

OLYMPUS
OM-1

OLYMPUS
OM-1
REPAIR MANUAL



OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

<http://olympus.dementia.org/Hardware>



I N D E X

- A. DRAWING AND PARTS LIST
- B. GENERAL OUTLINE AND MECHANICAL FEATURES
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- F. PARTS WHERE OIL, GREASE, ETC. SHALL BE USED
- G. SPECIAL TOOLS
- H. OTHERS



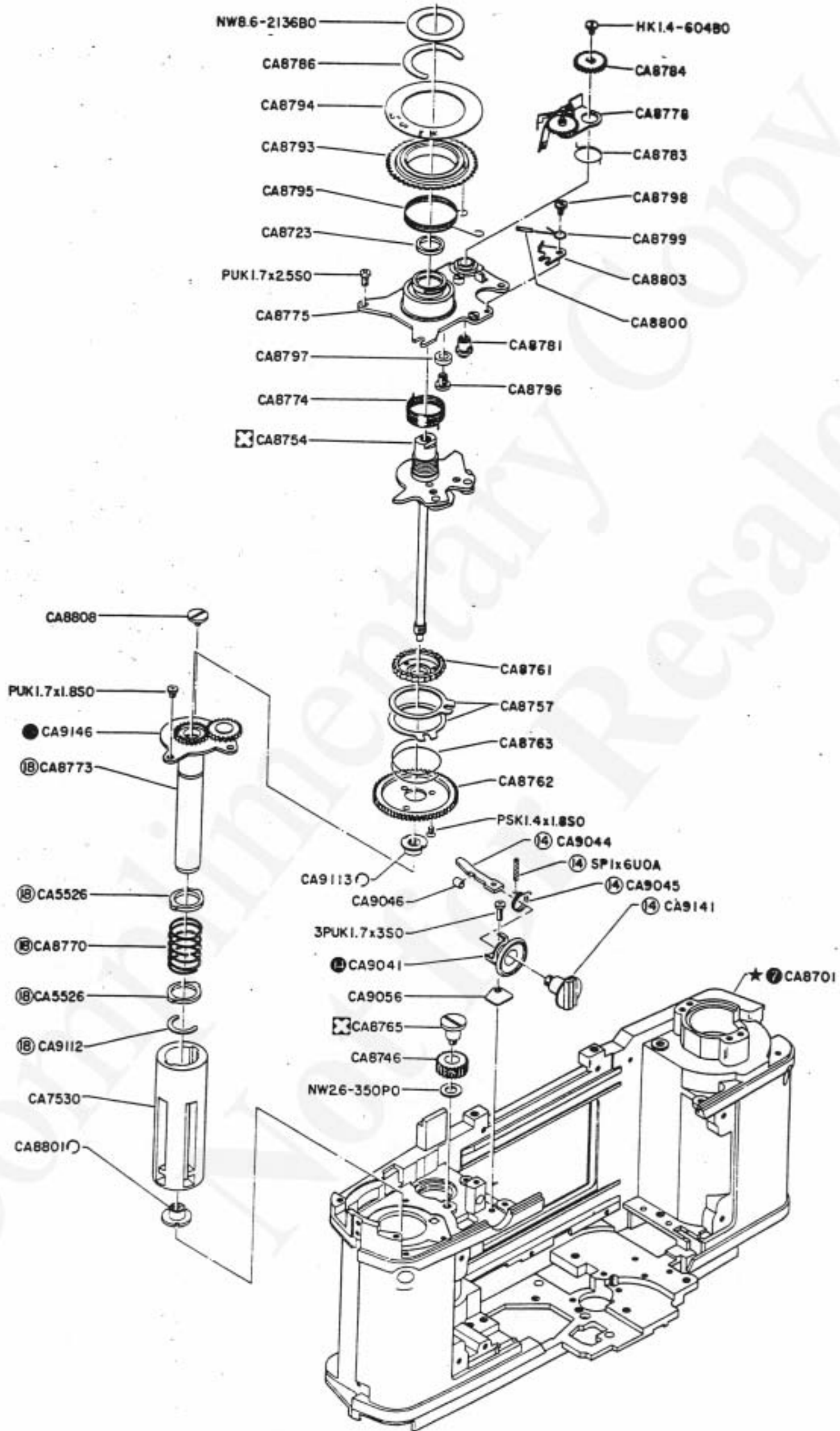


DRAWING AND PARTS LIST

EXPLANATORY NOTES ON VARIOUS MARKS & NUMBERS USED IN IMPROVED PARTS TABLE

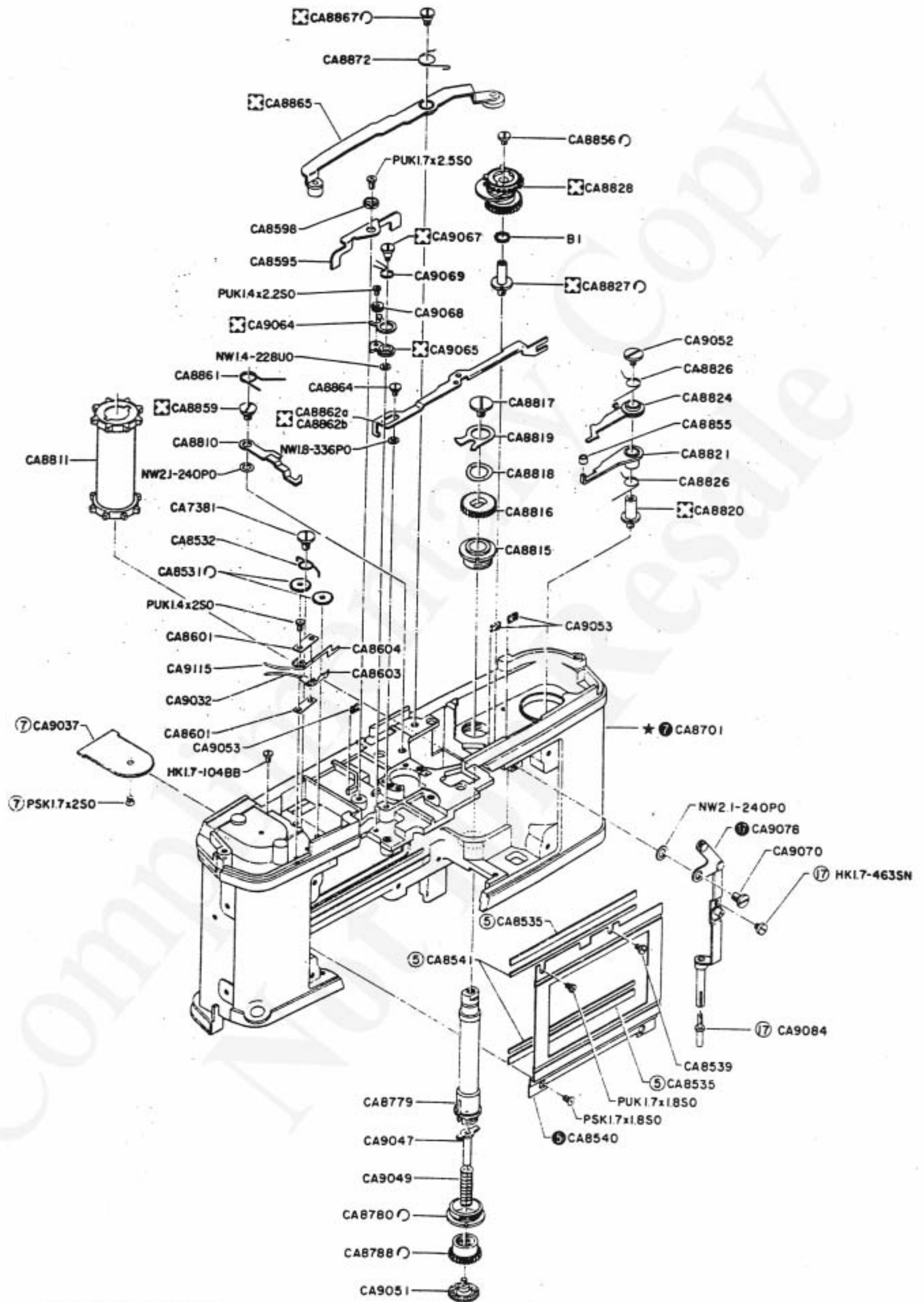
- ★ Only Body Die-Cast is not available in case of overseas.
- ① An assembled parts is supplied including parts marked with
- ① Single parts is supplied.
- () Not to be supplied in single parts, but as an assembled parts.
- ↻ Left-handed screw. (the mate screw hole is not marked particularly). All right-handed screws have no special indication.
- < > Improved parts. Number shows INDEX in IMPROVED PARTS TABLE where more details are explained.
- ≡ No more available parts.
- ➡ The place where parts have been improved.
- [] Dimensions of improved parts and improved points.
- ♥♠♦♣ Replacing parts of no more available parts marked with ≡.
- ✳ How to replace parts or how to repair.
- Original parts are also usable instead of improved parts.
- ✕ Printing error. No parts are built-in cameras.
- ⊠ The part which should not be touched directly by fingers. Be sure to cover fingers with rubber sacks.

Clarify HOUSE CODE, PARTS NUMBER and QUANTITY in your ORDER SHEETS.



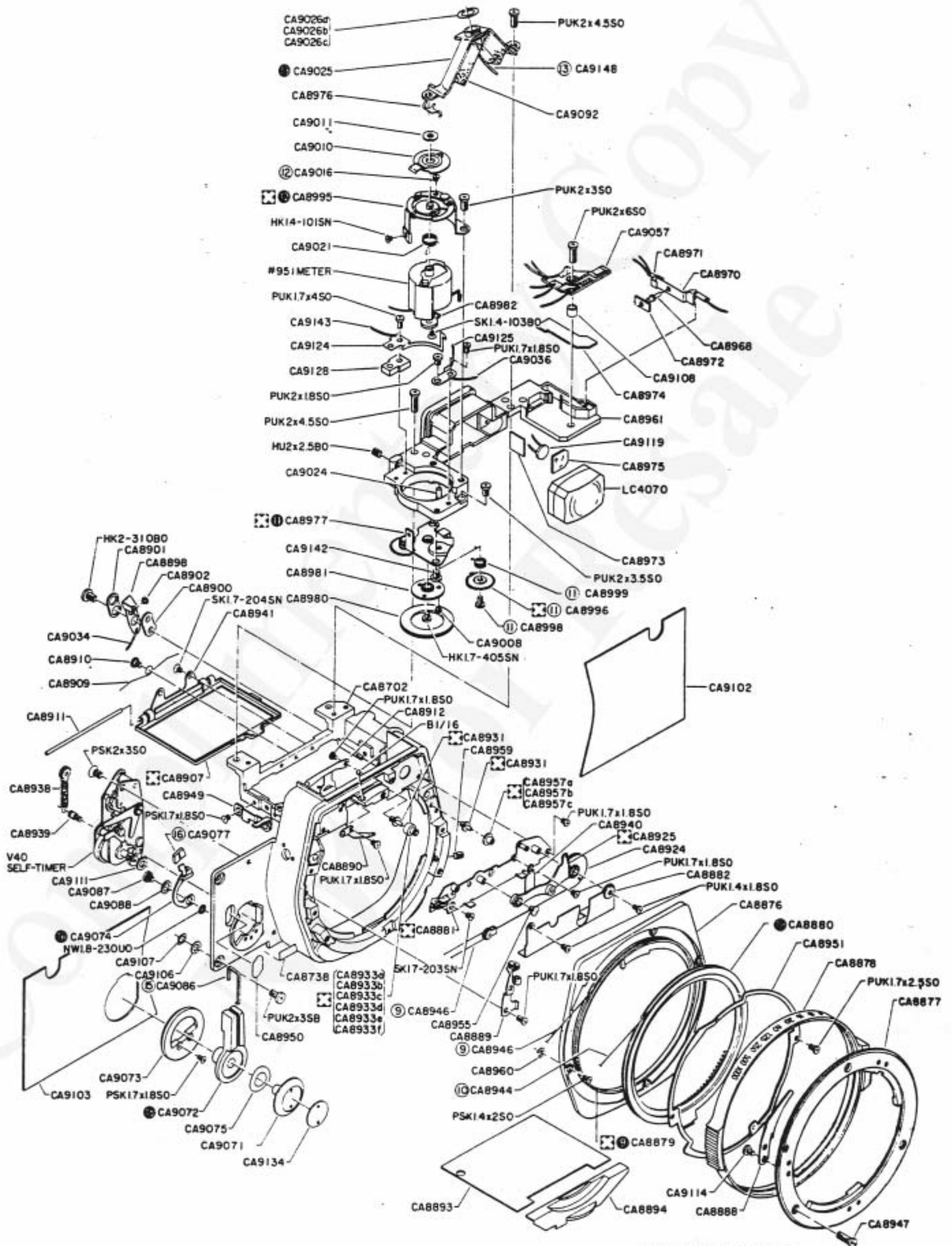
REPAIR MANUAL

MODEL	HOUSE CODE	FIG. 2/6
OLYMPUS M-1	MDS	
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		



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MODEL	HOUSE CODE	FIG. 4/6
OLYMPUS M-1	MDS	
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REPAIR MANUAL

MODEL	HOUSE CODE	FIG 5/6
OLYMPUS M-1	MDS	
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PARTS LIST

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PARTS NO.	NAME OF PARTS	NOTE
CA 5526	SPOOL HOLDER	⑩
6345	BATTERY COMPARTMENT LID	
7381	STOPPER SCREW	
7530	SPOOL "B"	
7732	GUIDE	
7963	RING "E"	
8076	TUBE	
8401	"M" FRAME	① 11 parts 8 kinds
8404	"M" LEVER SCREW	
8409a	ADJUSTING WASHER a	t: 0.15
8409b	ADJUSTING WASHER b	t: 0.20
8409c	ADJUSTING WASHER c	t: 0.30
8410	LEFT SIDE PLATE	11 parts 10 kinds
8411	RIGHT SIDE PLATE	5 parts 4 kinds
8412	M CHARGING LEVER	5 parts 5 kinds
8418	STOPPER SPRING	
8419	M HOOKING LEVER	
8421	HOOKING LEVER SPRING	
8422	TUBE #2	
8423	RETURNING SPRING	
8425	CONNECTING LEVER	4 parts 3 kinds
8427	M WASHER (RUBBER)	
8434	HOOK SPRING	
8435	M BASE PLATE	② 5 parts 5 kinds
8437	MS SPRING	
8441	M LEVER	6 parts 6 kinds
8444	TUBE #3	③
8446	M RING	④
8447	M SPRING	
8448	CONNECTING LEVER SPRING	
8450	MU RING #0	2.5mm diam.
8451	MU RING #1	2.8mm diam.
8452	MU RING #2	3.1mm diam.
8453	MU RING #3	3.4mm diam.
8454	M PIVOT	2 parts 2 kinds
8457	LEVER SHAFT	
8459	MU RING #4	3.7mm diam.
8460a	LINK a	③ 8 parts 7 kinds
8460b	LINK b	③ 8 parts 7 kinds
8460c	LINK c	③ 8 parts 7 kinds
8463	E RING 08	⑤ 0.40mm diam.
8464	SPRING #1	⑥ 0.45mm diam.
8466	SPRING #2	⑦ 0.55mm diam.
8467	SPRING #3	⑧
8468	SPRING COVER	⑨
8469	PIPE CONNECTOR	④
8471	A PIPE	
8473	PIPE HOLDER (UPPER)	④ 6 parts 5 kinds
8474	PIPE HOLDER (LOWER)	
8476	M POSITIONING SPRING	

PARTS LIST

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PARTS NO.	NAME OF PARTS	NOTE
CA 8477	M POSITIONING SCREW	
8478	M POSITIONING PLATE	
8479	M POSITIONING SHAFT	
8481	S WASHER (RUBBER)	④
8483	LIGHT PROOF PLATE	①
8484	MU SHAFT	
8486	MU LEVER	
8489	MU SPRING	5 parts 5 kinds
8490	RIGHT COVERING PLATE	
8499	B MASK	
8501	S BASE PLATE	6 parts 6 kinds
8508	CURTAIN BASE R	2 parts 2 kinds
8510	ROLLER A	
8513	ROLLER HOLDER	2 parts 2 kinds
8517	TUBE STOPPER SCREW	
8519	TUBE SHAFT A	2 parts 2 kinds
8520	TUBE SHAFT B	2 parts 2 kinds
8521	2nd. CURTAIN STOPPER	
8522	1st. CURTAIN STOPPER	
8523	TUBE SHAFT HOLDER	
8529	ROLLER B	
8531	TENSION NUT	
8532	TENSION NUT STOPPER	⑤
8535	FELT B	
8538	1st. CURTAIN	9 parts 9 kinds
8539	STOPPER FOR CA8540	
8540	FRAME	
8541	FELT A	⑤ 5 parts 3 kinds
8543	GEAR SHAFT A	⑥
8545	GEAR SCREW	⑥ 53 parts 10 kinds
8556	CONNECTING PLATE	④
8567S	LEVER S	11 parts 11 kinds
8567M	LEVER M	4 parts 4 kinds
8567L	LEVER L	4 parts 4 kinds
8570	SPRING FOR CA8567	4 parts 4 kinds
8571	G CAM SHAFT	
8575	LOW CAM	
8576	HIGH CAM	
8577	SPEED GEAR	
8578	A LEVER 1	3 parts 3 kinds
8580	B LEVER 1	3 parts 3 kinds
8585	A LEVER SCREW	3 parts 3 kinds
8586	A LEVER SPRING	
8588	B LEVER SCREW	
8589	SHAFT FOR CA8592	
8590	B LEVER SPRING	
8592	RELEASING CLAW	
8594	SPRING FOR CA8592	
8595	S LEVER	
8598	S LEVER WASHER	
8600	2nd. CURTAIN	9 parts 9 kinds

PARTS LIST

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PARTS NO.	NAME OF PARTS	NOTE
CA 8601	STOPPER PLATE	
8602	X SYNCHRO CONTACT POINT	
8603	FX SYNCHRO CONTACT POINT	
8604	F SYNCHRO CONTACT POINT	
8605	L CAM	
8606	S CAM	
8609	M LEVER	
8610	M LEVER SHAFT	2 parts 2 kinds
8611	M LEVER SPRING	
8612	A LEVER 2	
8614	A LEVER 2 SCREW	
8615	A LEVER 2 SPRING	
8617	GOVERNOR BASE	
8618	LIGHT PROOF PAPER	
8701	DIE-CAST BODY	3 parts 3 kinds
8702	FRONT CASTING PART	(Not available)
8703	TOP-COVER	4 parts 4 kinds
8704	BOTTOM-PLATE	4 parts 4 kinds
8705	REAR-COVER	
8710	PRESSURE PLATE	20 parts 12 kinds
8717	KEY A	4 parts 3 kinds
8719	KEY COLLAR	2 parts 2 kinds
8720	KEY COVER	
8722	KEY SPRING	
8723	BUSH	
8724	KEY POSITIONING SCREW	
8725	R. KNOB	
8726	R. LEVER	
8727	R. PINCH	4 parts 4 kinds
8729	PINCH SET SCREW	
8730	R. LEVER PIN	
8731	R. LEVER SPRING	
8732	R. LEVER WASHER	
8733	R. SHAFT	
8734	R. SHAFT HOLDER	
8735	R. SPRING	
8738	COVERING PLATE	
8739	R. LEVER STOPPER 2	
8740	R. LEVER STOPPER 3	
8741	FILM COUNTER COVER	
8742	BATTERY CASE	
8743	BATTERY CONTACT POINT	
8744	STRAP EYELET	
8745	LIGHT PROOF L	
8746	LIGHT PROOF R	
8747	LIGHT PROOF (LOWER)	
8748	LIGHT PROOF (SIDE)	
8749	F.W LEVER	
8750	F.W LEVER WASHER	
8751	F.W LEVER COVER	
8752	F.W LEVER HOLDER	

PARTS LIST

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PARTS NO.	NAME OF PARTS	NOTE
CA 8753	F.W LEVER DECORATION	
8754	F.W SHAFT	
8757	F PLATE	10 parts 7 kinds
8761	F.W LC	
8762	F.W GEAR	
8763	F. SPRING	
8764	S.T IDLE	
8765	IDLE SHAFT	
8770	SPOOL SPRING	
8773	SPOOL SHAFT	
8774	F.W SPRING	
8775	F.W BASE PLATE	
8777	FASTENING RING	5 parts 5 kinds
8778	F.C RETURNING LEVER	
8779	S.T SHAFT	8 parts 7 kinds
8780	SPROCKET HOLDER (UPPER)	
8781	F.C GEAR SHAFT	
8783	F.C RETURNING SPRING	
8784	F.C GEAR	
8786	C RING	
8788	S.T GEAR	
8793	F.C LC	
8794	F.C PLATE	
8795	F.C SPRING	
8796	L STOPPER	
8797	WASHER (RUBBER)	
8798	KS SHAFT	
8799	K STOPPER	
8800	K STOPPER COVER (RUBBER)	
8801	SPOOL HOLDER (LOWER)	
8803	F.C STOPPER	
8806	F.W LEVER COVER STOPPER	
8808	SPROCKET BASE SCREW	
8810	BULB SETTING PLATE	
8811	SPROCKET	
8813a	WASHER 1a	2 parts 2 kinds
8813b	WASHER 1b	t: 0.05
8815	SPROCKET HOLDER (LOWER)	t: 0.08
8816	GEAR #1	
8817	GEAR #1 SCREW	
8818	GEAR #1 SPRING	
8819	K CLAW	
8820	HOLDING SHAFT	
8821	CHECKING LEVER	
8824	LOCK LEVER	2 parts 2 kinds
8826	LOCK SPRING	2 parts 2 kinds
8827	SHAFT #2	
8828	GEAR #2 SHAFT	
8836	GEAR #3	8 parts 8 kinds
8839	GEAR #4	2 parts 2 kinds
8840	S WINDING PLATE	2 parts 2 kinds

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PARTS NO.	NAME OF PARTS	NOTE
CA 8841	GEAR #4 BASE	
8842	KS LEVER	2 parts 2 kinds
8843	SHAFT #4	
8844a	LEVER 1a	0
8844b	LEVER 1b	+0.1
8844c	LEVER 1c	-0.1
8845	LEVER #2	
8846	LEVER STOPPER	
8847	KS HOLDER	
8848	KS SHAFT	
8849	KS SPRING	
8851	GEAR #3 SPRING	
8852	SHAFT #4 SCREW	
8854	S RING	
8855	STOPPER RING	
8856	SHAFT #2 SCREW	
8857	BASE PLATE SHAFT	
8859	BULB PLATE SCREW	
8861	RETURNING SPRING	
8862a	KL PLATE a	1.4mm diam.
8862b	KL PLATE b	2 parts 2 kinds
8864	KL SHAFT	1.8mm diam.
8865	KM LEVER	2 parts 2 kinds
8867	M LEVER SHAFT	6 parts 6 kinds
8872	KM SPRING	
8875	TRIPOD SOCKET	
8876	FRONT COVERING PLATE	
8877	B MOUNT	
8878	S.S DIAL	
8879	CONNECTING RING	⑨ 2 parts 2 kinds
8880	DIAL GEAR	⑩ 2 parts 2 kinds
8881	B BASE PLATE	13 parts 11 kinds
8882	COVERING PLATE	
8888	B MOUNT SPRING	
8889	CONNECTING RING STOPPER	6 parts 6 kinds
8890	CLICK SPRING	
8893	COVERING PLATE	
8894	LOWER COVER	
8895	SYNCHRO SOCKET	4 parts 4 kinds
8896	FX SYNCHRO KNOB	
8897	FP SYNCHRO CONTACT POINT	
8898	FX SYNCHRO CONTACT PLATE	
8899	FX SYNCHRO CONTACT SPRING	
8900	INSULATING PLATE	
8901	INSULATING PLATE	
8902	FX RIVET	
8904	PENTAPRISM BASE	2 parts 2 kinds
8905	VIEW FIELD MASK #1	
8907	F FRAME	
8909	F SPRING	
8910	F SPRING SHAFT	

PARTS LIST

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PARTS NO.	NAME OF PARTS	NOTE
CA 8911	F SHAFT	
8912	F LOCK SCREW	
8914	DAMPER #1	
8915	DAMPER #2	
8916	DAMPER #3	
8917	MU KNOB	
8918	MU CAM	
8922	MU BASE	4 parts 4 kinds
8924	F PULLEY	6 parts 6 kinds
8925	CAM GEAR	5 parts 5 kinds
8931	PULLEY SHAFT	
8933a	RETURNING ROLLER a	3.3mm diam.
8933b	RETURNING ROLLER b	3.4mm diam.
8933c	RETURNING ROLLER c	3.5mm diam.
8933d	RETURNING ROLLER d	3.6mm diam.
8933e	RETURNING ROLLER e	3.7mm diam.
8933f	RETURNING ROLLER f	3.8mm diam.
8936	P COVER	
8938	B SPRING	
8939	B SPRING SHAFT	4 parts 4 kinds
8940	COVERING PLATE B	
8941	F HINGE	
8944	B STRING M	
8946	B STRING R	
8947	B MOUNT SCREW	
8949	B SPRING PLATE	
8950	COVERING PLATE	
8951	D FASTENING RING	
8955	F PULLEY SCREW	
8957a	R ROLLER a	3.6mm diam.
8957b	R ROLLER b	3.7mm diam.
8957c	R ROLLER c	3.8mm diam.
8959	DIAL STOPPER	
8960	COVERING PLATE WASHER	
8961	SM FRAME	
8962	S LEVER	
8963	S LEVER BASE	
8964	S LEVER BASE NUT	
8965	S LEVER CONNECTING PLATE	
8968	PIN FOR CA8970	2 parts 2 kinds
8970	CONTACT POINT #1	
8971	CONTACT POINT #2	
8972	PIN HOLDING PLATE	
8973	C LIGHT PROOF	
8974	S COVER	
8975	C COVER	
8976	M EARTH	
8977	M LOWER PLATE	
8980	M PULLEY	10 parts 10 kinds
8981	PULLEY HOLDER	2 parts 2 kinds
8982	M GEAR	2 parts 2 kinds

PARTS LIST

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PARTS NO.	NAME OF PARTS	NOTE
CA 8988	VIEW FIELD MASK #2	
8995	M BASE	⑫ 11 parts 11 kinds
8996	GEAR FOR CA8977	⑬
8998	SCREW FOR CA8996	⑭
8999	SPRING FOR CA8977	⑮
9001	LOCKING SPRING	
9003	LOCK BUTTON	
9004	LOCK BUTTON SPRING	
9005	LOCKING RING	
9007	A DIAL	
9008	PULLEY SCREW	
9010	A CAM	2 parts 2 kinds
9011	CAM HOLDER	
9016	A LEVER SCREW	⑯
9020	ASA PLATE	
9021	ST SPRING	
9024	INSULATION SHAFT	
9025	S BASE	⑰ 5 parts 5 kinds
9026a	T WASHER a	t: 0.1
9026b	T WASHER b	t: 0.2
9026c	T WASHER c	t: 0.4
9030	T NUT	
9031	LEAD WIRE (105mm LONG BLACK)	
9032	LEAD WIRE (45mm LONG BLACK)	
9033	LEAD WIRE (90mm LONG BLACK)	
9034	LEAD WIRE (70mm LONG RED)	
9036	LEAD WIRE (100mm LONG BLACK)	
9037	P PLATE	⑱
9041	K BASE	⑲ 6 parts 6 kinds
9044	K INNER PLATE	⑳
9045	K LEVER SPRING	㉑
9046	K PLATE HOLDER	
9047	ST CLAW	2 parts 2 kinds
9049	ST SPRING	
9051	ST SCREW	2 parts 2 kinds
9052	STOPPER SCREW	
9053	LEVER CUSHION	
9056	SPACING PLATE	
9057	CIUCUIT PLATE	
9060	CONTACT POINT COLLAR	
9064	M RELEASE #1	
9065	M RELEASE #2	2 parts 2 kinds
9067	MR SHAFT	
9068	M ECCENTRIC COLLER	
9069	MR SPRING	
9070	C SCREW	
9071	S LEVER STOPPER	
9072	ST LEVER	⑳ 2 parts 2 kinds
9073	S COVERING PLATE	
9074	ST START LEVER	㉒ 2 parts 2 kinds
9075	F SPRING	2 parts 2 kinds

PARTS LIST

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PARTS NO.	NAME OF PARTS	NOTE	
CA 9076	RELEASE BASE NUT	● 9 parts 9 kinds ● ●	
9077	START LEVER CAP		
9078	S RELEASE PLATE		
9082	S RELEASE BUTTON		
9083	SR BUTTON WASHER		
9084	SR BUTTON SHAFT		
9086	S LEVER PLATE		
9087	D SCREW		
9088	W SPRING		
9091	COVER (RUBBER)		
9092	SM COVER		
9093	SPRING FOR CA9099		
9094	HINGE PIN HOLDER (UPPER)		
9095	HINGE PIN HOLDER (LOWER)		
9097	HINGE PIN SCREW		
9098	HINGE PIN A		
9099	HINGE PIN B		
9100	COVERING PLATE		
9102	LEFT SIDE LEATHER		
9103	RIGHT SIDE LEATHER		
9104	REAR COVER LEATHER		
9105	HOLDER WASHER		
9106	ADJUSTING WASHER #1		
9107	ADJUSTING WASHER #2		
9108	T COLLAR		
9111	ST WASHER		
9112	C WASHER	●	
9113	FW GEAR HOLDER		
9114	M SPRING SCREW		
9115	LEAD WIRE (30mm LONG BLACK)		
9117	LEAD WIRE (110mm LONG RED)		
9119	CdS CELL		
9124	L CONTACT POINT	4 parts 3 kinds	
9125	M CONTACT POINT		
9128	LS GUIDE		
9129	P TAPE		
9130	P COVER HOLDER		
9131	PRISM HOLDER (RIGHT)		
9132	PRISM HOLDER (LEFT)		
9133	PRISM HOLDING SPRING		
9134	COVERING PLATE #1		
9135	COVERING PLATE #2		
9139	R COLLAR		
9141	K PINCH		●
9142	M STOPPER SCREW		
9143	LEAD WIRE (100mm LONG YELLOW)		
9144a	FRONT ADJUSTING PLATE a	t: 0.04	
9144b	FRONT ADJUSTING PLATE b	t: 0.06	
9144c	FRONT ADJUSTING PLATE c	t: 0.10	
9144d	FRONT ADJUSTING PLATE d	t: 0.15	
9144e	FRONT ADJUSTING PLATE e	t: 0.20	

PARTS LIST

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PARTS NO.	NAME OF PARTS	NOTE
CA 9144f	FRONT ADJUSTING PLATE f	t: 0.25
9144g	FRONT ADJUSTING PLATE g	t: 0.30
9144h	FRONT ADJUSTING PLATE h	t: 0.35
9145a	REAR ADJUSTING PLATE a	t: 0.04
9145b	REAR ADJUSTING PLATE b	t: 0.06
9145c	REAR ADJUSTING PLATE c	t: 0.10
9145d	REAR ADJUSTING PLATE d	t: 0.15
9145e	REAR ADJUSTING PLATE e	t: 0.20
9145f	REAR ADJUSTING PLATE f	t: 0.25
9145g	REAR ADJUSTING PLATE g	t: 0.30
9145h	REAR ADJUSTING PLATE h	t: 0.35
9146	SPOOL SHAFT	● 11 parts 10 kinds ●
9148	LEAD WIRE (45mm LONG BLACK)	
9501	FLESNEL LENS	
LC 4070	EYE PIECE LENS	
4073	PENTAPRISM	
G 30	GOVERNOR	
V 40	SELF TIMER	
# 951	EXPOSURE METER	
SET SCREW	<u>PUK</u>	
	1.4 x 1.8 SO	1.4 x 1.8 SN
	1.4 x 2 SO	1.4 x 2.2 SO
	1.4 x 3 SO	
	1.7 x 1.8 SO	1.7 x 2 SO
	1.7 x 2.2 SO	1.7 x 2.5 SO
	1.7 x 4 SO	1.7 x 8 SO
	2 x 1.8 SO	2 x 2 SO
	2 x 2.2 SO	2 x 3 SO
	2 x 3 SB	2 x 3.5 SO
	2 x 4.5 SO	2 x 6 SO
	<u>3PUK</u>	
	1.4 x 1.8 SO	1.4 x 3 SO
	1.4 x 5.5 SO	
	1.7 x 3 SO ④	1.7 x 4 SO
	<u>PSK</u>	
	1.4 x 1.8 SO	1.4 x 2 SO
	1.4 x 2.5 SO	
	1.7 x 1.8 SO	1.7 x 2 SO
	1.7 x 2.2 SO	1.7 x 2.5 SO
	1.7 x 3 SO	1.7 x 3.5 SO
	1.7 x 4 SH	
	2 x 2 SO	2 x 2.2 SO
	2 x 2.5 SO	2 x 3 SO
	2 x 3 SE	2 x 4 SE

PARTS LIST

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PARTS NO.	NAME OF PARTS	NOTE
	<u>HK</u>	
1.4 - 101	BO	1.4 - 101 SN
1.4 - 102	BO	1.4 - 602 SN
1.4 - 604	BO	1.4 - 636 SN
1.7 - 104	BB	1.7 - 405 SN
1.7 - 463	SN	
2 - 310	BO	
	<u>SK</u>	
1.4 - 103	BO	
1.7 - 203	SN	1.7 - 204 SN
	<u>HU</u>	
2 x 2.5	BO	
	<u>NU</u>	
1.4 x 1.5	SA	
	<u>SP</u>	
1 x 6	UOA	
	<u>B 1</u>	
1/16		
	<u>NW</u>	
1.4 - 228	UO	1.4 - 334 UO
1.4 - 430	UO	1.5 - 425 UO
1.8 - 230	UO	1.8 - 240 PO
1.8 - 336	PO	2.1 - 240 PO
2.6 - 350	PO	8.6 - 2136 BO



GENERAL OUTLINE
AND
MECHANICAL FEATURES

GENERAL OUTLINE AND MECHANICAL FEATURES

1. General Outline:

OLYMPUS Code Name: MDS

Model Name: Olympus OM-1

Main Features:

Format: 24 x 36mm

Lens Mount: Olympus OM-Mount, bayonet type.
 Flange back = 46.0mm
 Bayonet rotation = 70° (clockwise to mount).
 Lens release button on the side of the lens.

Shutter:

Type: Focal plane type

Shutter Speed: B, 1 to 1/1000 of a second.

Dial: On the lens mount.

Charging: Self-cocking.

Flash Synchronization:

X and FP with switch

With electronic flash (X) 1 to 1/60 sec.

With Class "M" bulbs (X) 1 to 1/15 sec.

With Class "F" bulbs (X) 1 to 1/15 sec.

With focal plane bulbs (FP) 1/60 to 1/1000 sec.

Viewfinder:

Type: Single reflex type, eye-level viewfinder.

Prism: Pentagonal roof prism, fixed, silver-coated.

Focusing Screen: 1-1 Microprism-Matte Type provided.
 Interchangeable with any of 11 additional
 screens available.

Viewfield:	97% both vertically and horizontally.
Exposure Indicator:	Visible in the viewfield is the exposure measurement indication.
Magnification:	0.92X at infinity with standard 50mm lens.
Reflex Mirror:	
Type:	Quick return type.
Mirror-up:	The mirror can be looked up by 90° rotation of the mirrorlock-up lever.
Mirror Cut-Out:	No mirror Cut-Out in the viewfinder regardless of the lens used, from 8mm fisheye through 800mm ultra-long telephoto (in case of full open aperture).
Reflection:	Highly reflective special coating is applied on the reflecting surface.
Exposure Meter:	
Type:	Through-the-lens light measuring meter.
Method of Measurement:	Open-aperture light measuring method, for average light measurement. Zero-method system
Sensing Cell:	Two CdS (cadmium sulphide) type cells.
Measuring Range:	EV1.2 - EV16.9 with MS5512 at ASA100 EV2 - EV1.7 with MS5014 at ASA100 EV2.35 - EV17.35 with MS5018 at ASA100
Film Type Indication:	Film sensitivity indicator dial with ASA ratings with the locking device.
Insufficient Light Warning:	When switched in, the needle jumps down extremely beyond the lower limit of the range indicator, if light is insufficient.
ASA Ratings:	ASA 25 - 1600
Power Source:	Mercury battery, 1.3V, JIS H-D type. (e.g. National H-D, Toshiba H-D, Mallory RM-625R, GE No. 625, Eveready E625N, etc.)

On/Off Switch:	Lever type
Calibration:	K=1.3
Film Loading:	
Loading Method:	Easy-loading system (EL system) by opening up the rear cover, which is hinged and provided with the magic-lock (opened when the film-rewinding knob is pulled out.)
Film Advance:	The take-up spool rotates in the direction contrary to the lever movement. Single-stroke rapid winding lever. (Also capable of film-advancement by several short strokes.) Winding angle = 150° Pre-winding angle = 30° Prevention against double-exposure and double-film-advance.
Exposure Counter:	Progressive and automatic-return type.
Exposure Counter Index:	S .. 1 2 . 4 . 6 34 . 36 . E
Film Rewinding:	Rewind crank. Film release knob (to be turned 90° toward the "R" mark with a red dot). Automatically reset when film is to be advanced.
Interchangeable Rear Cover:	By the mounting pin.
Shutter Release:	Shutter release button on the body. Also with a cable release, JIS approved screw-in type.
Self-Timer:	Lever system (Rotation angle 180°) with approx. 4 - 12 sec. delay. Action is started by the start-lever. In the middle of the timer action, the start-lever may be shifted back to stop it. The timer may be reset then.
Accessory Shoe:	Direct contact shoe to be screwed on.
Synchro-socket:	As per JIS standards.

Tripod Screw: As per JIS standards.

Size & Weight: Body only = 136w x 83h x 50d 490gr. (17.3 oz)
 with MS5512 = 136w x 83h x 97d 810gr. (28.2 oz)
 with MS5014 = 136w x 83h x 86.5d 720gr. (25.4 oz)
 with MS5018 = 136w x 83h x 81d 660gr. (23.3 oz)

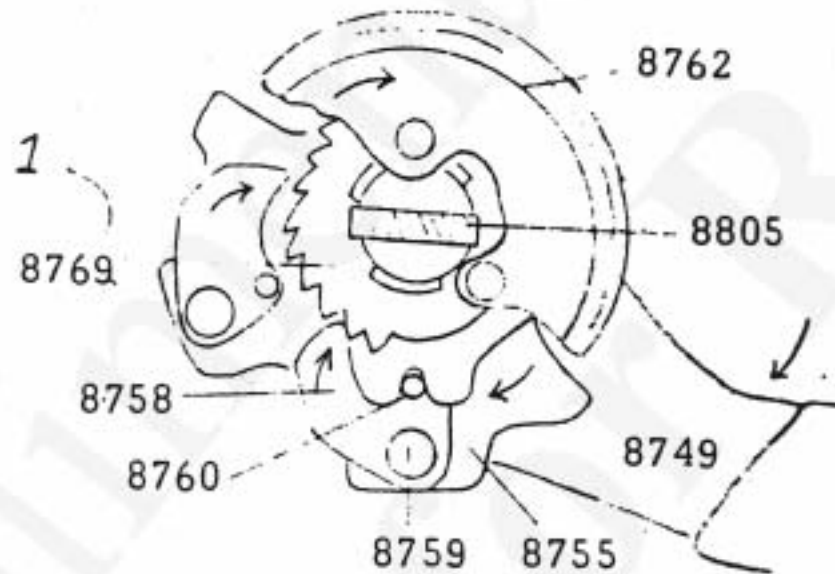
2. Mechanical Features:

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(1) Film Advance

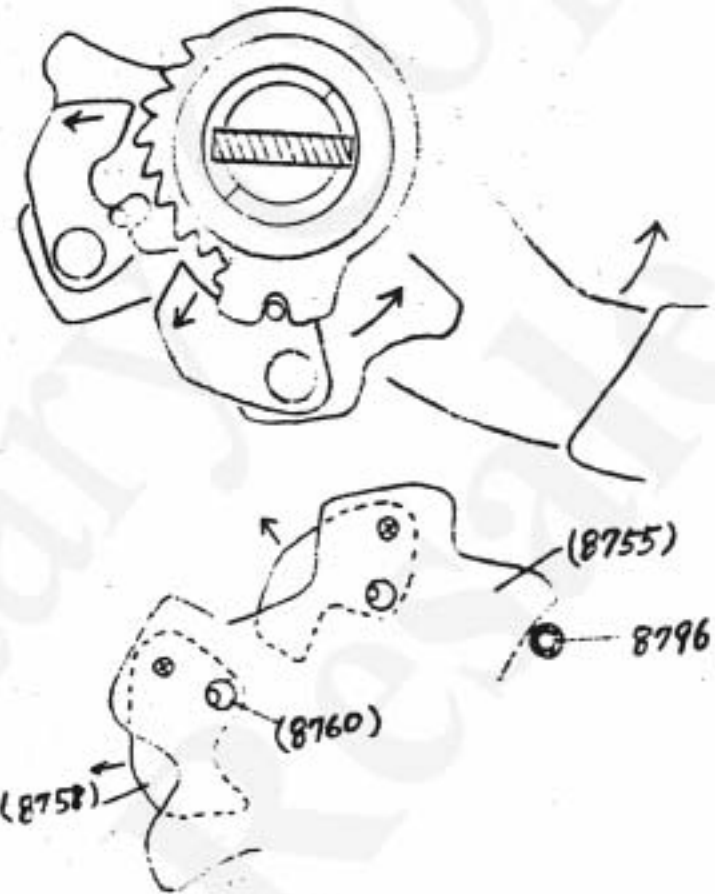
When 8749 is turned, (8755) is driven in the arrowed direction by means of (8805). When (8755) moves, two (8758) pivoted at (8760) is moved in the arrowed direction to engage on (8761) and to turn it.

(8762) is screwed on (8761) which rotates simultaneously to drive gears engaged on it. This starts the film advancing motion. One of the two (8758) will rotate (8761).



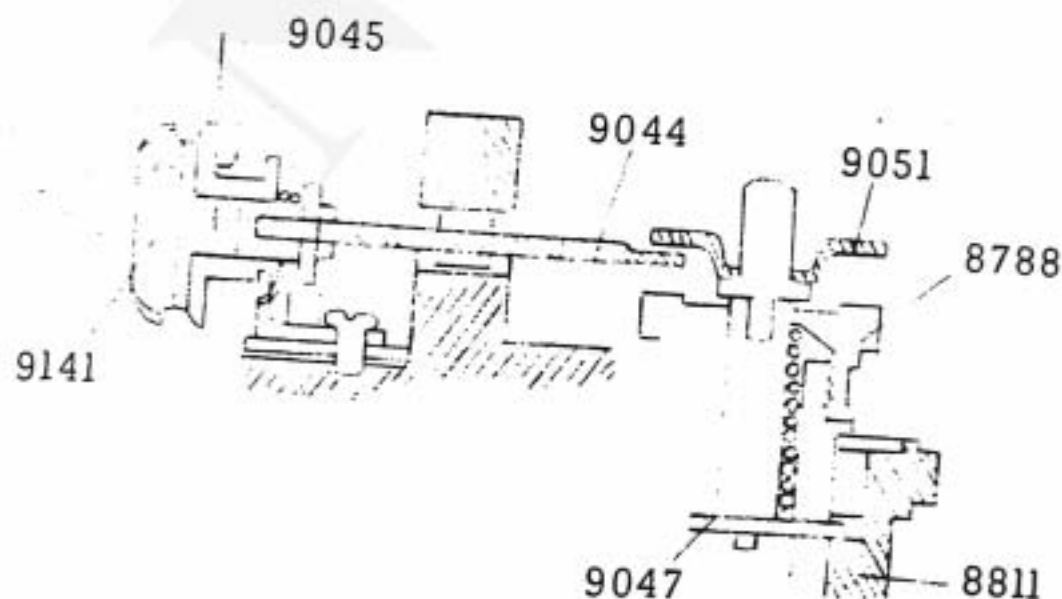
Upon turning (8749) to the fullest extent, and releasing it, (8755) returns to the original position moving in the arrowed direction by means of 8774 hooked on 8755. At this time, since (8758) escapes in the arrowed direction, pivoted at 8760, there is no clicking sound for (8758) going beyond the latchet. Amount of (8758)'s escape is determined by the guiding hole for (8760) on (8755).

(8755) stops when it hits 8796. 8796 is covered with rubber to absorb noise. Film advancing motion by engagement and disengagement of (8758), as described at right may be carried out by one single stroke or by several short strokes.



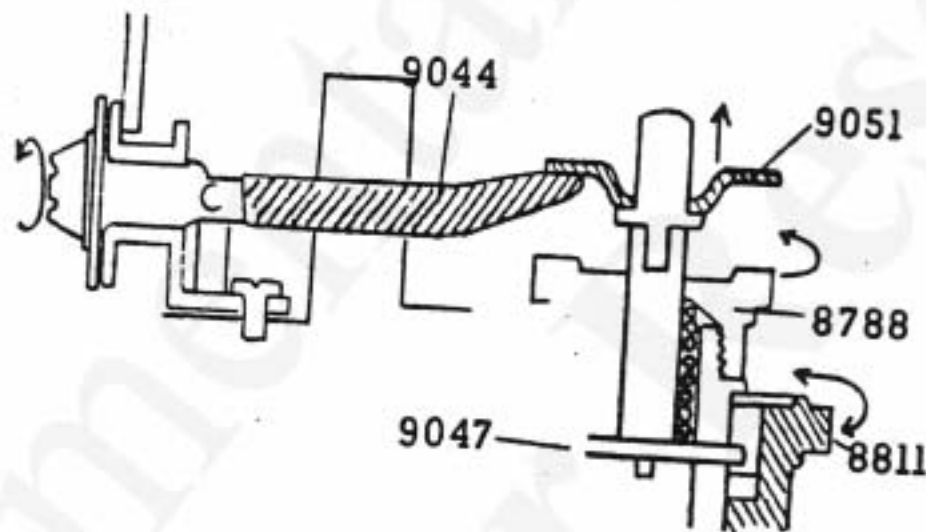
(2) Sprocket Release (Rewinding Mechanism):

Unlike the former push-button system, it adopts such a mechanism where in 9141 located at the joint of CA8703 (Top-cover) on the left front of the camera and the main body, is turned to release the sprocket. 9047 engaged into the groove of the sprocket moves jointly with 8788. It means that, to release the sprocket, this 9047 should be removed from the groove of the sprocket.



Order of Operation:

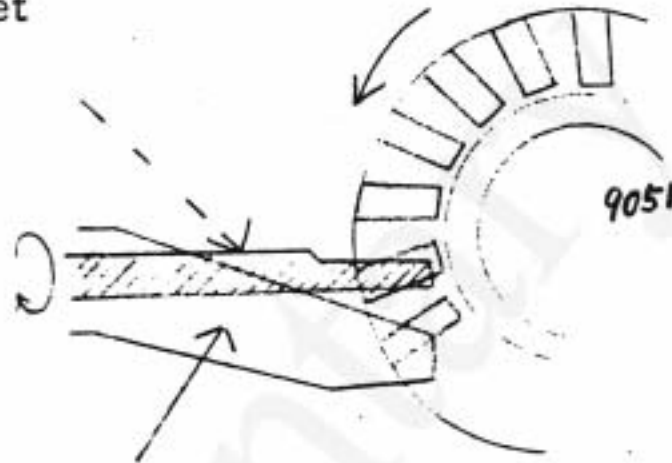
1. When 9141 is turned counterclockwise, 9141 adjoining 9044 pushes up 9051 at its tip.
2. Then 9047 connected to 9051 is pulled up simultaneously and comes off from the sprocket groove making the sprocket freely rotatable.



3. At the stage 2 above, if CA8749 (Lever) is turned up, 8788 rotates in the arrowed direction simultaneously rotating 9051 connected with 8788.
4. On 9051 are 18 grooves which catches 9044 to rotate it, as 9051 rotated.
5. When 9044 is turned until it is released from the groove of 9051, by 9045, 9141 backs to the original position.
6. At the same time, 9047 is pressed down by 9049. If the sprocket groove is in the position corresponding with 9047, the sprocket movement will also be synchronized.

If the groove position does not correspond with 9047, the sprocket will not be synchronized at the moment 9141 is returned to its original position but left released. In this case, winding operation needs to be repeated until 9047 fits into the sprocket groove.

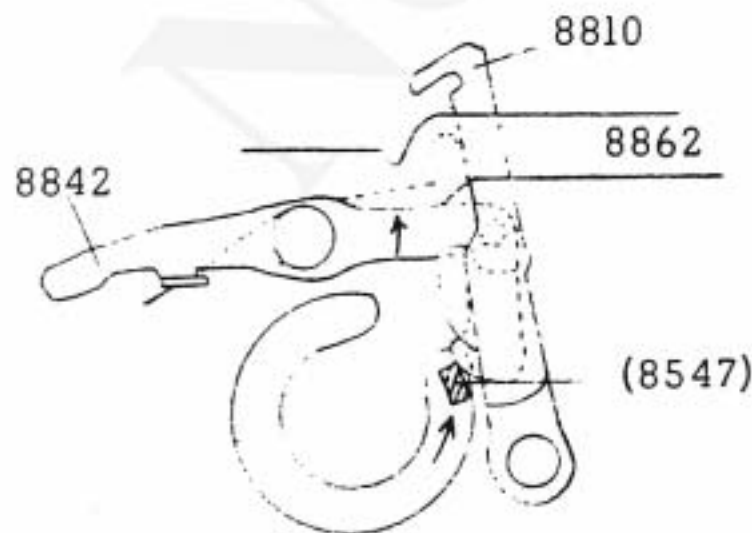
Position of 9044 at the time the sprocket is released.



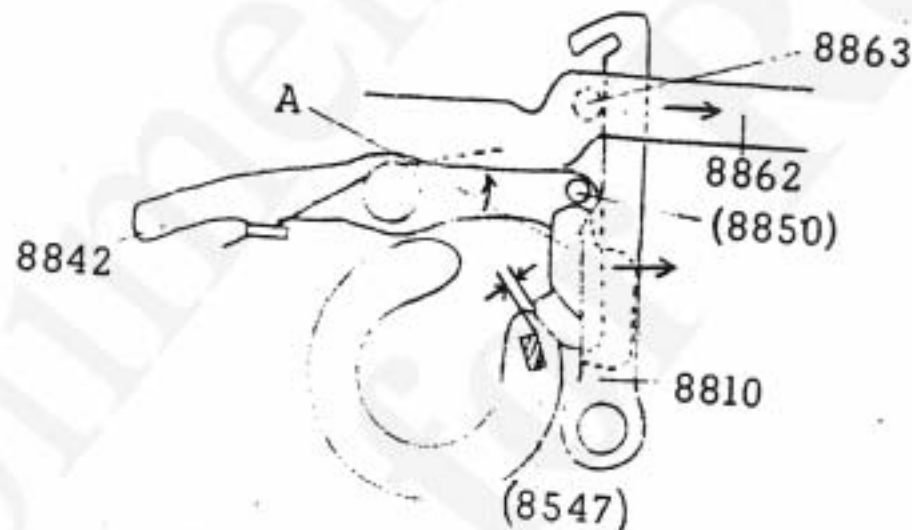
Position of 9044 at the time the sprocket is synchronized.

(3) Release for CA8849 (KS spring) Action:

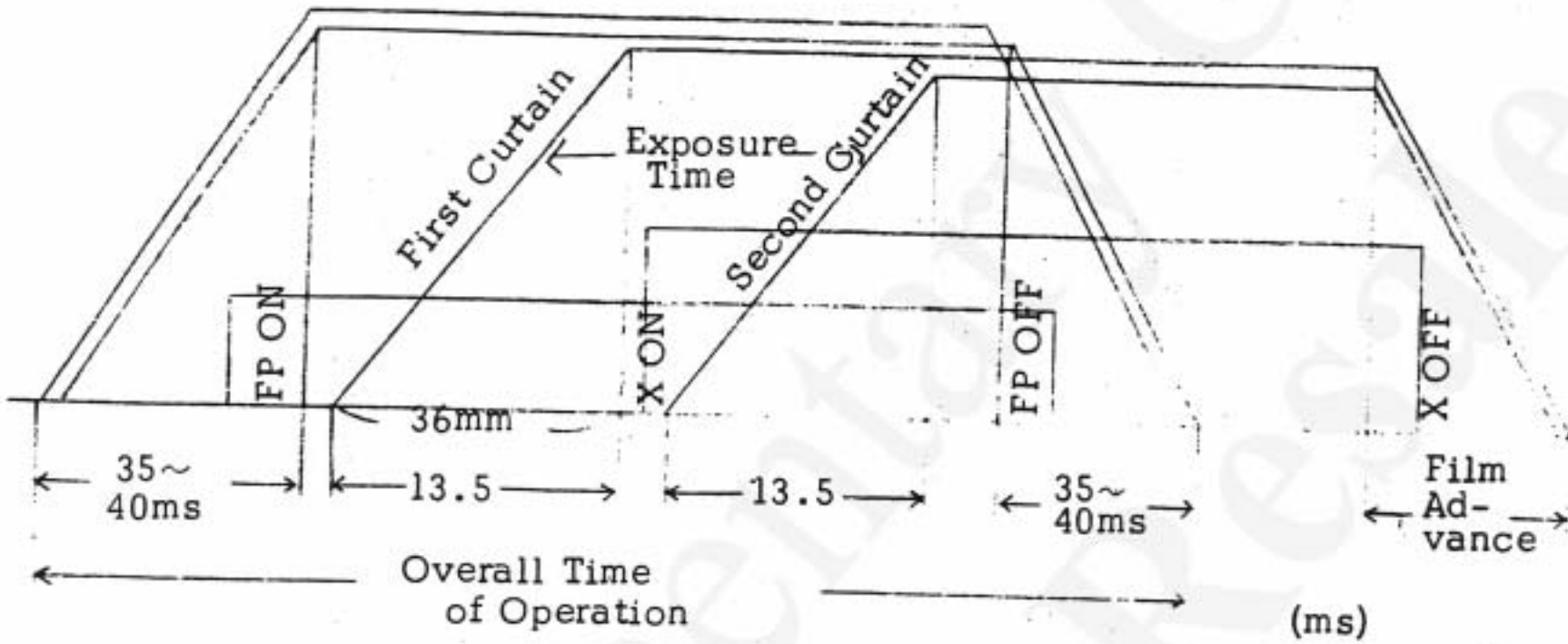
At the time of film advancing motion, the embossed portion of (8847) is rotated in the arrowed direction and hits 8842 immediately prior to completion of shutter charging action. (8847) turns 8842 in the arrowed direction to release the lock. If the shutter is operated while 8842 is in contact with the embossed portion of (8547), the 8849 engaged on 8842 works to push (8847) and the curtain speed is influenced. Therefore, such should be avoided.



1. When 9082 (button) is pressed, 8862 moves in the arrowed direction and turns, by means of (8863), 8810 in the arrowed direction.
2. When 8810 is moved, it hits (8850) clinched on the KS lever. When it is further moved, it turns the KS lever by (8850) action in the arrowed direction and releases 8842 from the boss on (8547).
3. When the 8862 is moved still further, the mirror commences its operation and the shutter also works.



(4) Shutter Timing:

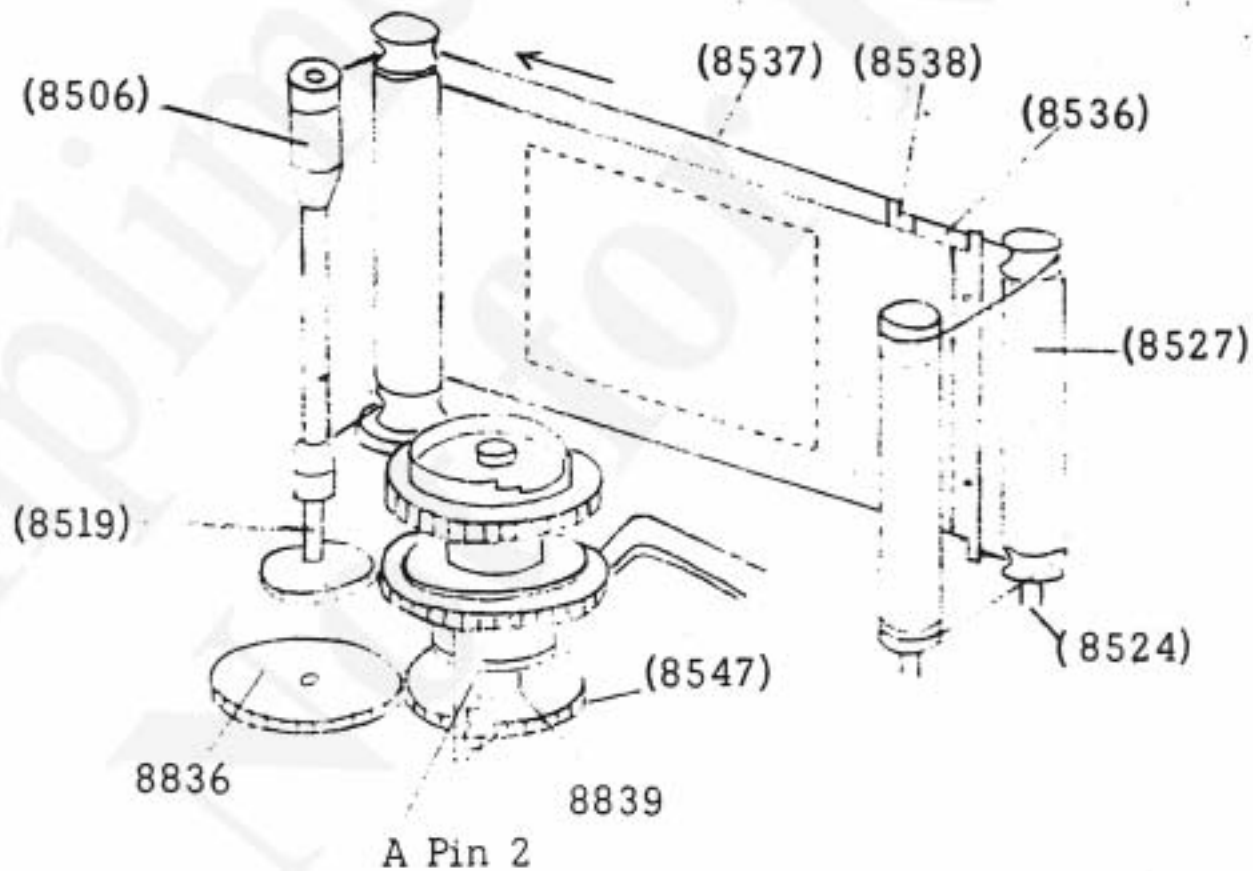


Shutter Release	Mirror elected. First Curtain starts.	First Curtain finishes its run. Second Curtain Starts.	Second Curtain finishes its run. Mirror lowered.	Overall operation completed.
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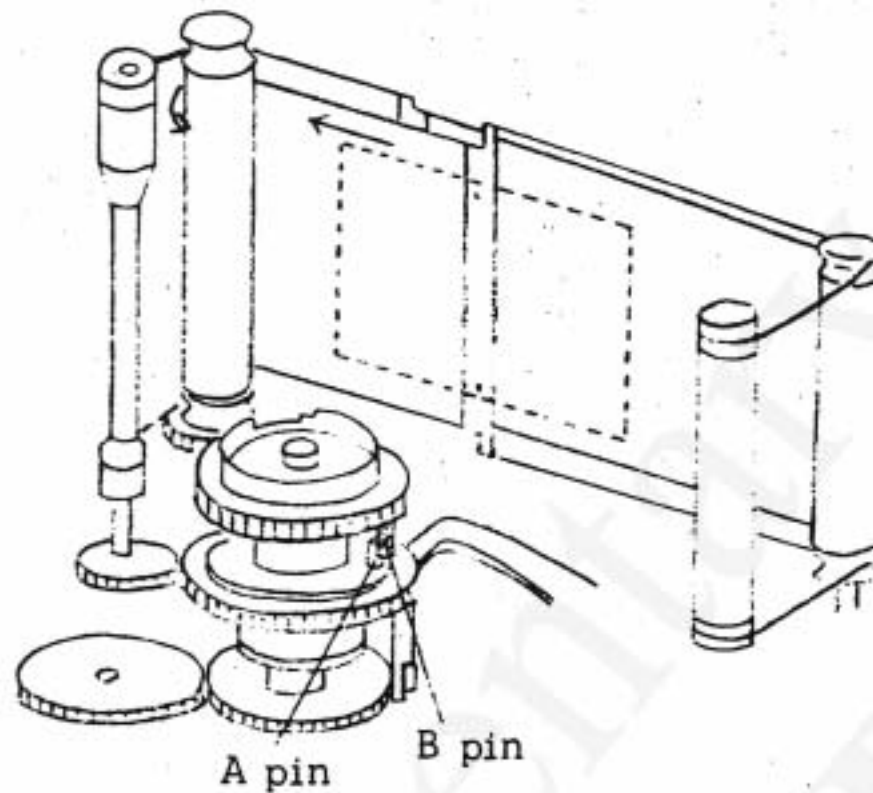
The above timing is based on the curtain movement from one edge to another edge of the mask. Therefore, it does not include the movement of the first and the second curtains before they appear one end of the mask and after they will have reached the other end of the mask.

(5) Shutter Charging:

1. When film is advanced, 8836 and 8839 are rotated, which in turn makes the embossed portion of 8840 of 8839 push A pin 2 connected to (8547). Thus (8547) is rotated.
2. When (8547) is rotated, it turns 8506 by means of 8519 connected thereto.
3. At each end of (8506) is glued a string, to which is attached (8538) of the first curtain. When (8506) is rotated, the strings are wound up towards (8506) against the spring force effected on (8524) and (8527), and thus the first curtain moves in the arrowed direction.

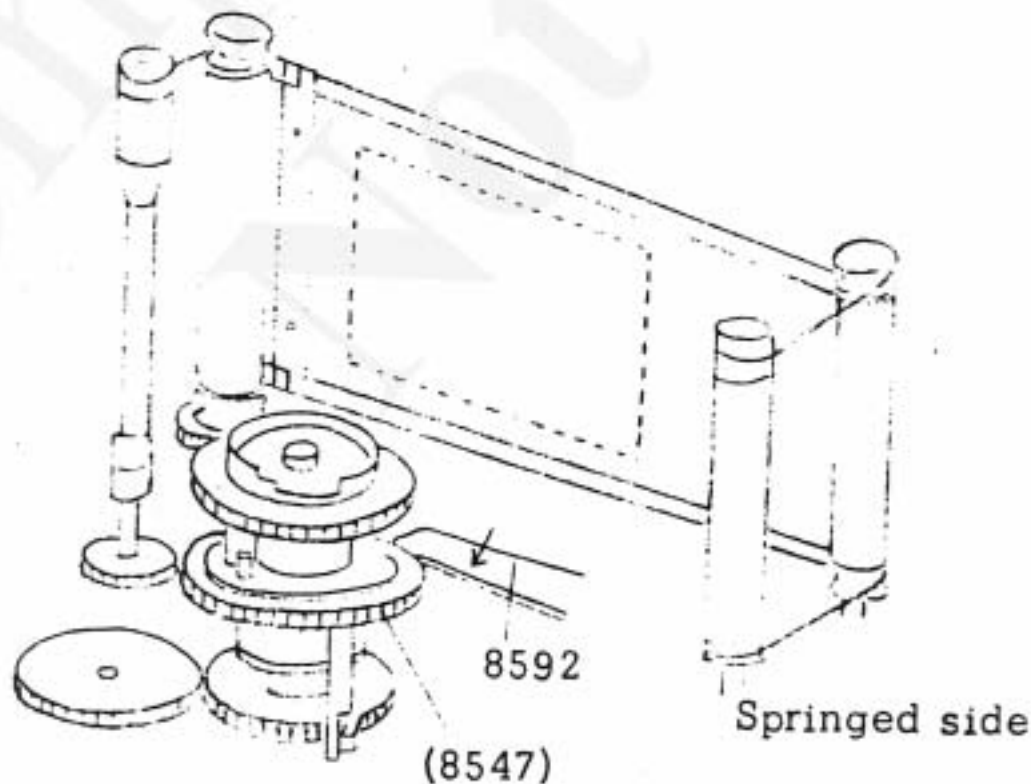


4. When (8547) is rotated, A pin of the (8547) pushes B pin of the (8548), thus moving the second curtain in the arrowed direction. ((8447) and (8548) will move simultaneously.)



5. Upon completion of winding as shown below, CA8592 is engaged onto the tooth of (8547) and locks (8547) and (8548). The first and second curtains will remain wound up while pooling the returning force towards the spring. This will complete the charging action of the shutter.

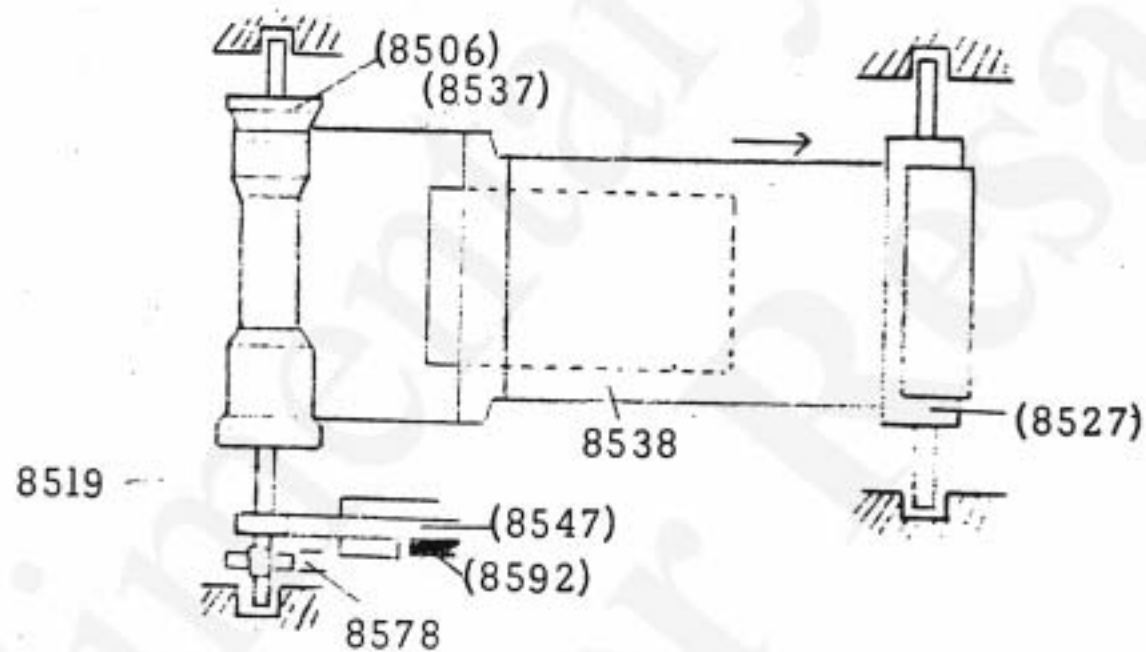
Curtains are wound up towards this side.



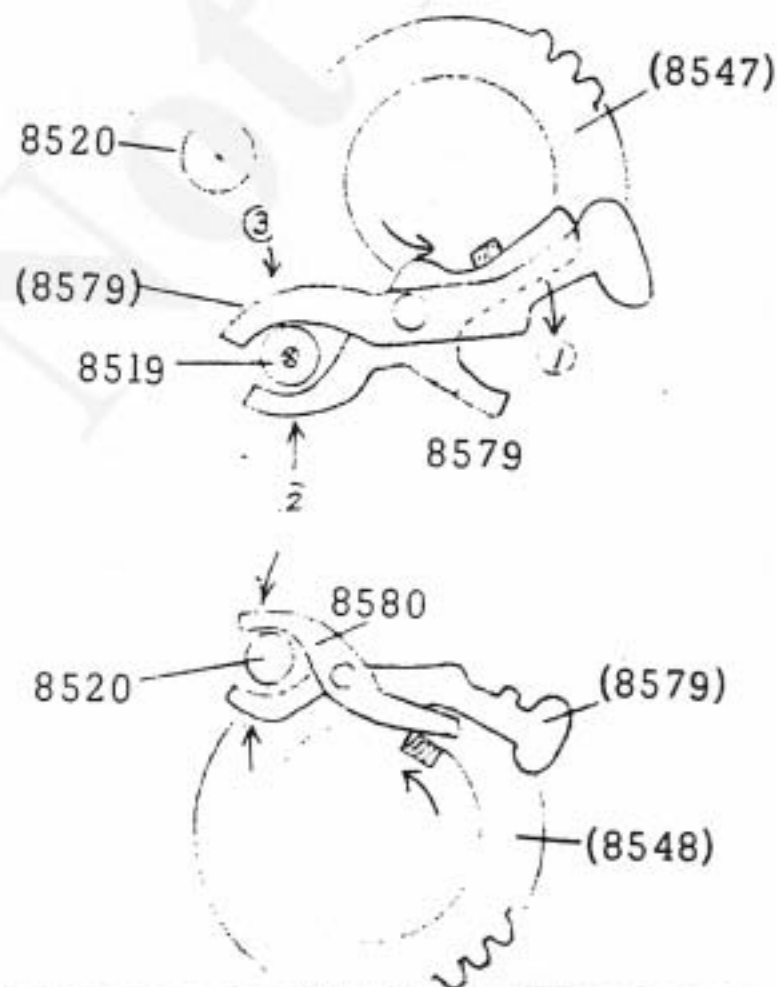
(6) First Curtain Operation:

While the shutter is charged, the curtain remains pulled by the Tension Spring equipped within (8527) in the arrowed direction.

When the shutter is released and the mirror is flipped up, 8592 is released from the gear. The first curtain runs as Main Spring in (8527) rolls it up. The rotation speed of (8527) at this time is an important factor determining the exposure time, since it relates to the speed of the first curtain.



For shock and noise absorption, the brake mechanism is provided. At the end of the curtain movement, the boss on (8547) or (8548) presses the tweezers squeezing up 8519 and 8520 to effect brake on shaft rotation.

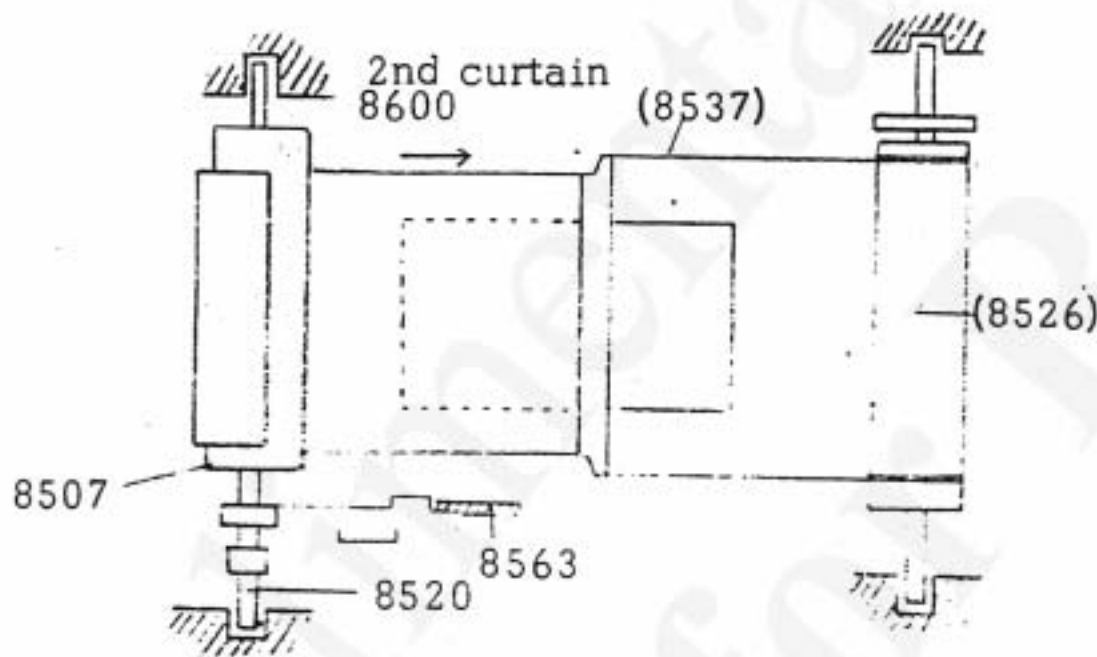


(7) Second Curtain Operation:

While the shutter is charged, the curtain remains pulled by the Tension Spring (8599) provided in (8526) in the arrowed direction.

Upon receipt of the signal from the first curtain, (8563) is released and the second curtain string is wound up onto (8526) by means of the Tension Spring (8599) and the curtain runs.

At this time, the rotation speed of (8526) is an important factor determining the exposure time since it relates to the speed of the second curtain.



(8) Shutter Speed Adjustment:

The exposure time is determined by the curtain speed and the slit width (interval between the first and the second curtain). When the curtain speed is fixed, the exposure depends on the slit width. In case of MDS, the curtain speed is set at 11.7 - 12.1 ms. (for both the first and the second curtains), and the exposure time is adjusted by various slit width.

The major part of the mechanism used for this purpose is:

Low Speed	1/1	1/2	Large ankle on the governor.
	1/4	1/8	Small ankle on the governor.
	1/15	1/30	Gear only of the governor.
High Speed	1/60 - 1/1000		By the shape of (CA8549, Cam) not using the governor.

High Speed (1/60 - 1/1000)

There is constantly a force by Tension Spring (8599) trying to make various parts work in such an order as (8527)-8538-(8537)-(8506)-8519-(8547). When 8592 is released as a result of mirror lifting, it releases 8547. Then the first curtain starts moving and (8506) rotating as (8527) is rotated by the force from (8530).

The interval between curtains, i. e. how soon the second curtain should start after the first curtain, is controlled as follows. 8547 clinched on the Gear A rotates in unit with the Gear A, and pushes out 8551 to let the back of 8551 release 8563. It will rotate (8548) and start the second curtain.

The shutter speed adjustment for 1/60 - 1/1000 is made by 8577 engaged on the shutter dial. When it is set at the desired speed between 1/60 - 1/1000, it will determine the position of 8576. Through 8559 connected to 8576 it will further determine the position of 8551. (When released, 8551 returns to its original position.)

Low Speed (1/1 - 1/30)

Since the mechanism of the first curtain operates in a same manner as in case of a high shutter speed, the exposure time is adjusted by controlling the timing after the start of the second curtain until the moment the Patch of the second curtain appears in the wash. The control is performed by the governor.

1/1 1/2

When the shutter dial is set at 1/1 or 1/2, it will determine the position of 8577 engaged onto the shutter dial. It will further set the position of 8605 screwed with 8577. The A lever is dropped into the concave of 8605 and the Large Ankle is engaged. The speed adjustment of 1/1 and 1/2 is made by the Cam lever connected to 8575. The Cam lever will determine the position of the G lever and thus change the angle of operation of the Governor to adjust the speed. (Ref. E - 29)

Now the preparation of speed adjustment for 1/1 or 1/2 is completed. After the first curtain run, 8563 is released. When the Gear B (second curtain) starts moving, the boss on the Gear G hits the G lever on the governor. After its operation for appropriate time on the governor, the boss on the Gear B is released from the G lever. This removes the Gear B load and the second curtain runs in a high speed. (The position of 8551 will be the same as in the case of 1/60.)

1/4 1/8

Among the series of the governors for 1/1 and 1/2, a Large Ankle is used in place of the Small Ankle to lessen the load. This controls the operating angle of the governor by 8575 so as to meet the requirement, i.e. 1/4 and 1/8. When the shutter dial is set at 1/4 or 1/8, the S lever of the governor escapes from 8606 and the Small Ankle will be engaged. Then 8605 presses the A lever to release the Large Ankle. The speed adjustment for 1/4 and 1/8 is directed from 8575 to the Cam lever and thus changes the operating angle of the G lever. (Ref. E -30)

1/15 1/30

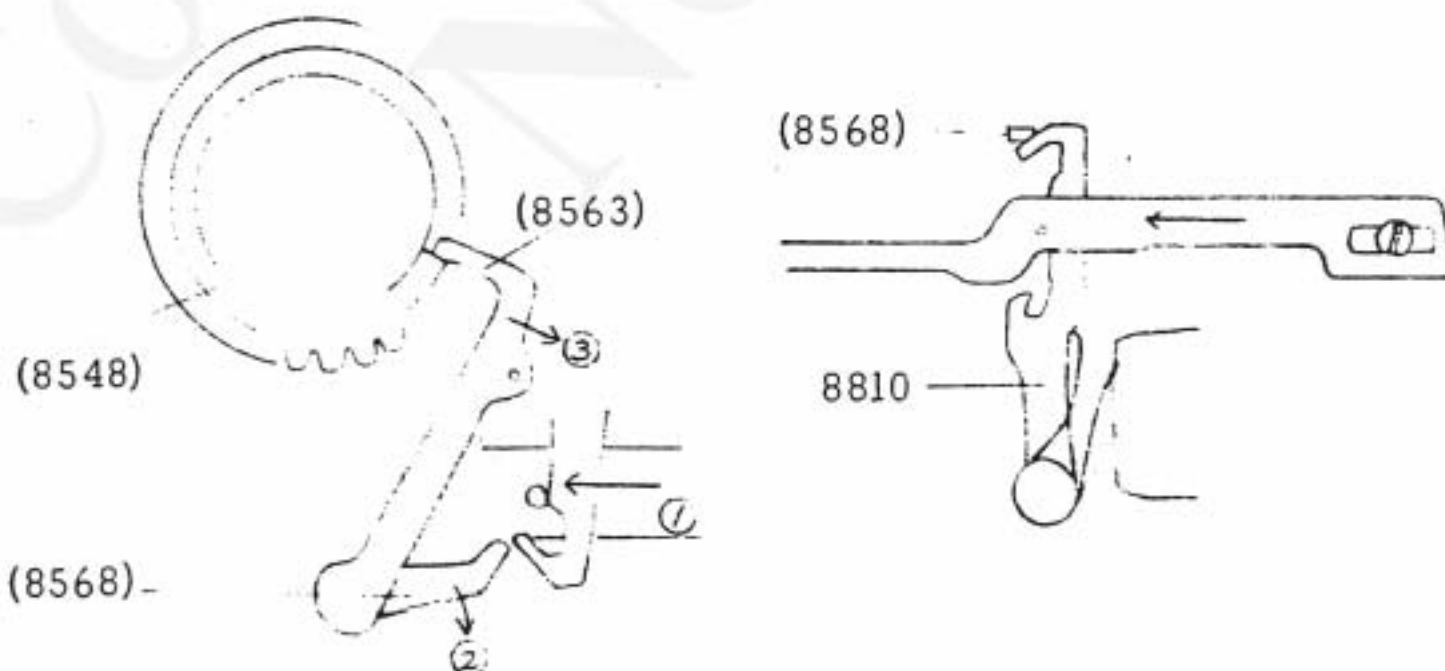
The only difference from the previous speeds, 1/1 - 1/8, is that it does not use the ankle of the governor but the gear of the governor alone to apply a load on 8548.

When the shutter dial is set at 1/15 or 1/30, the positions of 8575 and 8605 are determined by the gear. Both Large and Small Ankles are pressed toward outer perimeter of the Governor cam and released. According to the height of 8575, the movement of the Cam lever is governed and further the position of the G lever. Thus, the start of the second curtain's run will be delayed as appropriate. (Ref. E -30)

B (Bulb)

The movement of the first curtain is same as in other cases. By means of 8576, 8551 is placed in the position to escape the action of 8549. Therefore, the second curtain is not released by the operation of 8547.

When the release button returns to the original position, 9079 moves in the arrowed direction and its boss hits 8568. When 9078 returns, 8568 rotates in the direction of (2) shown in the illustration below. 8563 in unit with 8568 is released from the embossed portion of the B Gear. It will rotate the Gear B and the second curtain starts running.



Function of CA8612 (Lever)

In case of snapshot at low shutter speeds (1/1 1/4), CA8612 removes ankle from Gear-governor and returns G lever immediately to the appropriate position. This prevents irregularity of low shutter speeds. (Ref: E - 27)

(9) Mirror Operation:

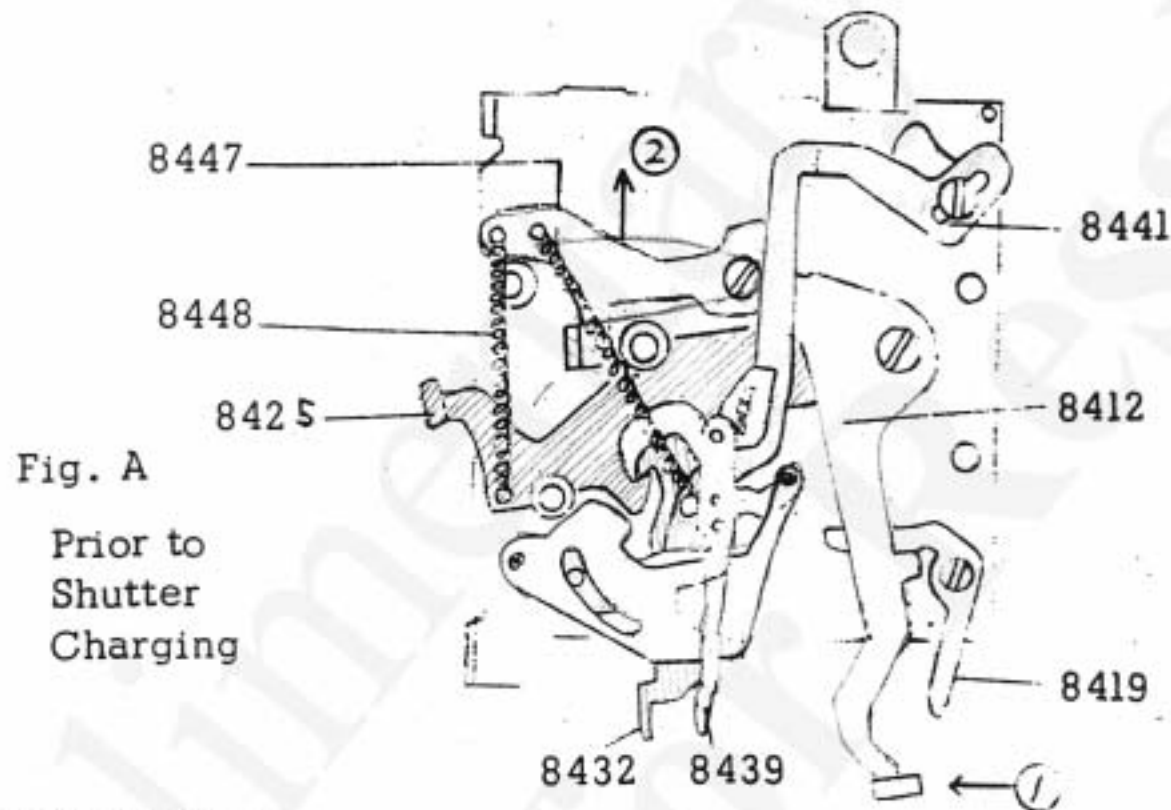


Fig. A

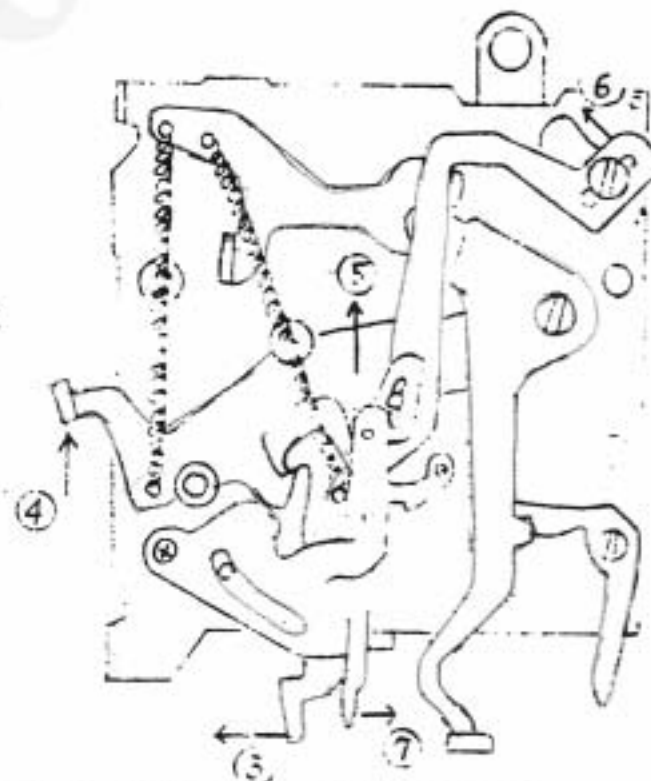
Prior to
Shutter
Charging

Mirror Charging:

1. When the film is advanced, 8412 is pressed in the direction of (1). (Fig. A)
2. Since 8448 is stopped by 8432 and 8441 by 8448, 8448 and 8412 are charged. (Fig. B)
3. 8412 is locked by 8419. (Fig. B)

Fig. B

Subsequent
to Mirror
Charging

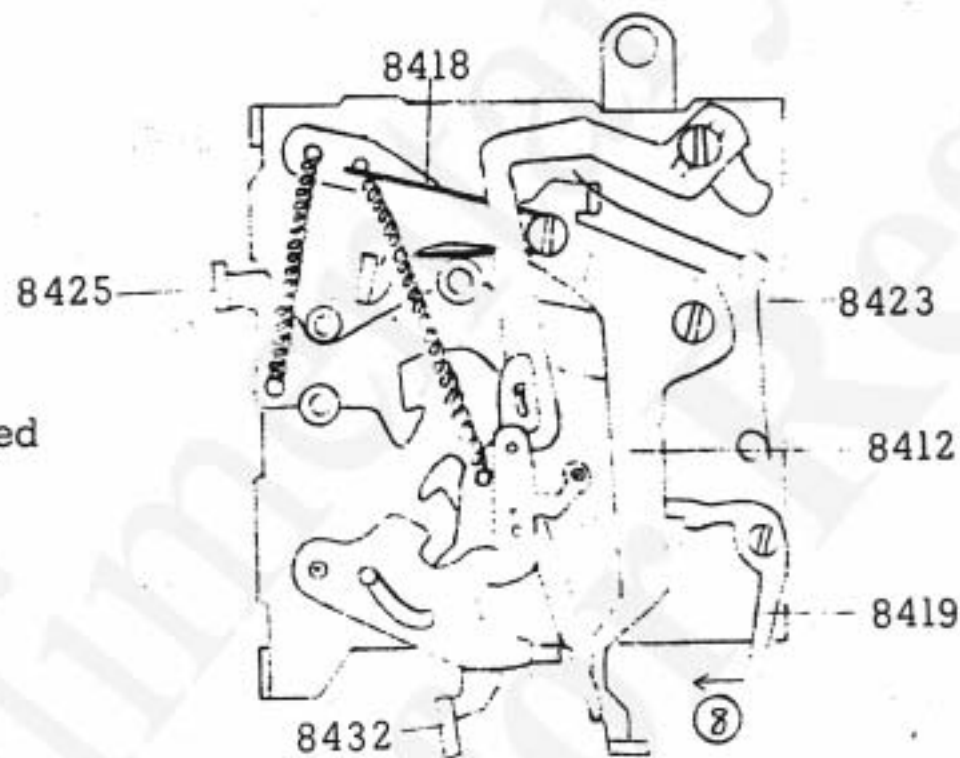


Mirror Operation:

1. When 9082 (Botton) is pressed, 8432 is pushed in the direction of (3) to be released from 8425.
2. 8425 is pushed by 8448 in the direction of (4). (Fig. B)
3. Along with the movement of 8425, 8441 moves in the direction of (6) to lift the mirror. (Fig. B)
4. When the 8441 moves in the direction of (6), 8439 is moved towards (7) to transmit the mirror-lift up to the shutter.

Fig. C

Mirror Lifted



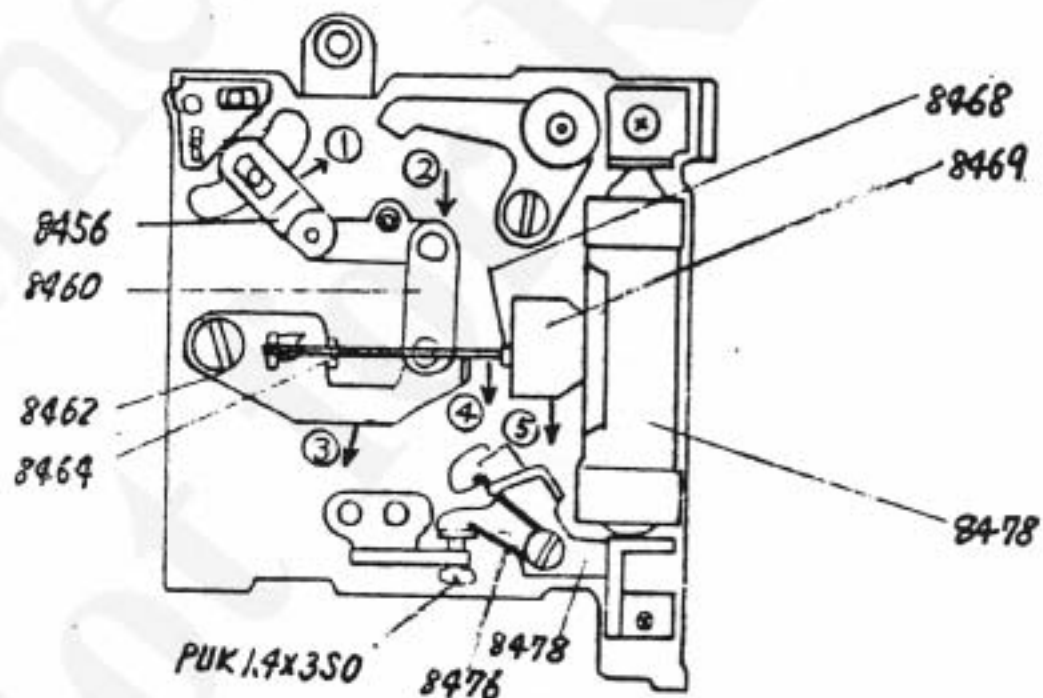
5. 8425 is fixed in position by 8418, which acts as the shock absorber.
6. Upon receipt of the message from the shutter that the second curtain has completed its run, 8419 is pressed in the direction of (8). (Fig. C)
7. When 8419 is released from 8412, 8412 is lowered by 8423.
8. 8425 is pressed down at the same time 8412 is lowered.
9. 8425 is locked by 8432. The mechanism returns to the original state shown in Fig. A.

(10) Mirror Brake Mechanism:

To absorb or prevent shocks during the mirror travel, an air brake is provided consisting of a cylinder and a piston, which is effected towards the latter part of the mirror movement vertically.

Steps of Operation:

1. When the mirror begins its movement, 8456 moves in the direction of (1) and its other end in the direction of (2).
2. 8456 and 8462 being connected by 8460, 8462 moves in the direction of (3).
3. As 8464 is fixed onto 8462, 8464 moves in the direction (4).
4. When the mirror is raised $20^{\circ} - 22^{\circ}$, 8464 will hit 8469. To absorb the shock at this time, 8464 is used and further a piece of rubber sheet is glued at its tip.



5. 8464, while bending itself, will push down 8469 in the direction of (5).
6. The mirror is completely raised.

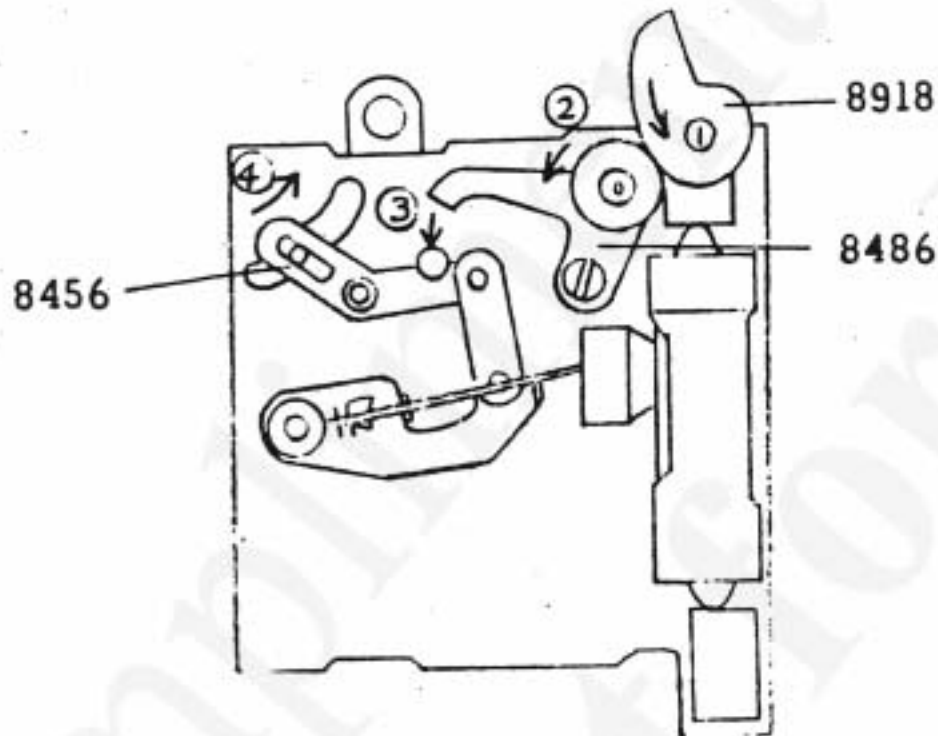
Positioning (45°) of the Mirror:

8401 hits 8476 and the mirror, thereby, is fixed in position of 45° . The necessary adjustment is made by rotating the PUK 1.4 x 3SO and changing 8476 position.

(11) Mirror-Up Mechanism:

When a short focus lens is used, the lens will hit the mirror. Therefore, it is necessary to lift up the mirror and thus the mirror-up mechanism is provided to meet the requirement.

1. When 8719 is turned, 8918 moves in the arrowed direction.
2. 8486 presses 8456, thus lifting the mirror.
3. Simultaneously with 8456 movement, 8441 pivoted at 8442 rotates counter-clockwise. The mirror is up. (Status (6) of Fig. B in the Repair Data B-17)

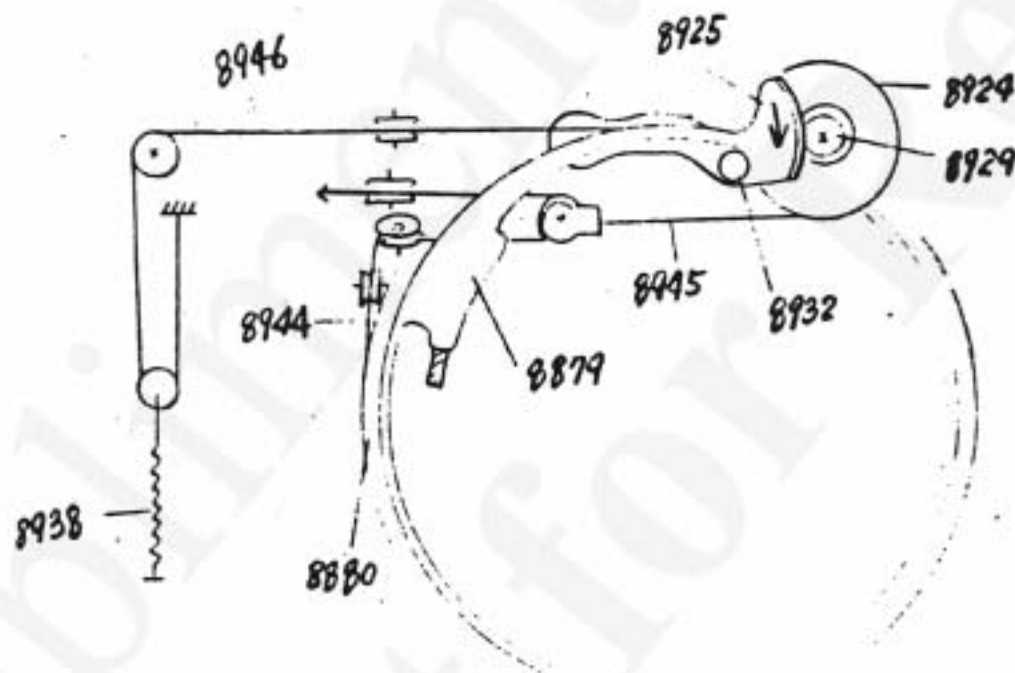


(12) Synchronizing Mechanism for the Exposure Meter:

When the shutter dial is turned, this rotates 8880 directly connected thereto. Then the string (8944) adhered to the outer perimeter of 8880 will move to rotate 8980 of the meter using the Moving pulley as a media. Three pulleys (8883) in the route are for converting the string (8944) angle. At this time, the string is given tension by the spring (8999) on the meter side.

When the aperture ring is turned, the Connecting lever on the lens turns 8879. 8932 which is clinched to the 8925 and is in contact with the Cam of 8879, will rotate itself. While doing so, it will turn 8925 in the arrowed direction and further 8929 which is engaged on 8925. Now, 8924 will turn since it is made in unit with (8929). It will roll up 8945 to pull the Moving pulley and 8944 and further to turn the pulley on the exposure meter.

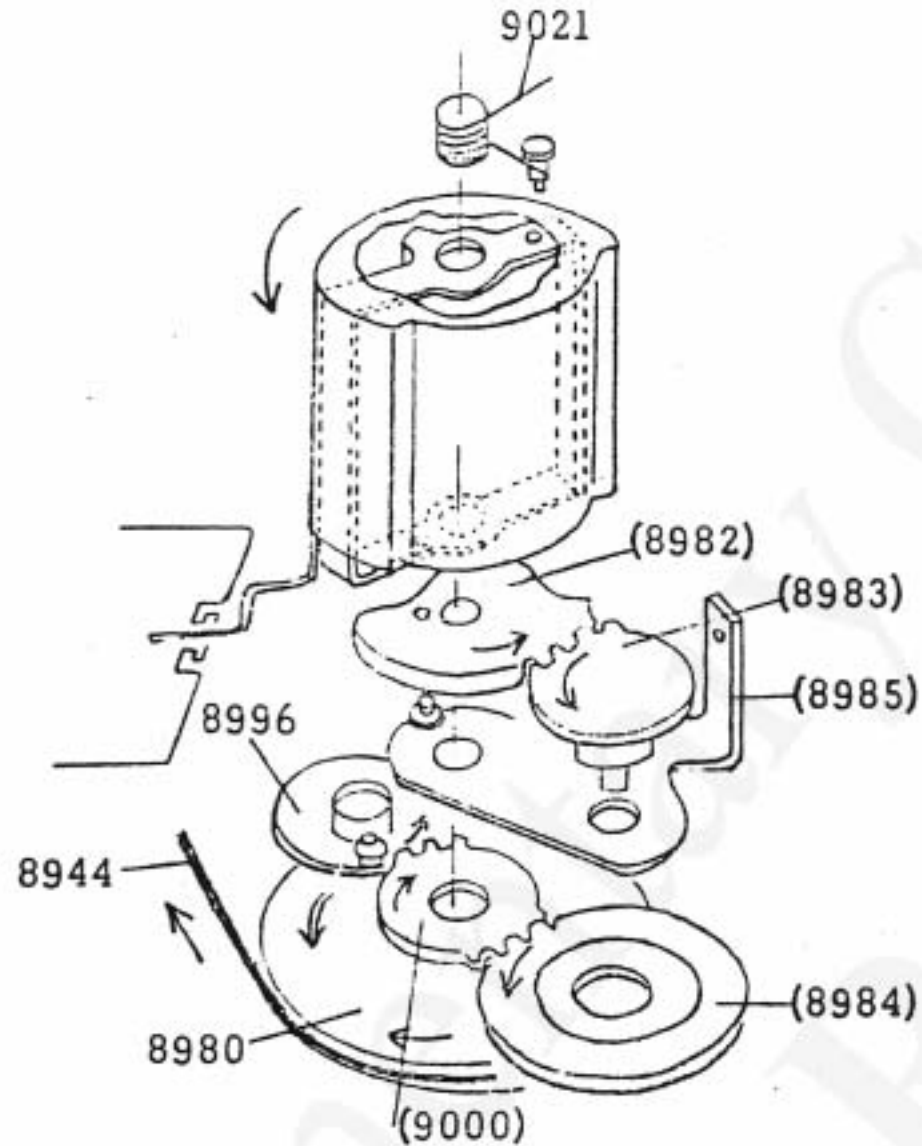
At this time, 8946 adhered to the outer perimeter of 8879 will also move to pull 8938. When the aperture ring is returned to the previous position, this will insure that the boss of 8879 will always hit the Connecting lever of the lens.



(13) Mechanical Section of Exposure Meter:

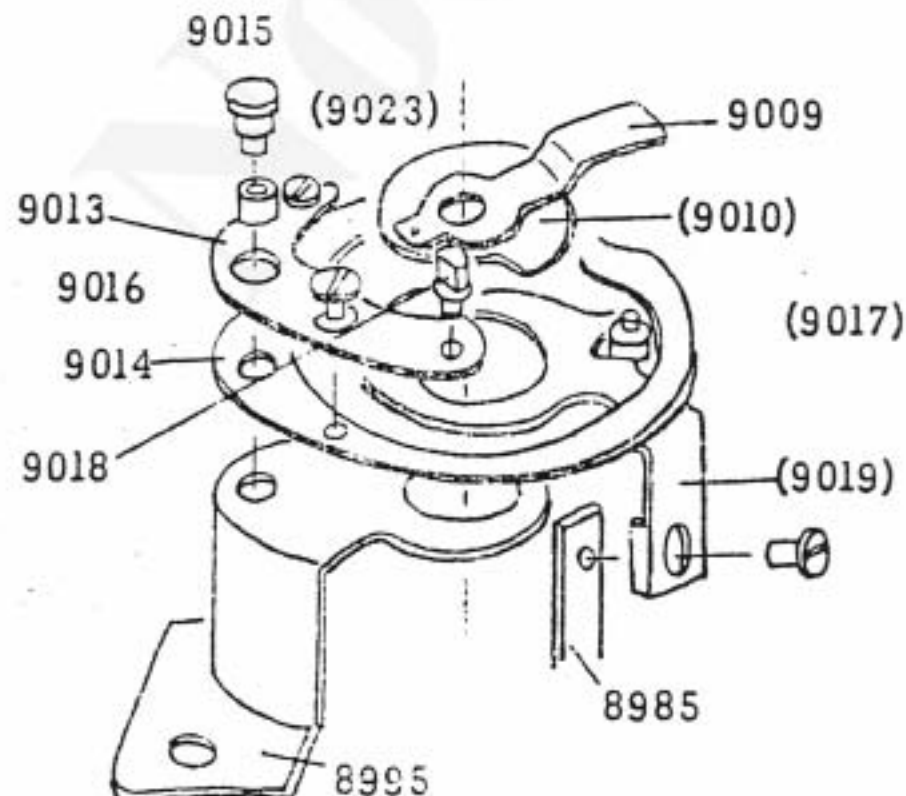
Changes in Shutter Speed and Lens Opening:

When the shutter dial is turned from 1/1000 toward B and the aperture ring from F 16 toward open, the string (8944) moves in the arrowed direction as shown in the illustration, next page, to turn 8980. (9000) in unit with 8980 turns 8984 and further 8982 through 8983 which is united with 8984. 8982 is fixed on the meter frame by screws. Thus, the meter is activated. On the pulley M is applied a force in the direction (→) by 8999 and 9021 engaged on 8996, and the string (8944) is given tension constantly.



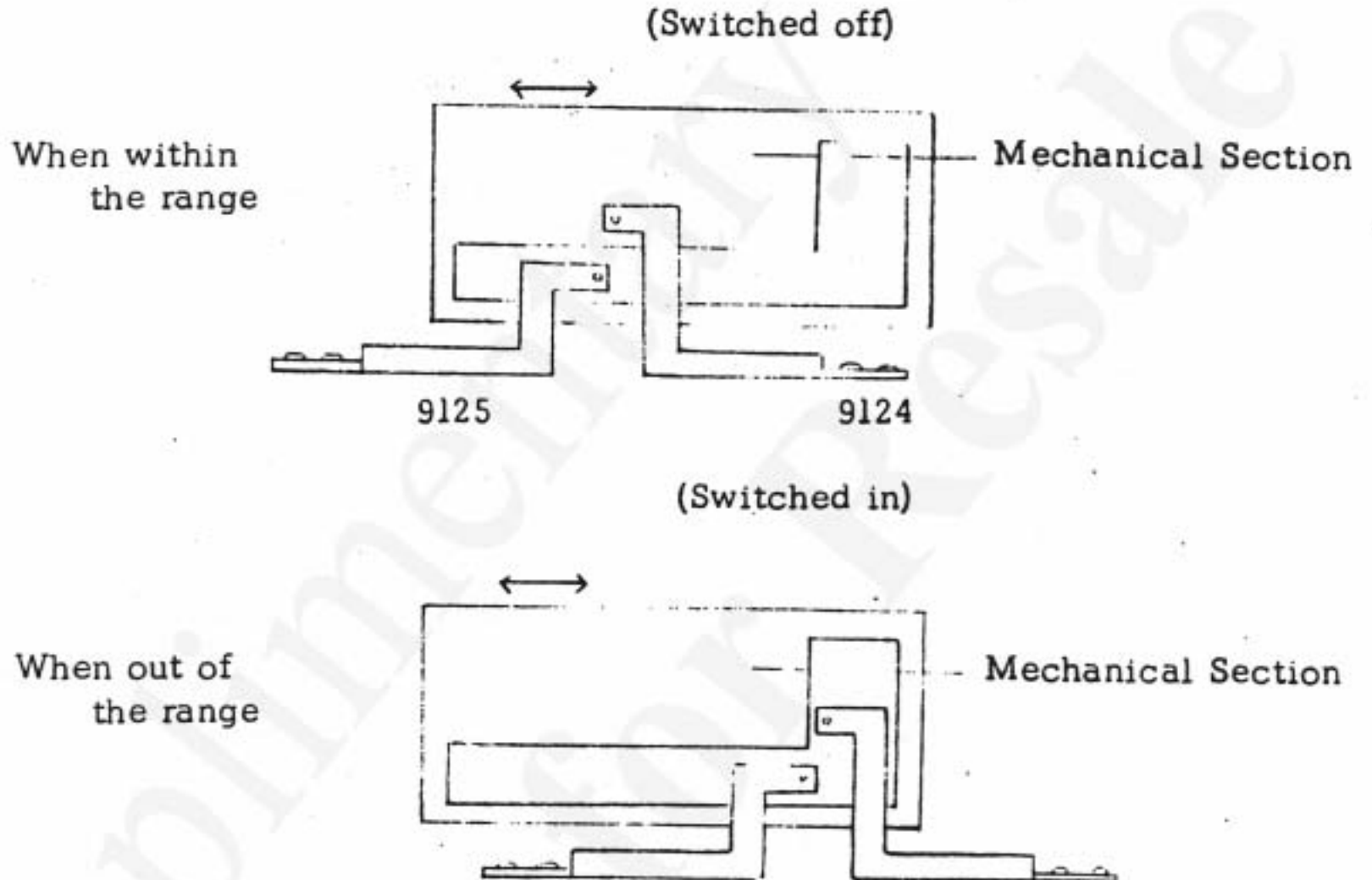
(14) ASA Setting Transmission:

When the ASA dial (9007) is turned, (9009) which is engaged onto the groove of the A dial turns 9010. 9010 is in contact with (9018). The lifting force of 9010 is transmitted to turn the (9013) pivoted at (9015). To (9013) is connected (9014) by 9016. On (9014) is clinched 9017 which is fitted into the groove of (9019). Thus (9019) is turned. (9019) is connected to 8985 by a screw. When 8985 is turned, the meter will be activated.



(15) Warning Switch:

When the light is insufficient and below the synchronous range of the exposure meter, a warning is given in the viewfinder. In case of various lenses used, if the light is below the lower limit of the measurable range, the needle is made to swing approximately 2EV toward the plus (+) side and not to meet the center of the index.

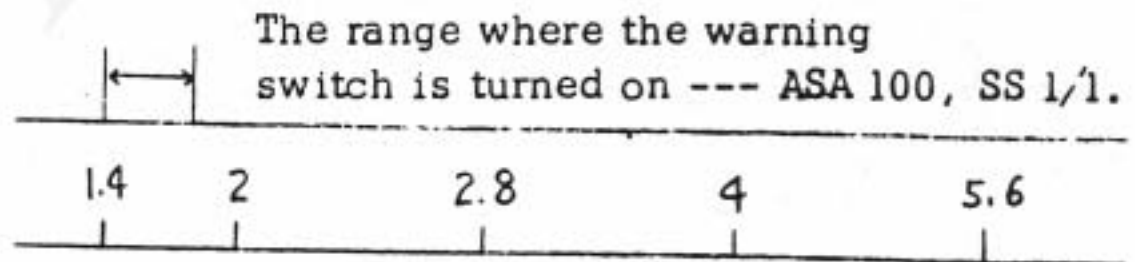


Range of Measurement of Each Lens:

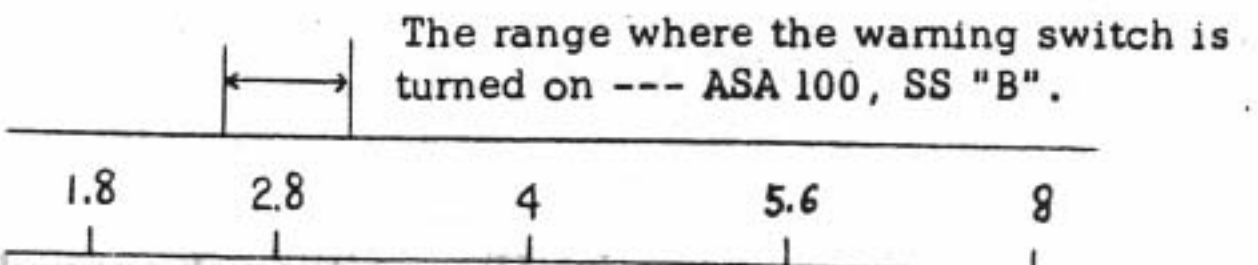
MS5014	BV2-17
MS5018	BV2.35-17.35
MS5512	BV1.9-16.9

ON-position of the Warning Switch:

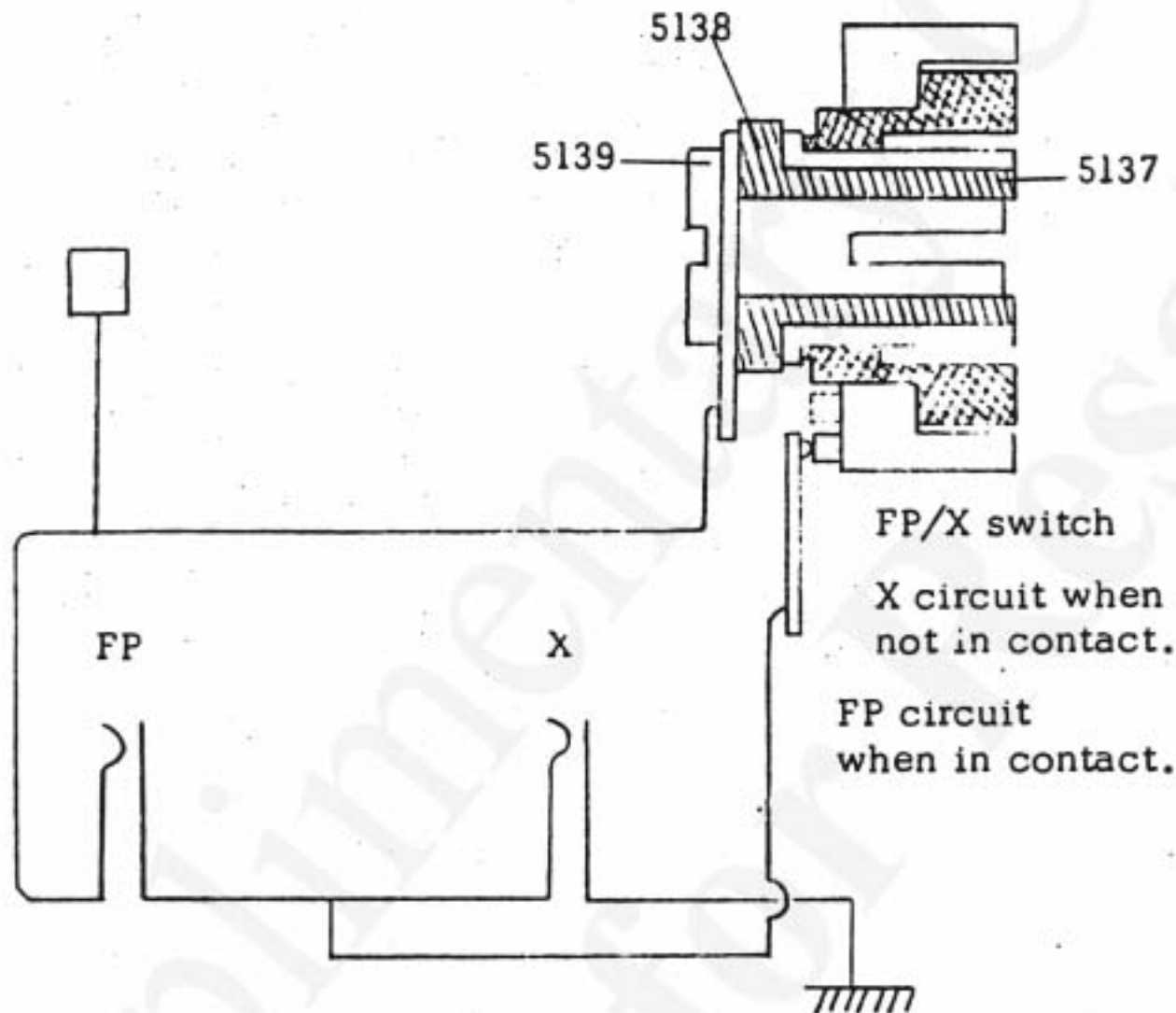
MS5014:



MS5018:



(16) Flash Synchronization Circuit:



In a single reflex, normally it takes the mechanism wherein the X contact is always kept ON and/or it is switched on again when the film is advanced. This causes an explosion at the time of the film advance. Therefore, normally the X contact piece is made movable to prevent it. However, because it means unstable positioning of the contact piece, FP and X are connected parallelly in case of MDS.

To check the insulation resistance of the contact piece, in case of X contact, set the shutter dial at 1/1 and release it. While the 1/1 governor is in operation, move the film advance lever for about half a stroke. See if the needle of the Insulation Resistance Meter) shows over 30MΩ. A check can then be carried out.

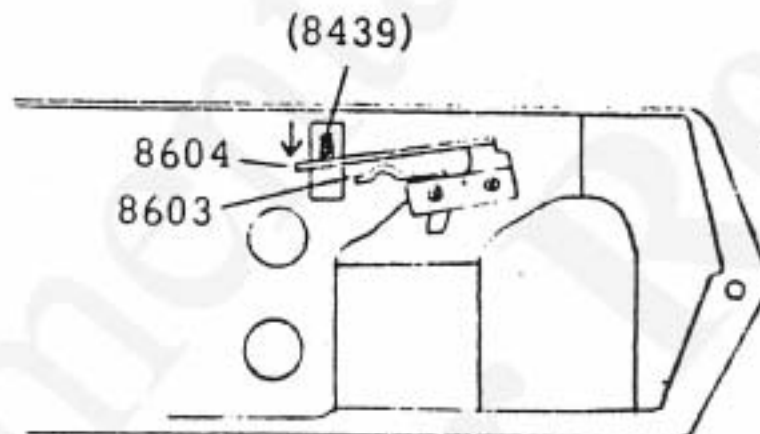
In case of FP turned ON and X being OFF, when the film advance lever is moved for a full stroke, curtains will make their runs and will return to the normal position. A check can then be carried out.

Do not attempt checking too frequently, since it may cause for strings for curtains to come off the pulley.

FP-Contact:

The FP contact has to be switched in within 10 ms. prior to complete opening of the first curtain. Thus, normally, the signal is received from the mirror driving mechanism. In case of MDS, the signal notifying the mirror rising is transmitted to the shutter which in turn makes the switch work by 8439.

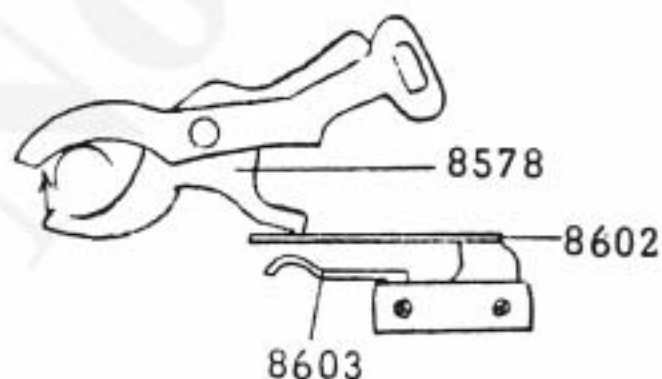
When the mirror rises, 8439 moves in the arrowed direction to switch the EP contact on.



X-Contact:

Since the X contact is to be switched IN immediately upon completion of the first curtain opening, the switching action is carried out by the first curtain cam and the first curtain brake.

In case of MDS, it is switched in by 8578 of the first curtain brake lever.



Immediately prior to completion of the first curtain opening, 8578 starts rotating in the arrowed direction, thus effecting the brake. The X contact is made effective immediately after completion of the first curtain opening.

The brake is kept effective until completion of the film advancement. In the meantime, the X contact is also kept effective.



CHECK POINTS

(INSPECTION STANDARD)

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Not for Resale

CHECK POINTS
(INSPECTION STANDARDS)


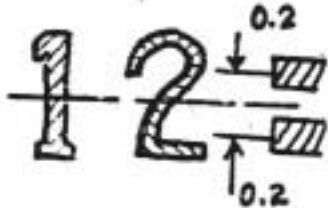
GENERAL FUNCTIONS

Major Check Point	Relative Functions to be checked	Checking Method or Points of Special Attention
1. Viewfinder	(1) Focus (2) Eyepiece Frame	1) No dirt or filth on it. 2) No blurring at the rim of the viewfield. 3) The edge of the prism should not be observed conspicuously. 1) When focussed at ∞ or at a distance desired, there should be no discrepancy between the reading on the focusing ring and the actual distance from subject to the film surface. 1) No deformation, rattling, nor space between the top cover. The magnifier should be mounted onto it firmly.
2. R Knob (CA8725)		1) No rattling vertically. (Horizontal tolerance, B-F & R-L, should be 0.1mm or less in the stored position, and 0.3mm or less at the tip of the knob when pulled out.) 2) Smooth and accurate rotation for rewinding. 3) Can be pulled out or pushed in smoothly and accurately. 4) The knob can be further pulled out (second step) to unlock and open the rear cover, but should auto-

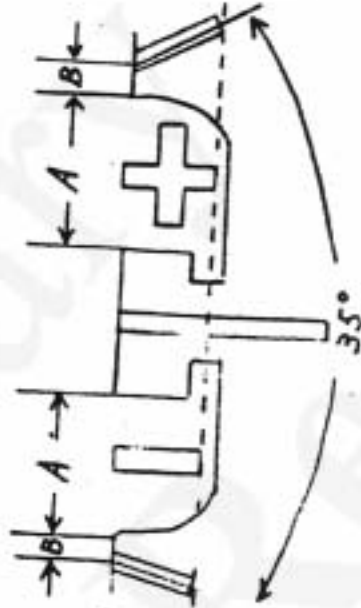
Major Check Point	Relative Functions to be checked	Checking Method or Points of Special Attention
		<p>atically return to the original position.</p>
	(1) R Lever (CA8726)	<ol style="list-style-type: none"> 1) Should be opened or closed smoothly and accurately. 2) CA8731 (R lever spring) should be functioning effectively. 3) The knob can be rotated smoothly.
	(2) Opening and closing of the rear cover	<ol style="list-style-type: none"> 1) Accurate engagement. No friction against the top and the bottom covers. Should be smoothly operable with self-weight.
	(3) Locking function	<ol style="list-style-type: none"> 1) Should be smoothly operable without an extreme friction, nor a squeak. 2) When the R knob is pulled out for the second step, make sure it unlocks. 3) When the R knob is released, the lock should return to its original position.
3. Film Advance Lever (CA8749)		<ol style="list-style-type: none"> 1) Tolerance: <ul style="list-style-type: none"> At the axis, vertically = 0.1 or less At the tip of the lever = 0.4 or less Horizontally, back & forth, or right and left = 0.1 or less 2) Film should be advanced smoothly (without difficulty at the start of the lever motion, an extreme friction, uneven movement, or squeaks.)

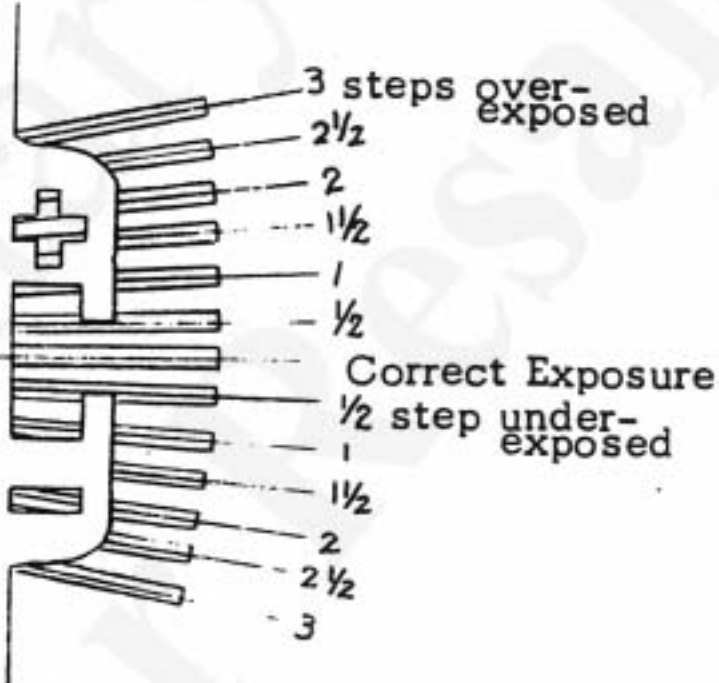
Major Check Point	Relative Functions to be checked	Checking Method or Points of Special Attention
		<p>3) Upon a full stroke or winding motion, film should be advanced by a full frame and the shutter and the mirror should be charged accurately.</p> <p>Further, even with a quick winding action, the shutter should be set accurately.</p>
		4) The film advance lever should return to its original position regardless of whether the film is loaded or not.
		5) The preadvancing movement of the lever should be smooth.
		6) In its still position, the lever should be in contact with the ASA dial or within 0.8 from the dial.
	(1) Room between CA8753 (Cover) and CA9083 (Holder)	1) During the film advancing motion, CA8753 and CA9083 should not hit each other.
	(2) Film advance by short strokes	1) Even with short strokes, the film should be advanced properly and locked in position accurately.
	(3) Prevention for double film-advance	1) Film cannot be advanced consecutively for the second frame without shutter release.
	(4) Film release	1) Upon shutter release, the film can be advanced for the subsequent frame.

Major Check Point	Relative Functions to be checked	Checking Method or Points of Special Attention
(5) Shutter release prior to or during the film advancing motion	1)	It should not allow the shutter release action prior to or during the film advancing motion. Be cautious at the point immediately prior to completion of the film advancing motion, particularly.
(6) Shutter Release	1)	No vertical tolerance, but 0.2 or less at the tip of the lever permissible.
	2)	Smooth and accurate release action (without friction, unevenness, squeak or other unusual noises).
	3)	The release button should not rotate.
	4)	Upon completion of the film advance movement, the shutter can be released. Other than that, the shutter release button may be pressed in only about 0.05 - 0.15 but not for the full stroke.
(7) Film Counter	1)	The number should progress by 1 accurately upon completion of the film advancing motion, but not when the rear cover is opened.
	2)	When the number plate stops at (37), "E" should also be visible.
	3)	When the rear cover is opened, the number should return, accurately, to the S position.

Major Check Point	Relative Function to be checked	Checking Method or Points of Special Attention
	<p>4) Upon closure of the rear cover and completion of charging (or even without charging) the first figure ("1") should appear in the window after advancement of 3 frames.</p> <p>5) After opening and closure of the rear cover, the "S" should not be out of position against the index point any more than the figure width.</p> <div data-bbox="1458 1096 1633 1239" style="text-align: center;">  </div> <p>At "1" and even numbers, the center of the index point should be within 0.2 from the center of the figure width.</p> <div data-bbox="1406 1639 1727 1844" style="text-align: center;">  </div> <p>At odd numbers other than "1", the center of the index should be as illustrated.</p>	<p>1) During the feeling test, it should not give unusual sound or shocks.</p>
4. ASA Dial (CA9007)		<p>1) When the locking button is pressed, it can be moved in either direction smoothly and accurately to be set at the desired ASA value.</p>

Major Check Point	Relative Function to be checked	Checking Method or Points of Special Attention
		<p>2) When the locking button is not pressed, the A dial would not rotate.</p> <p>3) The locking button should not go down CA9083 (Holder) and come off position.</p> <p>4) The tip of the index should be in line with the edge of the letters (figure).</p> <div data-bbox="1196 1096 1699 1262" style="text-align: center;"> </div> <p>5) Upon shifts of the ASA value, the exposure meter should give different values appropriately.</p>
5. Exposure Meter Switch Lever (CA8962)	(1) Exposure Meter Operation	<p>1) The S lever should be operated lightly, smoothly and accurately and be click-stopped. (Without extremely uneven movement, or stoppages.)</p> <p>2) Clicking should be felt. Even if it goes beyond, it should return to the clicking position.</p> <p>3) When the lever is click-stopped, the ON or OFF letters should be conspicuous and not hidden underneath the lever.</p> <p>1) By operation of the S lever, the meter should be turned ON or OFF accurately.</p> <p>2) The needle should not be stuck or tremble.</p>

Major Check Point	Relative Function to be checked	Checking Method Points of Special Attention
	<p>3) The meter should operate within the range indicated below.</p> 	<ul style="list-style-type: none"> ○ $A \leq B$ ○ the tip of the needle at its lowest position should be in contact with the dotted line.
<p>(2) Time for Response</p>	<p>1) Of a camera with MS5014 lens:</p>	<ul style="list-style-type: none"> ○ Time required for stabilization of the needle at the proper value should be within about 3 seconds, when it is shifted from dark to BV10. (BV10 → ASA100 1/30 F5.6) ○ When shifted from BV4 to BV1, the time required for the needle stabilization at BV2 value should be within about 7 seconds. (BV4 ASA100 1/1 F4) (BV2 ASA100 1/1 F2) <p>Refer to Item (5) in next page, Exposure Compensation.</p>

Major Check Point	Relative Function to be checked	Checking Method Points of Special Attention
	<p>(3) Balance of the mechanical part of the exposure meter</p> <p>(4) Exposure Compensation</p>	<p>When the camera is inclined 90° in all directions, the needle should be within 0.3EV or 1.5 times the needle width in comparison with its original position.</p> 
<p>6. Connecting Ring (CA8879)</p>	<p>(1) Operation of roller of cam gear</p>	<p>1) With the shutter speed B, CA8879 should turn as far as the stopper and return to the original position accurately.</p> <p>2) It should move smoothly (without an extreme unevenness or stoppage).</p> <p>1) It should operate smoothly in relation with the movement of CA8879.</p>
<p>7. Diaphragm Lever (CA8425)</p>		<p>1) Should work smoothly in relation with the shutter operation.</p> <p>2) When the lens is mounted and the shutter released, the aperture should be stepped down appropriately.</p>

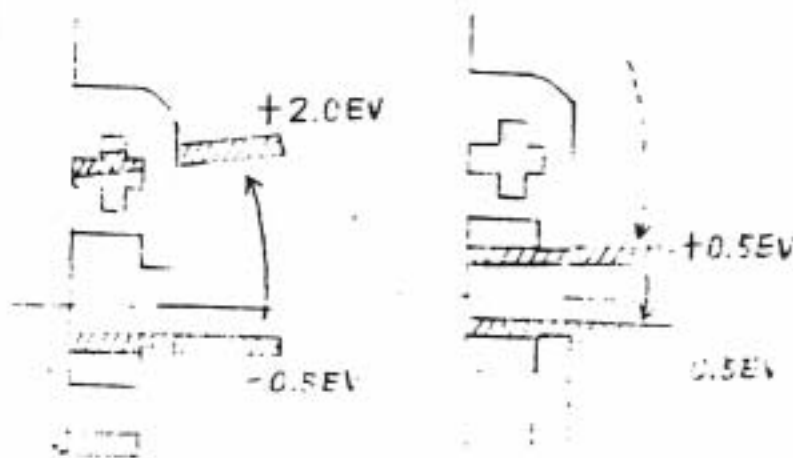
Major Check Point	Relative Function to be checked	Checking Method or Points of Special Attention
8. Focusing Screen		<ol style="list-style-type: none"> 1) With CA8912 (F-key) made effective, the focusing screen should accurately be located at the position of focus. 2) CA8912 should be released without an extreme friction and the mounting block of the focusing screen should be lowered enabling the screen to be easily removed. 3) CA8912 should accurately lock the screen frame with clicks.
9. Shutter Dial (CA8878)	(1) Shutter Speed	<ol style="list-style-type: none"> 1) Should smoothly operate with accuracy (without an extreme friction, unevenness and squeaks). The only noise is that of the governor. 2) Should be accurately click-stopped. 3) Discrepancy between the center of the index and that of the letter. <ol style="list-style-type: none"> 1) By ears, the following shutter speeds should give a clear difference in timing properly (without an extreme disorder). 1/1000, 1/60, 1/15, 1/4, 1/1, B.
10. Mirror-up Knob (CA8917)		<ol style="list-style-type: none"> 1) The MU knob should move smoothly without extreme frictions, unevenness and/or stoppage, and clicks should be felt. 2) By operation of the MU knob, the mirror should be raised and returned to the original position accurately.

Major Check Point	Relative Function to be checked	Checking Method or Points of Special Attention
		<p>5) Upon setting the timer lever, the start-lever will begin the operation of the self-timer.</p> <p>6) If the start-lever is pushed to the left during the timer operation, the timer should be stopped. But when the lever is returned to the correct position again, the timer should resume operation accurately.</p> <p>7) The self-timer should operate smoothly without uneven movement such hesitation or stoppage.</p> <p>8) The shutter should be released accurately by the self-timer.</p> <p>9) Upon shutter release by the self-timer, the release button should return to its original position.</p> <p>10) If the timer is started without the shutter fully charged, it will stop in the middle of its run but will start again when the film-advance motion is completed. It will then release the shutter.</p> <p>11) The total time of its operation, when fully set, will be 9 - 14 sec.</p> <p>12) After the shutter release, there should be a leeway in the run for less than 5 seconds.</p>
13. Film-re-winding Knob (CA9141)		1) When turned 90° or beyond, it should be accurately set and should not return to the original position. (Setting can be performed even during the film-advancing motion.)

Major Check Point	Relative Function to be checked	Checking Method or Points of Special Attention
		<p>2) The knob should return to the original position upon commencement of the next film-advancing motion.</p> <p>3) Without any uneven motion or hesitation, the knob should be operated smoothly and should be stopped in the proper position accurately.</p> <p>4) When the K knob is set, the sprocket should be released and made free in motion.</p>
(1) Sprocket teeth position	1)	When the sprocket comes closer to the mask at the stage where the film advance mechanism is locked, the sprocket teeth should be within the range shown below.
<p style="text-align: center;">EDGE OF THE MASK</p> <p style="text-align: center;">← 21.0 ~ 22.0 →</p> <p style="text-align: right;">SPROCKET</p>		
<p>It is regarded satisfactory if it is located rather towards the left, when viewed from the top. Make measurements as required with sliding calipers.</p>		

Major Check Point	Relative Function to be checked	Checking Method or Points of Special Attention
14. Rear Cover Mounting Pin (CA9099)	1) 2) 3)	The rear cover should be mounted or removed accurately with the mounting pin. The mounting pin is to be pressed down smoothly without squeaks and extreme frictions. The pin, once pressed down, should return to the original position by itself when released.
15. Pressure Plate (CA8710)	1) 2)	It should be properly mounted. When visually inspected, there should be no deformity nor unevenness on the surface (especially no concavity).
16. Spool (CA7530)	1)	Spool force (180 - 400g x 6mm) In the feeling test, it should not be too heavy nor too light.
17. Shutter Curtain	1) 2) 3) 4) 5)	Should be of cloth on the side facing the film surface. At any position in the picture frame, the amount of overlap of curtain edges (metal) should be over 2.5mm. The curtains should not be slanted nor loose. Prior or subsequent to film advancement, the edge metal should not appear within the mask. When the shutter is wide open at a slow speed, the second curtain should not appear in the picture frame.

Major Check Point	Relative Function to be checked	Checking Method or Points of Special Attention
	(1) Shutter Speed	1) At the speed of 1/1000 sec., the film should be completely exposed in any position of the frame. (Visual inspection.) 2) Check the speed by 1/1000, 1/15 and 1/1. (Feeling test.)
18. Warning Switch for Exposure Meter		1) Place the mercury battery in the camera, turn off the main switch, set it at ASA 100 and the shutter speed of "B", and turn the aperture ring from F16 to Open slowly. At this time the needle should swing once toward and beyond 2EV before it is stabilized at the index of -0.5EV. 2) At this time, the aperture ring should be stopped at somewhere smaller than F2.8. 3) When the lens is stopped down gradually from the open position, the needle should come down once to a position lower than -0.5EV before it is stabilized at +0.5EV.



Functions and Features (Items to be checked by measuring instruments)

1. Film Advance Lever = operating force: 1000 gr. or less at the tip of the lever, when film is loaded.
 - " = returning force: 24-34 gr. at the beginning of the return stroke or thereabout.
 - " = pre-advancing force: 25g-50g at the tip of the lever.
2. Shutter-releasing Force = 200 - 300 gr.
3. Release Button = Overall Height: $+1.5^{\pm 0.2}$ (from the tip of CA9083) (The plus sign (+) means that the button is extruding from CA9083)
 - " = Release Position: $-0.05^{\pm 0.15}$ (from the tip of CA9083)
 - " Stopping Position: 0.5 or deeper (from the tip of CA9083)
4. CA9084 (Button Shaft) = Depth of Action: The shutter should be released at 7 ± 0.3 from the tip of the button.
5. R-knob = Pulling Force: First Step $350^{\pm 100}$ gr.
 Second Step $1200^{\pm 300}$ gr.
6. Self-timer = Setting Force: 600 gr. or below at the tip of the lever.
 - = Operating Force of the Start-Lever: 40 - 100 gr. at the tip of the lever.
7. Flange-back = $46.0^{\pm 0.025}$

8. Accuracy of Meter Indications:

LSBL7 Light Source Box K=1.3 ASA100

<u>BV</u>	<u>SS</u>	<u>F</u>	<u>Discrepancy</u>	<u>Accuracy</u>
15	1/500	8	0.3EV	±0.6EV
12	1/125	5.6	-	±0.6EV
9	1/4	11	-	±0.6EV
6	1/2	4	0.3EV	±0.6EV

For BV15 and BV6, check the discrepancy in indications which may occur according to the direction of rotations of the aperture ring and the shutter dial.

In case of BV12 and BV9, the shutter dial is turned and set starting from the 1/1000 side and the aperture ring from the F16 side.

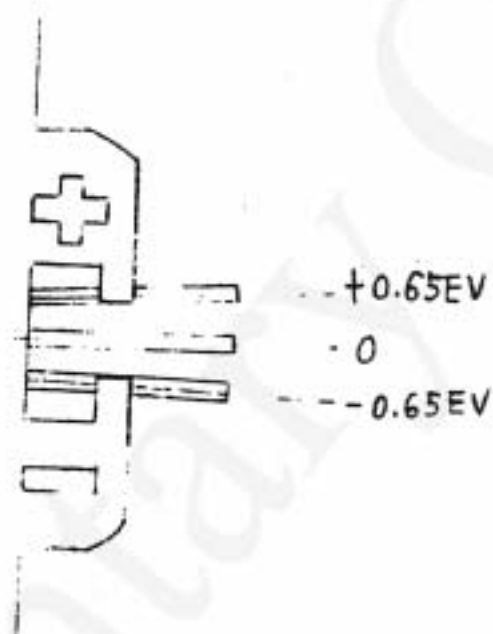
LSBL1 Light Source Box K=1.3 ASA100 (90V)

<u>BV</u>	<u>SS</u>	<u>F</u>	<u>Discrepancy</u>	<u>Accuracy</u>
16	1/500	11	0.3EV	±0.6EV
14	1/125	11	-	"
12	1/125	5.6	-	"
10	1/125	2.8	-	"
8	1/2	11	-	"
6	1/2	5.6	0.3EV	"

For BV16 and BV6, check the discrepancy in indications which may occur according to the direction of rotations of the aperture ring and the shutter dial.

In cases of EV 14, 12, 10 and 8, the shutter dial is turned and set starting from the 1/1000 side and the aperture ring from the F16 side.

How to judge amount of compensation
for proper exposure:



9. Curtain Speed: At the shutter speed of 1/1000, 11.7 - 12.1 ms for both the first and the second curtains.
10. Exposure Time:
Tolerance limit

1/1	1000ms	892 - 1100 ms
1/2	500	446 - 550
1/4	250	223 - 275
1/8	125	111 - 138
1/15	62.5	55.6 - 68.8
1/30	31.2	27.8 - 34.3
1/60	15.6	13.9 - 17.2
1/125	7.81	6.99 - 8.63
1/250	3.91	3.50 - 4.32
1/500	1.95	1.69 - 2.22
1/1000	0.98	0.79 - 1.20

11. Power Consumption: At BV16, 800 μ A or less

12. Leakage: 5 μ A or less

13. Contact efficiency:

X contact: 70% or above at the interval of 1 ms.
in slow speed including 1/60 sec.

FP contact: 70% or above at the interval of 2.5 ms.

14. Insulation resistance: 30M Ω and above at 500V.

15. Contact resistance: Ascertain continuity at 3V.

16. Time lag: X contact: At 1/60 sec., it should be switched in within 1.5 ms. of the closing action of the second curtain, upon completion of the first curtain opening.

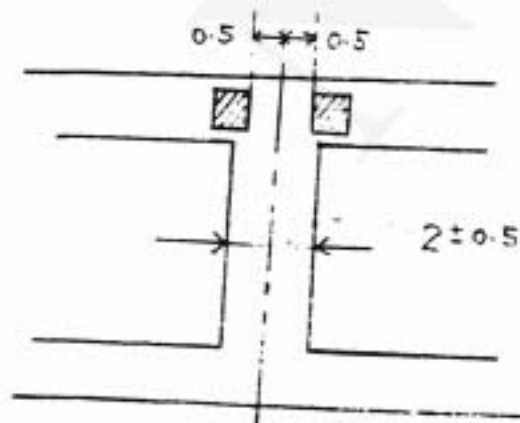
FP contact: It should be switched in at 8 - 14 ms. prior to commencement of the first curtain action.

17. Vertical discrepancy in positioning the actual picture:



The frame of the actual picture should not be overlapped with the perforation on the film.

18. Position of perforations: Perforations should be beyond 0.5mm from the center line between each frame.



19. Interval between picture frames: 2 ± 0.5 mm



ORDER OF DISASSEMBLY

ORDER OF DISASSEMBLY

- o Refer to the part number noted in the illustration of disassembly on the opposite side.
- o X mark at the head of the part number shows the part which should not be touched directly by fingers. Be sure to cover fingers with rubber sacks.

General Order of Disassembly

1.	Removal of CA8703 (Top-cover)	1
2.	Separation of CA8702 (Body front part) from (Die-cast body)....	2
3.	Disassembly of the shutter	4
4.	Disassembly of the film advance mechanism	9
5.	Disassembly of CA8702 (Body front part)	11
6.	Disassembly of CA8961 (Frame) and the exposure meter	17

Detailed Order of Disassembly

1. Removal of CA8703 (Top-cover)
 - 1) Remove CA9030 (Nut) - using the tool KC-CA9030G
 - 2) Remove CA8752 (Holder) - using the tool KC-CA8752G

Pay attention not to make scratches on CA9135 (Plate).
If scratched, replacement is required.

Then will come off:

CA8753	(Ring)	}	in a unit
CA8749	(Lever)		
CA8751	(Cover)		
CA8750	(Washer)		
CA8806	(Screw)		
PSK2 x 2.2SB			

- 3) Remove CA8777 (Fastener)
- 4) Loosen two NU1.4 x 1.5SA on CA9007 (Dial) to remove CA9007. (CA9007 is screwed in.)
- 5) Open CA8705 (Cover) and remove CA8725 (Knob)
Use the tool KC-0071M with care not to deform CA8733 (Shaft).

Then will come off:

CA8726	(Lever)
CA8730	(Pin)
CA8731	(Spring)

- 6) Remove two PSK1.7 x 4SH on CA8703 (Cover)
CA8703 can be taken off with attachments.
For attachment of CA8703, set the meter at ASA 100, turn off the meter switch, and mount the CA9005 (Ring) at 100.
- 7) Remove the following parts.

CA8722	(Spring)
CA9026 a - c	(Washer)
NW8.6 - 2136BO	

2. Separation of CA8702 (Body front part) from (Die-cast body)

- 1) Remove two PSK2 x 3SE and two PSK2 x 4SE on CA8704 (Plate).
Then CA8704 and CA6345 (Cover) can be taken off.
- 2) Remove CA9071 (Stopper) using the tool KC-CA9071G.
Pay attention not to make scratches on CA9134 (Plate).
If scratched, replacement is required.

Then will come off:

CA9075 (Spring)
CA9072 (Lever)

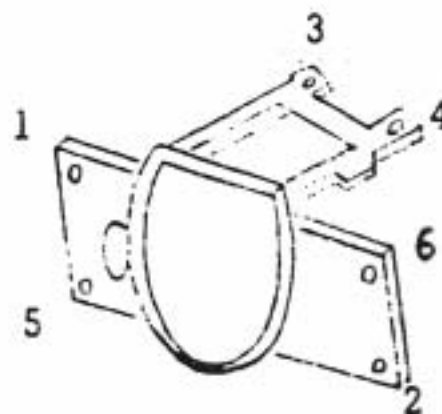
- 3) Peel off CA9102 (Leather), CA9103 (Leather).
- 4) Peel off CA8894 (Cover) and CA8893 (Plate), raising the mirror by CA8917 (Knob). (Glued with Everstic)
- 5) Remove two PSK1.7 x 3SO on CA8734 (Holder) and let CA8734 turn half way.
- 6) Take off (Lead wires) CA9115 (LW30R), CA9032 (LW45B) by removing solder.
- 7) Remove CA9036 LW100B from CA9125 (Contact point).
- 8) Remove four PUK2 x 3SO on CA8702 and two PUK2 x 6SO on CA8961 (Frame) respectively. Then Die-cast body can be separated from CA8702.

Docking of Die-cast body and CA8702.

Docking is made in the following mannger:

1. Keep the film-advancing mechanism in the state of being charged.
2. Let the small hole on CA8577 (Gear) face the lens (at the position of 1/1000).
3. CA8702 is set at shutter dial 1/1000.
4. CA8702 in the stage of mirror-up.

Setting CA8412 (Charge lever) and raising the mirror by CA8432 (Hook lever), you can proceed with docking. Further, at the docking, pay attention to deformation of EP Contact point and Lead-wires as well as the string from the meter. Fasten screws in accordance with the numbers illustrated below.



3. Disassembly of the shutter

(Lower side of the body)

- 1) Remove CA8867 (Shaft).

Then will come off:

CA8872 (Spring)
XCA8865 (Lever)

- 2) Remove CA8864 (Shaft).

Then will come off:

CA8862 a b (Plate)
NW1.8 - 336PO

- 3) Remove CA8826 (Spring) from CA8824 (Lever) and take off CA9052 (Screw).

Then will come off:

CA8826 (Spring)
CA8824 (Lever)
CA8821 (Lever)

Caution: XCA8820 (Shaft)

- 4) Remove CA8848 (Shaft).

Then will come off:

CA8849 (Spring)
CA8842 (Lever)
CA8847 (Holder)
XCA8845 (Lever)

NW1.8 - 240PO

- 5) Remove CA8846 (Shaft).

Then will come off:

CA8844 a - c (Lever)
NW1.8 - 240PO

- 6) Remove HK1.4 - 602SN of CA8836 (Gear).

Then will come off:

CA8836 (Gear)
CA8851 (Spring)

(Refer to the illustration shown in the next page
how to CA8851)

- 7) Remove two PSK1.4 x 1.8SO of CA8841 (Base plate) and CA8852 (Screw).

Then will come off:

CA8839 (Gear)

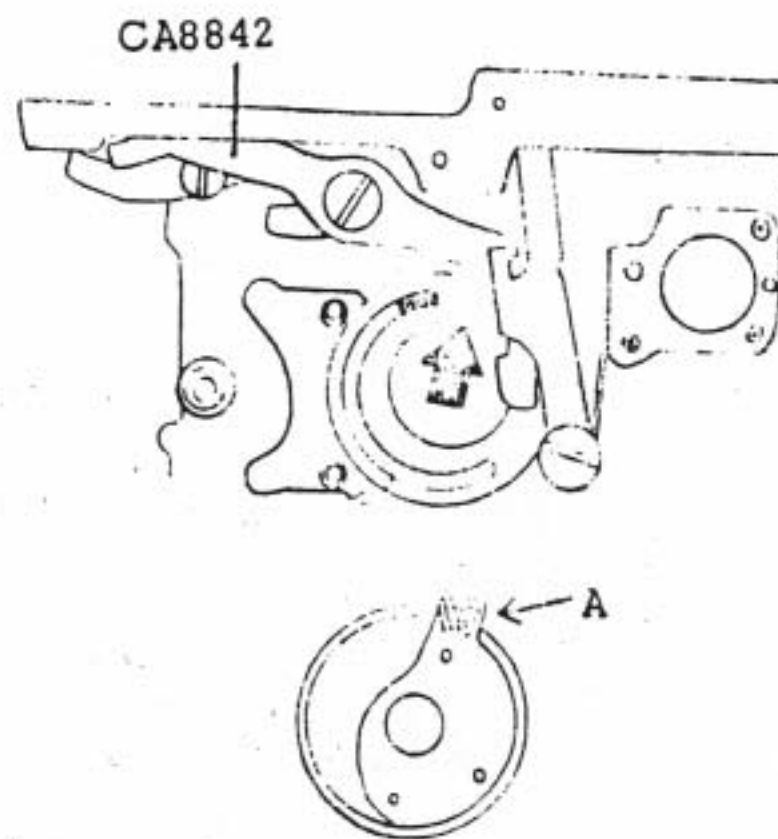
- 8) Remove CA8856 (Screw)

XCA8828 (Shaft)
B1 (Ball bearing) can be taken off.

Caution: XCA8827 (Shaft)

How to reassemble CA8839 (Gear):

After releasing shutter,
reassemble CA8839 (Gear)
so that the protrudent part
of CA8840 (Plate) may be
inserted between the boss
of CA8547 (Gear) and
CA8842 (Lever). (Insert
A to the arrowed part as
illustrated below)

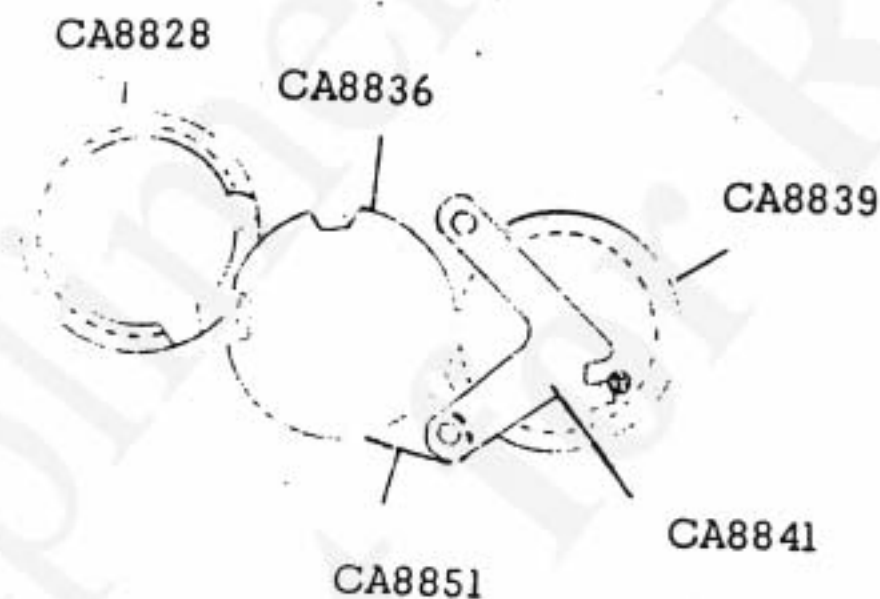


How to reassemble CA8836 (Gear):

Let one end of CA8851 (Spring) engage on to the tooth of CA8836 (Gear) on the side indicated by the arrow.



With film winding mechanism locked, release the shutter by CA8595 (Lever), reassemble it as shown below.



(Removal of Governor)

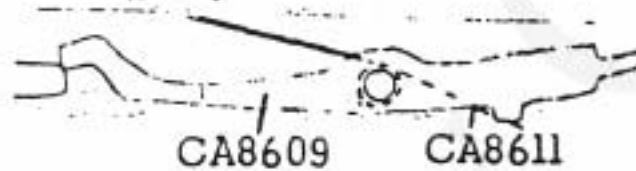
- 9) Remove PSK2 x 2SO and PSK1.4 x 2SO on (the governor).

Then will come off:

G30	(Governor)
XCA8609	(Lever)
CA8611	(Spring)

Caution: Pay attention to XCA8610 (Shaft). Assemble CA8609 while the film advance mechanism is charged.

Engage CA8611 (Spring) as shown in the illustration below.



- 10) Remove XCA8404 (Screw)

Then will come off in a unit.

CA8606 (Cam)
 CA8605 (Cam)
 CA8575 (Cam)
 CA8576 (Cam)
 CA8577 (Gear)

3PUK1.4 x 5.5SO
 PUK1.4 x 2SO

- 11) Take off PSK1.4 x 2SO which fastens CA8543 (Shaft) and loosen XCA8545 (Screw) to remove the following parts.

XCA8567 S.M.L. (Shaft)
 XCA8556 (Lever)

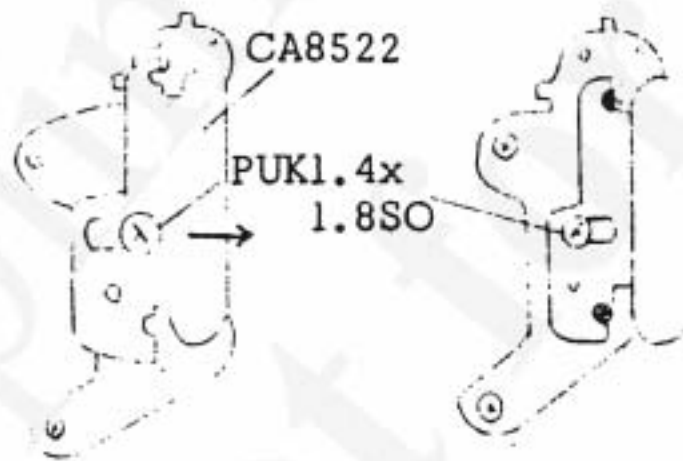
Caution: Simply loosen XCA8545 (Screw) alone, because if it is completely removed, CA8543 (Shaft) is separated.

After removing XCA8567 (Shaft), and XCA8556, XCA8545 should be always fastened again.

- 12) Remove XCA8843 (Shaft) using the tool KC-CA8843G.
 Then comes off CA8543.

(Removal of the Curtains)

- 13) Remove two PSK1.7 x 18SO on CA8540 (Frame) and loosen PUK1.7 x 1.8SO and CA8539 (Screw). Then comes off CA8540.
- 14) Remove CA7381 (Shaft). Then comes off CA8532 (Stopper).
- 15) Remove two CA8531 (Nut). (Adjustment of the tension and speed of the curtains.)
- 16) Remove two PUK2 x 2SO on CA8513 (Washer).
- 17) Remove two PUK2 x 2SO on CA8523 (Plate).
- 18) Remove HK1.4 - 101BO on CA8522 (Stopper) and loosen PUK1.4 x 1.8SO. Move CA8522 in the arrowed direction, let it tweeze the CA8519 (Shaft), CA8520 (Shaft) at their upper ends, and then tighten PUK1.4 x 1.8SO.



- 19) Remove two PUK2 x 2SO on CA8508 (Plate).

Then will come off CA8538 (Curtain), CA8600 (Curtain), and the following parts at the same time.

XCA8519	(Shaft)
XCA8520	(Shaft)
CA8517	(Stopper)
CA8510	(Roller)
CA8522	(Stopper)
CA8523	(Plate)
CA8529	(Roller)
CA7963	(Ring)

PUK1.4 x 1.8SO
 NW1.5 - 425UO

Caution: Pay careful attention to CA8538 (Curtain)'s assembly parts XCA8524 (Shaft), and to CA8600 (Curtain)'s assembly parts SCA8525 (Shaft).

(Removal of CA8501 Base plate)

- 20) Remove three PSK2 x 2.5SO which fastens XCA8501 under the main body. Then comes off XCA8501 with the following parts in a units.

CA8601 (Plate)
 CA8602 (Contact point)
 CA8603 (Contact point)
 CA8586 (Spring)
 XCA8578 (Lever)
 XCA8585 (Screw)
 CA8594 (Spring)
 XCA8592 (Claw)
 XCA8589 (Shaft)
 CA8590 (Spring)
 XCA8580 (Lever)
 XCA8588 (Screw)
 CA8612 (Lever)
 CA8614 (Screw)
 CA8615 (Spring)

NW1.4 - 334UO

CA8612 (Lever) should be reassembled with the shutter released.

4. Disassembly of the film advance mechanism

- 1) Remove CA8786 (Washer).

Then will come off in a unit:

CA8793 (Gear)
 CA8794 (Index)
 CA8795 (Spring)

- 2) Mount CA8749 (Lever) and tighten CA8752 (Fastener).

- 3) Remove PUK2 x 3SO and 3PUK1.7 x 4SO on CA8742 (Case).

Then will come off:

CA8742 (Case)
CA8743 (Plate)
CA9060 (Collar)

- 4) Remove CA8801 (Nut)

- 5) Remove three PUK1.7 x 2.5SO on XCA8775 (Base plate).

Then will come off in a unit:

CA8754 (Shaft)
CA8775 (Base plate)
CA8774 (Spring)
CA8796 (Stopper)
CA8797 (Washer)
CA8781 (Shaft)
CA8803 (Stopper)
CA8799 (Stopper) and CA8800 (Stopper)
CA8798 (Shaft)
CA8723 (Bush)
CA8783 (Spring)
CA8778 (Lever)
CA8784 (Gear)

HK1.4 - 604BO

Disassembly of the part removed in a unit:

Remove CA8752 (Fastener) and then CA8749 (Lever).
CA8775 (Base plate) can be separated from CA8754
(Shaft) and further CA8774 (Spring) and CA8723 (Bush)
can be removed.

- 6) Remove two PUK1.7 x 1.8SO on CA9146 (Shaft) and CA8808 (Screw).
Then comes off CA9146 (Shaft).

The steps 1) through 6) shown above may be followed without
separating CA8702 (Body front part) from the Die-cast body.

- 7) Remove 3PUK1.7 x 3SO on CA9041 Base plate.

Then comes off CA9041.

- 8) Pressing CA8811 (Sprocket), remove CA8817 (Screw).

Then will come off:

CA8819	(Claw)
CA8818	(Spring)
CA8816	(Gear)

- 9) Pressing CA8811 (Sprocket), remove CA8788 (Gear) using the tool KC-CA8788G

- 10) Remove CA8780 (Holder)

Then will come off:

CA9049	(Spring)
CA9047	(Claw)
CA8779	(Shaft)
CA8811	(Sprocket)

5. Disassembly of CA8702 (Body front part)

- 1) Remove two PSK2 x 3SO on V40 (Self-timer)

(For the new model, an extra piece is used fixing the self-timer from the front.)

Then comes off V40.

- 2) Remove two PUK2 x 4.5SO on CA9025 (Plate).

Then comes off CA9025.

Remove solder from the lead wire at the tube.

- 3) Pressing CA9130 (Holder) by fingers, remove CA9131 (Holder) and PUK1.7 x 2.2SO on CA9132 (Holder).

Care must be taken in handling it because of strong tension.

Then will come off :

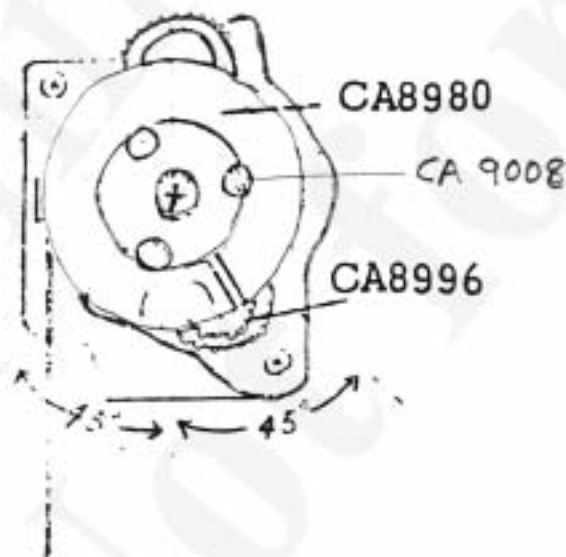
CA9130	(Holder)	} in a unit
CA9131	(Holder)	
CA9132	(Holder)	
CA9133	(Spring)	
CA8936	(Cover)	
LC4073	(Prism)	
CA8904	(Washer)	
CA8905	(Mask)	

- 4) Remove two PUK2 x 3.5SO and PUK2 x 6SO on CA8961 (Frame).
Then come off CA8961 and the exposure meter mechanism in a unit.
- 5) Remove three CA9008 (Screw) to separate CA8980 (Pulley) from CA8961 (Frame). The position of the exposure meter mechanism may be adjusted by loosening CA9008 (Screw).
(Coarse adjustment)

The position of CA8980:

The groove of CA8980 is to be positioned at the shutter speed 1/1000.

It should be positioned within the range shown below when CA8879 (Ring) is at the stopper.



- 6) Remove three CA8947 (Screw).

Then will come off:

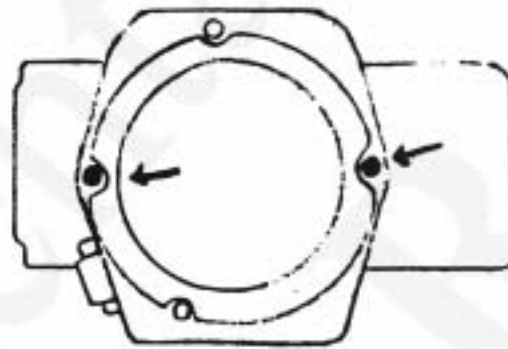
CA8877	(Mount)
CA8888	(Spring)
CA9114	(Screw)
CA8878	(Dial)

CA8947 is to be tightened from the top in order.

- 7) Remove two PUK1.7 x 2.5SO on CA8951 (Fastener).
Then comes off CA8591.
- 8) Remove four PSK1.4 x 2SO on CA8876 (Cover).
Then comes off CA8876.

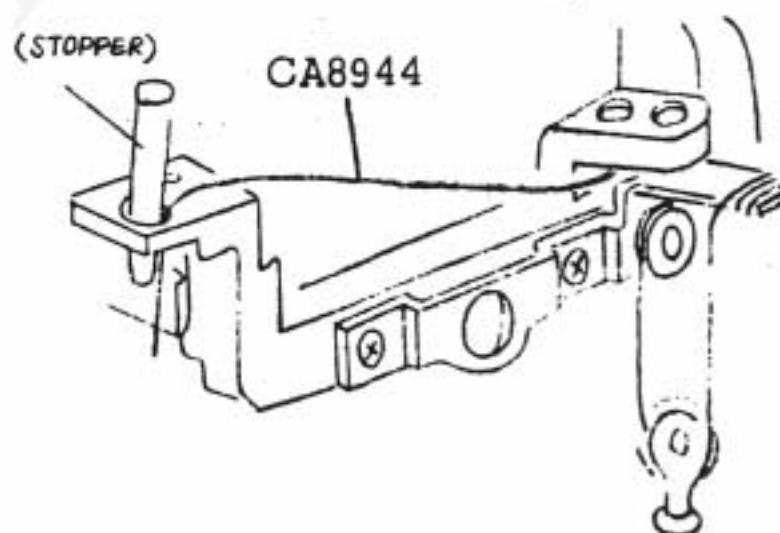
Caution: Two to four pieces of CA8960 (Lever) is used for room adjustment.

CA8960 is to be placed as shown below by arrows.
A number of them may be set as necessary to adjust
the room between CA8876 (Cover) and CA8878.



- 9) Remove CA8944 String from adhered part of CA8980 (Pulley). Then comes off CA8880 (Gear). In case of such a type of repair that will require removal of CA8944 adhered to CA8980 (Pulley) only and not that of CA8877, CA8878, and CA8880, it is advisable to take following measures so as to insure that the CA8944 will not be entangled or become off position.

Set the shutter at the speed of "B" and do not move it.
Stick one end of the CA8944 into the CA8702 (Plate).
Be careful not to cut the string at where it is stuck in.

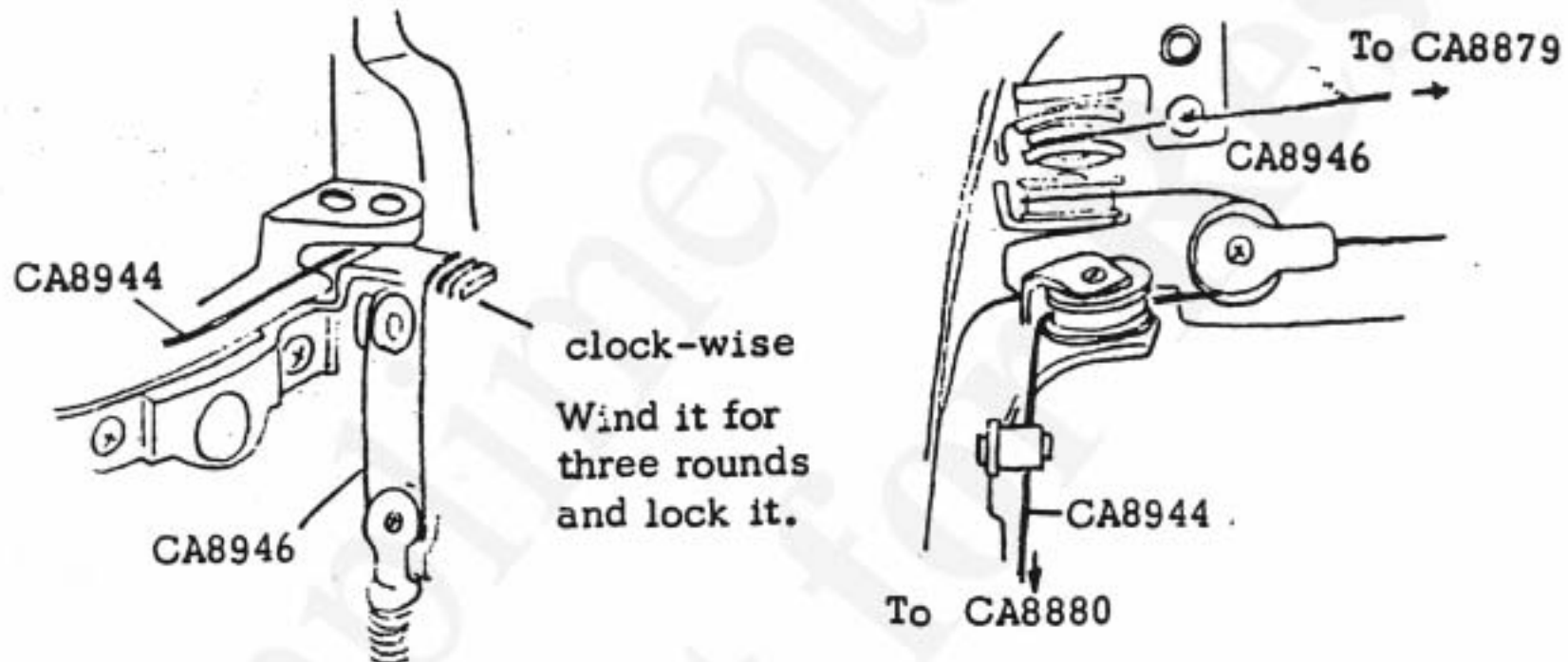


- 10) Remove adhesive, adhering CA8946 String with CA8949 (Plate), to separate them from each other.

Then will come off:

CA8879 (Ring)
CA8938 (Spring)
XCA8957 a - c (Roller) a - c
XCA8933 a - f (Roller) a - f

CA8946 and CA8944 are to be connected as follows.



- 11) Remove PUK1.4 x 1.8SO and three PUK1.4 x 1.8SO on CA8882 (Plate).
With care not to damage CA8914 (Damper) and CA8915 (Damper), remove CA8882.

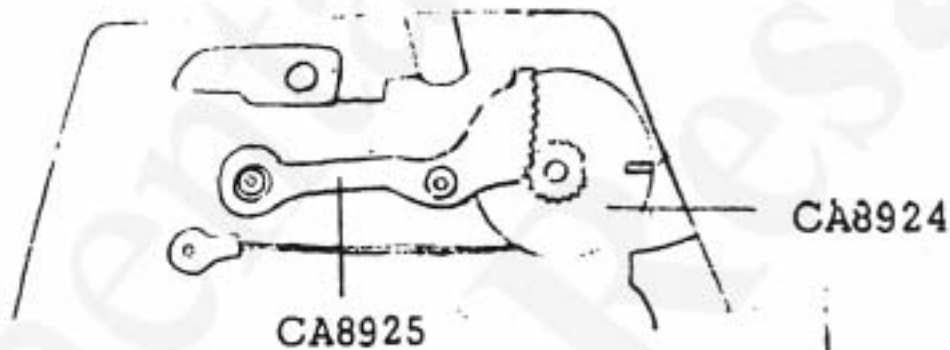
- 12) Remove CA8955 (Screw).

Then will come off:

XCA8925 (Gear)
CA8924 (Pulley)

Positioning of CA8925 and CA8924:

When the groove of CA8924 comes to the position almost horizontal at the right hand side, the CA8925 should be in contact with Cam gear stopper



(Removal of CA8410 (Plate) CA8411 (Plate))

- 13) Remove two PUK1.7 x 1.8SO on CA8889 (Stopper).

Then comes off CA8889.

Positioning of CA8889 may be performed with a jig.

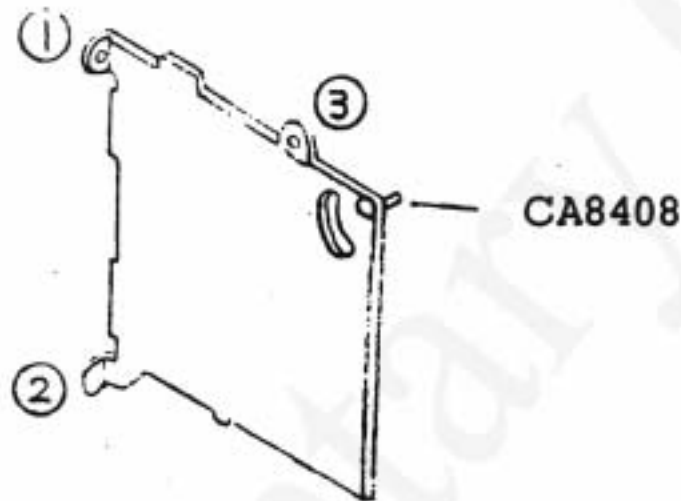
- 14) Remove XCA8404 (Screw) on CA8410.

- 15) Remove two PUK2 x 3SO and PUK2 x 2SO which fastens CA8410.

Then will come off:

CA8410 (Plate) and (Relative parts)
CA8401 (Frame)
CA8409 a - c (Washer) a - c

When assembling CA8410, tighten screws in the following order:

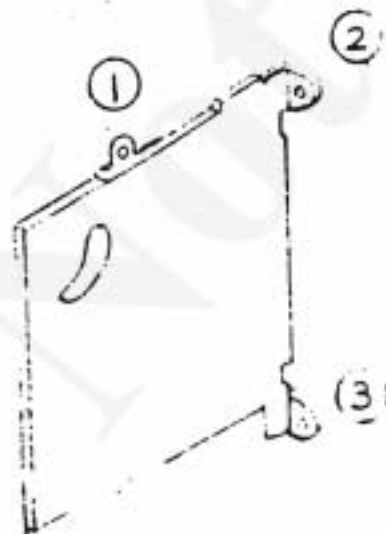


CA8408G (Pin) should be at 5.53 ± 0.05 from surface of the fresnel lens. Use the measuring tool KC-CA8408G. If the appropriate value is not obtained, adjust tightness of screws.

- 16) Remove two PUK2 x 3SO and a PUK2 x SO which fix CA8411 in the position.

Then CA8411 and its attachments (parts) will come off.

When assembling CA8411, tighten screws in the following order:



The space (interval) between CA8410 and CA8411 should be $39.6^{+0.2}_{-0.1}$. Check it with the sliding calipers. If an appropriate value is not obtained, adjust tightness of screws.

6. Disassembly of CA8961 (Frame) and the exposure meter

- 1) Remove HK1.7 - 405SN on CA8981 (Holder).

Then comes off CA8981.

- 2) Remove CA9011 (Holder). Then comes off CA9010 (Cam).

- 3) Remove HK1.4 - 101SN on CA8995 (Base).

- 4) Remove two CA9142 (Screw).

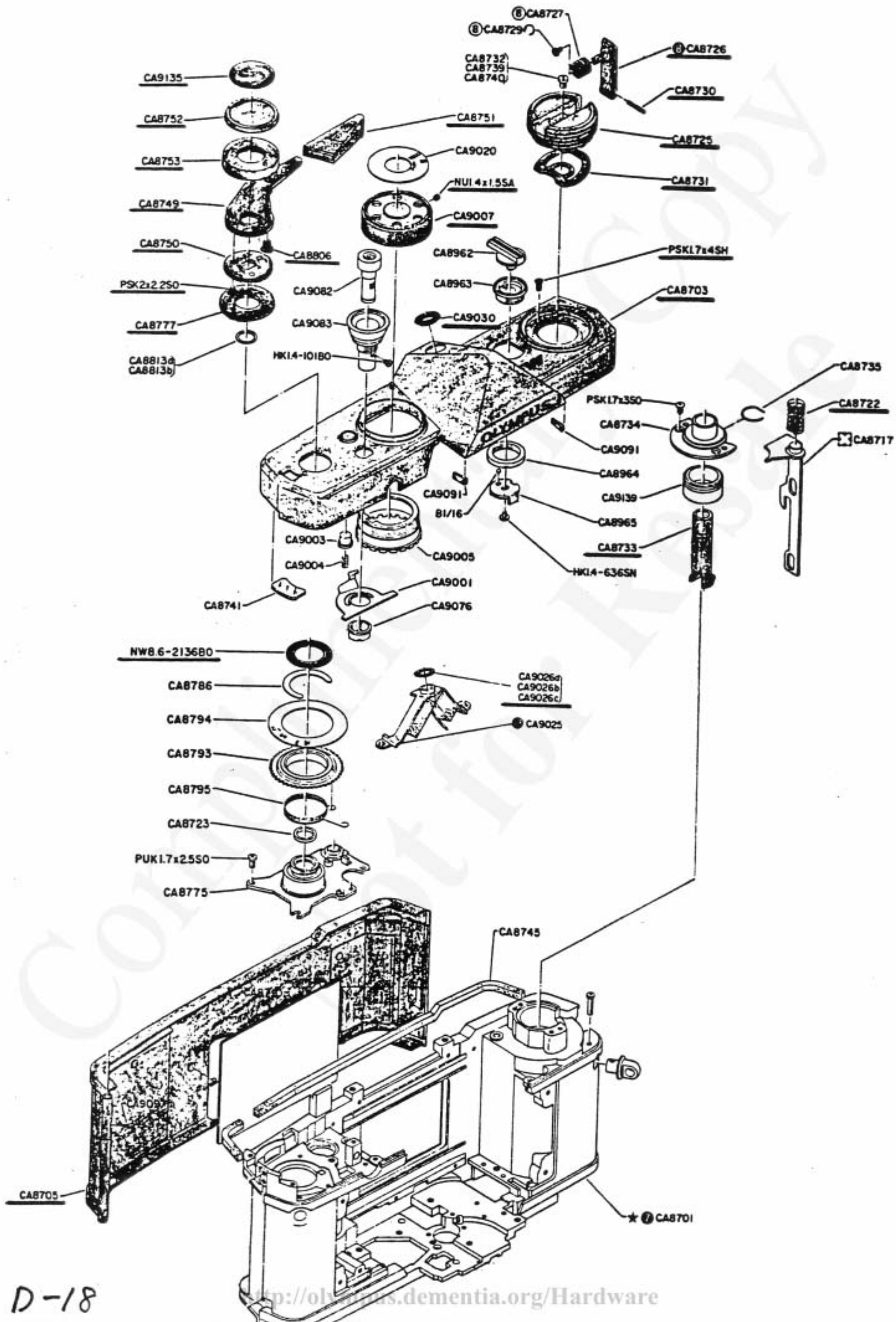
Then will come off in a unit:

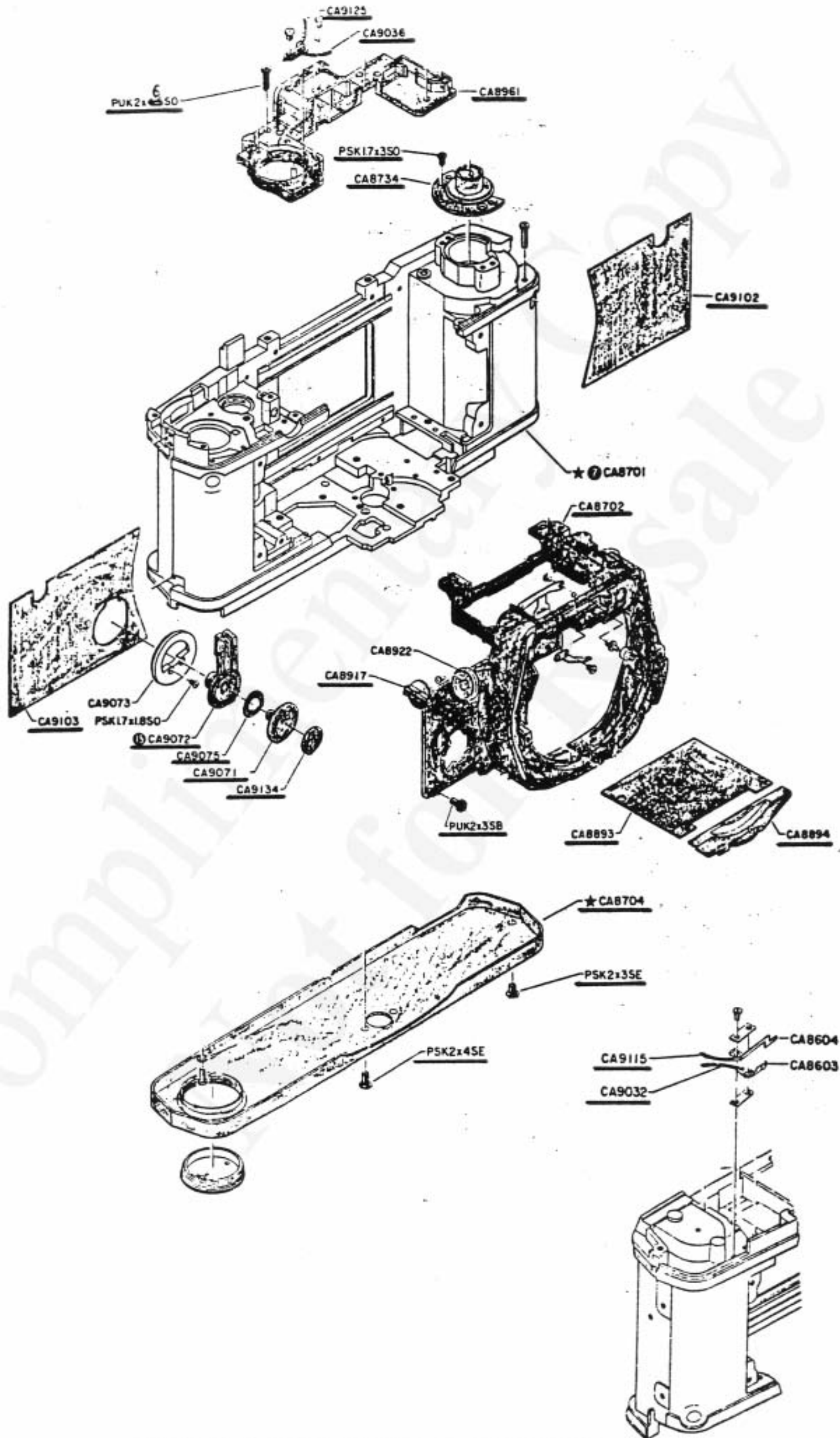
CA8977	(Plate)
CA8996	(Gear)
CA8998	(Shaft)
CA8999	(Spring)

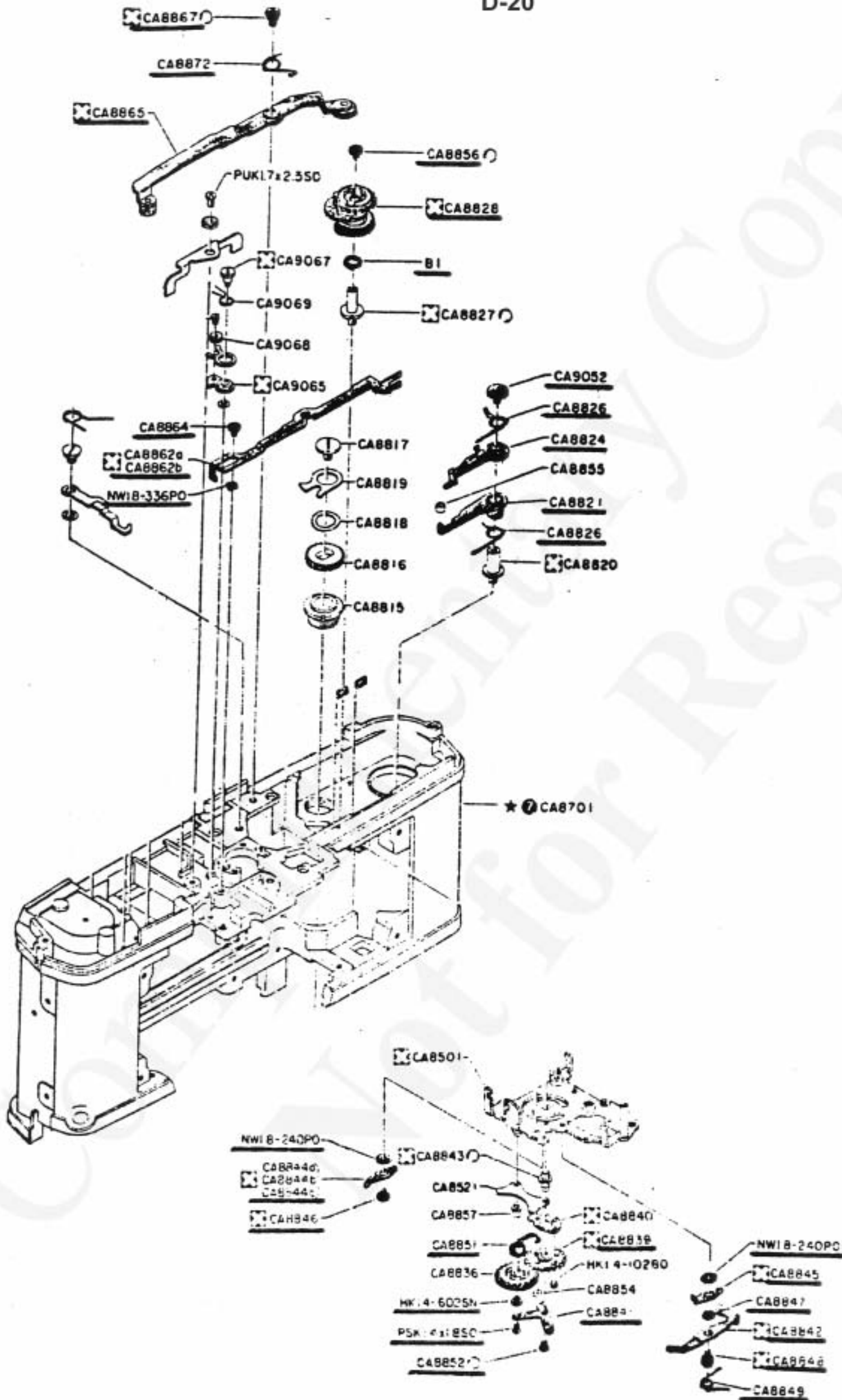
- 5) Remove CA9021 (Spring) from CA8995 (Base) #951 exposure meter mechanism is removed together with CA8982.

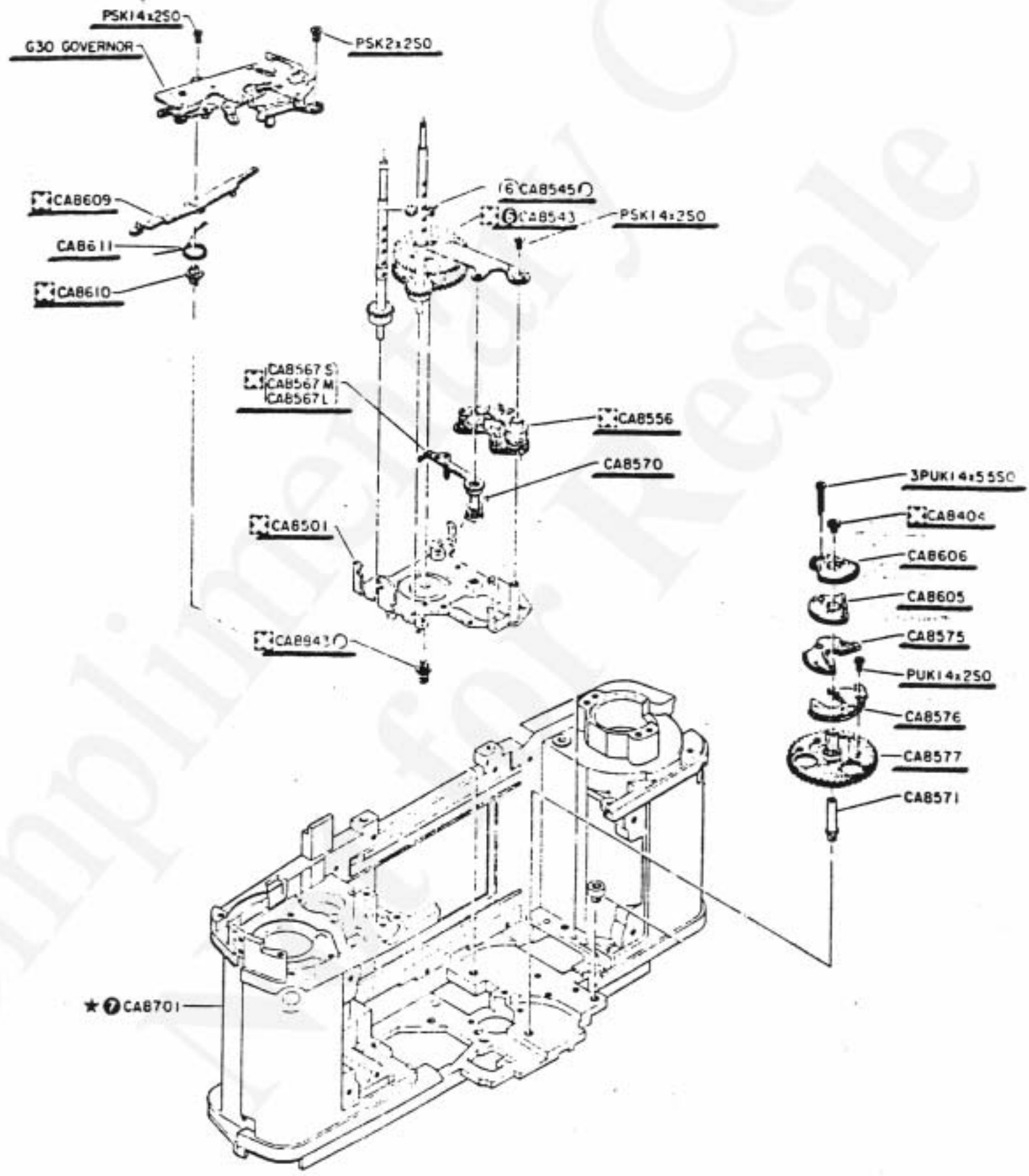
- 6) Remove two PUK2 x 3SO on CA8995.

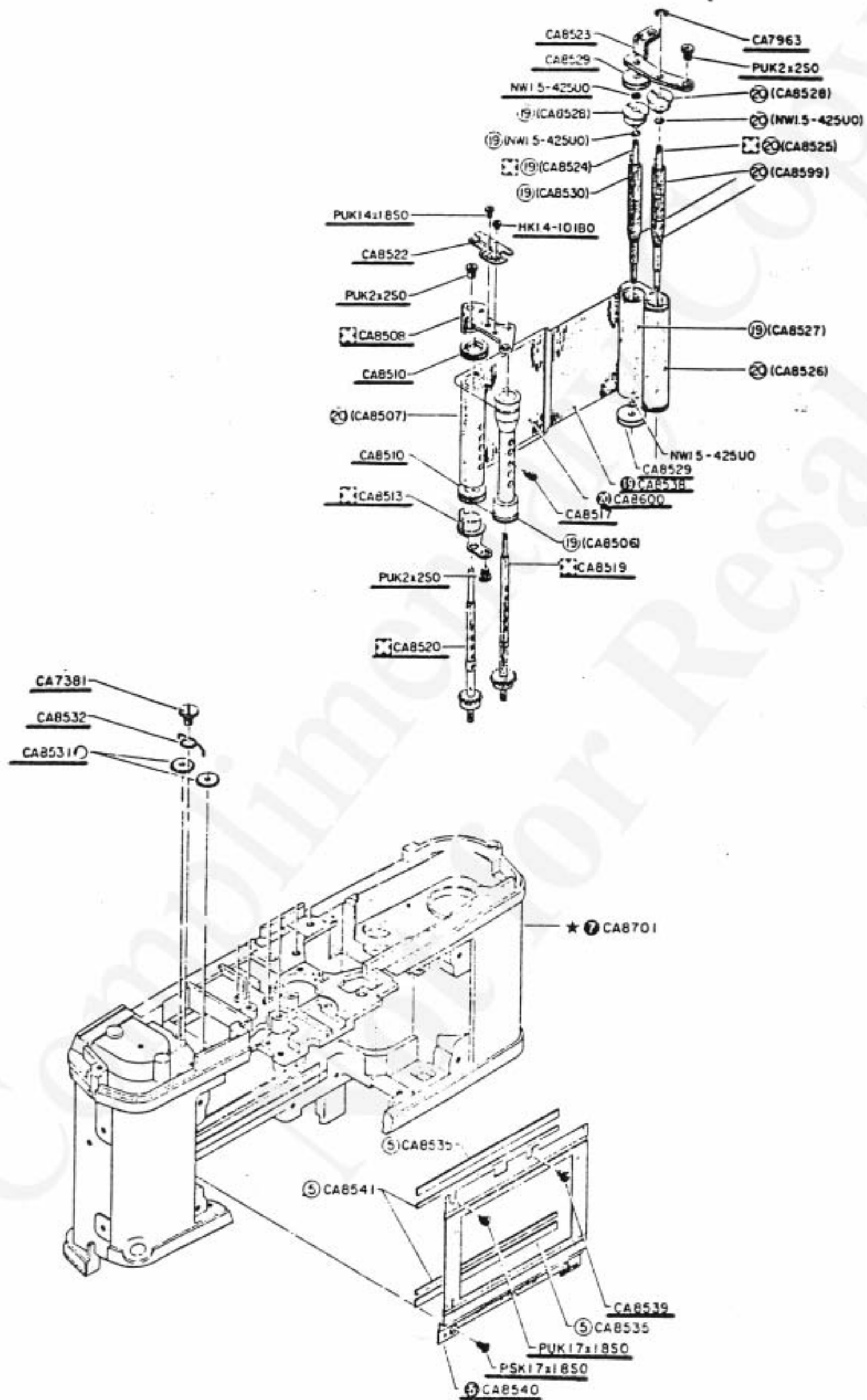
Then comes off CA8995.

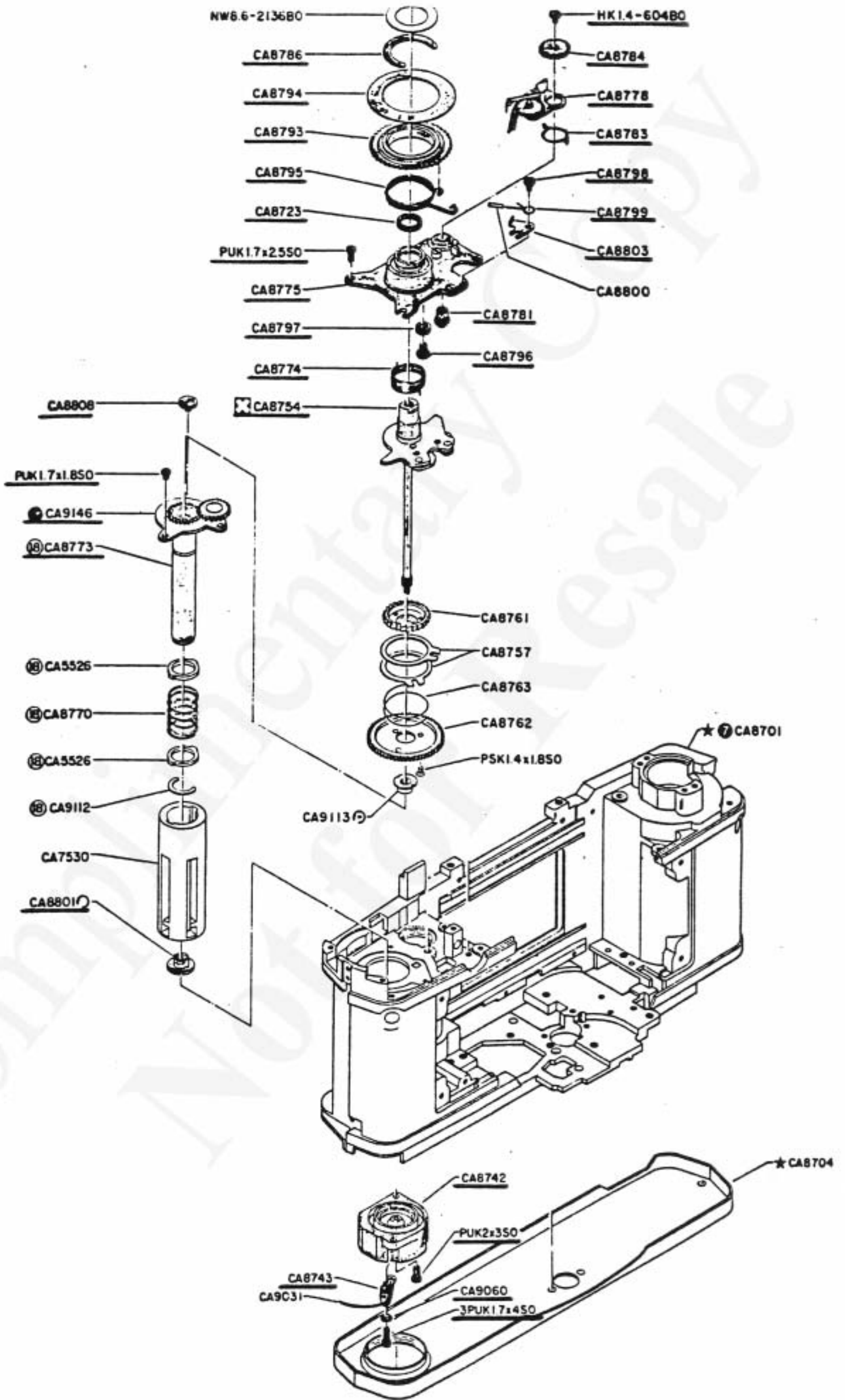


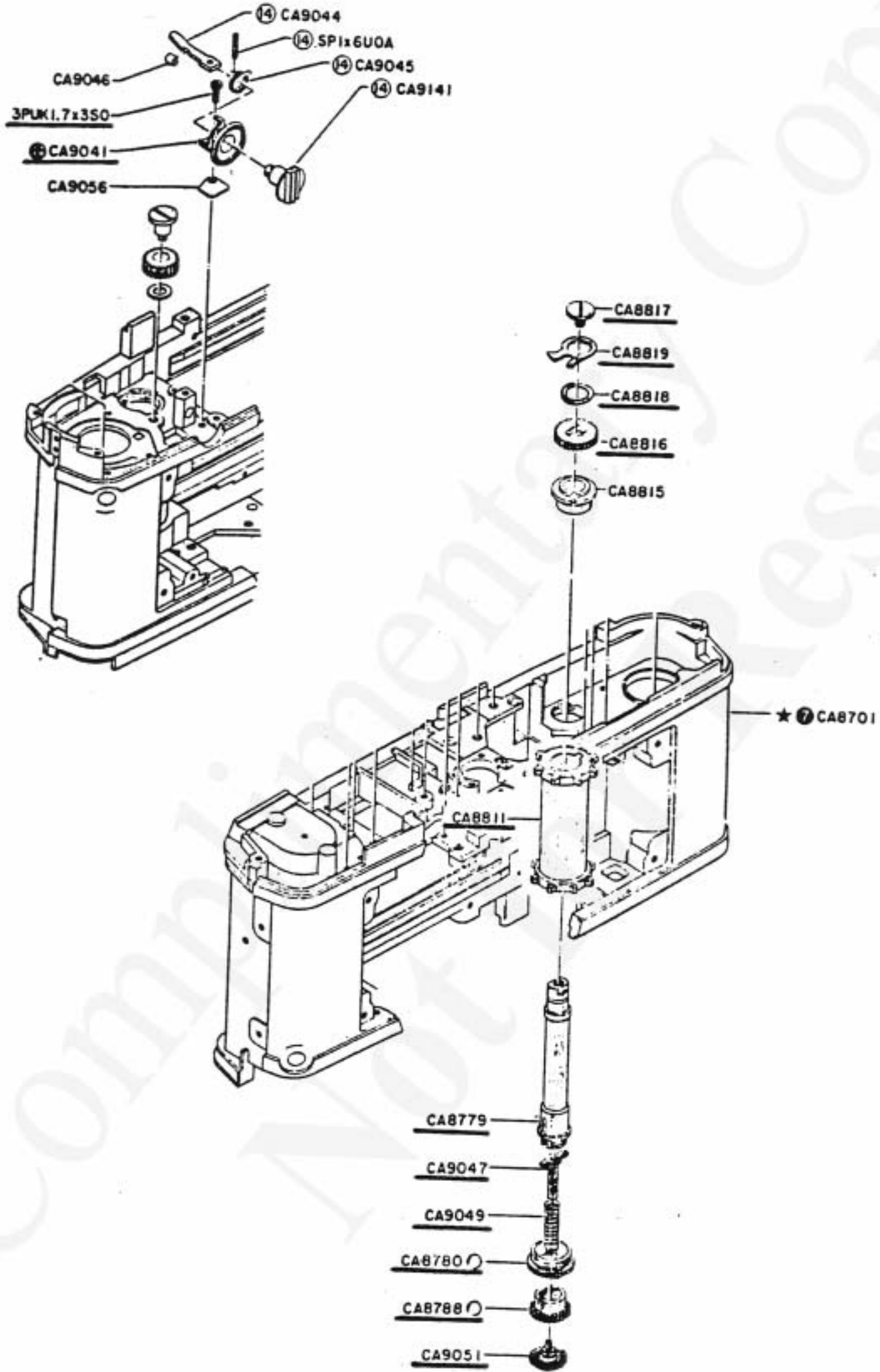




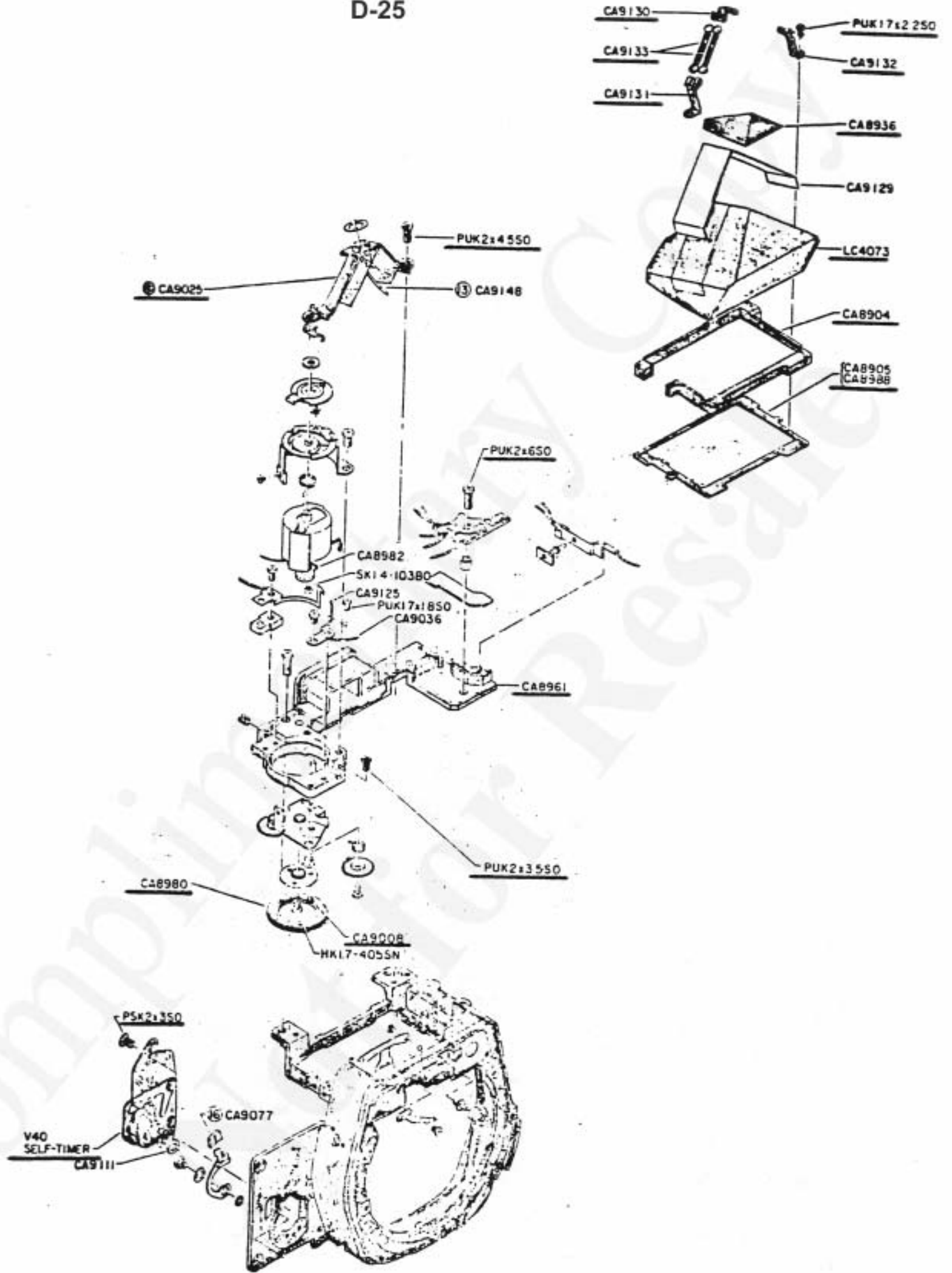


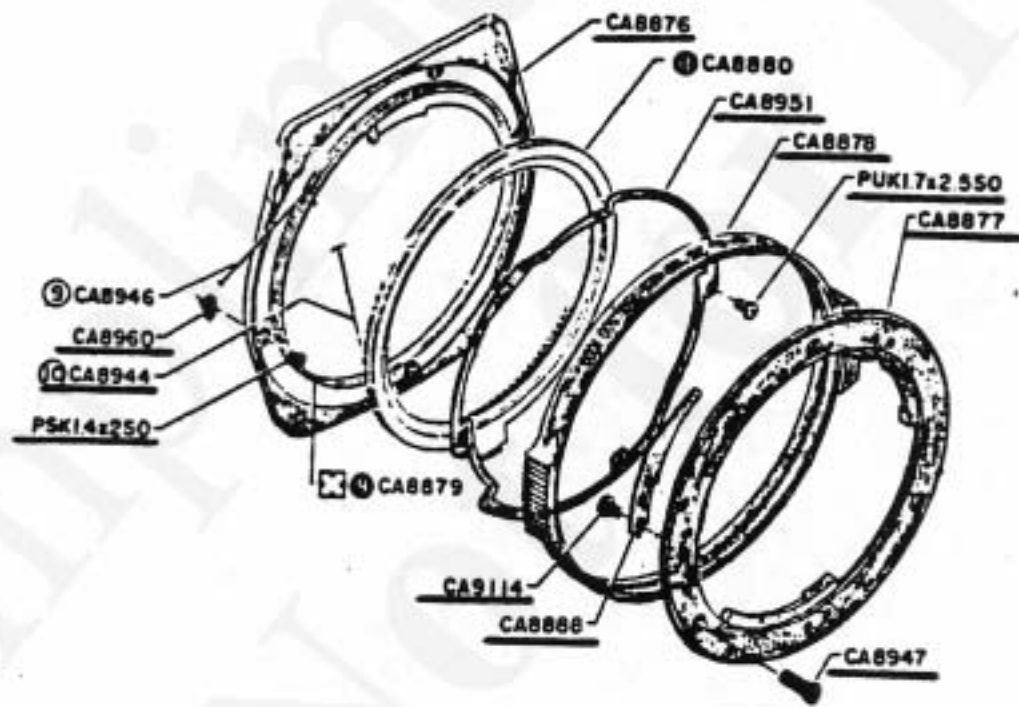
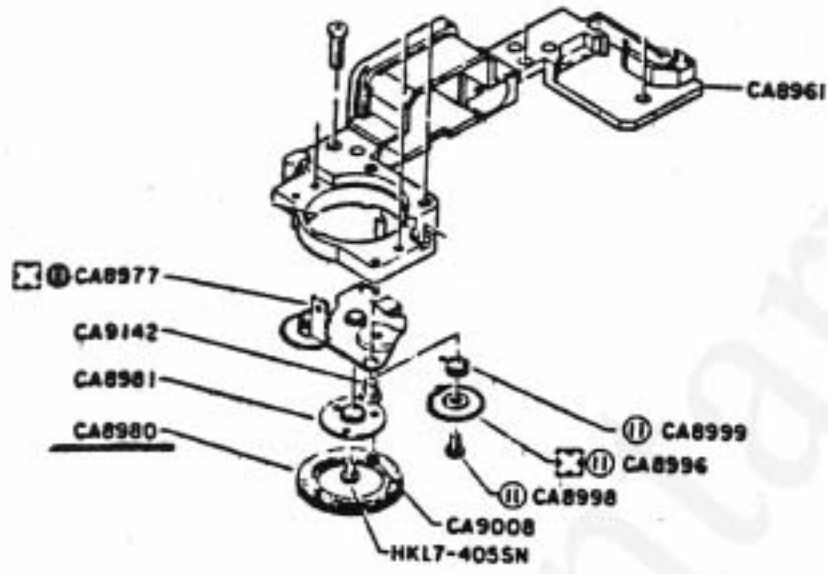


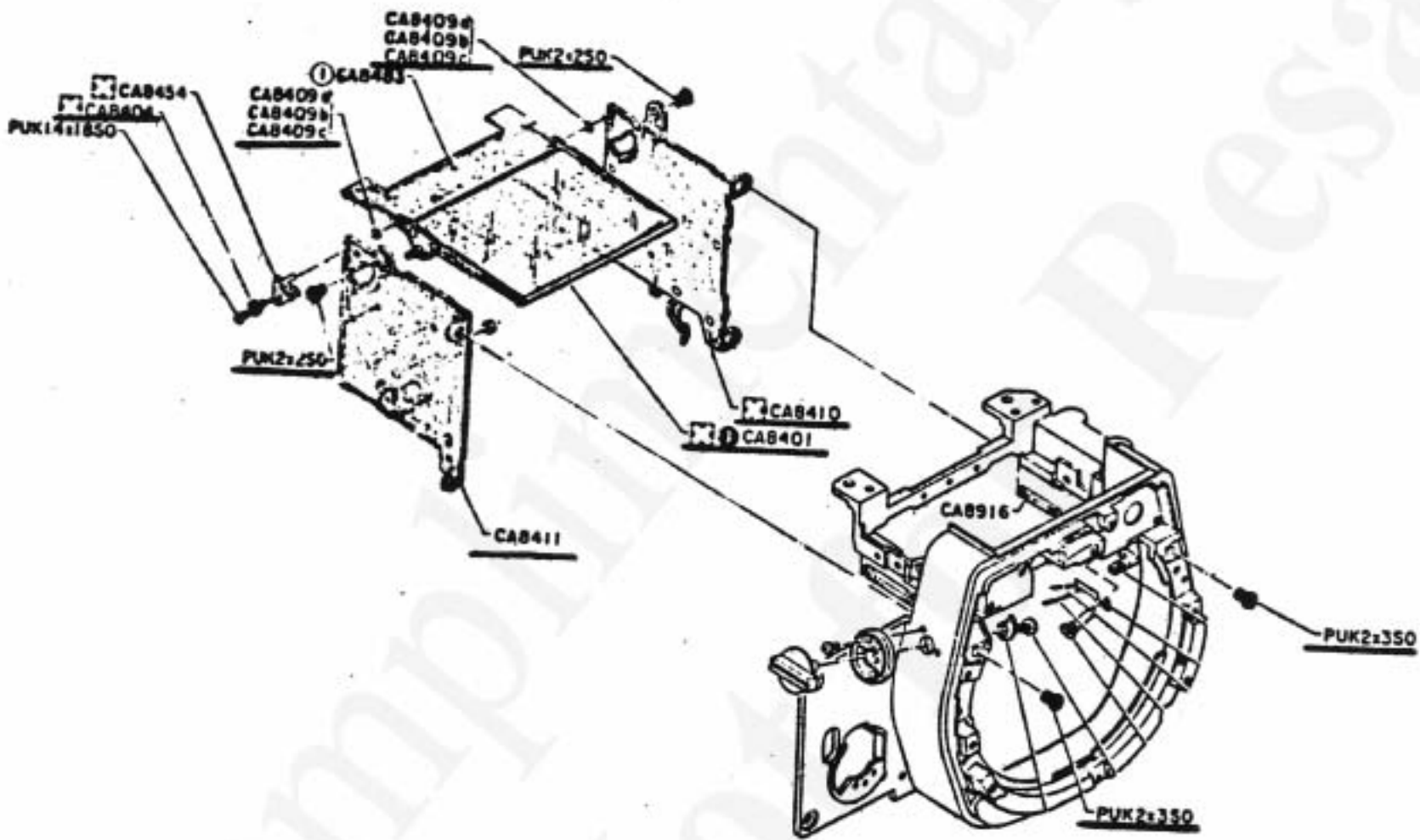


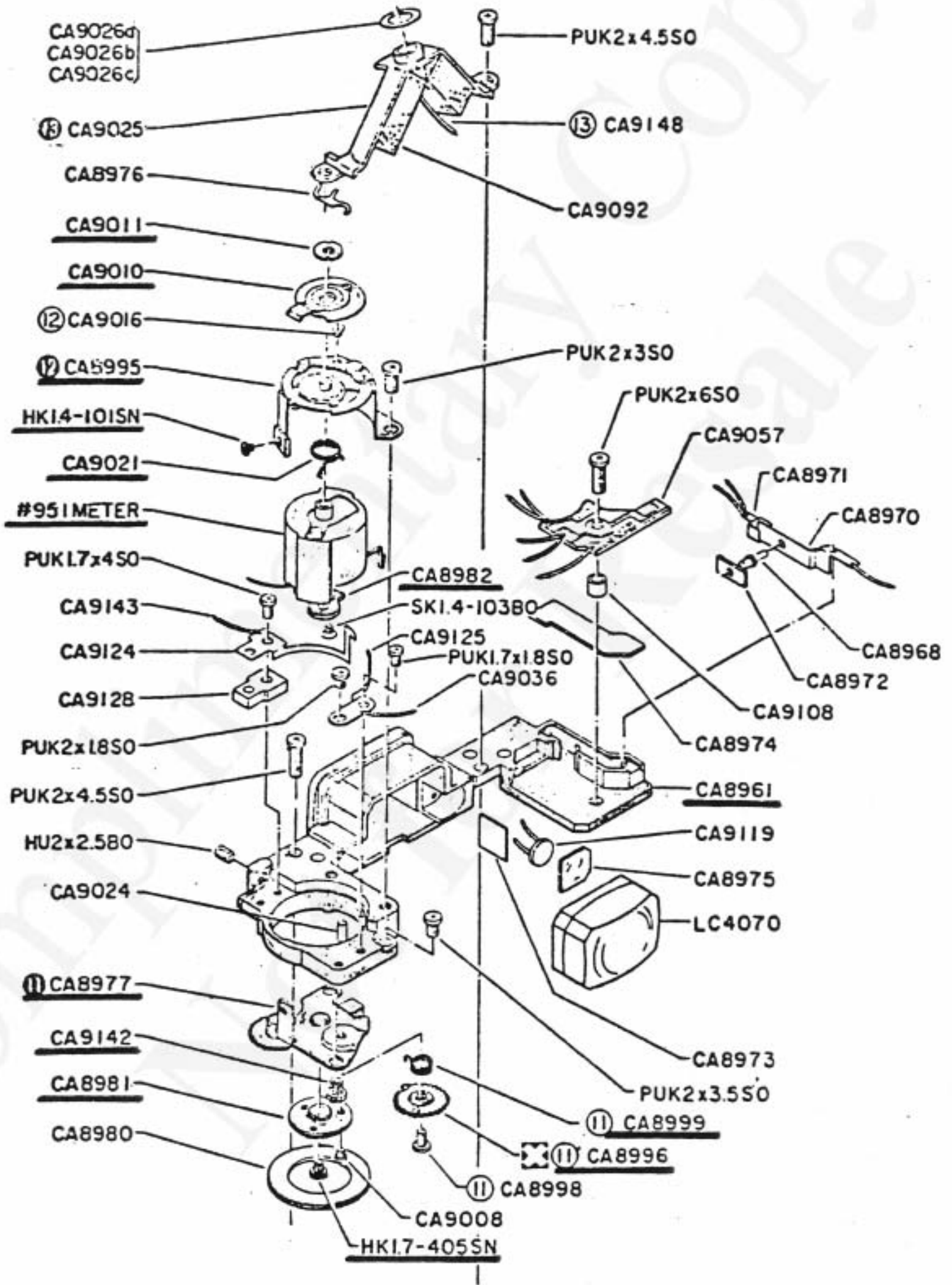


D-25











OUTLINE OF REPAIRS

OUTLINE OF REPAIRSTABLE OF CONTENT

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I. FILM ADVANCE & SHUTTER RELEASE MECHANISMS

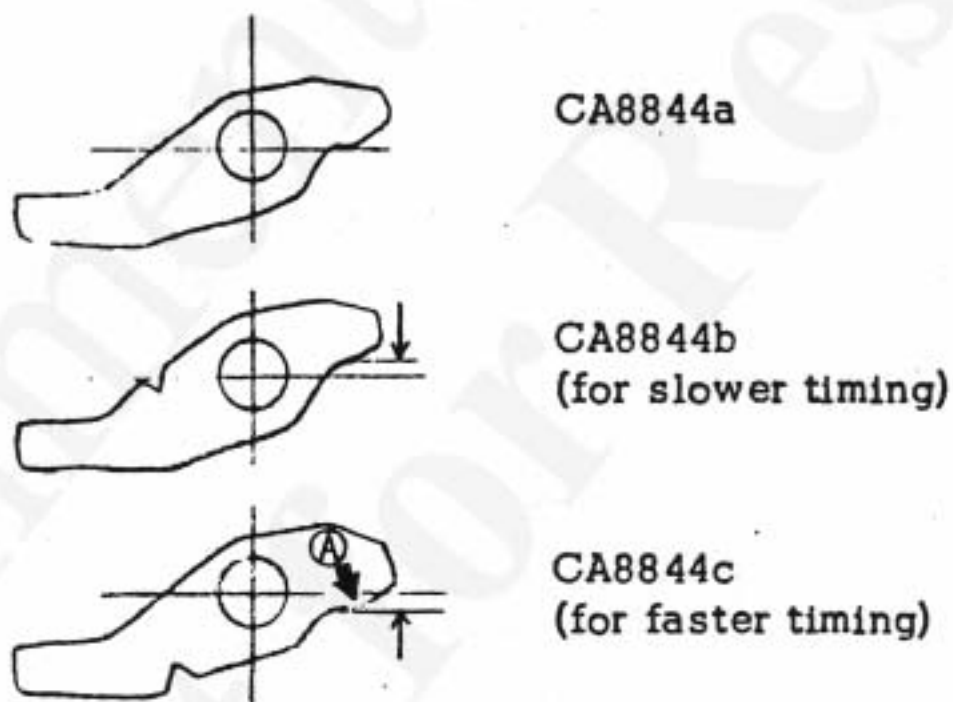
1. Film advancement not performed smoothly:

1) Improper selection of CA8844 (Lever)

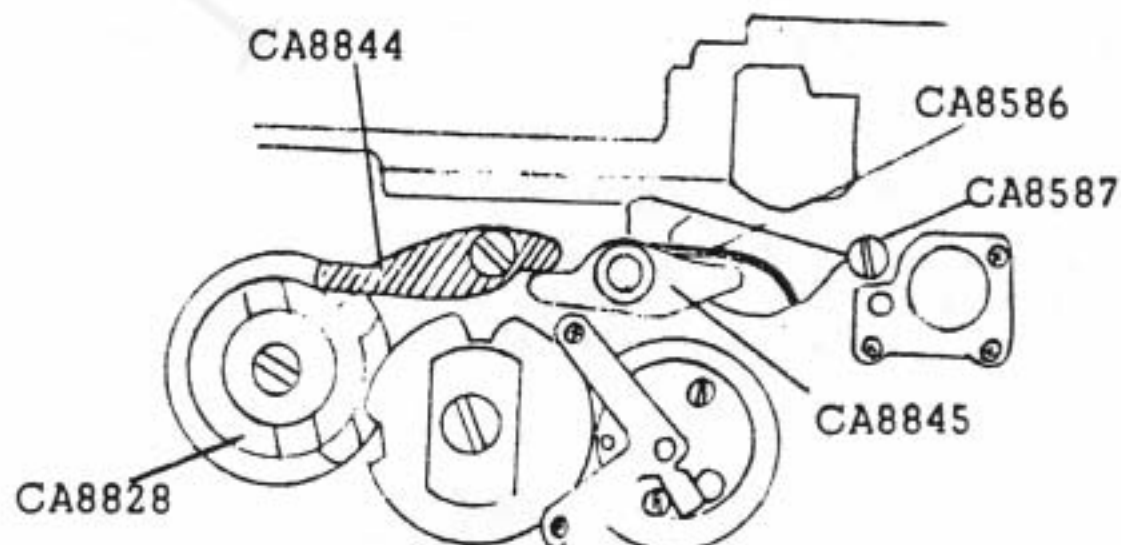
8844 is available in following 3 types. Adjustment should be made on the timing of brake release by replacement of 8844 with a proper type.

Caution:

Some of 8844 are bent for adjustment of engagement between 8828 (Shaft) and 8833 (Plate). This should be checked at the time of replacement.



If, even upon replacement with 8844C, the film advance motion is not smooth yet, the portion marked A may be slightly hammered out. (Do not work excessively, as it will cause the spring to be readily pressed from the beginning of the motion.)



2) Adjustment required of brake force

Strengthen the force of 8586 (Spring) with 8587 (Eccentric screw).
After this adjustment, be sure to check the bouncing effect.

2. Film cannot be advanced.

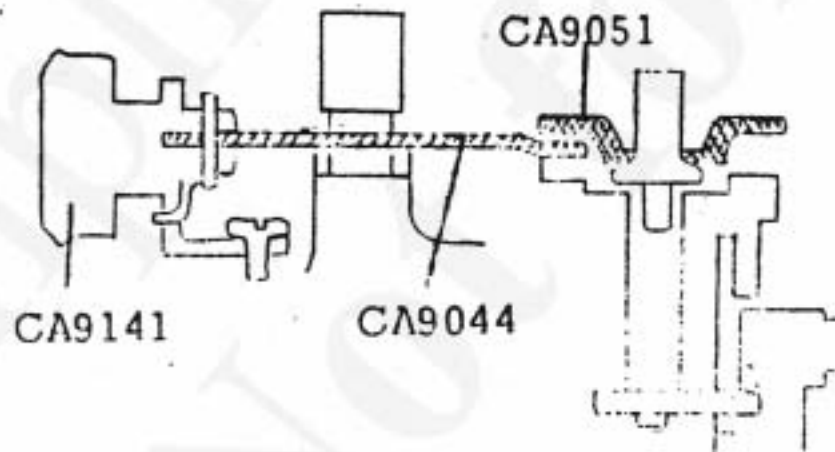
1) Parts coming loose or fallen off.

- (1) Check all parts relative to the film advance mechanism.
- (2) Check if any parts of the shutter mechanism have fallen off.
- (3) Check for any springs and screws of the Front Die-Casting either coming loose or falling off.

Make necessary repairs.

2) CA9051 (Plate) stuck with CA9044 (Plate)

When 9051 is extremely deformed, replacement is required. Clean the sliding portion of both 9051 and 9044, and apply small amount of Molicote (Grease) Type U.



3. Shutter automatically released, immediately upon completion of the film advance motion:

1) Insufficient engagement between CA8592 (Claw) and the Gear A.

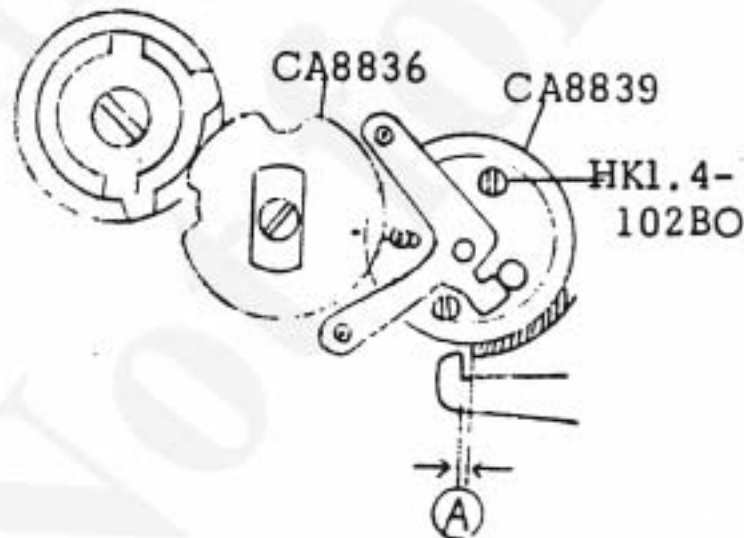
- (1) If insufficiency is in the horizontal direction, replace either 8592 or the Gear A (the whole assembly of 8543, Shaft) with a new one.

- (2) If insufficient engagement is found in the vertical direction,
- o Bend 8592 and adjust
 - o Adjust tolerance on 8592
 - o Replace 8592
 - o Replace the Gear A (the whole assembly of 8543)
4. Excessive or insufficient film advancement for Shutter-Charging
- 1) Improper adjustment of Eccentric Screw (8809)

In case of insufficient film advancement, loosen two HK1.4-102BO to widen the distance at A by adjusting (8809).

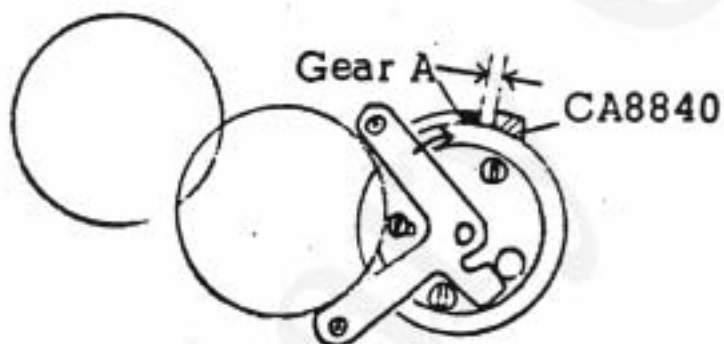
In case of excessive film advancement, narrow the distance at A by adjustment of (8809).

Care must be taken not to make an over adjustment causing the mechanism unchargeable.



Prior to film advancement, when the Gear A is pressed in the arrowed direction, the distance between 8840 and the Gear A should be $-0.10 \sim +0.3$. (-0.10 means the state where the Gear A comes in contact with 8840 and further moves by 0.1.)

Adjustment is similarly made by (8809).



Checkup

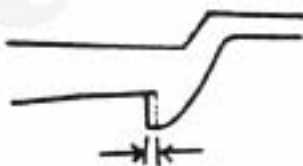
Gently wind up the film and see if the Gear A turns 0.3mm or more when 8592 (Claw) gets engaged on to it.

2) Delayed release of CA8824

Even upon film advancement, the shutter release button cannot be pressed down.

Refer to the checkup column below.

Take out the lower part of 8824 (Lever) (shown below) by 0.05 - 0.1mm.



Take out 0.05 - 0.1.

Checkup

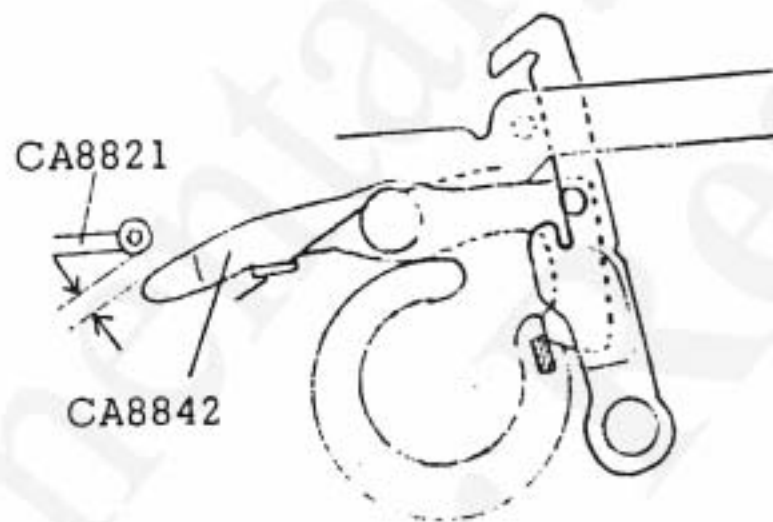
The Lock Lever should be released only after 2G and 3G are disengaged.

5. Locking device for the Film-advancing not operating properly

1) Improper operation of related parts

Refer to the following checkup column, and check the operation of related parts.

- (1) If the shutter cannot be released upon film advancement, check if 8842 (Lever) and the Stopper Ring of 8821 (Lever) are in contact with each other. They should not.



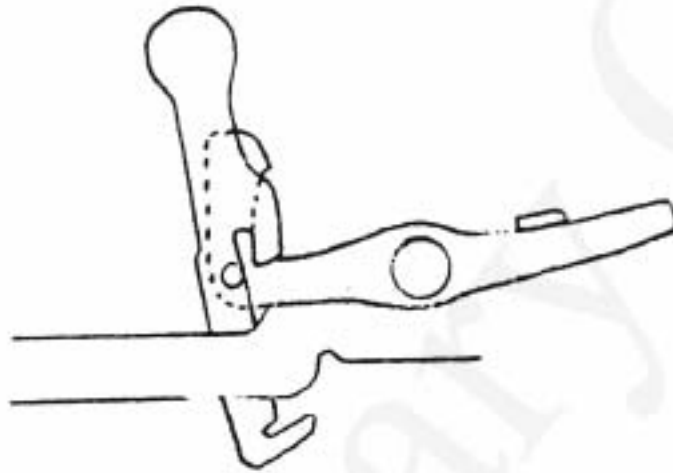
- (2) When the release button returns to its original position after the shutter release, 8862 (Plate) should return until its oblong hole hits 8864 (Shaft).
- (3) The operation should be accurately carried out from 8842 → 8821 → 8824 until CA8824 hits the CA9053 of the body.

(Release of Locking-device for the Film-Advancing)

6. The shutter can be released during or prior to film advancement.

1) Improper operation of related parts

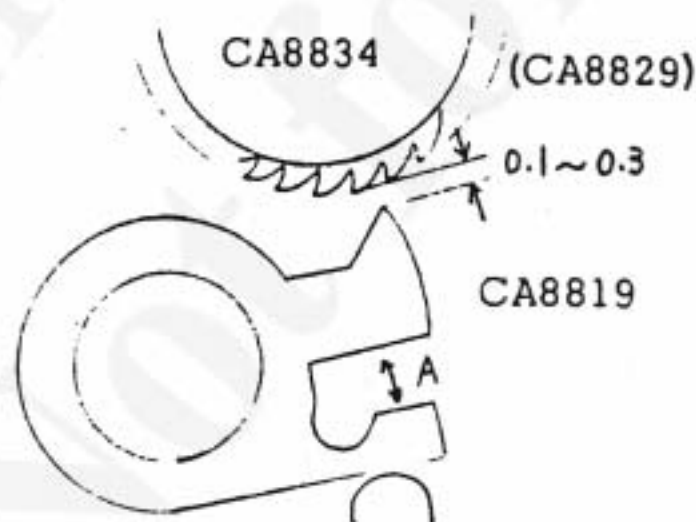
Check the operation of related parts. If the shutter cannot be released even upon film advancement, make sure 8850 (Pin) is not hitting 8810 (Plate).



7. Shutter cannot be charged.

- 1) Improper operation and/or adjustment of CA8819 (Claw)

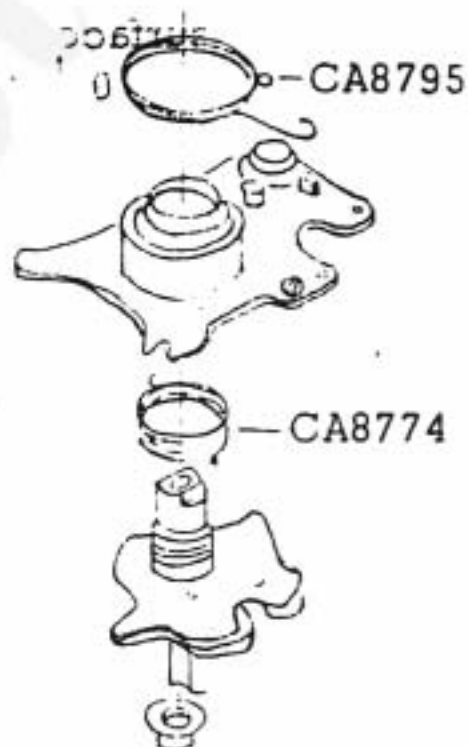
Refer to the checkup column. Adjust the distance A on 8819.



Checkup

- o When the film advance lever is returned to its original position during the film advancing operation, 8819 should engage onto (8829) to prevent reversion of 8834. (Apply force on the sprocket.)
- o During the film advancing motion, 8819 should stay away from the (8829) with a distance of 0.1~0.3.
- o 8819 should be in engagement with 8829 for more than its own (8819) thickness in the vertical direction.

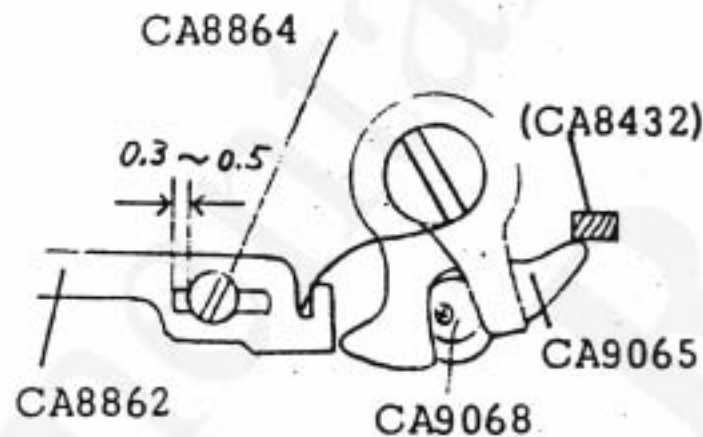
8. Film advancing operation is not smoothly carried out.
- 1) CA8828 (Shaft) and CA8836 (Gear) stuck together.
Adjust the position of 8501 (Plate).
 - 2) Delayed release action of CA8586 (Spring)
Ref: E-4 1-2)
 - 3) CA8578 (Lever) stuck.
Check the appropriate parts and make necessary repairs or adjustments.
 - 4) Excessive charging force CA8412 (Lever).
Check the operation of the related parts and make necessary repairs or adjustments.
- Checkup:
- The charging force of 8412 should be: 430 - 500 gr.
9. CA8749 (Lever) does not return completely and/or smoothly to the original position.
- 1) Top-cover mounted slightly off position.
When 8703 (Top-cover) is mounted off position, it will cause 8753 (Decoration) and 9083 (Washer) to rub each other.
The position of the 8703 should be adjusted.
 - 2) CA8774 (Spring) and CA8795 (Spring) worn out, broken or entangled.



10. The shutter releasing position of the button too deep or too shallow. Excessive or insufficient leeway in the button motion after the shutter release.

1) Improper adjustment of CA9068 (Collar).

9068 should be adjusted so that the mirror commences its operation when the distance between the oblong hole of 8862 and 8864 at their edges is $0.3 \sim 0.5$.



Checkup

- o Make sure 9065 does not hit 8432 (Hook) prior to or during the film advancing motion.
- o Taking the upper edgesurface of 9083 as the basis, the shutter should be released within $0 \begin{smallmatrix} +0.1 \\ -0.2 \end{smallmatrix}$.

11. Heavy touch of the Shutter Release Button

- 1) Operation of CA9078 (Plate)
- 2) Releasing force of the CA8432 (Hook) too heavy.

Checkup

- o The releasing force of (8432) should be 50 gr. or below.

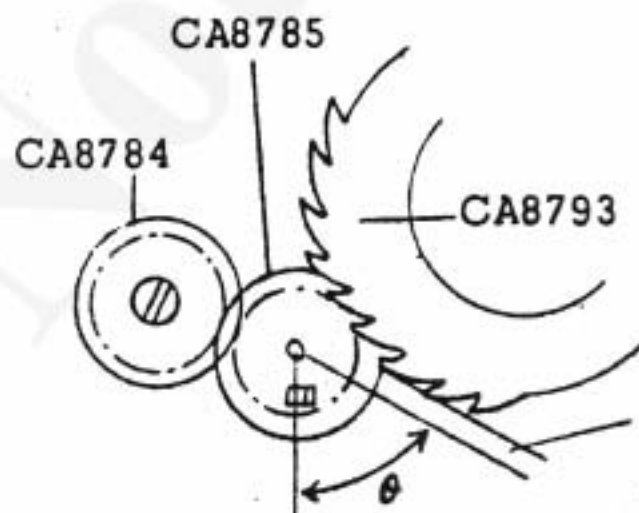
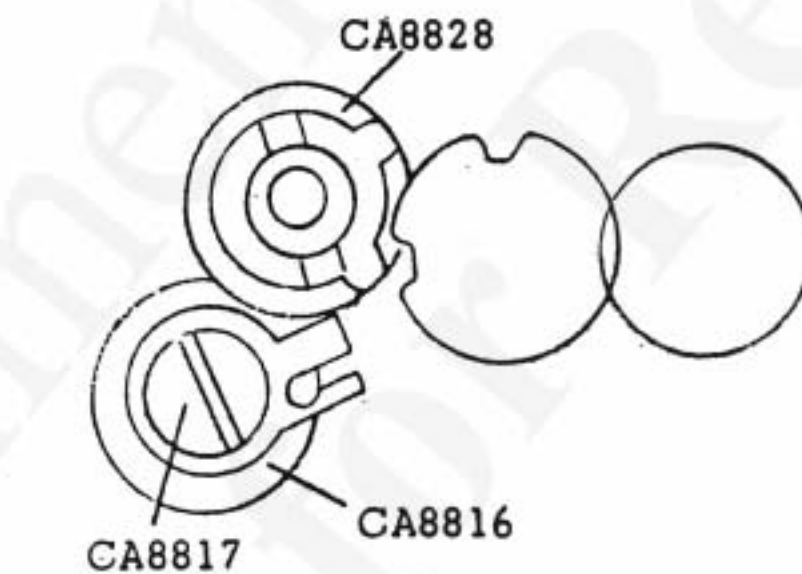
12. Uneven intervals between picture frames.

1) Improper positioning of Sprocket Teeth

After the film is advanced and locked, bring 8785 (Gear) to rise within the range θ , and make following adjustments:

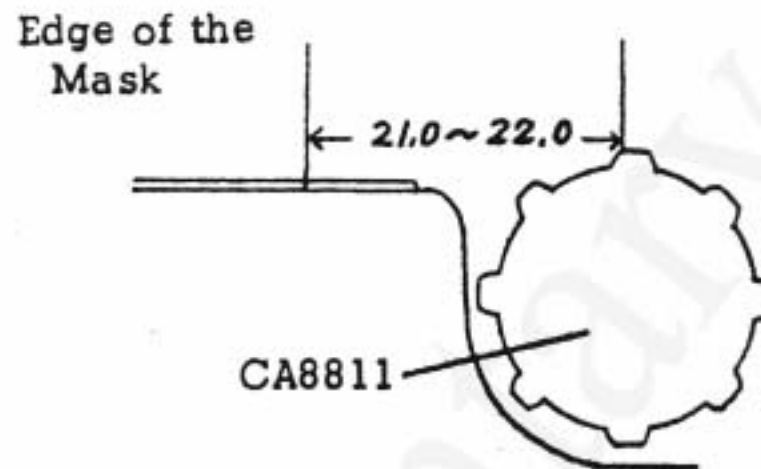
Loosen 8817 (Screw) and change the position of engagement between 8816 (Gear) and 8834 (Gear).

The Sprocket will turn 1.66mm more, or less, when the engagement is changed by a tooth on 8816 (Gear). → (The lowest gear is 8834.)



The clearance between boss of 8785 and 8793 should be over than 1mm.

The space between 8793 and 8785 should be 1mm or above.
The clearance between boss of 8785 and 8793 should be over than 1mm.



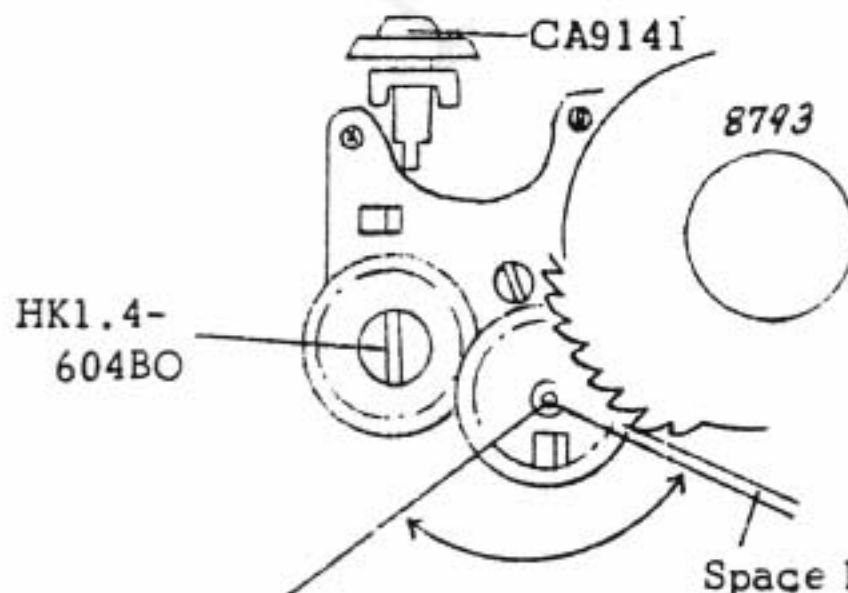
Checkup

When the Sprocket is pressed toward the Mask, the distance between the edge of the Mask and the Sprocket Teeth should be 21.0 - 22.0 mm.

13. Film Counter Plate not moving properly.

1) Improper positioning of CA8785 (Gear).

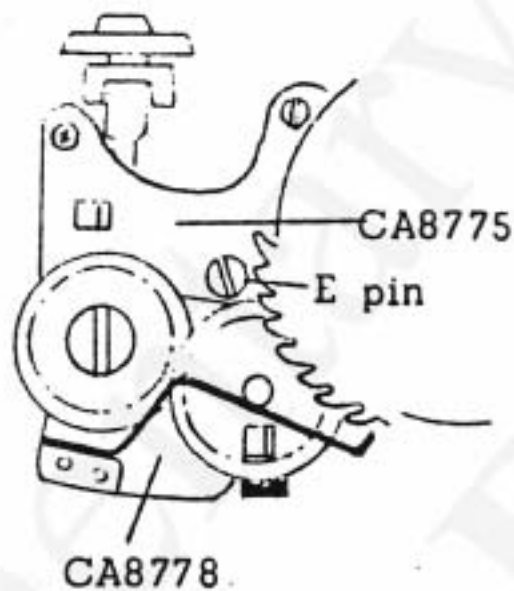
Set 9141 and loosen HK7.4-604 BO on 8784 to let it rise and adjust 8785 position. Upon completion of film advancement, 8785 should be positioned as follows (within the range shown by arrows.)



Space between 8793 and 8785 should be more than 1mm.

2) Improper positioning of CA8778 (Lever)

Keeping the E pin of 8775 at the neutral position of its eccentric motion, bend the Plate (A) so that 8778 will hit the E pin when the Rear Cover is closed.

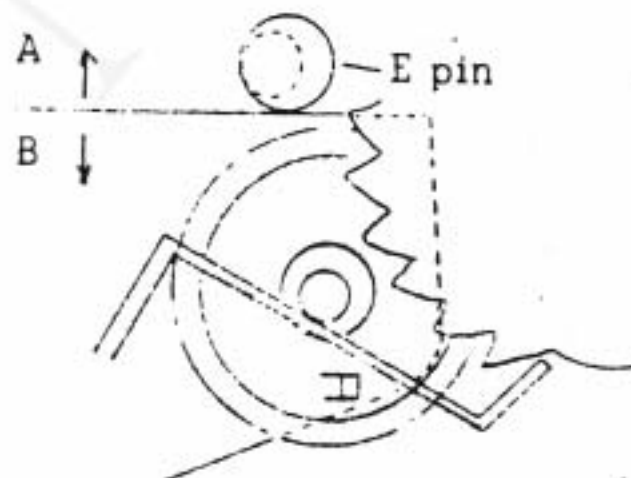


3) Improper material used for CA8786 (Ring)

If the material for 8786 is soft and is deformed, replacement will be required.

4) Improper position of CA8790 (Stopper)

When the Rear Cover is closed, the tip of (8790) should hit the bottom of the teeth of (8793). If it does not, an adjustment should be made by bending (8790) at the S position. Some room may be permissible between (8787) and (8790).



Checkup

- o When the Rear Cover is closed, (8790) should not supple.
- o Even is 8793 is shaken vertically, 8793 should be engaged with (8790) at least for its own thickness.
- o The tip of (8790) should be lower than the upper surface of 8793.
- o At the commence of motion, (8785) should work on the 4th tooth of 8793.

5) Adjustment of CA8802 (Pin)

Adjust the E pin like that 8793 will be travelled by 1.2 - 1.8 teeth space by means of (8785).

When there is insufficient travel, adjust (8802) in the A direction shown above, and when excessive in the B direction.

Upon adjustment of (8802) realign 8778 and (8790).

The three points explained above, i.e. the positions of 8778, (8790), and (8802), are all related to the movement of the Film Counter Plate.

6) CA8795 (Spring) entangled

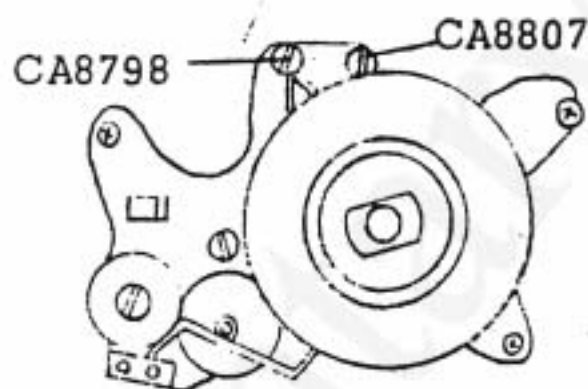
Check the relative part and adjust.



14. S point of the Film Counter Plate out of position.

1) Adjustment of CA8807 (Pin)

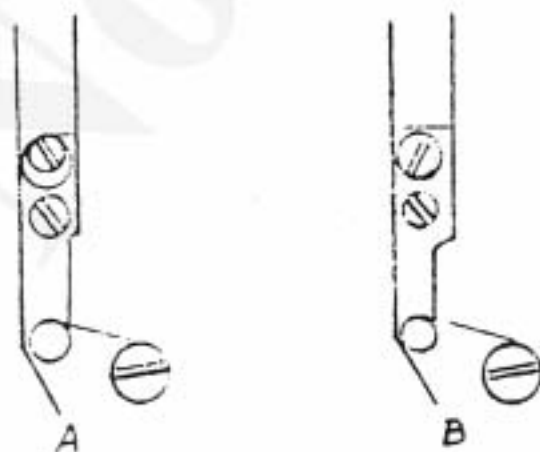
Loosen 8798 and adjust eccentricity of 8807 so that the tip of (8790) touches the bottom of the first tooth of 8793.



15. Little leeway stroke after the shutter release by the self-timer.

1) Adjustment of CA9089 (Screw)

Refer to the checkup column on the next page and make following adjustments.



A : Bigger leeway stroke after the shutter release and shorter self-timer operation.

B : Little stroke after the shutter release and longer self-timer operation.

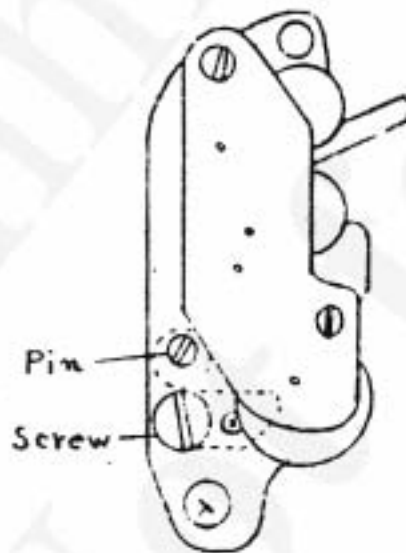
Checkup

The duration of operation of the self-timer is to be 9 - 14 seconds when it is fully set. The leeway stroke after the shutter release should be 0.2mm or above.

16. ST lever not pointing straight up.

1) S stopper pin of the self-timer not properly adjusted.

Loosen the screw and adjust the S stopper pin (eccentric). After adjustment, tighten the screw fully and bond it with Aron Alpha.



Checkup

The slant at the tip of the ST lever should be 0.3mm or less.

II. SHUTTER AND MIRROR

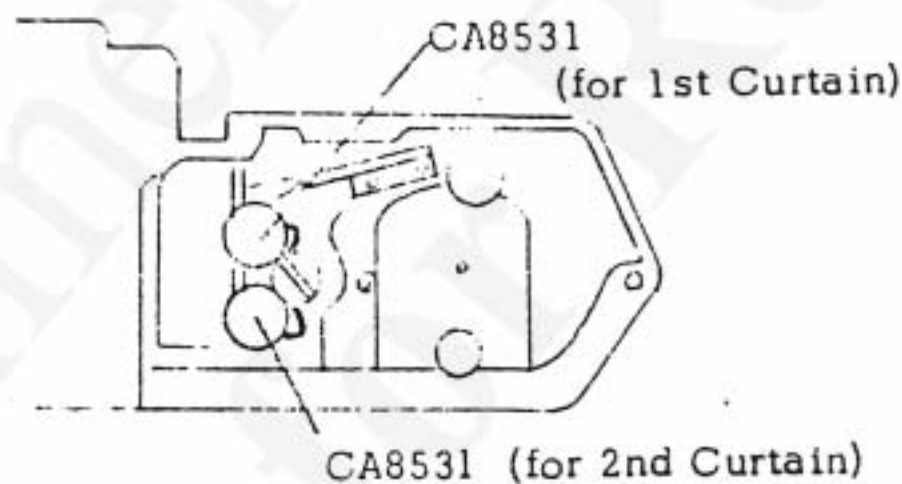
1. Excessive or insufficient speed of the curtains.

1) Improper adjustment of CA8531 (Nut)

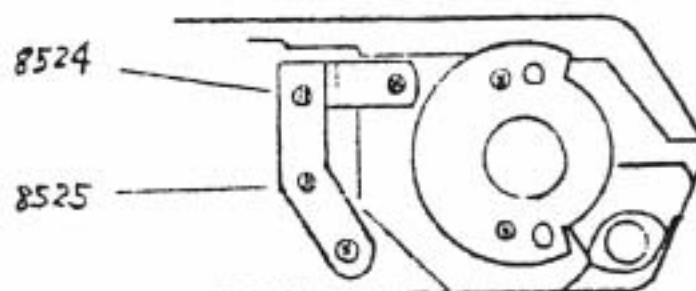
The curtain speed is adjusted by 8531. Refer to the checkup column and make adjustment.

Turn 8531 to the right to weaken the curtain tension and thus slow down the speed.

Turn 8531 to the left to increase the tension and thus speed up the curtain run.



Adjustments may be made by 8525 (Shaft) and 8524 (Shaft). Turn them to the right for stronger tension and faster speed, and to the left for weaker tension and slower speed. Care must be taken not to deform the driver groove at the upper end of 8525 and 8524, as it will cause poor operation of the curtains.



Checkup

Use the shutter tester 7F7L1 and/or 7F7L3. The speed should be 11.7~12.1 ms. at 1/1000 sec.

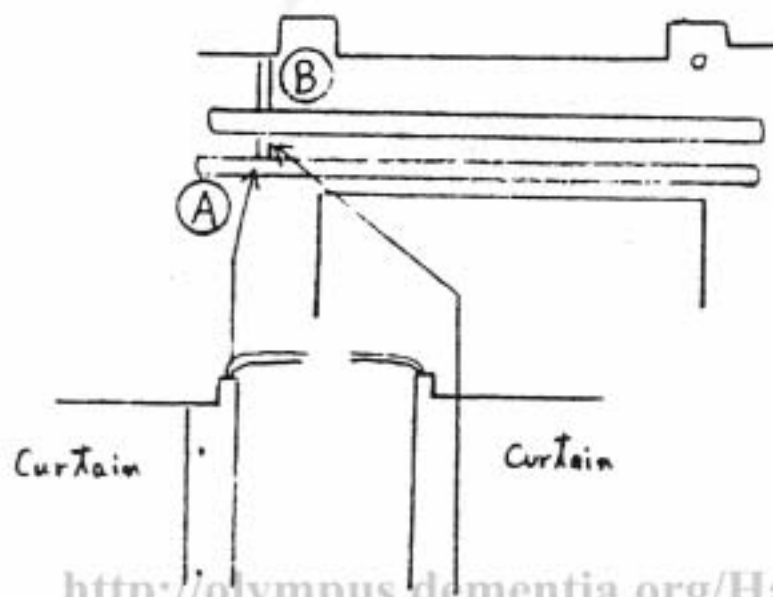
2. 1st curtain bounces.

1) Adjustment of the curtain position.(Patch inclined.)

- (1) Turn 8519 (Shaft) to let 8592 (Claw) engage on to the Gear A and lock it. Do not directly touch the metal part of (8519) with fingers.
- (2) Remove 8857 (Shaft) on the lens side, turn 8521 (Stopper), lower 8520 (Shaft), and disengage 8520 from the Gear B.
- (3) Rotate the Gear B to bring its boss to the position coincident with that of the Gear A as shown below.



- (4) Do not change the position of the Gear B but turn 8520 until the Patch of 8600 (Curtain) reaches closest to the Scratched line (A) below) on the Die-cast Body. Then raise (8520) and let it engage onto the Gear B.



Make fine adjustment on the alignment of the Patch of 8600 and the Scratched-Line on the die-cast by adjusting the 5 holes' positions.

Tolerance: 0 - 0.3mm

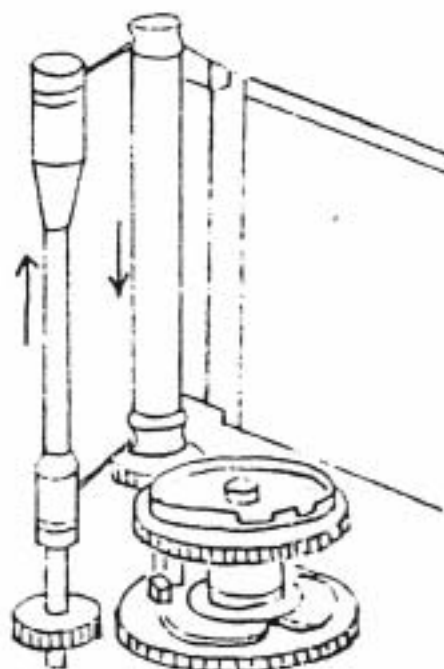
(From the point of perfect coincidence with the Scratched-Line up to 0.3mm passing it.)

- (5) Return 8521 to the original position and tighten 8857 (Shaft).
- (6) Loosen PUK1.4 x 1.8SO of 8522 (Stopper), slide aside the 8522, and raise 8519 (Shaft) to release its engagement with the Gear A.
- (7) While keeping the proper relationship between the Gears A and B (items (1) through (3) above), rotate (8519) until 8538 (Curtain) reaches closest to the Scratched-Line on the Die-Cast (see Ⓑ in the illustration in page 18), and lower (8519) until it gets engaged with the Gear A.

Make fine adjustment on the alignment of the Patch of 8538 and Scratched-Line on the die-cast by adjusting the 5 holes' positions.

Tolerance: $0_{-}^{+0.15}$ mm

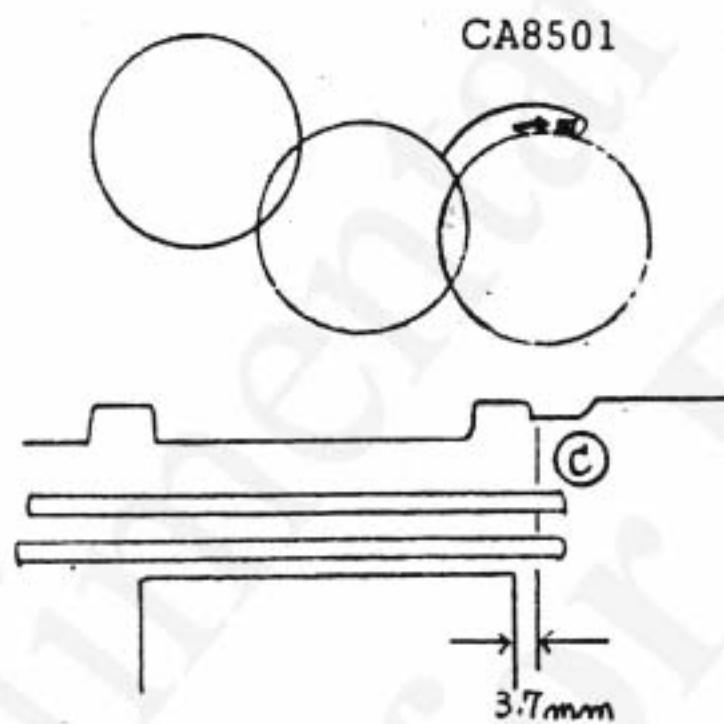
- (8) Return 8522 (Stopper) to the original position and tighten PUK1.4 x 1.8SO.



2) 1st curtain stops at the improper position.

After the shutter is released, when the boss of the Gear A is pressed against 8501 (Base Plate), the edge of 8538 (Curtain) should almost reach the Scratched-Line (see C below.)

If it does not, an adjustment may be made by moving vertically the mounting position of 8517 (Stopper) assembled in 8519 (Shaft).



Reference: (Stopping point of the second curtain)

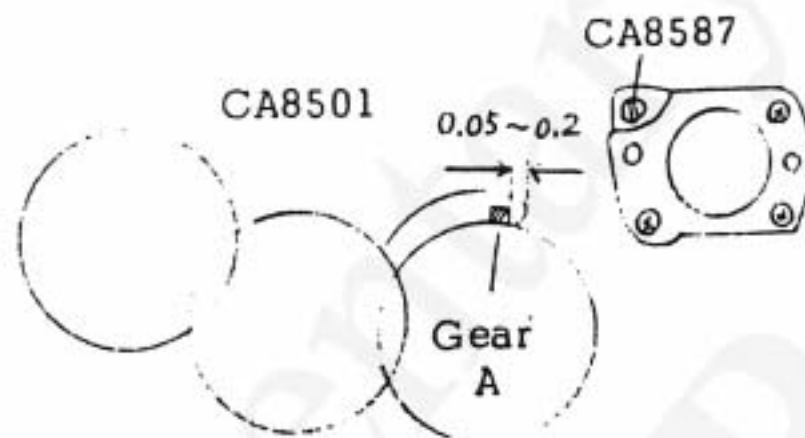
At 1/000 sec. the boss of the Gear B (covered with a rubber ring) should hit (8502) but not at the speed of 1/1.

Checkup

The first curtain should stop at 3.7 ± 0.5 from the edge of the mask. Also, the overlapping with the Patch of second curtain should be 2.5mm or above.

3) Brake adjustment unsatisfactory.

Upon adjustment of the curtain speed, when the shutter is released at 1/1000 or B, there should be a room of 0.05 - 0.2mm between 8501 (Base Plate) and the Gear A. If not, it should be adjusted to be within that range by 8587 (Screw). (It will change the spring tension of 8586 (Spring).)



4) Spring tension of CA8586 (Spring) weak.

If 8586 itself is worn out, make a replacement. Upon replacement, check the space between 8501 and the Gear A.

5) CA8578 (Lever) not operating properly.

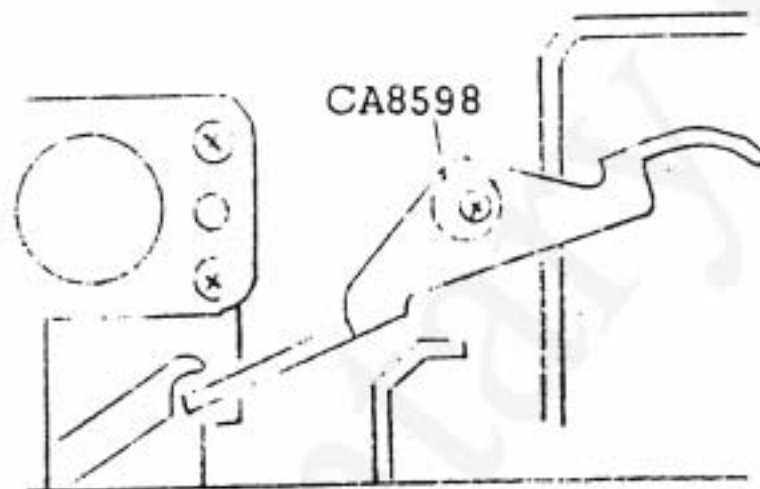
Looseness of 8585 (Screw) is to be checked. It should be tightened if loose. On the way of the film advancement, remove 8586 (Spring) from 8587 to check the operation of 8578. If it does not work properly, adjust or replace it.

6) Inaccuracy in surface finish of the sliding part of 8519.

To be cleaned, adjusted or replaced (in total assembly).

7) CA8595 (Lever) and CA8592 (Claw) stuck together.

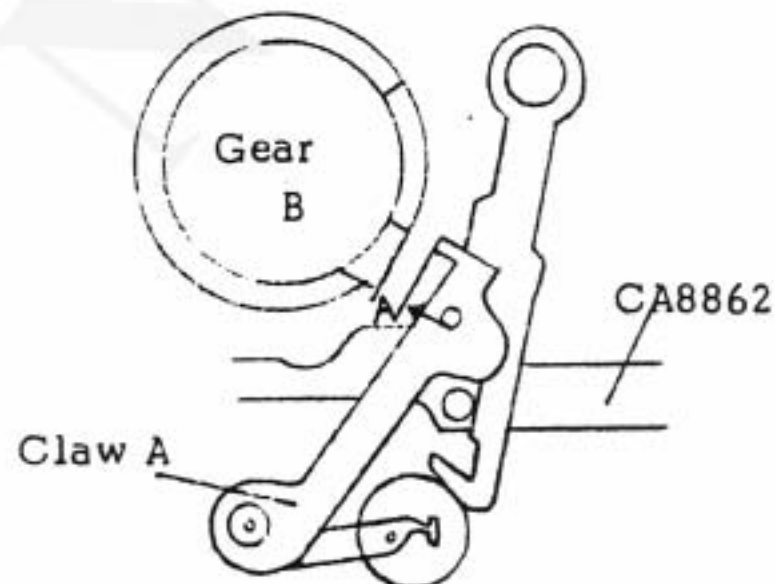
8598 (Washer) is to be mounted in the manner shown below.



3. Adjustment of "B" shutter speed (Irregularity of B stop, immediate closing or remaining open)

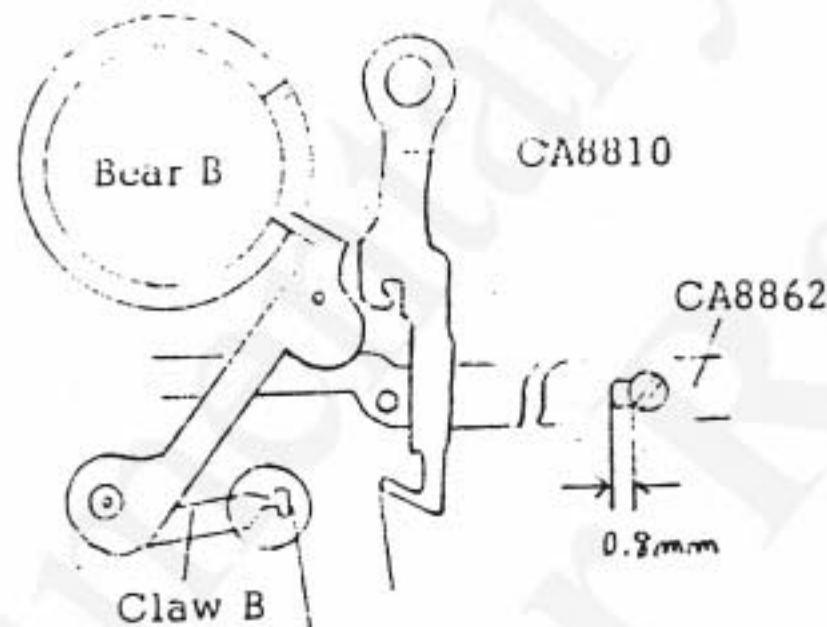
1) Adjustment of "Bulb"

(1) Upon completion of shutter charging, 8862 (Plate) should return to the original position accurately. At this time there should be a space between Claw A of 8567 (Shaft) and the Gear B of 0.5mm or above. (See below, the portion marked A) If there is not, an adjustment must be made by bending the portion marked with a circle in the picture below.



- (2) Press 9078, let Claw A of 8567 engage onto the Gear B, and see if there is a space of 0.2mm or above between 8810 (Plate) and Claw B when the space between the oblong hole of 8862 (Plate) and 8864 (Shaft) gets to 0.8mm. If there is not, an adjustment should be made by bending the portion marked with a circle in the picture below.

Upon such an adjustment, check the point (1) above, again.

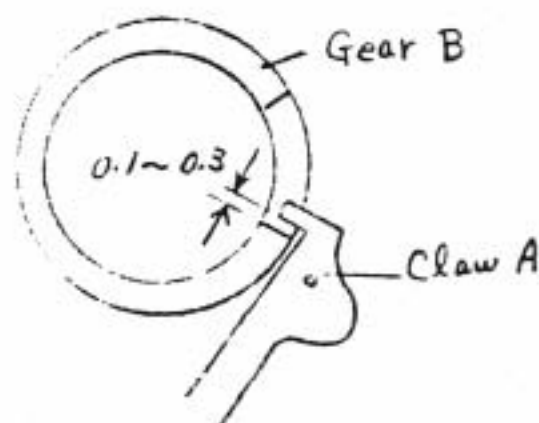


- 2) The space between Claw A and the Gear B.

Depending on the size of Claw A, there are three types of 8567 (Shaft). A proper selection should be made out of the three shown below, so that the space between Claw A and the Gear B would be 0.1-- 0.3 (as shown below).

CA8567S
CA8567M
CA8567L

An adjustment may be made by bending the tip of Claw A.



When Claw A is shaken if its lower edge hits the Gear B, an adjustment may be made by bending the Plate (B).



Checkup

Vertically, Claw A and the Gear B should be engaged with each other for more than $2/3$ of their thickness.

3) Shifts in releasing force of Claw A.

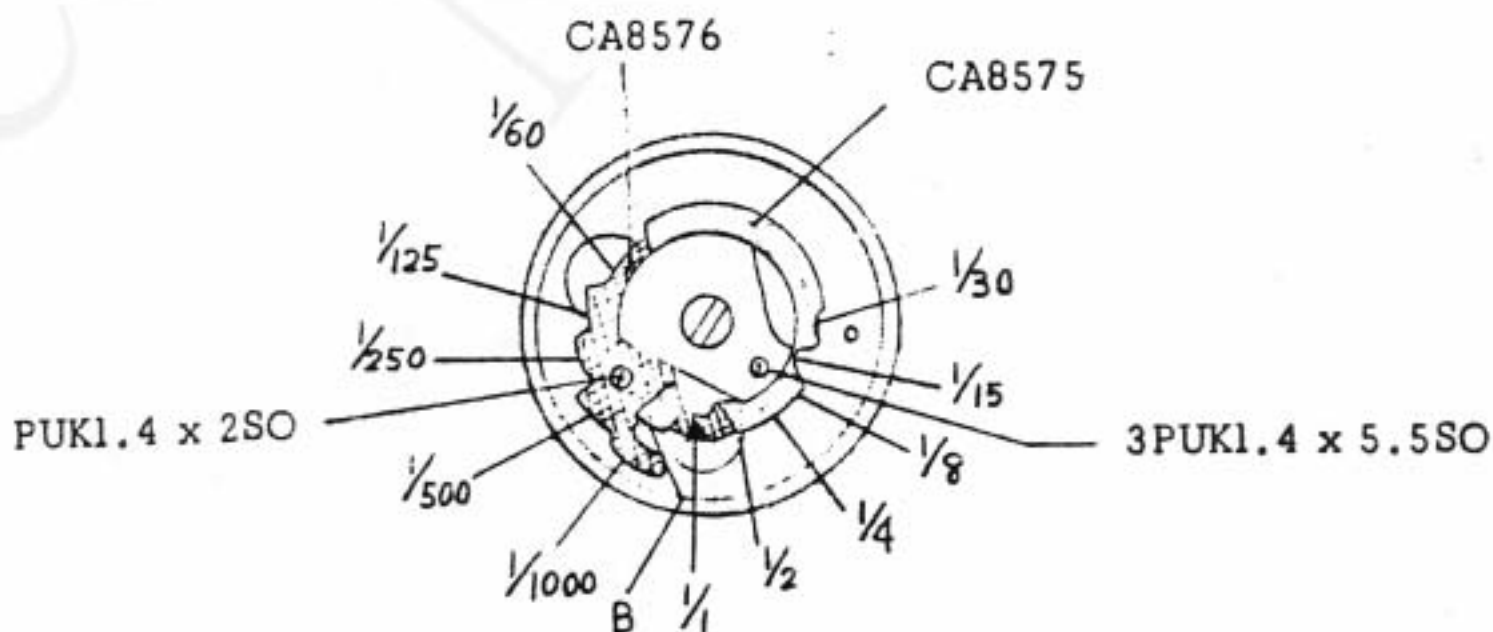
Where there is an extreme shifting in the releasing force, the portion of 8567 (Shaft), 8501 (Plate) and the Plate B where they fit with each other, should be cleaned. Then rub Claw A several times.

Checkup

While the release button remains depressed at the shutter speed "B", release the shutter with 8595. Releasing Claw A with a tension gauge, measure it. It should show the value of 5 - 15g.

4. Shutter Timing

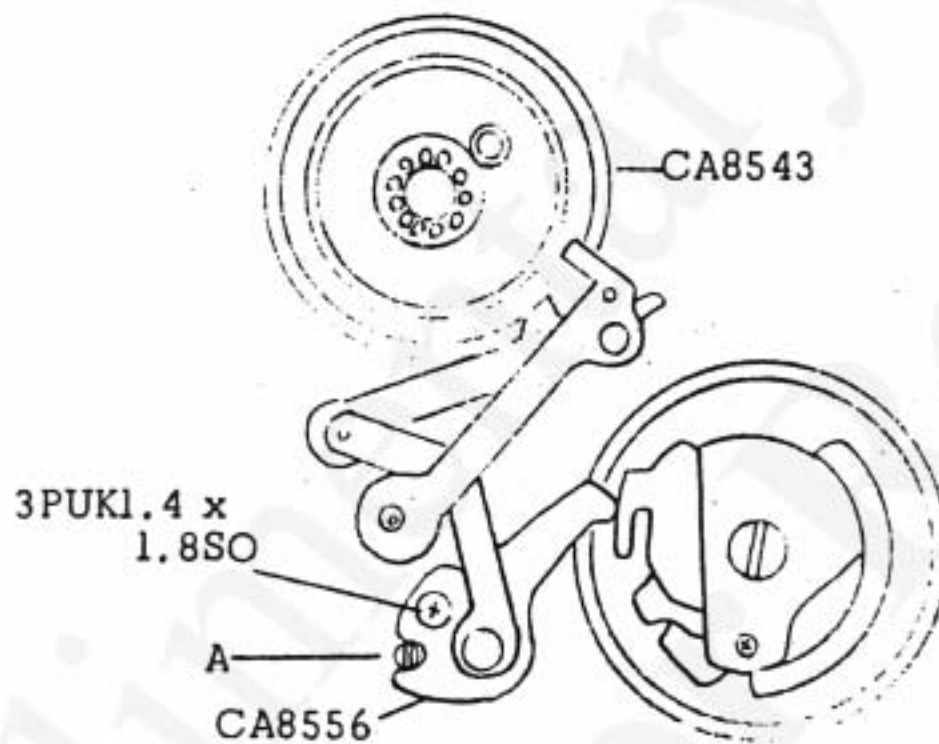
1) Positions of CA8575 (Cam) and CA8576 (Cam) at each speed:



5. Improper timing at high shutter speeds:

1) Adjustment of the Eccentric Screw

If the speed at 1/1000 - 1/60 sec. is in average longer (or shorter) than the proper timing, and adjustment is to be made with A of 8556 (Lever).



Checkup

Refer to the Inspection Standard for the proper timing and make measurements with the shutter tester.

(For reference - Shutter Release

↓
8592 releases the Gear A.

↓
1st curtain starts the run.

↓
The Cam of the Gear A is pressed.

↓
The Lever of 8556 is worked.

↓
The Claw of 8567 engages the Gear B

↓
2nd curtain starts the run.

2) Adjustment of CA8576 (High Cam)

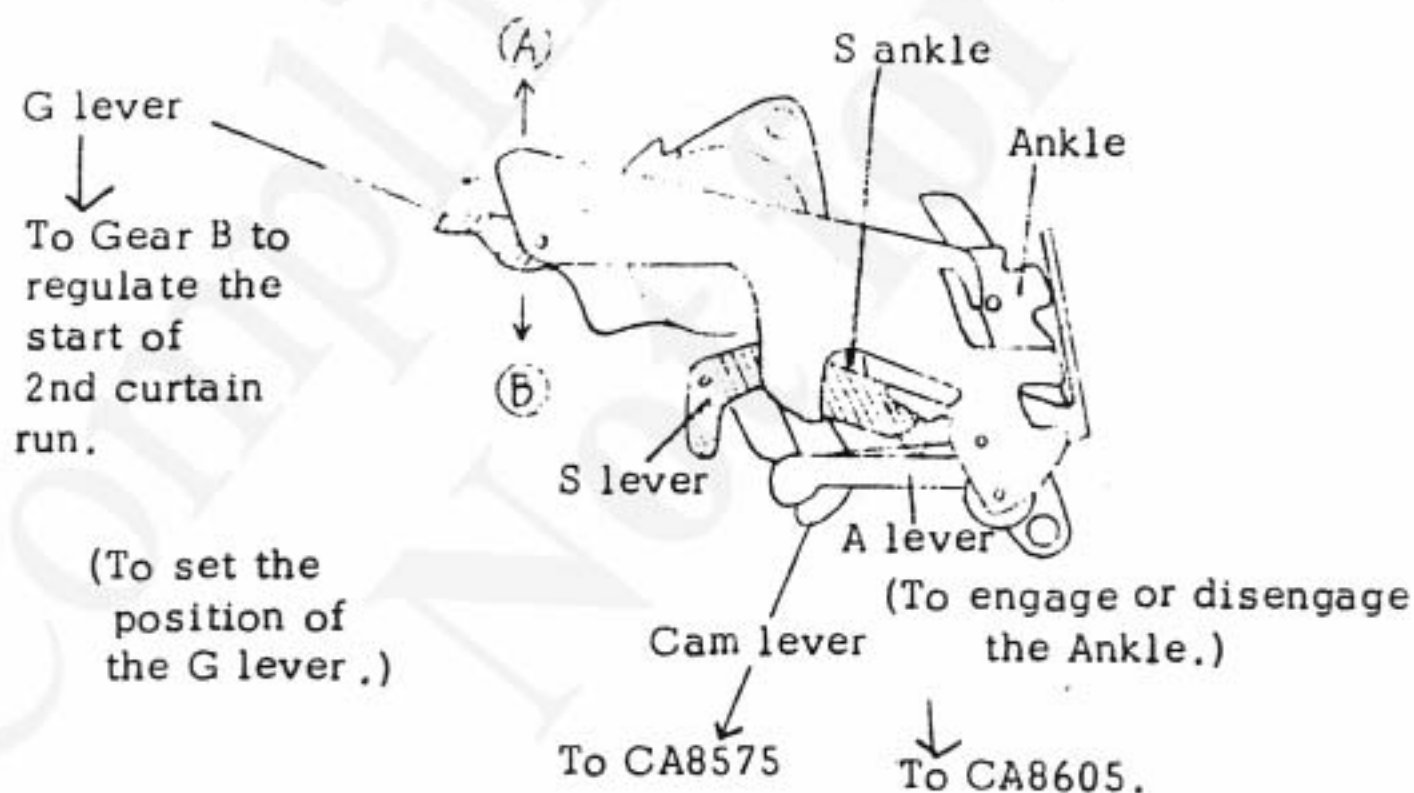
When a certain shutter speed takes longer than the proper timing, hammer out the appropriate portion of 8576, and when shorter shave it. In case of 1/1000 sec. widen or narrow the appropriate section.

For adjustment of 8576, remove PUK1.4 x 2SO, then 8576 will come off singly. See the Figure in E-24.

6. Improper timing at low shutter speeds:

1) Adjustment required for proper positioning of the Governor.

If the speed at 1/30 - 1/1 sec. is in average longer (or shorter) than the proper timing, an adjustment is made by moving the governor. When it is longer, the governor is to be positioned rather towards the direction A, and when shorter towards B.

Checkup

Refer to the Inspection Standard for the proper timing and make measurements with the shutter tester.

(For reference: See the picture above for functions of the individual levers for the Governor.)

2) Adjustment required for the Low Cam.

When a certain shutter speed takes longer than the proper timing, hammer out the appropriate portion of 8575, and when shorter shave it.

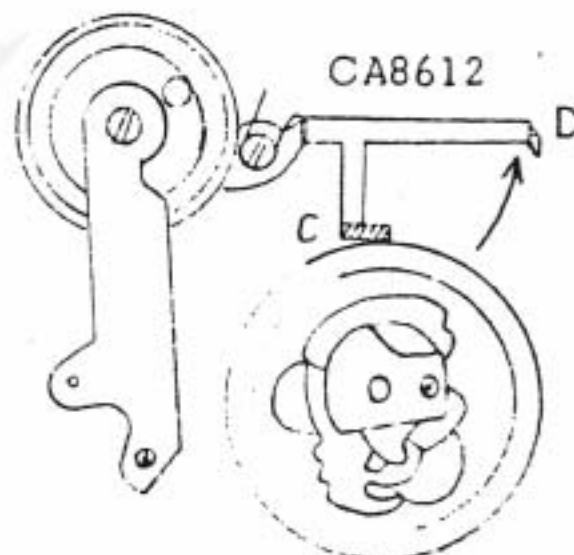
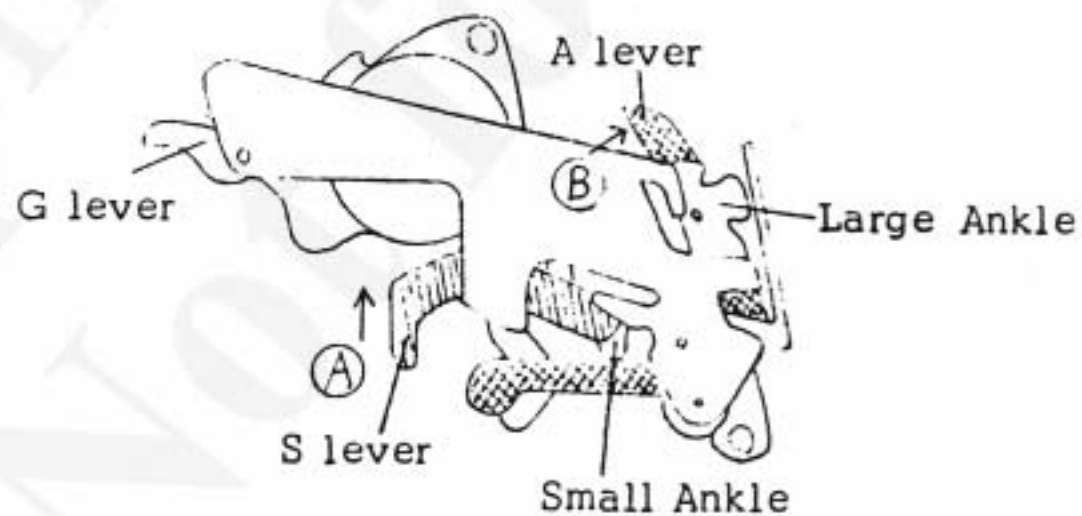
For adjustment of 8575 remove 3PUK1.4 x 5.5SO, then 8575 will come off singly. See the Figure in E-24.

7. Irregular shutter timing at the low speeds.

1) Little operation of CA8612 and large shaking.

Adjust by bending portions C and D of 8612 like that relative parts work as follows.

When 8575 is set at $1/1 - 1/8$, immediately prior to the shutter charging action 8612 starts working and portions A and B of the governor should move in the directions indicated by arrows to release the Large Ankle and Small Ankle of the governor.



Checkup

With 8575 set at $1/1 - 1/8$, when the Governor of the Governor is worked upon completion of film advancement, the Ankle should not be engaged.

(For reference: Prior to the shutter charging action

The boss on the Gear A

↓ presses

8612 ↓ presses

A lever of the Governor (in case of $1/1$ & $1/2$)

or

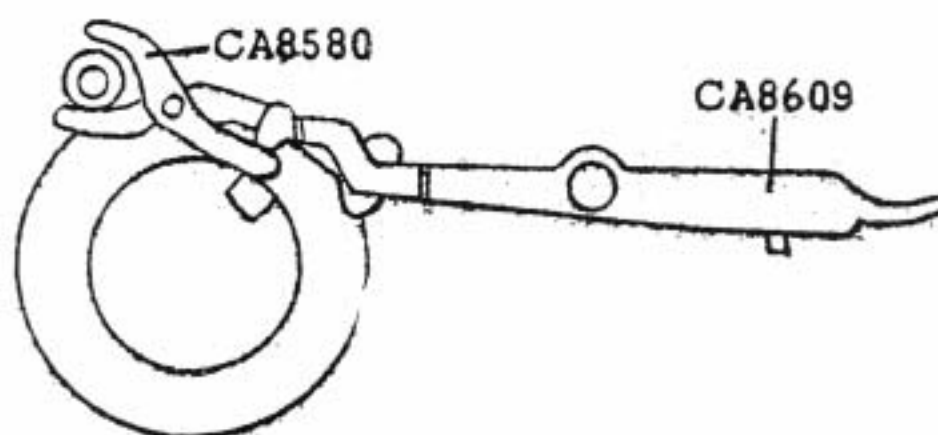
S lever of the Governor (in case of $1/4$ & $1/8$)

↓
And just immediately prior to the shutter charging action, engagement between the Ankle and the Gear is released and the G lever gets in contact with the tooth of the Gear B.

↓
The shutter is released.
The Gear A is rotated and 8612 is sprung back to the original position.

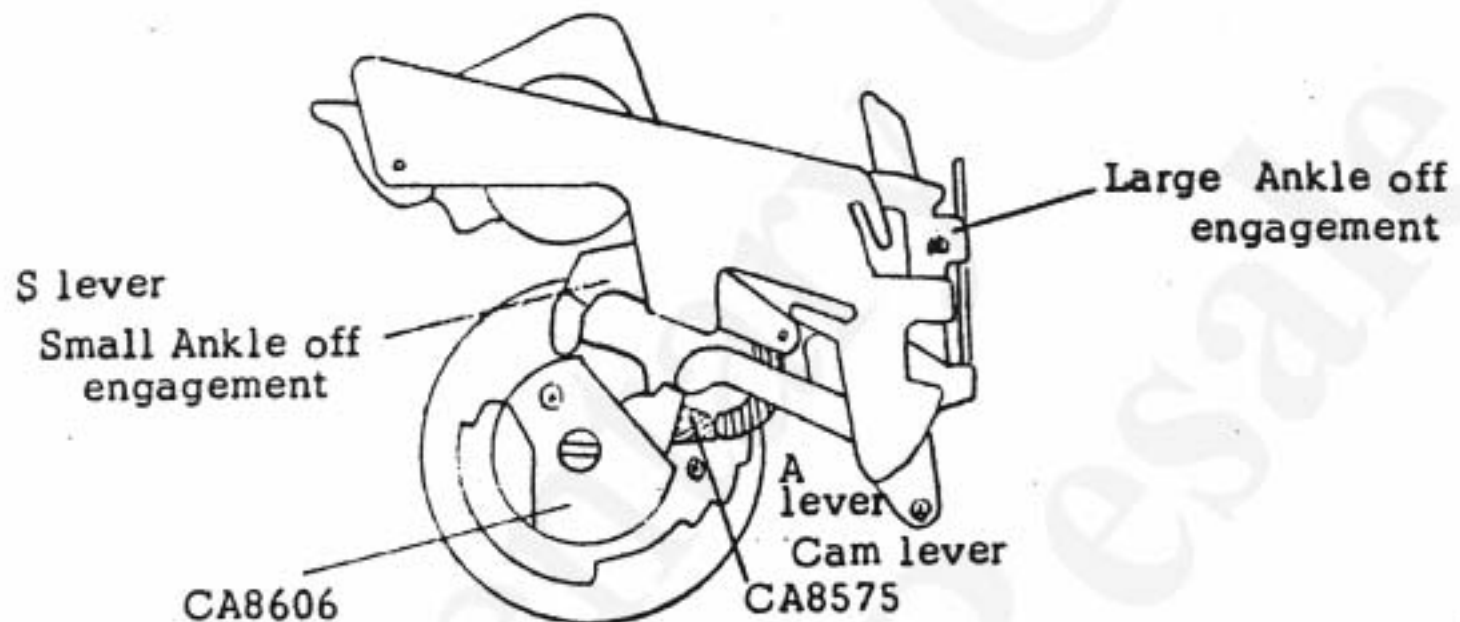
2) CA8580 lever rattling

Prior to film advancement, check the engagement between 8580 and 8609 by shaking vertically 8609. If such engagement is for less than $2/3$ the thickness of 8609, adjust the room at the rivet of 8580 to be within 0.3.



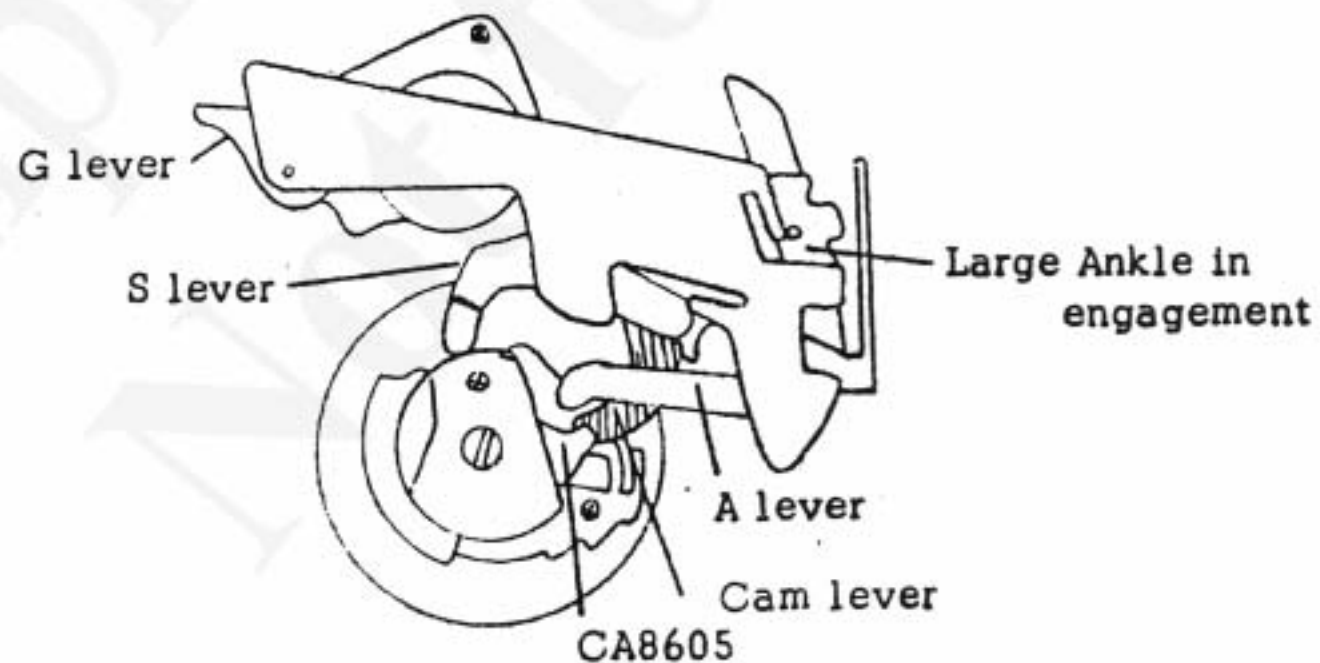
Relationship between the Governor and the Cam in CA8577 (Gear):

At the shutter speed "B":



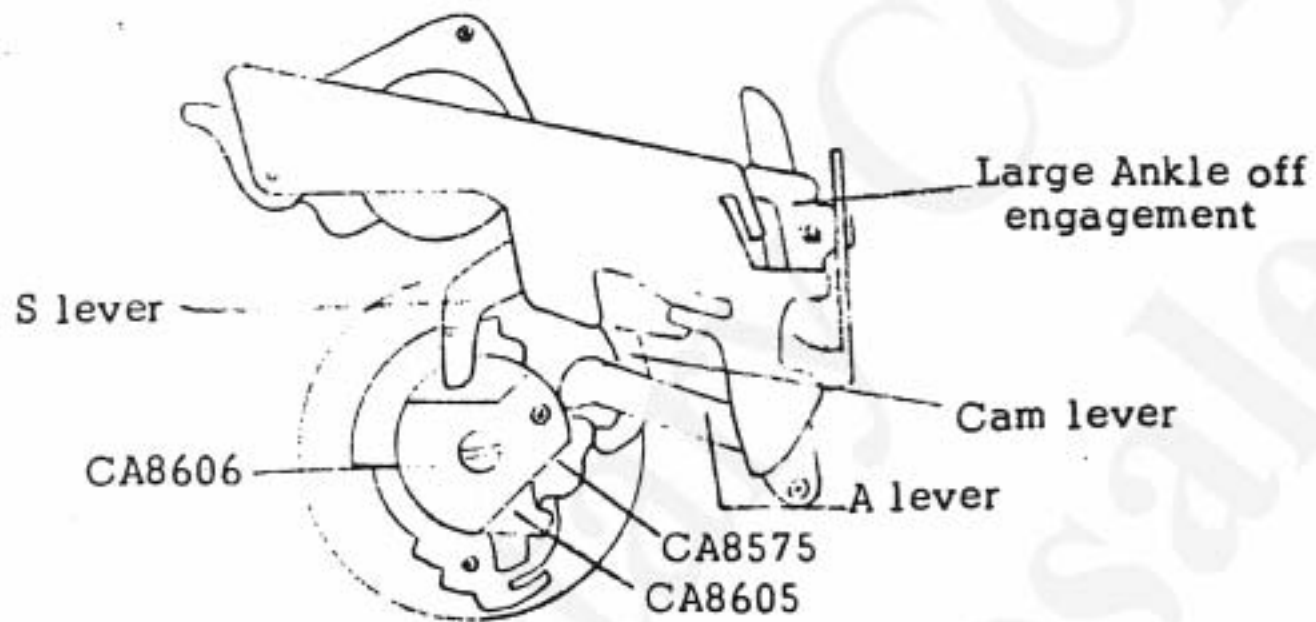
Both the S ankle and the L ankle are released from engagement by the S lever and the A lever.

At the shutter speed 1/1 and 1/2:



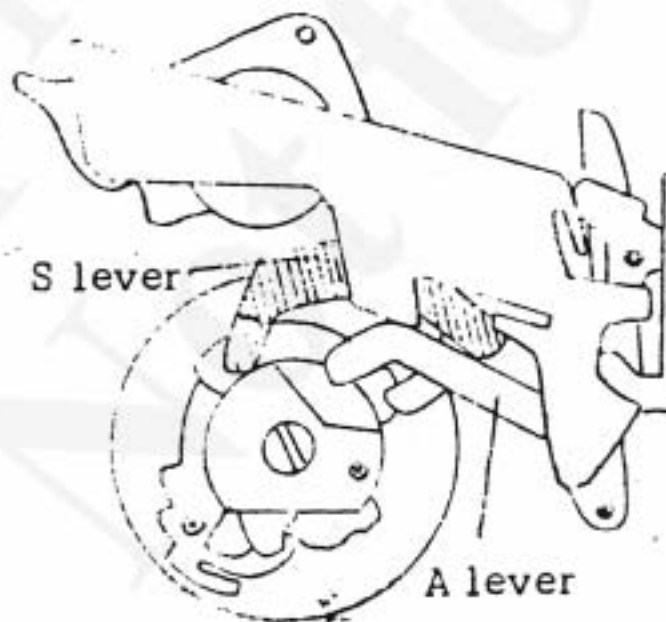
The A lever is released from 8605 and the L ankle is engaged. The S ankle remains off engagement by the S lever. To differentiate shutter timing for 1/1 and 1/2, the message is transmitted from 8575 to the Cam lever and the operating angle of the G lever will be changed.

At the shutter speeds, $1/4$ and $1/8$:



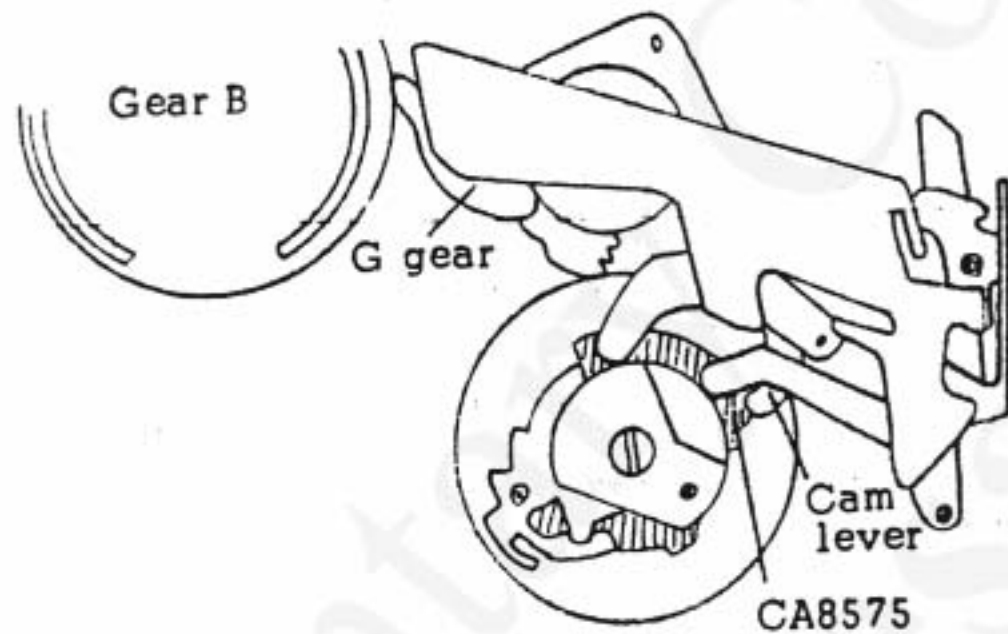
The S lever escapes from 8606 and the S ankle is engaged. 8605 pushes the A lever and the L ankle remains unengaged. To differentiate the shutter speeds of $1/4$ and $1/8$ from each other, the message is transmitted from 8575 to the Cam lever to change the operating angle of the G lever.

At the shutter speeds, $1/15$ and $1/30$:



Action is transmitted from 8606 to the S lever and from 8605 to the A lever, while both the L ankle and the S ankle remain off the engagement. Without the use of the Ankle, the load is given only by the gears. Differentiation between $1/15$ and $1/30$ will be in the same manner as in the case of $1/1 - 1/8$.

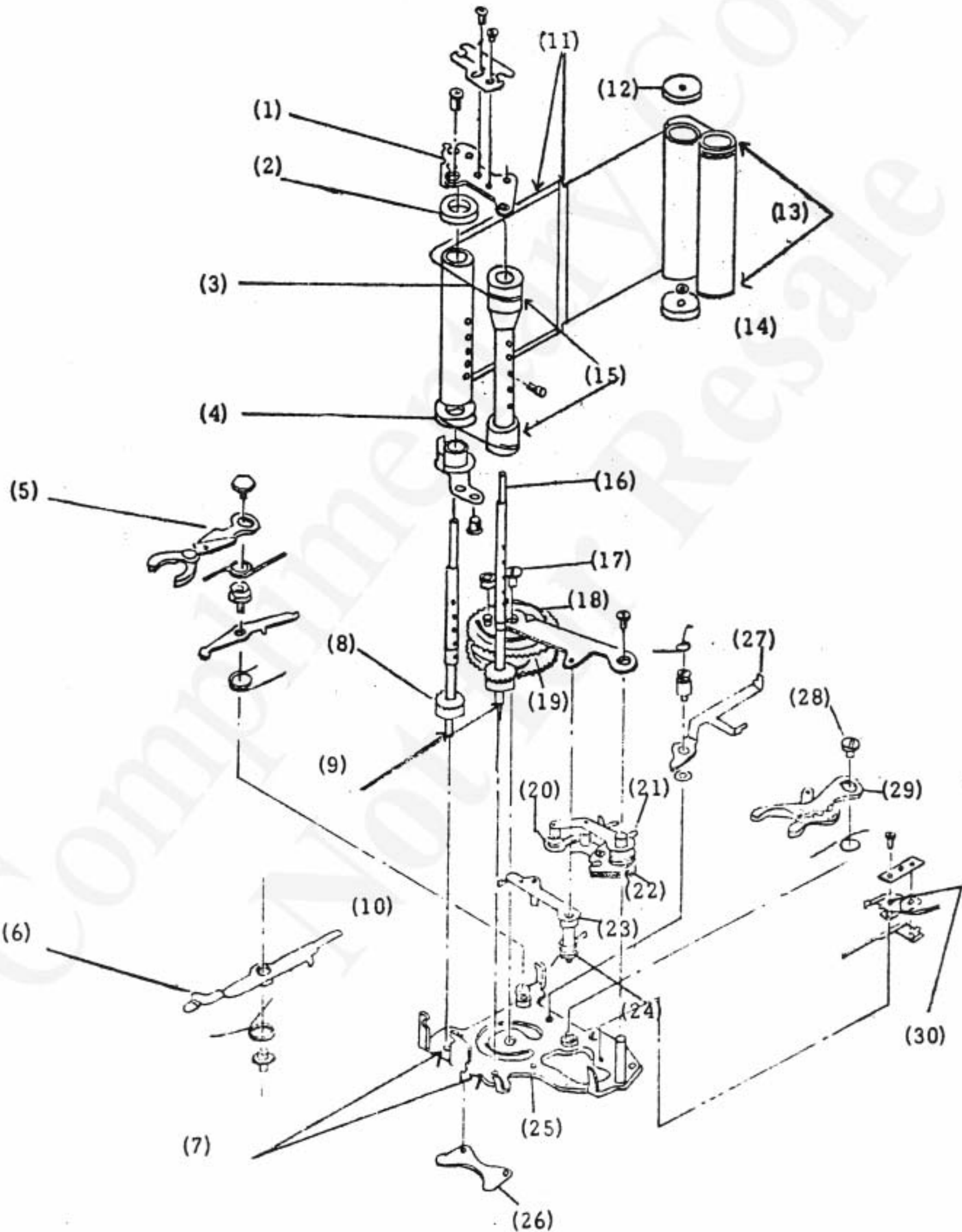
At the shutter speeds, $1/60 - 1/1000$:



In cases of $1/60 - 1/1000$, the action is transmitted from 8575 to the Cam lever of the Governor then to the G gear, and the arrowed portion of the Gear B is disengaged from the G gear. The governor will not be activated in this case.

8. Irregularity in Curtain Speeds:

Check the following items and make necessary repairs or adjustments.

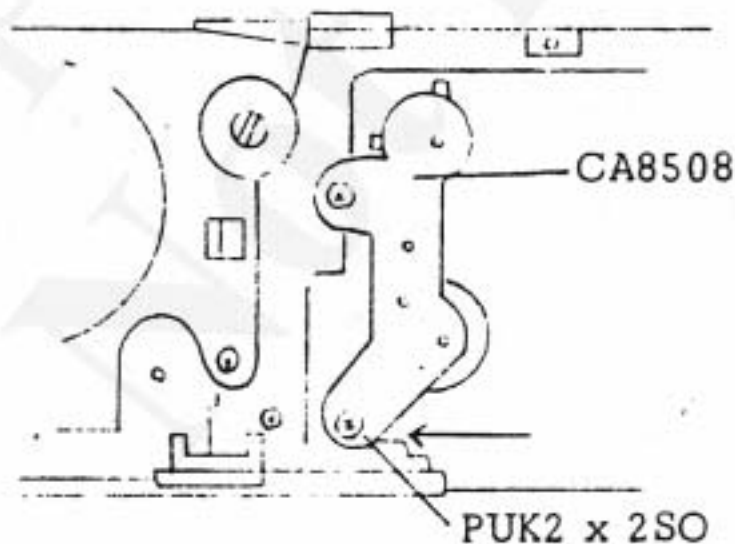


- (1) Mounting position of 8508.
- (2) Rotation of 8510. However, do not lubricate.
- (3) Whether 8537 (4 pieces) are off the roller.
- (4) Rotation of 8510. However, do not lubricate.
- (5) 8580. Check whether it with the Ring of the Shaft B.
- (6) 8609. Whether it is properly engaged on the lever.
- (7) 8501. Dirt or inaccuracy in surface finish at the guide holes for the Shaft A and B.
- (8) 8520. Check the engagement with the Gear B, any deformity or bent.
- (9) Shortage of lubricant and any scratches.
- (10) Pin
- (11) 8537. Check for any rubbing with 8540, also relation the string and the Patch.
- (12) 8529. Rotation to be checked, however no lubrication.
- (13) Check the manner in which the strings are bonded.
- (14) 8529. Check the rotation, but no lubrication.
- (15) Check the manner in which the strings are bonded.
- (16) 8519. Check its engagement with the Gear A, any deformity or bent.
- (17) 8545. Check if loose.
- (18) Gear B
- (19) Gear A
- (20) Lever off engagement
- (21) Lever. Check the relationship with the position of 8576

- (22) Lever. Check it is off position or whether it is efficiently working.
- (23) Claw. Check it is off position. Also check for the proper space between the Gear B.
- (24) 8570. Check if off position.
- (25) 8501. Check for deformity.
- (26) 8521. Check for deformity.
- (27) 8612. Check if it is stuck with the Gear A.
- (28) 8585. Check if loose.
- (29) 8578. Check for with the Ring of the Shaft A.
- (30) 8603. Check for the proper room between the Lever.

CA8508 (Plate) mounted off position.

Loosen two PUK2 x 2SO of 8508 and adjust the position of 8508. Check for inclination of 8519 and 8520 and make necessary adjustment.



In case where the Shaft rattles vertically due to deformation of 8508, insert a U washer (0.1 - 0.2) underneath the Plate R on the arrowed side.

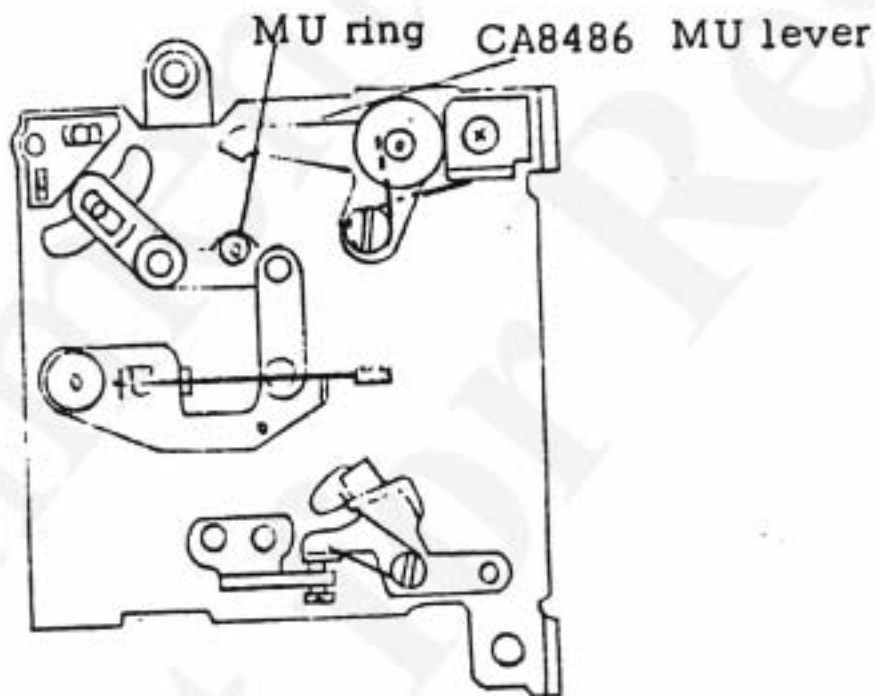
Checkup Vertical tolerance of the Shaft should be 0.2 or less.

9. Even when the mirror is raised, it does not reach the topmost position. During mirror-up operation, the MU knob gets heavy toward the end of its motion.

1) Improper selection of the MU ring

Make a proper selection of the MU ring to satisfy the requirement cited in the Checkup column below.

CA8451	MU ring (outer diameter 2.8 ϕ)
CA8452	" (" 3.1 ϕ)
CA8453	" (" 3.4 ϕ)
CA8549	" (" 3.7 ϕ)



Checkup

- (1) While the mirror is at the original lowered position, there should be a space of 0.2 or above between the tip of 8486 and the MU ring.
- (2) During the mirror-up operation, the mirror should be in such a position that its tip touches the damper and presses it accurately.
- (3) The MU knob should operate smoothly and should not get heavy toward the end of its motion.

10. Mirror bounds while being raised.

- 1) Improper selection of CA8464 (Spring), 8466, 8467

If the mirror bounds for more than 4mm while being raised, the Spring should be replaced with a thicker one.

8464	0.4 ϕ
8466	0.45 ϕ
8467	0.55 ϕ

In case that the mirror-rising time is more than 3.2ms., 8464 should be replaced with a thinner one.

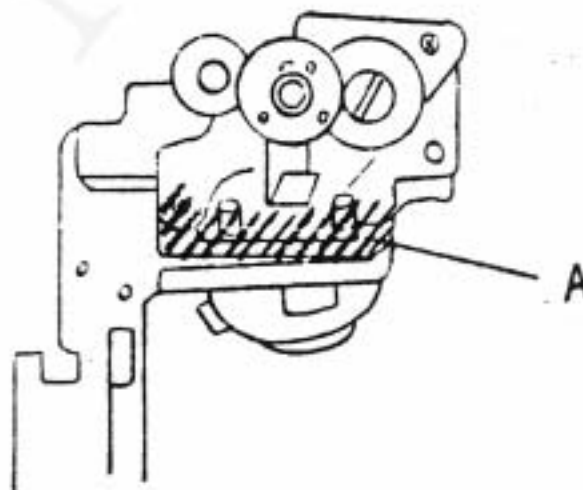
III. EXPOSURE METER

1. The meter needle gets stuck.

- 1) Filth or oil on CA9024 (Shaft)
Replace 9024.

Checkup No more sticking after the repair.

- (1) Remove 9025 (Base) and 4073 and take out 9024 positioned at the low-luminosity. If it cannot be removed because of adherence by Araldite take off 8961. (However, avoid removal of 8961 as much as possible.)
- (2) Clean the following parts with the ether alcohol and apply the oil Oilproof Liquid: 9025, around the area where 9024 is mounted, 8977 (Plate), and 9142.
- (3) Apply a little Araldite in the hole where the A fits in 9025 and set 9024



To be cleaned and applied with Oilproof Liquid.

- (4) Before mounting the Top cover, check the operation of CA8995.
Upon mounting the Top cover, check the indicator accuracy.
Ref: E-39

Checkup

8955 follows 9010 in its operation.

2. Inaccurate indications

- 1) The zero point of the meter off-positioned

If the zero point is extremely out of position, adjust the position of 8981.

- (1) In case of + (an excessive swing), loosen 9008 and turn 8981 to the right.
- (2) In case of - (an insufficient swing), turn it to the left. Upon adjustment, turn the shutter dial to adjust the loosened string.



Fine adjustments are made by 9016 (a part of 8995 assembly). At this time, it is preferable not to loosen 9016.
If 9016 is overly tightened, the L lever (a part of 8995 assembly) may operate poorly. Therefore, upon tightening it, be sure to check the operation of the L lever.



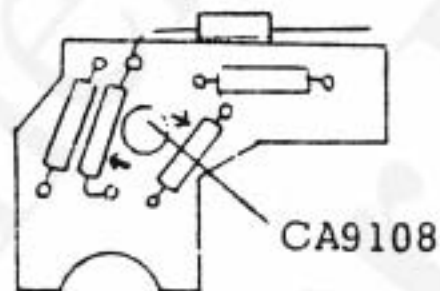
2) Poor soldering

Check 9057 (Plate), various resistors, and lead wires for poor soldering or short-circuit, and make necessary repairs or adjustments.

3) Position of resistors

Check the following points and make necessary repairs or adjustments:

- o Is the resistor soldered onto the printed board as tightly as possible?
- o Isn't the resistor in contact with 9108?
- o Is the printed board fixed closer toward the surface of the rails on the camera body?



4) CdS wire disconnected

In case when the value indicated is extremely in minus either in high or low luminosity, check for disconnection of the CdS wire as follows:

- o Conductivity of the red CdS lead wire (for both high and low luminosities),
- o the black CdS lead wire (for high luminosity), and
- o the green CdS lead wire (for low luminosity).

5) Disconnection of wire in the mechanical part (no needle swing)

Remove the lead wire by unsoldering and check the conductivity of the mechanical part.

If disconnection is found, replace the whole meter assembly.

- 6) Improper operation of CA8879 (Ring)

Ref: E-40

- 7) Improper adjustment of the Cam gear positioning Screw

Ref: E-43

- 8) Improper operation of the Dial gear

Ref: E-44

- 9) Change in CdS features

Ref: E-45

(Attachment - Table)

		<u>Meter Indication Accuracy</u>			
<u>LSB L7 Light Box</u>		K=1.3	ASA 100		
BV	S.S	F	Error		Tolerance
15	1/500	8	0.3 EV		± 0.6 EV
12	1/125	5.6	-		± 0.6 EV
9	1/4	11	-		± 0.6 EV
6	1/2	4	0.3 EV		± 0.6 EV

In cases of BV 15 and BV 6, check the error by directions of the turn of the aperture ring and the shutter dial.

For BV 12 and BV 9, start turning the shutter dial from the side of 1/1000 and the aperture ring from F16.

<u>LSB L1 Light Box</u>		K=1.3	(90V)	ASA 100
BV	S.S	F	Error	Tolerance
16	1/500	11	0.3 EV	± 0.6 EV
14	1/125	11	-	± 0.6 EV
12	1/125	5.6	-	± 0.6 EV
10	1/125	2.8	-	± 0.6 EV
8	1/2	11	-	± 0.6 EV
6	1/2	5.6	0.3 EV	± 0.6 EV

In cases of BV 16 and BV 6, check the errors by directions of the turn of the aperture ring and the shutter dial.

For BV 14, 12, 10, and 8, start the turn of the shutter dial from 1/1000 sec. and of the aperture ring from F 16.

3. Improper Operation of CA8879 (Ring)

- 1) Deformity or rough edge of CA8879 and protrusion at the string adhesion.

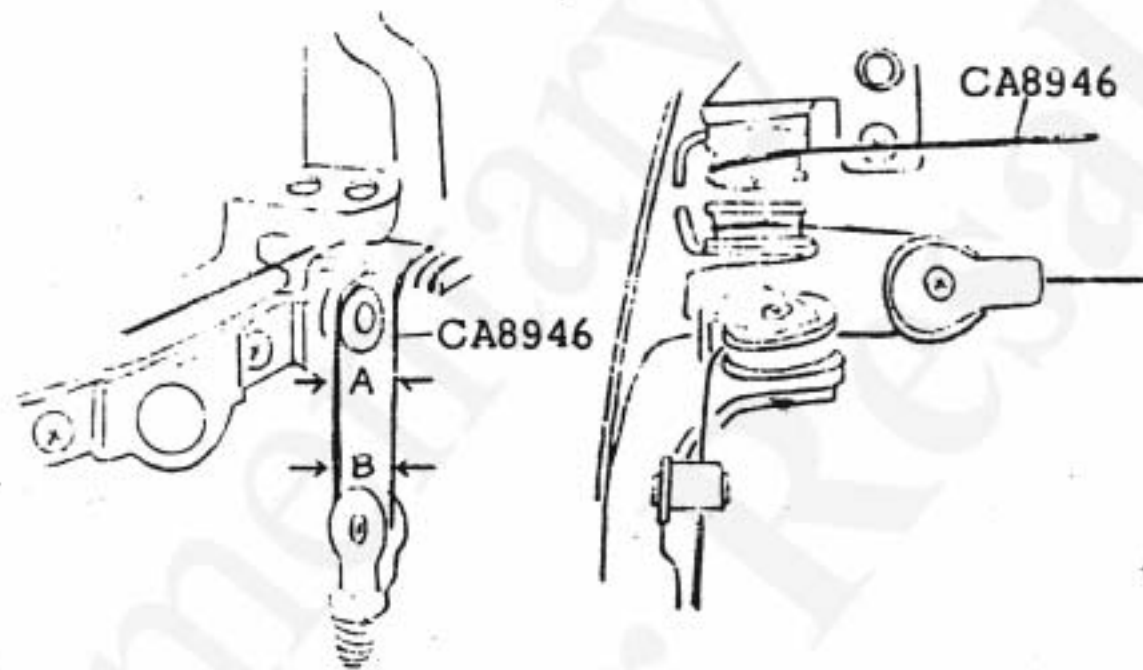
Replace 8879.

Method of Replacement:

- o With Cemedine 3000RS, bond the tips of the strings on 8879 as they were. (If they are bonded at the same position, it will give no problem in their functions.)
- o Do not allow the adhesive to protrude or heap up.

2) Adjustment of CA8946 (String) (dislocation and entanglement)

8946 is to be threaded as follows:



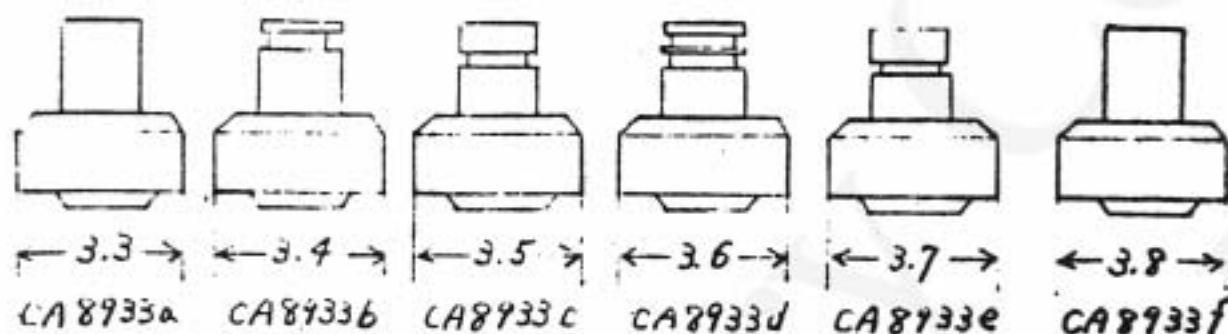
(Remarks:)

- o The string should not be dislocated from the pulley.
- o The width at A and B should be approximately the same.
- o When 8879 is turned until it hits the Cam Roller, there should be a space of less 1 mm between pulleys of the B spring and the B spring plate.

3) Improper selection of CA8933 (Roller) (diameter)

8933 comes in 6 types (see next page).

Referring to the checkup column on the right, make a proper selection and check the operation.

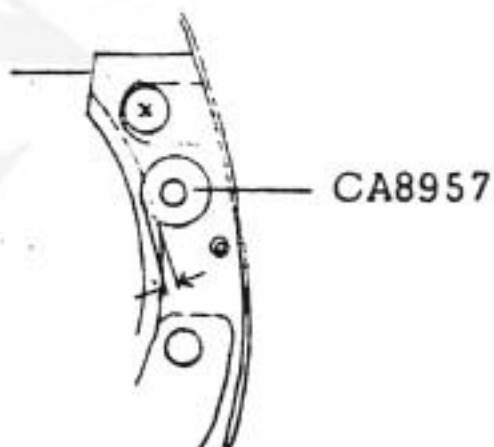
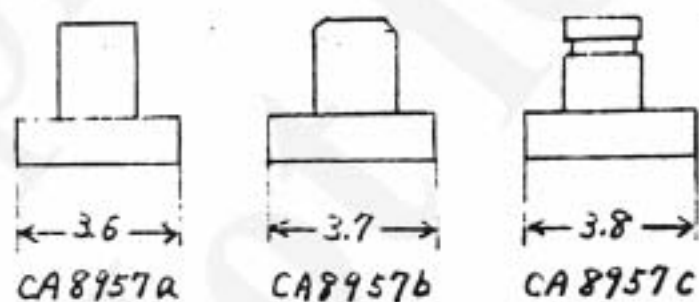


Checkup

8933 should turn smoothly and accurately without an extreme difficulty such as stoppage and uneven movement.

4) Improper diameter of CA8957 (Roller)

8957 comes in three types. Referring to the checkup column make a proper selection and check the operation.



Do not touch 8957 directly with bare fingers.

Checkup

8957 should always be protrusive from the surface where 8879 is joined with 8702.

A little space may be permissible between 8957 and 8879. (If the roller selection is made allowing no space between them, it sometimes causes poor returns of 8879.)

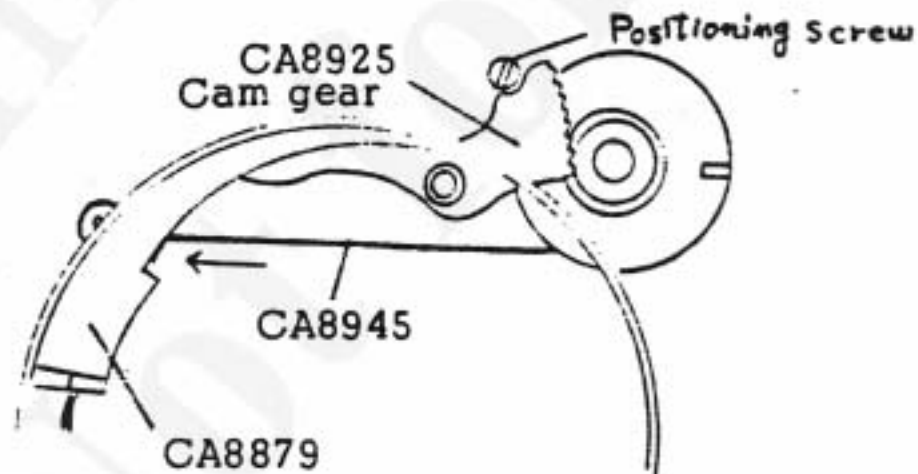
- 5) Spring pressure of CA8951 (Holder) too strong.

8951 should be checked for filth or deformity. Make necessary repairs or adjustments.

4. Improper Adjustment of the Cam gear positioning screw:

- 1) Adjustment of the Cam gear positioning screw.

When 8945 is pulled fully toward the arrowed direction, the space between 8879 and 8925 should be with 0.3mm. An adjustment should be made to fulfill this requirement by the Positioning screw.

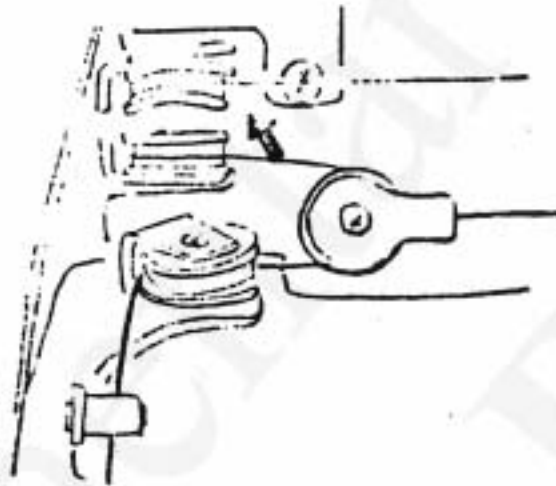
Checkup

- o Upon adjustment, there should be a space between the A and the stopper pulley.
- o When 8879 is turned to its fullest extent, the A should not hit 8925.

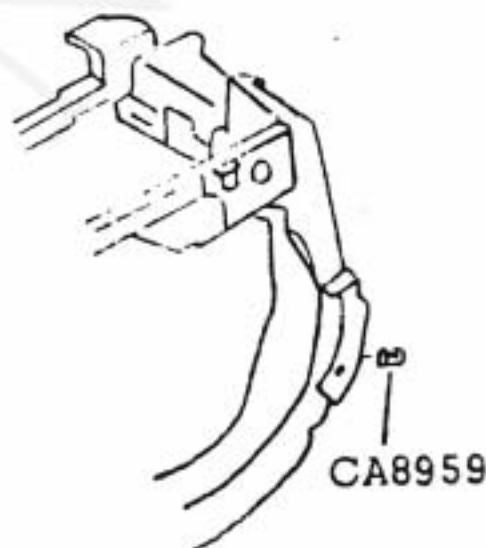
5. Dial Gear Operation:

1) Adjustment of CA8944 (String)

8944 (the string for the dial gear) should be threaded as follows. When threading, it should be started from the arrowed direction to avoid crossing with the String.

Checkup

- o If the meter is not mounted onto the Front Die-Casting, attach a 12 gr. weight at the tip of the string and check the operation.
- o Each pulley is to turn smoothly and accurately.
- o Tolerance on the dial gear should be 0.1 or less.
- o When the dial gear is rotates, 8924 should not move.



2) Tolerance adjustment on the dial gear (8880)

An adjustment is made with 8959 to bring the tolerance on 8880 to 0.1 or less.

6. Changes in CdS Features:

1) Changes in CdS Features (replacement of resistors)

Each resistor is to be matched. Following is the standard value of each resistor.

R1	12.4 K Ω	Low luminosity and in general.
R2	9.6 K Ω	High luminosity
R3	3.5 K Ω	"
R4	∞	Low luminosity
(R5		Warning switch)

ORDER OF MATCHING

For LSB L1
MS 5014 to be used for adjustment.

<u>Order</u>	<u>BV</u>	<u>ASA</u>	<u>S.S</u>	<u>F</u>	<u>Range</u>	<u>Adjustment</u>
(1)	6	100	1/2	5.6	$\pm 0.6EV$	In case of a (+), lessen R4.
(2)	8	100	1/2	11	$\pm 0.6EV$	In case of a (+), increase R1.
(3)	14	100	1/125	11	$\pm 0.6EV$	In case of a (+), lessen R3.

When R1 is replaced, it returns to the state of the order (1).

R3 cannot be utilized for less than 2 K Ω .
At BV16, if R3 is found insufficient, check it with R2.

Since R3 also influences BV8, when R3 is replaced, it returns to the state of the order (2).

<u>Order</u>	<u>BV</u>	<u>ASA</u>	<u>S.S</u>	<u>F</u>	<u>Range</u>	<u>Adjustment</u>
(4)	16	100	1/500	11	$\pm 0.6EV$	In case of a (+), increase R2

Since R2 also influences BV14, when R2 is replaced, it returns to the state of the order (3).

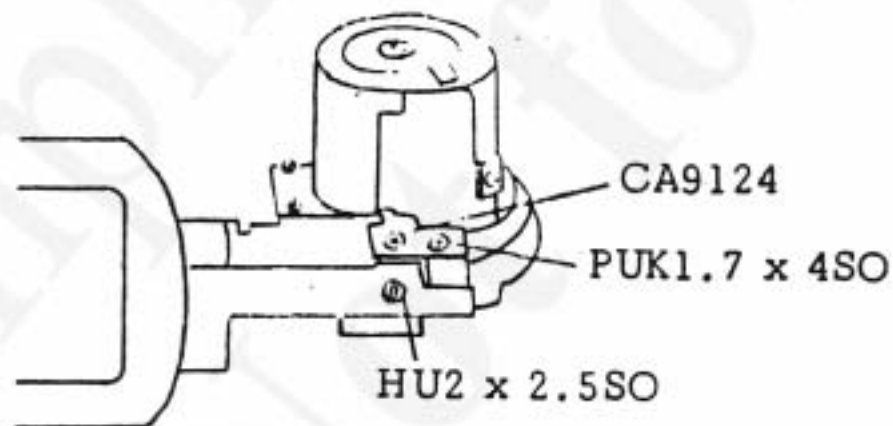
(5)	12	100	1/125	5.6	$\pm 0.6EV$	In case of a (+), lessen R1.
-----	----	-----	-------	-----	-------------	---------------------------------

When R1 is replaced, it returns to the state of the order (1).

7. Warning Switch Adjustment:

1) Adjustment of the L contact point position

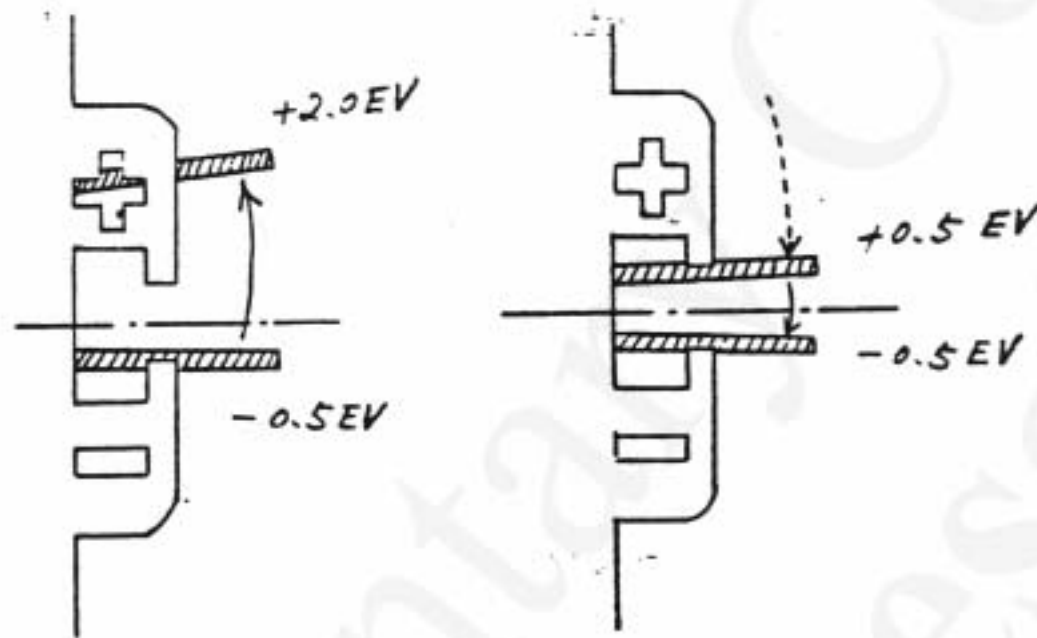
Ref. Checkup column. Loosen two PUK1.7 x 4SO on 9124. Slightly move HU2 x 2.5SO forward or backward for adjustment.



Checkup

- o Place the mercury battery in the camera and turn off the main switch.
- o With ASA 100 at the shutter speed B, the aperture ring is gradually turned from F16 toward open. At this time, the meter needle should once jump to + 2.0EV above the index center before it stays at - 0.5EV. (See Fig. A)

- o At this time, the aperture should be slightly stepped down than F2.8.




- o When the lens aperture is stepped down from the wide open state, the meter needle should once swing down to a position lower than -0.5EV before it is stabilized at +0.5EV. (See Fig. B.)

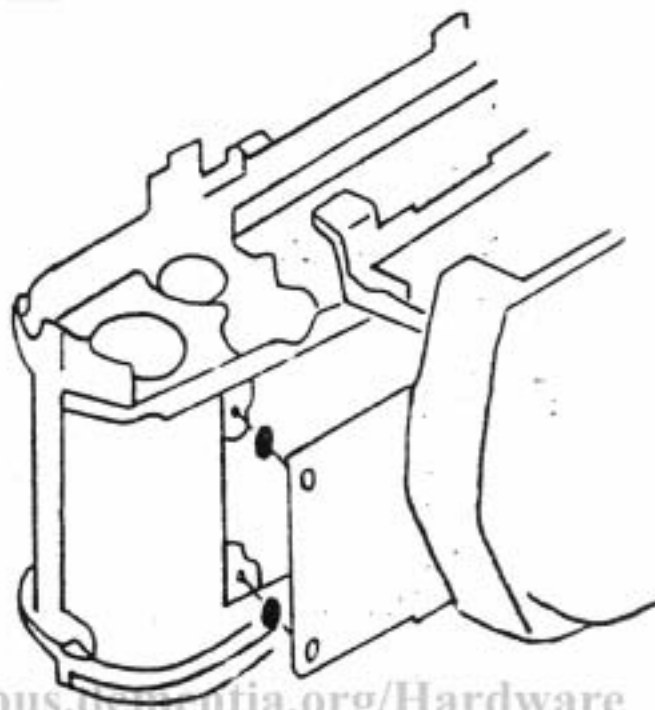
IV: MAJOR FUNCTIONS

1. Poor focus

- 1) Adjustment of flange back

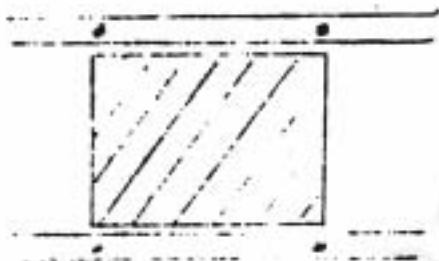
$$f_c = 46.00^{+0.02}$$

For adjustment, 9106 (Washer) (t = 0.01 round) or 9107 (Washer) (t = 0.02 ) is to be placed between the camera body and the Front Die-Casting.



Checkup

KC-0070G #01 Olympus M Mount U and KC-0070G #3 46.00 gauge are to be used to measure the four points on the rails.

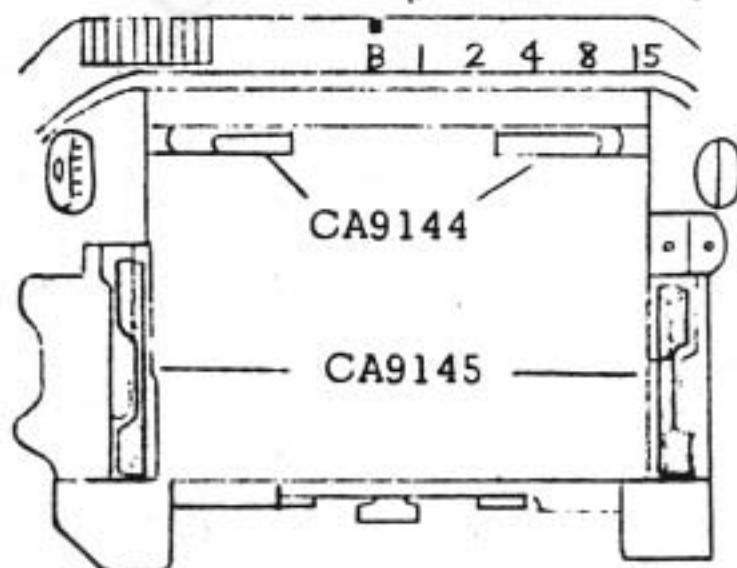


Parallelism (the difference between measured points) should be less than 0.02.

2) Focus adjustment for the viewfinder.

A proper type of 9144 (Washer) and 9145 (Washer) is to be selected out of 8 types available for each. Pick the type with the same thickness and use them in a pair.

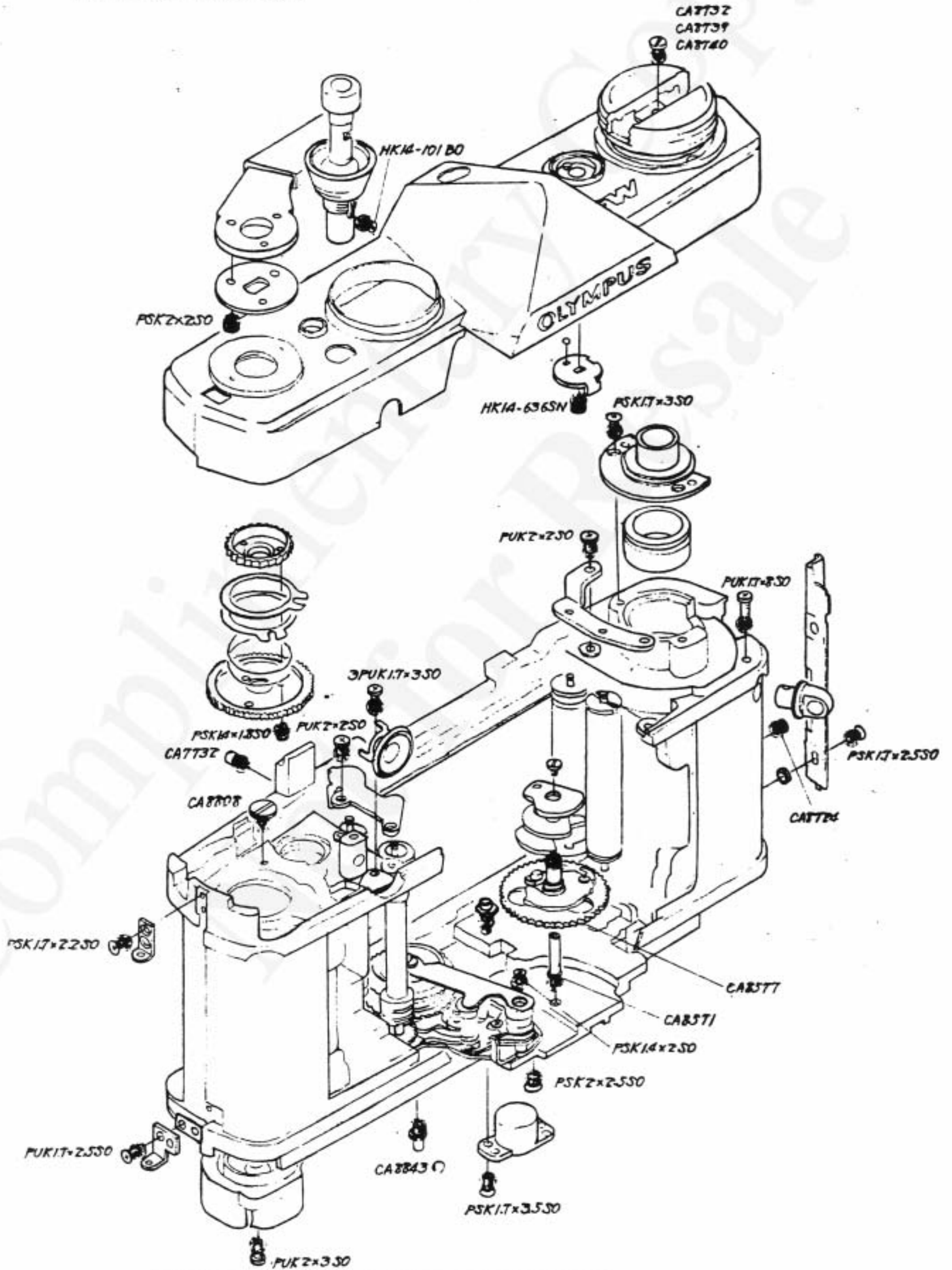
9144	a	t = 0.04	9145	a	t = 0.04
	b	0.06		b	0.06
	c	0.10		c	0.10
	d	0.15		d	0.15
	e	0.20		e	0.20
	f	0.25		f	0.25
	g	0.30		g	0.30
	h	0.35		h	0.35



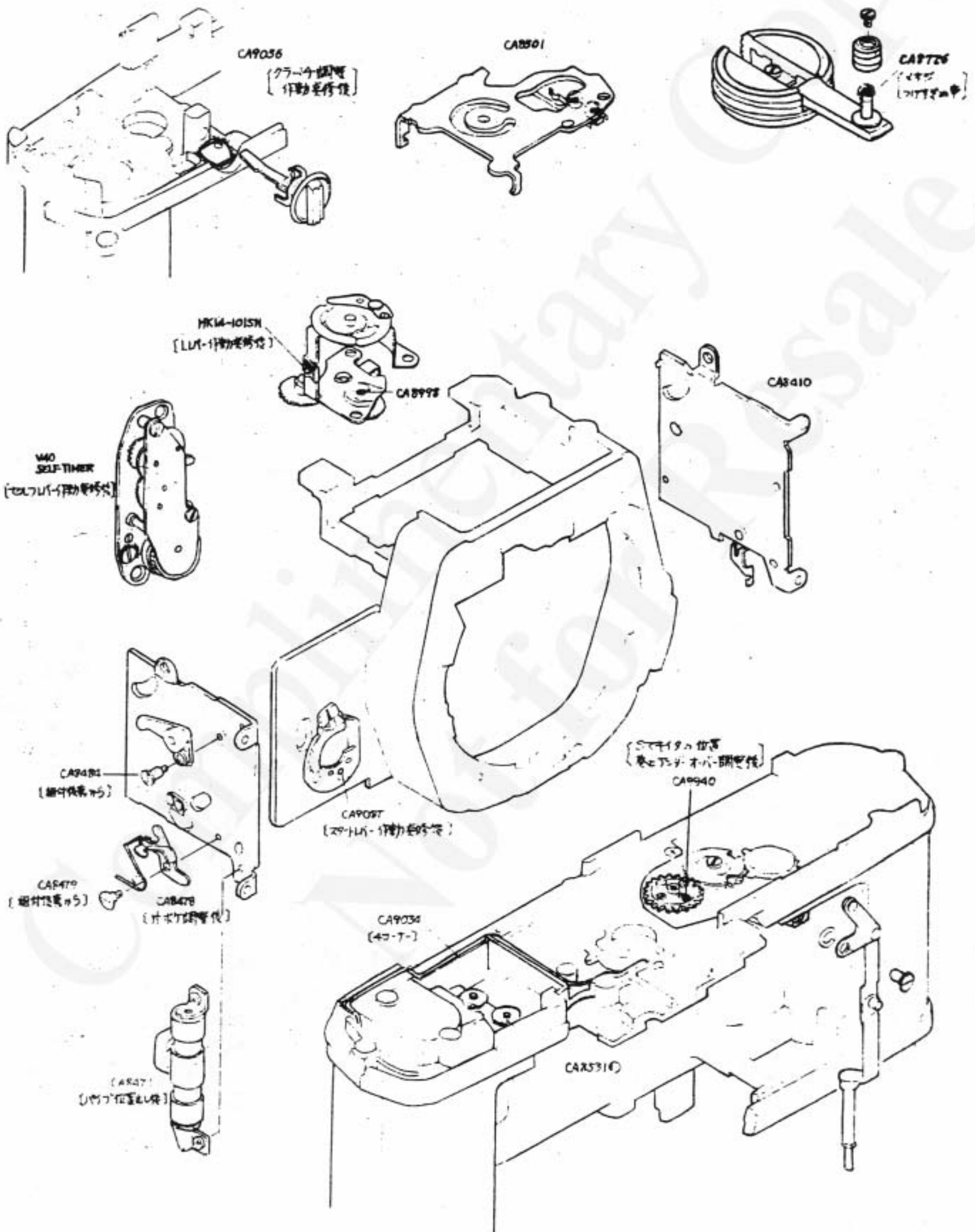


PARTS WHERE OIL, GREASE, ETC.
SHALL BE USED

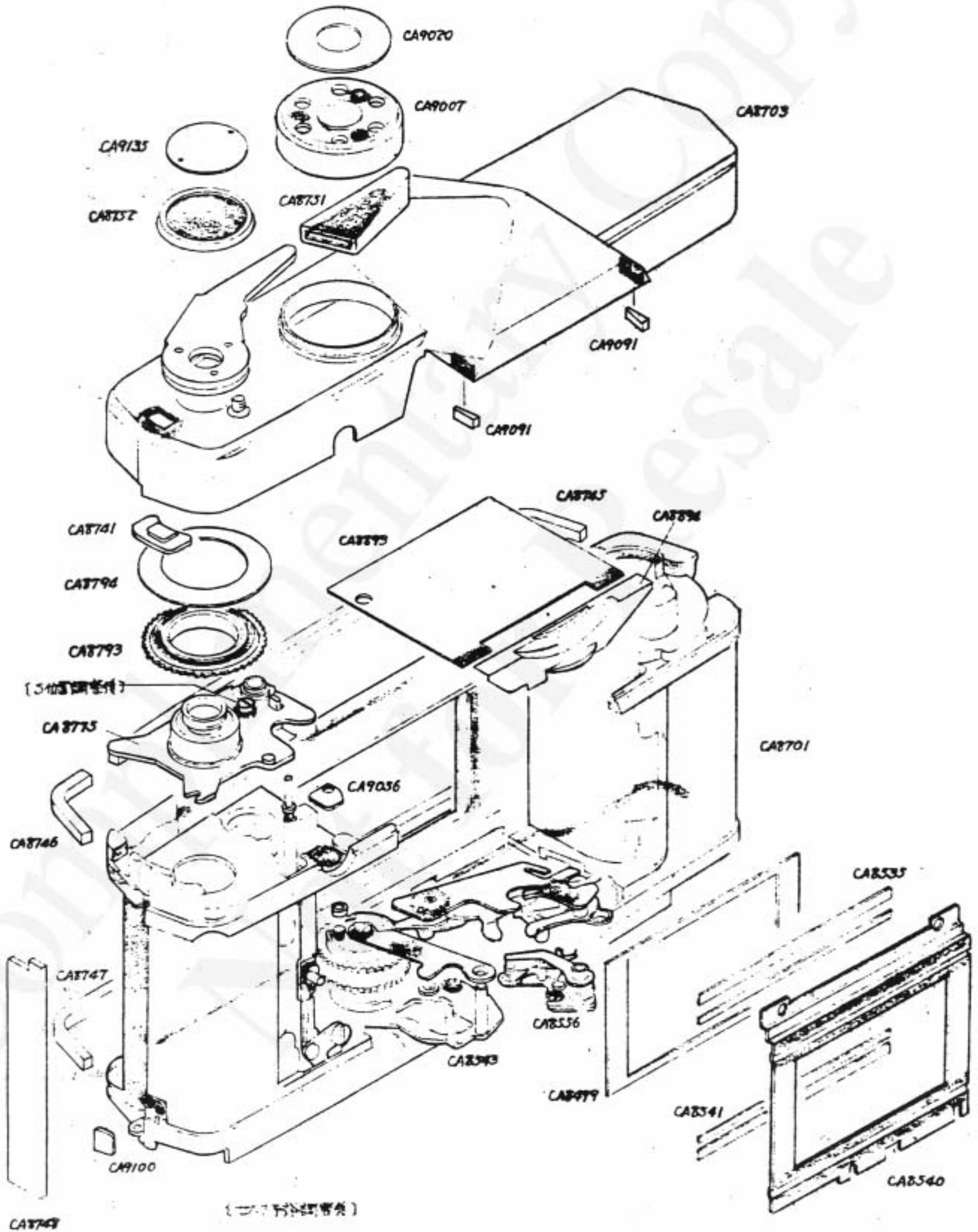
LOCKTITE (Cement)

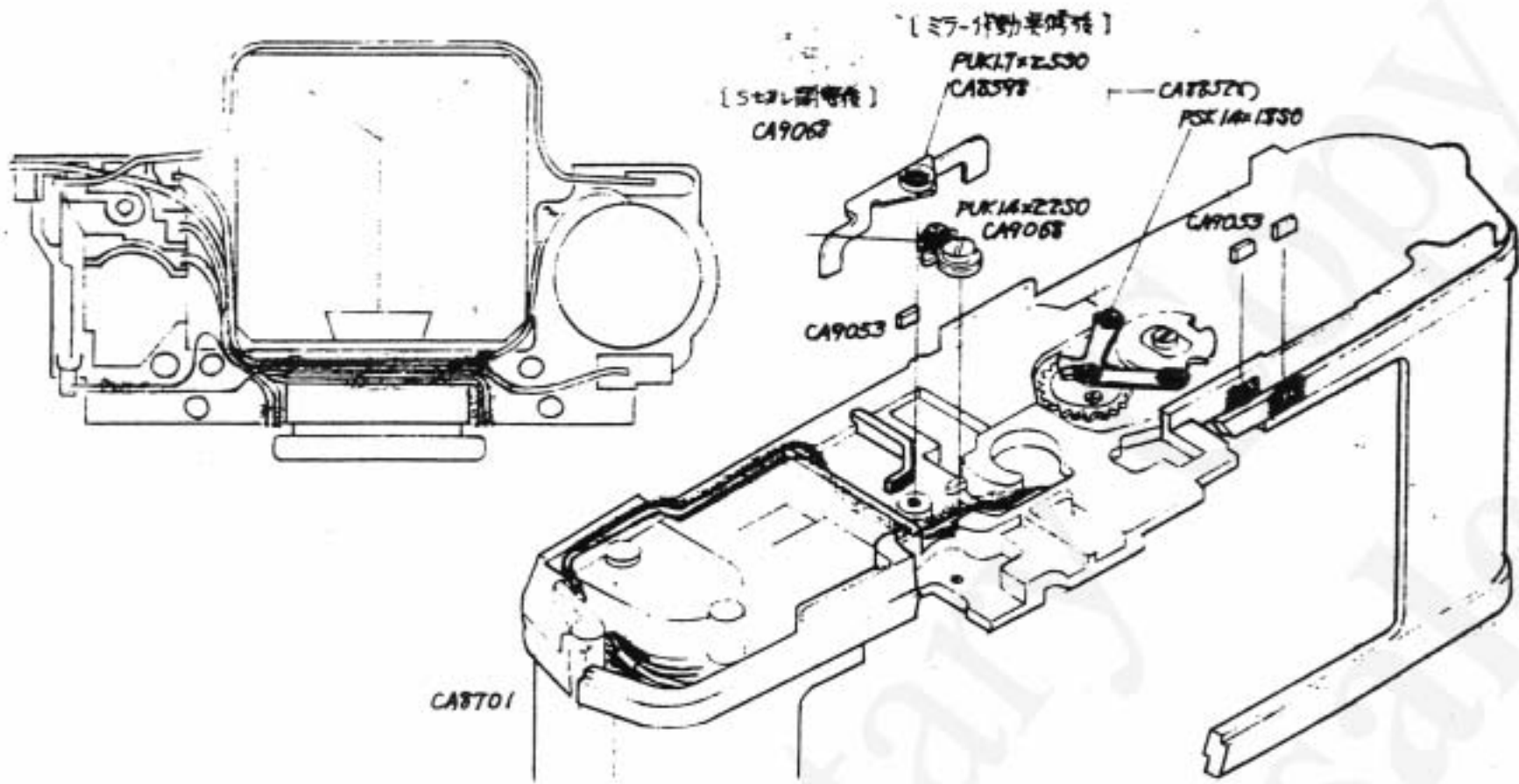


ALON ALPHA (Cement)

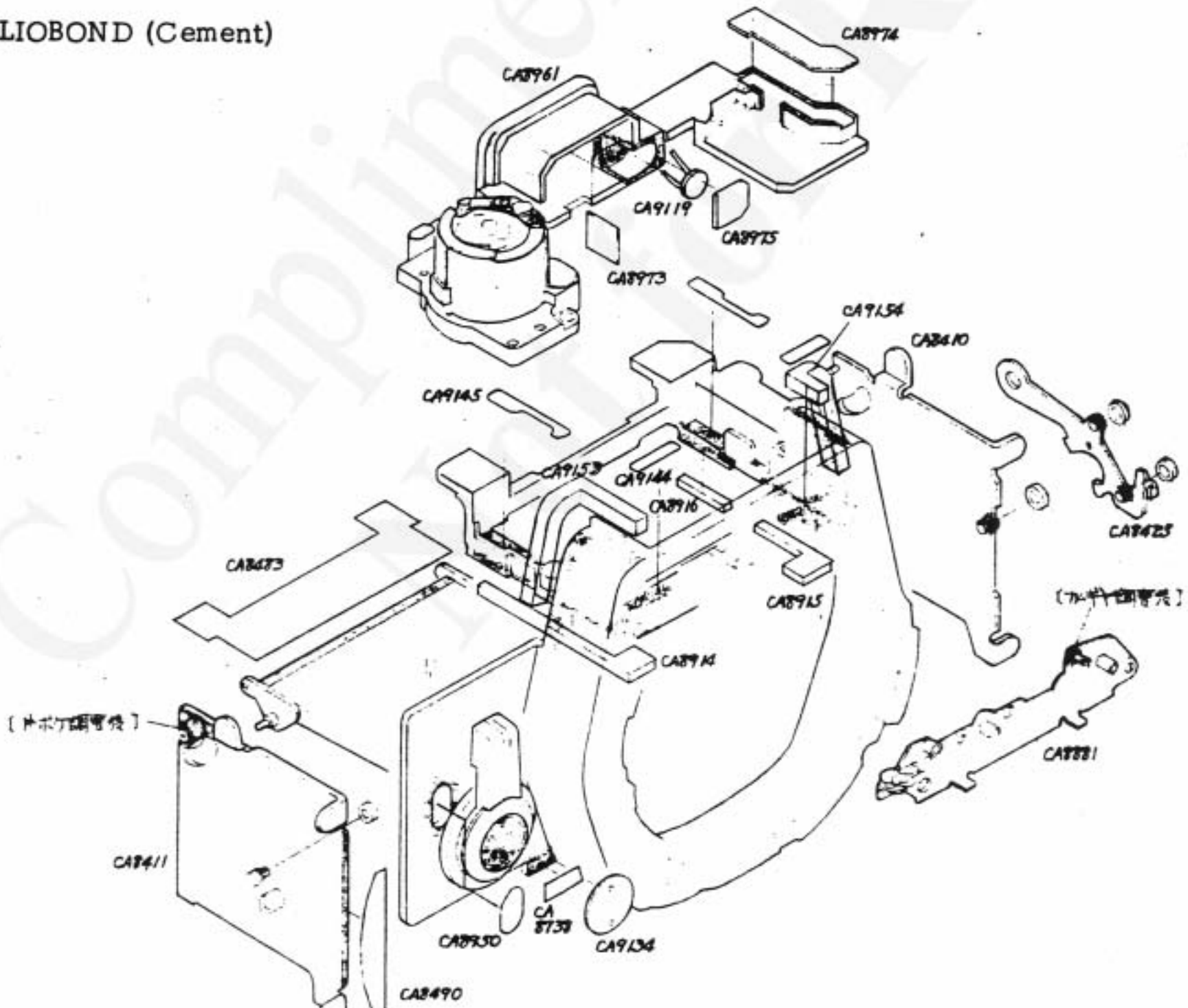


PLIOBOND (Cement)

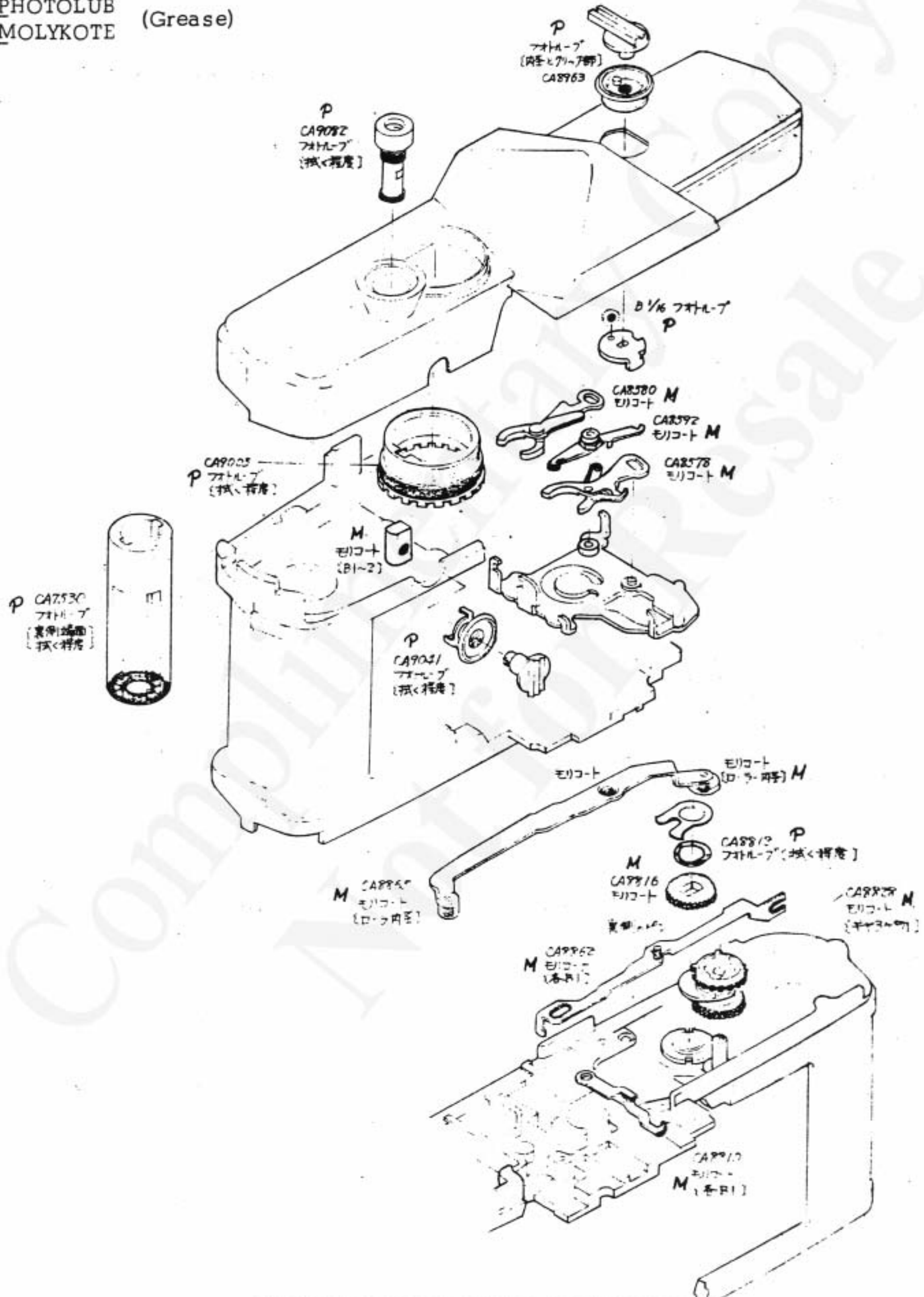




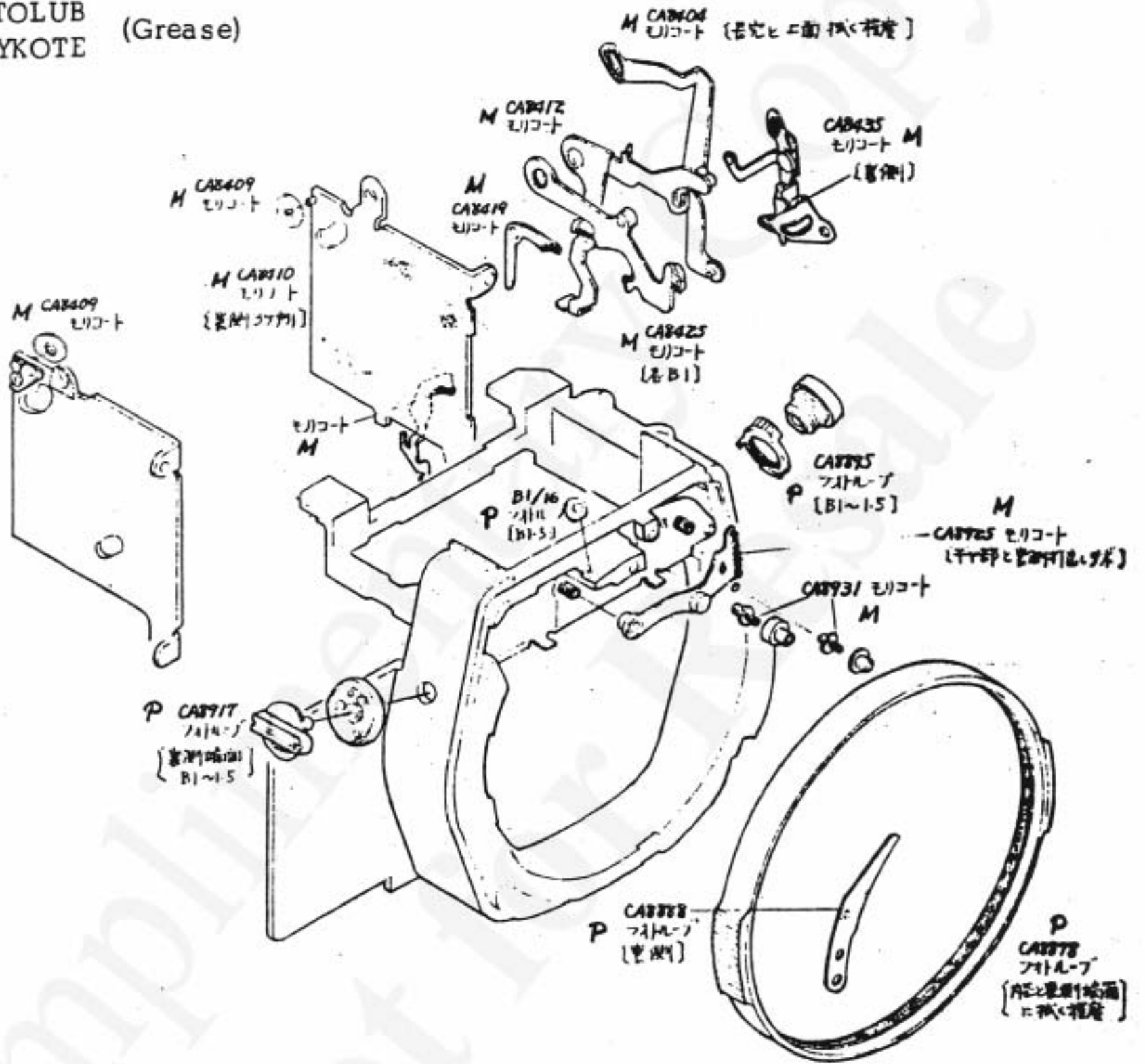
PLIOBOND (Cement)



PHOTOLUB
MOLYKOTE (Grease)



PHOTOLUB
MOLYKOTE (Grease)

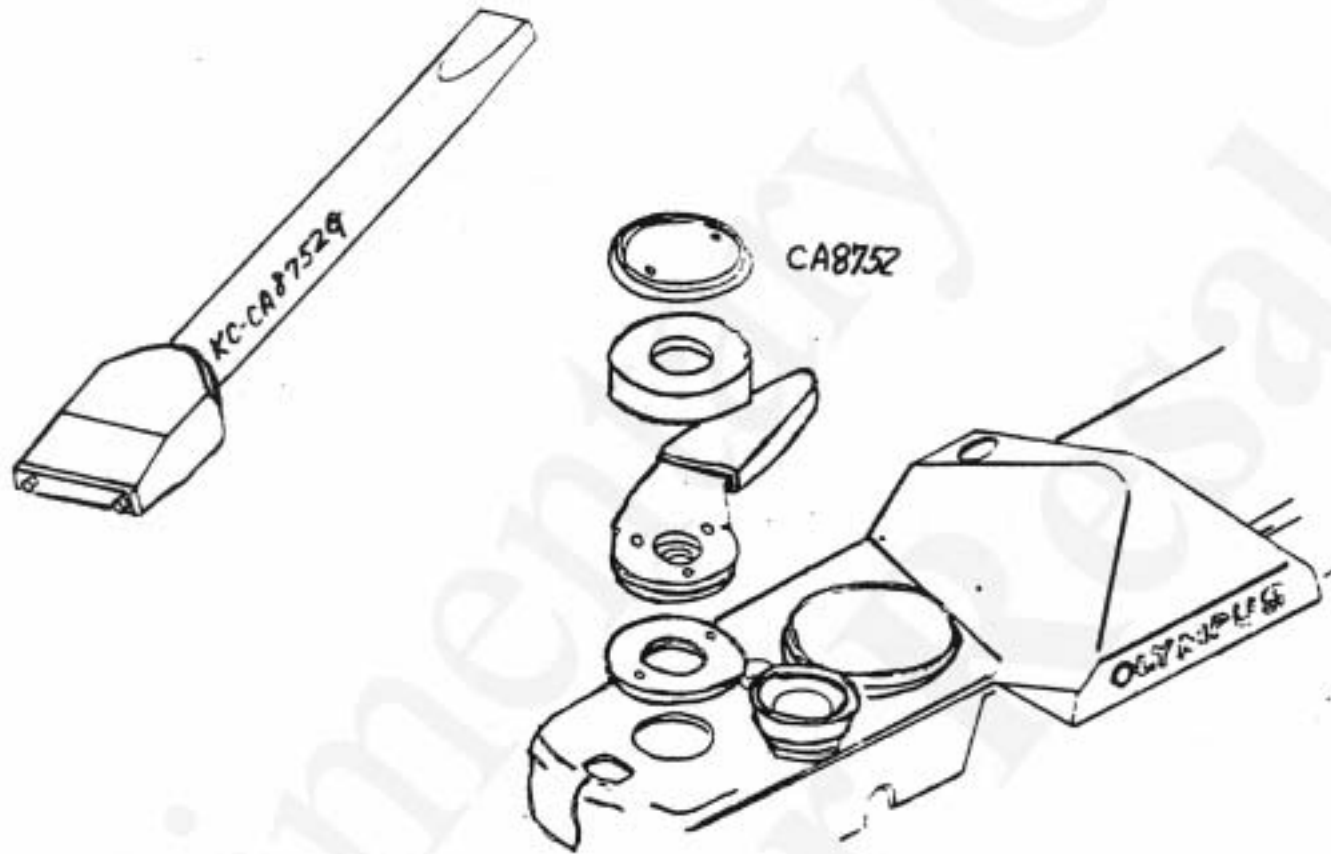




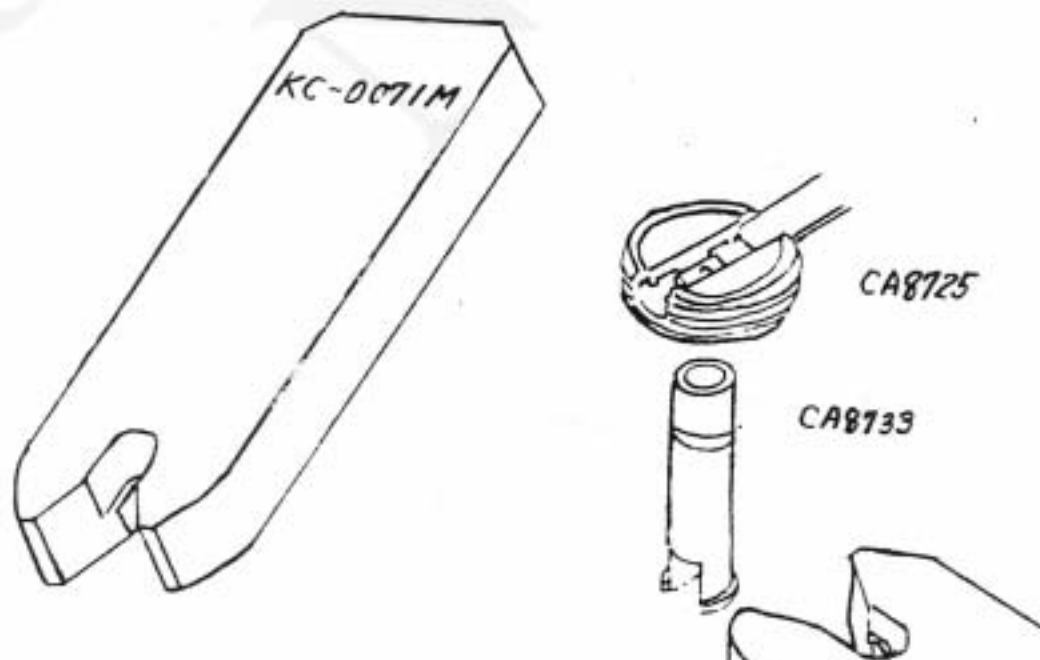
SPECIAL TOOLS

SPECIAL TOOLS

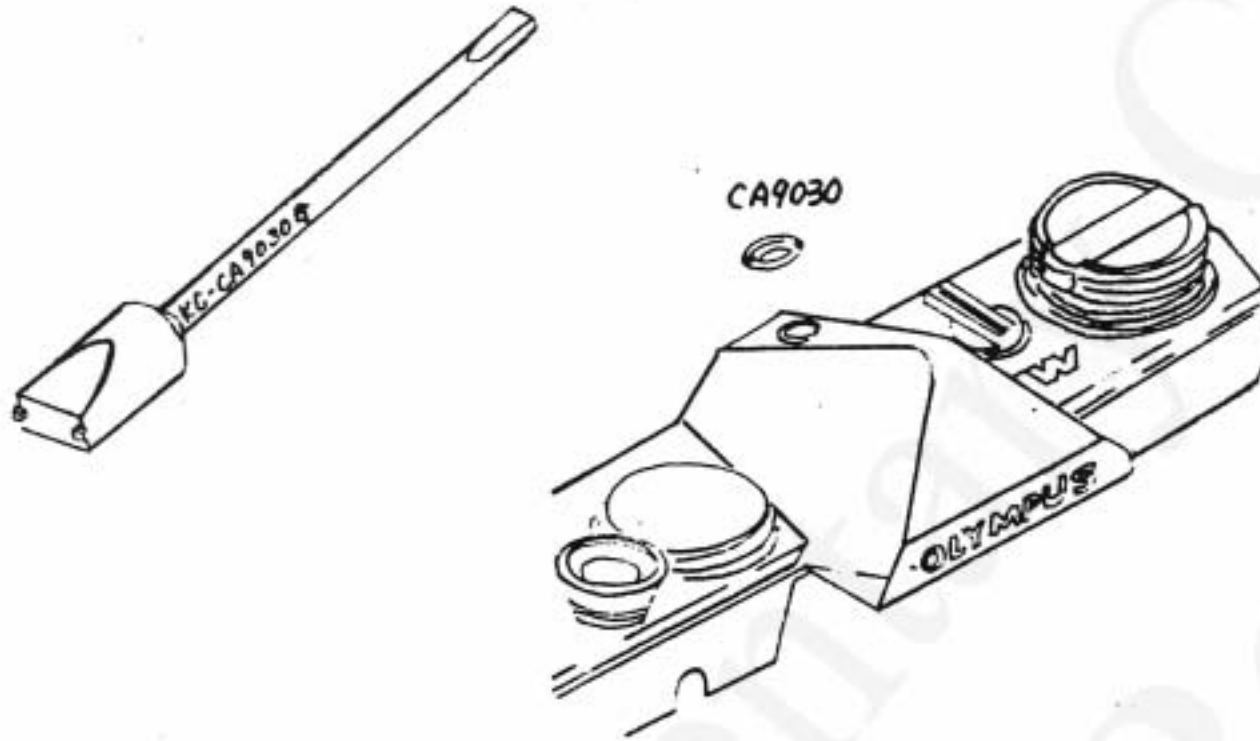
KC-CA8752D (Wrench) To be mounted onto Q-0009M (Diam.6mm, Holder) for use. To be used in dismantling CA8752 (Cap) and CA9135 (Plate).



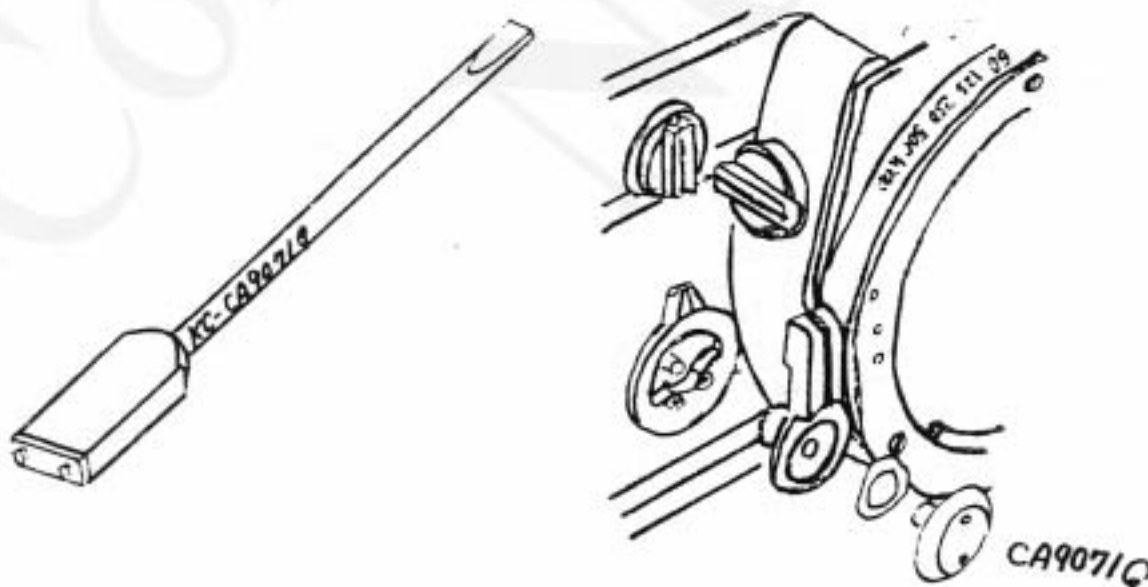
KC-0071M (Wrench) To be used in removing CA8733 (Shaft) and CA8725 (Knob). Pinch-holding the R. Shaft from outside, turn the R. Knob.



KC-CA9030G (Wrench) To be mounted onto Q-0008M (Diam. 3.2mm Holder) and to be used for mounting or removing CA9030 (Nut).



KC-CA9071G (Wrench) To be mounted onto Q-0008M (Diam. 3.2mm Holder) and used for mounting or dismounting CA9071 (Stopper).

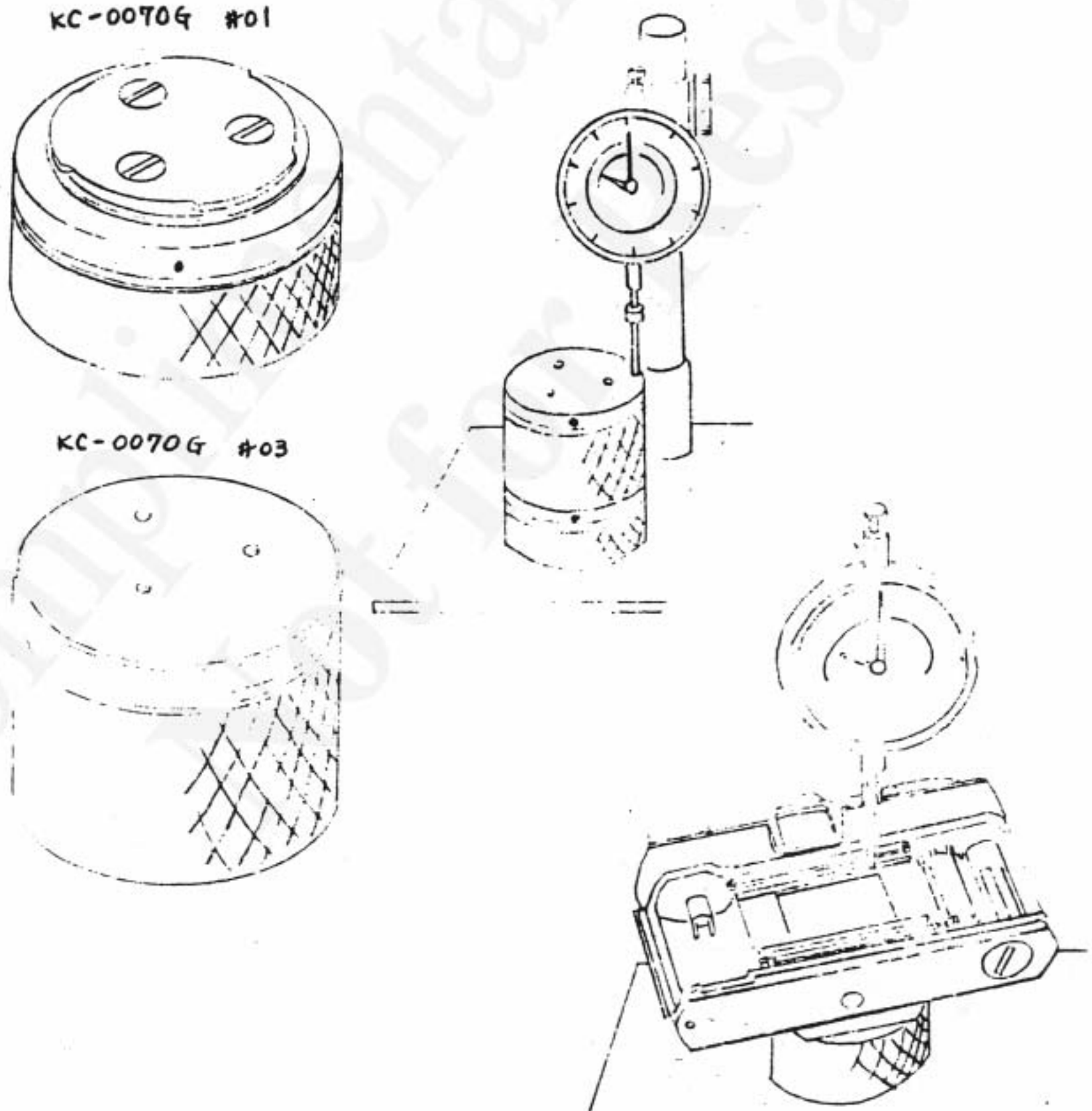


KC-0070G #01
(Mount Stage)

For measurement of flange-back 46.00 for OM-1, in the same manner as for Models FTL and FT.

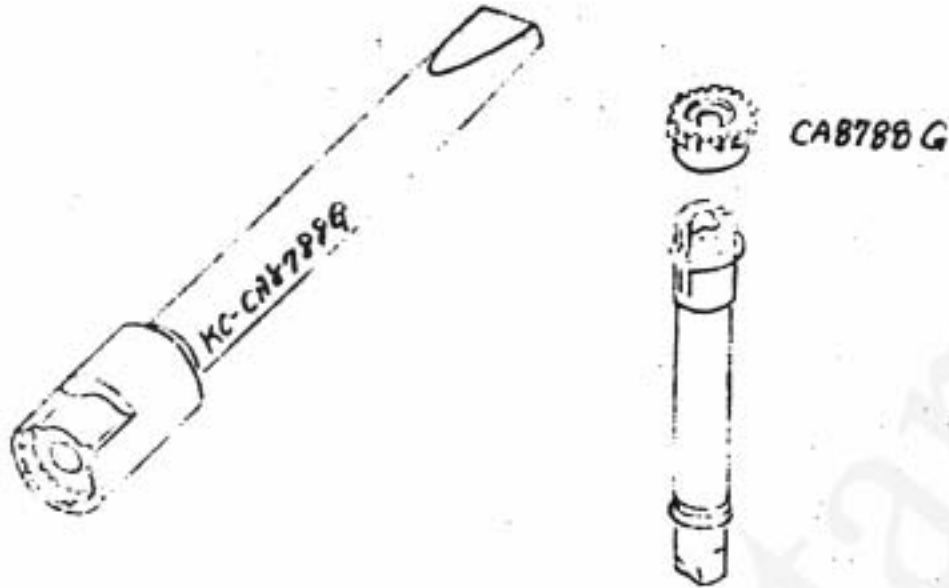
KC-0070G #03
(Measurement Gauge)

- (1) Place KC-0070G #3 on top of #1, and set the 0 (Zero) position.
- (2) Remove #3 and mount the camera body onto #1.
- (3) Measure the rail surface by the dial gauge. The discrepancy between the 0 (Zero) position should be within 0 ± 0.02 . (46.00 ± 0.02)



KC-CA8788G
(Wrench)

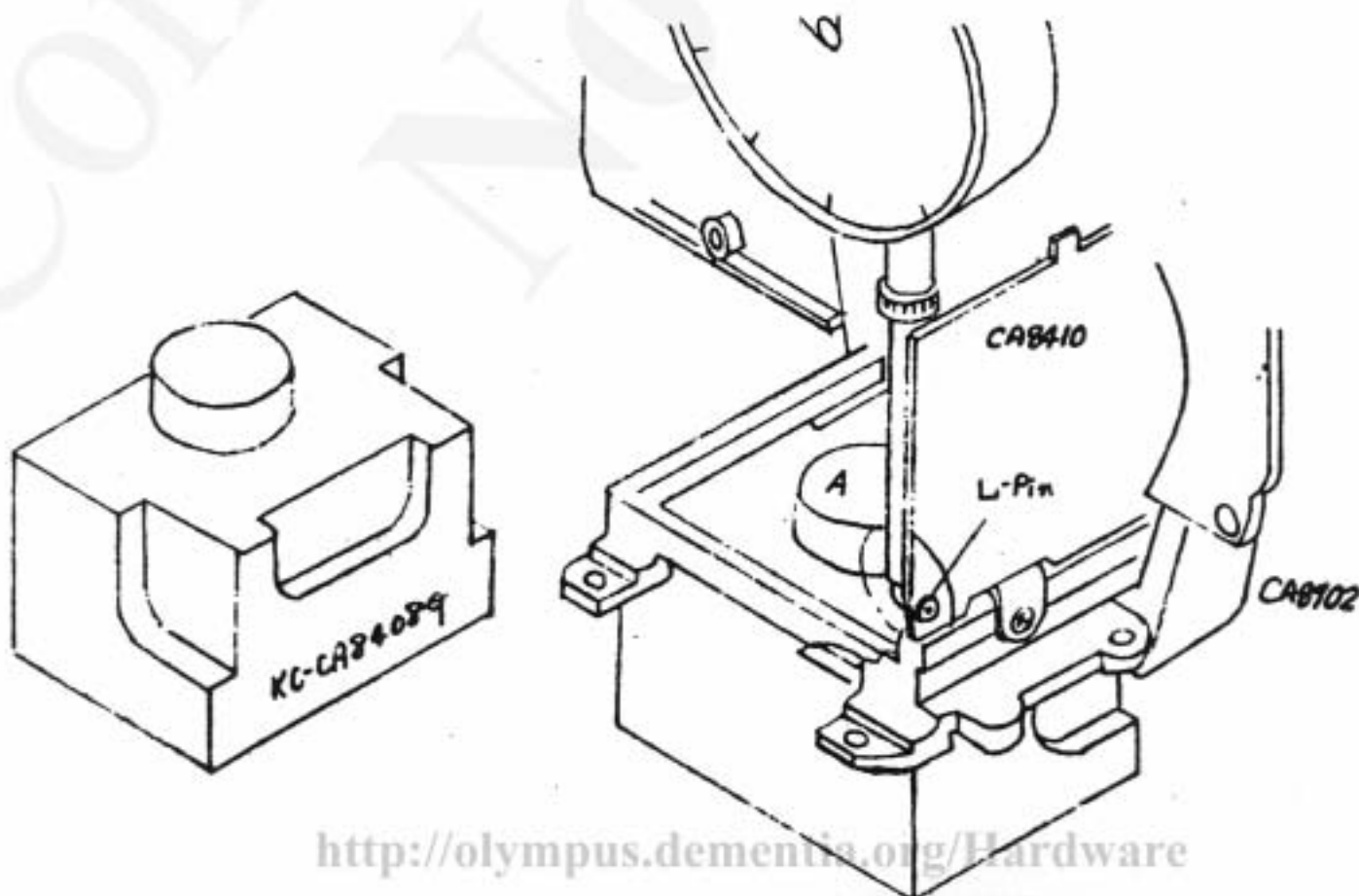
To be mounted onto Q-0009M (Diam. 6mm Holder) and used for mounting or dismounting CA8788 (Gear).



KC-CA8408G
(Positioning Tool)

Distance between the Fresnel surface of CA8702 (Plate) and the L pin, and its measurement.

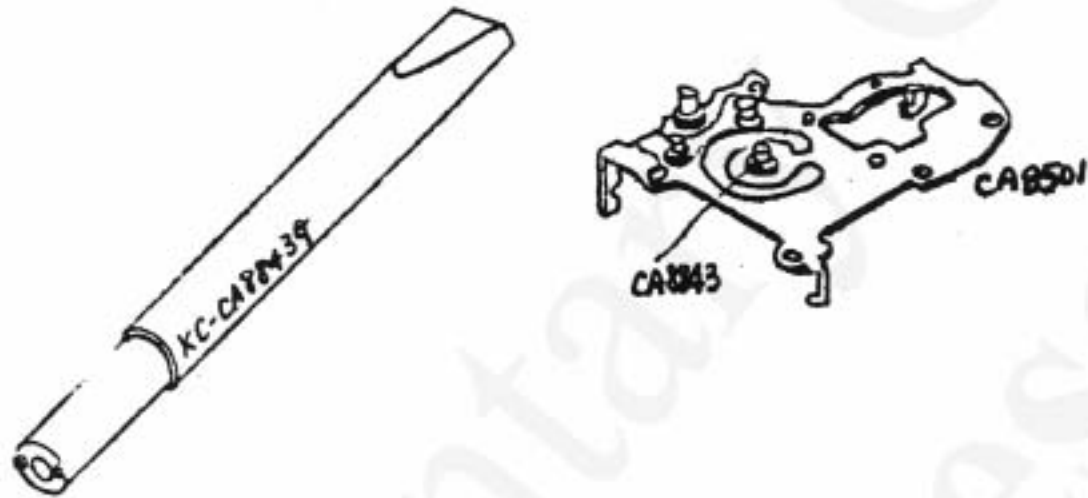
- (1) Place CA8702 upside down on the measuring stage, with its Fresnel surface pressed against the stage.
- (2) Set the A surface of the stage at the O position on the dial gauge. (Zero)
- (3) Slightly move the measuring stage, measure the height of the L pin and take the reading of the difference, which should be within 0 ± 0.05 mm. (5.53 ± 0.05)



KC-CA8843G
(Wrench)

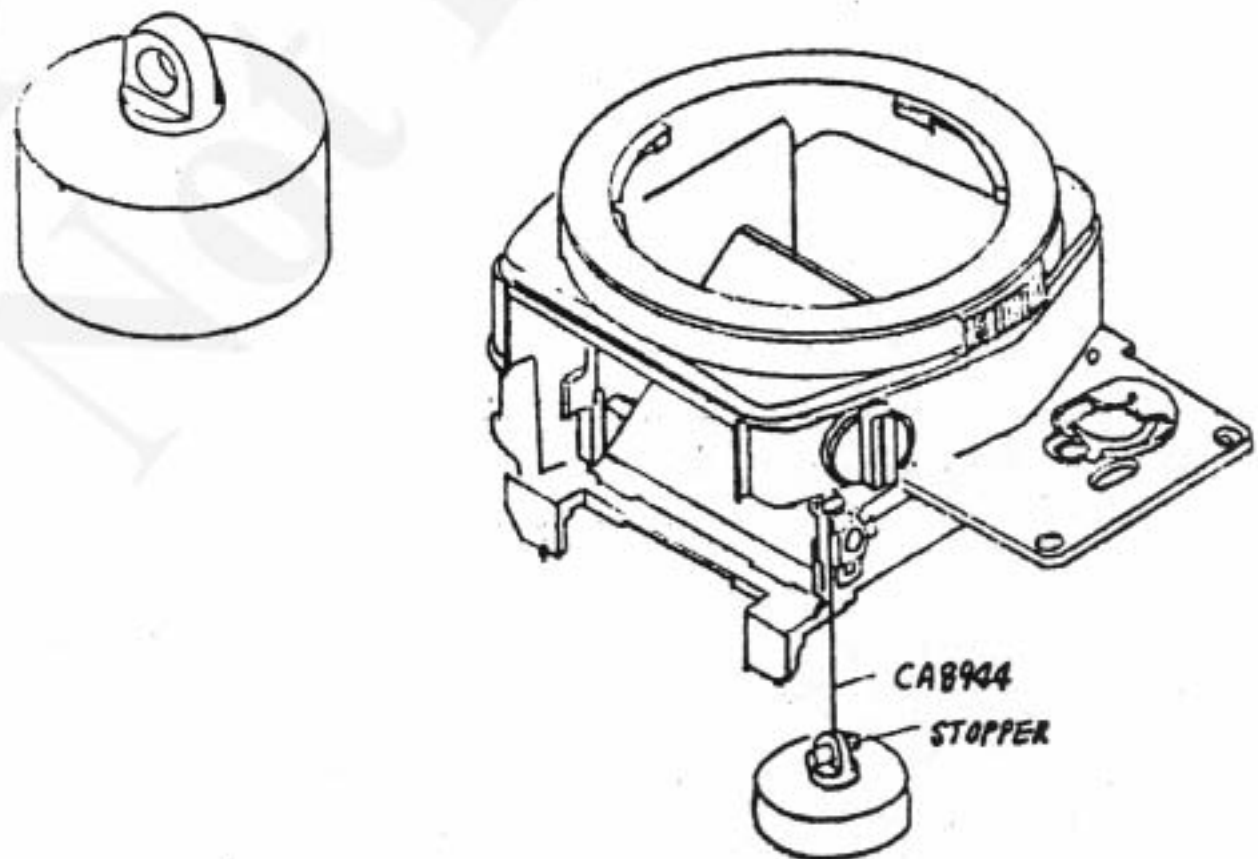
To be mounted onto Q-0009M (Holder) and used for mounting (or dismounting) CA8843 (Shaft) onto CA8501 (Plate).

Remarks: Do not touch both CA8843 and CA8501 with bare hands.

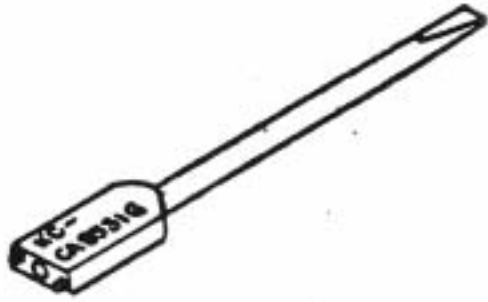


KC-0072G

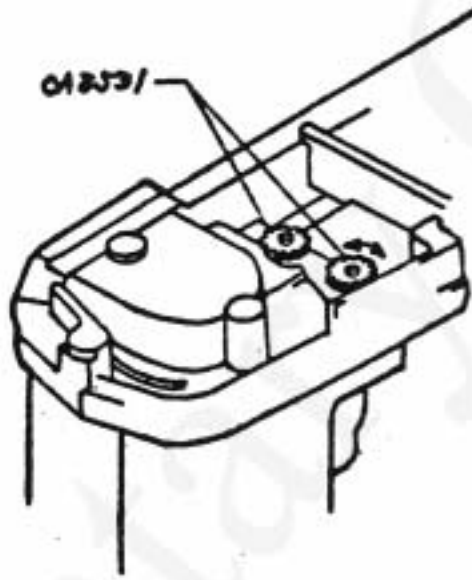
Poise for CA8944B To be mounted onto CA8944B(String) and used for inspection and adjustment of the CA8879 (Ring).
(String).



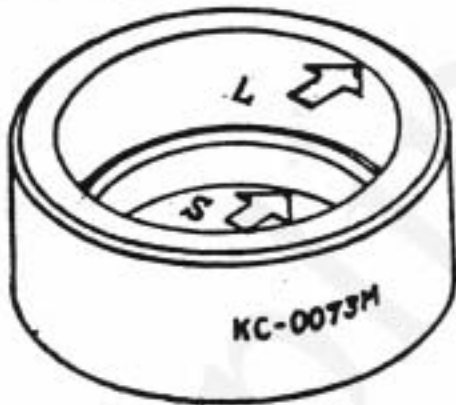
KC-CA8531 G Wrench



Use by inserting into Q-0008M
Adjust tension by turning Parts No.
CA8531.

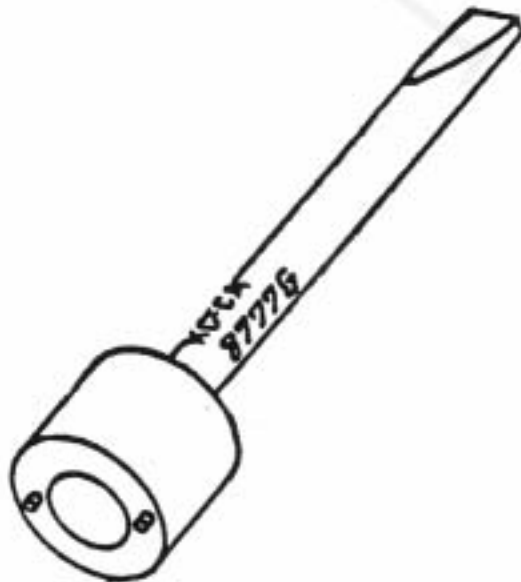


KC-0073M Base

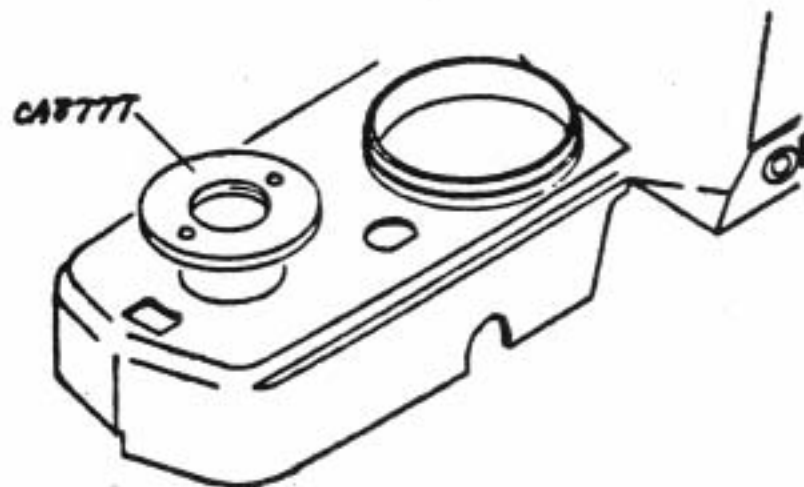


Use only to support lenses on
repairing. Larger dia. for OM
lenses and smaller for lenses
of PenFT & FTL.

KC-CA8777G Wrench

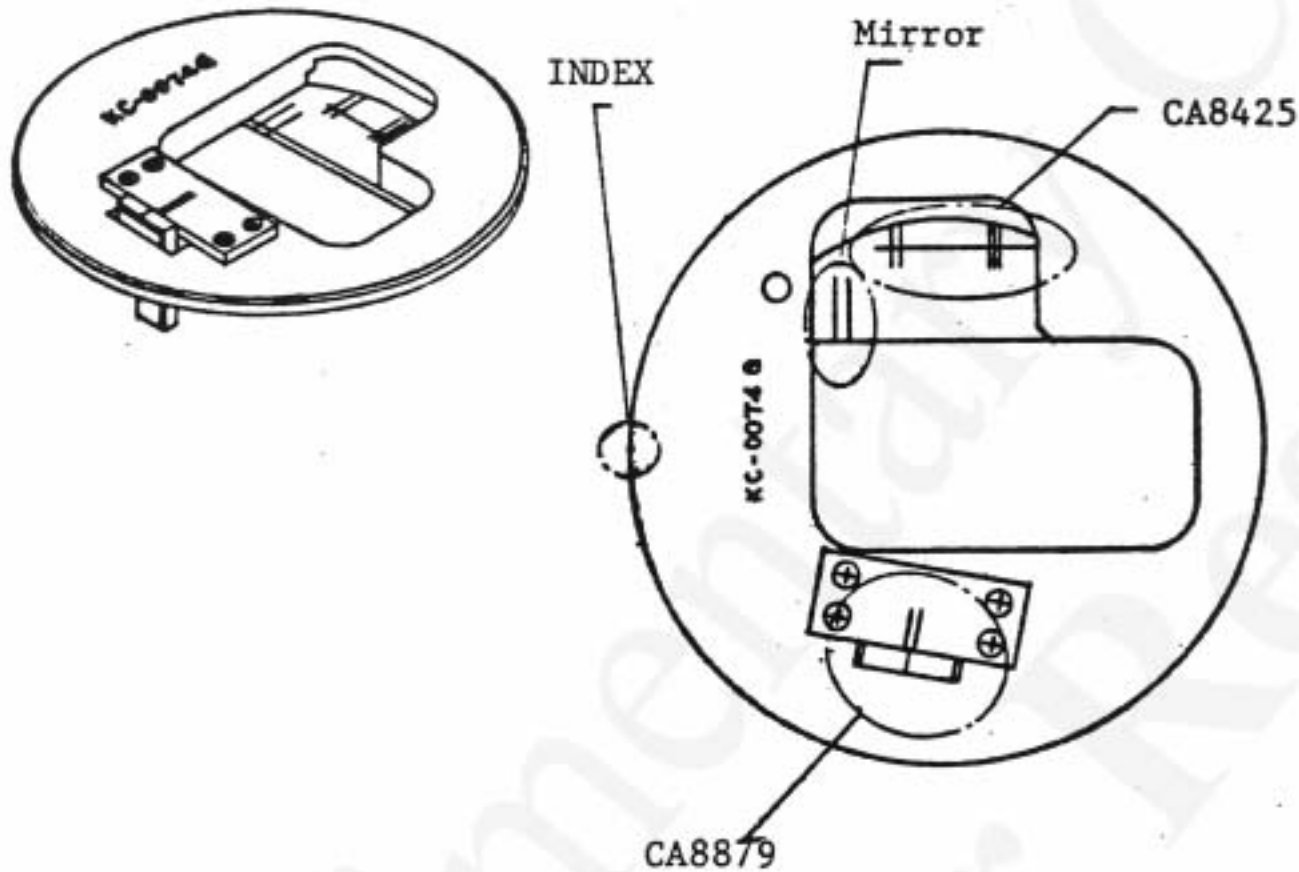


Use by inserting into Q-0009M.
Use for Parts No. CA8777.



KC-0074G Positioning tool

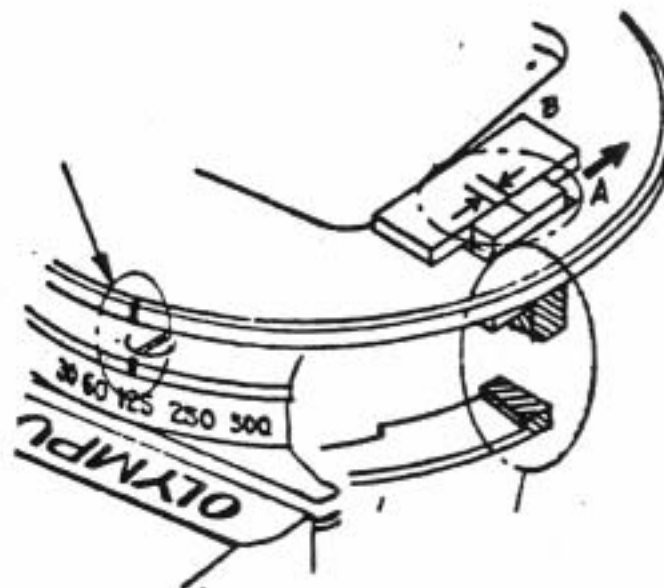
Use for Check of positions of connecting ring (CA8879), connecting lever (CA8425) and Mirror releasing.

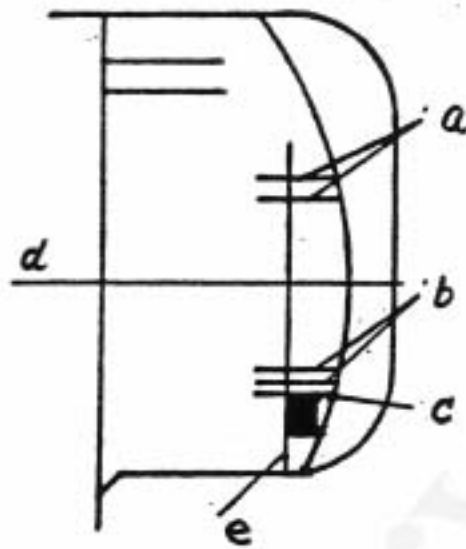


How to use; Mount KC-0074G and B mount by according index of KC-0074G outer circuit and that of B mount (Shutter speed setting position).

How to check; 1. Position of Connecting ring (CA8879)

Pull down A towards you and chek if scratched line of A returns between two scratched line of B.



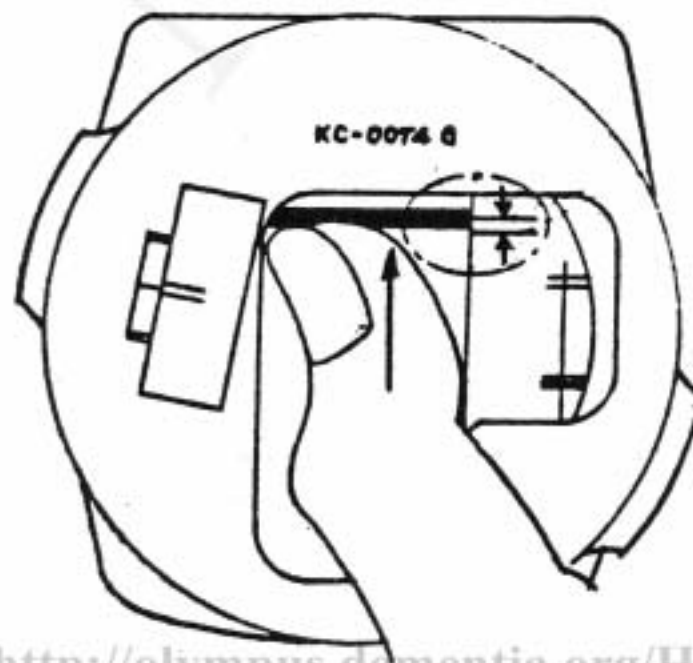


2. Position of Connecting lever (CA8425)

- a: Stop position of CA8425 should be in this range.
- b: After shutter charging, position of CA8425 should be this range.
- c: Before shutter charging, position of CA8425 should be this range.
- d: X direction of optical axis.
- e: Y direction (right & left) of CA8425 should be positioned around this vertical scratched line.

3. Position of Mirror releasing

- + Set shutter speed at 1/4 and charge.
- + Make mirror-up a little by turning mirror-up knob. Push down shutter release button with but at this time hold the mirror frame with your forefinger of right hand not to make shutter release.
- + Lifting up the mirror frame with forefinger, shutter should be released when the mirror frame is positioned in this range.

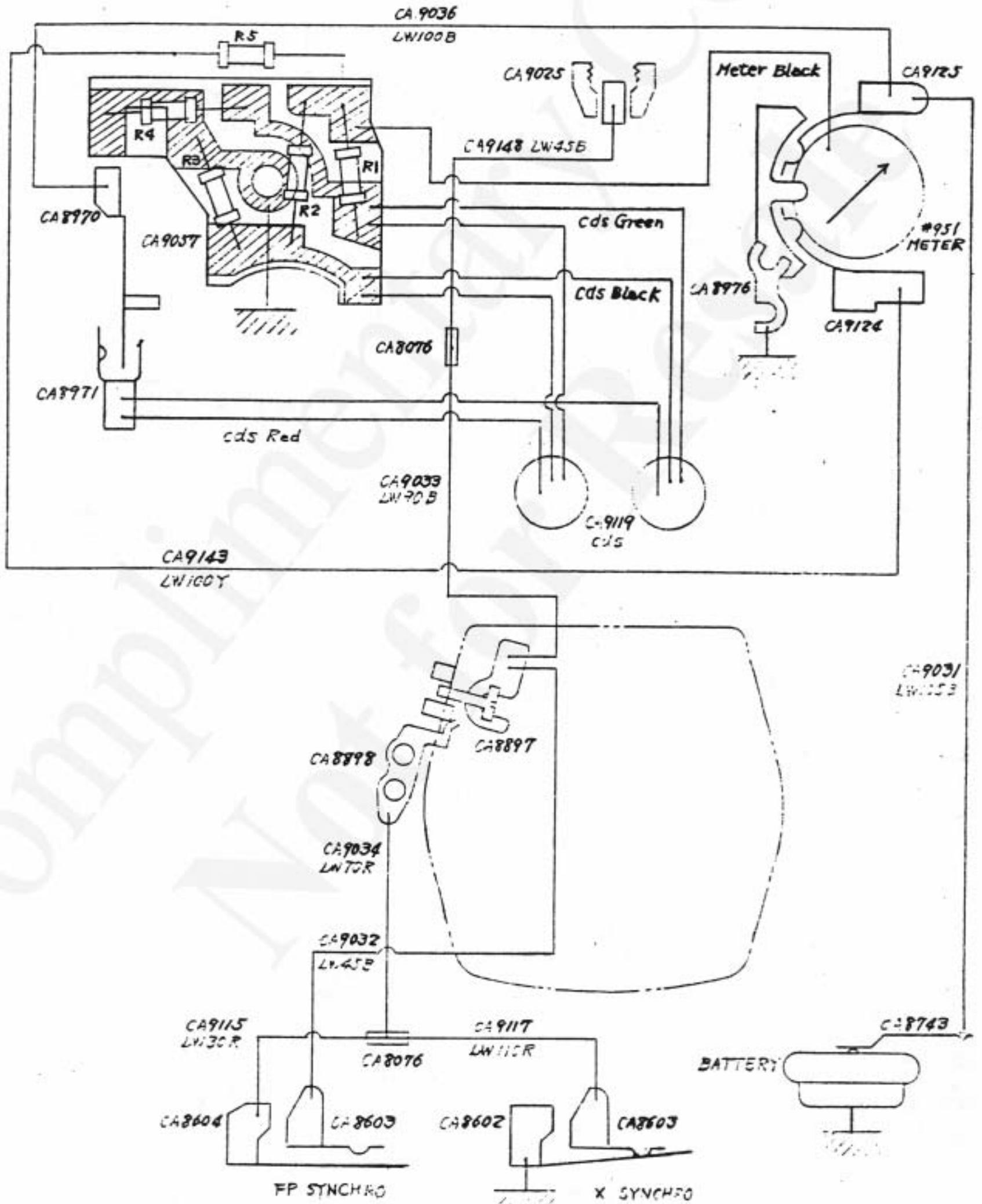




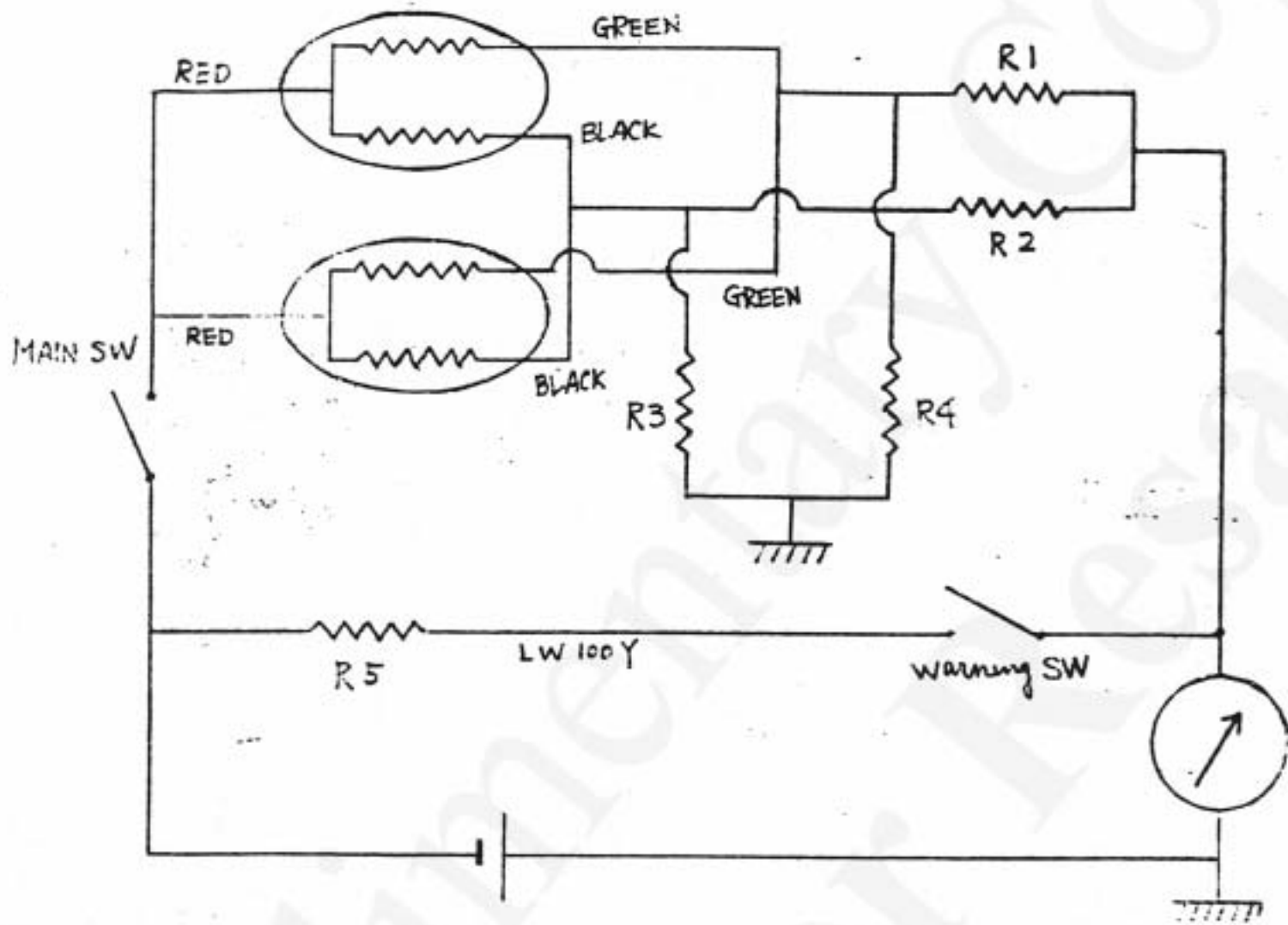
OTHERS

Complimentary Copy
Not for Resale

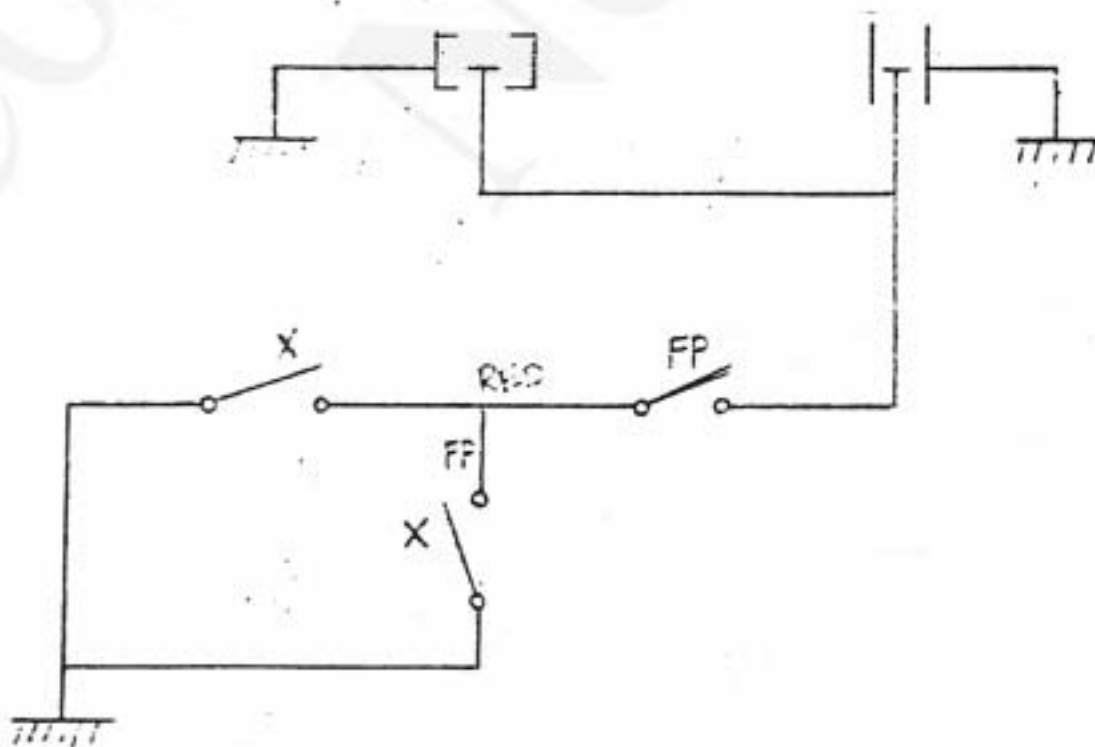
OM-1 Circuit Diagram



Exposure meter Circuit Diagram



Synchro contact point Circuit Diagram

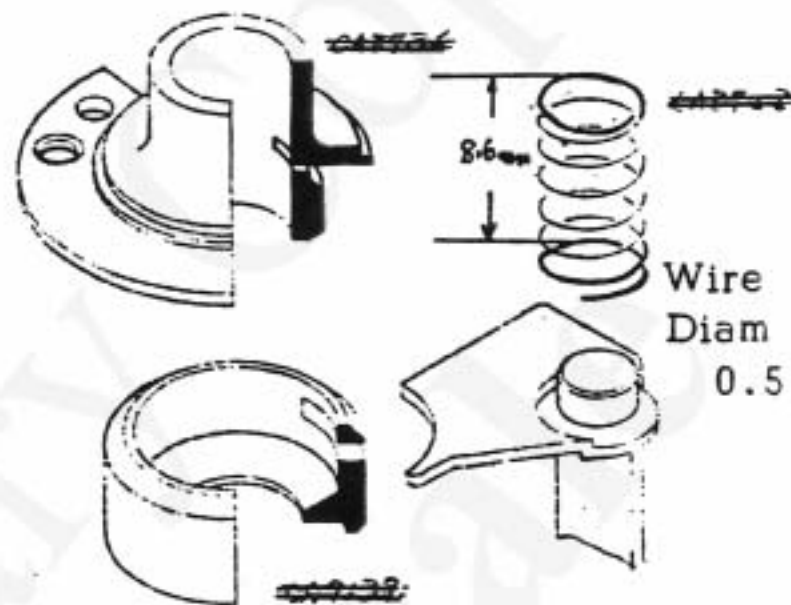
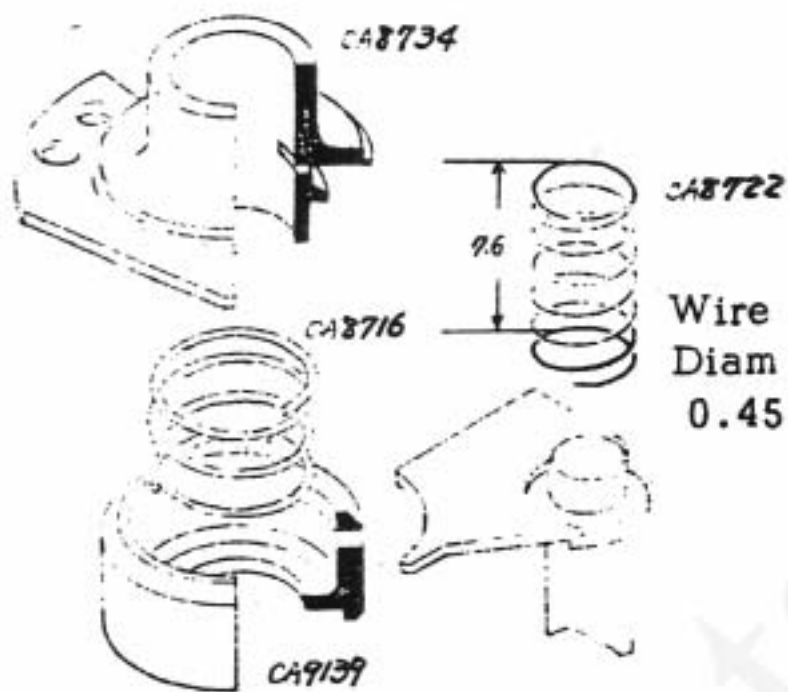


IMPROVED PARTS TABLE

Diag. A (New)

<1>

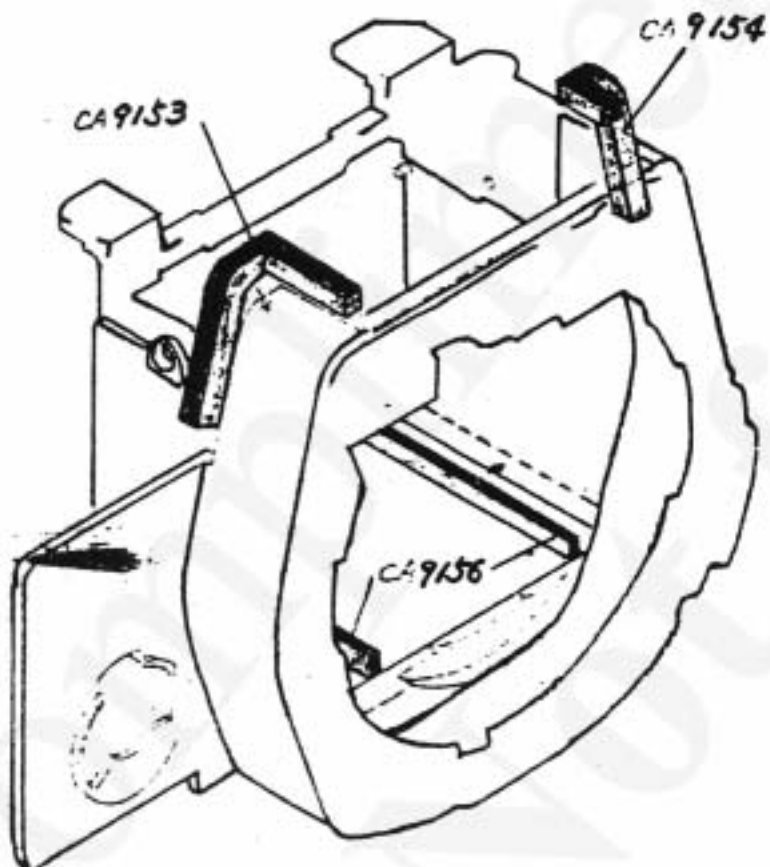
Diag. B (Old)



A

<2>

B

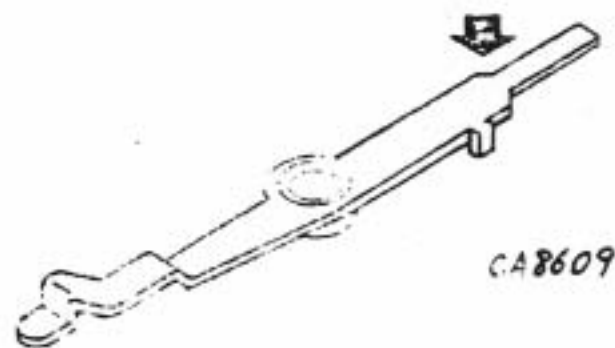
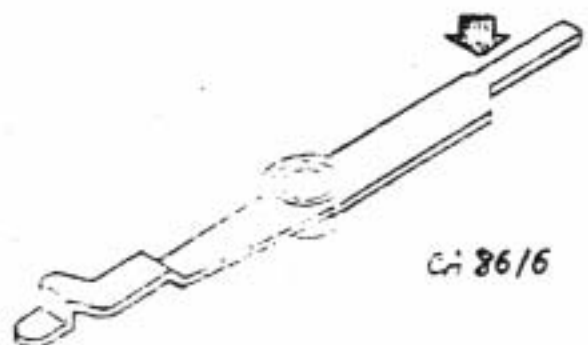


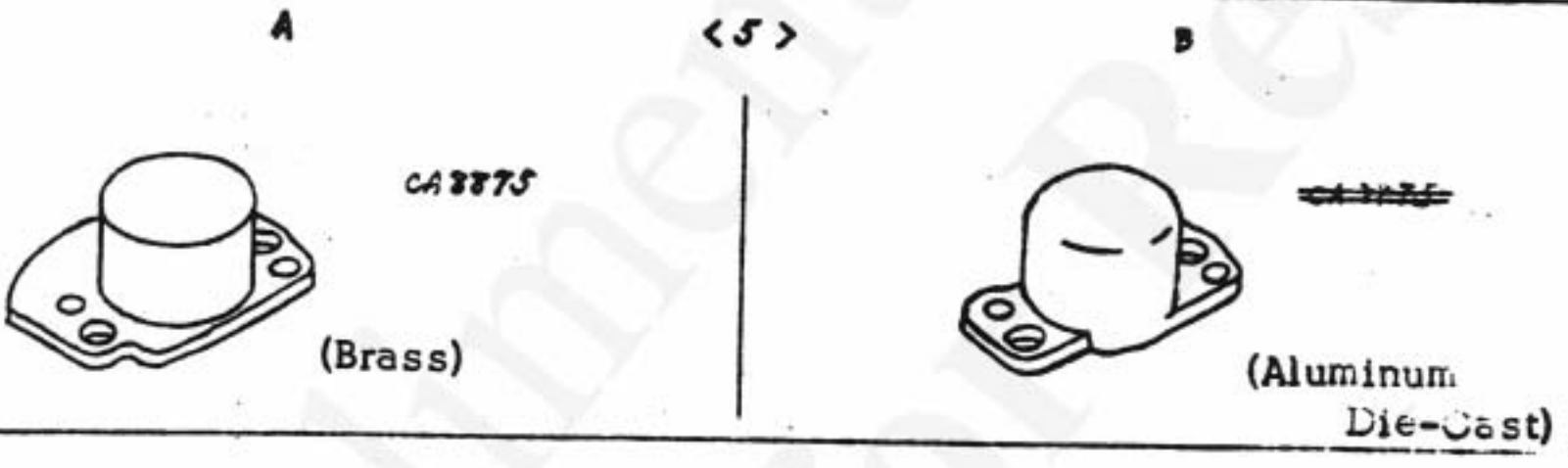
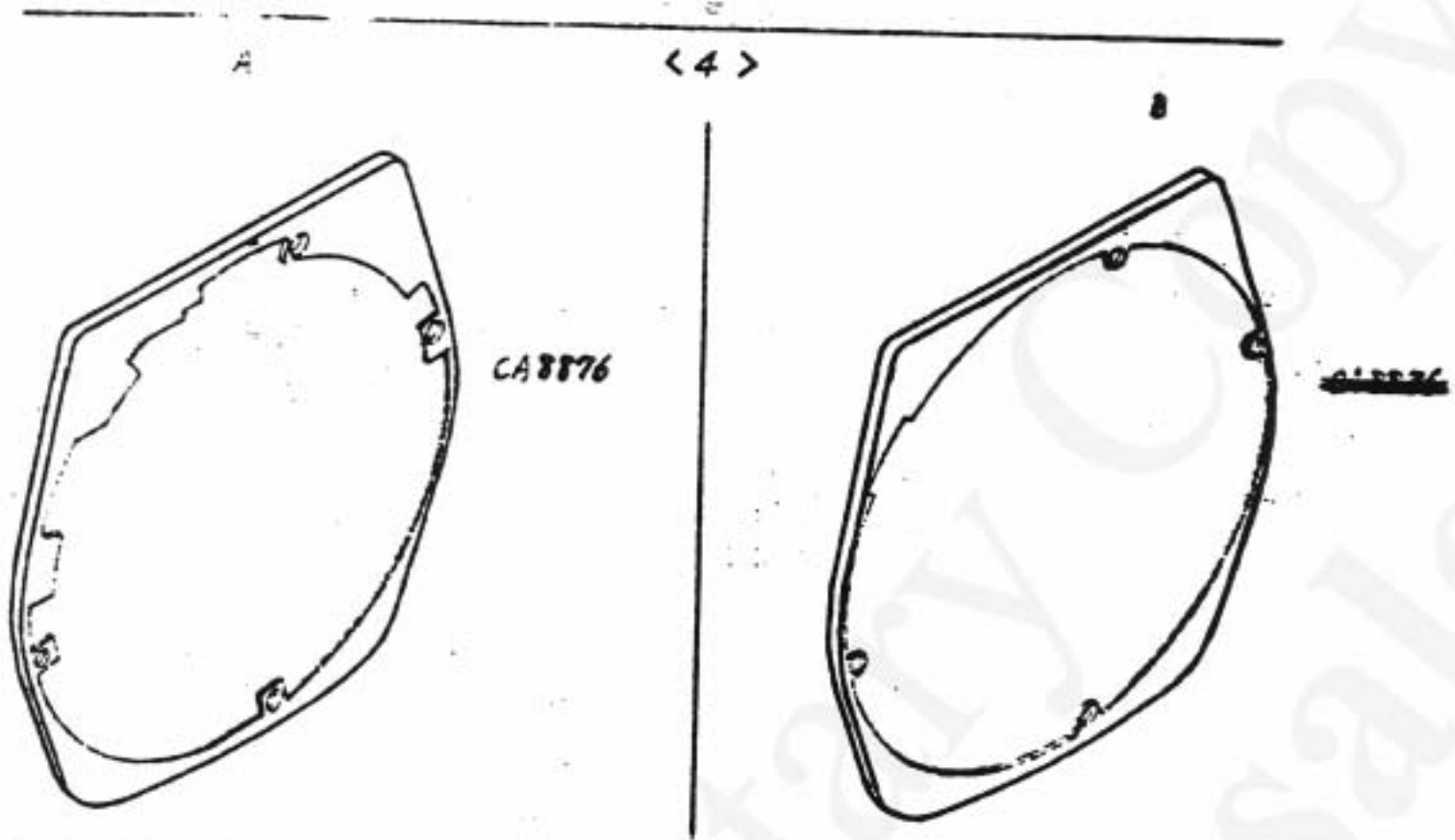
Three Parts CA9153, CA9154 & CA9156 (Shown left page) are added recently.

A

<3>

B





HOW TO CONVERT AN OM1/1N to use a Silver Oxide 357 Cell (Germanium Series Diode Method)

File: OM1DiodeVer2.1C © T.Hughes 1999,2000,2001,2002,2003

As an alternative to the no compromise calibration modification given elsewhere, a Germanium diode in series with the battery may be used. This is a little easier to install, as it does not require top plate removal. Accuracy at high EV values will be lower and there will be some small meter non-linearity. (approx 0.4EV, and some small temperature sensitivity) This modification is essentially the same as using a (Criscam) MR9 adapter, but building it into the camera.

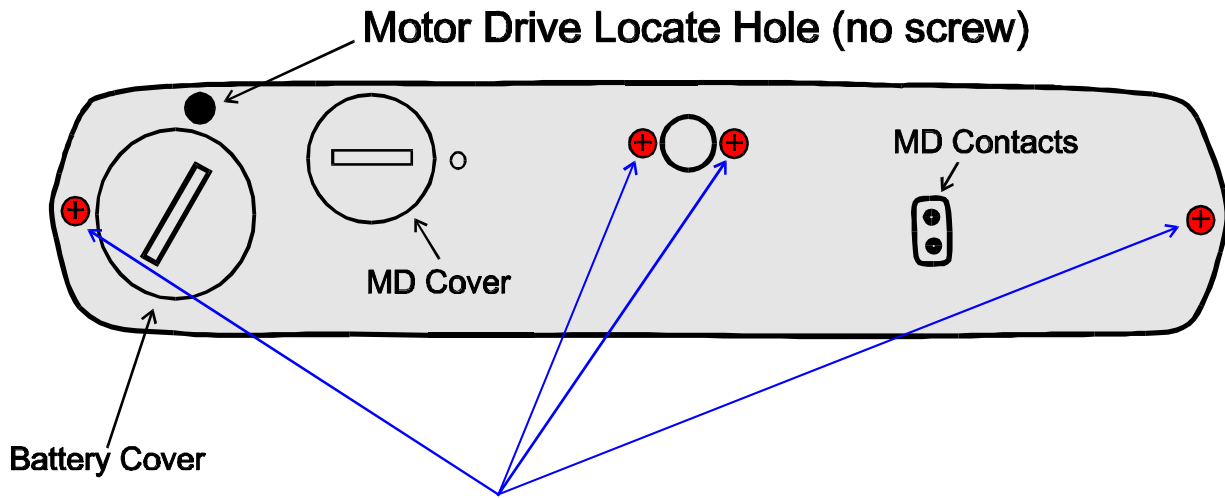
The 1N34A should be a very easy part to get as it is widely used by school kids for making "crystal" radios (see Diodes Sources at end of this document)

Before using the diode, trim it's leads shorter and apply solder so they are tinned making it easy to solder into the camera. Some of the diodes can be rather large and the leads may need dressing to fit around parts in the camera base. Cover any exposed lead as needed with an insulating sleeve or heatshrink tubing to stop it shorting to adjacent metal.

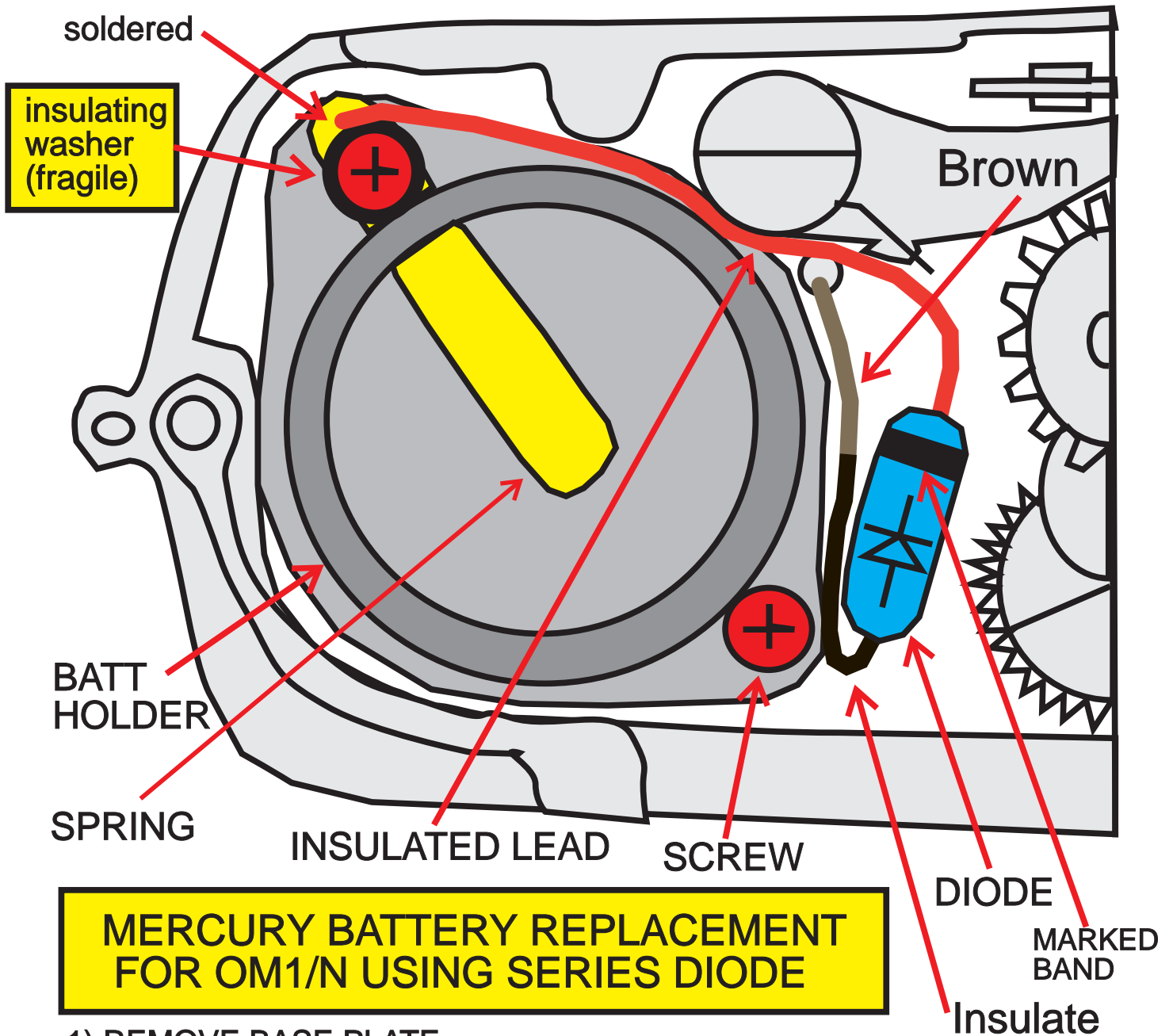
To make the modification all you need to do is remove the base plate (4 screws, [see attached drawing](#)) and find the black plastic part that holds the negative side of the battery (under the battery plate on base plate). This has a wire (brown on newer OM's) on its edge (which actually connects to the metal strip spring on the black plastic) .

Remove the screw that holds the battery spring strip connected to the wire. Carefully remove the spring. **Do not lose the insulating washer and screw. Removing the screw and spring prevents damaging (melting) the plastic pieces when soldering wires to the spring strip end.** Desolder the brown wire from the spring strip. Tin the spring strip. Solder the diode in series between the wire and the contact where it had been connected. The **marker line on the diode should be nearest the spring** (this is important, as the meter won't work if you get it wrong, although no harm is done). The metal strip can sometimes be difficult to resolder. If so, use a file or fine sandpaper to remove or roughen the nickel coating. This may help when tinning the strip prior to soldering the diode. If you are unable to tin the strip this way you can try using acid flux for tinning the strip. **However you must then wash and brush (old toothbrush) the tinned strip very well or the acid flux will attack the new joint you make causing long term reliability problems.** Using acid flux is a last resort as it is very tough to clean properly. Pass the diode lead through and bend back around the spring strip to improve the electromechanical connection when soldered. Solder the diode to the tinned strip with **rosin core solder**. Insulate the wire with tape or shrink tubing. Reassemble spring strip and insulating washer back into camera. Note: You may find it easier to remove the complete black plastic battery holder when performing this

OM1N Base Plate



Base Plate Mounting Screws



- 1) REMOVE BASE PLATE
- 2) REMOVE TWO SCREWS HOLDING BATTERY HOLDER
(may be sealed tight, insulating washer fragile)
- 3) REMOVE SPRING FROM BATTERY HOLDER
- 4) DESOLDER BROWN WIRE FROM SPRING
- 5) SLIDE INSULATOR OVER DIODE LEAD MARKED WITH LINE
- 6) SOLDER INSULATED (line) LEAD TO SPRING
- 7) SCREW BATTERY HOLDER BACK IN PLACE
be careful not to damage insulating washer on spring screw
- 8) SOLDER OTHER END OF DIODE TO BROWN WIRE
- 9) FIX DIODE DOWN WITH HOT GLUE TO STOP MOVEMENT /shorts
- 10) CHECK FOR SHORTING TO ADJACENT PARTS AND BASE PLATE
PLACE INSULATING MAGIC TAPE ON BASE PLATE ABOVE DIODE

modification. Always use resin core electrical solder on the wire or diode never use acid core solder or flux.

Put a piece of foam in the battery holder with a cutout hole to stop the 357 silver oxide battery from rattling around. Sometimes the wire from the battery holder is corroded. If so, clean and "tin" the section with solder, before soldering to the diode. If very badly corroded, strip back and replace a section of wire with new wire

APPENDIX: Comments and detailed tests on using Different Ge diodes:

(Some selected posts I submitted to the Olympus mail List)

(Note errors measured with diode modification could be reduced slightly if the meter fine trim mechanical calibration were performed at ~EV 17, but linearity errors would still remain)

TESTS on an OM1N:

OM1N current consumption is less than 1uA under completely dark and cool conditions. (meter switched on, with eyepiece taped over and lens cap on.)

This implies if the camera is stored in a really dark cupboard it makes almost no difference if the meter is left on or not as the battery should still last more than 2.5 years. This may not be as true at high temperature.

OM1N Current Consumption with a mercury cell (1.35V)

Ambient temperature of test: 18 deg C

Note: meter current consumption is dependent only on light intensity (not on aperture, speed setting or ASA settings).

Current Consumption does depend on lens maximum aperture since metering is at full aperture.

Sealed eyepiece AND lens cap	<1uA
EV2 (F2,1sec,100ASA)	16 uA
EV7 (F2.8,1/15sec,100ASA)	86 uA
EV16 (F16,1/250sec,100ASA)	471 uA

EXPOSURE ERRORS VERSUS BATTERY VOLATGE:

Test settings: ASA 100 (except as noted), OM1N using 50mm,F1.4 lens

Light source incandescent with diffuser

The camera meter was balanced at a battery voltage of 1.35V

The "battery" voltage then varied and the meter rebalanced using speed and/or aperture rings.

Approximate errors in stops were then estimated from the balance change with voltage. This calibrates the sensitivity to battery voltage error at a given light level.

Note: Reference Mercury battery voltage : 1.35V

Nominal Silver Oxide Cell voltage : 1.55V (often closer to 1.6V if new)

Voltage match setting	current	error
1.6V F2/1sec	15uA	0stop
1.55V F2/1sec	14.7uA *	0stop
1.4V F2/1sec	13.1uA	0stop
1.35V F2/1sec	12.7uA *	REF
1.25V F2/1sec	11.7uA	0stop
<hr/>		
1.6V F5.6, 0.5sec	71uA	-0.8stop
1.55V F5.6, 0.5sec	69uA*	-0.8stop
1.45V F5.6, 0.6sec	64uA	-0.2stop
1.35V F5.6, 0.8sec	59uA*	REF
1.25V F5.6, 1.0sec	54.4uA	+0.2stop
<hr/>		
1.6V F5.6, 1/40sec	167uA	-1.2stop
1.55V F5.6, 1/35sec	162uA*	-1.0stop
1.4V F5.6, 1/22sec	150uA	-0.6stop
1.35V F5.6, 1/17sec	140uA*	REF
1.25V F5.6, 1/12sec	130uA	+0.7stop
<hr/>		
1.60V ASA 50,F18, 1/1000sec	486uA	-3.2stop
1.55V ASA 50,F14, 1/1000sec	480uA*	-2.8stop
1.45V F12, 1/1000sec	448uA	-0.6stop
1.35V F8.6, 1/1000sec	418uA*	REF
1.25V F5.6, 1/1000sec	387uA	+1.0stop

ERRORS USING VARIOUS ADAPTER DIODES

Adapter using :

4 schottky diodes (1N5711) in parallel to create higher current diode

Input 1.55V silver oxide cell

	current	OutVoltage	error
EV2	12.7uA	1.35V	0 stop
EV6	57uA	1.31V	0 stop
EV7	135uA	1.29V	+0.4stop
EV16	400uA	1.26V	+0.8stop

Using a Germanium Junction Diode (transistor C-E junction)

Estimated Performance for Ge "Diode" :

EV16	0.42mA	1.35V	+0 stops
EV8	0.15mA	1.38V	-0.5 stops
EV6.5	0.1mA	1.40V	-0.2 stops
EV6	0.05mA	1.42V	-0.2 stops
EV2	0.015mA	1.45V	-0 stops

Estimated performance using series resistor of about 500Ohm

(actual resistor value would be set depending on the particular camera)

Input 1.55V silver oxide cell (Note Error over wide range)

EV	current	OutVoltage	error
EV16	400uA	1.35V	+0 stops
EV8	200uA	1.45V	-0.6 stops
EV7	135uA	1.47V	-0.8 stops
EV6	63uA	1.52V	-0.8 stops
EV2	15uA	1.54V	+0 stops

Estimated performance when using Schottky Power diode (eg 1N5918)

EV16	1.425	0.44mA	-1.2 stops
EV8	1.46V	0.16mA	-0.8 stops
EV6.5	1.47V	0.1mA	-0.6 stops
EV6	1.48V	0.05mA	-0.2 stops
EV2	1.46V	0.015mA	-0 stops

Comments: Because the battery voltage sensitivity error is lower at low Light levels, correcting the error at maximum light levels, tends to reduce errors fairly well over the whole range.

This is helpful when using diodes too, as the leakage currents are less significant than at low light levels. At high light levels having too low a simulated battery voltage introduces slightly less error than if the error in voltage were on the high side. This helps reduce the errors from the low power schottky diodes which drop too much voltage at maximum light levels.

TESTED OM1 ERRORS (1N34A) in stops at approx EV's :

194mV	@0.409mA	EV16	0 stop
165mV	@0.197mA	EV8	-0.5 stop
125mV	@0.100mA	EV6.5	-0.35 stop
100mV	@0.062mA	EV6	-0.2 stop
70mV	@0.023mA	EV2	-0.1 stop

(63-90mV for different diodes at low current)

Tests on 9 , 1N34A diodes from Radio Shack (part#276-1123)

Diode voltage @ current

213mV @ 0.558mA

221mV “

216mV “

218mV “

212mV “

210mV “

204mV “

203mV “

206mV “

173 mV @ 0.27mA
175 mV “
165 mV “
168 mV “
182 mV “
173 mV “
185 mV “
177 mV “
235mV @ 1.100mA

How reproduceable are different types of Diodes?

Ideal Diode for OM1 camera conversion drops about 200mV at 0.5mA

Tests on 5 Schottky, 1Amp power diodes (1N5818)

At	0.52mA	voltage drop:	0.127-0.132V
At	0.20mA	voltage drop	0.101-0.109V
At	0.05mA	voltage drop	0.065-0.070V

Test on 4 different Germanium Transistors

Using C-B junction (2N1305) (i.e. used as a diode)

At	0.52mA	voltage drop	0.198-0.205V
At	0.20mA	voltage drop	0.163-0.172V
At	0.15mA		~0.155 estimated
At	0.10mA		0.15V estimated
At	0.05mA	voltage drop	0.127-0.130V

Test on 3 different 1N5711's low power schottky diodes

At	0.52mA	voltage drop	0.308-0.325V
At	0.20mA	voltage drop	0.295-0.320V
At	0.05mA	voltage drop	0.255-0.270V

Test on 4 parallel connected 1N5711 schottky diodes

At	0.52mA	voltage drop	0.274V
At	0.20mA	voltage drop	0.261V
At	0.05mA	voltage drop	0.224V

Estimated Errors using a 1.4V Zinc/air "Wein cell")

EV3 0 stop

EV6 -0.1 stop

EV 7 -0.6 stop

EV 16 -0.6 stop

Unfortunately cell life is very short once the cell has been unsealed.

DIODE SOURCES

Micro-Tools in Vaccaville CA:

<http://www.micro-tools.com> PH: (707)446-1120 sells 1N34A's

Mouser Electronics

<http://www.mouser.com/>

Sells CDSH270 and NTE109 GE diodes (see below). (I have not tested these diodes)

Jameco in Redwood City CA

<http://www.Jameco.com> Sells 1N270's (part # 35941)

One of the few manufacturers of Ge diodes left, is :

American Microsemiconductor, Inc.

133 Kings Road, Madison, NJ 07940 USA

(973) 377-9566 / Fax: (973) 377-3078

info@americanmicrosemi.com

They make 1N270,1N34A,1N60 etc diodes, suitable for camewra use. Unit cost about 18 cents Unfortunately they have a minimum order of \$50 so you will need to buy through a distributor. Their 1N34A's have the lowest specified leakage current so are probably the preffered device.

NTE lists their part number NTE109 as similar to the 1N34A but it looks a bit more leaky and a slightly higher current part,so may have lower forward drop.

<http://www.nteinc.com/>

Many hobbyists sell Ge diodes for crystal set construction:

e.g. Scott sells 1N34A's for hobby use:

<http://home.talkcity.com/corporateway/comtrol/In34a.html>

Radio Shack used to sell part#276-1123 for \$1.20 and included 10 diodes.
