

- A. EXPOSURE SETTING RING: Adjust the exposure setting ring for smooth operation by tightening the threaded ring 547 finger tight. After this adjustment is completed, use the retaining screws 538 to lock the threaded ring at the nearest possible point. See Figure 3-1.
- B. CAM RING: The cam ring 552 must be a play-free fit on the mounting tube 204. If necessary, take up play by widening the slots in the cam ring. See Figure 302.
- C. COCKING PINION, COCKING RING AND DRIVE: The cocking pinion 517, cocking ring 528, and drive 514 determine the length of travel during cocking between the locking of the M-detent and the jumping-back of the blade opening pin in the blade ring 202. See Figure 3-2.

Due to possible differences in the cocking and release locks incorporated in the camera, the length of travel may be adjusted in the following ways:

1. Engagement of M-detent occurring simultaneously with or shortly after the engagement of the opening pin.
2. Engagement of M-detent occurring simultaneously with or at any desired time before the engagement of the opening pin.
3. Engagement of M-detent occurring simultaneously with, or shortly before the engagement of the opening pin.

The required adjustment is indicated in the applicable Spare Parts List by the letter A, B, or C used as a prefix to the Stock Number of the cocking pinion.

If 514, 517, or 528 has to be replaced, the length of travel must be checked and readjusted.

In the case of adjustments A and C, the width of the lug on the cocking pinion should be reduced, parallel to the surface of the drive, at the point indicated by an arrow in Figure 3-2. Where the width of the lug is insufficient, a new cocking pinion should be fitted and adjusted as necessary. Adjustment B requires no additional operations.

Insert the cocking pinion so its first tooth engages in the first tooth gap of the cocking ring.

The three different adjustments just discussed are based on the use of the M-detents and cocking pinions listed in the Spare Parts Lists. In the case of manually cocked shutters, the cocking lock is mounted on the M-detent. Where the closing element is coupled to the film winding mechanism, no cocking lock is used. The M-detent required in each particular case is identified by the number in the Spare Parts List.

- D. BRIDGE WITH LOCKING LEVER: With the jumping-back of the opening pin in the blade ring 202, the locking lever should prevent, simultaneously, any return movement of the drive 514. Where parts 514 and/or 621 have to be replaced, this function has to be adjusted by rotating the eccentric locking lever pivot 663. See Figures 3-4 and 5-3 #7.
- E. ESCAPEMENT 300: The depth of engagement of the escapement lever is factory adjusted so with the lever plate 319 resting against adjusting lug of plate 301, it amounts to 1/2 to 1/3 of the height of the tooth. See Figure 5-3, #1 and #2.

Push the lever plate toward the periphery of the case to permit insertion of the escapement.

- F. SHUTTER SPEED ADJUSTMENT: These adjustments must be performed in the order given:
1. 1-Second (See Figure 5-3, #3). Back off the two securing screws and pivot the escapement about screw 304 on the lever side (toward the mounting tube for increased exposure time, or toward the periphery of the case for shorter exposure time). Firmly tighten the two securing screws upon completion of adjustment.
  2. 1/15 Second (See Figure 5-3, #4). With cam ring 552 in position, bend the detent pin as required (toward tubular mount for shorter exposure, and toward the periphery of the case for longer exposure).



3. 1/500 Second (See Figure 5-3, #5). The cam ring should render escapement lever 341 inoperative to such an extent that drive 514 can run down without any obstruction. For this purpose, the pin of the check lever should be bent as required.

After completing these three adjustments, all other shutter speeds will automatically be timed correctly.

The various shutter speeds are subject to the following tolerance limits:

|                 |   |   |   |   |       |    |    |     |  |     |       |       |
|-----------------|---|---|---|---|-------|----|----|-----|--|-----|-------|-------|
| Shutter Speeds  | 1 | 2 | 4 | 8 | 15    | 30 | 60 | 125 |  | 250 | 500   | (1/s) |
| Tolerance Limit |   |   |   |   | ± 15% |    |    |     |  |     | ± 20% |       |

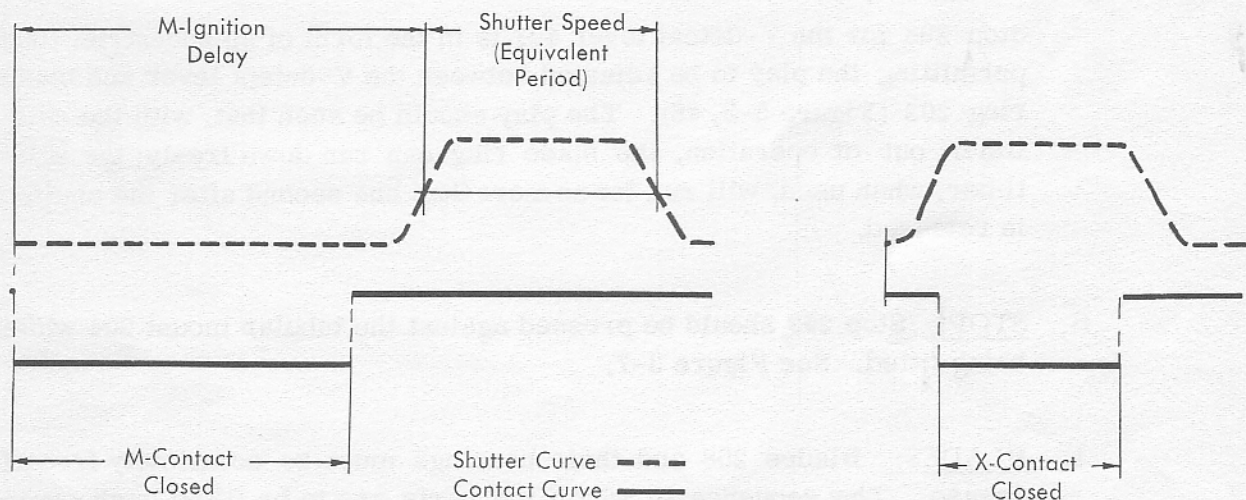


Figure 5-1. Flash Synchronization Diagram

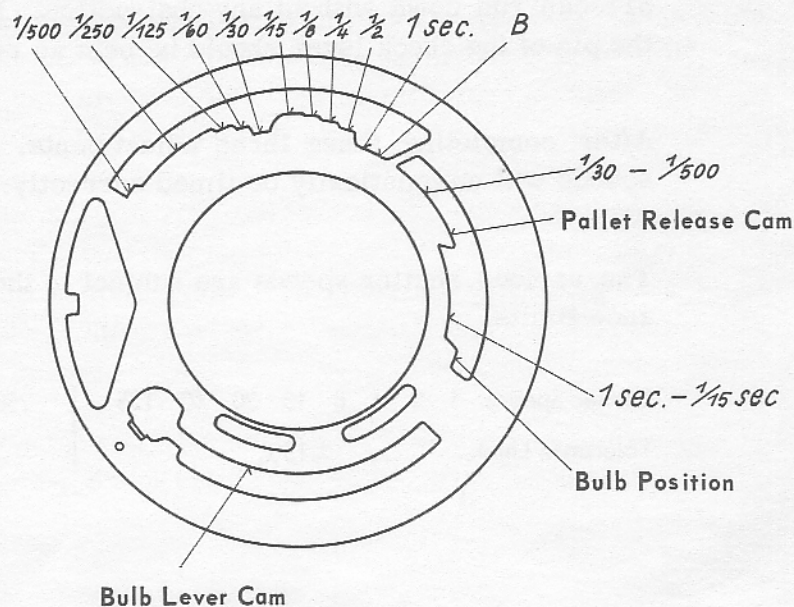


Figure 5-2. Cam Ring

- G. SELF-TIMER 400: Insert the mechanism in a half-wound condition and allow mechanism to run down after insertion. The running-down time is 8 to 10 seconds, and need not be adjusted. See Figures 3-6 and 5-3.

Stop 298 for the V-detent lever 421 is in the form of an eccentric, thus permitting the play to be adjusted between the V-detent lever and blade ring 202 (Figure 5-3, #6). The play should be such that, with the self-timer out of operation, the blade ring can run down freely; the self-timer, when used, will run for no more than one second after the shutter is released.

- H. STOP: Stop 299 should be pressed against the tubular mount 204 while being fitted. See Figure 3-7.

- I. BLADES: Blades 208 and their bearings must be completely free of grease. The sequence in which the parts are to be fitted is shown in Figure 3-7, beginning with the bearing sleeve of the drive 514 (Figure 3-2). In size 0 shutters (1210-000), the points of the first blade 268 and the last blade 267 are bent slightly upwards to improve their sliding action. "Lastina" varnish 22773, black, should be applied to fastening screws 230 of the blade mounting plate to lock the screws in position.



- J. M-CAM CHECK LEVER, M-ANCHOR PLATE, M-DETENT LOCK, AND V-DETENT LEVER: M-cam check lever 696, M-anchor plate 627, M-detent lock 664 and V-detent lever 421 are riveted in position on base plate 201. When replacing any of these parts the respective rivet(s) must be removed by drilling. Exercise extreme care when riveting to prevent the base plate from being distorted. See Figure 3-7.

A new main spring, closing spring, and for the 1210 shutter, a new plastic M-detent lever (Delrin) must be installed. To minimize adjustments and guarantee correct functioning after a shutter repair, use extreme care when removing or re-installing the springs.

- K. DIAPHRAGM SEGMENTS: Keep diaphragm segments 105 and their bearings completely free of grease. See Figure 3-8.

- L. SYNCHRONIZATION: (See Figures 3-4 and 5-3)

The minimum contact gap with the shutter cocked should be 0.5 mm (0.020"). In the case of Synchro-Compur, measure the contact gap in the M position. See Figure 5-3, #7.

Minimum contact pressure in X positions: 60 gms (2.1 ozs) (#8).

X-contact closes as soon as the blade points lie between a circle 15.5 mm (0.610") diameter (size 00) or 22.0 mm (0.778") diameter (size 0) on the one hand and the full diameter of the shutter aperture.

Compensate for deviations from the above values by bending contact spring 615, fixed to the X-contact lever, as required.

The M ignition advance period, as measured between the closing of the contact and the point at which the shutter aperture is one-half open, should be 16-1/2 milliseconds  $\pm$  10%.

To adjust the M ignition delay, back off screw 618 and rotate eccentric 298 as required (#7). This changes the tension of detent spring 641.

The delay will be shortened by an increase in spring tension and lengthened by a reduction in spring tension. Be sure to firmly retighten screw 618.

The pressure of the M-contact, which is determined by the shutter design, should be at least 10 gms (0.35 oz).



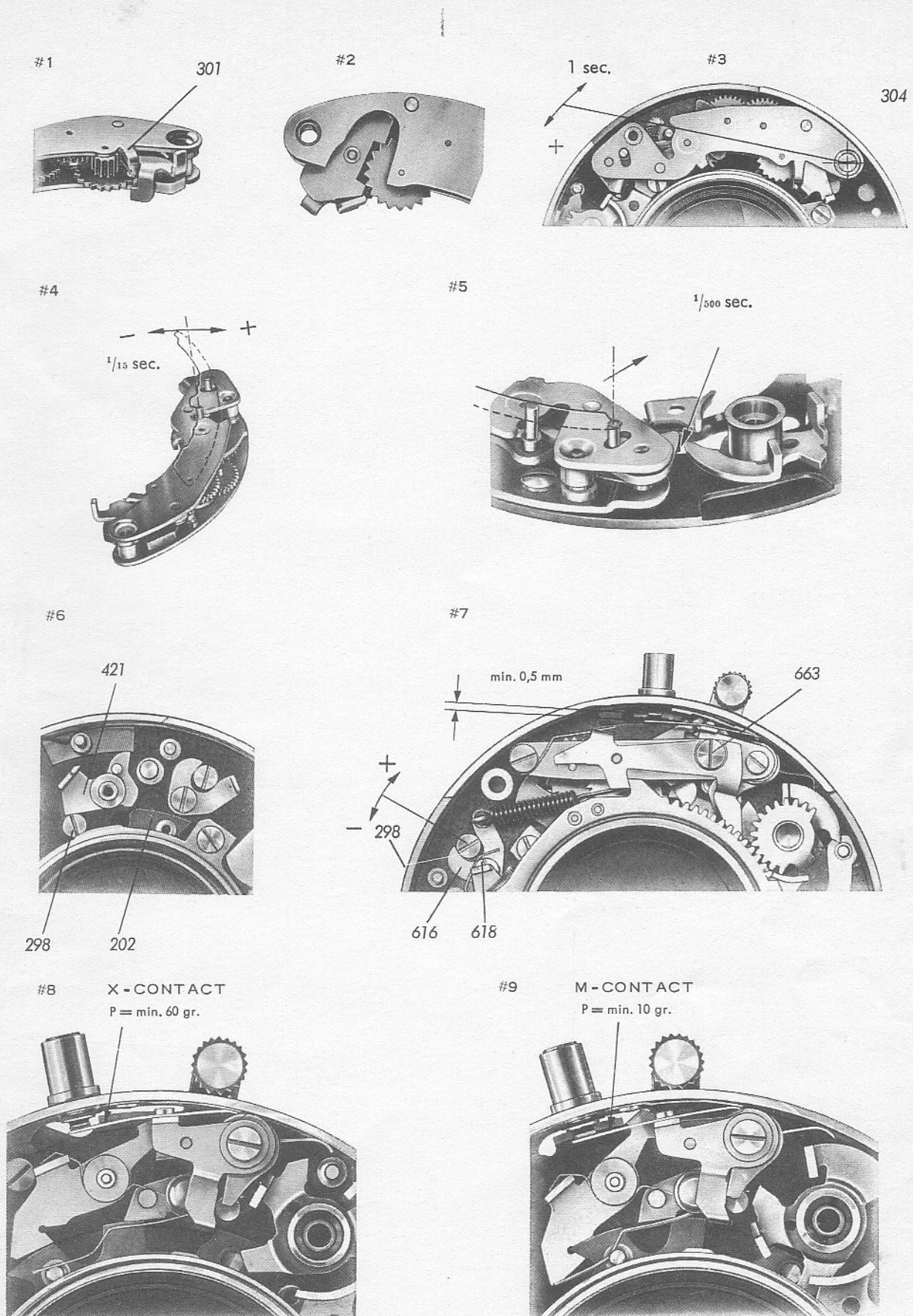


Figure 5-3

## SECTION 6 - SPECIAL INSTRUCTIONS FOR STANDARD 1110-010

### 6-1. GENERAL

The procedures for disassembling, maintenance, adjustment and reassembly of the Standard 1110-010 shutter are the same as for the 1110-000. Refer to Sections 3 and 5 for this detailed information. For descriptions on cleaning and lubricating the 1110-010, refer to information contained in Section 4, including Figures 4-1 and 4-2. A complete list of replacement components is provided in the Spare Parts List under Section 8.

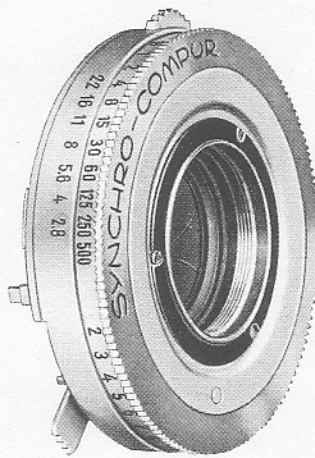


Figure 6-1. Standard 1110-010 Shutter

### 6-2. ASSEMBLY AND ADJUSTMENTS

The following information is provided to aid the technician in reassembling and making proper adjustments of the special components of the 1110-010 shutter:

- A. DIAPHRAGM SETTING RING AND DIAPHRAGM RING: The relative position of diaphragm setting ring 590 and diaphragm ring 108 is determined by a groove cooperating with a lug. See Figure 6-2.
- B. EXPOSURE CONTROL RING, SHUTTER SPEED COUPLING RING AND CAM RING: The relative position of exposure control ring 529, shutter



speed coupling ring 163 and cam ring 552 is determined by grooves cooperating with lugs. See Figure 6-2.

NOTE

All other adjustments are the same as those listed under paragraph 5-3 of Section 5 in this manual.

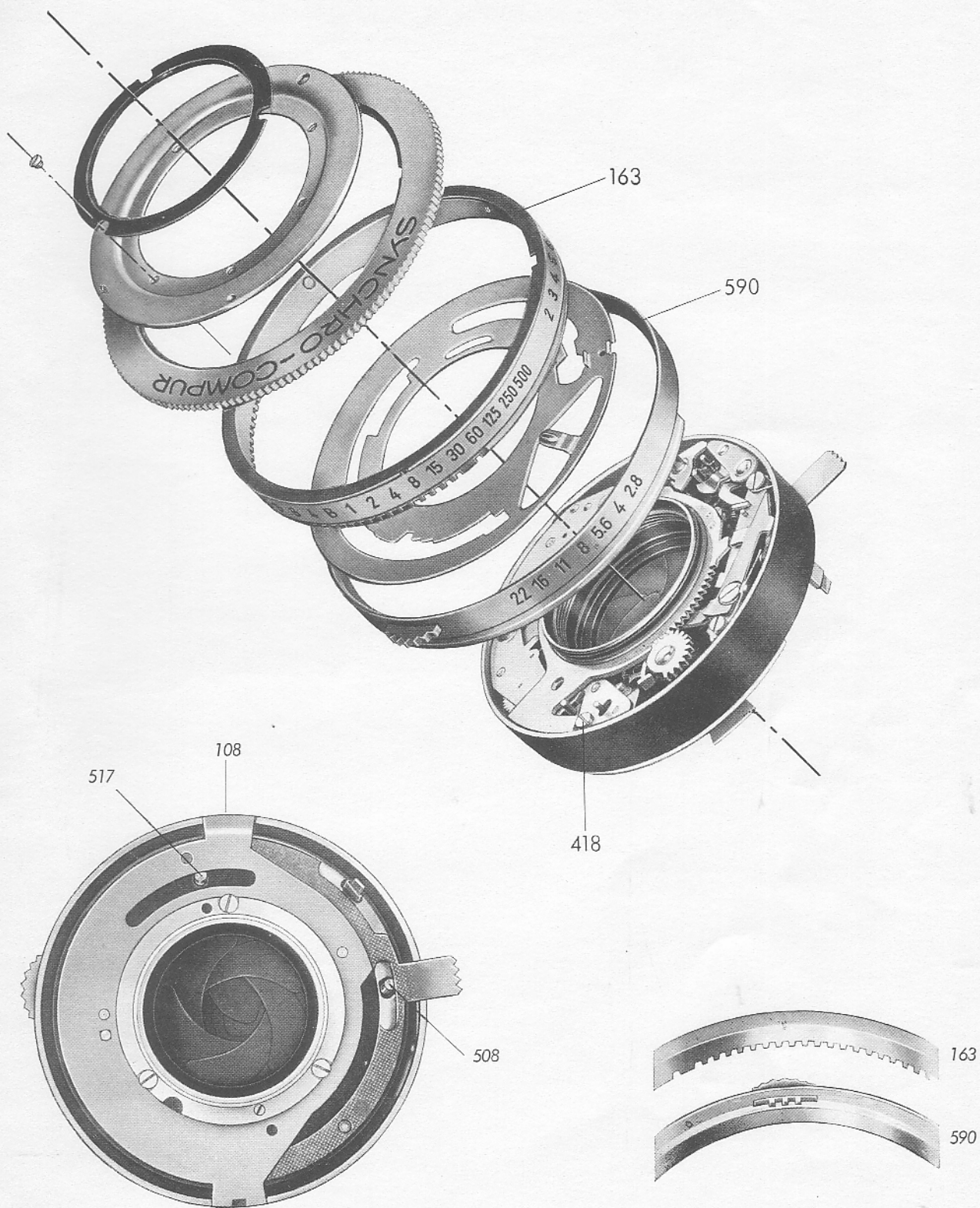


Figure 6-2



## SECTION 7 - SPECIAL INSTRUCTIONS FOR STANDARD 1110-019

### 7-1. GENERAL

The proper procedures for disassembling, maintenance, adjustment and reassembly of the Standard 1110-019 shutter with light-value follow-up system are identical to those for the 1110-000 and 1110-010 shutters. Technicians should refer to Sections 3 and 5 of this manual for this detailed information. Descriptions of cleaning and lubricating methods for the 1110-019 may be found in Section 4. A complete list of replacement components for the 1110-019 is provided in the Spare Parts List under Section 8.

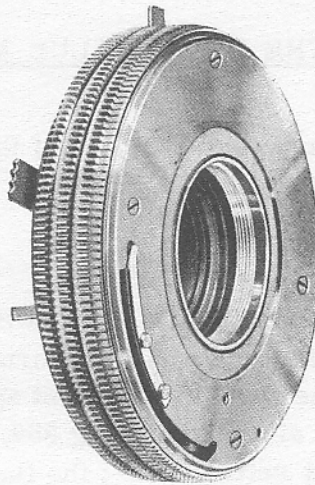


Figure 7-1. Standard 1110-019 Shutter

### 7-2. ASSEMBLY AND ADJUSTMENTS

The following information is provided for making reassembly and proper adjustments of components of the 1110-019 shutter. Adjustments needed for any component not listed in the paragraphs below may be found in the 1110-000 adjustment and assembly parts of Section 5.

- A. COCKING PINION, COCKING RING AND DRIVE: Procedures for these adjustments are the same as for the 1110-000, point C, adjustment 2.

B. EXPOSURE CONTROL RING: Smooth action and proper functioning of stops are insured by the design of exposure control ring 539. After replacing the cover plate, it may be necessary to adjust the ball stop spring so that, with smooth travel of the exposure control ring, slotted cam ring 522 (shown in Figure 7-2) engages efficiently.

C. COVER PLATE, EXPOSURE CONTROL RING AND FLANGED INTER-MEDIATE RING: When replacing cover plate 540, exposure control ring 539 and flanged intermediate ring 815, the vertical play of the exposure control ring must be checked. It should be between 0.03 mm and 0.08 mm. If there is too little play, the Planar guide surface for the exposure control ring on the cover plate must be machined down. If there is too much play, the cover plate also must be replaced and, if necessary, the above adjustment performed. See Figure 7-2.

D. ASSEMBLY OF THE LIGHT-VALUE MECHANISM: (See Figure 7-2)

1. Repair from the front end of the shutter. (Cover plate 540 and exposure control ring 539 are removed, but not retaining plate 174).

Diaphragm setting ring 590 with diaphragm ring 108 and flanged intermediate ring 815 are turned in a counter-clockwise direction to the stop (i.e., largest aperture). Exposure control ring 539 with slotted cam ring 552, fastened by groove and lug, are placed at setting "B"; the flanged intermediate ring must not be shifted from its position during this operation.

Cover plate 540, with ball stop inserted (heavily greased with lubricant A), is then mounted and firmly fastened with screws 004.

2. When effecting repair from the rear of the shutter, retaining plate 174, diaphragm setting ring 590, and flanged intermediate ring 815 are removed, but not the cover plate.

Exposure control ring 539, with slotted cam ring 552, is inserted at setting "B".

Flanged intermediate ring 815 is mounted so that one edge of



the recess is aligned with one edge of the housing groove, as in Figure 7-2, lower illustration, arrows.

When positioning setting ring 148, insure that the shutter speed lever spring 673 contacts the setting ring pin on the correct side.

Set the diaphragm to the smallest aperture with diaphragm ring 108 (up against stop) and mount the diaphragm setting ring. Fastened by groove and lug, retaining plate 174 should be screwed on with the MX locking lever swung out.

Check: At settings "B" and "500", it should be possible to set both the largest and the smallest aperture.