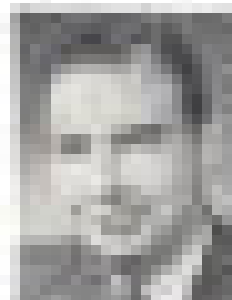


ULTRA MINIATURE

by ROBERT B. JOHNSON

For many years, the only way to make a miniature was to use a lathe or a mill. Now, a new process has been developed.



It's called "ultra-miniature" and it's the only way to make a miniature that's as small as a hair. It's called "ultra-miniature" and it's the only way to make a miniature that's as small as a hair.

I started my career as a mechanical engineer at a machine shop. But the work was boring. I wanted to do something more interesting. So I started my own company. I called it "ultra-miniature".

The first year, I made a few dollars. But the second year, I made a lot more. I was able to make things that were smaller than a hair. I was able to make things that were smaller than a hair.

The story of ultra-miniature

The first year, I made a few dollars. But the second year, I made a lot more. I was able to make things that were smaller than a hair. I was able to make things that were smaller than a hair.

The first year, I made a few dollars. But the second year, I made a lot more. I was able to make things that were smaller than a hair. I was able to make things that were smaller than a hair.

It was the first year. I made a few dollars. But the second year, I made a lot more. I was able to make things that were smaller than a hair. I was able to make things that were smaller than a hair.

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The products

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“It costs more to collect, transport, and store your waste than many other waste materials. The need to save after collection, even in a small city, is high.”

the 1990s, the U.S. has been unable to do so. In 1990, the United States was the only country in the world that had not signed the Convention. The United States has since signed the Convention, but it has not yet ratified it. This is because the Senate has not yet approved the Convention. The Senate has held several hearings on the Convention, but it has not yet reached a decision. The United States is currently a signatory to the Convention, but it is not a party to it. This means that the United States is not bound by the Convention's provisions, but it is still subject to its provisions. The United States is currently in the process of ratifying the Convention, but it is not yet a party to it.

The author declares that there are no potential conflicts of interest with respect to the publication of this article.

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1. The first step is to identify the problem. This involves understanding the current situation and the goals that need to be achieved.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
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THESE STUDIES HAVE BEEN CONDUCTED IN THE UNITED STATES AND IN OTHER COUNTRIES. THE RESULTS HAVE BEEN CONSISTENTLY POSITIVE. THE STUDIES HAVE BEEN CONDUCTED IN THE UNITED STATES AND IN OTHER COUNTRIES. THE RESULTS HAVE BEEN CONSISTENTLY POSITIVE.



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The sales staffs, the two divisions, are also responsible for the sales of the company's products. The sales staffs are responsible for the sales of the company's products. The sales staffs are responsible for the sales of the company's products.

Further, the authors note that the results of the study suggest that the use of a single, standardized measure of social support may not be sufficient to capture the complexity of social support in the workplace. They suggest that future research should explore the use of multiple measures of social support, as well as the role of social support in the workplace.

The first part of the book is a historical overview of the development of the field of international law. It begins with a discussion of the early foundations of international law, including the work of Hugo Grotius and the emergence of the concept of state sovereignty. The author then traces the evolution of international law through the centuries, highlighting key events and figures that shaped the modern system. This historical context is essential for understanding the current state of international law and the challenges it faces.

The second part of the book focuses on the contemporary challenges facing international law. The author discusses the impact of globalization on international law, the rise of transnational corporations, and the challenges posed by international terrorism. He also examines the role of international law in the context of human rights and environmental protection. The author argues that international law must evolve to meet the challenges of the 21st century and that a new paradigm is needed to address the complex issues of the globalized world.

The third part of the book is a critical analysis of the current state of international law. The author examines the effectiveness of international law in resolving international disputes and the role of international organizations. He also discusses the challenges of enforcing international law and the need for a more robust system of international law. The author concludes by offering his own vision for the future of international law and the role of the international community in promoting a more just and peaceful world.

This book is a valuable contribution to the field of international law and is highly recommended for scholars, students, and anyone interested in the future of the world. It provides a comprehensive overview of the field and offers a critical analysis of the current state of international law. The author's insights and proposals are thought-provoking and provide a clear vision for the future of international law.



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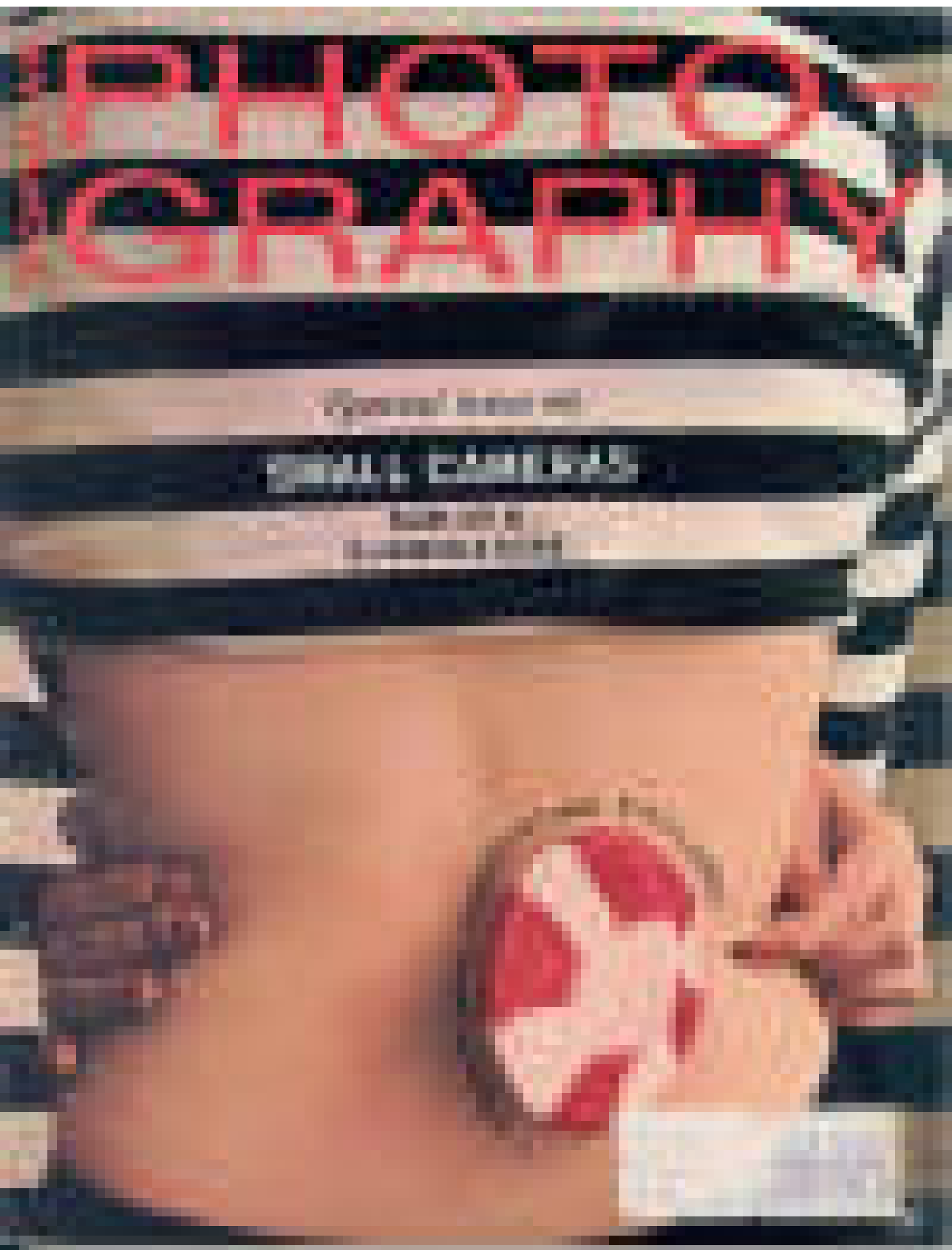


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The following table shows the results of the regression analysis for the dependent variable "Number of children in the household" (N = 1,000). The independent variables are "Age of the head of household" and "Gender of the head of household". The results are presented in the following table:

Variable	Coefficient	Standard Error	t-statistic	p-value
Age of the head of household	0.001	0.001	1.00	0.316
Gender of the head of household	0.001	0.001	1.00	0.316
Constant	1.000	0.000	1.00	0.316

The results show that the coefficient for "Age of the head of household" is 0.001, with a standard error of 0.001 and a t-statistic of 1.00. The p-value is 0.316, which is greater than the 0.05 significance level. Therefore, we fail to reject the null hypothesis that the coefficient is equal to zero.

The coefficient for "Gender of the head of household" is also 0.001, with a standard error of 0.001 and a t-statistic of 1.00. The p-value is 0.316, which is greater than the 0.05 significance level. Therefore, we fail to reject the null hypothesis that the coefficient is equal to zero.

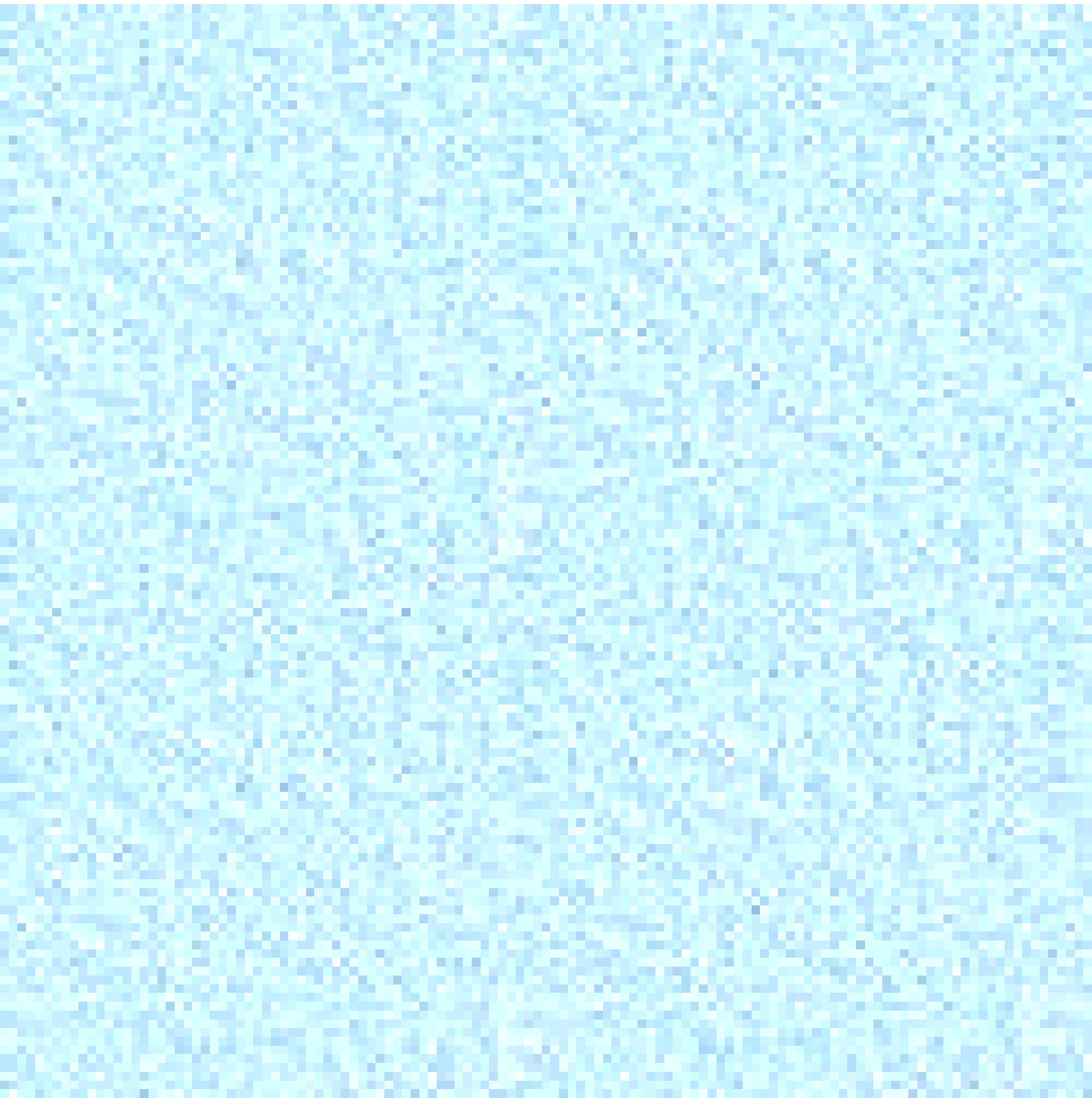
The constant term is 1.000, with a standard error of 0.000 and a t-statistic of 1.00. The p-value is 0.316, which is greater than the 0.05 significance level. Therefore, we fail to reject the null hypothesis that the constant is equal to zero.

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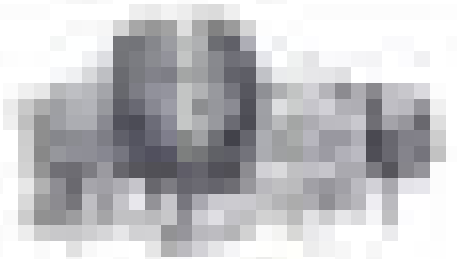
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 165. **Diagrams**
 166. **Charts**
 167. **Graphs**
 168. **Tables**
 169. **Figures**
 170. **Equations**
 171. **Formulas**
 172. **Diagrams**
 173. **Charts**
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 175. **Tables**
 176. **Figures**
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 182. **Tables**
 183. **Figures**
 184. **Equations**
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 187. **Charts**
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 189. **Tables**
 190. **Figures**
 191. **Equations**
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 193. **Diagrams**
 194. **Charts**
 195. **Graphs**
 196. **Tables**
 197. **Figures**
 198. **Equations**
 199. **Formulas**
 200. **Diagrams**
 201. **Charts**
 202. **Graphs**
 203. **Tables**
 204. **Figures**
 205. **Equations**
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 207. **Diagrams**
 208. **Charts**
 209. **Graphs**
 210. **Tables**
 211. **Figures**
 212. **Equations**
 213. **Formulas**
 214. **Diagrams**
 215. **Charts**
 216. **Graphs**
 217. **Tables**
 218. **Figures**
 219. **Equations**
 220. **Formulas**
 221. **Diagrams**
 222. **Charts**
 223. **Graphs**
 224. **Tables**
 225. **Figures**
 226. **Equations**
 227. **Formulas**
 228. **Diagrams**
 229. **Charts**
 230. **Graphs**
 231. **Tables**
 232. **Figures**
 233. **Equations**
 234. **Formulas**
 235. **Diagrams**
 236. **Charts**
 237. **Graphs**
 238. **Tables**
 239. **Figures**
 240. **Equations**
 241. **Formulas**
 242. **Diagrams**
 243. **Charts**
 244. **Graphs**
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 248. **Formulas**
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 250. **Charts**
 251. **Graphs**
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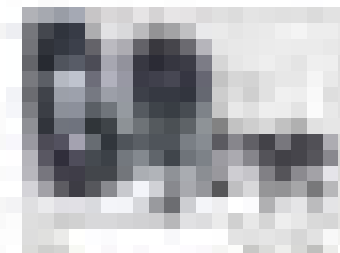
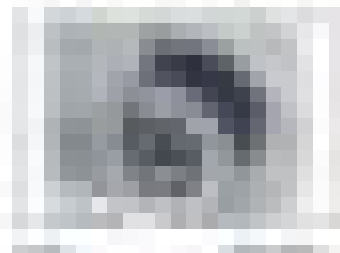
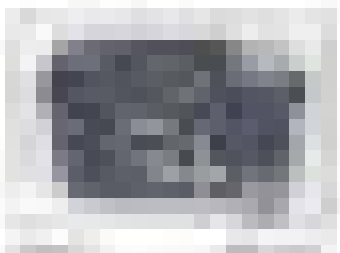
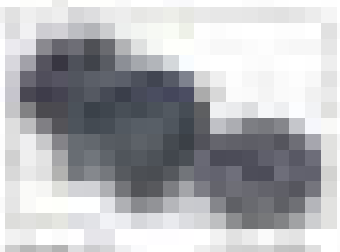
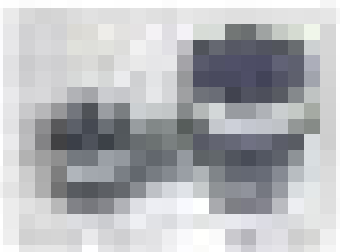
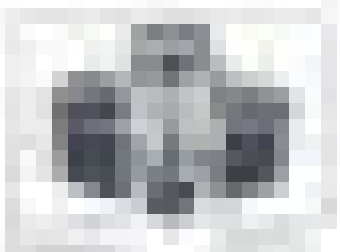


CORNWALL

For more information on the
Cornwall region, visit
www.cornwall.gov.uk

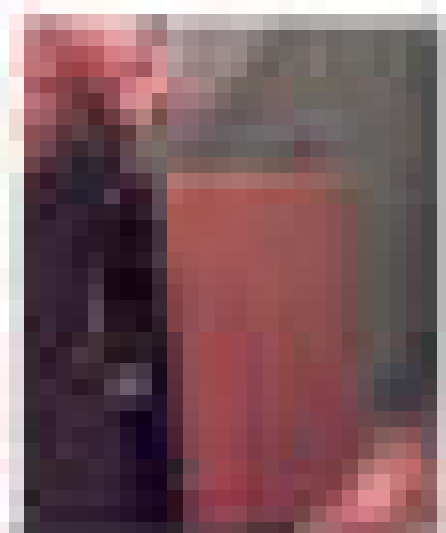
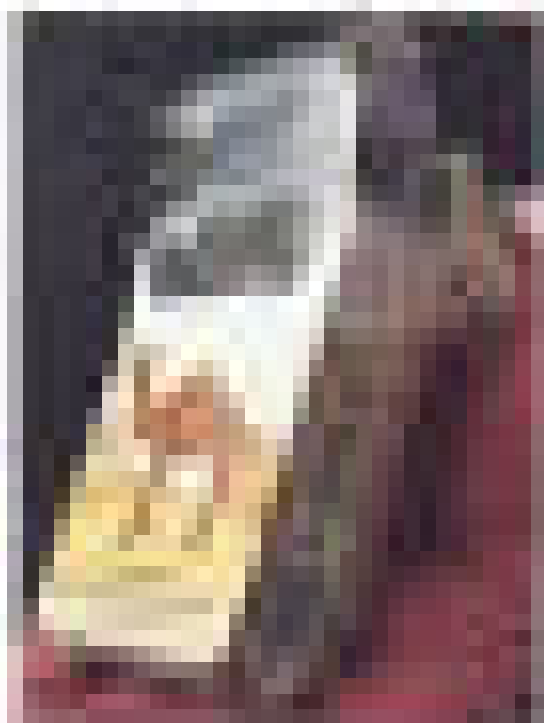
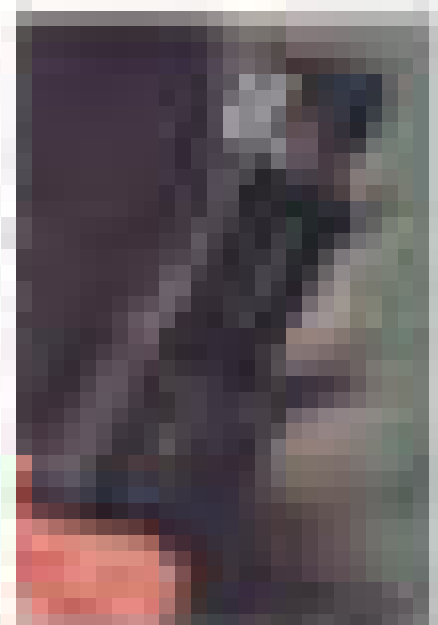


The Cornwall region is a beautiful area with a rich history and culture. It is home to some of the most stunning landscapes in the UK, from the rugged cliffs of the Lizard to the sandy beaches of the south coast. The region is also known for its vibrant arts and crafts scene, with many talented artists and designers based here. Whether you are looking for a peaceful retreat or a bustling city, Cornwall has something for everyone.

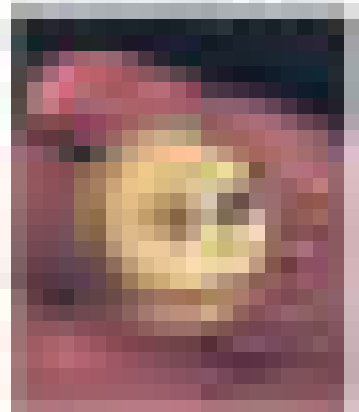
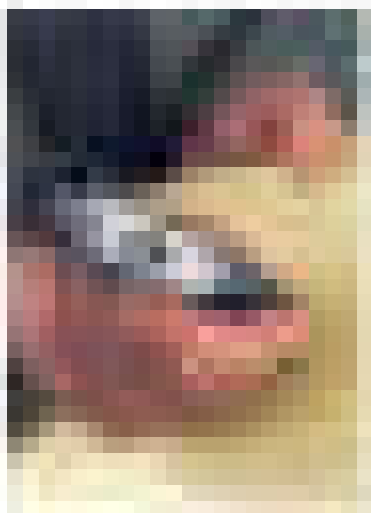
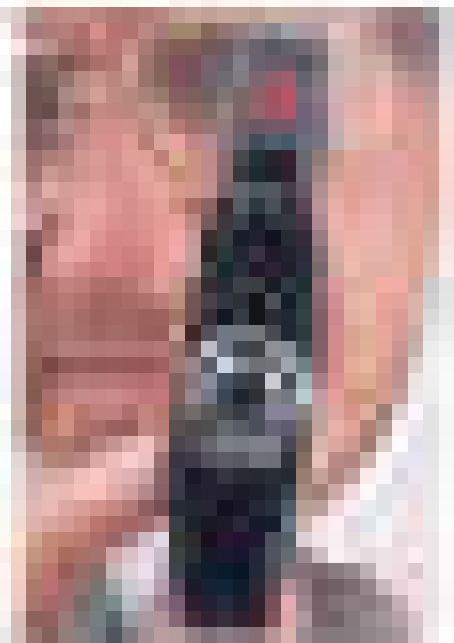
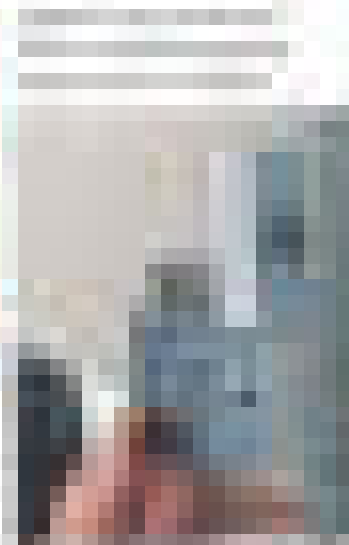
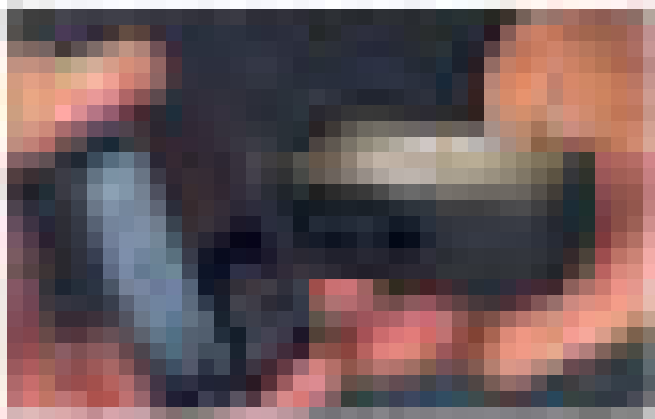


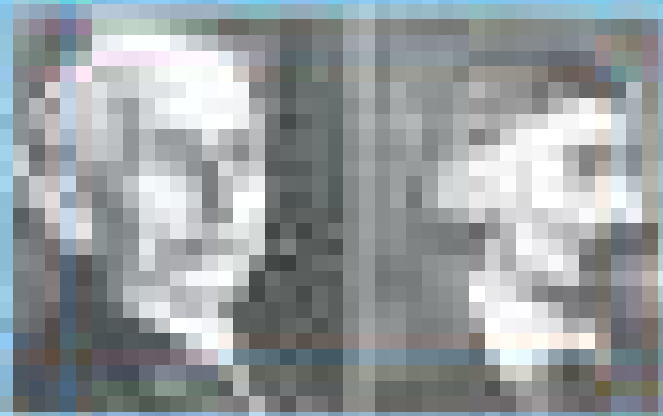
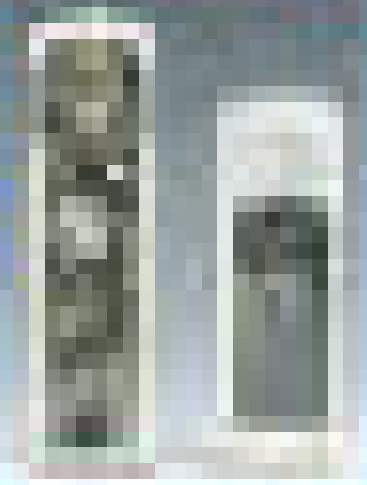
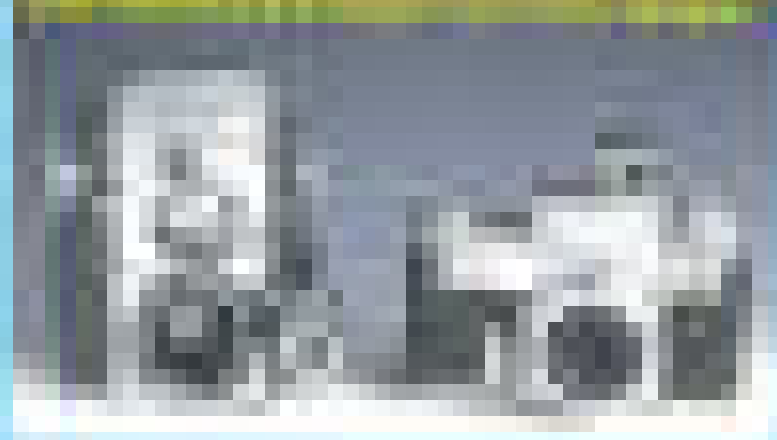
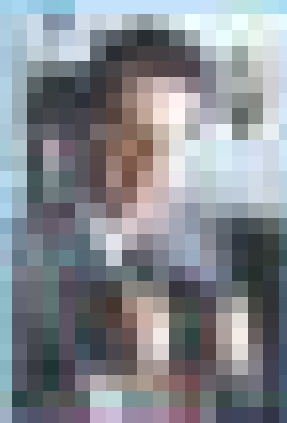
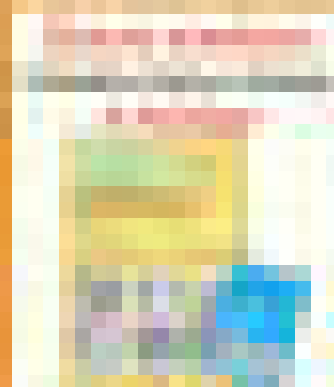


The traditional High Street photo development lab is under threat



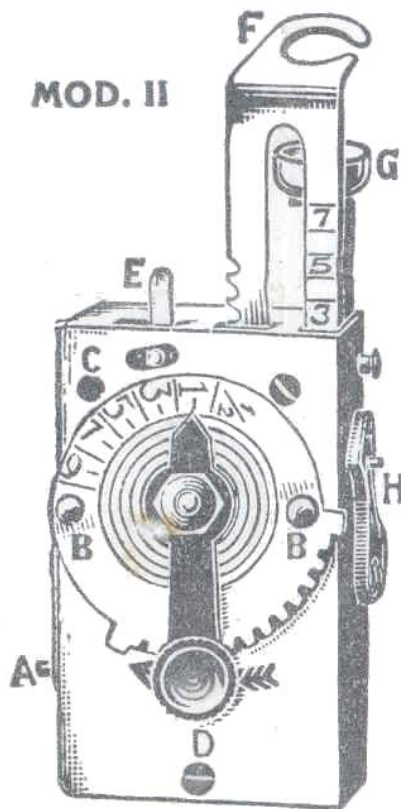
Section 1: Introduction





Gebrauchsanweisung für den

HAKA-AUTOKNIPS Mod. II



Werk an beiden Knöpfen **B** in Pfeilrichtung bis zum Anschlag **C** aufziehen.

Bei Zeitaufnahmen den Sekundenzeiger **D** durch leichtes Anheben auf die gewünschte Sekundenzeit einstellen. Der Objektivverschluß muß hierbei auf **B** stehen.

Hebel **E** zur Seite drücken und die Zahnstange **F** ganz herausziehen.

Stößel **G** in das Gehäuse drücken, bis derselbe in den seitlichen Schnabelhebel **H** einschnappt. Autoknips an den Drahtauslöser hängen und Zahnstange **F** so weit wieder zurückdrücken, bis dieselbe in den zweiten Zahn einschnappt.

Sollte der Autoknips so den Verschluß nicht auslösen, so läßt man die Zahnstange **F** in den nächsten 3. oder 4. Zahn einschnappen. Man merke sich diejenige Zahl resp. Stellung der Zahnstange, mit welcher der Verschluß am besten auslöst, und benutze diese Zahl resp. Stellung der Zahnstange ein für allemal.

Nachdem der Apparat aufnahmebereit ist, stelle man den Abstellhebel **A** nach hinten und setze so das Autoknipswerk in Bewegung.

Bei Momentaufnahmen stelle man den Objektivverschluß auf **M** resp. auf $\frac{1}{25}$, $\frac{1}{50}$, $\frac{1}{100}$ usw. und verfähre weiter, wie oben beschrieben, nur muß der Autoknips-Sekundenzeiger **D** ein für allemal bei Momentaufnahmen auf 1 Sekunde stehen. Diese Einstellung ist zwar belanglos und soll hierdurch nur der Verschluß nach 1 Sekunde wieder freigegeben werden.

Nach der Auslösung nehme man den Autoknips von dem Drahtauslöser wieder ab, drehe das Werk etwas auf, stelle das Gehwerk ab und drücke die Zahnstange in das Gehäuse hinein.

Der Autoknips soll während der Aufnahme mit dem seitlich angebrachten Bindfaden an irgendeinem vorstehenden Teil am Laufboden des Apparates aufgehängt werden, damit der Drahtauslöser nicht so geknickt wird. Für ein richtiges Funktionieren ist dieses von Wichtigkeit.

Sollte trotz der soliden Arbeit einmal eine kleine Reparatur notwendig sein, so bitten wir, uns den Autoknips zwecks Instandsetzung nach hier zu senden und nicht erst von unkundiger Hand auseinandernehmen zu lassen.

KLAPPROTT & LAMPE

Autoknipsfabrik

HAMBURG-RAHLSTEDT · AM HEGEN 17

Gebrauchsanweisung für den „HAKA=AUTOKNIPS“

D. R. P.

r. 391579



Werk an beiden Knöpfen **B** in Pfeilrichtung bis zum Anschlag **C** aufziehen.

Bei Zeitaufnahmen den Sekundenzeiger **D** durch leichtes Anheben auf die gewünschte Sekundenzeit einstellen. Der Objektivverschluß muß hierbei auf **B** stehen.

Hebel **E** zur Seite drücken und die Zahnstange **F** ganz herausziehen.

Stößel **G** in das Gehäuse drücken, bis derselbe in den seitlichen Schnabelhebel **H** einschnappt.

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HEINR. KLAPPROTT, Hamburg 25, Bürgerweide 62
Autoknipsfabrik

Torche-éclair EMOLUX pour lampes AG 1

Mode d'emploi

- Presser sur le bouton inférieur et retirer le boîtier.
- Introduire la pile (15 V) pol + vers le haut, remettre le boîtier.
- Glisser la torche dans la glissière de l'appareil. Relier le cordon électrique de la torche à l'appareil.
- Fixer la lampe-éclair et faire sortir le réflecteur.

L'appareil est prêt à fonctionner

La lampe-éclair est éjectée automatiquement en faisant glisser le réflecteur dans le boîtier.

Important: n'acheter que des piles fraîches. Chaque pile permet plusieurs centaines d'éclairs et dure plus qu'une année.

La torche-éclair EMOLUX s'adapte à n'importe quel appareil, depuis le simple BOX jusqu'au LEICA.

Avant la prise de vue, jeter un coup d'œil sur la table ci-contre.

Les lampes AG 1 s'emploient avec les films noir-blanc et les films en couleurs négatifs. Pour les films couleurs réversibles employer les lampes AG 1 B (bleues).

Tabelle d'exposition

Attention: fixer le contacteur sur "M"

Diaphragme	Sensibilité du film en DIN					
	11-13	14-16	17-19	20-22	23-25	26-28
2	6-9 m	8-13 m	12-19 m	16-26 m	24-38 m	32-54 m
2,8	4-6,5 m	6-9 m	8-13 m	12-19 m	16-26 m	24-38 m
4	2,8-4,8 m	4-6,5 m	6-9 m	8-13 m	12-19 m	16-26 m
5,6	2-3,5 m	2,8-4,8 m	4-6,5 m	6-9 m	8-13 m	12-19 m
8	1,5-2,5 m	2-3,5 m	2,8-4,8 m	4-6,5 m	6-9 m	8-13 m
11	1-1,7 m	1,5-2,5 m	2-3,5 m	2,8-4,8 m	4-6,5 m	6-9 m
16	0,7-1,3 m	1-1,7 m	1,5-2,5 m	2-3,5 m	2,8-4,8 m	4-6,5 m
22	-	0,7-1,3 m	1-1,7 m	1,5-2,5 m	2-3,5 m	2,8-4,8 m
Nombre-guide	16	22	34	45	62	85

☐ pour appareils BOX

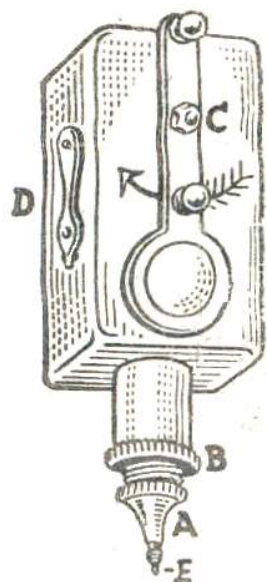
Lors de l'emploi de films couleurs (réversible) ouvrir le diaphragme d'un degré.

Exemple: distance du sujet 5 m film 15/10 DIN, ouverture du diaphragme 2,8 au lieu de 4.

EMO-ELEKTRONIK Arthur Seibert & Co., Wetzlar, Allemagne

Gebrauchsanweisung für den

AUTOKNIPS · MODELL IV



1. Das Werk mit dem Aufzughebel C bis zum Anschlag aufziehen und durch den kleinen an der Schmalseite befindlichen Hebel D abstellen.
2. Den Autoknips mit dem Gewindeansatz A in das für den Drahtauslöser vorgesehene Gewinde am Foto-Apparat einschrauben und zwar so, daß der Aufziehhebel C mit der roten Scheibe nach vorne zeigt.
3. Verschuß des Foto-Apparates spannen, Selbstauslöser-Werk durch Verschieben des Abstellzeigers D nach hinten in Gang setzen und sich in die Gruppe begeben.
4. Da die für die Auslösung erforderliche Länge des Auslösestiftes E bei jedem Foto-Apparat verschieden ist, ist bei diesem Modell eine mit Feingewinde versehene Kappe A vorgesehen, wodurch die Wirkung des Auslösestiftes, die normal 5 mm beträgt, um 5 mm vergrößert werden kann. Es ist also erforderlich, den Autoknips für den eigenen Foto-Apparat passend einzustellen.

Zunächst empfehlen wir, den Autoknips so wie vorstehend beschrieben in den Foto-Apparat einzuschrauben, wie er von uns geliefert wird. Sollte die Auslösung bei dieser Einstellung nicht erfolgen, so ist der Gewindestutzen A, nachdem die Rändelmutter B gelöst wurde, weiter hineinzudrehen und durch die Rändelmutter B wieder festzusetzen. Der Gewindestutzen ist so weit hineinzudrehen, bis die Auslösung erfolgt. Bleibt die rote Signalscheibe während der Auslösung stehen, so ist der Gewindestutzen schon zu weit eingedreht worden.

Der Autoknips ist richtig eingestellt, wenn die Auslösung erfolgt und die Signalscheibe dann bis zum Anschlag weiterläuft.

Für eine neue Aufnahme kann der Autoknips jetzt wieder aufgezogen werden. Er braucht dafür nicht erst aus dem Foto-Apparat ausgeschraubt zu werden. Bei der Konstruktion unseres neuen Autoknips Modell IV haben wir uns im wesentlichen nach der Masse der im Handel befindlichen Foto-Apparate gerichtet. Es ist uns bekannt, daß bei einigen Foto-Apparaten, wie z. B. Akarette, Isolette neu usw. der Auslösestift E unseres Modell IV selbst bei kürzester Einstellung noch zu lang ist. In diesen Fällen bitten wir, von dem Auslösestift E mit einer Beißzange etwa 2 mm abzukneifen. Dadurch wird auch in diesen Fällen eine einwandfreie Auslösung erreicht.

Sollte trotz der soliden Arbeit einmal eine kleine Reparatur notwendig sein, so bitten wir, uns den Autoknips zwecks Instandsetzung nach hier einzusenden.

KLAPPROTT & LAMPE

Autoknipsfabrik

HAMBURG-RAHLSTEDT, AM HEGEN 17

EMOLUX – lampeggiatore per lampadine al magnesio AG 1

Istruzioni per l'uso:

- premere, sul dorso del lampeggiatore, il bottoncino inferiore ed alzare l'involucro esterno.
- posare, tra le due molle, una batteria di 15 V osservando l'esatta posizione del polo +, rimettere quindi l'involucro al suo posto.
- inserire la spina del cavo del lampeggiatore EMOLUX nella contropina dell'apparecchio fotografico.
- innestare la lampadina AG 1 nell'apposito incastro del lampeggiatore EMOLUX ed alzare il riflettore.

La Vostra macchina fotografica è così pronta per la fotografia al magnesio.

Abbassando il riflettore la lampadina viene automaticamente espulsa, ciò che evita toccarla ed elimina noiose scottature.

Importantissimo: comperate batterie fresche che vi permetteranno d'eseguire per più di un anno centinaia di fotografie al magnesio.

Il lampeggiatore EMOLUX può essere applicato a qualsiasi apparecchio fotografico e permette di fotografare sia con pellicole bianco-nere, sia con pellicole a colori.

Per le pellicole invertibili è consigliabile l'uso delle lampadine AG 1 B.

Tabella d'esposizione

$1/25 - 1/80$ Sec.

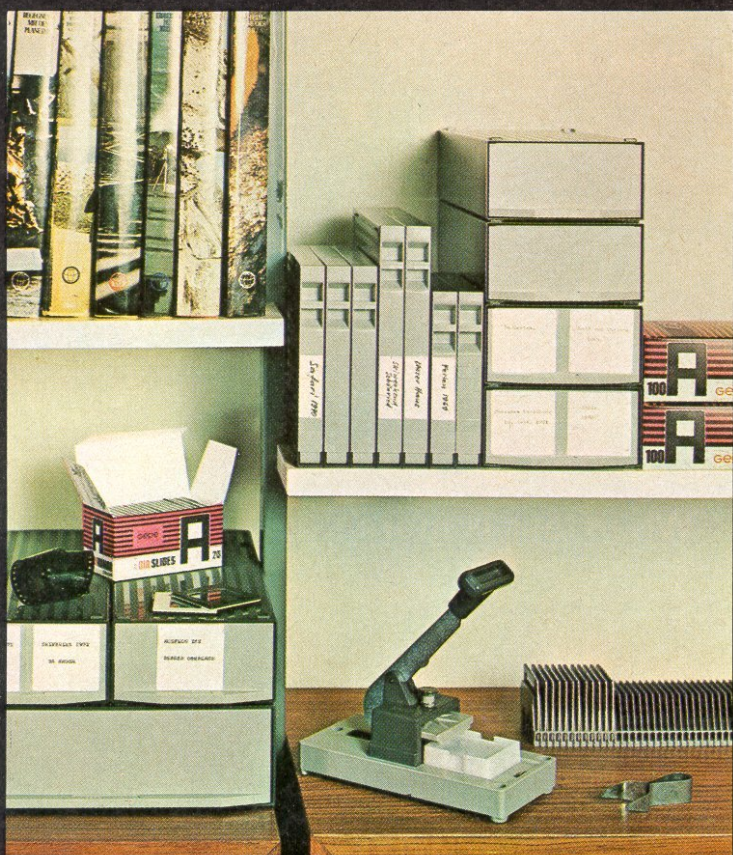
diaframma	sensibilità del film in DIN					
	11-13	14-16	17-19	20-22	23-25	26-28
2	6-9 m	8-13 m	12-19 m	16-26 m	24-38 m	32-54 m
2,8	4-6,5 m	6-9 m	8-13 m	12-19 m	16-26 m	24-38 m
4	2,8-4,8 m	4-6,5 m	6-9 m	8-13 m	12-19 m	16-26 m
5,6	2-3,5 m	2,8-4,8 m	4-6,5 m	6-9 m	8-13 m	12-19 m
8	1,5-2,5 m	2-3,5 m	2,8-4,8 m	4-6,5 m	6-9 m	8-13 m
11	1-1,7 m	1,5-2,5 m	2-3,5 m	2,8-4,8 m	4-6,5 m	6-9 m
16	0,7-1,3 m	1-1,7 m	1,5-2,5 m	2-3,5 m	2,8-4,8 m	4-6,5 m
22	—	0,7-1,3 m	1-1,7 m	1,5-2,5 m	2-3,5 m	2,8-4,8 m
numero guida	16	22	34	45	62	85

☐ per semplici camere box

Usando dei films ad inversione bisogna aumentare da una a due volte il valore del diaframma.

Per esempio: distanza della fotografia 4 m, film 13/10 DIN, invece del diaframma 5,6 usare il diaframma 4 oppure 2,8.

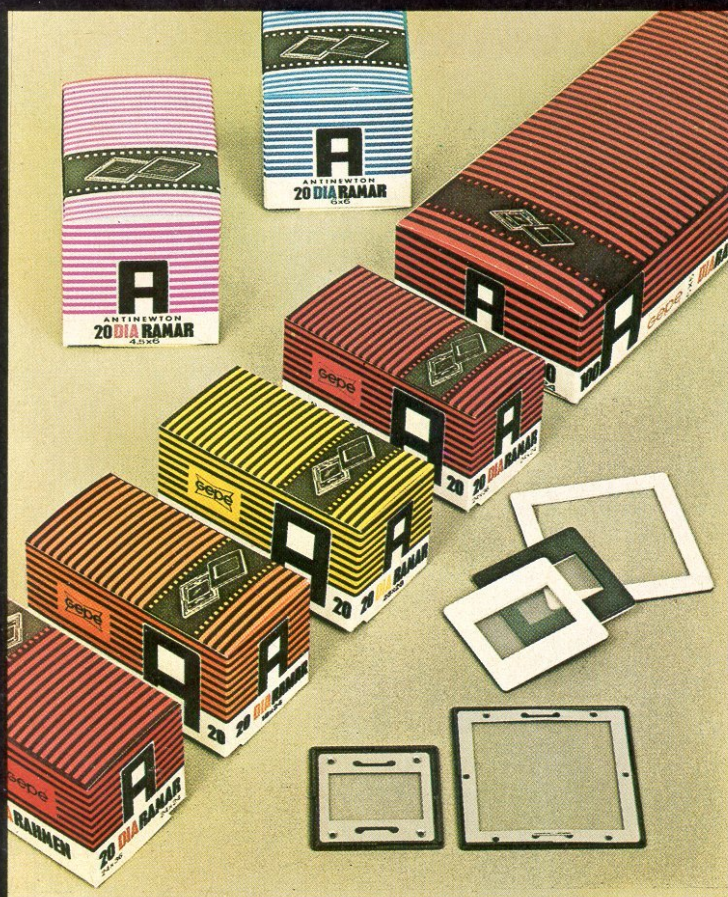
EMO-ELEKTRONIK Arthur Seibert & Co., Wetzlar, Germania



Gepe
SYSTEM

**15 Ways
to Improve Your Slide
and Movie Show**

Production: AB BIWEX Götene/Schweden, BIWEX NV Tilburg/Holland
Export-Office: GEPE Produkte AG Zug/Schweiz



GEPE A-Side Binders

24 x 36/24 x 24/20
 24 x 36/24 x 24/100
 24 x 36/24 x 24/1000 Industry
 18 x 24/20
 28 x 28/20
 45 x 60/20 one Anti Newton Glass
 60 x 60/20 one Anti Newton Glass
 54 x 68/10 one Anti Newton Glass

An introduction to the GEPE System:

This system is based upon a line of internationally famous and time tested specialized photographic products, specifically designed to assist you in successfully solving your slide and movie projection problems.

The following 15 easy steps will open the way to more enjoyable slide and movie shows:

Step 1: GEPE A-Slide-Binders

These special glass slide binders of 3 mm thickness (a European Standard) are made of heat resistant plastic material and feature preassembled glass plates and metal masks. In conjunction with a unique ventilation system, they counteract the formation of annoying Newton-Rings and ensure razor sharp, fuzz-free borders of the projected image. Transparencies are easily mounted into the binders, protecting them against dust, dirt and finger marks and are just as easily removed for reuse of the binders. (Also see steps 9 and 10.) For formats of 35 mm and larger, slide mounts with Anti-Newton-Glass are optionally available.

GEPE Slide Binders, like all quality binders, are composed of a light and a dark half. The light half must always face the projection lamp as its reflecting properties prevent a heat build-up on the binder. With the dark side of the binder facing the lens, undesirable internal reflections are minimized. (Not available in the United States, where only Super Thin Mounts – see Steps 4 and 5 – are marketed.)

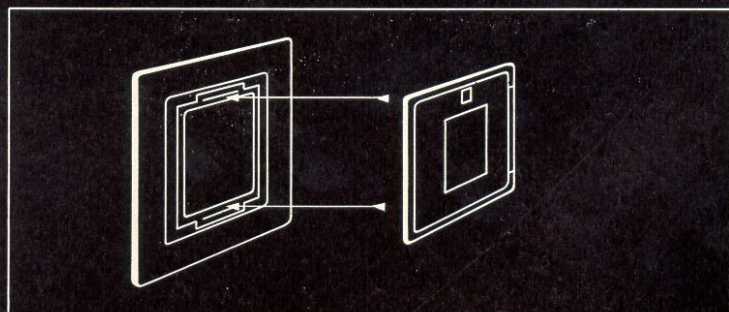
Step 2: Judicial Cropping

This is very important. Eliminate distracting parts of your transparency by covering them with masking tape. GEPE 35 mm Slide binders, by the way, make instant cropping down to 24 x 24 mm easy by joining the two slide halves cross-wise. The built-in metal mask furthermore facilitates centering or otherwise adjusting the transparency at will.



GEPE Super Thin Glassless Slide Binders

24 x 36/100
18 x 24/100
50 x 50/50 Adapter 110



Step 6: GEPE Super Thin Glassless Slide Mounts

Whenever you can do without the special protection offered by the glass slide binder, we suggest the use of the super thin glassless plastic slide binders. They also consist of a light and a dark half. For greater speed and convenience in mounting, a GEPE Hand Mounting Press is available, as described further in step 10. The particular design of this slide binder prevents the film from popping due to the influence of heat during projection.

Step 7: Projecting 2 pictures side by side

This type of projection is becoming increasingly popular. Instead of using two projectors for this purpose, a specially designed GEPE slide binder $2 \times 18 \times 24$ permits projecting 2 pictures 18×24 mm (half frame) with a single projector. Another special slide binder, the AV 24×36 plus 10×36 lets you show a full 35 mm frame plus a title or caption.

Step 8: The advantage of using a projector stand

The projector should always be placed upright (not tilted) in dead center of the screen to avoid distortion of the projected image. This is particularly important when projecting at a relatively short distance. A projector stand facilitates the correct positioning of the projector at the proper height and serves at the same time as a secure and solid base.



GEPE Hand-Mounting-Press
with illuminated base including tweezers less battery
GEPE Mounting-Tweezers

Step 9: GEPE Slide Mounting Tweezers

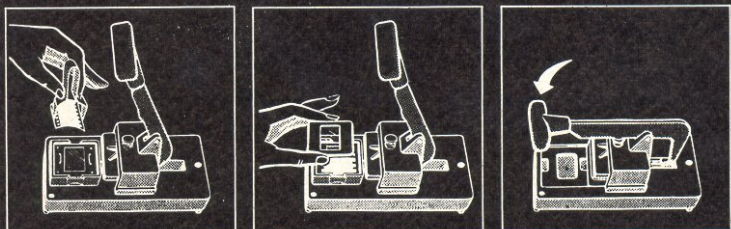
The tweezers are specially designed to facilitate and speed up the mounting operation and make it possible to insert the transparency into the mask of the binder in one single and quick operation, thereby avoiding annoying finger marks on the film which are so difficult to remove.

Step 10: GEPE Hand Mounting Press

Pressing the two slide halves together, although an easy and simple matter, may prove tedious, especially if large quantities are involved. The GEPE Hand Mounting Press facilitates and greatly speeds up this operation. Simply place the white half of the binder on the illuminated mounting block. Insert the film into the mask by means of the tweezers (for correct positioning, see step 3) and place the dark half of the slide mount on top. Pressing down the lever handle locks both halves together effortlessly. No fuss, no bother without ever growing tired, even when mounting hundreds of transparencies at a time.

Step 11: The ideal Projection Screen

In order to obtain the greatest possible brightness and brilliance of the projected picture, a beaded projection screen should be used and the audience seated as close to the center of the screen as possible. When projecting in very wide rooms, silver or plastic screens give best results because of their greater angle of reflection.





GEPE Super Thin Glass Slide Binders

24 x 36/20
 24 x 36/20 Anti Newton
 24 x 36/1000 Industry
 18 x 24/20
 18 x 24 + 18 x 24/20
 28 x 28/20
 24 x 24/20
 14 x 21/20 Tessina
 12 x 17/20 Rollei etc.
 13 x 17/20 Pocket-Instamatic
 10 x 14/20 Minolta etc.
 8 x 11/20 Minox
 21 x 28/20 TV
 40 x 40/20 one Anti-Newton Glass
 28 x 40/20 Bantam one Anti-Newton Glass
 24 x 36 + 10 x 36/20 one Anti-Newton Glass

Step 3: Correct mounting of the transparency

With reversal film the picture will appear laterally correct when viewed through the glossy or back side of the film. The glossy side must, therefore, be placed on the white half of the binder with the picture being up-side-down. Remember, the white half must face the projection lamp when the slide mount is inserted into the projector or the slide tray. Transparencies made from negative films, however, will show a laterally correct picture when viewed through the matte (emulsion) side.

Step 4: GEPE Super Thin Glass Slide Binders

These super thin glass slide binders have basically the same features as the A-Binders described in Step 1. In addition to this, they are particularly suited for use in circular slide trays and are preferred whenever weight and volume are a consideration, as for instance when travelling.

Step 5: Protection of your valuable transparencies

Both types of GEPE Slide Binders are provided with cover glass to protect the transparency against dust, dirt, finger marks, or scratches. They furthermore ensure sharpness over the entire picture area, as the film cannot buckle or shift under the influence of heat during projection.

Step 12: Storing your transparencies

The GEPE European style Universal straight Slide trays of either 40 or 50 slide capacity, may be used in any European Type projector. Two trays are fitted into an attractive storage drawer supplied with index sheet and self adhesive label. The storage drawers are easily stacked – and may be combined with storage drawers for circular trays – to form a chest of drawers of any desired height.



GEPE Universal-Magazine for 40 dias, designed for: Agfa, Aldis, Leitz, Rollei, Zeiss, Voigtländer and other projectors

GEPE Universal-Magazine for 50 dias, designed for: as above

GEPE Archive-Box incl. 2 Universal-Magazines for 40 dias

GEPE Archive-Box incl. 2 Universal-Magazines for 50 dias

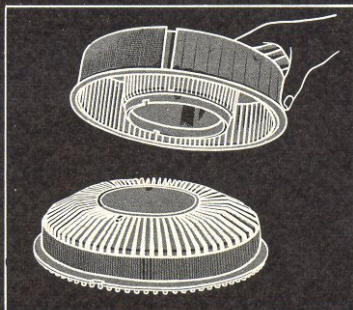
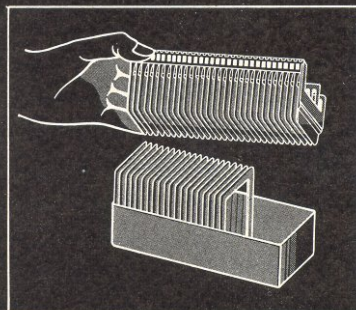


GEPE Transfer-Box 7 x 7 for 30 dias

GEPE Storage-Box Universal for Rotating-Magazines

GEPE Transfer-Box for Kodak Carousel-Magazines with cover

GEPE Storage-Box Universal incl. Transfer Box for Kodak Carousel-Magazines



Step 13: GEPE Transfer Trays

A GEPE Transfer Tray for the Kodak Carousel 80 Tray is also available in an attractive storage drawer, which may be stacked as well. These drawers also accept most circular slide trays on the market and may be stacked in combination with the other GEPE storage drawers (for slide trays of 40 or 50 slide capacity).

The GEPE Transfer Tray for 30 slides 70 x 70 mm (2 1/4 x 2 1/4") are supplied with a lid and thus serve as a dustproof storage tray as well.

Step 14: Adding Sound

It is very easy nowadays to add sound to a slide show and this greatly increases its effectiveness. All you need is an impulse device to be connected to the projector and a tape recorder.

Motion picture films to which sound is to be added should be taken at 24 frames per second. Films with a magnetic sound stripe must not be stored on steel projection reels.

NEW THE JOHNSON UNIVERSAL DEVELOPING TANK



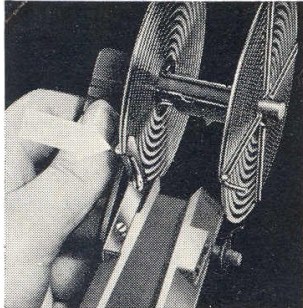
The UNIVERSAL is the result of many years' experience in the design and manufacture of developing tanks. Strongly made in black polystyrene, the UNIVERSAL has a specially designed lid which is easily replaced in the dark, and it's completely leak-proof even during inversion agitation. The lid has an unusually large filling funnel, too; it has a novel system of light-trapping which eliminates "spluttering" and gives easy pouring from any angle. The film holder will take any of three widths of film (120/620, 127 or 35 mm.), and is easily adjusted by means of white tubular plastic spacers which ensure that the spiral flanges are exactly parallel and correctly spaced. Together with the

Roto-Feed device, this makes film-loading exceptionally easy. A full 36-exposure length of 35 mm. film (or two 20-exposure lengths), two 120 or two 127 films can be developed at one time; the second exposure of colour reversal films can be carried out without removing the film.

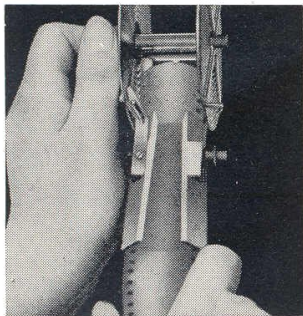
**See the UNIVERSAL for yourself.
It's at your dealer's now. 32/6**

JOHNSONS
OF HENDON LTD

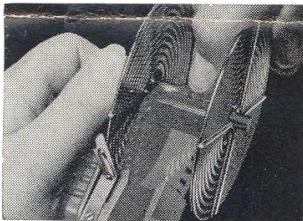
FOR CONFIDENCE IN PHOTOGRAPHY



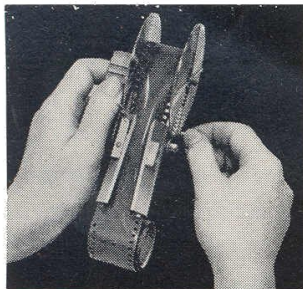
11. The white arrows on both pictures show this procedure. When correctly handled, film loader with guide and reel are now a tight unit. The right hand is now free.



12. Hold the film pretty near at its end and slide it into the film guide. Keep on sliding the film right into the center slot.



13. On turning the reel slowly clockwise press the film through the spike.



14. Keep on turning the reel until the film is entirely feeded.

15. Take the loaded reel off the shaft slide it back and check by fingertest according to points 6 + 7.

16. Put the correctly loaded reel into the developing tank and close with lid.

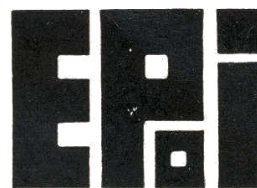
EHRENREICH PHOTO-OPTICAL INDUSTRIES INC
EXECUTIVE OFFICE / 623 STEWART AVENUE
GARDEN CITY N. Y. 11530

REELS 35 MM / 120 / 372

PRINTED IN GERMANY

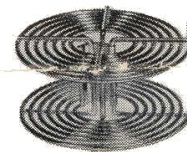
KINDERMANN Steel Reel Development

Instructions for Use



Feeding by hand
and with reel loader
for films **35** mm
and 110 film

Stainless steel film reels for 35 mm



23195

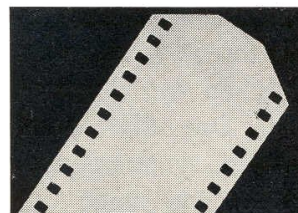


23196

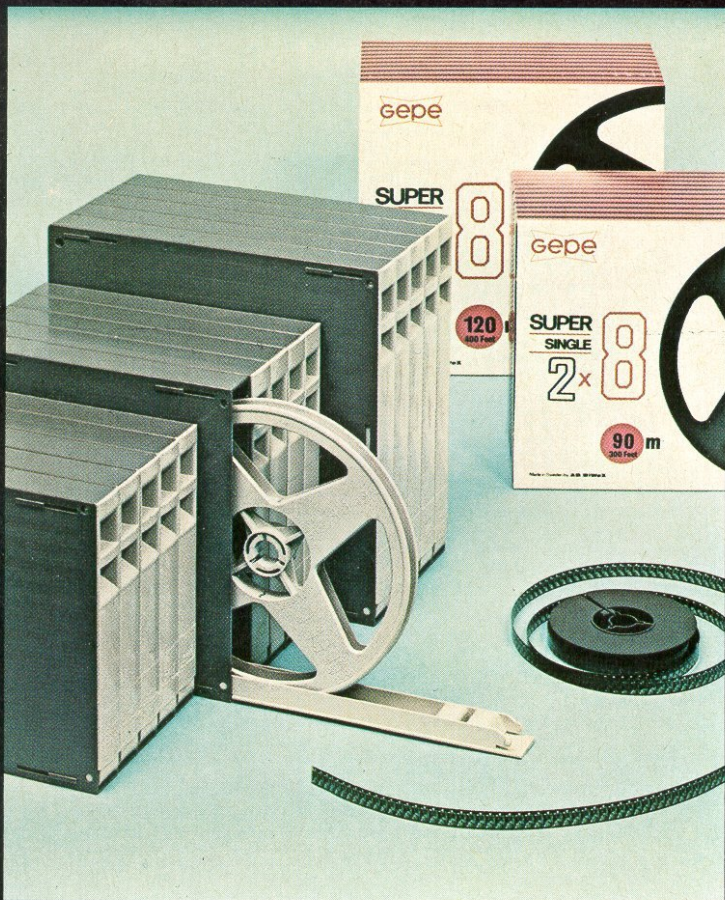
23195 films up to 100 cms

23196 films up to 160 cms

First practice loading the reel in daylight, using a discarded piece of film, in order to get the readiness to load the exposed film in the dark-room.



1. Cut-off „tongue“ and first few pairs of sprocket holes. Then snip-off a small wedge from each corner.



GEPE Reel and library style storage cassette for super 8 and 2 x 8

60 m – 200 ft
90 m – 300 ft
120 m – 400 ft

News:

200 ft Automatic Loading
300 ft Film Snap
400 ft Film Snap

Step 15: GEPE Movie Reels

Made of unbreakable, non-warping plastic material, these universal movie reels are designed for use with Super 8, Single 8 and Double 8 film and projectors. The reels are supplied in a practical library style cassette which snaps together to form an attractive film library. A self-adhesive label is included for identification of contents.

To protect your valuable film, always add a sufficiently long film leader and trailer, as the beginning and end of a film are usually subjected red base film (for trailer) as well as a black base film.

When less is more

As you do not want to bore your audience, but rather wish to entertain and inform, always bear this in mind: Experience has shown that a slide show should not comprise more than 200 slides to avoid tiring your audience.

Now go ahead and

Prepare Your Next Enjoyable and Successful Slide Show!



Author: G. Pettersson

Die Objektmessung

erfaßt das von der Aufnahmeszene reflektierte Licht. Das Diffusorrollo darf dabei die Lichteintrittsöffnung (9) nicht bedecken. Mit der Nocke (8) schieben Sie es gegebenenfalls zurück, damit die Lichteintrittsöffnung (9) ganz frei liegt.

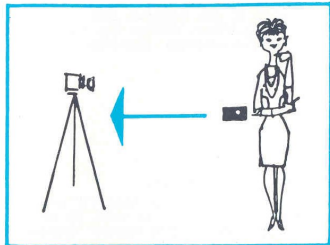
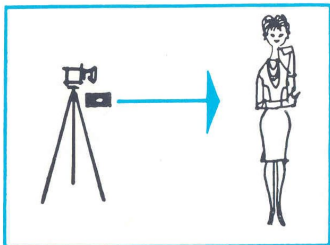
Messen Sie von der Kamera zum Objekt. Diese Meßmethode ist immer dann anzuwenden, wenn im Motiv helle oder dunkle Partien nicht stark überwiegen.

Die Lichtmessung

erfaßt das Licht, das die Szene beleuchtet. Im Gegensatz zur Objektmessung schieben Sie das Diffusor-Rollo mit der Nocke (8) ganz vor die Lichteintrittsöffnung. Messen Sie vom Objekt aus zur Kamera. Lesen Sie den angezeigten Skalenwert ab und ermitteln Sie die gewünschte Zeit-Blenden-Kombination, wie bereits beschrieben.

Die Lichtmessung liefert in allen Fällen zuverlässige Resultate.

Bei schwer zugänglichen Objekten führen Sie die Lichtmessung an einer Stelle aus, die die gleiche Beleuchtung erhält wie das zu fotografierende Objekt.



Reflected light measuring

This method accepts the light which is reflected from the scene or subject to be taken. Open the diffusor blind with the (8) and take care that the cell window (9) is not obstructed. With the blind in this position, the BISIX 2 is ready to measure according to the reflected light method and the meter should be directed towards the subject from the camera position. This is a good method of reading to adopt particularly when large areas of bright or dark tones are not included in the scene.

Incident light measuring

This method refers to readings taken from the light which illuminates the scene or subject. Contrary to the "reflected method" move the diffusor blind with the (8) entirely over the cell window. With the blind in this position, the BISIX 2 is adjusted for incident light measurement. The meter is directed from the subject towards the camera. Read now the indicated scale value and find out the most suitable speed/aperture combination as described already. Incident light measurements make possible accurate readings of inaccessible subjects when taken at a substitute point receiving the same illumination as the subject. It is also preferable to use incident readings when subjects contain large areas of either light or dark tones.

Lichtmeting

meten van het licht dat het motief verlicht. In tegenstelling tot bij objektmeting schuift U het diffusor rolletje (8) helemaal voor de lichtinlaatopening (9). Meet U vanaf het motief naar de camera. Leest de aangegeven schaalwaarde af en stelt U de gewenste tijd-diafragma-kombinatie vast zoals reeds werd beschreven. Lichtmeting geeft in alle gevallen betrouwbare resultaten. Bij moeilijk toegankelijke objecten kunt U lichtmeting uitvoeren vanaf een plaats, die dezelfde belichting heeft als het te fotograferen object.

Objektmeting

meten van het door het opnamemotief gereflecteerde licht. Schuift U het diffusor-rolletje (8) geheel open en let U erop dat de lichtinlaatopening (9) helemaal vrij is. Meet U vanaf de camera naar het motief. Deze meetmethode is steeds dan te gebruiken wanneer in het motief geen lichte of donkere partijen sterk domineren.

Falls Sie mehr über GOSSEN-Fotofachgeräte wissen möchten, schicken wir Ihnen gerne ausführliche Druckschriften zu.

GOSSEN GMBH D-8520 Erlangen

Änderungen vorbehalten
Printed in Germany

Beachten Sie bitte

Ihr GOSSEN-Belichtungsmesser ist ein fotoelektrisches Präzisionsgerät mit praktisch unbegrenzter Lebensdauer.

Sollten Sie dennoch einmal Veranlassung haben, Ihren BISIX 2 überprüfen zu lassen, so senden Sie ihn bitte direkt an

GOSSEN GMBH

Service-Stelle B
D-1000 Berlin 31
Wilhelmsaue 36

Geräte bitte ohne Zubehör wie Etui und Tragleine einsenden!

Printed in Germany

127310 deh

In case you should be interested in more details concerning GOSSEN special meters, we are of course gladly prepared to let you have detailed prospectus or leaflets.

GOSSEN GMBH

D-8520 Erlangen, West Germany
Modifications reserved
Printed in Germany

Additional Information

Your GOSSEN BISIX 2 exposure meter is a photo electric precision meter with unlimited life duration if treated with care. Should it become faulty, for any reason, do not try to repair it yourself. Return it immediately to the GOSSEN Agent in your country or

GOSSEN GMBH
D-8520 Erlangen, Nögelsbachstraße 25
West Germany
Telephone (09131) 827-1, Telex 629 845

Please send meters without accessories as case or carrying cord!

Let U s.v.p. op het volgende

Uw GOSSEN-belichtingsmeter is een fotoelektrisch precisie-apparaat met onbegrensde levensduur.

Zou U echter de behoefte hebben Uw BISIX 2 te laten controleren, dan kunt U deze opzenden aan de alleen-importeur voor Nederland J. P. VOS/CINEFOTO-IMPORT B.V.
Laan Copes v. Cattenburch 54
Den Haag telefoon 070-63 69 00

Apparaten zonder accessoires zoals lederetui en draagkoord insturen! Voor het geval U meer over GOSSEN-vakfotofotografie wilt weten, sturen wij U gaarne uitvoerige prospecti toe.

GOSSEN GMBH

Erlangen, W. Duitsland
Wijzigingen voorbehouden
Gedrukt in West-Duitsland.


GOSSEN

BISIX 2

Gebrauchsanleitung
Instructions
Gebruiksaanwijzing

7909-0124Y0

Garantie

Für die einwandfreie Funktion aller mechanischen und fotoelektrischen Bauteile übernehmen wir die volle Garantie für die Dauer eines Jahres.

Guarantee

We assume full guarantee for the duration of one year for the irreproachable functioning of all mechanical and photoelectrical components.

Garantie

Voor het juiste functioneren van alle mechanische en fotoelektrische delen geven wij de volle garantie gedurende één jaar.

INSTRUCTIONS FOR USING NIKOR #16 ROLL FILM TANK FOR 16mm x 40" FILM

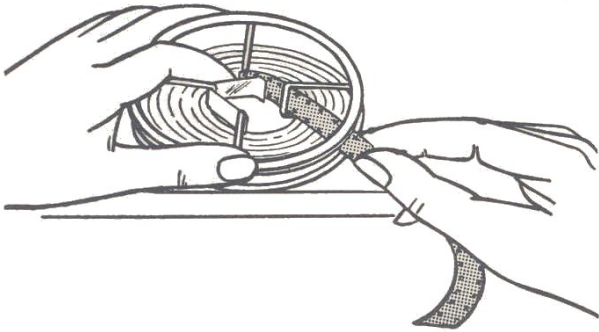


Figure 1

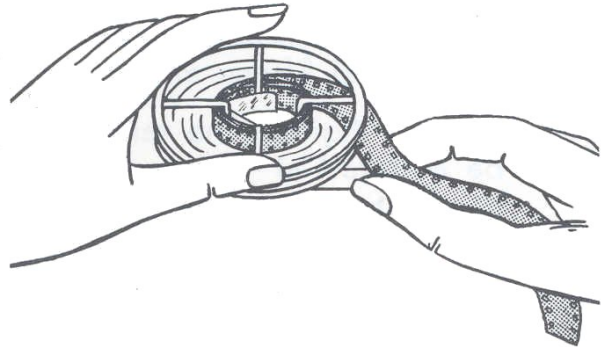


Figure 2

TO LOAD REEL

1. Place each reel flat on a table top and along one edge of the table, with open face of the reel **upward**, as in Fig. 1.
2. Insert finger of left hand in the open face and depress the spring clip, opening the end of the clip for insertion of film.
3. Holding film in right hand, over the edge of the table, insert end of film under the open clip and release the spring to close clip. (See Fig. 1.)

NOTE: Film **must** be inserted at an angle of 30° to 45° from vertical, so that it enters the spiral lower face of the reel "on the bias", with the **upper** film edge **outward** from the center of the reel.

4. Slowly turn the reel with the left hand, leaving the reel flat on table, and retaining the 30° to 45° entering angle of the film with the right hand. The film will wind onto the reel and will right itself into a vertical position inside the reel, as in Fig 2.

We strongly recommend a little practice in daylight with an exposed piece of film before attempting to load the reel in complete darkness.

TO DEVELOP

1. Place the loaded reels in the tank and put the cover on firmly.
2. Bright lights may now be turned on and the developer poured in through the large segment of the filler mouth. Tilt the tank while filling by placing the cap under one side, so that small segment of filler mouth, the air vent, is upward.
3. Place the cap over the filler mouth.
4. Shake gently and frequently during development and fixing.
5. Keep developer, wash water, and fixer as near the same temperature as possible.
6. Use high quality, fresh chemicals, thoroughly dissolved.
7. Keep all parts of the NIKOR clean.

over

Unseren Glückwunsch zu Ihrem neuen Belichtungsmesser BISIX 2, der Ihre Belichtungsprobleme zuverlässig und exakt lösen wird.

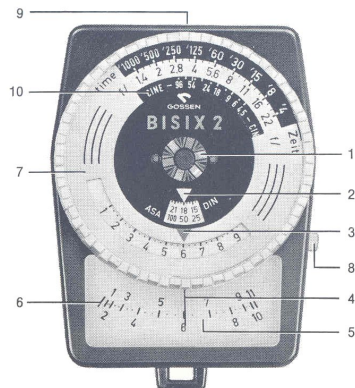
BISIX 2 stellt sich vor:

Ihr BISIX 2 kommt aus dem Hause GOSSEN, der Herstellerfirma der weltbekannten Belichtungsmesser

LUNASIX, SIXTAR, SIXON, SIXTOMAT, SIXTINO des Farbtemperaturmessers SIXTICOLOR des Blitz-Belichtungsmessers SIXTRON electronic des Vergrößerungsbelichtungsmessers LABOSIX

Es lohnt sich, diese ausführliche Gebrauchsanleitung zu lesen. Viel Vergnügen und viel Freude an Ihrem neuen Belichtungsmesser.

Ihre
GOSSEN GMBH
D 8520 Erlangen, Nägelsbachstraße 25



- | | |
|-----------------------|----------------------------|
| 1 Rändelknopf | 7 Rechenring |
| 2 weiße Dreiecksmarke | 8 Nocke für Diffusor-Rollo |
| 3 rote Dreiecksmarke | 9 Lichteintrittsöffnung |
| 4 Zeiger | 10 Cine-Gangzahlen |
| 5 Skalenwert | |
| 6 Nullmarke | |

Introduction

Congratulations on your choice of the BISIX 2 exposure meter — a product of the GOSSEN company who also manufacture the world famous LUNASIX, SIXTAR, SIXON, SIXTOMAT, SIXTINO exposure meters, the SIXTICOLOR colour temperature meter and SIXTRON electronic flash meter as well as the special LABOSIX enlarging exposure meter.

The BISIX 2 will solve all your exposure problems reliably and accurately. Read carefully through this instruction book to obtain the best from it.

Onze gelukwensen met Uw belichtingsmeter BISIX 2, die Uw belichtingsproblemen betrouwbaar en nauwkeurig zal oplossen.

BISIX 2 stelt zich voor:

Uw BISIX 2 komt van de firma GOSSEN, producent van de wereldbekende belichtingsmeters LUNASIX, SIXTAR, SIXON, SIXTOMAT, SIXTINO

van de kleurtemperatuurmeter SIXTICOLOR van de flitsbelichtingsmeter SIXTRON electronic van de belichtingsmeter voor vergrøtingsdoeleinden LABOSIX.

Het loont de moeite deze uitvoerige gebruiksaanwijzing te lezen. Veel genoegen en veel plezier met Uw nieuwe belichtingsmeter.

GOSSEN GMBH
Erlangen, West-Duitsland.

- | | |
|-------------------------|----------------------|
| 1 Central knurled knob | 7 setting ring |
| 2 white triangular mark | 8 diffuser blind |
| 3 red triangular mark | 9 cell window |
| 4 indicator needle | 10 cine speed values |
| 5 scale value | |
| 6 zero mark | |

Einstellen der Filmeempfindlichkeit

Drehen Sie den zentralen Rändelknopf (1), bis die Spitze der weißen Dreiecksmarke (2) auf die Filmeempfindlichkeit (DIN/ASA) des von Ihnen verwendeten Filmes zeigt.

Zur Messung

Jetzt bringen Sie Ihren BISIX 2 in Meßstellung und können wahlweise eine **Objektmessung** oder eine **Lichtmessung** vornehmen. (Für die Lichtmessung schieben Sie mit der Nocke (8) das Diffusorrollo vor die Lichteintrittsöffnung (9).)

Der Zeiger (4) deutet auf einen Skalenwert (5), den Sie auf den Rechenring (7) übertragen. Hierzu drehen Sie den Rechenring, bis gegenüber der roten Dreiecksmarke (3) der Wert erscheint, auf den der Zeiger deutet.

Nun stehen sich auf dem oberen Teil des Rechenrings (7) die richtigen Zeit- und Blendenwerte gegenüber. Wählen Sie die für Ihre Aufnahme zweckmäßige Zeit-Blenden-Kombination.

Setting the film speed

Put your BISIX 2 in measuring position and you can measure either reflected light or incident light.

Measuring

The indicator needle (4) is pointing to a scale value (5) which you should transfer to the setting ring (7). Turn the setting ring until opposite the red triangular mark (3) the value appears to which the indicator needle points.

The upper part of the setting ring (7) shows the relevant shutter speed/aperture values. Select the most suitable combination for your purposes.

Instellen van de filmgevoeligheid

Draait U de centrale kartelknop (1) tot de punt van het witte driehoeksteken (2) op de filmgevoeligheid (DIN/ASA) van de door U gebruikte film staat.

Metten

Uw BISIX 2 is direct gereed voor het meten naar keuze d.m.v. **objektmeting** of **lichtmeting**. De wijzer (4) geeft een schaalwaarde (5) aan, die U overbrengt op de rekenring (7) tot tegenover het rode driehoeksteken (3) de waarde verschijnt, die de wijzer (4) aangeeft. Nu staan op het bovenste deel van de rekenring (7) de juiste tijd- en diafragmawaarden tegenover elkaar. Kiest de voor U opname meest geschikte tijd-diafragma-kombinatie.

Beim Filmen

messen Sie in üblicher Weise. Die Blende lesen Sie über der Gangzahl (10) ab, die Sie auch an Ihrer Filmkamera eingestellt haben.

Bereitschaftsetui

Für den Schutz Ihres wertvollen Belichtungsmessers BISIX 2 hat Ihr Fachhändler ein Bereitschaftsetui. Bitte, fragen Sie ihn danach.

Nullpunktkontrolle

Der Zeiger (4) muß bei völlig verdunkelter Lichteintrittsöffnung (9) auf der Nullmarke (6) links am Skalenanfang stehen. Sollte dies einmal nicht zutreffen, drehen Sie die Nullstellschraube auf der Rückseite des BISIX 2, bis der Zeiger wieder genau auf der Nullmarke steht.

Cine readings

Read as usual the diaphragm above the cine speed values (10) which you have set at your camera.

Ever-ready case

For protecting your valuable exposure meter your photo dealer offers an ever-ready case upon request.

Zero point adjustment

When the cell (9) of your BISIX 2 is completely covered, the indicator needle (4) must stand at the zero mark (6) on the left side of the scale. If this is not the case, your meter can be adjusted by turning the zero-setting screw slightly at the rear side of the BISIX 2 until the indicator needle comes to rest exactly at the zero mark.

Bij het filmen

meet U op dezelfde manier. Het diafragma leest U af tegenover de filmbeeldsnelheid (10), waarop U ook Uw camera hebt ingesteld.

Etui

Voor het beschermen van Uw waardevolle BISIX 2 heeft Uw fotohandelaar een speciaal etui. Vraagt U hem s.v.p. hiernaar.

Nulpuntcontrole

Voor het controleren van de wijzerinstelling op het nulpunt dient de lichtinlaatopening (9) volledig te worden afgedekt en het diffusor rolluikje (8) gesloten te zijn. Nu moet de wijzer (4) op het nulpuntteken (6) links bij het begin van de schaalverdeling staan.

Indien dit niet het geval is, draait U dan aan de achterzijde de nulinstelschroef tot de wijzer weer precies op het nulpuntteken (6) staat.

- | | |
|-----------------------|-----------------------|
| 1 Kartelknop | 7 rekenring |
| 2 wit driehoeksteken | 8 diffusor rolluikje |
| 3 rood driehoeksteken | 9 lichtinlaatopening |
| 4 wijzer | 10 filmbeeldsnelheden |
| 5 schaalwaarde | |
| 6 nulteken | |

DEVELOPMENT PROCEDURE

Every photographer has his own methods of development. However, we have the following suggestions that will aid in securing perfect negatives.

1. When using freshly mixed solutions, particularly developer, let them stand fifteen minutes or longer to allow dissolved air to escape.

2. Agitate the tank moderately. We recommend that the tank be agitated at the start of development and fixing by inverting and gently shaking, repeating every two minutes.

3. After developing, fill and empty the tank several times with fresh water, then pour in the fixer.

4. Be sure to agitate the tank when fixing as gas bubbles often form when the acid fixer strikes the alkaline developer.

5. The internal temperature of the tank may be accurately controlled by placing it in a large pan of water, the temperature of which can be easily checked and maintained.

6. Let the water run vigorously into the reel when washing as a fast flow reduces washing time although this is not true of paper prints.

7. Wipe the surplus water from the films when drying. This can be done by hanging the film with a strong clip and drawing damp viscose sponges slowly down each side of the film.

8. Stainless steel does not ordinarily rust or tarnish even under severe conditions of photographic use. However, any deposit of dirt may be readily removed with "Bab-O" or "Bon Ami." An overnight soaking in a 25% solution of Nitric Acid will render the tank chemically clean. DO NOT use Hydrochloric or Sulphuric Acid.

9. When through developing, it is best to dry the tank before putting it away. Films are liable to stick the next time it is loaded if it is still wet. The reel may be dried by artificial heat if it is to be used immediately.

10. It is advisable, when using film that has been tightly wound in small cassettes, to load the film into the Reel emulsion side out. This prevents the possibility of two layers of film coming close together.

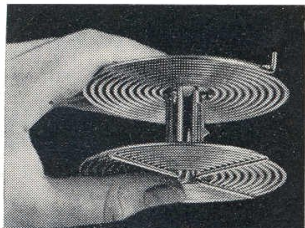
SOLUTION REQUIRED: To cover two #16 Reels: 8 oz.
To cover one #16 Reel: 5 oz.

Patented in U. S. A. and Great Britain. Other Patents Pending.

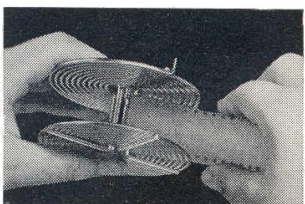
All NIKOR equipment is designed and made in the U. S. A.

It is fully guaranteed against defects.

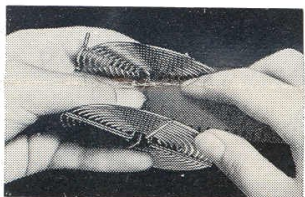
NIKOR PRODUCTS CO., INC.
WEST SPRINGFIELD, MASS., U.S.A. 01089



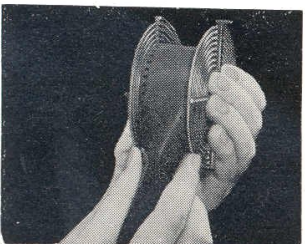
2. Hold the reel so in your left hand, that the center slot with the spike points to the right. The bent end of the spiral is at top.



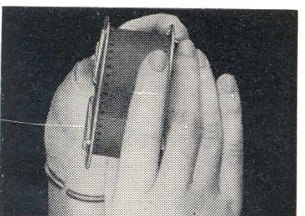
3. Bow film — emulsion side down — between thumb and index finger. Push it into center slot of reel.



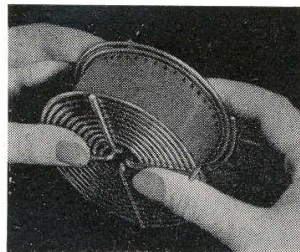
4. Press the film through the spike, turning the reel slightly counter-clockwise.



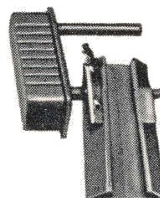
5. Keep on turning the reel slowly, guiding the film with your thumb and index finger. Both fingers rest against the outer spirals. Hold film always straight.



6. Has the film been entirely threaded into the reel, slide it back with thumb and index finger as far as possible. The film must be properly positioned between the reels.



7. Check by fingertest between both thumbs and index fingers: the film has been threaded correctly when it does not project above the windings.

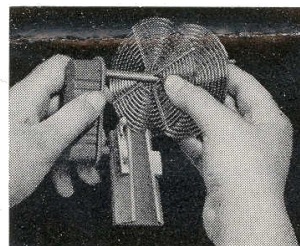


With a Filmloader

feeding of the film in the reel is faster, and much more simple.

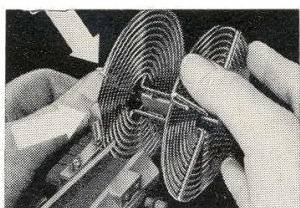
23220 **Film-Loader**
for films 35 mm.

Method of handling Film-Loaders

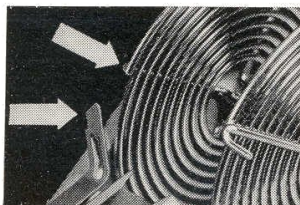


8. Hold film loader by the plastic handle in your left hand. Film guide points towards operator.

Slide film reel onto the loader's shaft, the bent crank handle points to the right.



9. Raise film guide between spirals of wire and turn reel counter-clockwise.



10. Turn the reel counter-clockwise until its end rests in the notch of the film guide's index.



SYSTEM 4

DEVELOPING TANKS

Made by Paterson Products Ltd. London England: Printed in England

Paterson Products are distributed throughout the world:

United Kingdom Rollei (U.K.) Ltd., Wellingborough, Northants

France SCOP, St. Antoine, Paris.

U.S.A. Braun North America, Cambridge, Mass. 02142.

Canada Braun Electric (Canada) Ltd., Mississauga, Ontario.

Mexico Foto Regis, Mexico 1, D.F.

South Africa Peterhouse Ltd., Johannesburg.

Japan Asanuma & Co. Ltd., Tokyo.

Australia Rank Industries Australia Ltd., Chatswood, N.S.W.

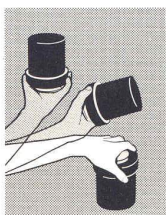


FIG. 2

luftbubblorna, om dosans botten knackas lätt mot ett fast underlag.

Sätt därefter på plastlocket och låt hela dosan stå i ca en minut, så att framkallningsvätskan hinna tränga in i filmens gelatinskikt. Obs! Sätt på locket sakta och försiktigt! Annars kan det lätt uppstå för starkt lufttryck inuti dosan, vilket kan orsaka läckage vid packningen när Ni sedan vänder på dosan.

- 2 När ca en minut har gått, vänd dosan uppochner och sedan tillbaka till ursprungsläget igen. (Se fig. 2).
- 3 Vänd dosan på detta sätt en gång i minuten under hela framkallningstiden.

FIXERING

När framkallningstiden är slut, tag bort locket och håll ut framkallaren. Håll i fixering och agitera med jämna mellanrum under fixeringstiden. När filmen är fixerad, är den inte längre känslig för ljus. Ni kan nu alltså ta bort dosans lock, om Ni vill.

SKÖLJNING

Tag bort locket och skölj filmen genom att placera dosan under en vattenledningskran, så

att vattnet rinner ner i dosan genom centrumhylsan. Ni kan få ännu effektivare sköljning genom att använda PATERSON FILMSKÖLJARE, som åstadkommer att vattnet under hela sköljtiden genom tryck rör sig från dosans botten och uppåt, varvid alla fixeringssalter avlägsnas. Paterson Filmsköljare kan användas med dosans lock påsatt eller borttaget. Paterson tillverkar även en dubbel filmsköljare för samtidig sköljning av två dosor.

HUR MAN TAR UR FILMEN

När Ni skall ta ut filmen ur spiralen, fatta tag om kanterna på den fria filmänden och tryck dem helt lätt mot varandra så att filmen buktar sig något. Drag sedan försiktigt filmen ur spiralen med t.ex. högra handen och låt spiralen rotera på den vänstra. På det sättet tar Ni lätt ut filmen, som därefter hängs upp till torkning.

FÄRGFRAMKALLNING

Paterson framkallningsdosor är speciellt lämpade för framkallning av färgfilm, inkl. omvändningsfilm som kräver en extra exponering under processen. Ni behöver i sådana fall inte ta filmen ur spiralen före exponering, eftersom spiralen är tillverkad av genomskinligt material. Eftersom spiralsidorna är halvtransparenta, måste exponeringstiden fördubblas i jämförelse med normalvärdet för helt genomskinlig spiral. Belys t.ex. i 1 minut per sida i stället för 30sek.

SKÖTSEL OCH VÅRD

Gör ren dosan noggrant efter användningen. För att avlägsna alla eventuella rester av kemikalier från

segunda spiral puede contener 2 películas del paso 126 y del 35mm. La línea Multi-Unit contiene varios rollos como ya describimos a continuación. Todo el sistema de tanques 4 tiene las piezas intercambiables y pueden comprarse separadamente a su conveniencia.

35mm tanke rummer en 35mm eller en 126 film. Universal tanke rummer en 35mm, 126, 127 eller 120/220 film, men ved at anvende yderligere en spiral rummer den to 35mm eller 126 film. Multi Unit tankene rummer flere film, som beskrevet senere. Alle System 4 enkelt-dele er udskiftelige og kan købes særskilt.

Småbildsdosan rummer en 35mm eller 126-film. Universaldosan rummer en 35mm, 126-, 127- eller 120/220-film samt med hjælp av en extra spiral två 35mm eller 126-filmer. Multi-Unit-dosorna rummer som framgår nedan ännu fler filmer. Alla delar i SYSTEM-4 är utbytbara och kan köpas separat.



PATERSON

35mm tanks hold one 35mm or 126 film. Universal tanks hold one 35mm, 126, 127 or 120/220 film, but by adding a second reel it will hold two 35mm or 126 films. Multi-unit tanks hold several films as described later. All System 4 parts are interchangeable and can be bought separately.

Les cuves 35mm acceptent un film 35 ou 126. Les cuves Universal reçoivent un film 35, 126 ou 127 ou 120/220 mais par adjonction d'une seconde spire l'on peut traiter 2 films 35 ou 126 à la fois. Les Multi-Unit reçoivent un plus grand nombre de films comme décrit par ailleurs. Tous les éléments du "System 4" sont interchangeables et peuvent s'acquérir séparément au fur et à mesure du besoin.

35mm Tank für ein 35mm oder 126 Film. Universal Tank für ein 35mm, 126, 127 oder 120/220 Film. Durch Einsetzen einer zweiten Spirale können zwei 35mm oder 126er Filme entwickelt werden. Multi Tanks nehmen mehrere Filme auf. Beschreibung folgt weiter hinten. Alle Teile des System 4 sind voll auswechselbar und können einzeln bezogen werden.

In de kleinbeeldtank kan 1 kleinbeeld- of Instamatic film worden ontwikkeld. In de Universeel tank gaat 1 kleinbeeldfilm, 1 Instamatic film, 1 rolfilm spoel 127 of 120/220, echter kunnen door toevoeging van een extra spiraal 2 kleinbeeldfilms of 2 Instamatic films gelijktijdig worden behandeld. Zoals later beschreven zal worden, gaan in de Multi-Unit tanks meerdere films. Alle onderdelen van Systeem 4 tanks zijn onderling uitwisselbaar en derhalve afzonderlijk verkrijgbaar.

Le sviluppatrici possono contenere 1 pellicola 35mm. o 126; le sviluppatrici Universal, invece, 1 pellicola 35mm., 126, 127 o 120/220; se si aggiunge una seconda spirale potrà contenere 2 pellicole 35mm. o 126. Le sviluppatrici Multi Unit possono contenere più pellicole come sotto descritto. Tutte le parti delle sviluppatrici System 4 sono intercambiabili e possono essere acquistate separatamente.

El tanque de 35mm. contiene una película de 35mm o de 126. El tanque Universal contiene una de 35mm, 126, 127 o 120/220, pero añadiéndole una

ljusslussen bör Ni låta ljummet vatten rinna genom locket från båda sidor. Se till att alla delar av dosan är helt torra, innan Ni ställer undan den. Låsfjädern skall förvaras separat i dosan. Om den får sitta kvar på insatsröret under förvaringen, kan den förlora en viss fjädrande verkan.

PATERSON MULTI-UNIT FRAMKALLNINGSDOSOR

Dessa framkallningsdosor har extra stora underdelar, som rymmer mer än en spiral och tillåter samtidig framkallning av flera filmer. Eftersom spiralerna är omställbara, kan filmer av olika bredder och format framkallas samtidigt, förutsatt att framkallningstiden är densamma. Multi-Unit framkallningsdosor tillverkas i följande tre typer:

Multi-Unit 1

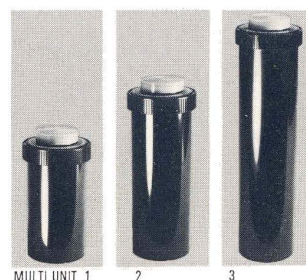
rymmer upp till 3 35mm eller 126 filmer
eller 2 127 filmer
eller 2 120 eller 220 filmer

Multi-Unit 2

rymmer upp till 5 35mm eller 126 filmer
eller 4 127 filmer
eller 3 120 eller 220 filmer

Multi-Unit 3

rymmer upp till 8 35mm eller 126 filmer
eller 6 127 filmer
eller 5 120 eller 220 filmer
Multi-Unit framkallningsdosor säljs utan spiraler, eftersom antal och typ av spiraler varierar med den individuella fotografens behov. Spiralerna och alla andra delar i Paterson System 4 framkallningsdosor är utbytbara och säljs separat. Vilken System 4-dosa som helst kan alltså ändras om till en annan modell bara genom att man köper till de extra delar som behövs. Ni kan t.ex. använda



locket och spiralen i standardmodellen och få en Multi-Unit dosa genom att köpa till en lämplig underdel och de extra spiraler som krävs. De laddade spiralerna sätts på det svarta insatsröret. Se till att spiralerna skjuts ner så långt det går, och när den sista spiralen är på plats, sätt på låsfjädern överst. Den vätskemängd som behövs för varje film finns angivet på dosans botten. Den totala vätskevolymen för det antal filmer Ni skall framkalla får Ni lätt fram genom att lägga ihop värdena för de enskilda filmerna. För framkallning av t.ex. tre 35mm filmer behövs 870 cm^3 , d.v.s. $3 \times 290 \text{ cm}^3$ (290 cm^3 för varje film). Om Ni skall framkalla en 35mm film, en film 127 och en 120 på samma gång, behövs totalt: $290 \text{ cm}^3 + 370 \text{ cm}^3 + 500 \text{ cm}^3 = 1160 \text{ cm}^3$. Om Ni i en Multi-Unit använder mindre än maximalt antal spiraler, behöver Ni bara hålla i så mycket vätska, att det täcker det antal filmer Ni laddat.

PATERSON SYSTEM 4
DEVELOPING TANKS

SPECIAL NOTE

System 4 Tank Reels are made from acetal resin material which has extremely high resistance to photographic solutions and will withstand temperatures of up to 100°C. All other black tank parts are made of polystyrene which has the utmost resistance to photographic solutions but may be adversely affected by heat or by organic solvents such as ether. These parts should not therefore be washed in water hotter than can comfortably be borne by the hand, or stood close to fires or radiators.

INSTRUCTIONS

ADJUSTING THE REEL

The reels are adjustable for 3 film widths: 35mm. and 126, 127, and 120/220. Remove the reel from the black centre column and adjust to the size of the film in use. To do this hold the reel with the film entry points uppermost and facing towards you. Twist the right-hand flange firmly clockwise until the resistance of the locking device is overcome. A slight 'click' will be felt indicating that the flanges are now disengaged and can be moved freely apart. The setting for each film width is controlled by a keyway on the centre core. When the flanges are at the correct separation, twist them firmly in the reverse direction to lock. If the flanges are pulled completely apart,

ensure the two notches on the core coincide when re-assembly.

LOADING THE REEL

This must be done in the dark. For 35mm. films cut off the half-width leader of the film, cutting between the perforations, not through them. It may also help if you round off the two leading corners. With roll films it is best to unroll the film and separate it completely from the backing paper before loading. Hold the reel in the left hand with the entry points opposite one another and facing towards you. Insert the end of the film into the grooves and push it forward about half a turn of the reel. The edges of the film will now be engaged by the ball-bearing mechanism and the film cannot be withdrawn. Now hold the reel as shown (Fig. 1) and simply oscillate the two halves of the reel backwards and forwards in OPPOSITE directions as far as they will go. A stop device is fitted which prevents them being turned too far. The film will be drawn directly into the reel by the ball bearing action and the entire length will travel in quite easily. Turn the reel smoothly and steadily. Note especially the position of the thumbs (Fig. 1) which overlap the edges of the reel and the film. Placing the thumbs in this position helps to guide the film smoothly into the reel. If the film sticks for any reason do not use force, as this might tear the film. Simply remove the film from the reel (as described later) and begin again. If you are unfamiliar with loading reels it is worthwhile practising with a spare film in the

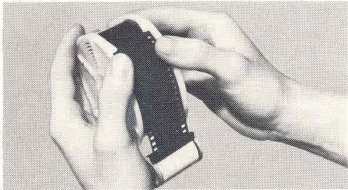


FIG. 1

klokt i att först öva. Er med en bit kasserad film under ljusa förhållanden men med ögonen slutna. När laddningen går lätt, är Ni i stånd att sätta i en exponerad film i totalt mörker. I de flesta 35mm kameror rullas filmen upp på upptagningsspolen omvänt, d.v.s. med filmemulsionen utåt. Därvid rätas filmen ut, något som kan göra det lite besvärligt att mata filmen den sista biten in i spiralen. Detta beror på att den uträtade filmen har svårare att matas in i de allra innersta spiralspårerna. Denna svårighet undviks dock, om den färdigexponerade filmen spolats tillbaka in i kassetten och får vara där ett par timmar, innan Ni sätter in den i spiralen. Under film-laddningen bör Ni så vitt möjligt låta filmen behålla sin naturliga upprullning, antingen genom att Ni håller filmrullen i handen eller placerar den på Ert arbetsbord. När Ni laddat färdigt, skjutes spiralen ned helt över insatsröret. Sätt även på låsfjädern, som förhindrar att spiralen rör sig vid omrörning genom vändning. Sätt därefter ner spiralen i dosans underdel. Se till att packningen kommer i rätt läge över kanten på dosan och skruva sedan till locket. Dosan är nu helt och hållet ljustät, och allt

framkallningsarbete kan ske i fullt dagsljus.

FRAMKALLNING

På dosans undersida finns angivet hur mycket vätska som behövs för framkallning av de olika filmformaten. Håll erforderlig mängd framkallningsvätska genom centrumhålet i locket. Håll INTE dosan snett under påfyllningen. Paterson System 4 är nämligen konstruerad så, att den fylls ytterst snabbt nerifrån och uppåt om dosan står plant. Vätskan når filmen snabbt och jämnt, vilket gör att Ni inte behöver riskera fläckar pch ojämn framkallning.

OMRÖRNING

Vid framkallning med denna dosa får Ni bästa resultatet, om Ni rör om genom vändning. Detta är den mest effektiva metoden för att undvika ojämn framkallning. Följande tillvägagångssätt rekommenderas : 1 När Ni har hållt i framkallaren, sätt i omrörningsspinnen och vrid spiralen fram och tillbaka några sekunder, så att eventuella luftblåsor vilka kan ha bildats på filmens yta lossnar. Det hjälper också till att frigöra

PATERSON SYSTEM 4 FRAMKALLNINGSDOSOR

ATT OBSERVERA

Spiralerna i System 4 framkallningsdosor är tillverkade i acetalhartsmaterial, som är ytterligt beständigt mot fotografiska lösningar och tål temperaturer upp till $+100^{\circ}\text{C}$. Alla svarta delar av framkallningsdosan är tillverkade av polystyren, som tål alla fotografiska lösningar men som kan skadas av alltför stark värme och organiska lösningsmedel, t.ex. eter. Sådana delar av dosan bär därför inte rengöras i vatten som är varmare än att man utan obehag kan hålla händerna i det. Man bör också se till att man inte placerar de värmekänsliga delarna av dosan alltför nära element eller andra starka värmekällor.

BRUKSANVISNING

INSTÄLLNING AV SPIRALEN

Spiralerna kan ställas in för tre olika filmbredder: 35mm samt film i format 126, 127 och 120/220. Tag först bort spiralen från det svarta insatsröret. Ställ sedan in önskad filmbredd. Därvid skall spiralen hållas med filmens införingsslitsar överst och mot fotografen. Vrid den högra flänsen stadigt medsols, tills låsanordningens motstånd övervinnes. En lätt knapp kommer att uppfattas, vilken anger att flänsarna lösgjorts och kan föras isär. Inställningen för de olika filmbredderna regleras genom ett spår i insatsröret. När flänsarna befinner sig på rätt avstånd från varandra, skall de

vridas stadigt åt motsatta hållet så att de låses. Om flänsarna tas isär helt och hållet, tillses att de båda hak på insatsröret sammanfaller vid hopsättningen.

HUR MAN LADDAR SPIRALEN

Laddning av spiralen måste ske i absolut mörker. När Ni skall framkalla en 35mm film, klipp först bort hela den enkelperforerade filmänden, och se till att Ni klipper av filmen mellan perforeringshålén och inte genom dem. Rullfilm bör först frigöras helt från skyddspapperet, innan Ni börjar ladda. Håll spiralen med vänstra handen med slitsarnas öppningar mot Er. (Se också till att slitsarna står mitt för varandra). Stick in filmen i de båda slitsarna i spiralen och skjut in den ung. ett halvt vridningsvarv. Filmen hakar nu i kulmekanismen och kan inte lossa från spiralen. Håll spiralen som framgår av bilden härintill (fig. 1) och vrid nu de båda halvorna så långt det går fram och tillbaka I MOTSATT RIKTNING MOT VARANDRA. En inbyggd stoppanordning förhindrar att halvorna vrids för långt. Hela filmen matas på detta enkla sätt automatiskt in i spiralen av kulmekanismen.

Vrid spiralen stadigt och lugnt. Lägg på fig. 1 särskilt märke till tummarnas placering. De skall täcka både kanten av spiralen och själva filmen, vilket underlättar inmatningen. Om filmen av någon anledning skulle fastna, använd inte fäld, eftersom Ni då lätt kan slita av filmen. Tag i stället filmen ur spiralen (se nedan!) och börja om på nytt. Om Ni är osäker på laddningen av spiralen, gör Ni

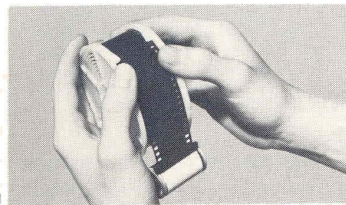


FIG. 1

light with your eyes closed. When you can do this you will be able to load an exposed film in total darkness.

In the majority of modern 35mm. cameras the film is wound on the take-up spool of the camera in the reverse direction to its natural curl. This straightens the film, and may cause difficulty in loading the last few inches into the reel, as the straight film does not conform so easily to the inner coils of the reel. This difficulty is avoided if the exposed film is rewound into the cassette and left for a few hours before loading into the reel, so that it recovers its normal curl. During loading, the curl of the film should be carefully preserved by resting the coil of film on the hand or on the bench.

After loading, push the reel fully onto the black centre column followed by the spring collar which prevents the reel moving during inversion agitation. Now replace the reel in the tank. Make sure the sealing ring is in position on the tank rim, and screw down the lid. The tank is now light-tight, and all other operations can be carried out in full daylight.

DEVELOPMENT

The quantities of solution required for each size of film will be found engraved on the tank base. Pour the required quantity of solution through the central hole in the lid. DO NOT tilt the tank during filling. The tank is designed to permit solutions to be poured in with extreme rapidity whilst in an upright position, and the solution covers the film evenly from below upwards, avoiding streaks and uneven development.

AGITATION

The recommended method of agitation is by inversion. This method is the most effective one in preventing uneven development of the film and the following procedure is recommended.

- 1 After pouring in the developer insert the agitator and twist the reel backwards and forwards for a few seconds to dislodge any air-bells which might form on the surface of the film. Lightly tapping the bottom of the tank on the bench will also help to remove air-bells. Place the water-tight polythene cap in position on the lid and allow one minute

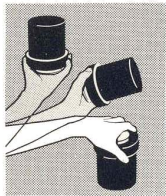


FIG. 2

for the film to become saturated with the solution.

N.B. Push the cap down SLOWLY.

This prevents undue air pressure inside the tank which might cause leakage past the sealing ring during inversion.

- 2 After one minute, invert the tank and at once return it to the upright position (see Fig. 2).
- 3 Invert once each minute during the development time.

FIXING

After development for the required time remove the cap and pour out the developer. Pour in the fixer and periodically agitate during the period of fixation. After fixation the film is no longer sensitive to light, and the tank lid can be removed.

WASHING

Remove the lid and wash the film by placing the tank under a tap so that the water flows down through the centre column. More efficient washing is obtained by the use of the special

PATERSON FORCE FILM WASHER which ensures a positive flow of water under pressure from the bottom of the tank upwards. It may be used with or without the tank lid in position. A dual Force Film Washer is also available for simultaneous washing with two tanks.

REMOVING THE FILM FROM THE REEL

To remove the film from the reel, arch the free end by bending the two edges together slightly. Pull gently on the free end, allowing the reel to rotate on the other hand, and the whole length of film will run easily out of the reel as it rotates. The film should then be clipped or pinned up to dry.

COLOUR PROCESSING

Paterson Tanks are specially suitable for processing colour films including reversal films which require re-exposure to light during processing. It is not necessary to remove the film from the reel for this exposure, as it can be accomplished through the flanges of the reel. As the reels are made of translucent material the time recommended for transparent reels should be doubled, i.e. 1 minute per side instead of 30 seconds.

CARE AND STORAGE

Wash the tank thoroughly after use. Run water through the lid from both sides to remove any residual chemicals from the light trapping system. Ensure that the tank and reel are thoroughly dry after use before putting away. Store the spring collar separately in the tank. If

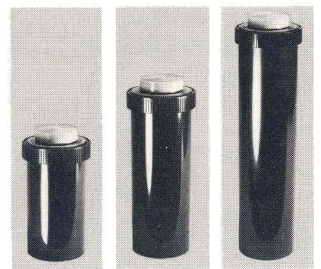
normal, recibiendo más de una espiral y permitiendo el tratamiento simultáneo de varias películas. Como las espirales son ajustables, pueden tratarse a la vez combinaciones de varias medidas de películas, siempre que el tiempo de revelado de las mismas sea el mismo. Estas Cubas Múltiples están disponibles como sigue:

Multi-unit 1 con una capacidad de hasta 3 películas de 35mm o 126 o bien 2 películas 127 o bien 2 películas 120 ó 220

Multi-unit 2 con una capacidad de hasta 5 películas de 35mm o 126 o bien 2 películas 127 o bien 3 películas 120 ó 220

Multi-unit 3 con una capacidad de hasta 8 películas de 35mm o 126 o bien 6 películas 127 o bien 5 películas 120 ó 220

Las Cubas Múltiples se venden sin espirales porque el número y tipo de espirales variarán según las necesidades de cada usador individual. Las espirales y demás piezas de las cubas Paterson Sistema 4 son intercambiables y disponibles separadamente. Así, cualquier Cuba del Sistema 4 puede ser convertida en otro modelo simplemente comprando las piezas de repuesto que se necesitan. Por ejemplo, puede Vd. utilizar la cubierta y la espiral de una cuba modelo sencillo agregándole el cuerpo apropiado y las espirales extras, convirtiéndolo así en una Cuba Múltiple. Las espirales cargadas se encajan sobre la columna negra central. Asegúrese de que todas las espirales están metidas a fondo en la columna. Cuando se ha colocado en su lugar la última



espiral empujar la abrazadera de resorte hasta llegar a tope.

Las cantidades de solución que se necesitan para cada película están grabadas en la base del cuerpo de la cuba. El volumen total de soluciones que se necesitan para cualquier número de películas (o para cualquier combinación de películas de medida diferente) se calcula fácilmente sumando las cantidades que se precisan para cada película por separado. Por ejemplo, tres películas de 35mm. necesitarán 10 onzas cada una, o sea, un total de 30 onzas. Si se procesan juntas una película de 35mm. otra película 127 y otra 120, el volumen total requerido es de 10 ozs.+13 ozs.+17½ ozs.= 40½ ozs.

Cuando se utiliza un número menor de espirales, sólo se precisa utilizar una cantidad de solución suficiente para cubrir el número de películas que se vayan a tratar.

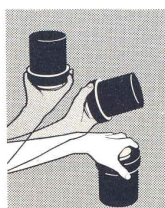


FIG. 2

- anillo sellador durante la inversión.
- 2 Después de un minuto, invertir la cuba y volverla inmediatamente a su anterior posición horizontal (vea fig. 2).
- 3 Invertir una vez por minuto durante el tiempo de revelado.

FIJACION

Después del revelado durante el tiempo requerido quite el tapón y vacíe el líquido revelador. Vierta el fijador y agite periódicamente durante el tiempo de fijación. Después de la fijación, la película no es ya sensible a la luz, y puede quitarse la cubierta de la cuba.

LAVADO

Quite la cubierta y limpie la película y coloque la cuba bajo un grifo de tal modo que el agua corra por la columna del centro. Se consigue un lavado más eficiente utilizando el LAVADOR FORZADO DE PELICULAS PATERSON especial que proporciona una corriente positiva de agua a presión desde la parte inferior de la cuba hacia arriba. Puede utilizarse con la cubierta de la cuba puesta o quitada. También hay disponible un Lavador de Películas doble para el lavado simultáneo de dos cubetas.

SACAR LA PELICULA DE LA ESPIRAL

Para sacar la película de la espiral, curvar el extremo libre, flexionando simultáneamente los dos extremos ligeramente. Tirar suavemente hacia el extremo libre, permitiendo que la espiral gire en la otra mano, y saldrá fácilmente toda la película de la espiral, a medida que ésta gira. Entonces se deberá colgar o sujetar la película para que se seque.

PELICULAS EN COLOR

Las cubas Paterson están especialmente indicadas para tratar las películas en color, incluyendo las películas invertidas que necesitan una nueva exposición a la luz durante el proceso. No es necesario sacar la película de la espiral para esta exposición, ya que puede efectuarse a través de las bridas de la espiral.

Como las espirales están hechas de material translúcido, deberá duplicarse el tiempo recomendado para las espirales transparentes, es decir, un minuto por cada lado en vez de 30 segundos.

MANTENIMIENTO Y ALMACENAJE

Lávese a fondo la cuba después de usarse. Hágase correr agua a través de la tapa desde ambos lados para quitar cualesquier residuos químicos del sistema de trampa de luz. Asegúrese de que estén bien secos la cuba y el espiral después de usarse y antes de guardarse. Guárdese la abrazadera de resorte por separado en la cuba. Si se deja en la columna durante el almacenaje la acción del resorte puede perder efectividad.

CUBAS MULTIPLES PATERSON

Estas cubas tienen un cuerpo más largo que lo

left on the column during storage its spring action may become less effective.

PATERSON MULTI-UNIT TANKS

These tanks have extra long bodies which accommodate more than one reel and allow simultaneous processing of a number of films. Since the reels are adjustable, combinations of various film sizes may be processed together provided the development times of the films are similar. Three Multi-Unit Tanks are available as follows:

Multi-unit 1

holds up to 3 35mm or 126 films
or 2 127 films
or 2 120 or 220 films

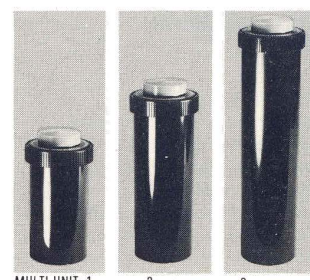
Multi-unit 2

holds up to 5 35mm or 126 films
or 4 127 films
or 3 120 or 220 films

Multi-unit 3

holds up to 8 35mm or 126 films
or 6 127 films
or 5 120 or 220 films

Multi-Unit Tanks are sold without reels because the number and type of reels will vary with the requirements of the individual user. The reels and all other parts of Paterson System 4 Tanks are interchangeable and available separately. Thus any System 4 Tank can be converted into another model by simply purchasing the spare parts required. For example, you can use the lid and reel of a single model tank and convert it into a Multi-Unit Tank by adding the appropriate body and extra reels



MULTI-UNIT 1

2

3

The loaded reels are pushed onto the black centre column. Ensure that all the reels are pushed fully home on the column. When the last reel is in place push the spring collar down on top.

The amounts of solution required for each film are engraved on the base of the tank body. The total volume of solution required for any number of films (or for any combination of films of different sizes) is easily calculated by adding together the amounts required for each individual film. For example, three 35mm. films will require 10 ozs. each, a total of 30 ozs. If one 35mm. film, one 127 film and one 120 film are processed together, the total volume required is 10 ozs.+13 ozs.+17½ ozs.=40½ ozs. When using less than the full number of reels it is only necessary to use sufficient solution to cover the number of films being processed.

CUBAS DE REVELADO PATERSON SISTEMA 4

NOTA ESPECIAL

Las espirales de la cuba del Sistema 4 están hechas de material de resina acetática que tiene una resistencia extraordinariamente alta a las soluciones fotográficas, y soporta temperaturas hasta de 100°C. Todas las partes negras estantes de la cuba están hechas de poliestireno que tiene una resistencia perfecta a las soluciones fotográficas, pero que puede verse afectado por el calor o por disolventes orgánicos tales como el éter. Por lo tanto estas partes no deben ser lavadas con agua más caliente que la que puede soportarse fácilmente con la mano, ni estar cerca de chimeneas o radiadores.

INSTRUCCIONES PARA EL USO

AJUSTE DE LA ESPIRAL

Las espirales pueden ajustarse para tres anchos de película: 35mm, y 126, 127 y 120/220. Extraer la espiral de la columna central negra y ajustar la medida de la película que se esté utilizando. Para hacer esto, sujete la espiral con los puntos de entrada de la película en la parte superior y frente a usted. Doble la brida de la derecha firmemente en dirección destrógira hasta que venza la resistencia del dispositivo trabador. Se sentirá un ligero "click" para indicar que las bridas están entonces separadas y pueden moverse libremente sin establecer contacto. La regulación del ancho de cada película se efectúa mediante una chaveta en el núcleo central. Cuando las bridas se han separado en la medida adecuada, dóblense firmemente en la dirección

inversa para trabarse. Si las bridas se apartan completamente, cerciórese de que las dos entallas el núcleo coinciden cuando se vuelve a montar.

CARGA DE LA ESPIRAL

Debe efectuarse en la oscuridad. Para películas de 35mm. cortar la cabeza de la película de menos ancho que la película, cortando entre dos perforaciones, no a través de ellas. Con los rollos de película, es mejor desenrollar la película y separarla completamente del papel soporte antes de la carga. Mantenga la espiral en la mano izquierda con los puntos de entrada opuestos entre sí y mirando hacia Vd. Introduzca el extremo de la película en las ranuras de la espiral y hágala correr aproximadamente una media vuelta de la espiral. El mecanismo con cojinete de bolas sujeta ahora los bordes de la película que no puede ya escaparse de la espiral.

Acto seguido, mantenga la espiral como muestra la fig. 1, y haga oscilar sencillamente las dos mitades de la espiral hacia delante y hacia atrás en dirección OPUESTA lo más lejos que puedan ir. Hay un dispositivo de tope que impide que la espiral gire demasiado. La película se moverá directamente hacia la espiral por la acción del cojinete de bolas y toda la longitud de la misma correrá con facilidad. Dé vueltas a la espiral suavemente y con regularidad. Note especialmente la posición de los pulgares (Fig. 1) que cubren los bordes de la espiral y la película. Colocando los pulgares en esta posición se ayuda a que la película se enrolle suavemente en la espiral.

Si la película se atasca por cualquier razón, no haga fuerza, ya que podría romperse la

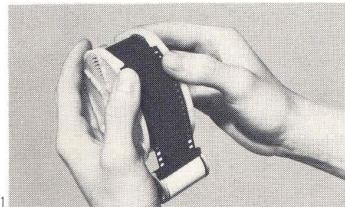


FIG. 1

Si pour une raison quelconque le film ne pénètre pas, ne pas forcer, ceci risquerait de détériorer une perforation. Retirer le film comme décrit par ailleurs et recommencer l'opération.

Pour vous familiariser avec le chargement, nous vous recommandons d'opérer en plein jour avec un film voilé ou déjà développé avant de charger votre cuve dans l'obscurité totale.

Dans la plupart des appareils 35mm, le film est enroulé sur sa bobine réceptrice dans le sens opposé à sa courbure naturelle. Ceci peut causer quelque difficulté pour l'introduction des derniers centimètres dans les spires, car le film devenu plus ou moins plan ne se prête plus avec la même aisance. Il suffit de le conserver rebobiné dans son chargeur pendant quelques heures afin qu'il retrouve sa courbure normale. Pendant le chargement, cette courbure doit être préservée, il est bon de maintenir le film enroulé dans la main.

Après le chargement, introduire les spires pleines sur la colonne centrale noire ajouter ensuite le collier à ressort qui empêche la spire de se déplacer pendant l'agitation par renversement.

Replacer maintenant la spire dans la cuve. S'assurer que le joint est en bonne place puis visser le couvercle à fond. La cuve est maintenant prête à être portée en un endroit éclairé pour la suite des opérations.

DÉVELOPPEMENT

Les doses de solution nécessaires au traitement de chacun des formats sont portées sur la base de la cuve.

Verser la quantité requise dans le centre du couvercle formant entonnoir, ne pas agiter la cuve pendant le remplissage. Le liquide pénètre avec une extrême rapidité et la cuve étant posée, l'on est assuré d'une immersion régulière et rapide évitant toutes créations de traces ou de zones.

AGITATION

Après remplissage, la méthode recommandée pour une bonne répartition des bains sur toute la surface du film est le retournement. Procéder comme suit:

1 Après avoir versé le révélateur, introduire dans

CUVES PATERSON
'SYSTEME 4'

NOTE SPECIALE

Les joues à spires des cuves sont en résine d'acétate qui résiste parfaitement aux effets des solutions de développement et résistant à une température de plus de 100°C.

Les autres éléments noirs sont en polystyrène, matière offrant la plus grande résistance aux solutions et bains photographiques. Ils peuvent être affectés par une haute température ou par des solvants organiques tels que l'éther. Ils supportent d'être nettoyés à l'eau chaude non brûlante.

INSTRUCTIONS

RÉGLAGE DES SPIRES

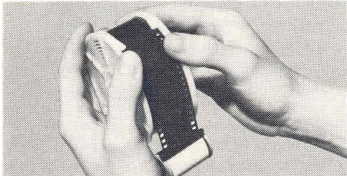
Les spires sont réglables pour trois dimensions de film : 35mm. et 126, 127, et 120/220. Retirer les spires en les dégageant de la colonne centrale et ajuster leur largeur en fonction du film à traiter. Pour y parvenir, tenir les spires de telle manière que l'extrémité d'entraînement du film se trouve on haut et vous faisant face. Tourner fermement la joue droite dans le sens des aiguilles d'une montre jusqu'à ce que la résistance du dispositif de fermeture soit annulée. Un léger 'click' se manifestera, indiquant le désengagement des joues qui peuvent alors être séparées. Le réglage correspondant à chaque largeur de film est obtenu au moyen d'une rainure de clavette située sur le centre du

moyeu. Lorsque les joues se trouvent à une distance de séparation convenable, tournez-les fermement dans le sens inverse pour les bloquer. Si ces joues sont complètement séparées, assurez-vous que leurs deux encoches situées sur les moyeux coïncident bien entre eux au moment du ré-assemblage.

CHARGEMENT DES SPIRES

Cette opération se fait dans l'obscurité. Pour les films 35mm., couper l'amorce du film entre les perforations et non à l'intérieur de l'une d'elles. Pour les films en bobines, dérouler le film et le séparer de son papier protecteur. Tenir les spires de la main gauche, les deux canaux d'entrée en vis à vis bien alignés. Introduire l'extrémité du film dans les deux joues et le pousser au moins de la valeur d'un demi-tour. Les deux tranches du film sont ainsi engagées dans le mécanisme d'autochargement et ne peuvent être dégagées. Maintenant, tenir les spires comme indiqué fig. 1 et les faire osciller alternativement en avant et en arrière, chacune dans une direction opposée, aussi loin qu'il sera possible de le faire. Une butée interdit une trop forte oscillation. Le film sera entraîné et pousser dans les spires, sur son entière longueur, par l'action des billes. Faire osciller les joues sans à-coups mais fermement et régulièrement. Noter spécialement la position des joues qui empêche la formation de boucles. Cette position facilite l'entrée du film dans les spires.

FIG. 1



pellicula. Simplement saque la pellicula de la espiral (como se describe más adelante) y empieza de nuevo. Si no está habituado a cargar espirales, conviene que practique con una pellicula usada a la luz, con los ojos cerrados. Una vez que logre hacer esto, podrá cargar una pellicula sacada en oscuridad total. En la mayoría de las modernas cámaras de 35mm. la pellicula se enrolla en la bobina de recuperación de la cámara en dirección contraria a su arrollamiento natural. Esto hace que la pellicula se enderece y puede causar alguna dificultad al cargar el final de la pellicula en la espiral, debido a que la pellicula enderezada no se adapta tan fácilmente a la bobina interior de la espiral. Esta dificultad puede evitarse enrollando de nuevo la pellicula expuesta dentro del chasis dejándola unas cuantas horas antes de cargarla en la espiral, con el fin de que recupere su arrollamiento natural. Durante la carga deberá conservarse cuidadosamente el enrollamiento de la pellicula, permaneciendo el carrete de la pellicula en la mano o en el banco. Después de la carga, coloque la espiral en la columna central negra introduciéndola a fondo, seguida de la abrazadera de resorte que impide que la espiral se mueva durante la agitación invertida. A continuación vuélvase a colocar la

espiral en la cuba. Asegúrese de que el anillo de cierre está en su posición en el borde de la cuba y enrosque la cubierta. La cuba está ahora aislada de la luz, y todas las demás operaciones pueden ya llevarse a cabo a plena luz.

REVELADO

En la base de la cuba pueden encontrarse las cantidades de solución que se necesitan para cada medida de pellicula.

Vierta la cantidad requerida de solución a través del orificio central de la cubierta. NO INCLINE la cuba durante el llenado. La cuba está diseñada de tal forma que permite que las soluciones se viertan con mucha rapidez cuando está en posición horizontal, y la solución cubre la pellicula uniformemente desde abajo hacia arriba, evitando rayas y revelado desigual.

AGITACION

El método de agitación que se recomienda es por inversión. Este método es el más efectivo para evitar un revelado desigual de la pellicula y se recomienda el procedimiento siguiente:

- 1 Después de verter el líquido revelador, introducir el agitador y muévase la espiral hacia adelante y hacia atrás durante unos segundos para eliminar cualquier burbujas de aire que pudiera firmarse sobre la superficie de la pellicula. Golpear ligeramente el fondo de la cuba sobre el banco que también contribuirá a eliminar las burbujas de aire. Colocar el tapón de polietileno en su lugar en la cubierta y esperar un minuto para que la pellicula se sature con la solución. Nota. El tapón debe empujarse LENTAMENTE hacia abajo. De esta manera se evita una excesiva presión del aire en el interior de la cuba que podría producir escapes através del

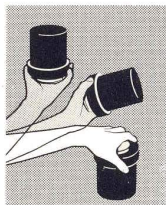


FIG. 2

l'agitateur, l'animer d'un mouvement rotatif de va-et-vient pour déloger les bulles d'air qui pourraient se former à la surface du film. En tapotant légèrement le fond de la cuve sur la table, vous faciliterez l'élimination des bulles d'air. Placer le bouchon sur le couvercle et attendre une minute pour que le film s'imprègne bien du produit.

- 2 Ensuite, renverser la cuve en la retournant complètement et lui faire reprendre sa position normale. (Fig. 2)
- 3 Renouveler cette opération chaque minute.

FIXAGE

Lorsque le temps précis pour le développement est écoulé, retirer le bouchon et vider la cuve. La remplir de fixateur et l'agiter périodiquement pendant le fixage. Ensuite, le film ne craint plus la lumière, le couvercle peut être retiré.

LAVAGE

Retirer le couvercle, placer la cuve sous un robinet pour que le filet d'eau pénètre par la colonne centrale. Le lavage sera plus rapide et

plus efficace avec le Force Film Washer qui assure une parfaite circulation de l'eau au travers des spires, de bas en haut. Il peut être utilisé avec ou sans le couvercle. Un Force Film Washer double est livrable pour le lavage simultané de plusieurs films dans deux cuves.

DÉGAGEMENT DU FILM

Pour dégager le film, cambrer l'extrémité accessible en rapprochant les deux tranches puis tirer lentement en permettant aux joues de pivoter. Toute la longueur du film se dégagera sans effort. Le film peut être fixé par une pince ou par une épingle pour son séchage à l'abri de la poussière.

DÉVELOPPEMENT DES FILMS COULEUR

Les cuves PATERSON sont très estimées pour le traitement des films couleur y compris les films inversibles nécessitant une exposition à la lumière en cours d'opération. Il n'est pas nécessaire de dégager le film, cette exposition se faisant au travers des spires.

Comme les joues sont en matière translucide, le temps indiqué pour des spires transparentes doit être doublé, par exemple d'une minute ou bien de 30 secondes.

SOINS ET RANGEMENT

Laver la cuve à fond après emploi. Faire passer de l'eau par le couvercle des deux côtés pour enlever tous produits chimiques restant encore dans le système trappe-lumière.

S'assurer que la cuve et la spire soient bien

PATERSON MULTI-UNIT TANKE

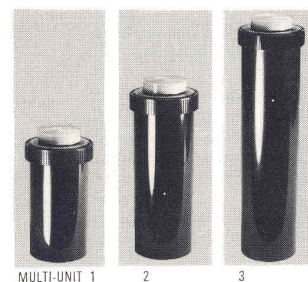
I disse tanke er selve tanken ekstra lang, således at den rummer mere end een spiral. Derved kan flere film fremkaldes på een gang. Da spiralerne er indstillelige, kan film af forskellige formater fremkaldes samtidig, under forudsætning af at filmens fremkaldetid i den givne fremkalder er den samme. Multi-unit tankene findes i tre forskellige størrelser:

Multi-unit 1 kan rumme indtil 3 stk. 35mm eller "126" film eller 2 stk. "127" film eller 2 stk. "120" eller "220" film

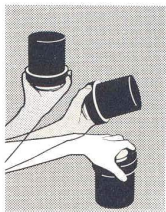
Multi-unit 2 kan rumme indtil 5 stk. 35mm eller "126" film eller 4 stk. "127" film eller 3 stk. "120" eller "220" film

Multi-unit 3 kan rumme indtil 8 stk. 35mm eller "126" film eller 6 stk. "127" film eller 5 stk. "120" eller "220" film

Multi-unit tanke sælges uden spiraler, fordi antallet og typen af spiraler vil variere alt efter den enkelte kundes behov. Spiralerne og alle de andre enkelte dele i Paterson System 4 tankene kan anvendes kundes behov. Spiralerne og alle de andre enkelte dele i Paterson System 4 tankene kan anvendes vekselvis og anskaffes hver for sig. Enhver System 4 tank kan derfor forvandles til en hvilken som helst anden System 4 tank ved anskaffelsen af de manglende dele. Man kan for eksempel benytte låg og spiral fra standard modellen af System 4 og forvandle den til en Multi-unit tank ved køb af den større tank og det fornødne antal ekstra spiraler. Spiralerne med pårullet film skubbes ned over den sorte midtersøjle. Sørg for at spiralerne



bliver skubbet helt ned over søjlen. Når den sidste spiral er sat på plads, skubbes den fjederkrave af nylon, ned over den. Den mængde fremkalder, der skal bruges for hver film, er indgraveret i tankens bund. Den totale fremkaldermængde til et givet antal film findes let ved at lægge mængderne for de enkelte film sammen (dette gælder også, hvis der på samme tid fremkaldes forskellige filmformater i den samme Multi-unit tank). For eksempel vil tre stk. 35mm. film kræve 10 ozs. (284 ccm.) hver, ialt 30 ozs. (852 ccm.). Hvis en 35mm. film, en "127" film og en "120" film fremkaldes samtidig, skal der benyttes denne mængde fremkalder: 10 ozs. (284 ccm.) + 13 ozs. (368 ccm.) + 17½ ozs. (497 ccm.) = 40½ ozs. (1150 ccm.). Hvis der bruges mindre end det fulde antal spiraler, der kan være i en given Multi-unit tank, er det kun nødvendigt at bruge så meget fremkalder eller anden væske, som antallet af enkeltfilmene kræver.



FIGUR 2

2 Efter 1 minuts forløb vendes tanken på hovedet et kort øjeblik, og derefter tilbage til normal stilling. (Figur 2)

3 Under resten af fremkaldertiden vendes fremkaldertanken på hovedet ('kippes') een gang hvert minut.

FIKSERING

Efter udløbet af den foreskrevne fremkaldertid fjernes låget og væsken hældes ud. Hæld fikserbadet på og kip tanken med regelmæssige mellemrum under hele fiksertiden. Efter fikseringen er filmen ikke længere lysfølsom og låget kan fjernes.

UDSKYLNING

Fjern låget og anbring tanken under en rindende vandhane således at vandet løber ned gennem midtersøjlen. En mere effektiv udskylning opnås ved benyttelse af den specielle PATERSONS FILMSKYLLER, der sørger for, at vandet under hele skyllingen bevæger sig fra bunden af tanken og op efter, hvorved alle salte fjernes. Filmskylleren kan benyttes med eller uden låget på tanken. Der kan også leveres en dobbelt filmskyller til samtidig udskylning af to tanke.

FILMEN FJERNES FRA SPIRALEN

Når filmen skal fjernes fra spiralen, bøjes kanterne på det frie filmstykke let mod hinanden. Derved krummer filmen i længderetningen, og den kan nu uden besvær trækkes ud af spiralen, der f. eks. kan rotere på den venstre hånd, mens man trækker i filmen med den højre. Hæng straks filmen til tørre med en passende klemme på et roligt støvfrit sted.

FREMKALDELSE AF FARVEFILM

Paterson fremkaldertankene er specielt velegnede til fremkaldelse af farvefilm, også omvendefarvefilm, der skal reeksponeres under fremkaldelsesprocessen. Det er ikke nødvendigt at tage filmen ud af spiralen under reeksponeringen, idet spiralens endeflader er fremstillet af gennemsigtigt materiale. Da endefladerne er matagtige skal tiden for reeksponeringen fordobles sammenlignet med helt gennemsigtigt materiale, f. eks. 1 minut på hver side i stedet for 30 sekunder.

PASNING OG OPBEVARING

Vask tanken grundigt efter brugen. For at fjerne eventuelle kemikalierester fra lysfældesystemet bør man lade vandet løbe gennem låget fra begge sider. Sørg for, at tanken og spiralen er helt tørre, inden de lægges væk efter brugen. Fjederringen bør opbevares for sig i tanken. Efterlades denne på søjlen under opbevaringen, kan det ske, at dens fjedervirkning bliver mindre effektiv.

séchées après l'emploi et avant le rangement. Introduisez séparément le collier à ressort dans la cuve. Si on le laisse posé sur la colonne en cours de rangement, son ressort peut s'affaiblir.

CUVES PATERSON 'MULTI-UNIT'

Ces cuves ont un corps très haut qui reçoit plusieurs jeux de spires permettant ainsi de procéder au traitement simultané de plusieurs films même de formats différents, pour autant que leur durée et conditions de traitement soient identiques. Il existe trois tailles de MULTI-UNIT:

Multi-unit 1

pour 3 films 35mm ou 126
ou 2 films 127
ou 2 films 120 ou 220

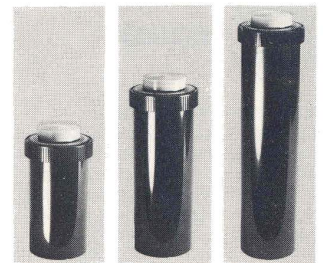
Multi-unit 2

pour 5 films 35mm ou 126
ou 4 films 127
ou 3 films 120 ou 220

Multi-unit 3

pour 8 films 35mm ou 126
ou 6 films 127
ou 5 films 120 ou 220

Les cuves MULTI-UNIT se vendent sans spires, car le nombre et le modèle des spires dépendra des besoins de l'utilisateur. Tous les éléments constituant les cuves PATERSON du 'SYSTEME 4' sont interchangeables et livrables séparément. Les cuves peuvent donc être converties par un simple échange d'éléments, par exemple le couvercle et un jeu de spires d'une cuve simple peuvent



MULTI-UNIT 1

2

3

habiller le corps d'une MULTI-UNIT, complétée ensuite par des jeux de spires supplémentaires. Les spires chargées se poussent sur la colonne centrale noire, s'assurer qu'elles descendent bien à fond. Quand le dernier jeu est en place, engager le collier à ressort et le pousser.

La quantité de solution nécessaire au traitement d'un format est indiquée sur la base du corps de chaque cuve. Il suffit d'additionner les nombres donnés pour obtenir le volume à utiliser, par exemple 3 films 35mm. nécessitent 10 onces (290 cc) chaque, soit un total de 30 onces (870 cc). Si l'on traite 1 film 35mm., 1 127, 1 120 ensemble, le volume du bain sera: 10 (290 cc)+13 (370 cc)+17½ (480 cc) soit 40½ onces (1140 cc).

Dans tous les cas, il suffit de recouvrir le ou les jeux de spires de solution.

PATERSON
ENTWICKLUNGSTANKS
SYSTEM 4

ZUR BESONDEREN BEACHTUNG

Die 'System 4'-Tankspiralen bestehen Azetatharz, das gegen photographische Lösungen und bei Temperaturen bis zu 100°C äuSerst beständig ist. Sämtliche anderen schwarzen Bestandteile des Tanks sind aus Polystyrol hegestellt, das zwar gegenüber photographischen Lösungen von höchster Beständigkeit ist, aber unter dem Einfluß von Wärme und organischen Lösungsmitteln leiden mag. Daher sollte man diese Teile nur mit Wasser von einer Temperatur waschen, die man mit der Hand gut verträgt und sie auch nicht in die Nähe eines offenen Feuers oder eines Heizkörpers bringen.

GEBRAUCHSANWEISUNG

EINSTELLEN DER SPIRALE

Die Spiralen sind auf drei Filmbreiten einstellbar, und zwar auf Kleinbildformat, Nr. 126 (Instamatic), 127 (4×6 cm), 120/120 (6×9cm). Man hebe die Spirale von der schwarzen Mittelsäule ab und stelle die Filmbreite ein. Um dies durchzuführen halte man die Spirale mit den Filmeinführungsschlitzten nach oben und dem Körper zugewandt. Man drehe den rechten Flansch fest im Uhrzeigersinn, bis der Widerstand des Sperrmechanismus überwunden ist. Durch ein leichtes Rastgefühl wird angezeigt, dass die Flansche nun gelöst und ungehindert abgenommen werden können. Die Einstellung für jede Filmbreite wird durch eine Nut auf dem Kern geregelt. Wenn die Flansche im richtigen Abstand sind, drehe man sie fest in umgekehrter Richtung, um sie zu

sperrn. Wenn die Flansche vollkommen gelöst sind, so überzeuge man sich, dass die beiden Kerben auf dem Kern übereinander liegen, wenn die Flansche wieder montiert werden.

LADEN DER SPIRALE

Das muß im Dunkeln geschehen. Bei Kleinbilddfilmen schneide man die schmale Zunge des Filmanfanges ab, und zwar zwischen den Perforierungen, nicht durch sie hindurch. Rollfilme wickelt man am besten auf und löst sie von der Papierunterlage ganz ab, ehe man die Spirale damit lädt. Dabei halte man die Spirale mit der linken Hand, wobei die Einführungsschlitzte einander gegenüberliegen und dem Körper zugewandt sind. Nun fuhr man das Filmende in die Rillen der Spirale ein und schiebt es ungefähr eine halbe Drehung ein. Die Ränder des Films werden jetzt von der Kugellagermechanik festgehalten, und der Film läßt sich aus der Spirale nicht mehr herausziehen. Nunmehr halte man die Spirale wie in Abb. 1 gezeigt und schwenke die beiden Hälften der Spirale vorwärts und rückwärts in ENTGEGENGESETZTER Richtung, soweit es möglich ist. Ein Anschlag verhindert, daß man die Spiralen zu weit dreht. Der Film wird durch die Wirkung des Kugellagers unmittelbar in die Spirale gezogen und in seiner ganzen Länge ganz leicht hineingleiten. Dabei drehe man die Spirale sanft und stetig. Auf die Stellung der Daumen (Abb. 1) achte man besonders, die über die Kanten der Spirale und des Films übergreifen. Wenn man die Daumen in dieser Stellung hält, trägt es dazu bei, den Film sanft in die Spirale gleiten zu lassen. Sollte der Film aus irgendwelchen Gründen steckenbleiben, über man keine Gewalt aus, da

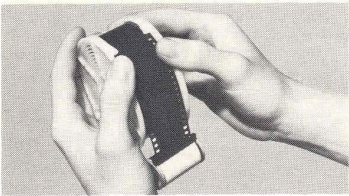


ABB. 1

film ind i en fremkalderspiral, er det ulejligheden værd at øve sig på er det ulejligheden værd med lukkede øjne at øve sig på en reservefilm. Kan De klare det, vil De kunne sætte den første eksponerede film i under korrekt mørkekammerbelysning, d.v.s. absolut mørke I mange af de moderne småbilledkameraer rulles 35mm. filmen omvendt op på opsamlerspolen, altså modsat filmens naturlige krumning. Derved rettes filmen ud og dette kan besværliggøre indsætningen af de sidste centimeter af filmen i spiralen, fordi filmen ikke så let kan rette sig efter den inderste del af spiralen med de mindre diametre. Denne vanskelighed undgås, hvis den eksponerede film efter at være spolet tilbage i kassetten, får lov at være nogle timer i denne før indsætningen i spiralen. Filmen generhverver herved sin naturlige krumning. Under indsætningen skal filmens naturlige krumning bevares bedst muligt, enten ved at lade filmrullen hvile i hånden eller ligge på arbejdsbordet. Efter filmindsætningen skal spiralen skubbes helt ned over den sorte midtersøjle fulgt af fjederkraven der forhindrer spiralen i at bevæge sig, når man anvender 'kipmetoden'. Herefter sættes spiralen tilbage i fremkaldertanken. Sørg for at tætningsringen ligger korrekt på

kanten af tanken og skru låget på. Fremkaldertanken er nu helt lystæt og resten af fremkaldelsesproceduren kan foregå i fuldt dagslys.

FREMKALDELSEN

Den nødvendige mængde fremkalder til de enkelte filmformater er indgraveret i bunden af tanken. Hæld den korrekte fremkaldermængde gennem midterhullet i låget. Tanken må ikke stå skråt under påfyldningen. Tanken er konstrueret med henblik på, at opløsningerne skal kunne påfyldes med størst mulig hastighed i opretstående stilling, og fremkaldervæsken vil på denne måde dække filmen jævnt nedefra og opefter, hvorved fremkalderstriber eller ujævn fremkaldelse undgås.

BEVÆGELSE UNDER FREMKALDELSEN

Det anbefales at bevæge tanken under fremkaldelsen efter 'kipmetoden'. Denne metode er den mest effektive, når det drejer sig om at undgå ujævn fremkaldelse af filmen. Følgende fremgangsmåde anbefales:

- 1 Når fremkalderen er hældt i tanken, stikkes drejepindén ned gennem midterhullet og spiralen drejes kraftigt frem og tilbage i nogle få sekunder for at fjerne eventuelle luftblærer, der kan danne sig på filmens overflade. Lette slag på bunden af tanken på bænken hjælper også med at fjerne luftblærer. Derefter anbringes det vandtætte polyætylen låg på midterhullets krave, og tanken henstår i 1 minut, så filmen kan blive gennemvædet af fremkalderopløsningen. N.B Låget skubbes LANGSOMT ned. Herigennem forhindres unødvendigt lufttryk inde i tanken, der kan forårsage lækage gennem tætningsringen under neddypningen.

PATERSON FREMKALDERTANK SYSTEM 4

VIGTIGT

Filmspiralerne til System 4 fremkaldertankene er fremstillet af acetalharpiksmateriale, der er specielt modstandsdygtigt mod fotografiske opløsninger og der kan tåle temperaturer op til 100°C. Alle andre sorte tankdele er af Polyætylen fremstillet af Polystyrene, der har den største modstandsdygtighed overfor fotografiske opløsninger, men kan påvirkes uheldigt af varme eller af organiske opløsningsmidler som for eksempel æter. Disse dele må derfor ikke rengøres i vand, der er varmere end hvad man uden ubehag kan have hænderne i, og de må ikke tørres i nærheden af kraftige varmekilder eller stilles ovenpå en radiator.

BRUGSANVISNING

INDSTILLING AF SPIRALEN

Filmspiralerne kan indstilles til tre forskellige filmbredder: 35mm, plus '126', '127' og '120/220'. Fjern spiralen fra den sorte søjle i midten og indstil den på den ønskede størrelse. Til opnåelse heraf holder man spiralen således, at filmindføringsstederne er øverst og vender mod Dem. Højre udskæring drejes fast til højre, indtil låseanordningens modstand forsvinder. Man føler et svagt klik, der angiver, at udskæringerne ikke længere er i indgreb og nemt kan skilles ad. Hver films indstilling reguleres af en kilegang på midterkærnen. Når udskæringerne er rigtigt adskilt, drejes de fast i modsat retning til låsning. Skilles flanger helt fra hinanden, skal man sørge for, at de to hak på kærnen falder sammen, når de samles igen.

INDSÆTNING AF FILMEN I SPIRALEN

Indsætningen skal ske i absolut mørke. På 35mm. småbilleddfilm skæres trækstrimlen (det første 'halve' stykke af filmen) af mellem perforationshullerne, ikke gennem disse. For rullefilmens vedkommende er det bedst at trække den helt af spolen og frigøre den fra beskyttelsespapiret, før indsætningen påbegyndes. Hold spiralen i venstre hånd, med filmindføringsstederne lige overfor hinanden og vendt mod Dem selv. Skyd filmen ind i spiralens riller og skub den en halv omgang frem (10-15 cm). Filmens kanter vil nu være i indgreb med kuglemekanismen i spiralen, og filmen kan ikke trækkes ud.

Hold nu spiralen som vist i figur 1 og drej de to spiralhalvdele frem og tilbage, hver del i sin retning, og så langt de vil gå. En indbygget stopanordning forhindrer at de to dele drejes for langt. Filmen vil automatisk blive trukket ind i spiralrillerne af kuglemekanismen, og hele filmen vil let blive spolet ind. Drej spiraldelene smidigt og roligt. Læg på figur 1 særlig mærke til tommelfingrenes placering. De skal dække både kanten af spiralen og selve filmen. Denne placering hjælper til at lede filmen glat og sikkert ind i rillen. Disse takker griber fat i perforationshullerne, når filmen er nået halvvejs ind og hjælper derved med til at overvinde gnidningsmodstanden mellem film og rillekanter.

Hvis filmen af en eller anden gruns skulle gå fast undervejs, må der ikke bruges magt, idet filmen derved kan rives i stykker. Fjern filmen fra spiralen (se længere fremme hvorledes dette bedst sker) og begynd indsætningen forfra. Hvis man aldrig før har prøvet på at sætte en

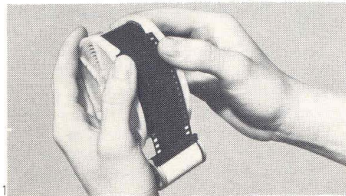


ABB. 1

er sonst reißen könnte, sondern nehme ihn einfach wieder aus der Spirale (wie nachfolgend beschrieben) und fange nochmals an. Falls man mit dem Laden von spiralen nicht vertraut ist, lohnt es sich, mit einem anderen Film mit geschlossenen Augen zu üben. Wenn Sie die Spiralen mit geschlossenen Augen laden können, werden Sie in der Lage sein, einen belichteten Film im Dunkeln zu laden.

Bei der Mehrzahl der modernen Kleinbildkameras wird der Film auf die Aufnahmespule der Kamera in umgekehrter Richtung zu seiner normalen Wicklung aufgerollt. Das richtet den Film aus und mag bei den letzten fünf Zentimetern Schwierigkeiten verursachen, die Spirale damit zu laden, weil sich der ausgerichtete Film nicht so gut an die Innenwindungen der Spirale anlegt. Diese Schwierigkeit läßt sich vermeiden, wenn man den belichteten Film in die Kassette zurückwickelt und einige Stunden darin läßt, ehe man ihn in die Spirale lädt, so daß er seine normale Windung wieder annimmt. Während des Ladens sollte man die Windung des Films sorgfältig erhalten, indem man die Spule auf der Hand, oder auf dem Tisch ruhen läßt. Nach dem Laden schiebe man die Spirale ganz auf die schwarze Mittelsäule, gefolgt von dem Kragen

aus Federn, der eine Bewegung der Spirale während der Kippbewegung verhindert. Nun schiebt man die Spirale wieder in den Tank. Dabei ist zu beachten, daß sich der Dichtungsring aus Polyäthylen richtig auf dem Rand des Tanks befindet und schraube dann den Tankdeckel zu. Dieser ist jetzt ganz lichtdicht und kann in volles Tageslicht gebracht werden.

ENTWICKELN

Die erforderlichen Entwicklungsmengen für jedes Filmformat sind an der Unterseite des Tanks eingraviert.

Man gieße die benötigte Lösungsmenge durch die Mittelloffnung im Deckel. Während des Füllens DARF der Tank NICHT schräg gestellt werden. Der Tank ist so konstruiert, daß man Lösungen ganz rasch einschütten kann, während er sich in aufrechter Stellung befindet, so daß die Lösung den Film von unten nach oben bedeckt und dabei Streifen oder ungleichmäßiges Entwickeln vermieden werden.

BEWEGEN

Das empfohlene Bewegungsverfahren ist Kippen. Es ist das wirksamste, um eine ungleichmäßige Entwicklung des Films zu verhindern. Folgendes Vorgehen wird empfohlen:

1. Nach dem Einfüllen des Entwicklers führe man den Rührer ein und drehe man die Spirale für einige Sekunden hin und her, damit Luftblasen, die sich auf der Filmoberfläche bilden können, entfernt werden. Ein leichtes Klopfen gegen den Boden des Tanks wird ebenso dazu beihelfen, Luftblasen zu beseitigen. Dann bringe man die wasserdichte Kappe auf dem Deckel in die richtige Stellung und warte eine Minute, bis der Film mit der Lösung gesättigt ist.



English

Paterson make a full range of darkroom equipment for both black-and-white and colour photography. The range includes film developing tanks, focusing equipment, trays, washers, proofers, filters, colour print processors, equipment for resin coated paper processing, trimmers and many other items. Ask your dealer for details and a full line brochure.

Français

Paterson fabrique une gamme complète d'accessoires pour le traitement en chambre noire des films et papiers photographiques noir et blanc ou couleurs. L'utilisateur peut disposer ainsi de diverses cuves pour le développement des films, de margeurs, de laveurs d'épreuves, de cuves de traitement pour papiers couleurs, de nécessaires de traitement des papiers plastifiés, etc. Renseignements et documentation détaillée chez tous les négociants spécialistes.

Deutsch

Paterson bietet ein komplettes Dunkelkammerprogramm für die Verarbeitung von sowohl Schwarz-Weiß-als auch Color-Materialien an. Es umfaßt Filmentwicklungsdosen, Microscharfsteller, Schalen, Bildwascher, Blattkopiererrahmen, Filter, Colorentwicklungstrommeln, Geräte zur Entwicklung von RC-Papieren, Schneidemaschinen und vieles andere. Holen Sie sich von Ihrem Händler den ausführlichen Prospekt.

Español

Paterson fabrica una gama completa de equipos para cuarto oscuro, tanto para la fotografía en blanco y negro, como en color. La gama incluye tanques de revelado de película, accesorios de enfoque, cubetas, lavadores, copiadores de pruebas, filtros, procesadores para copias en color, equipos para el procesado de papel revestido de resina, cizallas y otros muchos artículos. Solicite detalles en su comercio habitual y un folleto sobre la línea completa.

Italiano

Paterson fornisce un'attrezzatura completa per camera oscura, per la fotografia in bianco e nero e a colori. La gamma comprende: sviluppatrici per pellicole, attrezzatura per messa a fuoco, bacinelle, lavatrici, stampatori a contatto, filtri, sviluppatrici per stampe a colori, attrezzatura per trattamento di carte politenate, taglierine, e molti altri articoli.

Chiedete al vostro negoziante un opuscolo dettagliato e completo.

Nederlands

Paterson vervaardigt een compleet programma voor Uw donkere kamer voor zowel zwart wit als kleurenfotografie. Het programma omvat o.a. ontwikkeltanks, instel-spiegels, ontwikkelschalen, spoelapparaten, afdrukramen; filters, kleurontwikkeltanks, apparatuur voor behandeling van RC-papier snijapparaten en vele andere artikelen. Vraag Uw dealer om inlichtingen en brochure.

Svenska

Paterson tillverkar alla typer av mörkrumsutrustning för både svart/vitt och färg. Sortimentet omfattar framkallningstankar, fokuseringstillbehör, skålar, sköljare, kontaktkopieringsramar, filter, färgkopieframkallare, utrustning för framkallning av RC-papper, skärapparater och många andra artiklar. Vänd dig till din fotohandlare så får du närmare upplysningar och broschyrer över hela sortimentet.

Danske

Paterson fremstiller en komplet serie mørkekammerudstyr til både sort/hvidt- og farvearbejde. Udvalget omfatter fremkaldertanke til film, hjælpeudstyr til skarphedsindstilling, skåle, skylleapparater, kontaktprintere, filtre, fremkaldertromler til farvebilleder, udstyr til Resin-coated papir, beskæremaskiner og meget andet tilbehør. Kontakt Deres forhandler for nærmere oplysninger, og få den omfattende brochure.

THE JOHNSON UNIVERSAL DEVELOPING TANK

The Johnson Universal Tank is the result of many years experience in the design and use of developing tanks and has several unusual features.

The body and lid are robustly made in black polystyrene. The lid is specially designed so that it can be easily replaced in the dark; the screw closure and a soft polythene sealing washer preventing leakage of solution during inversion agitation. The lid is provided with an unusually large filling funnel and a novel system of light-trapping prevents "spluttering" and gives excellent pouring whichever way the tank is tilted. During agitation the funnel and pouring vent are sealed by means of a polythene cap.

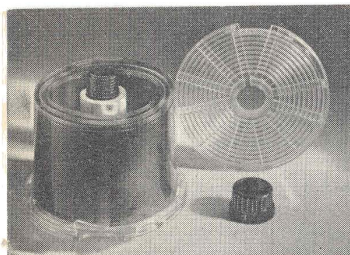
The film-holder is adjustable to take four widths of film—No. 120 (or 620) Roll Film, No. 127 Roll Film, 35 mm. Miniature Film and 16 mm. film. The spiral groove is sufficiently long to accept a full (36-exposure) length of 35 mm. film or up to about 5 ft of 16 mm. 20 exposure lengths of 35 mm. film may also be developed either singly or two at a time. Similarly roll films may be developed either singly or two at a time.

The adjustment to the required width of film is carried out by means of plastic spacers of three different sizes—a system which ensures that the spiral flanges are parallel and correctly spaced. Combined with the Roto-Feed device this makes the Universal Tank particularly easy to load.

The film-holder is self-centering in the tank body and the flanges are of transparent polystyrene—which allows the second exposure of reversal colour films to be carried out without removing the film. The spacers, which surround the central column, are made of white plastic, giving additional reflected light.

The parts of the tank and of the film-holder are shown in the "exploded" photographs on Page 3. These also indicate the correct method of assembly.

WARNING: As stated, many of the components of the tank are made of polystyrene. This plastic has excellent chemical resisting properties but is liable to distort or melt if subjected to excessive heat. Do not, therefore, wash the tank in very hot water or dry it in an oven, over a hot radiator or near a hot fire.



REMOVING THE FILM FROM THE FILM-HOLDER

At this stage the object is to remove the film from the film-holder without damaging the soft, wet emulsion.

The best way of doing this is to place the film-holder on a flat surface and then remove the retaining nut and the upper spiral flange. The film

can then be taken out of the lower spiral flange and unrolled.

Attach film clips to the ends of the film, wipe it down carefully with a pad of damp cotton wool or a soft plastic sponge and hang it up to dry in a warm dust-free place. Make sure it is really dry before taking it down.

WASHING AND DRYING THE TANK

Always wash the tank thoroughly and dry it before putting it away. If the lid, cap and sealing washer were removed before the film was washed, take particular care to wash them free from fixer. The film-holder is usually washed free from chemical contamination during the washing of the film. To make sure of this it is, however, advisable to dismantle the film-holder and rinse the various parts separately.

Finally wipe all parts of the tank with a soft, absorbent cloth and leave it in a warm place to dry.

CAUTION

DO NOT WASH THE TANK IN VERY HOT WATER OR DRY IT IN AN OVEN, OVER A RADIATOR, OR NEAR A HOT FIRE. TOO MUCH HEAT MAY DISTORT OR EVEN MELT THE PLASTIC.

CHEMICALS FOR BLACK-AND-WHITE PROCESSING

All Johnson Developers and Fixers may be used in the Universal Tank, but the following products are particularly recommended—

Unitol Fine Grain Developer. This is a concentrated fine grain developer which is based on the system of diluting one ounce of the concentrate to the volume required to develop a film. The working strength solution is made up fresh for each film and discarded after use.

PATERSON PRODUCTS ARE MADE IN ENGLAND : PRINTED IN ENGLAND



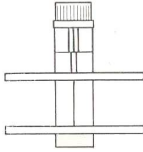
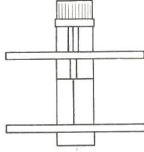
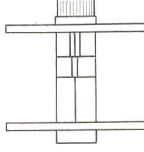

PATERSON



ADJUSTING THE FILM HOLDER

The distance between the spiral flanges may be adjusted for any one of four film widths, as follows:-

- Remove the plastic **retaining nut** from the end of the centre column. Slide off the **upper spiral flange** and the three white **spacers**. The longest spacer has one rib, the shortest two ribs and the intermediate spacer three.
- Replace spacers and upper flange as shown below. The grooved side of the upper flange must face the grooves in the lower flange and all three spacers must be used—either between the flanges or between the upper flange and the retaining nut. For 16 mm. film use the shortest spacer (two ribs) between the flanges and the other two spacers between the upper flange and the retaining nut.
- Tighten retaining nut sufficiently to hold flanges firmly in position but at the same time allow the lower flange to rotate smoothly. Over-tightening may make the Roto-Feed action (see page 6) unduly stiff.

35 mm Film 828 Roll Film	No 127 Roll Film	No 120 or 620 Roll Film
		
Solution required - 300 c.c.s or 10½ ounces	Solution required - 400 c.c.s or 14 ounces	Solution required - 500 c.c.s or 17 ounces

Solution Volumes

The diagram also indicates recommended solution volumes for three film widths. For 35 mm. and No. 27 roll films these are minimum volumes. More solution may be used if preferred, but it is never advisable to use much more than 500 ccs. (or 17 oz.) since this reduces the air space which is necessary to ensure efficient agitation when the tank is inverted. The above figures are engraved on the base of the tank.

The minimum volume of solution necessary for 16 mm. film is 200 ccs. (or 7 oz.)

The Universal Tank is designed for Inversion Agitation and when correctly assembled (sealing washer and cap in place and lid screwed down firmly), it can be turned upside down without risk of leakage. Every effort has been made to ensure that the tank is leak-proof but, of course, development should be carried out (say) over a sink or pile of newspapers in case of accidents.

The method of agitation is shown on Page 8. Hold the tank as shown turn it upside down and wait until the developer has drained away from the film into the lid. Then turn it back again. Repeat this half-a-dozen times at the commencement of development to dislodge any air bubbles which may be adhering to the film, and then agitate in the same way for about 10 seconds (say four inversions) at minute intervals throughout development.

When using very short developing times (less than say 5 minutes) agitation should be carried out at intervals of about 30 seconds.

Note. The Universal Tank has been specifically designed for inversion agitation. No provision is made for rotation of the film-holder and no "stirring rod" is provided. In fact, methods of agitation by which the tank is rotated or twisted should be avoided since they may cause films to move along the spiral grooves.

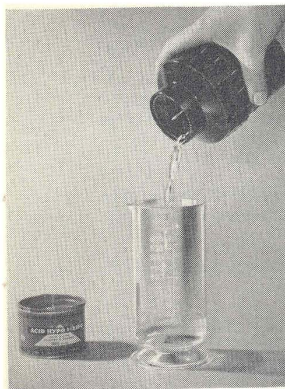
Straightforward, gentle inversion is all that is required; cocktail shaking techniques are quite unnecessary!

FIXING

Time development carefully and, when the recommended time has passed, remove the sealing cap and pour the developer away. **DO NOT** remove the lid of the tank at this stage.

Give the film a *brief* rinse by filling the tank with clean water and then pouring it away. Rinse twice in this way or, if preferred, use a stop bath (e.g. Pactum Chrome Stop Bath) according to the instructions. Prolonged washing at this stage is unnecessary and undesirable.

Next pour the fixing solution into the tank and replace the sealing cap. Agitate occasionally.



When using ordinary hypo fixers, 10 minutes is a safe fixing time with fresh solution and the lid of the tank may safely be removed after about 5 minutes. If for any reason the film has not cleared when it is examined, continue fixing until it has; "double the clearing time" is a safe rule. With rapid fixers such as Ultrafix, films will clear much more rapidly—usually in 30-60 seconds. A total fixing time of 2-3 minutes is usually ample.

After the fixer has been poured back into a measure or bottle, remove the lid of the tank and the sealing washer (if you have not done so before).

WASHING

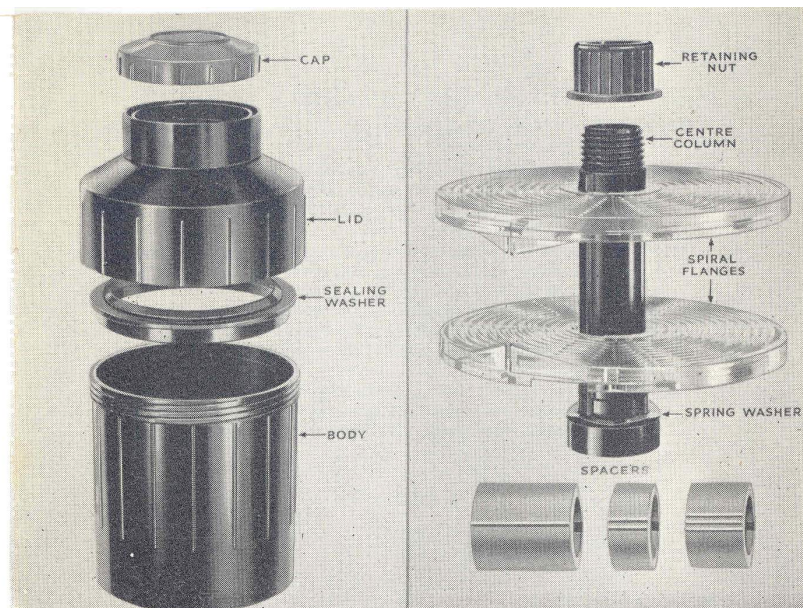
To wash a film efficiently the water must be changed completely at regular and fairly frequent intervals—and must circulate freely to all parts of the film. Otherwise pockets or layers of chemical solution can remain undisturbed throughout the process.

These conditions cannot be obtained merely by placing a developing tank under a running tap for the recommended washing time. Positive steps must be taken to ensure adequate circulation and change of water, and several alternative methods are suggested below.

When possible, remove the lid of the tank before washing. There are only a few special occasions where this is not permissible, e.g. in the first stages of Ferranicolor Reversal processing (see page 12). Then use one of the following methods:—

- Run water from the tap into a plastic funnel which is a tight fit inside the centre column. The Johnson 5 inch polythene funnel is suitable for the purpose. Wash for about half-an-hour, emptying the tank completely every 3-4 minutes.
- Obtain a rubber tube or plastic anti-splash device which is a tight fit inside the centre column, connect the other end to a tap and then proceed as in (a).
- Remove the film-holder from the tank and wash in running water (e.g. in a print washer) for about half-an-hour.
- Where running water is not available, wash with about ten changes of fresh water, leaving each change in the tank for about 3 minutes, agitating occasionally.

After washing, soak the film for 2 or 3 minutes in fresh water containing a few drops of Johnson Wetting Agent 326. This will help it to drain and dry more quickly and evenly.



SPARE PARTS

Spare parts for the Universal Tank are available in standard packs **only**—as detailed below. Individual small components (e.g. single spacers or spiral flanges) are **not** available. The standard packs may be ordered through photographic dealers and to avoid misunderstandings the reference numbers should always be quoted.

Part	Reference Number
Tank Body	UT/1
Tank Lid	UT/2
Sealing Washer	UT/3
Cap	UT/4
Film Holder (complete)	UT/5
Centre column, spring washer and retaining nut	UT/5A
Upper & lower spiral flanges (one of each)	UT/5B
Spacers (set of three)	UT/5C

Please Note. The parts of the new Universal Tank are **not** interchangeable with those of the Roto-Two Tank.

There may be minor differences between your enlarger and the illustrations in this instruction manual, due to a policy of continual product development.

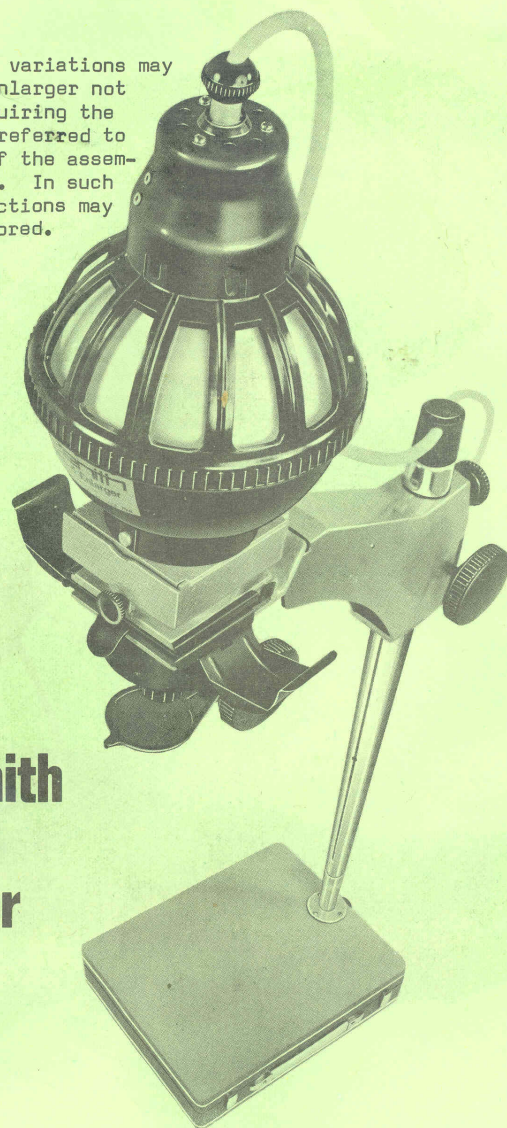


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Zenith House, Thane Villas, London, N7 7PB. Telephone: 01-263 0951
Grams: TECOPTIC London Telex: 261874

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PLEASE NOTE

Lamphouse design variations may result in your enlarger not including or requiring the light trap ring referred to in paragraph 4 of the assembly instructions. In such cases the instructions may therefore be ignored.



The Zenith UPA5M Enlarger

One ounce of Unitol is sufficient to develop one 36-exposure 35 mm. film (or two 20-exposure lengths) at Dilution 10½, one or two No. 27 roll films at Dilution 14 or one No. 20 roll film at Dilution 17.

When developing two No. 20 roll films use two ounces of Unitol and work out developing times for Dilution 8½.

Definol. A highly concentrated high definition developer used at a dilution of 1+20.

Solufin. An extra-fine grain developer, suitable for all types of film. The 250 cc. size is diluted to give 600 ccs. of working strength solution which will develop eight films over a period of several months.

Pactum Chrome Stop Bath. The Twin Pactum contains two packets of powder each sufficient to make a tankful of hardening stop bath.

Fixadon. An efficient acid hardening fixer can be prepared by dissolving 3-ozs. of the powder in 20-ozs. of water. A measure lid is provided.

Ultrafix. A rapid ammonium thiosulphate fixer sold in packs to make two 21-oz. bottles of solution, which can be stored and used repeatedly.

FERRANICOLOR PROCESSING

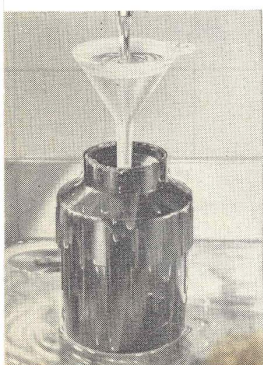
The Universal Tank is very suitable for the processing of Ferraniacolor 25 ASA Reversal Film. 300 ccs. of the Part I Solutions (developers) is sufficient to process one 36-exposure length of 35 mm. film or two 20-exposure lengths. 500 ccs. is sufficient to process two No. 20 roll films.

Washing: Washing is particularly important in colour processing and the instructions given on page 10 should be carefully followed.

The first two washes in Ferraniacolor Reversal processing (between First Development and Second Exposure) must be carried out with the lid on the tank. A funnel (as shown) or rubber tube may be used as suggested but with short washes the use of several changes of water is convenient and effective. Fill the tank with fresh water, agitate several times over a period of about a minute, pour the water away and repeat the process.

Second Exposure: The film-holder has transparent spiral flanges, which allow second exposure to be carried out without removing the film. The spacers are made of white plastic and these also help to ensure efficient re-exposure.

Instructions for carrying out Second Exposure are given in the leaflet supplied with the Johnson Ferraniacolor Processing Outfit.



JOHNSON UNIVERSAL DEVELOPING TANK

for
120, 127, 35
and 16 mm
films



JOHNSONS OF HENDON LTD.

Check, and if necessary, adjust the temperature of the solutions before using them. Once a solution has been poured into the tank its temperature may be checked by means of a Johnson Tank Thermometer.

Pour the developer in a steady stream through the funnel in the lid of the tank. Air will be displaced through the circular pouring vent which surrounds the funnel and there is no risk of "spluttering" unless the solution is poured in far too quickly.

There is no need for undue haste; just steadily pour the correct volume of developer into the tank. Never stop half-way because this can cause a dark line on the negatives.

As soon as the developer has been poured in, replace the sealing cap and agitate thoroughly to ensure that the film is evenly wetted.

AGITATION

If a film is simply left to soak in stagnant developer there is a serious risk of uneven development. The developer on the surface of the film quickly becomes exhausted—particularly where the emulsion has been most heavily exposed—and the by-products of development stream down the emulsion, causing underdeveloped streaks.

The solution to this problem is thorough and regular agitation of the developer. What is known as "occasional" agitation—about 10 seconds at the end of each minute—is quite sufficient. All Johnson developing times are based on this type of agitation and it must be remembered that the degree of agitation has an important effect on the speed of development. For consistent results, agitate in exactly the same way every time you develop a film.

LOADING FILMS INTO THE TANK

The whole process of loading films—up to the time when the film-holder has been replaced in the tank and the lid has been firmly screwed down—**must be carried out in the dark.**

There is no need to have a proper darkroom to do this. It is usually possible to find a room or cupboard which, particularly after dark, can be blacked out for a few minutes. But remember that the weakest light (e.g. from street lamps or passing cars) may damage the film.

With a little practice loading is quite easy even in complete darkness—so try to manage without a safelight. Nearly all modern films are panchromatic and even the recommended dark green safelight has to be used with great care. With high speed films the use of a safelight is not, in any case, permissible.

Before starting to load films always make sure that the film-holder is dry and correctly adjusted and that the film(s) and the parts of the tank are laid out on a convenient table or shelf where they can be easily found.

Having found a suitable dark place, prepare your film for loading. In the case of 35 mm. film, remove the film from the cassette (preferably by taking off one of the end plates rather than by drawing it through the light trap) and cut off both the "tongue" and the "tail". With roll films, unroll the film, separate it from the backing paper and remove any pieces of adhesive tape or gummed paper. In either case if the leading end of the film has a pronounced curl, bend it back slightly to straighten. It also helps to clip off the sharp corners of the film, but this is not essential.

If possible, handle films by their edges. If the back of the film is touched occasionally it will do no harm, but do not touch the emulsion side.

Having prepared the film for loading, take the film-holder in your left hand and hold it as shown.

Locate the entry to the spiral grooves by feeling for the indentations in the outer rims of the flanges—or for the small lugs which project inwards to facilitate loading. Make sure that these lugs are opposite to each other by rotating the lower flange anti-clockwise as far as it will go before starting to load.

With the emulsion side of the film downwards, guide the end of the film over the guiding lugs into the spiral

grooves. Then, gradually unrolling the film in the right hand, feed about 6-9 inches into the film-holder. The remainder of the film can now be loaded by means of the Roto-Feed device.

ROTO FEED

The upper spiral flange of the film-holder is locked into position on the centre column; but the lower flange is free to rotate to some extent. Before loading a film, check that the lower flange rotates smoothly; stiffness is due to over-compression of the spring washer and can be avoided by slackening off the retaining nut slightly.

Hold the film-holder as shown and rotate the two flanges in opposite directions—first one way and then the other—applying pressure to the edges of the film with each thumb alternately. This acts like a ratchet and the film is gradually drawn into the film-holder. Make sure that the end of the film is fed a full half inch inside the spiral groove.

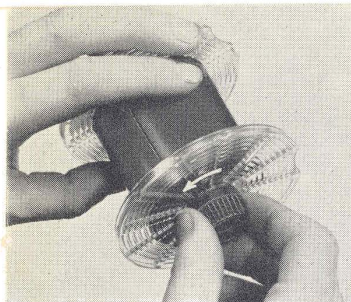
Roto-Feed is very effective and does not damage the edges of the film. After a little practice with an odd length of film it will be found very easy to use. It is often possible to load films without using the Roto-Feed mechanism—but slight differences in the curvature, width or thickness of films may occasionally interfere and, as a routine, the Roto-Feed method is recommended.

A film which has been wound "emulsion side out" in the camera will lose its natural curl and may be more difficult to load. In such a case the film should, if possible, be re-wound back into the cassette some hours before being loaded.

When a colour reversal film has been removed from the film-holder for second exposure it can easily be returned by using Roto Feed—provided that both film and film-holder are held under water.

LOADING TWO FILMS

The spiral grooves are sufficiently long to permit the loading of two No. 20 or No. 27 roll films or two 20-exposure lengths of 35 mm. films—provided that the first film is loaded right into the centre of the film-holder. If this is done, there will be several inches between the back end of the first film and the leading end of the second, and the films cannot, therefore, touch each other.



The first film should be loaded as described above but cannot be fed right to the centre by means of the normal Roto-Feed system. The desired result can be obtained quite easily by lightly gripping the outside of the coil of film with one hand and rotating the film-holder with the other as shown. Alternatively, with roll films, the flanges can be rotated as for Roto-Feed loading—light pressure being applied with the finger tips to the back of the film to give the ratchet effect.

Since no provision has been made for agitation by rotating the film-holder, the two films will not over-lap provided that they have been loaded as recommended.

REASSEMBLING THE TANK

When the film has been loaded, place the film-holder in the tank body—with the retaining nut uppermost. Don't forget to replace the sealing washer in the top of the tank, and then screw the lid down firmly. The cap need not be replaced.

NOTE: The sealing washer is provided to ensure a leak-proof joint when the tank is inverted. If the washer is accidentally omitted, no damage will be done and the tank will function in a quite normal manner, but slight leakage may occur during inversion agitation.

Once the lid is in position the tank may be taken into the light and development can be carried out. The tank is very efficiently light-trapped but it is not, of course, advisable to leave it in bright sunlight for any considerable length of time.

PROCESSING A BLACK-AND-WHITE FILM

Having chosen a suitable developer, make up the quantity recommended in the table on page 4 for the type of film to be processed. At the same time, make up a sufficient quantity of fixer—taking care not to contaminate the developer with it. Some notes on suitable developers and fixers are given on page 12.

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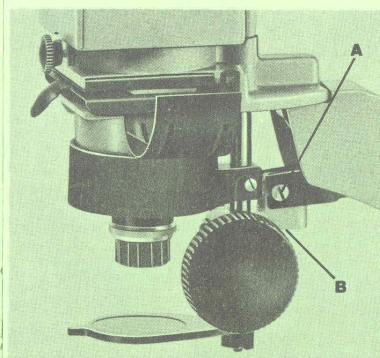
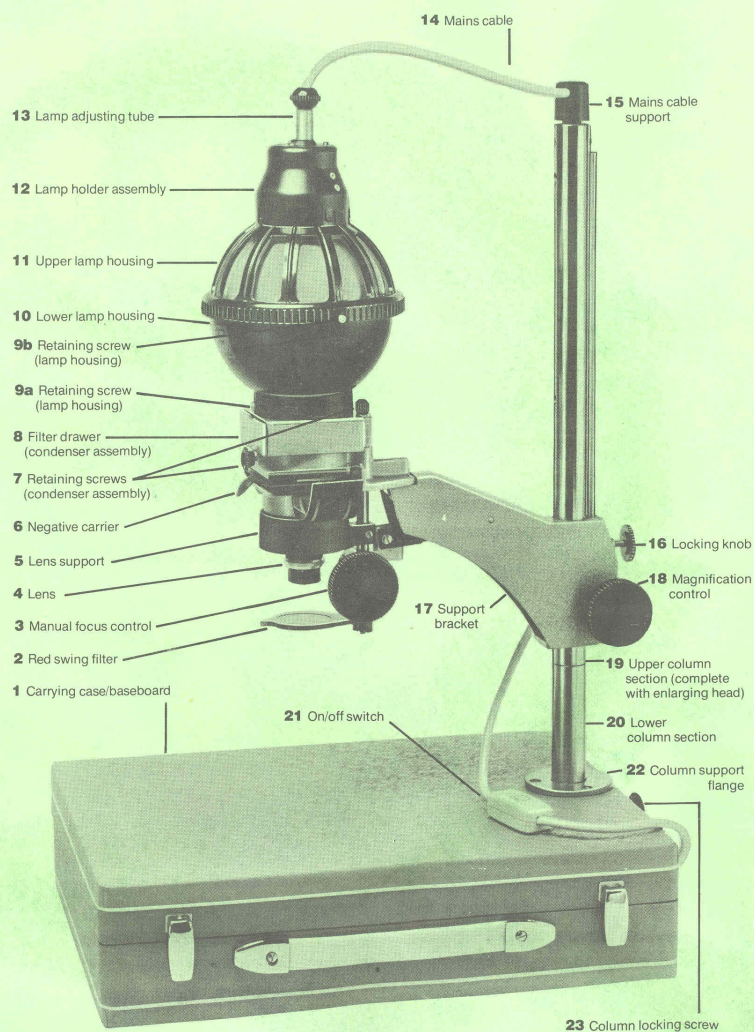


Fig 2

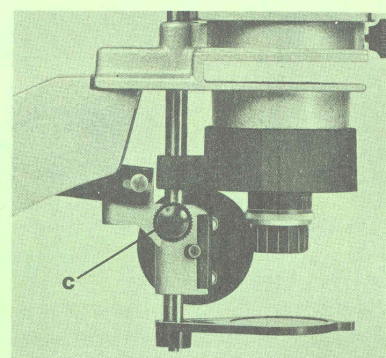


Fig 3

The Zenith UPA5M Enlarger

INSTRUCTION MANUAL

Description The Zenith UPA5M Portable Enlarger offers both automatic and manual focusing and provides facilities for printing from standard (24 x 36mm) 35mm negatives, from half frame (18 x 24mm) 35mm negatives and from 10 x 14mm negatives taken on 16mm sub-miniature film. It is also possible to use the enlarger for colour printing by placing up to four 6 x 6cm correcting filters in the drawer provided. The automatic focusing mechanism operates in the 2.5x to 8x magnification range. Manual override permits focusing in the range from 8x to 20x magnification.

Preparation and Assembly Remove the various components and parts from the carrying case and assemble as follows:—

1. Close and lock the carrying case.
2. Screw the lower column section (20) into the upper column section (19) as far as it will go, locking it tightly.
3. Insert the whole column unit, complete with head, fully into the support flange (22) on the case lid. Tighten locking screw (23) to lock the column

firmly into place with the enlarging head projecting over the case (baseboard).

Note: the auto-focusing mechanism is designed to work directly on the baseboard. If a masking frame is used, then the column must be raised until the locking screw (23) can engage the lower of the two grooves in the lower column section (20). This raises the head by 22mm, so suitable packing must be used to bring the surface of the masking frame to 22mm above the baseboard in order to maintain the auto-focusing facility (see 'Operating Procedure' for further information on this point).

4. Place the lower lamp housing (10) on to the condenser assembly (8), locking it into place with the screw (9a) provided at the front. Now drop the black metal light-trap ring into place at the base of the housing.

5. Fit the lamp holder assembly (12), complete with mains lead, by pushing it on to the upper housing (11), then screw in the 75w 240/250 volt enlarging lamp. Fit the upper lamp housing (11), with bayonet mount, on to the lower housing (10). The upper housing should be locked into place by tightening the locking screw (9b) provided at the side.

6. Push the negative carrier (6), with its sprung steel tensioners at the bottom, into the slot at the front of the enlarger. Push the mains cable support (15) into the top of the column, leaving enough slack to allow free movement of the enlarging head.

7. Fit a three-pin plug to the three-core mains cable, following the instructions affixed to it. If a fused plug is used, then a 3amp fuse *must* be fitted. For non-fused plugs, fit a 3amp fuse into the mains circuit supplying the equipment.

8. Remove the cap from the lens and move the red swing filter to one side, then, before using the enlarger, check that the lamp is set to the position which gives most even illumination, paying special attention to the corners. Adjustment to illumination is made by moving the tube (13) upwards or downwards after having first slightly loosened the three clamping screws around the top of the lamp holder assembly (12). Make sure that the tube is in the correct position and lock it there by retightening the three screws. If a more diffused light is required, the matt finish glass supplied can be fitted into the filter drawer.

9. The single-glass negative carrier supplied is designed for the 24 x 36mm format. In addition there are slip-in masks for the 18 x 24mm and 10 x 14mm formats. These fit into the lower section of the negative carrier.

The Auto-Focus mechanism The auto-focus mechanism is preset at the factory. To be sure that the assembly has not received any damage in transit it should be checked as follows:—

1. Rack the enlarger head down as far as it will go using the control knob (18), fixing it in place with the locking knob (16).

2. Rack manual focus control (3) down as far as it will go, locking it in this position with knob (C—fig. 3).

3. Press the front of the negative carrier down to enable a strip of negatives to be inserted with the emulsion (matt) side facing towards the baseboard. Release pressure on the carrier, switch on the amp using the on/off switch (21). Move the red swing filter (2) to one side, making certain the cap has been removed from the lens.

4. With the column set in its lowest position in the support flange (22), and with a sheet of paper on the baseboard to simulate the photographic paper, the lens should now focus correctly.

5. If the image is found to be out of focus this can be corrected as follows: turn the adjusting screw (A—fig 2) in either direction to obtain the sharpest focus. Before attempting to turn the adjusting screw, first loosen the locking screw (B—fig 2) situated directly below it. After correct focus has been obtained, tighten up the locking screw (B—fig 2) once more, then release the head locking knob (16) and rack enlarger head, using control knob (18), to the top of the column. Now check that the lens is still in focus, bearing in mind that with the increased magnification the image will obviously appear more grainy.

Note If at this stage it is found that focus is still not correct, then it is necessary to return the whole assembly to the suppliers for rectification. Once this has been carried out (i.e. just after initial purchase stage) there should be no further need to adjust the auto-focus mechanism.

Warning No adjustment other than that detailed above should be attempted by the user since otherwise the guarantee will be invalidated.

Operating Procedure All printing should be carried out in a darkroom with a suitable safelight. To protect the photographic paper from accidental exposure whilst it is being positioned on the baseboard, the red swing filter should be positioned below the lens. Avoid over-heating of the lamp house by only switching the lamp on during setting-up, focusing and exposure sequences. Exposure may be made by using the on/off switch or by moving the red swing filter to one side for the amount of time required. Using the auto-focus mechanism it is possible to obtain enlargements of up to 8x magnification directly on the baseboard. For greater magnification turn the complete enlarger column and head assembly through 180° and proceed to project the image on to any other flat surface, e.g. the floor, table or stool, below normal baseboard height. Note: *before* attempting to turn the enlarging column around on its axis, make sure that the unit has been suitably counter-balanced by putting some weight on the baseboard, thus preventing the equipment from toppling over. When the enlarger is used in this form, focusing must be carried out manually as follows:—

1. Loosen the locking screw (C—fig 3) then focus the lens by turning control knob (3) in an upwards or downwards movement.
2. Magnification can be increased or decreased by using knob (18) after first having loosened the locking knob (16).
3. To return from manual control to automatic focusing, the friction knob (3) should be turned until the lens support (5) is at its lowest position, where it should be locked into place with screw (C—fig 3). The enlarger can then be used in its normal mode, focusing automatically direct on the baseboard.
4. If one has a masking frame with a depth of less than 22mm, an alternative method of using the auto-focusing facility (i.e. to avoid the necessity of building-up the height of the masking frame) is as follows:—loosen column locking screw (23) and raise the column to the higher of the two notches, then retighten the locking screw. Loosen the head locking knob (16), then turn the magnification control (18) till the head support bracket (17) is in its lowest position. Then loosen screw (C—fig 3) and



Fig 4

adjust manual focusing control (3) until perfect focus is obtained. With control knob (3) left in this position the auto-focus feature will be retained; however it must be emphasised that screw (C—fig 3) must not be locked. FAILURE TO OBSERVE THIS WARNING CAN RESULT IN DAMAGE TO THE AUTO-FOCUS MECHANISM.

Dismantling To dismantle the enlarger, follow the assembly procedure in reverse. Pack as illustrated (fig 4). The head support bracket should be adjusted to the lowest position, using control knob (18), to pack correctly in the case.

Note To avoid possible backlash in the auto-focus mechanism, the final movement of the head support into the position of correct focus should always be upwards.

The enlarger is supplied with the 3-element Industar 50 enlarging anastigmat lens. This has a focal length of 53.5mm and a maximum aperture of f/3.5. Optimum definition will probably be obtained at an aperture of f/5.6 or less. A 75 watt 240 volt Edison screw P3/3 enlarging lamp is supplied. This is the maximum wattage recommended for use with this equipment.

Beginners Page

DEVELOPING YOUR OWN SLIDE FILMS

Many amateurs get put off doing their own thing with colour because they think it seems so complicated. This is not true and anyone who has developed one or two of his own black and white films should be perfectly capable of developing a colour transparency film.



Items required for colour slide processing: Developing tank, several bottles, measure, thermometer and clock. The number of bottles you will require for the chemicals depends on which process for use. For example, the Kodak E-4 process will need nine, whereas the Unichrome process only needs seven. The extra two for the E-4 are for two additional preliminary steps, Prehardener and Neutraliser.

REVERSAL processing (to give it its correct name) is a process by which a positive image is produced direct on the film without having to make a print. It can be done with almost any photographic material, black and white as well as colour.

The basic principle

When an image is projected on to the film by the camera lens, the light affects the silver salts that form the film's emulsion. When the film is developed, the 'latent image' is changed into a physical image by the action of the developer; the silver salts that have been exposed to light are turned black. This is why the negative is formed—the light parts of the subject look dark on the negative and vice versa.

Suppose that before the developed sil-

ver image is fixed that you make it disappear by bleaching it away; that would leave you with a clear piece of film, of which part of the emulsion had been affected by light (the light parts of the picture) and part had not been affected by light (the dark parts of the picture). But the film is completely clear, having had any image removed by the bleach. What if you now expose the film to light again? The silver salts that have not previously been affected by light will be affected now; developing the film again will produce a dark image where there was no image previously, in other words where the light parts were on the original negative. So a reversal of the image has occurred to produce a positive image.

While this is the basic principle upon which all reversal processing works, it is slightly more complicated when one comes to colour; with a colour transparency the picture is made up of layers of dye and the presence of metallic silver (the dark

parts of the negative) would only make the picture look dull. As a result, the bleaching stage is left till the end so that all the metallic silver (from both negative and positive images) is bleached out at the same time leaving only the image created by the dyes. I think that it would be better to leave the theory here without going on and, possibly, confusing matters. If you are interested in delving further into the subject, there are several good books available in your local library.

It is worth mentioning here that not all reversal is brought about by the action of light on the unexposed silver halide in the emulsion. There are processes, notably the Kodak E-4 process for Ektachrome, where reversal is achieved by chemical fogging.

Equipment

The most important item is a developing tank; for convenience, so that the film does not have to be removed from the spiral for the reversal exposure, the spiral should be made of a translucent material or stainless steel. The older tanks with black plastic spirals are not really suitable.

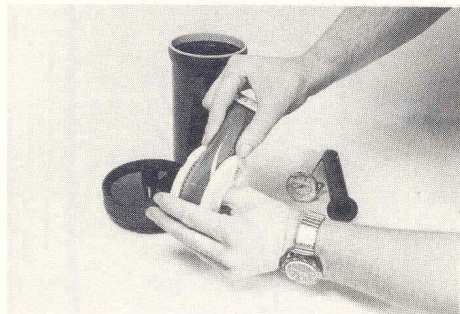
Next, an accurate thermometer; the temperatures that are used are generally higher in colour processing, and small variations can have disastrous effects on the final results. Because of this last point it is advisable to work in a water bath, a tub of warm water, in which the temperature is the same as the working temperature for the process; all the chemicals should be kept in this bath as well as the developing tank. Because temperature is critical, some means of monitoring the temperature of the wash water is invaluable. To this end I have made a simple device that constantly checks the temperature. It consists of a brass T-piece into which is inserted a Brooks dial thermometer (available from Pelling & Cross). This can then be fixed in a Paterson force film washer (if you have a mixer tap) or you can modify one of those handshowers that fits on the hot and cold taps (if you have no mixer tap). See the Built-It article in this issue.

You will also need a number of bottles (or jars) to contain the mixed chemicals. These should all be clearly labelled in such a manner that the labels will not wash or soak off. I favour the use of Dymo Tape personally, but another good way is to paint the names direct on the glass or plastic.

Other items that are essential are an accurate timer (a stop watch will suffice if you don't have a darkroom clock) and, of course, a measuring cylinder. Other items such as stirring rods, etc., are useful, but not essential.

If you are using one of the processes other than the genuine Kodak E-4, you will also need a No 2 Photoflood bulb for the re-exposure. □

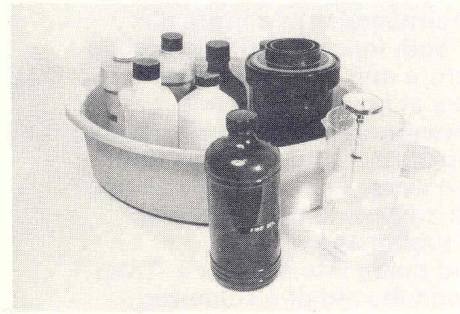
STEP BY STEP REVERSAL PROCESSING



Step 1. Load the film in the spiral. Here you can see how to load Paterson centre-load spirals. The editor prefers this type, finding them much quicker to load.



Step 2. Place the spiral on the centre post and insert in the tank. Both Steps 1 and 2 MUST be done in TOTAL DARKNESS.



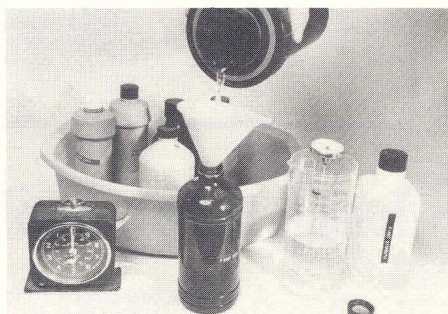
Step 3. All the chemicals should have been mixed beforehand and placed in clean bottles, which should be allowed to stand in a basin of water of which the temperature is that of the process. This should be checked from time to time and heated up by adding fresh warm water. This will keep the temperature of the chemicals right for the process. Before using any chemical check its temperature. **CORRECT TEMPERATURE IS ESSENTIAL TO THE SUCCESS OF THE OPERATION.**



Step 4. Pour the first developer into the tank. Replace the tank sealing cap. Start the clock (times given in chemical instructions).

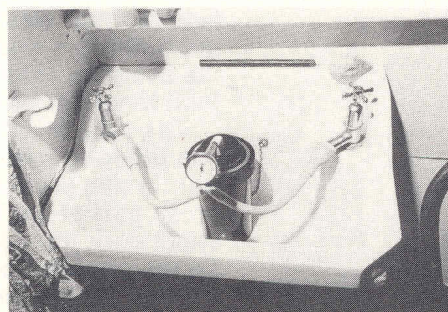


Step 5. Agitate the tank. This is done by inverting it every so often. The exact amount of agitation required will be given in the instructions for the chemistry. Be sure to hold the sealing lid on with the fingers in case it should come loose.

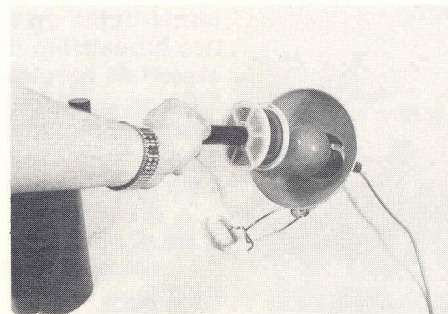


Step 6. When the time for first development has expired, pour it back into the bottle. Have the first stop-bath ready for Step 7.

Step 7. (Not illustrated). Pour the first stop-bath into the tank. Start clock again (times in chemical instructions). Agitate as above. At end of time return to bottle.



Step 8. Wash. The correct temperature is essential here. The picture shows this month's Build-It gadget in use. Duration of wash given in instruction sheet.



Step 9. Second exposure. This is done by shining each side of the spiral to a No 2 Photoflood lamp for about 30 seconds. Careful with some films that you don't hold it too close to the bulb. Don't let water drip on the bulb or it will break. Return the film to the tank.



The rest of the stages can be carried out with the tank lid off, if you wish, but agitation is more difficult that way. With E-4 omit Step 9.

Step 10. Colour developer. Set clock to correct time and start when developer is poured in. Agitate. When time is up, return colour developer to colour developer bottle.

Step 11. (Not illustrated). Colour stop-bath. Pour in . . . set clock . . . agitate . . . when time's up, pour back into bottle.

Step 12. (Not illustrated). Wash as in Step 8.

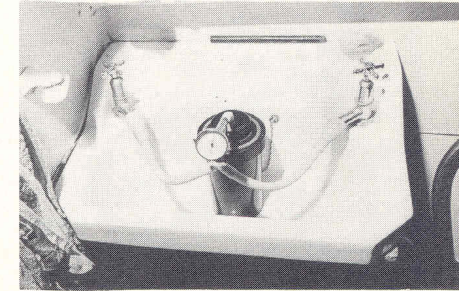


Step 13. Bleach. Pour in . . . start clock . . . agitate. When time's up, return to bottle.

Step 14. (Not illustrated). Wash as in Step 8.



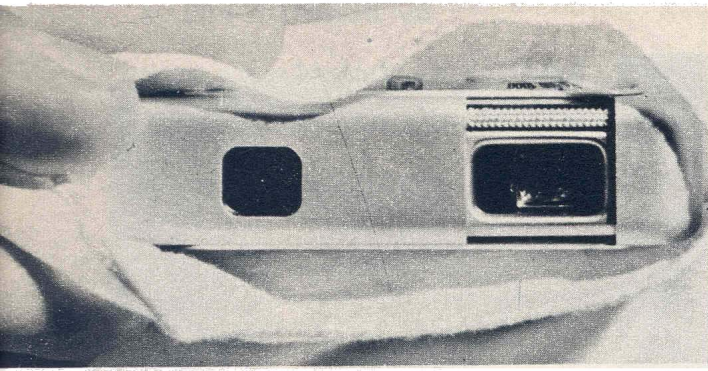
Step 15. Fix. Pour in . . . start clock . . . agitate. When time up, return to bottle.



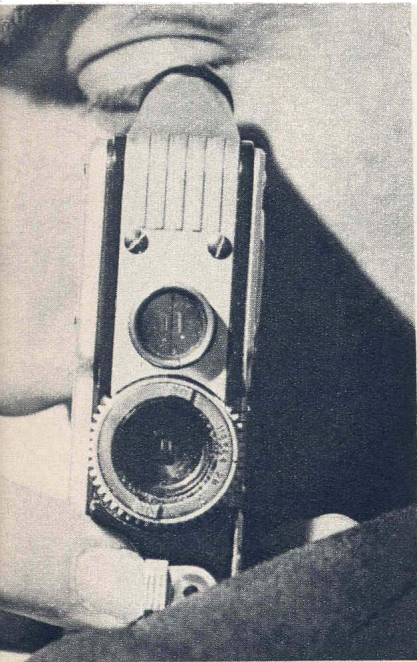
Step 16. Wash.

Step 17. (Not illustrated). Stabiliser. Pour in . . . agitate . . . pour back into bottle.

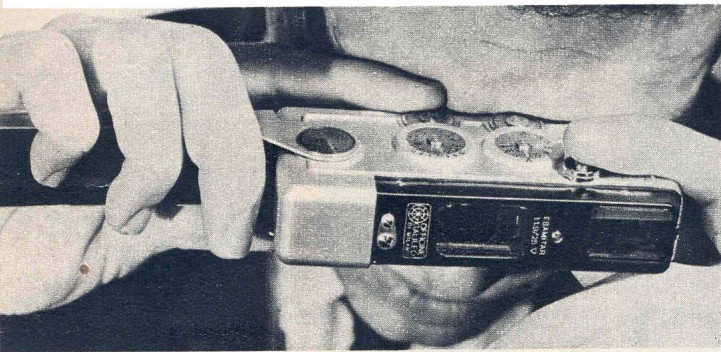
Step 18. (Not illustrated). Dry. Allow film to drain naturally, don't squeegee as the delicate emulsion could be damaged.



Minox: 3.5 lens; shutter to 1/1000



Minicord has f/2 lens; shutter to 1/400



GaMi: 1.9 lens, shutter to 1/1000

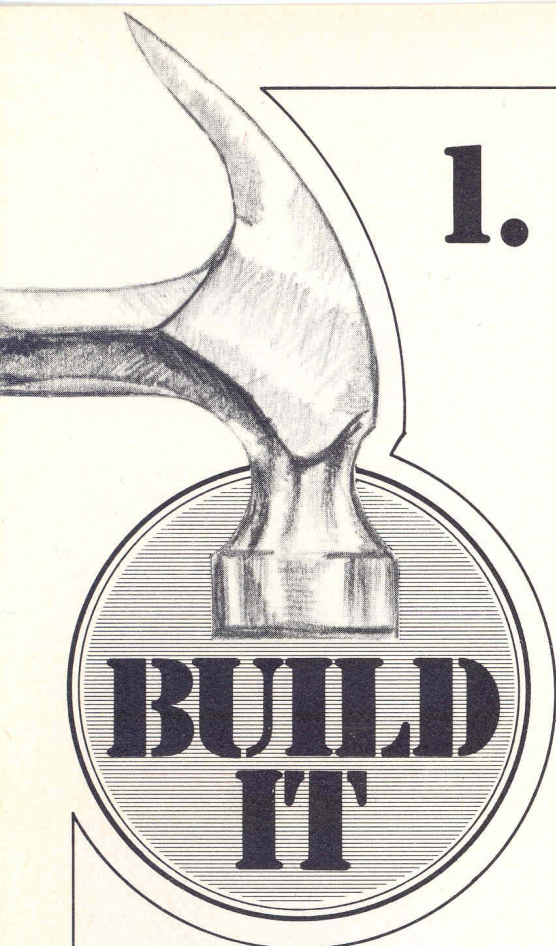
These three cameras are the most advanced models now available in the subminiature field. Although they can be adapted to a variety of photographic duties, they are unexcelled for work where the camera must be as inconspicuous as possible.

These tiny precision instruments can make pictures with unobtrusive efficiency when the situation requires a really *candid* candid camera

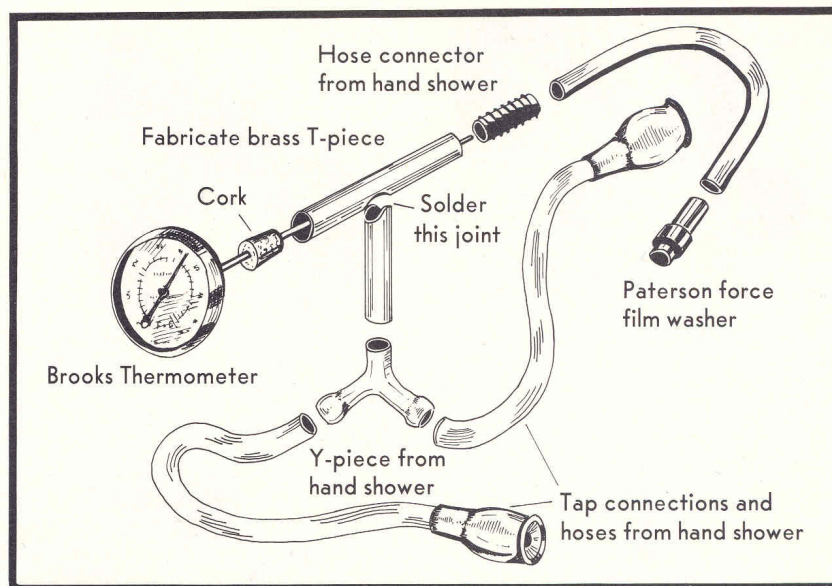
SUBMINIATURE cameras using 16-mm film have been around for a long time but only recently have they left the novelty counters to make their bid for recognition as instruments capable of serious photography. Limited by crude design, uncertain film supply, and careless processing, these cameras were barely capable of producing a blurry, grainy 4x5 print. Now, however, with the introduction of new cameras built to highest precision standards, equipped with sharp, fast lenses and automatic operating controls, subminiature photography may be on the threshold of a boom similar to that experienced by 35-mm during the thirties. It still presents the most exacting challenge to photographers, but aided by specialized accessories and new films, it is possible to make good pictures with these unobtrusive little cameras.

The subminiature offers, in return for the exacting technical skills required to use it successfully, an unexcelled tool with which to gain that most fleeting of photographic objectives—immediacy. Light, fast, inconspicuous, it offers exciting possibilities for creating new visual experiences, capturing those sudden and intimate moments when a subject is completely revealed. It lends itself admirably not only to photojournalism, but to travel and investigative photography where the need is for a quick sketch rather than a full portrait. When the photographic requirement calls for rapid, unobtrusive work, the subminiature fills the bill with large film capacity, almost unlimited depth of field, and fully automatic operation.

By ARTHUR KRAMER



1.



Temperature controlled force film washer

The problem of the temperature of wash water when developing films is even more of a problem with some of the modern high temperature colour processes. This led me to think of the possibility of incorporating a thermometer in a force film washer that fitted to both taps so that one could monitor the temperature and keep it constant. After various attempts at boring holes in a Paterson force film washer attached to a domestic twin tap hair washing spray (during which both the bathroom and the writer were liberally wetted) the eventual solution came in the form of a six inch length of brass tubing and a cork.

The tube is cut and made into a T-piece. This can be done easily with the aid of a soldering iron. A dial thermometer is then inserted down the cross part of the T, being secured in position by a small cork through which a hole has been bored. To the opposite end is fitted a Paterson force film washer. To the third leg of the T (the stem) is fitted the bathroom shower unit. The latter should have the part after the Y-piece removed so that the Y-piece can be fitted into the T-piece that has been fabricated. Alternatively a 'Y' could be constructed on the inlet part of the 'T' and the two tubes from the shower unit fitted to these.

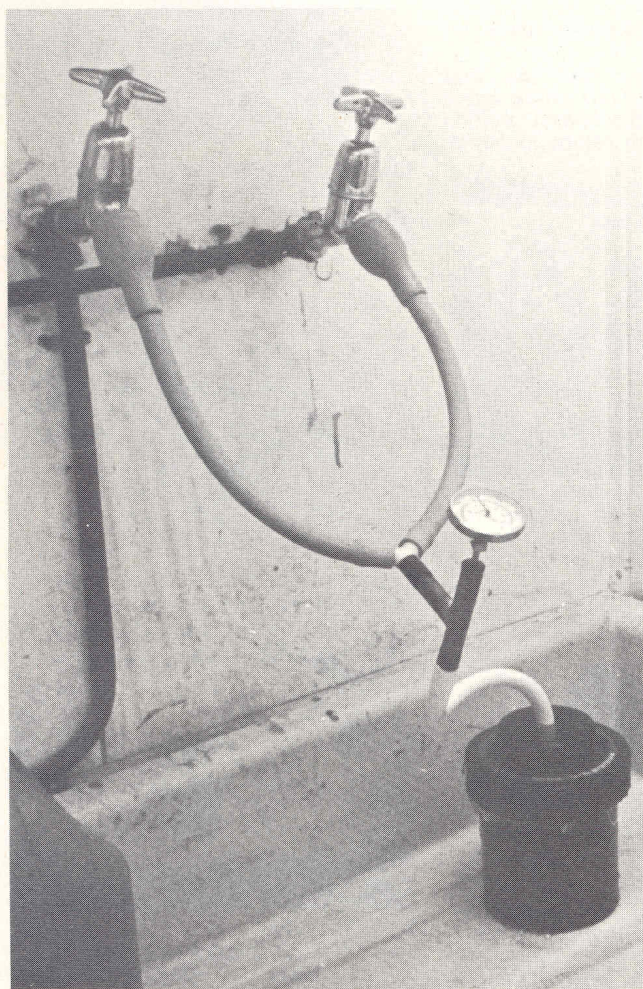
Materials required:

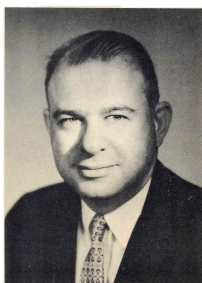
- 1 Paterson force film washer
 - 1 Brooks dial thermometer
 - 1 hand spray to fit the bathroom taps
 - 1 six inch length of $\frac{1}{2}$ -inch OD (outside diameter) brass pipe
 - 1 small cork with a hole bored in it. (Your local chemist might be able to help here.)
- PVC tape is also useful to provide a good seal at the joints

Solder and flux

Tools required:

Hacksaw, round file and soldering iron.





MEET THE AUTHOR

Joseph D. Cooper's *The New Ultra-Miniature Photography* is based upon several years of study and use of all ultra-miniature cameras, accessories, and materials on the market.

His other guide books in the field of ultra-miniature photography include *The Minox Manual*, *The Minolta-16 Camera Guide*, and *The Mamiya-16 Camera Guide*. At the present time he is preparing a series of pocket-sized volumes to be used as a working guide with each ultra-miniature camera. The first of these will be the *Minox Companion*.

Dr. Cooper also writes a monthly column for *Modern Photography* on ultra-miniature topics.

In addition to his busy writing schedule, Dr. Cooper has been active as a business and management consultant. He is also adjunct professor at government and public administration at American University, in Washington, D. C.

Among his other Universal Photo Books have been *Photography Through Monoculars, Binoculars and Telescopes*, *The Fujica Camera Guide*, *The Olympus Camera Guide*, *Single-Lens Reflex Photography*, *The Minolta Manual*, *The Mamiyaflex Camera Guide*, and *The Voigtlander Bessamatic Guide*.

Books on Ultra-Miniature Photography by Joseph D. Cooper

THE MINOX MANUAL

Joseph D. Cooper's recently published *Minox Manual* is the most thoroughgoing guide ever published on the fabulous Minox cameras—models B and III-S.

Written in clear and simple language, it takes the reader through every phase of camera operation and picture-taking. It covers every aspect of Minox photography: how to expose correctly under all lighting conditions, how to use built-in and auxiliary light meters, how to take flash pictures and control light output, how to use filters to greatest advantage, how to take candid photographs, how to use the Minox with binoculars for long-range photography, how to use the Minox in micro-photography and copying.

The *Minox Manual* contains much information never before published, plus a wealth of useful and easy-to-follow tables and diagrams. It is filled with a wonderful collection of photographs that show the capabilities of the Minox and its accessories under every condition.

MINOLTA-16 CAMERA GUIDE

One of the most versatile and popular of the lower-priced ultra-miniature cameras is the Minolta-16.

In this sprightly volume, Joseph D. Cooper tells the complete story of how to use the Minolta-16 for every phase of photography, and supports his claims for Minolta quality with a series of sparkling photographs.

Films, filters, flash—all this and more is presented in clear and concise detail. The entire book is designed to take the reader along the shortest path to successful performance with the Minolta-16.

MAMIYA-16 CAMERA GUIDE

Every model in the series of Mamiya-16 cameras is discussed fully in Joseph D. Cooper's *Mamiya-16 Camera Guide*.

Handy and practical instructions on every phase of working with the Mamiya Auto-16, the Mamiya-16 Deluxe, and the Tower-16 are included: how to load, unload and advance films; how to focus; adjusting for parallax; controlling depth of field; use of exposure meters; shutter, diaphragm and the secrets of exposure; flash, filters, copying stands, and much more.

Useful advice is also given on how to use the Mamiya in sports, travel, architectural, scenic, and candid photography.

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COOPER
the new
ULTRA-miniature
photography
UNIVERSAL
(AMPHOTO)

the new ULTRA-miniature photography

by Joseph D. Cooper

**COMPLETE DIRECTORY OF
ALL ULTRA-MINIATURE:**

- CAMERAS
- FILMS
- ACCESSORIES

COMPLETE INSTRUCTIONS ON:

- PICTURE TAKING
- EXPOSURE
- FLASH
- COLOR
- DEVELOPING
- ENLARGING
- CLOSE-UPS
- TELEPHOTOGRAPHY

A Complete Guide to Sub-Miniature Photography
with a Chapter on the New Sub-Miniature 35mm Cameras

ABOUT \$7.95

THIS COMPLETELY revised and up-dated version of the author's *Ultra-Miniature Photography* is the ideal guide for every fan who wants to get the best results from his ultra-miniature camera.

Ultra-miniature photography has soared in popularity in the past several years, and new cameras, equipment and developments have made it possible to get thoroughly professional results from smaller-than-a-pack-of-cigarettes cameras. All the latest techniques of picture taking, developing and printing are presented here concisely and clearly.

Besides giving a history of the growth and development of ultra-miniature photography, and a full run-down on all the equipment available, this edition contains expanded chapters on developing and printing, plus brand-new chapters on sub-miniature 35mm cameras and stereo-16 photography.

Here is a short survey of the text:

- The complete low-down on ultra-miniature films, their characteristics and capabilities. How to choose them, how to use them. Full details on how to load your own 16mm film and convert 35mm film to 16mm.

- Techniques for taking better pictures. How to avoid camera shake. When and how to use filters. How to take advantage of psychological sharpness. Suggestions for picture subjects: how to find them, see them, direct them. Complete exposure techniques for every light condition.

- Available light photography. What films are best. What are the limits of camera, film, developers.

- Flash—combustible and electronic. How to control light output. Synchro-sun and synchro-shade exposures.

- Color photography. Films, ratings and uses. How to get the best transparencies and prints. How to make black-and-white prints from color negatives. Ultra-miniature slide projectors.

- Close-up photography. Copying. Micro-photography. Long-distance close-ups.

- Telephoto. Interchangeable and supplementary lenses. How to couple ultra-miniature cameras to binoculars.

- Developing facts and formulas. How to choose material and match it to your film and exposure. Printing and enlarging. Ultra-miniature enlargers.

THE SUBMINIATURE CAPTURES CELEBRITIES OFF-GUARD



When photographer V. M. Hanks covered the U. S. Open Golf Tournament at San Francisco for the *Call-Bulletin*, he chose a Minox instead of the usual 4x5 press camera.

This permitted him to make rapid series shots at 1/1000 second as well as sneaking a photographic scoop with candids of Bing Crosby and Kathy Grant, unknown to them.

Of the more than twenty models now on the market, three cameras are outstanding for their excellence of design, precision workmanship, and superior optics. They are the Minox, the first precision subminiature; the Minicord, a reflex type; and the GaMi, an Italian import. All three have proved dependable under hard use.

The Minox, a German product, originated in Latvia shortly before the war, earning for itself the nickname "spy camera" because of its adaptability to in-

telligence work. About the size of a pack of chewing gum, $\frac{5}{8} \times 1 \times \frac{3}{4}$ inches, it takes 50 pictures 8x11 mm. The lens is a 15-mm f/3.5 with a focusing range from 8 inches. There is no diaphragm on the lens, exposures being varied by adjusting the shutter from $\frac{1}{2}$ second to 1/1000 second. The camera features built-in flash and two filters, an orange and a green. Film is transported by a push-pull opening-closing motion of the camera body and is supplied in special cassettes with a film chamber and take-

up spool so that rewinding is unnecessary. Loading takes about three seconds.

The Minicord is a more ambitious design, a twin-lens reflex with eye-level prism focusing and viewing. The taking lens, a 25-mm f/2 Goerz Helgor, is coupled to the viewing lens by geared mounts. Rotating the taking lens rotates the finder lens. The Minicord uses 16-mm film in reloadable cassettes holding enough for 40 exposures. The film transport is coupled to the shutter wind, the speed range (Continued on page 176)

ULTRA MINIATURE

by JOSEPH D. COOPER

For clear, grainless enlargements, a return to normal—the use of relatively slow films.



Choosing and using a film nowadays is like the story of a cup of tea. You sweeten it with sugar to take away the acid bite of the lemon; you serve it piping hot but then you blow on it. With modern, ultrafast, supersensitive "hot" films, the cooling agent is a neutral density filter to help hold back the light. To sweeten the bitter taste of the rough grain a little, you pour on super-duper fine-grain developers.

I suggest a new departure—a return to normal—the use of relatively slow films for most picture taking with ultraminiature cameras. (Moreover, I suggest the same for 35mm cameras!)

The slower films give you the ultra-fine grain and image resolution you need for making good clear enlargements. This is generally true of black-and-white photography, and in one respect is equally true of color.

Fast or supersensitive films have some advantages: They let you take pictures under lighting conditions where otherwise you could not get a picture. They also enable you to stop down the lens so that you have the deepest possible zone of sharpness (or greatest depth of field). As for their disadvantage, in general, the faster the film, the grainier will be the negative and the print.

No depth of field worries

You don't have a depth of field problem with ultraminiature cameras, even at f/3.5. In fact, the entire Minox system of photography has been built around taking pictures at full aperture of f/3.5, for the 15mm Minox lens has no diaphragm! Still, you can set the focusing scale to take pictures which will be sharp for anything from six feet to infinity.

Most of the other ultraminiature cameras have a focal length of 25mm. Several of them are fixed focus at f/3.5, although they have lens diaphragm controls. This is true of the Steky and it is also true of two new entrants on the market—the Minolta-

16 and the Golden Ricoh 16 cameras.

A couple of cameras, the GaMi 16 and the Minicord, have superbly corrected f/1.9 and f/2 lenses. They enable you to take pictures under difficult lighting conditions with slow films. When stopped down, however, they have the same great depth of field.

It follows, then, that with the flexibility of wide lens apertures and great depth of field, you don't need fast films except in emergencies. On the other hand, when you use fast films like Tri-X you become aware of grain when you enlarge to 4 x 5 or bigger.

Let's review what you want from a general purpose film: First, for ultraminiature photography, you want the finest grain and sharpest image contours to permit maximum satisfactory enlargements to 5 x 7 or 8 x 10 in. Then, as with any general use film, you want full tonal range.

The slowest films usually have the finest grain, but tend to build up excessive contrast if overexposed and overdeveloped. The fastest films produce coarsest grain and tend toward flatness or lack of contrast. Films with thin emulsion layers give you sharpest image contours. The combination of fine grain and sharp image contours gives you best image resolution.

For finest grain

If you want the ultimate in fine grain you can take scenic pictures with a copying film such as Minox Doku-Ortho (ASA 5) or one of the 16mm professional negative duplicating films made by DuPont or Eastman. (I've made 8 x 10's from a Minox Doku-Ortho negative that are just about grainless. You should underexpose somewhat and use a soft, dilute developer to produce a negative a little on the thin side. We'll discuss developers later. Outdoors, you'll do better under hazy sunlight than in brilliant lighting.)

As a practical matter, however, you can use films rated from about ASA 16 to ASA 40 for best results. A number of different films are sold in individual loads for ultraminiature cameras, such as Adox KB-14 for the Minicord and Minox, Ilford Pan F for the GaMi 16, and Kodak Panatomic-X for the new Minolta-16. For the new binocular camera, the CamBinox, KB-14 is the only black-and-white film supplied. These films are the thin emulsion type

(Continued on page 40)

ULTRAMINIATURE

(Continued from page 38)

KB-14 for the Minox has been rerated by the camera factory to ASA 25 instead of ASA 16-20. This is to offset some of the exposure latitude allowed by the ASA rating system, in order to avoid overexposure with its grainy consequences.

If you have a 16mm camera, you can also load your own from bulk movie films. We'll get to that after we discuss what the slow films can do.

As I write this, it is a dull, dreary, gray day in Washington, D. C. With my meter set for ASA 25, I get an exposure of approximately 1/25 sec. Admittedly, this cannot stop action, but then again you are not apt to be taking many pictures on such a day. For action pictures you can switch to a faster film, but still you won't need Tri-X. Out in the brilliant sunlight of Southern California, using an ASA 25 meter setting, I have taken readings indicating exposures of 1/1000 sec.!

The same go-slow advice holds true for flash photography. With the Minox, your biggest problem is to cut down the surplus light from even the smallest flashbulbs—the M2's. Even with the cameras that have lens diaphragms, you are apt to overexpose if you take pictures closer than 11 feet.

If you want to load your own 16mm film, you can save a lot of money and have the joy of shopping for a variety of movie *negative* films. These are normally available from motion picture supply houses. They do not ordinarily have the anti-abrasion backings supplied with regular amateur films, but I have never found this to be any real problem provided ordinary care is taken in loading and subsequent handling of the film.

Most of the films in the following list are available in 100-ft. spools. There are some Gevaert films available in the United States, but since they can be obtained only in 1000-ft. spools, I have not listed them.

FILM	EXPOSURE INDEX	
	D	T
Ilford Pan F	25	16
DuPont 914A Panchromatic	32	25
DuPont 901A Superior 2	40	32
Eastman Background X (Type 7230)	40	32
DuPont 930A Rapid Reversal	50	40
Ilford FP3	64	50
DuPont 931A High Speed		
Rapid Reversal	80	64
Eastman Plus-X (Type 7231)	80	64
Ilford HP3	200	160
DuPont 928A	320	250
Eastman Tri-X	320	250
Ilford HPS	400	320

Note that the DuPont 930A films are rapid reversal films, but they can be processed as negatives. These films have some unique properties: They have thin emulsions of .0002 inches and they can be processed in temperatures as high as 150°F without any impairment of the image. Thus, they are films which you can use under unusual heat conditions.



Compare the results obtainable with ultrafast (*above*) and slow, fine-grain film (*below*). Each picture was enlarged from a portion of 16mm frame.

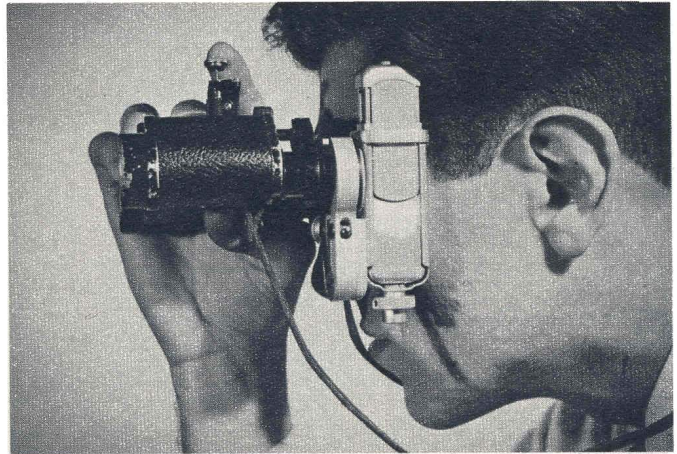


You can also convert 35mm film to 16mm by using the GaMi film cutter. This is a simple slitting device through one end of which a cartridge load of 35mm film is fed. It sells for \$12. The unperforated film which you make in this way can be used with any of the 16mm cameras, except the Minicord, the Stylophot or any other cameras which depend on a sprocket type of film advance.

For color work, the two available film types are Anscochrome and Kodachrome. Anscochrome E. I. 32 is supplied for some of the currently available ultraminiatures, although the release of Super Anscochrome E. I. 100 in 16mm movie spools may result in this new type being made available for these cameras. In any event, you can buy bulk spools and load your own.

Daylight Kodachrome 16mm film is being made available by the distributors of some of the 16mm cameras being newly released to the market. Kodachrome is slow, rated at E. I. 10, but it has exceptionally fine grain, which is important for color prints. For home darkroom loading you can buy a spool of double 8mm or a spool of 16mm Kodachrome. The only color processor I have found, thus far, who will develop short lengths of Kodachrome is the Berkey Photo Service of New York. For the GaMi 16, individual Kodachrome film loads can be obtained from E. B. Meyrowitz, 520 Fifth Avenue, New York, N. Y.—THE END

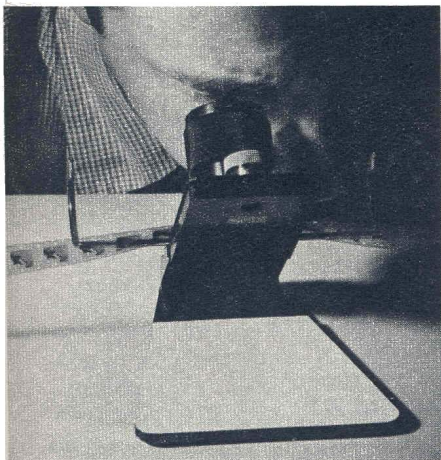
SOME TYPICAL ACCESSORIES AVAILABLE FOR SUBMINIATURE CAMERAS



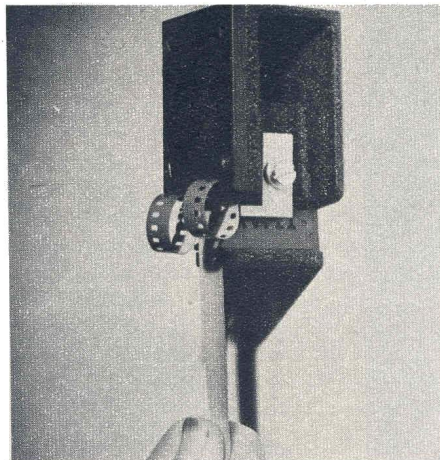
Telephoto-Binocular clamp for Minox permits camera use with binoculars for telephoto effects or on tripod for time exposures.



For close work (18 inches) the Minox has a chain with distances from 8 to 18 inches marked off for exact focusing.



GaMi Frame Viewer can be used both for inspecting negatives, viewing color slides.



GaMi film cutter lets user cut 35-mm stock to get subminiature 16-mm size.

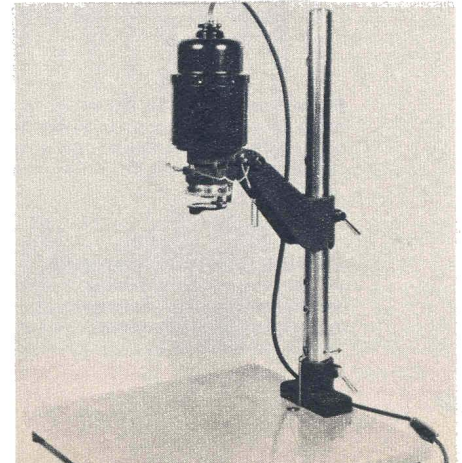
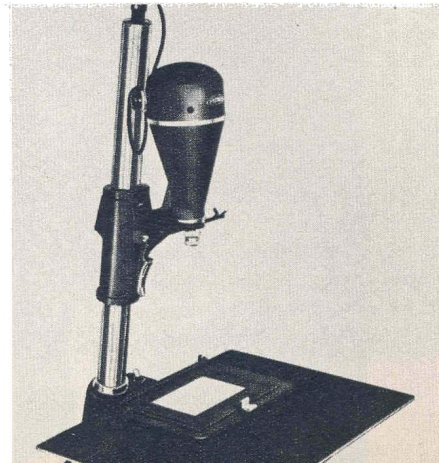
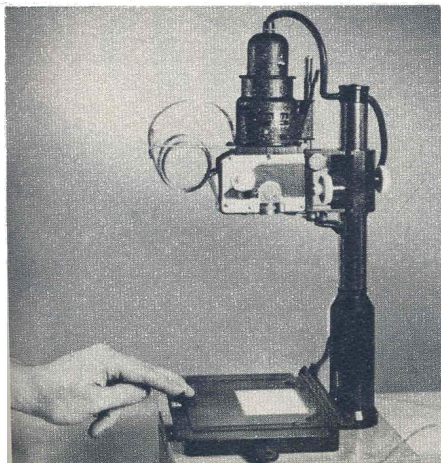


Developing tank for GaMi loads in daylight and uses only 4 ounces of solution.

Minilux attachment uses the Minicord camera for enlarging. The outfit rests on the hardwood box used as a carrying case. It is lowest-priced enlarger of the three.

Minox enlarger has $f/3.5$ lens, allows enlargements up to 11x14 inches on base-board. It uses double condensers with a diffusing disk, has dustless film carrier.

GaMi has non-adjustable lens and unique focusing system. When numbers on column are matched to numbers on lens ring, enlarger is sharp at chosen magnification.



NOT JUST SMALL

*Carry a camera. But you can't carry
one all the time. Well then, get the
sort of camera you don't
even know you're carrying.*

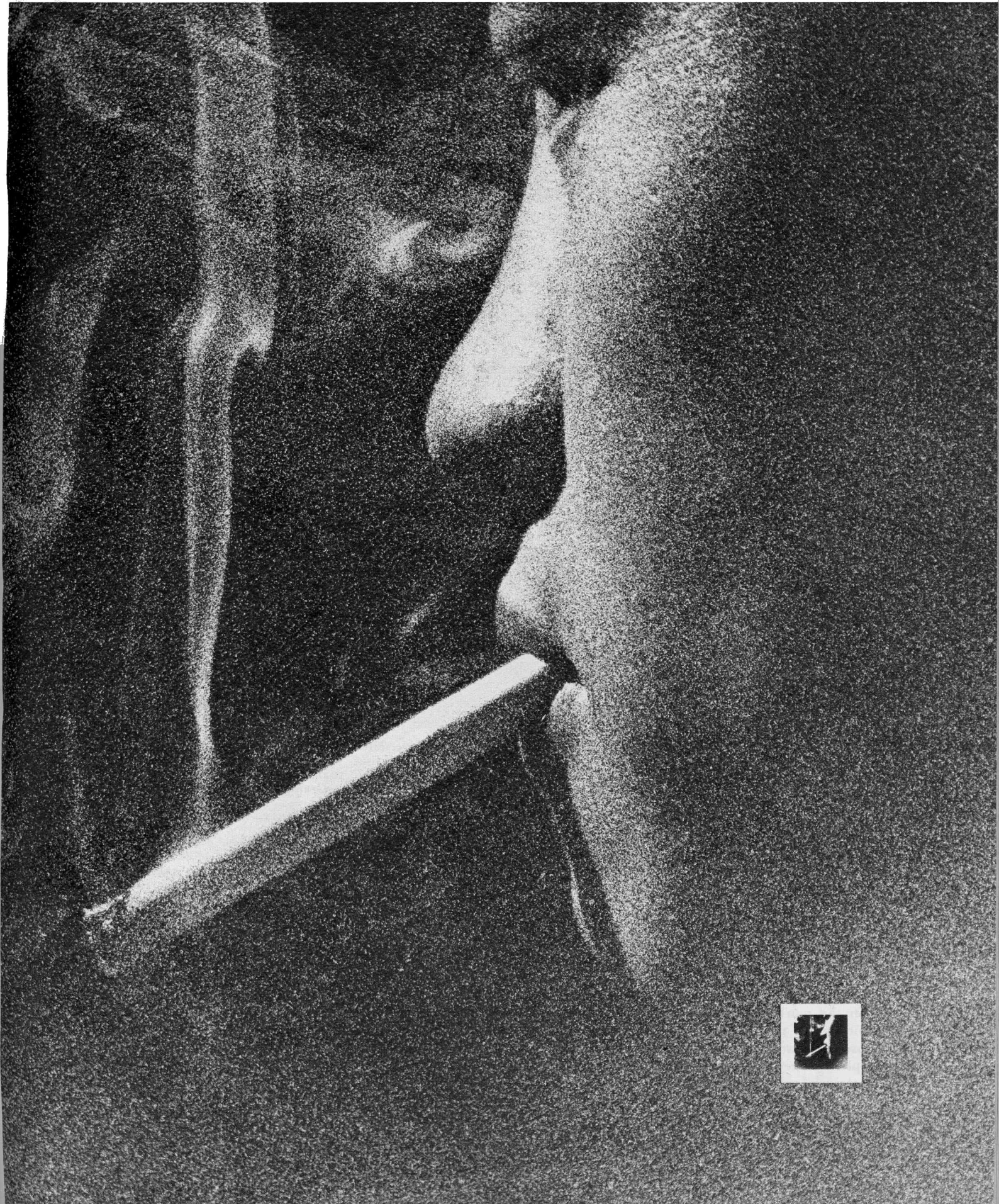
By RON HACK and KEN BAILEY

NOWADAYS you can see in any good camera shop a range of sub-miniature cameras ranging from about ten pounds to over seventy, pretty little things with something of the satisfying feel of a good watch in your hand. Are they anything more than toys, or a second camera, something for your wife to put in her handbag? We've found that they are a whole lot more. We might almost go as far as to say that they open up a completely new field of photography to the amateur and perhaps to the professional, too.

ADVANTAGES

Why? Well, there are two big reasons and a few sub-miniature ones too. First, and this is the biggest reason of all, they are eminently "carryable". With a sub-miniature, neither the bulk nor the weight will spoil your suit if you put it in your pocket. You can "carry a camera" literally, *always*, without looking like a Christmas tree, without straining your neck with a gadget bag and (though this is straying into the second big reason) without labelling yourself as a photographer. The advantages of this kind of portability are obvious—whenever you see a picture situation, you take it. Your camera is out, set (we set ours to the rough light conditions on the way to work in the morning) and you've taken a couple of shots while the man next to you is still wishing he'd brought his camera along. The shot of Lord Russell and his wife was taken in just this way. A sunny day, a celebrity and his wife out for a stroll, a charm-

MINIATURES



This available-light shot, made with a Minicord, shows the results possible with subminiature cameras. Compare with contact print.

With a pipe stuck in your mouth it's simple to go through a little series of perfectly natural actions—and finish up with a picture like the one of the girl in the bus.

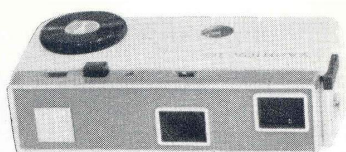
This brings us to another minor advantage of the sub-miniature. Short focus lenses give you a tremendous depth of field. Girl, bus and background are all quite satisfactorily sharp. As for close-ups—the little girl on the other page is staring into the lens at a distance of 12 in.!

Disadvantages? Not many, and most of them can be remedied by changing your technique to suit the new camera. Negatives on 9.5mm. or 16mm. are difficult to process yourself but then the film is correspondingly cheap and the quality of enlargements has to be seen to be believed. Take a look at the enlargement of the cat on page 108. All the enlargements shown on these pages were done commercially. With this sort of service it's nice to be able to relax and concentrate on the taking end.

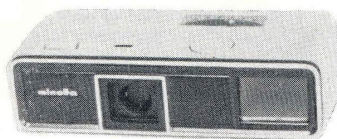
To sum up then, there are more places for a sub-miniature than in a lady's handbag or in the pocket of some international spy. They are a useful tool for the serious photographer and the amateur who likes to take "on-the-spot pictures". A sub-miniature used imaginatively can open up for you a whole new field of photography, and a whole lot of fun.



Yashica 16



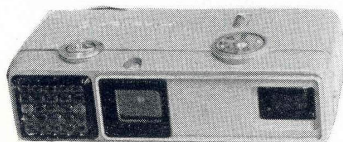
Minolta 16P



Minox B

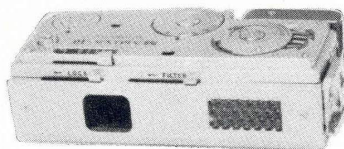


Minolta 16EE

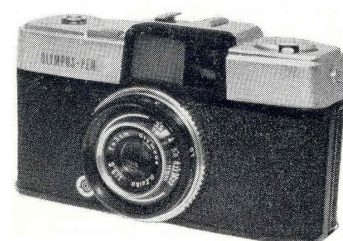


P.M. TESTS

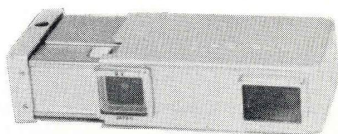
Mamiya 16



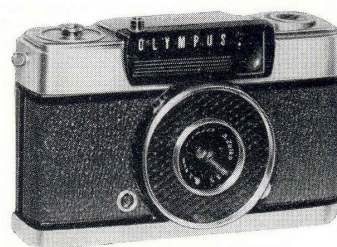
Pen



Minolta 16(II)



Pen EE



important thing is to find a comfortable method of holding the camera without interfering with the lens panel.

Features which we particularly liked were the provision of a neutral density filter (4 × times) which goes over the lens and masks the exposure meter and the large viewfinder eyepiece.

The Rokkor lens was quite good generally in performance but the facility for focusing is an obvious advantage at close distances even with 25-mm. focal length. Quality was noticeably improved when working under conditions in which the lens would be quite well stopped down.

On Reflection

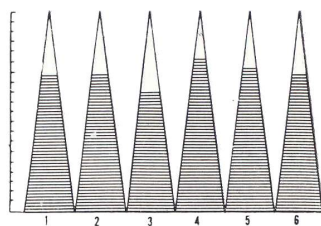
This is a solidly constructed little instrument with a definite type of person in mind. It is extremely simple to use, so simple in fact that one might almost become blasé enough with it to omit the few settings necessary. It will yield negatives of high quality that should be expected of a camera of this price. The only disadvantages have already been stated and it must be remembered that for the sake of automation a scaling up is inevitable.

On Record

Lens: f 2.8. Rokkor 25-mm. Shutter automatic, coupled shutter speeds with film speeds, aperture with meter. Synchronized for flash. Focusing: two zone setting. Finder: optical bright line. Meter selenium cell. Load: special Minolta cassettes Unsprocketed film (Reloadable with sprocket cine stock) 20 exposures. Transport serrated wheel. Size: 2×4 × 1 ins. Weight: 8½ oz.

Price: £29 10s. 7d.

MINOLTA 16P



Lightest and least expensive of these models is the 16P Minolta. This is essentially a simple camera transferred into the subminiature class. It is of cast and pressed alloy construction and satin finish. The single shutter speed of approximately 1/100 sec. works in conjunction with an aperture range of from f 16 to 3.5 the maximum of the lens. Exposure time is determined by a series of symbols in a window on top. These are calibrated against film speed (which is set by a thumb screw) and apertures which are controlled by a serrated disc and indicated by a small pointer. The use of this built-in calculator is very straightforward and a definition of the symbols is printed on the camera back.

The viewfinder is a non-optical type without a bright line and quite functional. Focus is not necessary, beyond 16 ft. There is a tripod bush, and flash socket.

On Test

The camera worked very quietly and with a smoothness on controls. The lens was not much inferior to that fitted to the EE though admittedly of smaller maximum aperture and without focusing

facilities. There are however, close-up lenses available. Because of the automatic aperture control direct comparisons between the two cameras were not possible. One wonders, though, if there is really any economy to be made from constructing a 3.5 lens of this focal length other than an f2.8. Differences in quality which we found may only be inherent in those lenses fitted to the particular cameras tested. On all three Minolta cameras the lens is basically the same one.

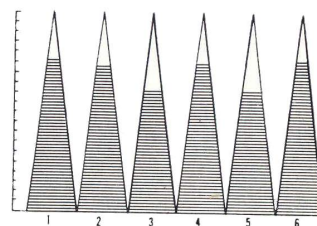
On Reflection

This camera brings subminiature within the reach of the photographic Everyman. It is a delightful little instrument to use in its utter simplicity and good workmanship. Its light weight is probably the greatest single asset and in conjunction with this it is made slimmer than others. The less expensive camera has fewer subject possibilities and more likelihood of error, but neither this nor the automatic is intended for the camera control enthusiast. In conclusion then, a straightforward simple camera for 16-mm. snapshotting and at a very reasonable price; a sound instrument and more rugged than its refined superiors. If you are a day-to-day man of modest budget and you want a subminiature then have a look at this one.

On Record

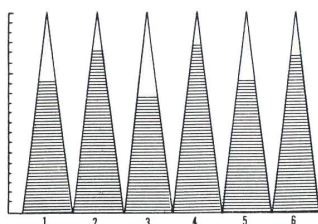
Lens: f 3.5 25-mm. Rokkor coated. Load: standard Minolta cassettes. Viewfinder: non optical. Exposure control: symbol aperture, single shutter speed (suitable also for flash). Size: 1½×4×1 ins. Weight: 5½ oz. Price: (inc. leather strap and case) £11 13s. 1d.

MINOLTA 16(11)



The Minolta 16 (11) is the 16-mm. subminiature which uses the slide transport and shutter tensioning in a similar way to the Minox. This layout has the great advantage that the overall dimensions of the retracted camera can be greatly reduced. The 16 (11) is much shorter in length than any of the other cameras reviewed here, even the Minox. The camera is in fact about the size of a packet of ten cigarettes but slightly fatter. This is achieved by making one part of the body fit inside the other like a section of a telescope. One half contains the mechanism of the camera while the other is a kind of shell which contains the viewfinder and lens window. When the camera is collapsed both are covered, but when pulled open, the space at the end of this outer section makes a tunnel for the viewfinder, while the shutter opening on the inner section arrives opposite that of the outer. There is no built-in light meter and focusing is not provided. However, for extremes, a number of close-up lenses are available which will fit over the taking lens and there is also a distance lens. It must be admitted that subminiature cameras are not the most likely choice for someone wishing to take numerous landscapes. With a smaller negative

YASHICA Y16



On Inspection

This subminiature is a magazine loading model with conventional layout of exposure control. It is solidly made in two cast metal sections. Speed (clickstop) and aperture (free moving) controls are milled wheels beneath the front panel.

Speed and aperture settings are registered in two windows on the top of the camera.

A circular glass window in the top of the body counts the frames additively by dots on a revolving disc, numbered in fives. Transport is by an unusual flat serrated wheel in the top. This tensions the shutter, moves on the film and sets the exposure counter. The very large magazine is box shape and inserted into one end of the camera. The film speed is ASA and the name marked on an end panel, an excellent idea that might be more widely adopted in this and other fields. The magazine is quite simply removed by slipping a catch, and can be interchanged with another with the wastage of only one frame. In this event care should be taken to advance the film one turn before removal and another after insertion. Even so this is a facility otherwise only found in the most expensive of

larger sized models. It is therefore quite possible in a matter of a few seconds to change from b & w to colour and back. The camera has a flash contact and the usual wrist strap and a slip core.

On Test

Magazine changing is simple and positive. The transport knob when used in the recommended way is quite efficient, but used any other way rather inconvenient. The position adopted is most suitable for transporting the film without taking the camera away from the face and the camera is consequently quite fast working for repeat shots. The optical viewfinder is rather smaller than on some other models, and it gives a reduced image slightly one half the size of direct vision. This we did not favour a great deal though it might encourage the user to fill the frame. The viewfinder has no bright line and represents the entire negative area. Lens performance was on the whole very good indeed stopped down, less good at maximum aperture, and the shutter was for all practical purposes, accurate. When the magazine is removed the counter automatically returns to zero so that the frames already exposed must be added to those already exposed if the magazine is to be re-inserted. The magazine is an independent unit containing its own baffle, pressure plate, etc.

On Reflection

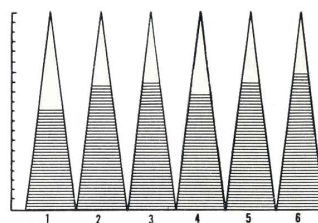
This is an uncomplicated subminiature without the refinements of built-in filters or exposure meter or slow speeds. The 3.5 lens aperture is normally fitted to cameras of this category. The camera is fairly large,

extremely neat and attractive, and beautifully finished with a machining and two tone lacquer. The shutter is rather louder than on some other models but in all the camera is a good average all-rounder which is in the versatile non-automatic class, at a price which is in the Yashica tradition.

On Record

Lens: f 3.5 25-mm Yashinon (coated) shutter. Load, with unperforated 16-mm film 24 exposures. Viewfinder: Optical reduction type. Transport: Moulded disc. Size: $2 \times 4 \times 1$ ins. Weight: 8oz. Price: £15 18s. 6d.

MINOLTA 16EE



Currently the only fully automatic subminiature, the Minolta 16EE is also a shade larger than most of its rivals. The sacrifice of fully automatic is that optional manual control is not possible. However, against this the camera is down to a bare minimum of controls, which makes for the utmost photographic simplicity.

The smooth body is made from finely finished pressed alloy and the lens panel is a single casting. Exposure control is therefore a com-

bination of aperture control by the meter (which of course, does not give numerical readings) and the film speed setting ring which operates the shutter speed at the same time. As always with this system the flash facilities are provided by disengaging the automatic mechanism and using the marked flash figures on the film speed disc. After use with flash the auto is simply re-engaged and the film speed ring returned to the emulsion speed figure.

The viewfinder on this camera is the optical bright line diminishing type. It is marked for parallax errors at close distances.

The EE has a two-zone focus control which will cover most requirements. This is in the form of slide catch marked with portrait and landscape symbols. The magazine is the familiar moulded two chamber type which fits a similar pattern inside the camera. The magazine door returns the frame counter to zero once opened ready for the next film.

On Test

The only test of an automatic camera is to use it as the owner might and to attempt to cheat the mechanism in order to show up any weaknesses. This camera measured up pretty well all round. The exposures were accurate enough under various conditions when the camera was operating freely. However, we did find that the large exposure meter window was susceptible to finger interference if not managed carefully. This is where the small size falls over itself somewhat when in the hands of those not accustomed to it. The

flicks of the thumb and we were glad to see that it was not overgeared to the point of stiffness as on some cameras.

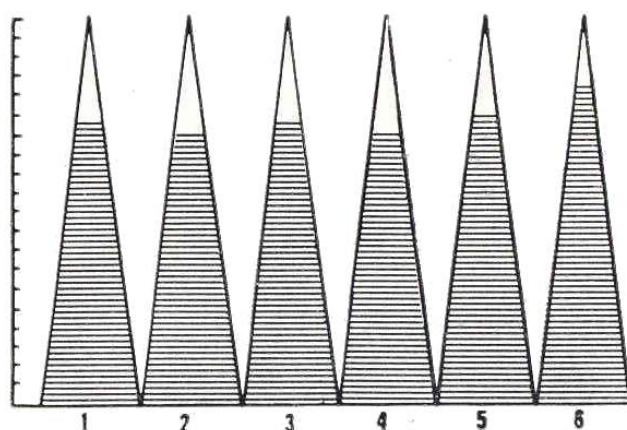
The bright line viewfinder remains bright whatever you point the camera at and is one of the best we have seen.

The camera is really compact and was carried around in a brief case among papers in a way in which a normal sized 35-mm camera could never be.

On Reflection

We were very impressed indeed with this camera. The workmanship and general finish is excellent. It is also remarkable value for money. We give the camera our strongest recommendation, with practically no reservations.

OLYMPUS PEN EE



This automatic version of the Pen camera is of basically similar construction. The main difference is the control arrangement on the lens barrel. In the place of the shutter setting is an ASA film speed ring. In the place of the aperture scale and occupying the front of the lens panel is a large exposure meter window encircling the lens. There is no focus ring.

As the camera is completely

automatic there is no exposure reading and it is translated directly to the aperture diaphragm. In conditions of low light when exposure is impossible a red signal appears in the viewfinder.

The film speed ring has manual control of apertures from f 3.5 to f 22 for use with flash. The aperture leaves open on depression of the shutter release.

The lens fitted to this camera is identical to the Pen and gave a similar performance.

This camera is slightly wider than the Pen camera because of the extra lens barrel, but in all other respects the cameras are similar.

Pen (Pen EE in brackets) Lens: D Zuiko f 3.5 28-mm. Shutter: Copal four speed and 'B' (Single speed 1/60 sec.) Finder: bright line. Film: 35-mm. 24×18 mm. frame. Transport thumb wheel, coupled with film counter, shutter tensioning. Price: £16 16s. 0d. (£24 3s. 0d.)

KEY TO THE CONES

1. Cost; 2. Performance; 3. Precision; 4. Reliability
5. Workmanship; 6. Design.

SQUARES AND CONES

The diagrams which frequently accompany reviews on these pages compare the various features of each item of equipment with one another in relation to the price asked. As these are relative, and not absolute ratings the various sets of cones should not be compared directly with one another except in terms of value for money. Comparisons of this sort would be impractical since an inexpensive item would be shown with a low rating despite the fact that its features might be excellent value for money, and equipment in the 'aristocracy' class would always top the cones regardless of whether the price was too high or not.

the larger the subject is within it, the better. For general subjects, focusing is quite unnecessary with such depth of field.

On Test

This is probably the fastest handling of these subminiatures as far as repetitive shots are concerned. The pump action is extremely convenient. Doing without an exposure meter has its compensations in compactness immediately felt between this and the other models. Since this camera is essentially a sober design we felt that it would have been even better equipped with focusing. Lens performance was the best of the three cameras with Rokkor lenses and at middle distance the definition was remarkable. Loading was quite straightforward although at first, loading a subminiature can be a little difficult for some people. The problem is usually getting the film into the gate, overcome with practice. Unloading is always easy.

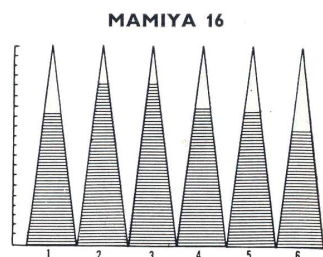
On Reflection

A pleasing camera, by reason of its conventional controls and solid construction. All the same the necessity of an additional lens for long distance work is undoubtedly a certain inconvenience. We liked the camera otherwise, though, and think that it would probably be preferred to others by the more experienced amateur.

On Record

Lens: f3.5 25-mm. Rokkor. Load standard Minolta cassettes. Manual exposure control. Size: $3 \times 1\frac{3}{8} \times 1$ ins. Weight: 6 oz. Price: £16 5s. 5d. (With Case)

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With the Mamiya 16 we come to the subminiature with everything built in. In terms of bigger cameras it would be classed as a semi-automatic camera with a built-in figured exposure meter with additional refinements. For this we go up a bit in size and weight, but there are a lot of mechanics built into these few cubic inches. The camera has a solid pressed steel and die cast body. On the left of the front panel is the exposure meter honeycomb edge. This gives a needle reading on the window on top of the camera. Black and white bands like those on many exposure meters correspond to the markings on the shutter speed/film speed dial. Turning the dial directly controls the aperture seen in another window on the top plate. Next to this is the shutter speed control dial and on the right hand of the top plate is the serrated transport wheel. This has a film load reminder disc on top. The frame counter is in another window and works additively (counting the frames exposed) on the part of the top panel is the focusing control, a slide on a calibrated scale (1 ft. to infinity). To the right of this is the release button with a cable release centre. The lens opening is in the right-hand side of the front panel and can be covered

with a sliding trap door which also locks the shutter release. To the left of this is the sliding filter control which works in a similar manner. The filter is held in a frame behind the front panel and can be moved over the lens by sliding the control. Beneath this is a small sliding gate which opens so that the filter may be removed for cleaning or replacement by another filter. The bright-line viewfinder is popped and swings up in an erect position over the body. When not in use it is folded back into the body again. The base plate has a safety lock on it, and a tripod bush, together with a flash contact. At the other end of the camera is an accessory shoe with a tripod bush centre thread. Normally the wrist strap screws in here, but it can also be used for tripods. The film plane is engraved on the top.

As will be seen from the foregoing description the whole instrument has an array of controls which cannot fail to impress. It also has a good overall finish and a solid feel about it.

On Test

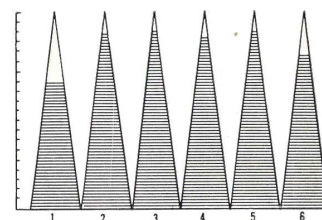
This is definitely a top liner. Not just on account of its versatility, but by performance. The Sekor lens in our sample was as good as any of those tested in general work and at optimum performance had the edge on the f2.8 Rokkor of the Minolta 16 (11). The facility of focusing is a great advantage, with its convenient slide system. The exposure meter was very accurate and reliable. All the controls were smooth and easy to move except the aperture control which was, we thought, too stiff for the size of lever fitted. We have other small criticisms, though they

do not involve the performance. The viewfinder arrangement was good enough but the bright line in the finder should have been much brighter. We would have liked to see a higher top speed than 1/200 sec. since the camera is a subminiature and needs high top speeds. However, the camera has many features which others do not have at all. The price ? £34 0s. 6d.

On Reflection

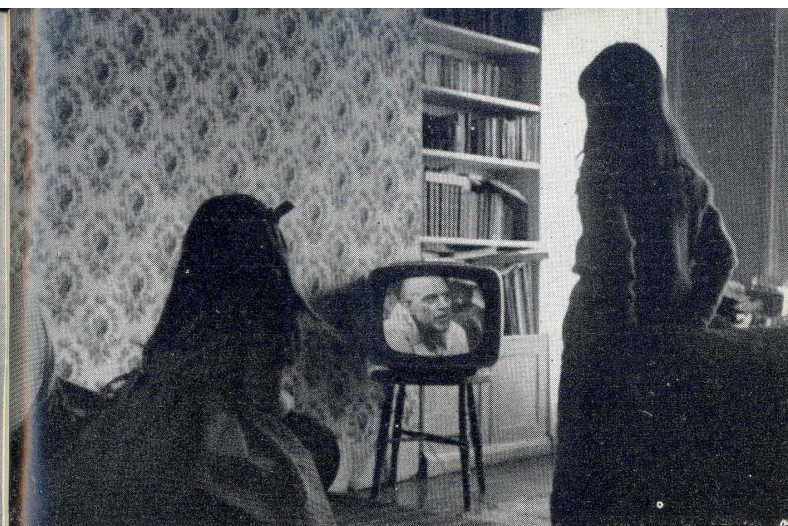
Against all the advantages it must be remembered that the price is higher than any of the other 16-mm.'s reviewed and in some cases twice as high. In return for this there is everything that goes with a higher priced camera, workmanship precision, etc. It is most suitable for the serious worker in 16-mm. and will, if handled as it should be, give him the maximum out of the format, leaving all else to his own personal skill.

MINOX B



The Minox is virtually a complete photographic system on its own, using film 9.5-mm. wide it is the smallest of all the subminiatures. Despite this it is probably the most versatile as well as the most expensive. The camera, made from

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Very fine grain film, 1/10 second, f 3.5.

Photograph by Ken Bailey, London.

This shot cleverly shows off three advantages of the sub-min; the great depth of field, the suitability of the camera for dim lighting especially the screen where the image is arrested, and ease of composition even with a small camera.

case is to pretend to be doing something else—in the days before sub-miniatures we used to get quite good results with a false lens hood stuck on the side of a twin-lens reflex. Try it yourself—you can shoot away quite happily at right-angles to a subject who is convinced you're taking something else. With a sub-miniature the whole thing is much easier. It's smaller, so you hold it differently. The lens isn't anywhere near so obvious and the different layout makes the action of the cameraman not nearly so easy to recognize. A Minox, for instance, looks just like some types of gas lighter.

With a little time, and care in focusing, you can produce real quality shots of the kind of subject, like the cat, which benefits by a sharp lens. Also note that there's no distortion, even at this distance.

◀ Very fine grain film, 1/10 second, f 3.5.

Photograph by Ken Bailey, London.



Fine grain film, 1/50 second, f 3.5 and 1/200 second, f 3.5

Photographs by Ken Bailey, London.

This is a field in which the sub-miniature cannot be bettered. A wide lens and tremendous depth of field are ideal for candid work at close quarters. Incidentally, that doesn't mean she can't look at you.

ingly relaxed pose caught before they had even noticed the camera. And this brings us to the next big advantage of the sub-miniature. They are unobtrusive and this doesn't just mean small. Getting really "candid", relaxed shots with a 35mm. camera is very much a matter of luck, or let's say very long practice. It's not only the size of the camera, it's the whole action of the photographer. You know the sort of thing. Up to the eye with both hands and a great staring lens, it's quite unmistakable and your subject will recognize it right away, even out of the corner of his eye. He'll either shy away or perhaps worse, give you a stiff smile. The essence of disguise in this

Portraiture or candid work, or candid portraiture, the submin, is quick to use and gives quality good enough where candid work is concerned to compare with much larger negatives under the same conditions.

◀ *Fine grain film, 1/25 second, f 3.5.*

Photograph by Ken Bailey, London.

SUB-MINIS

Those Mighty Midget Cameras

Try a tiny camera that fits in a shirt pocket. With some know-how you'll make good pictures

By Bob Berger

TWENTY-FIVE YEARS AGO, you probably didn't own a subminiature camera (one using film smaller than 35-mm) unless you also carried a code number, a Luger automatic and had a secret radio transmitter hidden in your attic. Tiny, precision cameras were strictly cloak and dagger items. Not so today. In fact, subminiature snapshooters are clicking away at a record rate.

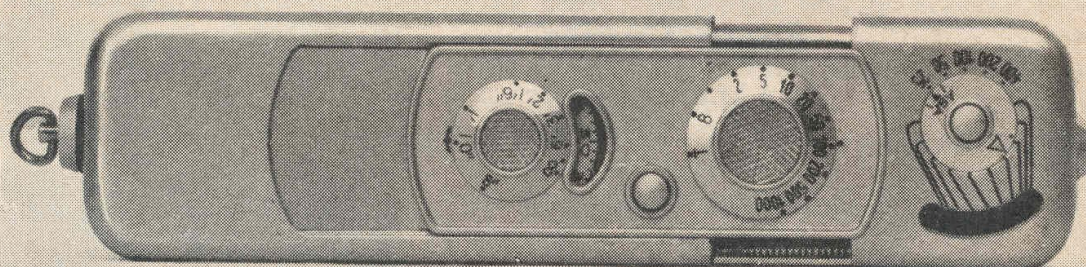
From a bumper crop of tiny cameras, PM selected some of the more popular models—those you are likely to find stocked at the local camera shop—and put them through their paces.

Seven sub-minis were tested:

The Minox B, the granddaddy of all tiny cameras, is made in Germany, and is



Minolta 16 II



Minox B

alloys, is designed on the push pull telescopic system. It has a very wide range of shutter speeds. The f3.5 lens is without a diaphragm and is designed to always operate at maximum aperture, using the shutter speed to correct exposure.

The controls are moved by the fingertips. They consist of a focusing disc, a speed control disc which is linked to a pointer on the exposure meter, an exposure meter needle lock (combined with the film speed scale—ingenious, this) and the button release. Film transport, shutter tensioning and frame counting are all operated by closing and opening the camera in one movement. When the camera is opened a serrated control over the lens is revealed, which can bring either a green or neutral density filter over the lens (automatically compensating the exposure meter with its factor). Also revealed when the camera is opened are the viewfinder (bright line), the lens, and the catch for the magazine compartment.

The focusing knob is coupled to the viewfinder which pivots on its axis to compensate for parallax at close distances. The distances may be reversed by the metal 'knots' on the lanyard, or measuring chain.

Film is contained in a metal cassette similar in shape to that used in the Minolta cameras but much smaller in size.

On Test

There is no other camera with which to directly compare the Minox, but the results we obtained were first class. For some idea of what the lens is capable of you should turn to page 105. The Minox handles smoothly and the workmanship is quite superb. Push button

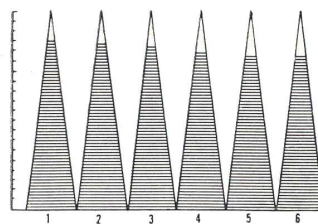
readings are quickly translated on to the speed dial and results obtained were in any case correctly exposed. The inclusion of a built-in exposure meter which gives needle readings has been accomplished with remarkable simplicity. Not only this but the meter showed a decided aversion to being misled; stray light did not exercise much influence. The shutter release was very light, too light really, since it is better to be able to rest a finger on the button, than having to guess where it is and then stab at it. Another small point for criticism is the catch for the magazine well, which is tricky to move with short fingernails and very tricky with bitten ones. Practice overcomes most of such problems. The only great disadvantage is in the transport method. The viewfinder does not become apparent unless the camera is opened, and every time it is opened the film is moved on by one frame regardless of whether it is exposed or not. The only way round this is to leave the camera open, not satisfactory for carrying in the pocket, or its case. With 50 exposures to get through some people may not find this a disadvantage but the moral is that if you need the viewfinder you need to shoot. However, it is a guarantee against double exposures.

On Reflection

The Minox has a multitude of uses and one great advantage—its size. When we consider the quality demands of many amateurs it is clear that the Minox is not to be considered a rich man's toy. The camera has its specialist applications that we all know about, but also a great amateur appeal. The Minox system comprises all the necessary accessories and apparatus required

in normal photography. In size it is virtually unrivalled. There is probably not a pocket it will not fit into, while the general design is of the very highest order. The Minox is unique and those who become interested in it can be assured that the instrument is, in its size, the equivalent of a very high grade large size camera. The price of this one is £79 12s. 7d.

PEN



On Inspection

The Pen camera is a half-frame type of conventional specifications. It is constructed from pressed and cast alloy parts.

The load is a standard 35-mm cassette of up to 72 half-frame exposures. The camera has a maximum aperture of f 3.5 and there are four instantaneous shutter speeds and B on the Copal x shutter. Focus is by a free running ring with the click stops one at 7 and one at 15 feet. The shutter speed, focusing and aperture rings are arranged one within the other and the result is remarkably compact. Film transport is by means of a milled ring set in the top section of the camera. This also tensions the shutter and rotates the subtractive frame counter. This is set in the top and

works on the time honoured revolving pointer system showing the entire scale of frames.

The viewfinder (set vertically) has a bright frame within it which is marked for parallax error. It has a magnification of 0.5.

The shutter release is set next to the counter on top and has a cable release socket inside it.

Rewind is by means of a folding crank and the mechanism is disengaged by a button in the base.

There is also the usual tripod bush flash contact and accessory shoe and the camera has a leather lanyard.

On Test

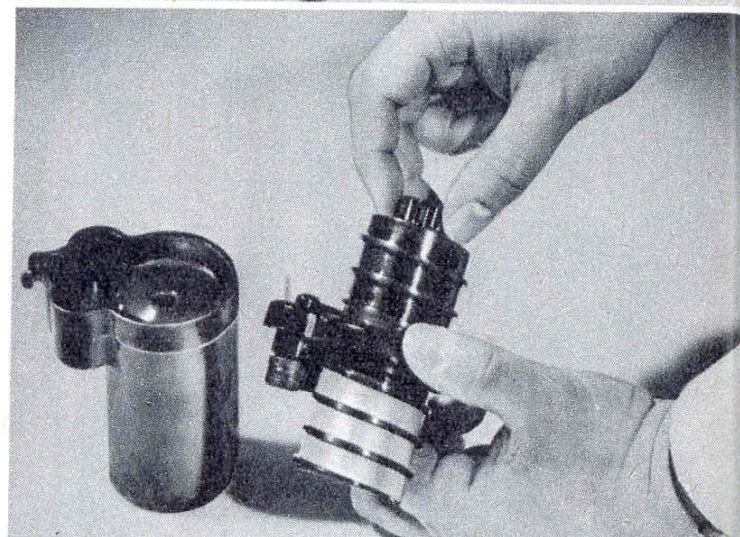
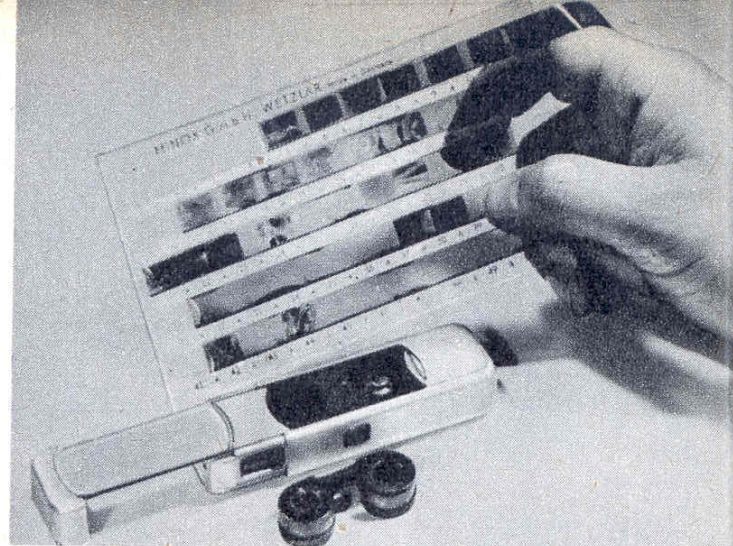
The camera handles very nicely indeed and its compactness does not make it fiddly from the control point of view. All the moving parts are smooth and the shutter is very quiet, as well as being accurate.

The lens performance is quite amazing and far in excess of what we had expected. Using the lens at its optimum performance a pin-sharp ten by eight-inch print would be made from the negative obtained. For the price of the camera the four element lens offers a performance superior to what one would expect for a camera of the same price using the full frame format. There is no evidence of any distortion or halation difficulties.

Despite the angular path through which the film must travel in these small cameras, there was no tendency to negative scratch and the small vertical pressure plate was heavy enough to keep the film firmly in the plane without damaging it.

The gearing of the transport was sufficient to move the film with two

DIE BESONDERS LEICHTE MINOX (rechts) hat ein Gewicht von nur 70 g. Diese Präzisionskamera ist mit einer 1 : 3,5 Blende und fester Öffnung versehen. Die Verschlussgeschwindigkeit beträgt $\frac{1}{2}$ — $\frac{1}{1000}$ sec. Das Negativformat beträgt 8 x 11 mm; die Negativstreifen sind auf unserer Abbildung rechts über der Kamera zu sehen. Die Tageslichtkassette mit 50 Aufnahmen wird eingelegt, indem man auf der Rückseite der Kamera eine Art Schieber herauszieht. Preis der Kamera: DM 393.—. Die Abbildung auf der vorhergehenden Seite zeigt, wie für Minox-Tele-Aufnahmen ein Feldstecher verwendet werden kann. Das Minox-Dreibein-Stativ wird hier als Einbein-Stativ verwendet (Preis DM 29.70). Der Stativkopf ist beweglich. — Die Trommel der Minox-Tageslichtentwicklungsdose (Bild rechts), die hier aus der Dose genommen wurde, weist spiralförmig angeordnete Rillen zum Einlegen der Filme auf. Während der Film sich noch in der Kassette befindet, wird ein Ende an einem drehbaren Ring festgehakt, der auf unserer Abbildung mit der linken Hand gehalten wird. Der Ring wird in der Trommel befestigt, dann schiebt man sie in die Dose. Durch Drehen des oberen Knopfes wird die Trommel fest eingeschraubt, wobei der Film gleichzeitig in die Kassette gezogen und in die Spiralrillen geleitet wird.

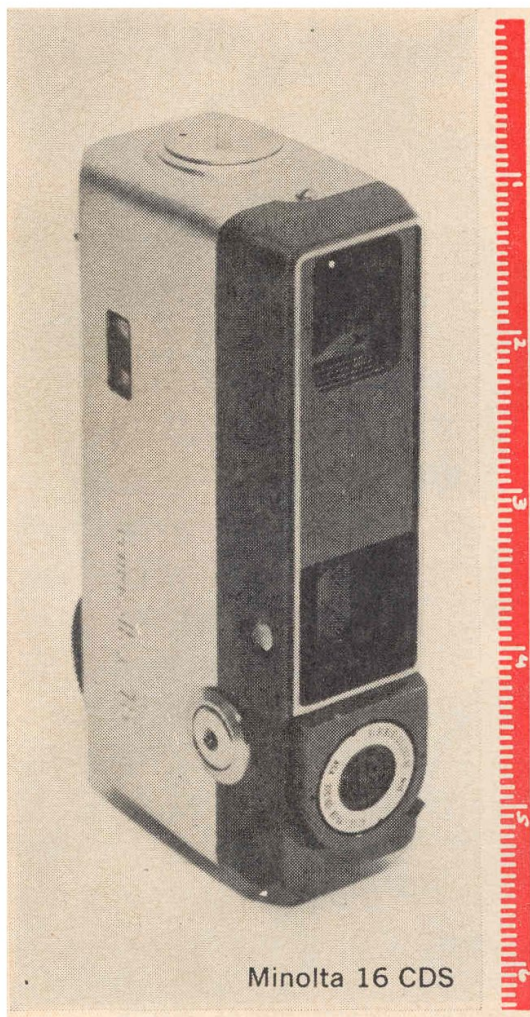


werden, so steht Ihnen eine ausgezeichnete Präzisions-Kamera zur Verfügung, für die Sie allerdings rund 400 DM anlegen müßten. Falls Ihre Ambitionen nicht so weit gehen, erhalten Sie eine mit weniger Präzision und optischen Einrichtungen gearbeitete Kamera schon um nicht ganz 50 DM.

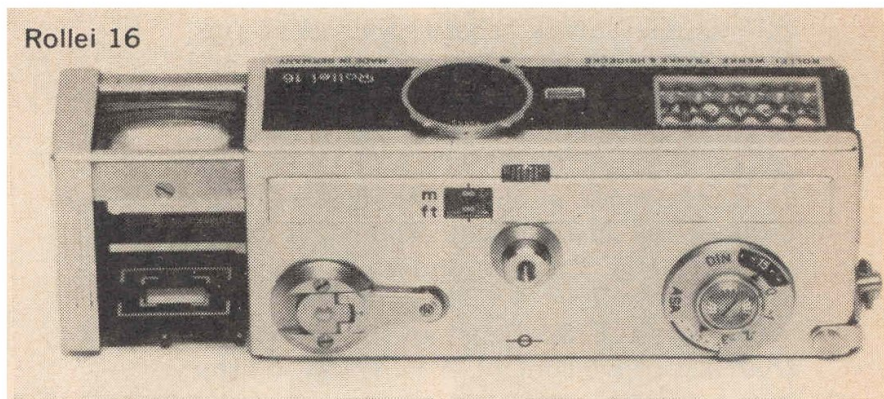
Doch Spaß beiseite — auch Sie können sich ein Privatvergnügen mit diesen Miniatur-Kleinstbild-Kameras machen. Da es sich bei diesen Photoapparaten um et-



WER BEACHTET SCHON einen Mann, der da gerade auf seine Uhr schaut? Aber es war gar keine Uhr, sondern eine Armband-Kamera. Dem Mann mit dieser Kamera gelang die links abgebildete winzige Aufnahme, die von dem oben gezeigten Kontaktabzug vergrößert wurde.



Minolta 16 CDS

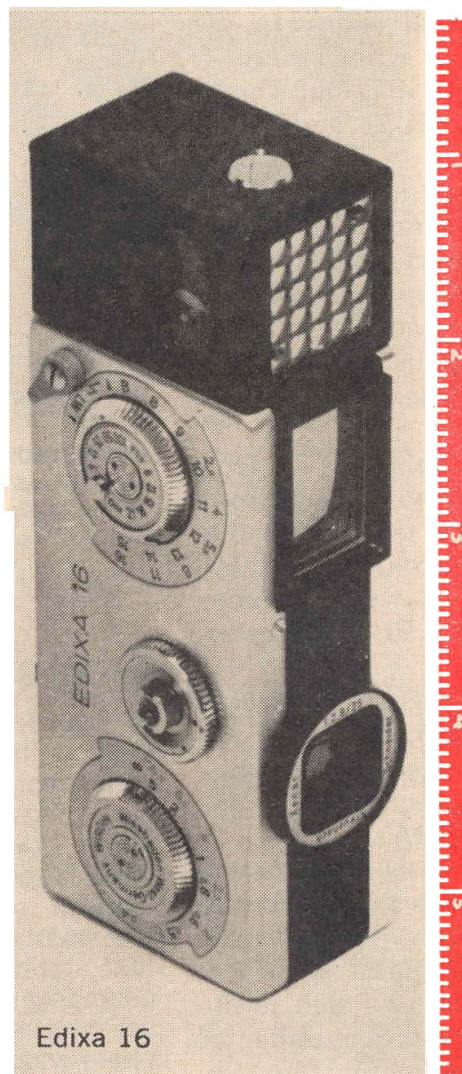


Rollei 16

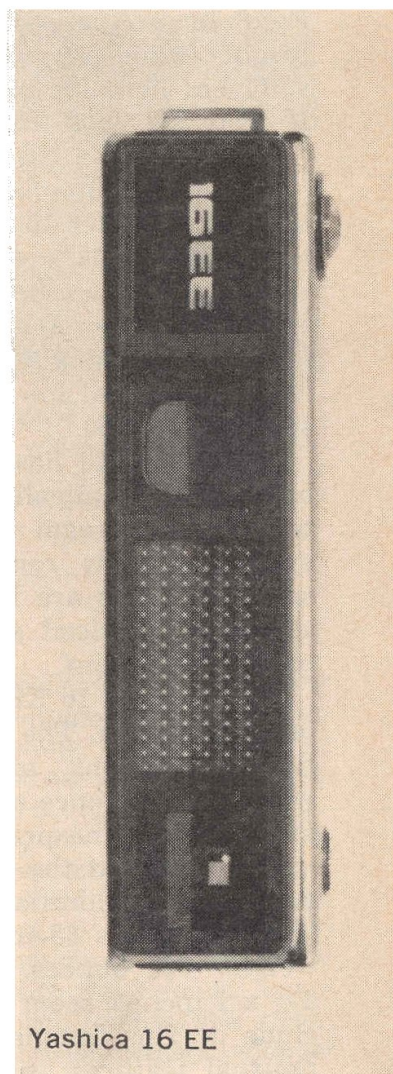
EXCLUSIVE PM PHOTOS



Tessina



Edixa 16



Yashica 16 EE



Dr. Joseph D. Cooper is a leading authority on ultra-miniature cameras. He conducts a monthly column on ultra-miniature news and techniques for **Modern Photography** magazine. His collection of ultra-miniature cameras, of museum proportions, is in great demand for exhibitions. His advice on product development, design and use is sought by manufacturers and laboratories. Some of his unique methods are explained here for the first time. He has worked with all the cameras described in this book.

Dr. Cooper was a free-lance photographer in the 1930's, pioneering in the use of 35mm color film, then new, and of 35mm cameras, then considered extremely miniature. As he advanced in other fields—he is presently Executive Assistant to the Deputy Postmaster General of the United States and Professor at the American University—extreme camera portability became a requisite to continuance of his photographic work.

He believes that ultra-miniatures will see an increasingly wider use, due to their portability and improved lenses, films, chemicals and photographic techniques. He believes, too, that "The larger cameras will always have their place, but the ultra-miniature is most likely to be in your pocket, ready for use, when a bulky camera is left behind or can't be used."

A complete guide to buying and using all ultra-miniature cameras, films, and accessories

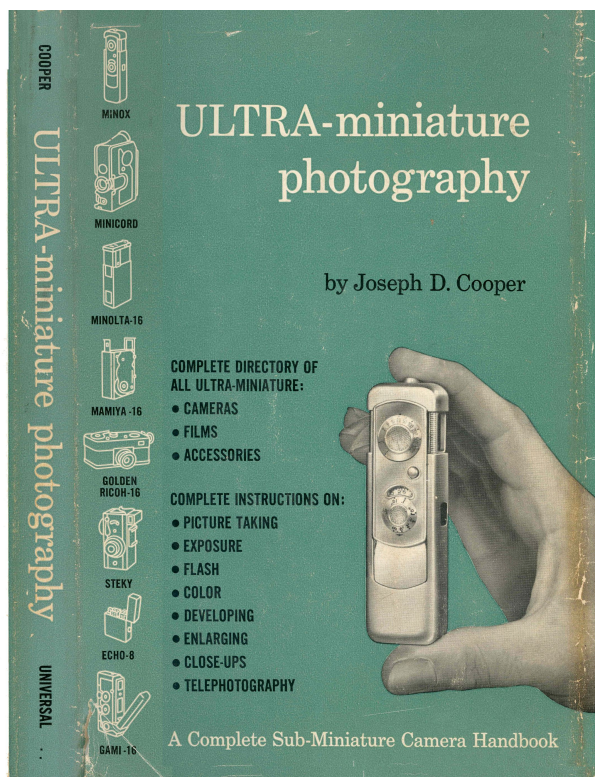
ULTRA-MINIATURE PHOTOGRAPHY

A Complete Guide to all Ultra-Miniature Equipment and Techniques, this volume explains the complete system of ultra-miniature (or sub-miniature) photography.

- Complete specifications and working descriptions of all ultra-miniature cameras and accessories.
- Films for ultra-miniature use — directory of available films, 16mm bulk film loading, how to convert 35mm film into 16mm film.
- How to take better pictures with ultra-miniature cameras — how to avoid camera movement, when and how to use filters, complete depth-of-field tables, complete exposure techniques for finest grain, clearest image.
- Color work with the ultra-miniature: directory of color-film; color exposure and color flash techniques, ultra-miniature slide projectors; making black-and-white prints from color.
- Rules and data for ultra-miniature available-light photography.
- Using flash and electronic flash with ultra-miniature equipment.
- Close-up-pictures — use of close-focusing cameras, supplementary lenses, camera supports, and copying stands — microphotography.
- Telephoto and wide-angle picture taking — interchangeable lenses, binocular picture-taking procedures.
- Developing — directory of fine-grain developers for ultra-miniature film and exposure combinations, directory of developing tanks and all materials, complete-developing procedures.
- Filing and storing ultra-miniature negative strips.
- Enlarging — directory of ultra-miniature enlargers, conversion of larger sized enlargers, complete enlarging procedures, overcoming dust and scratches.

A complete sub-miniature handbook

UNIVERSAL PHOTO BOOKS, NEW YORK 36, N. Y.



\$3.95

As shown from the wide variety of equipment discussed in this book, the ultra-miniature camera, also referred to as the sub-miniature camera, is rapidly increasing in popularity.

In this book you will find data and instructions for selecting and using all makes of ultra-miniature cameras and the complete accessories and techniques that make up the ultra-miniature system of photography.

Anyone can take and make good pictures with modern ultra-miniature equipment by learning a few basic rules. In simple, direct language, this book gives all the details and techniques of ultra-miniature equipment picture taking, film developing, enlarging, and printmaking. It tells how to work with ultra-miniature cameras, films, flash, filters, lenses, developers and enlargers for the best results in black-and-white and color pictures, close-ups, microphotography, telephotography, prints, enlargements and slides.

The trend toward ultra-miniature photography began as far back as the "detective cameras" of the 1880s. The earliest practical miniatures were the 35mm cameras. During World War II several countries made rapid progress in ultra-miniature camera design, lens design, and processing. Many of these "spy camera" improvements are incorporated in the modern ultra-miniature equipment now on the market and discussed in this volume.

As discussed at length in this book the popularity of the ultra-miniature camera is due to the following advantages:

1. The cameras can be carried easily in pocket or purse.
2. There are now ultra-miniature cameras and accessories in every price range.
3. You can shoot pictures with the lens wide open and still have good depth-of-field.
4. You can use a wide range of filters, flash, interchangeable lenses, and all photographic accessories and techniques that you desire.
5. You can take truly candid pictures, even "spy" pictures, without being observed.
6. You can get big pictures from tiny negatives no bigger than your smallest fingernail.

not much larger than a man's index finger. Shutter speeds range from $\frac{1}{2}$ -1/1000 sec. Lens aperture is fixed at F:3.5. Film is available in either 36 or 50-exposure cartridges. Special features include built-in filters, measuring chain for close-ups, built-in coupled exposure meter, and bright line viewfinder with automatic parallax correction. The price is \$149.95.

The Minolta 16 II, 16 Ps and 16 CdS are Japanese-made submini's that give 20 exposures on 16-mm film. The 16 II has a fixed focus F:2.8 lens and shutter speeds to 1/500 sec. The 16 Ps is equipped with a fixed focus F:3.5 lens and a "Weather Dial" exposure control. A two-way shutter speed selector sets the shutter at 1/100 sec. for daylight snapshooting or at 1/30 for flash pictures. The 16 CdS has, as its name indicates, a cadmium sulphide electric eye that automatically adjusts the diaphragm setting for the four-element F:2.8 lens. A green signal shows in the bright frame viewfinder when there is sufficient light for picture making. The 16 II costs \$37.50, 16 Ps is \$25.50, and the 16 CdS is \$79.50.

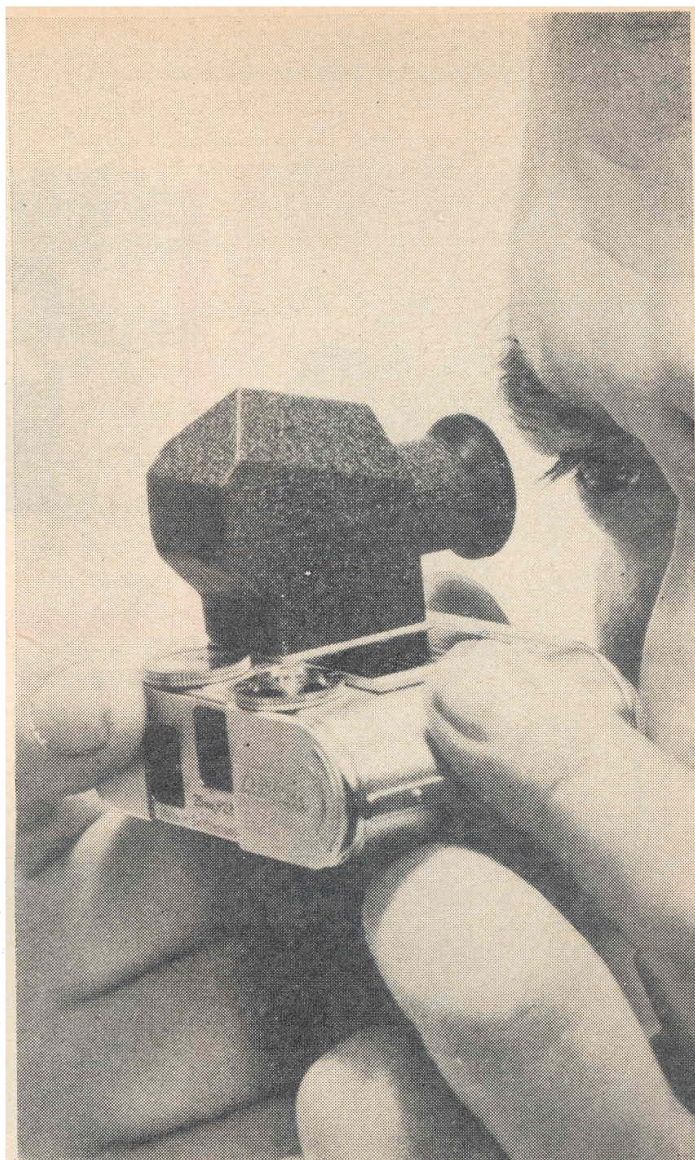
Bearing a name familiar to most camera buffs, the Rollei 16 uses an 18-shot cartridge. The lens is a Tessar F:2.8; exposure is set automatically, but manual control is possible. A go-ahead green dot is incorporated in a luminous frame viewfinder corrected for parallax. The camera sells for \$179.50.

The Edixa 16 has a Xenar F:2.8 lens, and an automatically programmed shutter and diaphragm using the light value system. Speeds range from 1/30-1/500 sec. Cartridges are loaded with 21 exposures. It is priced at \$99.50 with meter, or \$79.50 without.

The Yashica 16 EE makes 20 exposures on 16-mm film. The camera has an F:2.8 fixed-focus lens, and features thumb-wheel film advance and electric eye exposure setting. The price is \$55.

Rounding out the group is the Tessina. By our own definition, it is not a submini because it uses 35-mm film. But its light weight—5½ ounces, and small size—2 x 2½ x 1 inches, seem reason enough to include it. The Tessina boasts a number of unusual features: spring motor film advance, reflex viewing, and a negative two or three times larger than most of its competitors. Shutter speeds are from $\frac{1}{2}$ -1/500 sec. The lens is a 25-mm F:2.8 Tes-

(Please turn to page 243)

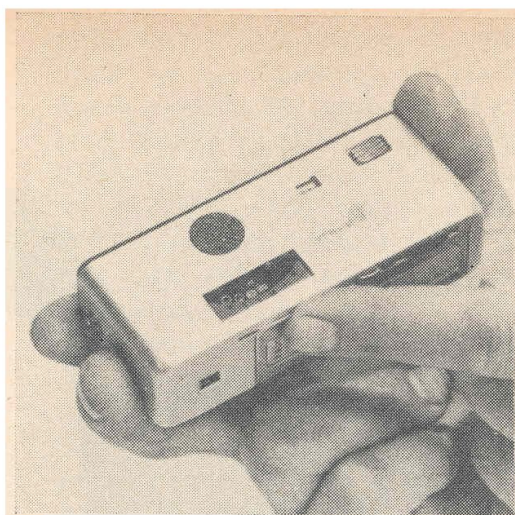


SWISS-MADE TESSINA is shown here with an accessory pentaprism viewfinder. The finder sells for about \$40 and gives a 6x magnification for easier focusing. An 8x magnifier is also available for \$19.95

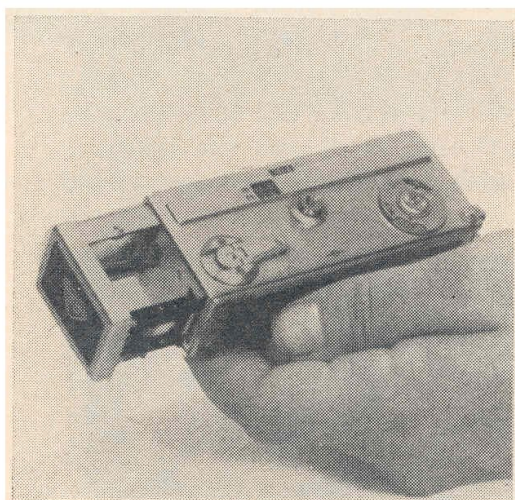
PROCESSING TIPS

First of all, your darkroom must be clean; dust is the archrival of the subminiature photographer. A tiny, unseen speck that settles on a negative will show up in the enlargement as an aspirin-sized white blob. But dust is pesky stuff; even after a thorough cleanup, you may find that you are still getting spotty prints. In such a case, it's likely that static electricity is the real culprit. Try grounding your enlarger to a water pipe, and use an antistatic brush (available at most photo shops) to clean the negative.

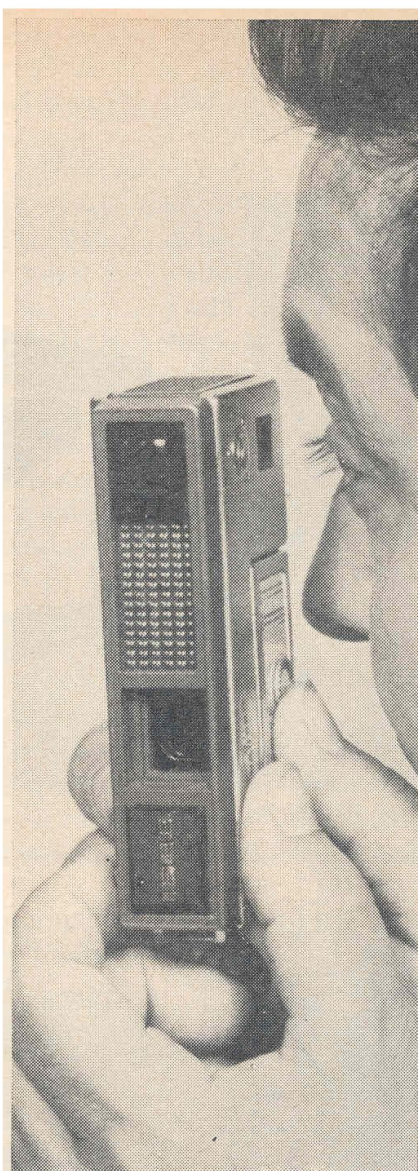
Development of submini film isn't difficult, though care is needed in controlling solution temperatures. Your best bet is to follow the manufacturer's directions. Generally, if developer, stop bath, hypo and wash water are kept at 68-70° F., you'll get good results.



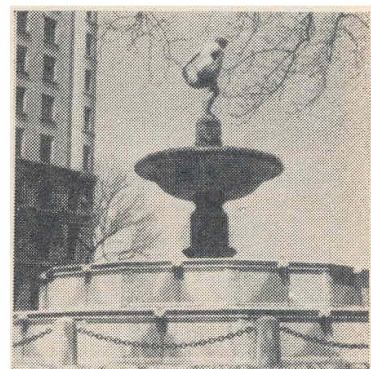
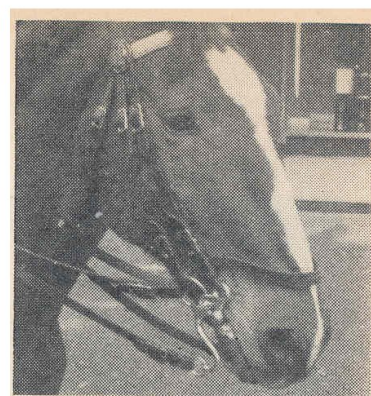
WEATHER DIAL on Minolta 16P uses symbols for common lighting conditions. Exposure is set by turning pointer to the proper symbol



ROLLEI 16 has excellent luminous frame viewfinder, handy milled wheel for setting distance scale which is visible through window



RIGHT ANGLE VIEWFINDER on Yashica 16 EE is especially handy for candid shots of kids and even adults who tend to mug for your camera



TOP SHOT was taken with Minolta, middle picture with Tessina. A Rollei 16 made bottom shot. All enlarged well to 8 x 10

The importance of precise temperature control makes an accurate thermometer an absolute must. So-called process thermometers are not expensive and are consistently correct within one degree.

All solutions should be filtered, either through laboratory-type filter paper or a tuft of cotton placed in a funnel. Even the wash water can deposit sediment which may become imbedded in the film emulsion. One way to beat the problem is to bathe the film in hypo eliminator after it is thoroughly fixed, then simply soak it in several changes of filtered water.

Excessive grain can ruin film shot with even the best submini. Expanded grain is often the result of long development and washing times. With this in mind, try to choose a fine-grain

developer having a reasonably short working time and use hypo eliminator to cut down wash time. After washing, don't sponge or squeegee the film, instead, dunk it in a wetting agent and hang it up to dry.

Once you get really hooked, you'll probably want to buy darkroom equipment specifically made for submini work. Various developing tanks are available, as are special enlargers. These are usually of the condenser type and are fitted with short focus lenses for big blow-ups. If you prefer, you might buy a 25-mm lens for your present enlarger and use that for submini negatives. Other than the tank, enlarger and plenty of perseverance, there's nothing else you'll need to develop and print submini films. Happy processing.



**Mit Kameras von einem
unwahrscheinlich kleinen
Format lassen sich auch
Aufnahmen machen**

Zwerg-Kameras aus aller Welt

Wären Sie auch am liebsten ein Geheimagent, der mit einer Miniatur-Kamera Spione dabei ertappt, wie sie gerade gestohlene Dokumente weitergeben? Nun — an der Kamera soll es nicht fehlen! Es gibt nämlich Photoapparate, die nur so groß sind wie eine Packung Zigaretten oder gar nur wie eine Zündholzschachtel. Ja, es gibt sogar Kameras in Form von Armbanduhren!

Sollten Sie also ein ganz großer, von verführerischen Schönen verfolgter Geheimagent



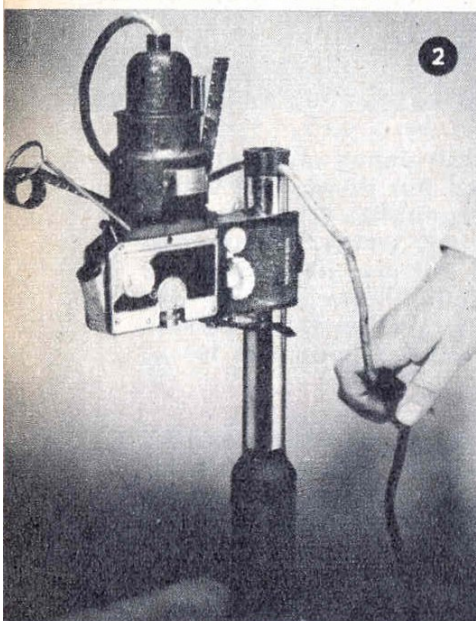


sehen, sind diese Kleinstbildkameras nicht für alles und jedes geeignet. Außerdem gibt es Kleinstbildkameras hoher Präzision, an die man auch hohe Ansprüche stellen kann — andere sind mehr ein Spielzeug. Wer eine Vielzweck-Kamera haben will, greift besser zu einer größeren Ausführung. Doch wem es Spaß macht, seinen Photoapparat stets schußbereit in der Westentasche oder am Handgelenk zu tragen — der gehe hin und kaufe sich eine Miniatur-Kamera!

Hartley E. Howe

1 DIE MINICORD ist eine echte Reflexkamera mit gekoppelten Objektiven. Blende 1:2. Sie wird in Österreich hergestellt und ist nicht größer als eine Zigarettenschachtel. Filmformat: 16 mm, Verschußgeschwindigkeit: $\frac{1}{10}$ — $\frac{1}{400}$ sec, Preis: DM 425.—. Diese Zwerg-Kamera eignet sich ganz besonders für Aufnahmen in rascher Folge.

2 Als Vergrößerungsapparat dient hier die Kamera mit einem entsprechenden Ansatzgerät. In die Minicord wird anstelle des Filmhalters ein Negativ eingelegt. Derganze Vergrößerungsapparat kann in dem Holzbehälter, der hier als Grundplatte dient, verpackt werden.



3 DIE STEKY, eine japanische Kamera, ist nicht größer als eine Streichholzschachtel. Sie wird zur Zeit in den skandinavischen Ländern für etwa DM 60.— verkauft. Die Brennweite der Normaloptik beträgt 25 mm, ihre Lichtstärke 1:3,5. Die Kassette dieser japanischen Kamera nimmt einen 16 mm-Schmalfilm auf.

4 DAS ZUSATZGERÄT für das Blitzlichtragt weit über die zündholzschachtelgroße Mamiya Super-16 hinaus. Die in Japan gebaute Kamera hat eine Blendenöffnung von 1:3,5 bis 1:11. Verschuß $\frac{1}{2}$ — $\frac{1}{200}$ sec. Der Preis für die winzige Kamera beträgt ungefähr DM 160.—.



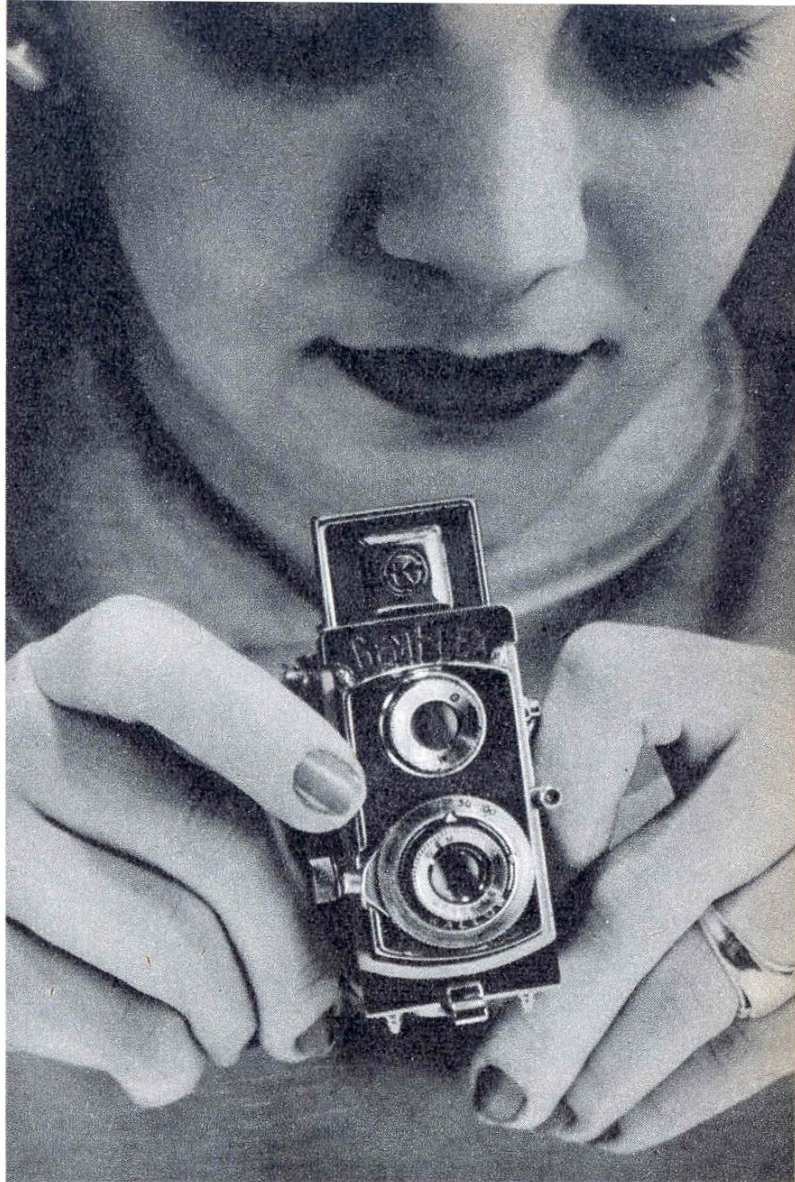
was ganz Besonderes handelt, bedürfen sie allerdings auch einer besonderen Handhabung. Darum bedenken Sie:

1. Manche Negative sind so klein, daß 20 bis 25 davon in einem 35 mm breiten Leicanegativ Platz hätten. Erwarten Sie also nicht, daß Ihre Vergrößerungen ebenso ausfallen wie die der üblichen Kleinbildfilme.

2. Beim Aufnehmen der Bilder müssen Sie geradezu in Ruhe erstarren können; denn eine Miniatur-Kamera hat praktisch kein Gewicht. Es wird Ihnen deshalb leichter fallen, den ganzen Apparat zu bewegen, als nur den kleinen Verschußauslöser! Das Ergebnis: ein verwackeltes Bild.

3. Da die meisten dieser Kleinst-Kameras in der Faust eines Mannes verschwinden können, besteht leicht die Gefahr, daß Sie die Linse verdecken; Sie müssen sich also darin üben, die Kamera so zu halten, daß auch Ihre Finger kein Hindernis mehr bilden.

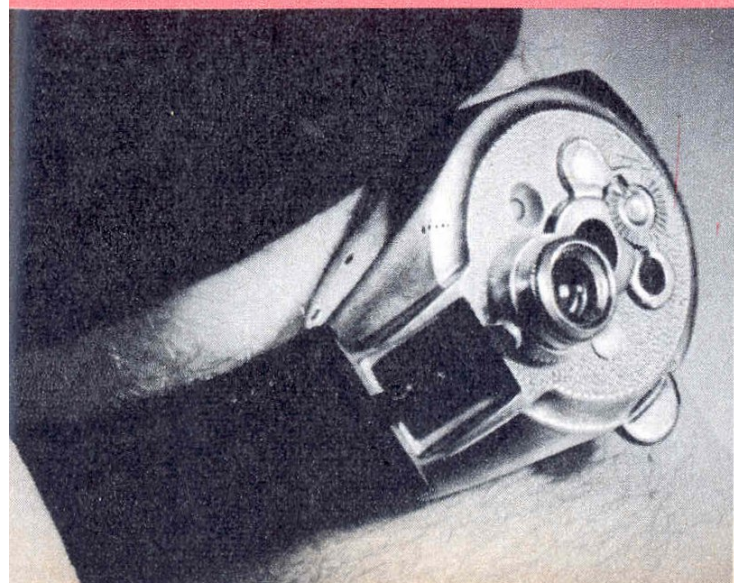
4. Außerdem müssen für viele der Miniatur-Kameras ungewöhnliche Filmformate verwendet werden. Sie werden also nicht ohne weiteres Ihren Film in der nächsten Drogerie entwickeln lassen können. Viele Photogeschäfte haben aber einen Kundendienst für ausgefallene Filmformate. Teilweise können Sie auch passende Entwicklungsdosen kaufen und Ihre Filme selbst entwickeln. Wie Sie →



DIE KLEINE GEMFLEX aus Japan unterscheidet sich auf den ersten Blick nur durch ihre Größe von den bekannten Spiegelreflex-Kameras. Sie hat eine 1:3,5 Blende mit fester Entfernungseinstellung und arbeitet mit drei verschiedenen Verschußgeschwindigkeiten. Die Kamera aus Spritzguß-Duraluminium ist für 14 mm-Filme konstruiert und kostet mit 6 Filmen DM 100.—.

ALS ARMBAND-KAMERA ist die Steineck-ABC gebaut. Die Kamera hat eine feste Entfernungseinstellung und nur zwei Blendeneöffnungen. Verschußgeschwindigkeit $\frac{1}{125}$ sec.

DER RINGFÖRMIGE FILM für die Steineck-ABC wird in eine flache Kassette auf der Kamera-Rückseite eingelegt. Nach jeder Aufnahme wird die Kassette automatisch weitergedreht.



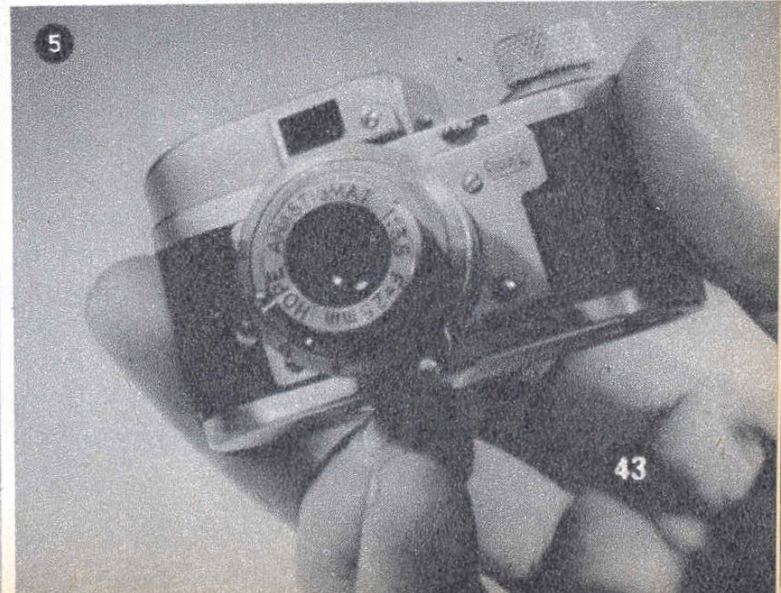
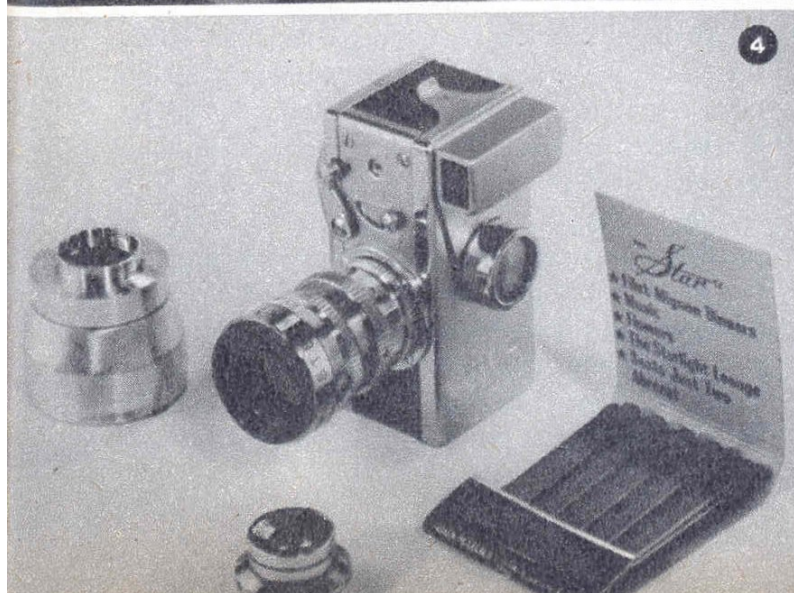
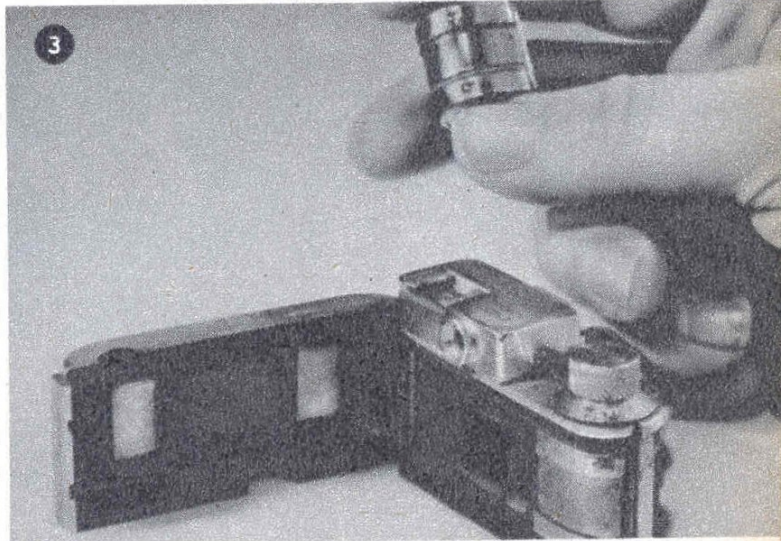
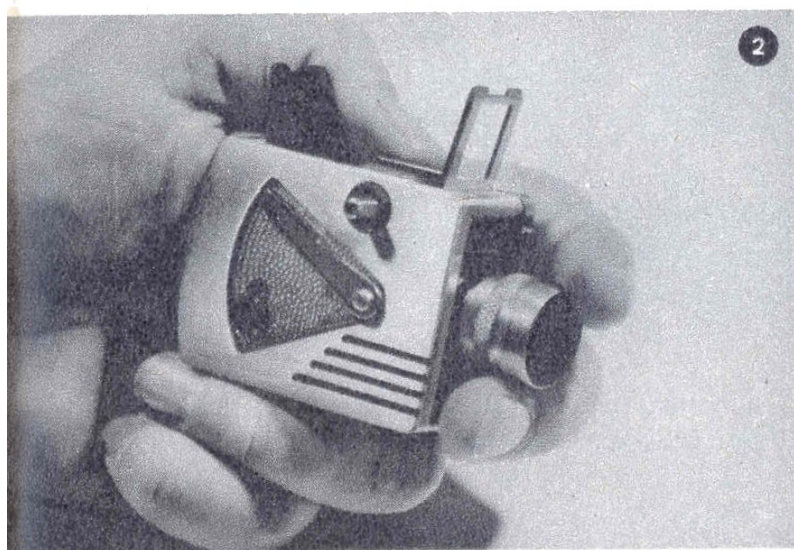
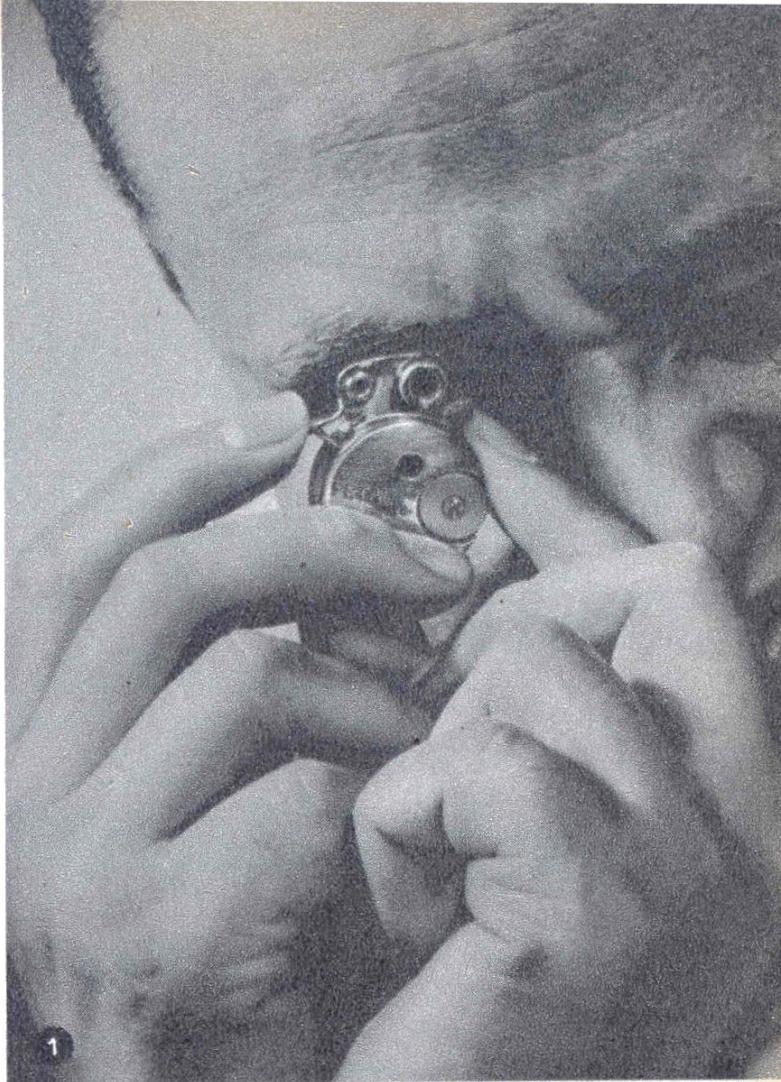
1 DIE PETAL-KLEINSTBILDKAMERA hat den Durchmesser eines Mantelknopfes. Mit einem winzigen ringförmigen Film können 6 Aufnahmen gemacht werden. Verschußgeschwindigkeit und Blendenöffnung lassen sich nicht verändern. Die Petal wird in Japan hergestellt und kostet in unsere Währung umgerechnet DM 40.—.

2 DIE 'UNIVERSAL-MINUTE-16' ist eine der wenigen amerikanischen Miniatur-Kleinstbildkameras. Das 1 : 6,3 Objektiv hat eine feste Entfernungseinstellung für den Bereich von einem Meter bis unendlich. Verschußgeschwindigkeit $\frac{1}{50}$ sec., 16 mm-Filme erlauben 14 Aufnahmen.

3 DIE RUBINA-KLEINSTBILDKAMERA ähnelt den bekannten 35 mm-Kameras. Auf unserer Abbildung ist die Rückwand geöffnet und man sieht die 16 mm-Filmkassette. Blendenöffnung von 1 : 3,5 bis 1 : 16; Einstellbereich von 60 cm bis unendlich. Drei verschiedene Verschußgeschwindigkeiten. Preis beträgt ungefähr DM 80.—.

4 ALS ZUSATZTEIL für die Steky III gibt es ein Tele-Foto-Objektiv, das in unserer Abbildung aufgesetzt ist. Die Steky III, gleichfalls in Japan hergestellt, ist eine 16 mm-Kleinstbildkamera. Standardobjektiv 1 : 3,5; feste Entfernungseinstellung; der Preis beträgt ungefähr DM 90.—.

5 DIE RUBIX KLEINSTKAMERA mit 1 : 3,5 Blende und drei verschiedenen Verschußgeschwindigkeiten wird ebenfalls in Japan hergestellt und kostet ungefähr DM 60.—. Sie arbeitet wie andere Kleinstkameras mit 16 mm-Filmen und Negativformat von 14 × 12 mm.



PETERSEN'S Guide to

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02P2595

POCKET CAMERA PHOTOGRAPHY

By Kalton C. Lahue and the Editors of Photographic Magazine

CURRENT CAMERAS

Full details on Kodak Pocket Instamatic, Minolta, Minox, Tessina and Yashica Atoron

HOW THEY WORK

Shutters, lenses, focusing, exposure, film transport

THE LITTLE FILMS

What's available / Getting the most from mini-negatives

THE WHOLE STORY

History of pocket cameras / Creative photography with the small format / Avoiding the pitfalls / Techniques



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ANOKA MINN



sub • min'i • a • ture (*in photography*) *n.* any still camera that uses film from basic stock smaller than 35-mm, whether single-, double-, or unperforated; usually 16-mm or 9.5-mm.—**sub • min'i • a • ture** *adj.* as *subminiature* camera; *subminiature* film; or "How's that for *subminiature* quality?" For examples of the versatility possible, see result with fast film (Plus-X), by available light (1/50 sec at *f*/3.5), at right; and turn the page for an example shot on fine-grain film. Both were taken by R. Stephen Vercoe, who develops his film according to normal manufacturer-prescribed procedures, and makes his own prints. Both were shot with a 3¼-ounce Minox B camera, and Vercoe made prints exactly the size you see here from negatives ☐ that were this size:

SUBMINIATURE



A prediction:



THERE'S
A
SMALL
CAMERA
IN
YOUR
FUTURE

Little cameras—half-frame and subminiature—are in the news. It all started with the Olympus Pen half-frame. Although it wasn't the first, it has turned out to be one of the most important small cameras by creating a minor revolution since its arrival on our shores. Many photographers, bothered by the bulky 35-mms, looked to this camera because it was small enough to fit into a pocket, good enough to make quality images. Then small cameras by other manufacturers began arriving, giving the little guys an added shot in the arm. And now Kodak with its brand new Instamatics has put a bright spotlight on small formats. This issue is devoted to the substandard-size formats. It is aimed at giving you the full picture — from equipment to processing, from projection to printing. We believe the new small cameras will stimulate more interest in photography itself. Cameras that can be carried easily, anytime, and anywhere, are cameras that will most likely take more pictures. Here is your issue on truly portable cameras that — in most cases — barely fill the palm of your hand.

...the past...

By JOSEPH D. COOPER

Subminiature devotee and specialist Joe Cooper presents, in the next ten pages, a roundup discussion of the pocket-size camera—its origins, where it stands today, and what's to come; plus a directory of the current subminiature market; a look at film and accessory availability; shooting tips; and information about processing. Cooper is the author of The New Ultra-Miniature Photography, Universal Photo Books, \$3.95; and the Universal guides to Minox, Minolta-16, and Mamiya-16 cameras. In addition, it's probable he owns one of the world's most complete collections of subminiature cameras. The two shown below, among the earliest efforts at subminiaturization, illustrate attempts at concealment. Both are disguised to resemble timepieces. Top is the Expo "pocket watch," and bottom is the wrist-strapped Steineck A-B-C camera.



Although size and weight (or lack thereof) are the major considerations behind the current boom in subminiature cameras, there's little doubt that the first of these was inspired by an interest in concealment. At first, concealment was accomplished by disguise. Almost from the moment that dry plates became a practical reality, efforts were made to hide cameras in the interests of truly candid photography. By the 1880s there were quite a few so-called "detective" (because they were disguised) cameras on the market. They weren't necessarily small, in our terms, nor did they look much like cameras. One looked like a paper-wrapped package of about shoe-box size with a hole in the end; one of the very successful models, the Fallowfield Facile Detective Camera was built into a suitcase; and the Eastman Dry Plate & Film Co. introduced a small (3¼x3¾x6½ in.), lightweight (2 lb, 3 oz) detective camera called The Kodak that looked substantially like a box, if only because it had no viewfinder.

The first of the successful pocket-size cameras hit the market at about the turn of the century. It resembled a railroad-man's pocket watch. The lens was built into the stem. Behind it was a simple rotary shutter, and it made 14x25-mm pictures on 16-mm film. The watch camera was called Expo in the U.S., while an identical model was sold in England under the name Ticka.

In the next decade there was a rash of subminiaturization, with cameras being built into walking sticks, hats, etc. One detective-type camera was concealed in a false shirt front with permanently attached cravat, and the photographer released the shutter by squeezing a rubber bulb in his pocket, attached by air hose to the camera.

Attempts to refine surreptitious picture-taking equipment continued through the 1930s. Several fine-quality precision cameras were introduced, but then vanished from the market because of the relative shortage of spies, at whom marketing efforts were largely directed.

In 1938 a Latvian inventor, Walter Zapp, came out with a camera that wore no outer disguise, but was quite concealable because of its very small size, about that of a large pocket knife. He called it the Minox, and designed it to take 9.5-mm film, a popular home-movie size in Europe.

Zapp's Minox coincided with the great increase of espionage activity that accompanied World War II, and his camera was used to advantage by both sides.

When the war ended Zapp was hired by a newly organized corporation in Wetzlar, West Germany, to help design a sophisticated, high-quality version of his little camera. The company, which called itself Minox GmbH (and later moved to Giessen), suspected that there was a broad general market for a subminiature camera.

It turned out they were right.

Meanwhile, in Japan, where the war's end was followed by a bursting forth of a bustling camera industry, there was high priority given to developing subminiatures for the popular market. One of the first of these, the Echo 8, a subminiature built into a cigarette lighter, was an improved version of one used by Japanese naval intelligence. Subse-

The controversial camera...

If the existence of two completely divergent and apparently irreconcilable opinions on a single subject indicates controversy, then the subminiature camera probably represents the most controversial area of the photographic equipment field. Just about anyone willing to discuss subminiatures has an adamant opinion about them—pro or con. Interestingly, though, if you stop and examine all the arguments on both sides you discover that each can be summed up in a single word, and having done so you discover that the two sides actually don't relate to each other.

The word for the pro opinion is "portable."

The cons, however, attack on the basis of "quality."

And both opinions considered, you find that there is a basic problem that stems from the insistence of the photography-oriented on considering the subminiature in direct relation with other camera sizes and types.

The fact is, it's not realistic to do so, because the subminiature offers both advantages and disadvantages of its own, and it should be considered for these alone.

In its favor:

Most subminiature cameras are small enough to be carried in a pocket or purse, which means you can have a camera with you at all times if you happen to own one of these midgets. There are professional photojournalists who would never set out to shoot an assignment with a subminiature, but who own *and use* them because they've been confronted by potential subjects while unarmed with larger equipment.

Being lightweight and small, the subminiature makes a handy second camera, especially for the traveler who likes to have a "just-in-case" choice of a second emulsion type, or insurance that he'll have a working camera handy if some mishap should befall the primary piece of equipment.

The subminiature has been received with a good deal of favor by the casual snaphooter who doesn't want to be concerned with anything more than necessary, and who finds small size to be indicative of simplicity.

If quantity is important, you can take a lot of pictures with a pocketful of subminiature film. This is most applicable, for example, to record making, one of the most important uses of subminiatures. Very small cameras (with their ability to focus close and still produce good depth of field) make it easy for production people, working in close quarters, to keep track, photographically, of manufacturing operations. Researchers copy copiously with their subminiatures. And in fact, a subminiature camera and a slide projector constitute a very workable "microfilming" system.

And as for very candid picture-taking, even to spy-type photography, you *can* carry a subminiature camera fairly surreptitiously (although frankly, one wonders how much less obtrusive is the actual act of taking a picture with a subminiature than with a 35-mm camera, if both are being used at eye level).

On the other hand:

Subminiatures use such extremely small negatives that

prints for any professional purpose require pretty extreme blowing up, with the resultant falling-apart of quality in the extra-great magnification (although the proponents say you have to reconcile yourself to smaller prints, especially where fast film and increased grain are concerned).

Dust gets so much magnification, in both printing and slide projection, that it calls for extra care.

Only one subminiature offers lens interchangeability (although others have close-up attachments or accessory provision for shooting through binoculars), which limits their function, when compared with the more versatile larger-format equipment.

Subminiatures, being small and lightweight, are difficult to hold steady at slow shutter speeds, which results in more camera movement than one is used to, and its subsequent exaggeration in many-diameter enlargement.

Actually, both sides in the controversy are right, but there's a basic flaw in the whole business. That flaw is the readiness of both sides to *compare* subminiature with other camera sizes. *The subminiature is a unique type of camera.* Many are precision instruments of amazingly good quality in both material and craftsmanship. There are, for example, 211 parts in a Minox, and making one requires 1,533 manufacturing and assembling operations. The result is a machine that takes pictures, and that you can carry in your pocket. If you want to compare the pictures it takes with those made by a 4x5 view camera, or a 2 $\frac{1}{4}$ x2 $\frac{1}{4}$ reflex, or even a 35-mm camera, then you have to try carrying a 4x5 view camera, or a 2 $\frac{1}{4}$ x2 $\frac{1}{4}$ reflex, or even a 35-mm camera in your pocket. So the subminiature is a special piece of equipment, and it must be considered as such. It would be folly to recommend one of the subminiatures for a job that calls for the quality offered by a 2 $\frac{1}{4}$ x2 $\frac{1}{4}$ transparency, provided circumstances permit the larger camera to be used; but on the other hand it does make sense, if you're interested in taking advantage of any and all picture-taking opportunities that might happen to come along, to keep a subminiature with you always.

All this is not to deprecate the possible quality that can be achieved with a subminiature camera. By being resourceful and taking fullest advantage of what's available in film and processing you can come up with final print quality that does compare with the big-camera stuff. This may be outside the interest or ability of the casual subminiature user, but it is, in fact, achieved all the time by some devotees. There are, in fact, some who find the real satisfaction in coming up with a grain-free, ultra-sharp 8x10 print from a negative made with a subminiature camera. They load with ultra-fine-grain film (even if they have to load the cartridges themselves) and shoot with eight-ounce cameras mounted on five-pound tripods. All this, plus the special pains they go to in developing, is forgotten when they show you an 11x14 print that looks like it was made from a 4x5 negative and ask, "How's that for subminiature quality?"

That just about makes short shrift of the controversy.

quent production included cheap novelty cameras, crude scaled-down versions of the 35-mm type, and several top-quality subminiatures that advanced the development of the field substantially.

An interesting sidelight is that one company, the Riken Camera Co., originated as a subminiature manufacturer. Its first product, about the size of a 25-cent piece, using disks of film, was replaced by the Steky, which enjoyed a wide popularity in the U.S. for a time. Next it came out with the Golden Ricoh-16, which is no longer made. The company prospers, however, with several lines of 35-mm and twin-lens reflex cameras.

The Minolta 16 camera line originated as the Konan-16. Today, there are three models of the Minolta-16 on the market; and there is in Japan a Konan Camera Co. that's currently engaged in independently designing new subminiatures. Recently, the Russians came out with a copy of the Minolta-16 II.

For a time there was a penchant for building subminiature cameras into binoculars. This goes back to the 19th century, but was revived in Japan, in the Teleca and the Binoca.

More recently, a binocular camera of top quality was made by the J. D. Moeller Optical Co. of Germany, under the name CamBinox. A precision camera was suspended between the viewing sections of a roof-prism binocular. But sales were so limited, that this camera, too, was dropped from the market.

In the United States, comparatively few subminiature cameras followed the Expo. There were the Universal Minute 16, Whittaker Micro-16, and Tynar. At one time, the Parker Pen Co. had a new camera just about ready for distribution, but abandoned the effort because of the non-standard film format.

...the present...

In discussing the status of the subminiature camera today, I keep hearing it mentioned that it is, or may be, the camera of the future. The fact is that there are hundreds of thousands of subminiature cameras owned and used in this country, not to mention the untold number in use in the rest of the world.

Essentially, the subminiature today is considered a snapshot camera, and most of the people who own them use them as such.

In considering the pros and cons of subminiatures we often hear reference to the quality found in an 8x10 print, shot with a submin and regular film under ordinary circumstances. It is true that the quality of such a print will not, most of the time, measure up to the quality of a print from a negative made with a larger camera, all other things being equal.

But consider this. How big do you think most pictures are printed, whether from subminiature, roll-film, or 35-mm cameras? If they are processed through any commercial

photofinishing service, not more than one in a thousand is printed larger than 3½x5 in. When you consider this, you can see why hundreds of thousands of subminiature camera owners are satisfied, if not happy, with the results they get from their pocket-size cameras. They get prints of satisfactory snapshot quality, which is all they want in the first place, and they have the additional convenience of being able to carry their snapshot cameras especially conveniently.

Why, then, hasn't the subminiature camera yet earned its due respect?

The reasons are several. In the first place, the cameras got off to a false start. Some were originally developed as spy cameras, for actual cloak-and-dagger use. The "spy camera" label has hung on to some extent, and, with it has come an abundant use of gravel-grain films (for sneaky available-light exposures), such as Kodak's otherwise fine Tri-X. Inevitably, those who think their subminiatures are for taking pictures under beds or in dimly lit cabarets are disappointed.

I've talked to distributors, asking them why they sell the grainier fast films for subminiature use, and they explain that they are merely satisfying an actual demand, pointing to the great amount sold. "Nevertheless," they say, "we urge the use of the slower, fine-grain films." This seems rather shortsighted since the inevitably poor results with fast films are blamed on the cameras, even though some of them have lenses whose resolving power is greater than that of any of the films ordinarily available for amateur use.

Another source of the bad image has been the practice of making and selling novelty and toy cameras in subminiature formats. These gadgets, with lenses made from window glass, sell for as little as 41 cents—case and film extra. Other cheap cameras have been built into cigarette lighters (although there also are some good ones), ladies' compacts, and novelty opera glasses.

Probably the biggest offenders have been photofinishers, with the exception of a few who specialize in subminiature processing. You simply cannot dunk subminiature films into the same baths as their giant 35-mm and roll-film cousins. They cannot be handled at work tables and enlargers as though they were loaves of bread being wrapped. They demand a little extra care at each step, care which some photofinishers have not been willing to give. So here, too, is a source of disappointment for the new subminiature fan who can become easily discouraged into leaving his camera in the bureau drawer, or selling it cheap.

A third deterrent has been the lack of standard films. If you have a 35-mm camera you know that you can find film for it in any camera shop, drugstore, department store, or supermarket. The brands and types of film may vary, but the film loads all fit into 35-mm cameras. Not so with subminiatures. *Until this year there were no two cameras that could use films interchangeably.* All the manufacturers were in favor of reaching a standard, but each wanted the others to adopt his own.

This obstacle has now been overcome with agreements

on standards in both Germany and Japan. Two new cameras shown at *photokina* in Cologne, Germany, last March both used the new German standard—a smaller version of the standard 35-mm film cartridge. These are the Rollei 16 and the Edixa 16. Rumors abound of others to follow. But that's another story. The new German cartridge uses 16-mm movie film with perforations on one edge only. The image format is 12x17-mm.

From Japan I obtained a report, now confirmed, that the industry there has agreed to a new twin cartridge which combines the features of the present Mamiya-16 and Minolta-16 cartridges. (Users and new buyers of the present cameras need not be concerned, for film will continue to be available for their cameras.) A twin cartridge has a supply cup at one end in which the unexposed film is stored. At the other end, connected by a bridge, is a take-up cup, into which the film advances after each exposure. The Japanese standard calls for unperforated film and an image format of 12x18-mm.

It appears, unfortunately, that efforts to reach an international agreement on standards have been unsuccessful. On the other hand, two standards are better than none at all, in a jungle which heretofore has discouraged camera dealers from stocking subminiature films.

...the future...

What about the future? I predict that one day subminiature cameras will be the biggest thing in amateur photography, and there are those who are willing to stick their necks all the way out and say the subminiature will someday have the status 35-mm enjoys today among professionals.

Although the current trend is to add features that tend to increase camera size beyond what might be considered ideal, even the biggest subminiatures cannot be considered unwieldy or too big to carry in pocket or purse. I can't help feeling that industry's success in the past decade in miniaturization of almost all things photographic (exposure meters, flash and electronic flash equipment, automatic electric-eye systems and circuitry, etc.) will start reversing the trend of the growing subminiature, and that someday we'll achieve the completely surreptitious wrist-watch or button-hole (or whatever your particular fancy happens to be) camera.

But to get back to the immediate future, I think I could predict without qualm that the next two or three years will see quite a few new subminiature cameras appearing on the market. These new ones, we can feel fairly confident, will adopt either the Japanese or German standard film cartridge.

In addition, we may have independent makes of new cameras, made in Japan, built around the Minox film cartridge, which uses 9.5-mm unperforated film with an image size of 8x11-mm. While new cameras using Minox film are probably about two years away, they could come sooner.

There is a possibility, also, that the once-popular Minicord, previously made by Goerz in Austria, will be made again, in Japan, under license, with built-in exposure meter.

The new cameras to come will be in all price ranges, to meet the widest markets as well as to satisfy the most exacting precision requirements, as reflected in the top-quality workmanship of the new Rollei 16. Advanced designs may be introduced.

One of the remaining obstacles is to get the major film manufacturers to package their films for these cameras. At present, each camera maker must arrange independently to have film spooled and packaged for his camera.

I asked the Eastman Kodak Co. for its position on the future of 16-mm cameras and films. This was shortly after Kodak had released its new line of Instamatic cameras. For them, the new 26x26-mm film format is a step toward subminiaturizing; Kodak will not discuss the possibility of going any smaller.

Anso's manager for amateur products, James P. Demaree, told me that there is no doubt that subminiature photography will be the wave of the future. The sub-35, which makes images of 18x24-mm instead of the conventional 24x36-mm, is, in his opinion, an intermediate step toward further subminiaturizing. Ilford's George Ashton expressed much the same point of view to me.

At the most recent *photokina*, Zeiss Ikon's director of public relations, Wolf Wehran, told a press party that Zeiss would bypass the split-35 and go instead to 16-mm at such time as marketing conditions are ripe. This is the first time any major camera maker has ever been willing to comment on the subject.

The Instamatic film, called the Kodapak Cartridge, actually is a great tribute to subminiature pioneering. It uses the classic twin-cup drop-in design currently used with the GaMi-16 Minox, Minolta-16, and Mamiya-16 cameras, as well as a number of other cameras no longer made. The coding of the film speed onto the drop-in cartridge was used with the Wilca, a 16-mm subminiature shown at the 1960 *photokina*. The position of the notch (or protrusion) on the film cartridge automatically set the camera's film speed control for automatic exposure control.

In passing it might be of interest to note that other advanced camera features have been pioneered by subminiatures. For example, the Mec-16 SB has a behind-the-lens photocell for more accurate exposure reading of the scene actually being recorded.

I have two predictions to make; perhaps I should offer them as recommendations to the camera industry. They are that (a) having agreed on standards for film cartridge and sizes, they should address themselves to the improvement of film processing services, and the perplexing situations that now exist in mounting subminiature color film for use with standard projectors; and (b) the human hand should be given primary consideration in the design of future cameras (scaling down 35-mm camera systems is not the answer), so that the tiny apparatus can be handled to maximum advantage.



Slow film and slow shutter speed (Adox KB14 at 1/20 sec) added up to surprising detail and quality in this Minox portrait of movie actress Sophia Loren. Compare with big-grain picture on preceding pages. Both were taken by Vercoe in available light.