

Service Manual for

SIX-20 'BROWNIE'

ALL-METAL WELDED BODY

Kodak

**EQUIPMENT
SERVICES**

FEBRUARY 1955

Service Manual for

SIX-20 'BROWNIE'

ALL-METAL WELDED BODY

MODELS COVERED BY THIS MANUAL ARE

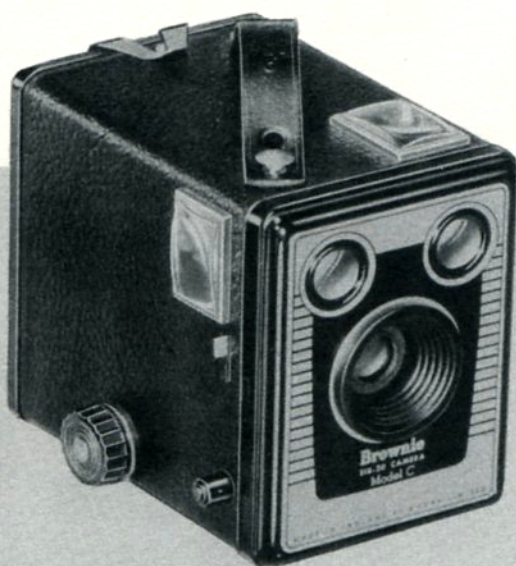
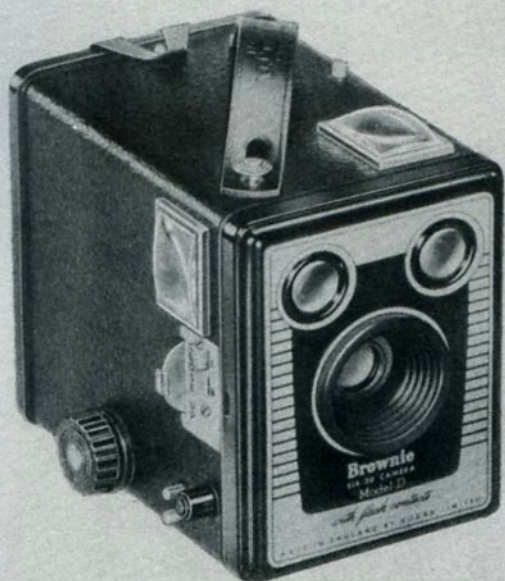
Six-20 'Brownie' C

Six-20 'Brownie' D

Six-20 'Brownie' E

Six-20 'Brownie' F

MADE IN ENGLAND BY KODAK LIMITED



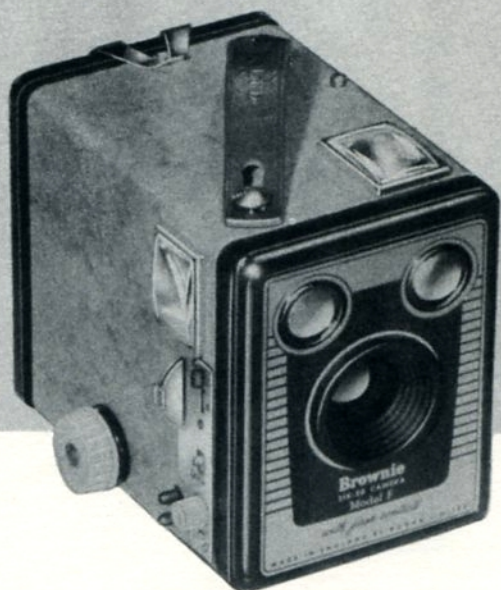
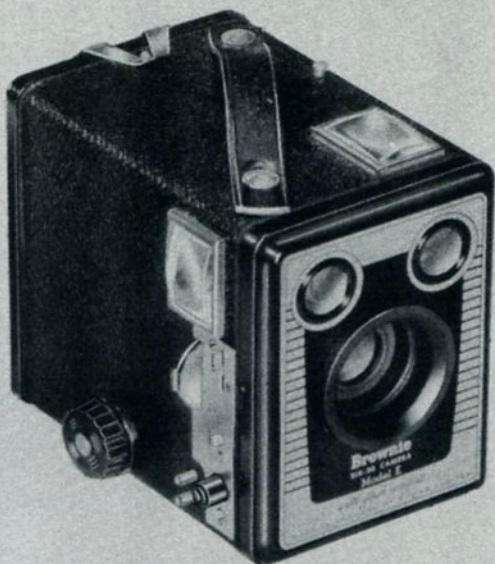
THIS MANUAL CONTAINS SERVICING INSTRUCTIONS FOR

SIX-20 'BROWNIE' C

SIX-20 'BROWNIE' D

SIX-20 'BROWNIE' E

SIX-20 'BROWNIE' F



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SERVICE MANUAL FOR SIX-20 'BROWNIE'

The original "Service Manual for SIX-20 'Brownie' Cameras with All-metal Welded Bodies" covered the Models C & D with no flash contacts, and Model E with flash contacts.

Since the issue of that manual, the Model D has had flash contacts added, these being of the same type and setting as on the first Model E. Figure 1 illustrates the earlier Model D.

With the introduction of the Model F, new flash contacts were incorporated which allowed the use of either F or M types of flashbulb.

At the same time the contacts on the Models D and E were modified to match those of the Model F.

These later Models D and E have a label, bearing the words—"Shutter synchronised for flash bulbs Class F or M"—fixed to the inside of the back (see Fig. 3).

This service manual covers all models, and the appropriate servicing of flash contacts is referred to under Section IX.

A further alteration to the Models D, E and F is the use of engraved figures in place of the words "Close-up" or "Portrait" on the close-up slide.

In the text, "Close-up" has been used throughout, but the instructions apply equally to those cameras bearing on the slide the word "Portrait" or the engraved figures.

SECTION - I TOOLS

For the servicing outlined in this manual, the following tools and supplies are required:-

4oz. Hammer.
4½" Pliers, Snipe Nose.
4½" Pliers, Flat Nose.
Tweezers, Watchmaker's "A.A."
3/16" Screwdriver—Fluted Handle.
Flat-headed Punch.
"Turn-over" Rivet Punch.
'Selvyt' Cloth.
Camel-hair Brush.
Lens Cleaner.
Dry Powdered Graphite.
Cellulose Dead-black Paint.
Hand Drill with assorted small-gauge drills.
'Seccotine' or similar glue.

In addition to the above general tools and supplies, the following special tools are required:-

Winding Key Jig T.11.
Angle Rivet Punch T.16.

These special tools are available from:-

Kodak Limited, Equipment Services,
Wealdstone, Harrow, Middlesex.

SECTION II - SHUTTER

The shutter is a new type employing several departures from normal 'Brownie' practice. It is a simple, robust and efficient mechanism of few parts. This makes servicing easy, and no difficulty should be experienced in carrying out the following operations.

Operation 1: Access to the Shutter Assembly

Hold the camera front firmly between the fingers and thumb of one hand, and hold the body of the camera with the other hand.

Ease off the front plate assembly, first lifting the side nearest to the exposure button. The assembly consists of the camera lens, the viewfinder front lens, and finder boxes with their mirrors.

With the front plate removed, access is obtained to the shutter assembly.

Operation 2: Removal of the Shutter Assembly

See Fig. 1. Lift the right-hand edge of the light guard on the top of the shutter bracket. It is "sprung" into place and once clear of the indentations on the camera box side can be easily withdrawn.

In some later models, the lip on the shutter bracket and the hood on the guide channel have been lengthened, thereby obviating the necessity for the light guard. In these models the light guard has been omitted.

(If servicing Models D, E and F, unscrew the three retaining screws of the instruction plate at the left side of the camera and remove the instruction plate. Do not lose the shutter-lock lever from the Models E and F).

Place a finger behind and on the right-hand side of the shutter bracket and pull towards the front. At the same time ease the right edge of the bracket over the retaining stud in the right-hand wall of the camera box.

This will release the whole of the shutter assembly.

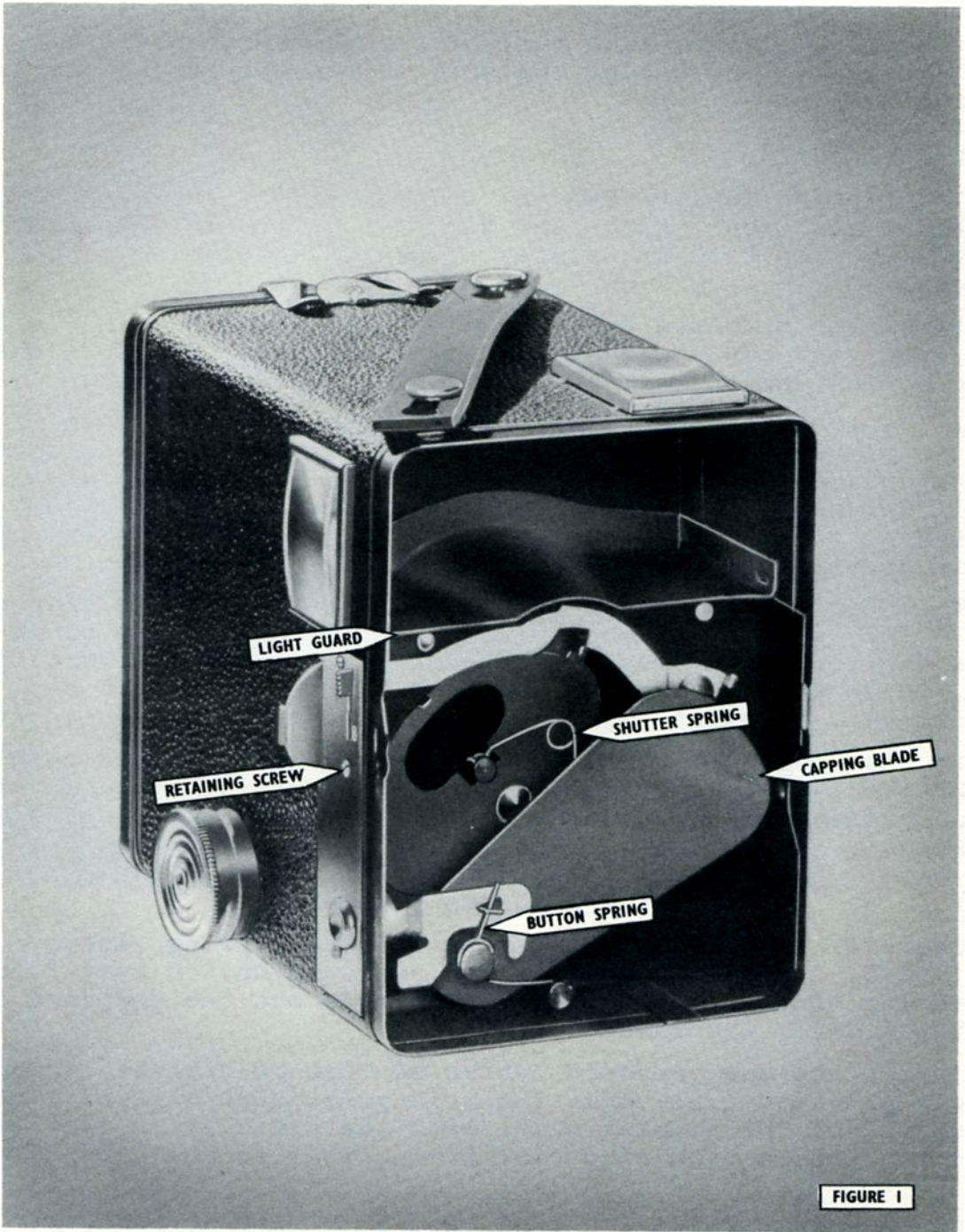
Operation 3: Spring Replacement in the Shutter

See Fig. 1. There are two springs.

(a) Exposure Button Spring

Lift the end of the spring from the grooved anchor stud at the bottom centre of the shutter bracket.

Lift the coil of the spring off the capping blade stud upon which it pivots. Remove the spring, sliding out the upper end from the drilled lug attached to the capping plate.



Insert the short end of the new spring into the drilled lug of the capping plate. Ease the coil of the spring over the pivot stud. Hook the long end of the spring into the groove of the anchor stud.

(b) Shutter Spring

This spring is attached (a) to the rear of the capping blade, and (b) to the front of the shutter. It is possible to remove the spring ends from both anchorages by manipulation with a pair of tweezers.

Press the exposure button and keep it pressed. This will bring into view the spring stud of the shutter. Lift off this end of the spring, noting carefully the fixing arrangements.

Allow the spring to straighten and hang from the capping blade stud. Steady the loose end of the spring with the thumb, and push the opposite hooked end off the capping blade stud, using a small screwdriver. If difficulty is experienced, it is permissible to bend the capping blade forward slightly in order to gain access to the spring anchorage.

When replacing the spring, first attach it to the capping blade, then, with the exposure button pressed, fix the other end to the shutter. The arms of the spring must exert an "outwards" force. Note that the loop or coil of the spring should be pointing away from the exposure button when the button is pressed.

Do not forget to re-align the capping blade before putting the shutter back into service. A piece of rod or circular wood held underneath the point of bending will prevent excessive distortion.

Operation 4: Changing the Exposure Button

See Fig. 1. Remove the exposure button spring, as in Operation 3. Lift the plate of the exposure button away from the drilled lug of the capping blade and slide out the exposure button from the side of the assembly.

Insert the new exposure button so that it projects through the hole provided. See that the triangular slot engages with the drilled lug of the capping blade with the plate lying flat, and movement of the button correctly transmitted to the capping blade.

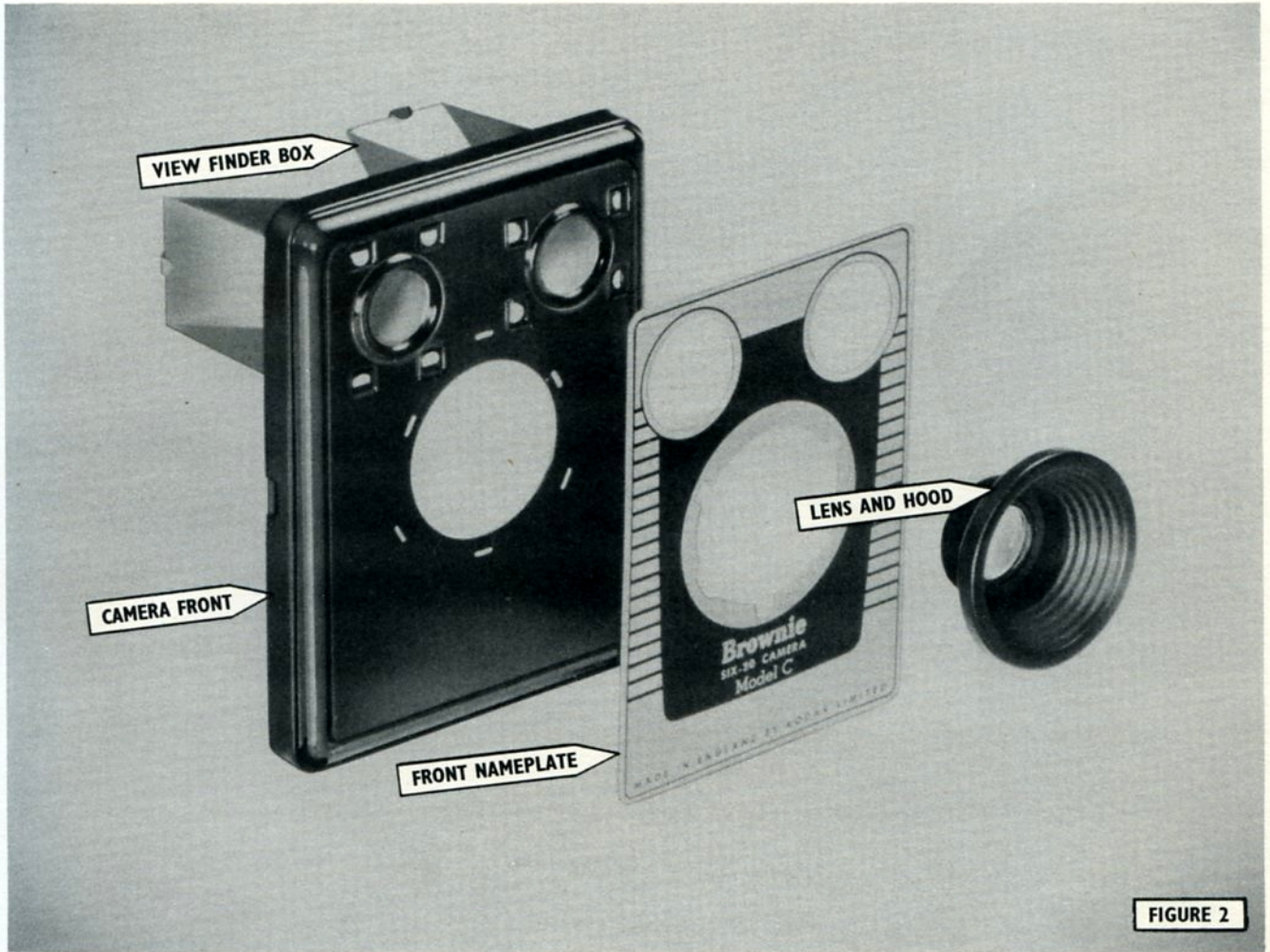
Replace the exposure button spring.

Operation 5: Cleaning and Easing the Shutter Movement

To ensure smooth working of the shutter, clean the INNER surfaces of the shutter plate and blade with a camel-hair brush and polish with dry powdered graphite. Do not use oil.

Operation 6: Replacing the Shutter

Reverse the procedure outlined in Operation 2.



SECTION III - CAMERA FRONT ASSEMBLY

Operation 7: Replacement of the Camera Lens

Remove camera front complete, as in Operation 1.

See Fig. 2. Lay the front, face down, on a dust-free surface and lift the securing lugs of the lens and hood assembly. With the lugs straightened, withdraw the lens and hood. This will also release the front name plate.

Insert the new centre lens complete with hood, and guide the lugs of the hood into their slots. Bend over the lugs with pliers and then tap them flat, using a flat-headed punch. Make sure that the name plate is centred correctly.

Operation 8: Replacement of the Viewfinder Mirror

Insert a screwdriver into the top of the finder box and lift the two mirror retaining lugs, thus freeing the mirror. Remove it, and replace with a new one. Turn down the retaining lugs and flatten them with the aid of a screwdriver.

Operation 9: Replacement of the Viewfinder Box

Remove the camera lens and front plate, as in Operation 7. The four lugs securing each box can be seen projecting through the camera front. Taking care not to drop the viewfinder front lens, lift these lugs, straighten them, and then withdraw the finder box. Fit a new box, trapping the lens in position, flat side towards the camera front, and flatten the retaining lugs.

Operation 10: Replacement of the Viewfinder Front Lens

Remove the finder box as in Operation 8. This automatically releases the front lens of the finder. To replace, merely insert a new lens with the flat side towards the camera front, and trap it in position by fastening down the finder box lugs.

Operation 11: Cleaning the Lenses

First remove any surface dust or grit, using a soft clean camel-hair brush. Polish with a 'Selvyt' Cloth, using a light rotary motion. If the lens is very dirty, use a little 'Kodak' Lens Cleaning Solution on the cloth. Do not use acids, alcohol or harsh linty cloth. Avoid excessive pressure and unnecessary cleaning.

SECTION IV - BODY

See Figs. 1 and 3. If the body structure itself is damaged, repair is not possible, and a complete replacement of the case is necessary. The following repairs to case fitments are practicable:-

Operation 12: Replacement of the Viewfinder Top Lens

Remove the camera front complete as in Operation 1.

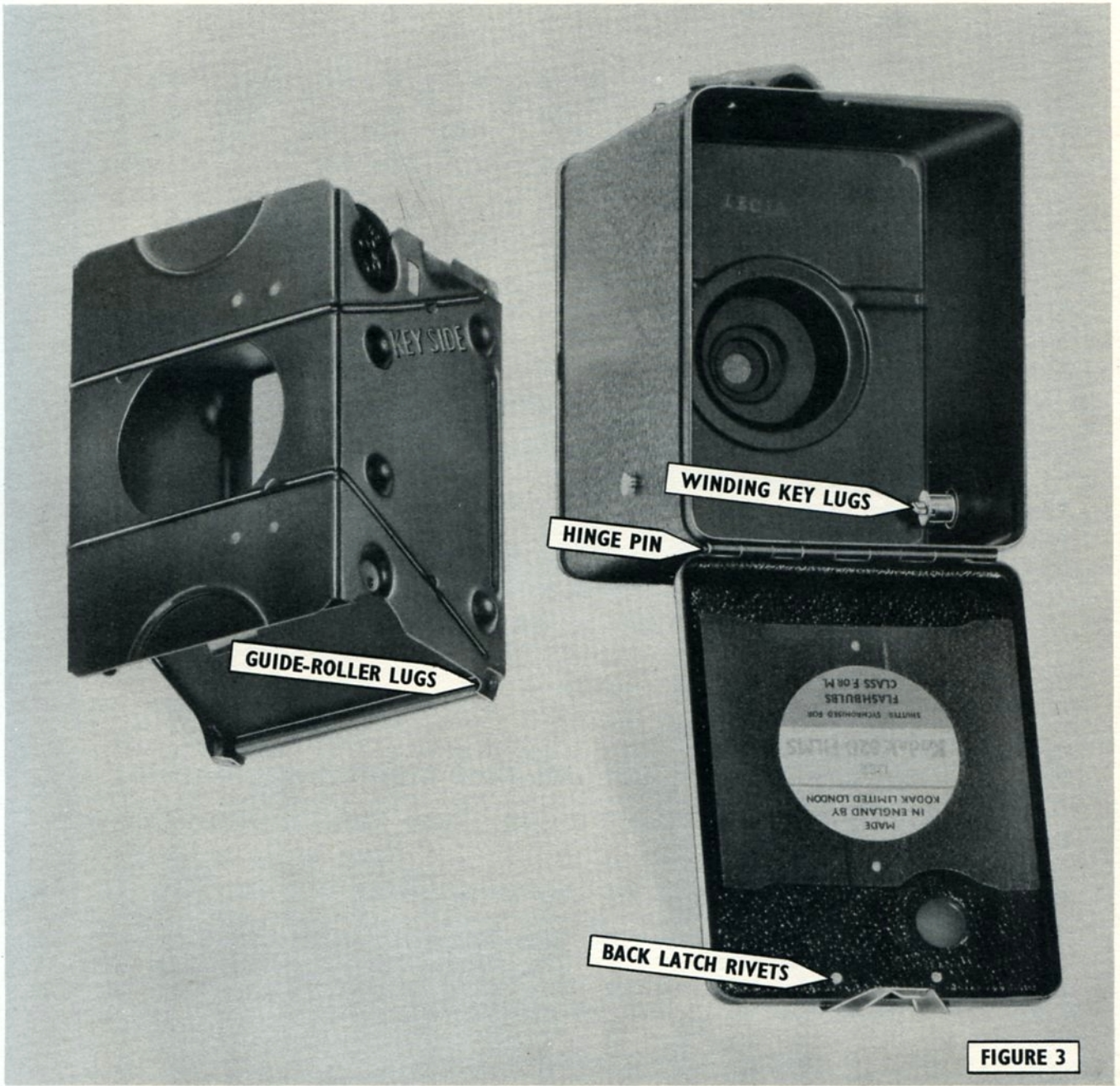


FIGURE 3

With a screwdriver, lift the lugs securing the top viewfinder lens retainer.

Straighten the lugs and withdraw the viewfinder lens retainer. The top lens of the finder can now be removed and replaced. Refasten the retainer by means of the four lugs, making certain that the lens is gripped tightly in position.

Operation 13: Replacement of the Winding Key

(a) Removal of the Winding Key

Slide the disc of the winding key into the slot provided on the winding key jig. Open the camera back, withdraw the roll holder and, using a screwdriver, prise up the two lugs securing the key.

Straighten the lugs and withdraw the key.

(b) Replacement of the Winding Key

Remove the old key from the jig and replace with a new one. Insert the lugs of the key into the slots in the camera side and press home with the winding key still held in the jig. Bend the lugs outwards and tap flat with a small hammer.

SECTION V - CAMERA BACK

Operation 14: Removal of the Back

See Fig. 3. Unlatch the back, and using a piece of stiff wire as a punch, tap out the hinge pin until it projects sufficiently for a grip to be obtained with the pliers.

Using the pliers, withdraw the hinge pin. The back is now free.

Operation 15: Replacement of the Back

Align the hinge pieces of the new back with those of the camera body. When they are in register, insert the hinge pin, using pliers. If inclined to be stiff, lightly tap home the pin with the hammer.

Operation 16: Replacement of the Back Latch

Remove the camera back, as in Operation 14.

Use a drill slightly smaller than the rivets securing the latch to the camera back, and drill out the rivets.

Withdraw the rivets and the defective latch.

Position the new latch with rivet holes in register. Insert new rivets with the heads on the outside of the camera back. With the round heads backed by a flat metal surface, use a punch (spread-over type) to turn over the ends of the rivets.

Replace the camera back.

SECTION VI - ROLL-HOLDER

If the roll holder is damaged structurally, it must be completely replaced. The rollers may be removed and cleaned, if necessary, and the interior of the roll holder may sometimes require "touching up" with dead-black paint. Oil must not be applied to the guide rollers; if they show any signs of corrosion they should be replaced.

Operation 17: Replacement of a Guide Roller

See Fig. 3. Bend out the drilled lugs holding the guide roller in place. The lugs should be bent no more than is necessary to remove the roller.

Replace with the new roller. Bend back the drilled lugs forming the bushes at either end of the roller in such a way as to give maximum freedom of the roller to revolve with minimum end-play. If there is any stiffness in working, the application of a little powdered graphite to the ends of the rollers will ease them considerably. Oil must not be used.

SECTION VII - CLOSE-UP LENS

Model D only

Damage to the close-up lens is unlikely, but in this event, replacement can be carried out as follows:-

Operation 18: Removal of the Close-up Slide

See Fig. 4. The slide which houses the close-up lens runs in a guide channel immediately behind the shutter bracket. The assembly is known as the "guide and hood assembly" and is attached to the shutter bracket by means of four rivets.

Using a small drill (slightly smaller than the rivet), drill out the top two securing rivets. Ease the guide channel back slightly. The close-up slide assembly and the spacing guide can now be removed easily. Take care to retain the light-trap felt at the end of the guide channel.

Operation 19: Replacement of the Close-up Slide

Insert the spacing guide so that the "V" cut on the bottom edge of the slide engages with the raised lug one third of the way along the channel.

With the word "Close-up" facing the rear of the camera, insert the close-up slide assembly. Make certain that the cut-out at the bottom of the slide engages with the raised lug so that as the slide is pulled out, the movement is checked when the close-up lens exactly covers the aperture.

Re-position the felt piece and, after testing the operation of the slide, refix the channel by means of two new rivets, which should be backed by a metal surface and turned over with a rivet punch and a small hammer.

Replace the shutter bracket assembly and the camera front.

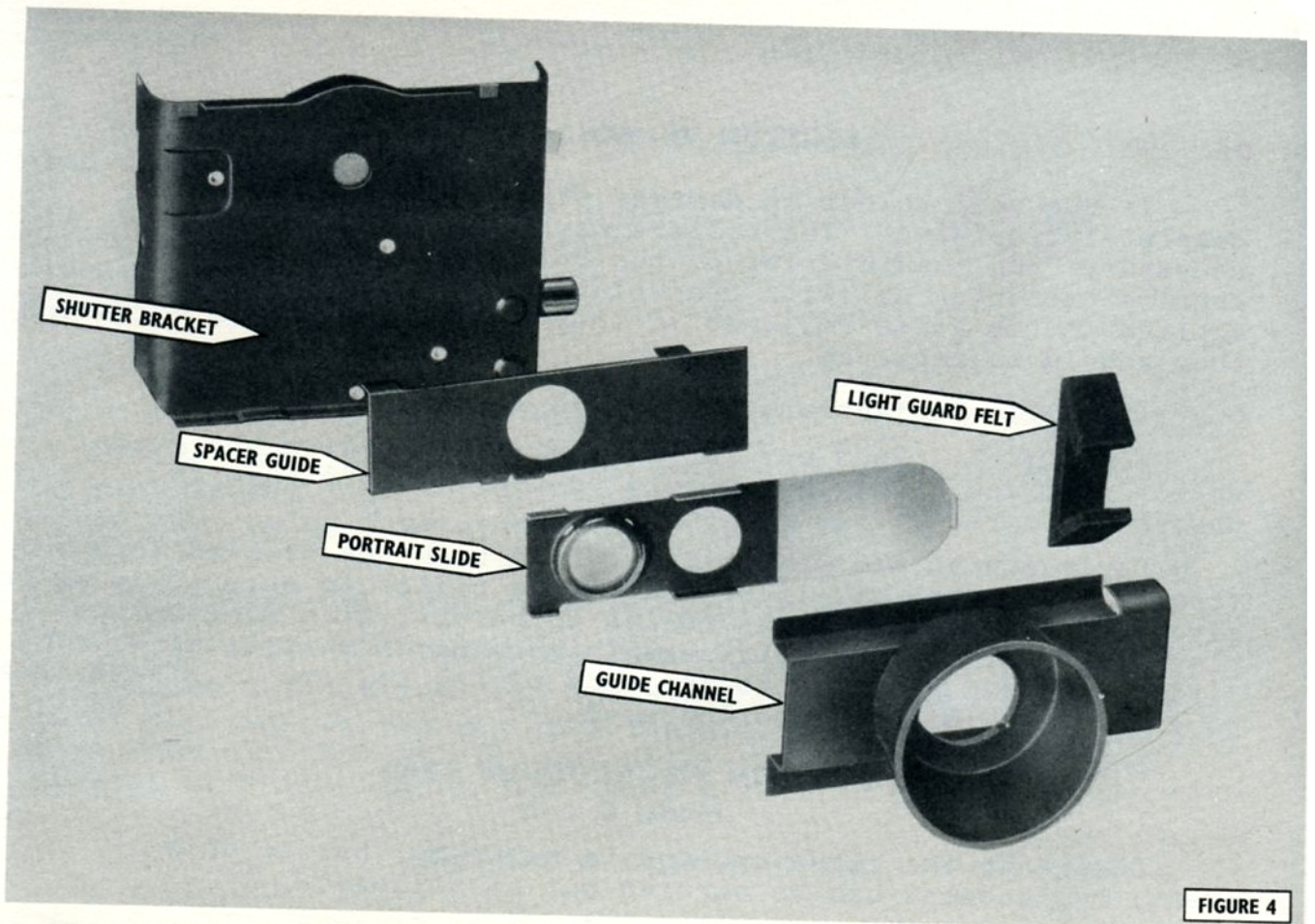


FIGURE 4

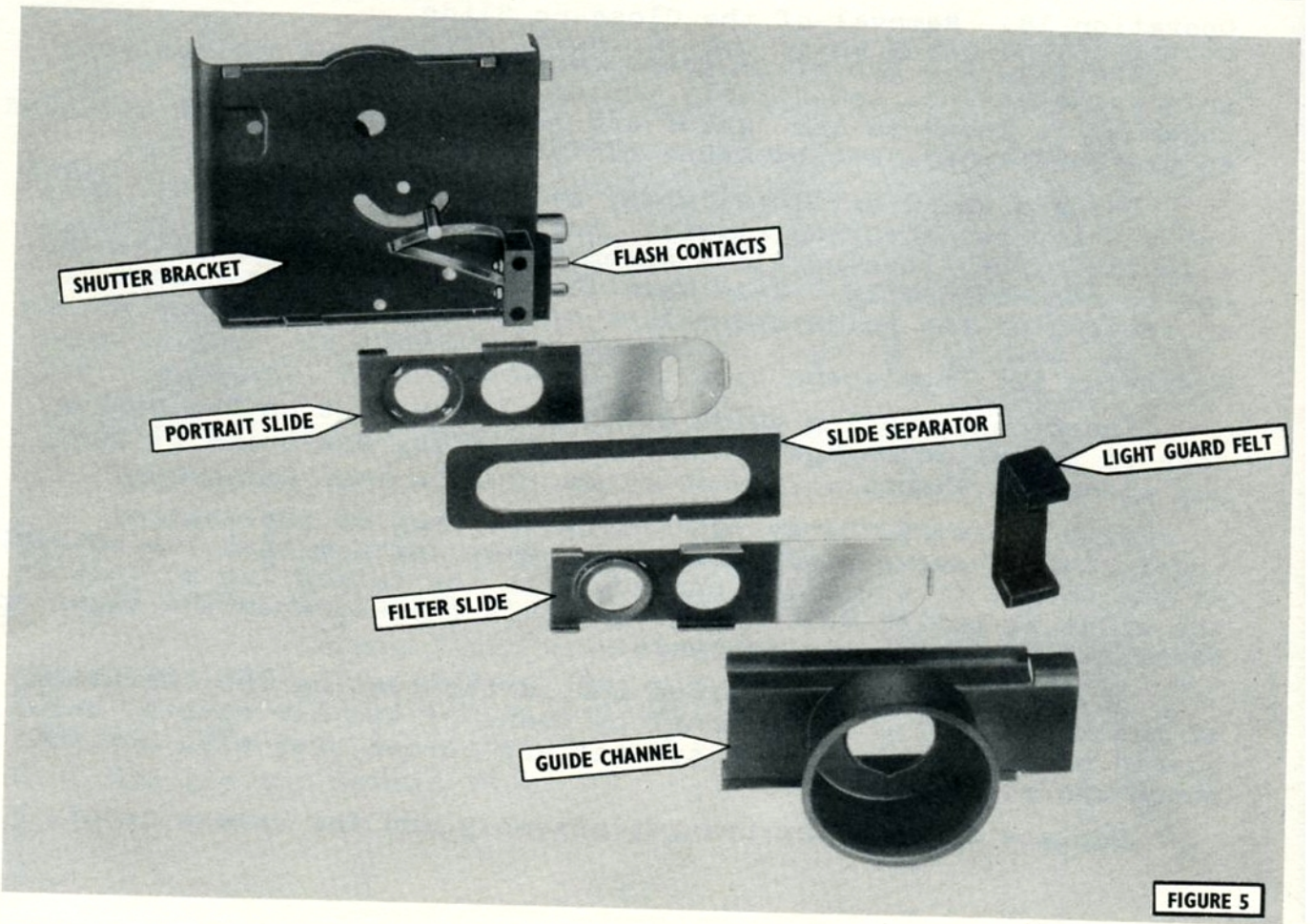


FIGURE 5

SECTION VIII - CLOSE-UP AND FILTER ASSEMBLY

Models E and F

The close-up and filter assemblies on these models are fitted in a similar manner to those of the SIX-20 'Brownie' Model D. The spacing guide differs slightly in construction, however, due to the additional space occupied by the filter slide. (See Fig. 5).

Servicing should be carried out as detailed in Section VII, but it should be noted that the slides are inserted with the words "Close-up" or "Filter" to the FRONT of the camera and not to the rear, as in Model D.

SECTION IX - FLASH CONTACTS

Models D and E synchronized for class F flashbulb only

The flash contacts of these models can be tested for synchronization as detailed in the Kodak Equipment Services Manual "How to use the 'Brownie' Flash Tester".

Model F, and Models D and E synchronized for class F and M flashbulbs

With these cameras, the flash contacts have been modified to give a long "wipe". As a result the 'Brownie' Flash Tester cannot be used with these cameras to give any accurate indication of the point at which flash contact is made.

The neon indicator of the Flash Tester will give a definite indication whether or not contacts are making. As the contacts are accurately set during manufacture to cover a flash delay up to 25 milliseconds, it is reasonable to assume that if contact is being made, the camera shutter will satisfactorily fire all types of flashbulb.

Should there be any doubt as to the efficiency of the flash contacts, the camera should be returned to Kodak Limited, Equipment Services, for checking on an electronic shutter tester.

SECTION X - SERVICE PART LIST

When ordering service parts, the part numbers must be quoted.

MODEL C	No.	MODEL D Cont.	No.
Camera Front Complete	D.3387	Guide for Slides with Hood	D.3378
Front and Finder Box Assembly	D.3383		
Centre Lens Mounted	D.3390	Slides in Guide Assembly	D.3401
Front Plate	D.3079	Spacer for Slide	D.3070
Camera Front	D.3007	Felt for Slide	D.3049
Finder Box	D.3028	Portrait Slide Assembled	D.3429
Front Finder Lens	D.3026		
Finder Mirror	D.3027		
		MODEL D with Flash Contacts	
Camera Case Complete	C.3373	Camera Front Complete	D.3386/D
Key Complete	D.3398	As for Model D except—	
Top Finder Lens	D.3025	Front Plate	D.3397
Top Finder Lens Retainer	91001		
Handle	D.3018	Camera Case Complete	D.3385
		Side Instruction Plate	D.13394
Camera Back Complete	D.3392	Screws for above	D.3118
Back Latch	93660		
Rivets for above	D.3030	Camera Back Complete	D.3392
Hinge Pin	D.3032	Back Latch	D.5758/A
Red Disc (celluloid)	1618	Rivets for above	D.3030
Red Window (celluloid)	D.13265	Hinge Pin	D.3032
		Red Disc (celluloid)	1618
Shutter Assembly Complete	C.3382	Shutter Assembly Complete	D.3388
Time Lever	90997	Time Lever	D.3056/A
Time Lever Stud	D.3057	Time Lever Stud	D.3057
Exposure Button	90998	Exposure Button	D.10500
Exposure Button Spring	D.3052	Exposure Button Spring	D.3052
Light Guard	D.3038	Portrait Slide Assembled	D.3429
Shutter Spring	99802	Felt for Slide	D.3049
		Spacer for Slide	D.3070
Roll Holder Complete	91773	Contact Spring, Upper	D.3405
Guide Roller	91604	Contact Spring, Lower	D.3406
		Contact Block	D.3402
		Contact Pin	D.3404/D
		Contact Pin Nut	N.1800
		Roll Holder Complete	91773
		As for Model C	
MODEL D		MODEL E	
Camera Front Complete	D.3386	Camera Front Complete	D.3384
As for Model C except—		As for Model C except—	
Front Plate	D.3077	Front Plate	D.3008
		Centre Lens Mounted	D.3389
Camera Case Complete	C.3372		
As for Model C except—		Camera Case Complete	D.3370
Side Instruction Plate	D.3075	As for Model C except—	
Screws for above	D.3118	Side Instruction Plate	D.3022
		Screws for above	96045
Camera Back Complete	D.3392	Key	D.3396
As for Model C			
Shutter Assembly Complete	C.3381	Camera Back Complete	D.3391
As for Model C except—		As for Model C	
Slides in Guide complete	D.3401		
Rivets for above	96259		
Roll Holder Complete	91773		
As for Model C			

MODEL E Cont.	No.	MODEL F Cont.	No.
Shutter Assembly Complete As for Model C except— Exposure Button	C.3379 D.3427	Top Finder Lens Retainer Handle Side Instruction Plate Screws for above	D.3029/E D.14688 D.14689 D.96045/E
Roll Holder Complete As for Model C	91773	Camera Back Complete Back Latch Rivets for above Hinge Pin Red Disc (celluloid) Red Window (celluloid)	D.14718 D.5758/E D.14723 D.3033 1618 D.13265
Guide for Slide with Hood	D.3378	Shutter Assembly Complete Time Lever Time Lever Stud Exposure Button Exposure Button Spring Filter Slide Assembled Portrait Slide Assembled Felt for Slides Spacer for Slides Shutter Spring Contact Spring, Upper Contact Spring, Lower Contact Block	D.14720 D.3056/E D.3057 D.14692 D.3052 D.14717 D.14719 D.5727 D.3065/E D.99802 D.3405 D.3406 D.3402 D.3404/E N.1800 D.14721
Slides in Guide Assembly Spacer for Slides Felt for Slides Portrait Slide Assembled Filter Slide Assembled	D.3400 D.3065 D.3049 D.3375 D.3374	Roll Holder Complete As for Model C	91773
Flash Contact Mechanism Contact Spring, Upper Contact Spring, Lower Contact Block	D.3405 D.3406 D.3402		
MODEL F			
Camera Front Complete Front and Finder Box Assembly Centre Lens Mounted Front Plate Front Finder Lens Finder Mirror	D.14714 D.14711 D.14715 D.14687 D.3026 D.3027		
Camera Case Complete Key Complete Top Finder Lens	D.14712 D.14713 D.3025		

Prices, which are subject to Purchase Tax and normal discount, are listed in a separate Price List.

Address orders to Kodak Limited, Equipment Services, Wealdstone Harrow, Middlesex.

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