

HOW TO SERVICE

The Kodak Medalist II



EASTMAN KODAK COMPANY, ROCHESTER 4, N.Y.

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● The sequence given in the section on disassembly is recommended for complete disassembly of the camera. However, many parts and/or assemblies *can* be removed without strict regard to this chronological order. For example: To replace the EYELET LENS (figure 5), it would be necessary to remove only the COVER ASSEMBLY (figure 2) by removing the retaining screws and the PARALLAX FRAME (figure 5) by removing the two eyelet FRAME SCREWS.

Underlined words in the text indicate nomenclature which appears on illustrations. Such nomenclature, when not followed by a direct figure reference, will be found on the figure indicated in the last preceding figure reference.

Disassembly

SERVICE TOOLS REQUIRED (See figure 23).

Part No.	Nomenclature	Application
274	Crooked file	For filing the depth-of-focus scale frame shoulder on the direct view finder cover
501-A	Shutter retaining collar wrench	For removing the shutter from the camera
501-B	Focusing tube retaining collar wrench	For removing the focusing tube assembly from the camera case
501-C	Offset screw-driver	For adjusting the range finder prisms
501-D	Wrench	For focusing the range finder objective lenses
501-E	Wrench	For adjusting the range finder prisms
501-I	Bending tool	For bending the trigger plate or the trigger bell crank
501-L	Offset screw-driver	For various screws
501-O	Clamp	For removing the front lens and mount from the shutter
501-V	Ground glass and spring clamp	For focusing
501-W	Shutter protector block	For use in protecting the shutter and lens when they are removed from the camera
611	Special jeweler's screwdriver blade	For removing and replacing the terminal nut on the flash terminal assembly

In following these instructions it is understood that the right side referred to is the one to the serviceman's right when the camera is held in the picture-taking position.

SHUTTER.

If the repairs to be made involve only the shutter, the shutter complete (figure 9) can be removed from the camera without disassembling the camera. Refer to page 5.

RANGE FINDER ACTUATING LEVER LINK.

The range finder actuating lever link (figure 1) is located inside the camera. The end of the link toward the back of the camera is slotted and slides forward and back as the focusing tube assembly (figure 9) is moved in and out.

NOTE: It is not necessary to remove the rangefinder actuating lever link unless the range finder plate is to be removed.

If the range finder plate must be removed, extend the focusing tube to the limit of travel and remove the camera back.

Insert the blade of a jeweler's screwdriver in the key slot of the link, and pull the link back to disengage it. Remove the link.

Retract the focusing tube to the closed position.

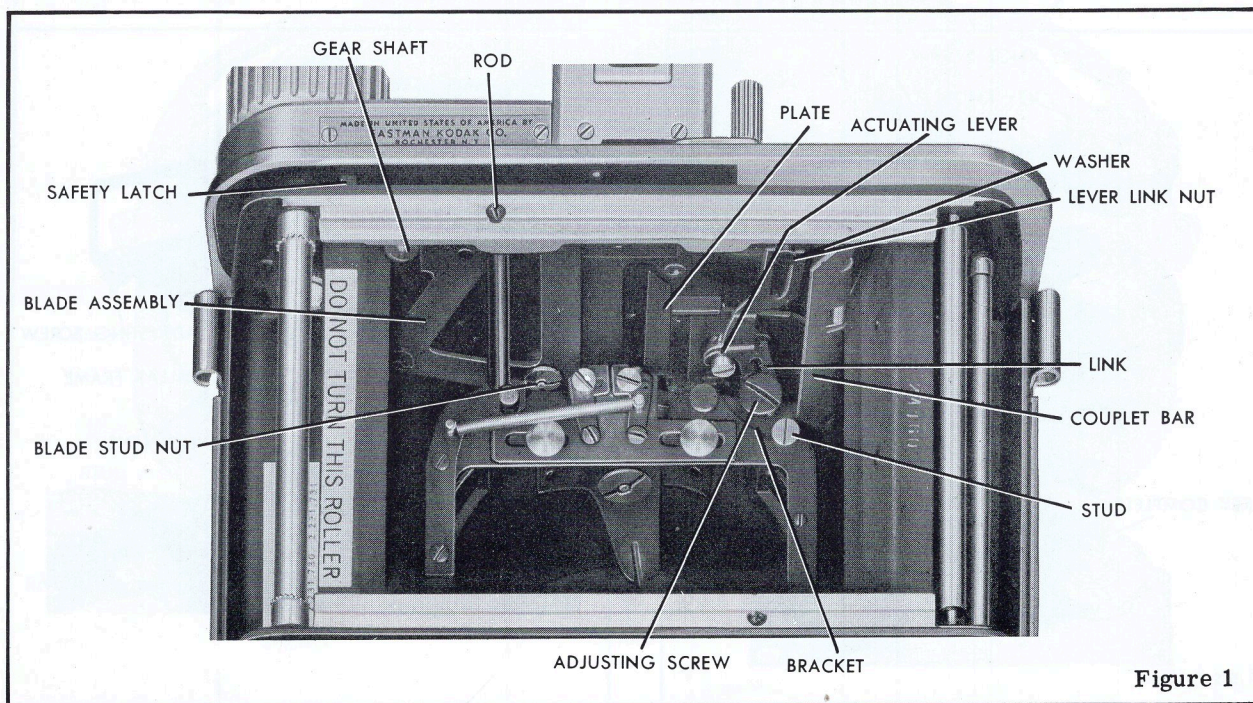


Figure 1

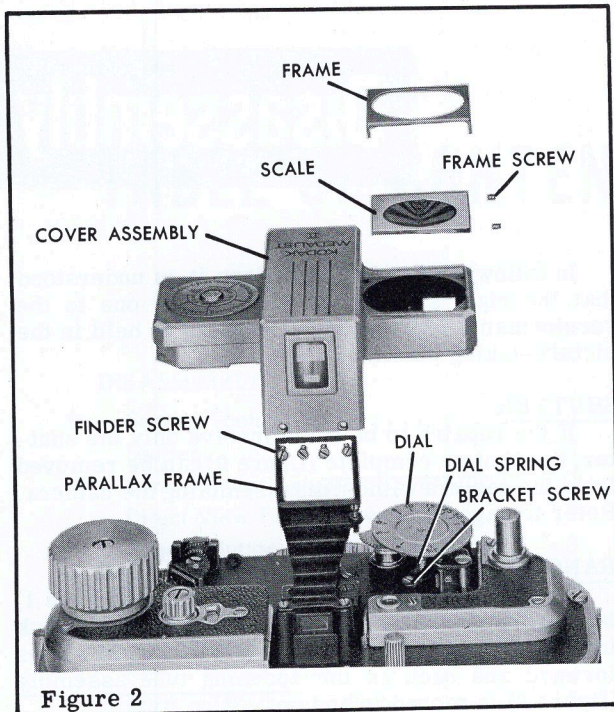


Figure 2

DIRECT VIEW FINDER COVER ASSEMBLY (See figure 2).

Remove the four direct view finder screws; two under the view finder and range finder windows on the back of the direct view finder cover assembly, and two next to the range finder windows on the front of the cover. It is not necessary to remove the two depth-of-focus scale frame screws unless the depth-of-focus scale is to be replaced.

Lift off the direct view finder cover, being careful to lift it straight up.

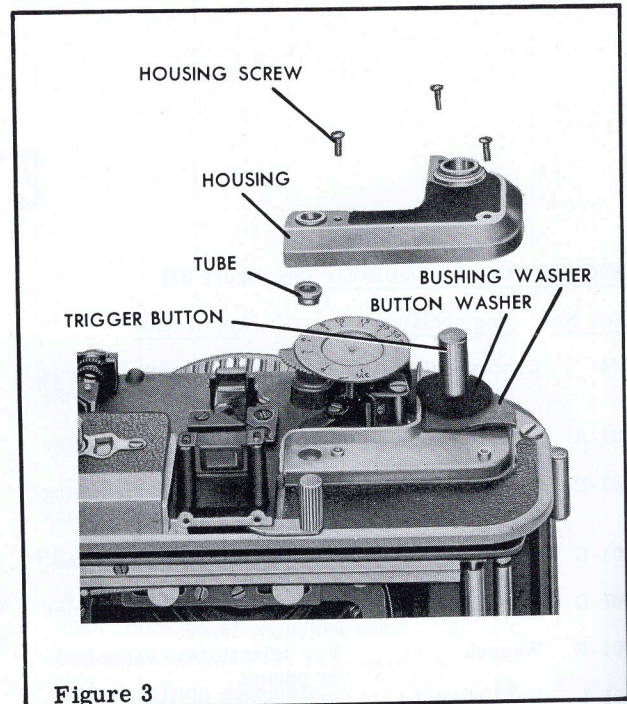


Figure 3

CAUTION: If the cover is pulled off at an angle, it will strike the parallax frame assembly and may bend it out of adjustment.

Do not remove the focusing dial unless necessary. However, if the focusing dial must be removed proceed as follows: Unhook the dial spring from the bracket screw and lift off the dial and spring. Then if necessary, remove the bracket from the mechanism plate by removing the two holding screws.

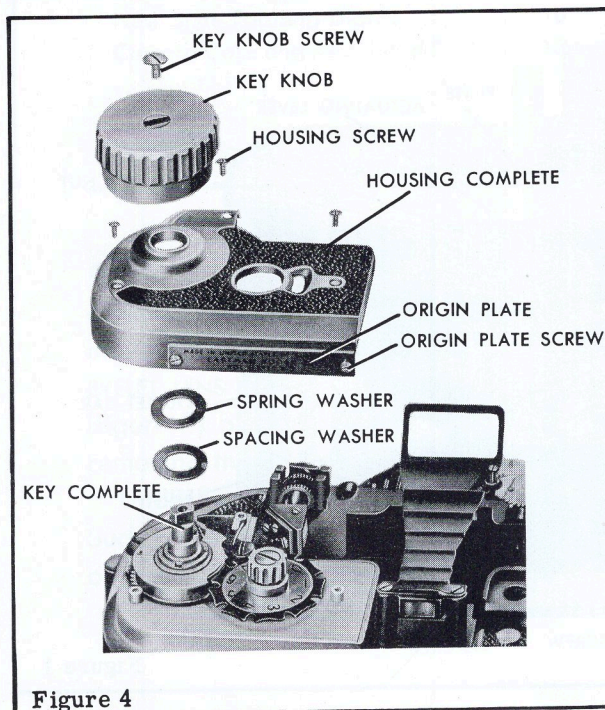


Figure 4

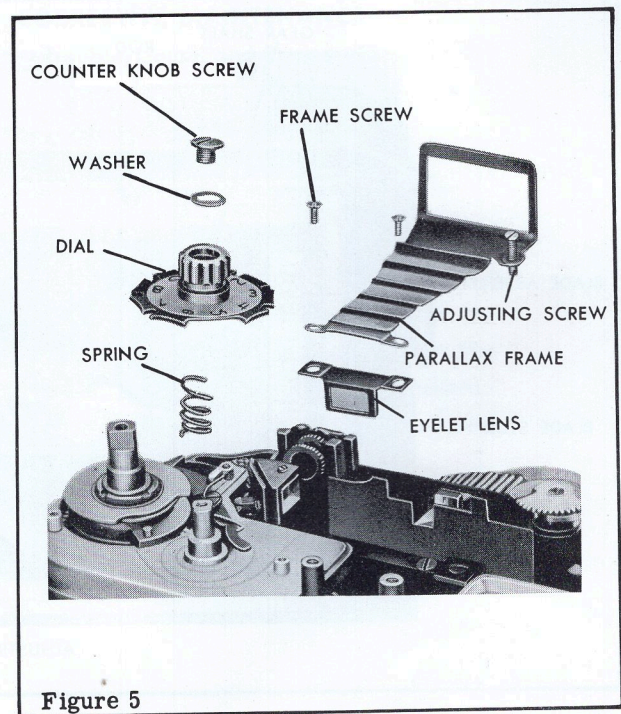


Figure 5

NOTE: Refer to page 10 for instructions on the range finder focusing dial that is held on the bracket post by a screw.

TRIGGER BUTTON HOUSING COMPLETE

(See figure 3).

The range finder plate complete (figure 6) can be removed from the camera with the trigger button housing complete (figure 3) still attached to it.

Remove the three trigger button housing screws and remove the trigger button housing complete. This will free the exposure indicator tube, which is inserted in the range finder plate directly above the red signal, and the exposure indicator tube can be lifted off.

Lift off the trigger button leak light washer. If necessary, also remove the trigger bushing leak light washer, which is cemented to the range finder plate.

COUNTER DIAL HOUSING COMPLETE

(See figure 4).

Remove the key knob screw and lift off the key knob.

Remove the three counter dial housing screws and lift off the counter dial housing complete together with the origin plate and the two origin plate screws.

Remove the key post spring washer. Note that this washer is placed on the key post with the concave side upward. Some cameras also have a flat key post spacing washer. This is to prevent the key knob from wobbling as it is turned.

COUNTER DIAL ASSEMBLY AND SAFETY CONTROL STOP PAWL (See figure 5).

The range finder plate can be removed from the camera with the counter dial assembly and the safety control stop pawl still fastened to it. However, if they are left on, the counter dial assembly must be turned to any number except "0" in order to move the end of the safety control stop pawl (figure 6) away from the safety control cam complete.

Hold down the counter dial with the fingers, and remove the counter knob screw (figure 5). Lift off the counter knob washer, the counter dial assembly, and the counter knob spring.

Unhook the straight end of the safety control stop pawl spring (figure 6) from the projecting lug on the range finder plate. Remove the safety control stop pawl stud. Lift off the safety control stop pawl spring and the safety control stop pawl.

RANGE FINDER PLATE.

Remove the range finder plate screw (figure 6),

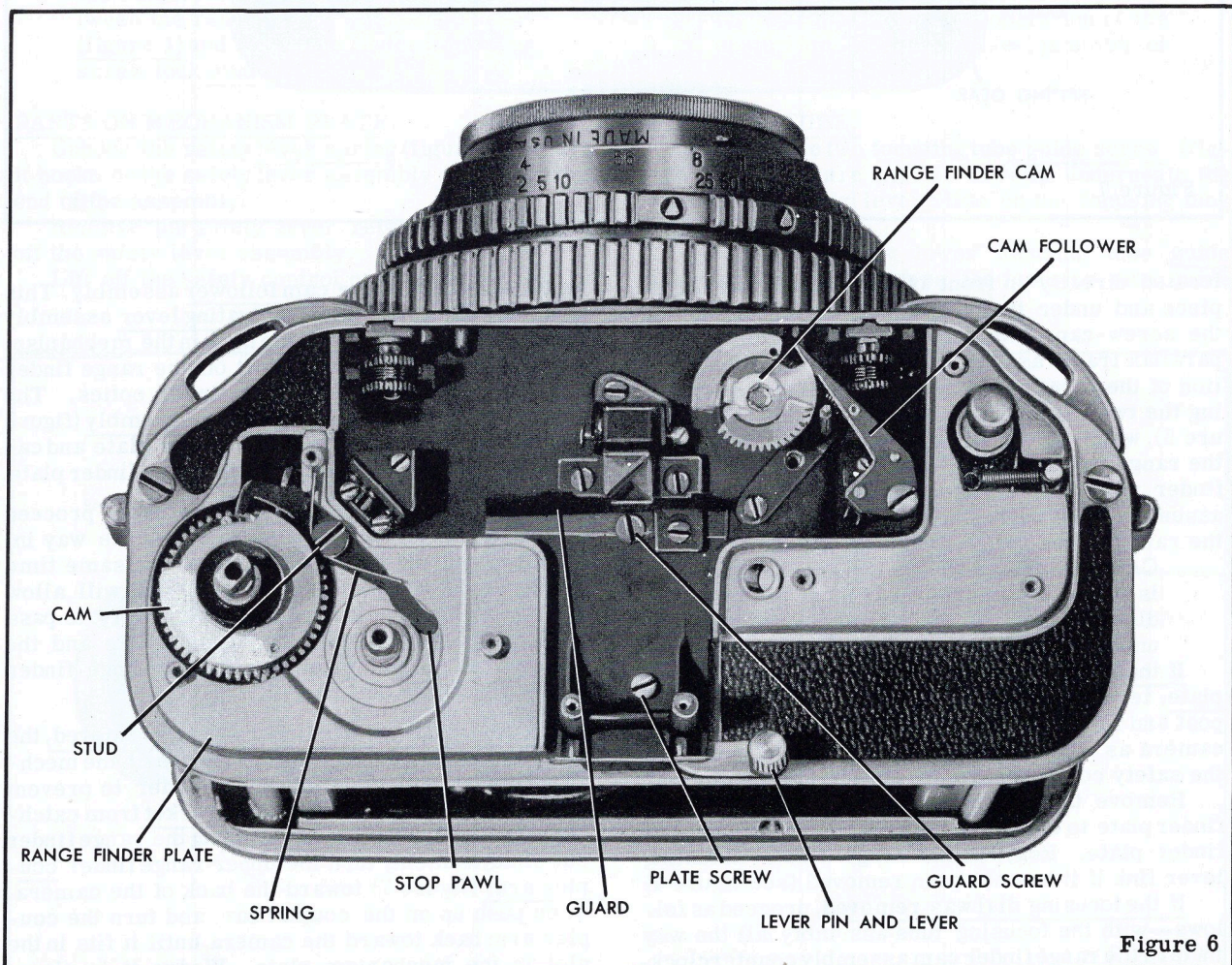


Figure 6

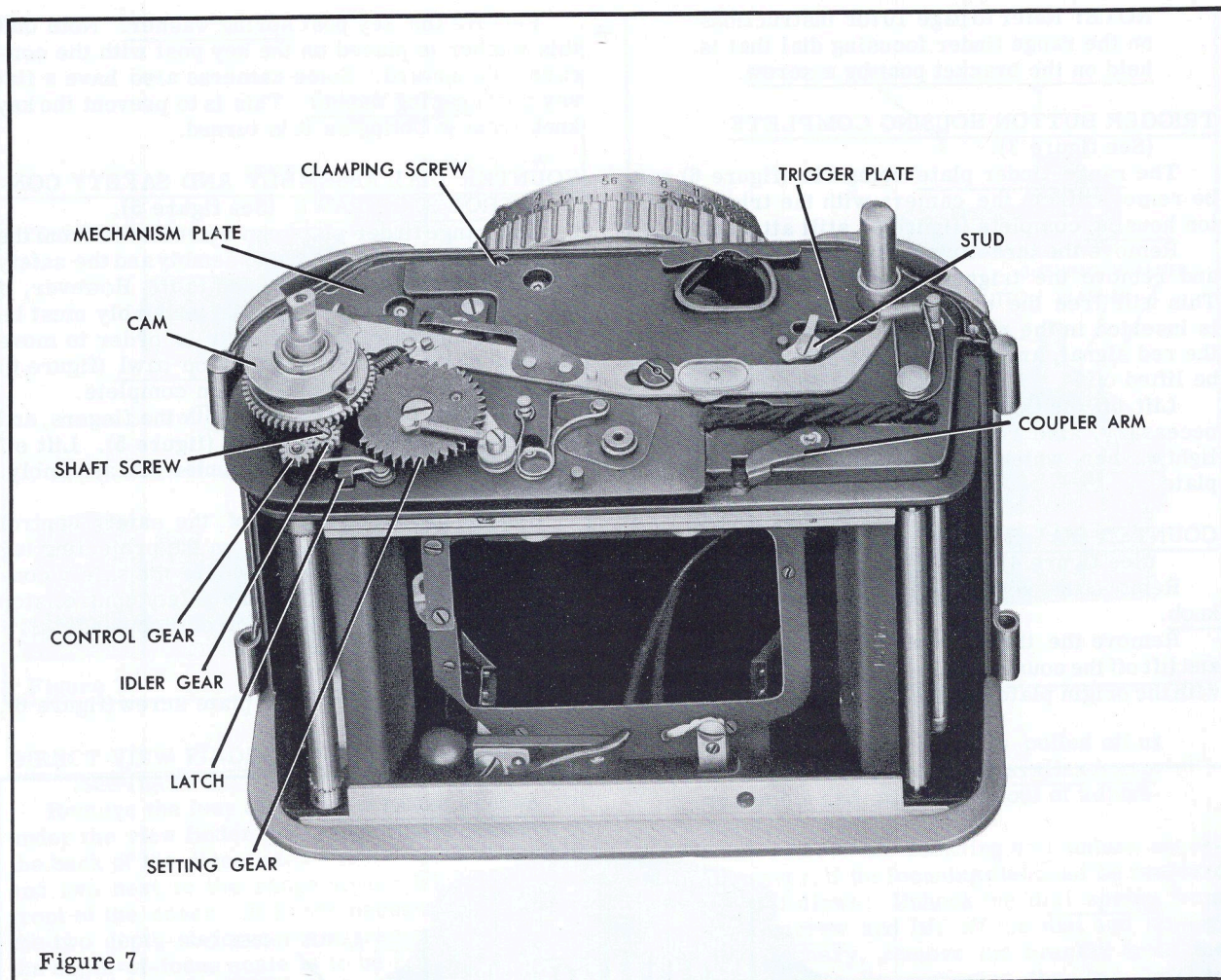


Figure 7

located directly in front of the range finder eyepiece and under the parallax frame assembly. If the screw cannot be turned without removing the parallax frame assembly, be sure to note the position of the parallax frame assembly before removing the two range finder eyelet frame screws (figure 5), which hold the parallax frame assembly and the range finder eyelet lens assembly to the range finder plate. On reassembly, the parallax frame assembly must be replaced in the same relation to the range finder reflection guard (figure 6).

CAUTION: The parallax frame assembly is made of thin metal and must be handled with care. It should not be removed unless necessary.

If the counter dial was left on the range finder plate, temporarily replace the key knob on the key post and follow through the cycle of operation of the camera as described on page 8 until the cutout on the safety control cam faces toward the counter dial.

Remove the two screws which hold the range finder plate to the case, one at each end of the range finder plate. Remove the range finder actuating lever link if it has not been removed (see figure 1)

If the focusing dial was removed, proceed as follows—with the focusing tube assembly all the way in, turn the range finder cam assembly counterclockwise until the first tooth of the gear on the cam is

opposite the end of the cam follower assembly. This will allow the range finder actuating lever assembly (figure 1) to pass through the hole in the mechanism plate assembly (figure 7). Lift off the range finder plate, together with the range finder optics. The shutter setting lever pin and lever assembly (figure 6) will come off with the range finder plate and can be pulled out through the slot in the range finder plate.

If the focusing dial was not removed, proceed as follows—with the focusing tube all the way in, turn the focusing dial clockwise; at the same time lift up on the range finder plate. This will allow the range finder actuating lever assembly to pass through the hole in the mechanism plate and the range finder plate, together with the range finder optics which can be lifted off.

As soon as the range finder plate is removed, the range finder couplet bar (figure 1) beneath the mechanism plate will drop down. In order to prevent the range finder adjusting screw bracket from catching on the couplet bar and throwing the range finder out of adjustment, turn the upper range finder coupler arm (figure 7) toward the back of the camera. Then push up on the couplet bar, and turn the coupler arm back toward the camera until it fits in the slot in the mechanism plate. Wedge it in place. The wedging is most conveniently accomplished by

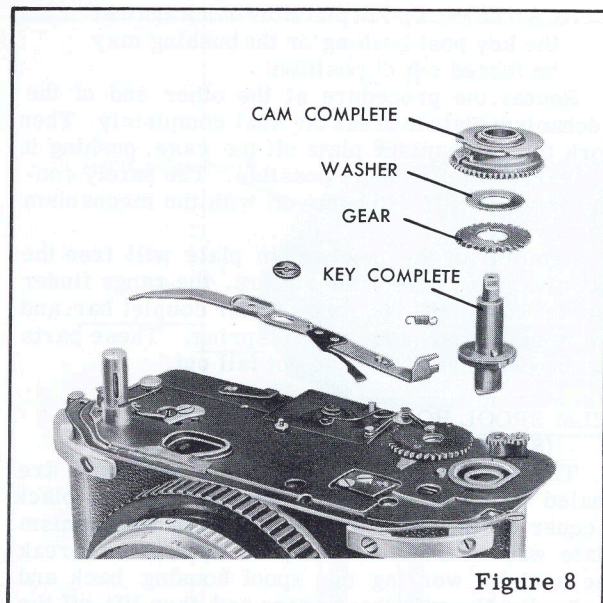


Figure 8

inserting a small tapered wood block in the channel to the left of the coupler arm in which the top of the camera back fits.

NOTE: The lower (unbroken) edge of the coupler bar must fit in the slot between the range finder adjusting screw (figure 1) and the range finder adjusting screw lock stud.

PARTS ON MECHANISM PLATE.

Unhook the safety lever spring (figure 13) where it hooks on the safety lever assembly stud near the end of the assembly.

Remove the safety lever retaining nut and lift off the safety lever assembly.

Lift off the safety control cam complete (figure

8) and the key complete together with the key post washer and the key post gear.

Remove the gear shaft screw (figure 7). Lift off the safety control idler gear.

Remove the trigger plate bell crank stud and lift off the trigger plate bell crank (figure 13).

REMOVAL OF SHUTTER (See figure 9).

Disconnect the contact wire on the left side of the focusing tube guide assembly. Using special tool No. 501-A, take the initial tension off the shutter retaining ring. Remove the retaining ring by turning it the rest of the way with a jeweler's screwdriver. Then carefully draw the shutter out of the focusing tube; at the same time guide the contact wire through the holes in the focusing tube guide assembly and shutter light guard. The wire should be pushed through the holes at the same time the shutter is being pulled out of the focusing barrel. The shutter retaining ring will remain on the shutter. Disconnect the ground wire from the right side of the focusing tube guide assembly and guide the wire through the hole in the guide plate at the same time that the shutter light guard is being removed from the focusing tube.

CAUTION: The shutter light guard is made of thin metal and must be handled with care. If it is bent by rough handling, it may bind on the shutter operating disk and cause faulty operation of the shutter or, in severe cases, jamming of the camera.

FOCUSING TUBE.

Remove the two focusing tube guide screws (figure 9). These are the two screws underneath the shutter operating lever slide on the focusing tube guide assembly.

Remove the four lower focusing tube guide screws (figure 10) to free the focusing tube guide

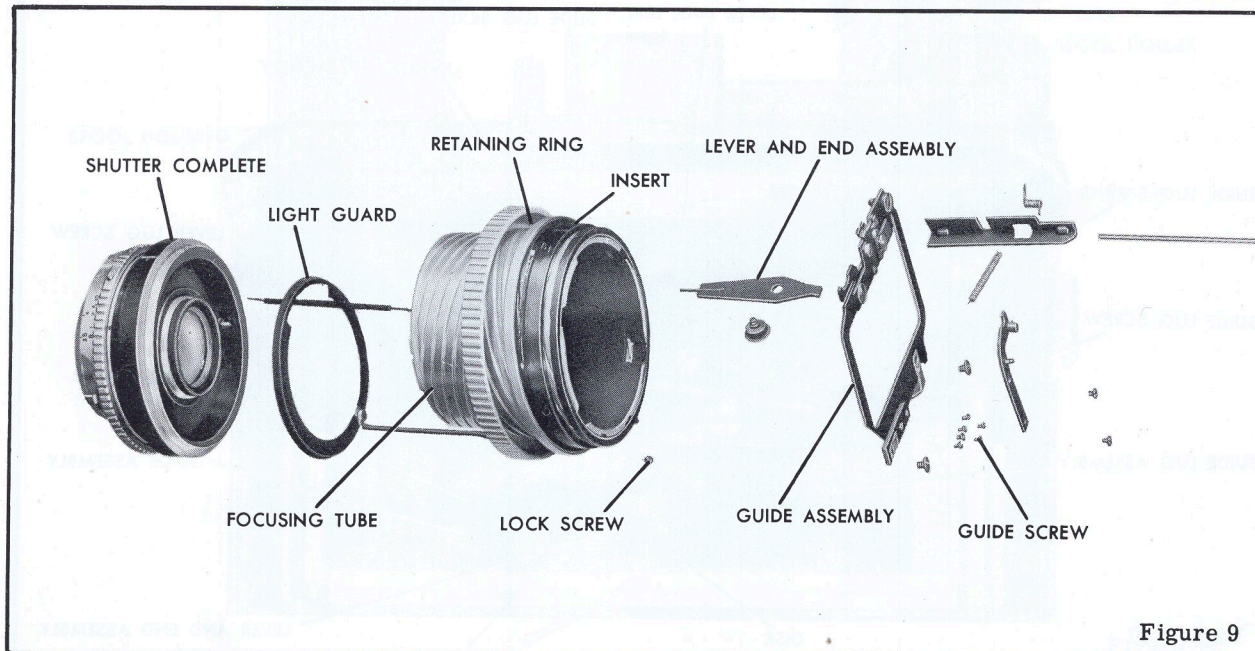


Figure 9

assembly, the focusing tube guide lug assembly, the two focusing tube guide lug screws, and the guide lug spring. If necessary, the focusing tube guide lug assembly can be disassembled from the focusing tube guide assembly by removing the two focusing tube guide lug screws.

CAUTION: Unless it is necessary to adjust the shutter operating lever lugs, do not disturb the two lower operating lever lug screws or the two slide lug screws.

Remove the focusing tube retaining ring lock screw (figure 9).

Use special tool No. 501-B to loosen the focusing tube insert retaining ring and unscrew the insert retaining ring. Turn the focusing tube back in approximately half way. Then grasping the case in one hand, work the focusing tube out of the case with the other hand, using no more pressure on the case or focusing tube than is necessary.

MECHANISM PLATE (See figure 11).

Remove the four retaining screws which hold the two neck strap brackets in place.

Remove the two mechanism plate holding screws, one just in front of the key post bushing, the other about the same distance in back of the trigger button.

The mechanism plate assembly is sealed to the case with heavy black lacquer, and to separate the two assemblies, it is necessary to break the seal.

First try to lift up the mechanism plate by finger pressure at the ends, being careful to push the plate as nearly straight up as possible in order to avoid bending the safety control driving shaft assembly where it passes through the mechanism plate.

If the mechanism plate is sealed to the case too tightly to come loose with finger pressure, hold the camera against the body to absorb the shock, place a block of fiber or soft wood against the end of the mechanism plate near the key post bushing, and tap the block gently until the seal is broken loose.

CAUTION: Do not place the block against the key post bushing or the bushing may be forced out of position.

Repeat the procedure at the other end of the mechanism plate to break the seal completely. Then work the mechanism plate off the case, pushing it as nearly straight up as possible. The safety control driving shaft will come off with the mechanism plate.

Removal of the mechanism plate will free the left and right case film rollers, the range finder couplet bar shaft, the range finder couplet bar, and the range finder couplet bar spring. These parts can be lifted out if they do not fall out.

FILM SPOOL HOUSINGS AND SPACERS

(See figure 11).

The left and right spool housing assemblies are sealed to the bottom of the case with heavy black lacquer in the same manner that the mechanism plate was sealed to the top of the case. Break the seal by working the spool housing back and forth slightly with the fingers and then lift off the spool housings.

Remove the three bottom plate retaining screws (the right-hand screw is the one nearest the back frame). The bottom plate is now free from the case.

Remove the left and right mechanism plate spacers by removing the two holding screws.

BACK COMPLETE (See figure 12).

Remove the two tension pad holding screws and lift off the film tension pad assembly.

Remove the seven window cover retaining screws and lift off the window slide cover assembly.

Grasp the window slide spring with a pair of tweezers and pull it toward the top of the back.

If necessary, use a No. 50 drill to remove the turned-over portion of the window slide button being careful not to drill any deeper than is necessary

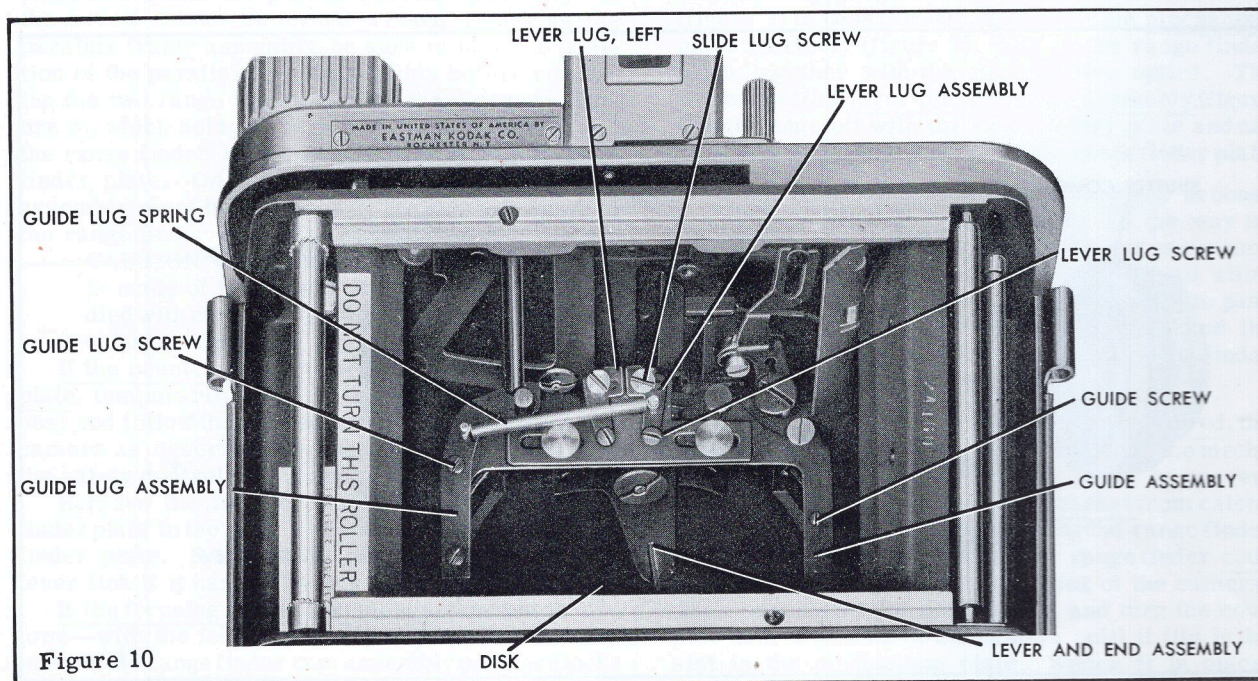


Figure 10

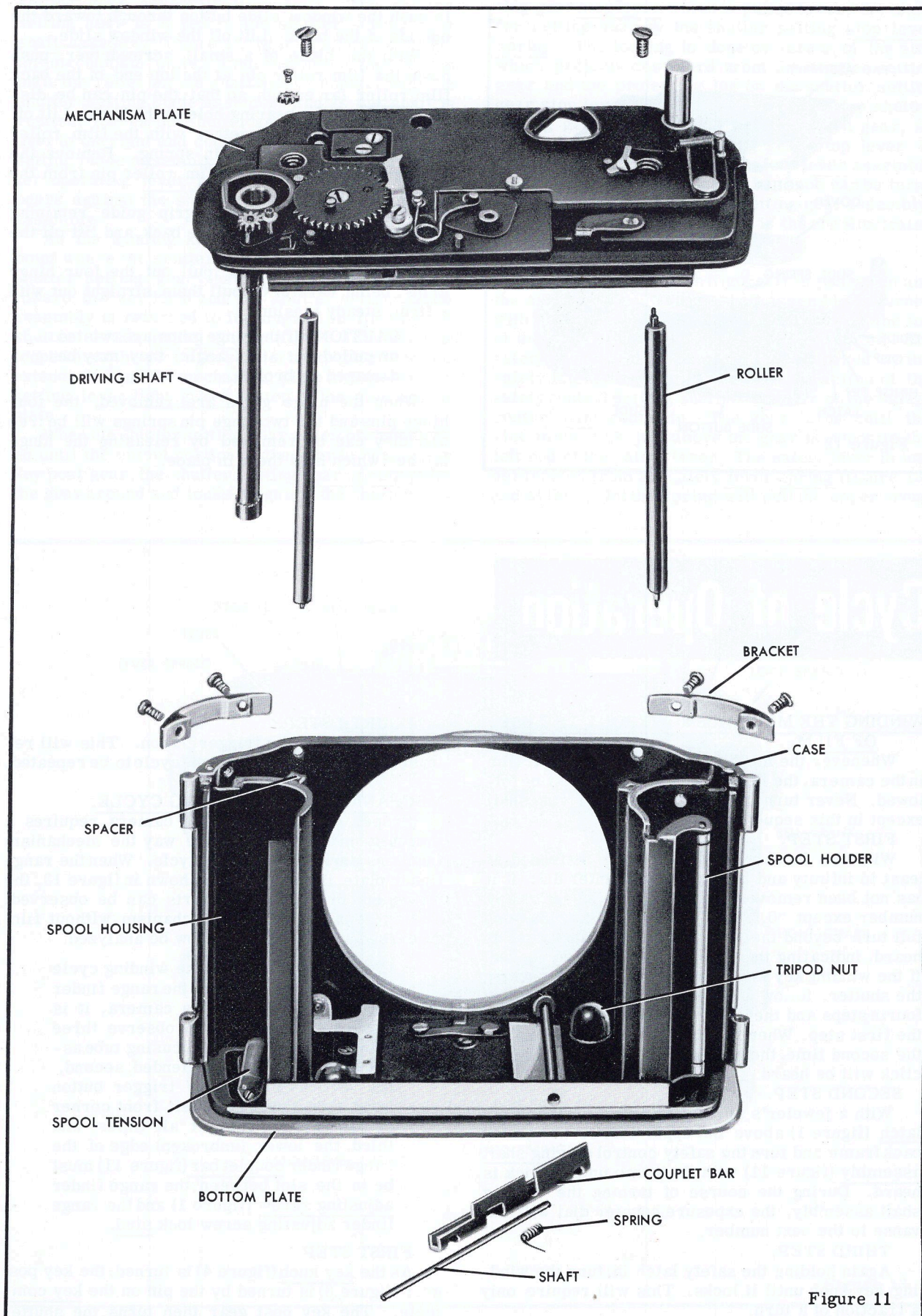
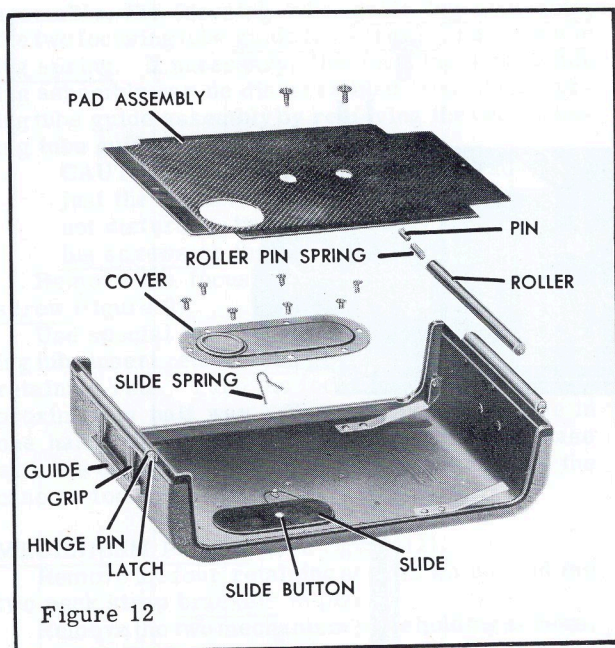


Figure 11



to push the window slide button through toward the outside of the back. Lift off the window slide.

With the blade of a small screwdriver, push down the film roller pin at the top end of the back film roller far enough so that the pin can be disengaged from the bearing hole in the back. Lift off the back film roller together with the film roller pin and the film roller pin spring. Remove the spring by drawing out the film roller pin from the end of the film roller.

Remove the four hinge grip guide retaining screws, two at each end of the back, and lift off the two hinge grip guides.

With a pair of pliers, pull out the four hinge grips, being careful to pull them straight out with a firm, steady tension.

CAUTION: If the hinge grips are twisted or pulled out at an angle, they may be damaged or broken.

When the hinge grips are removed, the four hinge pins and the two hinge pinsprings will be free and they can be removed by releasing the hinge latches which hold them in place.

Cycle of Operation

WINDING THE MECHANISM WITHOUT THE USE OF FILM.

Whenever the mechanism is wound without film in the camera, the following procedure must be followed. Never turn the safety control driving shaft except in this sequence:

FIRST STEP.

With the focusing tube assembly extended at least to infinity and the exposure counter dial (if it has not been removed from the camera) set on any number except "0," turn the winding key knob one full turn beyond the point where a distinct click is heard, indicating that the shutter has been cocked. If the winding key knob turns freely without cocking the shutter, follow through the second, third, and fourth steps and then start the cycle over again with the first step. When the first step is performed for the second time, the shutter will cock and a distinct click will be heard.

SECOND STEP.

With a jeweler's screwdriver, push in the safety latch (figure 1) above the upper left corner of the backframe and turn the safety control driving shaft assembly (figure 11) with the thumb until a click is heard. During the course of turning the driving shaft assembly, the exposure counter dial will advance to the next number.

THIRD STEP.

Again holding the safety latch in, turn the winding key knob until it locks. This will require only a fraction of a turn.

FOURTH STEP.

Push down on the trigger button. This will release the shutter and enable the cycle to be repeated.

MECHANICS OF THE WINDING CYCLE.

Proper adjustment of the camera requires a thorough understanding of the way the mechanism functions during the winding cycle. When the range finder plate is removed, as shown in figure 13, the movement of the various parts can be observed. The cycle of winding the mechanism without film discussed on this page can now be analyzed.

CAUTION: Whenever the winding cycle is followed through with the range finder plate removed from the camera, it is extremely important to observe three precautions: first, the focusing tube assembly must be fully extended; second, the vertical slot in the trigger button must face toward the left front corner of the camera case at all times; and third, the lower (unbroken) edge of the range finder couplet bar (figure 11) must be in the slot between the range finder adjusting screw (figure 1) and the range finder adjusting screw lock stud.

FIRST STEP

As the key knob (figure 4) is turned, the key post gear (figure 8) is turned by the pin on the key complete. The key post gear then turns the shutter

setting gear assembly (figure 7). The shutter setting gear is keyed to the shutter setting gear shaft assembly (figure 1), which extends through the mechanism plate. Underneath the mechanism plate the roller on the shaft makes contact with the shutter setting blade assembly and as the shaft is rotated, forces the shutter setting blade assembly over to the right and cocks the shutter. The shutter setting blade assembly bears against the left shutter operating lever lug (figure 10), which in turn bears against the shutter operating lever and end assembly.

As the winding key knob is turned beyond the point where the shutter is cocked, the roller on the shutter setting gear shaft assembly moves back toward the key knob and the shutter setting blade assembly is returned to its original position by the shutter setting guide spring (figure 13), which is looped over the pin on the shutter setting blade which extends through the mechanism plate and the shutter setting lever light guard on top of the mechanism plate.

When the shutter setting gear assembly has turned until the cutout portion of the gear is next to the key post gear, the shutter setting gear spring pulls the gear around and locks it against the shutter set-

ting gear stop lever which is pulled toward the shutter setting gear by the shutter setting stop lever spring. The locking is done by means of the stud which projects downward from the shutter setting gear and the projecting lug on the shutter setting gear stop lever. The cutout portion of the shutter setting gear is still next to the key post gear, so that until the shutter setting gear stop lever is moved out of the way by the safety lever assembly later in the cycle, the winding key knob can be turned without turning the shutter setting gear assembly. This position of the mechanism is the one illustrated in figure 13.

SECOND STEP.

When the safety latch (figure 7) is pushed in and the safety control driving shaft assembly is turned with the thumb, the safety control gear on the top of the safety control driving shaft also turns. The safety control idler gear, no longer locked by the safety latch, turns and transmits the action of the safety control driving shaft to the gear on the safety control cam complete. The gear turns until the slot in the disk just above the gear is opposite the left end of the safety lever. The safety lever is under tension from the safety lever spring (figure 13) and at this point the spring will pull the upper prong

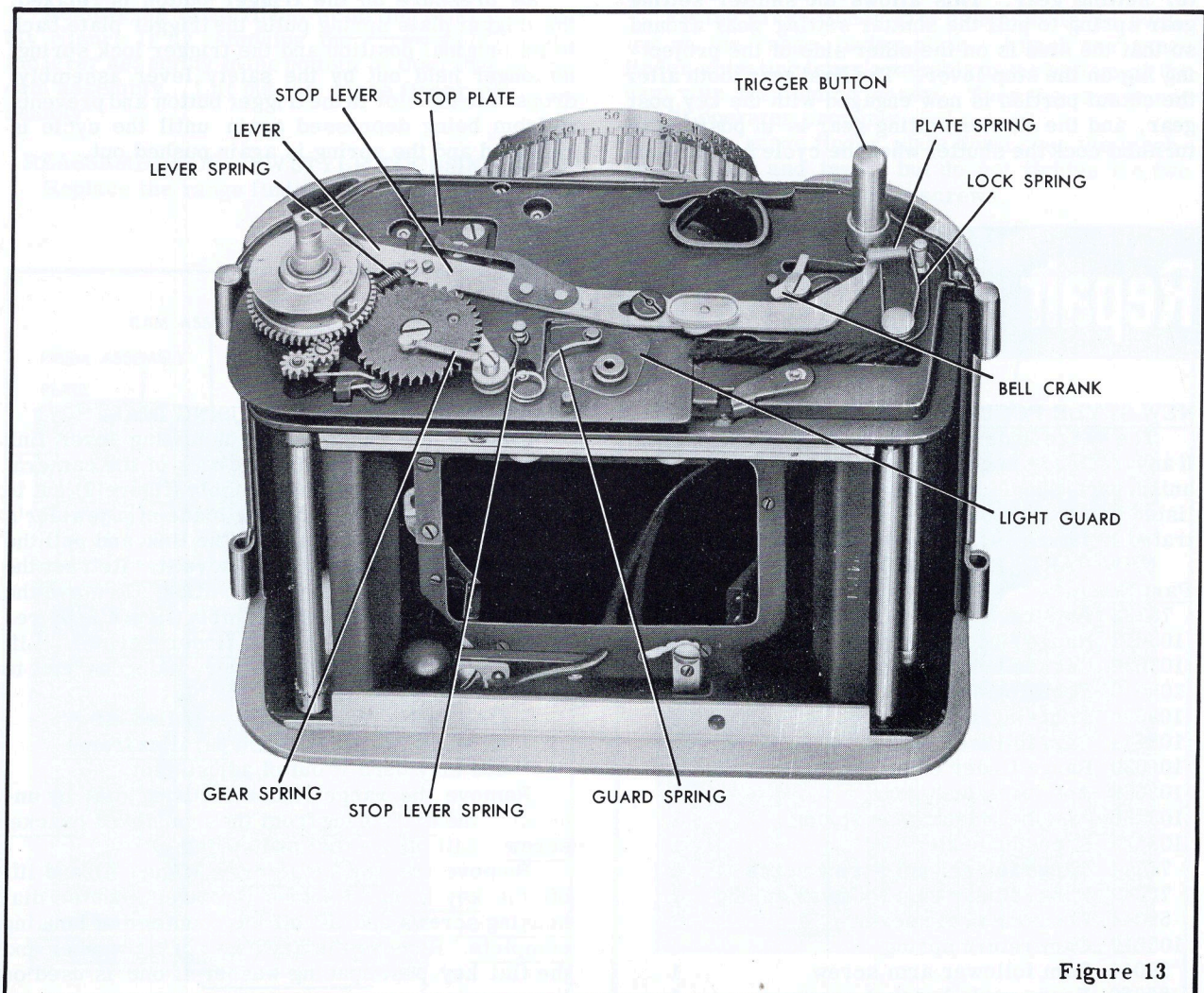


Figure 13

on the left end of the safety lever assembly into the slot. The safety control driving shaft assembly will stop turning unless it is forced.

With film in the camera, the top edge of the back makes contact with the safety latch, holding it in, and the safety control driving shaft is turned by the film as the film is drawn past by the winding key knob. Thus, in actual use of the camera, the second part of the operating cycle overlaps the first part of the cycle and the prong on the safety lever falls into the slot shortly after the shutter is cocked.

THIRD STEP.

When the safety latch is again held in and the winding key knob is turned, the lower prong on the left end of the safety lever assembly is engaged between the teeth of the key post gear. Turning the winding key knob now forces the safety lever assembly toward the right. As the safety lever moves, the right end pushes the trigger lock spring out of the slot in the trigger button.

At the same time the black spring on the left end of the safety lever assembly moves up past the first step on the safety lever spring stop plate and locks on the second step.

Also at the same time, the second stud from the left end of the safety lever pushes the shutter setting gear stop lever away from the stud on the shutter setting gear. This allows the shutter setting gear spring to pull the shutter setting gear around so that the stud is on the other side of the projecting lug on the stop lever. The first gear tooth after the cutout portion is now engaged with the key post gear, and the shutter setting gear is in position to turn and cock the shutter when the cycle is repeated.

FOURTH STEP.

When the trigger button is pushed down, the lower end bears against the trigger bell crank underneath the mechanism plate. As the lower end of the bell crank is forced downward, the stud on the upper end of the bell crank forces the trigger plate (figure 1) to the left and downward, releasing the shutter. The trigger plate bears against the right shutter operating lever lug assembly, which in turn bears against the shutter operating lever and end assembly.

As the trigger plate moves to the left, the vertical edge of the plate, which extends up through the mechanism plate, bears against the longer end of the trigger plate bell crank (figure 13), forcing the shorter end of the trigger plate bell crank against the safety lever assembly near the right end. Since the safety lever assembly is mounted on one pivot stud, the left end moves in the opposite direction; and as the black spring on the safety lever assembly slips past the second step on the safety lever spring stop plate, the safety lever spring, assisted by the trigger lock spring, pulls the whole safety lever assembly back to the left. In a properly adjusted camera, the black spring on the safety lever assembly slips off the second step on the safety lever spring stop plate at the exact instant the shutter is released.

As pressure on the trigger button is relaxed, the trigger plate spring pulls the trigger plate back to its original position and the trigger lock spring, no longer held out by the safety lever assembly, drops into the slot in the trigger button and prevents it from being depressed again until the cycle is repeated and the spring is again pushed out.

Repair and Adjustment

NEW STYLE FOCUSING DIAL.

The range finder mechanism has been improved. If any trouble is encountered, the range finder mechanism parts should be changed to the new style parts listed below. The old style mechanism parts, illustrated in figure 14, are no longer available.

NEW PARTS REQUIRED.

Part No.	Part Name	No. Req'd.
78793	Anti-back lash gear screw	1
105612	Range finder cam assembly	1
103632	Cam follower spring post	1
105615	Focusing scale bracket assembly	1
103636	Focusing scale pinion	1
105611	Cam follower arm	1
106030	Range finder cam follower screw	1
103629	Anti-back lash gear	1
103630	Anti-back lash gear spring	1
103637	Focusing scale	1
74111	Range finder cam spring screw	1
78849	Range finder cam follower spring	1
59044	Focusing scale screw	1
105619	Cam return spring	1
59044	Cam follower arm screw	1
66860	Focus scale bracket screw	1

DISASSEMBLY OF THE FOCUSING DIAL.

Remove the range finder actuating lever link (figure 1) by first removing the back of the camera. Extend the focusing tube assembly (figure 9) out to the limit of travel. Insert the blade of a jeweler's screwdriver in the key slot of the link, and pull the link back to disengage and remove it. Retract the focusing tube to the closed position. Remove the direct view finder cover assembly (figure 2) by removing the four direct view finder screws. Lift off the direct view finder cover, being careful to lift it straight up.

CAUTION: If the cover is pulled off at an angle it will strike the parallax frame and may bend it out of adjustment.

Remove the range finder focusing dial by unhooking the dial spring from the shouldered bracket screw. Lift off the dial and spring.

Remove the key knob screw (figure 4) and lift off the key knob. Remove the three counter dial housing screws and lift off the counter dial housing complete. Remove the key post spring washer and the flat key post spacing washer if one is used on the camera.

Remove the parallax frame assembly and the eyelet lens assembly (figure 5) by removing the two range finder eyelet frame screws. Remove the range finder plate screw (figure 6).

Unhook the cam follower spring (figure 14) from the range finder cam assembly. Remove the cam follower screw and carefully lift off the cam follower assembly. Remove the focus scale bracket by removing the two holding screws.

Remove the right objective lens mount assembly by first loosening the two objective lens mount retaining nuts with tool No. 501-D. Then pry off the lens (straight up) with a jeweler's screwdriver.

Remove the two screws which hold the range finder plate to the case, one at each end of the range finder plate.

With the focusing tube assembly all the way in, turn the range finder cam assembly counterclockwise until the first tooth of the gear on the cam is approximately opposite the front post of the right objective lens mount assembly. This will allow the range finder actuating lever assembly (figure 1) to pass through the hole in the mechanism plate. Lift off the range finder plate. The shutter setting lever pin and lever assembly (figure 6) will come off with the range finder plate and can be pulled out through the slot in the range finder plate.

Remove the range finder actuating lever assembly (figure 1) by removing the screw which holds the lever assembly to the bottom of the range finder cam assembly. Lift out the range finder cam assembly.

REASSEMBLY OF NEW STYLE FOCUSING DIAL.

Replace the range finder plate assembly on the

camera and secure it in place with the two holding screws. Turn the focusing tube assembly all the way in. Place a protective covering over the erecting and coincidence prism assembly (figure 14).

To provide clearance for the additional parts to be added to the range finder cam assembly, mill down the top of the range finder cam bushing (figure 15) .040 inch (+.020 or -.010).

To make the cam follower spring level with the ramp of the cam assembly, file down the top of the left front objective lens mount post .106" (+.050-.050).

Center punch and drill with a No. 55 drill the top of the left front objective lens mount post. Drill deep enough to hold the cam follower spring screw. Tap the drilled hole with an .080 tap.

To allow clearance for the cam follower screw, file off the left rear objective lens mount post at a 45° angle or half through. Tolerance is .030 on each side at a 45° angle.

To allow clearance for the protruding end of the anti-back lash gear (figure 17), file the shoulder of the direct view finder cover between the points (A) and (B) as shown in figure 16, .045 for width of .437 (.218 each side of center). Tolerances are +.050 or -.000.

Remove the range finder plate by removing the two holding screws.

Fit the range finder cam assembly in the bushing on the range finder plate. Attach the range finder actuating lever assembly to the bottom of the cam with the holding screw. Turn the cam to see that it operates properly.

Fit the range finder plate down over the mechanism plate and insert but do not tighten the two range finder plate holding screws.

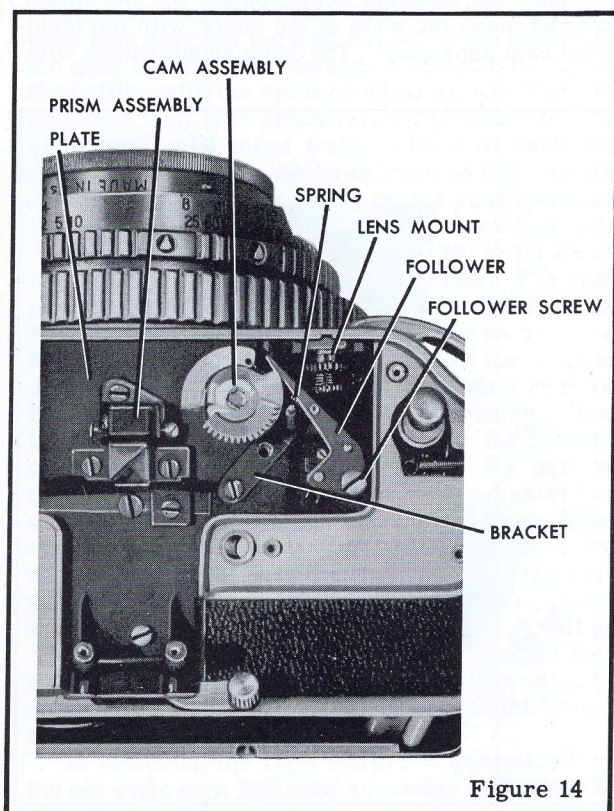


Figure 14

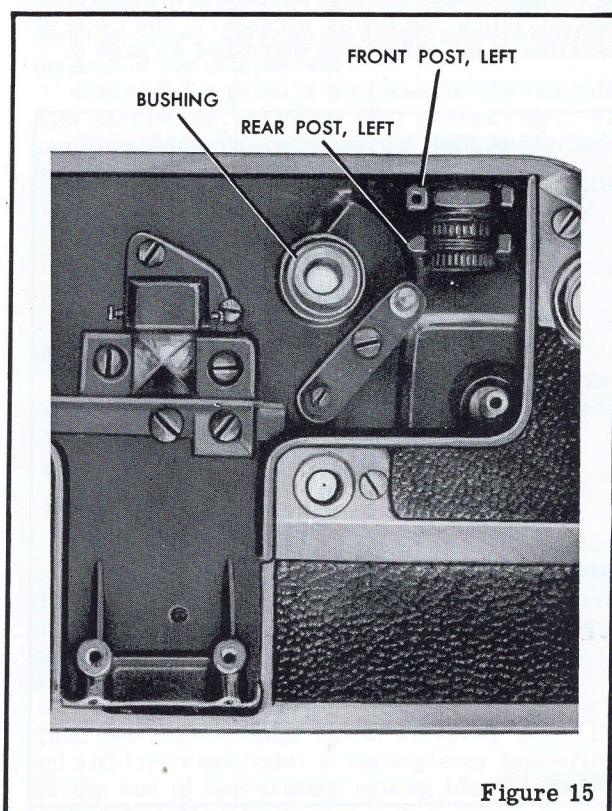


Figure 15

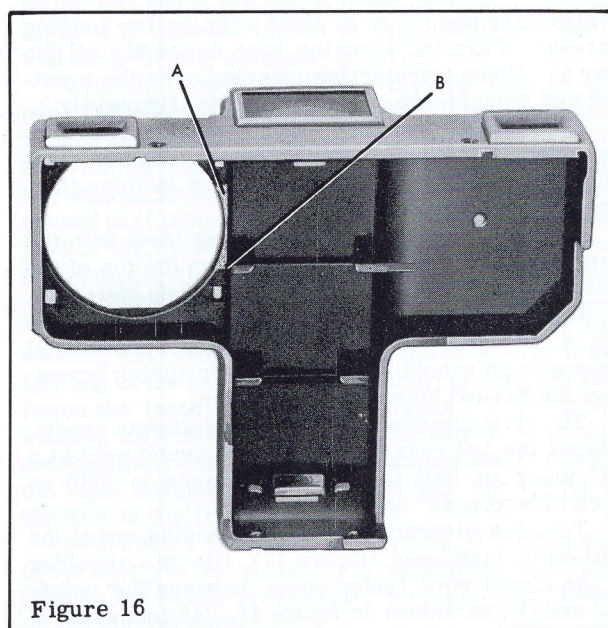


Figure 16

CAUTION: Make sure the focusing tube assembly is retracted. If it is extended beyond the infinity setting, the stud on the rangefinder actuating lever assembly will go on the camera on the wrong side of the rangefinder adjusting screw (figure 1).

Turn the counter dial assembly (figure 5) to any number except "0" in order to move the end of the safety control stop pawl (figure 6) away from the safety control cam complete. Also, the cutout on the safety control cam complete must face toward the counter dial assembly. To turn it to the proper position, follow, as far as necessary, the cycle of operation of the camera as discussed on page 8.

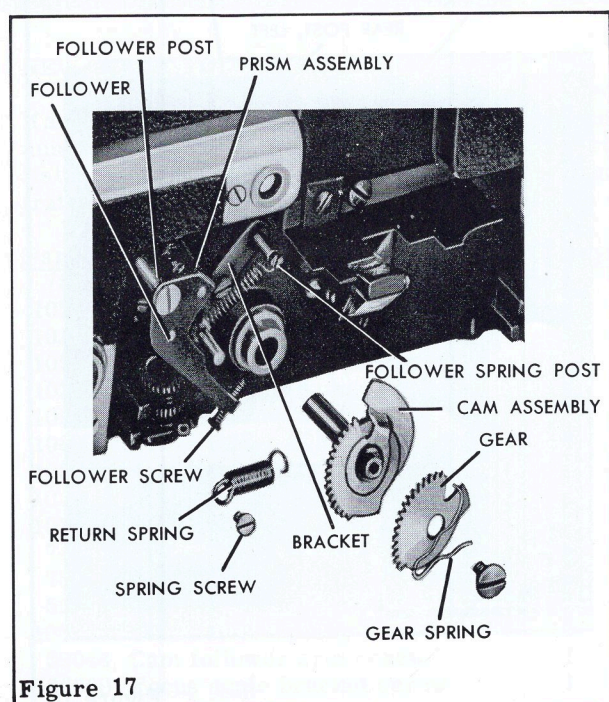


Figure 17

Insert the shutter setting lever pin and lever assembly in the slot in the back of the range finder plate with the point facing toward the left front corner of the camera case. Move the lever around until the hole in the lever is under the hole for the range finder plate screw; then carefully press down the range finder plate and seat the lever on the bushing which holds in place the shutter setting lever light guard (figure 13). Then tighten the two range finder plate screws and replace and tighten the long range finder plate screw.

Attach one end of the cam return spring (figure 17) to the left front post of the objective lens mount assembly with the cam spring screw and the other end to the lip on the cam assembly.

Replace the right objective lens mount assembly and secure it in place by tightening the two objective lens mount nuts with tool No. 501-D.

Remove the right end prism assembly from the old style cam follower assembly and fit the prism assembly to the new style cam follower assembly. Replace the cam follower assembly on the cam follower post and secure the assembly with the holding screw. Insert the cam follower screw into the hole near the end of the cam follower arm and turn the screw until the end of the cam follower arm does not strike the gear teeth of the cam assembly. It may be necessary to bend the end of the cam follower arm so that the screw will ride against the smooth edge of the cam assembly.

Place the new focusing scale bracket in place and secure it with the holding screw and the cam follower spring post. Attach one end of the cam follower spring (figure 18) to the post under the cam follower arm and the other end to the cam follower spring post.

Place the focusing scale pinion on the pinion post and mesh the teeth of the pinion with the teeth of the cam assembly. The teeth should mesh with

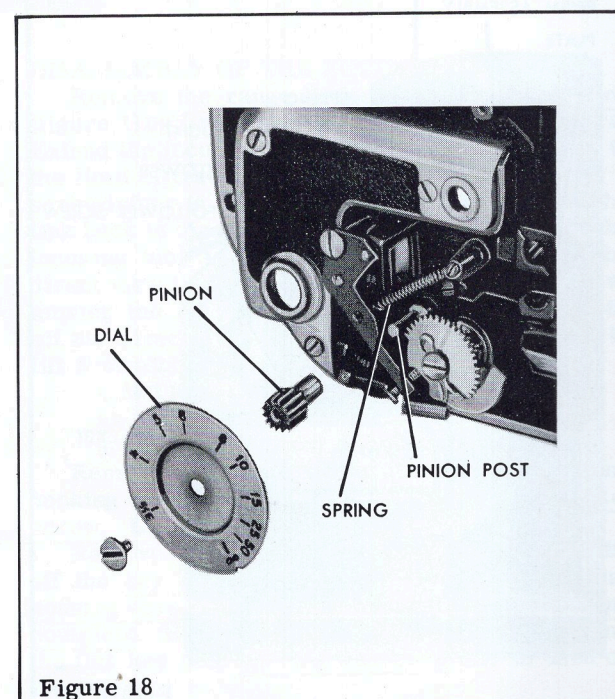


Figure 18

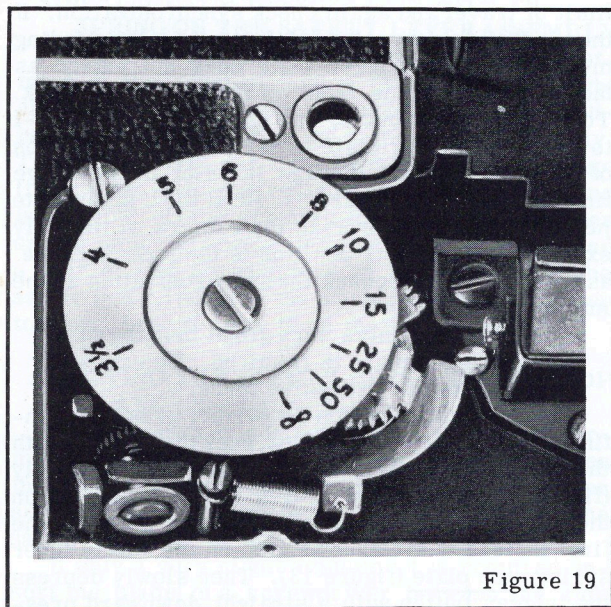


Figure 19

a minimum of play between the gears. If there is excessive play or binding of the gear teeth move the focusing scale bracket until the condition is corrected. Then remove the pinion from the post.

Place the anti-back lash gear (figure 17) over the gear on the cam assembly. Be sure the anti-back lash gear fits tight against the cam assembly gear. If it does not fit tight, ream out the hole in the anti-back lash gear. Check for burrs on the gear by turning it on the cam assembly. Set the anti-back lash gear spring over the anti-back lash gear with the center loop of the spring over the end of the cam assembly shaft. Fit the short end of the spring against the protruding end of the anti-back lash gear and the long end of the spring against the gear and the cam assembly. Secure the spring in position with the spring holding screw. Turn the anti-back lash gear against spring tension (counterclockwise) until three teeth of the anti-back lash gear extend beyond the first tooth on the cam assembly gear. Set the pinion on the post and mesh it with the teeth on the cam and anti-back lash gear.

Attach the focusing dial (figure 18) to the focusing scale pinion with the holding screw. The completed focusing dial reassembly is shown in figure 19. Set the direct view finder cover on the range finder plate and check to make sure the focusing dial operates smoothly and that the dial is centered in the depth-of-focus scale frame window. Then lift off the finder cover and remove the focusing scale and holding screw. Replace the parallax frame assembly and the range finder eyelet lens assembly and fasten them with the two range finder eyelet frame screws. The eyelet lens assembly should go on first with the frame toward the rear; make sure that it is straight and that it is pushed as far toward the front of the camera as it will go.

Extend the focusing tube and make sure the anti-back lash gear does not strike the parallax adjusting screw. If it does, file off the corner which strikes the screw.

In removing the right end prism assembly from the old style cam follower assembly and replacing

it on the new style cam follower assembly, the range finder may be moved out of adjustment. For adjustments to the range finder see page 16.

Set the range finder on infinity by looking at an object at least 200 feet away. Then replace the focusing dial on the pinion with the infinity indication facing toward the front of the camera. Secure the dial in position with the holding screw. Set the direct view finder cover on the range finder plate and fasten it with the four retaining screws.

To adjust the focus of the lens refer to page 22.

CAMERA CASE AND ASSOCIATED PARTS.

TRIPOD NUTS (See figure 11).

If the threads have been stripped from one of the tripod nuts, remove the bottom plate as described on page 6.

NOTE: It is not necessary to remove the shutter, focusing tube, or focusing tube guide.

Using a punch with a head approximately 1/32 inch in diameter, knock out the old tripod nut from inside the case. To do this, rest the case on a block of wood with a hole slightly larger than the tripod nut drilled in it.

Place a new tripod nut in position, and with the case resting on a flat metal block, turn over the flange which holds the tripod nut in position. This is conveniently done by using a screwdriver with a blade about 1/8 inch wide, ground down so that the end is about 1/32 inch thick.

FOCUSING TUBE ASSEMBLY (See figure 9).

If the inside focusing tube binds in the outside tube, smear the inside focusing tube with any light oil and sprinkle powdered graphite liberally over it.

Work the inside and outside tube together until they turn freely, starting the inside tube on different threads of the outside tube.

Clean off the parts of the focusing tube assembly with carbon tetrachloride and reassemble. The same procedure can be followed if the outside focusing tube binds on the focusing tube insert.

WARNING: Carbon tetrachloride is a volatile solvent. Use it with adequate ventilation. Avoid frequent or prolonged breathing of the vapors.

MECHANISM PLATE.

The following repairs to the mechanism plate assembly (figure 7) can be made only with the mechanism plate removed from the camera.

SHUTTER SETTING BLADE ASSEMBLY

(See figure 1).

If the shutter setting blade assembly is bent and is binding, remove the guide rod clamping screw (figure 7). With a jeweler's screwdriver, break the upper guide rod (figure 1) loose at the clamp screw end and push it out through the holes in the mechanism plate.

Remove the three shutter setting blade stud nuts. Then remove the range finder actuating lever link nut and the range finder actuating lever link washer on the end of the shutter setting blade assembly

which projects toward the trigger button end of the mechanism plate.

If the shutter setting blade assembly cannot be straightened so that it works freely, replace it, fitting the pin on the top of the new assembly through the hole in the shutter setting lever light guard (figure 13).

Replace the three shutter setting blade stud nuts, the range finder actuating lever link washer, and the range finder actuating lever link nut.

Put a little powdered graphite on the slide slots of the shutter setting blade assembly and work the blade assembly back and forth to make sure there is no binding. The blade assembly should slide under its own weight as the mechanism plate is tilted. Then blow off the excess graphite, and shellac in place the three shutter setting blade stud nuts and the range finder actuating lever link nut.

Replace the upper guide rod with the slotted end toward the back of the mechanism plate and fasten it with the guide rod clamping screw.

Hook the shutter setting guide spring over the pin on the shutter setting blade assembly which extends up through the shutter setting lever light guard.

TRIGGER PLATE AND TRIGGER.

If the trigger plate (figure 7) is bent, do not attempt to straighten it, but replace it with a new part.

On top of the mechanism plate, release the trigger plate spring (figure 13) where it hooks around the lug on the vertical edge of the trigger plate which projects through the slot in the mechanism plate. The trigger plate is now free and it will drop off the underside of the mechanism plate.

If the trigger button is damaged, release it by pulling back on the trigger lock spring. Replace the trigger button with a new part.

Assemble the new trigger plate to the mechanism plate by fitting the hole in the end of the trigger plate over the trigger plate stud on the trigger bell crank assembly with which the lower end of the trigger button makes contact. Then, fit the projecting vertical edge of the trigger plate through the slot in the mechanism plate, and hook the trigger plate spring over the lug near the trigger button.

NOTE: In some cases, it may be necessary to ream out the hole in the end of the trigger plate in order to make it fit over the trigger plate stud without binding. The trigger plate should fit snugly but must turn freely on the stud.

ADJUSTING SYNCHRONIZATION.

TESTING SYNCHRONIZATION.

Whenever the synchronization is in doubt, it must be checked in the following three ways before it can be assumed to be in correct adjustment.

First check the synchronization by following through the winding cycle with the focusing tube assembly extended to the infinity position. If the camera is not properly synchronized with the focusing tube assembly in the infinity position, adjust it as described in the next paragraph on adjusting.

When synchronization is perfect at the infinity position, extend the focusing tube assembly to the

limit of travel and again check synchronization. If the shutter is now released later than the winding mechanism, the trigger plate does not extend as far to the left at the front as it does at the back. To correct this trouble, use special tool No. 501-I to grasp the trigger plate where the vertical section of the plate extends through the slot in the range finder couplet bar (figure 1). Bend the trigger plate just enough to synchronize the camera at the fully extended (3 1/2-foot) position of the focusing tube assembly. Then recheck the synchronization at the infinity position.

CAUTION: Only a very slight bending of the trigger plate is required. Be careful not to use excessive force.

When synchronization is perfect at both the infinity and 3 1/2-foot positions, cock the shutter with the shutter setting lever pin and lever assembly (figure 6). This lever moves the black spring on the safety lever assembly up until it locks on the first instead of the second step on the safety lever spring stop plate (figure 13). Then slowly depress the trigger button with a straight downward pressure. If the black spring on the safety lever assembly does not slip off the first step at the exact instant the shutter is released, adjust the safety lever spring stop plate as described on page 15.

NOTE: If the range finder plate is off the camera, the shutter setting lever pin and lever assembly can be used by holding it down over the bushing which holds the shutter setting lever light guard in place. The wider prong should be to the left of the pin on the shutter setting blade assembly which extends through the mechanism plate and through the shutter setting lever light guard.

ADJUSTING SYNCHRONIZATION WITH THE SHUTTER OPERATING LEVER OR THE RIGHT SHUTTER OPERATING LEVER LUG. (See figure 10).

If the synchronization is only slightly off, it can be adjusted by moving the right shutter operating lever lug assembly. This adjustment can be made with the range finder plate on the camera.

Loosen the lower operating lever lug screw and the slide lug screw which hold the right shutter operating lever lug. Move the lug to the right to release the shutter sooner or to the left to release it later. After tightening the screws, shellac the heads to prevent them from working loose.

CAUTION: Do not move the shutter operating lever lug so far to the right that the trigger plate fails to make solid contact with the lug when the trigger button is pushed down. If only the bottom edge of the trigger plate touches the lug, the plate may slip over the top of the lug and get jammed between it and the bottom surface of the mechanism plate.

If it is not possible to obtain proper synchronization of the camera by moving the right shutter operating lever lug, adjust the black spring on the safety lever assembly as described in the next paragraph on page 15.

ADJUSTING SYNCHRONIZATION WITH THE SPRING ON THE SAFETY LEVER ASSEMBLY

If it is not possible to obtain sufficient adjustment of the synchronization by moving the right shutter operating lever lug, it is necessary to adjust the black spring on the safety lever assembly. This adjustment can only be made with the range finder plate removed from the camera. If the spring is slipping off the second step on the safety lever spring stop plate before the shutter is released, use a pair of flat-nosed pliers to bend it toward the safety lever, while if the spring hangs on the step too long, bend it away from the safety lever.

ADJUSTING THE SAFETY LEVER SPRING STOP PLATE (See figure 13).

If the camera is perfectly synchronized for normal operation but is not releasing properly when the shutter has been cocked with the manual shutter setting lever pin and lever assembly, adjust the safety lever spring stop plate.

If only a very slight adjustment is required, insert the blade of a screwdriver between the side of the stop plate and the mechanism plate. Force either the first or second step at the exact instant the shutter is released. Make certain that the two safety lever spring stop plate retaining screws are tight and shellac the screw heads to prevent any possible movement of the stop plate. Then recheck the synchronization at all points as described on page 14.

If anything more than a very slight adjustment of the safety lever spring stop plate is required, remove the safety lever assembly as described on page 5, and scribe around the stop plate to record its position. Then remove the two safety lever spring stop plate screws and pry up the stop plate. Remove and discard the dowel in the safety lever stop plate. Put shellac under the stop plate and replace it in the same position it occupied before, using the scribed lines as a guide. Replace the two safety lever spring stop plate screws and replace the safety lever assembly as described on page 20. Now, by inserting the blade of a screwdriver between the side of the stop plate and the mechanism plate, move the stop plate as required to make the black spring on the safety lever assembly drop off either the first or second step at the exact instant the shutter is released. Make certain that the two safety lever spring stop plate screws are tight and shellac the screw heads to prevent any possible movement of the stop plate. Then recheck the synchronization at all points as described on page 14.

ADJUSTING THE COCKING OF THE SHUTTER (See figure 10).

The cocking of the shutter is controlled by the adjustment of the left shutter operating lever lug. If the front end of the shutter operating lever and end assembly is not moving far enough to the left to cock the shutter completely, loosen the lower operating lever lug screw and the slide lug screw which hold the left shutter operating lever lug. Move the lug a little farther to the left and tighten the screws. The lug should be adjusted so that the shutter is setting slightly ahead of the winding mechanism. After checking the adjustment by following

through the winding cycle as described on page 8, shellac the heads of the screws to prevent them from working loose.

CAUTION: Do not move the lug so far to the left that the front end of the shutter operating lever and end assembly will be forced beyond the point at which it cocks the shutter. If this happens, the winding key knob will turn hard when the shutter is being cocked.

ADJUSTING THE SAFETY LEVER (See figure 20).

Correct adjustment of the safety lever assembly is extremely important to proper operation of the camera. Whenever it is necessary to install a new safety lever assembly, fit it to the camera by the following procedure. These instructions should also be consulted if trouble is experienced with the operation of the old safety lever and it is to be adjusted rather than replaced.

Inspect the bottom of the safety lever for burrs. If the surface is not perfectly smooth, use a fine stone to remove any roughness. Also make sure there are no burrs on the end of the spring at (C).

Bend the whole safety lever a little so that point (E) is slightly higher than point (A) or point (G). This will bring the top of the safety lever in contact with the safety lever retaining nut and prevent any possibility of loose operation of the safety lever.

Bend the black spring down far enough between points (C) and (D) to insure positive engagement of the end of the spring at (C) with the steps on the safety lever spring stop plate.

If necessary, bend the lever up from point (A) to point (B) in order to raise the top prong sufficiently so that it will clear the gear on the safety control cam complete (figure 7). The prong must not touch the teeth of the gear. It may also be necessary to bend the lever slightly toward the back of the camera between points (A) (figure 20) and (B) in order to allow the top prong of the safety lever to make positive contact with the slot in the disk just above the gear.

Bend the safety lever down slightly between points (F) and (G). This will bring the right end of the safety lever down in contact with the mechanism plate so that the trigger lock spring cannot slip under the end. If any difficulty is experienced with the trigger lock spring jumping over the top of the safety lever assembly, it may be advisable to make a fine slot in the end of the safety lever at (G) with a knife stone. The slot will form a recess for the spring and prevent it from slipping over the top of the lever.

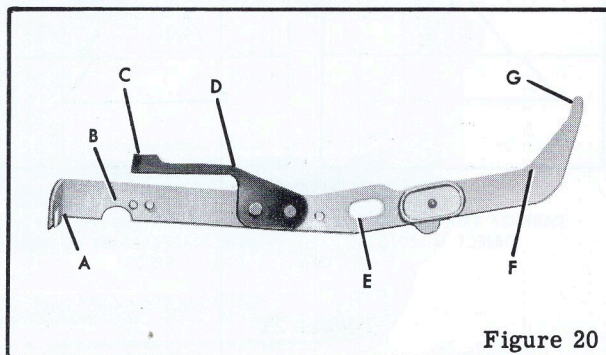


Figure 20

OPTICAL ADJUSTMENTS TO RANGE FINDER.

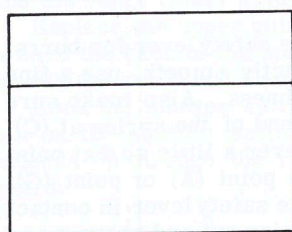
NOTE: It is preferable to correct optical defects (figure 21) in the range finder system in the order named.

ONE FIELD IS SMALLER THAN THE OTHER.

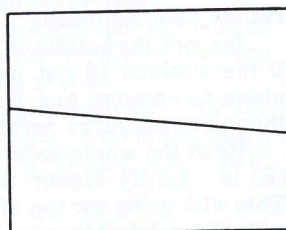
This condition is due to tilting of the erecting prism forward or backward, usually caused by a severe jar to the camera. The focus of one or both fields may also be affected.

Remove the two range finder eyelet frame screws (figure 5) and the parallax frame assembly. Then fasten the range finder eyelet lens assembly in place again with the two range finder eyelet frame screws.

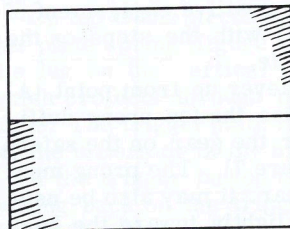
Loosen the erecting prism retaining screws (fig-



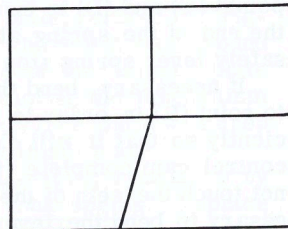
ONE FIELD SMALLER THAN THE OTHER



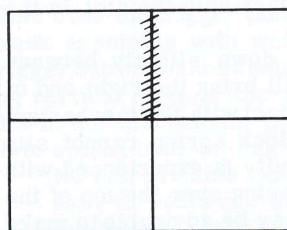
DIVIDING LINE TIPPED



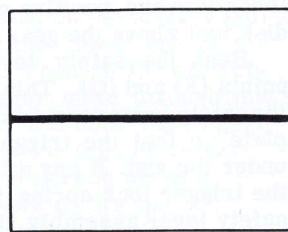
A SHADOW IN ANY OF THE OUTSIDE EDGES



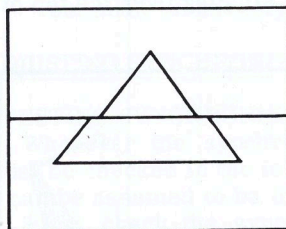
VERTICAL LINES TIPPED IN ONE FIELD



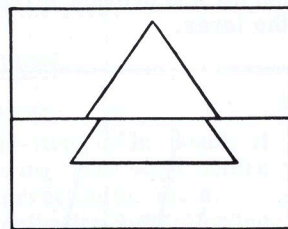
EITHER FIELD OUT OF FOCUS



DIVIDING LINE TOO THICK



PART OF TRIANGULAR TEST OBJECT MISSING



PART OF TRIANGULAR TEST OBJECT APPEARS IN BOTH FIELDS

HALVING INCORRECT

Figure 21

ure 22) on either side of the erecting and coincidence prism assembly; special tool No. 501-C will be found convenient for the right-hand screw. Tilt the prism assembly forward or backward until the dividing line is centered up and down and the two fields are of equal size. After tightening the retaining screws, put a small amount of shellac on the heads to prevent the screws from working loose.

Again remove the two range finder eyelet frame screws, replace the parallax frame assembly, and replace the eyelet frame screws.

DIVIDING LINE TIPPED.

This condition is very similar to that described in the paragraph above. Instead of tilting forward or backward, the erecting prism has tilted sideways. Make the adjustment in the same manner and be sure to shellac the heads of the retaining screws to prevent recurrence of the trouble.

A SHADOW IN ANY OF THE OUTSIDE EDGES.

A shadow may be due to bending of the range finder reflection guard (figure 6) so that it is cutting into the beam of light. If the reflection guard has not been bent, make sure that the range finder reflection guard screw is tight and is not allowing the guard to slip out of position in any direction. In this case, tighten the screw and shellac the head to prevent it from working loose again.

If no obstruction can be located in the affected beam, the erecting prism may not be perfectly lined up with the coincidence prism. Loosen the two erecting prism retaining screws, adjust the erecting prism so that it is the same distance from the coincidence prism at both sides, and tighten and shellac the screws.

VERTICAL LINES ARE TIPPED IN ONE FIELD.

Lines are Tipped in Lower Field.

If the lines are tipped clockwise as shown in figure 21, use special tool No. 501-E to tighten the large end prism bracket screw (figure 22) on the end prism assembly. In most cases it will be necessary to tighten the screw only very slightly. If no result is obtained, loosen very slightly the center one of the three smaller end prism bracket screws directly above the large screw. Working the two screws in conjunction with each other, straighten the vertical lines. After making the adjustment, shellac both screw heads. If the lines are tipped counterclockwise, follow the same general procedure, but tighten the upper screw, and if necessary, loosen the lower one.

Lines are Tipped in Upper Field.

If the lines are tipped clockwise, tighten slightly the small end prism bracket screw in the center of the right end prism assembly mount directly above the large end prism bracket screw. If no result is obtained, loosen very slightly the large screw and work the two screws in conjunction with each other to straighten the vertical lines. Then shellac both screw heads. If the lines are tipped counterclockwise, follow the same general procedure, but tighten the lower screw, and if necessary, loosen the upper one.

NOTE: After an adjustment has been made to correct tipped vertical lines, it will probably be necessary to correct the halving also.

EITHER FIELD OUT OF FOCUS.

The focus of each field is controlled by the position of its objective lens mount assembly. The left-hand lens mount assembly controls the lower (stationary) field, while the right-hand lens mount assembly controls the upper (movable) field. If it is necessary to adjust the right-hand lens mount, the focusing dial must be removed. To make an adjustment, use special tool No. 601-D to loosen the two objective lens mount nuts on the objective lens mount assembly concerned and move it forward or backward until the field is in perfect focus. After making the adjustment, correct the halving as described in the paragraph below, and shellac the nuts to lock them in place.

HALVING IS INCORRECT.

The halving or height adjustment is best tested on a triangular test object. When the halving is incorrect, the sides of the test object will appear to be broken even when the range finder is set for the correct distance. This effect is due to incorrect adjustment of one of the objective lens mount assemblies; if there is too much vertical separation between the two lenses a section of the triangle will be missing, while if there is not enough, the same part of the triangle will appear in both fields. See figure 21.

Part of Triangular Test Object Missing.

Without loosening the objective lens mount nuts, gently tap down the right-hand objective lens mount assembly or raise the left-hand objective lens mount assembly by gently prying it up with the blade of a

screwdriver. When the adjustment is correct, shellac the nuts in place. If any adjustment is to be made to the right-hand objective lens mount assembly, the focusing dial must be removed.

NOTE: Neither of the two objective lens mount assemblies should be raised or lowered to the extent that it is not reasonably well centered in its front window on the direct view finder cover assembly (figure 2). For this reason, it is advisable to replace the cover assembly temporarily before making the adjustment. The lens assembly which it is preferable to adjust can then be selected on the basis of its centering in the front window.

Part of Triangular Test Object Appears in Both Fields.

Follow the same general procedure as that given in the preceding paragraph, but raise the right-hand objective lens mount assembly or lower the left-hand objective lens mount assembly.

DIVIDING LINE TOO THICK.

Severe climatic conditions sometimes cause separation of the two triangular coincidence prisms. If this is the case, replace the coincidence prism assembly complete.

Too thick a dividing line may also be due to incorrect position of the small aligning mask under the view finder mask at the back of the direct view finder cover assembly. Move the mask up or down until the dividing line is of the desired thickness; then apply a small amount of shellac to the mask to prevent it from slipping out of place.

NOTE: Great care should be taken with this adjustment because it may have a tendency to affect the clarity and brightness of both fields.

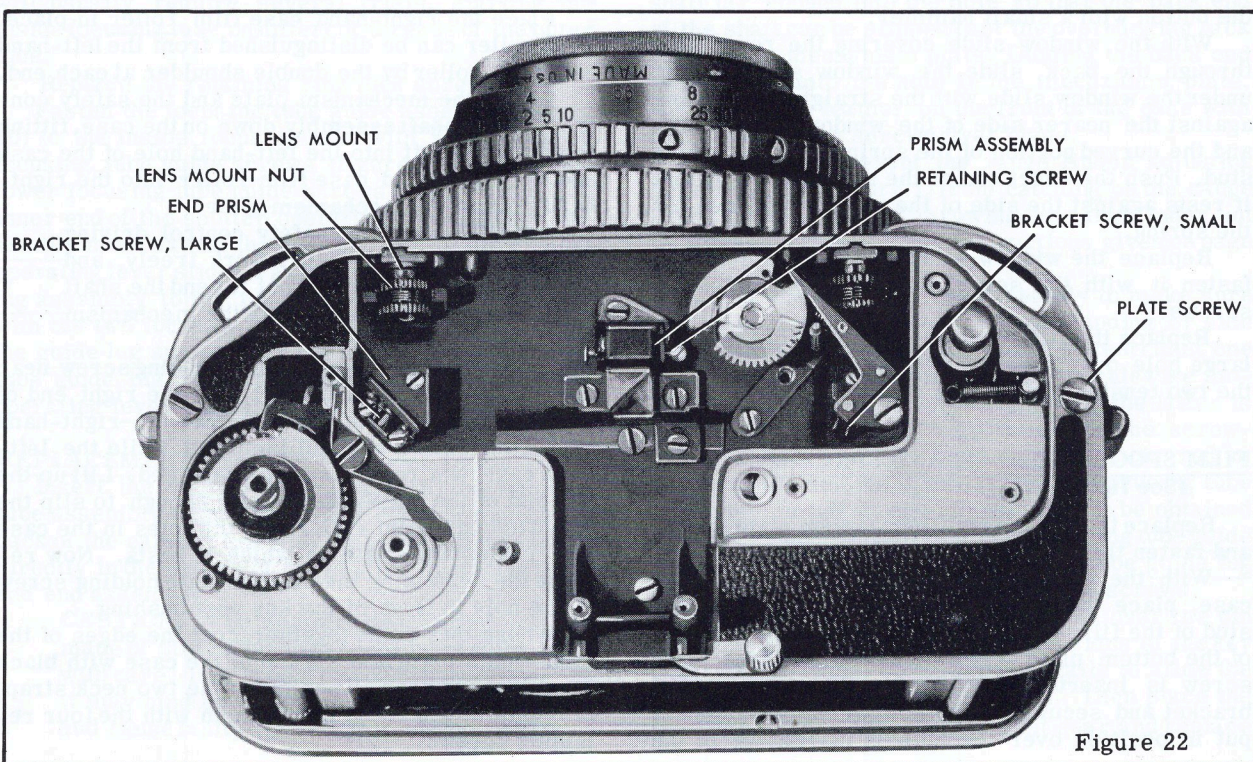


Figure 22

Reassembly

BACK COMPLETE (See figure 12).

Place the two hinge latches in position, one at each end of the back, and fasten them with the two hinge screws.

Place the two hinge pin springs and the four hinge pins in position and hold them in place with the hinge latches at either end of the back. The hinge pins must be turned so that the holes are in position to receive the hinge grips.

Using adhesive tape to protect the finish on the hinges, force the four hinge grips into place with a pair of blunt-nosed pliers.

Replace the two hinge grip guides, one at each end of the back, and fasten them with the four hinge grip guide retaining screws.

Replace the film roller pin spring in the open end of the back film roller and insert the film roller pin with the small end turned out. Put the solid end of the film roller in the bearing hole at the left bottom corner of the back; then, with a small screwdriver, push the film roller pin far enough into the roller to allow the small end of the pin to be engaged in the bearing hole at the top of the back.

If the window slide button was disassembled from the back, place the window slide in place with the window slide button extending through it. Rest the back on a metal block covered with adhesive tape to protect the finish on the outer end of the window slide button, and turn over the inner end of the button with a small hammer.

With the window slide covering the round hole through the back, slide the window slide spring under the window slide with the straight end resting against the nearer side of the window slide button and the curved portion of the spring over the spring stud. Push the short end of the spring down so that it rests against the side of the recess provided for the spring.

Replace the window slide cover assembly and fasten it with the seven window cover retaining screws.

Replace the film tension pad assembly with the large hole over the film window and fasten it with the two tension pad holding screws.

FILM SPOOL HOUSINGS, AND SPACERS

(See figure 11).

Replace the left and right mechanism plate spacer and fasten them with the two case screws.

With the bottom plate in position beneath the case, place the spool tension over the centering stud of the film roller bracket. Fasten it with one of the bottom plate screws. The right-hand plate screw is inserted through the right-hand spool bracket and secured. The bottom plate washer is put in position over the hole in the center of the

case and fastened with the remaining bottom plate screw.

With the blade of a small screwdriver, scrape out the channels in the bottom of the case where the bottom edges of the spool housings are to fit. Apply black wood lacquer dope to the channels.

NOTE: The lacquer dope functions as a filler; wood lacquer dope should therefore be used in preference to metal lacquer dope because it has a higher percentage of solids. If only clear dope is available, add carbon black to it so that no light will be transmitted. If neither clear nor black lacquer dope is available, use regular black wood lacquer without thinning.

Place the left and right spool housing assemblies in position in the case. Set each housing in its channel by placing a wood or fiber block on top of the spool housing and tapping the block gently.

MECHANISM PLATE (See figure 11).

With the blade of a small screwdriver, scrape out the channels in the bottom of the mechanism plate into which the top edges of the spool housings are to fit. Apply black wood lacquer dope to the tops of the spool housings. Refer to the preceding paragraph.

Place the right-hand case film roller in place. This roller can be distinguished from the left-hand case film roller by the double shoulder at each end.

Lower the mechanism plate and the safety control driving shaft assembly down on the case, fitting the driving shaft into the left-hand hole of the case and the right-hand case film roller into the right-hand hole in the mechanism plate.

CAUTION: The safety control driving shaft assembly must work freely, and care should be taken not to bend the shaft where it passes through the mechanism plate.

Replace one mechanism plate holding screw near the trigger button. This will hold the right end of the mechanism plate down so that the right-hand case film roller will not jump out while the left-hand case film roller is being replaced. Lift up the left end of the mechanism plate enough to slip the left-hand case film roller into the holes in the case and mechanism plate in which it rests. Now replace the remaining mechanism plate holding screw in the hole in front of the key post bushing.

Where they come together, coat the edges of the mechanism plate and the top of the case with black wood lacquer dope. Then place the two neck strap brackets in place and fasten them with the four retaining screws.

FOCUSING TUBE ASSEMBLY.

On each side of the opening into which the focusing tube assembly (figure 9) is to fit, the outside edge of the flange projects about 1/16 inch for a distance of about 1 1/2 inches. Coat the inside of the flange at these points with black wood lacquer dope.

Remove the inside focusing tube from the outside focusing tube.

Turn back the focusing tube insert until it fits tightly against the focusing tube flange with the stop stud on the bottom. Do not exert too much pressure on the insert; otherwise its shape may be distorted, causing binding of the focusing tube assembly after it has been reassembled to the camera.

Line up the focusing barrel in the case so that the stop stud will be on the right-hand side of the stop plate located in the bottom of the camera case. Do not attempt to insert the focusing barrel into the case. While in this position, the cutout portion on the insert is lined up directly above the built-up portion of the case, and the insert is pencil marked in this position. The insert is then turned approximately half way back on the focusing barrel with the stop stud on the right-hand side of the stop plate. The focusing barrel is inserted in the case until the stop stud is beyond the tube opening shoulder of the case. The insert is then turned back until the pencil mark on the insert is lined up with the built-up portion of the case. The tube is then pushed into the case until it locks into position. Then the retaining ring is screwed into position using special tool No. 501-B.

With the outer tube fully extended, insert the inside focusing tube in such a manner that when the inside tube is screwed all the way in, the shutter operating lever is at the top and the inner end of the inside focusing tube extends slightly farther into the case than the focusing tube flange. To do this will usually require several trials, starting the inside focusing tube on different threads of the outer tube.

Replace the retaining ring lock screw.

Fasten the focusing tube guide assembly (figure 10) to the inside focusing tube with the two upper focusing tube guide screws (figure 9) and the four lower focusing tube guide screws (figure 10). The inner end of the shutter operating lever and end assembly must extend through the slot in the shutter operating lever slide. Fasten the focusing tube guide lug assembly to the focusing tube guide assembly with the two focusing tube guide lug screws. Hook the guide lug spring over the studs on the focusing tube guide lug assembly and on the right shutter operating lever lug assembly.

REPLACEMENT OF SHUTTER (See figure 9).

Insert the shutter light guard in the focusing tube assembly with the smaller opening toward the back of the camera and with the large cutout portion directly in the center of the shutter operating lever and end assembly.

CAUTION: The shutter light guard is made of thin metal and should be handled with care. If it is bent by rough handling, it may bind on the shutter operating disk and cause faulty operation of the shutter.

Replace the shutter complete in the focusing tube—guiding the end of the wire through the opening in the shutter light guard at the same time guiding the end of the shutter operating lever and end assembly through the hole in the shutter operating disk (figure 10). Seat the shutter firmly with the cable release nut in the cutout slot in the focusing tube.

With a jeweler's screwdriver, turn on the shutter retaining ring.

Insert the contact wire, which comes out of the shutter, into the left side hole of the focusing tube guide assembly. Insert the ground wire, which extends from the shutter light guard, in the hole on the right side of the focusing tube guide assembly. Fasten the long contact wire to the left side of the contact plate on the focusing tube guide assembly. Fasten the ground wire to the contact plate on the right side of the focusing tube guide assembly.

PARTS ON MECHANISM PLATE.

The range finder couplet bar (figure 11) will fit into the case with the end having the cutout toward the back. Push the range finder couplet bar shaft through the couplet bar until the back end is flush with the end of the couplet bar.

Extend the focusing tube assembly to the limit of travel. The front end of the range finder couplet bar shaft fits in a hole in the front of the case which is located near the top right corner of the focusing tube guide assembly. This hole extends through the case and on the front of the case is covered only by the leather. With the free end of the range finder couplet bar spring turned toward the top of the case and resting against the right-hand spool housing assembly, insert the projecting end of the range finder couplet bar shaft in the hole in the case. Then, allowing the leather covering on the front of the case to be pushed out, push the front end of the shaft far enough into the hole so that the back end of the shaft can be slipped past the overhanging back edge of the mechanism plate. Guiding the back end of the shaft into the hole in the mechanism plate, push down the leather on the front of the case with the flat side of a screwdriver blade.

In order to prevent the range finder adjusting screw bracket (figure 1) from catching on the range finder couplet bar and throwing the rangefinder out of adjustment, follow the instructions given on page 4.

Check the focusing tube assembly to make sure that it operates smoothly, without binding or side play. Since the upper guide rod is eccentric at one end, it provides an adjustment of the sidewise motion of the focusing tube assembly as the latter is extended or retracted. By means of the screwdriver slot in the back end, turn the guide rod as required for smooth operation of the focusing tube assembly. If not enough adjustment can be obtained with the guide rod, loosen the two focusing tube guide lug screws (figure 10), the focusing tube guide lug assembly as required, and tighten the screws.

Place the key post gear (figure 8) over the pin on the key complete. The flattened sides of the key post gear pin must be turned vertically to allow the gear to seat properly over the pin. Then place the key post washer over the key post gear and replace

the key complete with the flat side of the key cam toward the left end of the camera.

Replace the safety control cam complete on the key post with the gear on the bottom meshed with the safety control idler gear (figure 7).

Replace the safety lever assembly (figure 13) with the two prongs on the left end above and below the gear on the safety control cam complete. The flat side of the end of the shutter setting gear stop lever must be to the right of the second stud from the left end of the safety lever assembly. The right end of the safety lever assembly must bear against the near side of the trigger lock spring. Fasten the safety lever assembly with the safety lever retaining nut and shellac the nut in place. Hook the safety lever spring over the first stud on the left end of the safety lever assembly.

Place the trigger plate bell crank in position with the long end toward the front of the camera and the hole to the right. Fasten it with the trigger plate bell crank stud (figure 7).

Check the shutter setting guide spring (figure 13) to make sure that the curved end is looped over the pin on the shutter setting blade assembly (figure 1) which extends through the mechanism plate and the shutter setting lever light guard (figure 13) on top of the mechanism plate.

At this point check the synchronization of the camera by following through the winding cycle as described on page 8. If the spring on the safety lever assembly fails to slip off the second step on the safety lever spring stop plate at the exact instant the shutter is released, refer to page 15, for adjustment instructions.

RANGE FINDER PLATE.

Holding the upper range finder coupler arm (figure 7) in toward the front of the camera, remove the wedge which was used to hold the coupler arm in position. Put on the back of the camera; this will hold the coupler arm until the range finder plate has been replaced.

If the focusing dial has not been removed, proceed as follows:

With the focusing tube fully retracted, turn the range finder focusing dial (figure 2) clockwise, exerting a slight downward pressure on the dial to keep the teeth of the dial pinion meshed with the teeth of the focusing cam, until the range finder actuating lever assembly (figure 1) can pass through the hole in the mechanism plate. Fit the range finder plate down over the mechanism plate and insert but do not tighten the two range finder plate screws.

CAUTION: Make sure the focusing tube assembly is retracted. If it is extended beyond the infinity position, the stud on the range finder actuating lever assembly will go on the camera on the wrong side of the range finder adjusting screw.

If the counter dial assembly (figure 5) and the safety control stop pawl (figure 6) were left on the range finder plate in disassembling the camera, the counter dial must be turned to any number except "0" in order to move the end of the stop pawl away from the safety control cam complete. Also, the cutout on the safety control cam complete must

face toward the counter dial assembly. To turn it to the proper position, follow, as far as necessary, the cycle of operation of the camera as described on page 8.

Insert the shutter setting lever pin and lever assembly in the slot in the back of the range finder plate with the point facing toward the left front corner of the camera case. Move the lever around until the hole in the lever is under the hole for the range finder plate screw; then press the range finder plate down gently and seat the lever on the bushing which holds in place the shutter setting lever light guard (figure 13). Then tighten the two range finder plate screws (figure 22) and replace and tighten the range finder plate screw.

NOTE: If a new shutter setting lever pin and lever assembly is being installed, it is advisable to bevel the under side of the point with a file to prevent it from catching on the side of the safety lever assembly (figure 13) as it moves over to make contact with the stud on top of the safety lever assembly.

If the focusing dial has been removed, proceed as follows:

With the focusing tube fully retracted turn the range finder cam assembly (figure 6) on the range finder plate counterclockwise until the first tooth of the gear on the cam assembly is opposite the end of the cam follower assembly. This will allow the range finder actuating lever assembly (figure 1) to pass through the hole in the mechanism plate. Fit the range finder plate down over the mechanism plate and insert, but do not tighten, the two range finder plate screws.

Replace the focus scale bracket (figure 14) on the mechanism plate and secure it in place with the two bracket screws. The shoulder screw goes nearest the bracket post. Line up the range finder on infinity by looking at an object at least 200 feet away from the camera. The spring attached to the focusing dial pinion is placed on the bracket post and the end of the spring is hooked around the shoulder screw. The dial is then lifted to prevent the pinion teeth meshing with the focusing cam and turned clockwise until the infinity reading is toward the front of the camera. The teeth of the pinion are then meshed with the teeth of the cam. If the range finder is on infinity and the teeth of the pinion are properly meshed with the focusing cam while the infinity indication of the focusing dial is toward the front of the camera, the rest of the footage scale will be in adjustment. If they are not, it should be borne in mind that it is more necessary for the range finder to be accurate on the shorter distances. The error may be due to the focusing cam which should be replaced if necessary.

Cock the shutter slowly with the shutter setting lever and listen for the sound of the shutter as it is set and the sound of the black spring on the safety lever assembly as it moves up on the first step of the safety lever spring stop plate (figure 13). The shutter should set slightly ahead of the black spring. If it does not, an adjustment must be made. If the shutter is cocked after the black spring clicks over the first step on the stop plate, bend the point of the lever very slightly to the left or, if necessary, file

the end of the lever a little where it comes in contact with the stud on the safety lever assembly.

If the parallax frame assembly (figure 5) and the range finder eyelet lens assembly were removed from the range finder plate in disassembly, replace them and fasten with the two range finder eyelet frame screws. The eyelet lens assembly should go on first with the frame toward the rear; make sure that it is straight and that it is pushed as far toward the front of the camera as it will go.

RANGE FINDER ACTUATING LEVER LINK

(See figure 1).

CAUTION: Be careful not to damage the parallax frame assembly while performing the following operations.

Extend the focusing tube assembly fully; then retract it slightly. With the camera upside down and level, hold the range finder actuating lever link so that the long prongs are to the left and the steps in the link go up from left to right. Slip the prongs between the range finder actuating lever link washer and the range finder actuating lever link nut.

Grasp the link with a pair of tweezers and swing the right end around toward the front of the camera until it is beyond and just to the left of the range finder actuating lever retaining screw.

With a jeweler's screwdriver, force the link with firm pressure toward the front of the camera until the short prongs slide over the stud on the range finder actuating lever assembly.

COUNTER DIAL ASSEMBLY AND SAFETY CONTROL STOP PAWL.

Replace the safety control stop pawl (figure 6) and safety control stop pawl spring and fasten them with the safety control stop pawl stud.

The long end of the safety control stop pawl spring fits into the groove on the safety control stop pawl. The short end rests against the right side of the projecting lug on the range finder plate.

Replace the counter knob spring (figure 5) and hold it down with the counter dial assembly while replacing the counter knob washer and counter knob screw.

COUNTER DIAL HOUSING COMPLETE

(See figure 4).

Replace the key post spring washer on the key post with the concave side upward. Also replace the flat key post spacing washer if one was used on the camera as originally assembled; this washer is not necessary unless the winding key knob shows a tendency to wobble as it is turned (after the counter dial housing complete has been replaced).

Replace the counter dial housing complete and fasten it with the three counter dial housing screws. Make sure the key post is not binding against the housing.

Replace the key knob and fasten it with the key knob screw.

TRIGGER BUTTON HOUSING COMPLETE

(See figure 3).

If the trigger bushing leak light washer was removed during disassembly, replace it with the clipped corner toward the right front corner of the range

finder plate and fasten it along the back edge with shellac. Make sure the hole is centered around the trigger button. Slip the trigger button leak light washer over the trigger button.

Replace the exposure indicator tube in the hole in the range finder plate directly above the red signal.

Replace the trigger button housing complete and fasten it with the three trigger button housing screws. Make sure the trigger button is not binding against the housing.

DIRECT VIEW FINDER COVER.

Before replacing the direct view finder cover assembly (figure 2), check the range finder to make sure that it is free from any of the defects illustrated in figure 21. If any of these troubles is encountered, refer to page 16 for instructions on adjusting the optical system. Be sure all the range finder optics are perfectly clean. Even a small amount of dirt may make one or both halves of the field appear hazy. Any required cleaning can be done with a piece of wadded-up lens cleaning paper or soft, lintless cloth on the end of a toothpick, using moisture from the breath or lens cleaner as required.

CAUTION: If lens cleaner is used, it should be applied sparingly to the lens cleaning paper or cloth, not to the glass. Never use alcohol or other solvents.

Check to make sure that the windows in the direct view finder cover assembly are perfectly clean. If they are not, clean them as described in the preceding paragraph.

Look through the range finder at a distant object and turn the focusing tube assembly in or out until the two halves of the field are lined up; this establishes the approximate infinity position of the focusing tube assembly.

NOTE: If the range finder image in the upper field cannot be moved far enough to the left to coincide with the image in the lower field, the left end prism assembly (figure 22) must be adjusted. Loosen slightly the right-hand screw of the three end prism bracket screws and tighten the left-hand screw. Do not adjust the center screw. On the other hand, if the image in the upper field moves very far to the left when the focusing tube assembly is retracted from the infinity position to the closed position, it may happen that the upper field cannot be moved far enough to the right to coincide with the lower field when an object at 3 1/2 feet is viewed through the range finder. In this case, loosen slightly the left-hand screw and tighten the right-hand screw. When the end prism has been properly adjusted, the two range finder images can be made to coincide when either a distant object or an object at 3 1/2 feet is viewed. As the focusing tube assembly is retracted from the infinity position to the closed position the upper image should move only slightly to the left of the lower image.

At this point check to make sure that the paral-

laxframe assembly (figure 2) is operating properly without binding on the view finder cover. The parallax frame assembly can be seen by aiming the view finder at a light and looking into it rather than through it. If the parallax frame assembly is functioning correctly, it will be seen to move smoothly downward as the focusing tube assembly is moved out toward the 3 1/2-foot position. At the 3 1/2-foot position the lower edge of the negative finder lens frame at the front of the view finder cover should be distinctly visible. If it is not, remove the view finder cover and adjust the parallax adjusting screw (figure 5) on the parallax frame assembly. After securing the proper position of the screw, shellac the screw head to prevent it from turning accidentally during use of the camera. The parallax frame assembly must not be raised too high or it will come in contact with the top of the view finder cover as the focusing tube assembly is retracted and the rectangular frame at the front end of the assembly will be bent. Jerky movements or lack of any movement of the parallax frame assembly indicates that the assembly is binding either on the range finder reflection guard (figure 6) or on the viewfinder cover. Correction of this trouble will require loosening the two range finder eyelet frame screws (figure 5) and shifting the position of the parallax frame assembly as required. Before tightening the screws again, make sure that the range finder eyelet lens assembly is pushed as far toward the front of the camera as it will go and that it is straight.

DEPTH-OF-FOCUS SCALE (See figure 2).

If the depth-of-focus scale was disassembled from the focusing scale frame or if it is necessary to install a new scale, shellac the corners of the scale to the frame.

Replace the depth-of-focus scale and the focusing scale frame together on the direct view finder cover assembly. Fasten the frame with the two depth-of-focus scale frame screws.

FOCUSING THE LENS.

NOTE: The rangefinder must always be adjusted BEFORE the lens is focused.

Refer to page 21.

Set up the camera on a firm support with the

diaphragm control ring retainer exactly 15 feet from a large wall chart or calendar suitable for accurate focusing.

Remove the camera back and place the ground glass of special tool No. 501-V on the back frame of the camera in the position of the film plane. The ground side of the glass must be toward the lens and the cutaway corner must be at the upper right to allow access to the adjusting screws. Fasten the ground glass in place with the spring clamp. Insert a T.B.I. Cable Release in the shutter cable release socket.

With the diaphragm pointer set to $f/3.5$, turn the shutter speed control ring so that the red pointer is at "B." Cock the shutter and open it by placing the T.B.I. Cable Release on the time position and depressing the button.

Focus carefully on the test object by turning the focusing tube assembly. Use a magnifying glass to examine the image and make sure that it is the sharpest obtainable.

Look at the focusing scale. If the 15-foot mark is not exactly at the black index mark on the depth-of-focus scale, loosen the range finder adjusting screw lock stud (figure 1). This is the smaller screw at the upper right-hand corner of the focusing tube guide assembly.

If the 15-foot mark on the focusing scale is to the left of the index mark, turn the range finder adjusting screw (the larger of the two screws) clockwise until the two marks exactly coincide. If the 15-foot mark is to the right of the index mark, turn the adjusting screw counterclockwise. Then tighten the range finder adjusting screw lock stud.

The focusing tube stop plate should be adjusted so that the 3 1/2-foot indication on the focusing dial can reach the infra-red mark on the depth-of-focus scale. Never allow the 3 1/2-foot mark to go too far beyond the infra-red mark. This may cause the range finder actuating lever and link assembly to bear against the focusing cam screw and to pull off of the lock stud. The lever link will come close to the screw in any case but if it should actually touch before the 3 1/2-foot indication is below the infra-red mark on the scale, the stop plate should be readjusted so that it cannot touch. It may then be necessary to readjust the range finder as described on page 21.

Corrective Maintenance

TROUBLE	CAUSE	REMEDY
Camera is jammed.	The safety control <u>driving shaft</u> assembly (figure 11) has been turned manually without first turning the winding key knob. (The camera usually jams on the third or fourth cycle.) See page 8.	Set the counter dial on "1." Rack the focusing tube assembly all the way in. Press the trigger button down as far as possible and hold it down while turning the winding key knob until a definite click is heard. In severe cases it may appear that the trigger button cannot be depressed at all; however, by alternately pushing hard on the trigger button and turning the knob with strong finger pressure, it is usually possible to work the knob free. Rack the focusing tube assembly out at least to the infinity position and press the trigger button. The camera jam should be cleared.
	The winding key knob has been turned with the trigger button partly depressed.	Same as above.
	Binding of the shutter operating disk (figure 10) has allowed the back end of the shutter operating lever and end assembly to hang over toward the trigger plate (figure 1). As a result, the trigger plate has moved over the top of the right shutter operating lever lug (figure 10), instead of tripping the shutter.	Remove the shutter. Refer to page 5. Make sure the shutter light guard (figure 9) is not bent or rough. Clean the shutter operating disk and the shutter operating disk spacer located under the operating disk.
	Tension on the <u>guide lug spring</u> is sufficient and has allowed the right shutter operating lever lug to hang over toward the trigger plate. As a result, the trigger plate has moved over the top of the lug instead of tripping the shutter.	Increase the tension on the guide lug spring by removing 2 or 3 turns of the spring. However, do not put excessive tension on the spring.
	The trigger lock spring (figure 13) has slipped under the end of the safety lever assembly and the safety lever assembly has not unlocked the trigger button.	Disassemble the camera down to the mechanism plate and adjust the safety lever assembly. Refer to page 15.
Winding key knob does not unlock when shutter is released.	The shutter is releasing before the winding mechanism (camera is out of synchronization).	Refer to page 14.
Blank frame of film.	The winding mechanism is releasing before the shutter (camera is out of synchronization).	Refer to page 14.

TROUBLE	CAUSE	REMEDY
Winding key knob does not lock with counter dial on a number other than "0."	The <u>safety lever spring</u> (figure 13) is weak or broken.	Disassemble the camera down to the mechanism plate and replace the safety lever spring.
Shutter trips when shutter setting lever is released.	Tension on the <u>guide lug spring</u> (figure 10) is too high.	Stretch the guide lug spring slightly.
Film winds too hard.	The <u>key complete</u> (figure 4) is binding on the counter dial <u>housing complete</u> .	Loosen the three screws holding the counter dial housing in place and shift the housing until the key post is centered in the hole in the housing.
	The <u>spool holder assembly</u> (figure 11) is binding on the case.	Bend the roller ends of the spool holder assembly until they do not touch the case when a roll of film is inserted in the spool housing.
Shutter is not set when winding key knob is turned with counter dial on a number other than "0."	The shutter setting gear <u>stop lever</u> (figure 13) is not releasing the <u>shutter setting gear assembly</u> (figure 7).	Disassemble the camera down to the mechanism plate and swedge the shutter setting gear stop lever at the point where it makes contact with the second stud on the <u>safety lever assembly</u> (figure 13).
Trigger button fails to snapback to its proper position after tripping shutter, or returns too slowly.	The trigger button is binding on the trigger button <u>housing complete</u> (figure 3).	Loosen the three screws holding the trigger button housing in place, and shift the housing until the trigger button is centered in the hole in the housing. If necessary, remove the housing and clean and smooth the hole.
	The tension on the <u>trigger plate spring</u> (figure 13) is too low.	Remove the direct view finder cover assembly and trigger button housing complete, and add tension to the trigger plate spring by removing one loop. Care should be taken in this adjustment because if too much tension is added to the spring, the <u>trigger plate</u> (figure 1) may not lie flat against the under side of the mechanism plate. As a result, the right shutter operating lever lug assembly (figure 10) may bear up against the trigger plate when the shutter is cocked with the focusing tube assembly extended to the 3 1/2 foot position.
Trigger button does not lock after an exposure is made.	The <u>trigger lock spring</u> (figure 13) has slipped over the end of the safety lever assembly and is being held up out of position by the trigger button sleeve.	Disassemble the camera down to the mechanism plate and adjust the safety lever assembly. Refer to page 15.
Shutter blades open and close as shutter is being set.	The left shutter operating lever <u>lug</u> (figure 10) has slipped out of position, causing partial shutter setting action.	Loosen the screws holding the left shutter operating lever lug and move the lug slightly to the left. Care should be taken not to move it over so far that it will make the winding key knob turn too hard as the shutter is being set. After securing the proper adjustment, tighten the screws and shellac the heads to prevent them from working loose.
Focusing tube binds.	The upper <u>guide rod</u> (figure 1), one end of which is eccentric, has been turned.	Turn the upper guide rod by means of the screwdriver slot at the back end of the rod until the focusing tube operates more smoothly. Refer to page 19.

TROUBLE	CAUSE	REMEDY
Focusing tube works too freely.	The upper guide <u>rod</u> (figure 1) has been turned.	Turn the upper guide rod by means of the screwdriver slot at the back end of the rod until the focusing tube does not operate so easily. Refer to page 19.
Spacing between exposures is too great or too small.	The winding key knob has been forced and the prongs on the left end of the <u>safety lever assembly</u> (figure 13) are bent.	Disassemble the camera down to the mechanism plate and adjust or replace the safety lever assembly. Refer to page 15.
Range finder is out of adjustment.	If the focusing scale does not read correctly, see page 20. If the range finder is out of adjustment optically, see page 16.	If the focusing scale does not read correctly, refer to page 20. If the range finder is out of adjustment optically, refer to page 16.

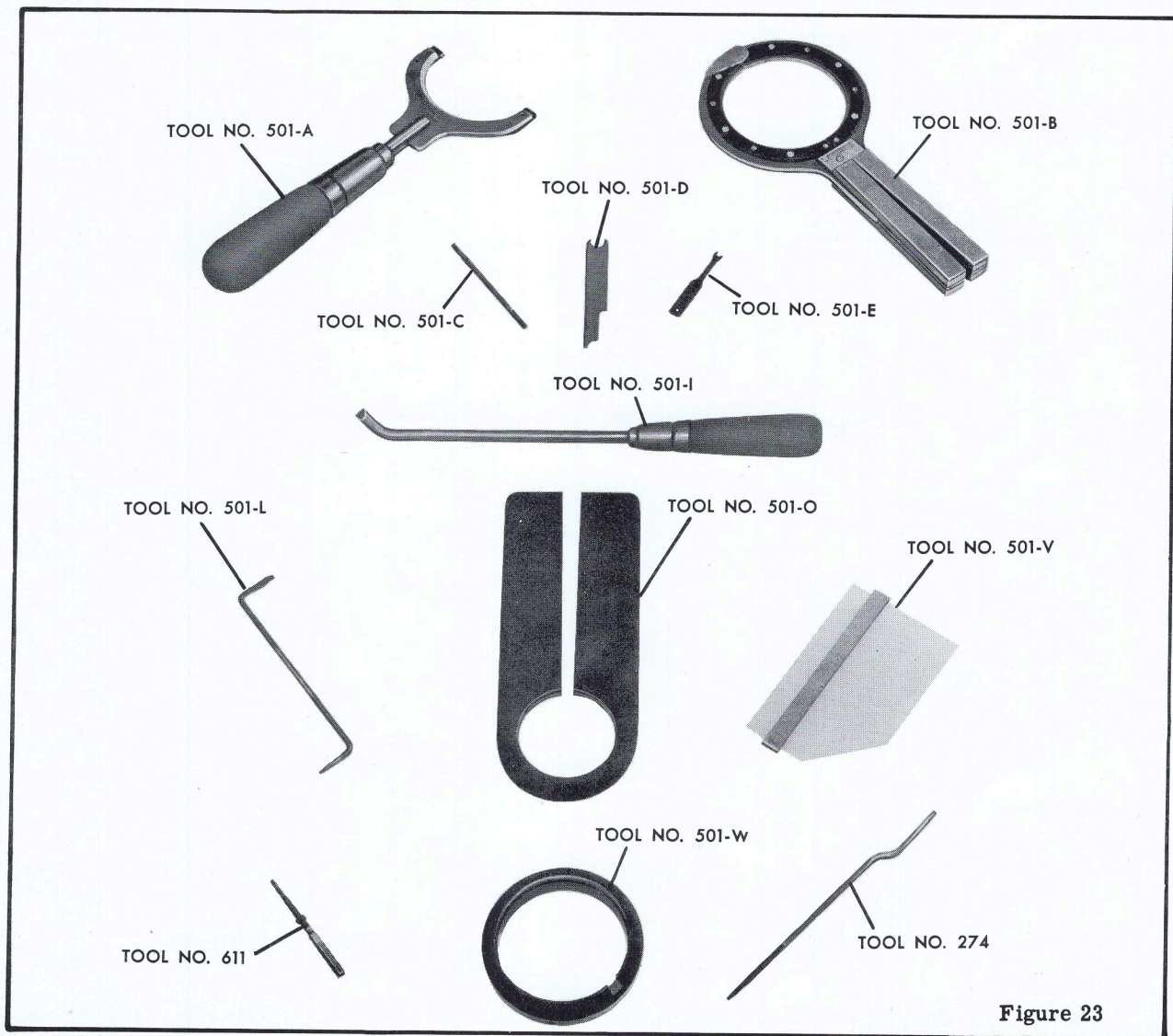


Figure 23

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