Westar
projectors

INSTRUCTIONS

FOR

TYPES 2001-E, F, G & H

Westrex Company Ltd.
152 Coles Green Road
London, N.W.2

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WESTAR PROJECTOR
OPERATING INSTRUCTIONS

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Westrex

A DIVISION OF LITTON INDUSTRIES

TYPE 2000 PROJECTORS and SOUND REPRODUCERS

Installation and Spares Manual

Westrex Company Ltd.
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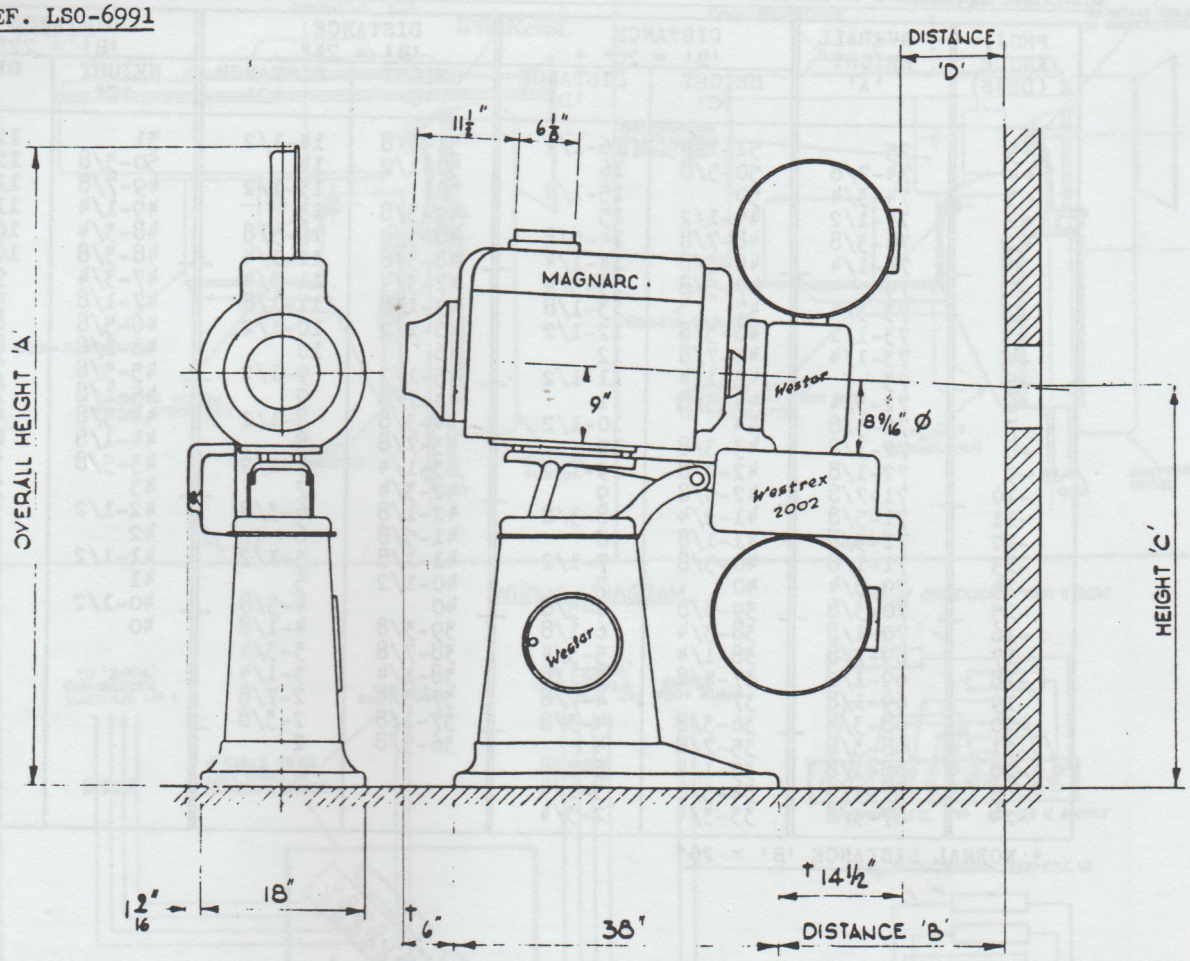
GENERAL EQUIPMENT BULLETIN

REF. LSO-6991



FOR CHART SEE NEXT PAGE

† THESE DIMENSIONS ARE WITH PEDESTAL ARM HORIZONTAL.

Ø THIS DIMENSION REFERS TO WESTAR AND ALL SIMPLEX PROJECTORS. FOR THE FOLLOWING PROJECTORS AND ASSOCIATED ADAPTER PLATE, ADD THE DIMENSION GIVEN, BOTH TO DIMENSION 'Ø' AND HEIGHT 'C' (ANGLE OF PROJECTION MAY BE NEGLECTED)

KALEE 7 & 8	2-1/4"
KALFE 11 (a)	2-1/4"
KALFE 11 (b)	1-11/16"
KALEE 12	11/16"
KALFE 21	3/16"
ROSS F.C.	1-3/4"
ROSS G.C.	7/8"
ERNEMANN 1, 2, 3, 4 & 5	1-15/16"
ERNON	1-15/16"
WALTURDAW FIVE	1-15/16"

(a) BEFORE SERIAL No. 15126
(b) SERIAL No. 15126 AND ONWARDS

GENERAL EQUIPMENT BULLETIN

PROJ. ANGLE (DEGS)	OVERALL HEIGHT 'A'	DISTANCE 'B' = 26" *		DISTANCE 'B' = 24"		DISTANCE 'B' = 22"	
		HEIGHT 'C'	DISTANCE 'D'	HEIGHT 'C'	DISTANCE 'D'	HEIGHT 'C'	DISTANCE 'D'
+5	75	51-1/4	16-1/2	51-1/8	14-1/2	51	12-1/2
+4	74-7/8	50-5/8	16	50-1/2	14	50-3/8	12
+3	74-3/4	50	15-1/2	50	13-1/2	49-7/8	11-1/2
+2	74-1/2	49-1/2	15	49-3/8	13	49-1/4	11
+1	74-3/8	48-7/8	14-5/8	48-3/4	12-5/8	48-3/4	10-5/8
0	74-1/4	48-3/8	14-1/4	48-3/8	12-1/4	48-3/8	10-1/4
-1	74	47-5/8	13-3/4	47-3/4	11-3/4	47-3/4	9-3/4
-2	73-3/4	47	13-1/8	47-1/8	11-1/8	47-1/8	9-1/8
-3	73-1/2	46-3/8	12-1/2	46-1/2	10-1/2	46-5/8	8-1/2
-4	73-1/4	45-7/8	12	46	10	46-1/8	8
-5	73	45-1/4	11-1/2	45-1/2	9-1/2	45-5/8	7-1/2
-6	72-3/4	44-5/8	11	44-7/8	9	45-1/8	7
-7	72-5/8	44	10-1/2	44-3/8	8-1/2	44-5/8	6-1/2
-8	72-3/8	43-3/8	10	43-7/8	8	44-1/8	6
-9	72-1/8	42-7/8	9-1/2	43-1/4	7-1/2	43-5/8	5-1/2
-10	71-7/8	42-3/8	9	42-3/4	7	43	5
-11	71-5/8	41-3/4	8-3/8	42-1/8	6-3/8	42-1/2	4-3/8
-12	71-3/8	41-1/8	8	41-5/8	6	42	4
-13	71-1/8	40-5/8	7-1/2	41-1/8	5-1/2	41-1/2	3-1/2
-14	70-3/4	40	7	40-1/2	5	41	3
-15	70-3/8	39-3/8	6-5/8	40	4-5/8	40-1/2	2-5/8
-16	70-1/8	38-3/4	6-1/8	39-3/8	4-1/8	40	2-1/8
-17	69-7/8	38-1/4	5-3/4	38-7/8	3-3/4		
-18	69-1/2	37-5/8	5-1/4	38-1/4	3-1/4		
-19	69-1/8	37	4-7/8	37-3/4	2-7/8		
-20	68-3/4	36-3/8	4-3/8	37-1/8	2-3/8		
-21	68-3/8	35-7/8	4	36-5/8	2		
-22	68-1/8	35-1/4	3-5/8				
-23	67-3/4	34-5/8	3-1/4				
-24	67-3/8	33-3/4	2-3/4				

* NORMAL DISTANCE 'B' = 26"

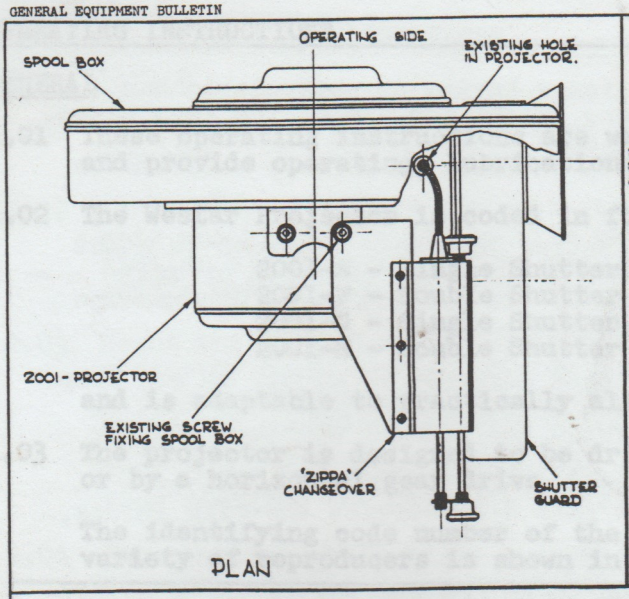
AFTER INSERTION OF 3" BLOCK (SPACING REP.SET FORWARD)

		DISTANCE 'B' = 30"	
-25	65-3/4	31-1/4	3-7/8
-26	65-1/4	30-1/2	3-1/2
-27	64-7/8	29-3/4	3
-28	64-3/8	29	2-3/4
-29	63-3/4	28-1/8	2-1/2
-30	63-1/4	27-1/4	2-1/4

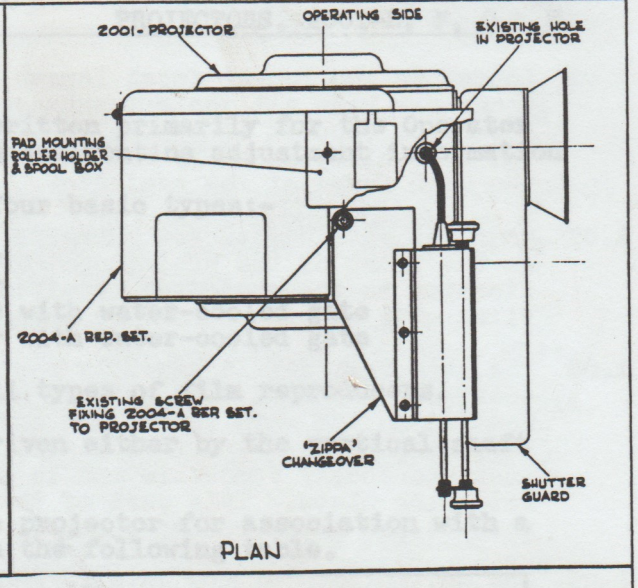
THE ABOVE DIMENSIONS ARE IN INCHES TO NEAREST 1/8" AND REFER TO THE STANDARD 2024-A PEDESTAL. THE FOLLOWING NON-STANDARD PEDESTALS MAY BE USED IF REQUIRED:-

2024-B	(2" LOWER)
2024-C	(2" HIGHER)
2024-D	(4" ")
2024-E	(6" ")

GENERAL EQUIPMENT BULLETIN

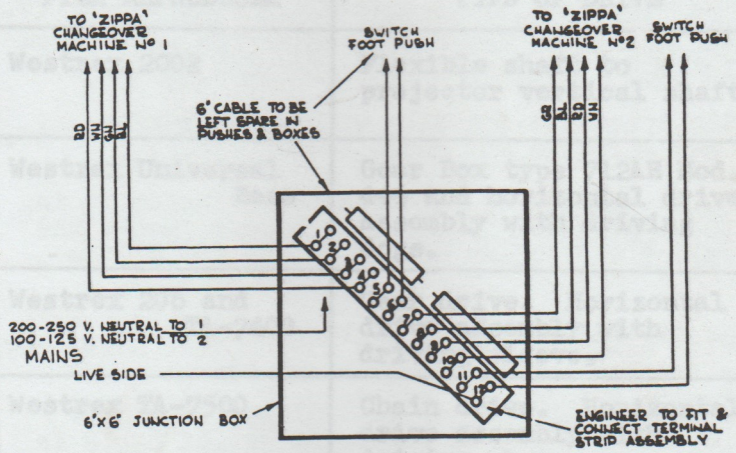


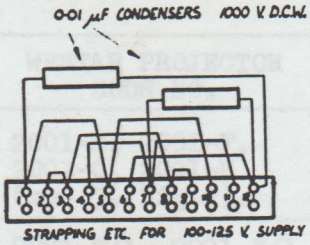
PLAN



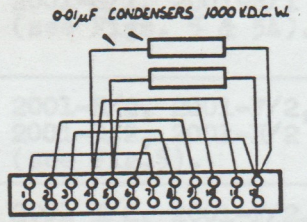
PLAN

WIRING DIAGRAM.



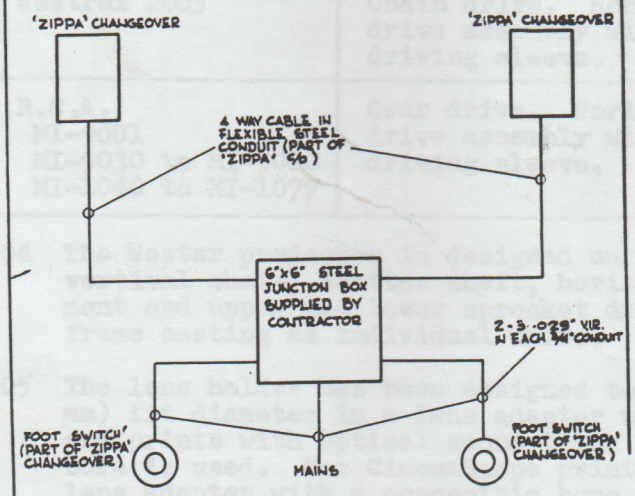


STRAPPING ETC. FOR 100-125 V. SUPPLY



STRAPPING ETC. FOR 200-250 V. SUPPLY

CONDUIT LAYOUT



'ZIPPA' CHANGEOVER (FOR FITTING TO 'WESTAR' PROJECTOR)

CONSISTING OF

2 - END BOXES (RELAY CHANGEOVER) COMPLETE WITH 4 CORE CABLES & FLEX. CONDUIT & COUPLINGS

2 - FOOT PUSH SWITCHES

1 - 12 WAY TERMINAL STRIP COMPLETE WITH SUPPRESSOR CONDENSERS & STRAPPING (CHECK STRAPPING FOR SUPPLY VOLTAGE -SEE ABOVE)

2 - SHUTTER PLATE ASSEMBLIES

FITTING OF 'ZIPPA' CHANGEOVER TO WESTAR PROJECTOR LSO-10094 ISSUE: 2

1. GENERAL

1.01 These operating instructions are written primarily for the Operator and provide operating, lubrication and routine adjustment information.

1.02 The Westar Projector is coded in four basic types:-

2001-E - Single Shutter
2001-F - Double Shutter
2001-G - Single Shutter with water-cooled gate
2001-H - Double Shutter with water-cooled gate

and is adaptable to practically all types of film reproducers.

1.03 The projector is designed to be driven either by the vertical shaft or by a horizontal gear drive.

The identifying code number of the projector for association with a variety of reproducers is shown in the following table.

DRIVES FOR WESTAR PROJECTORS

FILM REPRODUCER	TYPE OF DRIVE	WESTAR PROJECTOR CODE NO.
Westrex 2002	Flexible shaft to projector vertical shaft.	2001-E, 2001-F, 2001-G, 2001-H (see 7, Fig.2).
Westrex Universal Base	Gear Box type 712AE Mod. 444 and horizontal drive assembly with driving dogs.	2001-E/1, 2001-F/1, 2001-G/1, 2001-H/1 (see Figs. 5 & 5A).
Westrex 206 and TA-7400	Gear drive. Horizontal drive assembly with driving sleeve.	2001-E/2, 2001-F/2, 2001-G/2, 2001-H/2 (see Fig.5).
Westrex TA-7500	Chain drive. Horizontal drive assembly with driving sleeve.	2001-E/2, 2001-F/2, 2001-G/2, 2001-H/2.
Westrex 2003	Chain drive. Horizontal drive assembly with driving sleeve.	2001-E/3, 2001-F/3, 2001-G/3, 2001-H/3.
R.C.A. MI-9001 MI-9030 to MI-9060 MI-1040 to MI-1077	Gear drive. Horizontal drive assembly with driving sleeve.	2001-E/2 Mod.674, 2001-F/2 Mod.674, 2001-G/2 Mod.674, 2001-H/2 Mod.674.

1.04 The Westar projector is designed on the unit assembly principle; the vertical shaft, shutter shaft, horizontal drive, intermittent movement and upper and lower sprocket drives can be removed from the main frame casting as individual units.

1.05 The lens holder has been designed to take lenses of 2.781 inches (70.7 mm) fit diameter in a lens adapter with a pre-focus stop. For standard prints with optical sound track a lens adapter with an eccentric bore is used. For CinemaScope prints with magnetic sound tracks a lens adapter with a concentric bore is used. Some lenses are not suitable for a lens adapter with a pre-focus stop, and for this type a lens stop ring is available.

1.06 Lenses in the longer focal length range having an appreciable back focus may have all their overhanging weight forward of the lens clamp. A forward support is available for such cases, which forms part of the lens clamp assembly and provides an additional clamp external to the main frame of the projector.

1.07 Mounting attachments for anamorph optics have been designed to mount on the front of the projector. This is the only addition or modification to the projector required for the projection of CinemaScope films with either optical or magnetic recording.

1.08 The gate heat shield assembly has been designed to accept an arc lamp aperture of f/1.9. The gate is made in two parts; the rear part is mounted on the main frame, and carries the framing aperture and the removable picture aperture plate. The aperture plate (9, Fig.1) is instantaneously removable and is accurately located in place by a retaining plate. This part of the gate also carries the film guides, runners and guide roller assembly.

1.09 The moving part of the gate is mounted at the rear of the lens holder casting on a sliding tube. The gate pads are long and heavy and are designed to give uniform pressure over the entire film contact surface.

1.10 A standard aperture plate (9, Fig.1) is provided, coded 77498. Full details of this aperture and method of use are given in the accompanying General Equipment Bulletin "Projector, 2001 - Aperture Plates".

1.11 The projector is fitted with sprockets for film with small perforations and will therefore run magnetic and photo track prints.

1.12 To fit a Westrex 2004 Magnetic Reproducer to a Westar Projector it is only necessary to remove the upper spool box roller holder, mount the reproducer in place and replace the roller holder on the top of the magnetic reproducer.

1.13 Facilities are provided for fitting the Thide picture changeover device to the projector.

1.14 A single shutter projector already in use may be modified to double shutter at the theatre by means of a set of parts. A set of parts is also available for conversion of 2001-E or F Projectors to provide a water-cooled gate.

1.15 The water-cooled gate (1, Fig.6) projector, coded 2001-G or H, requires connection to a water supply giving a rate of flow of 0.8 to 1.2 pints (0.5 to 0.7 litres) a minute. The pressure drop required across the inlet and outlet nozzles of the projector (2, Fig.6) to produce this rate of flow is about 2 lbs per square inch (0.14 Kgm per square cm). The water flow can be obtained from the mains or by the use of a closed circuit pump and cooling unit.

1.16 The following external controls are provided on the front of the projector.

Focus
Frame
Shutter (or travel ghost control)

The framing lamp switch is located on the top of the projector (2, Fig.2).

2. INSTALLATION

2.01 Unpack the projector and remove any trace of packing material which may have got into the mechanism during shipment.

2.02 Thoroughly clean off the protection grease from sprockets, rollers, gate and all parts of the film path. If carbon-tetrachloride or a similar cleaning solvent is used DO NOT use solvent on the gears or shafts where it might enter the ball bearings.

2.03 Mount the projector on the reproducer set. In the base of the projector there are six fixing holes. Two are tapped 3/8" Std. Whit. (for the standard American mounting); the other four are clearance holes for mounting directly on reproducer sets by four 3/8" Std. Whit. socket head cap screws. In line with the rear 3/8" tapped mounting hole there is a safety screw whose head prevents the mounting screw from damaging the adjacent gear.

2.04 For vertical shaft drive a short flexible shaft with a coupling at each end (7, Fig.2) is connected between the vertical shafts of the 2002 Reproducer and projector, the couplings being fixed to the shafts by cap screws and lock nuts.

2.05 A steel spring washer and a plain steel washer are tied to the shutter knob. These must be inserted under compression between the top coupling of the flexible shaft and the lower ball bearing of the projector with the plain washer next to the ball bearing.

2.06 For horizontal drive (Fig.5) loosen the two screws fixing the Tufnol gear (3, Fig.5), also the four screws in the outer collar.

2.07 With Universal Base insert the drive shaft (Fig.5A) so that the two dimples line up with the two pointed screws in the collar and tighten first these screws, then the flat ended screws. Finally tighten the two screws fixing the gear.

2.08 With reproducers using gear or chain drive proceed as in 2.06 above, then insert shaft with reproducer drive gear or sprocket as far as possible. Tighten the two pointed screws into the space between pinion teeth, or into the dimples, whichever are present. Tighten first the pointed screws, then the flat ended screws. Finally tighten the screws fixing the gear.

2.09 When the projector has been mounted on the reproducer and the drive has been assembled, check the film alignment. Lubricate the projector before running it - see Sections 4.01-4.05 on Lubrication.

2.10 Connect the threading lamp (6, Fig.1). A flexible conduit for the lamp supply and a small fuse box (normally 2 Amp. fuses) for mounting on the pedestal or front wall are provided. The conduit has a plug and fittings for entry into the front of the projector (5, Fig.2). If the conduit is to pass towards the rear of the projector, use the two clips provided below the door on the non-operating side. A 125 V, 15 W, SBC lamp is normally provided and is suitable for 110 V supply. A 250 V, 15 W, SBC lamp is also available.

2.11 If the projector is a 2001-G or H with a water-cooled gate, connect the inlet and outlet nozzles by suitable flexible hose pipe to the water supply - see Section 1.15.

2.12 When the projector has been checked by running, align the arc lamp with the gate aperture.

2.13 Fit the lens in the projector and centre the projected image on the screen. File the aperture plate to the required ratio - see Section 1.10.

3. TO THREAD THE FILM

3.01 The film path is shown in Fig.1.

To open the gate give the large knob (1, Fig.1) a quarter turn to the right; the knob will remain locked in that position. The gate is closed by pushing the knob. If the knob is given a full half turn to the right a second locking position will be found. This is normally used only to remove the gate - see Section 4.09.

3.02 By a twisting action with finger and thumb open the upper pad roller arm (5, Fig.1), the lower pad roller arm (21, Fig.1) and the intermittent shoe (19, Fig.1).

3.03 Check with the framing knob (24, Fig.1) that the framing mechanism is in the central position. Turn the mechanism by hand until the intermittent sprocket stops moving - no further.

3.04 Thread the film through the roller holder on the top of the projector, under the upper sprocket and over the upper pad roller, through the gate, under the intermittent sprocket, under the lower pad roller, and over the lower sprocket to the sound reproducer. The upper and lower pad rollers in the open position serve as guides for setting the film loop above and below the gate; typical loop sizes are shown on Fig.1. Immediately above the aperture plate on the fixed part of the gate is mounted a framing aperture, which is spaced precisely two frames above the projector aperture.

3.05 Hold the film in the gate, close the intermittent shoe, and close the gate by pushing the knob (1, Fig.1). Finally close the upper and lower pad rollers (5 and 21, Fig.1) again using the finger and thumb in a twisting action.

4. LUBRICATION AND ADJUSTMENT

4.01 Lubricants - the following lubricants must be used. Shell Vitrea 33

2009-A Oil for the intermittent, upper and lower sprocket bearings and various parts of the mechanism as specified below.

32081-A Grease for all gears.

32082-A Grease for lubricating the vertical shaft at the sliding gear (8, Fig.2).

Do not oil or grease with projector running.

Do not oil the ball bearings. They are factory filled and require no additional lubrication.

4.02 Intermittent (12, Fig.1; 2, Fig.4)

Fill the intermittent with 2009-A Oil through the oil cup (11, Fig.1 and 2, Fig.4) until it shows half-way up the window (14, Fig.1) and check daily. There will be no oil level indication with the projector running. Lubricate with 2009-A Oil the outrigger bearing of the intermittent and the face of the collar (10, Fig.1).

4.03 Plain bearings

The plain bearings fitted to the upper (3, Fig.1) and lower (22, Fig. 1) sprocket drive assemblies are of the oil-impregnated type but must be replenished with 2009-A Oil. The bearings of top and bottom Westar spool boxes should also be lubricated with 2009-A Oil.

4.04 Gears

Apply a smear of 32082-A Grease on the vertical shaft at the sliding gear (8, Fig.2). Before the grease is applied clean the gear sleeve and the shaft of any deposit by wiping and using a little 2009-A Oil while operating the framing knob. This cleaning procedure with 2009-A Oil is particularly important during the early operating days of the projector. After greasing, move the gear up and down a few times by the framing knob (24, Fig.1).

All gears must be kept lubricated with a minimum amount of 32081-A Grease.

4.05 The following lubrication routine should be followed.

Each day

Check intermittent oil level (Section 4.02), and oil intermittent outrigger bearing. Check grease on sliding gear on vertical shaft (Section 4.04) and re-grease with 32082-A Grease if necessary.

Twice a week

A few drops of 2009-A Oil in each oil cup and on plain bearings (Sections 4.02 and 4.03).

Grease all gears with 32081-A Grease (Section 4.04), using a minimum of lubricant.

Once a week

After cleaning apply a drop of 2009-A Oil to the focusing, fire shutter, and framing mechanisms, the gate opening mechanisms (including the tube actuating pin), pad roller arms, upper and lower spool box bearings and the friction washer of the Westar take-up.

The art of lubrication is "little and often". Lack of attention to lubrication will ruin the projector - on the other hand excessive lubrication is to be deprecated.

4.06 To time the shutter

To check the timing, remove the red glass from the shutter guard by pressing it in with the thumb and pushing upward. The indicator bar (1, Fig.3), is used for timing the shutter. Turn the projector slowly by hand while watching the intermittent sprocket. When the sprocket has advanced exactly two teeth from its stationary position, stop the projector; this must be done very accurately. If the notch in the shutter blade (2, Fig.3) is now exactly opposite the indicator bar the shutter is in time. If not, check if the shutter can be corrected by adjusting the knob marked "Shutter" in the front of the projector.

If a change of setting is necessary, first move the shutter timing mechanism to the centre of its travel by the shutter knob, then loosen the two screws in the shutter boss (3, Fig.3) and rotate the

shutter until the notch and indicator are in line. Tighten the screws and check by running film; eliminate any travel ghost by means of the shutter knob.

4.07 To Adjust the Removable Part of the Gate

To inspect the removable part of the gate give the knob (1, Fig.1) a full half turn to the right, where there is the second locking position. (With certain lenses, due to very short back focus distance between lens and film, it may be necessary to remove the lens in order to use the second gate locking position). Loosen the holding screw (26, Fig.1). The assembly can now be withdrawn towards the fixed part of the gate. (The extent of the gate opening can be adjusted if necessary, see Section 4.09).

The pressure of the gate pads can be adjusted over a wide range, through coil springs (2 and 23, Fig.1). After a little experimenting, the best operating pressure will be found for any condition of film; it is suggested that until the optimum pressure is found, the adjusting nuts should be about mid-position. A safety feature lies in the limit stops provided, since the adjusting nuts cannot be tightened so as to lock the film. It is desirable to operate with as little pressure as possible on the pads while still maintaining a steady picture. The lighter the pressure, the less the wear on the intermittent sprocket, pads and film.

4.08 To Adjust the Fixed Part of the Gate

Remove the shield by releasing the two captive screws (8, Fig.1). Loosen the screws securing the fixed part of the gate. The film runners must be lined up slightly forward of the sprocket. Place a straight edge against the face of the runner and let it extend down to the sprocket. The assembly should now be adjusted so that the straight edge is approximately two film thicknesses ahead of the sprocket. Then tighten the holding screws. Replace the shield.

The gate assembly may be removed for inspection by removing the securing screws.

4.09 To Adjust the Gate Opening

If the position of the lens when focused permits, the opening at the first locking position can be increased. Open the gate to the first locking position. Then loosen the two set screws (top and bottom) behind the gate operating knob, and turn the whole knob and sleeve assembly clockwise. Find by trial a setting at which the gate (still in the first locking position), is satisfactorily clear of contact with the lens, then tighten the two screws. If it is decided to adopt the new position permanently, drill small dimples in the sleeve at the points marked by the screws. In exceptional cases, when the lens is in focus, it may not be possible to open the gate even to the first locking position as normally set, and the gate opening must be reduced. Move the lens forward temporarily, and open the gate to the first locking position. Then proceed as above, but move the knob and sleeve assembly anti-clockwise to find the new setting. Under these conditions it will be necessary to move the lens forward in order to use the second position when taking out the gate for inspection.

4.10 To Remove the Intermittent (12, Fig.1)

Remove the flywheel on the non operating side of the projector. Frame the intermittent carriage into its lowest position and then raise it 1/16". Remove the film gate (Section 4.07). Loosen the four screws

(17, Fig.1) holding the intermittent. Since these four screws are hardened and have large heads, a small screwdriver should be used to avoid risk of breakage. Turn the intermittent about an eighth turn to a clockwise direction until the cut-outs (18, Fig.1) in the intermittent cover are in line with the holding screws and then withdraw.

Do not attempt internal repairs or adjustments to the intermittent.

4.11 To Replace the Intermittent

Set the shutter adjustment mid-way by the shutter knob, and move the framing carriage to its lowest position, less 1/16". When fitting a new intermittent, loosen the stop screw (13, Fig.1). This stop, when finally set, permits the intermittent to be removed and replaced without readjustment of the gear mesh.

Remove the red glass from the shutter guard by pressing it in with the thumb and pushing upward. Rotate the mechanism by hand until the notch in the shutter blade is in line with the bottom of the aperture of the glass retainer. Take the intermittent in the hands and rotate the gear on the cam shaft until the sprocket advances exactly two teeth; at this point the hole for the flywheel screw is vertical.

Insert the intermittent with four cut-outs (18, Fig.1) in line with the locking screws (17, Fig.1) and the fifth cut-out in line with the bottom of the film gate runner. Turn the intermittent counter-clockwise so that its gear meshes with the driving gear on the vertical shaft. Continue turning the intermittent until these two gears press lightly together with no backlash. Tighten any two opposite locking screws using a small screwdriver to avoid risk of breakage. Push the stop plate (15, Fig.1) against the stop (16, Fig.1) and tighten the stop screw (13, Fig.1). Now loosen the two locking screws previously tightened and turn the intermittent clockwise to give 3/64" clearance between stop plate and stop. Hold the intermittent in this position and tighten the four locking screws (17,Fig.1). Loosen screw (13, Fig.1), push stop plate against stop and re-tighten screw. The slot in the stop plate is off centre and it may be necessary to rotate the plate through 180° to push it against the stop. Replace the flywheel and make sure that its screw is tight. Refill the intermittent with 2009-A Oil, (Section 4.02), and check oil level before running.

4.12 To Adjust the Focusing Mechanism

The tightness of the screw thread of the focusing knob shaft can be adjusted by the screw (25, Fig.1). Do not use this adjustment to give friction to the focus knob; friction should be provided by the spring washer and twin locknuts on the shaft.

4.13 To Set the Pad Roller Arms

The upper and lower pad rollers must be adjusted so that there is a clearance of just over two thicknesses of film between the pad roller and the sprocket in order to pass lapped film joints without damage. To do this, loosen the stop screw (7, Fig.1) of the upper pad roller and back it out of contact with the stop. Slacken the two small screws securing the mounting flange of the assembly; this allows a slight adjustment of the arm. Set the arm so that the roller contacts the sprocket under slight tension and tighten the two screws. Adjust the stop screw until the roller just fails to grip two layers of film round the sprockets.

4.14 To Set the Intermittent Shoe Assembly

To adjust the shoe assembly of the intermittent sprocket loosen the set screw (1, Fig.4) and turn the shaft until the shoes just make contact with the sprocket, with little or no pressure. When film is in place it will depress the shoes by the thickness of the film. A fine adjustment can be made by the knurled nut (20, Fig.1 and 3, Fig. 4). The setting is not critical; the clearance may be increased if desired. If the shoes are set too close to the sprocket, the picture may jump when a joint passes.

4.15 To Set the Height of the Automatic Fire Shutter

The height of the shutter should be adjusted so that while it does not intercept the light beam with the projector running, it does not touch the top of the shield. At the top of the governor on the vertical shaft there is set screw (1, Fig.2), which locks the governor to a groove in the shaft. Loosen this screw. The governor may now be raised or lowered, which will raise or lower the fire shutter. When the proper shutter height is obtained the governor set screw should be firmly tightened. Check that the shutter cuts the light off completely when down.

4.16 To Adjust the Shutter Shaft

The forward bearing of this shaft (i.e., the bearing next to the gear) is mounted in an eccentric ring; this enables the shaft to be adjusted relative to the vertical shaft in order to obtain accurate mesh. This adjustment is chiefly intended for use when the projector is first assembled, but it must be checked if a new gear is fitted. The method of adjustment is as follows. The eccentric ring is locked in position by two 2 BA set screws in the side of the bearing bracket (3, Fig.2). (To prevent interference, the screws are sealed in with wax). When these screws are slackened, the ring may be slowly turned by inserting an Allen wrench in one of the holes in the ring and levering against the shaft. Clockwise rotation increases the backlash between the gears, anti-clockwise decreases it. As a guide to the correct amount of backlash, hold the vertical shaft and gently turn the shutter boss to and fro. The backlash or play between the gears is correct when it gives a free movement of 1/16" to 1/8" at the tip of the shutter blade.

Re-tighten the set screws securely.

The eccentric ring and the bearing bracket are marked at the time of factory assembly to indicate the adjustment then found to be correct. Do not disturb this setting unless it is really necessary. The adjustment is intended to be used very rarely, e.g., when fitting a new gear.

4.17 To Adjust the Gear Mesh of Upper and Lower Sprocket Shaft Assemblies

These assemblies are mounted on detachable bearing plates, together with their roller arms. The upper assembly can be completely withdrawn after removing the four screws (4, Fig.1) holding the bearing plate, but the lower assembly requires the Tufnol gear (4, Fig.2) to be removed first. The method of mounting allows the gears to be adjusted slightly for backlash before finally tightening the four screws holding the bearing plate; the correct amount of backlash can be judged by referring to that which can be felt between the gears of the shutter shaft. On no account should the gears be run hard in mesh; a small amount of backlash should be present at all positions

as the gear is rotated. Finally tighten very securely the screws holding the bearing plate. After tightening, re-check the backlash before switching on the motor.

4.18 Main Drive Assembly

The drive (Fig.5) is mounted on a detachable bearing bracket, and the mesh of the gears (1 and 3, Fig.5) can be adjusted by slightly loosening the three screws (6, Fig.2 and 2, Fig.5) and sliding the bracket sideways, while keeping the toe of the bracket (on the extreme right) pressed down in contact with the main frame. The correct amount of backlash is as described above.

4.19 Westar Upper and Lower Spool Boxes

Keep the fire trap holders clean and free from film particles, especially the upper holder. If a roller fails to turn it will quickly develop a flat spot, resulting in film scratch. Check that the spool spindles have a small amount of endplay and adjust the collars if necessary. Note that there are two lubricators on the drive side of the lower spool box, one being just at the back of the pulley.

In order to cater for all spools, spindles are 5/16" diameter (American Standard). Spool adapters are available for British Standard spools and for a number of older types. Washers are sometimes required between adapter and spool box bearing, to obtain good film alignment. The take-up is designed for spools having a standard hub diameter of 4 inches and over.

Run the V belt as slack as is possible with safety; it should be easy to twist the belt through 180° with the fingers. Check that the belt idler pulley runs accurately in line with the belt. The pulley should float freely sideways, and show no tendency for its flanges to twist the belt.

4.20 Tools Supplied with Projector

68185 Oil Can
63269 Wrench, 2BA x 4BA
68290 Key Wrench, 5/32" A/F
68291 Key Wrench, 3/16" A/F
Wrench, 0.05" A/F
Wrench 1/16" A/F
Wrench 5/64" A/F
Wrench 3/32" A/F
Wrench 1/8" A/F
Wrench 5/32" A/F
Wrench 3/16" A/F
Wrench 7/32" A/F
Wrench 5/16" A/F

4.21 Lubricants Supplied with Projector

32081-A Grease, 2 oz Tube
32082-A Grease, 1 lb Container
2009-A Oil, 1 Quart Container - Shell Vitrea 33

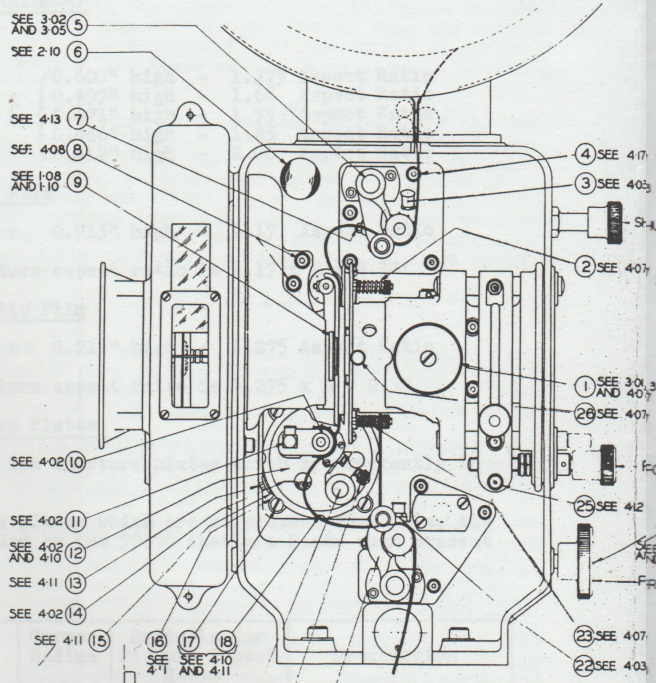


FIG. 1

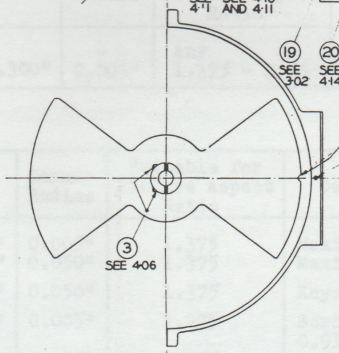


FIG. 3

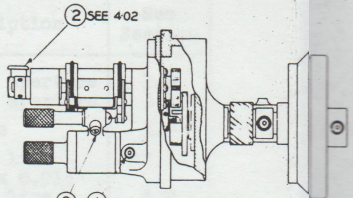


FIG. 4

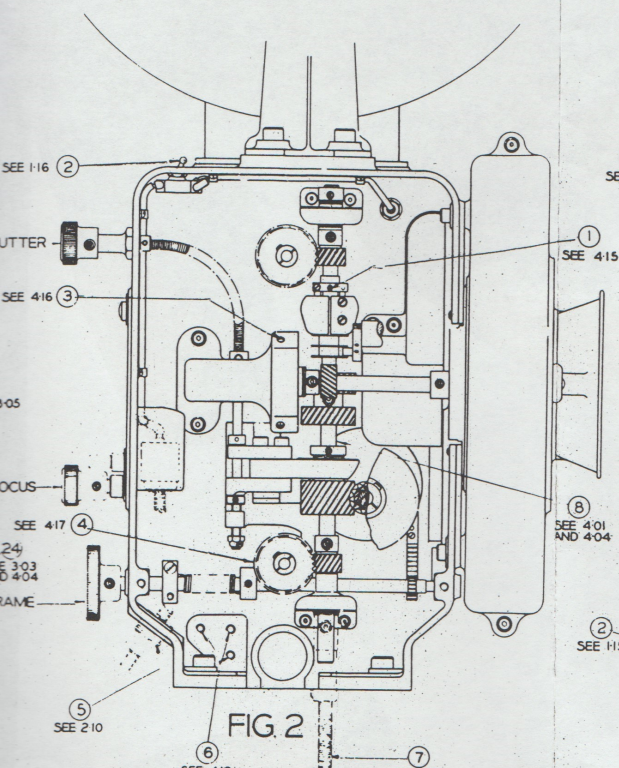


FIG. 2

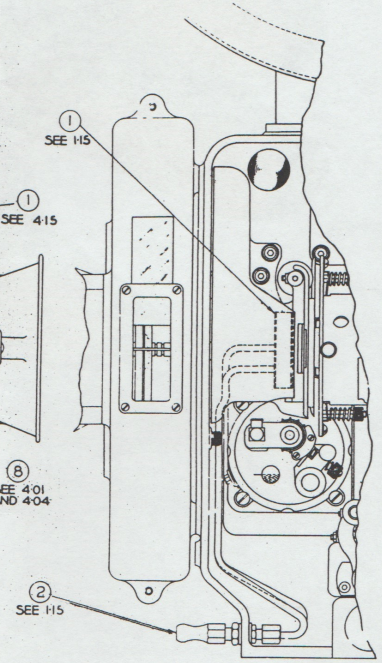


FIG. 6

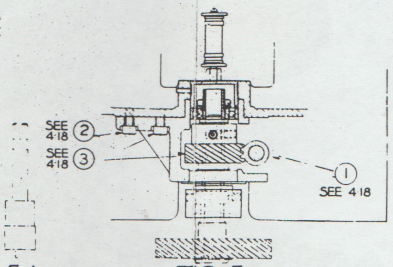


FIG. 5A (SEE 2-07)

FIG. 5

GENERAL EQUIPMENT BULLETIN

Pages 1 & 2 re-issued to include Amendments 402 & 403 LSA-9183

1. GENERAL

1.1 Aperture Dimensions (Maximum)

For Standard Film

0.825" wide x
- 0.600" high - 1.375 Aspect Ratio
- 0.497" high - 1.66 Aspect Ratio
- 0.471" high - 1.75 Aspect Ratio
- 0.446" high - 1.85 Aspect Ratio
- 0.412" high - 2.00 Aspect Ratio

For CinemaScope Photo Film

0.839" wide x 0.715" high - 1.17 Aspect Ratio

With anamorph the picture aspect ratio is 1.17 x 2 = 2.34

For CinemaScope Magnetic Film

0.912" wide x 0.715" high - 1.275 Aspect Ratio

With anamorph the picture aspect ratio is 1.275 x 2 = 2.55

1.2 Description of Aperture Plates

Table A describes the two aperture plates which are currently in production.

Table B lists aperture plates which are at present available, but which will be superseded by the 77498 Aperture Plate when present stocks are exhausted.

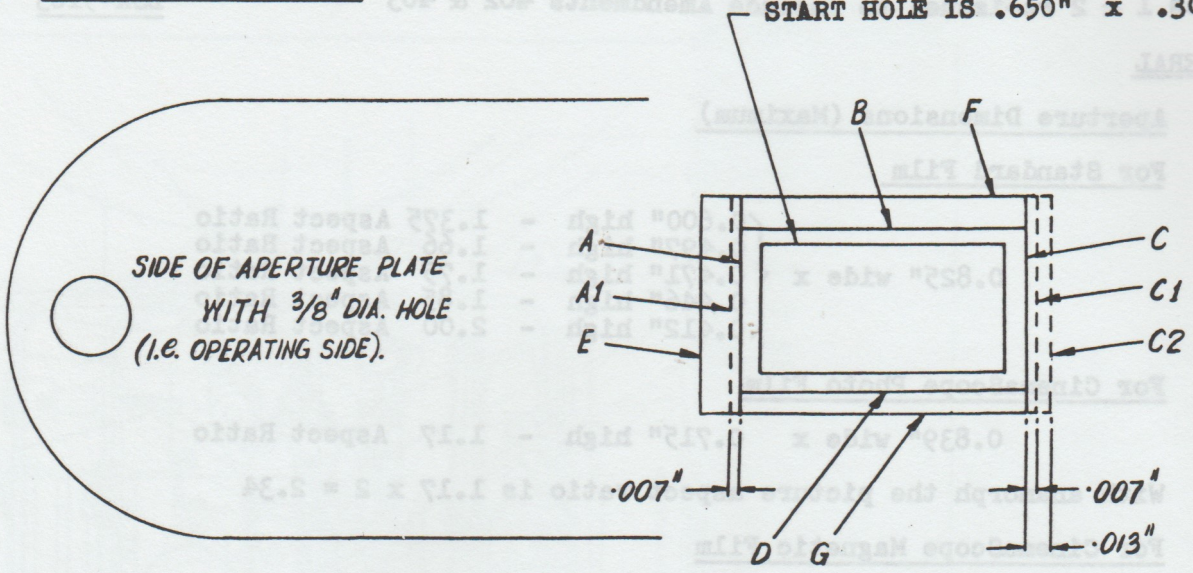
TABLE A

Code	Aperture	Corner Radius	Suitable for Picture Aspect Ratio	Description
75155	None	-	Any	Blank
77498	0.650" x 0.300"	0.005"	1.375 - 2.55	See Section 1.3

TABLE B

Code	Aperture	Corner Radius	Suitable for Picture Aspect Ratio	Description	See Section
73995	0.825" x 0.600"	0.005"	1.375	Maximum aperture	1.4
75105	0.825" x 0.600"	0.050"	1.375	Maximum aperture	1.4
76134	0.750" / 0.825" x 0.600"	0.050"	1.375	Keystone	1.5
77171	0.852" x 0.656"	0.005"	1.275	Scribed line 0.912" x 0.715"	1.6
77231	0.832" x 0.555"	0.005"	1.275	Scribed line 0.912" x 0.715"	1.7

1.3 77498 Aperture Plate



For standard film the scribed lines A and C show the maximum width of 0.825". Lines B and D indicate the maximum height of 0.497" for an aspect ratio of 1.66.

For CinemaScope photo the scribed lines F and G give the height of 0.715". The dotted lines A1 and C1 are not scribed, being only 0.007" outside lines A and C; they indicate the maximum dimension 0.839".

For CinemaScope magnetic the height is the same as for CinemaScope photo. The width is limited by scribed line E and dotted line C2 (not scribed) which is 0.013" outside line C.

1.4 73995 and 75105 Aperture Plates

The 73995 (square corners) and 75105 (rounded corners) plates have the maximum size aperture and are for use only where the effective projection angle is small. (The effective projection angle is the difference between the negative projection angle and the tilt of the screen.)

1.5 76134 Aperture Plate

The 76134 plate has a keystone aperture for use where the effective projection angle is less than 25 degrees.

1.6 77171 Aperture Plate

The 77171 plate has a guide line showing the maximum aperture usable with magnetic CinemaScope. The aperture is 0.030" undersize all round.

1.7 77231 Aperture Plate

The 77231 plate is for use with magnetic CinemaScope with steep effective negative projection angles when the top and bottom lines have to be heavily curved. The working margin inside the guide line is 0.090" at the top, 0.070" at the bottom and 0.030" at the sides.

2. SHAPING THE APERTURE

2.1 The object of shaping the aperture is to present to the audience a rectangular picture of the correct size and aspect ratio. When a rectangular aperture is projected on to a flat screen with an effective negative projection angle the aspect ratio of the image is smaller than that of the aperture. The top line is shorter than the bottom line and the sides are not perpendicular. If the screen is curved, the top and bottom lines of the image appear to be concave. (See LSA-9183)

2.2 On the screen, the image of the aperture is the converse of the aperture itself. The top edge of the aperture produces the bottom line of the image; the left edge of the aperture produces the right side of the image. If, therefore, a rectangular aperture produces an irregular image on a curved and tilted screen, as shown on LSA-9183, the aperture, as seen from the lamphouse, should be trimmed to approximately the same irregular shape in order to produce a rectangular image. The effect of horizontal masking lines is also shown on LSA-9183.

2.3 Magnification Factor

The amount to be filed from the plate to extend the image by a given distance may be estimated from the magnification factor.

Example 1 - Picture width 30'. Aspect ratio 1.66

$$\text{Magnification} = \frac{30 \times 12}{0.825} = 436$$

Alternatively, Throw 100'. Lens 2.75"

$$\text{Magnification} = \frac{100 \times 12}{2.75} = 436$$

Thus to widen or heighten the picture 8 inches file away $\frac{8}{436}$ inch, or 0.018" (0.009" from each side.)

Example 2 - Magnetic CinemaScope picture 40' x 15'6"

$$\text{Horizontal magnification} = \frac{40 \times 12}{0.912} = 525$$

$$\text{Vertical magnification} = \frac{15.5 \times 12}{0.715} = 262$$

Thus to increase height by 8 inches file away a total of $\frac{8}{262}$ inches = 0.030". To increase width 8 inches file away a total of $\frac{8}{525}$ inches = 0.015" (0.0075" from each side.)

2.4 Vertical Centre Line

Because of the sound track, the centre of the picture on standard and photo CinemaScope film is 0.049" from the centre of the film. With magnetic CinemaScope film the offset in the same direction is only 0.019". The centre lines of the two pictures are therefore separated by 0.030". The centre lines of aperture plates cut for magnetic CinemaScope must also differ by 0.030" from those for standard and photo CinemaScope film. If this discrepancy were compensated by filing the magnetic CinemaScope aperture plate asymmetrically so that the vertical centres of both apertures coincided there would be a cut-off of the left magnetic CinemaScope image of 0.030" x the horizontal

amplification, resulting in an aspect ratio of 2.38 and a loss of about 6-1/2% of picture width, with titles off-centre. This condition is avoided as described below.

2.5 In the 2001 projector the centres of the standard aperture and the optical system are co-axial. When the projector is modified for running both standard and magnetic CinemaScope film (Mod. 630, including Mod. 636) the lens holder is replaced by one whose vertical centre is displaced 0.030" toward the operating side. The lens adapter (77247S) used with the projection lens for standard film is eccentric, and locates the lens on the vertical centre of the standard aperture. The lens adapter (77249C) used with the projection lens for magnetic CinemaScope film is concentric, locating the lens on the vertical centre of the magnetic CinemaScope aperture. Thus all images on the screen have a common vertical centre.

3. LOCATING THE APERTURE

3.1 When both magnetic CinemaScope and standard film of an aspect ratio between 1.375 and 2.0 are projected the heights of the two pictures are likely to differ, the picture from standard film being usually the higher. The Exhibitor will decide whether the horizontal centre lines or the bottom edges are to be common, but the trend is towards a common bottom edge, thus avoiding the masking problem which would otherwise arise.

3.2 There are two ways of projecting both pictures on a common base line.

(a) Both aperture plates may be cut with a common centre line, in which case the projector must be tilted between two predetermined positions, or -

(b) The apertures may be cut so that the bottom edges of both pictures coincide.

For various reasons the centre of the magnetic CinemaScope aperture should coincide with the optical centre. If the height of the picture from the standard film is the greater, the picture should be raised by cutting the aperture lower, as in (b) above.

3.3 The dimension from the horizontal centre to the lower edge of the picture is calculated as follows -

$$\frac{h_1 \times T}{f_1} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where h_1 is the distance of the top edge of the aperture from the optical centre.

T is the throw

f_1 is the focal length of the lens

3.4 To align the bottom edges of both pictures the top edges of the apertures must be displaced from the optical centre so that -

$$\frac{h_1 \times T}{f_1} = \frac{h_2 \times T}{f_2} \quad \ldots\ldots\ldots\ldots \quad (2)$$

Where h_2 is the distance of the top edge of the second aperture from the optical centre.

f_2 is the focal length of the second lens.

Therefore $h_1 = \frac{h_2 \times f_1}{f_2}$ ..... (3)

3.5 To locate the centre line of the standard aperture above or below the optical centre (which is also the centre line of the magnetic CinemaScope aperture) first determine the top line of the standard aperture by means of formula (3) as follows.

Example

Height of magnetic CinemaScope aperture 0.715", therefore top edge is 0.357" above centre.

Focal length of magnetic CinemaScope lens 4.75".

Standard picture aspect ratio 1.66.

Focal length of standard lens 2.75".

$$h = \frac{0.357 \times 2.75}{4.75} = 0.207$$

The top line of the standard (1.66 aspect ratio) aperture must therefore be 0.207" above the centre line. The total height of this aperture is 0.497", therefore the bottom line will be 0.290" below centre. Thus the horizontal centre of the standard aperture will be 0.042" below the optical centre. Note that if the dimension obtained from the above formula is greater than 0.249, the centre line of the standard aperture will be above that of the magnetic CinemaScope aperture.

4. FILING THE APERTURE

4.1 Tools

The following files should be obtained on loan from the Supervisor:-

1 - 4" File, hand - second cut
1 - 6" File, warding - bastard cut
1 - 14 cm File, Stubbs needle - No.2 cut
2 - 14 cm File, Stubbs needle, Barrett No.4 cut
2 - 14 cm File, Stubbs needle, Three Square No. 2 cut
1 - 77232 Tool (filing jig)

Also required are a straight edge and a scribe.

4.2 The screen should be masked or taped to show the picture outline for which the aperture plate is being cut. Black tape is preferable as spilled light is more easily seen on the screen than on masking. When checking progress, focus the aperture to get a sharp outline, bearing in mind that when ultimately the focus is changed back to the film the aperture image will be slightly out of focus and a little larger.

4.3 Where the small picture will be shown without masking special care should be taken to ensure straight lines free from burrs and irregularities. Chamfering the rear edges (nearest the lamphouse) will help to obtain clean outlines.

(17, Fig.1) holding the intermittent. Since these four screws are hardened and have large heads, a small screwdriver should be used to avoid risk of breakage. Turn the intermittent about an eighth turn to a clockwise direction until the cut-outs (18, Fig.1) in the intermittent cover are in line with the holding screws and then withdraw.

Do not attempt internal repairs or adjustments to the intermittent.

4.11 To Replace the Intermittent

Set the shutter adjustment mid-way by the shutter knob, and move the framing carriage to its lowest position, less 1/16". When fitting a new intermittent, loosen the stop screw (13, Fig.1). This stop, when finally set, permits the intermittent to be removed and replaced without readjustment of the gear mesh.

Remove the red glass from the shutter guard by pressing it in with the thumb and pushing upward. Rotate the mechanism by hand until the notch in the shutter blade is in line with the bottom of the aperture of the glass retainer. Take the intermittent in the hands and rotate the gear on the cam shaft until the sprocket advances exactly two teeth; at this point the hole for the flywheel screw is vertical.

Insert the intermittent with four cut-outs (18, Fig.1) in line with the locking screws (17, Fig.1) and the fifth cut-out in line with the bottom of the film gate runner. Turn the intermittent counter-clockwise so that its gear meshes with the driving gear on the vertical shaft. Continue turning the intermittent until these two gears press lightly together with no backlash. Tighten any two opposite locking screws using a small screwdriver to avoid risk of breakage. Push the stop plate (15, Fig.1) against the stop (16, Fig.1) and tighten the stop screw (13, Fig.1). Now loosen the two locking screws previously tightened and turn the intermittent clockwise to give 3/64" clearance between stop plate and stop. Hold the intermittent in this position and tighten the four locking screws (17, Fig.1). Loosen screw (13, Fig.1), push stop plate against stop and re-tighten screw. The slot in the stop plate is off centre and it may be necessary to rotate the plate through 180° to push it against the stop. Replace the flywheel and make sure that its screw is tight. Refill the intermittent with 2009-A Oil, (Section 4.02), and check oil level before running.

4.12 To Adjust the Focusing Mechanism

The tightness of the screw thread of the focusing knob shaft can be adjusted by the screw (25, Fig.1). Do not use this adjustment to give friction to the focus knob; friction should be provided by the spring washer and twin locknuts on the shaft.

4.13 To Set the Pad Roller Arms

The upper and lower pad rollers must be adjusted so that there is a clearance of just over two thicknesses of film between the pad roller and the sprocket in order to pass lapped film joints without damage. To do this, loosen the stop screw (7, Fig.1) of the upper pad roller and back it out of contact with the stop. Slacken the two small screws securing the mounting flange of the assembly; this allows a slight adjustment of the arm. Set the arm so that the roller contacts the sprocket under slight tension and tighten the two screws. Adjust the stop screw until the roller just fails to grip two layers of film round the sprockets.

GENERAL EQUIPMENT BULLETIN

1. PURPOSE

1.1 To supplement the information given in Section 1.1 of the main bulletin.

2. GENERAL

2.1 Aperture Dimensions (Maximum)

Picture Aspect Ratio	Film	Aperture Plate (Vertical centre line on standard photo film optical centre)	See Section
2.31	CinemaScope (Perspecta) with 2/1 Anamorph	0.825" x 0.715"	-
2.00	Superscope (Photo) with 2/1 Anamorph	0.715" x 0.715"	2.2

2.2 Superscope Films

For Superscope films the 77498 Aperture Plate will be supplied.

2.3 Metroscope Films

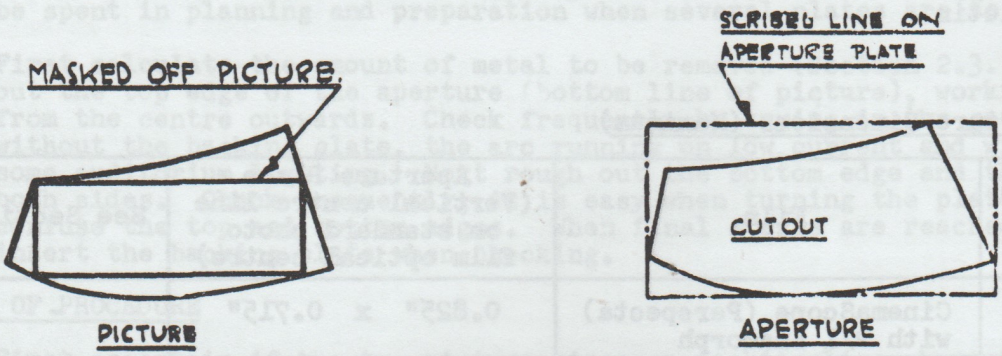
Metroscope is the distinguishing name of MGM wide screen films. They are not photographed with an anamorph and are projected by a short focal length lens symetrically on the standard photo film vertical optical centre to obtain a wide picture. In general these films will have a Perspecta sound track.

2.4 All MGM films requiring anamorphic devices for projection will continue to be called CinemaScope.

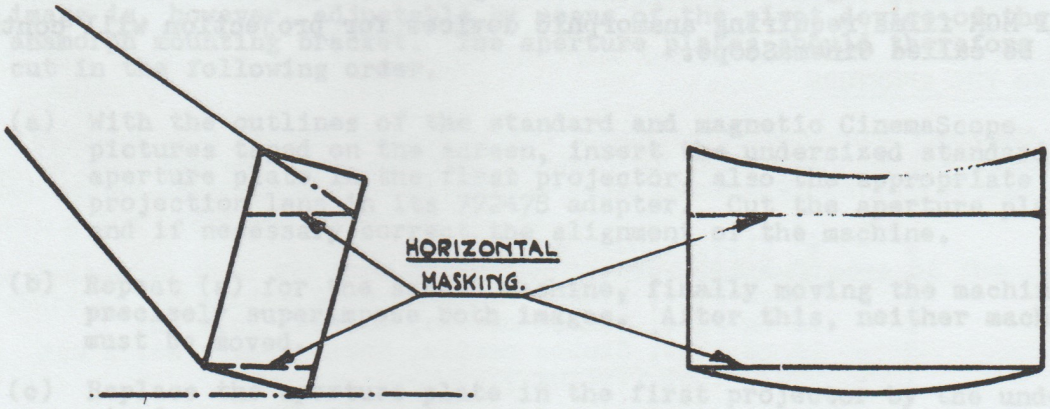
LSA-9183 is on the reverse side of this sheet.

GENERAL EQUIPMENT BULLETIN

REF. GEB "APERTURE PLATES"



The left picture (exaggerated) might result from projecting a rectangular aperture on a curved, tilted screen with the projector offset to the left. In order to obtain a rectangular picture on the same screen the aperture should be given the shape indicated on the right (looking from the lamp house). The aperture must be within the maximum rectangle permissible (scribed line).



SIDE & FRONT VIEW OF CURVED TILTED SCREEN.

It is becoming practice to use horizontal masking both top and bottom, giving a picture of constant height. The curve of the top of the aperture plate removes the light on the floor and on the screen below the mask (this involves no loss of picture height). The curve of the bottom of the aperture plate removes the light above the top mask. This does involve a loss of picture height.

LSA-9183

GENERAL EQUIPMENT BULLETIN

1. GENERAL

1.01 The information contained in this bulletin supplements the Operating Instructions and is for use when dismantling the projector. Reference should be made to the Operating Instructions for details of lubrication and minor adjustments for which the Operator is normally responsible.

1.02 Special Tools

The special tools listed below are used in maintenance.

69934 Hammer, Ball Pein
LD-2835 Tool - Pin Extractor
LD-2851 Tool - Film Alignment
LD-2848 Tool - Intermittent Window
LD-2854 Tool - Film Gate Alignment
LD-3023 Tool - Screwdriver
LD-3049 Tool - Drift
TA-7093 Wrench, Shutter Shaft Housing

2. MAINTENANCE

2.01 To dismantle the Intermittent (See LSR-9706)

When it is necessary to dismantle the intermittent for removal of the sprocket or for any other purpose the work should be done only where good clean working conditions exist. Spare gaskets and sealing washers must be available.

Before opening the intermittent, feel and note the action of the cam and cross when turned slowly, and check the end play of both shafts as a guide to reassembly. Check also that the two adjusting screws (Item 23) are seated; on reassembly very little adjustment will then be required.

To open, first remove one of the five screws holding the cover and drain out the oil. Turn the cam shaft until the sprocket is in a stationary position. Remove the other four screws from the cover.

Hold the case of the intermittent in one hand and the cover in the other and carefully pull them apart. Extreme care must be used to prevent damage to the cross and cam.

2.02 To remove the Sprocket Shaft

Push the two taper pins out of the hub of the sprocket using an LD-2835 Tool. The larger end of the taper is marked on the hub by a small nick. The tool has two screws; one with a short nose for starting to extract pins and one with a longer end for following through. The pins must be removed only by this method.

Remove the collar from the other end of the sprocket shaft. The shaft can now be withdrawn and the sprocket removed.

2.03 To remove the Cam Shaft

Remove screw (Item 18), bracket (Item 16) and spacer (Item 17). Remove gear (Item 4) and washer (Item 6) by unscrewing screw (Item 5). The cam shaft may now be withdrawn.

2.04 To assemble the Cam Shaft

Insert the cam shaft in the bush far enough to allow the washer and gear to be fitted. Then push the shaft home and while holding the gear, rotate the shaft to bring the screw holes in line. Insert and tighten the screw securely.

Replace the spacer, thrust bearing and screw, taking care that the ball seats centrally in the end of the shaft. Adjust bearing (Item 35A) to obtain free rotation of the shaft without end play.

2.05 To assemble the Sprocket Shaft

Insert the sprocket shaft into its bearings and check that it turns smoothly when fully home. With the larger end of the tapered holes uppermost partly withdraw the shaft and place the sprocket in position, with the larger end of its tapered holes also uppermost. Push the shaft home so that the holes are in line. Insert pins and press firmly home with the LD-2835 Tool, using the short nosed screw. Oil the face of the collar with 2009-A Oil, place it on the shaft and clamp in place so that the shaft turns freely but without end play.

2.06 To assemble the Intermittent

Wipe the mating faces of the case and cover with a piece of washed linen. Place the gasket on the case taking care not to obstruct any of the holes. Rotate the cam to the disengaged position and carefully replace the cover so that the locating pin enters its hole. The radius of the cam and cross should coincide. Loosely replace all fixing screws with cork washers, rotate the cover to engage the cross with the cam radius and lightly tighten the screws. The assembly should now rotate smoothly without binding or backlash when the sprocket is stationary.

Binding or backlash is eliminated by adjusting the two set screws (Item 23). To relieve binding, loosen the lower screw a fraction and tighten the upper screw by a corresponding amount. To remove backlash reverse the process.

Increase the tension on the five cover screws by about half a turn, tightening opposite screws in turn. Loosen both adjusting screws, securely tighten the cover screws and finally tighten, but do not over-tighten the adjusting screws. The intermittent may now be replaced in the projector (see Operating Instructions, 4.11).

2.07 To remove the Lens Holder

First remove the gate (Operating Instructions, 4.07) and lens. Move the lens carrier to its forward position and remove the two screws (LSO-9705, Item 40) securing the holder to the main frame. The unit can now be removed for inspection or cleaning.

2.08 To replace the Lens Holder

Check that the lens carrier is in its forward position. Fit the lens holder on to the dowel pins and replace without tightening the two screws. Replace and close the gate, adjust the position of the lens holder so that the gate butts firmly against its fixed portion when the gate opening knob (Operating Instructions 1, Fig 1) ends its travel and tighten securely the two screws.

If it is necessary to correct the vertical alignment of the gate loosen the screw (LSR-9711, Item 4) securing the eccentric pin with slotted head (Item 5) and rotate pin with LD-3023 Tool until the gate closes without fouling the flanges of the guide rollers and film guides. Tighten the screw.

2.09 Replacing the Gate Knob Spring

Close the gate. Remove the screw at the centre of the knob and pull off the knob. Remove the old spring.

Insert the new spring so that the end engages in one of the holes at the bottom of the recess. Hold the knob so that the slot is at right-angles to the flats on the shaft, and holding the gate closed engage the outer end of the spring in the nearest hole in the knob. With the knob on the shaft but not engaging the flats, rotate it a quarter turn to the right and push home to engage the flats. Replace the scre and tighten securely.

2.10 To dismantle the fixed part of the Gate

Unscrew the two captive screws (Operating Instructions 8, Fig.1) and remove the shield. Remove the three screws holding the gate casting to the main frame and withdraw the casting from its dowel pins. (If a water-cooled gate is fitted the water must first be turned off and the pipes disconnected.)

To remove the guide rollers for cleaning or replacement loosen the screw (LS0-9709, Item 46) and withdraw either pivot, leaving the other in place. The guide rollers may now be dismantled.

To remove the film guides and runners remove the retaining screws.

2.11 To assemble the fixed part of the Gate

Worn runners and guides may be changed to opposite sides or replaced, taking care that the runners are in contact with the raised centre portion of the casting, as these runners determine the location of the aperture plate.

Replace the guide rollers assembly and pivot. Tighten the screw. The roller should revolve freely without end play.

Replace the gate on its dowel pins and insert the three fixing screws just sufficiently tight to permit lateral movement. Place a straight edge, LD-2854 Tool, against the face of the runner to extend down to the outside land of the sprocket. Adjust the gate so that the straight edge is at least two film thicknesses (0.012") ahead of the sprocket. Tighten the screws and check clearance of sprocket and straight edge.

If the guides have been removed they must be aligned with the sprocket and upper guide roller, using the LD-2851 Tool. To do this it is first necessary to remove the lens holder (Section 2.07), and loosen the screws securing the guides. Apply the LD-2851 Tool to the intermittent sprocket so that the teeth are in the grooves with the body of the tool upwards in contact with the runners and lying between guides and flanges of roller. Press the side flange of the tool firmly against the outer face of the sprocket. In this position the side of the tool should be touching the face of the roller flange nearer the Operator. To adjust the roller to this position loosen both pivot set screws and while keeping the wrench in the far screw, with finger and thumb move the pivots and roller; tighten screws. Check that the roller spins freely without end play. Hold the tool firmly in contact with the sprocket, push the near side guide so that its centre contact the tool and tighten the screws. Repeat for the far side guide. As a final check insert a length of film, preferably negative stock, and make sure that the sprocket teeth are not in contact with the sides of the perforations.

2.12 Changing Upper or Lower Sprocket

Remove the cap screw securing the sprocket to the shaft and withdraw the sprocket. Before fitting the replacement sprocket lightly smear the shaft with 2009-A Oil. The sprockets are reversible. If the holes in the sprocket and shaft do not line up, loosen the screw securing the Tufnol gear to the shaft and tap the shaft through to obtain alignment. When the screw securing the sprocket has been tightened the gear should be clamped to the shaft so that there is end play of approximately 0.003".

2.13 To remove the Shutter

There are two halves to the shutter guard. Remove the two screws (LSO-9705, Item 10) securing the half on the non-operating side. Remove two screws from inside gear compartment and one screw from inside the film compartment (LSO-9705, Item 34) fixing the other half. Loosen the two screws (LSR-9713, Item 62) and withdraw the shutter.

2.14 Projector Horizontal Drives

To remove drive first take off 712 Drive or chain if present. Withdraw three fixing screws (Operating Instructions 6, Fig.2) and remove unit.

To replace drive, reverse the above process. Before tightening, slide the bracket sideways towards the gear to obtain a correct mesh, at the same time pressing down the toe of the casting to the main frame. Tighten the three screws.

2.15 Projector Vertical Drive

To remove drive from projector remove lock nut and cap screw from top coupling of the flexible shaft. Loosen both set screws securing coupling to flexible shaft abd slide coupling down.

2.16 To remove the Shutter Shaft

Remove the half shutter guard on the non-operating side (see Section 2.13). Remove four screws securing the rear bracket of the shutter shaft and two screws fixing the front bracket to the main frame. Holding a bearing in each hand carefully draw the assembly towards the rear to disengage the dowel pin, and remove the complete unit.

To replace the ball bearing or gear remove the two lock nuts at the end of the shaft and the cap screw fixing the gear. Before reassembly apply 32082-A Grease to the shaft at the location of the ball bearing. Screw the gear to the shaft and tighten the lock nuts securely.

2.17 To replace the Shutter Shaft

Apply a smear of 32082-A Grease to the shaft at the location of the rear ball bearing and to the outer surface of the front ball bearing. Slide the front mounting bracket on to its ball bearing, place the assembly in position and loosely insert the two screws securing the bracket, at the same time meshing the gears. Push the rear bracket along the shaft on to its dowel and insert the four fixing screws. Tighten all six screws and check the backlash between gears. For adjustment see Operating Instructions 4.16.

2.18 To remove the Vertical Shaft

Remove the shutter shaft, intermittent and projector drive as previously described.

Withdraw two screws (LSO-9707, Item 35) securing bearing of the sliding gear, also the four screws securing the top and bottom bearings. Carefully draw the shaft out. Any repairs necessary may now be made to the unit, but when reassembling care must be taken that the washers are replaced in the correct order.

2.19 To replace the Vertical Shaft

Slide the centre bearing into its bracket and the upper and lower bearings on to their dowels, taking care not to bend the shaft. Replace the four screws fixing the upper and lower brackets, also the two screws clamping the centre bearing bracket. Check the shaft for free rotation. Assemble the shutter shaft, intermittent and projector drive.

GENERAL EQUIPMENT BULLETIN

1. GENERAL

1.1 The reference numbers on the replacement parts drawings listed below identify the items on the accompanying stocklists.

1.2 Items marked * are not separately replaceable.

1.3 When ordering parts, the correct coding and serial number of the projector must be quoted in full.

1.4 The differences between the various projectors and their components are shown in the following table. The figures referred to will be found on the drawings listed in the next Section.

2001 PROJECTOR	DESCRIPTION	SEE FIGURES (ITEMS IN BRACKETS)
C	Single Shutter (with detachable Roller and Sprocket Plate Assemblies). For drive from 2002 Reproducer.	1-15, 16 (1 to 47), 17, 18, 19 (101A), 22, 23.
C/1	As C but for drive from Universal Base.	1-15, 16 (1 to 48), 17, 18, 20, 21 (1 to 25), 22, 23.
C/2	As C but for drive from 206, TA-7400, TA-7500 and 2003 Reproducers.	1-15, 16 (1 to 47), 17, 18, 19 (101A), 21 (1 to 25), 22, 23.
D	As C but with Double Shutter.	1-15, 16 (1 to 47), 17, 18, 19 (101A), 24, 25.
D/1	As C/1 but with Double Shutter.	1-15, 16 (1 to 48), 17, 18, 20, 21 (1 to 25), 24, 25.
D/2	As C/2 but with Double Shutter.	1-15, 16 (1 to 47), 17, 18, 19 (101A), 21 (1 to 25), 24, 25.
E	As C but adapted for CinemaScope.	1-15, 16 (1 to 39, 41 to 47), 17, 18, 19 (101A), 22, 23.
E/1	As E but for drive from Universal Base.	1-15, 16 (1 to 39, 41 to 48), 17, 18, 20-23.
E/2	As E but for drive from 206, TA-7400, TA-7500 Reproducers.	1-15, 16 (1 to 39, 41 to 47), 17, 18, 19 (101A), 21-23.
E/3	As E but for drive from 2003 Reproducer.	1-15, 16 (1 to 39, 41 to 47), 17, 18, 19 (102A), 21 (1 to 25), 22, 23.
F	As E but with Double Shutter.	1-15, 16 (1 to 39, 41 to 47), 17, 18, 19 (101A), 24, 25.
F/1	As E/1 but with Double Shutter.	1-15, 16 (1 to 39, 41 to 48), 17, 18, 20, 21, 24, 25.
F/2	As E/2 but with Double Shutter.	1-15, 16 (1 to 39, 41 to 47), 17, 18, 19 (101A), 21, 24, 25.
F/3	As E/3 but with Double Shutter.	1-15, 16 (1 to 39, 41 to 47), 17, 18, 19 (102A), 21 (1 to 25), 24, 25.
2001 PROJECTORS WITH WATER COOLED HEAT SHIELDS		
2001-C or D Projectors converted for water cooled heat shields are MOD. 589. For replacement parts for heat shields see Fig. 32, LSO-9735.		
G G/1 G/2 G/3 H H/1 H/2 H/3	As E As E/1 As E/2 As E/3 As F As F/1 As F/2 As F/3	but with water cooled heat shield.	See appropriate figure references and - Add 32. Omit 12, 16 (14A), 9 (45A, 55A to 57).

1.5 The following drawings are associated with this bulletin, and carry the figures shown.

DRAWING	FIG	ASSEMBLY
LSO-9705	16	Key to assembly
LSR-9706	1-4	Intermittent
LSO-9707	5	Framing Shaft
	6	Intermittent Carriage
LSO-9708	7	Doors & Cover
LSO-9709	8	Rollers and Holder (Fire Trap)
	9	Film Gate (Fixed)
	10	Pilot Lamp
	11	Plug & Switch (Pilot Lamp)
	21	Drive & Guide Roller
LSO-9710	12	Shield
	13	Fire Shutter
	22	Single Shutter Shaft
LSR-9711	14	Film Gate (Movable)
	17	Lens Holder
LSR-9712	15	Vertical Shaft
	18	Upper Sprocket & Roller Plate
	19	Lower Sprocket & Roller Plate (91253 & 91960)
	20	Lower Sprocket & Roller Plate (91265)
LSR-9713	23	Single Shutter Blade
	24	Double Shutter Blades
	25	Double Shutter Shaft
LSO-9714	26	Forward Support
	27	Flexible Drive Shaft
	28	Conduit
LSO-9735	32	Water Cooled Heat Shield

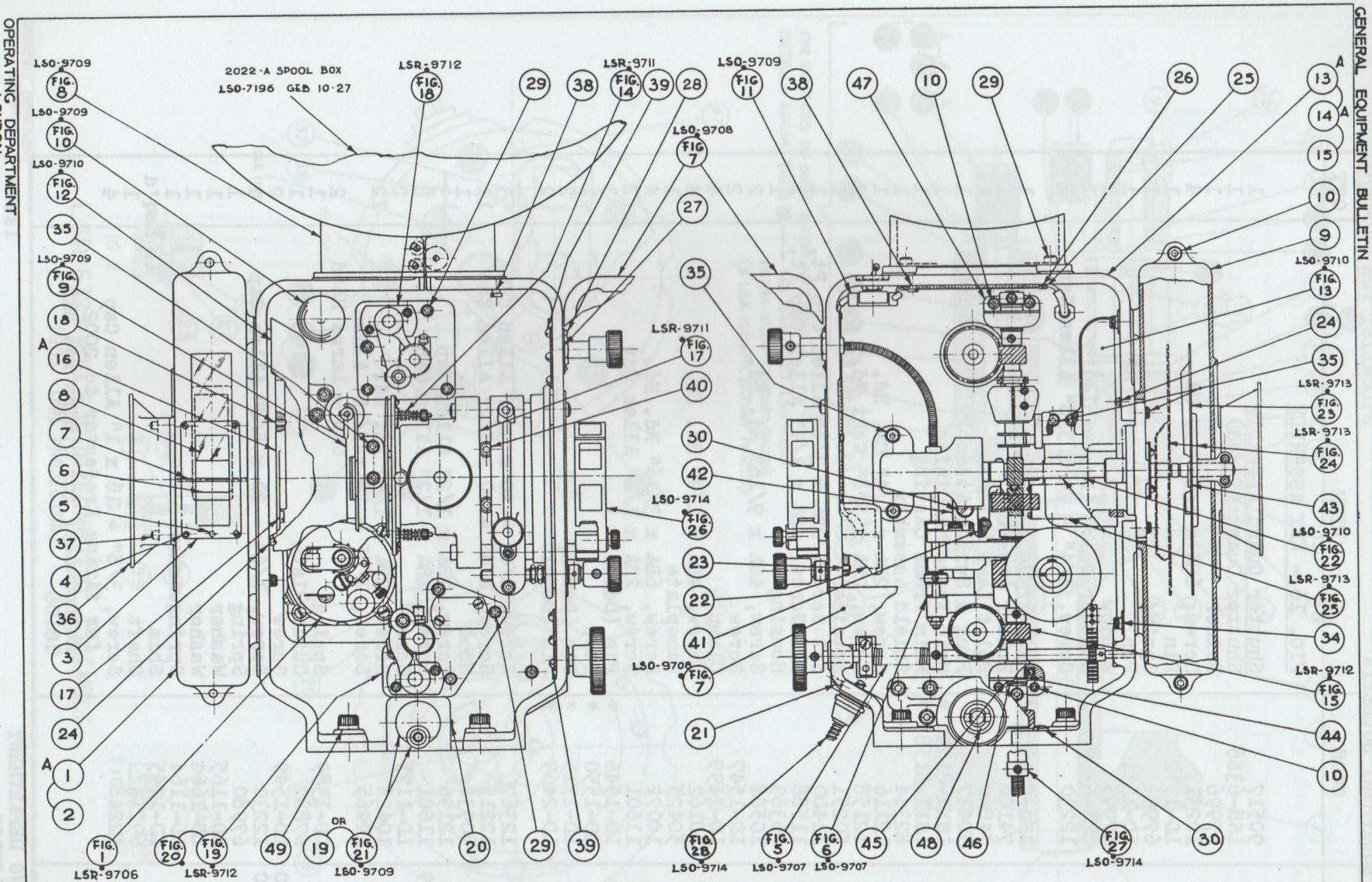
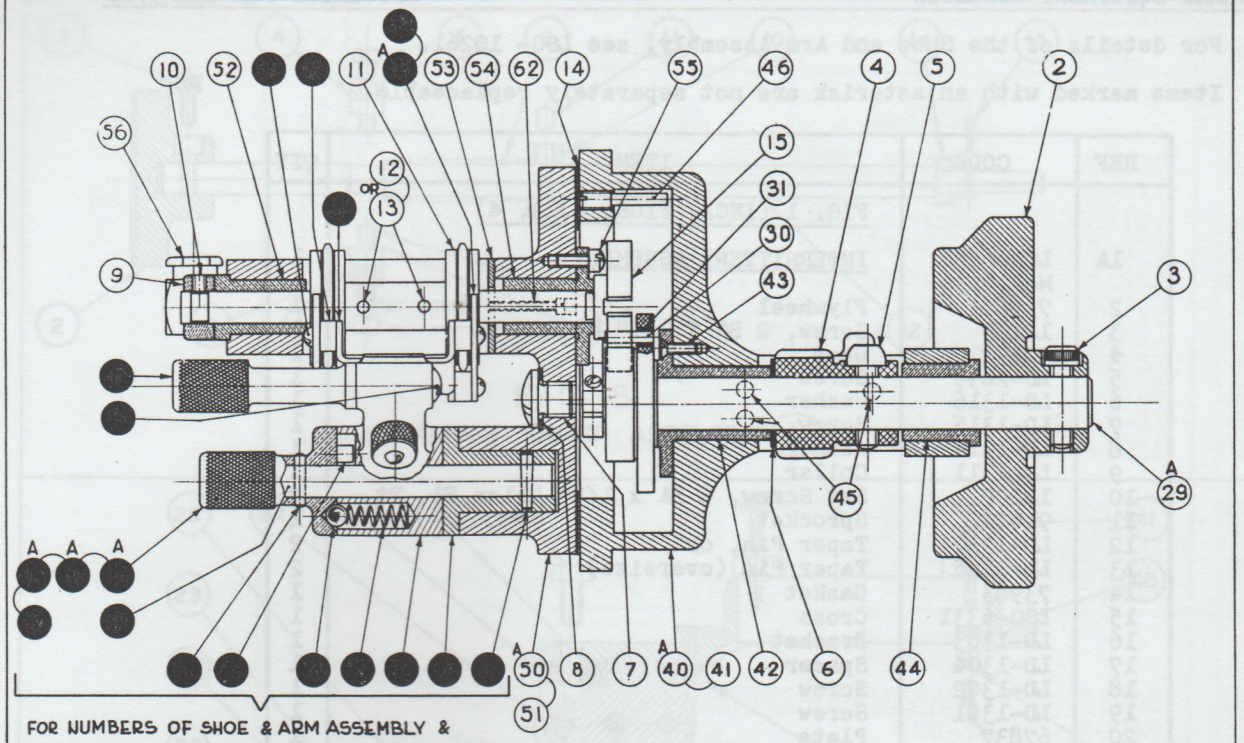


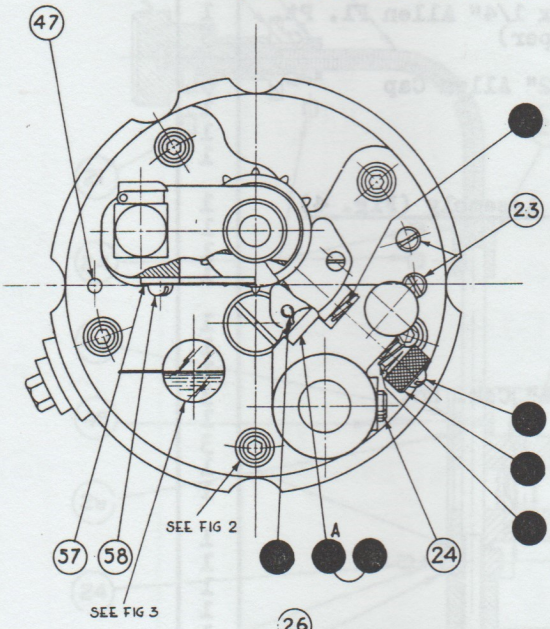
FIG. 16

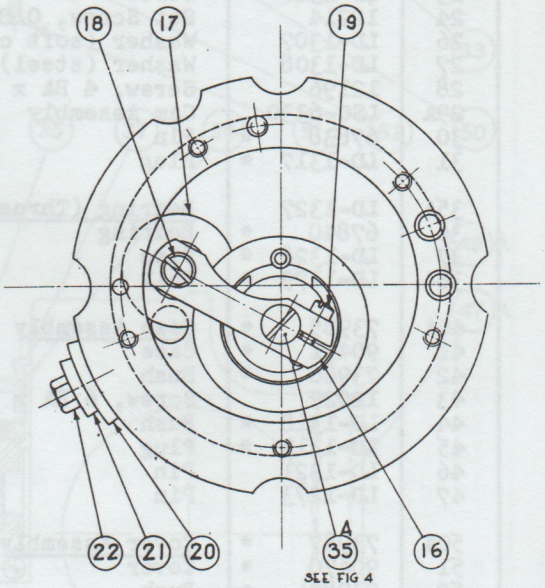
2001- C,D,E & F PROJECTOR

REF	CODE		ITEM	QTY
			FIG. 16 - KEY ASSEMBLY	
1A	90517		Shutter Guard Assembly	1
2	LSR-6388		Shutter Guard (Fixed)	1
3	67996		Holder	1
4	10231		Screw, 6BA x 1/4" Rd. Hd.	4
5	LD-1552		Pin	1
6	67994		Spring	1
7	LD-1551		Pin	1
8	67995		Window	1
9	LSR-6387		Shutter Guard (Removable)	1
10	12230		Screw, 1/4" - 20 x 5/8" Allen Cap	2
13A	LSO-8219	*	Main Frame Assembly	1
FIG.8	74108		Holder Assembly	1
FIG.10	74860		Pilot Lamp Assembly	1
FIG.11	50437		Plug & Switch Assembly	1
14A	LSXX-8159	*	Main Frame Machining	1
15	LSXX-8158	*	Main Frame Casting	1
16A	82344		Shield Assembly	1
17	12116		Screw, 2BA x 1/4" Ch. Hd.	1
18	12158		Screw, 2BA x 5/8" Csk. Hd.	2
19	50251		Retainer	1
20	11400		Set Screw, 2BA x 3/8" Allen Cup Pt.	1
21	11588		Set Screw, 4BA x 1/4" Allen Cup Pt.	1
22	76369		Housing	1
23	10568		Screw, 4BA x 9/16" Rd. Hd.	2
24	LD-1547		Screw	2
25	LD-2499		Clamp	4
26	10162		Screw, 4BA x 1/4" Rd. Hd.	4
27	50425		Nameplate	1
28	10072		Screw, 6BA x 3/16" Rd. Hd.	4
29	11601		Screw, 2BA x 1/2" Allen Cap	2
-	LD-1546	*	Pin (Dowel)	3
-	LD-1550	*	Stop	1
-	LD-1715	*	Pin (Dowel)	2
-	LD-2469	*	Pin (Dowel)	2
34	12367		Screw, 1/4" - 20 x 3/4" Allen Cap	3
35	12215		Screw, 1/4" - 20 x 1/2" Allen Cap	11
36	80936		Hood	1
37	12196		Screw, 4BA x 1/2" Allen Cap	3
29	11601		Screw, 2BA x 1/2" Allen Cap	8
38	LD-1175		Screw	2
39	10426		Screw, 2BA x 1/4" Rd. Hd.	12
40	12465		Screw, 1/4" - 20 x 7/16" Allen Cap - Large Head	2
41	LD-1389		Spring	1
42	67882		Guide Plate	1
30	LD-1549		Screw	2
10	12230		Screw, 1/4" - 20 x 5/8" Allen Cap	4
43	67980		Spring	1
44	LD-1165		Washer	1
45	LD-1664		Washer	1
46	LD-1164		Springwasher	1
47	LD-1745		Shim	As Req'd
48	69213		Shaft	1
49	12248		Screw, 3/8" - 16 x 1" Allen Cap for fixing Projector to 2002 Reproducer; for others see GEB 10.06	4



FOR NUMBERS OF SHOE & ARM ASSEMBLY & DETAILS SHOWN THUS ● → SEE GEB 10·27 LSO-10261
(& LSA-10266-CENTURY PARTS)
(& LSA-10367-CENTURY PARTS)





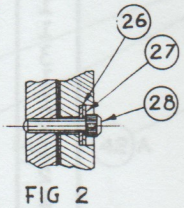


FIG 2

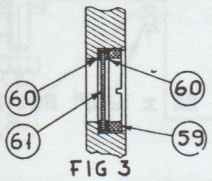


FIG 3

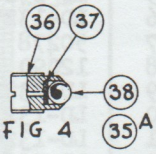


FIG 4

LSR-6328 MOD. 630 INTERMITTENT ASSEMBLY (2001-TYPE PROJECTOR) FIG. 1

1. For details of the Shoe and Arm Assembly, see LSO- 10261.

2. Items marked with an asterisk are not separately replaceable.

REF	CODE		ITEM	QTY
			FIG. 1 (INCL. FIGS. 2, 3, 4)	
1A	LSR-6328 Mod. 630		INTERMITTENT ASSEMBLY	1
2	73984		Flywheel	1
3	12195		Screw, 2 BA x 3/4" Allen Cap	1
4	90472		Gear	1
5	LD-2699		Screw	1
6	LD-1316		Washer	1
7	LD-1315		Screw	1
8	LD-1314		Washer	1
9	LD-1311		Collar	1
10	12209		Set Screw, 6 BA x 1/8" Allen Fl. Pt.	2
11	91624		Sprocket	1
12	LD-1312		Taper Pin, or	2
13	LD-3195		Taper Pin (oversize)	2
14	73983		Gasket	1
15	LSO-6331		Cross	1
16	LD-1303		Bracket	1
17	LD-1304		Spacer	1
18	LD-1302		Screw	1
19	LD-1301		Screw	1
20	67837		Plate	1
21	LD-1305		Plate	1
22	12327		Screw, 4BA x 1/2" Hex. Hd.	1
23	LD-1310		Screw	2
24	12214		Set Screw, 0 BA x 1/4" Allen Fl. Pt.	1
26	LD-1307		Washer (soft copper)	5
27	LD-1308		Washer (steel)	5
28	12196		Screw, 4 BA x 1/2" Allen Cap	5
29A	LSO-6330		Cam Assembly	1
30	67838	*	Pin	1
31	LD-1317	*	Plug	1
35A	LD-1327		Bearing (Thrust) Assembly (Fig. 4)	1
36	67840	*	Bearing	1
37	LD-1328	*	Disc	1
38	LD-1179	*	Ball	1
40A	73985	*	Case Assembly	1
41	90471	*	Case	1
42	73986	*	Bush	1
43	12027		Screw, 6 BA x 1/4" Csk. Hd.	3
44	LD-1318	*	Bush	1
45	LD-1319	*	Plug	3
46	LD-1321		Pin	1
47	LD-1273		Pin	1
50A	73987	*	Cover Assembly	1
51	90470	*	Cover	1
52	73989	*	Bush	1
53	LD-4454		Plate	1
54	73988	*	Bush	1
55	LD-1326		Screw	3
56	LD-1325		Oiler	1
57	50278		Stripper	1
58	12090		Screw, 6 BA x 1/8" Rd. Hd.	2
59	LD-1322		Nut	1
60	LD-1323		Washer	2
61	LD-1324		Window	1
62	LD-4455		Screw	3

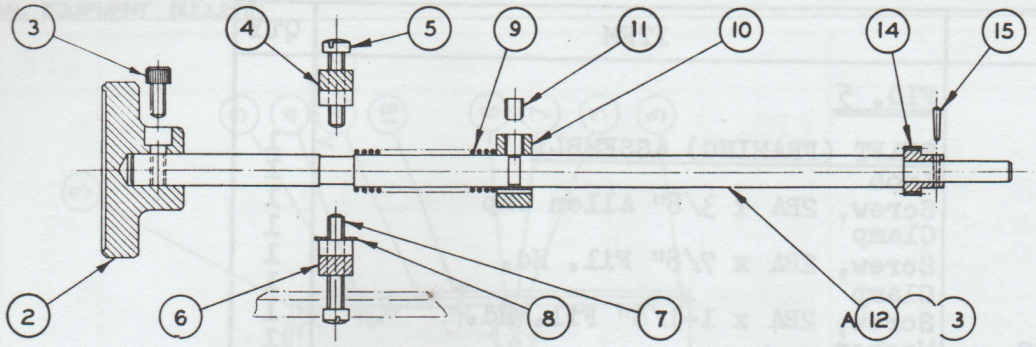


FIG. 5
FRAMING SHAFT ASSEMBLY (1)A

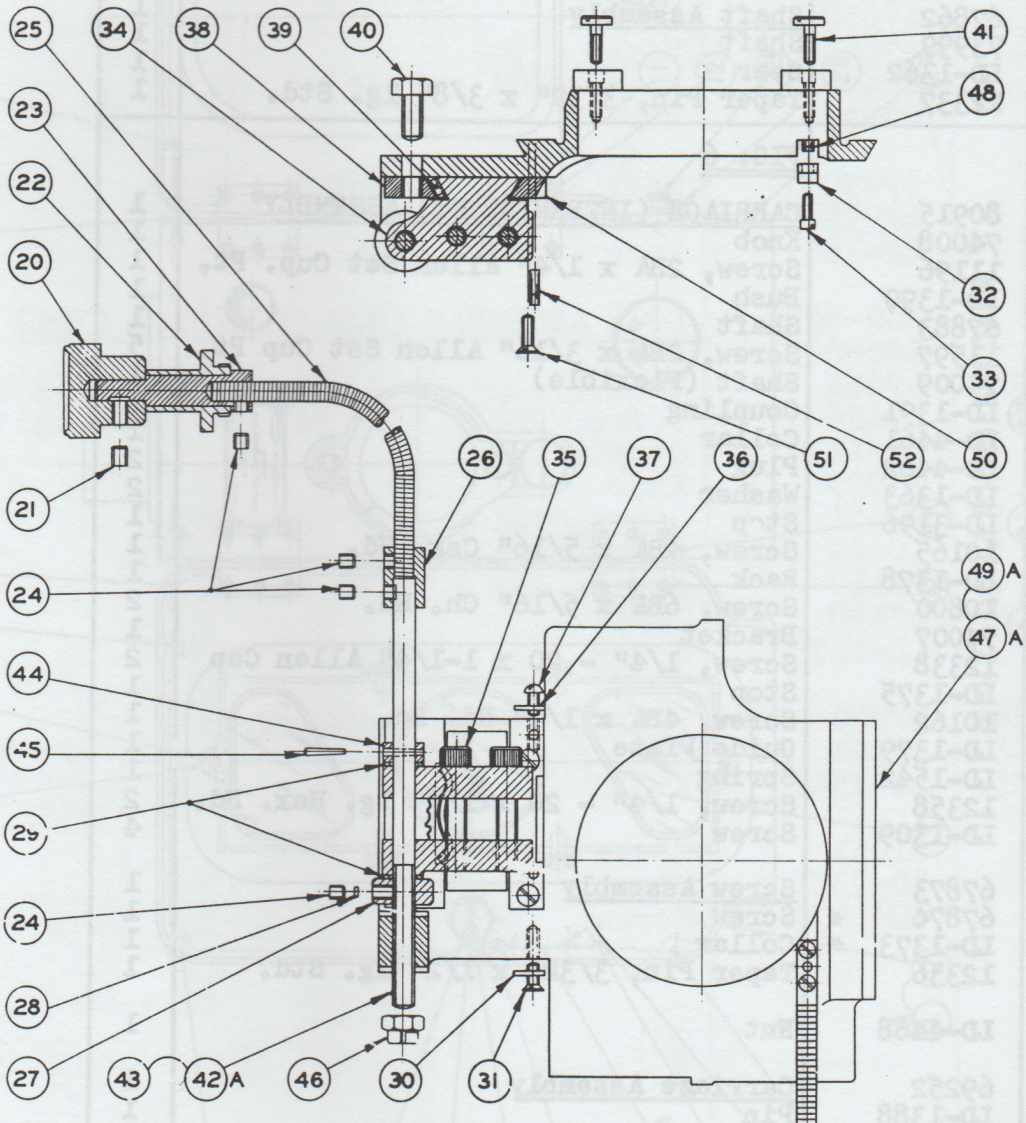


FIG. 6
CARRIAGE (INTERMITTENT) ASSEMBLY (19)A

REF	CODE		ITEM	QTY
			FIG. 5	
1A	90479		SHAFT (FRAMING) ASSEMBLY	1
2	73998		Knob	1
3	12185		Screw, 2BA x 3/8" Allen Cap	1
4	67865		Clamp	1
5	12218		Screw, 2BA x 7/8" Fil. Hd.	1
6	67864		Clamp	1
7	12219		Screw, 2BA x 1-1/8" Fil. Hd.	1
8	LD-2807		Washer	1
9	67863		Spring	1
10	LD-1361		Collar	1
11	12214		Screw, 0BA x 1/4" Allen Fl. Pt.	1
12A	67862		Shaft Assembly	1
13	73999		Shaft	1
14	LD-1362		Gear	1
15	12337		Taper Pin, 3/32" x 3/8" lg. Std.	1
			FIG. 6	
19A	80915		CARRIAGE (INTERMITTENT) ASSEMBLY	1
20	74008		Knob	1
21	11196		Screw, 2BA x 1/4" Allen Set Cup. Pt.	1
22	LD-1390		Bush	1
23	67883		Shaft	1
24	11597		Screw, 2BA x 3/16" Allen Set Cup Pt.	5
25	74009		Shaft (Flexible)	1
26	LD-1391		Coupling	1
27	LD-4461		Collar	1
28	LD-4462		Plug	2
29	LD-1363		Washer	2
30	LD-3196		Stop	1
31	10165		Screw, 4BA x 5/16" Csk. Hd.	1
32	LD-1378		Rack	1
33	10800		Screw, 6BA x 5/16" Ch. Hd.	2
34	74007		Bracket	1
35	12338		Screw, 1/4" - 20 x 1-1/4" Allen Cap	2
36	LD-1375		Stop	1
37	10162		Screw, 4BA x 1/4" Rd. Hd.	1
38	LD-1379		Guide Plate	1
39	LD-1542		Spring	1
40	12358		Screw, 1/4" - 20 x 1/2" lg. Hex. Hd.	2
41	LD-1309		Screw	4
42A	67873		Screw Assembly	1
43	67874	*	Screw	1
44	LD-1373	*	Collar	1
45	12336		Taper Pin, 3/32" x 1/2" lg. Std.	1
46	LD-4468		Nut	1
47A	69252		Carriage Assembly	1
48	LD-1388		Pin	1
49A	LSO-6342		Carriage Assembly	1
50	LD-3199	*	Guide Plate	1
51	11708		Screw, 3BA x 7/16" Csk Hd.	2
52	LD-3200	*	Pin	2

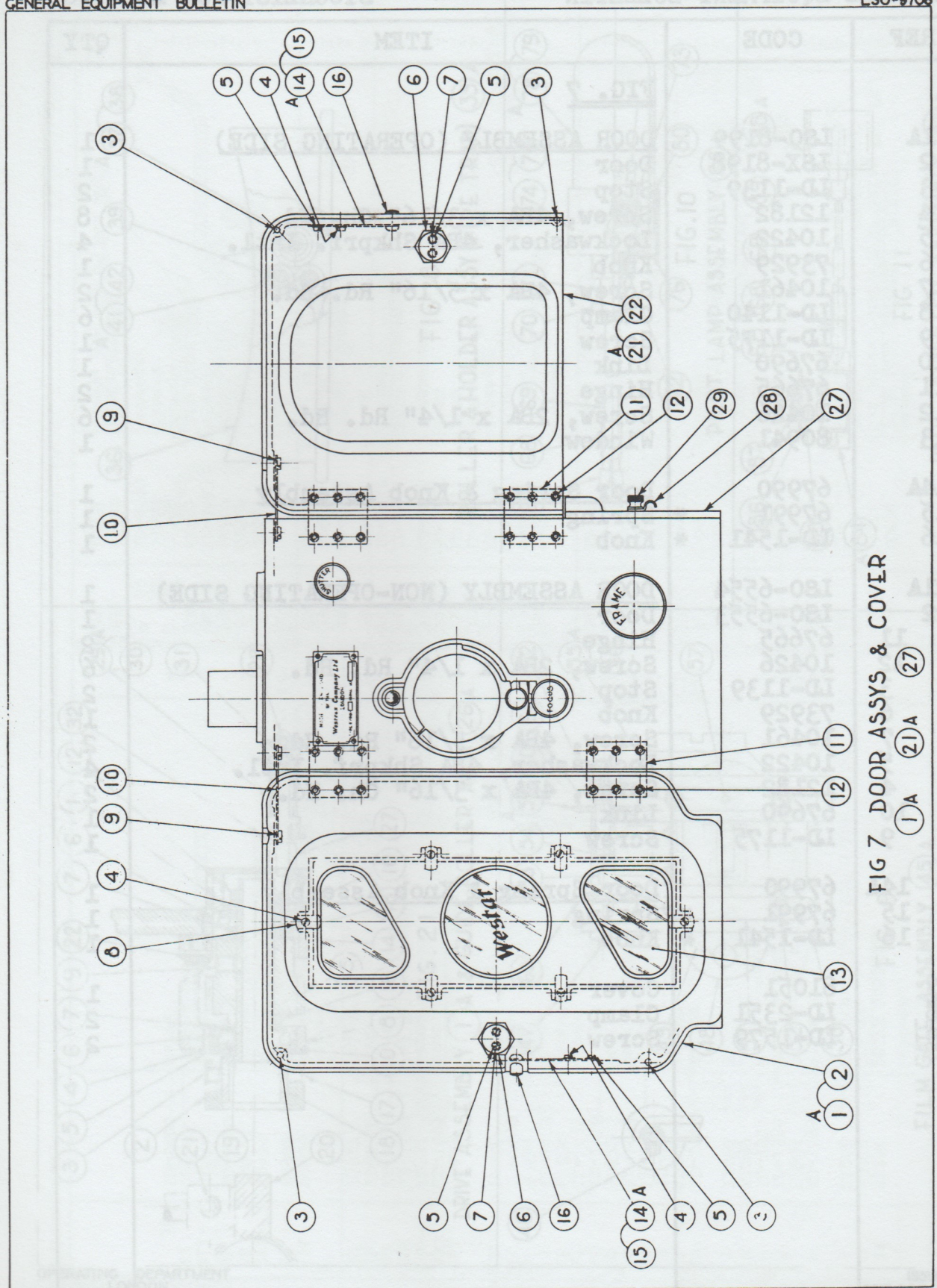


FIG 7 DOOR ASSYS & COVER (1)A (21)A (27)

REF	CODE		ITEM	QTY
			FIG. 7	
1A	LSO-8199		DOOR ASSEMBLY (OPERATING SIDE)	1
2	LSX-8198		Door	1
3	LD-1139		Stop	2
4	12182		Screw, 4BA x 3/16" Cn. Hd.	8
5	10422		Lockwasher, 4BA Shkprf. Intl.	4
6	73929		Knob	1
7	10461		Screw, 4BA x 5/16" Rd. Hd.	2
8	LD-1140		Clamp	6
9	LD-1175		Screw	1
10	67690		Link	1
11	67665		Hinge	2
12	10426		Screw, 2BA x 1/4" Rd. Hd.	6
13	80941		Window	1
14A	67990		Door Spring & Knob Assembly	1
15	67991	*	Spring	1
16	LD-1541	*	Knob	1
21A	LSO-6554		DOOR ASSEMBLY (NON-OPERATING SIDE)	1
22	LSO-6553		Door	1
11	67665		Hinge	2
12	10426		Screw, 2BA x 1/4" Rd. Hd.	6
3	LD-1139		Stop	2
6	73929		Knob	1
7	10461		Screw, 4BA x 5/16" Rd. Hd.	2
5	10422		Lockwasher, 4BA Shkprf. Intl.	4
4	12182		Screw, 4BA x 3/16" Ch. Hd.	2
10	67690		Link	1
9	LD-1175		Screw	1
14A	67990		Door Spring & Knob Assembly	1
15	67991	*	Spring	1
16	LD-1541	*	Knob	1
27	81051		Cover	1
28	LD-2351		Clamp	2
29	LD-1579		Screw	2

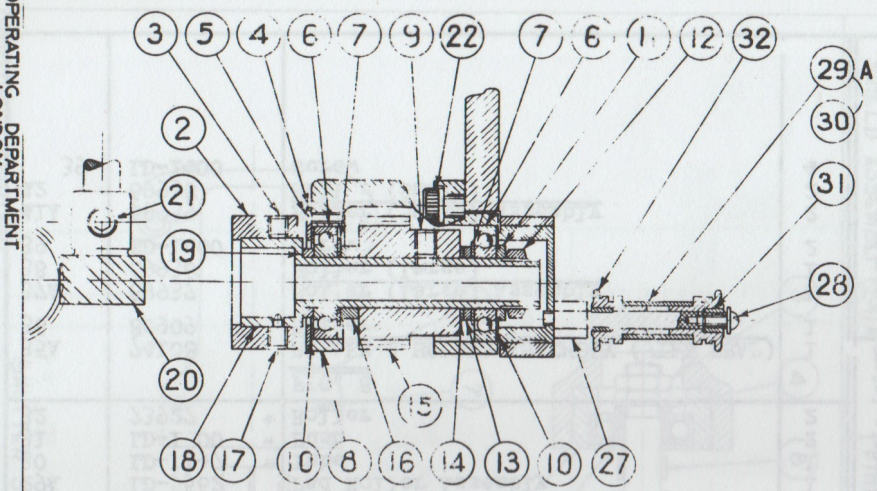


FIG. 21

DRIVE ASSEMBLY (1)A & GUIDE ROLLER ASSY (26)A

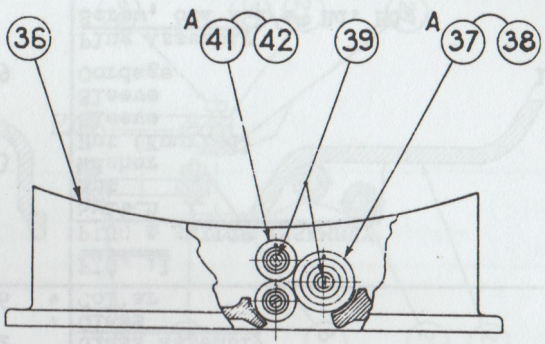


FIG. 8

ROLLER & HOLDER ASSY (FIRE TRAP) (35)A

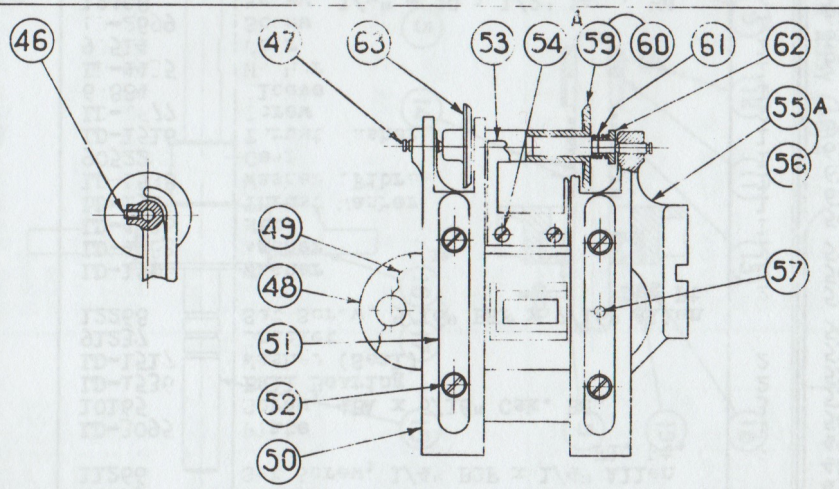


FIG. 9

FILM GATE ASSEMBLY (45)A
(FIXED)

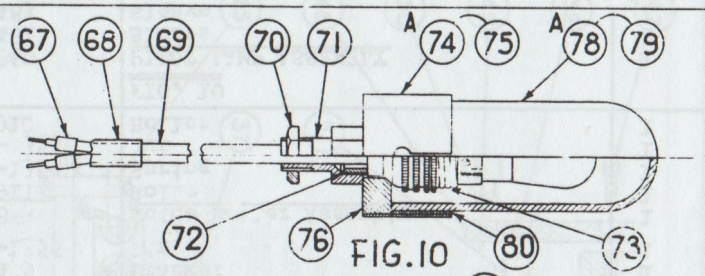


FIG. 10

PILOT LAMP ASSEMBLY (66)A

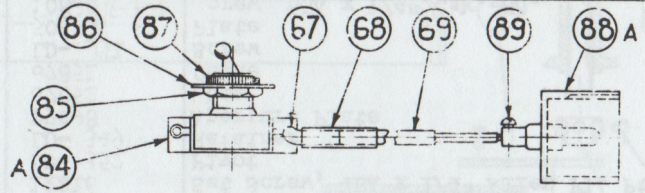


FIG 11

PLUG & SWITCH ASSEMBLY (83)A

OPERATING DEPARTMENT
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ISSUE 1
22ND JULY 1965
PROJECTOR. 2001-C. 10.27
10 H
L.S.C.-7.09

REF	CODE	ITEM	QTY
		FIG. 21	
1A	91254	DRIVE ASSEMBLY	1
2	68007	Collar	1
3	11266	Set Screw, 1/4" BSF x 1/4" Allen Fl. Pt.	2
4	LD-3095	Plate	1
5	10165	Screw, 4BA x 5/16" Csk. Hd.	3
6	LD-1536	Ball Bearing	2
7	LD-1517	Washer (Seal)	2
8	91237	Bracket	
9	12268	Set Screw, 5/16" BSF x 7/16" Allen Dog Pt.	2
10	LD-1518	Washer	2
11	LD-4783	Washer	1
12	LD-4436	Nut	1
13	LD-1519	Thrust Washer	1
14	LD-1538	Washer (Fibre)	1
15	90522	Gear	1
16	LD-1516	Thrust Washer	1
17	LD-[illegible]77	Screw	2
18	67884	Sleeve	1
19	LD-4435	Washer	1
20	90514	Gear	1
21	LD-2699	Screw	1
22	12408	Screw, 1/4" - 20 x 1/2" Large Hd. Allen Cap	3
26A	74413	Guide Roller Assembly	1
27	LD-1895	Stud	1
28	62331	Screw	1
29A	LD-5562	Pad Roller Assembly	1
30	LD-1147 *	Tube	1
31	LD-1[illegible]00 *	Bush	2
32	73927 *	Roller	2
		FIG. 8	
35A	74108	ROLLER & HOLDER ASSEMBLY (FIRE TRAP)	1
36	80909	Holder	1
37A	69937	Roller (Large) Assembly	1
38	69936	Roller (Large)	1
39	LD-1400	Screw	2
41A	69939	Roller (Small) Assembly	2
42	69938	Roller (Small)	2
39	LD-1400	Screw	4

REF	CODE	ITEM	QTY
		FIG. 9	
45A	90474	FILM GATE ASSEMBLY (FIXED)	1
46	12216	Set Screw, 4BA x 1/4" Allen Fl. Pt.	2
47	LD-[illegible]352	Pivot	2
48	LD-[illegible]349	Retainer	1
49	77498	Aperture Plate	1
50	67852	Shoe	2
51	67851	Guide	2
52	LD-[illegible]351	Screw	4
53	90374	Plate	1
54	LD-[illegible]830	Screw 6BA x 1/4" Csk. Hd.	2
55A	67854	Bracket & Stop Pin Assembly	1
56	90475 *	Bracket	1
57	LD-1355	Pin	1
59A	67853	Guide Roller Assembly	1
60	80911	Roller	1
61	LD-1354	Spring	1
62	LD-[illegible]353	Nut	1
63	80910	Roller	1
		FIG. 10	
66A	74860	PILOT LAMP ASSEMBLY	1
67	65481	Sleeve	2
68	65483	Sleeve	1
69	LD-4499	Cordage	10-1/2"
70	LD-1918	Nut	1
71	LD-1919	Bush	1
72	LD-2522	Bush	1
73	LD-2413	Lampholder	1
74A	LD-1921	Holder Assembly	1
75	LD-1917 *	Holder	1
76	LD-1920 *	Ring	1
78A	LD-1922	Glass Assembly	1
79	67956 *	Glass	1
80	LD-1916 *	Collar	1
		FIG. 11	
83A	50437	PLUG & SWITCH ASSEMBLY	1
84A	60517	Switch	1
85	61107	Nut	1
86	LD-3813	Washer	1
87	61095	Nut (Knurled)	1
67	65481	Sleeve	2
68	65483	Sleeve	1
69	LD-4499	Cordage	11-1/2"
88A	68382	Plug Assembly	1
89	10231	Screw, 6BA x 1/4" Rd. Hd.	4

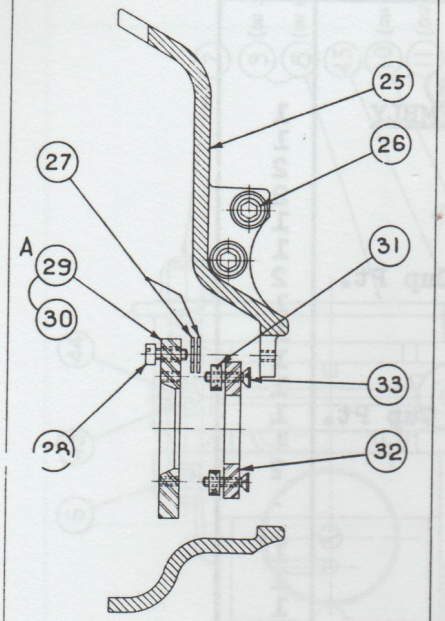


FIG. 12
SHIELD ASSEMBLY (24) A

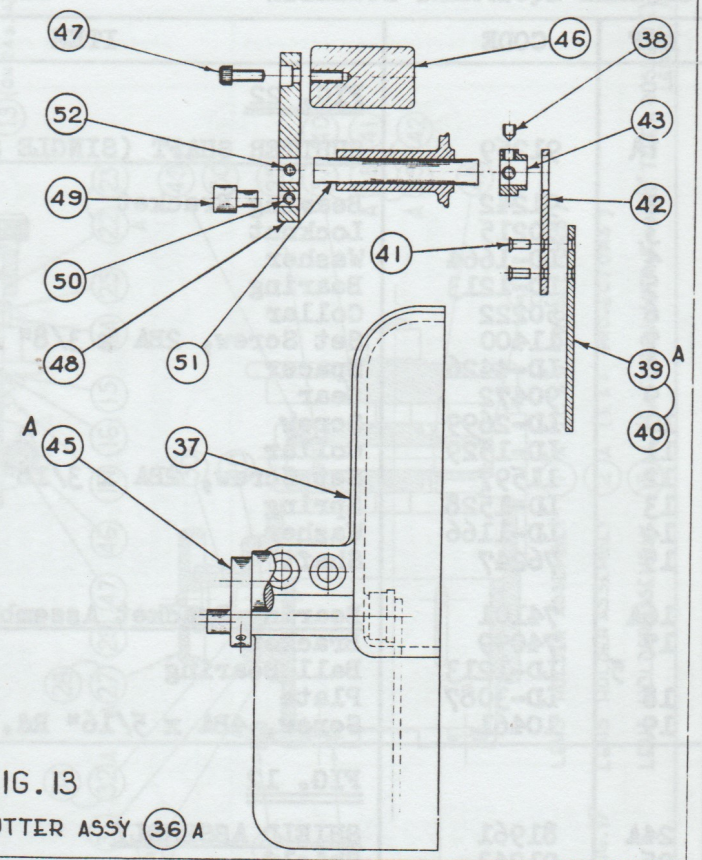


FIG. 13
FIRE SHUTTER ASSY (36) A

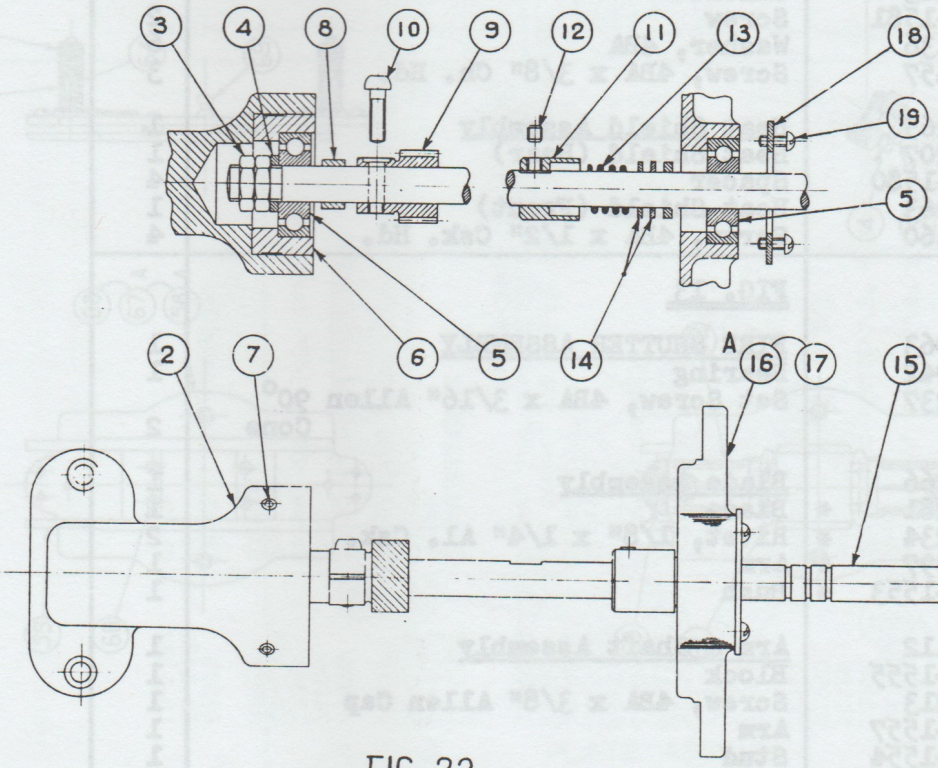


FIG. 22
SHUTTER SHAFT (SINGLE) ASSY (1) A

REF	CODE		ITEM	QTY
			FIG. 22	
1A	91259		SHUTTER SHAFT (SINGLE SHUTTER) ASSEMBLY	1
2	91242		Bearing Bracket	1
3	50215		Locknut	2
4	LD-1664		Washer	2
5	LD-1213		Bearing	1
6	50222		Collar	1
7	11400		Set Screw, 2BA x 3/8" Allen Cup Pt.	2
8	LD-4426		Spacer	1
9	90472		Gear	1
10	LD-2699		Screw	1
11	LD-1529		Collar	1
12	11597		Set Screw, 2BA x 3/16" Allen Cup Pt.	1
13	LD-1528		Spring	1
14	LD-1166		Washer	2
15	76247		Shaft	1
16A	74101		Bearing Bracket Assembly	1
17	74099		Bracket	1
5	LD-1213		Ball Bearing	1
18	LD-3087		Plate	1
19	10461		Screw, 4BA x 5/16" Rd. Hd.	4
			FIG. 12	
24A	81961		SHIELD ASSEMBLY	1
25	91243		Shield	1
26	LD-1581		Screw	2
27	10136		Washer, 4BA	6
28	10457		Screw, 4BA x 3/8" Ch. Hd.	3
29A	51265		Heat Shield Assembly	1
30	77207		Heat Shield (Rear)	1
31	LD-1580		Spacer	4
32	51263		Heat Shield (Front)	1
33	10360		Screw, 4BA x 1/2" Csk. Hd.	4
			FIG. 13	
36A	81963		FIRE SHUTTER ASSEMBLY	1
37	80942		Bearing	1
38	12237		Set Screw, 4BA x 3/16" Allen 90° Cone	2
39A	76266		Blade Assembly	1
40	50281	*	Blade	1
41	12234	*	Rivet, 1/8" x 1/4" Al. Csk.	2
42	67997	*	Arm	1
43	LD-1553	*	Bush	1
45A	74112		Arm & Shaft Assembly	1
46	LD-1555		Block	1
47	12213		Screw, 4BA x 3/8" Allen Cap	1
48	LD-1557		Arm	1
49	LD-1554		Stud	1
50	12190		Set Screw, 4BA x 3/16" Allen Fl. Pt.	1
51	LD-1556		Shaft	1
52	12244		Set Screw, 4BA x 1/4" Allen 90° Cone	1

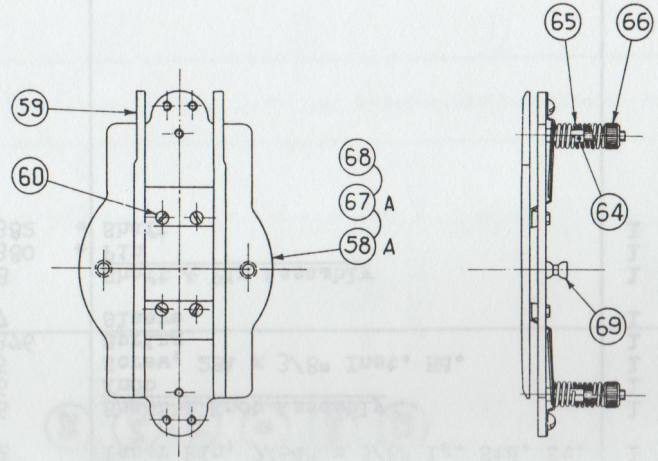
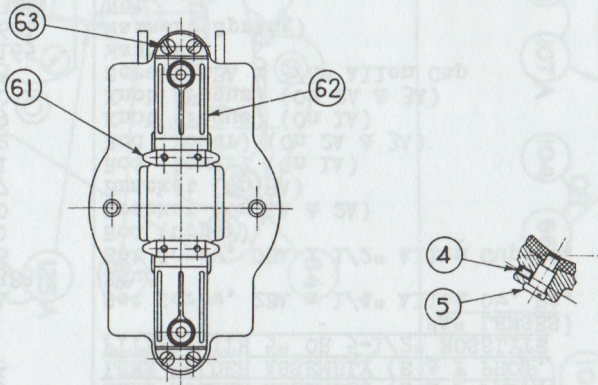


FIG.14 FILM GATE ASSY (58) A (MOVING)



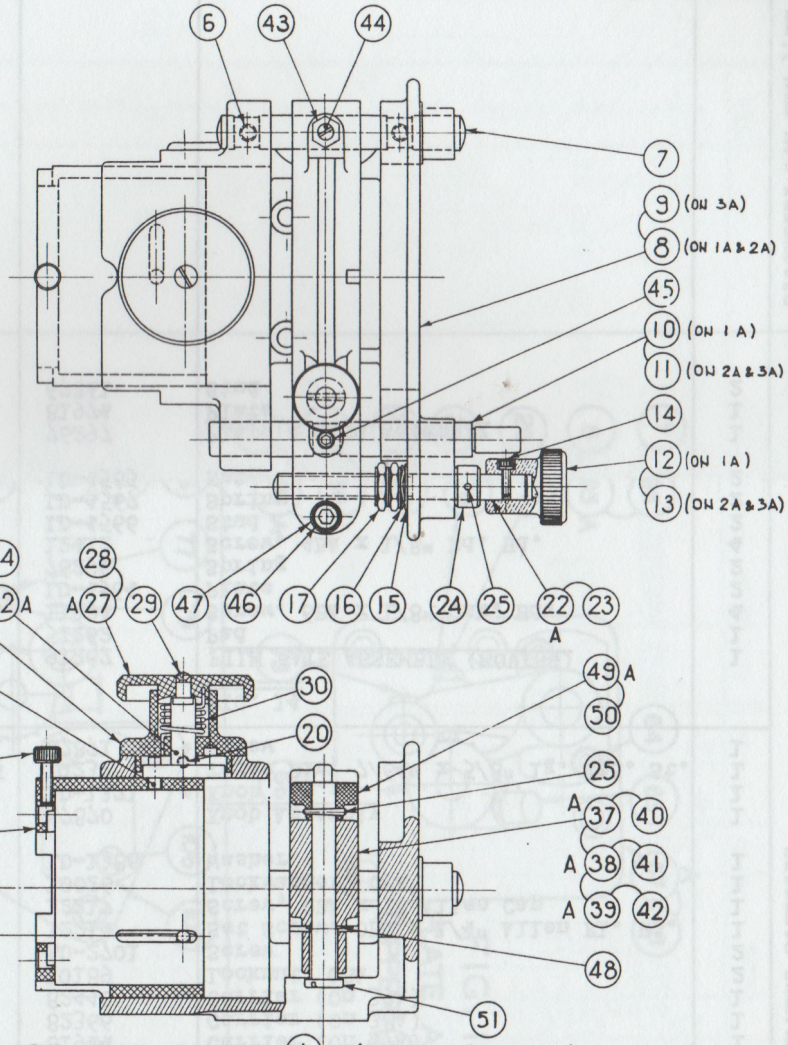


FIG.17
LENS HOLDER ASSEMBLY (1) A (C & D PROJECTORS)
LENS HOLDER ASSEMBLY (2) A (E & F PROJECTORS)
LENS HOLDER ASSEMBLY (3) A (E & F PROJ. WITH 5" OR 5½" TYPE A ROSSLYTE LENSES)

REF	CODE		ITEM	QTY
			FIG. 17	
1A	91247		LENS HOLDER ASSEMBLY (C & D PROJ.)	1
2A	91895		LENS HOLDER ASSEMBLY (E & F PROJ.)	1
3A	91896		LENS HOLDER ASSEMBLY (E & F PROJ. FITTED WITH 5" OR 5-1/2" ROSSLYTE "A" LENSES)	1
4	12421		Set Screw, 2BA x 1/4" Allen Ov. Pt.	1
5	LD-1383		Stud	1
6	12406		Set Screw, 0BA x 1/2" Allen Cup Pt.	2
7	50220		Rod (Upper)	1
8	77250		Bracket (On 1A & 2A)	1
9	77517		Bracket (On 3A)	1
10	50221		Rod (Lower) (On 1A)	1
11	51302		Rod (Lower) (On 2A & 3A)	1
12	67879		Knob (Focus) (On 1A)	1
13	51380		Knob (Focus) (On 2A & 3A)	1
14	12213		Screw, 4BA x 3/8" Allen Cap	1
15	LD-1165		Washer	
16	LD-2601		Washer (Spring)	
17	LD-1385		Nut	
18	76198		Sleeve	1
19	LD-4401		Screw	1
20	12244		Set Screw, 4BA x 1/4" Allen 90° Cone	2
21	12465		Screw, 1/4" Whit x 7/16" Allen Cap Large Head (On 2A & 3A)	2
22A	LD-1367		Screw Assembly	1
23	LD-1368	*	Screw	1
24	LD-1369	*	Collar	1
25	10232		Taper Pin, 7/64" x 5/8" lg. Std. St.	1
27A	67876		Shaft & Knob Assembly	1
28	74006		Knob	1
29	11345		Screw, 2BA x 3/8" Inst. Hd.	1
30	LD-1376		Spring	1
31	67877		Sleeve	1
32A	67878		Shaft & Pin Assembly	1
33	LD-1380	*	Pin	1
34	LD-1382	*	Shaft	1

REF	CODE		ITEM	QTY
37A	81945		Carrier Assembly (On 1A) or -	1
38A	82367		Carrier Assembly (On 1A)	1
38A	82367		Carrier Assembly (On 2A)	1
39A	82476		Carrier Assembly (On 3A)	1
40	81944		Carrier (On 37A)	1
41	82366		Carrier (On 38A)	1
42	82440		Carrier (On 39A)	1
43	10189		Locknut, 0BA	2
44	LD-2701		Screw	2
45	12214		Set Screw, 0BA x 1/4" Allen Fl. Pt.	1
46	12217		Screw, 0BA x 1" Allen Cap	1
47	10026		Lockwasher, 0BA	1
48	LD-1386		Washer	1
49A	67870		Knob Assembly	1
50	LD-1371	*	Knob	1
25	10232		Taper Pin, 7/64" x 5/8" lg. Std. St.	1
51	67871	*	Screw	1
			FIG. 14	
58A	91267		FILM GATE ASSEMBLY (MOVING)	1
59	51262		Pad	1
60	11394		Screw, 6BA x 1/8" Csk. Hd.	4
61	LD-4564		Plate	2
62	76296		Spring	2
63	12412		Screw, 4BA x 1/8" Rd. Hd.	4
64	LD-4566		Stud	2
65	LD-4567		Spring	2
66	LD-4565		Nut	2
67A	76297		Plate & Stud Assembly	1
68	81974		Plate	1
69	67861		Stud	2

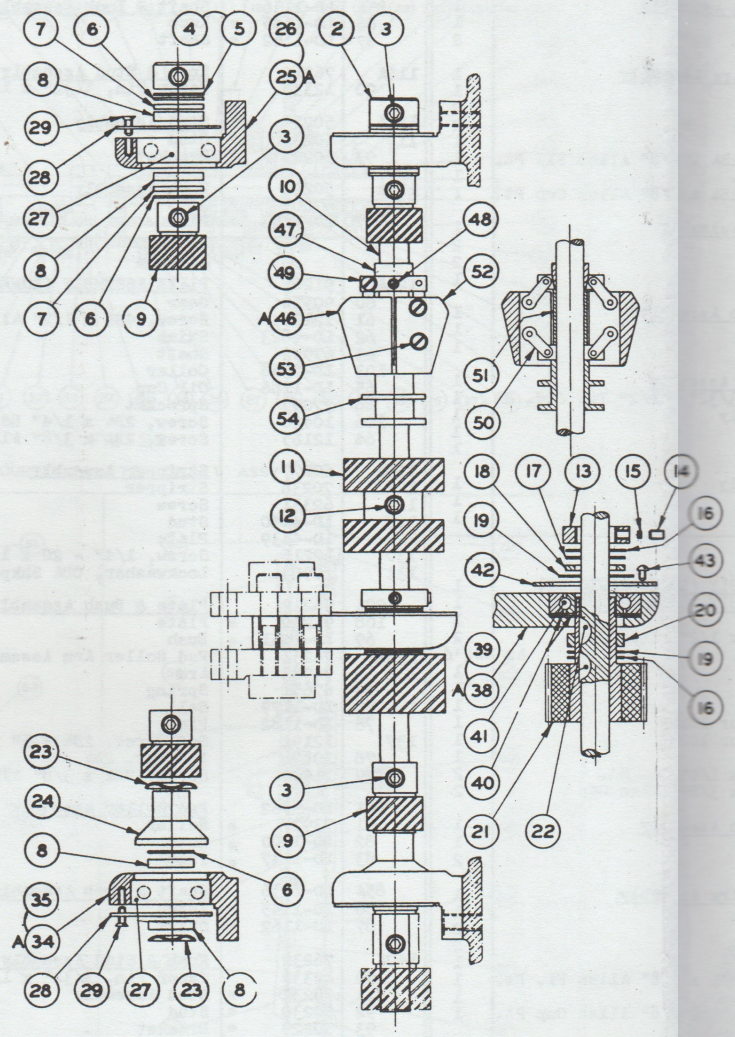


FIG. 15
VERTICAL SHAFT ASSY. (1)A

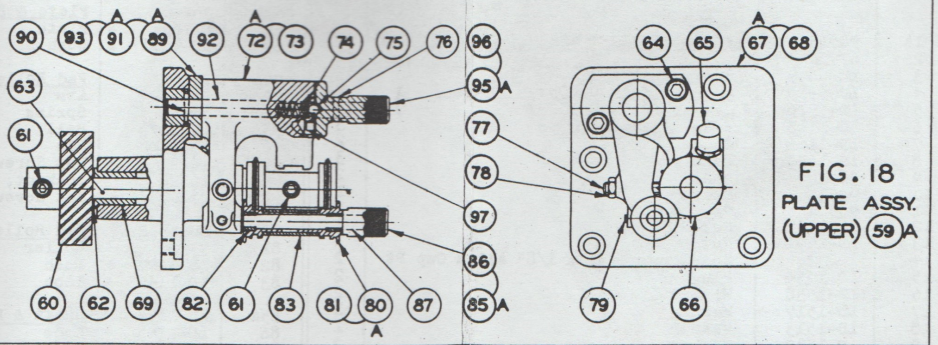


FIG. 18
PLATE ASSY.
(UPPER) (59)A

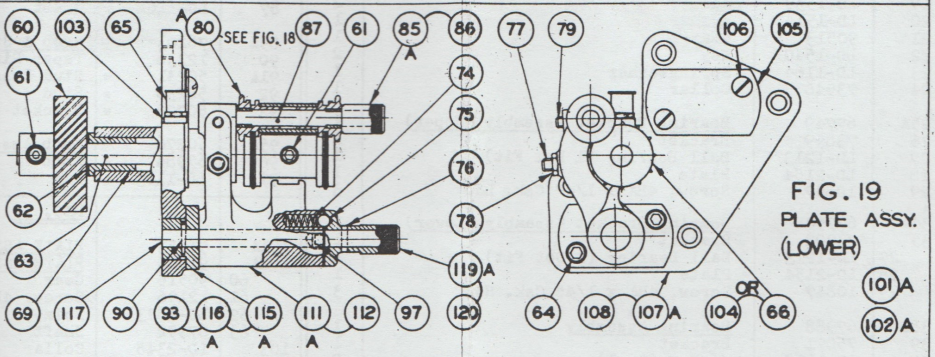
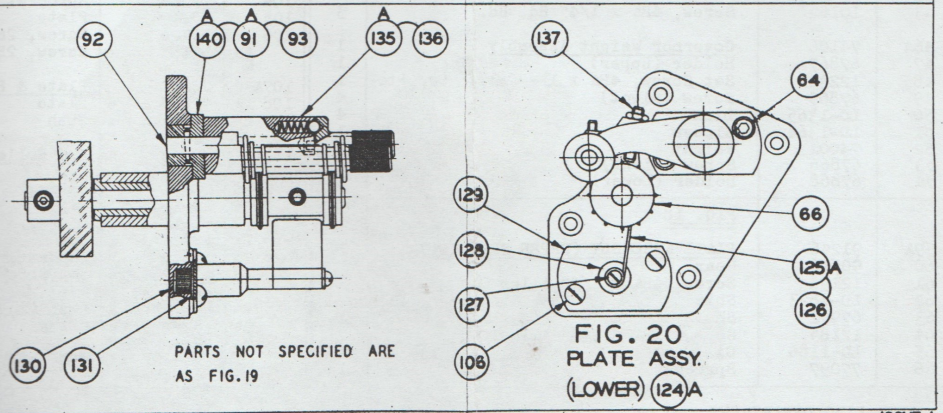


FIG. 19
PLATE ASSY.
(LOWER)
(101)A
(102)A



PARTS NOT SPECIFIED ARE AS FIG. 19

FIG. 20
PLATE ASSY.
(LOWER) (124)A

REF	CODE	ITEM	QTY
		FIG. 15.	
1A	90515	VERTICAL SHAFT ASSEMBLY	1
2	67720	Collar	1
3	LD-2699	Screw	3
4	LD-5915	Washer (Shim 0.005")	As
5	LD-5916	Washer (Shim 0.010")	req'd
6	LD-1165	Washer (Fibre)	3
7	LD-1166	Washer	2
8	LD-1664	Washer	3
9	90510	Gear	2
10	90512	Shaft	1
11	90511	Gear	1
12	LD-1537	Screw	1
13	LD-1591	Nut	1
14	12233	Set Screw, 4BA x 1/8" Allen Cup Pt	2
15	LD-1534	Plug	2
16	LD-1538	Washer (Fibre)	2
17	LD-1517	Washer	1
18	LD-1513	Washer	1
19	LD-1539	Washer	2
20	LD-1514	Washer	1
21	90513	Gear	1
22	LD-1540	Key	2
23	LD-1164	Springwasher	1
24	73946	Collar	1
25A	67749	Bearing Bracket Assembly (Upper)	1
26	73899	Bracket	1
27	LD-1213	Ball Bearing (1 Dot Fit)	1
28	LD-2154	Plate	1
29	10847	Screw, 4BA x 1/4" Csk. Hd.	3
34A	67750	Bearing Bracket Assembly (Lower)	1
35	73902	Bracket	1
27	LD-1213	Ball Bearing (1 Dot Fit)	1
28	LD-2154	Plate	1
29	10847	Screw, 4BA x 1/4" Csk. Hd.	3
38A	67988	Bearing Assembly	1
39	75071	Bracket	1
40	LD-1518	Washer (Seal)	2
41	LD-1536	Ball Bearing (1 Dot Fit)	1
42	LD-2332	Plate	1
43	10162	Screw, 4BA x 1/4" Rd. Hd.	3
46A	74106	Governor Weight Assembly	1
47	67867	Holder (Upper)	1
48	12236	Set Screw, 4BA x 1/4" Allen Cup Pt.	1
49	67869	Screw (Pivot)	4
50	LD-1365	Link	4
51	LD-1364	Sleeve	1
52	74001	Weight	2
53	67866	Screw (Pivot)	4
54	67868	Holder (Lower)	1
		FIG. 18	
59A	91246	PLATE ASSEMBLY (UPPER SPROCKET)	1
60	90516	Gear	1
61	12196	Screw, 4BA x 1/2" Allen Cap	2
62	LD-4823	Shim As Req'd	
63	67992	Shaft	1
64	12185	Screw, 2BA x 3/8" Allen Cap	2
65	LD-1186	Oil Cup	1
66	77097	Sprocket	1

REF	CODE	ITEM	QTY
67A	76200	Plate & Bush Assembly	1
68	81943 *	Plate	1
69	LD-1441 *	Bush	2
72A	76201	Pad Roller Arm Assembly	1
73	74103	Arm	1
74	67651	Spring	2
75	LD-1179	Ball	2
76	LD-1182	Pin	1
77	12232	Set Screw, 2BA x 7/8" Allen Fl. Pt.	1
78	10826	Locknut, 2BA	1
79	11400	Set Screw, 2BA x 1/8" Allen Cup Pt.	1
80A	LD-5562	Pad Roller Assembly	1
81	73927 *	Roller	2
82	LD-1200 *	Bush	2
83	LD-1147 *	Tube	1
85A	LD-1136	Shaft & Knob Assembly	1
86	LD-1145 *	Knob	1
87	LD-1162 *	Shaft	1
89A	76203	Knob & Stud Assembly	1
90	12336	Taper Pin, 3/32" x 1/2" lg. Std. St.	1
91A	50231 *	Stud Assembly	1
92	50230 *	Stud	1
93	50229 *	Bracket	1
95A	50276	Knob Assembly	1
96	67984 *	Knob	1
97	LD-1183 *	Pin	1
		FIG. 19.	
101A	91253	PLATE ASSEMBLY (LOWER SPROCKET)	1
102A	91960	PLATE ASSEMBLY (LOWER SPROCKET)	1
60	90516	Gear	1
61	12196	Screw, 4BA x 1/2" Allen Cap	2
62	LD-4823	Shim As Req'd	
63	67992	Shaft	1
103	LD-2348	Collar	1
65	LD-1186	Oil Cup	1
66	77097	Sprocket (For 101A)	1
104	77098	Sprocket (For 102A)	1
105	50249	Plate	1
106	10426	Screw, 2BA x 1/4" Rd. Hd.	2
64	12185	Screw, 2BA x 3/8" Allen Cap	2
107A	76212	Plate & Bush Assembly	1
108	91240 *	Plate	1
69	LD-1441 *	Bush	2
111A	76213	Pad Roller Arm Assembly	1
112	74105	Arm	1
74	67651	Spring	2
75	LD-1171	Ball	2
76	LD-1182	Pin	1
77	12232	Set Screw, 2BA x 7/8" Allen Fl. Pt.	1
78	10826	Locknut, 2BA	1
79	11400	Set Screw, 2BA x 3/8" Allen Cup Pt.	1
80A	LD-5562	Pad Roller Arm Assembly	1
81	73927 *	Roller	2
82	LD-1200 *	Bush	2
83	LD-1147 *	Tube	1

REF	CODE	ITEM	QTY
85A	LD-1136	Shaft & Knob Assembly	1
86	LD-1145 *	Knob	1
87	LD-1162 *	Shaft	1
115A	76214	Knob & Stud Assembly	1
90	12336	Taper Pin, 3/32" x 1/2" lg. Std. St.	1
116A	50234 *	Stud Assembly	1
117	50233 *	Stud	1
93	50229 *	Bracket	1
119A	50242	Knob Assembly	1
120	67669 *	Knob	1
97	LD-1183 *	Pin	1
		FIG. 20	
124A	91265	PLATE ASSEMBLY (LOWER SPROCKET)	1
60	90516	Gear	1
61	12196	Screw, 4BA x 1/2" Allen Cap	2
62	LD-4823	Shims As Req'd	
63	67992	Shaft	1
103	LD-2348	Collar	1
65	LD-1186	Oil Cup	1
66	77097	Sprocket	1
106	10426	Screw, 2BA x 1/4" Rd. Hd.	2
64	12185	Screw, 2BA x 3/8" Allen Cap	2
125A	50277	Stripper Assembly	1
126	70238	Stripper	1
127	62331	Screw	1
128	LD-4440	Stud	1
129	LD-4439	Plate	1
130	12215	Screw, 1/4" - 20 x 1/2" Allen Cap	1
131	10903	Lockwasher, OBA Shkprf. Intl.	1
107A	96212	Plate & Bush Assembly	1
108	91240 *	Plate	1
69	LD-1441 *	Bush	2
135A	76231	Pad Roller Arm Assembly	1
136	74983	Arm	1
74	67651	Spring	2
75	LD-1179	Ball	2
76	LD-1182	Pin	1
137	12191	Set Screw, 2BA x 1" Allen Fl. Pt.	1
78	10826	Locknut, 2BA	1
79	11400	Screw, 2BA x 3/8" Allen Cup Pt.	1
80A	LD-5562	Pad Roller Assembly	1
81	73927 *	Roller	2
82	LD-1200 *	Bush	2
83	LD-1147 *	Tube	1
85A	LD-1136	Shaft & Knob Assembly	1
86	LD-1145 *	Knob	1
87	LD-1162 *	Shaft	1
140A	76232	Knob & Stud Assembly	1
90	12336	Taper Pin, 3/32" x 1/2" lg. Std. St.	1
91A	50231 *	Stud Assembly	1
92	50230 *	Stud	1
93	50229 *	Bracket	1
119A	50242	Knob Assembly	1
120	67669 *	Knob	1
97	LD-1183 *	Pin	1

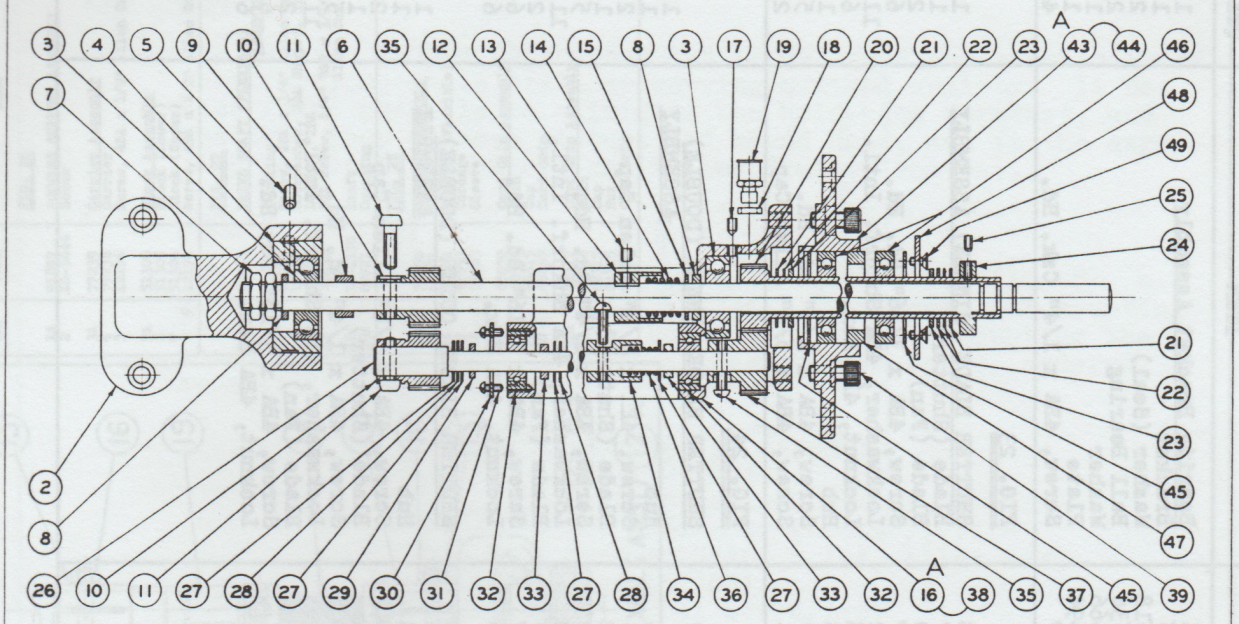


FIG. 25

DOUBLE SHUTTER SHAFT ASSY (1) A

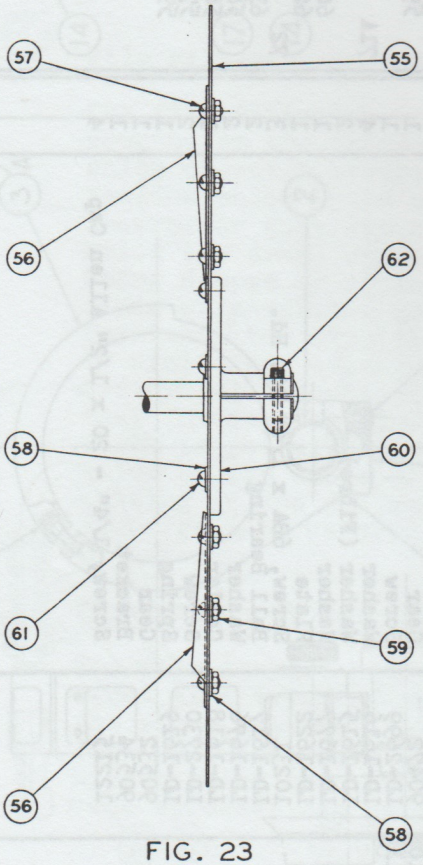


FIG. 23

SHUTTER BLADE (SINGLE) ASSEMBLY (54) A

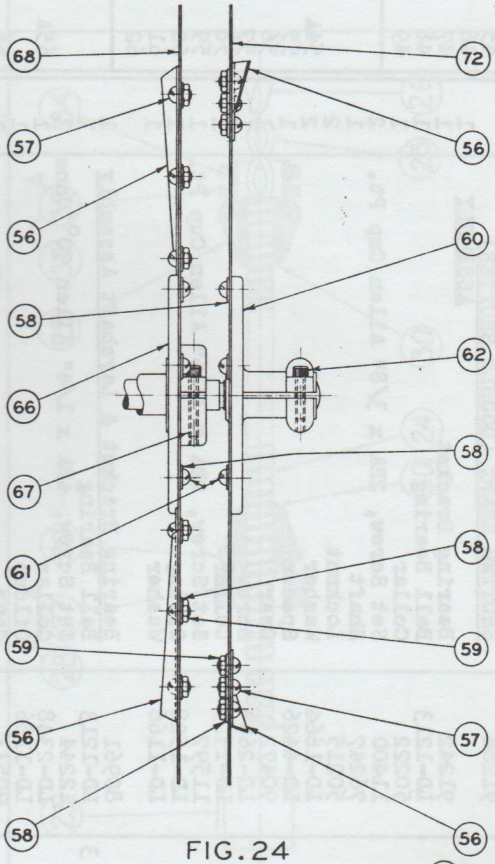


FIG. 24

SHUTTER BLADES (DOUBLE) ASSEMBLY (65) A (71) A

REF	CODE	ITEM	QTY
		FIG. 25	
1A	91264	SHUTTER SHAFT (DOUBLE SHUTTER) ASSEMBLY	1
2	91242	Bearing Bracket	1
3	LD-1213	Ball Bearing	1
4	50222	Collar	1
5	11400	Set Screw, 2BA x 3/8" Allen Cup Pt.	2
6	76247	Shaft	1
7	50215	Locknut	2
8	LD-1664	Washer	2
9	LD-4426	Spacer	1
10	90472	Gear	1
11	LD-2699	Screw	1
12	LD-1529	Collar	1
13	11597	Set Screw, 2BA x 3/16" Allen Cup Pt.	1
14	LD-1528	Spring	1
15	LD-1166	Washer	1
16A	80961	Bearing Bracket & Layshaft Assembly	1
3	LD-1213	Ball Bearing	1
17	12244	Set Screw, 4BA x 1/4" Allen 90° Cone	3
18	LD-2348	Collar	1
19	LD-1186	Oilcup	1
20	90533	Gear	1
21	LD-1538	Washer (Fibre)	2
22	LD-1539	Washer	3
23	LD-1665	Washer	2
24	LD-1620	Collar	1
25	11588	Set Screw, 4BA x 1/4" Allen Cup Pt.	2
26	68025	Shaft	1
10	90472	Gear	1
11	LD-2699	Screw	1
27	LD-1616	Washer	4
28	LD-1615	Washer (Fibre)	2
29	LD-1677	Washer	1
30	LD-1622	Plate	1
31	10231	Screw, 6BA x 1/4" Rd. Hd.	3
32	LD-1617	Ball Bearing	2
33	LD-1676	Washer	2
34	LD-1618	Collar	1
35	LD-2730	Screw	2
36	LD-1619	Spring	1
37	90532	Gear	1
38	90534	Bracket	1
39	12215	Screw, 1/4" - 20 x 1/2" Allen Cap	4
43A	74206	Bearing Bracket Assembly	1
44	74205	Bracket	1
45	LD-1518	Washer (Seal)	2
46	LD-1536	Ball Bearing	2
47	LD-1666	Washer	1
48	LD-2694	Plate	1
49	10847	Screw, 4BA x 1/4" Csk. Hd.	4
		FIG. 23	
54A	80938	SHUTTER BLADE (SINGLE) ASSEMBLY	1
55	80937	Blade (Shutter)	1
56	76280	Blade (Fan)	2
57	10057	Screw, 4BA x 3/16" Rd. Hd.	6
58	10422	Lockwasher, 4BA Shkprf. Intl.	11
59	11368	Lockmut, 4BA Hex.	6
60	74098	Hub	1
61	10229	Screw, 4BA x 1/4" Rd. Hd.	5
62	12211	Screw, 4BA x 5/8" Allen Cap	2
		FIG. 24	
65A	80959	SHUTTER BLADE, INNER (DOUBLE) ASSEMBLY	1
66	74204	Hub	1
67	12433	Screw, 4B.. x 7/8" Allen Cap	2
68	80962	Blade (Shutter)	1
61	10229	Screw, 4BA x 1/4" Rd. Hd.	5
58	10422	Lockwasher, 4BA Shkprf. Intl.	11
56	76280	Blade (Fan)	2
57	10057	Screw, 4BA x 3/16" Rd. Hd.	6
59	11368	Lockmut, 4BA Hex.	6
71A	80960	SHUTTER BLADE, OUTER (DOUBLE) ASSEMBLY	1
60	74098	Hub	1
62	12211	Screw, 4BA x 5/8" Allen Cap	2
72	80963	Blade (Shutter)	1
61	10229	Screw, 4BA x 1/4" Rd. Hd.	5
58	10422	Lockwasher, 4BA Shkprf. Intl.	11
56	76280	Blade (Fan)	2
57	10057	Screw, 4BA x 3/16" Rd. Hd.	6
59	11368	Lockmut, 4BA Hex.	6

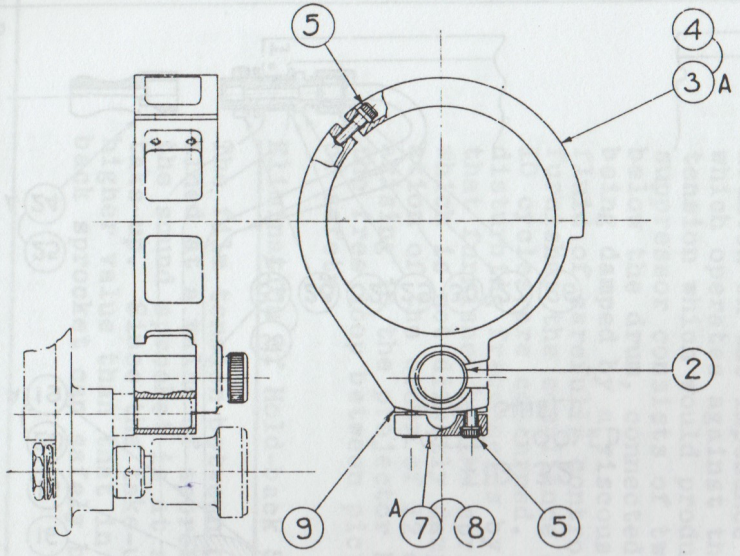


FIG. 26

FORWARD SUPPORT ASSEMBLY (1) A

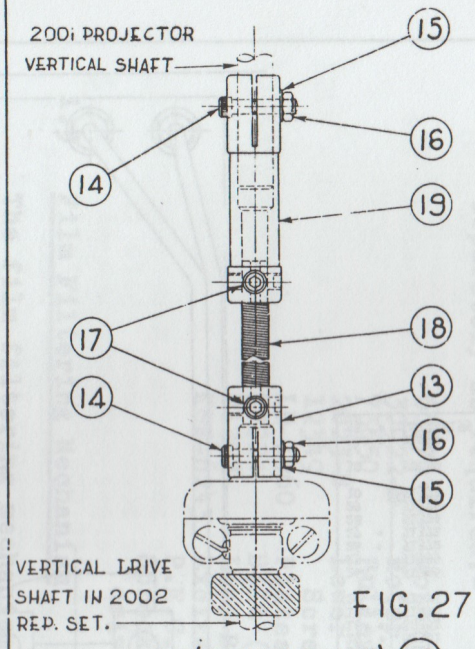


FIG. 27

DRIVE SHAFT (FLEXIBLE ASSY) (12) A

REF	CODE	ITEM	QTY
		FIG. 26	
1A	91897	FORWARD SUPPORT ASSEMBLY	1
2	LD-5644	Screw	1
3A	77239	Carrier Assembly	1
4	77236	Carrier	1
5	12196	Screw, 4BA x 1/2" Allen Cap	2
7A	51306	Block Assembly	1
8	51305	Block (Lower)	1
9	51304	Block (Upper)	1
5	12196	Screw, 4BA x 1/2" Allen Cap	2
		FIG. 27	
12A	73963	DRIVE SHAFT (FLEXIBLE) ASSEMBLY	1
13	LL-1174	Coupling	1
14	12195	Screw, 2BA x 3/4" Allen Cap	2
15	10108	Lockwasher, 2BA Shkprf. Intl.	2
16	10826	Locknut, 2BA	2
17	12436	Set Screw, 1/4" BSF x 3/16" Allen Cup Pt.	4
18	LD-1170	Shaft	1
19	67721	Coupling	1
		FIG. 28	
22A	74250	CONDUIT ASSEMBLY	1
23	68381	Socket	1
24	60064	Conduit (Flexible)	4'
25	68593	Cordage	4'4"
26	65483	Sleeve	2
27A	68070	Cord Grip Assembly	1
28	68316	Bush	1
29	68315	Cap	1
30	68067	Cord Grip	1
32A	68317	Cord Grip Assembly	1
33	68068	Bush	1
29	68315	Cap	1
34	63315	Nut	1
30	68067	Cord Grip	1

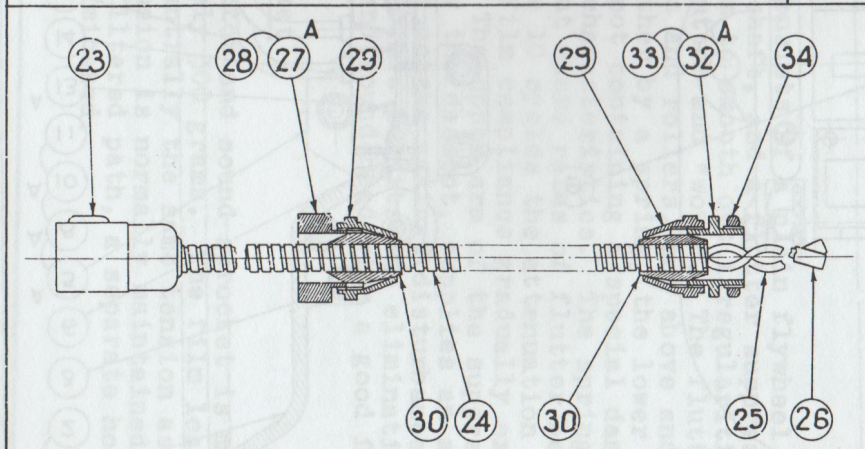


FIG. 28

CONDUIT ASSEMBLY (22) A

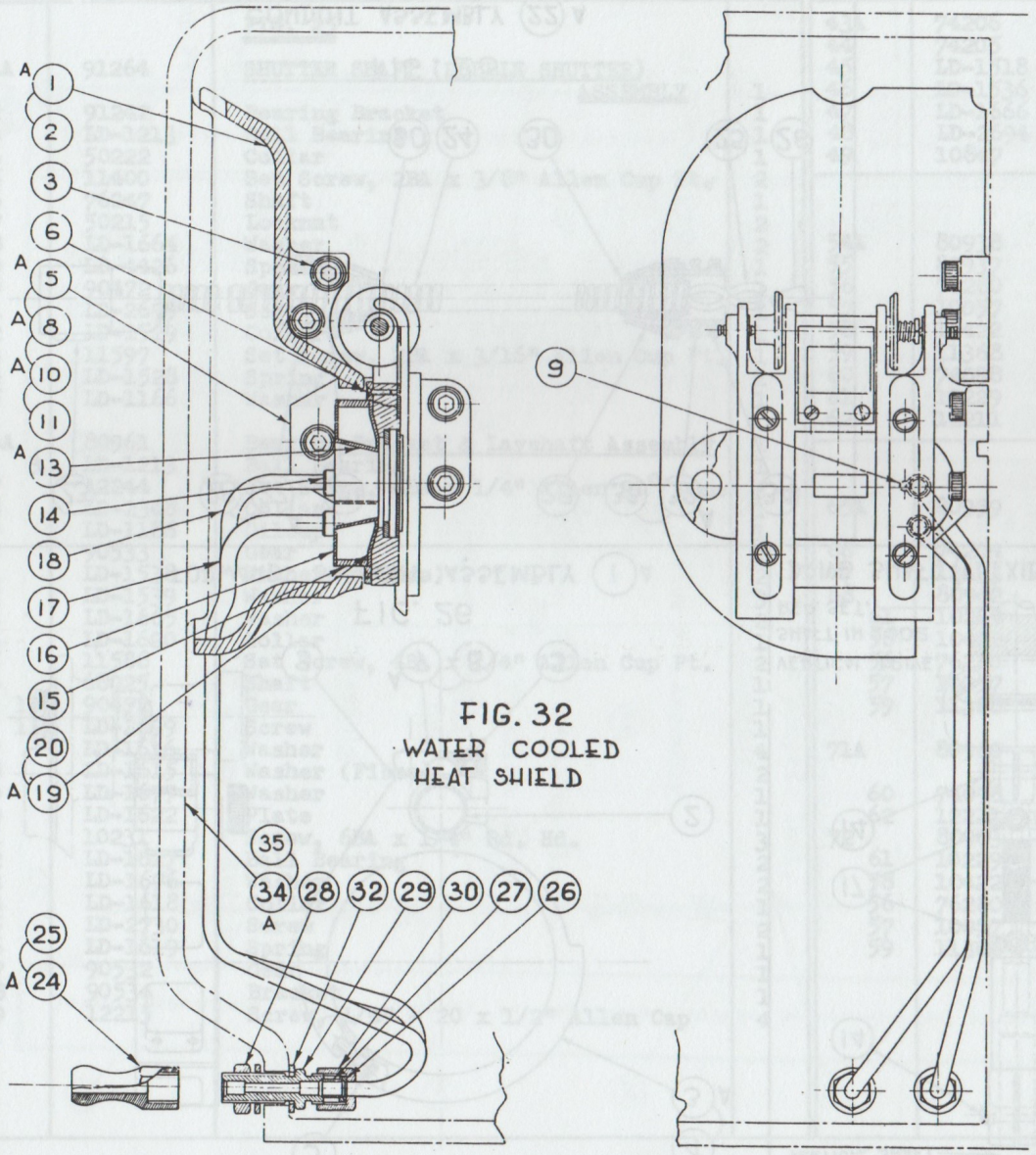


FIG. 32
WATER COOLED
HEAT SHIELD

REF		CODE	ITEM	QTY
			FIG. 32 - WATER COOLED HEAT SHIELD	
1A		772[illegible]7	Shield Assembly	1
2		91[illegible]3	Shield	1
3		LD-[illegible]1	Screw	2
5A		8[illegible]54	Aperture & Tubing Assembly	1
6		12[illegible]5	Screw, 82A x 5/16" Csk. Hd. Br.	4
8A		51[illegible]78	Bracket & Pin Assembly	1
9	*	LD-1355	Pin	1
10A	*	8[illegible]50	Bracket Modification	1
11	*	9[illegible]75	Bracket	1
13A		82353	Shield & Tube Assembly	1
14	*	LD-5960	Nipple	2
15	*	51273	Frame	1
16	*	51277	Plate (Large)	1
17	*	82351	Tubing (Front)	1
18	*	82352	Tubing (Rear)	1
19A	*	51276	Plate (Formed)	1
20	*	51275	Plate	1
24A		51376	Coupling Assembly	2
25		51999	Nozzle	2
26	*	51372	Collar	2
27	*	51371	Ferrule	2
28		51374	Nut	2
29		51375	Coupling	2
30		51373	Nut	2
32		50680	Washer	4
34A	*	91727	Main Frame Modification	1
35	*	LSXX-8159	Main Frame Machining	1

1. DESCRIPTION

1.1 General

The Westrex 2003-A Reproducer Set is designed for simplicity of construction, while still preserving maximum quality. It has been found possible to eliminate the hold-back sprocket, and the free loop between picture and sound head, and at the same time to obtain an exceptionally low flutter content.

1.2 Coding

The coding "2003-A" includes the 2010-A Amplifier (10.08), a matched pair of driving belts (74736), cap screws for mounting to the pedestal bracket, and hexagon screws for mounting the motor bracket. The following are associated parts, ordered separately as required:-

68876	Motor Bracket Assembly
30922-B	Motor (50 cycles)
75650	Pulley (motor, 50 cycles, normal)
2023-B	Lower Spool Box (Westar), with
12349	Screws, 5/16" x 1½", Allen cap
LD-1960	Plates (3/16")
74024	Belt (spool box drive)
81292	Lamp Bracket (spare)
KSE-6243	Exciter Lamp
	P.E.C., Valves, Wrenches, etc.
	Sprocket, Idler Sprocket, Chain etc. for drive to projector head

1.3 Film Filtering Mechanism

The film filtering mechanism consists of a plain flywheel mounted on the impedance drum shaft, and a flutter suppressor which operates against the film to smooth out irregularities in tension which would produce flutter and "wows". The flutter suppressor consists of two arms and rollers, one above and one below the drum, connected together by a spring, the lower arm being damped by a viscous dashpot containing a special damping fluid of carefully controlled characteristics. The spring furnishes the compliance element where rates of flutter below 10 cycles are concerned. Above 10 cycles the attenuation of disturbing frequencies by the film compliance gradually exceeds that furnished by the spring. The upper arm of the suppressor, which is not directly damped by the dashpot, supplies an attenuation of the order of 12 db per octave against disturbances arising in the projector head. This permits the elimination of the free loop between picture and sound-head with a good factor of safety.

1.4 Elimination of Hold-back Sprocket

The film tension between projector and sound sprocket is maintained at a value of approximately 300 grams. The film leaving the sound sprocket is at substantially the same tension as the take-up. Since the take-up tension is normally maintained at a higher value than that in the filtered path, a separate hold-back sprocket can safely be eliminated.

1.5 Other Mechanical Features

The impedance drum, shaft and flywheel mount in the main frame as a unit. The drive arrangement is somewhat different from current practice and is unique for ease of assembly and alignment. The sound sprocket shaft is the only drive shaft mounted in the main frame casting. This shaft is driven by the motor through a matched pair of V-belts. With the motor flexibly mounted, the belts provide a coupling that transmits very little motor vibration to the film mechanism. The belt drive also simplifies the motor alignment problem. Different motor speeds may be accommodated merely by change of pulleys.

1.6 Changeover

Change-overs are made by pressing the button on the operating side of the incoming machine. This operates a relay in the 2030 Control Cabinet and the relay performs the sound change-over. Successive operations of the switch will have no effect until the button of the second or third machine is pressed.

2. INSTALLATION

1st - Read the instructions below in conjunction with Assembly Drawing LSXX-7570. Adherence to the sequence of operations given will make the job easier and save time.

2nd - Place a washer on each of the two upper sound-head mounting screws and start the screws in the rear of the sound-head. Lift the sound-head into position so that the screws fit into the slots at the top of the pedestal bracket. Insert the two lower screws with washers and tighten all four screws so that the sound-head is securely fastened.

3rd - Mount the lower spool box, using the two 1½" screws provided and the 3/16" thick rectangular plates as spacers. Ref. 383, Fig.4.

4th - Mount the motor bracket with hexagon screws and steel washers.

5th - Unpack the motor very carefully, taking particular care not to bend the shaft. Clean the shaft thoroughly (using oil), and assemble the drive pulley with grooves toward the outside end of the shaft and with the face of the pulley ¼" from the end. Secure with set screw, making certain that the screw lines up with the flat on the shaft. Place the motor on the motor bracket and the matched V-belts around the motor pulley. Insert the four motor hexagon screws, using steel washers and nuts. Push motor forward until the V-belts are taut and then tighten the nuts securely. When connecting up, the direction of rotation of the motor will probably require to be changed (see instruction label inside cover plate). The direction required is anti-clockwise looking at the pulley end.

6th - Mount the projector on reproducer set, taking care that the projector is mounted squarely and not at an angle.

7th - Assemble the chain drive to the projector, but do not adjust at present.

8th - Loosen the two screws in the adjusting arm assembly, Ref.191 Fig.6, rotate arm clockwise as far as possible and tighten temporarily in this position. Remove the V-belt pulley and install the take-up belt. (Take this opportunity to put a drop of oil on the shaft). To adjust for belt tension loosen the two screws in the adjusting arm assembly and rotate as required. The pulley of the 2023-B Spool Box is intended to "float" sideways and take up a natural running position.

9th - Adjust chain idler sprocket to take up most of the drive chain slack.

10th - Mount the flywheel, hub in, on impedance drum shaft and secure with the screw.

11th - Remove the reservoir in the damper of the flutter suppressor by loosening the set screw and fill to the mark inside the reservoir with Westrex F2 Fluid. Replace reservoir and tighten screw. The F2 Fluid is a special damping fluid and in no circumstances should oils or other liquids be placed in the reservoir.

12th - Install the KSE-6243 Exciter Lamp in the removable lamp bracket.

13th - Remove the amplifier compartment cover and insert photo-electric cell and valves in the 2010-A Amplifier (see Bulletin 10.08). Connect in accordance with the System Wiring Diagram.

3. OPERATION

3.1 Threading the Film

The film is threaded in the reproducer as follows:- Lift upper arm of flutter suppressor, pass film over impedance drum and lower damper roller. Draw film sufficiently tight over sprocket to put the red line on the upper guide roller arm in approximate register with the line on the indicator plate. Close sprocket pad roller arm and turn motor handwheel a few times to ensure that film is tracking properly over the sprockets.

Care must be taken when threading to see that the film lies flat on the lands of the lower damper roller; when threaded carelessly the film is liable to be caught in the trough between the lands

3.2 Change-overs and Volume Control

Sound change-overs are made by pressing the push-button of the incoming machine when the proper cue is seen on the screen. Successive operations of the button have no effect until the butto of the second or third machine is operated. The knob below the pushbutton controls the volume of sound from the machine.

4. ADJUSTMENTS

4.1 Lens Tube and Exciter Lamp Adjustment

See Bulletin 10.29, Reproducer Set 2002-type, Sections 2.4 and 2.5. A lamp should be mounted and adjusted in a spare bracket for each machine.

The output of this Reproducer Set is 4 db. higher than that of the 2002 Reproducer Set.

4.2 Guide Roller Adjustment

The guide roller is adjusted laterally for proper positioning of the sound track in the light beam to eliminate sprocket hole and frame line noises, by turning the knurled end of the upper arm of the flutter suppressor, after unlocking the hexagon clamping screw at the rear.

The stop screws in the upper and lower roller arms are set so that the rollers are held just clear of the impedance drum (without film); particularly the upper one, which should have about .005" clearance between roller and drum. When running film, the upper arm rises only slightly from its stop position, but this is correct.

4.3 Adjustment of Indicator Lines

If, when threaded up with film of average shrinkage, the red line on the flutter suppressor does not ride in register with the red line on the indicator plate, adjustment can be made by loosening the two screws in the lower chain sprocket and turning the motor hand-wheel, while holding the sprocket, until the red lines are in register. Re-tighten screws very securely.

The reproducer set has been adjusted for minimum flutter before shipment and the spring (which is behind the indicator plate) should not require re-adjustment; but if the lock nut and adjusting nut have to be moved for any purpose, the number of threads (if any) exposed at the end should be counted as a guide to returning to the original adjustment.

It will be seen that the red lines give a guide to the operator for threading up in the correct sprocket holes, i.e. to the correct tension. The relative position of the red lines when running will differ slightly from their position when standing. This should be pointed out to the operator; but it is of no consequence. The rule is that the lines should be approximately in line after threading up and before running. The precise position depends a little on film shrinkage.

4.4 Flywheel Shaft End-play

On pressing the flywheel shaft in the direction of the impedance drum, the shaft can be felt to move lengthways. On release, it should return to its normal running position (with impedance drum home against the bearing) by pressure from the spring washer, Ref. 311. (The action may be assisted by spinning the flywheel). If a little more spring pressure is required, adjust the position of the collar, Ref. 322, in a direction away from the flywheel. Do not use more pressure than is necessary.

N.B. The spring washer is correctly assembled when its inner ring is toward the frame. This is very important.

5. MAINTENANCE

5.1 Lubrication

At the time of installation and occasionally thereafter, put one drop of Westrex 2009-A Oil on the take-up gear, one drop in the oil cup behind the driven pulley and one drop on the chain idler shaft; also a few drops in the oil cups of the lower spool box. Apart from the ball bearings of the flywheel shaft, the bearings of this reproducer set are of Oilite and require very little supplementary lubrication.

5.2 Cleaning

Keep the reproducer set clean at all times and wiped free of oil. In cleaning lenses, they should first be gone over with a soft brush to remove any gritty substance that might scratch the optical glass. Then polish with lens cleaning fluid and a soft lintless rag.

GENERAL EQUIPMENT BULLETIN

1. PURPOSE

1.1 To describe the features by which the 2003-B Reproducer Set differs from the 2003-A.

1.2 To describe important points concerning belt adjustment, lubrication, the use of a series motor resistance and special belt for Ross lower spool box.

2. 2003-B REPRODUCER SET

2.1 This reproducer set is intended for use with 3-WMX, 3-ST and 3-W systems, and differs from the 2003-A in the following features:-

(a) The 2010-A Amplifier has been omitted and is replaced by an 82076 Panel which carries the PEC. The PEC is connected by concentric cable to the pre-amplifier, which is mounted on the front wall common to both machines.

(b) The push-button changeover switch has been omitted.

(c) The 31086-B (or 31370-B) Potentiometer has been omitted; in its place is fitted a two-way exciter lamp switch for film changeover.

(d) The terminal strip arrangement and engraving have been changed.

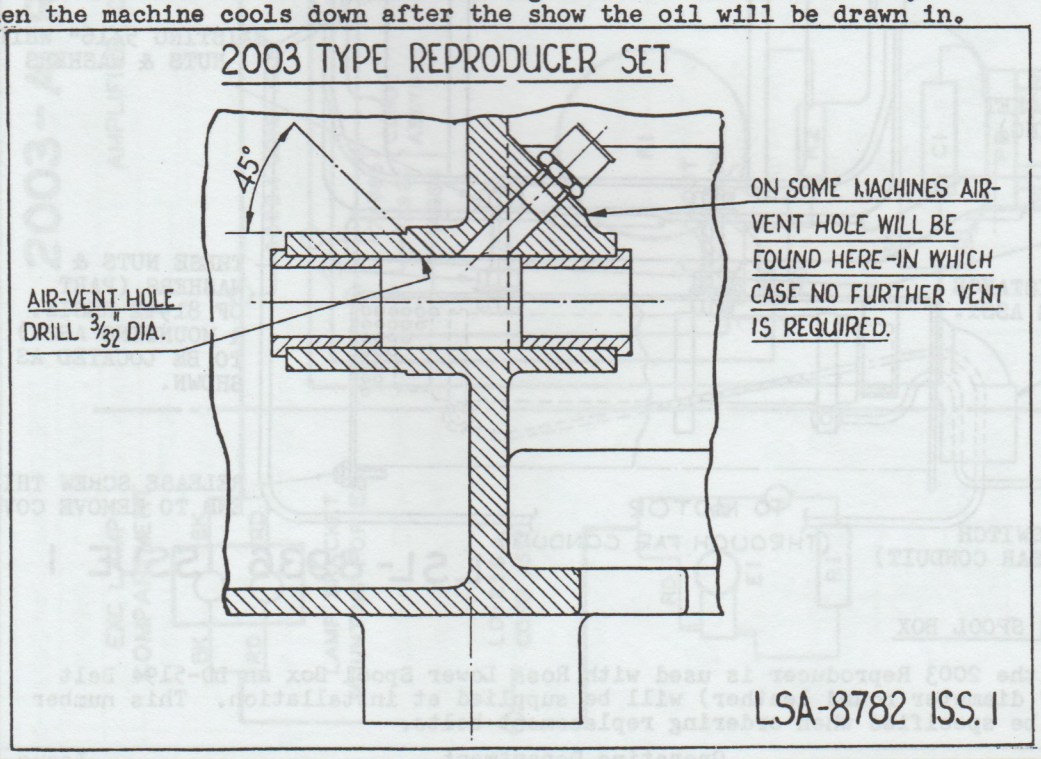
(e) The signal lamp indicating a burnt-out exciter lamp has been omitted.

3. BELT ADJUSTMENT - IMPORTANT (ALL 2003 REP. SETS)

3.1 If the hexagon screws securing the 81192 Arm Assembly (191, Fig. 6) are loosened for lower spool box belt adjustment, be sure to slacken the motor drive belts before retightening the screws. Otherwise the shaft may be left under strain, thus imposing an abnormal load on the main sleeve bearing.

4. LUBRICATION (ALL 2003 REP. SETS)

4.1 In some cases it has been found that the oil cup (271) tends to retain the oil, which is then pushed out by the expansion of air as the bearing warms. It is therefore advisable to oil this bearing when the machine is fully warm so that when the machine cools down after the show the oil will be drawn in.



4.2 To avoid this trouble, reproducer sets now have a small air-vent at the top of the bearing, the position of which is shown on LSA-8782 (page 1). If required, this hole should be drilled in existing reproducer sets in the field.

4.3 It has been found that this bearing requires more oil than is indicated by the instruction given in Section 5.1 of the main bulletin. Plenty of oil should be given until the space between the bearings shows signs of being full. After this, oil weekly.

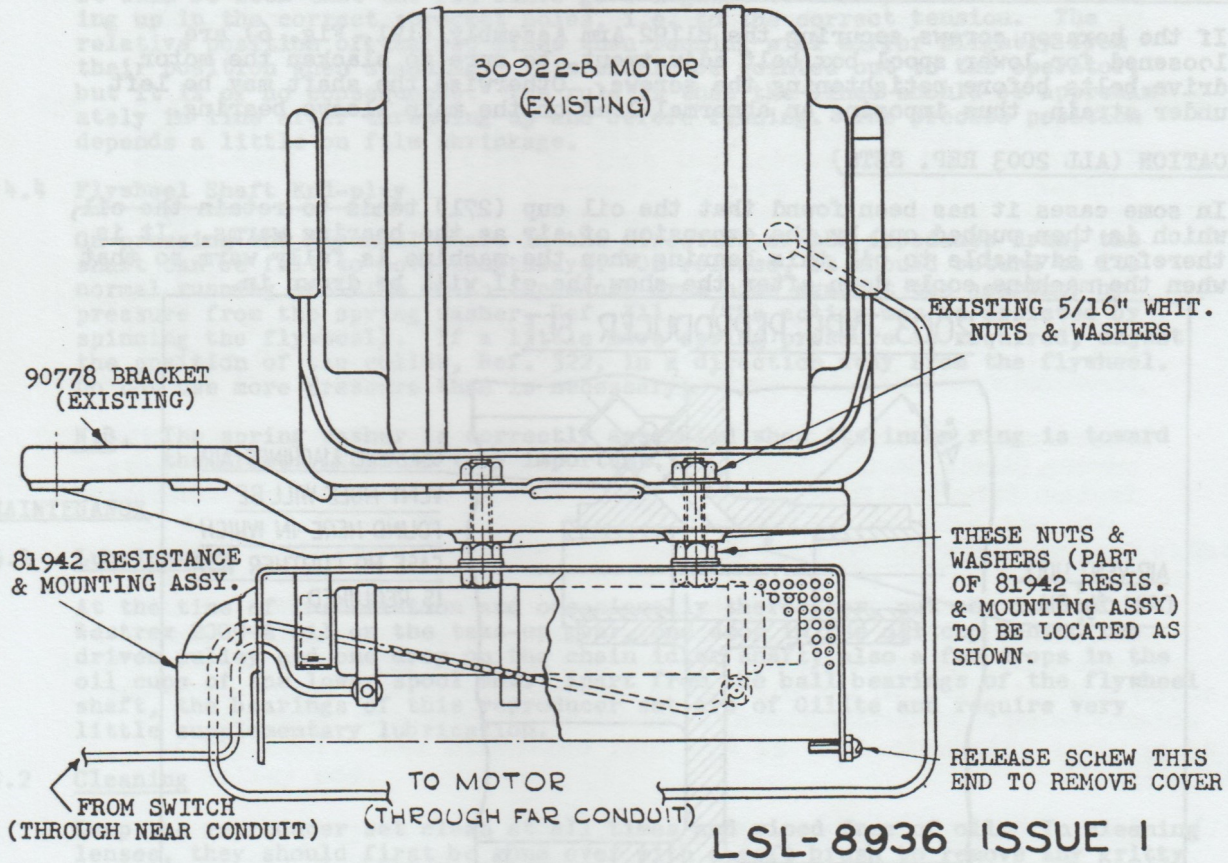
4.4 Impedance Drum Bearing (Flywheel End)

There is a tendency towards fretting at the outer race of the ball bearing (305), the spring (311) and the frame casting. The perimeter of the ball bearing, the tips of the spring, the surfaces of the frame recess into which the bearing fits and the shaft of the flywheel must therefore be smeared with Znol KG-24 grease before assembly. Examination and re-greasing should be done at six-monthly intervals.

5. 81942 RESISTANCE & MOUNTING ASSEMBLY

5.1 When the 2003 Reproducer is used with Westar projector an 81942 Resistance and Mounting Assembly is required to reduce the rate of acceleration. The method of fitting and wiring the assembly is shown on LSL-8936 (see below).

5.2 The 75988 Resistance which forms part of the above assembly is tapped at 1 and 2 ohms, so that 1, 2 or 3 ohms may be wired in series with the motor, the object being to increase the time of acceleration to approximately 3 seconds.

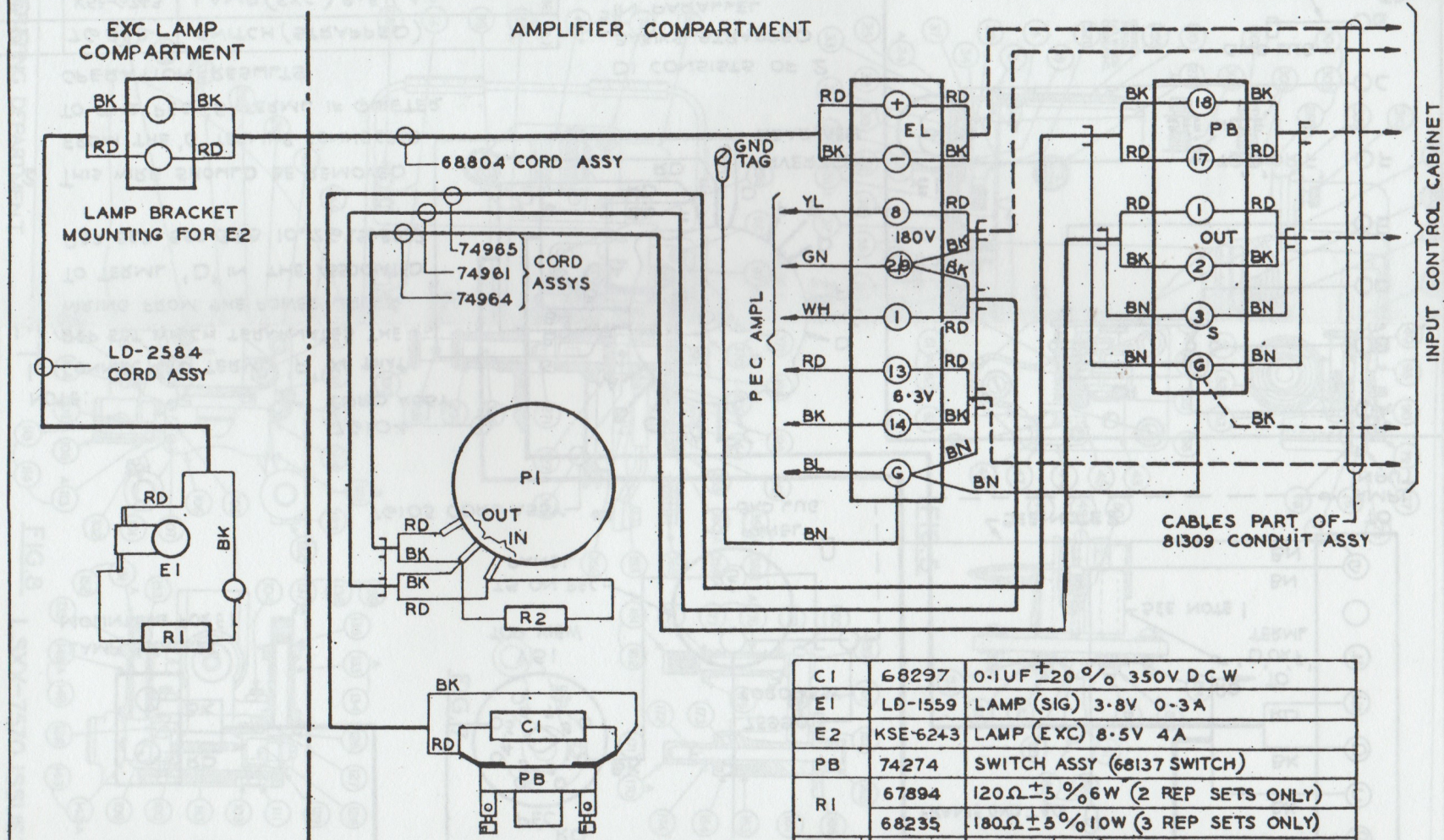


LSL-8936 ISSUE 1

6. ROSS LOWER SPOOL BOX

6.1 When the 2003 Reproducer is used with Ross Lower Spool Box an LD-5194 Belt (1/4" diameter round leather) will be supplied at installation. This number must be specified when ordering replacement belts.

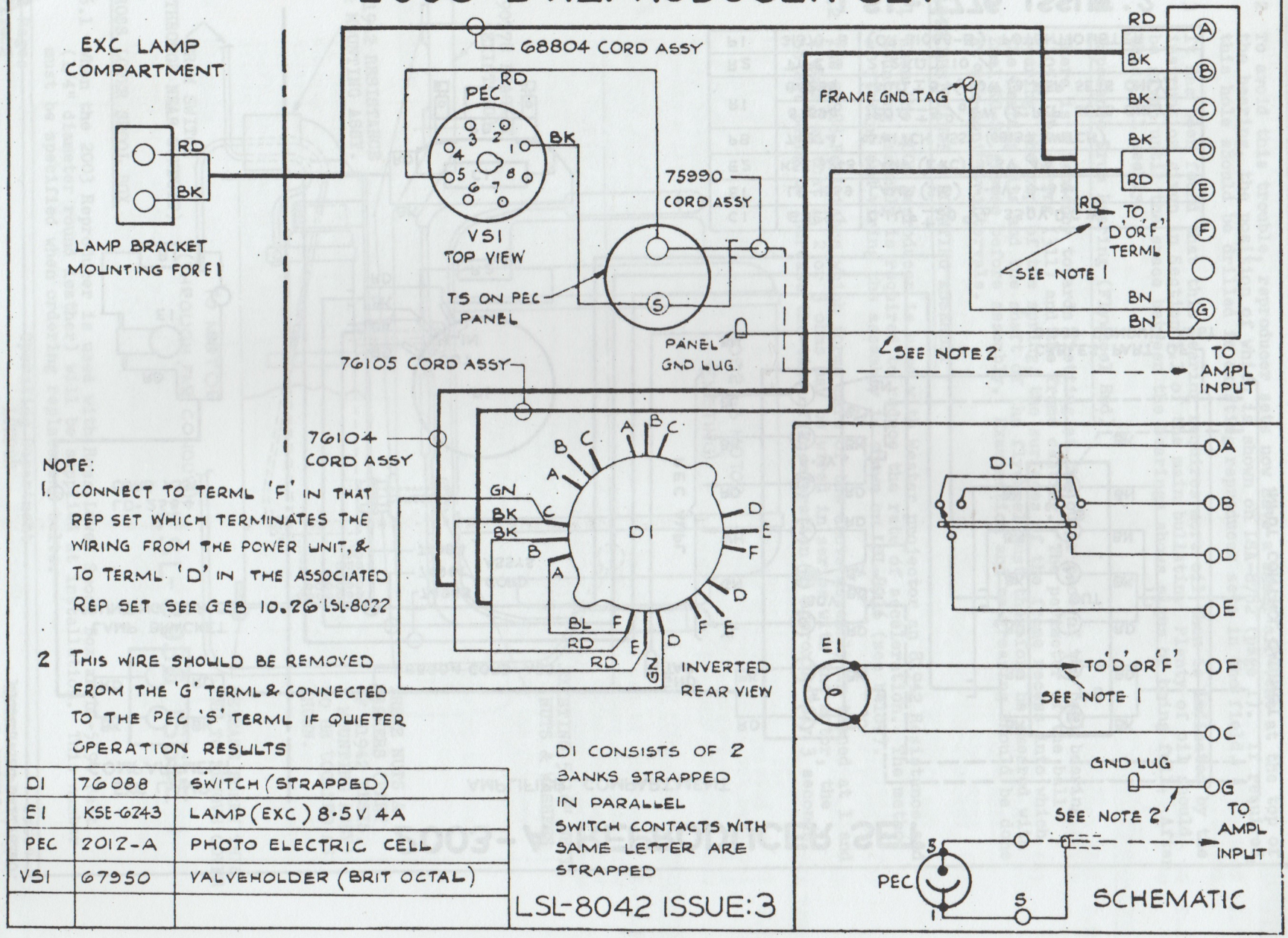
2003-A REPRODUCER SET



C1	68297	0·1UF ±20 % 350V D C W
E1	LD-1559	LAMP (SIG) 3·8V 0·3A
E2	KSE-6243	LAMP (EXC) 8·5V 4A
PB	74274	SWITCH ASSY (68137 SWITCH)
R1	67894	120Ω ±5 % 6W (2 REP SETS ONLY)
	68235	180Ω ±5 % 10W (3 REP SETS ONLY)
R2	TYPE 8	2·2KΩ ± 10 %
P1	31370-B	(OR 31086-B) POTENTIOMETER

LSL-7776 ISSUE: 2

2003-B REPRODUCER SET



NOTE:

1. CONNECT TO TERML 'F' IN THAT REP SET WHICH TERMINATES THE WIRING FROM THE POWER UNIT, & TO TERML 'D' IN THE ASSOCIATED REP SET SEE GEB 10.26 LSL-8022

2 THIS WIRE SHOULD BE REMOVED FROM THE 'G' TERML & CONNECTED TO THE PEC 'S' TERML IF QUIETER OPERATION RESULTS

D1	76088	SWITCH (STRAPPED)
E1	KSE-6243	LAMP (EXC) 8·5V 4A
PEC	2012-A	PHOTO ELECTRIC CELL
VS1	67950	VALVEHOLDER (BRIT OCTAL)

D1 CONSISTS OF 2 BANKS STRAPPED IN PARALLEL SWITCH CONTACTS WITH SAME LETTER ARE STRAPPED

LSL-8042 ISSUE:3

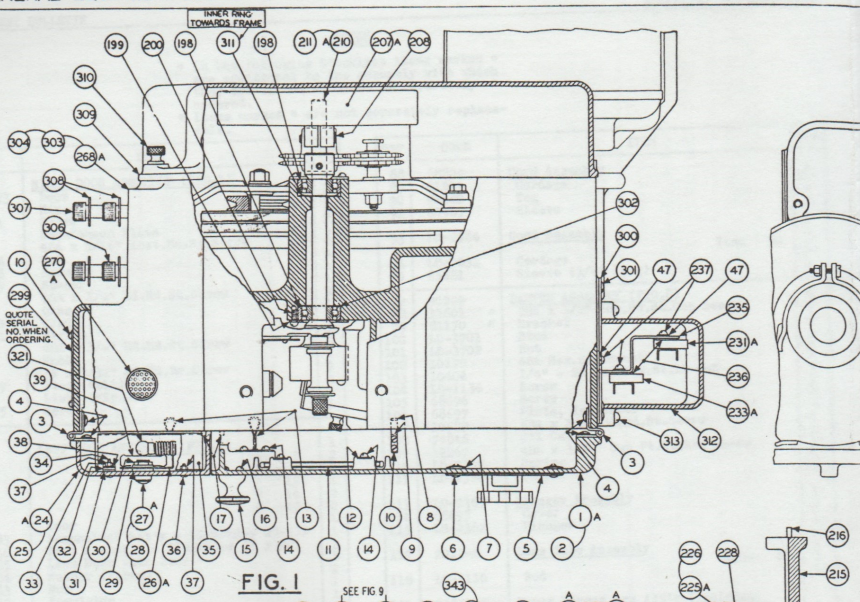


FIG. 1

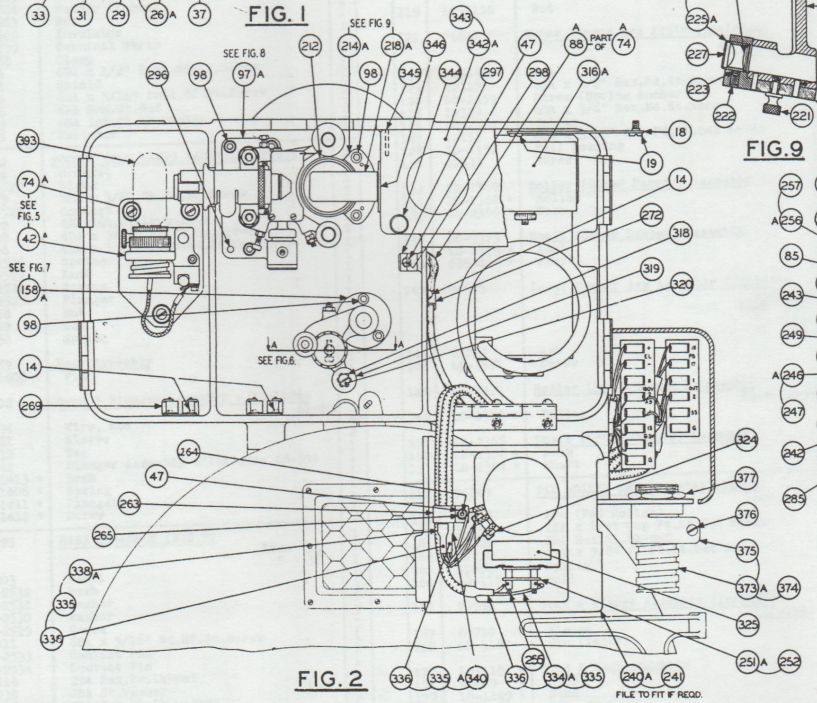


FIG. 2

FIG. 9

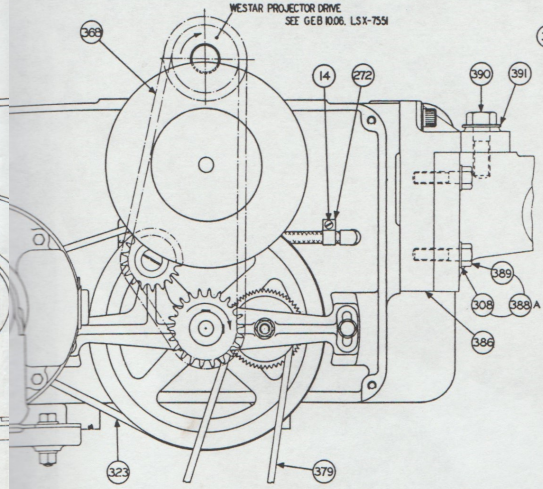


FIG. 3

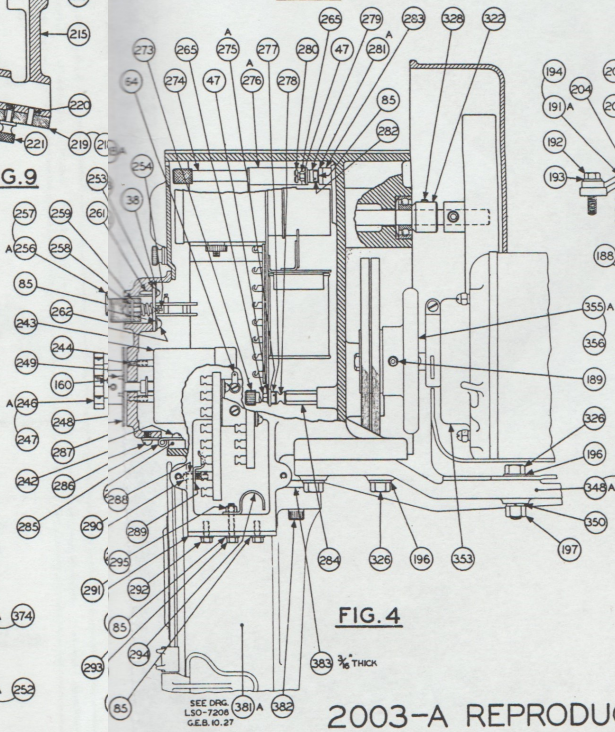


FIG. 4

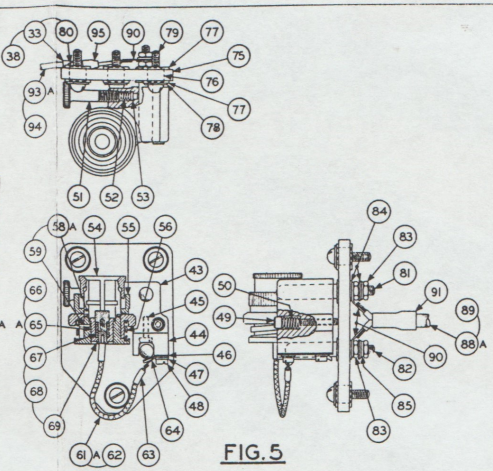


FIG. 5

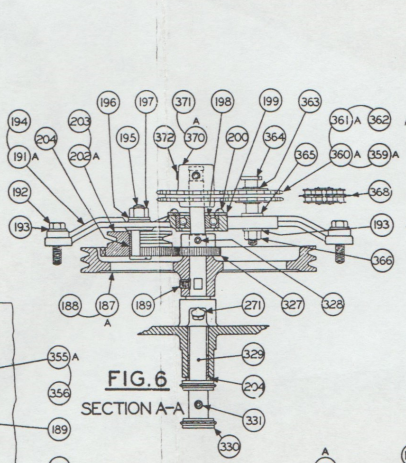


FIG. 6

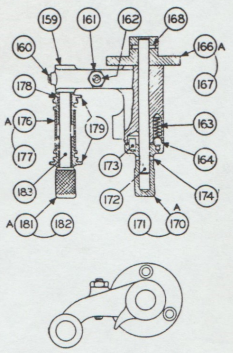


FIG. 7

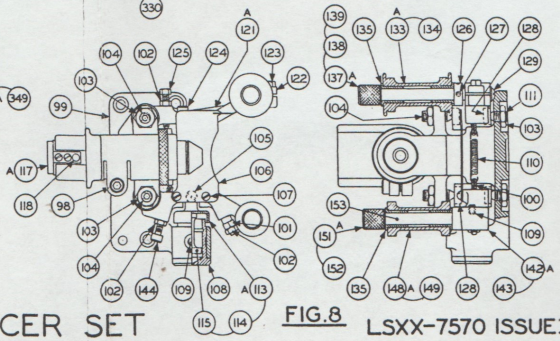


FIG. 8

2003-A REPRODUCER SET

LSXX-7570 ISSUE:1

NOTES

\+ In the following Stocklist items marked + are additional to the assembly with which they are listed and must be separately ordered.

* Items marked * are not separately replaceable.

REF	CODE	ITEM	QTY
1	81283	RIGHT DOOR ASSEMBLY (FIG.1)	1
2	LSR-6423	Door	1
3	67665	Hinge	2
4	LD-1294	Screw	6
5	74935	Escutcheon Plate	1
6	11197	4BA x 5/16" Inst.Hd.Br.Screw	4
7	LD-3544	Nut	4
8	LD-1748	Bracket	1
9	LD-1749	Spacer	1
10	10231	6BA x 1/4" Rd.Hd.St.Screw	2
11	67691	Glass	1
12	LD-1140	Clamp	4
13	LD-1141	Strike	1
14	10162	4BA x 1/4" Rd.Hd.St.Screw	6
15	73929	Knob	1
16	10591	4BA x 9/32" Rd.Hd.Br.Screw	2
17	LD-1139	Stop (Felt)	2
18	67690	Link (Fig.2)	1
19	LD-1175	Screw " "	1
24	74916	LEFT DOOR ASSEMBLY (FIG.1)	1
		Item 3	2
		" 4	6
		" 13	1
		" 14	2
		" 17	2
25	90528	Door	1
26	LD-2583	Lampholder Ass'y - (Includes 27-30)	1
27	LD-1436	Lens Assembly - (Includes 28 & 29)	1
28	LD-2885	Lens Bush with Lens	1
29	LD-2884	Washer (Fibre)	2
30	LD-2883	Nut	1
31	LD-2600	Insulator	1
32	LD-2599	Terminal Strip	1
33	LD-758	Clamp	1
34	10723	6BA x 1/2" Inst.Hd.St.Screw	1
35	75531	Shield	1
36	10726	6BA x 5/16" Inst.Hd.St.Screw	2
37	10016	6BA Hex.St.Nut	3
38	10423	6BA Int.St.Lk-washer	1
39	67894	Resistor	1
42	81292	SOCKET (EXC.LAMP) ASSEMBLY (FIG.5)	1
43	74934	Bracket	1
44	LD-2527	Block	1
45	10427	4BA x 3/8" Ch.Hd.Br.Screw	2
46	LD-2528	Contact	1
47	10422	4BA Int.St.Lk-washer	2
48	12108	4BA x 5/16" Ch.Hd.Br.Screw	2
49	12326	4BA x 1-1/4" Soc.Hd.St.Cap Screw	1
50	LD-2526	Spring	1
51	LD-2523	Knob	1
52	LD-2524	Spring	1
53	LD-2525	Plunger	1
54	80858	Nut	1
55	80857	Nut	1
56	67888	Spring	1
58	80859	Body Assembly	1
59	LD-1408 *	Pin	1
61	68802	Cord & Plunger Assembly - (Includes 62-69)	1
62	61204	Wire, Red	4"
63	65481	Sleeve	2
64	66232	Tag	1
65	74042	Plunger Assembly -(Includes 66-69)	1
66	LD-1413 *	Bush	1
67	LD-1406 *	Spring	1
68	LD-1411 *	Plunger	1
69	LD-1412 *	Screw	1
74	81293	BASE ASSEMBLY (FIG.5)	1
		Item 33	1
		" 38	1
75	68803	Panel	1
76	LD-2532	Bush	3
77	LD-2531	Washer	6
78	LD-2530	Washer	3
79	LD-2529	Screw	3
80	10011	6BA x 5/16" Rd.Hd.St.Screw	1
81	LD-2533	Contact Pin	1
82	LD-2534	Contact Pin	1
83	10116	2BA Hex.Br.Lk-nut	4
84	10030	2BA St.Washer	4
85	10108	2BA Int.St.Lk-washer	2

REF	CODE	ITEM	QTY
88	68804	Cord Assembly	1
89	61919	Cordage	26"
90	71660	Tag	2
91	65485	Sleeve	1
93	LD-2584	Cord Assembly	1
		Item 90	2
94	LD-2631	Cordage	14"
95	65481	Sleeve (3/8" long)	2
97	90829	DAMPER ASSEMBLY (FIG.8)	1
98	11601 +	2BA x 1/2" Soc.Hd.St.Cap Screw	3
99	81170 *	Bracket	1
100	LD-3701	Stud	1
101	LD-3702	Nut	1
102	10170	4BA Hex.St.Lk-nut	1
103	10404	1/4" - 26 BSF Hex.St.Lk-nut	4
104	LD-1134	Screw	2
105	68696	Screw	1
106	68697	Plate, Indicator	1
107	10587	6BA x 1/2" Rd.Hd.St.Screw	2
108	74846	Oil Cup	1
109	12267	4BA x 3/16" Cup Pt.St.Set Screw	1
110	LD-2357	Spring	1
111	LD-2360	Screw	2
113	LD-2363	Plunger Assembly	1
114	68695	Cover	1
115	LD-2362	Plunger	1
117	2013-A	Lens Tube Assembly	1
		Item 98	1
118	LD-1110	Rod	1
121	74844	Upper Damper Arm Ass'y (Includes 122-139)	1
		Item 102	1
122	74843	Arm	1
123	12327	4BA x 1/2" Hex.Hd.St.Screw	1
124	LD-2359	Screw (Spring Anchor)	1
125	12320	4BA x 3/4" Hex.Hd.St.Screw	1
126	LD-2367	Collar	1
127	12153	6BA x 3/16" Cup Pt.St.Set Screw	2
128	LD-1131	Ball Bearing	2
129	62331	Screw	1
133	LD-2369	Roller (Upper Damper) Assembly	1
134	LD-2368 *	Roller	1
135	LD-2366 *	Bush	2
137	LD-2373	Shaft (Upper Damper) Assembly	1
138	LD-2372 *	Knob	1
139	68694 *	Shaft	1
142	74845	Lower Damper Arm Assembly (Includes 143-153)	1
		Item 102	1
		" 109	1
		" 128	2
143	81258	Arm	1
144	LD-3551	Screw	1
148	LD-2371	Roller (Lower Damper) Assembly	1
		Item 135*	2
149	LD-2370 *	Roller	1
151	LD-2365	Shaft (Lower Damper) Assembly	1
152	LD-2372 *	Knob	1
153	LD-2364 *	Shaft	1
158	74869	PAD ROLLER ARM ASSEMBLY (FIG.7)	1
		Item 98	3
159	74868	Arm (Pad Roller)	1
160	11196	2BA x 1/4" Cup Pt.St.Set Screw	1
161	10826	2BA Hex.St.Lk-nut	1
162	12232	2BA x 7/8" Fl.Pt.St.Set Screw	1
163	67651	Spring	2
164	LD-1179	Ball	2
166	73938	Stud & Flange Assembly (Includes 167-174)	1
167	67740 *	Flange	1
168	LD-1180	Pin (Taper)	1
170	LD-1181 *	Stud & Knob Assembly	1
171	67669 *	Knob	1
172	LD-1149 *	Stud	1
173	LD-1183 *	Stop Pin	1
174	LD-1182 *	Pin	1

REF	CODE	ITEM	QTY
176	LD-1178	Pad Roller	1
177	LD-1147 *	Tube	1
178	LD-1200 *	Bush	2
179	73927 *	Roller	2
181	LD-1136	Shaft & Knob Assembly	1
182	LD-1145 *	Knob	1
183	LD-1162 *	Shaft	1
187	LD-2562	PULLEY ASSEMBLY (FIG.6)	1
188	81188	Pulley	1
189	11920	1/4" - 26 BSF x 5/16" Cup Pt.St.Set Screw	2
191	81192	ARM ASSEMBLY (FIG.6)	1
192	10311 +	1/4" - 20 Whit. x 1" Hex.Hd.St.Screw	2
193	10039 +	1/4" Whit. St. Washer	2
194	90793	Arm	1
195	68643	Stud	1
196	10285	5/16" Whit. St. Washer	1
197	11094	5/16" - 18 Whit.Hex.St.Nut	1
198	LD-1213	Ball Bearing	1
199	LD-2468	Plate	1
200	10098	4BA x 3/8" Rd.Hd.St.Screw	3
202	74755	Pulley Assembly	1
203	74754 *	Pulley	1
204	LD-1138 *	Bushing	1
207	81189	FLYWHEEL ASSEMBLY (FIG.1)	1
208	12195	2BA x 3/4" Soc.Hd.St.Cap Screw	1
210	74871	IMPEDANCE DRUM & SHAFT ASSEMBLY	1
211	68715 *	Shaft	1
212	68714 *	Drum	1
214	LD-2182	BRACKET (COLLECTOR LENS) ASSEMBLY (FIG.9)	1
		Item 98	2
215	81164 *	Bracket	1
216	LD-1218	Pin, Dowel	2
218	LD-2180	LENS HOLDER ASSEMBLY	1
219	74671 *	Lens Holder	1
220	LD-1129	Pin	2
221	LD-1128	Screw	1
222	12186	2BA x 1/4" Fl.Pt.St.Set Screw	1
223	LD-1126	Plug	1
225	LD-2179	Lens Assembly	1
226	LD-2178 *	Housing	1
227	LD-2176 *	Lens	1
228	LD-2177 *	Lens	1
231	LD-2548	TERMINAL STRIP ASSEMBLY (FIG.1)	1
233	LD-2551	TERMINAL STRIP ASSEMBLY (FIG.1)	1
235	LD-2544	Bracket (Fig.1)	1
236	LD-2545	Plate	2
237	10461	4BA x 5/16" Rd.Hd.St.Screw	6
		Item 47	6
		(Fig.4) " 64	1
240	81284	ATTENUATOR COVER ASSEMBLY (FIGS. 2 & 4)	1
241	90802	Cover	1
242	10426 +	2BA x 1/4" Rd.Hd.St.Screw	3
243	31086-B or 31370-B	Potentiometer	1
244	11544	4BA x 5/8" Csk.Hd.St.Screw	3
246	73921	Knob Assembly	1
		Item 160	2
247	73920	Knob	1
248	67657	Dial	1
249	10021	6BA x 3/16" Csk.Hd.St.Screw	3
251	74274	Switch (PB) Assembly (Includes 252-259)	1
252	68137	Switch	1
253	68135	Plate	1
254	12016	8BA x 5/16" Csk.Hd.St.Screw	2
255	12120	8BA x 3/16" Ch.Hd.Br.Screw	2
256	LD-1694	Knob Assembly	1
257	LD-1695 *	Knob	1
258	LD-1696 *	Insert	1
259	12259 *	1/16" Dia. x 5/8" St.Pin	1
261	10213	6BA x 3/8" Rd.Hd.St.Screw	1
		Item 38	1
262	10379	2BA x 3/8" Rd.Hd.St.Screw	2
		Item 85	2
263	LD-739	Clamp	1
264	10767	4BA x 1/2" Rd.Hd.St.Screw	1
		Item 47	1
265	10036	4BA Hex.St.Nut	1

REF	CODE	ITEM	QTY
268	LSR-6880*	FRAME ASSEMBLY	1
		Item 10	4
		" 14	7
		" 47	7
		" 85	5
		" 198	1
		" 199	1
		" 200	3
		" 204	2
		" 265	6
269	LD-1168	Catch	2
270	LD-1185	Ventilator	1
271	LD-1186	Oil Cup	1
272	LD-1263	Clamp	3
273	LD-1671	Nut	1
274	LD-1672	Nut	1
275	68073	Strip & Screw	1
276	68076	Strip, Bracket & Screw	1
277	LD-1663	Spacer	2
278	LD-1489	Mounting, Rubber	2
279	LD-1490	Mounting, Rubber	2
280	LD-1674	Screw	1
281	74253	Strip & Bush	1
282	10791	2BA x 3/4" Ch.Hd.St.Screw	2
283	LD-1673	Spacer	2
284	LD-2466	Stud	2
285	LD-2467	Strip	1
286	68755	Hinge	1
287	10163	2BA x 1/2" Rd.Hd.St.Screw	3
288	12259	1/16" Dia. x 5/8" St.Pin	1
289	LD-2558	Clamp	1
290	10156	4BA x 5/8" Rd.Hd.St.Screw	1
291	LD-2560	Plate (Conduit Coupling)	1
292	10028	2BA x 1/2" Hex.Hd.St.Screw	2
293	12329	2BA x 1" Hex.Hd.St.Screw	1
294	LD-2559	Clamp	1
295	10023	2BA Hex.St.Nut	1
296	LD-2469	Pin, Dowel	2
297	LD-2477	Catch	1
298	10304	4BA x 5/16" Rd.Hd.St.Screw	1
299	68754	Nameplate (Quote Serial No.)	1
300	73936	Plate (Cover)	1
301	12269	2BA x 1/4" Inst.Hd.St.Screw	4
302	LD-3626	Shim	2
303	LSXX-6407 *	Main Frame Machining	1
304	LSXX-6406 *	" " Casting	1

MISCELLANEOUS ITEMS
(Part of 2003-A Reproducer Set)

		Item 4	12
		19	1
		196	4
		198	1
306	12288	3/8" Whit x 1-1/2" Soc.Hd.Cap Screw	2
307	12289	3/8" - 16 Whit x 2-1/2" Soc.Hd.Cap Screw	2
308	10018	3/8" Whit.St.Washer	4
309	LSR-6415	Cover	1
310	68762	Screw	3
311	LD-2576	Spring (Loading)	1
312	81294	Cover	1
313	LD-2552	Screw	2
316	2010-A	Amplifier (GEB 10.08)	1
318	68763	Stud, Hexagon	1
319	LD-2476	Roller	1
320	10602	2BA x 5/16" Rd.Hd.St.Screw	1
321	LD-1559	Lamp	1
322	LD-2434	Collar	1
323	74756	Belts (Matched Pair)	2
324	Type 8	Resistor 2.2KΩ 1/2W (R2)	1
325	68249	Condenser	1
326	12321	5/16" - 18 Whit. x 1-1/4" Hex.Hd.St. Screw	4
327	68810	Gear (Take-up Pulley Drive)	1
328	12247	2BA x 5/16" Cup Pt.St.Set Screw	2
329	74874	Shaft (Main Drive)	1
330	74962	Sprocket	1
331	12196	4BA x 1/2" Soc.Hd.St.Cap Screw	1
334	74965	Cord Assembly	1
335	67978	Cordage	22"
336	65483	Sleeve	2
338	74961	Cord Assembly	1
		Item 335	18"
		" 336	2
340	74964	Cord Assembly	1
		Item 335	18"
		" 336	2
342	69692	Cover Assembly	1
343	81282	Cover	1
344	LD-2553	Screw	1
345	LD-3422	Light Shield (Felt)	1
346	LD-3715	Light Shield (Felt)	1

ASSOCIATED EQUIPMENT
(Not part of 2003-A Reproducer Set)

REF	CODE	ITEM	QTY
348	68876	MOTOR BRACKET ASSEMBLY	1
		Item 196	4
		" 197	4
		" 326	4
349	90778	Bracket	1
350	10898	5/16" St.Lk-washer	4
353	30922-B	MOTOR	1
355	75650	PULLEY ASS'Y 1.764" O.DIA — NORMAL	1
	75651	1.795" " — + 2%	1
	75652	1.827" " — + 4%	1
	74954	1.850" " — + 6%	1
	75257	2.266" "	1
		50 / 40	
		Item 189	1
359	69063	DRIVE PARTS (When driving Westar Projector) - Consists of	1 set
		Item 193	1
360	69064	Idler Sprocket Assembly	1
361	67780	Sprocket Assembly	1
362	74089 *	Sprocket	1
363	LD-1190 *	Bush	1
364	68642	Stud	1
365	LD-2311	Washer	1
366	10314	1/4" - 20 Whit.Hex.St.Nut	1
368	69062	Chain (70 Pitches)	1
370	LD-2580	Sprocket Assembly	1
371	74950	Sprocket	1
372	11962	1/4" - 26 BSF x 1/4" Cup Pt.St.Set Screw	2
	73966	Sprocket (In Projector)	1
	67816	Shaft	1
373	81309	Conduit Assembly	1
374	71335	Flexible Conduit	3'
375	73959	Conduit Coupling	2
376	11386	2BA x 1/2" Rd.Hd.Br.Screw	2
377	67795	Nut	2
379	74024	Belt (Take-up)	1
381	2023-B	Spool Box (Lower) Assembly (GEB 10.27)	1
382	12375	5/16" - 18 Whit. x 1-1/4" Soc.Hd.St. Cap Screw	2
383	LD-1960	Plate 3/16" thick	2
386	LS0-6411	Adapter Bracket	1
388	68454	Bag of Bolts, containing -	1
		Item 308	3
389	12291	3/8" - 16 Whit. x 1-3/8" Hex.Hd.St. Screw	3
390	12292	1/2" - 12 Whit. x 1-1/2" Hex.Hd.St. Screw	2
391	11922	1/2" Whit.St.Washer	2
393	KSE-6243	Exciter Lamp	1

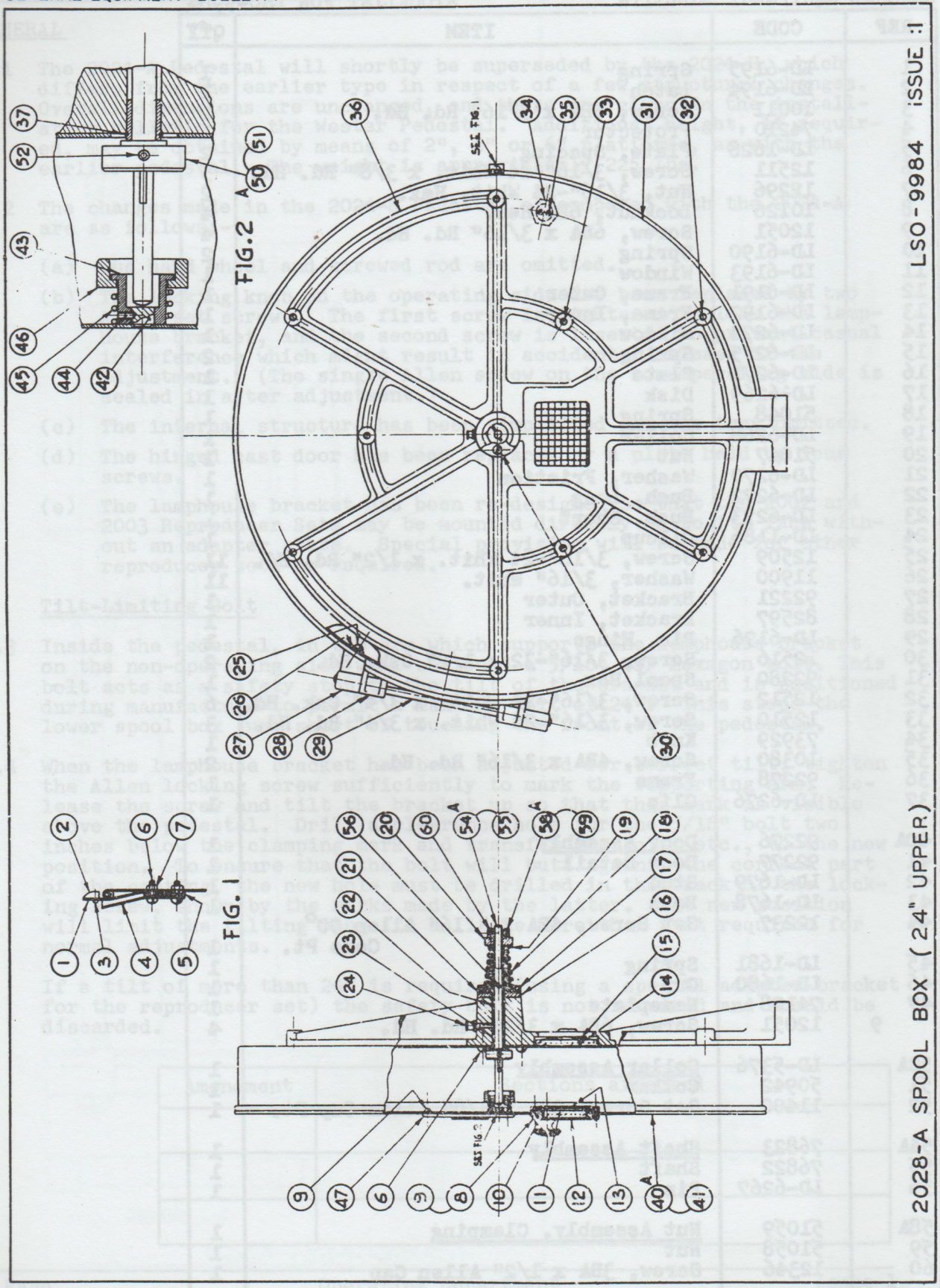


FIG.2
FIG.1
SEE FIG.1
SEE FIG.2
2028-A SPOOL BOX (24" UPPER)
LSO-9984 ISSUE :1

REF	CODE	ITEM	QTY
1	LD-6195	Spring	1
2	LD-6194	Latch	1
3	10011	Screw, 6BA x 5/16" Rd. Hd.	2
4	74210	Protector	1
5	LD-1628	Plate, Spacing	2
6	12511	Screw, 3/16"-24 Whit. x 3/8" Rd. Hd.	5
7	12296	Nut, 3/16"-24 Whit. Hex.	2
8	10126	Locknut, 6BA Hex.	4
9	12051	Screw, 6BA x 3/16" Rd. Hd.	4
10	LD-6190	Spring	2
11	LD-6193	Window	1
12	LD-6191	Frame, Outer	1
13	LD-6192	Frame, Inner	1
14	LD-6274	Window	1
15	LD-6275	Spring	2
16	LD-6271	Plate	1
17	LD-6269	Disk	1
18	51048	Spring	1
19	LD-6268	Collar	1
20	51047	Nut	1
21	LD-6270	Washer, Friction	1
22	LD-6272	Bush, Long	1
23	LD-6273	Bush, Short	1
24	LD-1186	Oilcup	1
25	12509	Screw, 3/16"-24 Whit. x 1/2" Rd. Hd.	11
26	11900	Washer, 3/16" Whit.	11
27	92221	Bracket, Outer	1
28	82597	Bracket, Inner	1
29	LD-6196	Pin, Hinge	1
30	12516	Screw, 3/16"-32 x 1/2" Csk. Hd.	2
31	92280	Spool Box	1
32	12512	Screw, 3/16"-24 Whit. x 3/4" Csk. Hd.	6
33	12510	Screw, 3/16"-24 Whit. x 3/4" Rd. Hd.	3
34	73929	Knob	1
35	10380	Screw, 4BA x 3/16" Rd. Hd.	2
36	92278	Frame	1
37	LD-6276	Clip	1
40A	92276	Door Assembly	1
41	92277	Door Detail	1
42	LD-1679	Stud	1
43	LD-1678	Boss	1
44	12237	Set Screw, 4BA x 3/16" Allen 90° Cone Pt.	1
45	LD-1681	Spring	1
46	LD-1680	Cup	1
47	74128	Nameplate	1
9	12051	Screw, 6BA x 3/16" Rd. Hd.	4
50A	LD-5376	Collar Assembly	1
51	50942	Collar	1
52	11400	Set Screw, 2BA x 3/8" Allen Cup Pt.	1
54A	76823	Shaft Assembly	1
55	76822	Shaft	1
56	LD-6267	Pin	1
58A	51059	Nut Assembly, Clamping	1
59	51058	Nut	1
60	12346	Screw, 3BA x 1/2" Allen Cap	1

1. GENERAL

1.1 The 2024-A Pedestal will shortly be superseded by the 2024-H, which differs from the earlier type in respect of a few structural changes. Overall dimensions are unchanged, and these are given in the installation bulletin for the Westar Pedestal. Additional height, if required, may be obtained by means of 2", 4" or 6" platforms, as with the earlier pedestal. The weight is approximately 225 lbs.

1.2 The changes made in the 2024-H Pedestal as compared with the 2024-A are as follows:-

(a) The hand wheel and screwed rod are omitted.

(b) The locking knob on the operating side has been replaced by two Allen set screws. The first screw is tightened to lock the lamphouse bracket, and the second screw is inserted to prevent casual interference which might result in accidental release of the adjustment. (The single Allen screw on the non-operating side is sealed in after adjustment.)

(c) The internal structure has been simplified and the tray omitted.

(d) The hinged cast door has been replaced by a plate held by four screws.

(e) The lamphouse bracket has been re-designed so that the 2002 and 2003 Reproducer Sets may be mounted directly on to its face without an adapter plate. Special provision will be made for other reproducer sets as required.

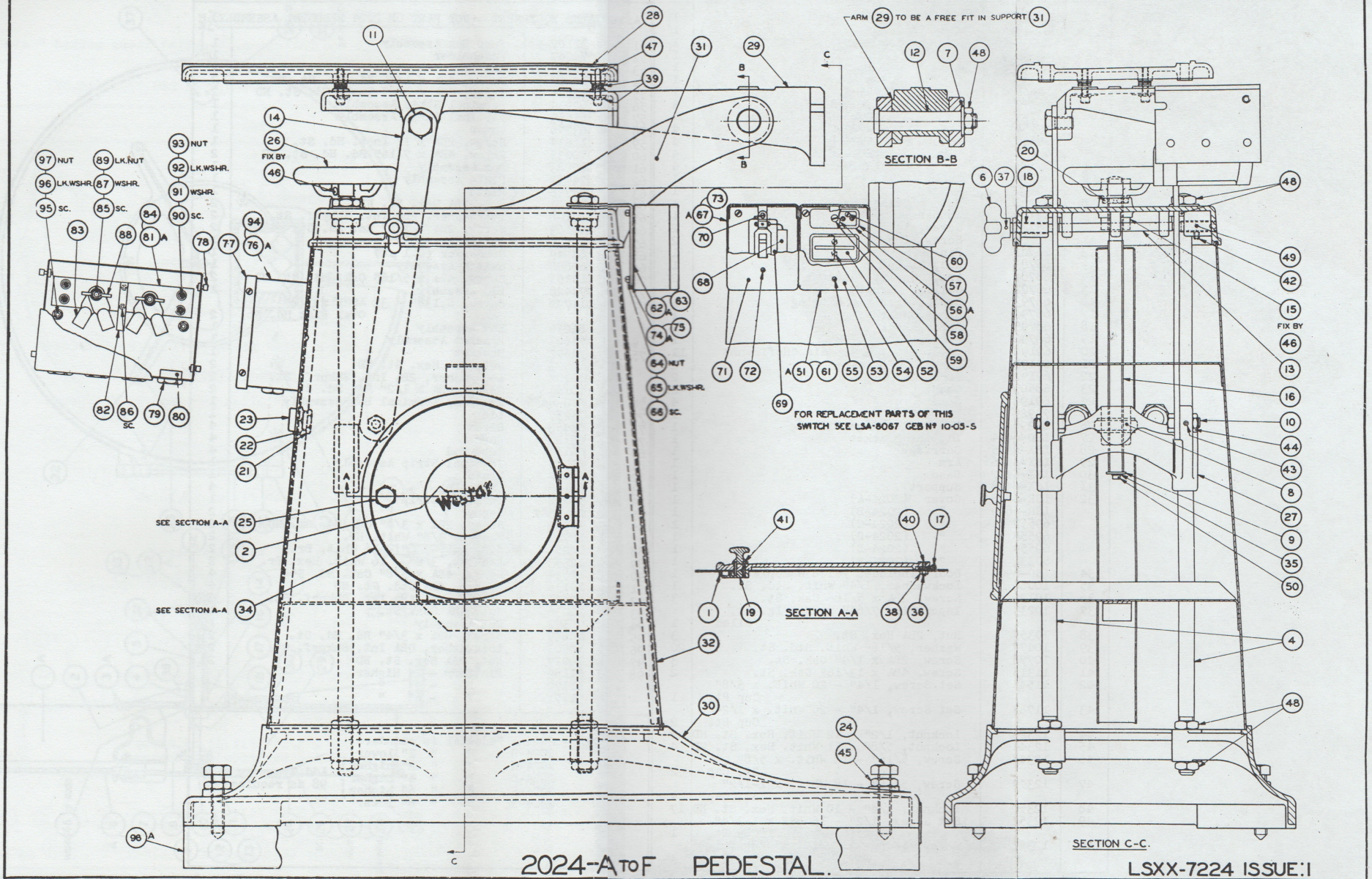
Tilt-Limiting Bolt

1.3 Inside the pedestal, in the arm which supports the lamphouse bracket on the non-operating side will be found a 5/16" BSF hexagon bolt. This bolt acts as a safety stop to the tilt of the bracket and is positioned during manufacture to permit a maximum tilt of 24°. This stops the lower spool box just short of touching the front of the pedestal.

1.4 When the lamphouse bracket has been adjusted for correct tilt, tighten the Allen locking screw sufficiently to mark the supporting arm. Release the screw and tilt the bracket up so that this mark is visible above the pedestal. Drill a clearance hole for the 5/16" bolt two inches below the clamping mark and transfer the bolt, etc., to the new position. To ensure that the bolt will butt against the correct part of the casting, the new hole must be drilled in the track of the locking screw, shown by the marks made by the latter. The new position will limit the tilting range to a little more than that required for normal adjustments.

If a tilt of more than 24° is required (using a special adapter bracket for the reproducer set) the safety bolt is not required and should be discarded.

Amendment	Sections affected



2024-A TO F PEDESTAL.

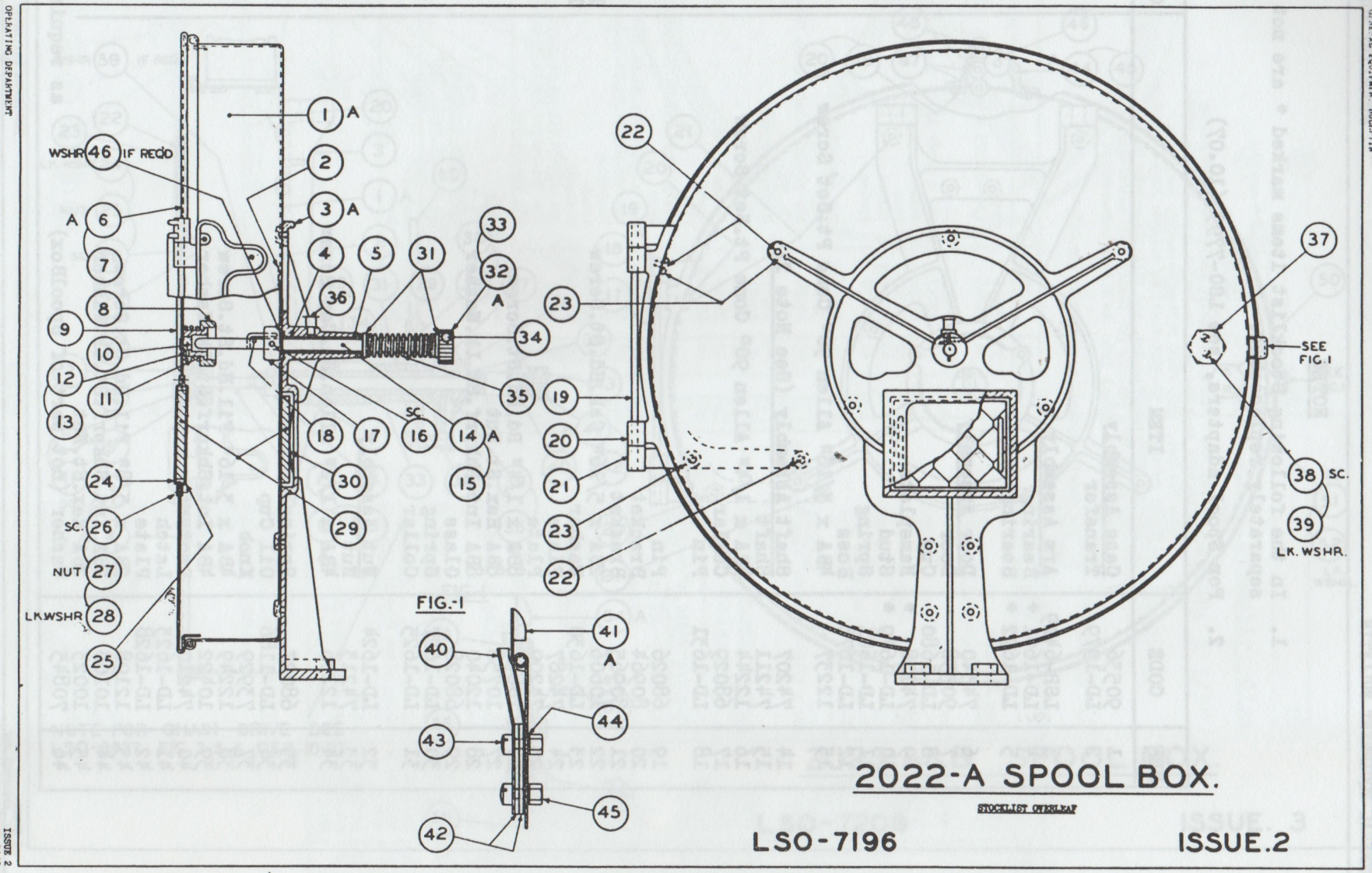
LSXX-7224 ISSUE:1

REF	CODE	ITEM	QTY
1	LD-1171	Catch	1
2	LD-1987	Transfer (2024-A)	1
	LD-3034	" (2024-B)	1
	LD-4597	" (2024-C)	1
	LD-4598	" (2024-D)	1
	LD-4599	" (2024-E)	1
	LD-4600	" (2024-F)	1
4	68772	Bolt, Stay (2024-A)	4
	68773	" " (2024-B)	4
	69554	" " (2024-C)	4
	69555	" " (2024-D)	4
	69556	" " (2024-E)	4
	50331	" " (2024-F)	4
6	68776	Knob, Lockscrew	1
7	68777	Washer	1
8	68778	Nut, Lifting Screw	1
9	68779	Washer	1
10	68780	Screw, Adjusting	2
11	68781	Screw, Lock	2
12	68782	Pin	1
13	68783	Rod, Clamping	1
14	68784	Arm, Support Pedestal	2
15	68792	Collar, Thrust	1
16	68793	Screw, Carriage Lifting	1
17	68794	Hinge, Door	1
18	68795	Screw, Lock	1
19	68796	Plate, Door Catch	1
20	69190	Ball, Steel 9/32" dia "Hoffmann"	11
21	69191	Bush	2
22	69192	Lock Nut	2
23	68507	Bush	2
24	69194	Screw	4
25	73929	Knob, Door	1
26	81290	Wheel, Carriage Lifting	1
27	LSO-6424	Lifting Bracket	1
28	LSX-6425	Carriage	1
29	LSX-6426	Arm	1
30	LSX-6427	Base	1
31	LSX-6428	Support	1
32	LSR-6898	Cover (2024-A)	1
	LSR-6899	" (2024-B)	1
	69557	" (2024-C)	1
	69558	" (2024-D)	1
	69559	" (2024-E)	1
	50332	" (2024-F)	1
34	LSO-6904	Door (Includes 74128 Nameplate)	1
35	10060	Lockwasher, 1/4" Whit. Std. St.	1
36	10179	Screw, 2BA x 5/16" Csk. St.	3
37	10233	Taper Pin, 7/64" x 7/8" lg. St. Oiled	1
38	10355	Nut, 2BA Hex. St.	3
39	10477	Washer, 5/16" Whit. Std. St.	20
40	10778	Screw, 2BA x 1/4" Csk. St.	3
41	11315	Screw, 4BA x 13/16" Csk. St.	2
42	11543	Set Screw, 1/4" - 20 Whit. x 3/8" Cup Pt.	1
43	11783	Set Screw, 1/4" - 20 Whit. x 1/2" Cup Pt.	2
44	12324	Locknut, 1/2" - 12 Whit. Hex. St. ND	2
45	12344	Locknut, 5/8" - 11 Whit. Hex. St. ND	4
46	12348	Screw, 5/16" - 18 Whit. x 5/8" St. Cap	2
47	12349	Screw, 5/16" - 18 Whit. x 1-1/2" St. Cap	4
48	12350	Locknut, 3/4" - 10 Whit. Hex. St. ND	17
49	12352	Set Screw, 1/2" - 16 BSF x 1-3/4" Cup Pt.	1
50	12353	Screw, 1/4" - 20 Whit. x 5/8" Ch. Hd. St.	1

REF	CODE	ITEM	QTY
		ASSOCIATED EQUIPMENT (NOT PART OF 2024 PEDESTAL ASSEMBLY)	
51	31107-A	Fuse Box Assembly	1
52	74247	Fuseholder	1
53	74449	Lid	1
54	10473	Screw, 4BA x 1/2" Rd. Hd. St. ND	2
55	12254	Screw, 4BA x 3/8" Inst. Hd. St. ND	2
56	62934	Terminal Strip Assembly	1
57	62569	Terminal Strip Assembly	1
58	63570	Cover	1
59	11634	Screw, 2BA x 1" Inst. Hd. St.	1
60	10035	Screw, 4BA x 7/16" Rd. Hd. St. ND	2
61	80983	Box Assembly	1
62	74731	Plate Assembly	1
63	74738	Plate	1
64	10023	Nut, 2BA Hex. St. ND	2
65	10108	Lockwasher, 2BA Int. Shkprf. St.	2
66	10163	Screw, 2BA x 1/2" Rd. Hd. St.	2
67	30535-J	Switch Assembly	1
68	68249	Condenser (0.1 μF)	1
69	69808	Switch Assembly	1
70	10165	Screw, 4BA x 5/16" Csk. Hd. St. ND	2
71	74428	Lid Assembly	1
72	11799	Screw, 0.138" - 32 ASME x 3/8" Oval Flat Hd. St.	2
73	81056	Box Assembly	1
74	74603	Bracket Assembly	1
75	74672	Bracket	1
64	10023	Nut, 2BA Hex. St. ND	2
65	10108	Lockwasher, 2BA Int. Shkprf. St.	2
66	10163	Screw, 2BA x 1/2" Rd. Hd. St.	2
76	LSO-6456	Arc Lamp Terminal Box Assembly	1
77	74257	Lid	1
78	63458	Screw	4
79	68122	Bush	4
80	68123	Tube End	4
81	80985	Terminal Strip Assembly	1
82	68107	Plate	1
83	68108	Cable Lug	4
84	74258	Terminal Strip	1
85	LD-1687	Screw	2
86	10791	Screw, 2BA x 3/4" Ch. Hd. St. ND	2
87	10715	Washer, 3/8" Whit. Br.	2
88	12252	Wing Nut, 3/8" - 16 Whit. Br.	2
89	12253	Locknut, 3/8" - 16 Whit. Hex. Br.	2
90	11544	Screw, 4BA x 5/8" Csk. Hd. St.	4
91	10136	Washer, 4BA Std. St. ND	4
92	10422	Lockwasher, 4BA Int. Shkprf. St.	4
93	10036	Nut, 4BA Hex. St.	4
94	90572	Box Assembly	1
95	10849	Screw, OBA x 3/4" Rd. Hd. St.	2
96	10903	Lockwasher, OBA Int. Shkprf. St.	2
97	10027	Nut, OBA Hex. St. ND	2
98	91169	Platform - 2" Higher	
	91170	" - 4" "	
	91171	" - 6" "	

NOTE - 2024-A Pedestal is standard
2024-B " " 2" lower
2024-C " " 2" higher
2024-D " " 4" higher
2024-E " " 6" higher
2024-F " " 6" lower

Add Items 98 as required



2022-A SPOOL BOX.

STOCKLIST OVERLEAF

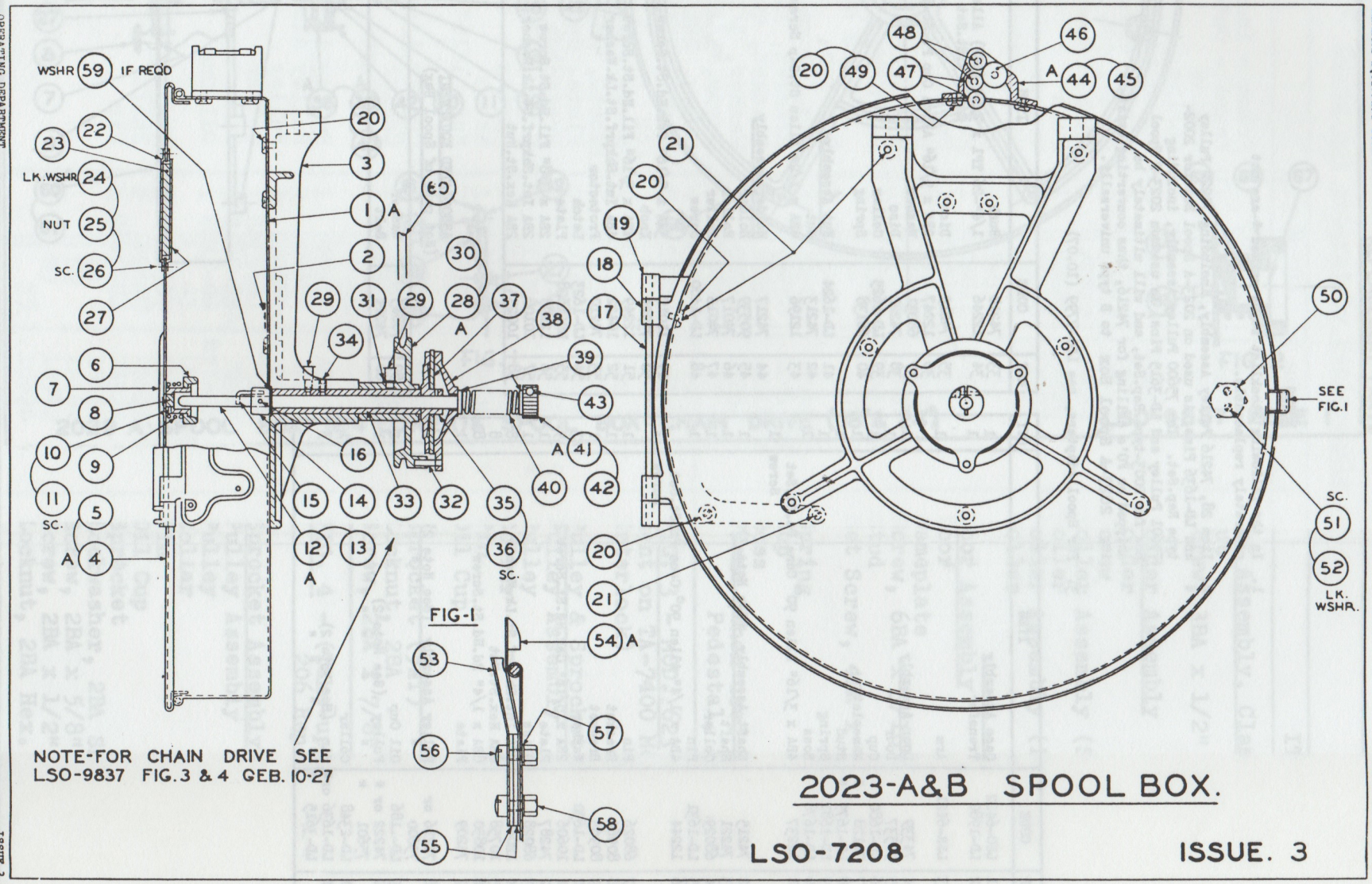
LSO-7196 ISSUE.2

NOTES

1. In the following Stocklist items marked * are not separately replaceable.

2. For Spool Adapters, see LSO-7799 (10.07)

REF	CODE	ITEM	QTY
1	90536	Case Assembly	1
2	LD-1979	Transfer	1
3	LSR-6419	Arm Assembly	1
4	LD-1691 *	Bearing	1
5	LD-1692 *	Bearing	1
6	74340	Door Assembly	1
7	90538	Door	1
8	LD-1680	Cup	1
9	74128 *	Nameplate	1
10	LD-1679 *	Stud	1
11	LD-1681	Spring	1
12	LD-1678	Boss	1
13	12237	4BA x 3/16" Allen 90° Cone Pt.Set Screw	1
14	74207	Shaft Assembly (See Note 2)	1
15	74211	Shaft	1
16	12244	4BA x 1/4" Allen 90° Cone Pt.Set Screw	1
17	68029	Collar	1
18	LD-1631	Pin	1
19	68026	Pin	1
20	80964	Bracket	1
21	80965	Bracket	1
22	10606	2BA x 5/16" Csk.Hd.St.Screw	19
23	LD-1630	Washer	19
24	74287	Plate	1
25	74209	Plate	1
26	10850	8BA x 1/4" Rd.Hd.St.Screw	8
27	10758	8BA Hex.St.Nut	8
28	12040	8BA Int.Shkprf.St.Lk.Washer	8
29	68028	Glass	2
30	LD-1627	Spring	2
31	LD-1625	Collar	2
32	LD-1624	Nut Assembly	1
33	74213	Nut	1
34	12196	4BA x 1/2" Allen.St.Cap Screw	1
35	68027	Spring	1
36	LD-1186	Oil Cup	1
37	73929	Knob	1
38	12249	4BA x 3/16" Fil.Hd.St.Screw	2
39	10422	4BA Int.Shkprf.St.Lk.Washer	2
40	74210	Protector	1
41	LD-1623	Latch	1
42	LD-1628	Plate	2
43	12198	2BA x 3/8" Fil.Hd.St.Screw	2
44	10108	2BA Int.Shkprf.St.Lk.Washer	2
45	10023	2BA Hex.St.Nut	2
46	70845	Washer (not part of SpoolBox)	as required



2023-A&B SPOOL BOX.

LSO-7208 ISSUE. 3

NOTES

1. In the following Stocklist items marked * are not separately replaceable.

2. Item 28, 74216 Pulley Assembly, including 74222 Pulley and LD-1636 Pins, is used on 2023-A Spool Box for 2002-type Rep.Set. The 75600 Pulley Assembly, including 75601 Pulley and LD-3615 Pins, is used on 2023-B Spool Box for 2003-type Rep.Set, and will ultimately be shipped on FO's calling for 74216, thus converting existing 2023-A Spool Box to B type universally.

3. For Spool Adapters, see LSO-7799 (10.07)

REF	CODE	ITEM	QTY
1	LSO-6422	Case Assembly	1
2	LD-1980	Transfer	1
3	LSR-6421	Arm	1
4	74339	Door Assembly	1
5	90537	Door	1
6	LD-1680	Cup	1
7	74128 *	Nameplate	1
8	LD-1679 *	Stud	1
9	LD-1681	Spring	1
10	LD-1678	Boss	1
11	12237	4BA x 3/16" Allen 90° Cone Pt.St.Set Screw	1
12	74215	Shaft Assembly (See Note 3)	1
13	74221	Shaft	1
14	68029	Collar	1
15	LD-1631	Pin	1
16	12244	4BA x 1/4" Allen 90° Cone Pt.St.Set Screw	1
17	68026	Pin	1
18	80964	Bracket	1
19	80965	Bracket	1
20	LD-1630	Washer	23
21	10606	2BA x 5/16" Csk.Hd.St.Screw	19
22	74287	Plate	1
23	68028	Glass	1
24	12040	8BA Int.Shkprf.St.Lk.Washer	8
25	10758	8BA Hex.St.Nut	8
26	10850	8BA x 1/4" Rd.Hd.St.Screw	8
27	74209	Plate	1
28	74216 or 75600	Pulley Assembly (See Note 2)	1
29	LD-1186	Oil Cup	2
30	74222 or * 75601 *	Pulley (See Note 2)	1
31	LD-2348	Collar	1
32	LD-1636 or* LD-3615 *	Pin (See Note 2)	3

REF	CODE	ITEM	QTY
33	74218	Bush	1
34	12246	1/4"-26 TP1 x 3/8" (BSF) Allen 90° Cone Pt.St.Set Screw	1
35	74219	Disc	1
36	12247	2BA x 5/16" Allen Cup Pt.St.Set Screw	1
37	68031	Washer	1
38	74220	Disc	1
39	LD-1625	Collar	2
40	68138	Spring	1
41	LD-1624	Nut Assembly	1
42	74213	Nut	1
43	12196	4BA x 1/2" Allen St.Cap Screw	1
44	74217	Holder Assembly	1
45	90539	Holder	1
46	74017	Roller	1
47	74016	Roller	3
48	LD-1400	Screw	8
49	11012	3BA x 5/16" Csk.Hd.St.Screw	4
50	73929	Knob	1
51	12249	4BA x 3/16" Fil.Hd.St.Screw	2
52	10422	4BA Int.Shkprf.St.Lk.Washer	2
53	74210	Protector	1
54	LD-1623	Latch	1
55	LD-1628	Plate	2
56	12198	2BA x 3/8" Fil.Hd.St.Screw	2
57	10108	2BA Int.Shkprf.St.Lk.Washer	2
58	10023	2BA Hex.St.Nut	2

ASSOCIATED EQUIPMENT
(Not part of Spool Box)

59	70845	Washer	as required
60	74024	Belt	1

* Parts not separately replaceable

REF	CODE		ITEM	QTY
1	LD-6192		Frame - Inner	1
2	LD-6191		Frame - Outer	1
3	LD-6193		Window	1
4	LD-6190		Spring	2
5	10126		Locknut, 6BA Hex.	4
6	12051		Screw, 6BA x 3/16" Rd. Hd. Rd. Hd.	4
7	10380		Screw, 4BA x 3/16" Rd. Hd. Rd. Hd.	2
8	73929		Knob	1
9	74218		Bush	1
10	68031		Washer	1
11	74220		Disc, Pressure	1
12	51048		Spring	1
13	51047		Nut	1
14	LD-6189		Collar	1
15	74219		Disc Friction	1
16	11196		Set Screw, 2BA x 1/4" All 4" Allen Cup Pt.	1
17	12227		Set Screw, 1/4" - 20 Whit. 20 Whit. x 1/4" Alle Allen Cup Pt.	1
18	LD-1186		Oil Cup	1
19	LD-6196		Pin, Hinge	1
20	82597		Bracket, Inner	1
21	92221		Bracket, Outer	1
22	11900		Washer, 3/16" Whit.	11
23	12509		Screw, 3/16" - 24 Whit. x Whit. x 1/2" Rd. Hd.	11
24	10426		Screw, 2BA x 1/4" Rd. Hd. Rd. Hd.	4
25	12512		Screw, 3/16" - 24 Whit. x Whit. x 3/4" Csk. Hd.	5
26	12510		Screw, 3/16" - 24 Whit. x Whit. x 3/4" Rd. Hd.	3
27	12511		Screw, 3/16" - 24 Whit. x Whit. x 3/8" Rd. Hd.	5
28	LD-1628		Plate, Spacing	2
29	74210		Protector	1
30	10011		Screw, 6BA x 5/16" Rd. Hd. Rd. Hd.	2
31	LD-6195		Spring	1
32	LD-6194		Latch	1
33	12296		Nut, 3/16" - 24 Whit. Hex. Whit. Hex.	2
34A	LD-5376		Collar Assembly	1
25	50942		Collar	1
36	11400		Set Screw, 2BA x 3/8" All 8" Allen Cup Pt.	1
38A	77179		Pulley Assembly	1
39A	75600	*	Pulley Assembly	1
40	75601	*	Pulley	1
41	LD-2348		Collar	1
42	LD-3615	*	Pin	3
18	LD-1186		Oil Cup	1
44A	76825		Shaft Assembly	1
45	76824	*	Shaft	1
46	LD-3667		Pin	1

REF	CODE		ITEM	QTY
48A	51059		Nut Assembly, Clamping	1
49	51058		Nut	1
50	12346		Screw, 3BA x 1/2" Allen Cap	1
52A	78187		Holder Assembly	1
53	92222		Holder	1
54	LD-1400		Screw	8
55A	51285		Roller Assembly (Small)	3
56	51286		Roller	3
57A	51283		Roller Assembly (Large)	1
58	51284		Roller	1
60A	92224		Door Assembly	1
61A	92223		Door	1
62	74128		Nameplate	1
6	12051		Screw, 6BA x 3/16" Rd. Hd.	4
63	LD-1679		Stud	1
64	12237		Set Screw, 4BA x 3/16" Allen 90° Cone Pt.	1
65	LD-1681		Spring	1
66	LD-1680		Cup	1
67	LD-1678		Boss	1
68	92232		Frame (When used on Simplex 5 Point Pedestal, file away to 82361)	1
			FIG. 3 - MOD. 623 - (Take-up arrangement on TA-7400 Mech. & Elect. Interlock)	
72A	77048		Pulley & Sprocket Assembly	1
39A	75600	*	Pulley Assembly	1
40	75601	*	Pulley	1
41	LD-2348		Collar	1
42	LD-3615	*	Pin	3
18	LD-1186		Oil Cup	1
74	77147		Sprocket (52T)	1
75	10826		Locknut, 2BA	8
76	12160		Screw, 2BA x 7/8" Csk. Hd.	4
			FIG. 4 - (Take-up arrangement on 206 Rep. Set)	
79A	74959		Sprocket Assembly	1
39A	75600	*	Pulley Assembly	1
40	75601	*	Pulley	1
41	LD-2348		Collar	1
42	LD-3615	*	Pin	3
18	LD-1186		Oil Cup	1
80	74924		Sprocket	1
81	10108		Lockwasher, 2BA Shkprf.	4
82	12194		Screw, 2BA x 5/8" Allen Cap	4
83	10592		Screw, 2BA x 1/2" Ch. Hd.	3
75	10826		Locknut, 2BA Hex.	3