DEPARTMENT OF THE ARMY TECNNICAL MANUAL

STILL PICTURE CAMERA SET KS-15(1) AND CAMERA EQUIPMENT AN/GFQ-2

OPERATION AND MAINTENANCE

This copy is a reprint which includes current pages from Changes 1 through 4.

HEADQUARTERS, DEPARTMENT OF THE ARMY
OCTOBER 1958

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Changes in force: C 1, C 2, C 3, and C 4

TM 11-6720-201-15
C 4

CHANGE

No. 4 ,

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 8 October 19

Operator's, Organizational, Field

and Depot Maintenance Manual

STILL PICTURE CAMERA SET KS-15(1)

AND CAMERA EQUIPMENT AN/GFQ-2

TM 11-6720-201-15, 29 October 1958, is changed as follows:

Page 5, paragraph 1.1. Delete paragraph 1.1 and substitute:

1.1. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

Paragraph 2. Delete paragraph 2 and substitute:

2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army) /NAVSUP PUB 378 (Navy) /AFR 71-4 (Air Force) /and MCO P4030.29 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38 (Army) /NAVSUP PUB 459 (Navy)/AFM 75-34 (Air Force)/and MCO P4610.19 (Marine Corps).

Paragraph 2.1 is added after paragraph 2.

2.1. Reporting of Equipment Publication Improvements

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSELMA-S, Fort Monmouth, NJ 07703.

Page 8, paragraph 5. Change title to read "Components and Dimensions of Still Picture Camera Set KS-15(1)."

Page 9, paragraph 6. Change title to read "Components and Dimensions of Camera Equipment AN/GFQ-2."

After paragraph 6 add:

6.1. Items Comprising an Operable Equipment

FSN	*Qty*	*Nomenclature, part No., and mfr code*	*Usable on code*	*Figure No.*
6720-301-4685	.....	Camera Set, Still Picture KS-15(1)		
6720-823-9759	.....	Camera Set, Still Picture KS-15(3)		

NOTE

The part number is followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB 708-42 and used to identify manufacturer, distributor, or Government agency, etc.

NOTE

Dry batteries are used with the equipment but are not considered part of the equipment. They will not be preshipped automatically but are to be requisitioned in quantities necessary for the particular organization in accordance with SB 11-6.

NOTE

Number 1 in the usable on code column refers to components comprising an operable KS-15(1) and number 2 refers to KS-15(3).

GROUP I
KS-15(1), KS-15(3)

6250-537-4058	1	Adapter, Lampholder: 16062, code CQQWO, W5M43	1	1, 23
6720-510-7579	1	Cable Assembly, Special Purpose: flash cord assy complete; 561, model 111F. 35643	1	24
6720-200-4584	1	Camera, Still Puncture KE-15(1): general purpose type; 85 mm roll film, 36 exp; 50 mm, f2.0 lens; focal plane shutter 1 sec to 7/1000 sec; Leica Model 111F	1	1,24
6720-823-9895	1	Camera, Still Picture KE-15(3): Leica part No. 10180, Leica M	2	
6760-598-5910	1	Filter, Light, Photographic Lens: orange; glass; 18,025, 35643	1	1
6760-184-2876	1	Filter, Light, Photographic Lens: 13101, 3564	2	1
5760-823-9898	1	Flash Gun, Photographic: 15503, 35S43	2	24
6720-318-6750	1	Housing: encloses inner components of flash units, also mts entire flash unit to camera; Leitz Battery Case No. 150, No. 155 and No. 17 in combination, 35643	1	1
6720-318-6751	1	Housing: contains capacitor and batt; Leitz Battery-Capacitor Container No. U280, 35646	1	1, 23
6250-523-6068	1	Lampholder: medium screw base; 415 mm lg X 37.3 mm dim o/a; Lampholder #U39, 35943	1	1, 23
6760-597-4745	1	Lens, Camera, General Photographic: 135 mm, f/4,5; telephoto; 11,035, 35643	1	1, 4
6760-823-9096	1	Lens, Camera, General Photographic: 11106, 3543	2	
6760-597-4747	1	Lens, Camera, General Photographic: 35 mm, f/3.5; ride angle; 11-005, 35643	1	1
6760-823-9007	1	Law, Camera, General Photographic: 11850, 35643	2	

FSN	Qty	Nomenclature, part No., and mfr code	Usable on code	Figure No.
6760-200-4369	1	Magazine, Film: film cassette, 14001, MM	2	14
6720-318-6763	1	Reflector, Light: 170 mm dia X 34.0 thk o/a; Reflector, Fantype, collapsible No. U110, 35643	1	23
6760-200-4365	1	Shade, Photographic Lens: for 135 mm Hektor Lens; 12,530, 35643	1	1
6760-815-5914	1	Shade, Photographic Lens: 12571, 35643	2	1
6760-200-4366	1	Shade, Photographic Lens: for 35 mm Summaron Lens; 12,505, 35643	1	1
6760-814-6079	1	Shade, Photographic Lens: 12575, 35643	2	1
6760-200-4367	1	Shade, Photographic Lens: for 50 mm Summaron Lens, 12,516, 35646	1	1
6760-814-3874	2	Spool, Photographic Film: 14022, 35643	2	14
6760-597-5346	1	Viewfinder, Camera: Imarect Viewfinder; 12,000, 35643	1	4

GROUP 2
KE-15(1), KEF15(3)

6720-200-4384	.....	Camera, Still Picture KE-15(1)
6720-823-9695	.....	Camera, Still Picture KE-15(3)

NOTE

Number 1 in the usable on code column refers to components comprising an operable KE-15(1) and number 2 refers to KE-15(3).

6760-200-4369	1	Magazine, Film: film cassette; 14,000, 35648	1,2	14
6760-345-9214	1	Lens, Camera, General Photographic: 50 mm f/2; 35 mm field of view covered; 11,016, code No. S00ZC, 35643	1	
6720-318-6705	1	Spool, Photographic Film: take-up spool; 14,020, 35643	1	
6760-814-2874	1	Spool, Photographic Film: take-up spool; 14022, 35643	2	14

6.2. Expendable Consumable Items

A list of expendable consumable items required for operation appears in table 1-1.

Table 1-1. Expendable Consumable Supplies and Material

The supplies and material listed in this table are required for operation of this equipment and are authorized to be requisitioned by SB 700-50. The FSN for the applicable unit of issue required can be found in appropriate supply catalogs. The FSCM is used as an element in item identification to designate manufacturer or distributor or Government agency, etc., and is identified in SB 708-42.

Item	Description	Re. No. and FSCM	FSC
1	Cleaner, Lens.....	08756 06650	6750
2	Paper, Lens.....	UU-P-313 81348	6640
3	Battery BA-261/U.....		6135

Page 13, paragraph 11*a.* Delete the second sentence.

Paragraph 11*b*. Delete the second sentence.

Page 49, appendix III. Delete appendix III and substitute:

APPENDIX III
BASIC ISSUE ITEMS LIST (BIIL) AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST (ITIAL)

Section I. INTRODUCTION

1. Scope

This appendix lists basic issue items and items troop installed or authorized required by the crew/operator for installation, operation, and maintenance of Still Picture Camera Set KS15(1) and Camera Equipment AN/FQ-2.

2. General

This Basic Issue Items and Items Troop Installed or Authorized List is divided into the following sections:

a. Basic Issue Items List-Section II. A list, in alphabetical sequence, of items which are furnished with, and which must be turned in with the end item.

b. Items Troop Installed or Authorized List Section III. A list, in alphabetical sequence, of items which, at the discretion of the unit commander, may accompany the end item, but are not subject to be turned in with the end item.

3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings.

a. Illustration. This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration in which the item is shown.

(2) Item Number. Not applicable.

b. Federal Stock Number. Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

d. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., and is identified in SB 708-42.

e. Description. Indicates the Federal item name and a minimum description required to identify the item.

f. Unit of Measure (U/M). Indicates the standard of basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, (e.g., ea, in., pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

g. Quantity Furnished With Equipment (Basic Issue Items Only). Indicates the quantity of the basic issue item furnished with the equipment.

h. Quantity Authorized (Items Troop Installed or Authorized Only). Indicates the quantity of the item authorized to be used with the equipment.

4. Special Information

Usable on codes are included in the Description column. Uncoded items are applicable to all models. Identification of the usable on codes are as follows:

Code	Used on
1	KS-15 (1)
2	KS-15 (3)

Section II. BASIC ISSUE ITEMS LIST

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)
(A) FIG. NO.	(B) ITEM NO.	FEDERAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION USABLE ON CODE	UNIT OF MEAS	QTY FURN WITH EQUIP
1		6720-200-4372	14,547	35643	CARRYING CASE, PHOTOGRAPH- 1 IC EQUIPMENT: FOR CAMERA AND ACCESSORIES	EA	1
		6760-823-9699	14,803	35643	CARRYING CASE, PHOTOGRAPH- 2 IC EQUIPMENT	EA	1
16		6760-200-4373	14,515	35643	CARRYING CASE, PHOTOGRAPH- 1 IC EQUIPMENT: CAMERA CASE	EA	1

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) Federal stock number	(2) Part number	(3) FSCM.	(4) Description Usable on code	(5) Unit of meas	(6) Qty auth
8020-200-6327	1352.10.1	07055	BRUSH (NOT INSTALLED) (NOT MOUNTED)	EA	1
6710-356-6334	3551	76500	SYRINGE (NOT INSTALLED) (NOT MOUNTED)	EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L BOWERS
Major General, United States Army
The Adjutant General

Distribution

Active Army:

USASA (2)	USA Dep (2)	17-42
CNGB (1)	Sig Sec USA Dep (5)	19-27
ACSC-E (2)	Sig Dep (5)	19-67
Dir of Trans (1)	Sig TLDM5 (2)	19-87
COE (1)	USAERDAA (1)	19-217
TSG (1)	USAERDAW (1)	19-1500
USAARENBD (1)	MAAG (1)	29-17
USAMB (10)	USARMIS (1)	29-1
AMC (1)	USA Crim Inves Lab (2)	29-2
FORSCOM (5)	AV Comm Cen (1)	29-11
ARADCOM (2)	Units org under fol TOE	29-21
ARADCOM Rgn (2)	(1 copy each):	2941
OS Maj Comd (4)	5-25	29-51
LOGCOMD (3)	5-28	29-11
MICOM (2)	5-35	29-134
TECOM (2)	5-52	29-136
USASTRATCOM (4)	5-101	30-14
MDW (1)	5-145	30-17
Armies (2)	5-146	30-18
Corps (2)	5-155	30-25
HISA (ECOM) (21)	5-156	30-26
Svc Colleges (1)	5-500	30-28
USASESS (5)	6-201	30-29
USAADS (2)	6-302	30-34
USAFAS (2)	7	30-500
USAARMS (2)	7-157	31-105
USAIS (2)	8-500	31-107
USAES (2)	9-22	33-105
USAINTS (3)	9-86	33-106
WRAMC (1)	9-510	33-107
USACDCEC (10)	11-15	37
ATS (1)	11-16	37-42
Instl (2) except	11-35	39-51
Fort Gordon (10)	11-39	47
Fort Huachuca (10)	11-95	55-500
Fort Carson (5)	11-96	57
Fort Bragg (5)	11-215	57-42
Fort Campbell (5)	11-216	57-100
Ft Richardson (ECOM) (2)	11-225	57-102
WSMR (1)	11-237	67
Army Dep (2) except	11-500 AA-AC	77-100
LBAD (14)	12-37	77-102
SAAD (30)	12-77	
TOAD (14)	12-157	
ATAD (10)	17	

NG: State AG (3).
USAR: None.
For explanation of abbreviations used, see AR 310-50.

CHANGE

No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *20 JULY 197*

Operators, Organizational, Field and Depot Maintenance Manual
STILL PICTURE CAMERA SET KS-15(1) AND CAMERA EQUIPMENT AN/GFQ-2

TM 11-6720-201-15, 29 October 1958, is changed as follows:

Page 5, paragraph 2. Delete subparagraph c and substitute:

*c. Reporting of Equipment Publication Improvements. T*he reporting of errors, omissions and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL MA-SNV, Fort Monmouth, NJ 07703.

Page 23, paragraph 17, after paragraph heading, insert the following:

NOTE

The camera base plate may be fitted with a film positioning adapter, which when used with a rapid loading spool will simplify film loading. Paragraph 17.1 contains information concerning the installation and use of the rapid loading kit.

Page 27, after paragraph 17 add paragraph 17.1:

17.1 Rapid Loading Spool Kit (FSN67601 657399)

NOTE

This kit contains a rapid loading spool, a base plate spacer, and a stick-n film loading diagram (.g. 20.1).

a. Assembly.

(1) Remove the base plate and take-up spool. Insert the rapid loading spool (fig. 20.1) into the camera.

(2) Slip the spacer onto the pilot plug in base plate, so that the plane surface rests against the guide strip, parallel to the long side of the base plate. Tighten the fixing screw (fig. 20.2).

(3) Secure the stick-on film loading diagram over the diagram engraved in the camera body.

b. Film Loading.

(1) Move the rapid loading spool to the loading position by turning the wind knob until the opening accepting the film faces the sprocket shaft (fig. 20.3).

(2) Slide the film magazine halfway into the camera body. Pull out the film end an: insert it into the rapid loading spool. Then push the magazine and film leader into the camera.

(3) Replace and secure the base plate.

Make two blind exposures, then pull the film taut by turning, the rewind knob in the direction of the arrow. When the shutter is tensioned a third time, the rewind knob will turn, indicating that the film has been properly loaded and is being advanced.

(4) Set the exposure counter dial to the number 1 position. The camera is now ready for the first exposure.

Page 27. Insert figures 20.1, 20.2, and 20.3.

Figure 20.1. Rapid loading spool kit (Stick-on film loading diagram not shown).

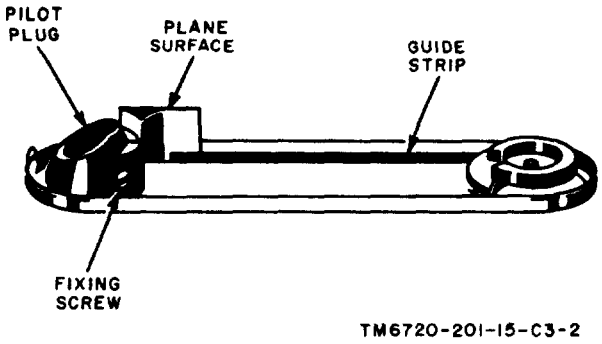

Figure 20.2. Base plate with spacer.

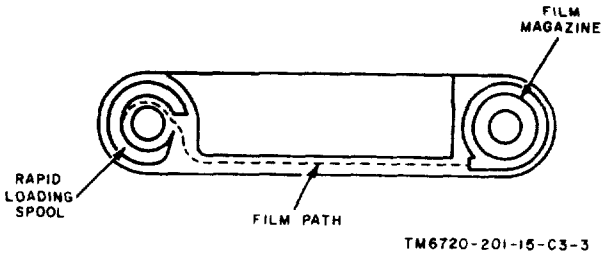

Figure 20.3. Film loading diagram.

By Order of the Secretary of the Army:

BRUCE PALMER, JR.
General, United States Army,
Acting Chief of Staff.

Official:

VERNE L. BOWERS
Major General, United States Army,
The Adjutant General.

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- USASA (2)
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- Dir of Trans (1)
- COE (1)
- TSG (1)
- DCSLOG (1)
- USAARENBD (2)
- USAMB (10)
- GS Maj Comd (4) except
  - USAREUR (6)
  - USARYIS (5)
- USACDC (2)
- USACDC Agcy (1)
- USACDCEC (10)
- AMC (1)
- MICOM (4)
- TECOM (2)
- USAESC (70)
- USASTRATCOM (4)
- CONARC (5)
- ARADCOM (2)
- ARADCOM Rgn (2)
- LOGCOMD (5)
- MDW (1)
- Armies (2)
- Corps (2)
- 1st Cav Div (3)
  - Instl (2) except
  - Ft Carson (21)
  - Ft Gordon (10)
  - Ft Huachuca (10)
  - Ft Bragg (5)
  - Ft Campbell (5)
  - WSMR (3)
- Svc Colleges (2)
- USASESS (10)
- USAADS (2)
- USAFAS (2)
- USAARMS (2)
- USAIS (2)
- USAES (2)
- USAINTS (3)
- Army Dep (2) except
  - SAAD (30)
  - LBAD (14)
  - TOAD (14)
  - ATAD (10)
  - LEAD (7)
  - NAAD (6)
  - SVAD (5)
- Gen Dep (2)
- Sig Sec, Gen Dep (5)
- Sig Dep (10)
- ATS (1)
- MAAG (1)
- USARMIS (1)
- USAERDAW (5)
- USACRREL (2)
- USAERDAA (2)
- WRAMC (1)
- AV Comm Cen (1)
- USA Crim Inves Lab (3)
- Sig FLDMS (2)
- Units org under fol TOE: 2 ea.
  - 5-25
  - 5-26
  - 6-35
  - 5-52
  - 5-101
  - 5-145
  - 5-146
  - 5-155
  - 5-156
  - 5-500 (AA-AC)
  - 6-201
  - 6-302
  - 7
  - 7-167
  - 8-500 (AC-AJ)
  - 9-22
  - 9-86
  - 9-500 (AA-AC)
  - 9-510
  - 11-15
  - 11-16
  - 11-35
  - 11-39
  - 11-95
  - 11-96
  - 11-215
  - 11-216
  - 11-225
  - 11-226
  - 11-237
  - 11-500 (AA-AC)

Changes In force: C 1 and C 2

TM 11-6720-201-15
***C 2**

Operator, Organizational, Field
and Depot Maintenance Manual
STILL PICTURE CAMERA SET KS-15(1) AND
CAMERA EQUIPMENT AN/GFQ-2

CHANGE

No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *21 SEPTEMBER 196*

TM 11-6720-201-15, 29 October 1958, is changed as follows:
Page 49. Add the following after Appendix I:

APPENDIX II
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

a. This appendix assigns maintenance functions to be performed on components, assemblies, and subassemblies by the lowest appropriate maintenance category.

b. Columns in the maintenance allocation chart are as follows:

(1) *Part or component.* This column shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the component. Components, assemblies, and subassemblies are listed in top-down order. That is, the assemblies which are part of a component are listed immediately below that component, and the subassemblies which are part of an assembly are listed immediately below that assembly. Each generation breakdown (components, assemblies, or subassemblies) is listed in disassembly order or alphabetical order.

(2) *Maintenance function*. This column indicates the various maintenance functions allocated to the categories.

(a) Service. To clean, to preserve, and to replenish lubricants.

(b) Adjust. To regulate periodically to prevent malfunction.

(c) Inspect. To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

(d) Test. To verify serviceability and to detect incipient electrical or me chanical failure by use of special equipment such as gages, meters, etc.

***This change supersedes that portion of SIG 7 & 8 KS-15(1), 23 May 56, including C1, 5 Nov 58, and SIG 7 & 8 KE-15(1), 11 May 56, including C1, 22 May 58, as pertains to first echelon items.**

(e) *Replace.* To substitute serviceable components, assemblies, or subassemblies, for unserviceable components, assemblies, or subassemblies.

(f) *Repair.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

(g) *Align.* To adjust two or more comments of an electrical system so that their functions are properly synchronized.

(h) *Calibrate*. To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(i) *Overhaul.* To restore an item to completely serviceable condition as prescribed by serviceability standards. This is accomplished through employment of the technique of Inspect and Repair Only as Necessary (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(j) *Rebuild.* To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements using original manufacturing tolerances and/ or specifications and subsequent reassembly of the item.

(3) *1st, 2d, 3d, 4th, 5th echelons (Operator, organization, direct and general support and depot).* The symbol X indicates the category responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Categories higher than the category marked by X are authorized to perform the indicated operation.

(4) *Tools required*. This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) *Remarks*. Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding column.

c. Columns in the allocation of tools for maintenance functions are as follows:

(1) *Tools required for maintenance functions.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) *1st, 2d, 3d, 4th, 5th echelon (Operator, organization, direct and general support and depot).* The dagger (‡) symbol indicates the categories normally allocated the facility.

(3) *Tool code.* This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal services organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including general support are authorized to the organization operating this equipment.

SECTION II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHLON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
CAMERA SET, STILL PICTURE KS-15(1), KS-15(3)	service	X						
	inspect	X						
	overhaul					X	1,2,3,4,5	Repair will be only effected at Sacremento & Tobyhanna Army Depots
CAMERA, STILL PICTURE KE-15( )	service	X						
	inspect	X						
	replace	X						
	overhaul					X	1,2,3,4,5	
LENS, CAMERA PHOTOGRAPHIC	replace					X	5	
	repair					X	3,4,5	
FLASH GUN PHOTOGRAPHIC	service	X						
	inspect	X						
	replace	X						
	repair					X	3,4,5	
VIEWER FINDER, CAMERA	service	X						
	inspect	X						
	test					X	5	
	replace	X						
	repair					X	3,4,5	

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHLON 1	2	3	4	5	TOOLS CODE	REMARKS
KS-1(15), KS-15(3), KE-15(1), KE-15(3) (continued)							
SHUTTER TESTER					†	1	
MULTIMETER TS-352/U					†	2	
TOOL KIT TK-77/GF					†	3	
TOOL EQUIPMENT TK-109/GR					†	4	
TOOLS & SPECIAL TEST EQUIPMENT PURCHASED FOR SACREMENTO & TOBYHANNA ARMY DEPOTS FOR REPAIR OF LEICA CAMERAS					†	5	

APPENDIX III
BASIC ISSUE ITEM LIST

Section I. INTRODUCTION

1. General

a. This appendix lists items supplied for initial operation and for running spares. The list includes tools, parts, and material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

b. Columns are as follows:

(1) *Federal stock number.* This column lists the 11-digit Federal stock number.

(2) *Designation by model.* The dagger (†) indicates model and/or equipment in which the part is used.

(3) *Description.* Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

(4) *Unit of issue.* The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(5) Expandability. Nonexpendable items are indicated by NX. Expendable items are not annotated.

(6) Quantity authorized. Under "Items Comprising an Operable Equipment", the column lists the quantity of items supplied for the initial operation of the equipment. Under "Running Spare Items" the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for the maintenance of the equipment.

(7) Illustration. Not used.

2. Batteries

Dry batteries shown are used with the equipment but are not considered part of the equipment. They will not be preshipped automatically but are to be requisitioned in quantities necessary for the particular organization, in accordance with SB 116.

SECTION II. FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL							DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
												FIGURE NO	ITEM NO
								GROUP 1 **KS-15(1), KS-15(3)**					
6720-301-4685	†							CAMERA, SET, STILL PICTURE XS-15(1): general purpose type; 35 m roll film, 36 exp; Inc Leica model IIIP Camera, flash Sun, wide angle & telephoto lens:		NX NX			
6720-823-9759	†							CAMERA SET, STILL PICTURE KS-15(3): general purpose type; 35 mm roll film; 36 exp; Leitz part No. 010,180 S.P.A.F					
								NOTE: Model Column 1 refers to KS-15(1). Model Column 2 refers to KS-15(3).					
								ITEMS COMPRISING AN OPERALE EQUIPMENT					
ORD THRU AOC	†	†						TECH MANUAL TM 11-6720-201-15			2		
6250-537-4058	†							ADAPTER, LAMPHOLDER: Leitz cat No. 16062, code CQQWO			1		
6135-160-7159	†							BATTERY BA-261/U:			1		
6720-510-7519	†							CABLE ASSEMBLY, SPECIAL PURPOSE: flash cord assy complete; Leitz No. 561, model IIIF			1		
6720-200-4384	†							CAMERA, STILL PICTE KE-15(1): general purpose type; 35 mm roll film, 36 exp; 50 mm, f2.0 lens; focal plane shutter 1 sec to 7/1000 sec; Leica Model IIIF		NX			
6720-823-9695		†						CAMERA, STILL PICTURE KE-.5(3): Leica part No. 10180 Leica M3			1		
6720-200-4372	†							CARRYING CASE PHOTOGRAPHIC EQUIPMENT: for camera & accessories; Leitz cat No. 14;541			1		
6760-823-9699		†						CARRYING CASE, PHOTOGRAPHIC EQUIPMENT: Leitz part No. 14803			1		
6760-200-4373	†							CARRYING CASE, PHOTOGRAPHIC EQUIPMENT: camera came; Leitz No. 14,515			1		
6760-598-5910	†							FILTER, LIGHT, PHOTOGRAPHIC LENS: orange; glass; Leitz cat No. 13,025			1		
6760-814-2876		†						FILTER, LIGHT, PHOTOORAPHIC LENS: Leitz part No. 13101			1		
6760-823-9698		†						FLASH GUN, PHOTOGRAPHIC: Leitz part No. 15503			1		
6720-318-6750	†							HOUSING: enclose Inner components of flash units, also mts entire flash unit to camera; Leitz Battery Came No. 150, No. 155 and No. 17 In combination			1		
6720-318-6751	†							HOUSING: contain. capacitor and batt; Leitz Battery-Capacitor Container No. U280			1		
6250-523-6068	†							LAMPHOLDER, medium screw base; 41.5 mm 1g x 37.8 -mm dim- o/a; Leitz Lampholder #U39			1		

SECTION II. FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO	ITEM NO
		KS-15(1), 15-15(3)1 KE-15(1), KE-15(3) (continued)					
6760-597-4745	†	LENS, CAMERA, GENERAL PHOTOGRAPHIC: 135 m. f/4.5; telephoto; Leitz Cat No. 11,035			1		
6760-823-9696	†	LENS, CAMERA, GENERAL PHOTOORAPHIC: Leitz part No. 11106			1		
6760-597-4747	†‡	LENS, CAMERA, GENERAL PHOTOGRAPHIC: 35 mm, f/3.5; wide-angle; Leitz Cat No. 11-005			1		
6760-823-9697	†	LENS, CAMERA, GENERAL PHOTOGRAPHIC Leitz part No. 11850			1		
6760-200-4369	†	MAGAZINE, FLLM: film cassette, Leitz part No. 14001			1		
6720-318-6763	†	RLECTOR, LIGHT: 170 dia 1 34.0 thk o/a, Leitz Reflector, Fantypa, collapsible No. U110			1		
6760-200-4365	†	SHADE, PHOTOORAPHIC LENS: for 135 - Hektor Lene; Leitz Cat No. 12,530			1		
6760-815-5914	†	SHADE, PHOTOGRAPHIC LENS: Leitz part No. 12571			1		
6760-200-4366	†	SHADE, PHOSOCRAPHIC LENS: or 35o Summaron Lens; Leitz Cat No. 12,505			1		
6760-814-6079	†	SHADE, PHOTOORAPHIC LENS: Leitz part No. 12575			1		
6760-200-4367	†	SHADE, PHOTOCRAPHIC LENS: for 50 on Summicron Lens, Leitz cat No. 12.516			1		
6760-814-2874	†	SPOOL, PHOTOORAPHIC FILM: Leitz part No. 14022			2		
6760-597-5346	†	VIEWPINDER, CAMERA: Imarect Viewfinder Leitz cat No. 12,000					
		RUNNING SPARE ITEMS					
8020-200-6327		BRUSH: Besealer p/n 8S2.10.1 (Not Installed) (Not mounted)			1		
6750-392-9751		CLEANER, LENS: Bell & Howell p/n No. 08756 (Not Installed) (Not mounted)					
6760-200-4369	†	MAGAZINE, FILM: film cassette, Leitz part No. 14001			1		
6410-393-2090		PAPER LENS: Fed spec LU-P-313, type 1 (Not Installed) (Not mounted)			1		
6710-356-6334		SYRINGE: BF Goodrich p/n No. 3551 (Not Installed) (Not mounted)					

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL						DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
											FIGURE NO	ITEM NO
							KS-15(1), 15-15(3)1 KE-15(1), KE-15(3) (continued)					
6720-200-4384	†						CAMERA, STILL PICTURE KE-15(1): GENERAL PURPOSE TYPE; 35 mm roll film, 36 exp; 50 mm, f\2.0 lens; focal plane shutter 1 sec. to 1/1000 sec; Leica model IIIF;					
6720-823-9695	†						CAMERA, STILL PICTURE KE-15(3): Leica M3 with rigid 50 mm Summicron f/2 lens; ISOUN Leitz cat No. 10180			NX		
							NOTE: Model Column 1 refers to KE-15(1). Model Column 2 refers to KE-15(3).					
							ITEMS COMPRISING AN OPERABLE EQUIPMENT					
	†						CAMERA, STILL PICTURE KE15(1) (BASIC COMPONENT)					
		†					CAMERA, STILL PICTURE K5-15(3) (BASIC COMPONENT)					
6760-200-4369	†	†					MAGAZINE, FILM: film cassette; Leitz cat No. 14,000					
6760-345-9214	†						LENS, CAMERA, GENERAL PHOTOGRAPHIC: 50 mm f/2; 35mm field of view covered; Leitz cat No. 11,016, code No. SOO2C			1		
6720-318-6705	†						SPOOL, PHOTOGRAPHIC FILM: take-up spool; Leitz part No. 14022			1		
							RUNNING SPARE ITEMS					
6760-200-4369	†	†					MAGAZINE FILM: film cassette; Leitz cat No. 14,000					
6720-318-6705	†						SPOOL PHOTOGRAPHIC FIM: take-up spool; Leitz cat No. 14,020			2		
6760-814-2874		†					SPOOL, PHOTOGRAPHIC FILM: take-up spool; Leitz part No. 14022			2		

Page 50. Change Appendix II to Appendix IV.

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff

Official:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:
Active Army:

CNGB (1)
CofT (1)
CofEngrs (1)
TSG (1)
CofSptS (1)
C/COMMEL (7)
USASA (2)
USCONARC (5)
USAMC (5)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (3)
OS Base Comd (2)
LOGCOMD (2)
USASMCOM (4)
USAECOM (32)
USA Avn Mat Comd (1)
USASCC (4)
USASMCOM (2)
USAPA (5)
USACDCCEA, Ft Monmouth (1)
MDW (1)
Armies (2)
Corps (2)
USA Corps (3)
Chicago Proc Dist (1)
Instl (2) except
Ft Monmouth (63)
USACDC Agencies (2)
1st Fld Sta, USASA (5)
USARSOUTHCOM Sig Agcy (1)
USAARMBD (2)
USAARTYBD (2)
USATC AD (2)
RSATC Armor (2)
USATC Engr (2)
USATC Inf (2)
USASTC (3)
USA Pic Cen (2)
WRAMC (1)
AMS (1)
Blue Grass Army Dep (8)
GENMISH (5)
USA Crim Inves Lab (5)
11th Air Assault Div (3)
US Army Tml (1) except Oakland (5)
POE (1)
Sig Fld Maint Shops (3)
USAERDL (2)
USA Cold Rgns R&E Lab (2)
Svc Colleges (2)
Br Svc Sch (2) except USASCS (60)
Army Dep (2) except Tobyhanna,
Lexington (12) Sacramento (28)
Ft Worth (8) Letterkenny, Navajo,
Savanna (5) Charleston, Sharpe (3)
GENDEP (OS) (2)
Sig Sec, GENDEP (OS) (5)
Sig Dep (OS) (12)
USA Elct R&D Agcy:
Yuma PG (2)
WSMR (13)
Ft Gordon (5)
Ft Huachuca (10)
USA PM Sch & Cen (20)
USATCA (1)
USATCG (1)
USATCG (1)
USAINTC (5)
MAAG, Mali (5)
Unit, org under fol TOE (2 ea UNOINDC):

5-25	11-36	11-557	29-56
5-26	11-38	11-587	30-14
5-145	11-39	11-592	30-17
5-146	11-95	11-597	30-18
5-155	11-55	12-37	30-25
6-302	11-56	17	30-26
7	11-57	17-42	30-28
7-2	11-95	19-27	30-29
9-22	11-96	19-67	33-105
9-500	11-117	19-217	33-106
AA-AC	11-155	19-500	36-107
10-22	11-157	AA-AE	37
11-5	11-215	20-17	37-42
11-6	11-216	29-1	39-51
11-15	11-237	29-2	55-500
11-16	11-500	29-11	AA-AE
11-35	AA-AE (4)	29-51	57

NG: State AG (3)
USAR: None
For explanation of abbreviations used, see AR 320-50.

TECHNICAL MANUAL
OPERATION AND MAINTENANCE STILL PICTURE CAMERA SET KS-15(1) AND CAMERA EQUIPMENT AN/GF2

TM 11-6720-201-15

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C *20 September 1963*

CHANGE No. 1

TM 11-6720-201-15, 29 October 1958, is changed as follows:

Paqe 5 is, paragraph 1. Delete subparagraph *c.*
Add paragraph 1.1 after paragraph 1:

1.1. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individuals parts (-10, -20, -35P, etc.) and the latest changes to and revisions of each equipment publication.

Delete paragraph 2 and substitute:

2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as pre scribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting by the individual user of errors, omissions, and recommendations for improving this manual is authorized r, encouraged. DA Form 2028 (Recommendation idea Changes to DA Technical Manual Parts 1or Supply Manual 7, 8 or 9) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to: Commanding Officer, U.S. Army Electronics Materiel Support Agency. ATTN: SELMSMP, Fort Monmouth, N J 07703. One information copy will be furnished to the individual's immediate supervisor (officer, noncommissioned officer, supervisor, etc.).

Page 41. Make the following changes:

Add section I heading after the chapter heading.

Section I. OPERATOR'S MAINTENANCE

Delete paragraph 33 and substitute:

33. Scope of Operators Maintenance

The maintenance duties assigned to the operator of the camera set are listed below together with a reference to the paragraphs covering the specific maintenance function. The tools and materials required are listed in paragraph 34.

a. Daily preventive maintenance checks and services (par. 35.2).

b. Weekly preventive maintenance checks and services (par. 35.3).

c. Visual inspection (par. 36).

d. Operational checks (par. 37).

e. Cleaning (par. 38).

Delete paragraph 35 and substitute:

35. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systemic Care. The procedures given in paragraphs 85.1 through 35.3 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services chart (pars. 35.2 and 35.3) outlines functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the chart indicates what to check, how to check, and what the normal conditions are. The references column lists the paragraphs that contain detailed repair procedures. If the defect cannot be remedied by the operator, higher echelon maintenance is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38750. Add paragraph 35.1 through 35.3 after paragraph 35.

35.1. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the camera set are required on a daily and weekly basis.

a. Paragraph 35.2 specifies check. and services that must be accomplished daily or at least once each week if the equipment is maintained in standby condition.

b. Paragraph 35.3 specifies the maintenance checks and services that must be performed each week. If the equipment is being maintained in standby condition. the daily (par. 35.2) and weekly procedures should be accomplished at the same time.

35.2. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Exterior surfaces	Remove dust and dirt from all exterior surfaces of the camera set.	Par. 38.
2	Lenses and light filters	Inspect exterior surfaces of lenses and light filters (fig. 3) for scratches, chips, cracks, or other defects.	None.
3	Viewfinders and range-finder.	a. Inspect exterior surfaces of viewfinder and range-finder windows for scratches, chips, cracks, or other defects.	None.
		b. Look through viewfinders and rangefinder and inspect for clarity and internal cleanliness.	None.
		Note. Use rangefinder adjustment lever to adjust rangefinder to the individual sys.	
4	Carrying cases and straps	Inspect carrying cases (fig. 2) and straps for tears, loose stitching, and broken fasteners.	

35.3. Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Camera controls	Operate camera controls (par. 12) and chock for smoothness and positive action.	None.
2	Lens controls	Operate camera controls (par. 13) and chock for smoothness and positive action.	None.

35.3. Weekly Preventive Maintenance Checks and Services Chart -Continued

Sequence No.	Item	Procedure	Reference
3	Universal viewfinder and flash lamp flasher controls.	Operate universal viewfinder and flash lamp flasher controls (par. 14) and check for positive action.	None.
4	Bottom cover assembly	Inspect for tight closure of bottom cover assembly(fig. 17).	None.
5	Takeup spool	Inspect film takeup spool (fig. 18) for distorted or bent flanges	None.
. 6	Flash lamp flasher	Inspect flash lamp flasher (fig. 23) for dirty, corroded, or pitted contacts. Inspect interior of tery-capacitor housing for sign' of corrosion or battery leakage.	None.

Page 42. Delete figure 30.
Page 43. Delete figure 31.
Page 44. After paragraph 38. Add:

Section II. ORGANIZATIONAL

38.1. Organizational Preventive Maintenance

a. Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the responsibility of all echelons concerned with the equipment and includes inspection, testing, and repair or replacement of parts, subassemblies, or units that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks of the equipment at the second echelon level are made at monthly intervals, unless otherwise directed by the commanding officer. Paragraph 2 contains additional information concerning submission of specific forms.

b. Maintenance forms and records to be used and maintained on this equipment are specified in TM 38-750.

38.2. Monthly Maintenance

Perform the maintenance functions indicated in the monthly preventive maintenance cheeks and services chart (par. 38.3) once each month at the same time that the daily and weekly procedures (pars. 35 2 and 35.3) are performed. A month is defined as approximately 30 calendar days of 8-hour-per-day operation. If the equipment is operated 16 hours a day. the monthly preventive maintenance checks and services should be performed at 15 day intervals. Adjustment of the maintenance interval must be made to compensate for any unusual operating conditions. Equipment maintained in a standby (ready for immediate operation) condition must have monthly preventive maintenance checks and services performed on it. Equipment in limited storage (requires service before operation) does not require monthly preventive maintenance. All deficiencies or shortcomings will be recorded, and those not corrected during the inspection and service will be immediately reported to higher echelon by the use of forms and procedures specified in TM 38-750. Equipment with a deficiency that cannot be corrected by second echelon should be deadlined in accordance with TM 38-750. Perform all the services listed in the monthly maintenance checks and services chart (par. 38.3) in the sequence listed. Whenever a normal condition or result is not observed, take corrective action in accordance with the listed references.

38.3. Monthly Preventive Maintenance Checks and Service Chart

Sequence No.	Item	Procedure	Reference
1	Completeness	Check to see that equipment is complete (par. 5 or 6).	
2	Cleanliness	Check to rec that equipment is dean	Par. 38.
3	Preservation	Check all surfaces for evidence of fungus, remove rust and corrosion, and spot-paint bare spot.	Par. 38.4.
4	Publications	Check to see that all publications are complete, serviceable, and current	DA Pam 310-4
5	Modification	Check DA Pam 310-4 to determine if new applicable MWO's have been published. All urgent MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	TM 38-750.
6	Operation	Perform operational checks. If normal indications Par. 37. are not obtained, higher echelon repair is required.	Par.37.

38.4. Cleaning and Touchup Painting

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TM 9-213

Page 49, appendix I. Add the following to the list of references:

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins Supply Bulletins, Lubrication Orders, and Modification Work Orders.
TM 9-213	Painting Instructions for Field Use.
TM 38-750	The Army Equipment Record System and Procedures.

BY ORDER OF THE SECRETARY OF THE ARMY:

EARLE G. WHEELER,
General, United States Army
Chief of Staff.

Official:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:
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TSG (1)
CSigO (7)
Coff (1)
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USA CD Agcy (1)
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ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (3)
OS Base Comd (2)
LOGCOMD (2)
USAECOM (5)
USAMICOM (4)
USASCC (4)
MDW (1)
Armies(2)
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USA Corps (3)
USATC AD (2)
USATC Engr (2)
USATC Inf (2)
USATC Armor (2)
USASTC (6)
Instl (2) except
Ft Monmouth (65)
Svc Colleges (2)
Br Svc Sch (2) except
GENDEP (OS) (2)
Sig Dep (OS) (12)
Sig Sec, GENDEP (5)
Army Dep (2) except
Ft Worth (8)
Lexington (12)
Sacramento (28)
Tobyhanns (12)
Mil Min, Mali (s)
USA Elet RD Actv, White Sands (13)
USA Elct RD Actv, Ft Huachuca (2)
USA Trans Tml Comd (1)
Army Tml (1)
POE (1)
USAOSA (1)
AMS (1)
WRAMC (1)
AFIP (1)
Army Pic Cen (2)
USA Mbl Spt Cen (1)
USA Elct Mat Agcy (12)
Chicago Proc Dist (1)
USARCARIB Sig Agcy (1)
Sig Fld Maint Shop (3)
Units org under fol TOE (2 cy ea UNOINDC):
7
9-500 (AA-AC)
10-22
11-5
11-6
11-7
11-15
11-16
11-35
11-36
11-38
11-9
11-55
11-56
11-57
11-95
11-96
11-117
11-156
11-157
11-215
11-216
11-237
11-500 (AA-AC) (4)
11-557
11-587
11-592
11-597
17
19-217
19-600 (AA-AE)
29-56
30-14

30-17
30-18
30-25
30-26
30-28
30-29
30-500 (AA-AE)
33-105
33-106
33-107
37
37
55-500 (AA-AE)
57

NG: State AG (3); units - same as Active Army except allowance in one copy to each unit.
USAR: None.

For explanation of abbreviations used see AR 320-50.

TECHNICAL MANUAL

No. 11-6720-201-15

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *29 October 1958*

STILL PICTURE CAMERA SET KS-15(1) AND CAMERA EQUIPMENT AN/GFQ-2 OPERATION AND MAINTENANCE

*This manual supersedes TM 11-2342, 27 May 1949.

12-37
12-77
12-157
17
17-42
1927
19067
19-87
19-217
19-500 (AA-AE)
20-17
29-1
29-2
29-11
29-21
29-41
29-51
29-111
29-134
29-186
80-14
80-17
80-18
80-25
30-26
30-28
80-29
30-34
30-500 (AA-AN)
31-105
31-107
31-105
33-106
33-107
37
37-42
39-51
47
55-500 (AA-AD)
57
57-42
57-100
57-102
67
77-100
77-102

ARNG: State AG (3).
USAR: None.
For explanation of abbreviations used, see AR 310-50.

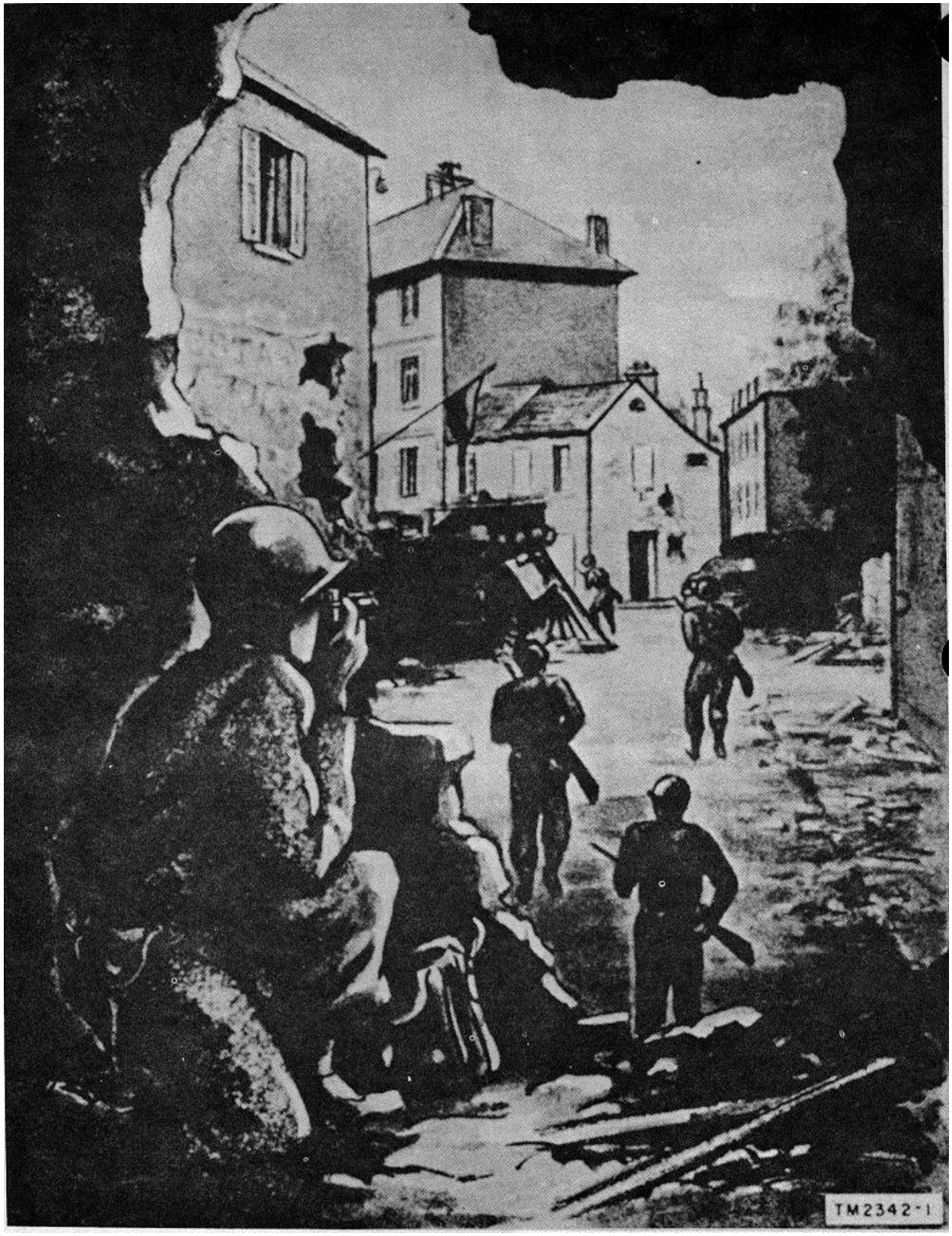


Figure 1. Camera set in use.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual covers the operation and maintenance of Still Picture Camera Set KS-15 (1) and Camera Equipment AN/GFQ-2.

b. Throughout this manual, Still Picture Camera Set KS-15(1) and Camera Equipment AN/GFQ-2 are referred to as camera set. The camera component of the KS15(1) and the camera component of the AN/GFQ-2 are referred to as camera.

c. Forward all comments on this publication directly to: Commanding Officer, United States Army Signal Publications Agency, Fort Monmouth, N. J.

2. Forms and Records

a. Unsatisfactory Equipment Reports.

(1) Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) to Commanding Officer, U. S. Army Signal Equipment Support Agency, Fort Monmouth, N. J., as prescribed in AR 70038.

(2) Fill out and forward AF TO Form 29 (Unsatisfactory Report) to Commander, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, as prescribed in AF TO 000-35D-54.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army); Navy Shipping Guide, Article 18504 (Navy) ; and AFR 714 (Air Force).

c. Preventive Maintenance Forms (figs. 30 and 31). Prepare DA Form 11-254 (Maintenance Check List for Signal Equipment (Still and Motion Picture Camera)), in accordance with the instructions contained on the form.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. Purpose. The camera set (figs. 2 and 3) provides candid photographs of most still and moving subject matter under normal or adverse lighting conditions (depending on the components and the type of film in use).

b. Use. The camera set is used primarily to take black and white or color photographs under field conditions (fig. 1) where small, readily portable equipment is desirable. The lenses supplied extend the application of the camera set to include wide areas and distant subjects.

4. Technical Characteristics

a. Camera.

Type ..... Miniature still picture; includes coupled range finder and lens mounting flange for interchanging the lens. Built-in flash synchronization (KS-15 (1) only).

Shutter:

Type ..... Focal plane, rubberized cloth curtain.

Slow speeds:

KS-15(1) 1, 1/2,1/5,1/10,1/15, and 12- second, and T (time). Speeds between 1 second and 1/25 second are continuous and permit intermediate settings.

AN/GFQ-2 1,1/2,1/4,1/8, and 1/20 second, and T (time). Speeds between 1 second and 1/8 second are continuous and permit intermediate setting.

Fast speeds:

KS-15(1) 1/25,1/50,1/75,1/100,1/200,1/500,and second, and B (bulb).

AN/GFQ-2 1/20, 1/30, 1/40, 1/60, 1/100, 1/200, 1/500.

Range finder ..... Lens coupled, superimposition type, focusing eyepiece.

View finder ..... Optical type, direct view, internal reflected. Used with 5-cm lens only.

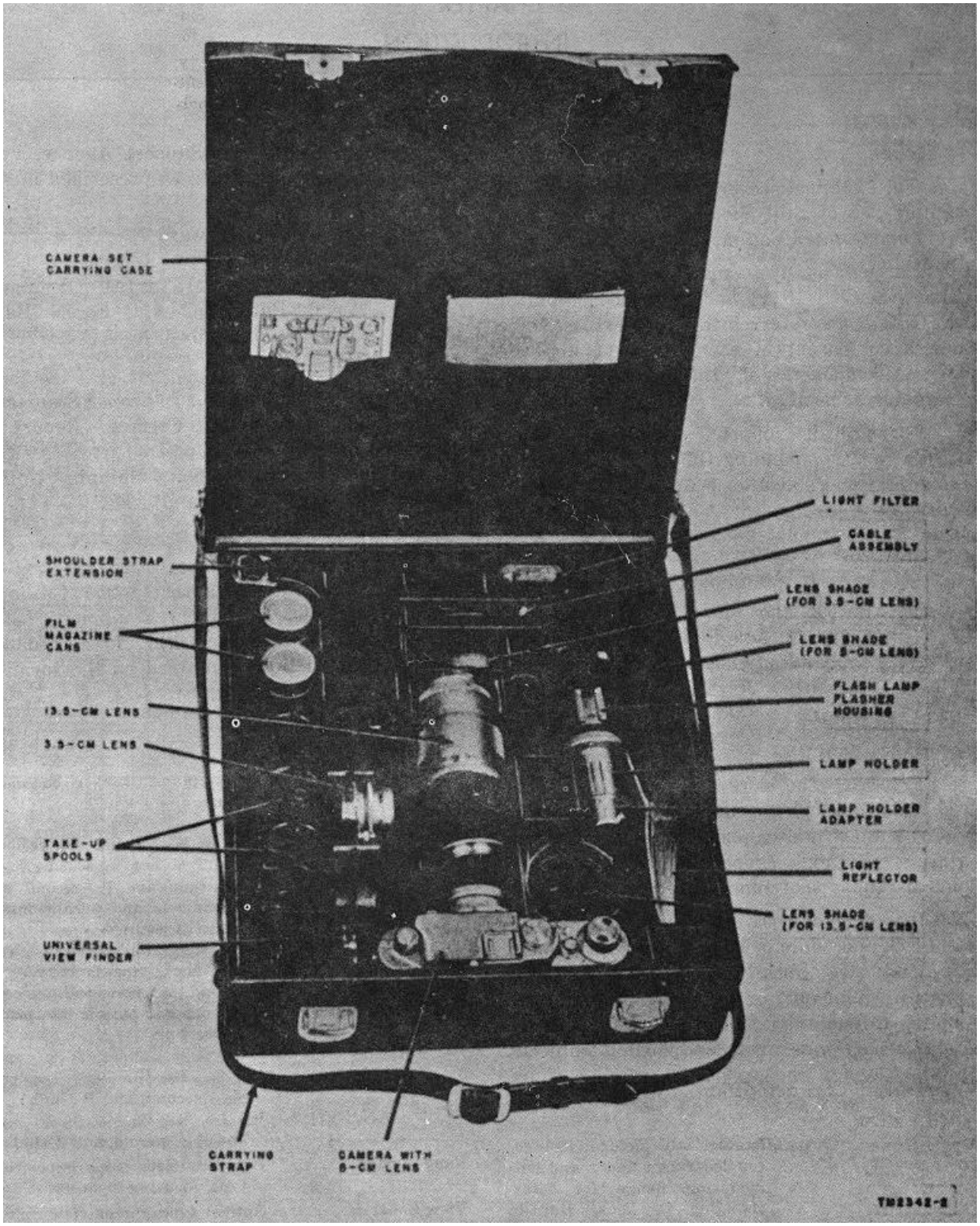


Figure 2. Still Picture Camera Set KS-15(1), components.

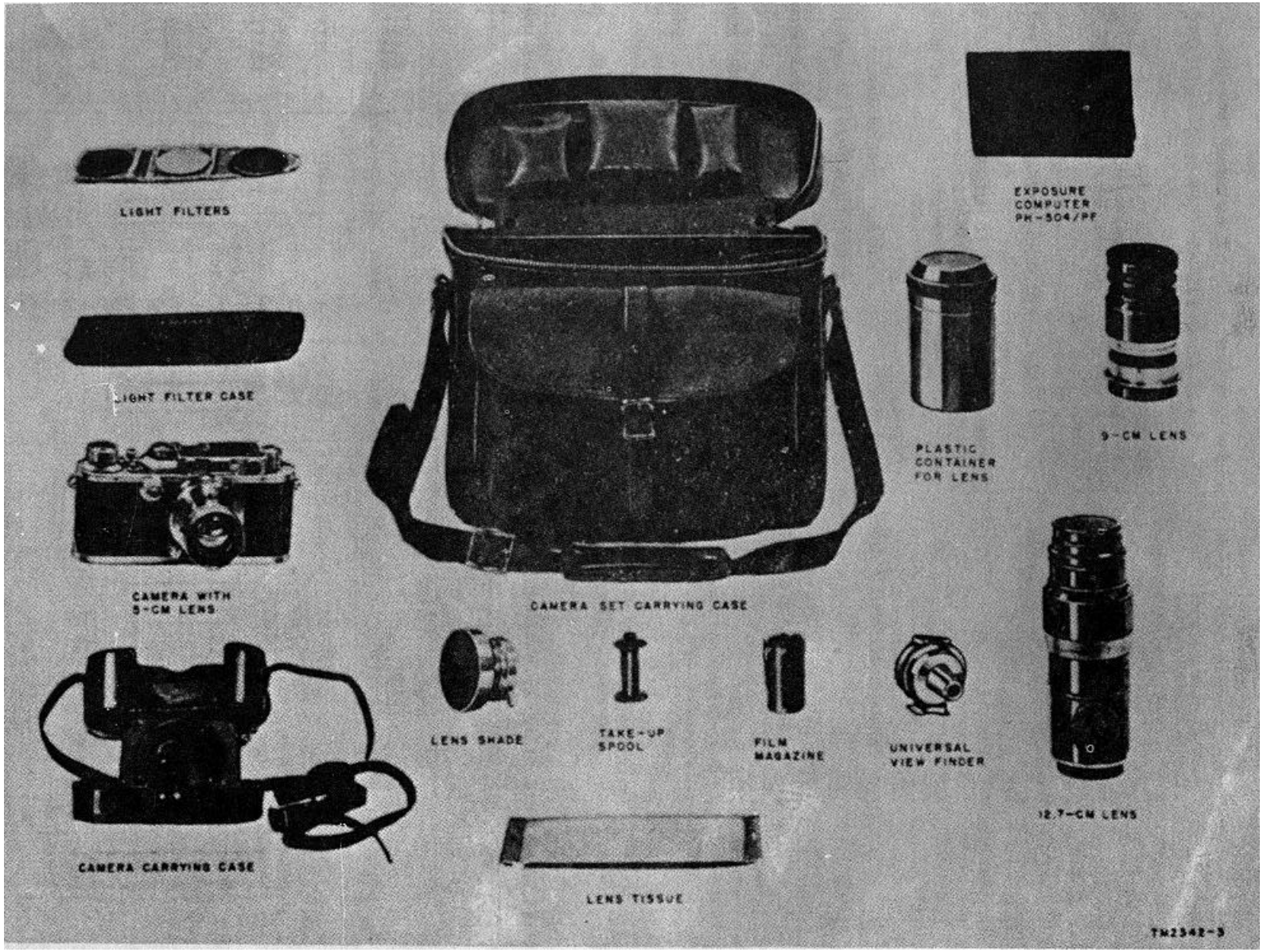


Figure 3. Camera Equipment AN/GFQ-2, components.

Exposure counter ..... Disk type, pawl operated, equipped with friction clutch. Scale calibrated from 0 to 39 in steps of 1; numbered from 0 to 35 in steps of 5.

Maximum capacity ..... 36 exposures (approximately 5 1/4 feet).

Film:

Type..... 35-mm, double perforated roll film; black and white or color.

Picture area..... 24-mm by 36-mm.

b. Lenses.

(1) *Lens, 5m (50-mm).*

Diaphragm range:

KS-15(1) - f/2 to f/16.

AN;/GFQ-2, f/2 to f /12.5.

Focus range ..... 3.5 to 100 feet and infinity.

Type..... Anastigmat, retractable focusing mount coated.

Coverage ..... 48 °

Angles of view..... 40° horizontal, 27° vertical.

(2) *Lens, 3.5-cm (35-mm) (KS-15 (1) only.*

Diaphragm range ..... f/3.5 to f/22.

Focus range ..... 3.5 to 100 feet and infinity.

Type..... Anastisgmat coated, focusing mount.

Coverage ..... 68°

Angles of view ..... 55° horizontal, 38° vertical.

(3) *Lens, 9-cm, (90-mm) (AN/GFQ2 only)*

Diaphragm range ..... f/4 to f/36.

Focus range ..... 3.5 to 100 feet and infinity.

Type..... Anastigmat, focusing mount.

Coverage ..... 26°

Angles of view ..... 22° horizontal, 15° vertical.

(4) *Lens, 12.7-cm (127-mm) (AN/GFQ-2 only) .*

Diaphragm range ..... f/4.5 to f/45.

Focus range ..... 5 to 300 feet and infinity.

Type ..... Anastigmat, focusing mount.

Coverage ..... 19°.

Angles of view ..... 16° horizontal, 11° vertical.

(5) Lens, 13.5-cm (135-mm) (KS-15(1) only).

Diaphragm range ..... f/4.5 to f/32.

Focus range ..... 5 to 300 feet and infinity.

Type ..... Anastigmat, coated, focusing mount.

Coverage ..... 18°.

Angles of view ..... 16° horizontal, 11°- vertical.

c. Flash Lamp Flasher (KS-15(1) only).

Type ..... Battery-capacitor.

Flash lamps accom- modated. Medium-screw base and bayonet base.

Battery voltage ..... 22 1/2 volts.

Reflector ..... Fan type, matte surface finish.

d. Universal View Finder.

Type ..... Variable field of view, image erecting, prismatic, with parallax correction control.

Settings:

KS-16(1)..... 3.5-cm, 5-cm, 8.5-cm, 9-cm, and 13.5-cm. Click stops.

AN/GFQ-2 ..... 3.5-cm, 5m, 7.3-cm, 9-cm, 12.7-cm, and 13.5-cm. Click stops.

5. Components, Still Picture Camera Set (KS-15(1))
(figs. 2 and 16)

Qantity	Component	Dimensions (in.) Height	Width	Depth	Volume (cu.in)
1	Still Picture Camera KE-15(1), including 5cm lens (Summicron, f/2) installed.	2 3/4	5 3/4	2 1/2	39.53
1	Camera set carrying case	3 3/8	11 3/4	13	514.76
1	Camera carrying case	3 3/8	6 1/4	3 1/8	65.71
1	Light filter (orange)		1 9/16 (dia)	3/8	
1	3.5cm lens (Summaron, f/3.5)		2 1/8 (dia)	1 3/16	
1	13.5cm lens (Hektor, f/4.5)		2 1/8 (dia)	5 3/18	
1	Universal view finder	1 13/16	1 1/2	2	5.62
1	Lens shade (for 6-m lens)	2 5/16	3 ½, .	1/2	.42
1	Lens shade (for 13.6-cm lens)		1 13/16 (dia)	2	
1	Lens shade (for 3.bcm lens)		1 5/8(dia)	3/4	
1	Film magazine can (with film magazine)		1 (dia)	2	
1	Takeup spool		29/32 (dia)	1 3/4	
1	Flash lamp flasher, c/o:				
	1 flash lamp flasher housing		1 7/16 (dia)	3 1/8	
	1 Battery-capacitor housing (contained in flash lamp flasher housing).		1 5/16 (dia)	2 1/2	
	1 lamp holder (medium-screw base)		1 9/16(dia)	1 7/8	

Quantity	Component	Dimensions (in.)			Volume (cu. in.)
		Height	Width	Depth	
	1 light reflector, fan type, collapsible		6 1/2 (dia)	6	
	1 lamp holder adapter (bayonet base)		1 1/8 (dia)	1 1/4	
	1 cable assembly			20 /14 (lg)	
	1 test lamp, incandescent, bayonet base, 6 volts (in storage compartment).				
1 set	Flash synchronization tables (in storage pocket).				
1 set	Spare parts, c/o:				
	1 takeup spool				
	1 film magazine can (with film magazine)				

6. Components, Camera Equipment AN/GFQ-2 (fig. 3)

Quantity	Component	Dimensions (in.)			Volume (cu. in.)
		Height	Width	Depth	
1	Camera, with 5-cm lens (f/2) installed	2 5/8	5 1/2	2 1/4	35.25
1	9-cm lens (f/4) with plastic container		1 3/4 (dia)	3 1/8	
1	12.7-cm lens (f/4.5)	2 1/4 (dia)	5		
1	Lens shade		2 1/2 (dia)	1 3/4	
1	Light filter carrying case with:				
	1 light filter (yellow)	1.41 (dia)	1/4		
	1 light filter (red)		1.41 (dia)	1/4	
	1 light filter (green)	1.41 (dia)	1/4		
1	Universal view finder	1 13/16	1 ½	2	5.62
1	Film magazine -	1 (dia)	2		
1	Takeup spool		29/32 (dia)	1 3/4	
1	Exposure Computer PH-504/PF	5	3 1/4	3/8	6.09
1	Camera set carrying case	10	12	6	720
1	Camera carrying case	3	6	2 3/4	49.5
6	Lens tissue, pad				
1 set	Spare parts c/o:				
	1 film magazine				
	1 takeup spool				

7. Description of Major Components

a. Camera. The camera (figs. 7 and 8) is a 35-millimeter (mm) still camera which normally mounts the 5-centimeter (cm) f/2 lens, Camera features include a coupled range finder, double exposure prevention device, and interchangeable lenses. The KS15(1) is also provided with built-in flash synchronization. The camera is portable and may be operated from the camera carrying case (fig. 16).

b. Lenses.

(1) *Lens, 5-cm* (figs. 7 and 8). The 5-cm lens is the normal focal length lens for the camera. The lens elements are set in a retractable barrel which has a focusing mount. When not in use, the lens barrel can be telescoped into the camera body.

(2) *Lens, 3.5-cm* (fig. 4). The 3.5-cm lens (KS15(1) only) is a wide angle lens mounted in a nonretractable barrel which has a focusing mount.

(3) *Lens, 9-cm (*fig. 12). The 9-cm lens (AN/GFQ2 only) is a semilong focus lens mounted in a nonretractable barrel which has a focusing mount.

(4) Lens, 12.7-cm (fig. 12). The 12.7-cm lens (AN/GFQ-2 only) is a long focus lens mounted ill a nonretractable barrel which has a focusing mount. Because of its greater weight, this lens is provided with a tripod socket on the underside of the lens barrel.

(5) Lens 13.5-cm (fig. 4). The 13.5-cm lens (KS15(1) only) is similar to the 12.7-cm lens described in (4) above.

*c. Universal View Finder (fi*g. 4). The universal view finder mounts into the camera accessory clips. An accessory clip on top of the Universal view finder provides a mount for the flash lamp flasher, if required.

d. Flash Lamp Flasher (figs. 5 and 23). The flash lamp flasher is supplied with the KS15(1) and mounts into the slide fastener on the camera or universal view finder.

8. Description of Minor Components

a. Lens Shades.

(1) Three lens shades are supplied with the KS15 (1). Two of the lens shades are marked for the particular lens (3.5-m and 5-cm) they fit. The third lens shade is adjustable and can be extended for use with certain lenses from 5 cm to 13.5 cm. The 3.5-cm and 13.5-cm (adjustable) lens shades are slip-on types. The 5-cm lens shade (fig. 25) is equipped with a spring mount.

(2) The lens shade (fig. 26) supplied with the AN/GFQ2 is the slip-on type and is provided with a recess to accommodate an unmounted light filter.

b. Light Filters.

(1) The light filter (fig. 2) supplied with the KS15(1) is the slip-on type. It can be used with the 3.5-cm and 13.5 cm lenses only.

(2) Three unmounted light filters (fig. 3) are supplied with the AN/GFQ-2. They are contained in a carrying case.

c. Film Magazine and Takeup Spool.

(1) The film magazine (fig. 14) consists of a film spool, an inner shell, and an

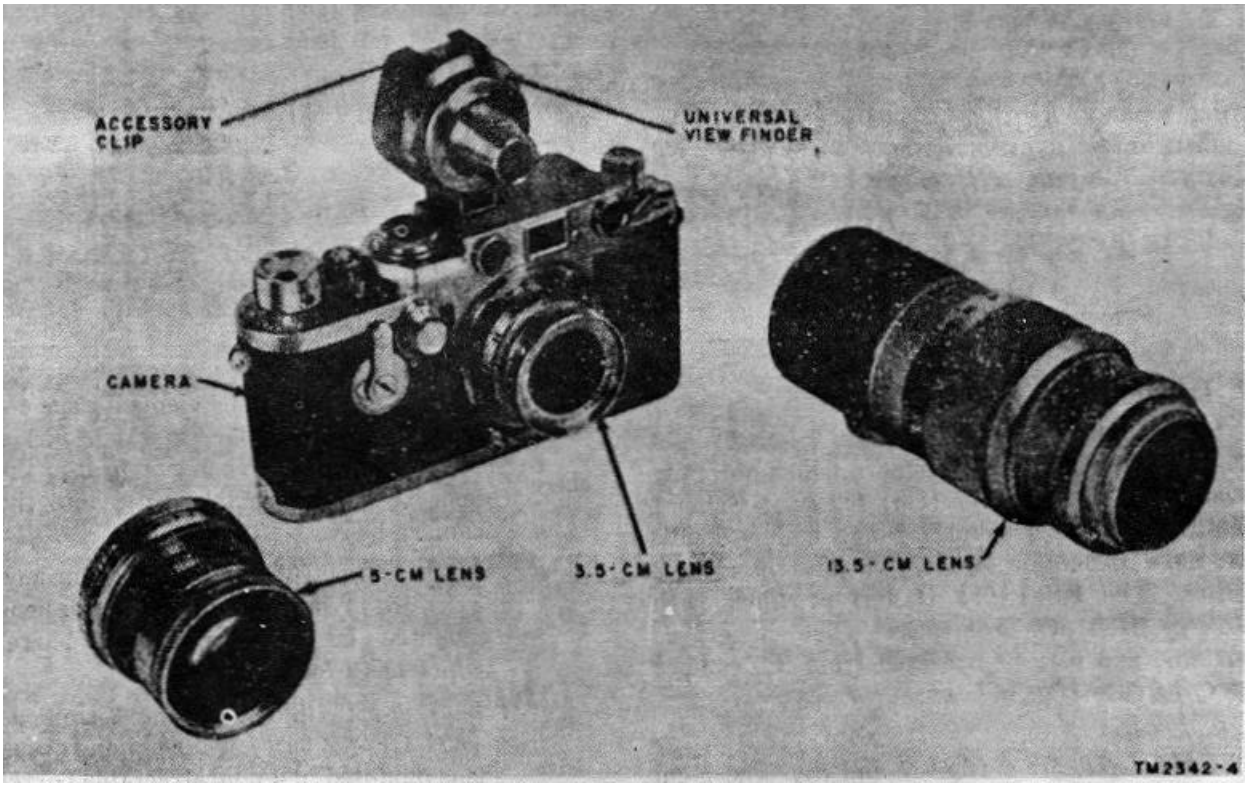


Figure 4. Camera, lenses, and universal view finder of Still Picture Camera Set KS-15(1).

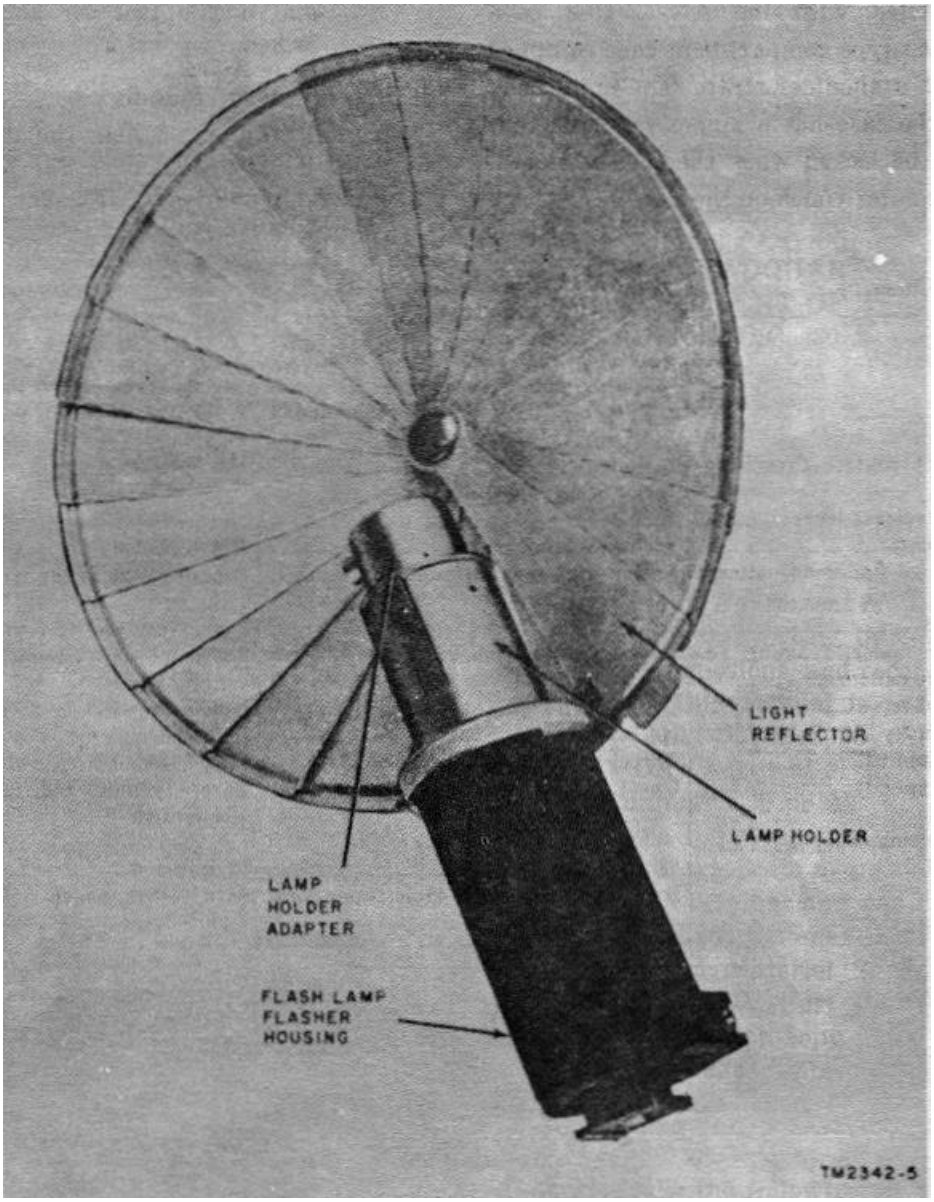


Figure 5. Flash lamp flasher.

outer shell. Both shells are spring locked.

(2) The takeup spool (fig. 18) includes a film retaining clip.

d. Exposure Computer PH504/PF (fig. 3). The exposure computer supplied with the AN/GFQ-2 is a pocket-sized booklet that contains film exposure data for various light conditions.

e. Camera Carrying Case (fig. 16). The camera carrying case is equipped with a shoulder strap and includes a camera securing screw (disk screw). The front flap on the case is secured with a snap fastener.

f. Camera Set Carrying Case.

(1) The camera set carrying case (fig. 2) supplied with the KS-15(1) is a rigid-type compartment case. The case is equipped with two locking latches, a carrying strap, and a shoulder strap extension.

(2) The camera set carrying case (fig. 3)

supplied with the AN/GFQ-2 is a pouch-type compartment case equipped with a shoulder strap. The main body of the case has a zipper fastener that can be locked when the case is closed. The outer pouch on the case has a strap and buckle fastener and also can be locked.

9. Differences in Models

The following table lists the differences between Still Picture Camera Set KS-15(1) and Camera Equipment AN/GFQ-2.

Items	KS15(1)	AN/GFQ-2
Shutter speeds:		
Fast	1/25, 1/30, 1/75, 1/100, 1/200, 1/500, and 1/1000 second, and B (bulb).	1/20, 1/30, 1/40,1/00,1/100,1/200 1/500, and 1/1000 second and Z (bulb).
Slow	1,1/2, 1/5, 1/10, 1/15, and 1/25 second, and T (time)	1,1/2, 1/4, 1/8, and 1/20 second and T (time).
Synchro contact control (synchronized flash).	Included	Not included
Delayed action release lever	Included	Not included
Film type indicator	Included	Not included
Location of range finder adjustment	Under film rewind knob lever.	Left of range finder eyepiece
Lenses supplied	3.5-cm, 5-cm, and 13.5-cm	5-cm, 9-cm, and 12.7-cm
Universal view finder, framing adjustment scale settings.	3.5-cm, 5-cm, 8.5-cm, 9-cm, and 13.5-cm	3.5-cm, 5-cm, 7.3-cm, 9-cm, 12.7-cm, and 13.5-cm.
Flash lamp flasher	Included	Not included
Exposure Computer PH-504/PF	Not included	Included
Lens shades supplied	Three, one for each lens	One, fits all lenses
Light filter supplied	One (orange), mounted, slip-on type-	Three (yellow, red, and green), unmounted.
Camera set carrying case:		
Size	13 x 11 3/4 x 3 3/8	12 x 10 x 6
Type	Reinforced leather, rigid-type compartment case.-	Soft leather, pouch type, compartment case.

CHAPTER 2

SERVICE UPON RECEIPT OF EQUIPMENT

10. Unpacking

(fig. 6)

a. Packaging Data. The dimensions, volume, and weight of the camera set packed in wooden boxes for shipment are listed in the table below:

Contents of box	Dimensions (in.)	Volume (cu ft)	Weight (lb)
Still Picture Camera Set KS-15(1).	17 x 16 x 8	1.2	58
Camera Equipment AN/GFQ-2.	16 x 14 X 10	1.3	50

b. Unpacking Camera Set.

(1) If possible, unpack the equipment indoors. Select a site free from dust, dirt, and excessive moisture.

Caution:
Be careful when unpacking the camera set. Avoid thrusting tools into the shipping container; damage to the equipment may result.

(2) Cut and fold back the metal straps.

(3) Remove the nails from the wooden cover with a nail puller. Do not attempt to pry off the wooden cover; the equipment may become damaged. Remove the wooden cover and expose the outer corrugated carton.

(4) Open the outer corrugated carton by cutting the gummed tape and expose the moisture-vaporproof barriers.

(5) Slit the moisture-vaporproof barriers and expose the inner corrugated cartons.

(6) Open the inner corrugated cartons by cutting the gummed tape and remove the contents.

(7) Open the containers and remove the components of the camera set. Place the components in the camera set carrying case (figs. 2 and 3).

11. Checking Unpacked Equipment

a. Inspect the equipment for any loss or damage that might have occurred during shipment. If the equipment has been damaged or is incomplete, refer to paragraph 2.

b. Check the equipment against the packing list. Where no packing list accompanies the equipment, the table of components (pars. 5 and 6) may be used as a general check to indicate the equipment which *probably* was packed.

c. Check the controls for normal operation (pars. 12-14). The controls should operate smoothly without binding.

Caution: Do not attempt to tighten any screws or make any adjustments (other than normal control adjustments, pars. 12-14) on the camera set. If after careful inspection any loose screws or parts are noted or any adjustments are required, turn the equipment in for depot repair.

d. If the equipment has been used or reconditioned, check to see whether it heats been changed by a Modification Work Order (MWO). If modified, the MWO number will be marked on the equipment.

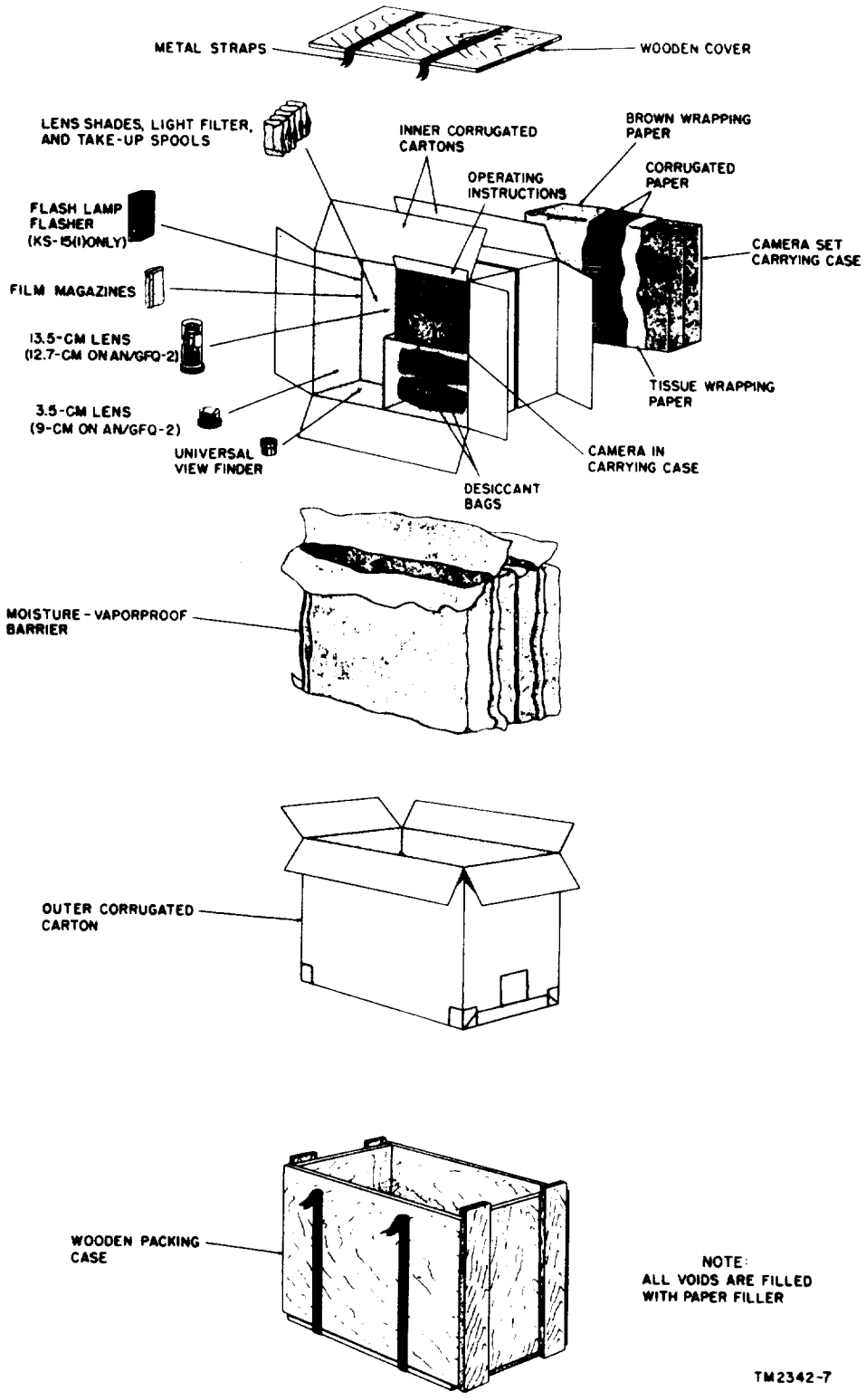


Figure 6. Still Picture Camera Set KS-15(1) and Camera Equipment AN/GFQ-2, packaging diagram.

CHAPTER 3

OPERATION

Section I. CONTROLS

Caution:
Do not attempt to operate the camera set until the use of each control is fully under- stood. Never use force to move any lock, adjustment, or control. Damage to the equipment may result.

12. Camera Controls

Control	Location	Function	How to operate
Film winder knob	Top cover assembly, left side (figs. 7 and 8) .	Engages takeup spool, transports film for next exposure, and winds shutter mechanism.	With film advance-rewind lever in position A, rotate film winder knob clockwise to its stop.
Film type indicator (KS-15(1) only).	Top of film winder knob (fig. 7).	Indicates type of film and film speed. Film speeds, are shown ill ASA and WESTON exposure index numbers.	Lift milled edge of film winder knob. For black and white film, turn knob in direction of arrow to correct setting and let it drop into place. For color film, turn knob against direction of arrow to correct setting and let it drop into place. The indicator shows black for black and white films and red for color films.
Exposure counter dial.	Under film winder knob (figs. 7 and 8).	Indicates number of next exposure (after film winder knob has been wound and before shutter is tripped).	Moves one graduation each time film winder knob is operated to it, stop position. Can be rotated in counter-clockwise direction independently of shutter transport mechanism. Rotate dial by using two projections on face of dial. **Caution: Do not rotate dial in clockwise direction.**
Shutter release button.	Top cover assembly, right of film winder knob.	Trips shutter mechanism	Rotate film winder knob to its stop. Press shutter release button to trip shutter mechanism.
Film advance-rewind lever.	Top cover assembly, forward of shutter release button.	Positions film transport and shutter mechanism for A (advance) or R (rewind).	Move lever to position A or R as required for advance or rewind operation.
Shutter fast speed control.	Top cover assembly, right of shutter release button.	Sets shutter mechanism for desired fast speed and bulb.	Rotate film winder knob clockwise to its stop. Set shutter slow speed control to its fastest speed. Grip shutter fast speed control at its knurled edge, raise it, and rotate it in either direction until selected setting is in line with index arrow engraved on slide fastener rail. Release control and allow it to drop into position. Setting 1000 is in a slightly higher plane than other speeds.

Control	Location	Function	How to operate
			Note. Adjust shutter fast speed control only after film winder knob has been wound completely. Shutter speed markings on control do not correspond with index arrow marking if film winder knob is not wound completely.
Synchro contact control (KS-15(1) only).	Under shutter fast speed control (fig. 7).	Provides flash synchronization at all shutter speeds.	Rotate control to desired setting on synchro contact scale.
Film rewind knob	Top cover assembly, right side (figs. 7 and 8).	Rewinds exposed film into film magazine.	With film advance-rewind lever in position R, lift film rewind knob and rotate it clockwise (direction of arrow) to wind exposed film from takeup spool into film magazine.
Shutter slow speed control.	Camera main section, left of lens.	Sets shutter mechanism for desired slow speed and time.	Rotate film winder knob clockwise to its stop. Set shutter fast speed control to its slowest speed. Grasp knurled edge on shutter slow speed control and rotate control until it click-stops at desired setting. On the camera supplied with KS-15(1) a safety catch holds control at position 25. Release the safety catch by pushing it back with thumbnail and operate the control as indicated above. **Note. This control can be set either before or after the film winder knob is rotated. Intermediate speeds can be obtained by setting control between indicated speeds.**
Delayed action release lever (KS-15(1) only).	Left of shutter slow speed control (fig. 7).	Provides delay of about 12 seconds before releasing shutter. Operates at all shutter speeds.	Rotate film winder knob clockwise to its stop. Turn delayed action release lever downward in a counterclockwise direction (approximately 180°)
Release button (KS-15(1) only).	Left of delayed action release lever.	Operates delay mechanism.	Press release button to release delay mechanism.
Range finder adjustment lever.	Under film rewind knob on KS-15(1) (fig. 9). Left of range finder eyepiece on AN/GFQ-2 (fig. 10).	Adjusts range finder eyepiece to compensate for slight eye variations in operators.	Cover range finder window, on front of camera, nearest adjustment lever. Sight through range finder at desired subject. Move lever for best image sharpness.

13. Lens Controls

a. Lenses, 3.5-cm and 5-cm.

Control	Location	Function	How to operate
Diaphragm adjustment ring	Forward part of lens (figs. 8 and 11).	Adjusts diaphragm opening that controls amount of light transmitted by lens.	Rotate diaphragm adjustment ring. until desired number (f/stop) is positioned directly opposite engraved reference mark.
Focusing lever	Rear part of lens	Focuses lens -	Press lock button on lower left section of focusing lever, push it 1/4 inch toward bottom of camera. Remove pressure from lock button and push focusing lever clockwise or counterclockwise as required.

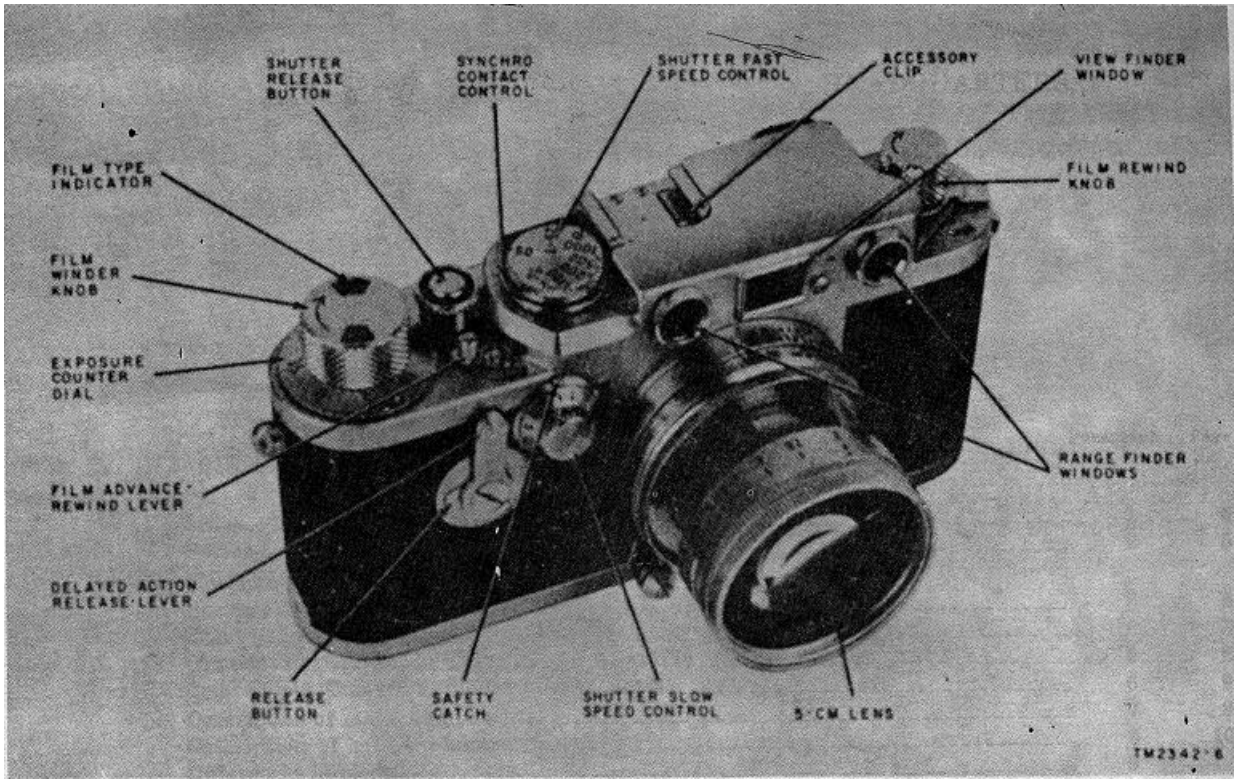


Figure 7. Still Picture Camera Set KS-15(1), camera component, front view.

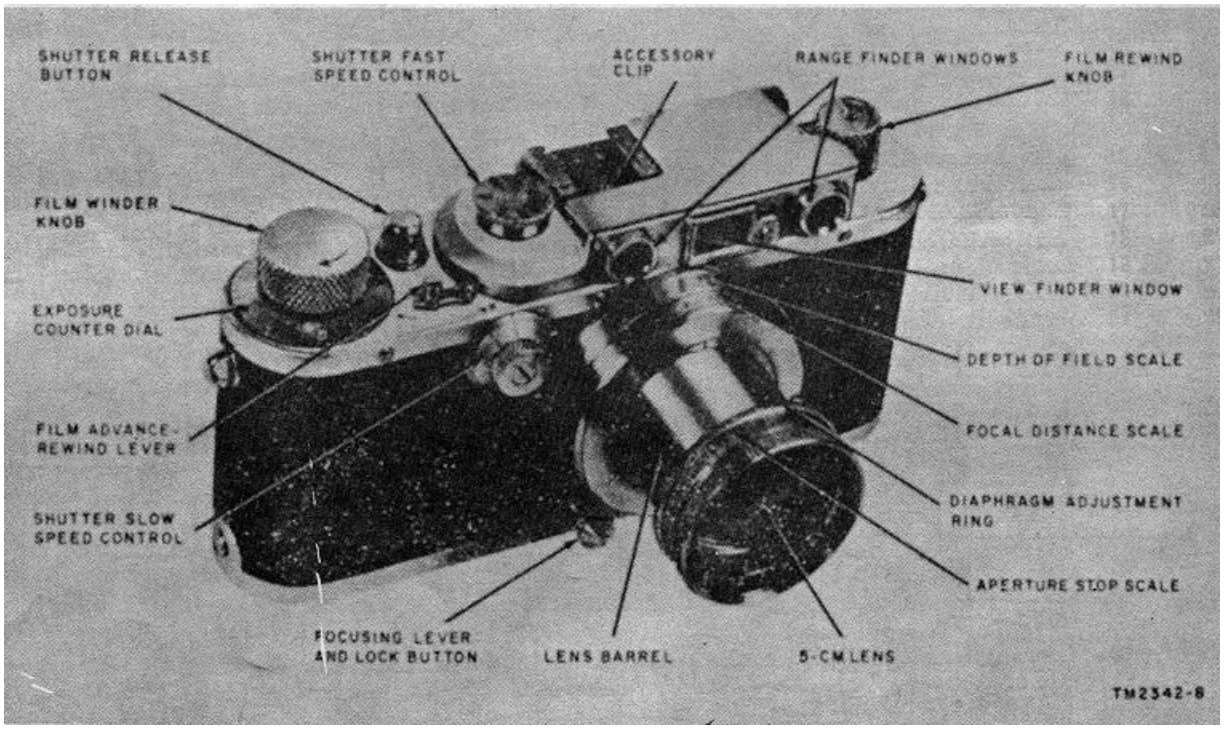


Figure 8. Camera Equipment AN/GFQ-2, camera component, front view,.

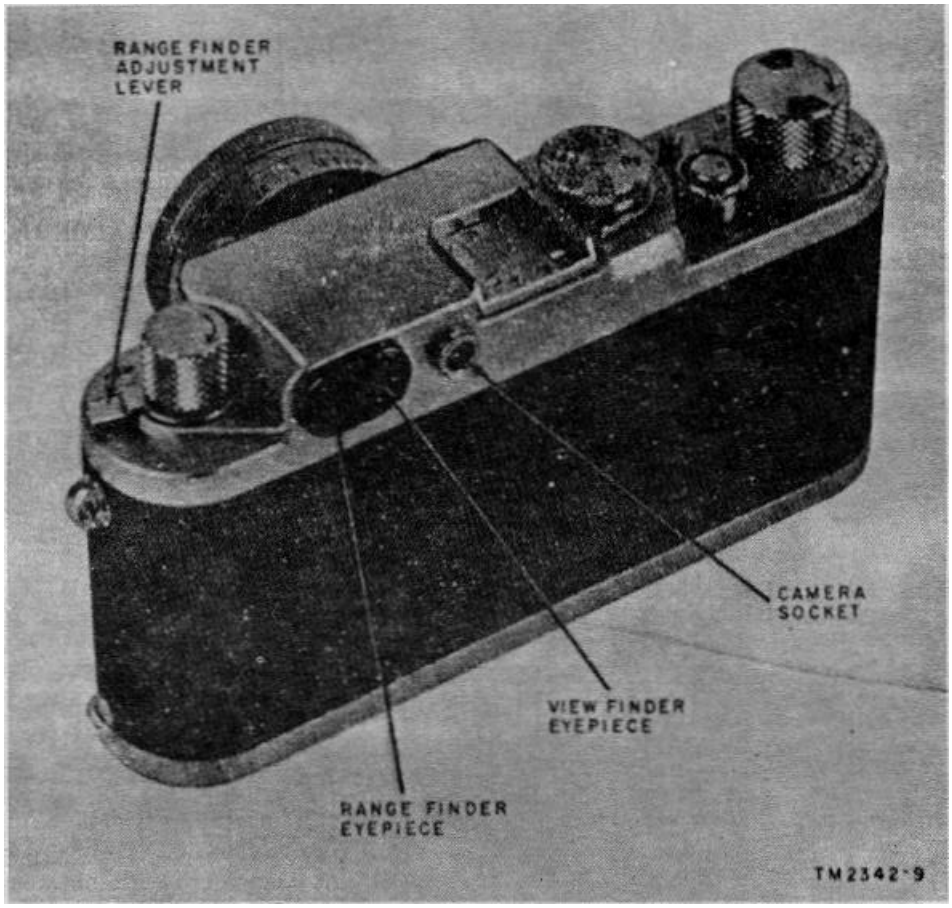


Figure 9. Still Picture Camera Set: KS-15(1), camera component, rear view.

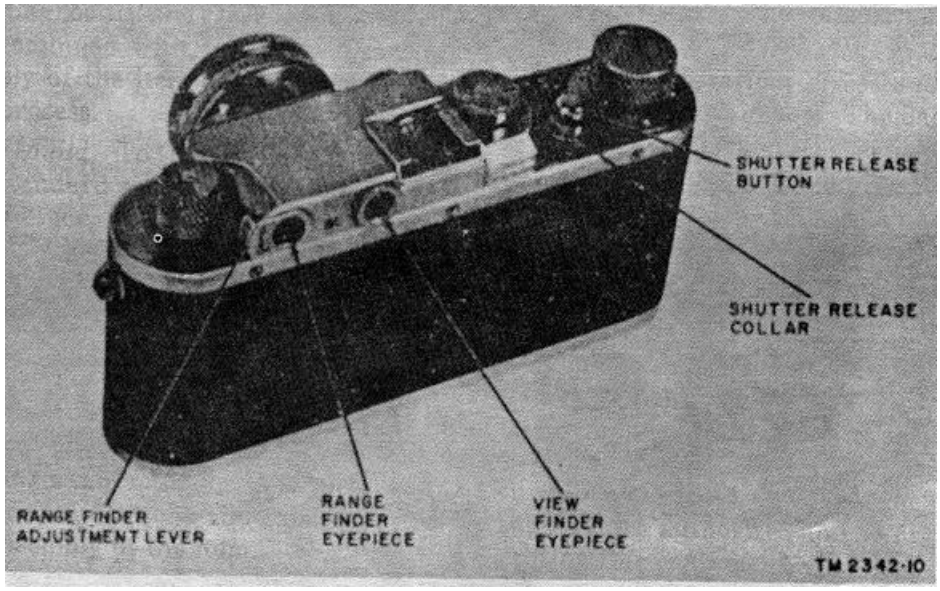


Figure 10. Camera Equipment AN/GFQ-2, camera component, rear view.

Control	Location	Function	How to operate
Lens barrel (5-cm lens only).	Forward portion of lens.	Retract or extend front portion of lens milled	**Caution: Lock button will lock focusing lever in infinity (¥) position. To release lock button, press and push it as instructed above.** To extend lens barrel, grasp front ring and pull it outward until it stops. Rotate lens barrel clockwise (direction of arrow) until it stops. To retract lens barrel, reverse this procedure. **Caution: Never use undue pressure to extend or retract lens barrel. If an easy twist does not engage or disengage lock, turn in lens for repair.**

b. Lenses, 9-cm, 12.7-cm, and 13.5-cm.

Control	Location	Function	How to operate
Focusing collar	Center of lens (figs. 11 and 12).	Focuses lens	Grasp milled surface on focusing collar and rotate collar clockwise or counterclockwise as required.
Diaphragm adjustment	Forward part of lens ring.	Adjusts diaphragm opening which controls amount of light transmitted by lens.	Rotate diaphragm adjustment ring until desired number (f/stop) is positioned directly opposite engraved reference mark.

14. Universal View Finder and Flash Lamp Flasher Controls

a. Universal View Finder.

Control	Location	Function	How to operate
Framing adjustment ring and scale.	Near objective lens, toward front of universal view finder (fig. 13).	Adjusts field of view to acceptance angle of lens used.	Rotate framing adjustment ring to setting of focal length of lens being used until ring click-stops at required setting. For focal distances over 6 feet, use long index mark; for focal distances under 6 feet, use short index mark.
Parallax adjustment lever and scale.	Bottom of universal view finder, below eyepiece.	Adjusts parallax between universal view finder and lens at any focal distance.	Rotate parallax adjustment lever so that required focal distance on given scale is in line with index mark.

b. Flash Lamp Flasher (KS-15 (1) Only).

Control	Location	Function	How to operate
Lamp ejector button	Side of lamp holder adapter (fig. 23).	Ejects bayonet base lamp	Press button to eject flash lamp.
Mounting clip	Side of flash lamp flasher housing.	Holds light reflector and permits adjustment for flash lamp centering.	Move light reflector up or down (click-stops) to center flash lamp.

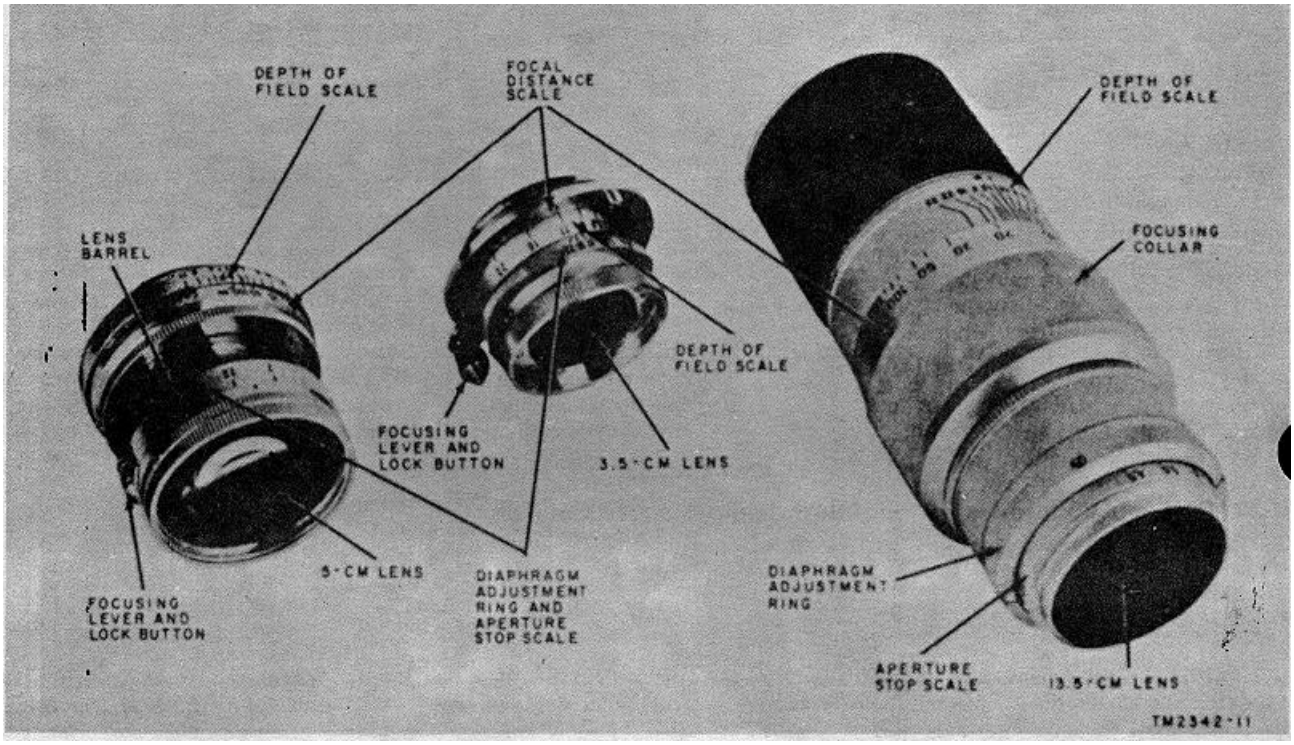


Figure 11. Still Picture Camera Set KS- 5(1), lenses.

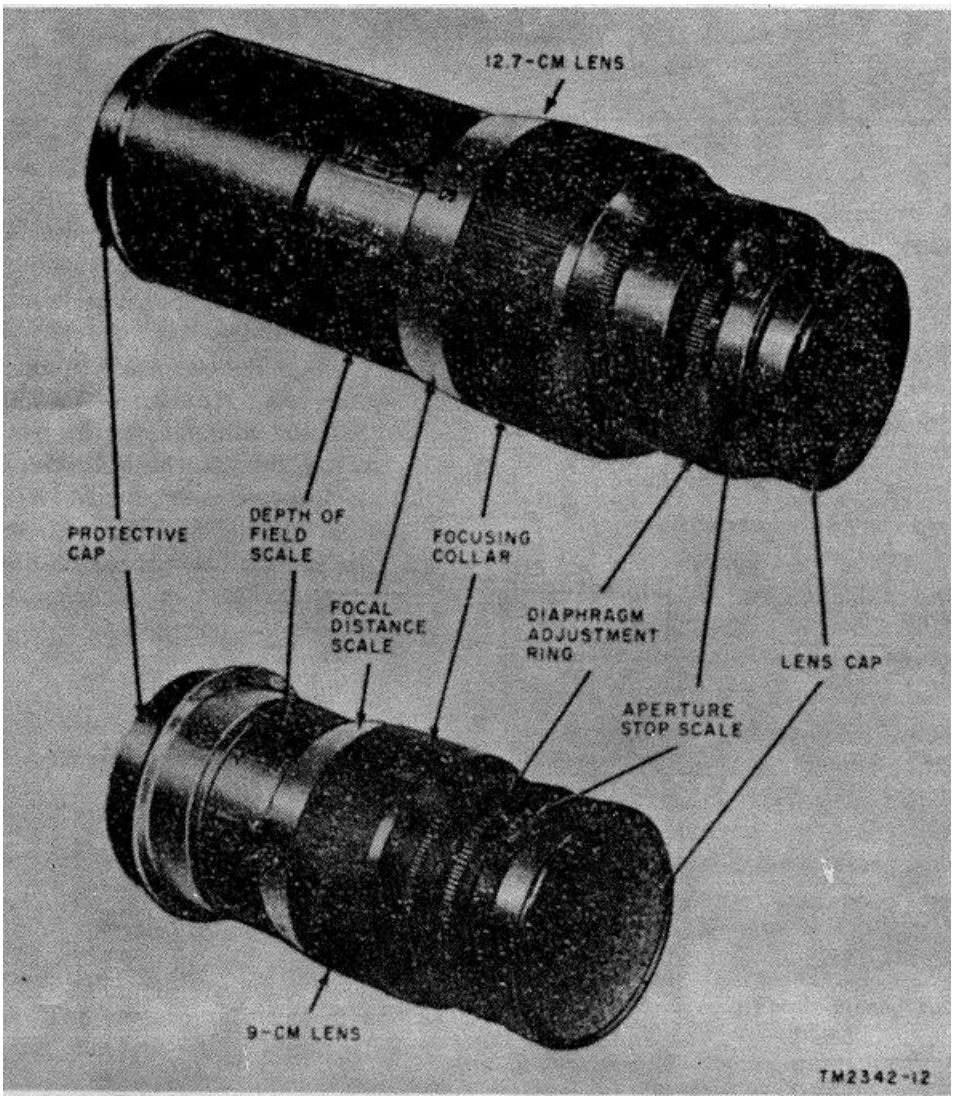


Figure 12. Camera Equipment AN/GFQ-2, lenses.

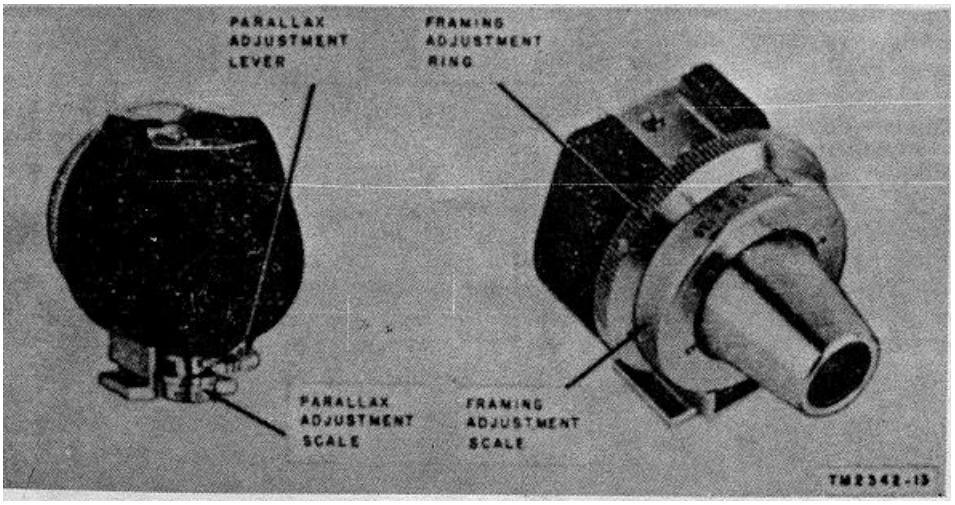


Figure 13. Universal view finder, front and rear views.

Section II. PRELIMINARY PROCEDURES

15. Loading Film Magazine

The camera may be loaded with a preloaded commercial film magazine. If bulk film is to be loaded into the film magazine supplied with the camera set, proceed as follows:

a. Opening Film Magazine (fig. 14).

(1) Hold the film magazine in the left hand and, using the left forefinger, flex the retaining spring slightly.

(2) With the right hand, turn the inner shell knob clockwise as far as it will go. Grip the inner shell knob and remove the inner shell.

(3) Lift out the film spool.

b. Loading Film Magazine. Load the film magazine in total darkness as follows:

(1) Trim the end of the film to a taper as shown in figure 15.

(2) Hold the film spool (knurled knob up) in the right hand. Insert the tapered end of the film (emulsion side in) into the slot in the film spool (fig. 14).

(3) Wind approximately 5 1/4 feet of film onto the film spool reasonably tight.

Caution:

Hold the film by the edges only. Touching the emulsion side of the film may scratch or leave fingerprints on the film which will show on the finished print. After the film is wound, do not pull it around the film spool to reduce its diameter. Cinch marks or scratches may result.

(4) Fold back the film sharply, just behind the second sprocket hole from the end.

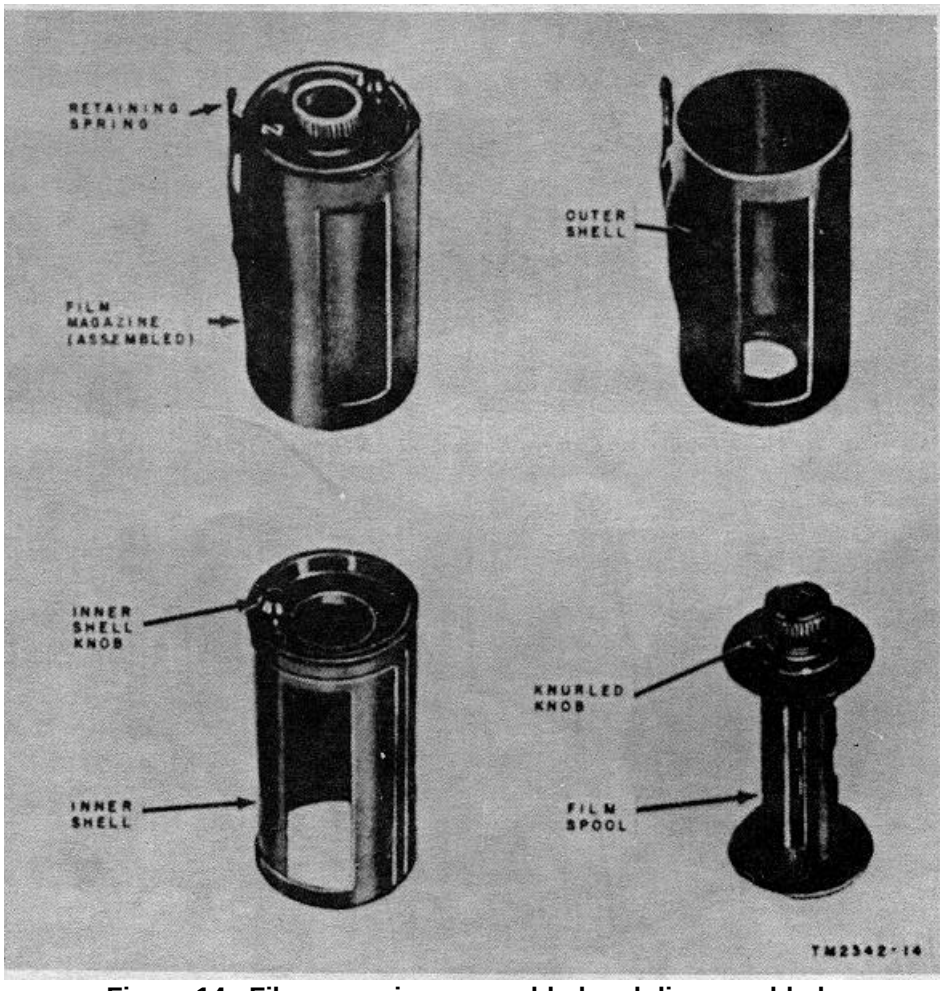


Figure 14. Film magazine, assembled and disassembled.

Hold the film on the film spool to prevent it from unrolling.

(5) Place the film spool (knurled knob first) inside the inner shell so that the folded over end of the film emerges through the slot in the inner shell.

(6) Install the inner shell into the outer shell so that the slots coincide. Draw out about 2 or 3 inches of film.

(7) Turn the inner shell knob counterclockwise as far as it will go. A distinct click will be heard when the film magazine is locked.

c. Trimming Film Leader.

(1) Draw out approximately 4 3/4 inches of film and trim the film leader as shown in figure 15.

Caution:

Do not cut through or damage a sprocket hole. Damaged sprocket holes can result in film chips which may jam the camera transport mechanism.

(2) Turn the knurled knob (fig. 14) counterclockwise to wind about 3 inches of the film leader into the film magazine.

(3) Place the loaded film magazine into the film magazine can to protect the film from light and dust.

16. Preloading Procedure

a. If the camera is in the camera carrying case, proceed as follows:

(1) Unsnap the snap fastener (fig. 16) and open the camera carrying case.

(2) Loosen the disk screw on the camera carrying case and remove the camera.

b. Make sure that the lens is securely attached to the camera and that the lens cap is mounted firmly on the lens.

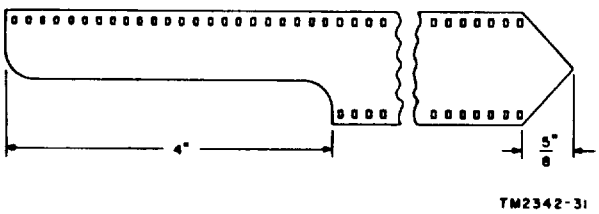


Figure 15. Film trimmed for loading.

c. Operate the film advance-rewind lever (figs. 7 and 8) to position A.

d. Rotate the film winder knob to its stop. This action cocks the shutter.

17. Loading Camera

The camera is loaded with the shutter cocked. Do not press the shutter release button while loading the camera.

a. Removing Bottom Cover Assembly (fig. 17).

(1) Place the camera with the bottom cover assembly up. Rotate the captive D-ring counterclockwise to the OPENAUF (KS15(1)) or AUF (AN/GFQ-2) position.

(2) Pull up on the captive D-ring and disengage the bottom cover assembly from the stud on the left side of the main section of the camera. Remove the bottom cover assembly.

Caution:

Do not force the captive D-ring or the bottom cover assembly during this operation.

b. Cleaning Inside of Camera. Blow dust and film chips from the inside of the camera with an air syringe.

c. Engaging Film on Takeup Spool (fig. 18).

(1) Hold the takeup spool in the left hand and the film magazine in the right hand (knurled knobs down). Push the end of the film leader as far as it will go under the film retaining clip on the takeup spool. The sprocket hole edge of the film leader should squarely contact the spool flange. Check the film leader on the takeup spool to be sure it is firmly anchored.

(2) Withdraw the film leader from the film magazine until two sprocket holes are visible on the trimmed edge of the film.

d. Inserting Film Magazine and Takeup Spool Into Camera.

(1) Position the film magazine (fig. 19) and the takeup spool (knurled knobs up) over the film chamber of the camera and slide them into their respective locations. At the same time, guide the film leader into position in the slot along the back of the camera.

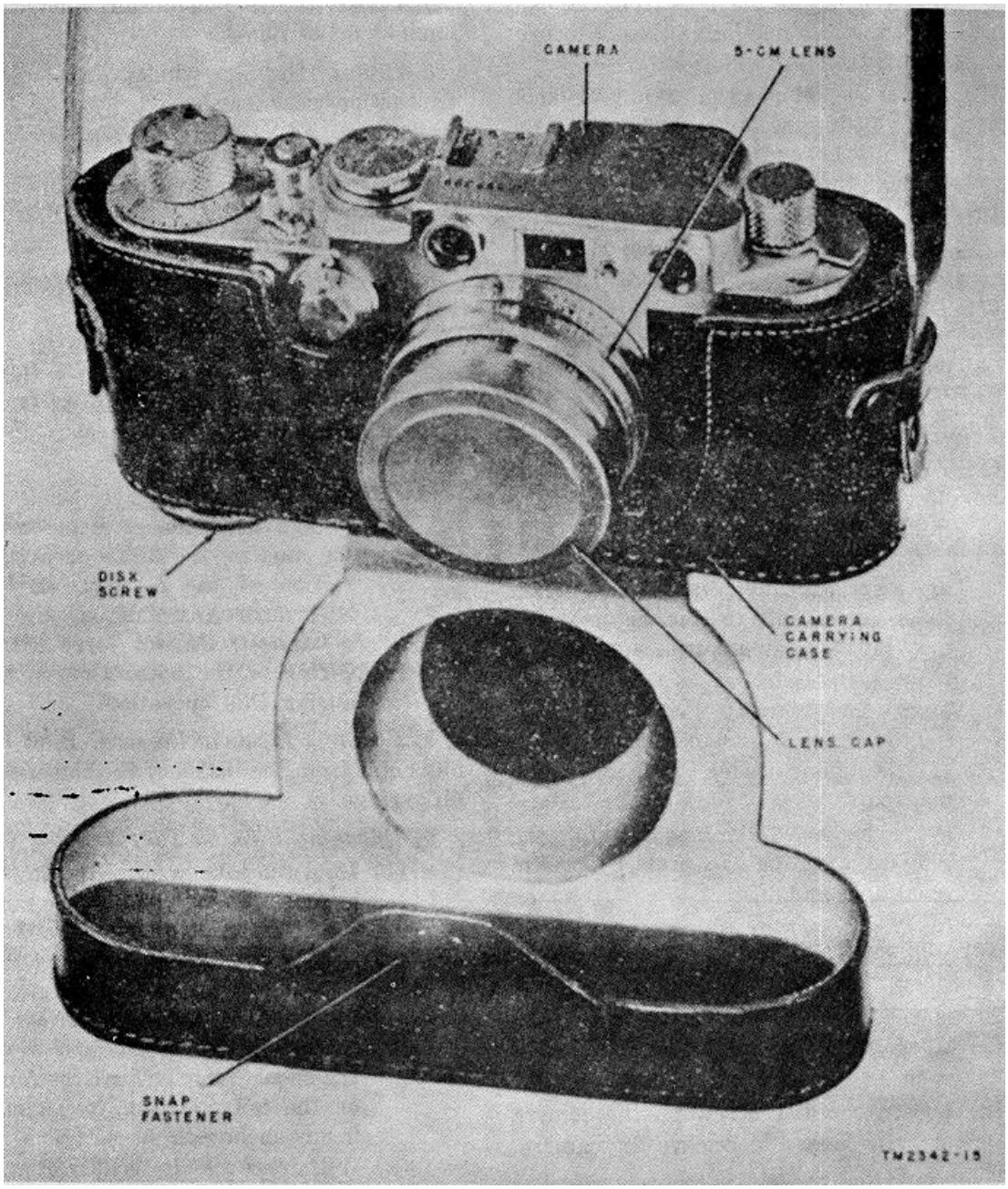


Figure 16. Camera, in camera case.

Caution:
Do not use force when performing this operation. If the film magazine or takeup spool does not drop into place easily, rotate the film magazine or the takeup spool slightly until it drops into place.

(2) Slowly rotate the film rewind knob (figs. 7 and 8) in the direction of the arrow on the top of the knob. Stop as soon as a slight resistance is felt. This action will remove slack from the film and insure that the film is engaged correctly with the film roller sprockets in the camera (fig. 20).

(3) Engage the opening on the film of the bottom cover assembly (fig. 17) with the stud on the side of the camera. Fit the bottom cover assembly on the camera.

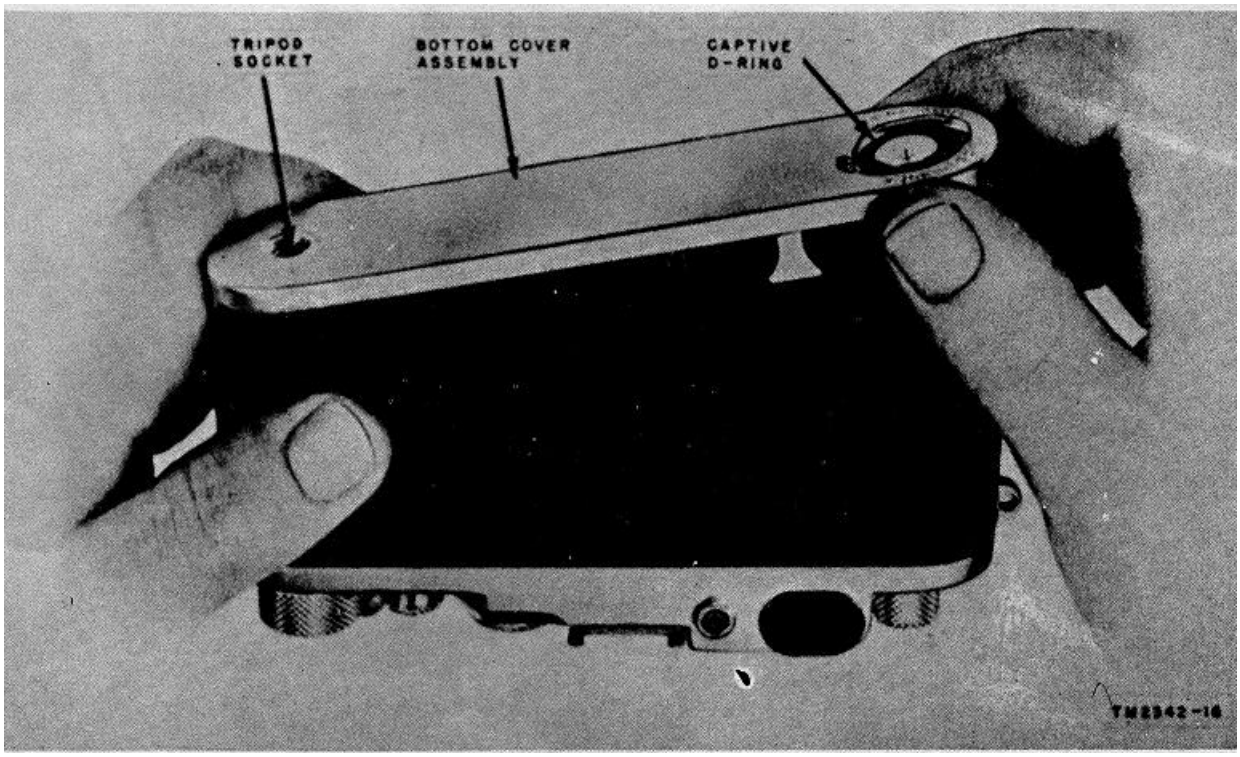


Figure 17. Removing bottom cover assembly.

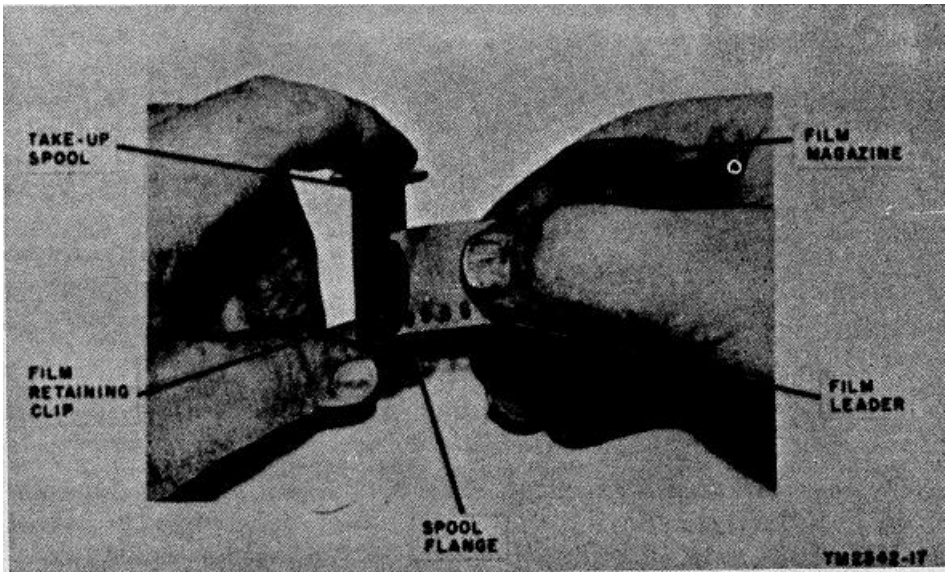


Figure 18. Engaging film on takeup spool.

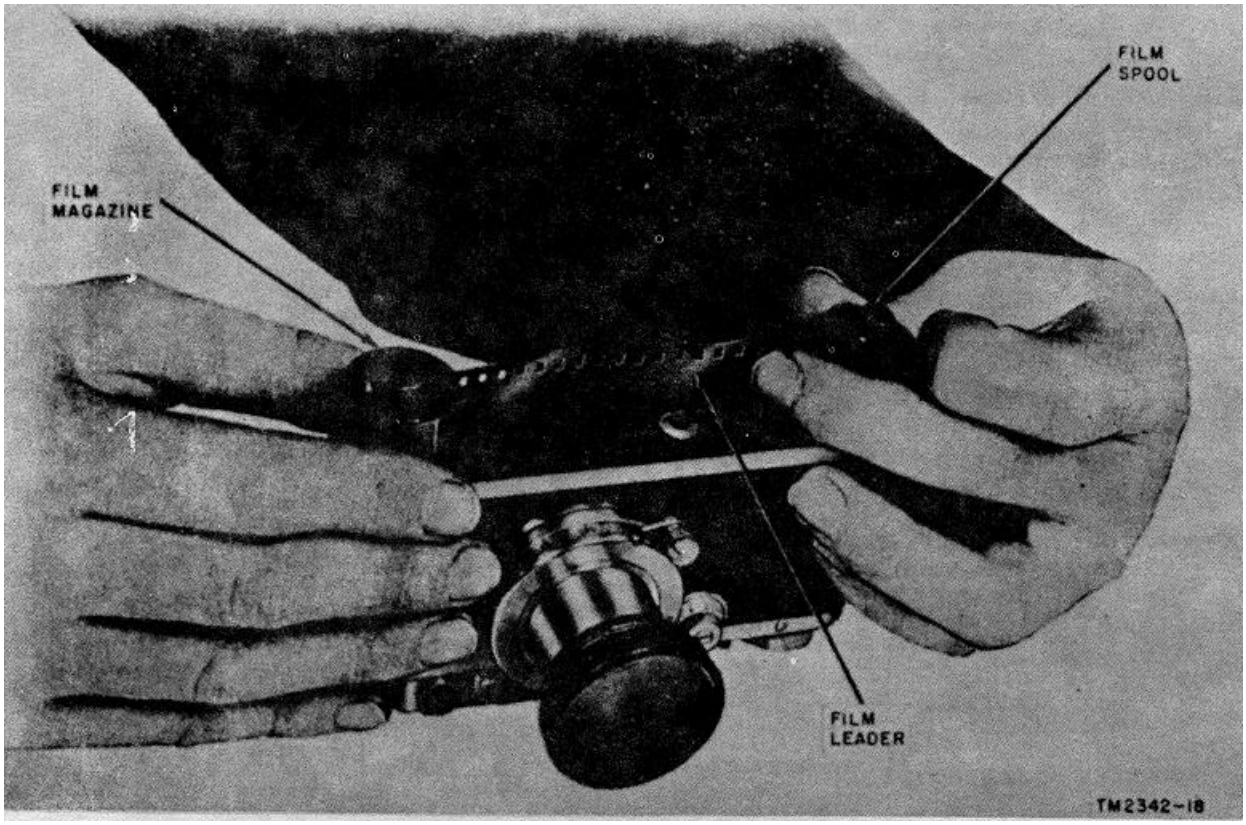


Figure 19. Loading camera.

Rotate the captive D-ring to the CLOSE-ZU (KS-15(1)1 or ZU (AN/GFQ-2) position to lock the bottom cover assembly.

e. Preparing Camera for First Exposure.

(1) Press the shutter release button (figs. 7 and 8) to release the shutter mechanism. Rotate the film winder knob to its stop. During this operation, observe the film rewind knob. If the film rewind knob fails to rotate while the film winder knob is being operated, proceed as follows:

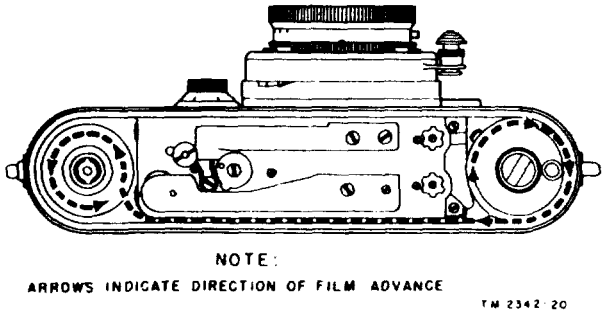


Figure 20. Correctly loaded camera.

(a) Remove the film advance-rewind lever to position R.

(b) Pull up the film rewind knob and turn it in a clockwise direction (direction of arrow). At the same time, observe the shutter release button (KS-15 (1)) or shutter release collar (AN/GFQ-2) (fig. 10). The shutter release button or the shutter release collar should turn and continue to turn until all of the film is rewound and the film leader leaves the takeup spool.

Note.

On the camera supplied with the KS-15(1), the shutter release button has a black dot engraved off-center to facilitate observation.

(c) Stop turning the film rewind knob (figs. 7 and 8) as soon as the shutter release button or the shutter release collar stops turning. Further rotation will cause the film leader to be drawn into the film magazine.

Note.

If the film leader is drawn into the film magazine, open the camera (*a*

above) and remove the film magazine. Open the film magazine in a darkroom and withdraw the film leader.

(d) Open the camera (a above) and remove the film magazine and takeup spool. Repeat the loading operations (c and d above).

(e) Move the film advance-rewind lever to position A and rotate the film winder knob to its stop.

(2) Press the shutter release button.

(3) Rotate the film winder knob again and press the shutter release button.

(4) Rotate the film winder knob for the third time. Rotate the exposure counter dial (counterclockwise) to the number 1 position. The camera is now ready for use.

18. Changing Lens

a. Cleaning.

(1) Select the lens to be used and remove the lens cap.

(2) Very carefully remove dust particles from the surface of the lens; use a camel's-hair brush or an air syringe.

Caution:

Dust particles contain an abrasive material as hard or harder than the lens or the coating on the lens surface. Dust the lens carefully before attempting any further removal of foreign matter.

(3) Slightly dampen a wad of lens tissue with lens cleaner. Using a circular motion from the edge to the center of the glass, gently wipe the lens with the moistened lens tissue. Dry the lens in the same manner, using fresh lens tissue. Always discard lens tissue after each use.

(4) Replace the lens cap.

b. Removing.

Caution:

Do not change the lens in direct sunlight. Turn away from the direction of the sun and shade the camera with the body.

(1) If the lens in use is equipped with a retractable lens barrel, return it to its collapsed position as follows:

(a) Rotate the lens barrel counterclockwise to its stop.

(b) Push in on the front of the let, barrel to return the lens to its collapsed position.

(2) Grasp the lens close to the camera body and unscrew the lens (counterclockwise).

(3) Place the protective cap on the lens threads.

c. Mounting.

(1) If the lens is equipped with a retractable lens barrel, proceed as follows:

(a) Draw the lens barrel out to its extended position (fig. 21).

(b) Rotate the lens barrel clockwise to its stop to lock it in the extended position.

(2) Remove the protective cap from the lens threads.

(3) Engage the lens threads by rotating the lens counterclockwise until it seats itself. Then rotate the lees in a clockwise direction until it is secure in the lens mounting flange.

19. Mounting Universal View Finder

Use the universal view finder with lenses other than the 5-cm lens to accurately scan the field of view covered by the lens at the point of focus. Use the universal view finder also, if desired, to compose a view to determine whether a particular lens would be desirable. Mount and adjust the universal view finder as follows:

a. Mount the universal view finder (fig. 22) on the camera by engaging the view finder mounting base rails with the accessory clip on top of the camera.

b. Turn the framing adjustment ring (fig. 13) very slowly until it click-stops at the proper scale marking for the lens being used.

c. Focus the lens (par. 25).

d. Adjust the parallax adjustment lever to the marking which corresponds to the distance read from the focal distance scale.

e. Sight the subject through the universal view finder eyepiece to obtain the proper field of view.

20. Mounting Flash Lamp Flasher (KS-15(1) Only)

a. Installing Battery.

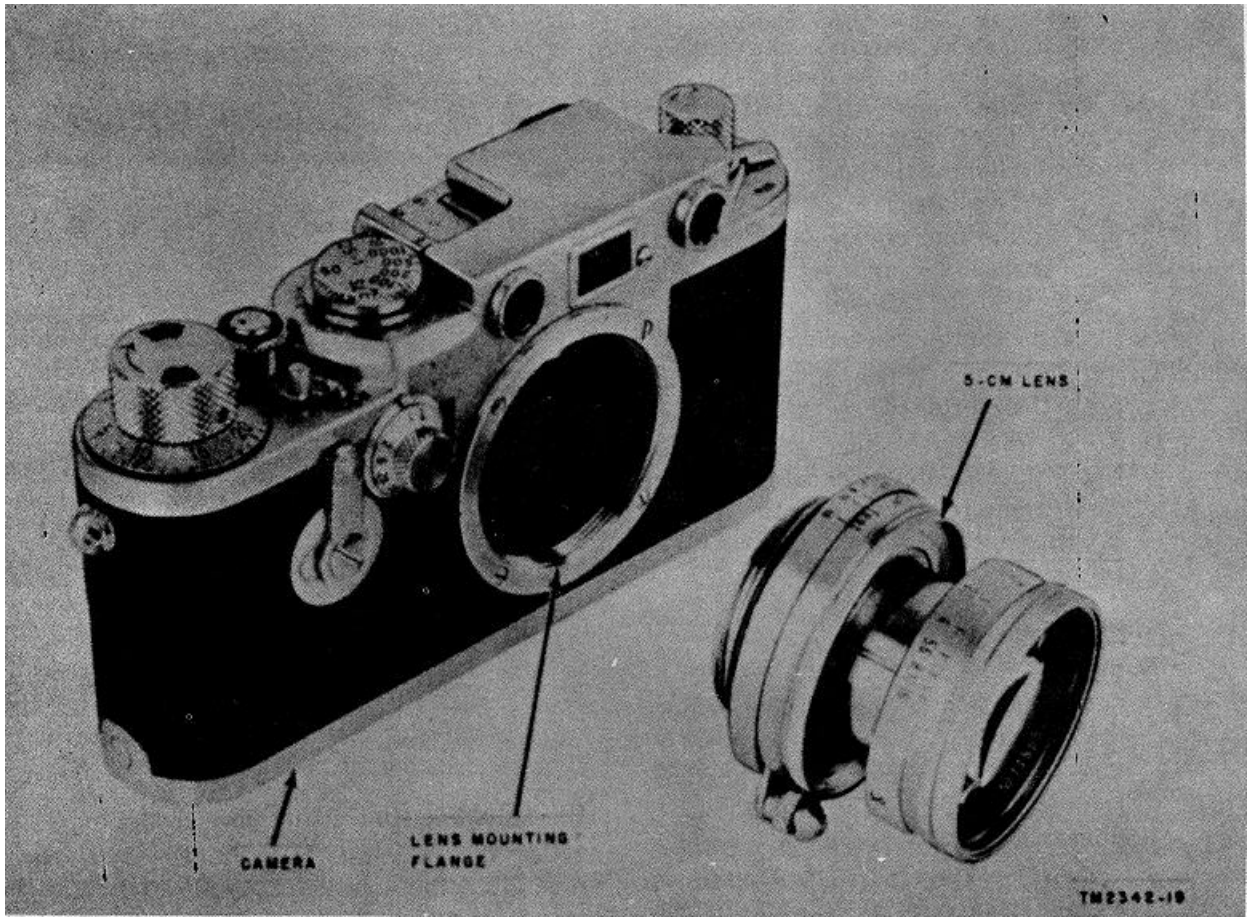


Figure 21. Camera, lens removed.

(1) Remove the lamp holder (fig. 23) from the flash lamp flasher housing by rotating the lamp holder one-quarter turn counterclockwise.

(2) Lift out the battery-capacitor housing.

Install one battery (Battery BA-261/ U, 22 1/2 volts); place the positive end of the battery toward the end of the battery-capacitor housing marked positive (+).

(3) Replace the battery-capacitor housing in the flash lamp flasher housing.

(4) Replace the lamp holder by pressing it onto the flash lamp flasher housing and turning the lamp holder one-quarter turn clockwise.

b. Assembling.

(1) Expand the light reflector and lock the sides of the section together to form the parabolic reflector.

(2) Mount the light reflector in the mounting clip on the flash lamp flasher housing. Raise or lower the light reflector in the mounting clip to center the flash lamp being used.

(3) Mount the flash lamp flasher in the slide fastener on the camera top cover assembly (fig. 24). If the universal view finder is being used, mount the flash lamp flasher in the accessory clip on the universal view finder (fig. 22).

(4) Connect the male connector (on one end of the cable assembly) to the flash lamp flasher housing (fig. 24). Connect the male connector with the red dot on the right side facing up.

(5) Hold the camera plug (on the other end of the cable assembly) in a horizontal position. The engraved arrow on the camera plug must point toward

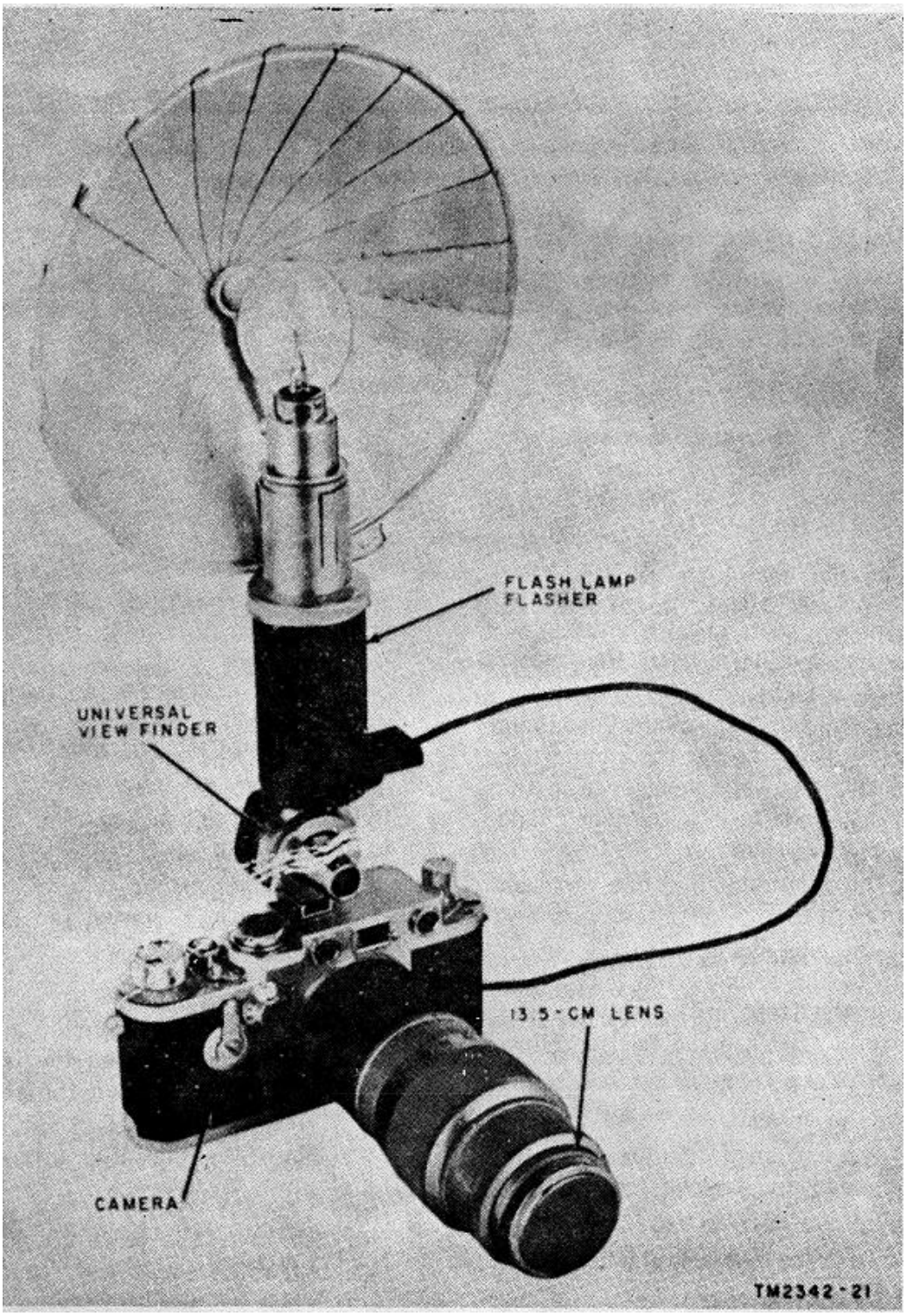


Figure 22. Camera, with 13.5-cm lens, universal view finder, and flash lamp flasher attached.

the dot beside the view finder eyepiece (fig. 9). Push the camera plug into the camera socket; rotate the camera plug clockwise 90° so that the arrow now points toward the top of the camera.

c. Checking. Check the flash lamp flasher for normal operation (par. 37d).

21. Mounting Lens Shades and Light Filters

a. Lens, 5-cm (KS-15 (1)) (fig. 25).

(1) Be sure the lens barrel is in its ex

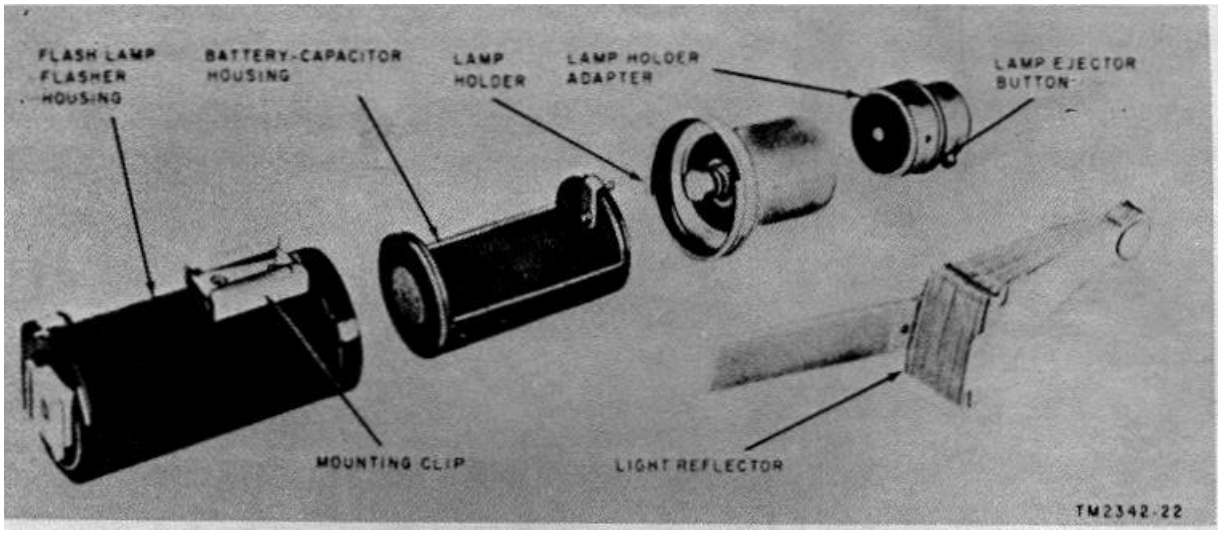


Figure 23. Flash lamp flasher, disassembled.

tended position (par. 18c(1)). Remove the lens cap.

(2) Open the side flaps until the center flaps spring open.

(3) Release the side flaps and allow them to spring back against the center flap ends. The side flaps must overlap the center flap ends to lock the lens shade in its open position.

(4) Press the friction clips, one on each side, inward.

(5) Mount the lens shade, with the cutout portion in the back of the lens shade up, over the front milled ring on the lens barrel. Release the friction clips.

b. Lens, 3.5-cm (KS-15 (1)).

(1) Remove the lens cap.

(2) Mount the lens shade, by means of its slip-on mounting, on the front milled ring on the lens barrel. Tighten the thumbscrew on the lens shade.

c. Lens, 13.5-cm (KS-15(1)).

(1) Remove the lens cap.

(2) Loosen the front thumbscrew on the lens shade and extend the lens shade to the 13.5-cm marking. Tighten the front thumbscrew.

(3) Mount the lens shade, by means of its slip-on mounting, on the front of the lens barrel. Tighten the rear thumbscrew.

Note.

Position the lens shade so that the rear thumbscrew does not obscure the f/markings on the front of the lens barrel.

d. Lens Shade (AN/GFQ-2).

(1) Remove the lens cap.

(2) Mount the lens shade, by means of its slip-on mounting, on the front of the lens barrel. Tighten the thumbscrew.

e. Light Filter (KS-15(1)).

(1) Remove the lens cap.

(2) Mount the light filter, by means of its slip-on mounting, on the front of the lens barrel. Tighten the thumbscrew.

(3) If desired, mount the lens shade on the front of the light filter (b and c above).

f. Light Filters (AN/GFQ-2).

(1) Unscrew the cone (B, fig. 26) from the collar.

(2) Place the desired unmounted light filter (yellow, red, or green) in the recess in the collar.

(3) Screw the cone (A, fig. 26) on the collar. The cone will hold the light filter in place.

(4) Mount the lens shade (d above).

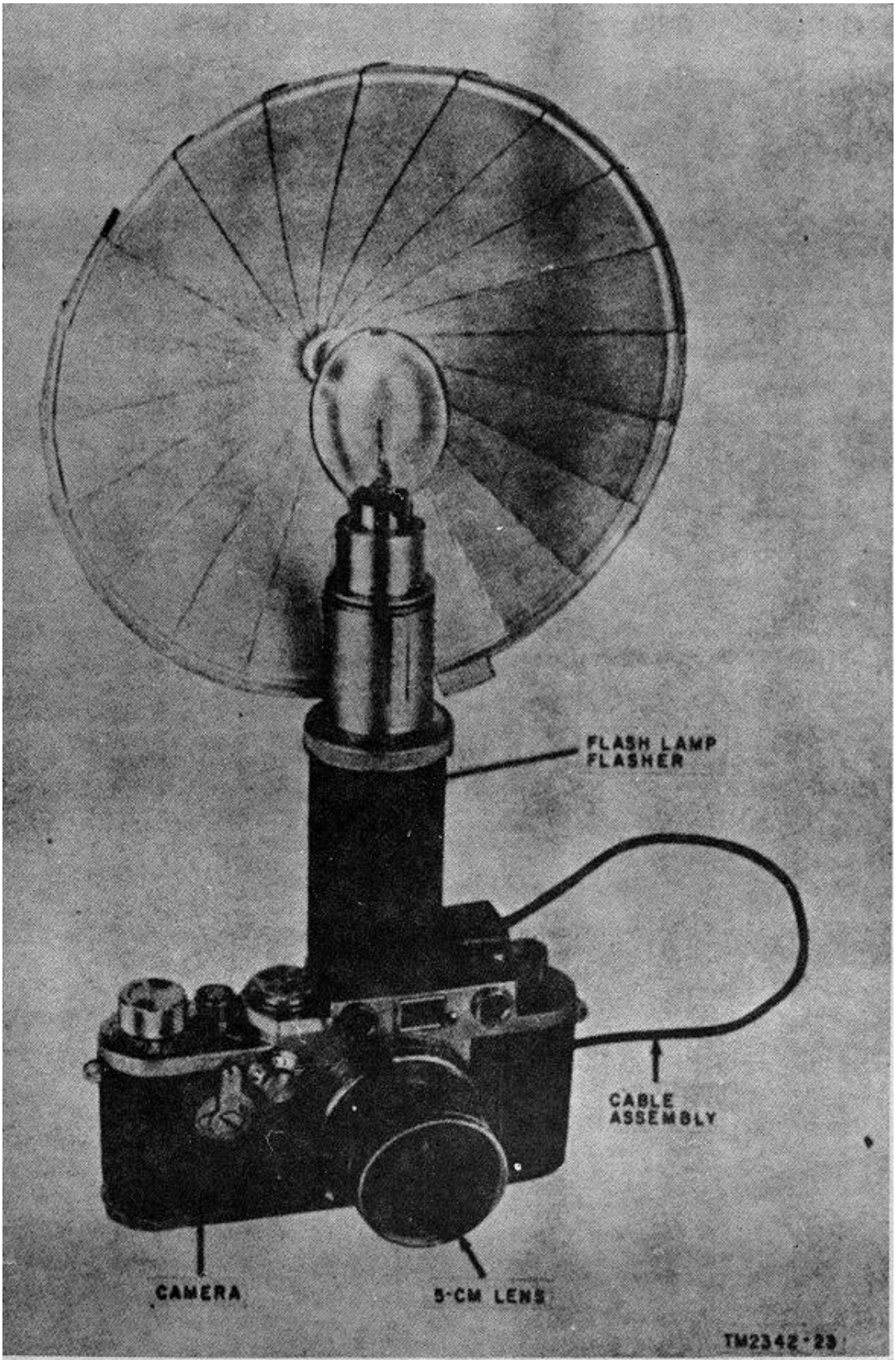


Figure 24. Camera, with flash lamp flasher attached.

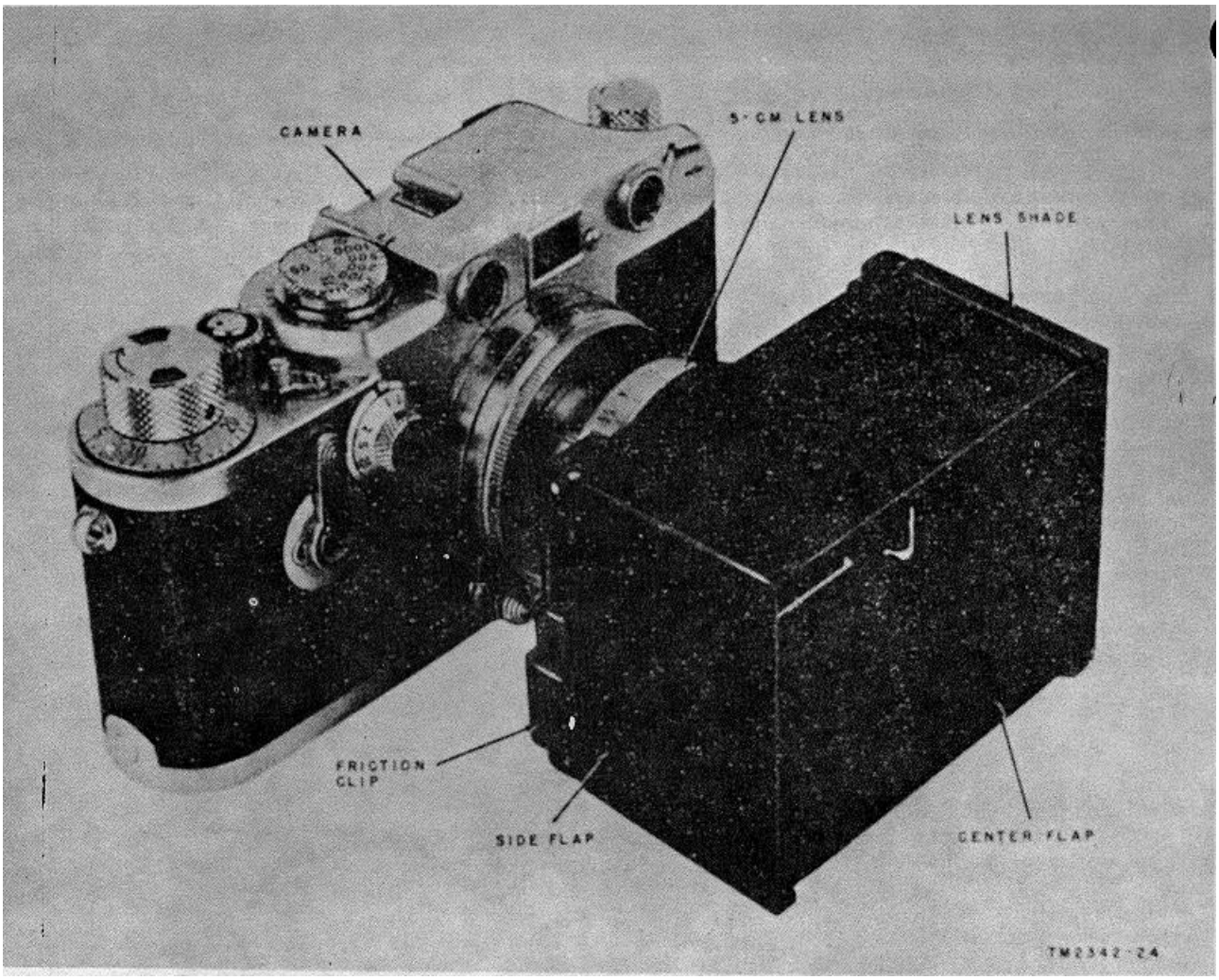


Figure 25. Camera, with 5-cm lens shade attached.

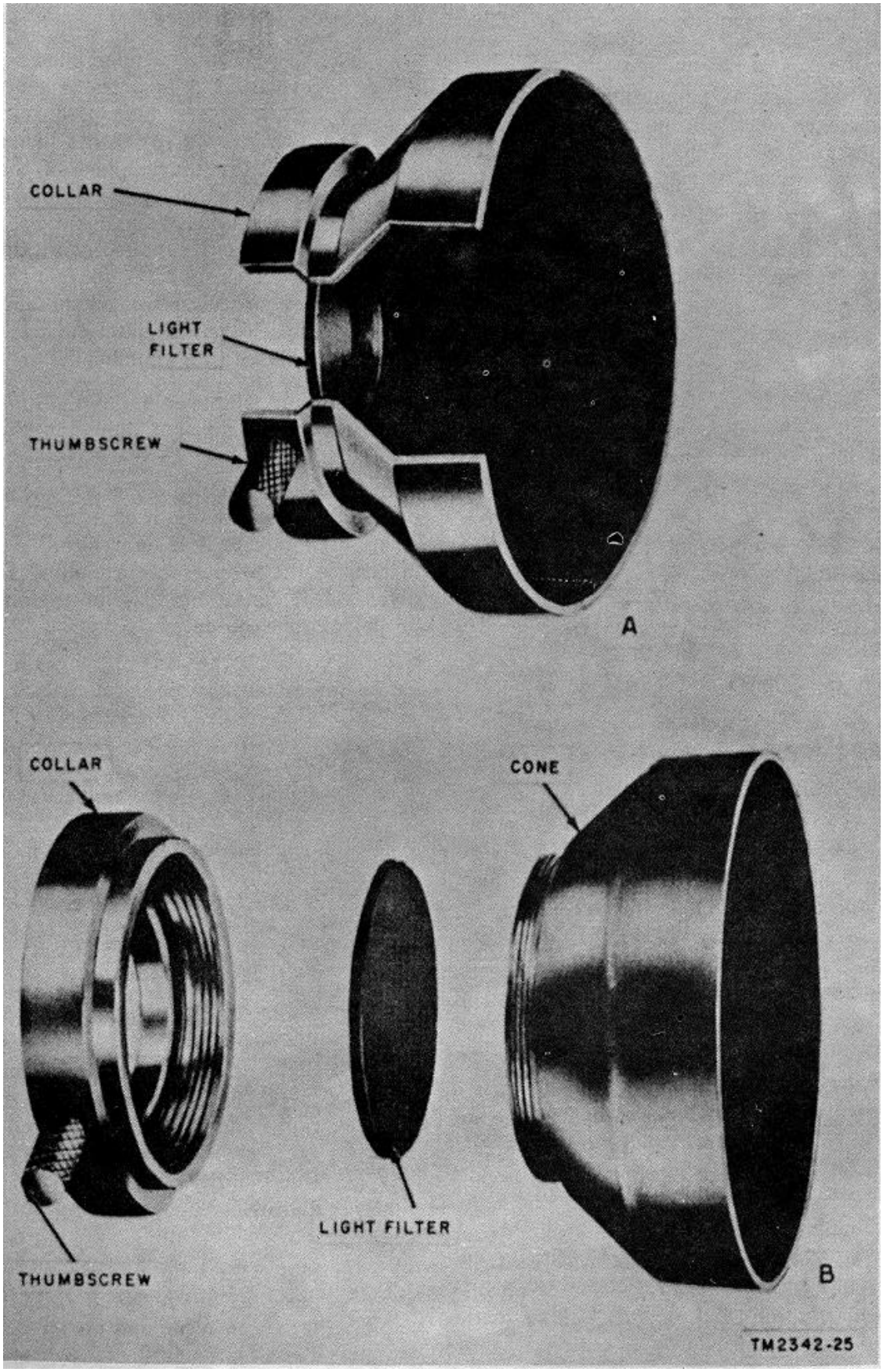


Figure 26. Lens shade and unmounted light filter, cutaway and exploded view.

Section III. OPERATION UNDER USUAL CONDITIONS

22. Precautions and Recommendations

Observe the following precautions and recommendations when operating the camera set.

a. Use the highest possible shutter speed when the long range lens is being used.

b. Be sure that the light filters, if used, are clean and undamaged.

c. Never use force on any of the controls or adjustments.

d. Each time a lens is changed, examine the lens to be sure it is clean. Foreign matter on a lens may result in a spotted negative. Droplets of water on a lens may result in distortion of important detail in the printed photograph.

e. Keep the lens cap on the mounted lens at all times, except when actually operating the camera to take a photograph.

f. Do not touch the lens with the fingers.

g. Use the lens shade to help protect the lens from rain, dust, or other foreign matter.

h. Shade the camera and lens when changing lenses.

23. Adjusting Shutter Speed

(figs. 7 and 8)

The shutter fast and slow speed controls enable the selection of shutter speeds from 1 second to 1/1000 second (par. 4a). Provisions are also available for time and bulb exposures.

a. *Fast Shatter Speeds*. To set the camera for fast shutter speeds and bulb, proceed as follows:

(1) Turn the film winder knob 1 complete revolution to its stop.

(2) Set the shutter slow speed control to its fastest speed.

(3) Grasp the shutter fast speed control by its knurled edge; lift up and turn the control until the desired setting is opposite the index arrow on the slide fastener rail.

(4) Release the shutter fast speed control. The control locks in position by means of the pin and detent locking with which it is provided.

b. *Slow Shutter Speeds*. To adjust for slow shutter speeds and time, proceed as follows:

(1) Turn the film winder knob 1 complete revolution to its stop.

(2) Set the shutter fast speed control to its slowest speed (a(3) and (4) above).

(3) Grasp the knurled edge of the shutter slow speed control and rotate it until it click-stops at the desired setting. On the camera supplied with the KS-15 (1), a safety catch retains the shutter slow speed control at the 25 position. To release the safety catch, press it back with the thumbnail.

24. Adjusting Diaphragm Opening

a. The proper aperture stop value for a given exposure is governed by the following factors: light conditions, emulsion speed of the film being used, shutter speed, depth of field required, and light filter factor, if a light filter is used. To determine the proper aperture stop value for a given set of conditions, use an exposure meter or an exposure computer.

b. To adjust the lens diaphragm opening, rotate the diaphragm adjustment ring (figs. 11 and 12) to the desired aperture stop (a above).

25. Focusing

a. *General*. The range finder is operated by the focusing lever or focusing collar on the lens.

Cohen the lens is focused for the first time. proceed as directed in b and c below. Thereafter, to refocus the lens, proceed as directed in c below only.

b. *Range Finder Eyepiece*.

(1) Cover the range finder window (figs. 7 and 8) nearest the range finder adjustment lever.

(2) Sight through the range finder eyepiece (figs. 9 and 10) and move the range finder adjustment lever to obtain greatest possible image sharpness.

(3) Uncover the range finder window ((1) above).

c. *Lens*.

(1) Sight through the range finder eyepiece. If one image is visible, the subject is in focus and no further adjustment is required. If two images are visible, proceed as directed in (2) below.

(2) Continue to sight through the range finder eyepiece and move the focusing lever or focusing collar (figs. 11 and 12) as necessary ((a) and (b) below) until the two images coincide. The lens is focused only when the two images coincide.

(a) When using the 5-cm lens, be sure the lens is fully extended and locked in place (par. 18c(1)). To turn the focusing lever on the 3.5-cm or 5-cm lens, press the lock button on the lower left section of the focusing lever. Push the lock button onequarter inch toward the bottom of the camera. Remove pressure from the lock button and push the focusing lever clockwise or counterclockwise as required.

(b) When using the 9-cm, 12.7-cm, or 13.5-cm lens, grasp the milled surface on the focusing collar and rotate the collar clockwise or counterclockwise as required.

26. Using Depth of Field Scale

(figs. 11 and 12)

a. *General*. The depth of field scale is used in conjunction with the focal distance scale. For explanation of the theory of depth of field, refer to TM 11-401.

b. *Procedure*. To determine the depth of field for any given aperture at any given focal distance, proceed as follows:

(1) Note the aperture stop for which the diaphragm has been adjusted. Find this aperture stop value on the depth of field scale both to the right and left of the scale reference mark.

(2) Read the values on the focal distance scale opposite the depth of field scale reference marks ((1) above). The distances read are the near and the far limits of the lens.

Note.

On some of the lenses, the focal distance scale is marked in meters. For conversion of meters to feet refer to appendix II.

(3) The near and the far limits indicate the area that is brought into acceptable focus by the lens for the given aperture stop.

Note.

The depth of field scale may be used to determine the aperture stop to which the lens must he adjusted to cover a predetermined area. Refer to the focal distance scale. Find the corresponding duplicate aperture stop, repeated on both sides of the depth of field scale reference mark, that includes both the near and the far limits of the desired area to be brought into focus. Set the diaphragm adjustment ring to this aperture stop.

27. Photographing Subject

After the camera has been focused, the picture composed, and the depth of field .ascertained, the subject is ready to be photographed.

a. Hold and operate the camera in either a horizontal (fig. 27) or a vertical (fig. 28) position as determined by the nature of the subject being photographed. In general, hold the camera steadily in a plane parallel to that of the subject. Avoid jerky motions.

b. If the camera is adjusted for shutter speeds slower than 1/50 second, support the camera on a rigid base or tripod, if available. If no stable mount is available, hold the breath during the actual release of the shutter ton minimize move ment of the camera.

c. When the 12.7-cm or 13.5-cm lens is being used without a tripod (fig. 29), hold the camera by supporting the lens at its mounting end with the heel of the left hand grasp the camera with the right hand so that the index finger rests lightly on the shutter release button. The 12.7 cm and 13.5-cm lenses are so heavy that they might damage the front panel of the camera body or move during a take if left unsupported.

d. Operate the shutter release button (figs. 7 and 8). Press down steadily until the shutter is released.

(1) When making time exposures, the shutter will open and remain open until the shutter slow speed control is moved off the T position. After the required exposure time has elapsed, place the lens and then move the shutter slow speed control away from its T position.

(2) When making exposures, with the shutter fast speed control set to B (KS-15 (1)) or Z (AN/GFQ-2), the shutter will not close until pressure is removed from the shutter release button.

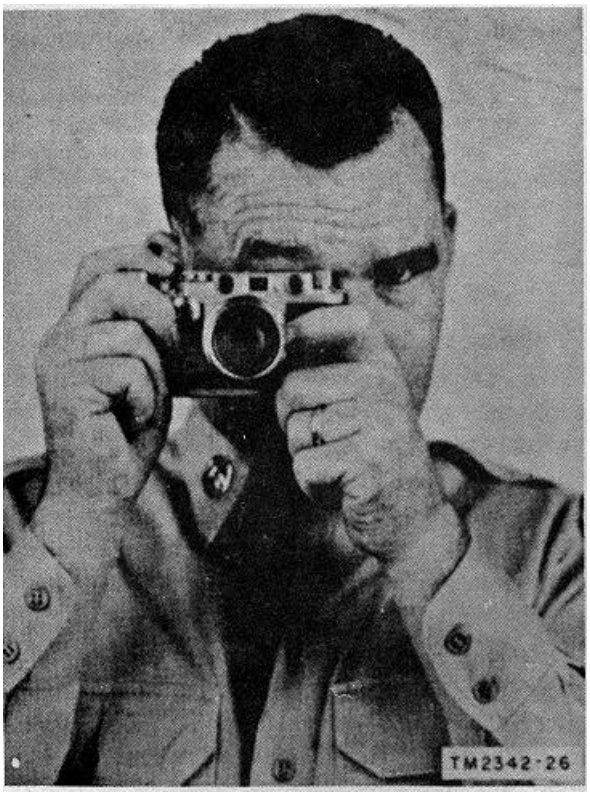


Figure 27. Camera, held in horizontal position.

28. Flash Lamp Flasher Operation

a. *Flash Lamp Types*.

(1) Class FP (focal plane) flash lamps are recommended for use with the camera set. Class M flash lamps and electronic flash can also be used. The class M flash lamps and electronic flash are of shorter duration so that the negative may not be evenly illuminated. This is especially noticeable with short duration exposures. It is suggested that when class M lamps or electronic flash is used, the negative development time be increased up to 50 percent. This is especially important with electronic flash.

(2) If daylight and electronic flash or class M flash lamp photographs are being made on the same roll of film, increased developing time may not be practical. In this case, use the next larger diaphragm stop for the flash photograph that is obtained from the exposure table.

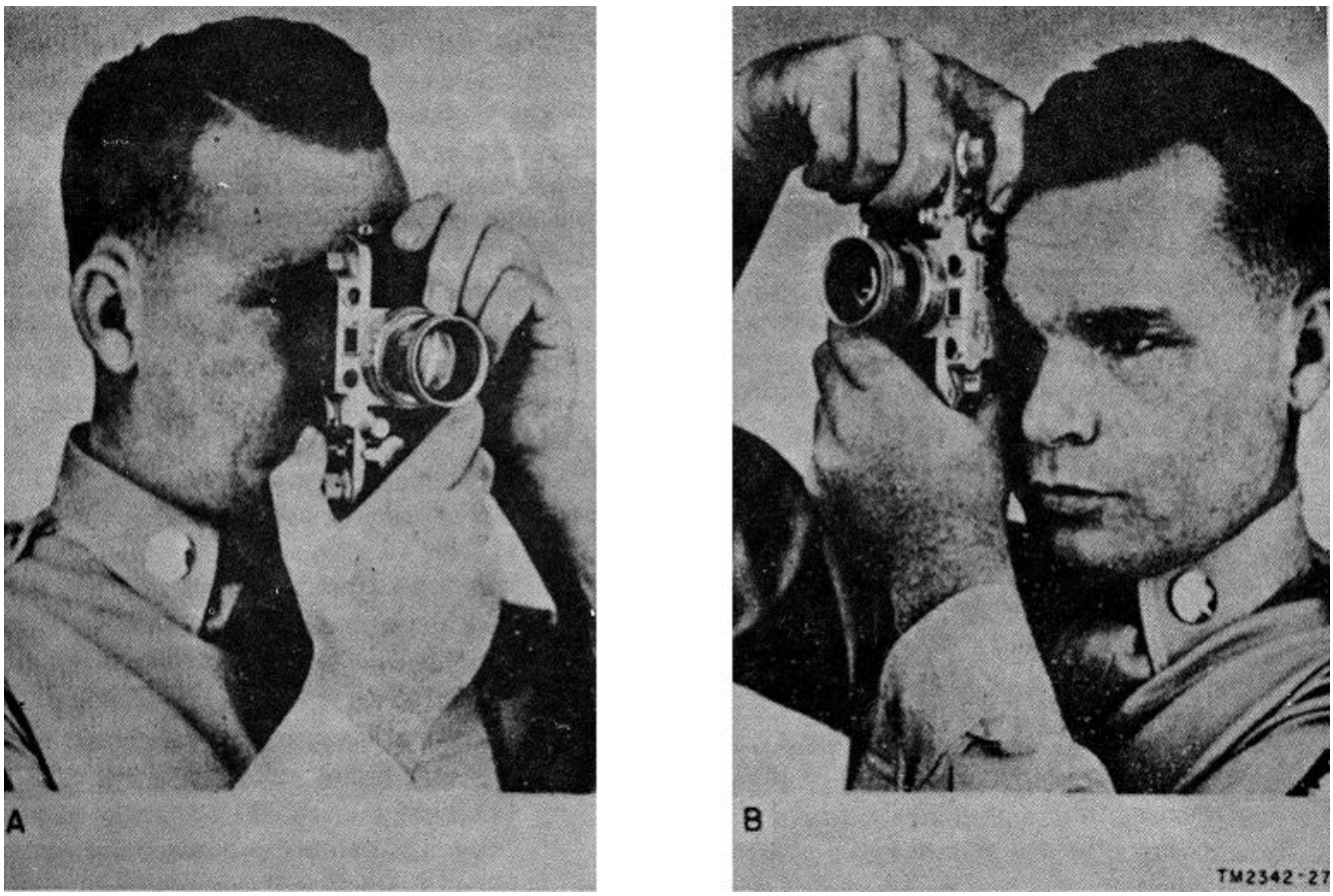


Figure 28. Camera, held in vertical position.

Figure 29. Camera, wit 12.7-cm lens in use.

b. *Flash Synchronization Tables*. The synchro contact control (fig. 7) is set from the flash synchronization tables supplied with the camera set. The tables in (1) through (3) below are general and should be compared with the tables supplied with the camera set. In case of differences between tables, use the values in the tables supplied with the camera set.

Note.

The flash synchronization tables have been prepared for an ASA film index of 40 T (tungsten). For film having a rating of 20 T or 24 T, use one stop larger than the stop calculated from the tables. For film with a rating of 80 T, use one stop smaller. For film with other film indexes, adjust the lens diaphragm in accordance with this ratio.

(1) *Class FP flash lamps*.

Shutter speed	Synchro contact scale NO.	Guide numbers		
		FP 6 and FP 26	FP 31	FP 2A
1/25	16	90	145	200
1/50	13	70	115	145
1/75	7	60	90	120
1/100	5	50	80	100
1/200	2	40	50	70
1/500	1	25	35	50
1/1000	0	20	25	35

(2) *Class M flash lamp*.

Shutter speed	Synchro contact scale No.	Guide numbers
		Press 40
1/25	13	135
1/50	12	105
1/75	6	85
1/100	4	80

(3) *Electronic flash.*

Shutter speed	Synchro contact scale No.	
	With delay	Without delay
1/25	0	----------
1/50	----------	20

c. Operation.

(1) Rotate the synchro contact control (fig. 7) to the contact scale number given s in the flash synchronization tables for the shutter speed being used.

(2) Locate the guide number for the flash lamp and the shutter speed being used. Divide the distance (in feet) between the flash lamp and the subject into the guide number. Set the lens diaphragm for this number.

Note

Guide numbers for use with electronic flash have not been given. Characteristics of each electronic flash are different. Use the contact scale number given in the flash synchronization table and obtain the guide number from the data supplied with the electronic flash unit.

29. Stopping Procedure

Upon completion of an assignment, remove all accessory items from camera. Replace all components in the camera set carrying case. To unload the film refer to paragraph 30.

a. Lens Shades and Light Filter.

(1) To remove the 5-cm lens shade (fig. 25) from the 5-cm lens supplied with the KS-15 (1), press inward on the friction clips and remove the lens shade s from the lens barrel. Open the side flaps to unlock the center flaps. Press the center flaps and then the side flaps down to return the lens shade to its collapsed position.

(2) To remove the 3.5cm or 13.5-cm lens shade, loosen the thumbscrew and slip the lens shade off the lens barrel. On the 13.5-cm lens shade, loosen the front thumbscrew and return the lens shade to its collapsed position; tighten the front thumbscrew.

(3) To remove the light filter supplied with the KS-15(1), loosen the thumbscrew and slip the light filter off the lens barrel.

(4) To remove the lens shade (fig. 26) and light filter from the camera supplied with the AN/GFQ-2, loosen the thumbscrew and slip the lens shade off the lens barrel. Unscrew the cone from the collar and remove the light filter. Screw the cone onto the collar.

b. *Flash Lamp Flasher*. Remove the flash lamp flasher from the accessory clip on the camera (fig. 24) or universal view finder (fig. 22) as follows:

(1) Rotate the camera plug 90° counterclockwise and pull it out of the camera socket. Pull the male connector of the cable assembly from the flash lamp flasher housing.

(2) Slide the flash lamp flasher from the accessory clip.

(3) Slide the light reflector (fig. 23) from the mounting clip on the flash lamp flasher housing. Return the light reflector to its collapsed position.

(4) Remove the lamp holder (par. 20a(1)) and the battery-capacitor housing from the flash lamp flasher housing. Remove the battery. Replace the battery-capacitor housing and the lamp holder (par. 20a(3) and (4)).

c. *Universal View Finder*. Slide the universal view finder (fig. 22) from the camera accessory clip.

d. *Lenses*. If the camera is equipped with the 5-cm lens, return the lens to its collapsed position (par. 18b (1)) and cover the lens with the lens cap. If one of the other lenses is mounted on the camera, proceed as follows:

(1) Remove the lens (par. 18b).

(2) Mount the 5-cm lens (par. 18c) and cover the lens with the lens cap.

30. Unloading Camera

(figs. 7 and 8)

a. *Unloading Completely Exposed Roll*. When the end of the film is reached, unload the camera ((1) through (4) below). The end of the film is reached when the film winder knob cannot be turned without exerting undue force.

(1) Place the lens cap on the lens.

(2) Turn the film advance-rewind lever to the R position.

(3) Pull up the film rewind knob and rotate it in the direction of the arrow engraved on top of the knob. This rotating action will feed the film back into the film magazine. Continue rotating the film rewind knob until a slight resistance is felt. This resistance indicates that the film has been unwound from the takeup spool and is being held only by the end of the film leader under the film retaining clip. Continue rotating the film rewind knob or 3 turns) until the film leader pulls away from the film retaining clip and enters the film magazine.

(4) Remove the bottom cover assembly (par. 17a) and lift out the film magazine.

(5) Protect the film magazine from light by storing it in the film magazine can.

b. *Unloading Partially Exposed Roll*. To remove a partially exposed roll of film in order to develop the exposed section and reload the remaining film into the camera, proceed as follows:

(1) Before rewinding the film, record the number of exposures that have been made.

(2) Move the film advance-rewind lever to the R position.

(3) Pull up the film rewind knob and rotate it in the direction of the arrow engraved on top of the knob. Watch the shutter release button (KS15 (1)) or the shutter release collar (AN/GFQ2). Continue rotating the film rewind knob until the shutter release button or the shutter release collar stop turning. Do not rotate the film rewind knob any further or the film leader will be drawn completely into the film magazine.

(4) Remove the bottom cover assembly (par. 17a) and lift out the film magazine with a portion of the film leader still showing.

(5) Take the film magazine into a dark room. Draw out and cut the exposed portion of the film. There are approximately eight pictures per foot of film exposed. Do not cut the film short but allow sufficient film for handling during processing.

(6) Cut a new film leader (fig. 15) on the end of the remaining film and load the film magazine back into the camera (par. 17).

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

31. Operation in Arctic Areas

a. Equipment operated at low temperatures should be kept in low temperature storage when not in use. Cover the equipment with water-repellent material and store it in an outdoor shelter. When stored equipment is to be used in a much warmer temperature, follow the procedure below before attempting to operate the equipment.

(1) Transfer the equipment from the cold to the warm location and allow it to remain in its case, covered with water-repellent material for approximately 6 hours.

Caution:
Do not uncover the equipment before it has been kept at the warmer temperature for the required time. It may become damaged by condensation.

(2) Before operating the equipment, use a lint-free cloth to remove any moisture that has condensed on the outer surface. Clean the lens (par. 18a) with an air syringe or a camel's-hair brush and then with the lens tissue. If moisture has condensed on an inner-glass surface of the lens, do not attempt to operate the camera because moisture will affect the image on the negative. To evaporate the condensed moisture, allow the camera and the lens to remain at room temperature until it is clear. To hasten this process, keep the camera and the lens at a higher temperature (do not exceed 120° F.) until the moisture evaporates.

b. When equipment is to be operated at freezing temperatures, follow the procedure given below before operating the equipment.

(1) Keep the equipment in low temperature storage when not in use. Be careful to avoid moisture condensation on the camera and lens. Frost crystals may jam mechanical parts of the camera mechanism and form translucent frost deposits on the lens elements.

(2) Do not breathe directly on the equipment when using it during cold weather. Even slight deposits of condensed, frozen vapor on the lens elements will seriously impair clarity of the negative image.

c. When the equipment is on the ground and not in use, cover it with water-repellent material.

Deposits of frost may cause the shutter to jam and spoil the film or make some moving parts operate stiffly.

d. During outdoor operation, carry the camera in the camera carrying case close to the body, but not under the parka, to avoid extreme temperature changes. If removal of heavy mittens is required, manipulation of the camera controls should be accomplished with the aid of anticontact gloves.

32. Operation in Desert and Tropical Areas

When the equipment is used under conditions of extreme heat, such as desert and tropical regions, observe the following precautions:

a. *Desert Regions.*

(1) Before using the equipment in desert regions, use an air syringe or a camel's-hair brush to remove any sand or foreign matter from the inside and outside of the camera. Clean the outerglass surfaces with a camel's-hair brush or an air syringe before using lens tissue. Lens tissue will scratch the glass elements if they have not been dusted previously. Keep the equipment in the carrying case when not in use.

(2) During outdoor operation, use a lens shade and a light filter to protect the lens from wind-blown sand particles. Keep the hands and face as dry as possible to minimize possible damage to the camera from body perspiration.

b. *Tropical Regions*. In climates of high humidity, such as the tropics, inspect the equipment daily for traces of fungus, mold, mites, and metallic corrosion. Remove all fouling immediately.

Note.
When practicable, store the equipment, with desiccant, in an adequately ventilated cabinet equipped with an illuminated incandescent lamp of approximately 100 watts.

33. General

a. *Organizational Maintenance*. The procedures outlined in this chapter are to be performed by the operator and organizational maintenance personnel. Organizational maintenance of Still Picture Camera Set KS-15 (1) and Camera Equipment AN/GFQ-2 is limited to preventive maintenance and replacement of the flash lamp flasher battery (par. 37d(7)). If other corrective maintenance is required, turn the equipment in for depot repair.

b. *Field Maintenance*. Repair of Still Picture Camera Set KS-15(1) and Camera Equipment AN/GFQ-2 is not authorized except at depot repair shops equipped to service precision photographic and optical equipment. Detailed theory and maintenance instructions required for repair of the camera set is present at the depot repair shops.

34. Tools and Materials Required

The tools and materials used for preventive maintenance are listed below:

Item	*Used to*
Camel's-hair brush TL-72	Remove dust from lens and camera.
Hand blower (air syringe)	Remove dust from lens and camera.
Lens cleaner (liquid)	Clean glass surfaces.
Lens tissue	Clean glass surfaces.
Lint-free cloth	Remove dust and dirt from exterior of components of camera set.

35. Preventive Maintenance

DA Form 11-254 (figs. 30 and 31) is a maintenance checklist to be used by the operator and organizational maintenance personnel. Items not applicable to the equipment are lined out on the form. References in the ITEM block are to paragraphs that contain additional maintenance information pertinent to the particular item. Instructions for use of the form appear on page 1 of the form.

AGO 1829A

36. Visual Inspection

a. *General*. Before operating the equipment, inspect it. Inspection may save repair time and avoid damage to the equipment. Inspect the following:

(1) Lens surfaces for scratches, chips, or cracks.
(2) Loose or missing screws.
(3) Loose, missing, or broken parts.
(4) All components for cracks or dents.

b. *Light Leakage*. Check the camera for light leakage through cracks or around loose parts. Any open screw holes or defects that admit light will cause the film to fog and render the photographs worthless. Remove the bottom cover assembly (par. 17a) and hold the camera to a light. Light should not be visible in the film chamber.

37. Operational Checks

Check the operation of each control (pars. 12, 13, and 14). In addition, perform the following checks:

a. *Shutter Fast Speed Control* (figs. 7 and 8). Check the operation of the shutter fast speed control as follows:

(1) Set the shutter slow speed control to its fastest speed (par. 4a).
(2) Rotate the film winder knob to its stop.
(3) Set the shutter fast speed control for any shutter speed.
(4) Press the shutter release button and observe the action of the shutter fast speed control. While the shutter is operating, the shutter fast speed control will revolve.
(5) Again rotate the film winder knob to its stop. The shutter fast speed control will return to its previous setting.
(6) Repeat (3) through (5) above for each of the remaining shutter speeds.

MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT
STILL AND MOTION PICTURE CAMERA
(AR 750-625)

EQUIPMENT NOMENCLATURE
STILL PICTURE CAMERA SET KS-15(1)

EQUIPMENT SERIAL NUMBER
452

INSTRUCTIONS

This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue.

1. For detailed Preventive Maintenance instructions see:
   a. The Technical Manual *(in TM 11 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   b. The Supply Bulletin *(SB 11-100 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   c. The Department of the Army Lubrication Order. *(See DA Pamphlet Number 310-4)*

2. The following action will be taken by either the Communications Officer/Chief for 1st echelon, or the Inspector for higher echelon:
   a. Enter Equipment Nomenclature and Serial Number.
   b. Strike out items that do not apply to the equipment.

3. Operator/Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND.

4. After operator completes each daily inspection he will initial over the appropriate dates under "Daily Condition for Month", then return form to his supervisor.

FOLD

TYPE OF INSPECTION

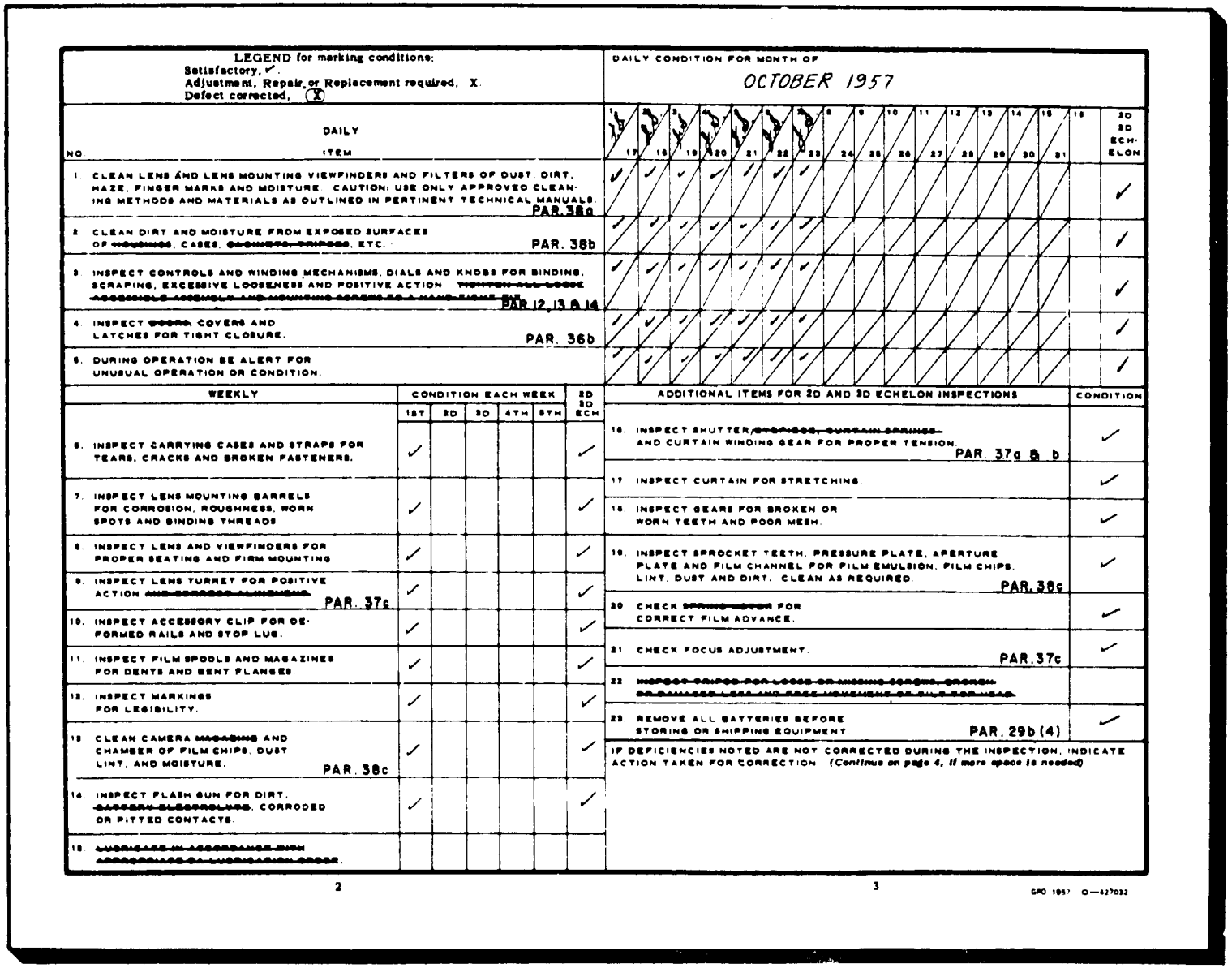
OPERATOR	2/3 ECHELON	DATE	SIGNATURE
✓		5 OCT 1957	John Smith
	✓	12 OCT 1957	William Brown

DA FORM 1 MAY 57 11-254

REPLACES DA FORMS 11-254, 1 SEP 55; 11-255, 11-255 AND 11-255I WHICH ARE OBSOLETE.

TM2342-29

Figure 30. DA Form 11-254, pages 1 and 4.



LEGEND for marking conditions:
Satisfactory, ✓.
Adjustment, Repair, or Replacement required, X.
Defect corrected, (X)

DAILY CONDITION FOR MONTH OF OCTOBER 1957

NO	DAILY ITEM	1 17	2 18	3 19	4 20	5 21	6 22	7 23	8 24	9 25	10 26	11 27	12 28	13 29	14 30	15 31	16	2D 3D ECHELON
1	CLEAN LENS AND LENS MOUNTING VIEWFINDERS AND FILTERS OF DUST, DIRT, HAZE, FINGER MARKS AND MOISTURE. CAUTION: USE ONLY APPROVED CLEANING METHODS AND MATERIALS AS OUTLINED IN PERTINENT TECHNICAL MANUALS. PAR. 38a	✓	✓	✓	✓	✓	✓	✓										✓
2	CLEAN DIRT AND MOISTURE FROM EXPOSED SURFACES OF [redacted], CASES, [redacted], ETC. PAR. 38b	✓	✓	✓	✓	✓	✓	✓										✓
3	INSPECT CONTROLS AND WINDING MECHANISMS, DIALS AND KNOBS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS AND POSITIVE ACTION [redacted] PAR 12, 13 & 14	✓	✓	✓	✓	✓	✓	✓										✓
4	INSPECT [redacted], COVERS AND LATCHES FOR TIGHT CLOSURE. PAR. 36b	✓	✓	✓	✓	✓	✓	✓										✓
5	DURING OPERATION BE ALERT FOR UNUSUAL OPERATION OR CONDITION.	✓	✓	✓	✓	✓	✓	✓										✓

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D 3D ECH
6. INSPECT CARRYING CASES AND STRAPS FOR TEARS, CRACKS AND BROKEN FASTENERS.	✓					✓
7. INSPECT LENS MOUNTING BARRELS FOR CORROSION, ROUGHNESS, WORN SPOTS AND BINDING THREADS	✓					✓
8. INSPECT LENS AND VIEWFINDERS FOR PROPER SEATING AND FIRM MOUNTING	✓					✓
9. INSPECT LENS TURRET FOR POSITIVE ACTION [redacted] PAR. 37c	✓					✓
10. INSPECT ACCESSORY CLIP FOR DEFORMED RAILS AND STOP LUG.	✓					✓
11. INSPECT FILM SPOOLS AND MAGAZINES FOR DENTS AND BENT FLANGES.	✓					✓
12. INSPECT MARKINGS FOR LEGIBILITY.	✓					✓
13. CLEAN CAMERA [redacted] AND CHAMBER OF FILM CHIPS, DUST LINT, AND MOISTURE. PAR. 38c	✓					✓
14. INSPECT FLASH GUN FOR DIRT, [redacted], CORRODED OR PITTED CONTACTS.	✓					✓
15. [redacted]						

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
16. INSPECT SHUTTER, [redacted] AND CURTAIN WINDING GEAR FOR PROPER TENSION. PAR. 37a & b	✓
17. INSPECT CURTAIN FOR STRETCHING.	✓
18. INSPECT GEARS FOR BROKEN OR WORN TEETH AND POOR MESH.	✓
19. INSPECT SPROCKET TEETH, PRESSURE PLATE, APERTURE PLATE AND FILM CHANNEL FOR FILM EMULSION, FILM CHIPS, LINT, DUST AND DIRT. CLEAN AS REQUIRED. PAR. 38c	✓
20. CHECK [redacted] FOR CORRECT FILM ADVANCE.	✓
21. CHECK FOCUS ADJUSTMENT. PAR. 37c	✓
22. [redacted]	
23. REMOVE ALL BATTERIES BEFORE STORING OR SHIPPING EQUIPMENT. PAR. 29b (4)	✓

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION. *(Continue on page 4, if more space is needed)*

2 3

GPO 1957 O—427032

TM2342-30

Figure 31. DAForm 11-254, pages 2 and 3.

b. *Shutter Slow Speed Control* (figs. 7 and 8). Check the operation of the shutter slow speed control as follows:

(1) Rotate the film winder knob to its stop.

(2) Set the shutter fast speed control to its slowest speed (par. 4a).

(3) Set the shutter slow speed control for any shutter speed.

(4) Press the shutter release button. The shutter will operate and the shutter fast speed control will revolve.

(5) Again rotate the film winder knob to its stop. The shutter fast speed control will return to its previous settings.

(6) Repeat (3) through (5) above for each of the remaining shutter speeds.

c. *Focusing and Rangefinder* (figs. 11 and 12). Check the camera focusing and the indication on the rangefinder as follows:

(1) Select a subject an infinite distance from the lens.

(2) Focus the camera (par. 25).

(3) Read the distance between the lens and the subject on the focal distance scale opposite the depth of field scale reference mark.

(4) Repeat (2) and (3) above for distances of 6 feet and 15 feet respectively.

(5) Turn the camera set in for depot repair if either of the following conditions exist:

(a) The distance indicated on the focal distance scale is not exact for infinity.

(b) The distance indicated on the focal distance scale is off more than the width of the index mark for distances of 6 feet or 15 feet.

d. *Flash Lamp Flasher*. Make sure there is no film loaded in the camera and check the operation of the flash lamp flasher as follows:

(1) Mount the flash lamp flasher (par. 20).

(2) Mount the lamp holder adapter (fig. 23) in the lamp holder.

(3) Turn the film winder knob (figs. 7 and 8) to its stop.

(4) Install a test lamp known to be good in the lamp holder adapter.

(5) Press the shutter release button. The test lamp should light momentarily.

(6) If the test lamp does not light, check the cable connections. If the cable is properly connected, replace the battery ((7) below).

(7) Remove the lamp holder (fig. 22) and the battery-capacitor housing from the flash lamp flasher housing. Remove the defective battery and replace it with a battery known to be good. Replace the battery-capacitor housing and the lamp holder.

(8) Repeat (2) and (4) above. The test lamp should light momentarily.

(9) If the test lamp still does not light, remove the battery from the flash lamp flasher and turn the camera set in fob depot repair.

38. Cleaning

Clean the components of the camera set. Use the tools and materials listed in paragraph 34.

a. Clean all glass surfaces by following the procedures listed for cleaning the lens (par. 18a).

b. Remove dust and moisture from all components of the camera set. Use the camel's-hair brush, air syringe, and lint-free cloth.

c. Blow dust and film chips from the inside of the camera with an air syringe.

39. Exposure Meter

Exposure Meter PH-77C, PH-77D, PH-77E, PH-260, or PH-260A, which measures the intensity of light reflected from the object to be photographed, may be used to determine the correct shutter speed and aperture stop according to the speed of the film used. Complete information on these meters is given in TM 112351 and TM 11-2356.

40. Photographic Changing Bag

Bag PH-105 may be used to load or adjust the camera in total darkness when a darkroom is not available. Information on this bag which is part of Photographic Equipment PH-383 is given in TM 11-2366.

41. Tripod

A tripod should be used to support the equip ment when the 12.7-cm or the 13.5-cm lens is used or when shots are to be taken at speeds slower than 1/50 second. The tripod socket on the camera is located on the bottom cover assembly. A tripod socket is provided on the base of the 12.7-cm and the 13.5-cm lenses.

42. Camera

The camera component of Still Picture Camera Set KS-15 (1) and Camera Equipment AN/ GFQ2 is a light tight box with a built-in mechanical arrangement for transporting and exposing 35-mm film. External mounting arrangements are provided to accept accessory components and lenses of different focal lengths.

a. *Focusing*. Focusing is accomplished by movement of the objective elements, in a straight line, toward or away from the plane of the film. The motion is achieved by rotating the focusing lever (figs. 8 and 11) or focusing collar (figs. 11 and 12) which adjusts the focal distance between the lens and the film.

b. *Rangefinder*. The rangefinder is synchronized with the movement of a lens by means of an internal roller and lever arrangement. When the lens is not in correct focus, and the subject is sighted through the rangefinder, two images are seen. Moving the lens in or out, by moving the focusing lever or focusing collar, brings the images into coincidence. This indicates that the lens is correctly focused for the distance between the subject and the film plane.

c. *Viewfinder*. The viewfinder is composed of a lens system the optical axis of which is parallel to the optical axis of the camera with the 5-cm lens attached. The optical train is arranged so that it scans the view to be composed. The view appears in reduced size in the rectangular frame of the viewfinder objective.

d. *Shutter*. The shutter is constructed of two separate opaque curtains that are wound simultaneously by the action of winding the film for the next exposure. This film winding action winds and compresses a helical spring that moves both curtains when released. Pressure on the shutter release button frees the helical spring and permits the shutter to move from right to left at a speed that is constant for all shutter time settings. During operation, the right hand, or leading, curtain will move across the plane of the film followed at a predetermined interval by the left hand, or following, curtain. The interval between the two curtains is determined by the time setting of the shutter speed controls. The time setting permits a vertical slit of predetermined width to pass across the plane of the film. The width of the vertical slit determines the length of time during which light will strike the film.

e. *Pressure Plate*. The pressure plate is contained within the camera body and applies a light pressure against the film after the film winder knob has been turned for an exposure. The film is positioned with just enough pressure to hold it flat in the film plane. When the film advance-rewind lever is set to position R, the pressure plate is released.

f. *Film Winder Knob* (figs. 7 and 8). The film winder knob engages the takeup spool, winds the shutter mechanism, and transports the film for the next exposure. It also brings the pressure plate forward to bear upon the film and turns the exposure counter dial into position to indicate the number of the next exposure.

g. *Shutter Fast Speed Control* (figs. 7 and 8). The shutter fast speed control is a small springheld disk with a knurled edge. It is held at each of the shutter speeds marked on it by a pin and detent locking device. The control is raised against the spring, turned to the desired shutter speed, and then released. The pin falls into the detent and holds the control at the desired shutter speed until it is reset by the operator.

h. *Shutter Slow Speed Control* (figs. 7 and 8). The shutter slow speed control is a small disk with a series of click stops to hold it in position. On the camera supplied with the KS-15(1), a safety catch holds the control at a shutter speed of 1/25 second. During operation, the control is turned until it click stops at the desired shutter speed. Intermediate shutter speeds can be ob

tained by setting the control between indicated shutter speeds. At the intermediate shutter speeds there are no click stops.

i. *Film Magazine* (fig. 14). The film magazine consists of a film spool and two springlocked shells, an inner shell and an outer shell.

The film is wound on the film spool and then placed in the inner shell. The inner shell is placed in the outer shell and the film magazine is locked by means of a spring catch. The film magazine permits unexposed film to be withdrawn so that it may be exposed. The exposed film is fed onto the takeup spool. After all exposures have been made, the film is rewound into the film magazine by rotation of the film rewind knob. The inner and outer shells protect the film from light.

j. *Takeup Spool* (fig. 18). The takeup spool is flanged on both ends and includes a film retaining clip to hold the film leader. Rotation of the film winder knob turns the takeup spool. This action draws the film out of the film magazine and winds it on the takeup spool.

43. Universal Viewfinder
(figs. 4 and 13)

The universal viewfinder is an auxiliary viewing instrument required when a lens other than the 5-cm lens is used. The universal viewfinder permits accurate scanning of a subject covered by the lens. An erecting lens arrangement is incorporated in the universal viewfinder so that the subject scanned appears upright. When the framing adjustment ring is set to the calibration mark which corresponds to the lens in use, the rectangular diaphragm of the universal viewfinder accurately frames the view covered by the lens. After the lens has been focused, the parallax adjustment lever, at the base of the universal viewfinder, is set at the marking for the focal distance indicated on the lens. The parallax adjustment alters the vertical angle of the universal viewfinder so that the optical angle of the lens and the optical angle of the universal viewfinder will coincide at the point of focus. Therefore, adjustment of the rectangular diaphragm accurately frames the view to be photographed and adjustment of the vertical angle corrects the camera for parallax.

44. Flash Lamp Flasher
(fig. 23)

The flash lamp flasher uses a battery-capacitor arrangement to insure successful firing of the flash lamp. When the flash lamp is inserted in the lamp holder, the capacitor charges. Pressing the shutter release button completes the circuit between the capacitor and the flash lamp. The capacitor discharges through the flash lamp, which causes the flash lamp to fire. When the synchro contact control is properly set (par. 28), the camera is synchronized so that the shutter operates at the same instant that the flash is at peak intensity.

45. Lenses and Light Filters

a. *Lenses* (figs. 11 and 12). The lenses are described in paragraph 7b. For discussion of the theory of lenses, refer to TM 11-401.

b. *Light Filters* (figs. 2 and 3). The light filters are described in paragraph 8b. For discussion of the theory of light filters, refer to TM 11-401.

CHAPTER 7
SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

46. Repacking for Shipment and Limited Storage

Note.
Before repacking the camera set, remove the battery (par. 29b(4)) from the flash lamp flasher.

a. If the original packing materials are on hand, use them and reverse the unpacking procedures given in paragraph lob. General repacking information is usually available at depots.

b. The prime requirement is to pack the equipment so as to prevent damage during transit or limited storage. Package the equipment securely and use sufficient wadding to minimize the effects of severe jolting. Make certain the equipment is protected from rain or snow.

47. Methods of Destruction

Use any or all of the demolition procedures outlined in this paragraph to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon order of the commander.

a. *Smash*. Smash the lenses, camera body, universal viewfinder, flash lamp flasher, light filter, carrying cases, and accessory parts; use sledges, axes, pickaxes, hammers, or other heavy tools.

b. *Cut*. Cut film, carrying cases, and cables; use axes, handaxes, or machetes.

c. *Burn*. Burn film, carrying cases, and technical manuals; use gasoline, kerosene, flamethrowers, or incendiary grenades.

d. *Explode*. If explosives are necessary, use firearms, grenades, or TNT.

e. *Dispose*. Bury or scatter the destroyed parts in slit trenches, foxholes or other holes, or throw them into streams.

APPENDIX I
REFERENCES

AR 700-38	Unsatisfactory Equipment Report.	TM 11-2351	Exposure Meters PH-77, PH-77A, PH-77C, PH-77D, PH-77E, and PH-252A.
AR 700-58	Report of Damaged or Improper Shipment. Shipment.	TM 11-2356	Exposure Meters PH-260 and PH-260-A.
TM 11-401	Elements of Signal Photography.	TM 11-2366	Photographic Equipment PH-383.

APPENDIX II
CONVERSION TABLE

Conversion Table for Metric Markings on Focal Distance Scale on Lenses (meters to feet and inches)

Marking on lenses (meters)	Equivalent (ft in.)	
(1 meter equal to 3.2808 ft)		
1	3	3.4
1.25	4	
1.5	4	11
1.75	5	10
2	6	6.8
3	9	10
4	13	1.6
5	16	2
6	19	8.4
7	22	11.8
8	26	3
9	29	6.6
10	32	10
12	39	6.8
15	49	3
20	65	8
30	98	6
50	164	2
100	328	4

[AG 413.53 (14 Aug 58)]

By Order of Wilber ,M. Brucker, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army
Chief of Staff.

Official:

HERBERT M. JONES,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army.

ASA (2)
CNGB (1)
Technical Stf, DA (I) except CSigO (30)
Technical Stf Bd (1)
USA Arty Bd (1)
USA Armor Bd (1)
USA Inf Bd (1)
USA Air Def Bd (1)
USA Abn & Elct Bd (1)
USA Avn Bd (1)
USA Armor Bd Test Sec (1)
USA Air Def Bd Test Sec (1)
USA Arctic Test Bd (1)
USCONARC (6)
US ARADCOM (2)
US ARADCOM, Rgn (2)
OS Maj Comd (6)
Log Comd (6)
MDW (1)
Armies (5)
Corps (2)
Div (2)
(TSATC k22
Svc Colleges (5
Br Svc Sch (5) except
USASCS (25) except USASCS (Ft Mon-
mouth) (50)
Gen Depots (2) except
Atlanta Gen Depot (None)
Sig Sec, Gen Depots (10)
Sig Depots (17)
Fld Comd, AFSWP (5)
Engr Maint Cen (1)
Army Pictorial Cen (2)
WRAMC (1)
AFIP (1)
AMS (1)
Port of Enib (OS) (2)
Trans Terminal Comd (2)
Army Terminals (2)
OS Sup Agey (2)
USA Sig Pub Agcy (8)
USA Sig Engr Agcy (1)
USA Comm Agey (2)
TASSA (13)
Mid-Western Rgn Ofc (TASSA) (1)
USA Sig Eqp Spt Agey (2)
USA White Sands Sig Agcy (13)
Yuma Test Sta (2)
USA Elct PG (1)
Sig Fld Maint Shops (3)
Sig Lab (5)
Mil Dist (1)
Sectors, USA Corps (Res) (1)
USA Corps (Res) (1)
JBUSMC (2)
Units org under fol TOE:
9-510 (2)
11-6 (2)
11-6 (2)
11-7 (2)
11-15 (2)
11-16 (2)
11-37 (2)
11-55 (2)
11-56 (2)
11-57 (2)
11-127 (2)
11-128 (2)
11-500 (AA-AE) (2)
11-57 (2)
11-587 (2)
11-592 (2)
11-697 (2)
39-61 (2)
39-61 (2)
39-71 (2)

NG State AG (6); units-same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

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PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

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PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 019559-000