TM 11-2364

WAR DEPARTMENT TECHNICAL MANUAL

CAMERA PH-501/PF

RESTRICTED. *DISSEMINATION OF RESTRICTED MATTER.* The information contained in restricted documents and the essential characteristics of restricted materiel may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. See also par. 28, AR 380-5, 15 Mar 1944.)

WAR DEPARTMENT 9 DECEMBER 1944

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WAR DEPARTMENT,
WASHINGTON 25, D. C., 9 DECEMBER 1944.

TM 11-2364, Camera PH-501/PF, is published for the information and guidance of all concerned.

[A. G. 300.7 (19 Feb 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

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(For explanation of symbols see FM 21-6.)

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

DESTRUCTION NOTICE

WHY — To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN — When ordered by your commander.

HOW — 1. Smash — Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.
2. Cut — Use axes, handaxes, machetes.
3. Burn — Use gasoline, kerosene, oil, flame throwers, incendiary grenades.
4. Explosives — Use firearms, grenades, TNT.
5. Disposal — Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT.

WHAT — 1. Smash — Lenses, body, front cover.
2. Cut — Shutter curtain, carrying strap, case.
3. Burn — Film, technical manual.
4. Bend — Film pack.
5. Bury or scatter — Remains of above.

DESTROY EVERYTHING.

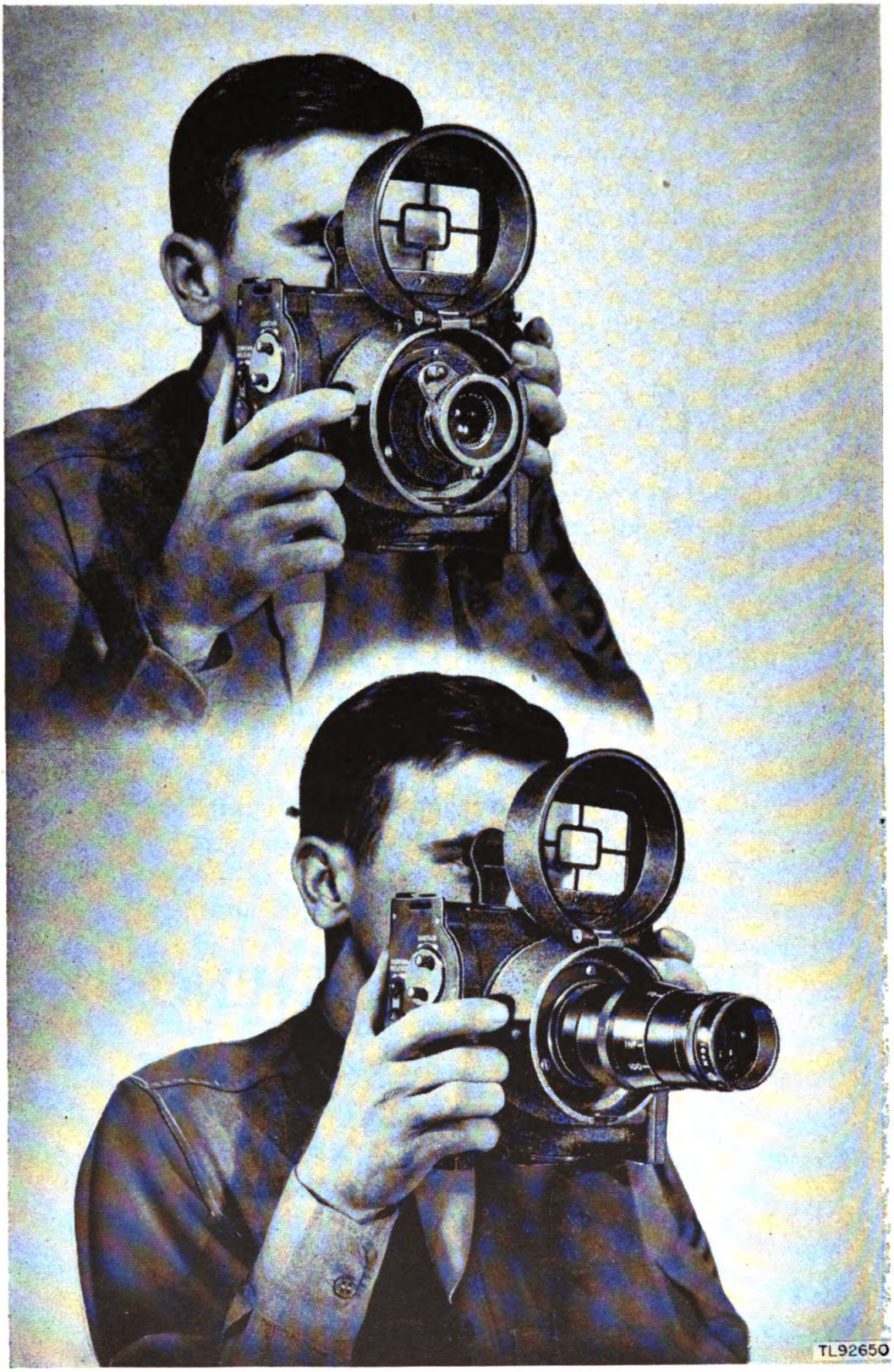


Figure 1. Camera PH-501/PF, in use.

PART ONE
INTRODUCTION

SECTION I
DESCRIPTION OF CAMERA PH-501/PF

1. GENERAL.

Camera PH-501/PF (fig. 1) is a camera of rugged construction designed for taking 2¼" x 3¼" still pictures under combat conditions. The body of the camera is a magnesium casting which houses a vulcanized rubber cloth focal-plane shutter. The 101-mm lens is protected, when the camera is not in use, by a hood which is lifted to form a direct viewfinder.

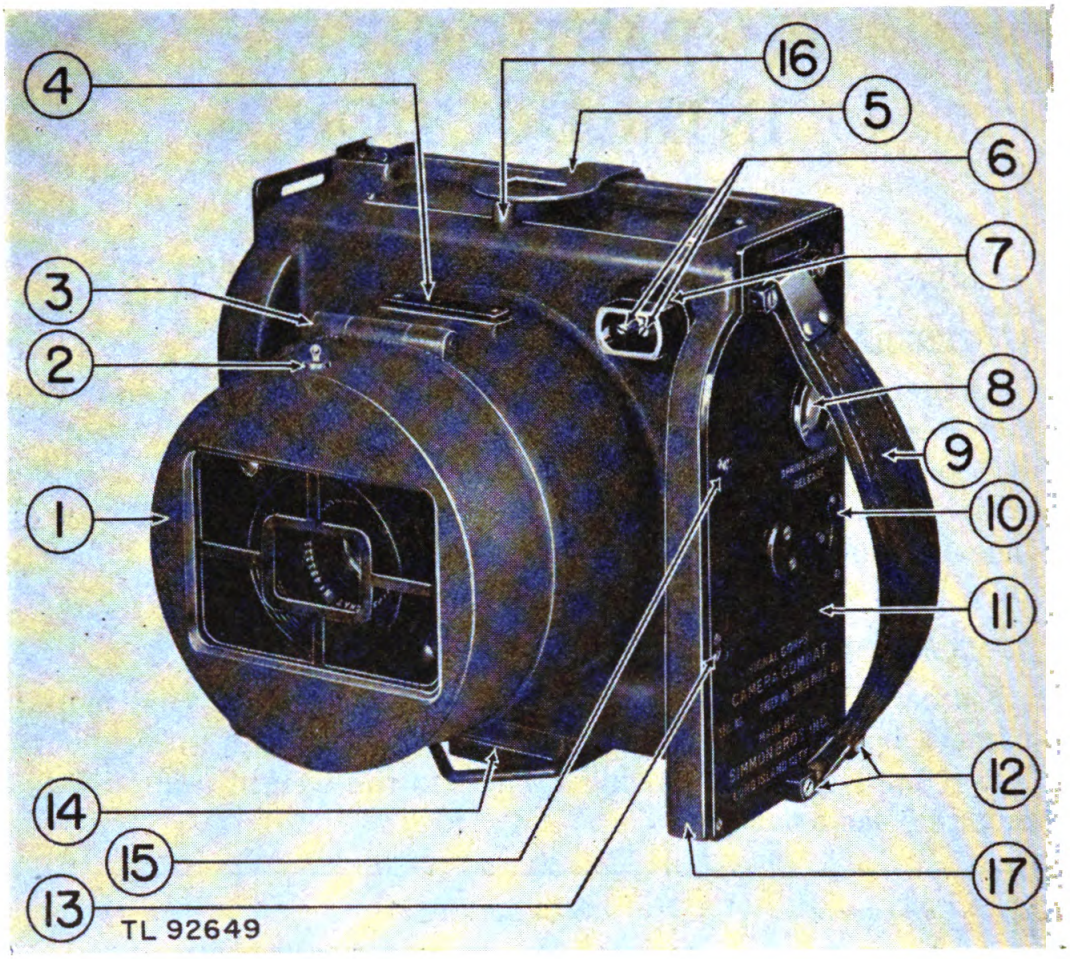
2. COMPONENT PARTS.

Camera PH-501/PF consists of three component parts: a camera body (fig. 2), a 101-mm lens (fig. 3), and a telephoto lens (fig. 3). The following table lists the weight and dimensions of each part.

Component	*Dimensions (in.)*				*Weight (lb)*
	Length	*Height*	*Width*	*Diam*	
Camera	7	7	6.5		4.75
Telephoto lens	2			3	0.50
101-mm lens	5			2.5	0.50

3. CAMERA.

This camera uses 2¼" x 3¼" film pack only. It is equipped with a focal plane shutter of the curtain type which provides six shutter speeds: 1/25, 1/50, 1/100, 1/200, 1/400, and 1/800 second. In addition, the shutter can be set for time and flash exposures. For flash exposures, built-in electrical flash taps [fig. 2 (6)] are located on the face of the camera to accommodate the Eastman Junior synchronizer, which may be used



1. Front cover
2. Front cover locking stud
3. Front cover hinge
4. Stud locking spring plate
5. Rear peepsight
6. Flash taps
7. Flash tap hood
8. Speed-indicator window
9. Strap handle
10. Spring-tension release lever
11. Left-side plate
12. Handle retaining screws
13. Tripod socket
14. Bottom tripod socket plate
15. Flash synchronizer stud
16. Rear peepsight support
17. Left ridge

Figure 2. Camera PH-501/PF, front view.

with this equipment. With three exceptions, all the operating parts are located on the two side plates of the camera (figs. 4 and 5). For the purpose of this manual, these side plates are identified by use of the terms "right-side plate" and "left-side plate."

NOTE: The identification of the working parts of the camera on the left or right refers to the operator's left or right when he is back of the camera with the lens facing the object to be photographed.

4. LENS, 101-mm (fig. 3).

This lens is used for all ordinary photographic work done with this camera. It is an f/4.5, anastigmat lens equipped with click stops for both the diaphragm and the distance settings. Its field of coverage is indicated accurately when the large rectangle in the front cover is framed in the rear peep-sight.

5. TELEPHOTO LENS (fig. 3).

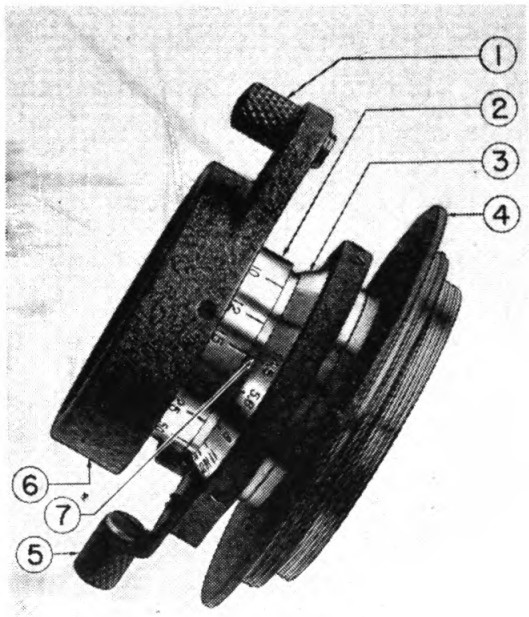
This 9-inch, f/6.3 lens is used only when it is necessary to secure a close-up view of an object over 50 feet from the camera. Its field of coverage is indicated accurately when the small rectangle in the front cover is framed in the rear peep-sight.

SECTION II

INSTALLATION AND ASSEMBLY

6. UNPACKING.

Camera PH-501/PF is shipped from the manufacturer, completely assembled and ready for operation, in a metal container which is inside a wooden box. Remove from the box and cut the tape sealing the cover of the container by running a knife blade around the edge of the cover. Lift the camera and the telephoto lens from the container.



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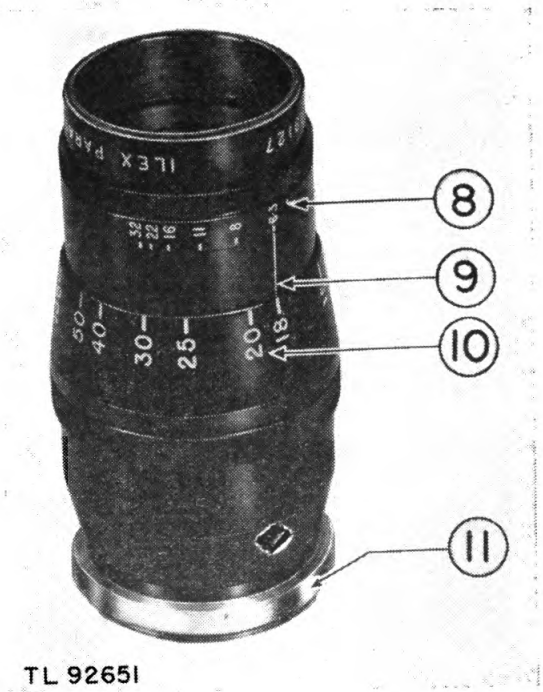


② TL 92651

① Lens, 101-mm

1. Focusing ring knob
2. Focusing ring
3. Diaphragm ring
4. Lens flange
5. Diaphragm ring knob
6. Sunshade
7. Indicator

② Telephoto lens

8. Diaphragm scale
9. Indicator
10. Focusing scale
11. Lens flange

Figure 3. Lenses.

PART TWO

OPERATING INSTRUCTIONS

NOTE: For information on destroying this equipment to prevent enemy use, see the destruction notice at the front of this manual.

SECTION III

STEP-BY-STEP OPERATING PROCEDURE

7. LOADING CAMERA.

a. With the right hand, open the film-tab protecting cover [fig. 6 (3)] by lifting it to the right as far as it will go. This will expose the film-pack holder cover locking spring [fig. 6 (4)]. This locking spring is a strip of spring steel which swings around a center pivot and holds the film-pack holder cover [fig. 6 (6)] firmly in place by exerting pressure against the inner flanges of the two locking-spring brackets [fig. 6 (5)].

b. Place the right thumb at the top and the right forefinger at the bottom of the film-pack holder locking spring and press firmly inward at both ends of the spring simultaneously. While pressing the spring, turn it in a counterclockwise direction out of the locking brackets. Open the film-pack holder cover.

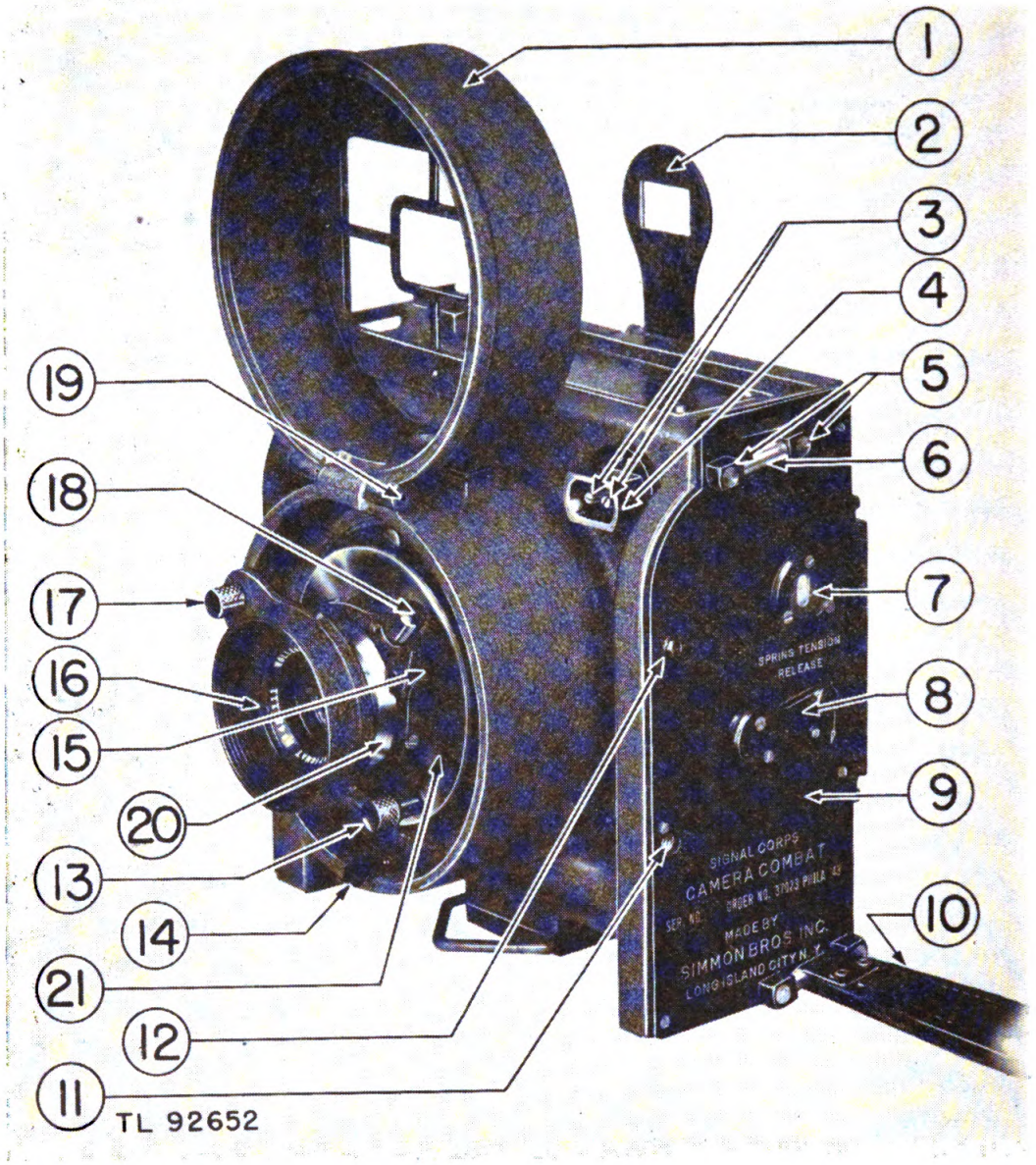
c. Place a 2¼″ x 3¼″ film pack with its bottom end against the end pressure spring [fig. 7 (13)] and set it into position with the tabs extending to the right.

NOTE: Place the film-pack into the film-pack holder with the opening in the film-pack case facing the lens. The figures on the tabs of the film-pack must face the camera operator.

d. Close the film-pack holder cover and lock it. Only the tabs of the film pack will now project beyond the holder. Before closing the protecting cover, pull the safety tab on the film pack to make the film ready for the first exposure. Close the protecting cover over the film tabs. The camera is now loaded.

8. SETTING UP VIEWFINDER.

a. Grasp the front cover [fig. 2 (1)] in the right hand and open it until the front cover locking stud [fig. 2 (2)] snaps into place in the stud locking spring plate [fig. 2 (4)] mounted at the top of the front extension of the camera body. The front cover is now in a vertical position and acts as the front portion of the viewfinder.



1. Front cover
2. Rear peepsight
3. Flash taps
4. Flash tap hood
5. Handle retaining screws
6. Tubular shaft
7. Speed-indicator window
8. Spring-tension release lever
9. Left-side plate
10. Strap handle
11. Tripod socket
12. Flash synchronizer stud
13. Lens removal knob
14. Front cover lower leaf locking spring
15. Diaphragm collar
16. Sunshade and focusing ring
17. Focusing ring knob
18. Diaphragm ring knob
19. Front cover hinge Allen screw
20. Diaphragm ring
21. Lens flange

Figure 4. Camera PH-501/PF, left-side view.

b. Open the rear peepsight [fig. 2 (5)] by swinging it upward until it is vertical, where it is held in place by the rear peepsight leaf spring [fig. 6 (12)].

CAUTION: Forcing the rear peepsight too far backward will bend it out of shape or cause it to break off entirely.

9. SETTING DIAPHRAGM STOPS.

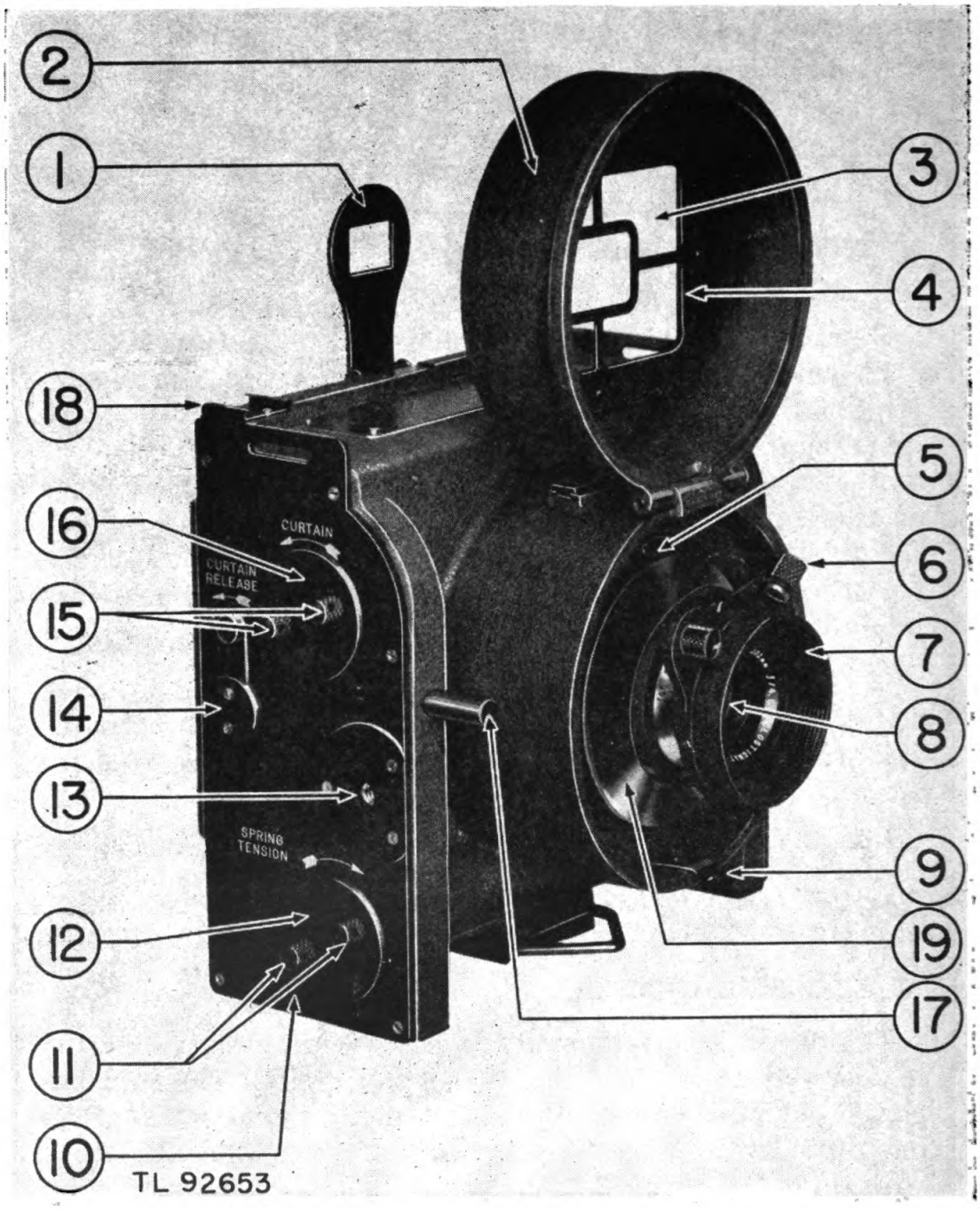
a. The lens, or diaphragm stops on the 101-mm, f/4.5 lens are graduated from f/4.5, which is the largest opening, to f/32, which is the smallest opening and admits the least amount of light to reach the film. These figures are engraved on the diaphragm ring [fig. 3 (3)] and can be seen by looking down on the lens from above. A straight line [fig. 3 (7)] engraved on the lens barrel itself serves as an indicator. By turning the diaphragm ring knob [fig. 3 (5)] the lens diaphragm can be set at any desired opening by bringing the setting desired into alignment with the indicator on the lens barrel.

b. The 101-mm lens has a diaphragm equipped with click stops. A distinct click is felt when the various stops on the diaphragm ring come into alignment with the engraved indicator on the lens barrel.

NOTE: By memorizing the diaphragm openings available, it is possible to set the diaphragm to any desired opening by counting the number of clicks when the ring is turned in either direction. This is worth the slight effort required.

10. FOCUSING CAMERA.

The distance markings on the focusing ring are calibrated in feet and are scaled from 6 feet to infinity. The focusing ring is equipped with click stops. A distinct click is felt when one of the various distance markings comes into alignment with the indicator on the lens barrel. The focusing ring knob [fig. 3 (1)] on the sunshade may be turned in either direction until the desired distance setting, engraved on the focusing ring [fig. 3 (2)], is in alignment with the indicator [fig. 3 (7)] engraved upon the lens barrel. The markings on the focusing ring should be memorized, so that it will not be necessary to look at the focusing ring to focus the camera. The clicks will indicate the distance at which the camera is focused. A rangefinder shoe [fig. 5 (18)] is mounted on the top of the camera at the extreme right edge but no rangefinder is supplied with the camera. A depth-of-field scale [fig. 8 (11)] is mounted directly on the camera top. This scale indicates the



1. Rear peepsight
2. Front cover
3. Lucite window
4. Front insert finder
5. Master lens flange
6. Diaphragm ring knob
7. Sunshade and focusing ring
8. Lens 101-mm
9. Front cover lower leaf spring
10. Right-side plate
11. Spring-tension cover plate knurled screws
12. Spring-tension cover plate
13. Tripod socket
14. Curtain-release lever
15. Curtain-winding cover plate knurled screws
16. Curtain-winding cover plate
17. Shutter-release plunger shaft
18. Rangefinder shoe
19. Lens flange

Figure 5. Camera PH-501/PF, right-side view.

areas which will be sharply covered by the 101-mm, f/4.5 lens at various distances and at various lens stops. By finding the distance in the left-hand column of the depth-of-field scale, and the lens stop in one of the four adjoining columns, it is possible to determine just which portion of the area focused upon will be sharply defined in the negative. For example, with the focusing ring set at 15 feet and the diaphragm ring set at f/8, all objects from 12½ to 19 feet from the camera will be in sharp focus.

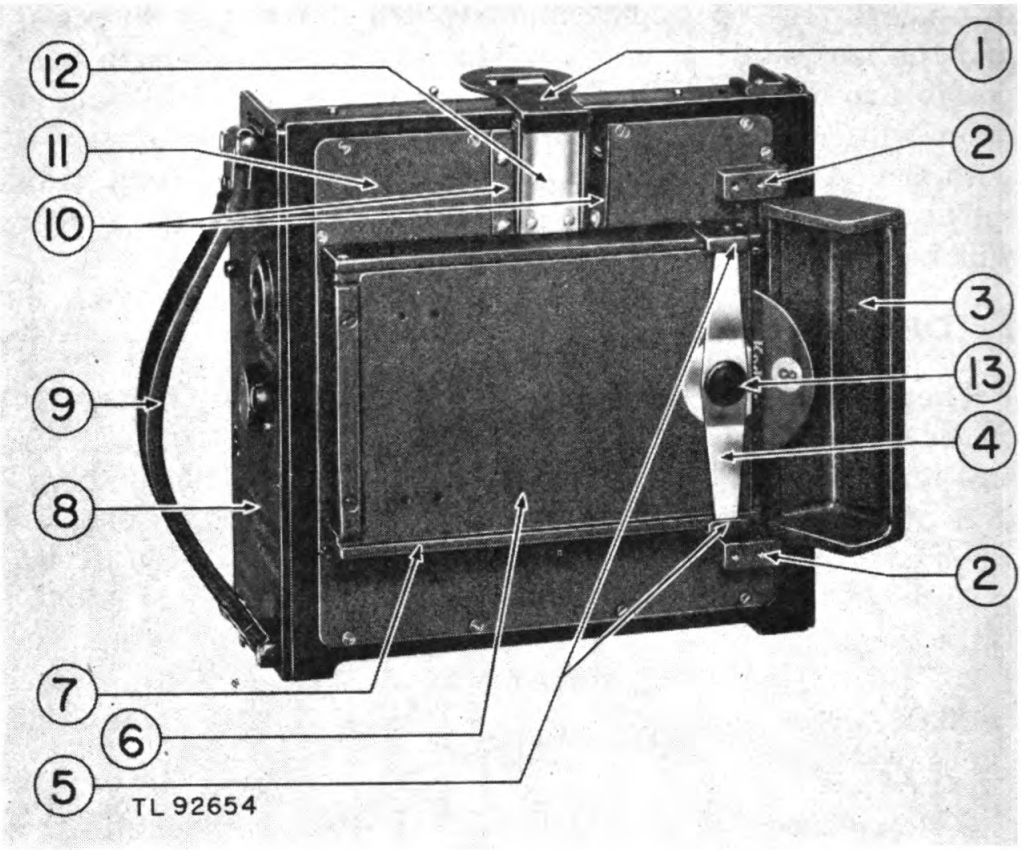
11. OPERATING SHUTTER.

The combat camera is equipped with a focal-plane shutter of the curtain type. This curtain has three fixed slots (fig. 30) and an opening for flash and time exposures. The combination of three curtain slots and two tensions for the shutter mechanism provides six shutter speeds. With the shutter set at high tension, these speeds are 1/50, 1/200, and 1/800 second. With the shutter set at low tension, the available speeds are 1/25, 1/100, and 1/400 second. Two additional settings are available on the shutter: T for time exposures and F for flash exposures.

a. Read the speed at which the shutter is operating in the speed-indicator window [fig. 4 (7)] located on the upper portion of the left-side plate. Speeds appear as numerals indicating the speed chosen. Thus the figure 400 in the speed indicator window means that the shutter is set to operate at 1/400 second. The letter F appears in the speed indicator window when the shutter is set for flash exposure. The letter T appears when the shutter is set for time exposure.

b. To use any of three speeds on the high-tension settings (1/50, 1/200, 1/800) turn the SPRING TENSION cover plate [fig. 5 (12)] located at the bottom of the right-side plate, in a clockwise direction as far as it will go. Next, wind the CURTAIN WINDING cover plate [fig. 5 (16)] located on the upper portion of the right-side panel in a counterclockwise direction as far as it will go. When the figure 800 appears in the speed indicator window, the shutter is set properly for 1/800 second.

c. To change shutter speeds without exposing the film, move the lever marked CURTAIN RELEASE [fig. 5 (14)], in the direction of the arrow engraved on the panel immediately above the CURTAIN RELEASE lever itself. With the shutter



1. Rear peepsight
2. Film-tab protecting cover bearings
3. Film-tab protecting cover
4. Film-pack holder cover locking spring
5. Film-pack holder cover locking spring brackets
6. Film-pack holder cover
7. Film-pack holder
8. Left-side plate
9. Strap handle
10. Rear peepsight brackets
11. Camera back
12. Rear peepsight leaf spring
13. Film-pack holder cover locking spring rivet

Figure 6. Camera PH-501/PF, back closed.

set at high tension and the CURTAIN fully wound, the first pull on the CURTAIN RELEASE lever brings the figure 200 into the speed indicator window [fig. 4 (7)], setting the shutter for 1/200 second. A second movement of the CURTAIN RELEASE lever will set the shutter for 1/50 second.

d. To decrease the tension from high to low, move the lever marked SPRING TENSION RELEASE [fig. 4 (8)] back and forth until it can be moved no farther. To use the shutter speeds of 1/25, 1/100, and 1/400 second, wind the CURTAIN WINDING cover plate [fig. 5 (16)] counterclockwise and move the CURTAIN RELEASE lever to the desired shutter setting.

NOTE: Each half turn of the CURTAIN WINDING cover plate brings a different slot in the shutter curtain into position.

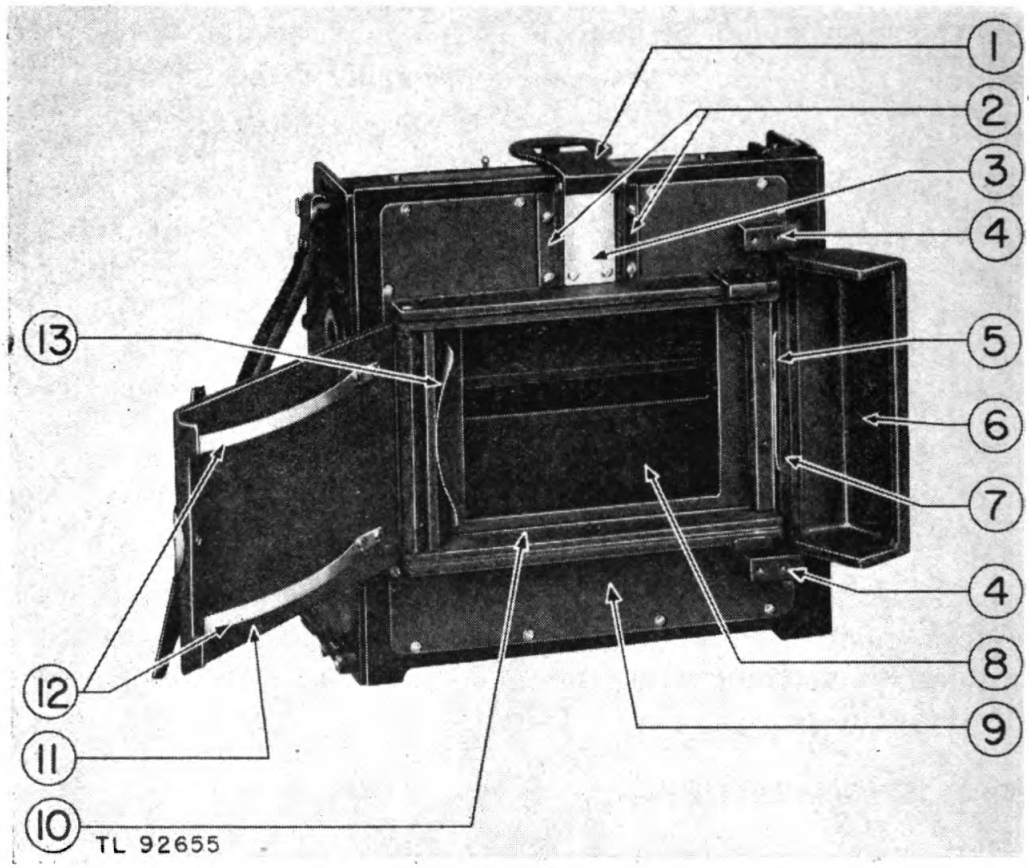
e. To use the flash and time exposure setting on either high or low tensions, move the CURTAIN RELEASE lever until the desired setting, either F or T, appears in the speed indicator window.

12. HOLDING CAMERA.

Slip the fingers of the left hand, from back to front, through the strap handle [fig. 2 (9)] of the camera, and extend the fingers over the front edge of the camera and around the left ridge. Steady the camera with the right hand, leaving the fingers free for operating the camera. This affords a firm, steady grip, eliminating camera vibration and subsequent blurring of the film.

13. FRAMING.

Hold the camera as described in paragraph 12, with the eye centered and directly behind the rear peepsight [fig. 4 (2)]. The rear peepsight must be held close to the eye so that the frame line of the front finder will be exactly framed in the rectangular opening in the rear peepsight. When the 101-mm, f/4.5 lens is being used, everything appearing in the large outer rectangle of the front insert finder will be in the finished photograph. When the 9-inch, f/6.3 telephoto lens is being used, the eye should be kept at exactly the same position but only that portion of the view which can be seen in the small rectangle centered in the front insert finder will appear in the final photograph.



1. Rear peepsight
2. Rear peepsight brackets
3. Rear peepsight leaf spring
4. Film-tab protecting cover bearings
5. Film-tab protecting cover tension spring
6. Film-tab protecting cover
7. Film-tab protecting cover shaft
8. Curtain
9. Camera back
10. Film-pack holder
11. Film-pack holder cover
12. Film-pack back pressure springs
13. Film-pack end pressure spring

Figure 7. Camera PH-501/PF, back open.

14. EXPOSURE.

With the lens focused and the lens stop and the shutter set, all that remains is to make the exposure. Press the shutter-release plunger shaft [fig. 5 (17)] all the way in until the shutter goes down. To take another exposure at the same setting and speed, open the film-tab protecting cover on the camera back; pull out and tear off the numbered paper tab; close the film-tab protecting cover and rewind the CURTAIN WINDING cover plate ½ turn counterclockwise to reset the shutter speed.

NOTE: The shutter-release plunger shaft has an unusually long movement. The first portion of this movement raises the light-lock door [fig. 17 (8)] located behind the lens. This door, when closed, permits the shutter to be rewound without exposing the film. The remainder of the shutter-release plunger shaft movement releases the shutter and causes the shutter curtain slot to drop down across the film, thus making the exposure.

15. MOUNTING CAMERA ON TRIPOD.

When it is necessary to compose the picture carefully or to use a slow shutter speed, Camera PH-501/PF may be mounted on a tripod. It is equipped with two tripod sockets, one [fig. 5 (13)] located at the center of the right-side panel, and the other on the bottom of the camera.

16. TIME EXPOSURES.

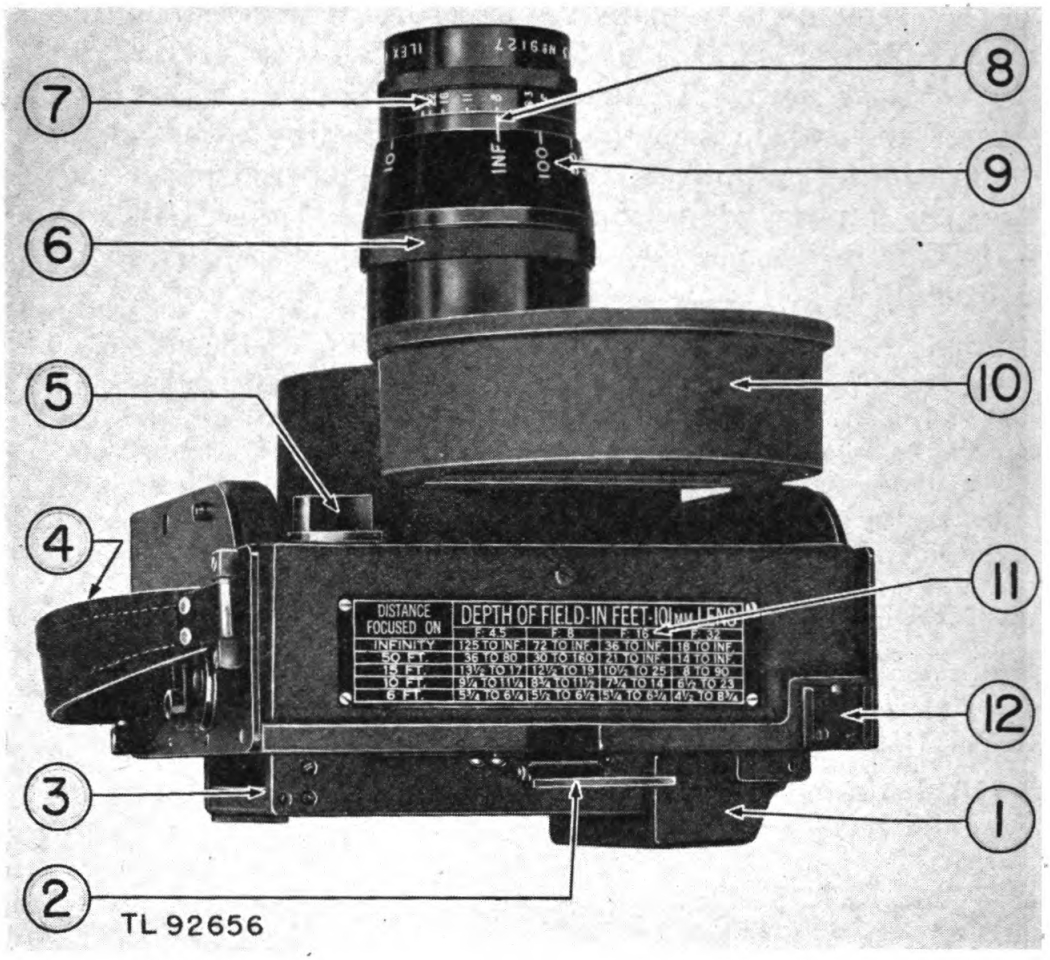
Time exposures cannot be made successfully with the camera held in the hand. The only sure way to get a sharp negative by time exposure is to place the camera upon the tripod to eliminate vibration.

a. Set the shutter for time exposure by moving the CURTAIN RELEASE lever until the letter T appears in the speed-indicator window [fig. 4 (7)].

b. To make the exposure press the shutter-release plunger shaft all the way in and *hold it there* while the exposure is being made. This will hold the light-lock door open for the desired time. When the exposure has been completed, release the shutter-release plunger shaft, to shut off the light.

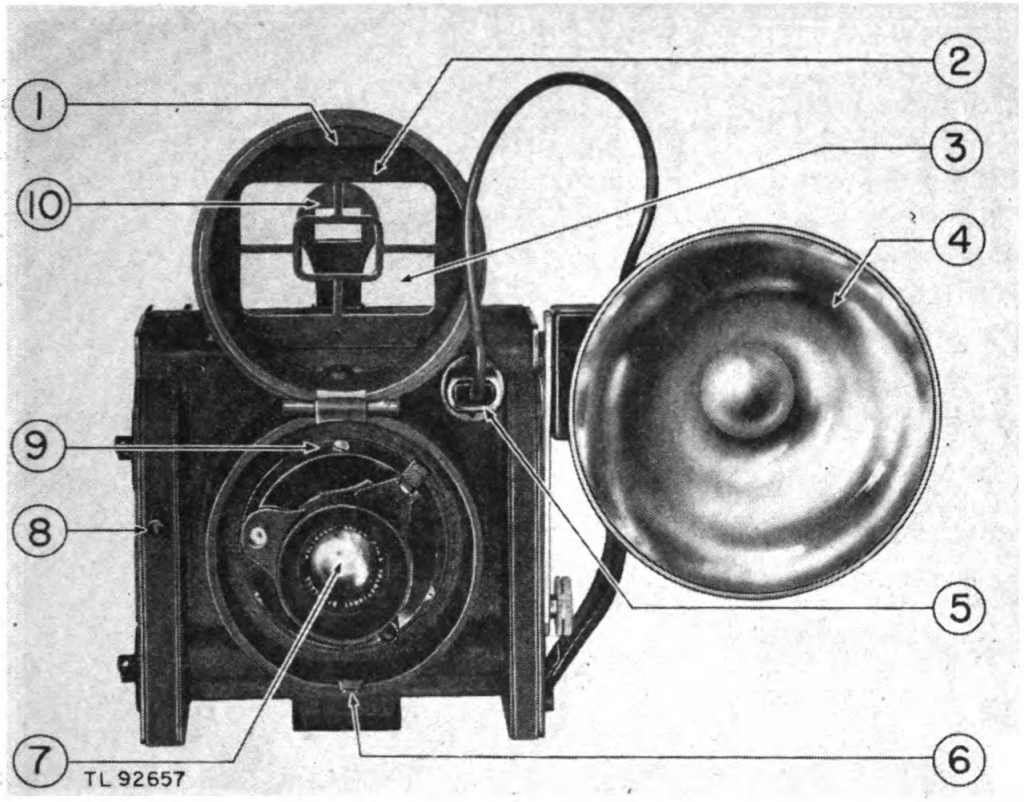
17. CHANGING LENSES.

Force the lens removal knob [fig. 4 (13)] counterclockwise. Continue to unscrew the lens assembly from the camera. When placing a lens in the camera, be sure to turn it all the way in so that the proper distance is maintained between the lens and film.



1. Film-tab protecting cover
2. Rear peepsight
3. Film-pack holder
4. Strap handle
5. Flash tap hood
6. Telephoto lens
7. Telephoto lens diaphragm scale
8. Telephoto lens indicator
9. Telephoto lens focusing scale
10. Front cover
11. Depth-of-field scale
12. Rangefinder shoe

Figure 8. Camera PH-501/PF, top view.



1. Front cover
2. Front insert finder
3. Lucite window
4. Flash synchronizer
5. Flash tap hood
6. Front cover lower leaf spring
7. Lens 101-mm
8. Shutter-release plunger shaft
9. Master flange
10. Rear peepsight

Figure 9. Camera PH-501/PF, flash synchronizer attached.

18. REMOVING FILM PACK.

Open the film-pack holder as described in paragraph 7*a*. Remove the film pack. The camera is now ready for reloading. If, however, the camera is to be put away, close the film-pack holder.

19. CLOSING CAMERA.

a. Press the rear peepsight [fig. 2 (5)] forward until it lies flat across the top of the camera and rests upon the rear peepsight support [fig. 2 (16)] on the top of the camera.

b. Close the front cover by pressing it gently forward until the front cover locking stud [fig. 2 (2)] disengages from the stud locking spring [fig. 2 (4)]. Bring the cover forward over the lens until it catches firmly in the front-cover lower leaf spring plate [fig. 5 (9)] located at the bottom of the circular portion of the camera front.

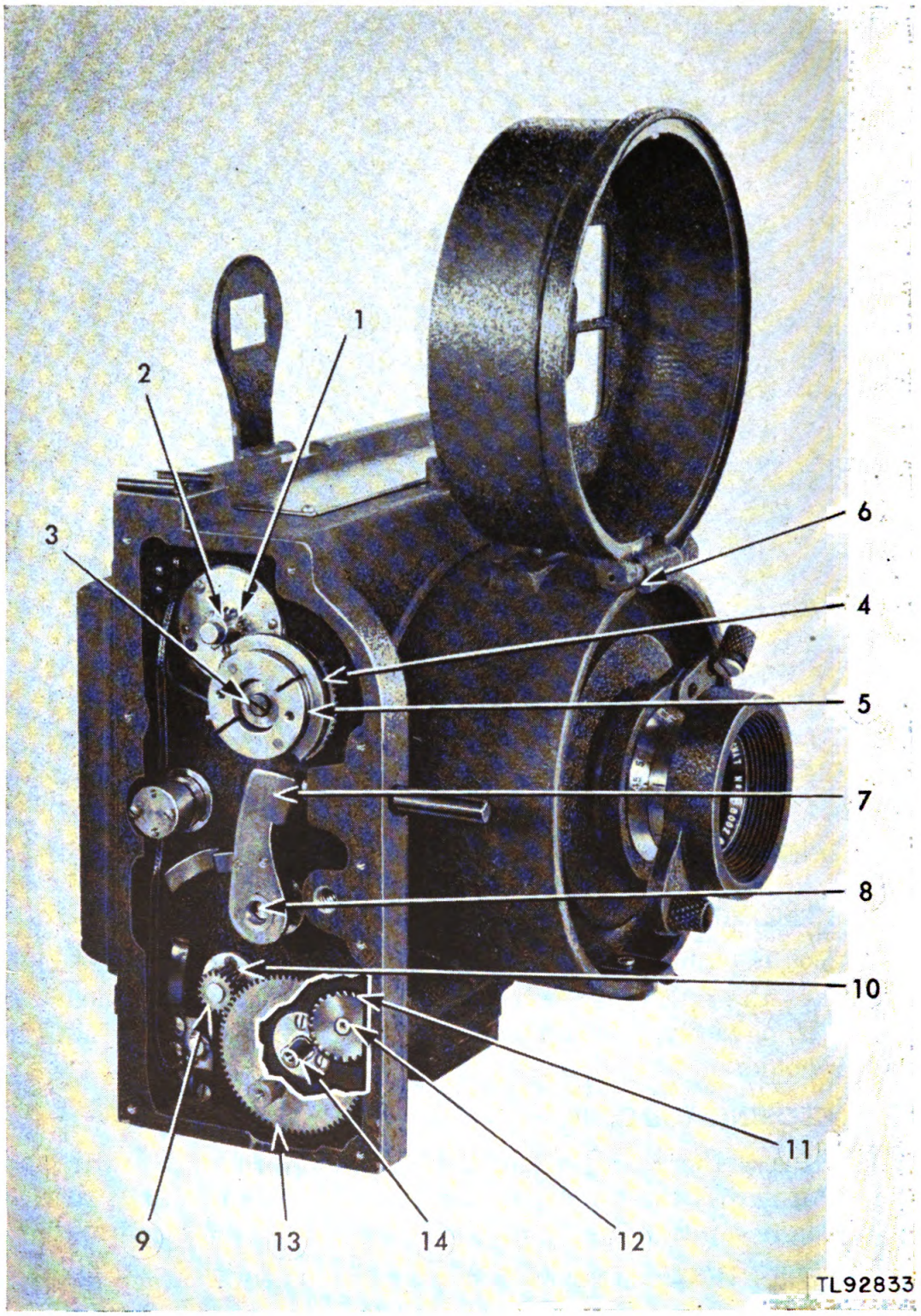


Figure 10. Camera PH-501/PF, right-side lubricating points.

PART THREE
PREVENTIVE MAINTENANCE

SECTION IV
PREVENTIVE MAINTENANCE TECHNIQUES

20. MEANING OF PREVENTIVE MAINTENANCE.

Preventive maintenance may be defined as a series of operations performed on equipment to minimize interruptions in service and to eliminate major breakdowns. The function of trouble shooting and repair on the other hand is to locate and correct existing defects. This section of the manual contains specific situations and serves as a guide for personnel assigned to perform the basic maintenance operation.

21. PREVENTIVE MAINTENANCE ON CAMERA PH-501/PF.

Camera PH-501/PF is a delicate instrument and should be handled with care to avoid damaging parts. To obtain the best results it should be inspected and cleaned at regular intervals. The following materials are needed for performing preventive maintenance.

Lens-cleaning fluid.
Camel's hair brush.
Lens-cleaning tissue.
Emery cloth.
Syringe.

22. ROUTINE INSPECTION AND MAINTENANCE.

a. Lenses. The lenses must be kept clean at all times. Never touch the glass of the lens with the fingers.

(1) Use a camel's hair brush or syringe to remove dust and lint from the lenses.

(2) Use lens tissue and cleaner, if additional cleaning is necessary.

CAUTION: Never use polishing material, alcohol, or other solvents on the lenses.

(3) Do not subject the lenses to extreme climatic conditions.

b. Shutter. Never leave the shutter and curtain springs in a stressed (cocked) position over long periods of time.

(1) Use a syringe or camel's hair brush to dust the shutter.

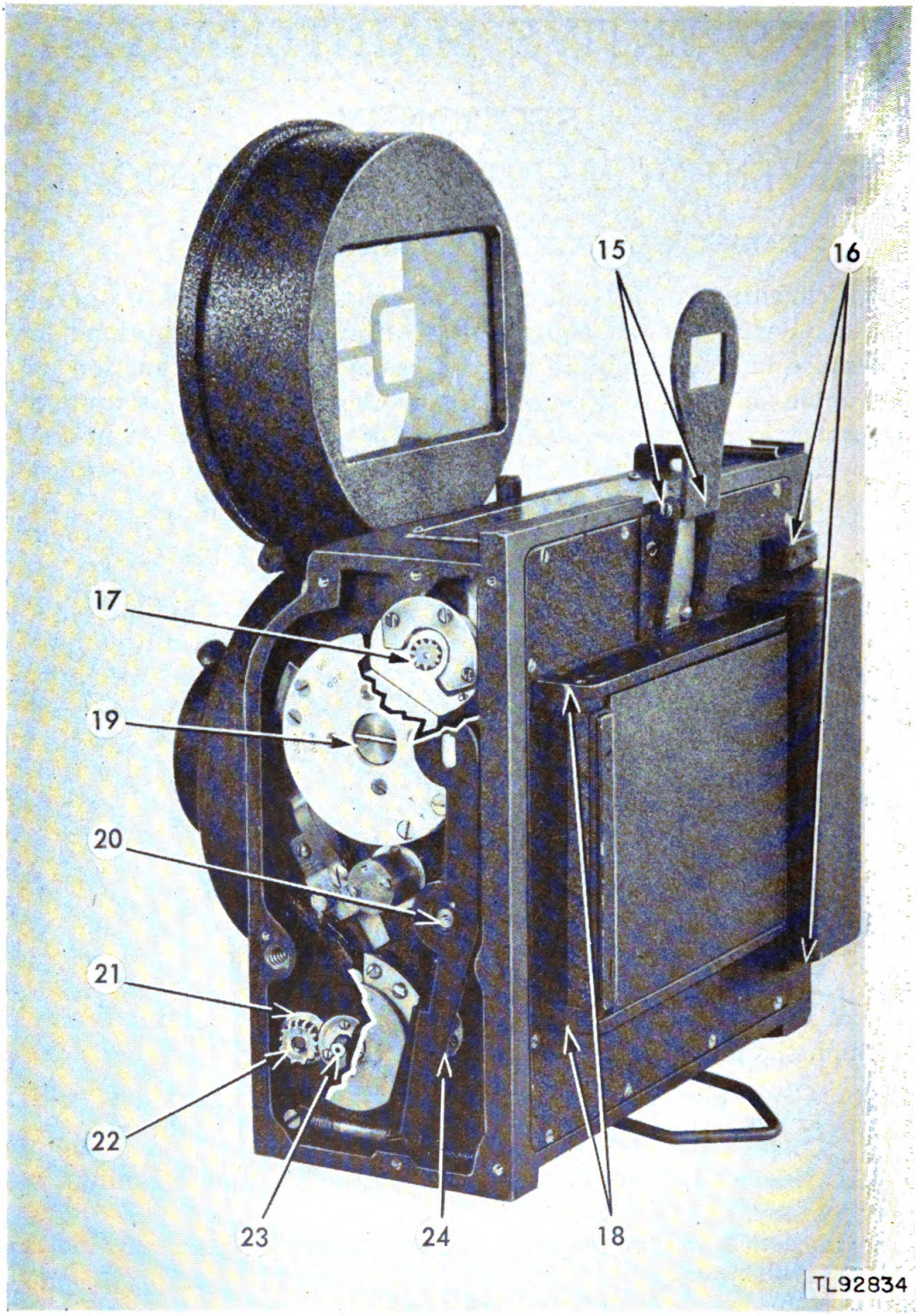


Figure 11. Camera PH-501/PF, left-side lubricating points.

(2) Check shutter (curtain) for leaks. If a leak is present, use rubber cement to attach rubberized fabric.

c. Film-pack Holders. Before being loaded, the holders should be thoroughly dusted on all sides with either a camel's hair brush or syringe.

d. Peepsights. Use a camel's hair brush or syringe to dust peepsights. The front peepsight plexiglass can be cleaned with a water-moistened cloth and then polished with a lint-free cloth or lens tissue. Do not use any solvents on the plexiglass. Check that the rear eyepiece spring tension is sufficient to hold the rear eyepiece erect.

e. Filters. The filters require the same care as the lenses. When using a filter, see that it is attached squarely and accurately to the lens.

f. Screws and Knobs. Tighten all screws and knobs.

g. Flash Gun Contacts. Clean flash gun contacts with fine emery cloth.

SECTION V
LUBRICATION

23. WAR DEPARTMENT LUBRICATION ORDERS.

War Department Lubrication Orders are waterproof, illustrated, numbered, and dated cards or decalcomania labels which prescribe approved first and second echelon lubrication instructions for mechanical equipment which requires lubrication by using organizations. Current War Department Lubrication Orders which are available are listed in the latest edition of FM 21-6 and monthly changes thereto.

24. REQUISITION OF WAR DEPARTMENT LUBRICATION ORDERS.

Posts, camps, stations, and ports of embarkation should requisition their requirements of War Department Lubrication Orders for Signal Corps equipment in conformance with the requisitioning instructions which appear on each War Department Lubrication Order. A serial number between 3001 and 4000 inclusive indicates that the War Department Lubrication Order pertains to Signal Corps equipment. In the absence of specific requisitioning instructions, requisitions for War Department Lubrication Orders having a serial number between 3001 and 4000 inclusive should be forwarded to Commanding Officer, Philadelphia Signal Depot, Philadelphia, Pennsylvania. In no instance will requisitions for War Department Lubrication Orders be addressed to the Adjutant General.

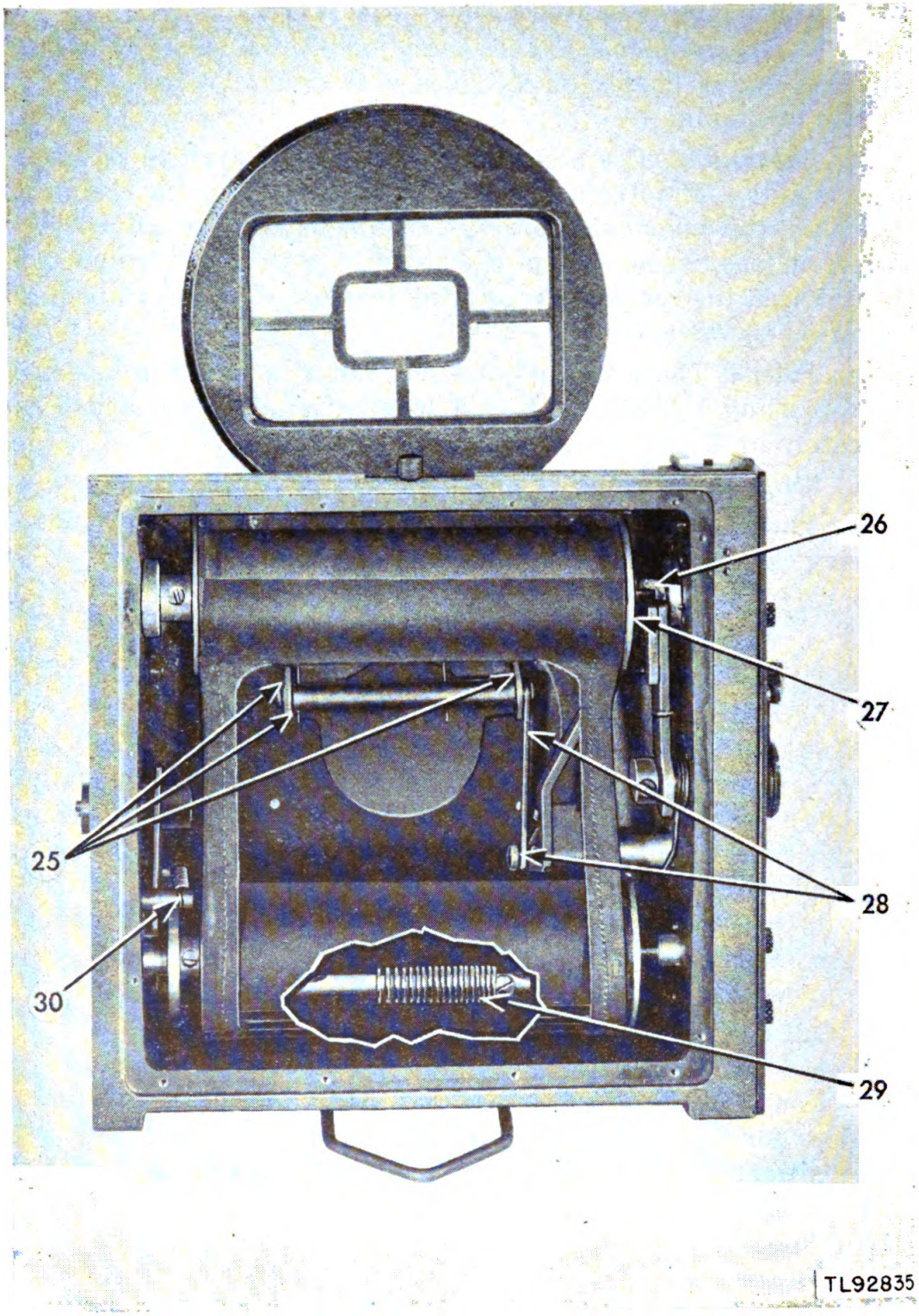


Figure 12. Camera PH-501/PF, back lubricating points.

25. COMPLIANCE WITH WAR DEPARTMENT LUBRICATION ORDERS.

Instructions contained in War Department Lubrication Orders are mandatory and supersede all conflicting lubrication instructions of an earlier date. Applicable War Department Lubrication Orders which are available will be obtained, carried with the equipment at all times, and fully complied with. Difficulties experienced in obtaining and complying with such lubrication orders will be reported through technical channels to The Commanding General, Army Service Forces, Attention: Maintenance Division.

26. LUBRICATION.

a. Recommended Lubricants. The following table lists the lubricating materials necessary to service Camera PH-501/PF, and indicates the symbols and abbreviations used in the lubrication chart given in subparagraph *c* below.

Lubricants		*Lowest expected air temperature*		*Intervals*
Symbol	*Nomenclature*	*above +60° F to below —30° F*	*below —30° F*	*See subparagraph c below.*
PS	OIL, lubricating, preservative, special.	PS	See subparagraph *d*, Weather Conditions.	3M (three months)
GL	GREASE, lubricating, special.	GL		6M (six months)

b. Cleaning. Remove the right-side plate, the left-side plate, or the back, as needed. Clean the parts with a soft, clean brush or a clean, lint-free cloth, lightly dampened with Solvent, Dry Cleaning, Federal Specification P-S-661a (SD). Do not allow the solvent to get on the lens or focal-plane shutter curtain. Thoroughly dry all parts before lubricating. After lubrication, replace each plate removed.

CAUTION: Avoid soiling the focal-plane shutter while lubricating. After lubrication, remove excess lubricant to prevent spreading onto film, film-pack adapter, lens, or focal-plane shutter curtain.

c. Lubrication Chart. The following chart indicates the lubrication points and intervals of lubrication for Camera PH-501/PF. The lubrication points are labelled in figures 10, 11, and 12.

Point No.	*Description*	*Interval*	*Lubricant*
1	Upper curtain winding gear bearing. Apply lubricant with a toothpick.	6M	PS
2	Curtain winding gear. Clean and coat lightly.	6M	GL
3	Curtain winding assembly retaining screw. Clean and coat lightly.	6M	GL
4	Mutilated gear. Clean and coat lightly.	6M	GL
5	Copper spring. Clean and coat surface lightly.	6M	GL
6	Front cover hinge. One drop.	6M	PS
7	Shutter actuating arm. Coat edge lightly.	6M	GL
8	Light lock actuating bearing. Clean and coat lightly.	6M	GL
9	Lower roller tension gear. Clean and coat lightly.	6M	GL
10	Lower roller tension-gear bearing. Apply lubricant with a toothpick.	3M	PS
11	Right transverse gear. Clean and coat lightly.	6M	GL
12	Right transverse gear bearing. Apply lubricant with a toothpick.	3M	PS
13	Spring-tension compound gear. Clean and coat lightly.	6M	GL
14	Spring-tension compound gear stud. Remove screw and washer. Clean and coat lightly. Replace screw and washer.	6M	GL
15	Rear peepsight. One drop sparingly.	6M	PS
16	Film-pack tab protecting cover. One drop sparingly.	6M	PS
17	Pilot gear and bearing. Clean and coat lightly.	6M	GL
18	Film-pack cover hinge. One drop sparingly.	6M	PS
19	Speed dial retaining-screw bearing. Clean and coat lightly.	6M	GL
20	Speed indicator arm shaft. Clean and coat lightly.	6M	GL
21	Relay gear and left transverse gear. Clean and coat lightly.	6M	GL
22	Left transverse gear bearing. Apply lubricant with a toothpick.	3M	PS
23	Speed indicator arm cam stud. Clean and coat lightly.	6M	GL

Point No.	*Description*	*Interval*	*Lubricant*
24	Lower roller-shaft bearing. One drop sparingly.	6M	PS
25	Light-lock door shafts. Apply lubricant with a toothpick.	6M	PS
26	Curtain release arm. Clean and coat inner edge lightly.	6M	GL
27	Light-lock actuating arm. Clean and coat surface lightly.	6M	GL
28	Light-lock connecting link. Apply lubricant with a toothpick.	6M	PS
29	Tension winding spring. Clean and wipe with dampened lint-free cloth.	6M	PS
30	Tension release arm. Clean and coat edge lightly.	6M	GL

d. Weather Conditions.

(1) MARITIME, HIGH ALTITUDE, AND COLD WEATHER. To prevent corrosion from salt-laden air or salt-water spray, and rusting from condensation or moisture, wipe all exposed metal parts with a soft cloth which has been saturated with lubricating oil (PS).

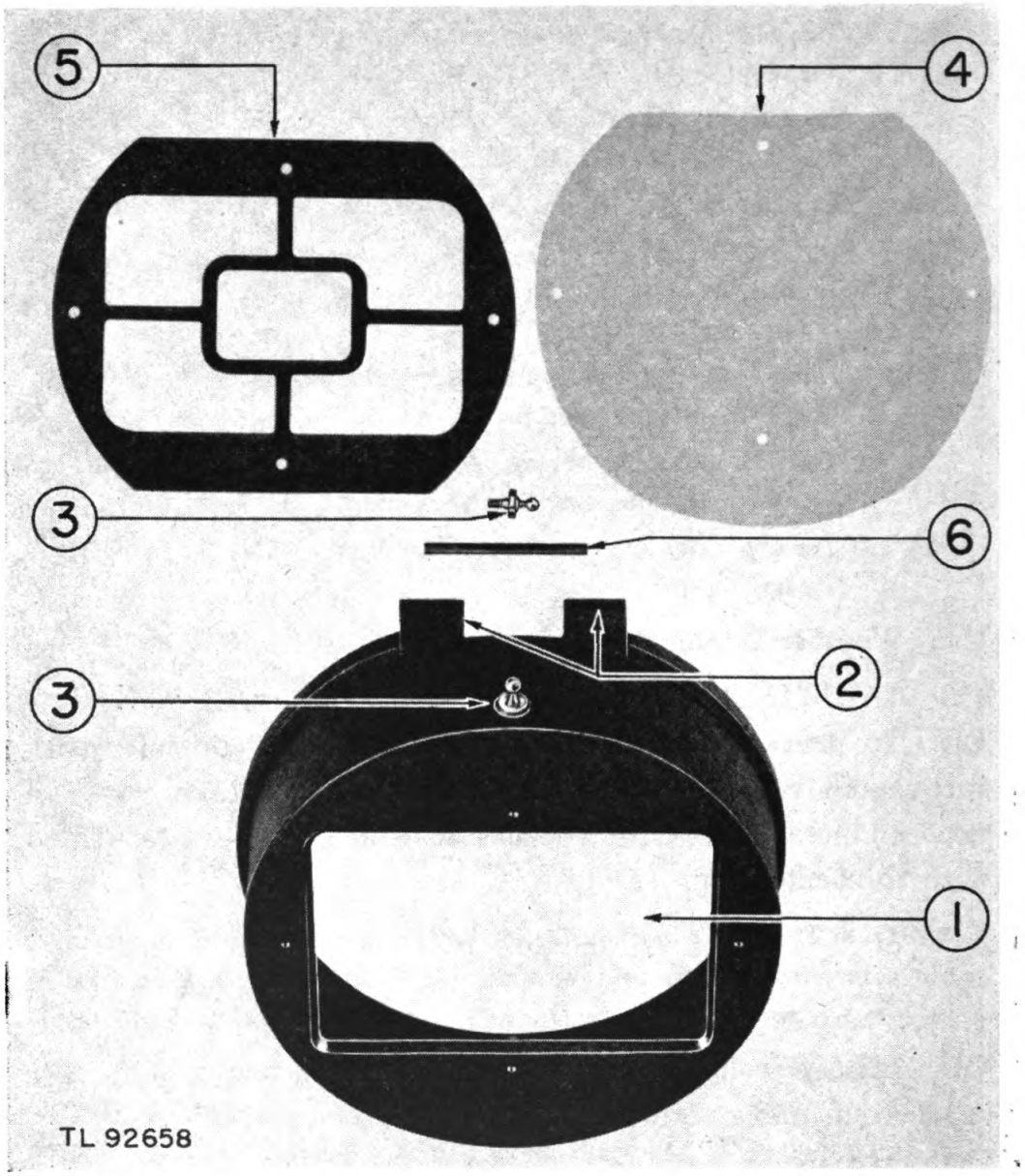
CAUTION: To avoid condensation, do not bring equipment into warm air after exposure to cold weather. Equipment in use should be in low temperature storage (usually a protected outdoor shelf).

(2) BELOW —30° F. Remove and clean all traces of former lubrication and operate dry.

(3) TROPICAL. Inspect camera daily for traces of fungus, mold, mites, moisture, and metallic corrosion. Remove fouling immediately by cleaning all parts thoroughly. Lubricate after cleaning.

(4) DESERT. Reduce lubrication intervals under severe operating conditions. Lubricate daily under extreme conditions of heat, sand, and dust.

e. Intervals. Lubricate all points every 6 months or after every 1,000 exposures, whichever occurs first. Before using a camera which has been idle for a month or more, inspect and lubricate all points which require lubrication.



1. Front cover
2. Front cover hinge
3. Front cover locking stud
4. Lucite window
5. Front insert finder
6. Cover hinge shaft

Figure 13. Front cover assembly.

PART FOUR
AUXILIARY EQUIPMENT

SECTION VI
AUXILIARY EQUIPMENT

27. GENERAL.

Standard camera accessories, such as an adapter, filters, flash gun, exposure meter, and tripod, may be used with Camera PH-501/PF if available.

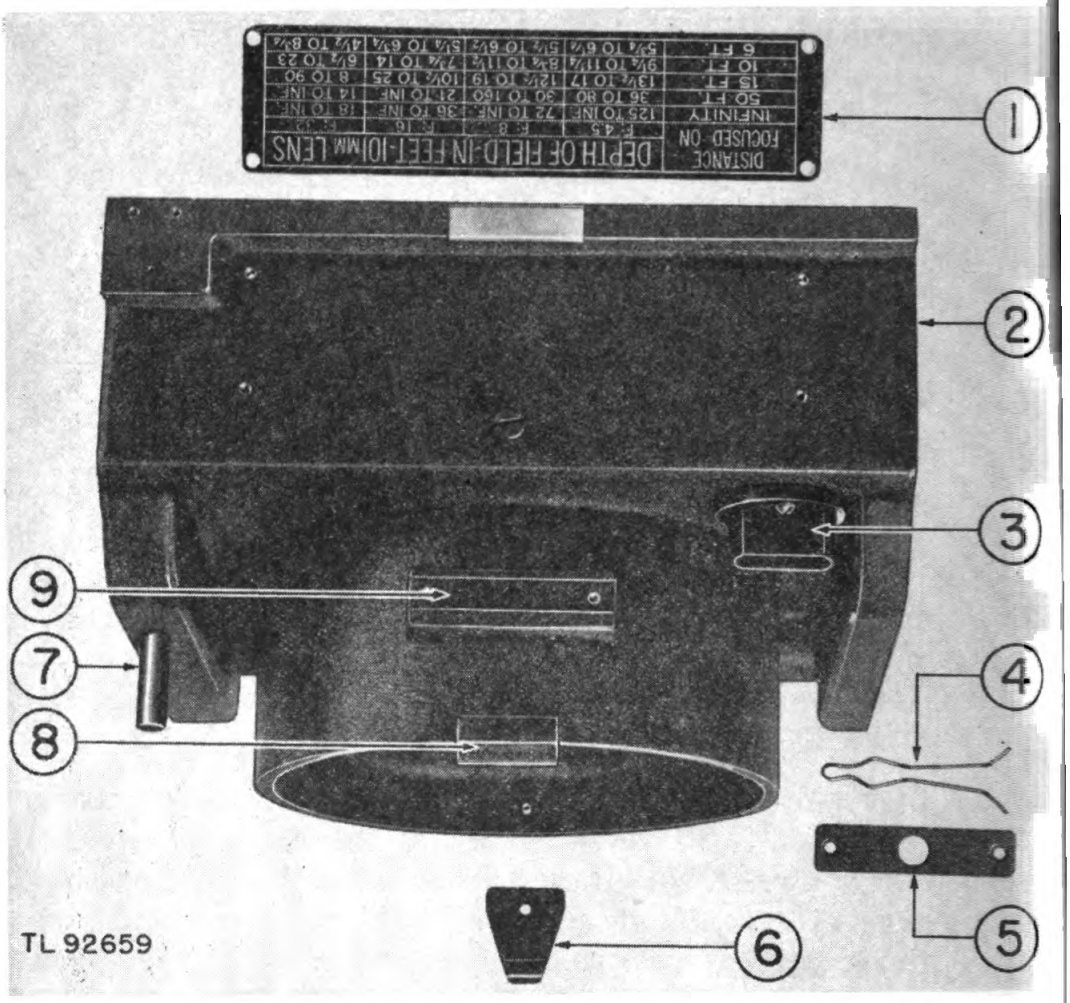
28. FLASH EXPOSURES (fig. 2).

The camera is equipped with built-in flash taps, located at the upper left-hand corner, on the front of the camera. These taps, the tripod socket and the flash synchronizer stud located on the left-side plate of the camera, are provided to accommodate the Eastman Junior flash synchronizer.

a. To mount the flash synchronizer press the upper hole on the synchronizer mounting bracket onto the flash synchronizer stud. This will bring the knurled flat screw on the synchronizer mounting bracket into alignment with the tripod socket. Turn the knurled synchronizer screw into the tripod socket, thus attaching the flash synchronizer firmly to the camera. Connect the electrical cord from the flash synchronizer to the flash taps on the front of the camera.

b. Set the shutter at F. The flash gun is now ready to operate in synchronization with the camera. The exposure is made by pressing the shutter-release plunger all the way in.

NOTE: The F setting on the shutter is available at either high or low tension.



1. Depth-of-field scale
2. Main casting
3. Flash tap hood
4. Front cover stud locking spring
5. Front cover stud locking spring plate
6. Front cover lower leaf locking spring
7. Shutter release plunger shaft
8. Cover hinge
9. Machined groove for stud locking spring

Figure 14. Camera PH-501/PF, top view, disassembled.

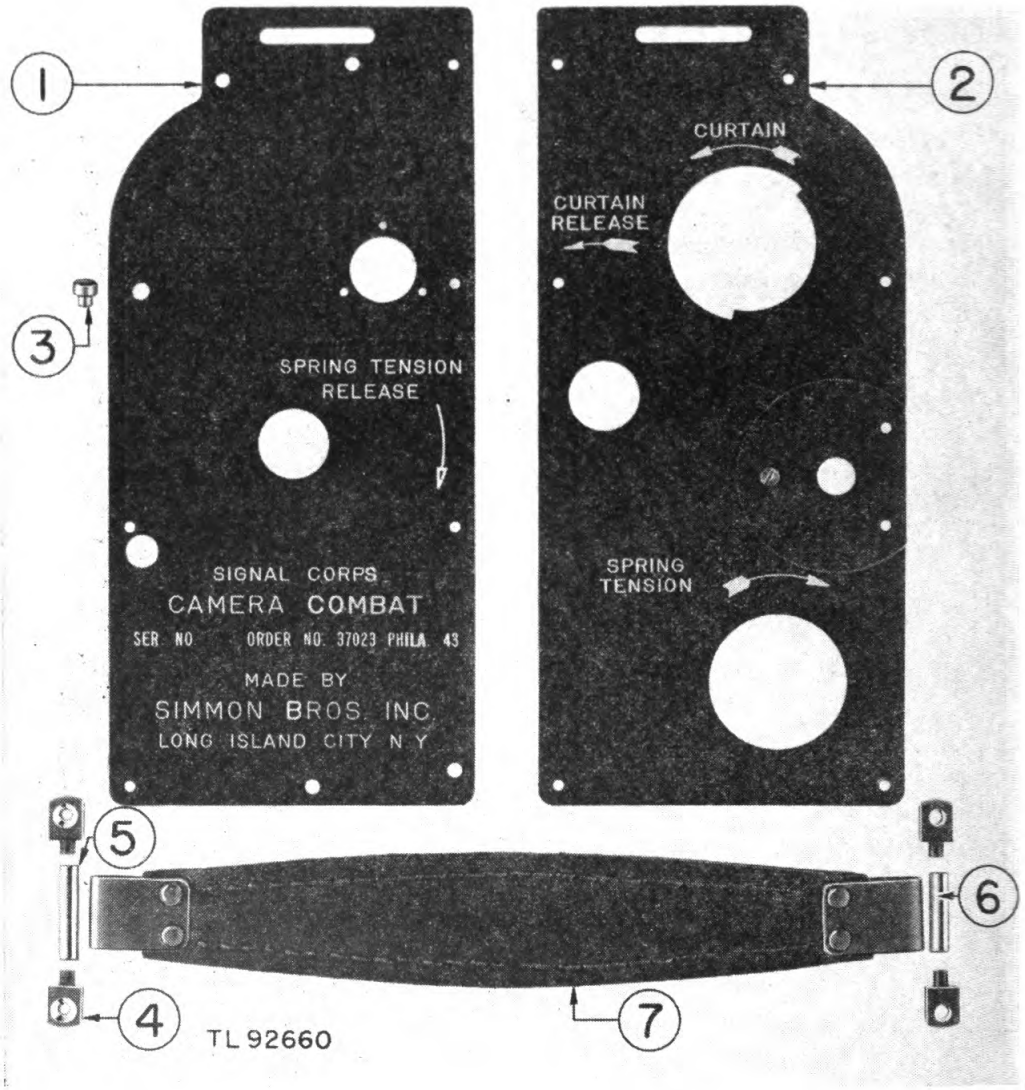
PART FIVE
REPAIR INSTRUCTIONS

NOTE: Failure or unsatisfactory performance of equipment used by Army Ground Forces and Army Service Forces will be reported on W.D., A.G.O. Form No. 468 (Unsatisfactory Equipment Report). For particulars see paragraph 49. If Form No. 468 is not available, see TM 38-250. Failure or unsatisfactory performance of equipment used by Army Air Forces will be reported on Army Air Forces Form No. 54 (unsatisfactory report).

SECTION VII
TROUBLE SHOOTING

29. TROUBLE, CAUSE, AND REMEDY CHART.

Trouble	*Cause*	*Remedy*
First picture missed.	Failure to pull out safety cover of film pack before taking picture.	Always pull out safety cover of film pack before making first exposure.
Negatives lack sharpness.	Lens fogged or dirty.	Clean lens.
	Improper focusing.	Use rangefinder.
	Lens not properly seated in master flange.	Screw lens all the way into master flange.
	Picture taken through lucite window of front cover.	Open front cover.
	Vibration as result of holding camera in hand during slow exposure.	Use tripod.
Fogged negatives.	Light-lock door not fully closed.	See paragraph 38 for light-lock door adjustment.
Negatives improperly centered.	Front cover locking stud not seated in front cover locking spring.	Set front cover locking stud firmly into stud locking spring so that front viewfinder is vertical.



1. Left-side plate
2. Right-side plate
3. Flash synchronizer stud
4. Handle retaining studs
5. Tubular shaft (long)
6. Tubular shaft (short)
7. Strap handle

Figure 15. Side plate and handle assembly.

Trouble	*Cause*	*Remedy*
Double exposure.	Eye not centered properly.	See paragraph 13 for framing procedure.
	Failure to pull film tab after each exposure.	Pull out and tear off tab after each exposure.
Consistent overexposure.	SPRING TENSION not fully wound.	Wind SPRING TENSION completely.
	Curtain stretched because of weather conditions.	See paragraph 47 for curtain replacement.
	Spring-tension gear stripped.	See paragraph 44 for adjustment.
Shutter fails to operate.	Not fully wound.	Wind shutter fully.
	Failure to push shutter-release plunger shaft all the way in.	Depress plunger shaft completely.
	Shutter jammed because wound too fast.	See paragraph 43 for shutter adjustment.
Flash failures.	Batteries weak.	Replace batteries.
	Corroded flash taps.	See paragraph 48 for flash adjustment and repair.
	Loose flash contacts.	See paragraph 48.

30. LIST OF TOOLS.

The following tools are recommended for repair:
Ball peen hammer, 4-ounce.
Pair needlenose pliers.
Spread type, non-handle screwdriver, 6- to 8-inch.
Machinist's scriber.
Punch (drive pin), $\frac{1}{16}$-inch.
Allen wrench, 6-32 inch.
Jeweler's screwdriver, No. 2.
Jeweler's screwdriver, No. 4.
Jeweler's screwdriver, No. 5.
Screwdriver, 4-inch, with $\frac{3}{16}$-inch tip.
Open-end wrench, $\frac{5}{16}$-inch.
Chip blower.
Camel's hair brush, 1-inch.
Pair tweezers.

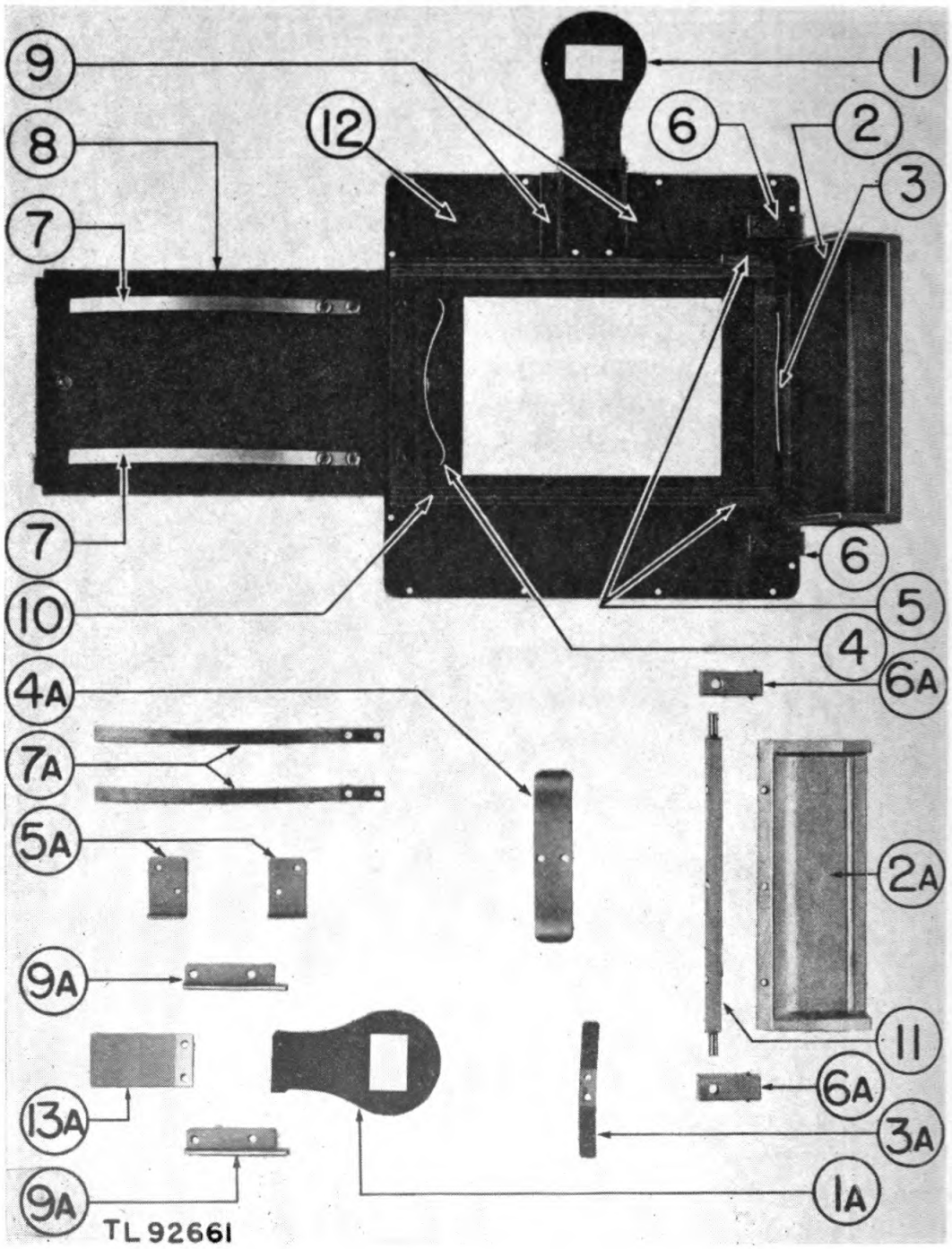


Figure 16. Camera PH-501/PF, back disassembled.

SECTION VIII
REPAIR

31. FRONT COVER ASSEMBLY.

a. Replacement of Front Cover Locking Stud. With the camera on its base, grasp the base of the front cover locking stud [fig. 13 (3)] between the jaws of the needlenose pliers. Exerting firm pressure, turn the stud counterclockwise until it comes free of the camera cover.

b. Replacement of Front Cover Locking Stud. With the camera still upon its base, pick up the front cover locking stud and set it into the threaded hole at the top of the front cover [fig. 13 (1)]. Turn the stud clockwise until it is firmly seated. Tighten it with the needlenose pliers.

c. Removal of Lucite Window and Front Insert Finder. Place the camera on its back with the cover fully open. Turn the four fillister-head screws until they can be removed and lift out the lucite window [fig. 13 (4)] and front insert finder [fig. 13 (5)].

d. Replacement of Lucite Window and Front Insert Finder. Set the new lucite window into the cover so that the holes in the window are in alignment with the four holes in the cover front. Next place the front insert finder into the cover and on top of the lucite window so that the four holes in the front insert finder are also in alignment with the threaded holes in

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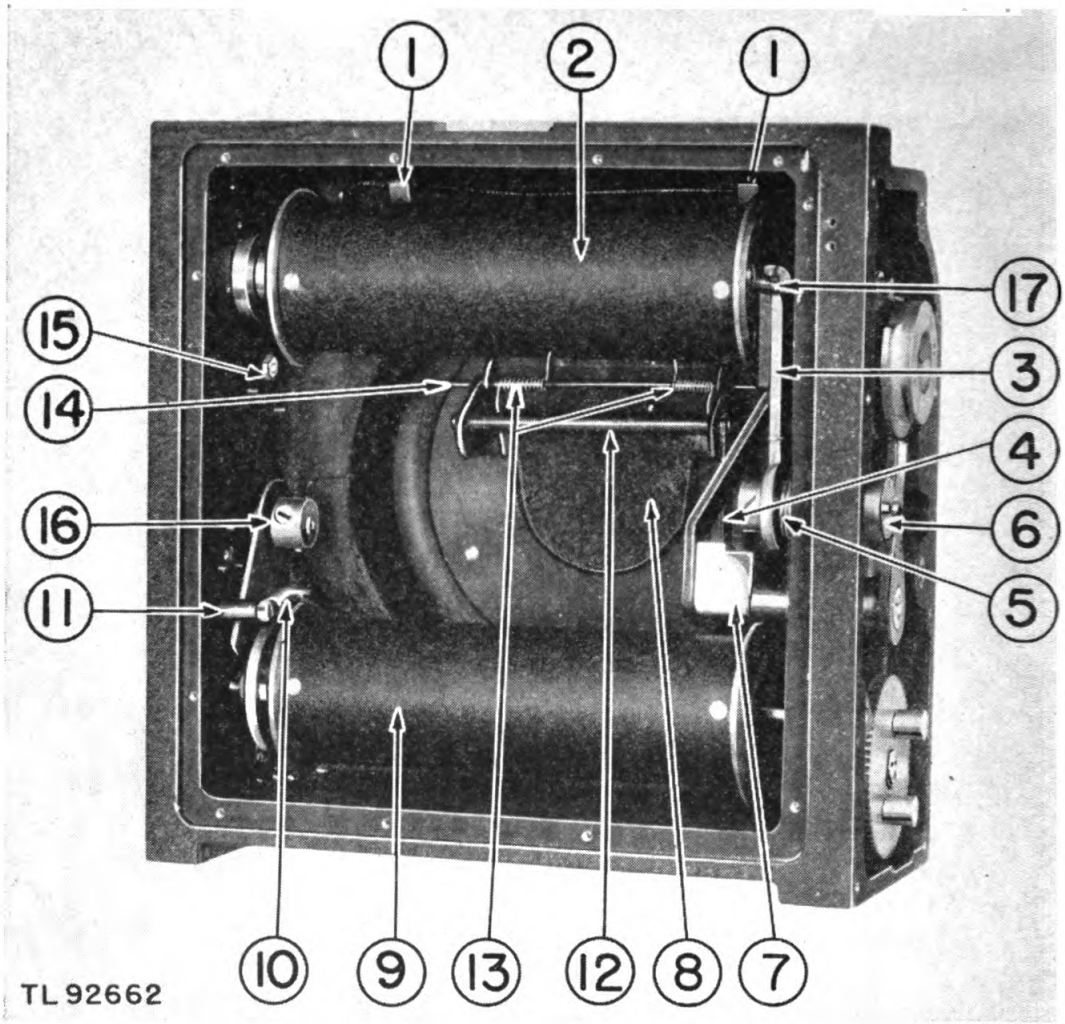
Key to figure 16.

1. Rear peepsight
1a. Rear peepsight disassembled
2. Film-tab protecting cover
2a. Film-tab protecting cover disassembled
3. Film-tab protecting cover tension spring
3a. Film-tab protecting cover tension spring disassembled
4. Film-pack holder end pressure spring
4a. Film-pack holder end pressure spring disassembled
5. Film-pack holder cover locking spring brackets
5a. Film-pack holder cover locking spring brackets disassembled
6. Film-tab protecting cover bearings
6a. Film-tab protecting cover bearings disassembled
7. Film-pack back pressure springs
7a. Film-pack back pressure springs disassembled
8. Film-pack holder rear cover
9. Rear peepsight brackets
9a. Rear peepsight brackets disassembled
10. Film-pack holder
11. Film-tab protecting cover shaft
12. Camera back
13. Rear peepsight leaf spring disassembled



1. Flash wire clamps
2. Upper curtain roller
3. Escapement arm
4. Light-lock connecting link
5. Escapement arm spring
6. Curtain-release lever connecting shaft
7. Light-lock actuating arm
8. Light-lock door
9. Lower curtain roller
10. Spring-tension release spring
11. Spring-tension release spring stud
12. Light-lock door shaft
13. Light-lock door springs
14. Light-lock hinge shaft
15. Speed dial assembly retaining nut
16. Spring-tension release plate bushing
17. Upper curtain roller stop pin

Figure 17. Camera PH-501/PF, curtain and camera back removed.

the camera cover. With the spread-type screwdriver, place the four fillister-head screws so that they pass through the holes in both lucite window and front insert finder and enter the holes in the camera cover. Turn the screws down and tighten.

e. Removal of Front Cover Lower Leaf Spring. Remove the lens from the camera and then place the camera on its back with the cover open as far as it will go. With the No. 5 jeweler's screwdriver, turn the head screw until the front cover lower leaf spring [fig. 14 (6)] can be removed.

f. Replacement of Front Cover Lower Leaf Spring. With the camera in the same position, set the front cover lower leaf spring in position on the inside flange at the bottom of the camera front. Turn the binding head screw through the hole in the spring and the camera body as far as it will go.

g. Removal of Front Cover.

(1) To remove the front cover place the camera on its base. Remove the two Allen screws by inserting the Allen wrench into the openings at both right and left of the front cover hinge [fig. 13 (2)] and turning.

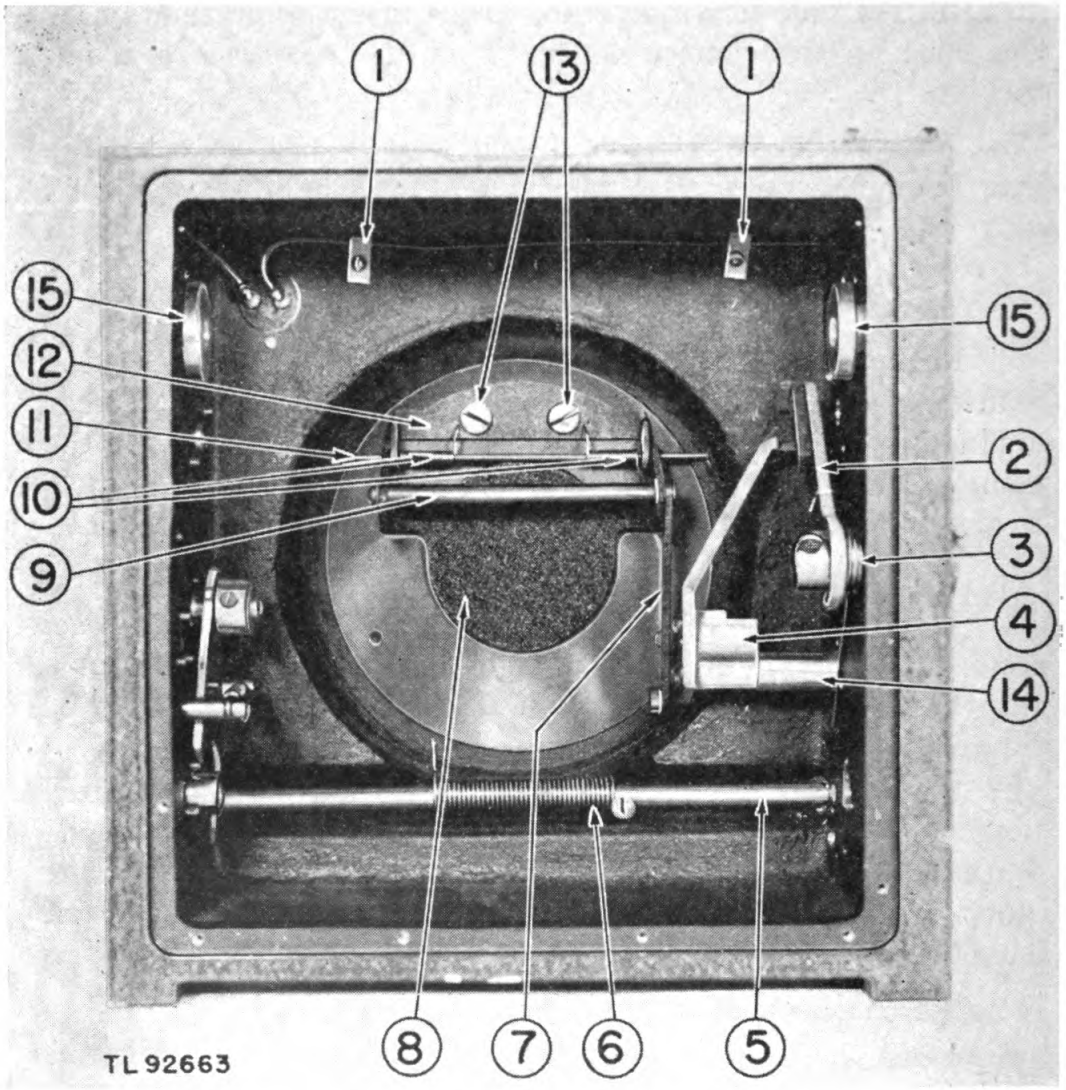
(2) Place the $\frac{1}{16}$-inch drive punch into the opening vacated by the Allen screws at either end of the front cover hinge. With the 4-ounce ball-peen hammer, drive the cover hinge shaft [fig. 13 (6)] out of the hinge and remove the front cover from camera.

h. Replacement of Front Cover.

(1) Place the camera on its left side. Align the holes in the cover hinge with the holes in that part of the hinge which is an integral part of the main casting. Set the cover hinge shaft into the hole in the cover hinge, inserting it as far as it will go. The largest part of the cover hinge shaft will project above the opening in the cover hinge.

(2) With the $\frac{1}{16}$-inch drive punch and the 4-ounce ball-peen hammer, drive the shaft downward until it is $\frac{3}{16}$ inch below the surface of the cover hinge. This will allow room for the insertion of the 6/32 Allen screws which lock the cover hinge shaft into position. With the Allen wrench, turn the two Allen screws (one at either end of the front cover hinge) until they are properly seated.

i. Removal of Front Cover Stud Locking Spring. To remove the front cover stud locking spring [fig. 14 (4)], place the camera upon its base. Turn the two flathead screws and lift off the



1. Flash wire clamps
2. Escapement arm
3. Escapement arm spring
4. Light-lock actuating arm
5. Transverse shaft
6. Tension winding spring
7. Light-lock connecting link
8. Light-lock door
9. Light-lock door shaft
10. Light-lock door springs
11. Light-lock hinge shaft
12. Light-lock door hinge
13. Light-lock door hinge binding head screws
14. Light-lock actuating shaft bearing
15. Right upper roller bearing housing

Figure 18. Camera PH-501/PF, camera back, curtain, and curtain rollers removed.

front cover stud locking spring plate [fig. 14 (5)]. The spring lies loose underneath this plate and is now accessible.

j. Replacement of Front Cover Stud Locking Spring. With the camera resting on its base, set the front cover stud locking spring into the groove [fig. 14 (9)] machined into the top of the main casting so that it does not obstruct the two threaded holes on the camera top. Place the front cover stud locking spring plate upon the two ridges so that the holes at the ends of the plate are in alignment with the holes between the ridges in the main casting. Replace the two flathead screws and turn them as far as they will go.

32. MASTER LENS FLANGE.

a. Removal. Unscrew and remove the lens from the camera and turn the three binding head screws until the master lens flange [fig. 9 (9)] can be removed from the camera.

b. Replacement. Place the camera on its back. Set the flange into the depression in the camera front so that the witness mark on the lens flange is at the top center of the camera. With the 4-inch screwdriver, replace the three binding head screws.

NOTE: The master lens flange is not an interchangeable part. The lens flange on each camera has been fitted to that individual camera only. Replacement of the master lens flange is a fifth echelon repair.

33. TRIPOD SOCKET PLATE.

a. Removal. To remove the tripod socket plate [fig. 2 (14)] place the camera on its top. Turn the four flathead screws and lift the plate from the bottom of the camera.

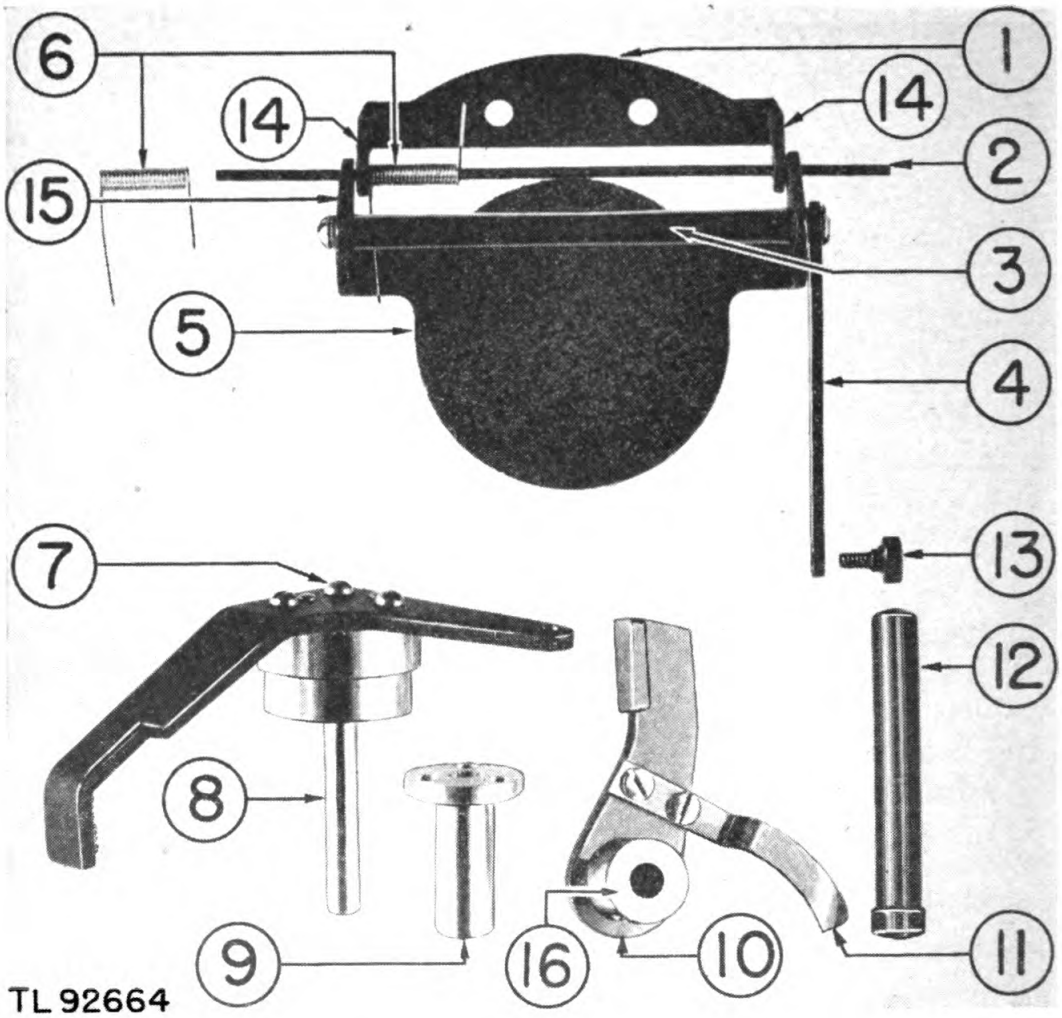
b. Replacement. With the camera turned on its top, place the new tripod socket plate on the camera body so that the four holes in the plate are in alignment with the four threaded holes in the camera body. Replace the four flathead screws.

34. CAMERA HANDLE ASSEMBLY (fig. 15).

a. Removal. Place the camera on its right side with the strap handle facing up. To remove the handle turn the four flathead screws and lift off the handle and the four handle retaining studs. These studs and the tubular shafts to which they fit may be replaced as piece parts, components, or as a portion of the entire assembly.

b. Replacement.

(1) To replace the camera handle set one of the four handle retaining studs on the left-side plate with the hole in the stud



1. Light-lock door hinge
2. Light-lock door hinge shaft
3. Light-lock door shaft
4. Light-lock connecting link
5. Light-lock door
6. Light-lock door springs
7. Light-lock actuating arm assembly
8. Light-lock actuating arm shaft
9. Light-lock actuating arm bearing
10. Shutter actuating arm
11. Flash contact arm
12. Shutter-release plunger shaft
13. 3-48 special screw
14. Light-lock door hinge flanges
15. Light-lock door arms
16. Shutter actuating arm bushing

Figure 19. Light-lock door assembly.

in alignment with the top front hole in the left-side plate. The countersunk portion of the studs must face upward. Replace the flathead screw.

(2) Repeat this operation with the bottom front handle retaining stud. Leave the screws loose so that the tubular shafts may be inserted at the proper angle.

(3) Slip the short tubular shaft over the lug on the top handle retaining stud. Slip either one of the metal ends of the handle over this tubular shaft and then insert the lug of another handle retaining stud into the open end of the tubular shaft.

(4) Replace the flathead screw and tighten both holding screws. The upper portion of the handle is now attached to the camera.

(5) Repeat this procedure [subpars. (3) and (4) above] to attach the lower end of the handle, using the long tubular shaft for this end.

35. LEFT-SIDE PLATE ASSEMBLY.

a. Removal.

(1) Place the camera on its right side. Remove the two flathead screws which hold the spring-tension release cover plate [fig. 23 (3)]. Remove the cover plate and lift off the spring-tension release lever [fig. 23 (2)].

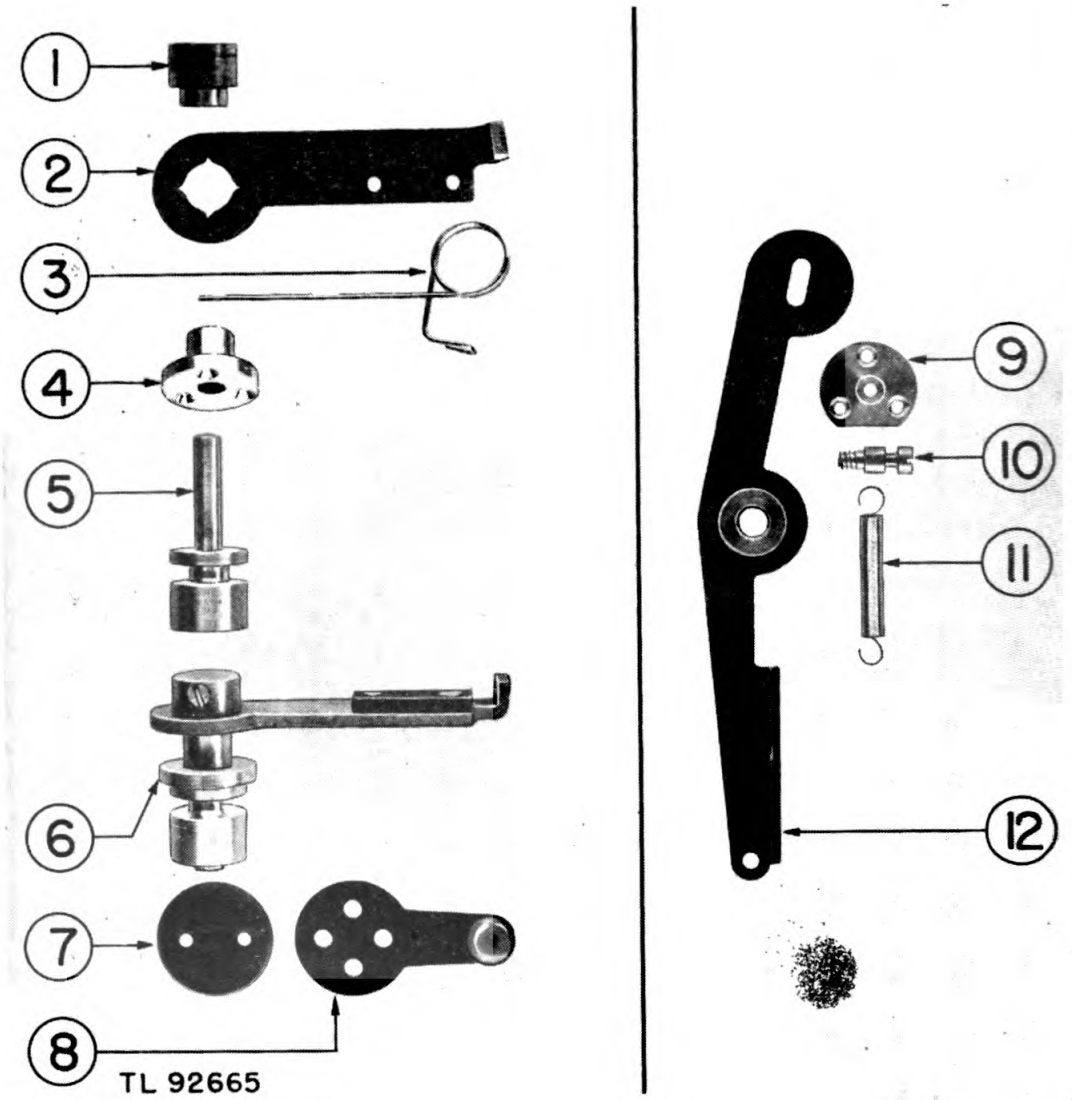
(2) Remove the five flathead left-side plate assembly screws. (See figure 21 for view of camera with left-side plate removed.) Remove the handle retaining screws, which are taped into the camera case. Then lift off the left-side plate [fig. 15 (1)].

b. Replacement.

(1) With the camera on its right side, place the left-side plate on the camera body with the five holes in the plate in alignment with the five threaded holes in the camera body. Replace the five flathead screws.

(2) Place the spring-tension release lever over the spring tension release lever connecting shaft [fig. 21 (4)] which protrudes through the left-side panel. Set the two holes which are in line with the lever handle over the two fillister-head screws in the spring-tension release lever connecting shaft. The handle of the spring-tension release lever must face the arrow engraved on the left-side plate.

(3) Set the spring-tension release cover plate over the spring-tension release lever, aligning the two countersunk holes in



1. Escapement arm bushing
2. Escapement arm
3. Escapement arm spring
4. Curtain-release lever shaft bearing
5. Curtain-release lever connecting shaft
6. Assembled escapement arm
7. Curtain-release lever cover plate
8. Curtain-release lever
9. Speed-indicator shaft
10. Speed-indicator arm tension spring stud
11. Speed-indicator arm tension spring
12. Speed-indicator arm

Figure 20. Escapement arm and speed-indicator arm assemblies.

the cover plate with the two threaded holes in the spring-tension release lever connecting shaft. Replace the two flathead screws. Replace the handle and the handle retaining screws.

36. RIGHT-SIDE PLATE ASSEMBLY.

a. Removal.

(1) Place the camera on its left side on a flat surface with the carrying handle down. Let the edge of the front cover rest on the flat surface for support. Place the $\frac{1}{16}$-inch punch in the holes of the knurled screws [fig. 28 (14)] on the spring-tension cover plate and the curtain-winding cover plate [fig. 24 (15) and (16)]. Remove these screws and lift off the spring-tension cover plate and the curtain-winding cover plate.

NOTE: A $\frac{1}{16}$-inch stop pin, $\frac{1}{4}$-inch in length, protrudes from the surface of the curtain-winding cover plate. This pin is the only difference between the two cover plates. Immediately below the curtain-winding cover plate is a brass thrustwasher [fig. 24 (14)], which can be lifted out with the needlenose pliers.

(2) Remove the two flathead screws in the curtain-release lever [fig. 20 (8)]. Lift off the curtain-release lever cover plate [fig. 20 (7)] and the curtain-release lever.

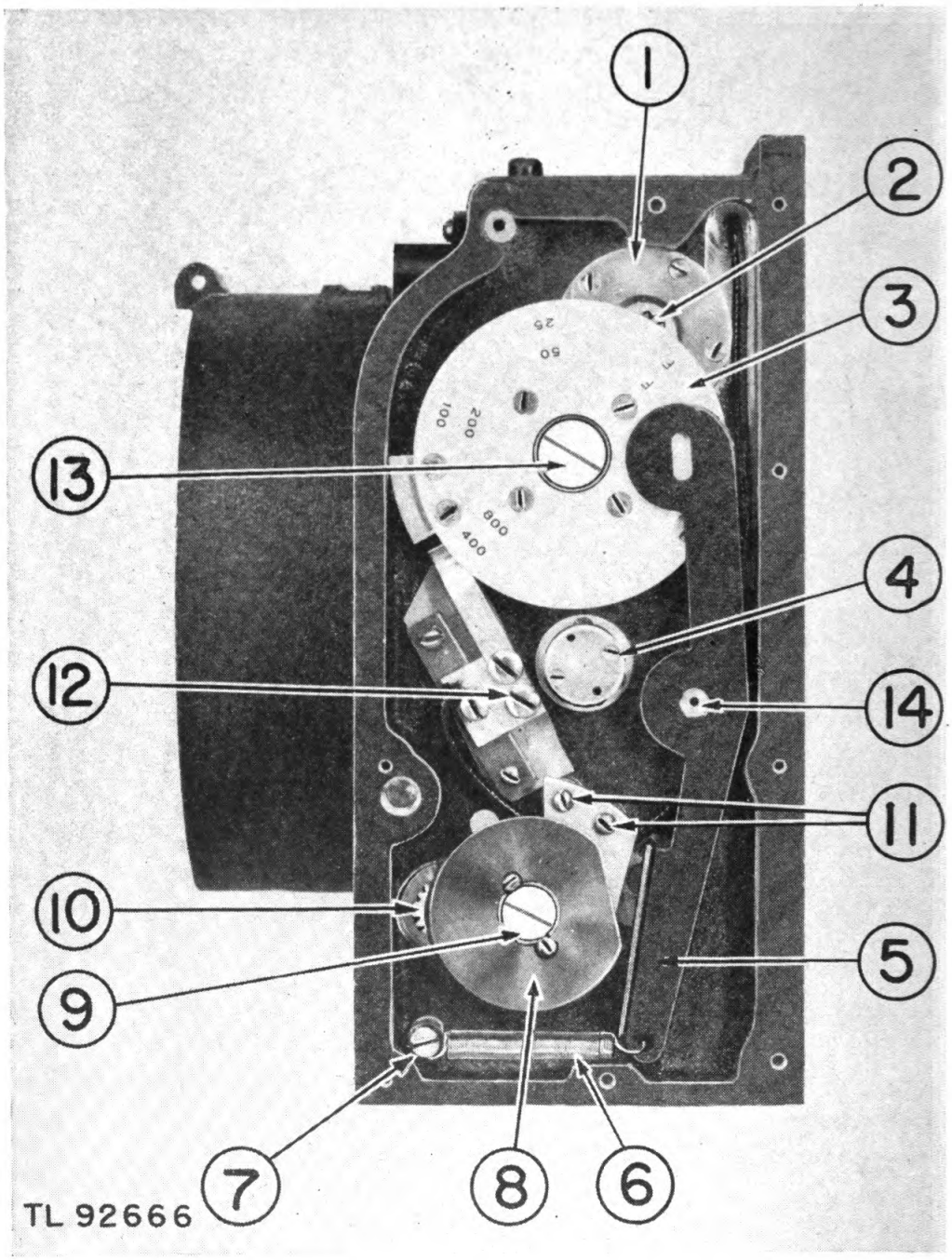
(3) Remove the eight side-plate assembly flathead screws and lift off the right-side plate when the shutter mechanism will come into view (fig. 25).

b. Replacement.

(1) Lay the camera on its left side. Place the right-side plate on the camera body, aligning the eight holes in the plate with the eight threaded holes in the camera body. Replace the eight flathead screws.

NOTE: The stop pin [fig. 25 (17)] in the curtain-winding spring housing [fig. 25 (3)] must point toward the top of the camera when the right-side plate is replaced, or the plate will not rest firmly on the camera side.

(2) Place the curtain-release lever on the curtain-release lever connecting shaft [fig. 25 (13)], which projects through the right-side plate. The handle of the lever should point upward toward the arrow engraved on the plate. With the handle in this position, two of the holes in the curtain-release lever will slip over the two screws in the curtain-release lever shaft (fig. 25). Place the curtain-release lever cover plate on the curtain-release lever with the two countersunk holes upward and in line with the two threaded holes in the curtain-release lever connecting shaft. Replace the two flathead screws.



1. Upper roller stop plate
2. Pilot gear assembly
3. Speed dial
4. Spring-tension release lever connecting shaft
5. Speed-indicator arm
6. Speed-indicator arm tension spring
7. Speed-indicator arm tension spring stud
8. Speed-indicator arm cam
9. Speed-indicator arm cam retaining screw
10. Left transverse gear
11. Spring-tension stop plate screws
12. Left flash contact
13. Speed dial retaining screw
14. Speed-indicator arm shaft

Figure 21. Camera PH-501/PF, left-side view, plate removed.

(3) Place the spring-tension cover plate [fig. 28 (15)], with its bevelled side up, on the spring-tension compound gear studs [fig. 25 (8)]. The two holes in the cover plate must be in line with the two threaded holes in the compound gear studs. Turn the two knurled screws [fig. 28 (14)] into these threaded holes. Insert the $\frac{1}{16}$-inch drive pin into the holes drilled through the head of the knurled screws and turn them clockwise until tight.

(4) Slip the thrustwasher over the head of the curtain-winding assembly retaining stud [fig. 24 (12)] so that it covers the curtain-winding cover plate reset spring [fig. 24 (13)].

(5) To replace the curtain-winding cover plate turn the curtain-winding spring housing one-quarter turn counterclockwise. Holding the spring housing in this position, place the curtain-winding cover plate, pin down, against the stop pin on the right-side plate. Align the two holes in the curtain-winding cover plate with the threaded holes in the curtain-winding spring housing. Replace the knurled screws [fig. 24 (16)] and tighten them with the $\frac{1}{16}$-inch drive punch.

37. CAMERA BACK AND FILM HOLDER ASSEMBLY.

a. Removal of Camera Back. Place the camera face down so that the twelve flathead screws are in view. Remove these screws and lift off the back assembly. This will bring the shutter into view (fig. 17).

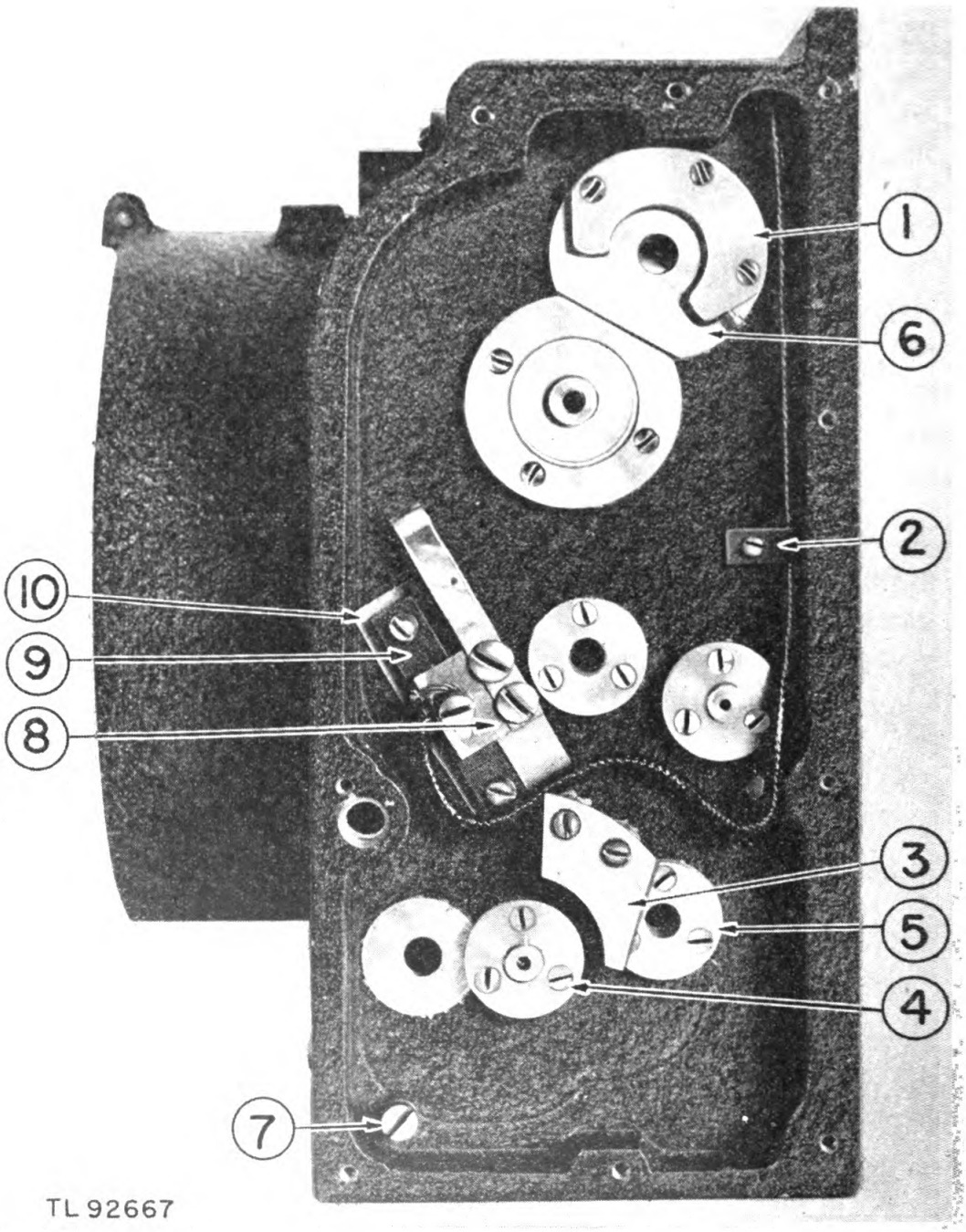
b. Replacement of Camera Back. Set the back into the recess machined into the back of the camera body, so that the rear peepsight [fig. 16 (1)] is at the top of the camera. Replace the twelve flathead screws.

c. Removal of Film-Tab Protecting Cover and Tension Spring.

(1) Place the camera back [fig. 16 (12)] face upward upon a flat surface and move the two flathead screws. Turn the camera back on its face and remove one of the film-tab protecting cover bearings [fig. 16 (6)]. Slip the film-tab protecting cover [fig. 16 (2)] out of the remaining bearing.

(2) Take out the two roundhead screws and remove the film-tab protecting cover tension spring [fig. 16 (3)].

d. Replacement of Film-Tab Protecting Cover and Tension Spring. Place the film-tab protecting cover tension spring against the right edge of the film-pack holder [fig. 16 (10)] so that the two holes in the spring are in alignment with the two threaded holes in the right edge of the film-pack holder.



1. Upper roller stop plate
2. Flash wire clamp
3. Spring-tension stop plate
4. Speed-indicator arm cam shaft
5. Left lower roller shaft bearing
6. Left upper roller bearing housing
7. Speed-indicator arm tension spring stud
8. Left flash contact
9. Left fiber insulator
10. Paper insulator

Figure 22. Camera PH-501/PF, left-side view, speed-indicator and speed dial assemblies removed.

Replace the two roundhead screws. Insert the film-tab protecting cover shaft [fig. 16 (11)] into one of the film-tab protecting cover bearings so that the cover closes inward against the film-pack holder. Slip the remaining film-tab protecting cover bearing over the exposed end of the cover shaft. Align the two threaded holes in the bearing with the holes in the camera back. These holes are countersunk on the inside surface of the camera back. Replace the two flathead screws.

e. Removal of Film-pack Holder Pressure Spring. To remove the film-pack holder pressure spring, hold the camera back in one hand and turn the two flathead screws, which hold the film-pack holder end pressure spring [fig. 16 (4)].

f. Replacement of Film-pack Holder Pressure Spring. To replace the pressure spring, set it against the inside left edge of the film-pack holder so that the two holes in the spring are in line with the threaded holes on the inside edge of the film-pack holder. Replace the two flathead screws.

g. Removal of Film-pack Holder Cover Locking-spring Brackets [fig. 16 (5)]. Remove the two fillister-head screws located on each of these brackets and lift brackets from film-pack holder.

h. Replacement of Film-pack Holder Cover Locking-spring Brackets. Place the left bracket against the top of the film-pack holder at the open end with the two holes in the bracket aligned with the threaded holes in the top of the film-pack holder. Replace the two fillister-head screws. Repeat this procedure with the right locking spring bracket at the bottom of the film-pack holder.

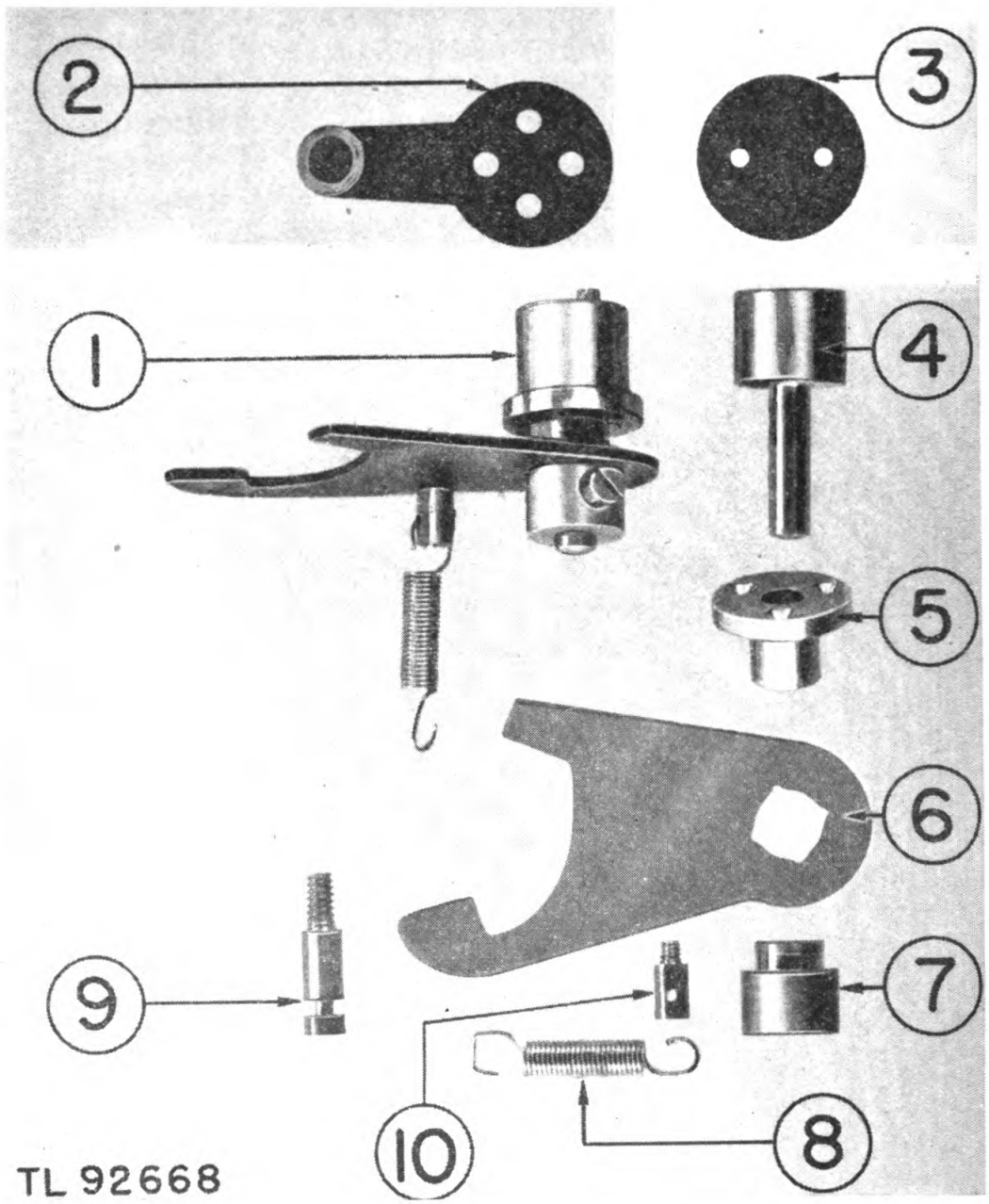
i. Removal of Film-pack Holder Cover. Remove the two fillister-head screws located at the top and bottom of the closed end of the film-pack holder and remove the film-pack holder cover.

j. Replacement of Film-pack Holder Rear Cover. Place the solid block end of the film-pack holder rear cover [fig. 16 (8)] between the sides of the film-pack holder at the left side. The holes in both ends of the cover must coincide with the holes at top and bottom of the film-pack holder sides. Replace the two fillister-head screws.

k. Removal of Rear Peepsight Assembly.

(1) Place the camera back face down on a flat surface. Remove the rear peepsight leaf spring [fig. 6 (12)] by turning the two roundhead screws at the base of the spring.

(2) Remove the rear peepsight [fig. 6 (1)] from the rear



1. Spring-tension release (complete assembly)
2. Spring-tension release lever
3. Spring-tension release cover plate
4. Spring-tension release lever connecting shaft
5. Spring-tension release connecting shaft bearing
6. Spring-tension release plate
7. Spring-tension release plate bushing
8. Spring-tension release spring
9. Spring-tension release spring stud
10. Spring-tension release plate stud

Figure 23. Spring-tension release assembly.

peepsight brackets [fig. 6 (10)] by taking out the two fillister-head screws at the left and right of the peepsight.

(3) To remove the rear peepsight brackets take out the four roundhead screws.

l. Replacement of Rear Peepsight Assembly.

(1) Set the left peepsight bracket [fig. 16 (9)] on the back cover of the camera with the two holes in the bracket in alignment with the two threaded holes at the top (left) of the camera back. Replace the two roundhead screws. Follow the same procedure with the right peepsight bracket.

(2) Place the rear peepsight leaf spring between the brackets, with the bent side upward and the two holes at the bottom of the spring aligned with the corresponding threaded holes in the camera back. Replace the two roundhead screws.

(3) Place the rear peepsight between the brackets, with the square solid part at the bottom of the sight, against the top of the leaf spring. Press inward slightly until the holes at both ends of the sight are in alignment with the holes in both ends of the rear peepsight brackets. Replace the two screws at either side of the peepsight.

38. LIGHT-LOCK DOOR ASSEMBLY.

a. Removal of Right-side Plate. Follow the procedure outlined in paragraph 36.

b. Removal of Shutter Actuating Arm [fig. 25 (5)]. Remove the flathead screw and lift off the shutter actuating arm.

NOTE: A copper flash contact arm [fig. 25 (12)] is attached to the lower portion of the shutter actuating arm by two 2-56 by ⅛-inch binding head screws. These screws are center-punched at their base and cannot be removed. Replacement of this contact arm as a piece part will be attempted only in a fourth echelon maintenance shop or higher. In lower echelons of repair the entire actuating arm must be replaced as an assembly.

c. Removal of Light-Lock Door Assembly.

(1) To remove the light-lock door assembly [fig. 19 (5)] take out the two binding head screws [fig. 18 (13)].

(2) Lift the light-lock door upward until it clears the camera body. Withdraw the door from the camera by drawing it to the left until the light-lock actuating arm shaft [fig. 19 (8)] is free of the bearing in the right side of the camera body. Lift the light-lock door assembly out of the camera.

d. Disassembly of Light-Lock Door Assembly.

(1) With the No. 5 jeweler's screwdriver, remove the 3-48 special screw [fig. 19 (13)] which connects the light-lock

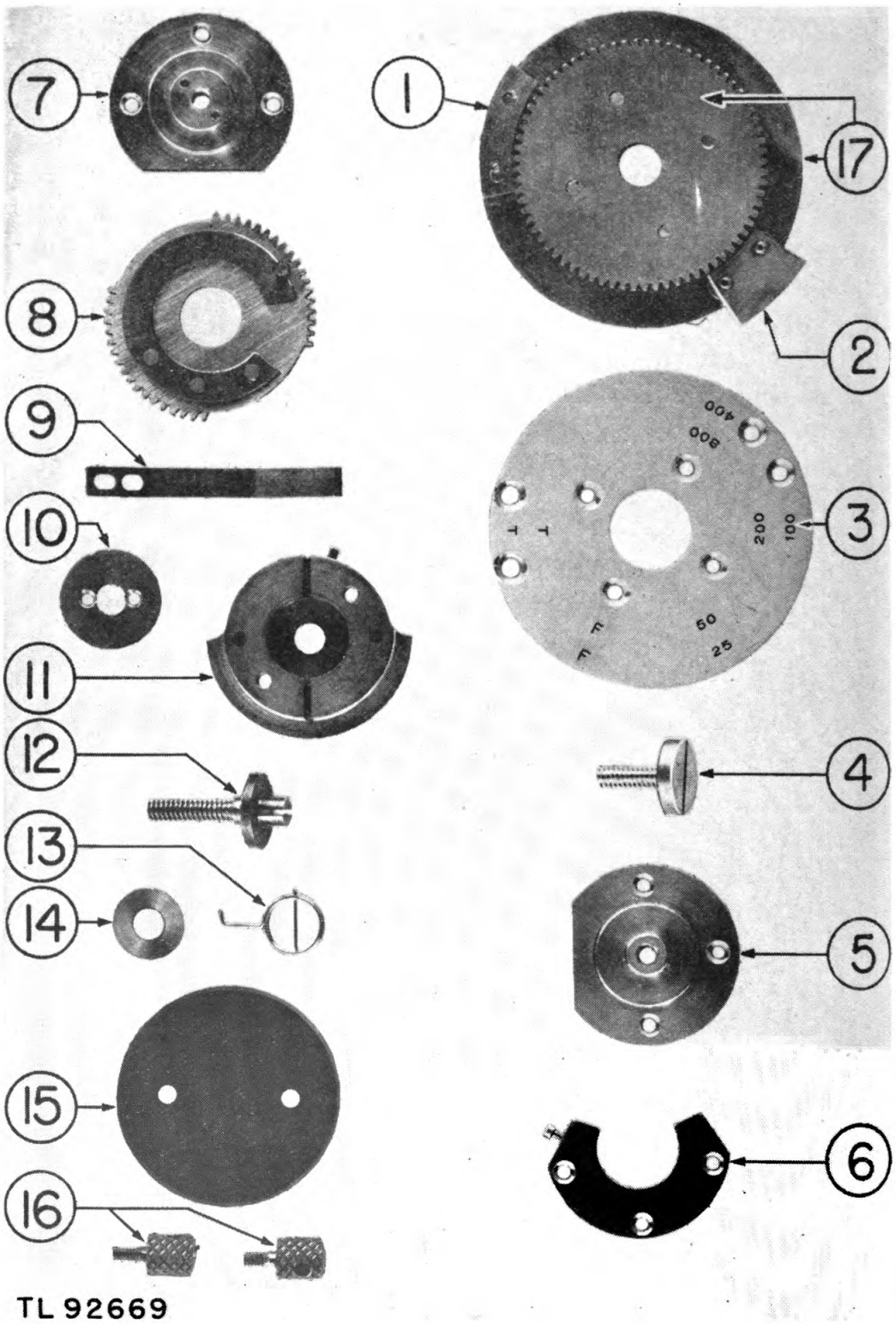


Figure 24. Curtain-winding and speed dial assemblies.

actuating arm [fig. 19 (7)] with the light-lock connecting link [fig. 19 (4)].

(2) Remove the light-lock connecting link by taking out the binding head screw.

(3) Remove the light-lock door springs [fig. 19 (6)] by grasping the light-lock door hinge shaft [fig. 19 (2)] at either protruding end with the needlenose pliers and pulling the shaft free. The springs will drop off the shaft.

e. Reassembly of Light-Lock Door Assembly.

(1) To replace the light-lock door springs, place the door face down upon a flat surface. Place the door hinge [fig. 19 (1)] alongside the light-lock door with the two projecting flanges [fig. 19 (14)] nested within the door arms [fig. 19 (15)] so that the holes in the hinge flanges are aligned with the holes in the light-lock door arms.

(2) Thread the light lock-hinge shaft through the holes at one side, half the length of the shaft.

(3) Hold the spring in one hand. Grasp the short end of the spring with the needlenose pliers and give the spring a half-turn counterclockwise with the pliers to increase its tension. Slip the spring, still held in the needlenose pliers, over the open end of the shaft so that the long end of the spring rests against the light-lock door and the short end rests against the hinge.

NOTE: The two light-lock door springs are identical and must be placed on the light-lock door shaft in the same manner.

Key to figure 24.

1. Speed dial fixed stop
2. Speed dial flash contact lug
3. Speed dial face
4. Speed dial assembly retaining screw
5. Speed dial bearing
6. Upper roller stop plate
7. Mutilated gear bearing
8. Mutilated gear assembly
9. Mutilated gear stop
10. Retaining washer
11. Curtain-winding spring housing
12. Curtain-winding assembly retaining stud
13. Curtain-winding cover plate reset spring
14. Thrustwasher
15. Curtain-winding cover plate
16. Curtain-winding cover plate knurled screws
17. Speed dial assembly

(4) Grasp the extruding end of the light-lock door shaft with the needlenose pliers. Force the shaft through the holes at the opposite end of the light-lock door and hinge so that the shaft extends at both right and left of the hinge.

(5) To replace the light-lock connecting link, place the light-lock door face down upon a flat surface. Place the connecting link so that one of the holes at either end is aligned with the hole in the right end of the door shaft. With the spread-type screwdriver, turn the binding head screw into the opening in the shaft.

(6) Place the light-lock actuating arm [fig. 19 (7)] against the outer surface of the connecting link so that the hole in the short arm of the actuating arm is in alignment with the hole in the end of the connecting link. With the spread-type screwdriver, turn the 3-48 special screw as far as it will go and tighten.

f. Replacement of Light-Lock Door Assembly into Camera.

(1) Place the camera face down. Hold the light-lock door hinge [fig. 18 (12)] in the left hand. Set the assembly into the camera so that the light-lock actuating arm shaft can be inserted into the actuating shaft bearing [fig. 18 (14)].

(2) Set the light-lock door hinge into the body of the camera with the two holes in the hinge in alignment with the threaded holes in the camera body provided for them.

(3) Replace the two binding head screws with the spread-type screwdriver. Tighten the screws with the 4-inch screwdriver.

NOTE: Because of the tension of the light-lock door springs, it is essential that the light-lock door be held perfectly flat against the inside face of the camera while these screws are being replaced. This will prevent the screws from entering the threaded holes in the camera at an angle.

g. Replacement of Shutter Actuating Arm. Place the camera on its left side. Set the shutter actuating arm bushing [fig. 19 (16)] over the light-lock actuating arm shaft [fig. 19 (8)]. Replace the flathead screw in the shutter actuating arm bushing.

h. Removal of Light-Lock Actuating Arm Bearing [fig. 27 (4)]. Turn the three flathead screws and push the bearing upward from inside the camera body.

i. Replacement of Light-Lock Actuating Arm Bearing [fig. 19 (9)]. Place the camera upon its left side. Insert the shaft of the bearing into the hole in the right side of the camera body so

that the three holes in the flat upper plate of the bearing are in line with the three threaded holes in the camera. Replace the three flathead screws.

j. Removal of Shutter-Release Plunger Shaft [fig. 19 (12)]. Turn the fillister-head screw located at the inside end of the plunger shaft and slide the plunger shaft out of the camera.

k. Replacement of Shutter-Release Plunger Shaft. Place the camera on its right side. Insert the tapped end of the plunger shaft into the hole on the right of the camera front so that it projects through to the inside of the camera. With the spread-type screwdriver, replace the fillister-head screw, which acts as a stop, into the threaded hole at that end of the plunger shaft [fig. 25 (4)] which is inside the camera, and tighten.

39. ESCAPEMENT ARM ASSEMBLY.

a. Removal of Right-Side Plate. Follow procedure outlined in paragraph 36.

b. Removal of Camera Back. Follow procedure outlined in paragraph 37a.

c. Removal of Escapement Arm Assembly. Place the camera cover down. To remove the escapement arm [fig. 17 (3)] turn the brass flathead screw and draw the curtain lever release connecting shaft [fig. 17 (6)] outward. This enables the escapement arm to drop down and be lifted out of the camera. Release of the escapement arm will disengage the escapement arm spring [fig. 17 (5)] which can also be lifted out of the camera.

d. Removal and Replacement of Curtain-Release Lever Shaft Bearing [fig. 20 (4)]. Place the camera upon its left side. Turn the three flathead screws and press the bearing upward to remove it from the camera. To replace the bearing, reverse the procedure.

e. Replacement of Curtain-Release Lever Connecting Shaft. Place the camera on its left side. Insert the curtain-release lever connecting shaft [fig. 20 (5)] into the bearing.

> **NOTE:** This shaft is exactly like the spring-tension release lever connecting shaft [fig. 23 (4)] except for the deep groove cut in the head of the shaft. This groove provides clearance for the right flash wire and holds the right flash wire in place.

f. Replacement of Escapement Arm and Escapement Arm Spring.

(1) Place the camera face down. Hold the escapement arm [fig. 20 (2)] in the left hand. Place the escapement arm spring

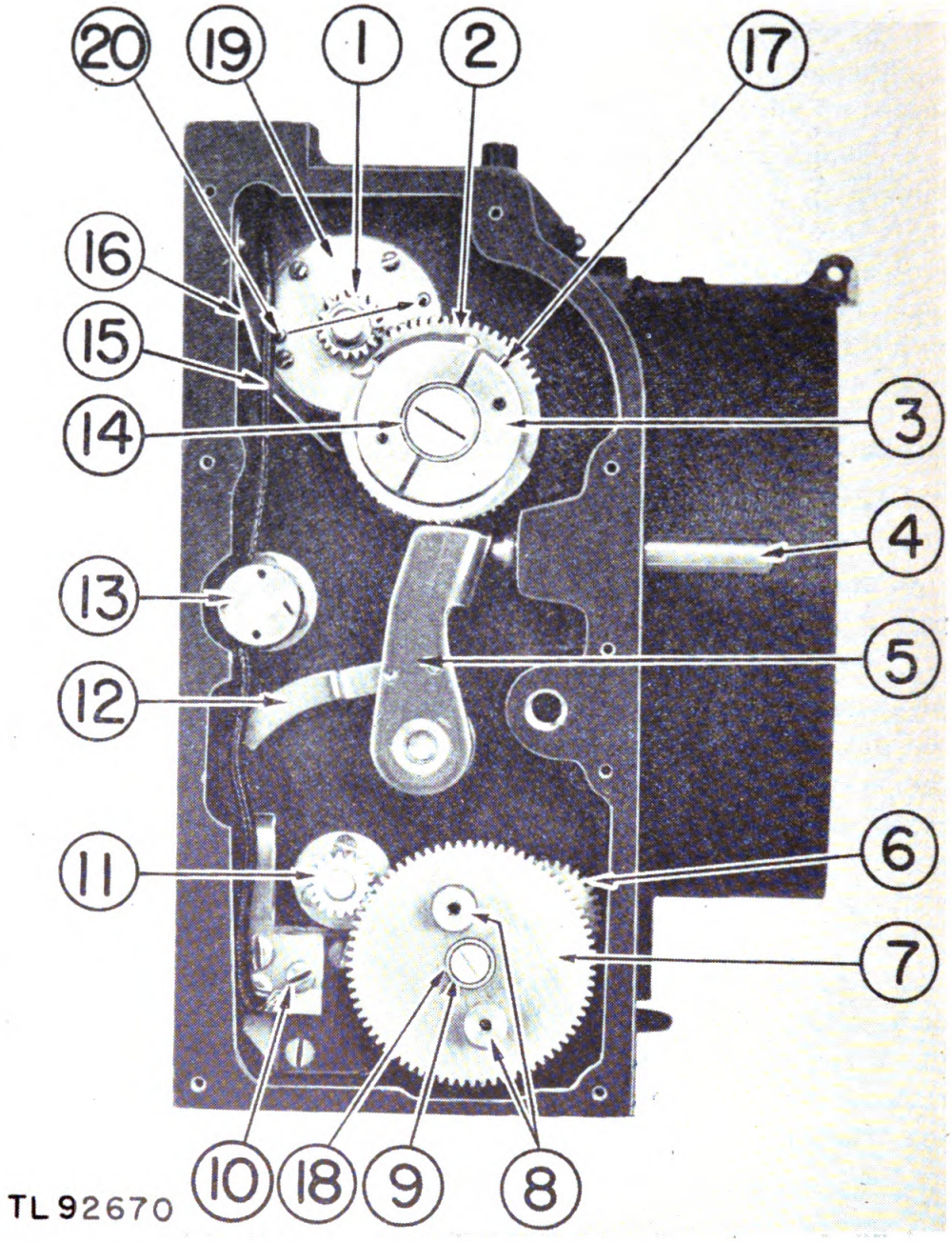


Figure 25. Camera PH-501/PF, right-side view, plate removed.

[fig. 20 (3)] against the outside surface of the escapement arm so that the short hooked end of the spring rests upon the escapement arm [fig. 18 (2)] and the coil of the spring is in line with the opening in the escapement arm bushing.

(2) With the thumb and forefinger of the right hand, draw the long end of the spring down and set the opening in the bushing of the escapement arm upon the curtain-release lever shaft so that the long arm of the escapement arm spring rests upon the light-lock actuating shaft bearing [fig. 18 (14)]. In this position, the tension provided by the escapement arm spring will hold the escapement arm in place.

(3) With the No. 5 screwdriver, lift the coil of the escapement arm spring up onto the curtain-release shaft bushing. Press the escapement arm fully onto the curtain-release lever connecting shaft [fig. 17 (6)].

(4) Turn the camera on its base so that the countersunk hole in the escapement arm faces the repairman. Turn the curtain-release lever connecting shaft until the hole in the inside end of the shaft is in line with the hole in the escapement arm. With the spread-type screwdriver, replace the flathead screw which connects the escapement arm to the curtain-release lever connecting shaft.

40. SPEED-INDICATOR ARM ASSEMBLY.

a. Removal and Replacement of Left-Side Plate. Follow the procedures outlined in paragraph 35.

Key to figure 25.

1. Curtain-winding gear
2. Mutilated gear
3. Curtain-winding spring housing
4. Shutter-release plunger shaft
5. Shutter actuating arm
6. Right transverse gear
7. Spring-tension compound gear
8. Compound gear studs
9. Compound gear retaining screw
10. Right flash contact
11. Lower curtain roller tension gear
12. Flash contact arm
13. Curtain-release lever connecting shaft
14. Curtain-winding assembly retaining stud
15. Right flash wire
16. Mutilated gear stop
17. Stop pin
18. Compound gear washer
19. Right upper curtain roller bearing housing
20. Upper curtain roller bearing housing pins

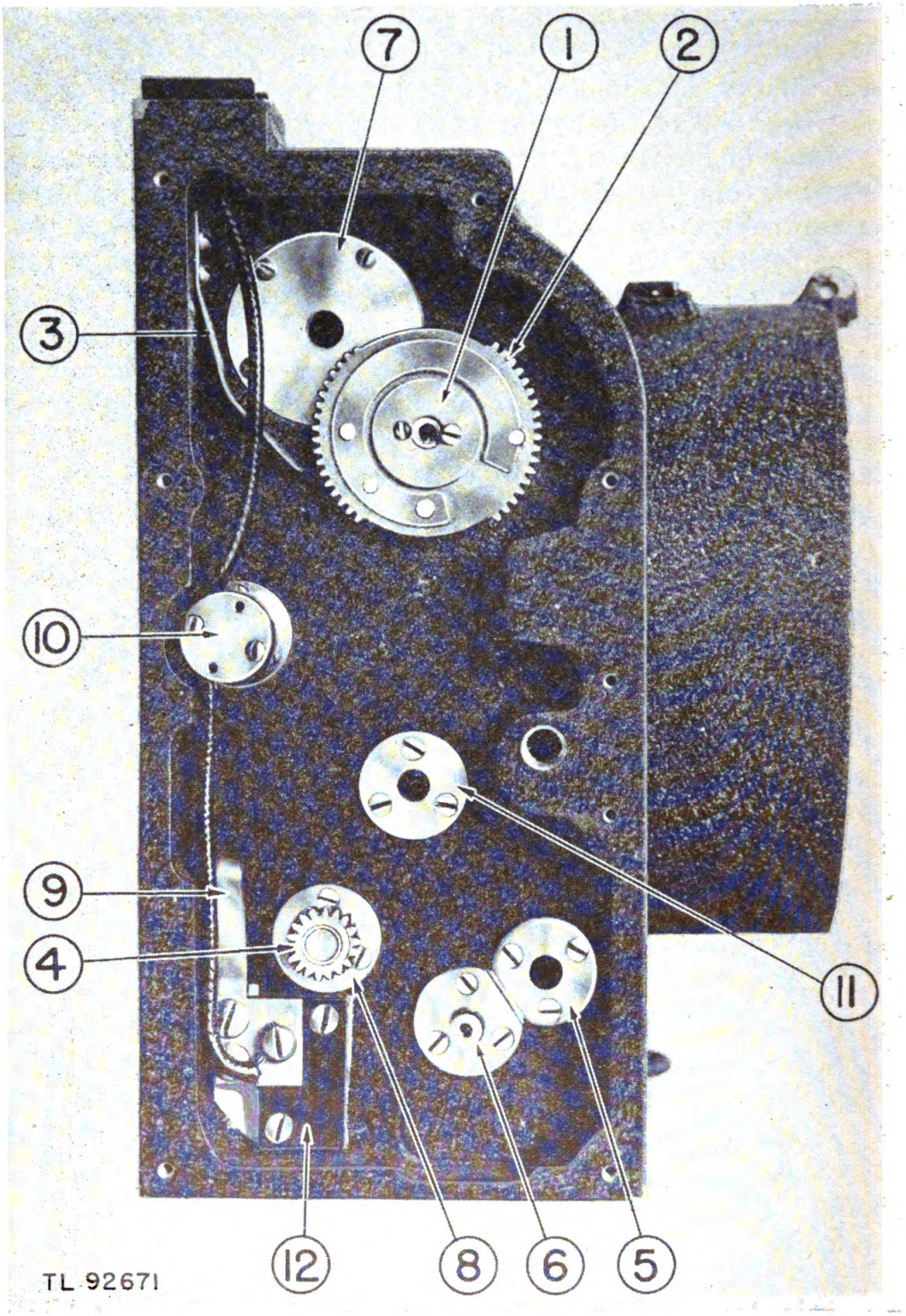


Figure 26. Camera PH-501/PF, right-side view showing bearings and mutilated gear.

b. Removal of Speed-Indicator Arm Tension Spring, and Tension-Spring Stud. With the left-side plate removed, lift the speed-indicator arm [fig. 21 (5)] off the speed-indicator arm shaft [fig. 21 (14)]. Remove the speed-indicator arm tension spring [fig. 21 (6)].

c. Replacement of Speed-Indicator Arm, Tension Spring, and Tension-Spring Stud. Place the camera on its right side. Slip one end of the speed-indicator arm tension spring over the head of the stud so that the spring rests in the machined slot in the stud. Engage the other end of the spring in the hole at the lower end of the speed-indicator arm. Exert tension on the spring and slip the speed-indicator arm onto the speed-indicator shaft.

41. SPRING-TENSION RELEASE ASSEMBLY.

a. Removal and Replacement of Left-Side Plate. Follow instructions in paragraph 35.

b. Removal of Camera Back [fig. 6 (11)]. Follow instructions in paragraph 37*a*.

c. Removal of Spring-Tension Release Assembly. Place the camera so that it rests with its cover down. With the needle-nose pliers, lift the spring-tension release spring [fig. 17 (10)] off the groove in the spring-tension release spring stud [fig. 17 (11)]. This spring is not removed from the camera but remains attached at its lower end.

d. Removal of Spring-Tension Release Lever Connecting Shaft [fig. 21 (4)]. Turn the flathead screw and withdraw the connecting shaft. The spring-tension release assembly is now completely disconnected within the camera body and can be lifted out.

e. Removal and Replacement of Spring-Tension Release Connecting Shaft Bearing [fig. 23 (5)]. Turn the three flathead screws and lift the bearing out of the camera body. To replace the bearing, reverse this procedure.

Key to figure 26.

1. Retaining washer
2. Mutilated gear
3. Mutilated gear stop
4. Lower curtain roller tension gear
5. Transverse shaft bearing
6. Spring-tension compound gear shaft
7. Right upper curtain roller bearing housing
8. Right lower curtain roller shaft bearing
9. Right flash contact
10. Curtain-release lever connecting shaft
11. Light-lock actuating arm bearing
12. Right fiber insulator

f. Replacement of Spring-Tension Release Assembly.
(1) Place the camera on its face. Insert the spring-tension release lever connecting shaft [fig. 23 (4)] so that the shaft projects into the body of the camera. Slip the spring-tension release plate [fig. 23 (6)] onto the spring-tension release lever connecting shaft so that the hole in the bushing shoulder [fig. 17 (16)] is in alignment with the threaded hole in the connecting shaft. With the spread-type screwdriver, replace the flathead screw and tighten it.
(2) Insert the spring-tension release spring stud [fig. 23 (9)] through the hole provided for it in the left side of the camera body. Grasp the spring-tension release spring [fig. 23 (8)] with the needlenose pliers and bring it upward until it hooks over the groove in the spring-tension release spring stud.

42. SPEED DIAL ASSEMBLY.

a. Removal and Replacement of Left-Side Plate. Follow instructions in paragraph 35.

b. Removal of Camera Back. Follow instructions in paragraph 37*a*.

c. Removal of Speed Dial Assembly.
(1) Place the camera with the cover down. Remove the speed dial assembly retaining nut [fig. 17 (15)] with the $\frac{5}{16}$-inch open-end wrench. While removing this nut, hold the speed dial assembly retaining screw [fig. 21 (13)] with the 4-inch screwdriver.
(2) Place the camera on its right side and remove the speed dial assembly retaining 6-32 special screw.
(3) Turn the speed dial assembly [fig. 24 (17)] approximately $\frac{1}{4}$ inch counterclockwise so that the contact lug [fig. 24 (2)] of the speed dial assembly will clear the brass contact point.

d. Removal and Replacement of Speed Dial Bearing.
(1) Place the camera on its right side. Remove the speed dial bearing [fig. 24 (5)] by taking out the three flathead screws.
(2) To replace the speed dial bearing, set the bearing in position on the left side of the camera so that the three countersunk holes in the bearing face upward and are in alignment with the three threaded holes in the camera side. Replace the three flathead screws.

e. Reassembly and Replacement of Speed Dial Assembly.
(1) Place the camera on its right side. Place the speed dial [fig. 21 (3)] upon the speed dial bearing with the speed dial flash contact lug between the blades of the left flash contact assembly.

(2) With the left hand, turn the upper curtain roller [fig. 17 (2)] downward until the upper curtain roller stop pin [fig. 17 (17)] rests against the escapement arm [fig. 17 (3)]. Hold the upper curtain roller in this position and set the speed dial [fig. 21 (3)] so that the fixed stop [fig. 24 (1)] on the speed dial is in contact with the upper roller stop plate [fig. 21 (1)] and engages the pilot gear assembly [fig. 21 (2)] at the end of the upper roller shaft.

(3) Set the speed dial assembly retaining screw [fig. 24 (4)] into the opening in the center of the speed dial and tighten the screw with the 4-inch screwdriver. The end of this screw will project into the inside of the camera.

(4) Place the 6-32 nut [fig. 17 (15)] on the inner end of the retaining screw and tighten with $\frac{5}{16}$-inch open-end wrench.

43. CURTAIN WINDING ASSEMBLY.

a. Removal of Right-Side Plate. Follow the instructions in paragraph 36.

b. Removal of Camera Back. Follow the instructions in paragraph 37*a*.

c. Removal of Curtain-Winding Assembly.

(1) Place the camera on its base with the camera back facing the repairman. Remove the curtain-winding disk 6-32 hexagonal retaining nut with the $\frac{5}{16}$-inch open-end wrench.

CAUTION: In removing the curtain-winding assembly retaining nut, the rubberized coating of the curtain must not be contaminated by either grease or oil.

(2) Remove spring and retaining washer before removing the special machine head stud. Place the camera on its left side. Remove the 6-32 special machine-head stud [fig. 25 (14)] (curtain-winding assembly retaining stud).

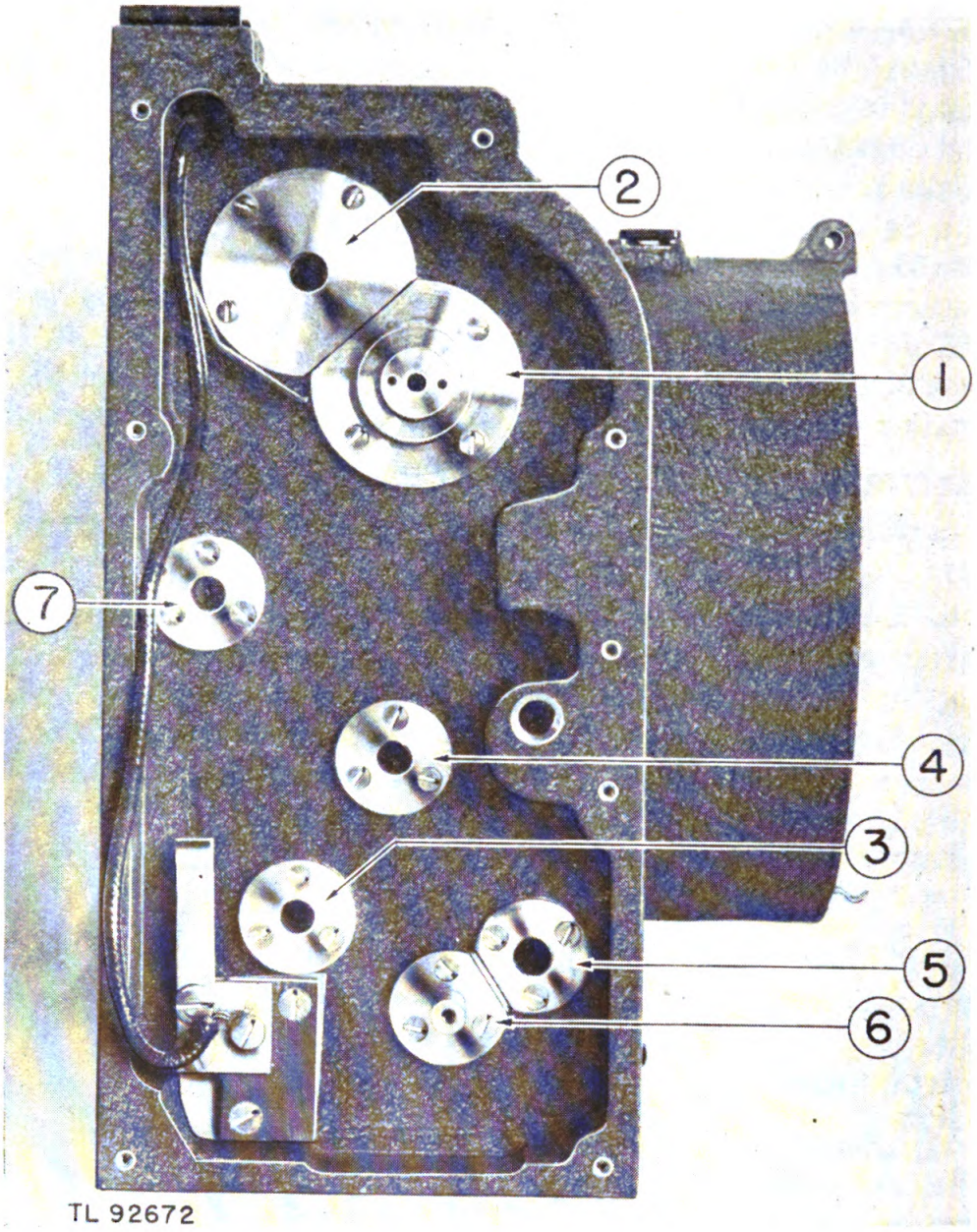
NOTE: Use the No. 4 screwdriver to remove this screw, as an oversize screwdriver will spread the head of the screw. This will cause the curtain-winding disk reset spring [fig. 24 (13)] to lie loosely, and the thrustwasher [fig. 24 (14)] will not fit the head.

(3) Lift off the curtain-winding spring housing [fig. 25 (3)].

(4) To remove the retaining washer [fig. 24 (10)] which holds the mutilated gear [fig. 26 (2)] in place, take out the two flathead screws and lift off the washer. Lift out the mutilated gear.

d. Replacement of Curtain-Winding Assembly.

(1) Set the mutilated gear on the mutilated gear bearing [fig. 27 (1)] with the spring attached to the gear facing upward. Place the retaining washer [fig. 26 (1)] with the countersunk holes facing upward, within the circle formed



1. Mutilated gear bearing
2. Right upper curtain roller bearing housing
3. Right lower curtain roller shaft bearing
4. Light-lock actuating arm bearing
5. Transverse shaft bearing
6. Spring-tension compound gear shaft
7. Curtain-release lever connecting shaft bearing

Figure 27. Camera PH-501/PF showing all right-side bearings.

by the spring on the mutilated gear, and with the holes in the washer aligned with the threaded holes in the mutilated gear. Replace the two flathead screws.

(2) Place the curtain-winding cam on the mutilated gear retaining washer with its bearing shoulder down. Place the curtain-winding assembly retaining stud [fig. 24 (12)] in the hole in the center of the curtain-winding cam. Turn this screw clockwise with the 4-inch screwdriver until the cam turns freely with as little play as possible. The end of the curtain-winding assembly retaining screw will project through to the inside of the camera.

(3) Place the camera on its right side. Place the 6-32 locking nut on the inside end of the curtain-winding assembly retaining screw and tighten it with the $\frac{5}{16}$-inch open-end wrench.

e. Removal of Mutilated Gear Stop [fig. 26 (3)]. Place the camera on its left side. Remove the two roundhead screws and lift the stop from the camera.

f. Replacement of Mutilated Gear Stop [fig. 26 (3)]. With the camera on its left side, set the stop against the right side of the camera body so that the two holes in the stop are in alignment with the two threaded holes in the camera body. Replace the two roundhead screws. Adjust the stop so that its lower end engages the teeth of the mutilated gear.

g. Removal and Replacement of Mutilated Gear Bearing [fig. 27 (1)]. First remove the curtain-winding assembly as described in subparagraph *c* above Take out the three flathead screws and lift the bearing out of the camera. To replace the bearing, reverse this procedure.

44. SPRING-TENSION WINDING ASSEMBLY.

a. Removal of Spring-Tension Compound Gear.

(1) Remove the right-side plate as described in paragraph 36*a*.

(2) Remove the spring-tension compound gear retaining screw [fig. 25 (9)] and washer [fig. 25 (18)] which hold the spring-tension compound gear [fig. 25 (7)] in place, and lift this gear off.

b. Removal of Speed-Indicator Arm Cam and Shaft.

(1) Remove the left-side plate as described in paragraph 35*a*.

(2) Remove the speed-indicator arm cam [fig. 21 (8)] by taking out the 3-48 special screw [fig. 21 (9)]. Lift the cam out. It will be noted that a relay gear [fig. 28 (9)] is attached to the cam by two flathead screws.

(3) To remove the speed-indicator arm cam shaft [fig. 22

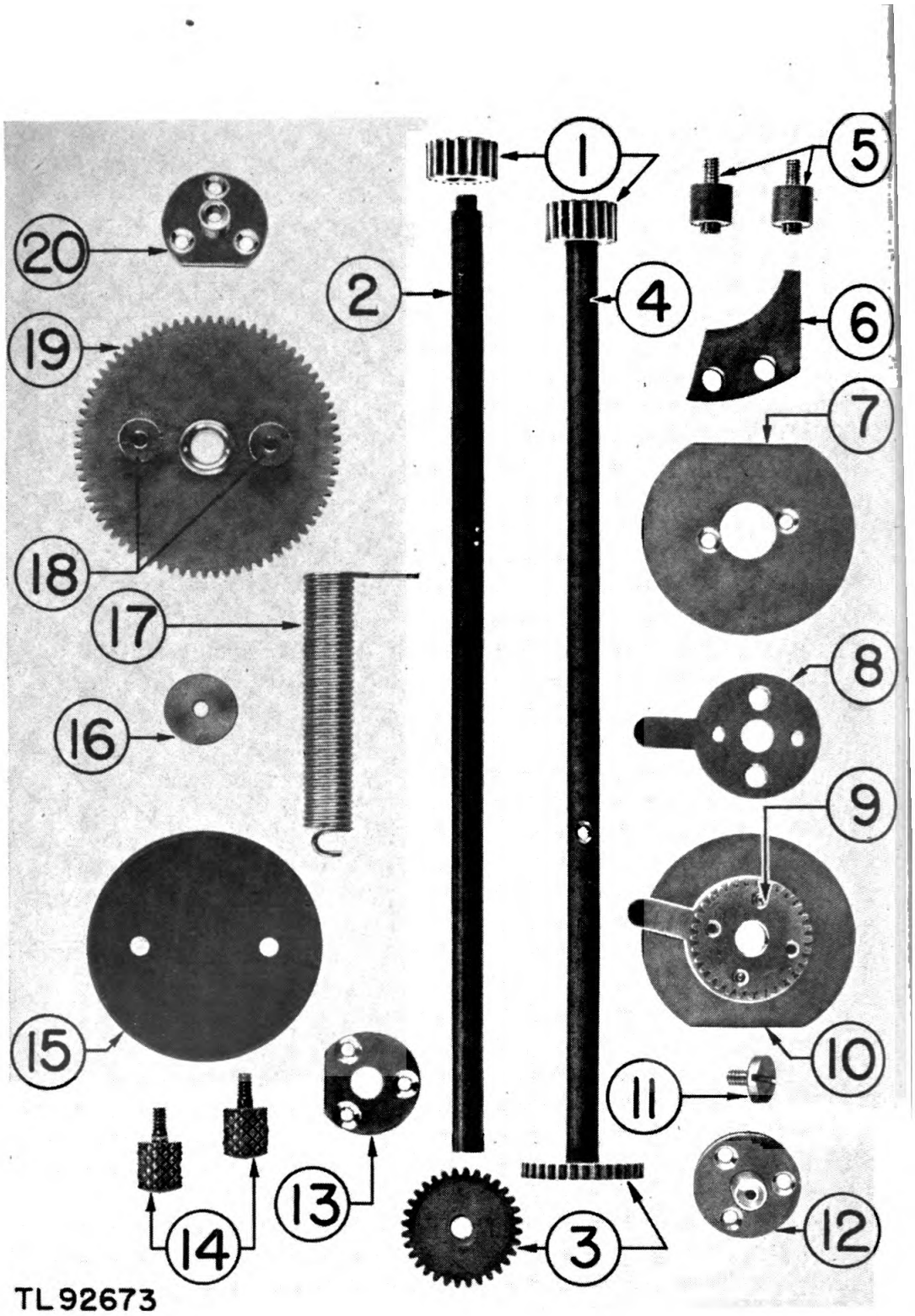


Figure 28. Spring-tension winding assembly.

(4)] turn the three flathead screws in the same manner and withdraw the shaft from the camera.

c. Removal of Left Transverse Gear.

(1) Place the camera on its right side. Remove the left transverse gear [fig. 21 (10)] by taking out the fillister-head screw.

(2) Place the drive punch on the transverse shaft [fig. 18 (5)]. With the 4-ounce ball-peen hammer, drive the shaft downward. This frees the left transverse gear, which can now be removed.

d. Removal of Transverse Shaft and Tension Winding Spring.

(1) Remove the camera back as described in paragraph 37*a*.

(2) Place the camera cover down. Turn the binding head screw until the spring is free of the transverse shaft [fig. 18 (5)]. Grasp the right transverse gear [fig. 25 (6)] and withdraw the shaft from the camera. The tension winding spring [fig. 18 (6)] will drop off the shaft within the camera and can now be removed.

e. Removal of Transverse Shaft Bearing. Place the camera on its left side. Remove the three flathead screws and lift the transverse shaft [fig. 26 (5)] bearing upward.

f. Removal of Spring-Tension Compound Gear Shaft [fig. 26 (6)]. Remove the three flathead screws and lift the shaft from the camera body.

Key to figure 28.

1. Left transverse gear
2. Transverse shaft
3. Right transverse gear
4. Tranverse shaft with left and right tranverse gears assembled
5. Spring-tension stop plate studs
6. Spring-tension stop plate
7. Speed-indicator arm cam
8. Speed-indicator arm
9. Relay gear
10. Speed-indicator cam, arm, and relay gear assembled
11. Speed-indicator arm cam retaining screw
12. Speed-indicator arm cam shaft
13. Transverse shaft bearing
14. Spring-tension cover plate knurled screws
15. Spring-tension cover plate
16. Spring-tension compound gear retaining washer
17. Spring-tension winding spring
18. Compound gear studs
19. Spring-tension compound gear assembly
20. Spring-tension compound gear shaft

g. Removal of Spring-Tension Stop Plate and Studs. Place the camera on its right side. To remove the spring-tension stop plate [fig. 22 (3)] take out the roundhead screws and lift the plate off. The spring-tension stop plate studs [fig. 28 (5)] can be removed by turning them counterclockwise with the needlenose pliers.

h. Replacement of Spring-Tension Compound Gear Assembly. Place the gear assembly [fig. 28 (19)] on the spring-tension compound gear shaft [fig. 28 (20)]. Set the spring-tension compound gear retaining washer [fig. 28 (16)] in place and align the hole in its center with the threaded hole in the spring-tension compound gear shaft. With the spread-type screwdriver, replace the roundhead screw and tighten it.

i. Replacement of Speed-Indicator Arm Cam.

(1) Place the camera on its base with the camera back facing the repairman. With the right hand, grasp the two studs [fig. 25 (8)] projecting from the compound gear and wind the gear two full turns clockwise. Hold the gear in this position.

(2) With the left hand, place the speed-indicator arm cam [fig. 28 (7)] on the speed-indicator arm cam shaft [fig. 22 (4)] on the left side of the camera so that the arm of the cam rests against the front edge of the spring-tension stop plate [fig. 28 (6)].

(3) Place the camera on its right side. With the spread-type screwdriver, replace the speed-indicator arm cam retaining screw [fig. 28 (11)] in the hole in the center of the cam shaft. Tighten it with the 4-inch screwdriver.

NOTE: The arm of the speed-indicator arm cam must rest against the spring-tension stop plate [fig. 22 (3)] when this unit is reassembled, or the spring tension will be lost and the speeds indicated in the speed indicator window will be inaccurate.

j. Replacement of Speed-Indicator Arm Cam Shaft [fig. 28 (12)]. Place the camera on its right side. Set the shaft into the holes in the lower left side of the camera body (fig. 22.) Replace the three flathead screws and tighten.

k. Replacement of Left Transverse Gear [fig. 28 (1)]. Place the camera on its right side. Slip the left transverse gear on the exposed end of the transverse shaft [fig. 28 (2)]. Align the hole in the side of the gear with the corresponding hole in the shaft and replace and tighten screw with the No. 2 jeweler's screwdriver.

NOTE: If the left transverse gear is mutilated in any way, replace it with a new part.

l. Replacement of Transverse Shaft, Shaft Bearing, and Tension Winding Spring.

(1) Set the transverse shaft bearing [fig. 28 (13)] into the hole on the right side of the camera [fig. 26 (5)]. Replace the three flathead screws and tighten them securely.

(2) Place the camera on its base. Insert the transverse shaft [fig. 28 (2)] through the shaft bearing so that the length of the shaft projects halfway through the camera.

(3) Slip the tension winding spring [fig. 28 (17)] on the transverse shaft from the inside of the camera so that the hooked end of the spring is to the right.

(4) Push the transverse shaft through the camera so that the left end of the shaft enters the hole in the left side of the camera.

(5) Tighten the binding head screw in the threaded hole in the shaft so that the hooked end of the spring is firmly secured underneath the head of the screw.

m. Replacement of Spring-Tension Compound Gear Shaft [fig. 28 (20)]. Place the camera on its left side. Set the shaft into the hole provided for it in the right side of the camera. Replace the three flathead screws and tighten.

n. Replacement of Spring-Tension Stop Plate and Studs.

(1) Place the camera on its right side. Set the two spring-tension stop plate studs [fig. 28 (5)] into two small holes in the left side of the camera body. With the needlenose pliers, turn the studs clockwise and tighten them firmly in place.

(2) Place the spring-tension stop plate [fig. 28 (6)] on the stop plate studs so that the curved portion of the plate is parallel to the curve of the speed-indicator arm camshaft, and the projecting portion of the stop plate points toward the bottom of the camera [fig. 22 (3)]. With the No. 5 screwdriver, replace the two roundhead screws.

NOTE: If, for any reason, the left roller shaft bearing has been removed from the camera, replace it before replacing the spring-tension stop plate [fig. 22 (3)]. The projecting arm of the plate extends over the screws in the left roller shaft bearing.

45. UPPER CURTAIN ROLLER ASSEMBLY.

a. Preliminary Removal of Parts. To adjust or replace this assembly, it is necessary to remove the following parts:

(1) The left-side plate [fig. 4 (9)] as described in paragraph 35*a*.

(2) The right-side plate [fig. 5 (10)] as described in paragraph 36*a*.

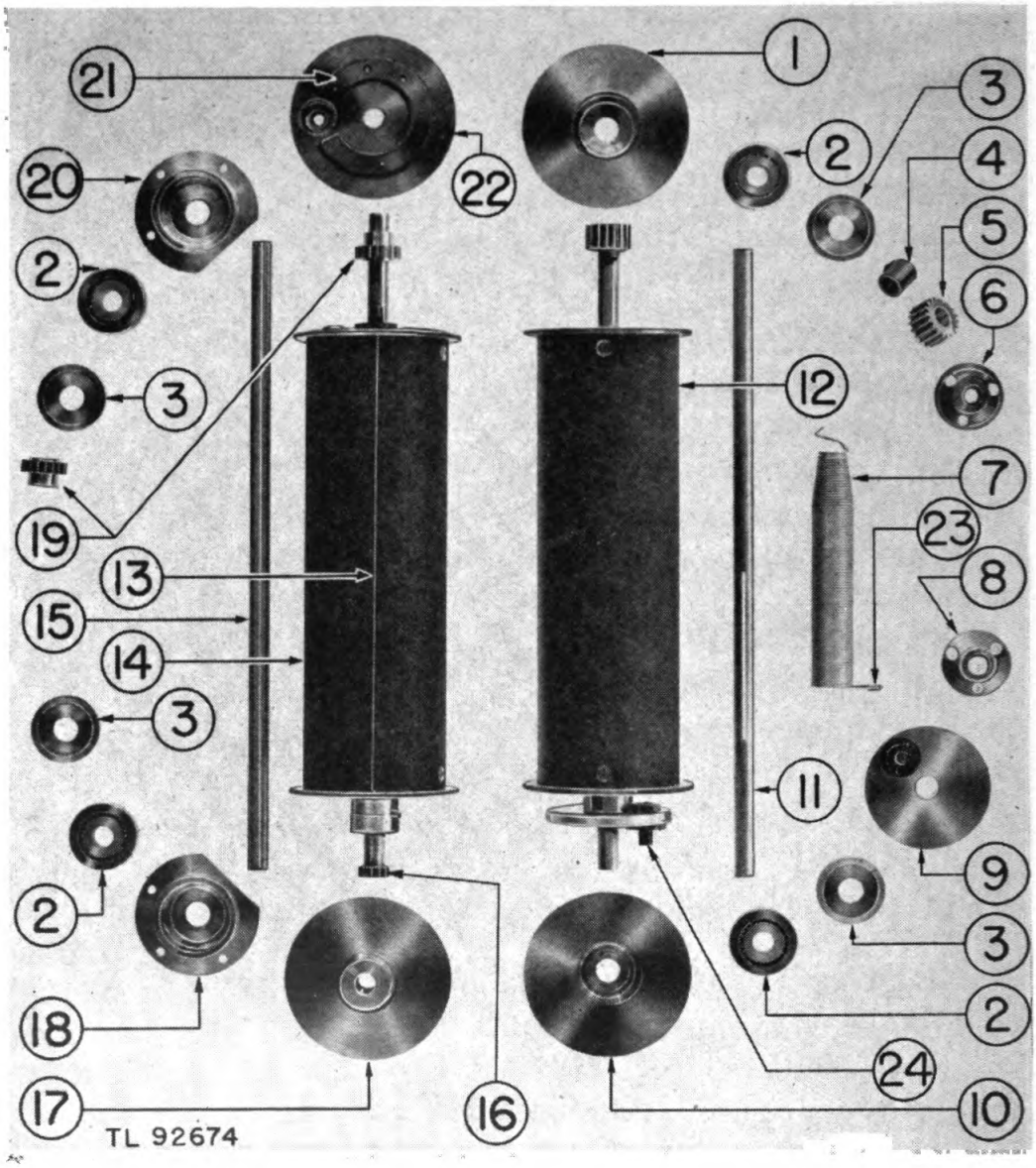


Figure 29. Curtain roller assemblies.

(3) The camera back [fig. 6 (11)] as described in paragraph 37*a*.

(4) The speed-indicator arm assembly [fig. 21 (5)] as described in paragraph 40.

(5) The speed dial assembly [fig. 21 (3)] as described in paragraph 42*c*.

b. Removal of Upper Curtain Roller Assembly [fig. 17 (2)]. Place the camera face down. Remove the flathead screw in the shoulder of the left upper flange [fig. 29 (17)].

c. Removal of Upper Curtain Roller Shaft [fig. 29 (15)]. Remove the screw which is in the face of the curtain-winding gear, and then remove the gear [fig. 25 (1)]. Press the right end of the shaft inward toward the camera body. This will cause the upper curtain roller shaft to project from the left side of the camera body so that it may be pulled out.

NOTE: The upper curtain roller assembly is now free. Be sure that the curtain does not come in contact with oil or grease, as these substances will ruin the rubberized coating of the curtain.

d. Replacement of Upper Curtain Roller Assembly.

(1) Place the camera on its face. Wind the curtain up on the upper curtain roller [fig. 17 (2)]. Hold the roller in the right hand and set it into the camera body so that the holes at both ends of the upper roller curtain assembly are in line with the roller bearing housings [fig. 29 (18) and (20)].

Key to figure 29.

1. Right lower curtain roller bearing housing
2. Curtain roller shaft bearings
3. Roller bearing seal plates
4. Thrust collar
5. Lower curtain roller tension gear
6. Right lower curtain roller shaft bearing
7. Main curtain spring
8. Left lower curtain roller shaft bearing
9. Spring tension stop pin assembly
10. Left lower curtain roller bearing housing
11. Lower curtain roller shaft
12. Lower curtain roller
13. Scored line on upper curtain roller
14. Upper curtain roller
15. Upper curtain roller shaft
16. Pilot gear assembly
17. Left upper curtain roller flange
18. Left upper curtain roller bearing housing
19. Curtain-winding gear
20. Right upper curtain roller bearing housing
21. Upper curtain roller rebound spring
22. Right upper curtain roller flange
23. Eyelet
24. Stop pin

(2) Holding the upper curtain roller assembly in this position, push the upper roller shaft [fig. 29 (15)] through the left upper roller bearing housing [fig. 29 (18)] so that it passes through the roller and projects through the hole in the right upper roller flange [fig. 29 (22)].

(3) Lift the escapement arm [fig. 18 (2)] and push the upper roller shaft through the right upper roller bearing housing [fig. 27 (2)]. Release the escapement arm, which will now rest on the upper roller shaft.

(4) Align the hole in the shoulder of the left upper roller flange [fig. 29 (17)] with the threaded hole in the upper roller shaft. Replace the flathead screw.

CAUTION: The right upper roller bearing housing should be removed only in the case of extreme necessity. This piece is set in the correct position by the manufacturer and it is a major operation to replace it correctly.

e. Removal of Right Upper Roller Bearing Housing [fig. 29 (20)].

(1) Turn the three roundhead screws until they can be lifted out.

(2) Place the camera face down. Place a soft block against the face of the right upper roller bearing housing from the inside of the camera. With the 4-ounce ball-peen hammer, drive the housing out of the camera body.

NOTE: The two pins [fig. 25 (20)] in the upper roller bearing housing are permanently attached and cannot be removed.

f. Replacement of Right Upper Roller Bearing Housing [fig. 27 (2).] Place the camera on its left side. Insert the shoulder of the housing into the hole in the upper right side of the camera body. Align the three holes in the housing with the three threaded holes in the camera side and replace the three roundhead screws.

g. Removal of Upper Roller Stop Plate and Left Upper Roller Bearing Housing.

(1) Remove the screw in the face of the brass curtain-winding gear [fig. 25 (1)], and remove the gear.

(2) Remove the screw from the upper left roller flange [fig. 26 (17)].

(3) Place the camera on its right side. Remove the upper roller stop plate [fig. 22 (1)] by taking out the three flathead screws and lift out the stop plate.

NOTE: Do not remove the fillister-head screw from this plate.

(4) Lift the left upper roller bearing housing [fig. 22 (6)] out of the camera.

h. Replacement of Upper Roller Stop Plate and Left Upper Roller Bearing Housing.

(1) Place the camera on its right side. Insert the shoulder of the left upper roller bearing housing into the hole provided for it on the upper left side of the camera body. Align the three holes in the housing with the corresponding holes in the camera side.

(2) Place the upper roller stop plate [fig. 22 (1)] upon the housing so that the three countersunk holes in the stop plate are in alignment with the corresponding holes in the housing and the camera body. Replace the three flathead screws and tighten.

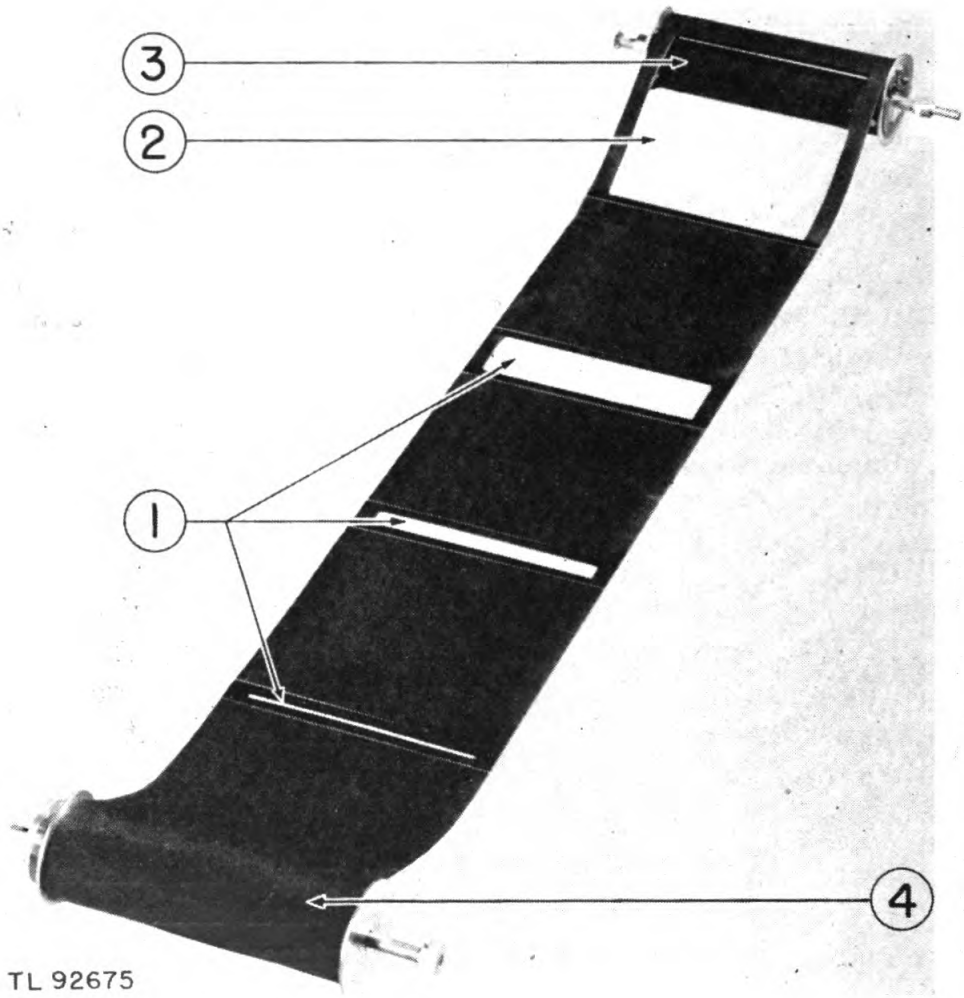
i. Removal, Replacement, and Adjustment of Curtain-Winding Gear.

(1) Place the camera on its left side. Remove the curtain-winding gear [fig. 25 (1)] from the curtain roller shaft [fig. 29 (15)] by taking out the fillister-head screw. It will be noted in reassembly that the witness marks on the gear and shaft must match in order to insert this screw. Lift the curtain-winding gear off the shaft.

(2) To replace the curtain-winding gear [fig. 29 (19)] set the gear on the projecting end of the upper roller shaft with the long shoulder of the gear facing upward. Match the witness marks on the gear and shaft. Replace the fillister-head screw.

(3) To adjust the curtain-winding gear with the mutilated gear [fig. 25 (2)] loosen the three roundhead screws on the right upper roller bearing housing [fig. 25 (19)] and mesh the curtain-winding gear with the mutilated gear. Retighten the three holding screws. Using a No. 55 drill, drill two holes through the outer edge of the right upper roller bearing housing and into the camera body. Insert two No. 00 hardened drill pins and seat them with the 4-ounce ball-peen hammer. In seating the pins avoid burring or expanding the metal by exerting too much pressure on the pins. The adjustment of the curtain-winding gear with the mutilated gear is a fifth echelon repair.

CAUTION: When drilling the two pin holes in the right upper roller bearing housing, care must be taken to drill the new holes in such a position that they will not break into the former drive pin holes or screw holes.



1. Curtain openings for all exposures except time and flash
2. Full opening for time and flash exposures
3. Upper curtain roller
4. Lower curtain roller

Figure 30. Curtain.

46. LOWER CURTAIN ROLLER ASSEMBLY.

a. Preliminary Removal of Parts.

(1) Remove the left-side plate [fig. 4 (9)] as described in paragraph 35*a*.

(2) Remove the right-side plate [fig. 5 (10)] as described in paragraph 36*a*.

(3) Remove the camera back [fig. 6 (11)] as described in paragraph 37*a*.

(4) Remove the speed-indicator arm assembly [fig. 21 (5)] as described in paragraph 40*b*.

(5) Remove the spring-tension compound gear [fig. 25 (7)] as described in paragraph 44*a*.

(6) Remove the speed-indicator arm cam [fig. 21 (8)] as described in paragraph 44*b*.

(7) Remove the spring-tension stop plate [fig. 22 (3)] as described in paragraph 44*g*.

b. Removal of Lower Curtain Roller Tension Gear [fig. 25 (11)]. Place the camera on its left side. Remove the fillister-head screw and lift off the gear. Witness marks appear on the lower roller shaft and this gear to align both for reassembly.

NOTE: If the lower curtain roller tension gear does not slide off smoothly, it may be pried upward gently with the largest screwdriver provided.

c. Removal of Lower Right Curtain Roller Shaft Bearing [fig. 27 (3)] and Thrust Collar [fig. 29 (4)].

(1) Place the camera on its left side. Remove the three flathead screws from the right lower curtain roller shaft bearing.

(2) Lift the lower curtain assembly upward to free the lower roller shaft bearing. Lift the shaft bearing off the shaft [fig. 29 (11)]. Removal of this bearing will reveal the thrust collar. Lift the thrust collar off its shaft.

d. Removal of Left Lower Curtain Roller Shaft Bearing [fig. 29 (8).] Place the camera on its right side. Remove the two screws which hold the spring-tension stop plate [fig. 21 (11)] in position. Remove the spring-tension stop plate. Remove the three flathead screws and lift out the bearing.

e. Removal of Lower Curtain Roller [fig. 17 (9)]. Place the camera face down. Draw the lower curtain roller forward and to the right so that it drops out of the opening in the left side of the camera body. Lift the complete upper and lower curtain assemblies and the curtain itself out of the camera.

f. Removal of Left Lower Curtain Roller Bearing Housing and Main Curtain Spring.

(1) To remove the main curtain spring [fig. 29 (7)] roll the curtain on the upper curtain roller until the lower end of the curtain is visible. With the tweezers, lift the left corner of the re-enforcing tape which holds the curtain to the curtain roller. This will expose one of the flathead screws which hold the roller bearing housing to the curtain roller. Remove this screw from the curtain roller.
(2) Roll the curtain up one-half turn. Remove the corresponding screw in the bottom of the curtain roller.
(3) Withdraw the lower curtain roller bearing housing [fig. 29 (10)] from the curtain roller by pulling it gently to the left. This exposes the main curtain spring.
(4) To remove the main curtain spring from the lower curtain roller shaft [fig. 29 (11)] turn the bearing with its inner face upward, and turn the roundhead screw. Remove the spring from the shaft.

g. Replacement of Left Lower Roller Bearing Housing and Main Curtain Spring.

(1) Slip the left lower roller bearing housing on the long portion of the lower curtain roller shaft with its largest flat surface facing the spring tension stop pin assembly [fig. 29 (9)].
(2) Slip the shaft through the large opening in the main curtain spring [fig. 29 (7)]. Align the eyelet [fig. 29 (23)] at the end of the spring with the threaded hole in the surface of the roller bearing housing.
(3) Insert the roundhead screw through the eyelet at the end of the spring and into the hole in the housing, thus fastening the spring to the housing.
(4) With the needlenose pliers, insert the straight end of the spring into the slot in the shaft.
(5) Insert the lower curtain roller shaft assembly into the roller itself so that the shaft projects through the hole in the right roller bearing housing [fig. 29 (1)] which forms an integral part of the lower roller.
(6) Align the two holes at the left end of the lower curtain roller with the threaded holes in the left lower roller bearing housing.
(7) Replace the two flathead screws and tighten.

NOTE: There are no other internal parts in the curtain assembly. The upper curtain roller is an idler and contains no parts whatever.

h. Removal and Replacement of Spring Tension Stop Pin Assembly [fig. 29 (9)].

(1) To remove the assembly, remove the flathead screw and draw the assembly off the lower curtain roller shaft.

(2) To replace the assembly, reverse this procedure.

i. Replacement of Lower Curtain Assembly into Camera.

(1) Place the camera on its face. Insert the lower curtain roller assembly into the camera body so that the long end of the lower curtain roller shaft [fig. 29 (11)] projects through the hole provided for it in the right side of the camera. Pull the right end of the shaft through the hole as far as it will go.

(2) Slip the left end of the shaft into the opening in the left lower roller shaft bearing so that the stop pin [fig. 29 (24)] in the spring-tension stop pin assembly rests in the opening of the spring-tension release [fig. 23 (1)] at the left of the camera.

j. Replacement of Thrust Collar and Right Roller Shaft Bearing.

(1) Place the camera on its left side. Place the thrust collar [fig. 29 (4)] over the projecting end of the lower curtain roller shaft [fig. 29 (11)]. The thrust collar will drop down on the shaft into the camera.

(2) Place the right lower roller shaft bearing [fig. 29 (6)] over the lower roller shaft so that the shoulder of the bearing projects through the hole in the camera side and firmly seats the shaft.

(3) Replace the three flathead screws which hold the bearing to the camera side, using the No. 5 jeweler's screwdriver.

k. Replacement of Lower Curtain Roller Tension Gear. Place the camera on its left side. Set the lower curtain roller tension gear [fig. 29 (5)] on the lower curtain roller shaft so that the hole in the gear is in alignment with the threaded hole at the right end of the shaft. Replace the screw and tighten.

l. Adjustment of Tension of Main Curtain Spring. Set the camera on its face. Turn the lower curtain roller tension gear counterclockwise until the curtain is completely wound upon the lower curtain roller. A minimum of four complete turns of the lower curtain roller tension gear will be required.

m. Reassembly of Camera. The replacement and adjustment of the curtain roller assembly is now complete. To complete the reassembly of the camera replace the assemblies which were removed to permit access to the curtain roller assembly. These assemblies are enumerated in subparagraph *a* above.

47. CURTAIN.

a. Removal of Old Curtain.

(1) Set the shutter so that the letter T appears in the speed-indicator window [fig. 4 (7)].

(2) Remove the camera back as described in paragraph 37*a*.

(3) To remove the old curtain from the upper curtain roller, lift a corner of the reinforcing tape which holds the curtain to the curtain roller and pull the tape off.

(4) Pull the loose end of the curtain upward until the reinforcing tape which secures the curtain to the lower curtain roller comes into view. Pull this end of the curtain free in the same manner.

b. Placing New Curtain in Position.

(1) There are four openings of various sizes in the curtain (fig. 30). Set that end of the curtain which contains the largest opening between the flanges of the upper curtain roller [fig. 17 (2)] so that the rubberized surface of the curtain faces the roller.

(2) Align the outside edge of the largest opening with the scored indicating line [fig. 29 (13)] on the upper roller. Fasten this edge of the curtain to the roller with reinforcing tape.

(3) Wind the curtain one-half turn up on the roller until the upper edge of the curtain appears below the roller. Shellac this edge of the curtain to the upper roller.

(4) Fasten the loose end of the curtain to the lower curtain roller by shellacing approximately 1 inch of the curtain across the lower roller surface.

CAUTION: Be sure that the curtain rolls straight upon the rollers.

(5) Adjust the tension of the main curtain spring by turning the lower curtain roller tension gear [fig. 25 (11)] counterclockwise until the curtain is completely wound upon the lower curtain roller. A minimum of four complete turns of the gear will be required.

(6) Replace the camera back as outlined in paragraph 37*b*.

48. FLASH ASSEMBLY.

If the flash feature of the camera fails to operate, examine the flash synchronizer and batteries for possible cause of failure before attempting to adjust the camera. If failure is not due to defective batteries or synchronizer misadjustment, proceed as follows.

a. Check of Flash Assembly for Cause of Failure.

(1) Check the flash taps [fig. 4 (3)] for possible corrosion. If the taps are corroded, clean them gently with emery cloth. Test the synchronizer after the flash taps have been cleaned.
(2) Remove the right-side plate as described in paragraph 36*a*, and see that the wire contact to the right flash contact [fig. 25 (10)] is secure. With this plate removed from the camera, retest the flash circuit.
(3) If the flash still fails to operate, remove the left-side plate as described in paragraph 35*a*. Repeat the procedure described in subparagraph (2) above with the left flash contact [fig. 21 (12)]. Retest the flash synchronizer.

NOTE: If the flash assembly still fails to operate, it will be necessary to dismantle the entire flash assembly. This is a fifth echelon repair.

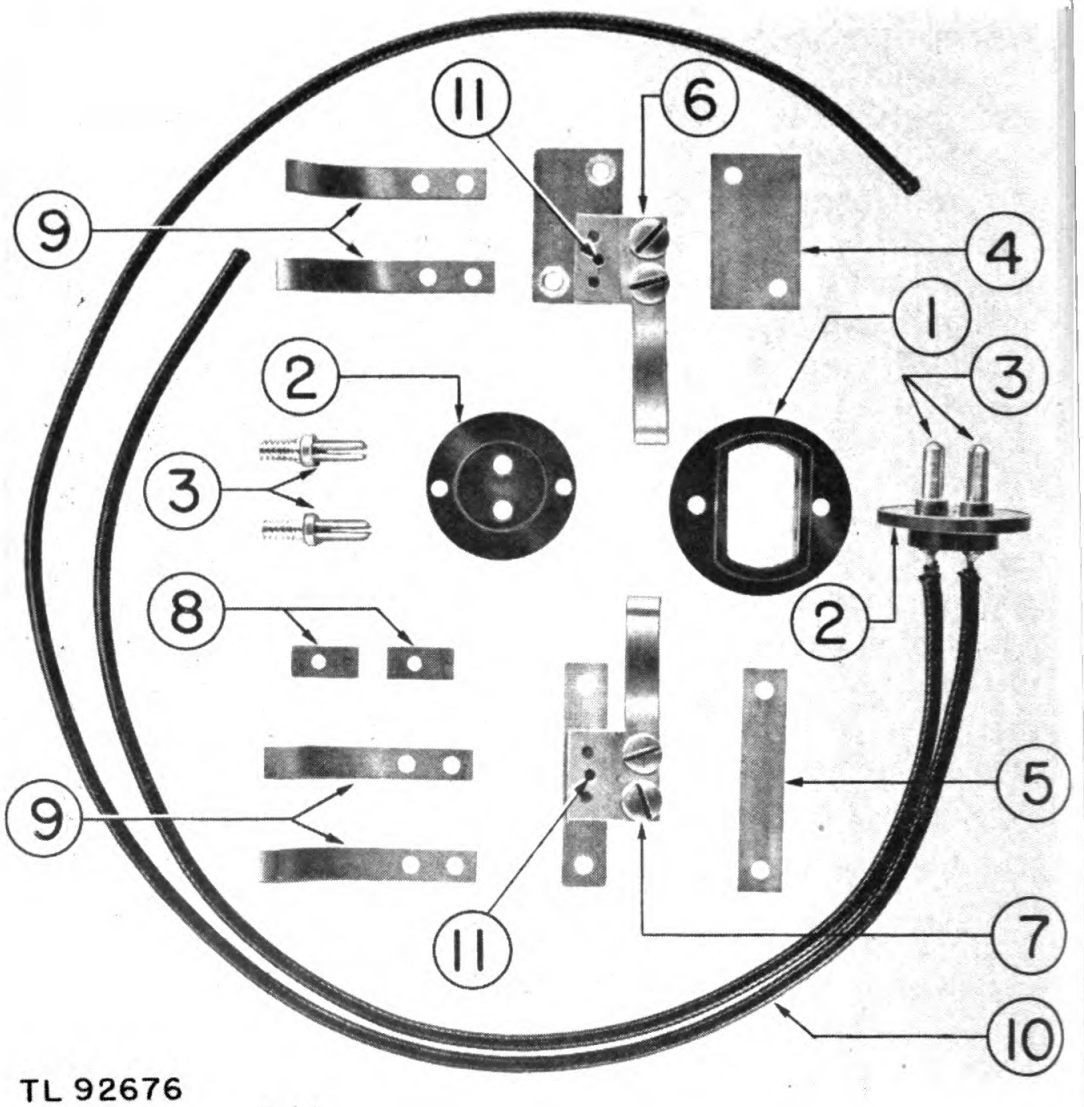
b. Preliminary Removal of Parts. To remove the flash assembly, first remove the following parts from the camera:
(1) The left-side plate as described in paragraph 35*a*.
(2) The right-side plate as described in paragraph 36*a*.
(3) The camera back as described in paragraph 37*a*.
(4) The upper curtain roller [fig. 17 (2)] as described in paragraph 45.
(5) The speed dial [fig. 21 (3)] as described in paragraph 42.

c. Removal of Right Flash Contact.

(1) Place the camera on its left side. Remove the binding head screw to release the wire from the contact.
(2) Cut the eyelet off the end of the wire with the cutting portion of the needlenose pliers. Pull the wire through the camera side so that it is inside the camera body.
(3) Remove the two wire clamps [fig. 31 (8)] by taking out the two roundhead screws.
(4) Remove the roundhead screws in the right flash contact [fig. 26 (9)]. Lift the contact from the camera.

d. Removal of Left Flash Contact.

(1) Place the camera on its right side. Remove binding head screw on the left flash contact [fig. 22 (8)].
(2) Remove the wire clamp by taking out the roundhead screw.
(3) Cut the eyelet off the end of the wire with the cutting portion of the needlenose pliers. Pull the wire through the hole in the camera side so that it is within the camera body.
(4) Remove the two roundhead screws. Lift the left flash contact from the camera.



1. Flash tap hood
2. Flash tap base
3. Flash taps
4. Right fiber insulator
5. Left fiber insulator
6. Right flash contact assembly
7. Left flash contact assembly
8. Wire clamps
9. Flash contact leaves
10. Flash wires
11. Contact points

Figure 31. Flash assembly.

e. Removal of Flash Taps.

(1) Place the camera on its back. Remove the two roundhead screws in the flash tap hood [fig. 31 (1)] and lift the hood from the camera.
(2) Grasp the flash taps [fig. 31 (3)] with the needlenose pliers and draw the flash wires out of the camera.

f. Replacement of Flash Wires and Tap.

(1) Thread the two wires of the flash taps through the hole at the upper left corner of the camera body. Set the flash tap base [fig. 31 (2)] against the camera face so that the wires project into the camera. The shorter wire attached to the flash tap must be on the left.
(2) Place the camera on its back. Set the flash tap hood over the projecting flash taps with its flat surface flat against the front of the camera. The two holes in the flash tap hood must align with the two holes in the camera body. Place the two roundhead screws in the openings and turn as far as they will go.
(3) Place the camera face down, with its base facing the repairman. Thread the left-hand wire through the hole at the top left of the camera so that the wire projects down the left side of the camera body. Run the right wire in the opposite direction along the inside edge of the camera. Thread it through the hole in the upper right of the camera and draw it down along the right side of the camera.
(4) Set two wire clamps in position at the inside top of the camera so that the holes in the clamps align with the threaded holes inside the camera. In this position, the clamps will project upward over the wire. With the spread-type screwdriver, place the two roundhead screws into the openings in the clamps and turn them clockwise as far as they will go.
(5) Place the camera on its right side following procedure described in subparagraph (4) above. Place another wire clamp in position so that it holds the wire firmly on the left side of the camera body.

g. Replacement of Left Flash Contact.

(1) Place the camera on its right side. Place the brown kraft wrapping-paper insulator on the right side of the camera so that the two large holes in the paper are in alignment with the two holes drilled in the left side of the camera body. Place the left fiber flash insulator [fig. 31 (5)] on the paper insulator so that the holes in the left fiber insulator are in alignment with the holes drilled in the camera body.

(2) Place the left flash contact on the fiber insulator so that the holes in the contact are in alignment with the holes drilled in the left side of the camera.

(3) With the spread-type screwdriver, replace the two round-head screws and turn them as far as they will go.

(4) Remove ½ inch of the insulation from the end of the left flash wire. Wind the exposed end of the left flash wire around the binding head screw and tighten.

h. Replacement of Right Flash Contact.

(1) Place the camera on its left side. Set the paper insulator in position on the left side of the camera with the holes in the paper insulator in alignment with the holes drilled in the right side of the camera. Place the right fiber insulator on the paper insulator with the holes in the insulator aligned with the holes in the camera side.

(2) Place the right flash contact in position on the fiber insulator.

(3) With the spread-type screwdriver, replace the two round-head screws and turn them clockwise as far as they will go and tighten these screws.

(4) Remove ½ inch of the insulation from the end of the right flash wire. Wind the exposed end of the right flash wire around the shank of the binding head screw and tighten.

i. Final Reassembly. To complete the assembly of the camera replace the parts enumerated in subparagraph *b* above, which were removed to provide access to the flash assembly.

49. UNSATISFACTORY EQUIPMENT REPORT.

a. When trouble in equipment used by Army Ground Forces or Army Service Forces occurs more often than repair personnel feel is normal, War Department Unsatisfactory Equipment Report, W. D., A. G. O. Form No. 468 should be filled out and forwarded through channels to the Office of the Chief Signal Officer, Washington 25, D. C. Refer to TM 38-250 for complete instructions on the handling of this report.

b. When trouble in equipment used by Army Air Forces occurs more often than repair personnel feel is normal, Army Air Forces Form No. 54 should be filled out and forwarded through channels.

APPENDIX

SECTION IX
MAINTENANCE PARTS LIST

50. MAINTENANCE PARTS LIST FOR CAMERA PH-501/PF.

Ref symbol	*Signal Corps stock No.*	*Name of part and description*	*Quan per unit*	*Running spares*	*Orgn stock*	*3d ech*	*4th ech*	*5th ech*	*Depot stock*
Fig. 29 (2)	3H324-1	BEARING, ball, bore $\frac{3}{16}$", OD $\frac{5}{8}$", wd $\frac{3}{16}$"; Schatz #ES-1277; (p/o Sig C Camera PH-501/PF).	4				*	**	*
Fig. 26 (11)	8P10-2275	BEARING: Simmons Bros #251-713; (aluminum; shoulder $\frac{27}{32}$" lg x $\frac{5}{16}$" wd x $\frac{3}{4}$" thk; $\frac{3}{16}$" reamed hole; three #48 holes csk for 0.172"; p/o Camera PH-501/PF).	1				**	**	*
Fig. 16 (5)	8P10-2281	BRACKET: cover lock; Simmons Bros #211-722A; (brass 1" lg x ½" wd x $\frac{1}{16}$" thk; 90 deg bend ⅛" lg at 1 end; two #52 drill holes at other end; p/o Camera PH-501/PF).	1				**	**	*
Fig. 13 (1)	8P10-2289	COVER: front; Simmons Bros #1-703; (magnesium; 4⅛" OD x 1⅜" d; w/a 2" wd x 3" lg rectangular cut, centered horizontally; p/o Camera PH-501/PF).	1		*		**	**	*

* Indicates stock available.
** Indicates parts may be requisitioned as needed from depot stocks.

50. MAINTENANCE PARTS LIST FOR CAMERA PH-501/PF (contd).

Ref symbol	*Signal Corps stock No.*	*Name of part and description*	*Quan per unit*	*Running spares*	*Orgn stock*	*3d ech*	*4th ech*	*5th ech*	*Depot stock*
Fig. 16 (8)	8P10-2290	COVER: rear; Simmons Bros #211-727; (magnesium casting; 4¾″ lg x 3″ wd x $\frac{1}{16}$″ thk; w/90 deg bend ¼″ lg above end; other end corners cut out ¼″ lg x ⅛″ wd; p/o Camera PH-501/PF).	1		*		**	**	*
Fig. 30	8P10-2295	CURTAIN: focal plane; Simmons Bros #C501; (vulcanized rubber cloth; 25$\frac{5}{16}$″ lg x 3⅞″ wd x 0.013″ thk; w/4 slots, largest slot 2″ from top, 3⅜″ lg x 3¼″ wd; minor apert 19″ from top, ⅛″ lg x 3¼″ wd; slots have metal strips around them; sides are reinforced w/rubber cloth; p/o Camera PH-501/PF).	1				**	**	*
Fig. 13 (5)	8P10-2307	FINDER: front insert; Simmons Bros #211-733; (#20 sheet brass; 3″ wd; ends 1$\frac{15}{16}$″ rad; 2″ x 3″ ID; ½″ cut from top and bottom; ⅛″ wd x $\frac{25}{32}$″ from sides making 1⅛″ lg x ¾″ wd; telephoto site; used as a viewfinder; p/o Camera PH-501/PF).	1		*		**	**	*
Fig. 28 (3)	8P10-2313	GEAR: spur; Simmons Bros #241-705; (brass; 32 teeth; $\frac{3}{32}$″ thk x ⅛″ ID x $\frac{11}{16}$″ OD; p/o Camera PH-501/PF).	1				**	**	*
Fig. 28 (1)	8P10-2314	GEAR: spur; Simmons Bros #241-706; (brass; 18 teeth; $\frac{7}{16}$″ OD x $\frac{3}{16}$″ ID x ¼″ thk; p/o Camera PH-501/PF).	2				**	**	*

Fig. 28 (9)	8P10-2315	GEAR: spur; Simmons Bros #241-707; (brass; 32 teeth $\frac{11}{16}$" OD x $\frac{3}{16}$" ID x ⅛" thk; p/o Camera PH-501/PF).	1				**	**	*
Fig. 28 (19)	8P10-2321	GEAR ASSEMBLY: compound; Simmons Bros. #241-703-4; (consists of, 2 gears; 1 brass, 72 teeth; 1½" OD x ⅛" thk; other brass; 18 teeth, $\frac{7}{16}$" OD x ⅛" thk, $\frac{3}{16}$" ID; p/o Camera PH-501/PF).	1				**	**	*
Fig. 29 (16)	8P10-2322	GEAR ASSEMBLY, pilot; Simmons Bros #251-728A; (steel; 12 teeth; ¼" OD x $\frac{3}{32}$" thk; riveted to drill rod shaft; $\frac{3}{16}$" OD x 5⅞" lg; p/o Camera PH-501/PF).	1				**	**	*
Fig. 24 (11)	8P10-2327	HOUSING: spring; Simmon Bros #251-702; (steel; $2\frac{1}{64}$" lg x 1⅛" OD; shoulder $\frac{15}{64}$" lg x 1" OD; bore $\frac{17}{64}$" d x ½" ID; bottom shoulder $\frac{3}{32}$" lg x ⅝" OD; center hole $\frac{3}{16}$", w/two #3-48 NF taped holes; slots $\frac{1}{32}$" wd x $\frac{3}{16}$" d across center; p/o Camera PH-501/PF).	1				**	**	*
Fig. 23 (2)	8P10-2335	LEVER: spring tension release; Simon Bros #211-714; (aluminum; $1\frac{7}{16}$" lg x $\frac{1}{32}$" thk; ¾" hub at base; ⅝" lg x ⅜" wd lever extension; w/button $\frac{5}{16}$" OD x $\frac{3}{16}$" thk; four #35 drill holes in hub; p/o Camera PH-501/PF).	2		*		**	**	*

* Indicates stock available.
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50. MAINTENANCE PARTS LIST FOR CAMERA PH-501/PF (contd).

Ref symbol	*Signal Corps stock No.*	*Name of part and description*	*Quan per unit*	*Running spares*	*Orgn stock*	*3d ech*	*4th ech*	*5th ech*	*Depot stock*
Fig. 16 (1)	8P10-2347	PEEPSITE: Simmon Bros #211-730; (brass, 2⅛″ lg w/1⅜″ diam top; base ¾″ wd; 1¼″ from base to bottom of site; apert ½″ wd x ¾″ lg; p/o Camera PH-501/PF).	1		*		**	**	*
Fig. 24 (11)	6L3942-6	PIN, ratchet; Simmon Bros #251-704; (steel; ⅛″ diam x ⅜″ lg) p/o Camera PH-501/PF).	2				*	**	*
Fig. 28 (15)	8P10-2353	PLATE: cover; Simmon Bros #211-704; (aluminum, 1⅜″ OD x $\frac{1}{32}$″ thk; w/two holes $\frac{1}{16}$″ diam, #37 drill; p/o Camera PH-501/PF).	1		*		*	**	*
Fig. 24 (15)	8P10-2354	PLATE: cover; Simmon Bros #211-704-A; (aluminum; 1⅜″ OD x $\frac{1}{32}$″ thk; w/2 holes $\frac{1}{16}$″ diam, #37 drill; $\frac{1}{16}$″ x ¼″ lg pin riveted to bottom of plate; p/o Camera PH-501/PF).	1		*		*	**	*
Fig. 23 (3)	8P10-2355	PLATE: cover; Simmon Bros #211-711; (aluminum; ¾″ OD x $\frac{1}{16}$″ thk; w/two #48 holes csk for 0.172″; used on lever assem; p/o Camera PH-501/PF).	2		*		**	**	*
Fig. 6 (13)	6L4041-.1-1	RIVET: brass; But H; $\frac{1}{16}$″ diam; Simmon Bros #251-740; (head ½″ diam x $\frac{1}{16}$″ thk; shoulder ¼″ diam; used as a bearing; p/o Camera PH-501/PF).	2				*	**	*

Fig. 24 (4)	6L6632-7.8	SCREW, machine: brass; Bind H; #6-32 x $\frac{7}{16}$" lg; NF; head dimensions $\frac{15}{32}$" diam x $\frac{3}{32}$" thk; Simmon Bros #251-707; on speed dial assem; p/o Camera PH-501/PF.	1				*	**	*
Fig. 16 (11)	8P10-2377	SHAFT: cover; Simon Bros #261-705; (brass; ¼" OD x 4½" lg; u/w aux cover of film pack holder; p/o Sig C Camera PH-501/PF).	4				**	**	*
Fig. 25 (4)	8P10-2378	SHAFT: pushbutton; Simmon Bros #251-749; (aluminum; ¼" OD x 1⅞" lg; rounded on ends; w/#4-40 thd hole ¼" from 1 end; used as push-button for curtain release; p/o Sig C Camera PH-501/PF).	1				**	**	*
Fig. 1 (14)	8P10-2379	SOCKET: tripod; Simmon Bros #261-708; (magnesium; 1½" lg x 1½" wd x ¼" thk; w/¼"-20 N.C. threaded hole; four #47 drill holes; p/o Sig C Camera PH-501/PF).	1		*		*	**	*
Fig. 24 (17)	8P10-2389	SPEED DIAL ASSEMBLY: Simmon Bros #206-701A; (consisting of aluminum dial; #206-701 face painted white enamel; brass gear; 1½" OD x $\frac{1}{16}$" thk, 72 teeth fixed stop; p/o Sig C Camera PH-501/PF).	1				*	**	*
Fig. 5 (9)	8P10-2394	SPRING: catch; phosphor bronze; leaf type; Simmon Bros #211-741; ¾" lg ⅝" wd at base, ¼" wd at top; front rolled $\frac{3}{16}$"; p/o Sig C Camera PH-501/PF).	1		*		*	**	*

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50. MAINTENANCE PARTS LIST FOR CAMERA PH-501/PF (contd).

Ref symbol	*Signal Corps stock No.*	*Name of part and description*	*Quan per unit*	*Running spares*	*Orgn stock*	*3d ech*	*4th ech*	*5th ech*	*Depot stock*
Fig. 24 (13)	8P10-2395	SPRING: coil; Simmon Bros #290-701; (steel; 4 turns 0.024″ diam wire; ⅜″ OD w/⅜″ 90 deg bend on 1 end; ¼″ tail on other end; p/o Sig C Camera PH-501/PF).	1				*	**	*
Fig. 19 (6)	8P10-2396	SPRING: coil; Simmon Bros #290-702; (steel; 23 turns; 0.024″ diam wire; ⅛″ OD; p/o Sig C Camera PH-501/PF).	2				*	**	*
Fig. 18 (6)	8P10-2397	SPRING: coil; Simmon Bros #290-704; (steel; 26 turns; 0.036″ diam wire; ¼″ OD; p/o Sig C Camera PH-501/PF).	1				*	**	*
Fig. 20 (11)	8P10-2398	SPRING: coil; steel; Simmon Bros #290-705 (steel; 55 turns, 0.014″ diam wire; ⅛″ OD; p/o Sig C Camera PH-501/PF).	1				*	**	*
Fig. 23 (8)	8P10-2399	SPRING: coil; Simmon Bros #290-706; (steel; 24 turns; 0.014″ diam wire; ⅛″ OD; p/o Sig C Camera PH-501/PF).	1				*	**	*
Fig. 6 (4)	8P10-2400	SPRING: locking; phosphor bronze; leaf type w/ rounded corners; Simmon Bros #211-728; $\frac{1}{32}$″ thk x 3¼″ lg x ½″ wd, tapering to ¼″; w/#31 drilled hole centrally located; p/o Sig C Camera PH-501/PF.	1				*	**	*

Fig. 16 (7a)	8P10-2401	SPRING: tension; phosphor bronze; Simmon Bros #211-729; 3¾″ lg x $\frac{3}{16}$″ wd x $\frac{1}{16}$″ thk; p/o Sig C Camera PH-501/PF.	2				*	**	*
Fig. 16 (3)	8P10-2402	SPRING: cover; phosphor bronze; ⅛″ wd x 1¾″ lg x 0.020″ thk, overall; Simmon Bros #211-724; (leaf type; p/o Army-Navy Camera PH-501/PF).	1				*	**	*
Fig. 24 (12)	8P10-2427	STUD, shutter: steel; ⅞″ lg x $\frac{15}{32}$″ diam overall; Simmon Bros #251-703; (one end thd $\frac{9}{16}$″ lg x #6-32 NF thd; 3 shoulders, first $\frac{3}{16}$″ diam x $\frac{3}{32}$″ lg, second $\frac{15}{32}$″ diam x $\frac{1}{16}$″ lg; third slotted $\frac{3}{16}$″ diam x $\frac{5}{32}$″ lg w/$\frac{1}{32}$″ wd slot; for shutter winding device; p/o Army-Navy Camera PH-501/PF).	1				*	**	*
Fig. 13 (3)	6L31104-1	STUD: tool steel; lock; $\frac{7}{16}$″ lg; $\frac{3}{32}$″ diam; Simmon Bros #251-742B; 1 end threaded $\frac{3}{16}$″ lg x #2-56 thd; other end ⅛″ diam ball; p/o Sig C Camera PH-501/PF.	1				*	**	*
Fig. 24 (10)	6L50113-7	WASHER: brass; $\frac{3}{16}$″ ID; Simmon Bros #211-703; (⅝″ OD, $\frac{1}{32}$″ thk; two #37 drill holes diametrically opposite; p/o Sig C Camera PH-501/PF).	1		*		**	**	*
Fig. 1 (8)	8P10-2437	WINDOW, dial: celluloid; ⅞″ diam x 0.010″ thk; Simmon Bros #211-738; (three #48 drilled holes 120 deg apart; used on speed indicator; p/o Army Navy Camera PH-501/PF).	1		*		*	**	*

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50. MAINTENANCE PARTS LIST FOR CAMERA PH-501/PF (contd).

Ref symbol	*Signal Corps stock No.*	*Name of part and description*	*Quan per unit*	*Running spares*	*Orgn Stock*	*3d ech*	*4th ech*	*5th ech*	*Depot stock*
Fig. 13 (4)	8P10-2438	WINDOW, lens cover: lucite; 3⅞″ diam x $\frac{3}{32}$″ thk; Simmon Bros #211-734; (cut off portion at 1 side for a distance of $\frac{7}{16}$″; four #40 drill holes on 3½″ x 2½″ x 2½″ centers; p/o Army Navy Camera PH-501/PF).	1		*		*	**	*
	6L6632-2.8	SCREW: machine; brass; Bind H; #6-32 NF thd; (⅛″ lg; u/w Camera PH-501/PF).	1				*	**	*
	6L6348-4.1	SCREW; machine: brass; RH; #3-48 x ¼″ lg; NF u/w Camera PH-501/PF.	2				*	**	*
	6L6348-2.5	SCREW, machine: brass; nickel plated; RH; #3-48 x ⅛″ lg; NF u/w Camera PH-501/PF.	6				*	**	*
	6L6348-6	SCREW, machine: brass FH; #3-48 x ⅜″ lg; NF u/w Camera PH-501/PF.	5				*	**	*
	6L6348-5.7	SCREW, machine: brass; nickel plated FH; #3-48 x $\frac{5}{16}$″ lg; NF u/w Camera PH-501/PF.	8				*	**	*
	6L6348-4	SCREW, machine: brass; FH; #3-48 x ¼″ lg; NF u/w Camera PH-501/PF.	5				*	**	*
	6L6256-3.8	SCREW, machine: brass; Bind H; #2-56 x $\frac{3}{16}$″ lg; NF u/w Camera PH-501/PF.	8				*	**	*
	6L6256-2.8	SCREW, machine: brass; Bind H; #2-56 NF thd; (⅛″ lg; u/w Sig C Camera PH-501/PF).	6				*	**	*

	6L6256-4.1	SCREW, machine: brass; RH; #2-56 x ¼″ lg; NF u/w Camera PH-501/PF.	6				*	**	*
	6L6256-3.1	SCREW, machine: brass; RH; #2-56 x $\frac{3}{16}$″ lg; NF u/w Camera PH-501/PF.	8		*		*	**	*
	6L6256-8	SCREW, machine: brass; FH; #2-56 x ½″ lg; NF u/w Camera PH-501/PF.	5		*		*	**	*
	6L6256-5	SCREW, machine: brass; FH; #2-56 x $\frac{5}{16}$″ lg; NF u/w Camera PH-501/PF.	6		*		*	**	*
	6L6256-4	SCREW, machine: brass; FH; #2-56 x ¼″ lg; NF u/w Camera PH-501/PF.	6		*		*	**	*
	6L6172-2	SCREW, machine: brass; FH; #1-72 NF thd (⅛″ lg; u/w Camera PH-501/PF).	13		*		*	**	*
	6L6172-3.7	SCREW, machine: brass; FH; #1-72 NF thd; ($\frac{3}{16}$″ lg; nickel plated; u/w Sig C Camera PH-501/PF).	81		*		*	**	*
	6L6172-4	SCREW, machine: brass; FH; #1-72 NF thd; (¼″ lg; u/w Sig C Camera PH-501/PF).	16		*		*	**	*
	6L6172-5	SCREW, machine: brass; FH; #1-72 NF thd; ($\frac{5}{16}$″ lg; u/w Sig C Camera PH-501/PF).	3		*		*	**	*
	6L6172-3.1	SCREW, machine: brass; RH; #1-72 NF thd; ($\frac{3}{16}$″ lg; u/w Sig C Camera PH-501/PF).	2		*		*	**	*
	6L6256-2	SCREW, machine: brass; FH; #2-56 x ⅛″ lg; NF u/w Camera PH-501/PF.	6		*		*	**	*
	6L6172-6	SCREW, machine: brass; FH; #1-72 x ⅜″ lg; NF u/w Camera PH-501/PF.	6		*		*	**	*

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50. MAINTENANCE PARTS LIST FOR CAMERA PH-501/PF (contd).

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	6L6080-2	SCREW, machine: brass; FH; #0-80 x ⅛″ lg; NF u/w Camera PH-501/PF.	4		*		*	**	*
	6L6080-2.3	SCREW, machine: brass; Fil H; #0-80 NF thd (⅛″ lg; u/w Sig C Camera PH-501/PF).	1		*		*	**	*
	6L6632-3.19	SCREW, machine: brass; binding head; #6-32 thd, NF, by $\frac{3}{16}$″ lg.	4		*		*	**	*
	6L6632-4.9	SCREW, machine: brass; binding head; #6-32 thd, NF x ¼″ lg.	2		*		*	**	*

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