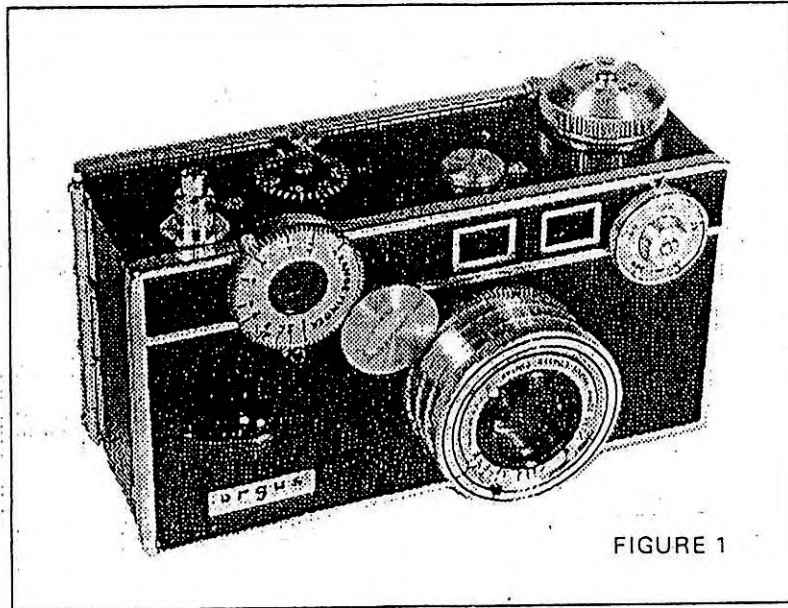


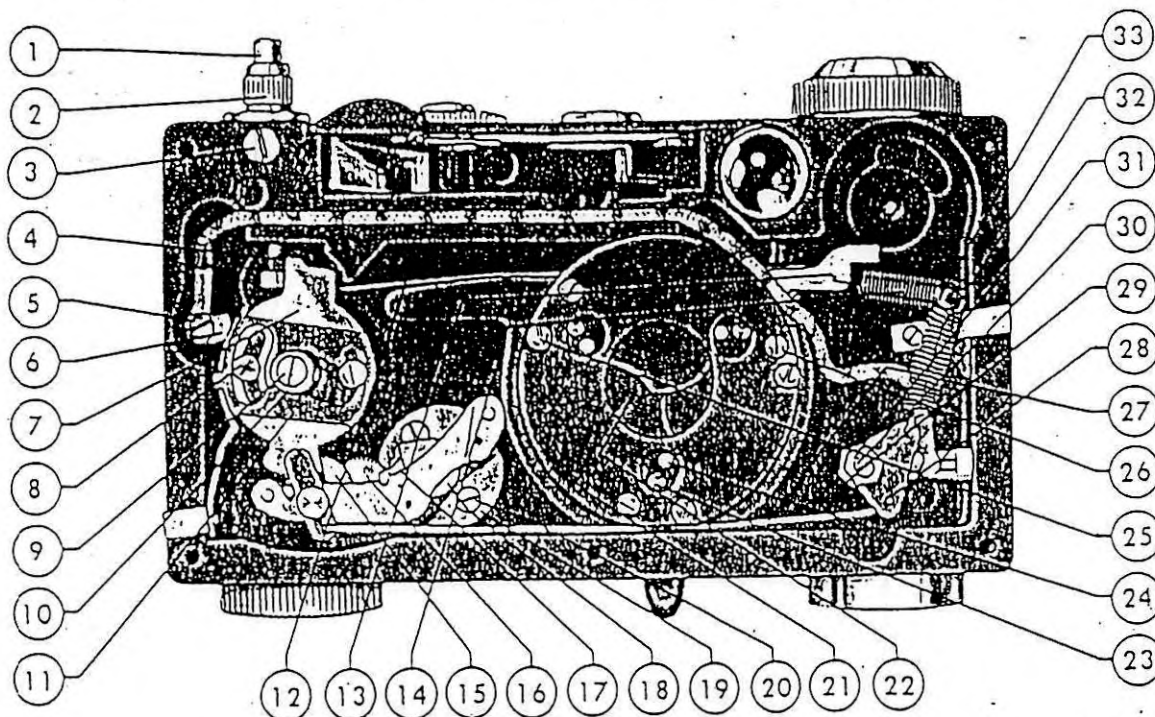
argus Model C3



SERVICE GUIDE



C-3 SHUTTER AND RELATED PARTS



Part No.	Description	Part No.	Description
14810	RELEASE PIN ASSEMBLY	*14263	SHUTTER ESCAPEMENT (New Style)
1 14164	Release Button	00406	1st Gear
2 14163	Grip, Release	00407	2nd Gear
3 14195	Screw, Release Pin	00408	Star Gear
4 14816	Pin Assembly	00409	Pallet
14158	Spring, Release Pin	00410	Frame Assembly
14159	Bearing, Top Release	00411	Screw, Frame
14161	Bearing, Bottom Release	14151	SHUTTER ASSEMBLY, WITH HARD RUBBER BLADES
14162	Bushing, Release Index	21 00412	Plate, Shutter Front
14193	Steel Ball	22 00413	Blade, Shutter
14194	Spring, Ball	23 00414	Plate, Inner Shutter
90043	Screw	24 00415	Ring, Shutter Control
5 90037	Screw, Contact	25 90057	Screw, Shutter Mounting
6 14186	Arm, Contact Fixed	26 00416	Screw, Shutter Plate
		00417	Base Plate Assembly
		00418	Spring, Shutter
14813	SHUTTLECOCK ASSEMBLY	*14860	SHUTTER ASSEMBLY, WITH METAL BLADES
7 14190	Cam, Release	14523	Plate, Shutter Front
8 90037	Screw	14520	Blade, Shutter (Metal)
9 14189	Screw, Shutter Drum	14522	Plate, Inner Shutter
10 14173	Drum, Shutter	14864	Shutter Control Ring & Pin Assembly
11 14182	Arm, Switch Release	14166	Screw, Shutter Plate
12 14176	Ribbon, Shuttlecock	14863	Base Plate Assembly
13 14178	Shuttlecock	14528	Spring, Shutter
14 14180	Spring, Shuttlecock	14275	Shutter Mounting Screw (Long)
14174	Pin, Catch	90059	Shutter Mounting Screw (Short)
14175	Catch		LINKAGE ASSEMBLY
14177	Spring, Catch	27 14203	Link, Wire
93004	Rivet	28 14200	Lever, Triangular
14152	SHUTTER ESCAPEMENT	29 14201	Bearing, Stud
15 00400	1st Gear	30 14199	Screw, Speed Adjuster
16 00401	2nd Gear	31 14198	Adjuster, Shutter Speed
17 00402	Star Gear	32 14197	Spring, Linkage
18 00403	Pallet	33 14196	Pin
19 00405	Frame Assembly	14814	CAM FOLLOWER
20 90037	Screw, Mounting	14819	SHUTTER COCKING LEVER
		14215	Set Screw

The Argus C-3, Fig. 2, is a good example of a 35mm camera using a built-in behind-the-lens shutter. In the Argus C-3, almost a third of the volume of the camera body is used to house the shutter mechanism. The result of the Argus design is a shutter that is inexpensive to manufacture, easy to service, and quite dependable -- three factors which contributed to making the Argus C-3 one of the most popular 35mm cameras ever designed.

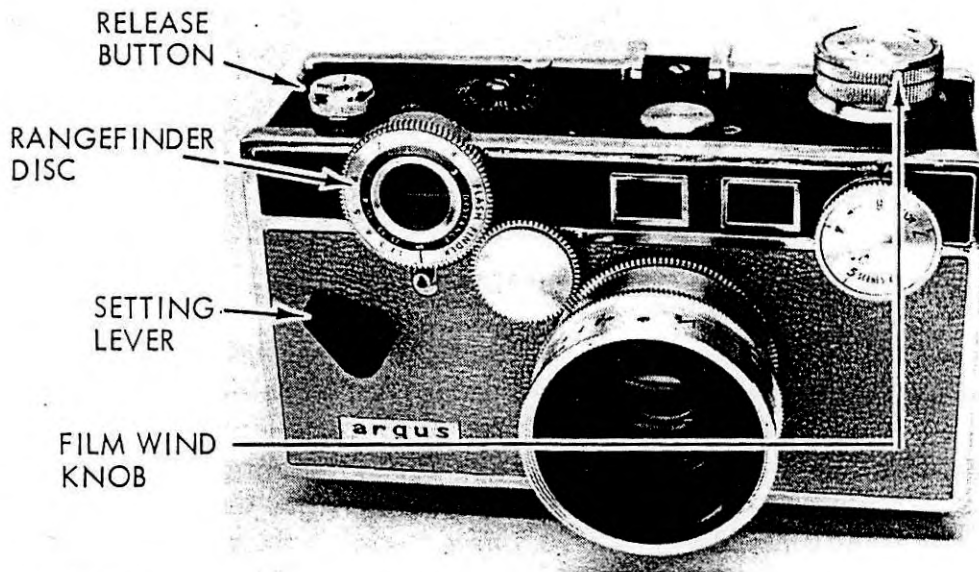


FIGURE 2

ARGUS C-3

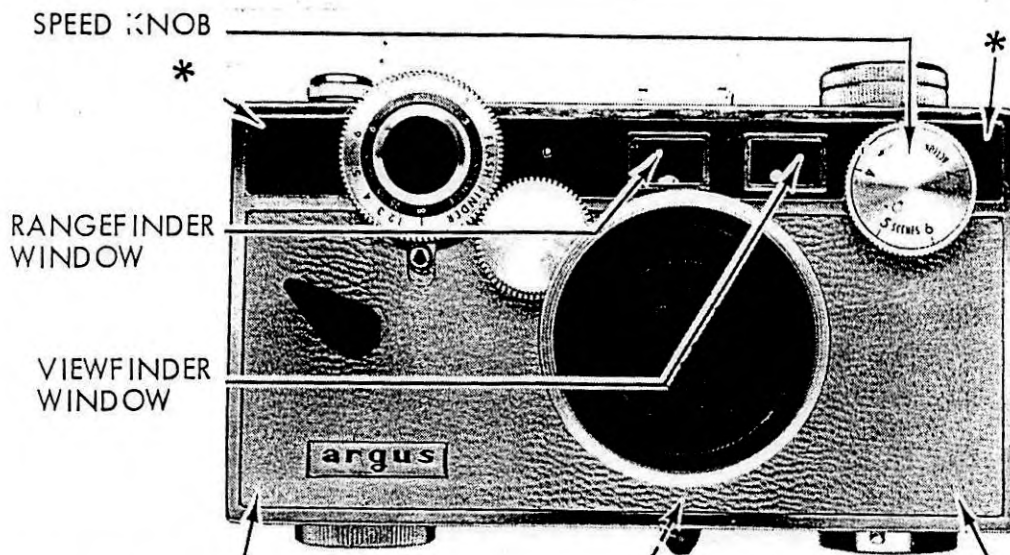


FIGURE 3 *DENOTE FRONT PLATE SCREW POSITIONS

The Argus C-3 has two controls in addition to the setting lever and the release button. One of these controls -- the SPEED KNOB -- operates a cam to determine the amount of retard, Fig. 3.

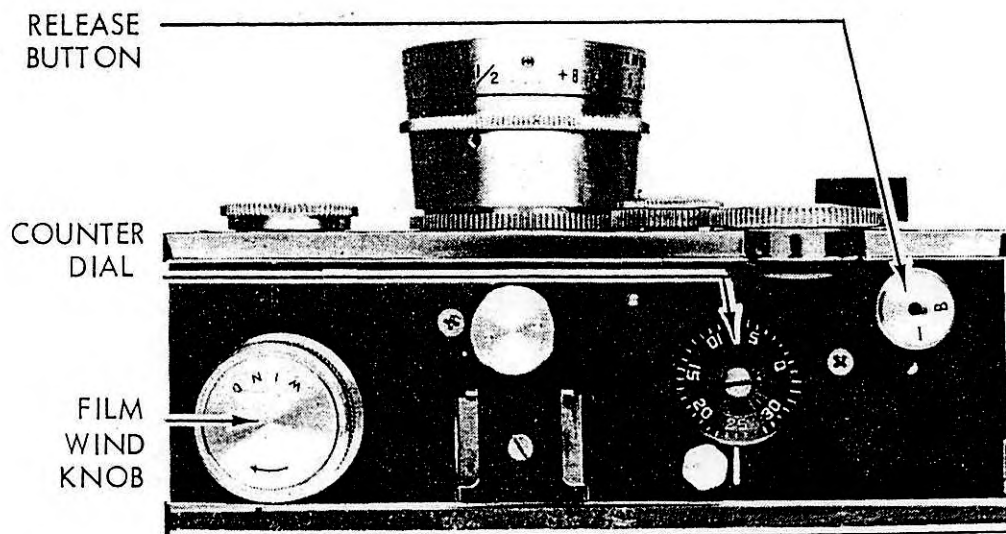


FIGURE 4

The other control permits "bulb" operation -- just turn the knurled release button from "I" (instantaneous) to "B" (bulb), Fig. 4.

Notice that the speed knob, Fig. 3, contains the number calibrations 4 through 8. The particular Argus C-3 illustrated is called the "Matchmatic," a name which refers to the unique method of calibrating the shutter speeds and the f/stops. Other Argus C-3 models are calibrated in the conventional fractions of a second. The numbers on the Matchmatic speed knob refer to the following shutter speeds:

- 8 -- 1/300 second
- 7 -- 1/125 second
- 6 -- 1/60 second
- 5 -- 1/30 second
- 4 -- 1/10 second.

REMOVING THE FRONT PLATE IN THE ARGUS C-3

The front plate assemblies of the various Argus C-3 cameras vary only slightly. In the older models, the setting lever is held by a setscrew. Just loosen the setscrew and unscrew the setting lever in a counterclockwise direction.

But the setting lever setscrew is eliminated in the later models -- such as the camera illustrated. Instead, a JAM NUT -- located immediately under the setting lever, Fig. 5 -- holds the setting lever in place. The setting lever post (on the main lever, as you'll see in a moment) has a left-hand thread. So moving the setting lever counterclockwise to cock the shutter binds the jam nut and the setting lever more tightly against one another.

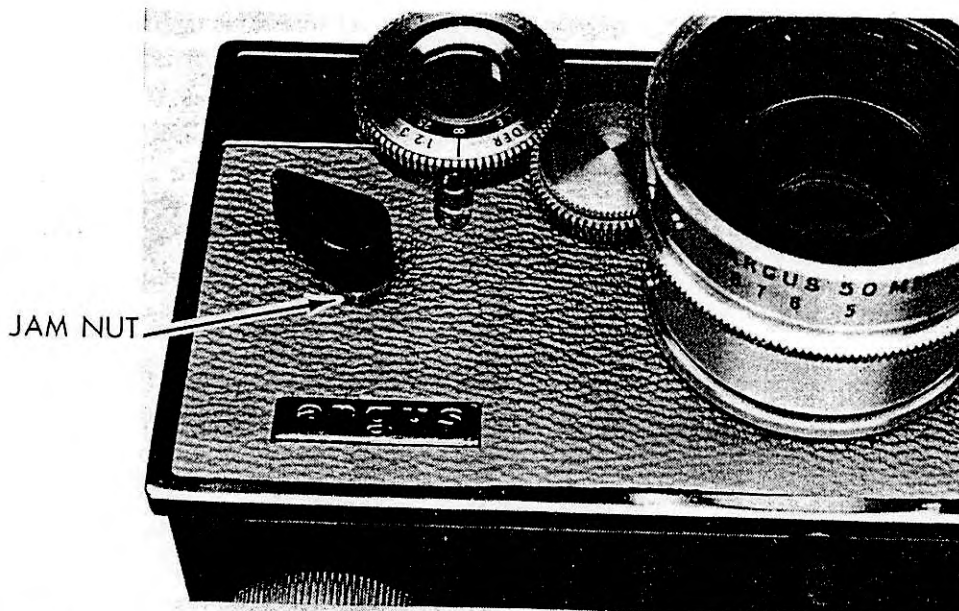


FIGURE 5

Hold the newer-style setting lever stationary with your fingers and turn the jam nut counterclockwise with a thin-headed wrench -- you are now moving the jam nut away from the setting lever. Then, unscrew the setting lever from its post by turning it in a clockwise direction -- and, after removing the setting lever, turn off the jam nut in the same direction.

CAUTION: Do not remove the Argus C-3 speed knob during the front plate disassembly -- the speed knob remains in place on the front plate. In the Matchmatic, the speed knob retaining screw is covered by the cemented calibration plate. But in other models, the screw is visible -- and there's always a temptation to remove an exposed screw. The speed cam -- which controls the movement of the retard section -- is attached to the back side of the speed knob. So by removing the screw, you lose the timing between the speed knob and the speed cam. You can, however, see the proper speed cam timing in figures 7 and 8.

Five or six screws (the number depending on the model) retain the front plate to the camera body. These screws are underneath the leatherette covering the front plate, as indicated by the arrows in figure 3. So carefully lift the leatherette at the four corners of the front plate with your bench knife -- try to avoid tearing or sharply creasing the leatherette.

VARIATIONS ON THE ESCAPEMENT RETARD

Another screw is located at the bottom center of the front plate -- as indicated by the dashed arrow in figure 3. And, in some models, there is a sixth screw adjacent to the rangefinder window. You can reach the lower screw without completely removing the leatherette -- either lift the bottom of the leatherette or cut the leatherette as indicated by the dashed arrow, Fig. 3. Make your cut very carefully with the sharp point of your bench knife -- when you later recement the leatherette, the cut will be almost undetectable.

If the sixth retaining screw is used, you can cut the leatherette by the rangefinder window, Fig. 6. Remove all of the flat-headed screws which hold the front plate. Then, carefully lift off the front plate -- be careful you don't drop out the CAM FOLLOWER which remains with the front plate, Fig. 7.

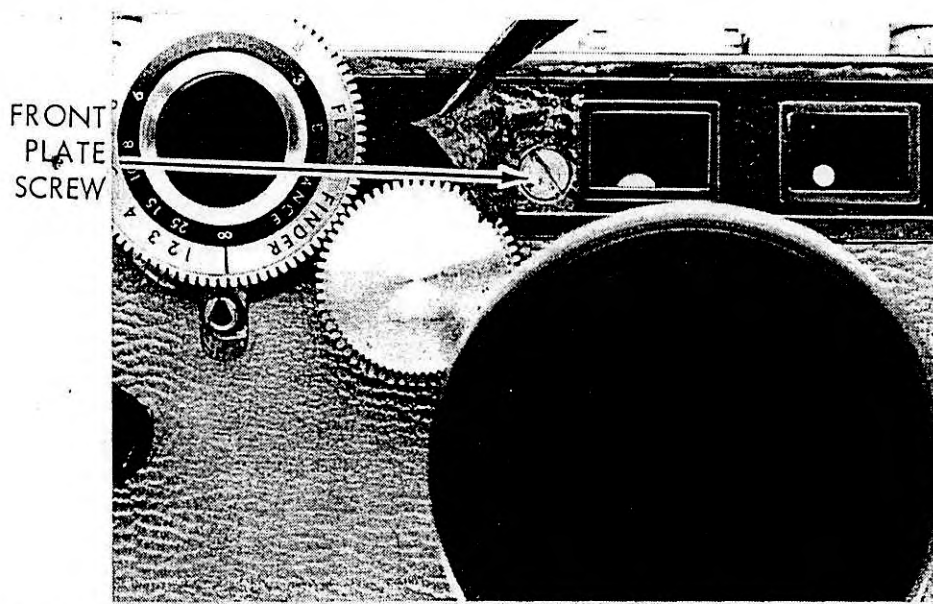


FIGURE 6

CAUTION: The front lens for the eyepiece may be loose once you've removed the front plate. If so, lift out the lens to prevent loss or damage -- the lens sits in the round cavity to the right of the rangefinder assembly, Fig. 10.

Figure 7 shows the inside of the front plate -- here, you can see the speed cam and the cam follower. The pin on the cam follower fits into the hole in the BELL CRANK (in the lower right-hand corner of the camera body, Fig. 9). The bell crank is part of the linkage between the speed cam and the speeds escapement, also pointed out in figure 9.

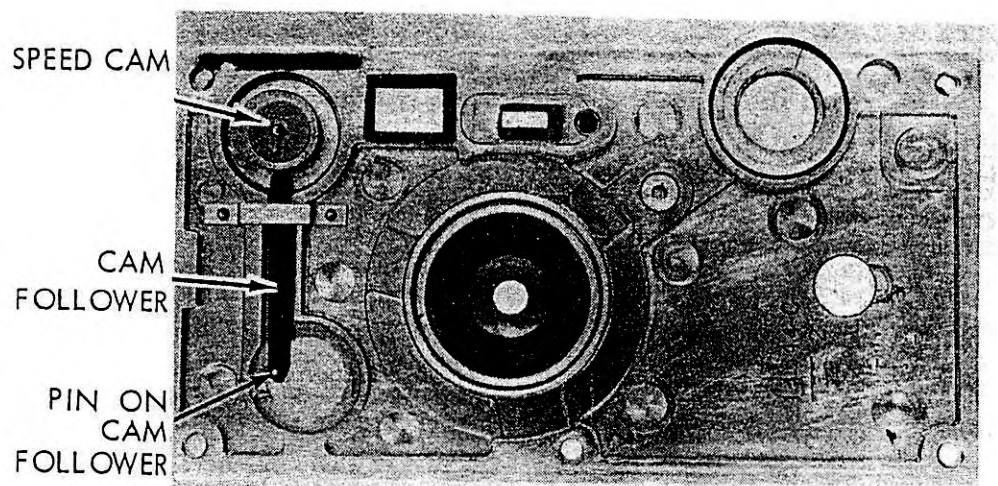


FIGURE 7

SHUTTER SET TO 1/300 SECOND ("8" ON MATCHMATIC)

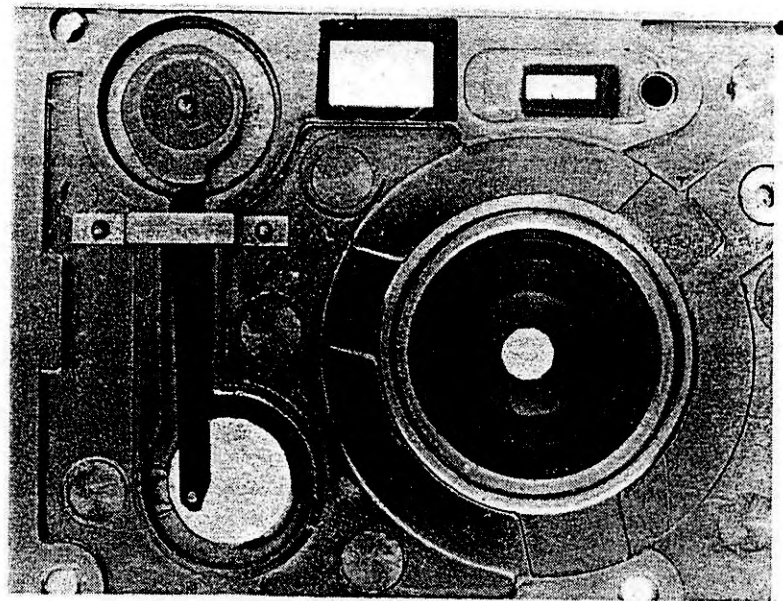


FIGURE 8

SHUTTER SET TO 1/10 SECOND ("4" ON MATCHMATIC)

You'll notice that the cam follower is at its highest position when the camera is set to the fastest shutter speed (1/300 second), Fig. 7. And the cam follower is at its lowest position when the shutter is set to the slowest shutter speed (1/10 second), Fig. 8.

VARIATIONS ON THE ESCAPEMENT RETARD OPERATION OF THE ARGUS C-3 SHUTTER

The main lever in the Argus C-3 is a multiple cam, Fig. 9. The SHUTTLECOCK and a long phosphor bronze ribbon -- the SHUTTLECOCK RIBBON -- connect the main lever to the tension-type mainspring.

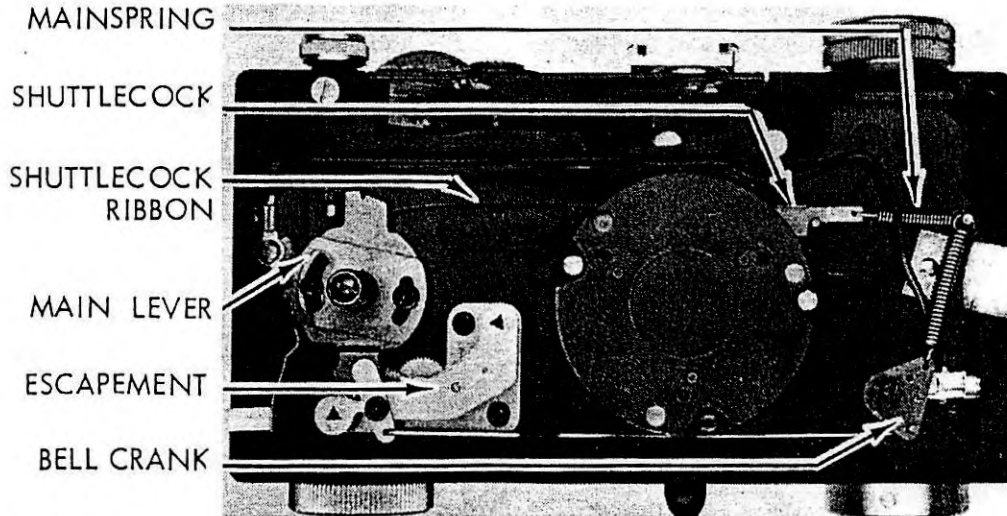


FIGURE 9

To cock the shutter, rotate the main lever in a counterclockwise direction with your finger -- as shown in figure 10. The main lever is then latched in the cocked position by the lower end of the RELEASE PLUNGER, Fig. 11.

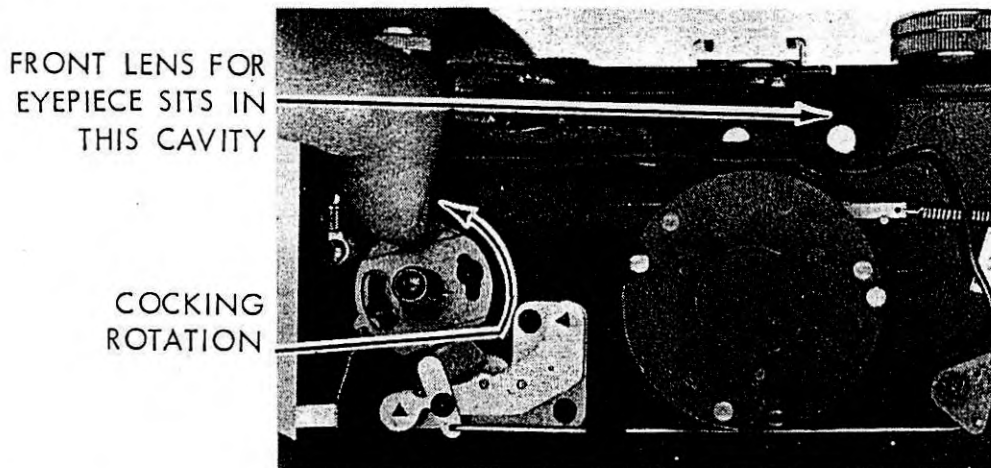


FIGURE 10

Depressing the release button pushes the release plunger down to free the main lever. Now, the mainspring pulls the shuttlecock from left to right, causing the main lever to rotate in a clockwise

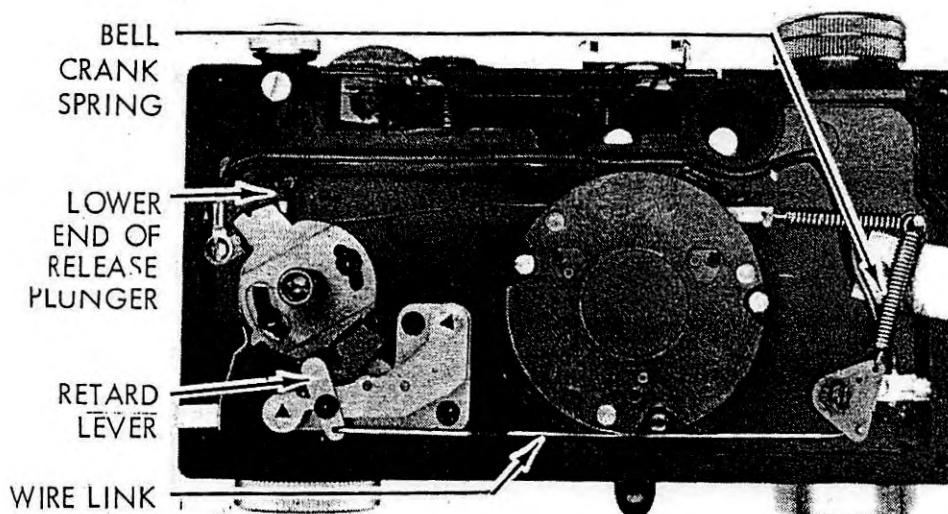


FIGURE 11 SHUTTER COCKED

direction. The shuttlecock assembly, during its release travel, contacts a lug on the blade operating ring to open the shutter blades -- you'll be able to see the action of the shuttlecock more clearly after we remove the shutter blade assembly. A spring on the blade operating ring, not yet visible, then closes the shutter blades.

Since you've removed the front plate -- and, along with it, the speed cam and the cam follower -- the shutter now delivers the fastest speed (1/300 second). The reason is that the bell crank spring, Fig. 11, holds the bell crank all the way in the counterclockwise direction.

Setting slower shutter speeds pushes the bell crank in a clockwise direction -- the speed cam pushes the cam follower down, and the cam follower in turn rotates the bell crank. Notice in figure 11 that a long WIRE LINK connects the bell crank to the RETARD LEVER in the speeds escapement.

In its present position -- 1/300 second -- the retard lever holds the first gear segment (in the speeds escapement) away from the lobe at the bottom of the main lever. But as you select slower speeds, the bell crank pulls the retard lever away from the first gear segment. The first gear segment then turns clockwise, under its own spring tension, as simulated in figure 12 -- now, the pin (on the first gear segment) is in the position to intercept the lobe (on the main lever) during the release cycle.

So the position of the bell crank determines the position of the retard lever -- and the retard lever decides how far the

VARIATIONS ON THE ESCAPEMENT RETARD

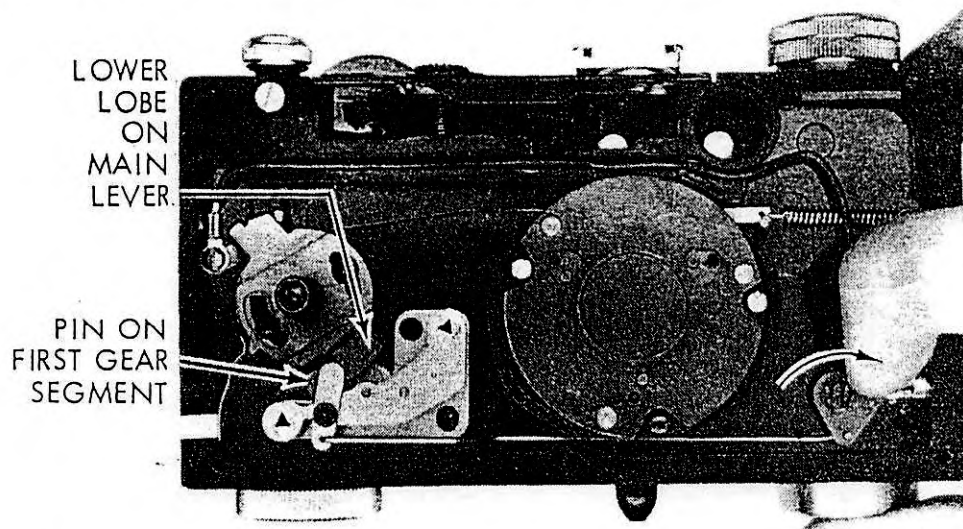


FIGURE 12

first gear segment rotates in a clockwise direction. The farther the first gear segment moves clockwise, the longer it remains in contact with the main lever lobe during the release cycle -- and the slower the resulting shutter speed.

The bell crank pivots on an eccentric bearing which provides an adjustment point for the shutter speeds. You'll adjust the shutter speeds after replacing the front plate -- a hole through the front plate allows you to reach the eccentric bearing, as you'll see a little later.

You can see that the Argus C-3 retard system is quite unlike anything examined in previous systems. But the most unusual part of the whole design is the time at which the retard is introduced. In other shutters we've discussed, the blades open fully before the speeds escapement slows down the main lever -- the escapement then holds the blades fully open for the required length of time. Yet in the Argus C-3, the main lever strikes the first gear segment just as the blades start to open. So the retard is introduced during the blade-opening time -- the slower the shutter speed, the more slowly the blades open.

The position of the pin on the first gear segment at the slowest shutter speed is critical -- careful observation now will help you in adjusting the escapement during reassembly. That is, the speeds escapement has a sliding adjustment -- after loosening the two screws shown in figure 13, you can slide the complete escapement to adjust its position. Referring to figure 13, here's the timing you should note:

With the first gear segment in the slowest-speed position and the main lever in the cocked position, the lobe on the main lever should contact the pin on the first gear segment -- but, at the same time, complete rotation of the main lever must be possible without interference from the first gear segment.

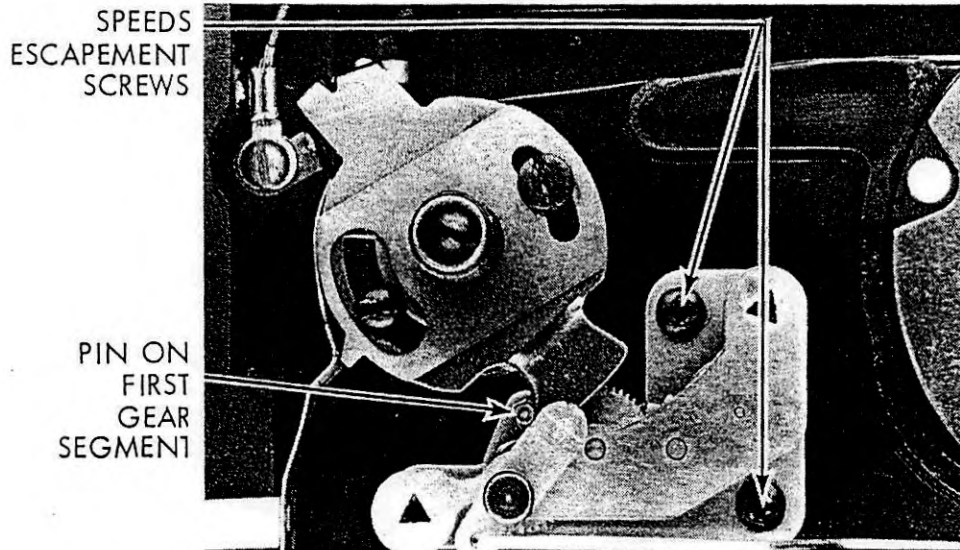


FIGURE 13

To obtain "bulb" action, rotate the release button until its "B" calibration aligns with the index dot on the camera body. Turning the release button to "B" rotates the release plunger to the position shown in figure 14. Now, when you release the shutter, the blades open to the full-open position -- but the flattened

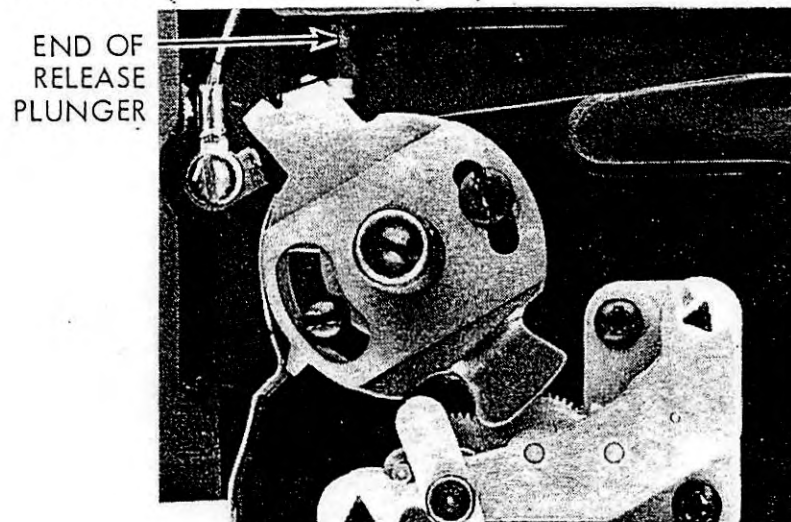


FIGURE 14 SHUTTER COCKED, SET TO "BULB"

VARIATIONS ON THE ESCAPEMENT RETARD

end of the release plunger catches the upper lug on the main lever, Fig. 15. Consequently, the main lever is arrested before the shuttlecock has moved far enough for the shutter blades to close. When you let up on the release button, the release plunger frees the main lever -- so the main lever completes its rotation and the shuttlecock moves past the lug on the blade operating ring.

RELEASE
PLUNGER
BLOCKS
MAIN
LEVER
HERE

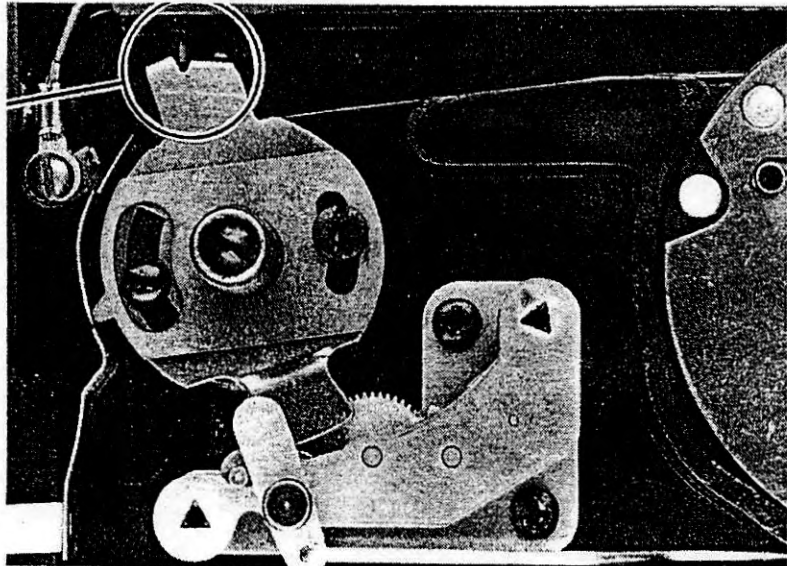


FIGURE 15 SHUTTER HELD OPEN ON "BULB"

DISASSEMBLY OF THE ARGUS C-3 SHUTTER

Remove the shutter blade assembly by taking out the three screws shown in figure 16. Now, on the back of the assembly, you can see the spring-loaded blade operating ring lug that is engaged by the shuttlecock assembly to open the blades, Fig. 17.

SHUTTER
BLADE
ASSEMBLY
RETAINING
SCREWS

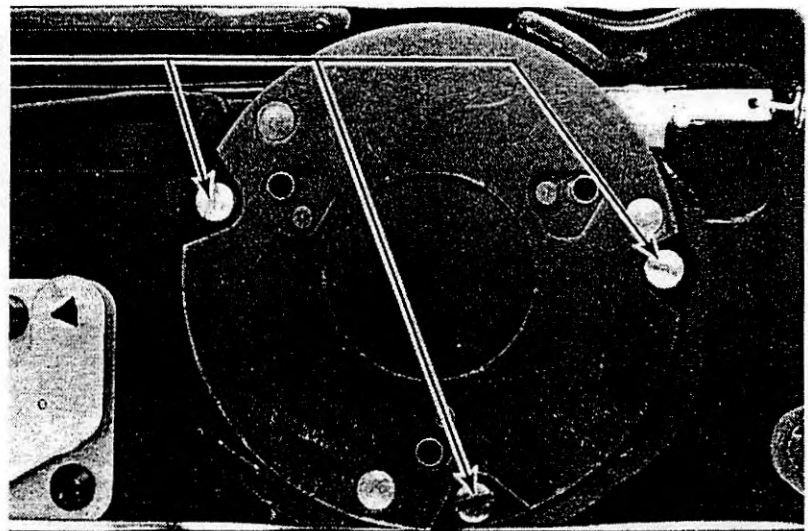


FIGURE 16

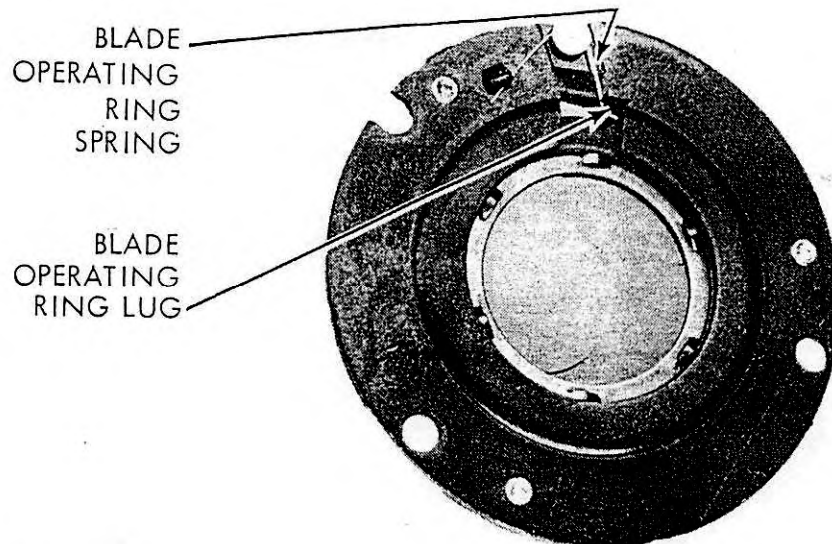


FIGURE 17

The shuttlecock is also clearly visible at this time, Fig. 18. During the cocking cycle, the pivoting action of the spring-loaded SHUTTLECOCK LATCH, Fig. 18, allows the latch to bypass the blade operating ring lug --but on the release cycle, the shuttlecock latch engages the lug and drives the blades to the open position.

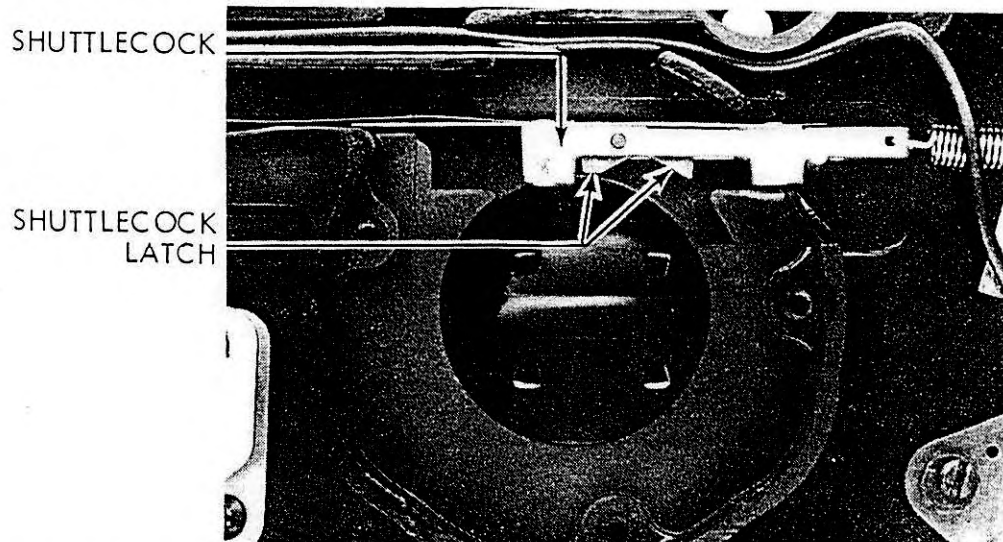


FIGURE 18

VARIATIONS ON THE ESCAPEMENT RETARD

Now, disconnect the wire link from the retard lever. Remove the two screws shown in figure 19 and lift out the entire speeds escapement.

Disconnect the two tension springs -- the bell crank spring and the mainspring -- from the post on the camera body, Fig. 19. Remove the main lever by taking out the screw through its threaded post, Fig. 19.

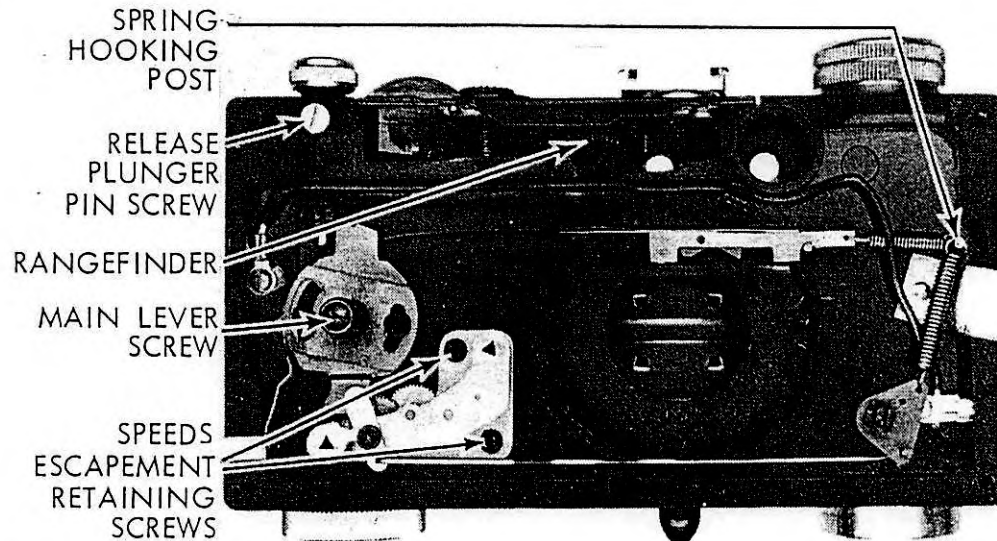


FIGURE 19

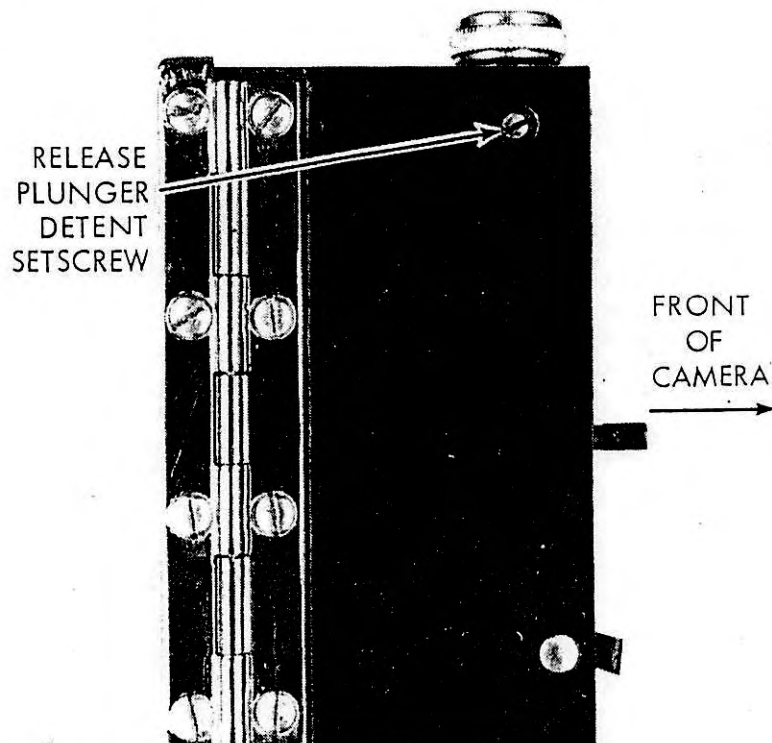


FIGURE 20

To remove the release plunger, first take out the setscrew at the end of the camera body, Fig. 20 -- but be careful: a spring and a ball detent remain inside the cavity. The ball detent acts on the rotating part of the release plunger assembly, holding it in either the "I" or the "B" position; and the setscrew you just removed determines the amount of spring tension on the detent. You can now remove the spring and the ball detent from the setscrew cavity.

Remove the brass pin screw at the front of the camera, Fig. 19, and lift out the release plunger. The release plunger is a complete unit which does not require further disassembly.

As we mentioned earlier, the bell crank pivots on an eccentric bearing. The eccentric bearing is pointed out in figure 21; the screw, also seen in figure 21, both holds the adjustment of the eccentric bearing and retains the bell crank. To take out the bell crank, remove the screw and the eccentric bearing. Now, lift out the bell crank and the wire link -- you'll have to adjust the eccentric bearing on reassembly to time the shutter speeds.

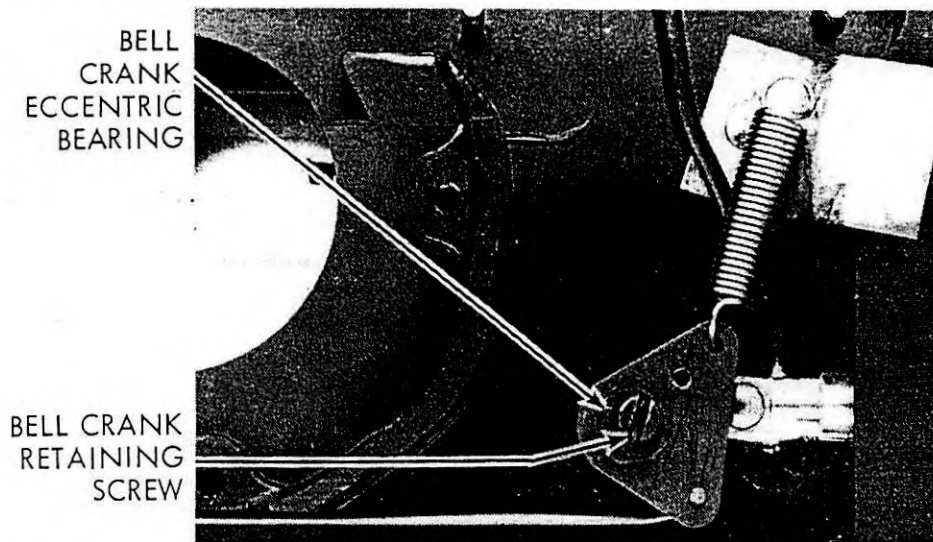


FIGURE 21

You will rarely have to disassemble the camera any further than we have just done -- at least to service the shutter. The disassembly and adjustment of the rangefinder, pointed out in figure 19, is covered in a later lesson -- avoid disturbing the rangefinder at this time.

REASSEMBLY OF THE ARGUS C-3 SHUTTER

Replace the bell crank and the wire link as one assembly. Then, seat the eccentric bearing and replace the retaining screw



VARIATIONS ON THE ESCAPEMENT RETARD

-- make sure the eccentric shoulder on the bearing passes through the hole in the bell crank. While tightening the screw, check to assure that the bell crank pivots freely.

Insert the release plunger assembly through its hole at the top of the camera -- the elongated slot in the release plunger (which receives the brass pin screw) must be to the front of the camera. Then, replace the brass pin screw from the front of the camera.

The release plunger should now rotate freely between the "B" and "I" positions -- remember, the ball detent and spring hold the release plunger at either setting. Place first the ball detent, and then the spring, into the cavity at the end of the camera body. Then, tighten the setscrew until you feel the two solid "click-stop" positions of the release plunger.

Before replacing the main lever and shuttlecock assembly, examine the joint between the shuttlecock ribbon and the main lever, Fig. 22. You can see that the shuttlecock ribbon is soldered within a slot in the body of the main lever. Replacing a broken shuttlecock ribbon is one of your more common repairs in the Argus C-3.

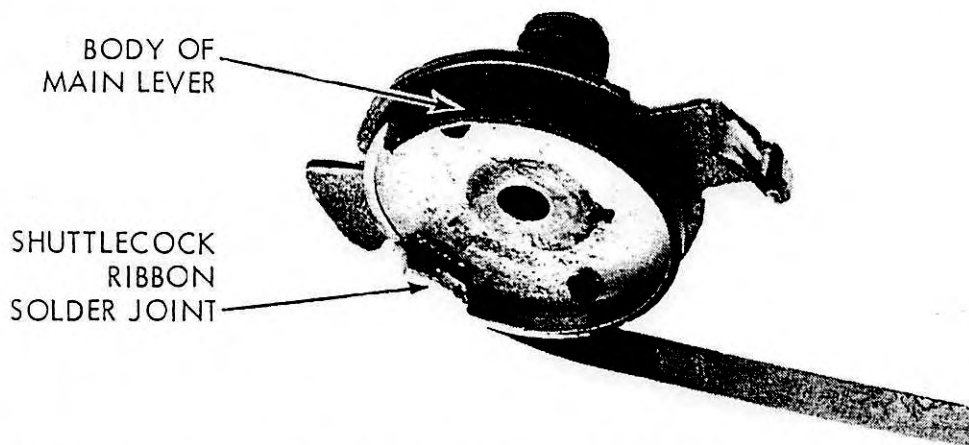


FIGURE 22 UNDERSIDE OF MAIN LEVER

Handle the shuttlecock ribbon very carefully as you lower the main lever into position. Accidentally placing a kink in the shuttlecock ribbon could cause the metal to fail during the shutter operation. When the assembly is fully seated, replace the main lever retaining screw and hook the end of the mainspring over its post. Test the movement of the main lever by cocking and releasing the shutter several times.

Hook the end of the bell crank spring over the post on the camera body. Now, cock the shutter and seat the speeds escape-



ment in position. Make sure that both the main lever lobe and the retard lever (with its hole end down) are to the right of the stud on the first gear segment. Then, replace the two screws holding the speeds escapement.

Before tightening the two screws, adjust the speeds escapement to the position shown in figure 13. Then, tighten the two screws to hold the adjustment. Check your adjustment by cocking and releasing the shutter several times -- the stud on the first gear segment must not slip past the main lever lobe as you cock the shutter. When you're sure the retard position is correct, hook the end of the wire link to the hole in the retard lever.

As you seat the shutter blade assembly, make sure the stud on the blade operating ring is toward the top of the camera. Then, replace the three retaining screws -- the long screw goes to the bottom of the shutter blade assembly.

ADJUSTMENTS ON THE ARGUS C-3 MAIN LEVER

We mentioned earlier that the main lever is a multiple cam. Actually, the main lever is in three separate parts -- and the relationships of these parts to one another may require adjustment on reassembly. The two screws provided at the front of the main lever, Fig. 23, hold the sections of the main lever together as one piece -- but by loosening the screws, you can reposition each part of the main lever.

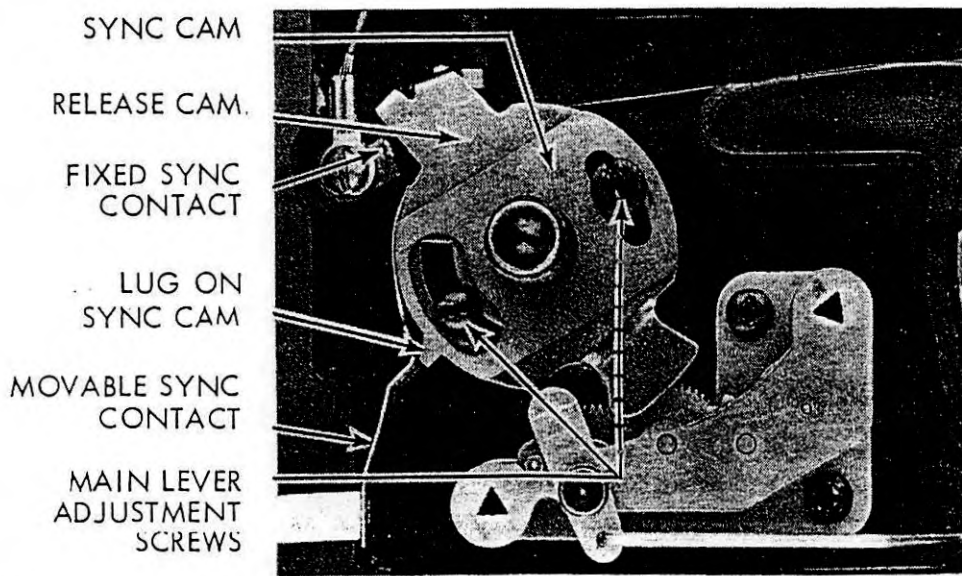


FIGURE 23

VARIATIONS ON THE ESCAPEMENT RETARD

The three sections of the main lever are: the main BODY which secures the shuttlecock ribbon, Fig. 22; the RELEASE CAM which engages the release plunger and the pin on the first gear segment, Fig. 23; and the SYNC CAM which closes the internal sync contacts, Fig. 23. To adjust the release cam, you must loosen both of the screws shown in figure 23. But to adjust the sync cam, just loosen the one screw indicated by the dashed arrow.

First, let's check the adjustment of the release cam. Cock the shutter and set the release plunger to "bulb." Now, release the shutter and hold the release button depressed -- the shutter blades should remain fully open. But if the release cam is out of adjustment, the shutter blades either will fail to remain open on "bulb," or will open only part way.

Say, for example, that the shutter blades remain partially open on "bulb" -- this means that the main lever is blocked by the release plunger before rotating far enough to allow full blade opening.

The correction is to continue holding the shutter open on "bulb" and loosen the two screws, Fig. 23 -- loosening the screws allows the body of the main lever to turn separately from the release cam. Now, while the release cam remains held by the release plunger, allow the body of the main lever to rotate slowly (clockwise) until the blades are fully open -- then, retighten the screws. As the body of the main lever turns clockwise, the shuttlecock ribbon moves farther to the right -- and that allows the shuttlecock to open the blades the additional amount.

The other symptom of maladjustment is that the blades open and close before the release cam is arrested by the release plunger. Consequently, the shutter delivers an instantaneous speed when set to "bulb." The correction is to loosen the two screws and turn the body of the main lever counterclockwise in relation to the release cam.

Once you've adjusted the release cam at "bulb," you can check the timing of the sync cam. Since only one of the two screws in figure 23 holds the sync cam, adjusting the flash sync doesn't disturb the release cam adjustment.

Compared to some of the other shutters you've studied, the operation of the Argus C-3 flash sync is quite simple. Locate the lug on the sync cam in figure 23 -- as the main lever revolves in the release (clockwise) direction, this lug strikes the movable sync contact. The sync cam lug then pushes the movable sync contact against the fixed sync contact to fire the flash.



By loosening the sync cam screw, Fig. 23, you can move the sync cam to change the time at which the flash is fired. Here, you have a wide adjustment range -- by just turning the sync cam, you can change the sync delay all the way from "F" sync to "X" sync.

Most Argus C-3's are set for "F" sync -- that is, the contacts close to fire the flash just before the shutter blades start to open. The actual delay is then the time it takes for the blades to reach the full-open position. But if your customer wants you to convert his Argus C-3 to "X" sync for electronic flash, all you have to do is turn the sync cam until the contacts close when the blades reach the full-open position.

REPLACING THE FRONT PLATE AND ADJUSTING

THE SHUTTER SPEEDS IN THE ARGUS C-3

When either the speeds escapement or the bell crank has been removed, you must readjust the shutter speeds. Strip back the leatherette from the lower right-hand corner of the front plate to reveal the inspection disc, Fig. 24. By removing the inspection disc, you can reach the eccentric bearing on the bell crank.

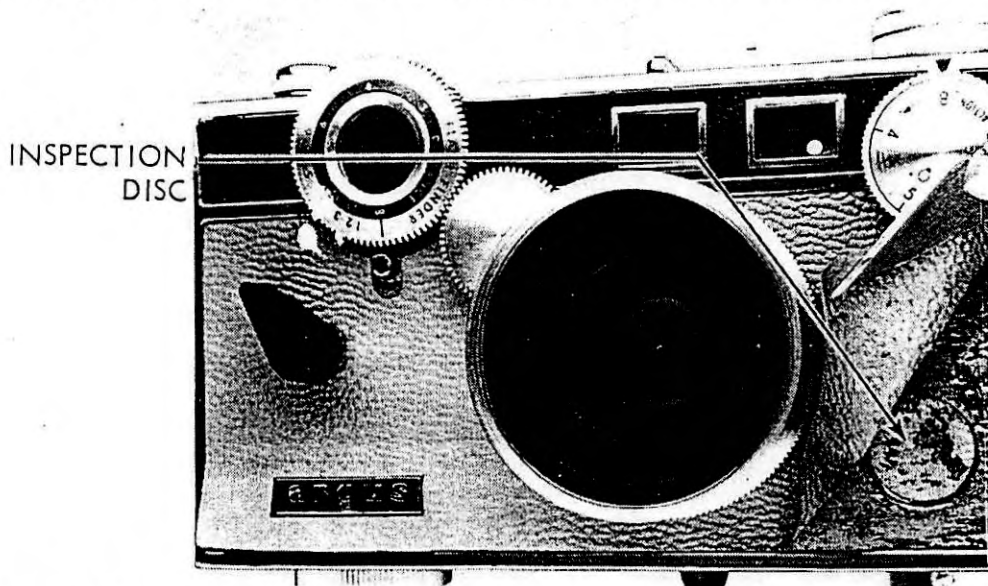


FIGURE 24

Set the speed cam at the highest speed (for ease of alignment) and fit the cam follower in position, Fig. 7. Now, seat the front plate on the camera body -- you can work through the inspection hole in the front plate to fit the cam follower pin into the bell crank hole. Then, replace the screws holding the front plate --



VARIATIONS ON THE ESCAPEMENT RETARD

the long screw, if there is one, goes beside the rangefinder window.

Depress the release button to make sure the shutter is in the released position. Now, replace the setting lever -- remember, the setscrew-type has a right-hand thread, while the jam-nut type has a left-hand thread. If you're installing the setscrew-type, turn the setting lever clockwise as far as it will go. Then, back off the setting lever until it points to 10:30 o'clock, Fig. 25, and tighten the setscrew.

But if you're installing the jam-nut type, first screw on the jam nut in a counterclockwise direction as far as it will go. Then, turn the setting lever all the way down to the jam nut. Back off the setting lever to 10:30 o'clock, Fig. 25. While holding the setting lever in position, use a thin-headed wrench to turn the jam nut clockwise -- until the jam nut is tight against the underside of the setting lever.

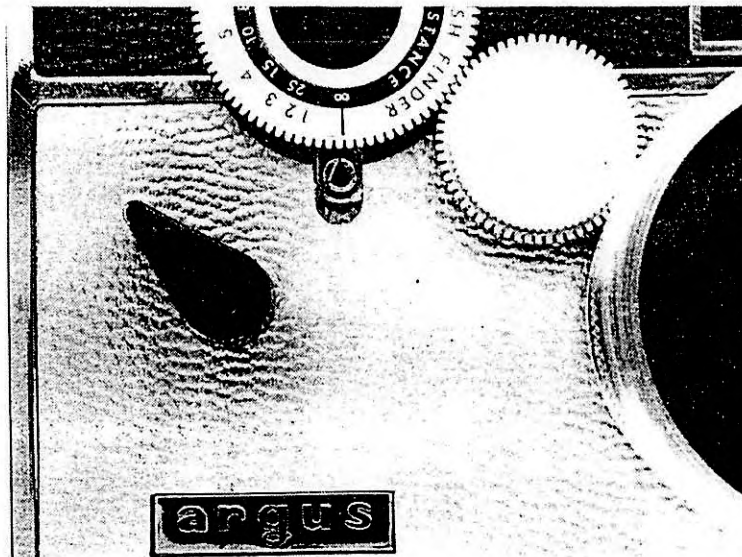


FIGURE 25 TIMING OF SETTING LEVER

You can now make a fairly accurate adjustment of the speeds by just listening to the retard action. At the fastest shutter speed, there should be no retard action -- and there should be just a trace of retard at the next-to-the-highest speed.

Cock the shutter and set the speed knob to the fastest speed ($1/300$ second). Now, while restraining the setting lever to slow down the main lever's rotation, push the release button. As you allow the main lever to run slowly through its cycle, listen for the sound of the retard.

If you can detect retard engagement at $1/300$ second, you must adjust the eccentric bearing. Working through the inspection



hole in the front plate, loosen the bell crank screw and turn the eccentric bearing. Set the eccentric bearing so you can hear no retard action at the fastest speed, and just a trace of retard at the next-to-the-highest speed.

But if you can't get enough adjustment out of the eccentric bearing, you may have to bend the wire link to change its effective length. Shortening the wire link provides less retard, and lengthening the wire link provides more retard. Bending the wire link is a rough adjustment for the shutter speeds -- you can then make fine adjustments by turning the bell crank lever eccentric.

When you're sure everything is working properly, recement the leatherette. Pliobond, a rubber-base cement, works well for this purpose. Apply a thin film of Pliobond to both surfaces -- the camera body and the back of the leatherette -- and allow the cement to dry until it is tacky. Be sure your cement is applied evenly -- "lumps" of excessive cement can damage certain types of leatherette. Then, press the leatherette to the camera body.

