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NEW ADDRESS 7/10/73

KINOTONE, INC.
MOTION PICTURE EQUIPMENT
150 ATLANTIC STREET
HACKENSACK N.J 07601

NORTH AMERICAN PHILIPS COMPANY, INC.
Norelco

AA II
UNIVERSAL 70/35mm PROJECTOR

model EL 4001

INSTALLATION AND OPERATING INSTRUCTIONS

1978

NORTH AMERICAN PHILLIPS
1 PHILLIPS PARKWAY
MT. VALE N.Y.
ZIP 07645
AREA CODE 201-391-1000

Distributed by: Motion Picture Equipment Division,
NORTH AMERICAN PHILIPS COMPANY, INC.
100 East 42nd Street, New York, 17, N.Y. Phone: Oxford 7-3600

Price $5.00

W A R R A N T Y

NORELCO MOTION PICTURE PROJECTORS

North American Philips Company, Inc. (NAP) warrants its motion picture projection equipment to be free from defects in workmanship and material under normal and proper use, service and maintenance.

NAP will replace at its expense or repair without charge for labor all parts to such equipment found to be defective, normal wear and tear excepted, provided that such parts are returned transportation prepaid, to NAP at its Service Center, for inspection within a period of one (1) year from the date of installation, or eighteen (18) months from date of shipment whichever occurs first. No return shipment will be accepted unless authorized by NAP.

This warranty shall not apply with respect to any equipment and/or component parts thereof that have been altered or repaired other than by NAP factory approved procedures, or which have not been serviced according to NAP's instructions, or which have been subjected to misuse, negligence and/or accidental damage, or which have been used with component parts which do not satisfy the specifications of or which have not been approved by NAP.

All glassware and solid state devices forming a part of such equipment is not warranted by NAP, but will carry the warranty of the respective manufacturer of such equipment.

In the event of any claimed defects in such equipment and/or component parts thereto, NAP, for itself and for its dealers, reserves the right to inspect such equipment and/or component parts on the customer's premises and to repair the same on the spot at its discretion, provided that such repairs can be made without undue delay. Any component parts replaced pursuant to the terms of this warranty shall only be warranted for the unexpired portion of the warranty on the original equipment.

This warranty is in lieu of any and all other warranties, obligations or agreements, express or implied on the part of NAP with respect to the sale and delivery of such equipment and no person, including any dealer, agent or representative of NAP, is authorized to assume any liability for NAP or to accept any liability or obligations on behalf of NAP.

NAP's sole liability pursuant to the terms of this warranty is to repair defective items or supply replacement parts in accordance with the terms herewith.

Under no condition shall NAP be liable for damage to or loss incurred as a result of the destruction or damage to any film used in conjunction with its motion picture projection equipment or for any other personal injury or property damage incidental to such use.

Shipments must be made prepaid and addressed as follows:

North American Philips Company, Inc.
Attention: Dep't. M.P.
3010 Review Avenue
Long Island City, N.Y.

On Parcel Post shipments add - Code No. 11101

7/24/63

ISCO KIPTAR 35mm PROJECTION LENSES

Cat. No.	EF.	Speed	O/A Length	Working Distance	Suggested List Price each
1510	4.0''	f/2.0	4.8''	2.0''	$ 150.00
1511	4.2	f/2.0	4.9	2.1	150.00
1212	4.4	f/2.0	5.0	2.2	150.00
1513	4.6	f/2.3	5.1	2.3	150.00
1514	4.8	f/2.2	5.2	2.3	150.00
1515	5.0	f/2.2	4.4	2.4	150.00
1516	5.2	f/2.3	4.5	2.5	150.00
1517	5.4	f/2.4	4.7	2.6	150.00
1518	5.6	f/2.5	5.0	2.7	150.00
1519	5.8	f/2.6	5.0	2.7	150.00
1520	6.0	f/2.6	4.2	3.6	150.00
1521	6.2	f/2.7	4.2	3.7	170.00
1522	6.4	f/2.8	4.3	3.8	170.00
1523	6.6	f/2.8	4.4	3.9	170.00
1524	6.8	f/2.9	4.6	4.0	170.00
1525	7.0	f/3.0	4.7	4.2	170.00
1526	7.2	f/3.1	4.8	4.3	170.00
1527	7.4	f/3.1	4.9	4.4	230.00
1528	7.6	f/3.1	5.0	4.5	230.00
1529	7.8	f/3.2	5.2	4.6	230.00
1530	8.0	f/3.3	5.3	4.7	230.00
1531	8.2	f/3.4	5.4	4.9	230.00
1532	8.4	f/3.5	5.6	5.0	230.00
1533	8.6	f/3.5	5.7	5.1	230.00
1534	8.8	f/3.6	5.8	5.2	230.00
1535	9.0	f/3.7	5.9	5.3	230.00

The ISCO Kiptar is of the four element Petzval type. The small aperture of these lenses provides excellent depth of focus and excels in outstanding definition and brilliance of black-and-white as well as color films.

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Norelco® MOTION PICTURE EQUIPMENT

NORTH AMERICAN PHILIPS COMPANY, INC.
Professional Products Division, 100 East 42nd St., New York, N.Y. 10017

Phone: Area Code 212-OXford 7-3600

Norelco

ISCO SUPER-KIPTAR 35mm PROJECTION LENSES

2-25/32" DIA.

Cat. No.	EF.	Speed	O/A Length	Working Distance	Suggested List Price each
SP 8011	45 mm (1.8")	f/1.6	3.98"	1.18"	$ 190.00
SP 8012	50 mm (2.0")	f/1.6	4.13	1.34	190.00
SP 8013	55 mm (2.2")	f/1.6	4.02	1.5	200.00
SP 8014	60 mm (2.4")	f/1.6	3.98	1.53	210.00
SP 8015	65 mm (2.6")	f/1.6	4.02	1.69	210.00
SP 8016	70 mm (2.75")	f/1.6	4.25	1.81	220.00
SP 8017	75 mm (2.95")	f/1.6	4.09	1.93	220.00
SP 8018	80 mm (3.15")	f/1.6	3.94	2.05	240.00
SP 8019	85 mm (3.35")	f/1.6	3.78	2.2	250.00
SP 8020	90 mm (3.55")	f/1.6	3.66	2.32	260.00
SP 8021	95 mm (3.75")	f/1.6	3.5	2.44	270.00
SP 8022	100 mm (3.95")	f/1.6	3.66	2.6	290.00
SP 8023	105 mm (4.15")	f/1.6	3.78	2.72	320.00
SP 8024	110 mm (4.35")	f/1.7	3.94	2.72	320.00
SP 8025	115 mm (4.55")	f/1.7	4.14	2.80	320.00
SP 8026	120 mm (4.75")	f/1.8	4.27	2.95	320.00
8027	125 mm (5.0")	f/2.0	4.3	3.6	320.00
8028	130 mm (5.2")	f/2.0	4.4	3.8	320.00
8029	135 mm (5.4")	f/2.1	4.5	3.9	340.00
8030	140 mm (5.6")	f/2.1	4.6	4.0	340.00
8031	145 mm (5.8")	f/2.2	4.8	4.3	340.00
8032	150 mm (6.0")	f/2.3	4.8	4.4	340.00

CS 352706A	Anamorphic-Kiptar Cinemascope Attachment	315.00
70650	Extension tube for 2" extension	15.00
70675	Extension tube for 2.95" extension	15.00

The ISCO SUPER-KIPTAR has 6 lenses in 4 components (Gauss Double Lens), a wide angle of view, extremely high speed in the focal lengths of 45 mm to 105 mm inclusive. They feature excellent correction of spherical aberrations, coma, astigmatism, distortion, field curvature and chromatic aberrations. This results in high resolving power and surprisingly good definition.

The Anamorphic-Kiptar Attachment is a 4 element cylindrical lens with a fixed anamorphic factor of 2X. The system is afocal and gives a sharp image out into the corners when used with very good axially symmetrical lenses such as the Super-Kiptar or Kiptar lenses. The barrel is equipped with a 2.668" x 36 thread to fit the mating thread in the front of the Kiptar, Super-Kiptar, and Bausch and Lomb lenses. A milled ring provides focussing adjustments for projection distances from between approximately 17 feet to infinity. A knurled screw locks the adjustment, preventing accidental shifting.

OVER

THE NORELCO UNIVERSAL 70/35 PROJECTOR

MODEL AA II

The Model AA II NORELCO 70/35 Projector provides many new features that have been added to the very popular and highly successful projector first introduced for the Todd-AO system in 1955.

The equipment is lighter in weight and a pair of projectors is now packed in 14 cases. A 15th case contains a tool and lubricant kit.

The optical pre-amplifiers and their housings are now an optional item. If ordered with the equipment 2 amplifiers with 2 housings will be supplied in an additional shipping case.

The following pages contain instructions and suggestions to assist installation personnel and projectionists in setting up and operating the equipment.

A series of illustrations are also included as additional aid. The NORELCO Installation Procedures Manual (green cover) contains additional useful information.

UNPACKING AND ASSEMBLY

The various cases are marked with large numerals 1 through 7. For a two machine installation there will be two sets of cases bearing these numerals.

The tool and lubricant kit will be found in Case #8 which should be unpacked first.

It will be assumed that all preliminary electrical and plumbing work, in the area of each projector location, has been completed. Also that the portholes have been installed and the booth cleaned up. This is very important if possible equipment damage, which is not covered by the warranty, is to be avoided.

The unpacking and assembly instructions that follow cover one projector. Of course the same procedure applies to the second projector.

Cases should be carefully opened in their numerical sequence and the various units progressively assembled.

Note that Cases #3-6-7 of each set have the same serial numbers. When these cases are unpacked, the contents of these 3 cases must not be interchanged between projectors.

LOWER BASE

Remove the top of Case #1. Remove the nuts and washers holding the base in the case. Do not disturb the hex nuts and the hollow head leveling screws. Carefully tilt the case on end with the front or vertical portion of the base down. Carefully slide the base out of the case onto a piece of cardboard or other soft material. Set the base in its approximate final position in the booth. The slanted portion containing 3 bushed holes constitutes the rear of the base.

When positioning the base refer to the NORELCO Installation Procedures Manual (green cover) for data on distance from the front wall (see 70 mm projection port chart), and projection axis location (Figs. 1 and 1A therein).

Metal plates measuring approximately 4" x 4" x 1/8" thick should be placed under each of the four leveling screws after the assembly is in its final location.

Remove the two large hex head cap screws and washers from the curved portion of the base. Temporarily push the 3 rubber hoses through the slot in the base to allow installation of the upper base.

Coat the curved portion of the lower base with grease. Do not use the special greases supplied in the tool and lubricant kit for this purpose.

UPPER BASE

Remove the top of Case #2. Determine the side of the upper base having the round cover that is fastened with two knurled screws. Remove this side of the case and any cross braces found. Remove the two sets of nuts, washers and bolts holding the inverted upper base to the bottom of the case.

Carefully slide the base out of the case onto a piece of cardboard or other soft material. Use 2 pieces of 2" x 4" wood placed to prevent damage to the magazine latch and rotate the inverted base 180° so that the large flat machined portion is at the top. The second flat machined surface, which has four threaded holes and one large round hole is the rear area of the upper base. Working from the film side of the bases lift the upper base onto the lower base. With the top machined surface approximately level install the two 3/4-10 x 2½" L. hex bolts and washers. Tighten well temporarily with the 1-1/8" wrench supplied in Case #8. Check the arrangement of the fire trap rollers against Fig. 5 and correct if necessary.

Push the 3 hose ends up through the square hole in the upper base. One of these hoses is marked "in" and the remaining two "out" at the front of the base. The "in" hose is connected to the "3 way" manifold. The two "out" hoses go to the "4 way" manifold. See Fig. 6

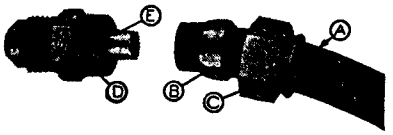


Fig. 1

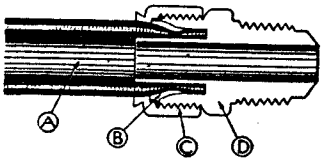


Fig. 2

To attach the hose to the couplings pass the hose "A" through the nut "C" and the compressible sleeve "B". The tapered end of the sleeve should point toward the cut end of the hose.

Lubricate threads of body "D" and insert "E" to minimize friction in assembly. (See Fig. 1 above)

Push the hose over insert "E" and into the body "D". Be sure hose reaches bottom of cavity surrounding the insert. Assemble nut "C" to body "D" and tighten nut until it touches the body as illustrated in section diagram (Fig. 2) above.

Remove the cover from the Square "D" motor starting contactor, and remove any blocking material that has been inserted for shipping purposes. Replace the cover.

PROJECTOR HEAD

Remove top of Case #3 - (arrows pointing up). Take-up drive extension shaft will be found, separately wrapped, either in top of case or tied to the mechanism. Remove and lay it inside of lower base. Carefully turn opened case upside down and lift it up evenly to clear inner packing skids. Remove bottom skid which is held by 2 hex head bolts. Wipe clean the machined surface now exposed. Using a piece of 2" x 4" lumber to prevent damage to drive coupling, at front of projector, turn head rightside up onto a clean cardboard or other soft material so that remaining wood skid is on top. Check to see that the 3 hex head bolts are tight. Use the top skid as an aid for lifting and place the projector head on top of the upper base. Do not lift by grasping any part of the interior of the projector.

Loosely bolt the head to the upper base with two 1/2-13 x 1¼" L. hex head bolts and washers found tied inside the upper base.

Turn the aligning washers, one below the front drain plug and one below the P.E.C. access cover on the lower edge of the drive

side of the projector, so that the flat side is up. Tighten the associated screws. Align the head laterally so that the circular portion of the aligning washers press against the flat machined bosses at the top edge of the upper base. Thread a piece of film from the bottom sprocket through the lower fire trap into the lower magazine. Pull the film taught and shift the head fore or aft as required so as to center the taught film in the slot in the bottom of the head. Check to insure that the alignment washers are in contact with the machined bosses and securely tighten the two 1/2-13 x 1¼" bolts.

In the upper base remove the fillister head screw that holds the slotted coupling at the top of the take-up drive. Slide the coupling down on the shaft. Partially fill the socket end of the take-up drive extension shaft (found in Case #3) with EL 4850 ball bearing grease (found in Case #8). Apply some grease to the pin end of the shaft. Insert the shaft into the bottom of the projector head, hollow head up, until it engages the bottom of the projector vertical shaft. Bring the pin end in line with the top of the take-up drive shaft, push the slotted coupling up to engage the pin, align the screw holes and re-insert the fillister head screw. Tighten well. The take-up shaft extension should have slight end play and be movable up and down, by hand, quite freely. If not, loosen the 4 hex head bolts holding the take-up drive bracket and shift the bracket as required to align the take-up vertical shaft and the extension. Firmly re-tighten the 4 hex head bolts.

UPPER MAGAZINE

Unpack Case #4. Three fillister or hollow head screws and three washers for fastening the upper magazine will be found in Case #7. Wipe clean the machined surfaces on top of the projector and at the bottom of the magazine bracket. Start the 3 fillister head screws and push the magazine squarely against the machined flange on the top of the projector before firmly tightening the screw.

The two smaller fire trap rollers must be equipped with threading guards (see Fig. 5). If not already installed the guards will be found in a package, tied inside the upper base, together with hose clamps, soldering lugs, etc.

Remove the left hand rear cover from the projector. Loosen the clamps holding the metal wiring tube. Push the tube upwards until it protrudes through the top of the projector about 1/2". Tighten clamp screws. Thread the magazine leads (Nos. 34-35) through the tube into the lower base. Fasten the cable mount to the top of the tube (5/64" Allen wrench). Replace the rear cover plate (3 screws). See Figs. 3-4-or 8.

ARC LAMP BRACKET

Unpack Case #5 which contains the arc lamp bracket, lamp slide, motor, motor mounting adapter with 4 screws and motor pulley.

Mount the arc lamp bracket on the rear of the upper base

PROJECTOR HEAD

On the latest versions, the light cone on the rear cover plate is held by 4 screws - nuts and washers. It is readily removable if the prescribed working distance of the lamp house so requires.

TAKE-UP DRIVE ASSEMBLY

The take-up shaft assembly, found packed with the projector head, must be lubricated when it is installed. The hollow coupling at the upper end should be almost filled with EL 4850/00 ball bearing grease and a small amount of grease must be applied around the lower end of the extension at the pin.

The extension must be removed every three months, or more often if the duty cycle is heavy, and the old grease removed and replaced as noted above.

Clean the flat contacting surfaces on the centrifugal device located at the upper end of the take-up assembly. These surfaces should be kept clean and dry or else the accurately machined areas will tend to adhere to one another and delay the opening of the changeover. The centrifugal device should move very easily and can be tested by a light pull with the tip of a finger placed at the outer edge of one of the halves.

Note carefully the alignment and clearance adjustment noted in the middle of page 5.

using the four 3/4-10 x 1½" L. hex bolts and washers supplied. Use the 1-1/8" wrench found in the tool kit.

Assemble the lamp slide as shown on Fig. 10

PROJECTOR DOOR

Unpack Case #6. The hinges for the door are packed in Case #7. The screws will be found in the projector head. Clean all machined surfaces. The hinge fitted with the cable clamp is used in the upper position. Mount hinges loosely, grease door pins and hang door. Close door and tighten screws. Shift the door hinges as required if door movement and latching are not smooth. Temporarily remove door by lifting it out of hinges for easier access during assembly of items in Case #7.

MISCELLANEOUS ASSEMBLIES

The following items will be found in Case #7:

Lens Bracket

Lens Holder with Eccentric Adapter

Focusing Knob and Screw

Flywheels for Magnetic Sound Head (2)

Magnetic Cluster

Cluster Mounting, Cable and Shield

Optical Sound Head

35 mm Conversion Parts Chest

35 mm Firetrap Rollers for Nitrate Film (4) (Red)

Projector Door Hinges

Hardware Assortment

Transmission Box w/6 Screws

2-Speed Pulley Clutch

"V" Belts (2)

Each projector head bears a serial number.
Use parts from cartons with same serial number.
Do not interchange.

LENS MOUNT ASSEMBLY

Clean with a solvent all the machined mounting surfaces on the projector head, lens bracket, lens holder and eccentric adapter. Mount the lens bracket with four screws found in projector. Make sure that the two dowel pins engage the holes in the projector casting. Lubricate the machined slide surfaces on the bottom of the lens holder with EL 8657 oil.

Pull back the spring loaded plunger in the lens bracket so that the cross rod in the extension locks into the short slot.

Place the lubricated lens holder in position. Use care to avoid contacting the intermediate sprocket. Install the large hex head stud-screw and washer (packed in the hardware assortment) through the slot in the lens bracket into the lens holder.

Lubricate the threads on focusing screw with light oil (black knob) and insert in the threaded hole in the front of the lens bracket. Place the rod, in the spring loaded plunger, into the long slot.

Screw the door bumper into the lens bracket.

See Fig. 7

OPTICAL SOUND HEAD

The optical sound head is packed in a separate carton. Remove carefully. Remove protective grease and the wood packing frame. Guard against smearing the surfaces of the optical elements. In some cases the P.E.C. cable is supplied as a separate item and must be connected to the P.E.C. socket before installing the sound head in the projector. If the NORELCO Cat. No. 3050 pre-amplifier has been purchased the co-ax cable must be connected so that the core is soldered to contact #4 and the shield to contact #2 on the P.E.C. socket. For some other types of pre-amplifiers these connections might require reversing. Fasten the cable under the two cable clamps on the back of the sound head and dress the cable so that the slot in the P.E.C. cover does not cut into the jacket.

Install the sound head in the opening in the lower left hand corner of the projector head. See Fig. 5. Pass the leads down into the upper base. Fasten with 4 hollow head screws found in the projector.

The 4 ampere, 9 volt, prefocused base exciter lamp and the RCA 918 photocell will be found tied in the lower base. The exciter is installed by pushing up on the knurled latch on the black bakelite door. The notch in the base of the exciter must engage the ball in the brass body of the holder before closing the door.

The P.E.C. compartment is accessible through the small square door on the non-operating side of the projector. See Figs. 4 & 8.

MAGNETIC SOUND HEAD

The 10 track magnetic cluster with mount and cable assembly is packed in a carton with the lens holder.

Note the position of and remove the Tantung spacer plate and 8 filister head screws. Clean all surfaces. Temporarily install the spacer plate with 1 screw and washer in one of the lower holes. Attach the cable assembly and mount to the projector using the 4 shorter filister head screws without washers. Remove the temporary screw. Test the fit of the shield. It should slip off and on without serious binding and be equidistant between the two magnetic capstans. Shift the spacer and/or mount as required and tighten the four screws. Fasten the ornamental cable under the cable clamp on the upper hinge. See Fig. 5. Refer to Theatre Service Instruction #11 for connections at the free end of the cable form. The 10 track cluster is pushed up into the Amphenol connector in the mount and fastened with the 4 longer filister head screws.

When the booth is clean, wipe off the top of the projector head and remove the oil compartment cover by removing 5 hollow head screws and nylon washers. (See Figs.4-8)

The flywheels for the magnetic head are packed in a carton with the door hinges and the 35 mm conversion chest. Carefully clean the flywheels, and their bores. Remove the filister head screws, washers, nuts and aluminum spacers from the capstan shafts. (Store the nuts and spacers for possible service use.) Press against the short shaft capstan and push either one of the flywheels on the short shaft. Work carefully - the fit is very precise. Fasten the flywheel with one of the filister head screws and washers. There should be no detectable end play but neither should the shaft bind. Spin the flywheel by hand and time the deceleration period; it should be several minutes. Repeat above procedure on the long shaft capstan. See Fig. 8

LUBRICATION

Carefully examine the interior of the gear case. If the projection angle is to be less than 20° down or up, pour sufficient EL 3762/10 oil (found in the tool and lubricant kit) to bring the level up to the top of the red circle on the sight glass located in the lower right hand corner of the projector. If the angle is more than 20° down, the correct level is at the bottom of the red circle. Later, after the projector has been run and the intermittent movement is full, it will probably be necessary to add some oil. This can be done through the oil hole provided in the top of the projector using the funnel found in the tool kit. Oil level checks should be made with the projector running.

Carefully wipe clean the tubular gasket in the cover and its

contacting surface on the projector. Re-install cover with 5 hollow head screws and washers. Do not over-tighten screws - use the shorter Allen wrench.

CAUTION: During the time the gear case cover is removed, guard against dirt or debris getting into the case.

MOTOR DRIVE

The motor, motor mounting adapter with screws, and motor pulley are packed in Case #5. The transmission box with mounting screws, the 2-speed clutch and two "V" belts are packed in Case #7.

At the front of the projector remove 3 filister head screws that hold the 6-hole retainer ring and pull out the six rubber bushings. Discard these items.

From the driving clutch remove the 3 small filister head screws and the round protective plate which has a red oil hole in the center. Wipe clean the mating surfaces and mount the clutch on the driving hub of the drive shaft. Fasten securely the long 10-32 screws and lockwashers supplied with the clutch. Note that the driving hub contains three 8-32, and three 10-32 threaded holes. Re-install the round protective disc on the clutch. See Fig. 9.

Clean the machined surfaces on the front of the projector around the drive shaft bracket. Trim off any excess gasket material found around the bracket. Clean the mating surface on the transmission box. Mount the transmission box on the projector with the six hollow head screws and lockwashers supplied. (7/32" Allen wrench.)

Hang the two "V" belts on the clutch in the "V" grooves.

Clean the motor shaft, key and the bore in the motor pulley. Slide the pulley onto the shaft and key. Leave 1/32" space between the face of the pulley hub and the shoulder on the shaft. Firmly tighten the set screw. (5/32" Allen wrench.)

Clean the machined surfaces of the motor flange and the motor adapter. Place the motor adapter on the flange so that when viewed from the pulley end the flat machined boss on the adapter is 45° to the right of the motor nameplate. This will be the top of the assembly. Fasten the adapter firmly with the 4 hollow head screws supplied. (5/16" Allen wrench.)

Place the motor and adapter assembly on the four studs in the transmission box, simultaneously placing the belts in the pulley grooves.

The flat machined surface on the adapter should be at top center. Guard against excessive strain on the belts and install the 4 nuts and washers on the studs. Adjust the belt tension by shifting the motor on the studs. The tension should be as low as possible but great enough to prevent slippage. "V" belts should not be tightly stretched. Tighten the four nuts.

ELECTRICAL CONNECTIONS

The electrical circuits are shown on Fig. 11 in this manual. A copy is also attached to the inside of the round cover on the upper base. 10 spade lugs for use on the internal leads will be found tied in the upper base. (See also Figs. 6-7)

The motor connections are also shown on a label attached to the inside of the cover on the motor terminal strip box.

In the upper base leads 34-35 from the upper magazine light (black twin-cable) and 34-35 from the framing light (asbestos) go to the top terminal strip.

Leads 60 and 60A from the film pile up switch (asbestos) also go to the top terminal strip.

Leads 80 and 81 from the exciter lamp (black twin-cable) go to the second terminal strip from the top. The exciter power supply connects to the same strip - lower screws.

The two long "asbestos" leads 50 and 52B come from the changeover coil. They connect to the lower terminal strip as shown in Fig. 11. Note that the lead labeled "52B" connects to the "51" terminal on the strip. All internal leads should be dressed and taped to the cable form to clear moving parts in the base.

Fig. 12 depicts a 2-machine changeover circuit utilizing D.P.D.T. switches mounted on the front wall.

Changeover circuits using foot switches, for both 2-machine and 3-machine installations, are shown in Fig. 13 and Fig. 14.

The 115 volt A.C. power supply is connected to the lower of the two-terminal strips. (The common side of the A.C. line should be connected to the right hand terminal "20".)

The two-terminal strip directly above the A.C. input is wired

to supply 115 V A.C. to the remote control of a rectifier when the "arc lamp on" button, located to the upper left of the lower magazine, is depressed. Obviously the relays in the rectifiers must be equipped with 115 V A.C. coils.

COOLING WATER CONNECTIONS

The two grey hoses from the projector cooling plate are passed into the upper base as shown in Fig. 6-7 One hose is clamped onto one of the copper tubes in the 3-way "in" manifold and the other onto one of the tubes in the 4-way "out" manifold. The water hoses from the lamphouses are connected to the remaining copper tubes.

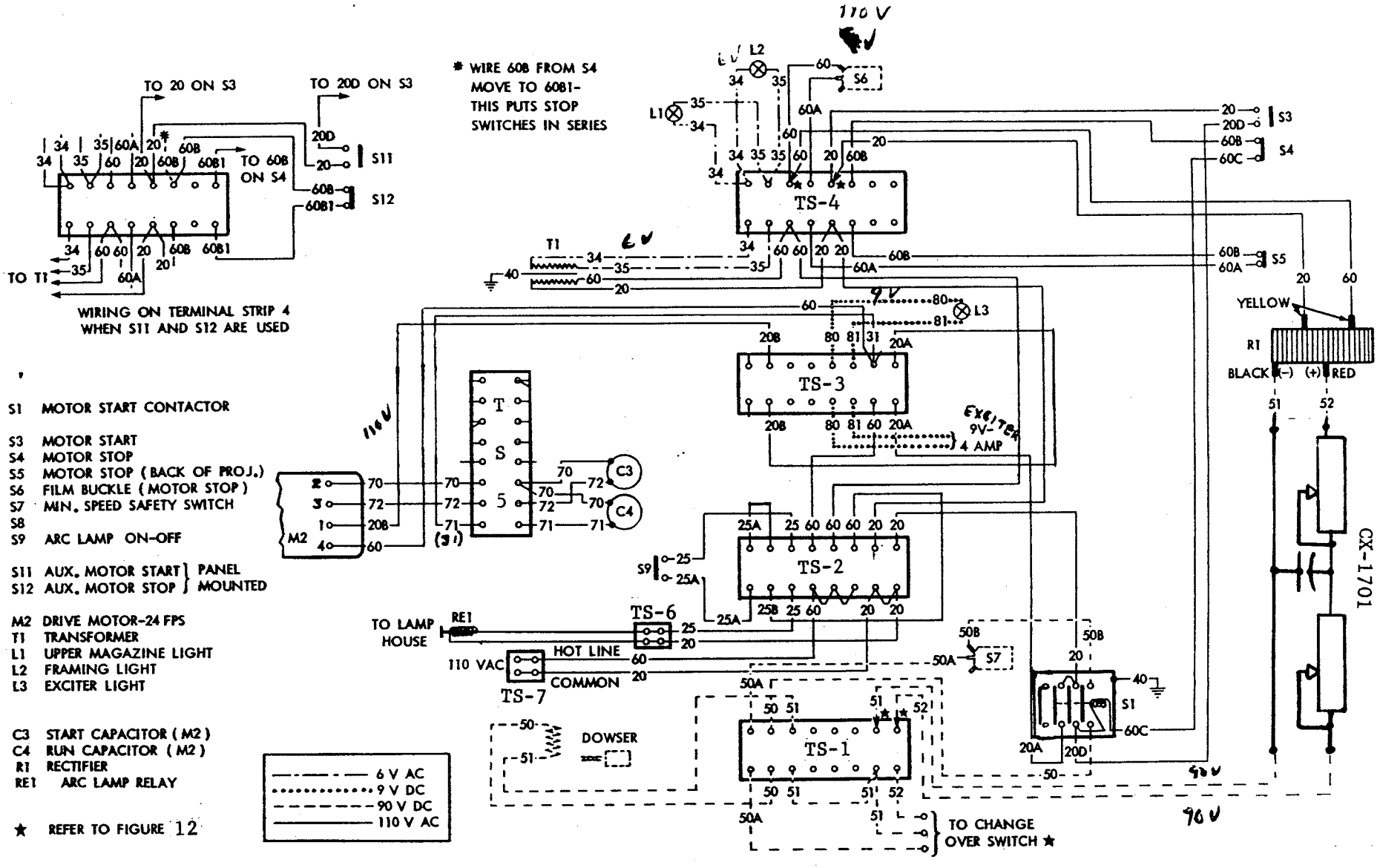
If city water is used for cooling, the feed line should contain a master shut-off valve and a pressure gauge. This line is then connected to each of the "in" connections, at the front of the bases, through a shut-off valve located at each base. The "out" connections at each base should be connected to the waste line using a 1" pipe.

If recirculators are used for cooling, it is recommended that one be attached to each lamp and a third be used to cool the projector cooling plates which are then to be connected in series. The appropriate openings at the front of the bases can be utilized to make the series connection. (See Fig. 3)

Sections III - IV - V - VI - VII consisting of pages 23 through 46 contain instructions on Pre-operational Services, Operating Instructions, Operation Maintenance Trouble Shooting, Removal and Installation of Replaceable Units, follow these installation instructions.

In general, these sections apply to all existing models of the NORELCO Universal 70/35 projector.

Reference should also be made to the various Theatre Service Instructions which will be found in this binder. Each installation is placed on the mailing list to automatically receive new Theatre Service Instructions as they are issued.



S1 MOTOR START CONTACTOR

S3 MOTOR START
S4 MOTOR STOP
S5 MOTOR STOP (BACK OF PROJ.)
S6 FILM BUCKLE (MOTOR STOP)
S7 MIN. SPEED SAFETY SWITCH
S8
S9 ARC LAMP ON-OFF

S11 AUX. MOTOR START } PANEL
S12 AUX. MOTOR STOP } MOUNTED

M2 DRIVE MOTOR-24 FPS
T1 TRANSFORMER
L1 UPPER MAGAZINE LIGHT
L2 FRAMING LIGHT
L3 EXCITER LIGHT

C3 START CAPACITOR (M2)
C4 RUN CAPACITOR (M2)
R1 RECTIFIER
RE1 ARC LAMP RELAY

★ REFER TO FIGURE 12

Fig. 11 - Wiring Diagram

NORELCO UNIVERSAL 70/35 PROJECTOR

MODEL AA II

I M P O R T A N T

This replacement parts price list also performs the function of cross referencing the superseding numbers for certain items. In most of these cases the price is only shown for one of the applicable numbers.

Where a price is not shown for a part number that part is considered to be non-expendable and the number has only been included for reference purposes.

A column has been provided for convenience in recording price changes. Invoices for parts should be checked for price changes and such changes inserted in the price list.

Do not issue orders for amounts of less than $7.50 net. This represents the minimum billing that will be made.

Please indicate on orders the preferred shipping method. The Parts Department will try to comply with these instructions.

Charges for special handling, messenger service, etc. will be invoiced to the customer.

Do not return any parts without prior authorization from NORELCO.

To insure continued uninterrupted operation, normally expendable parts such as magnetic clusters, exciter lamps, etc. should be ordered before they are required. Routine inspection and servicing should make this entirely practicable.

While the North American Philips Company makes every effort to promptly fill and ship all parts orders, we cannot control transportation delays.

Your cooperation will be of mutual benefit.

North American Philips Company, Inc.
Motion Picture Equipment Division

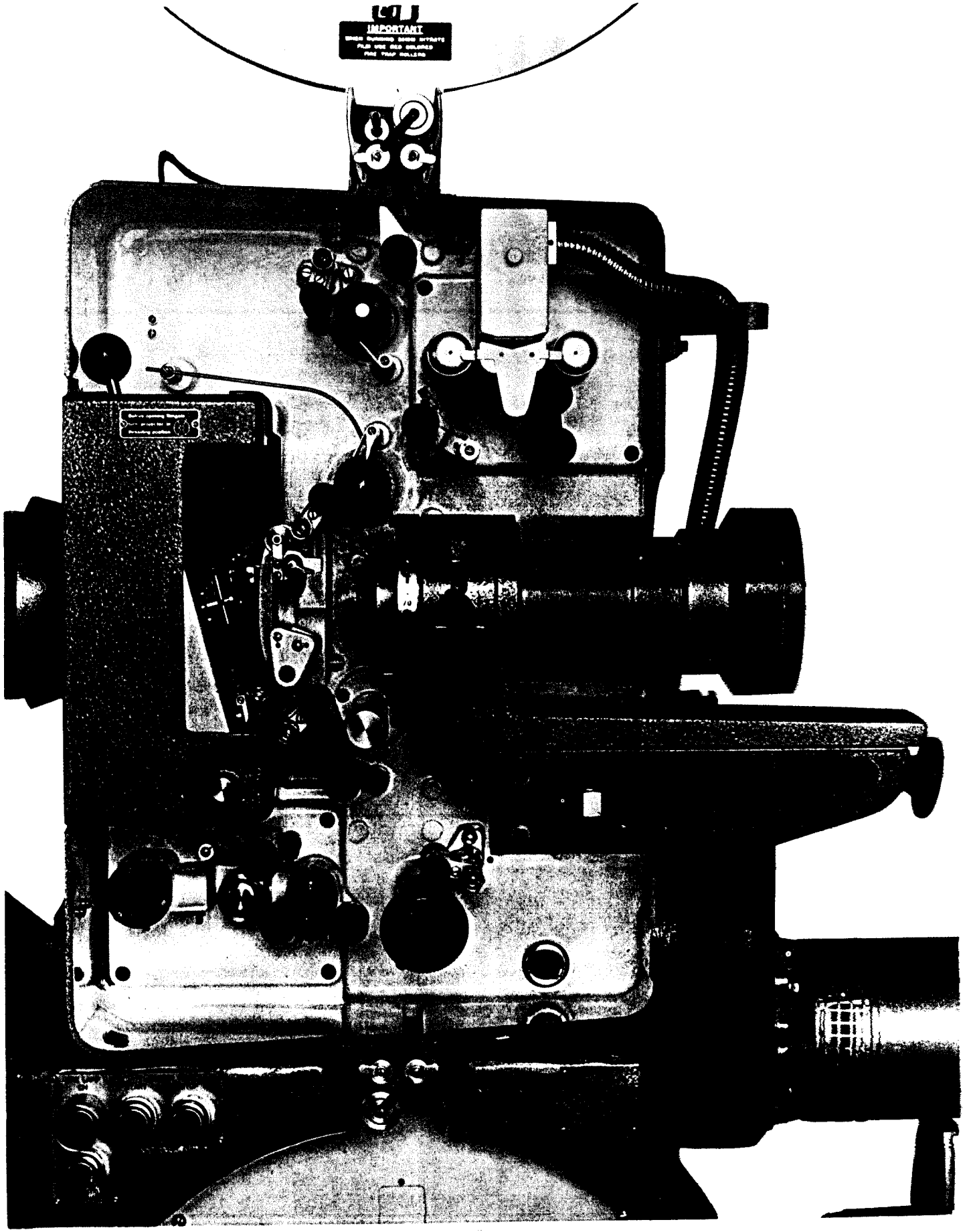


Fig. 5 - Projector Head - Right Side
Door Open - Cooling Plate Released

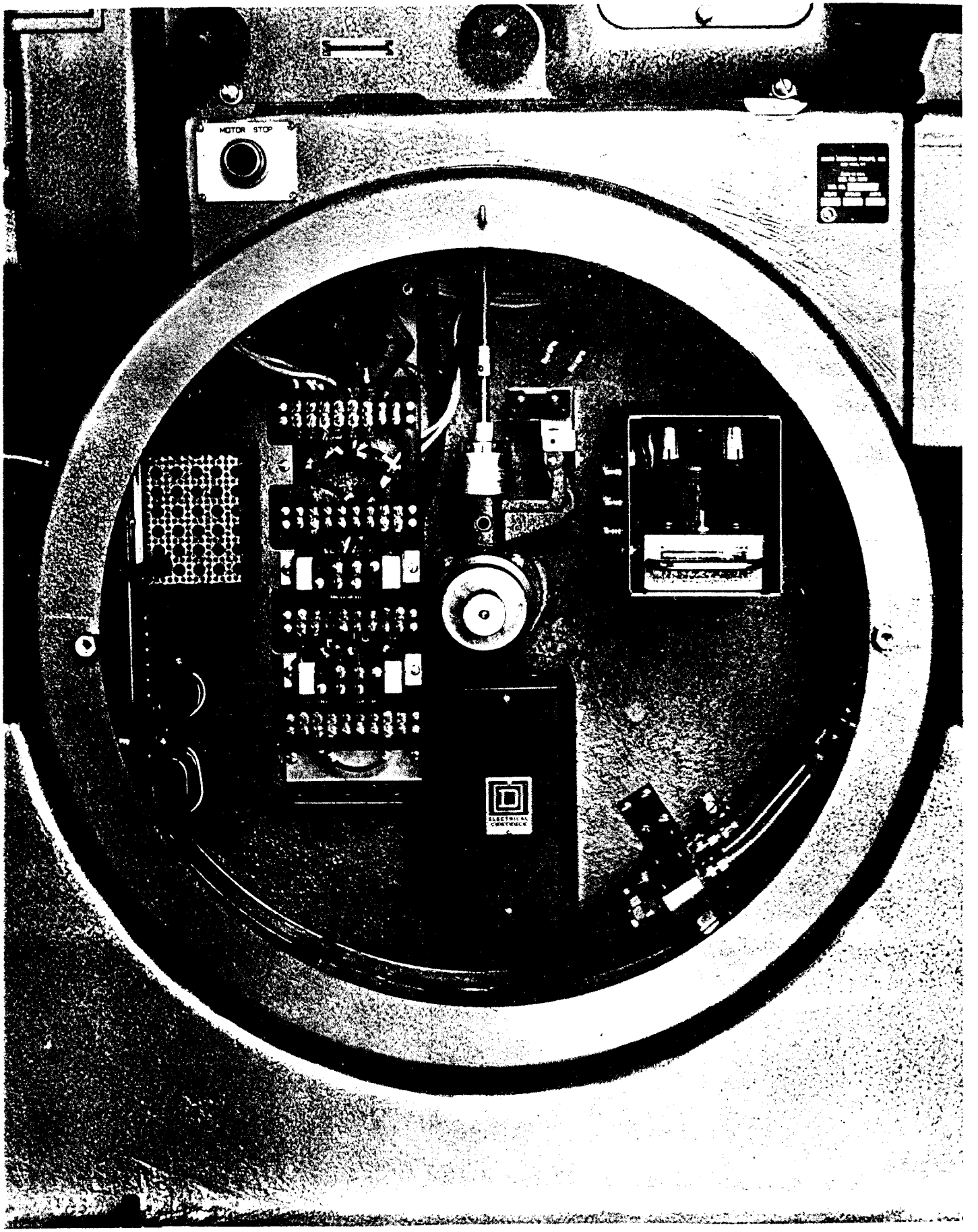


Fig. 7 - Upper Base - Left Side-Cover Removed
With Optical Pre-Amplifier

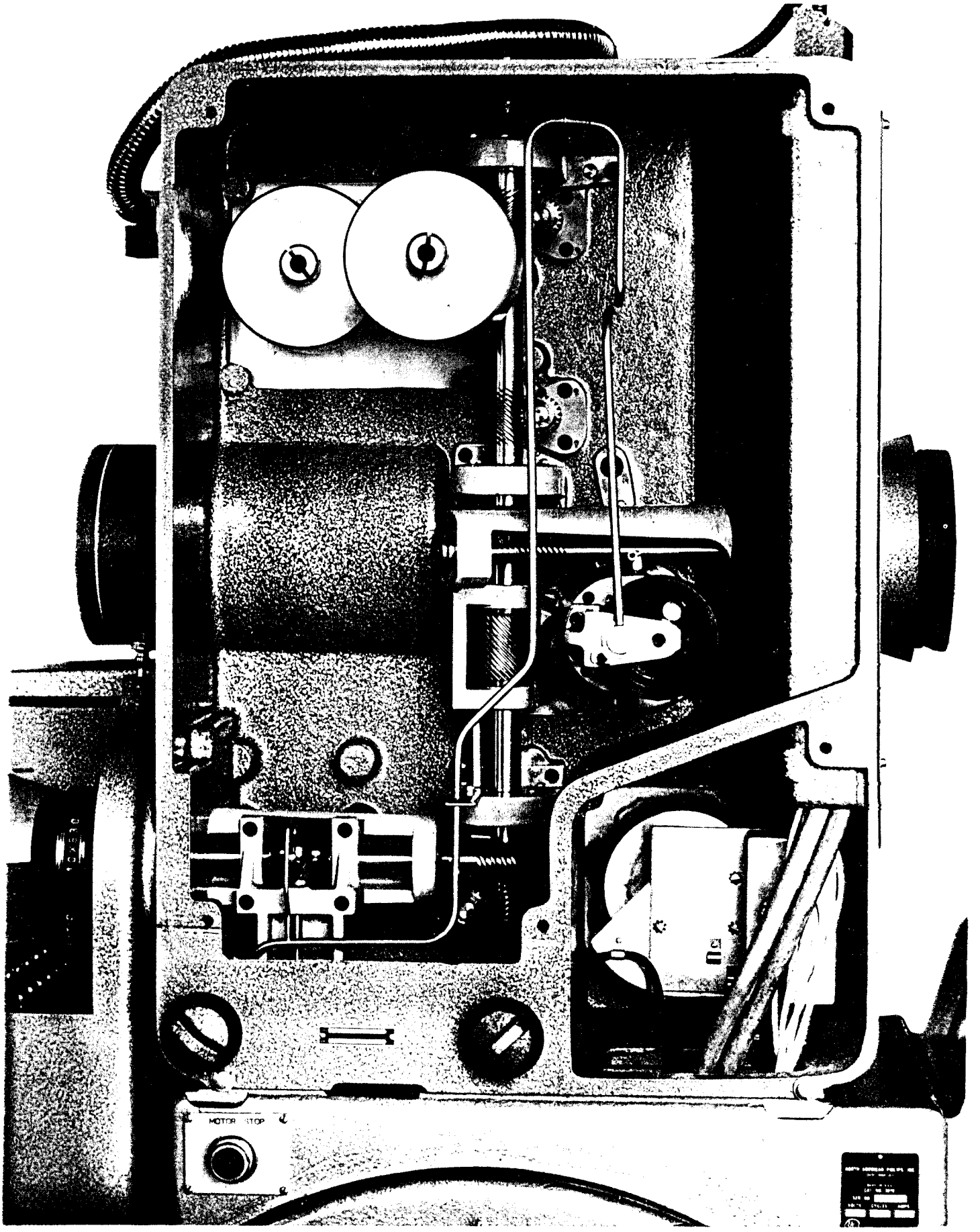


Fig. 8 - Projector Head - Left Side-Cover Removed

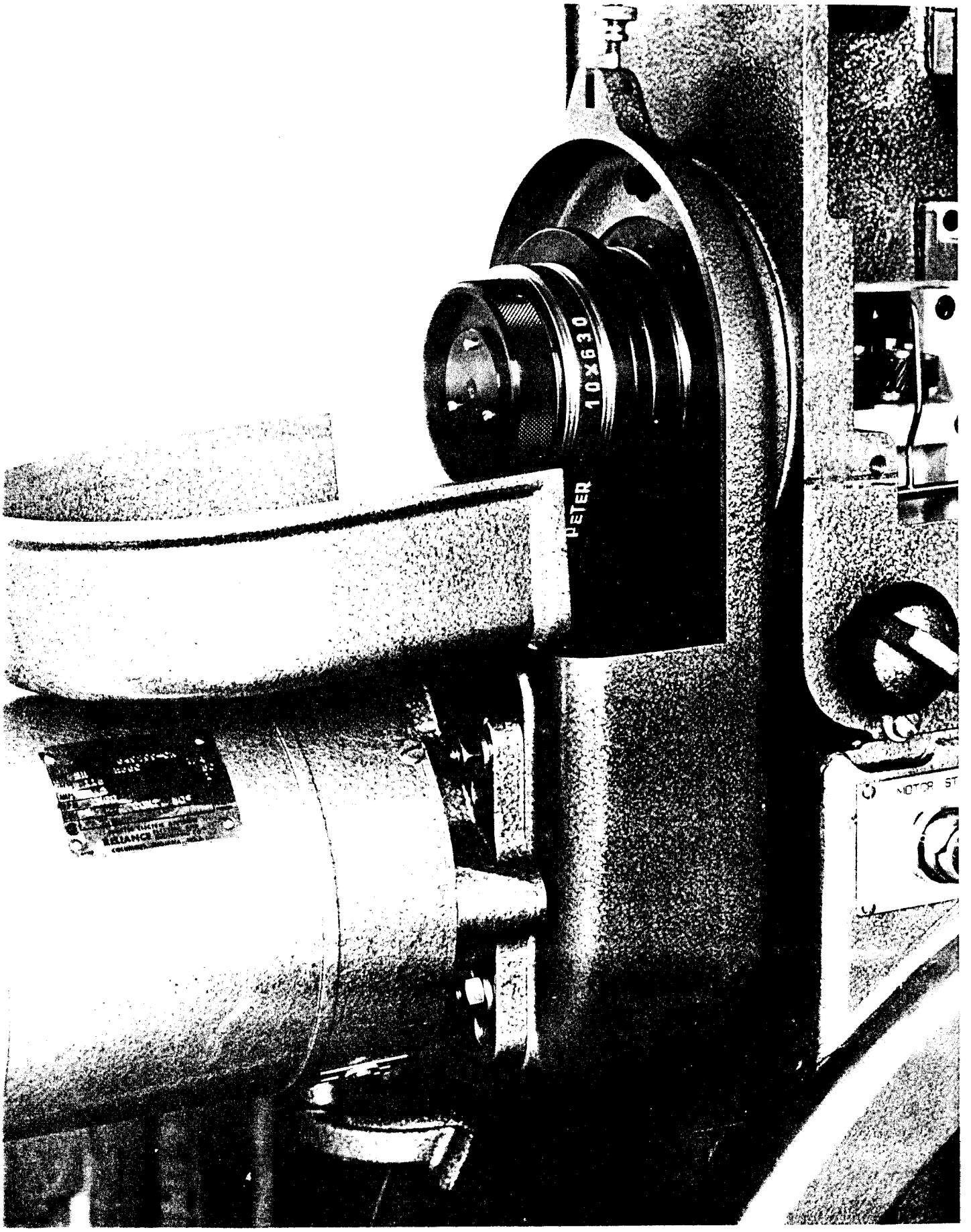


Fig. 9 - Close-up Motor Drive & 2-Speed Clutch Assembly

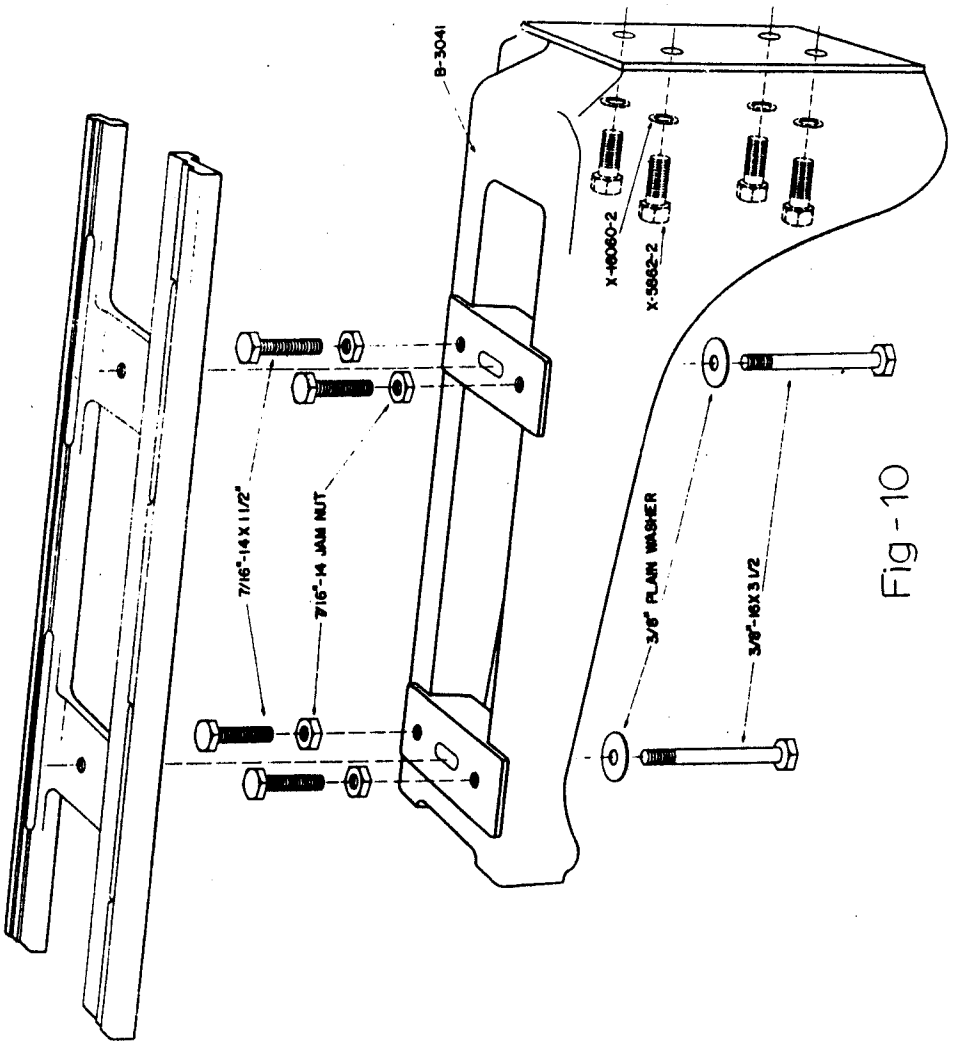

B-3041
X-46080-2
X-5862-2
7/16"-14 X 1 1/2"
7/16"-14 JAM NUT
3/8" PLAIN WASHER
3/8"-16 X 3 1/2

Fig - 10

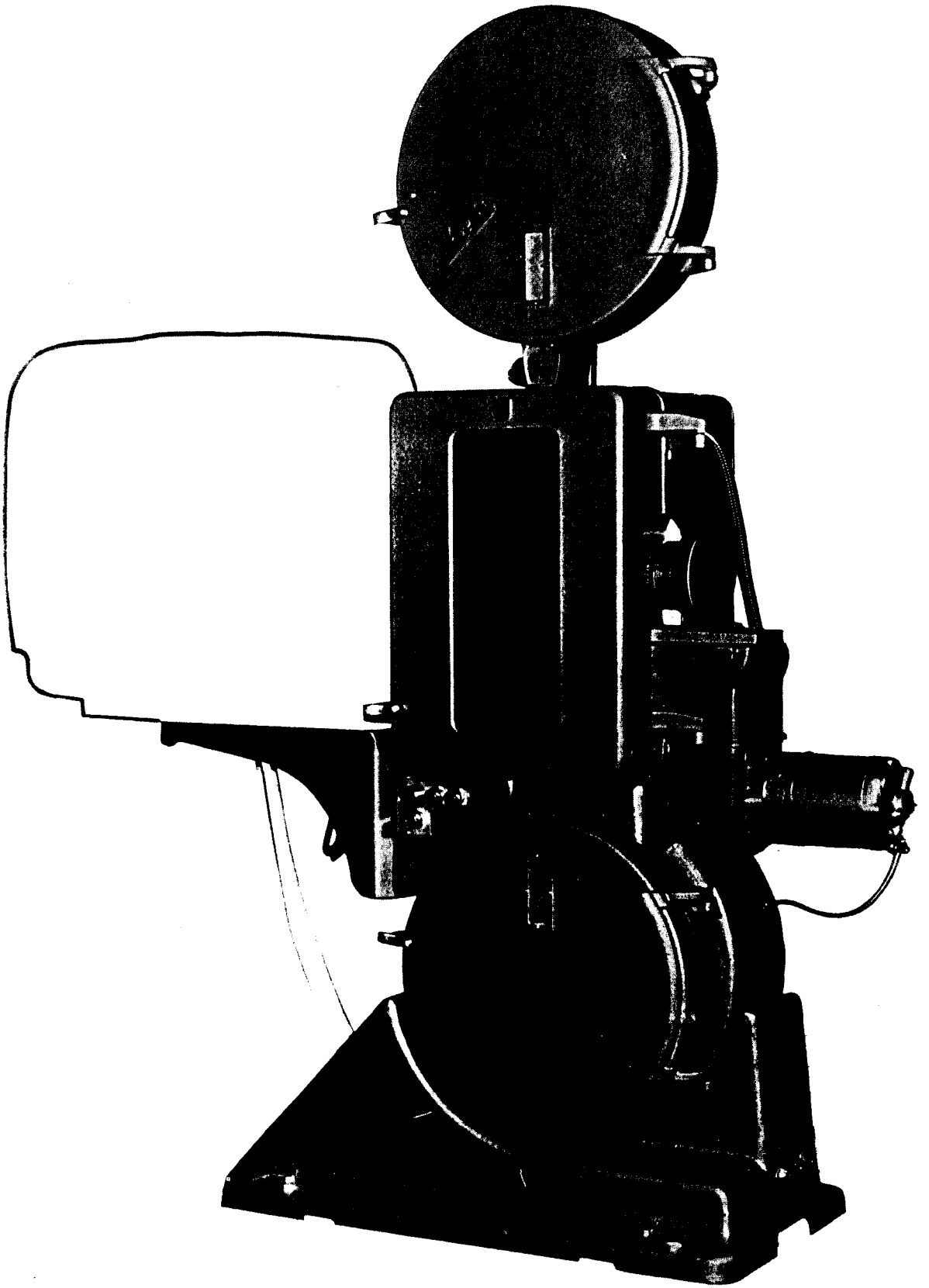


Fig. 1 - Three-Quarter Front View

NORELCO UNIVERSAL 70/35 PROJECTOR
MODEL AA II

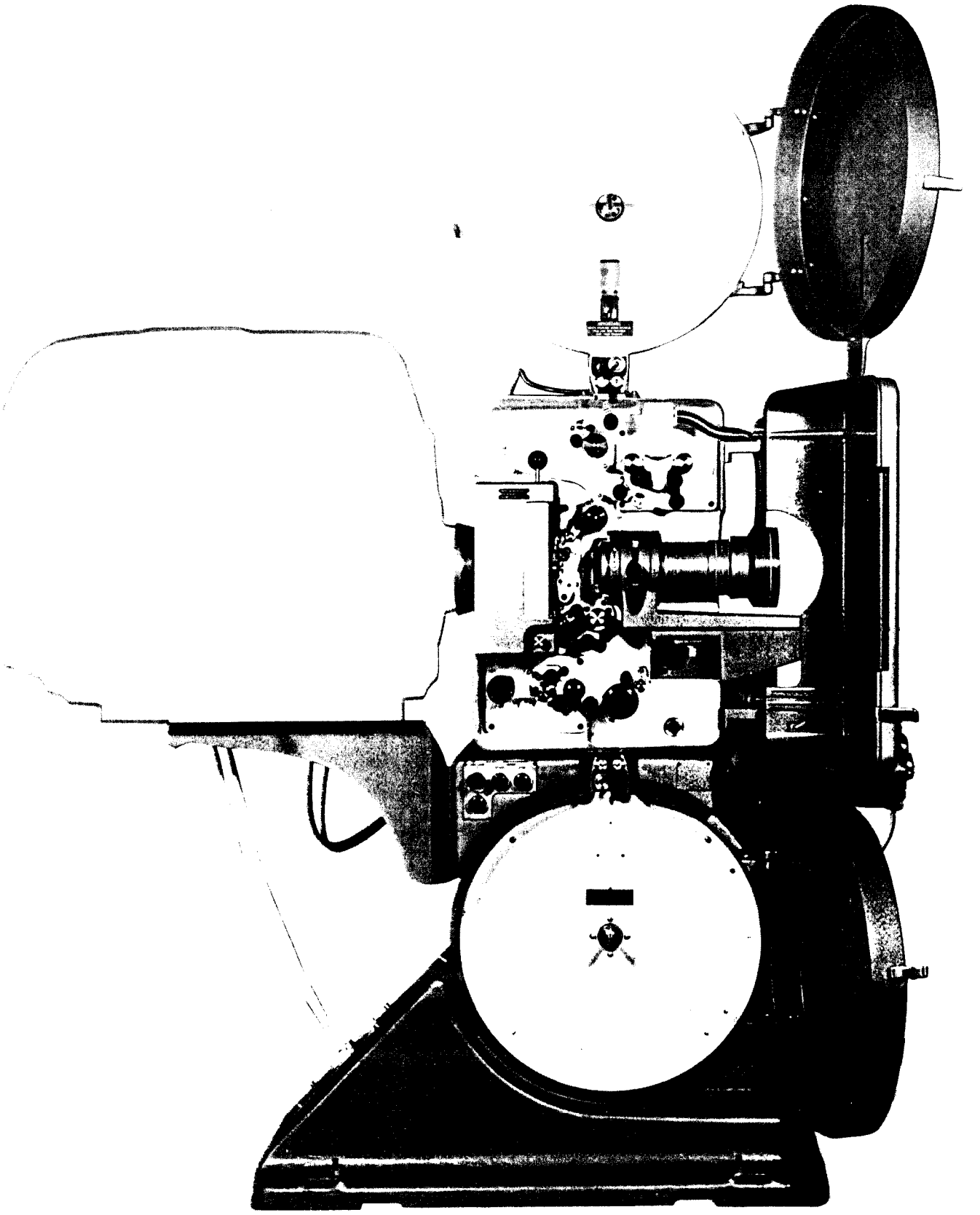


Fig. 2 - Side View - Doors Open

NORELCO UNIVERSAL 70/35 PROJECTOR
MODEL AA II

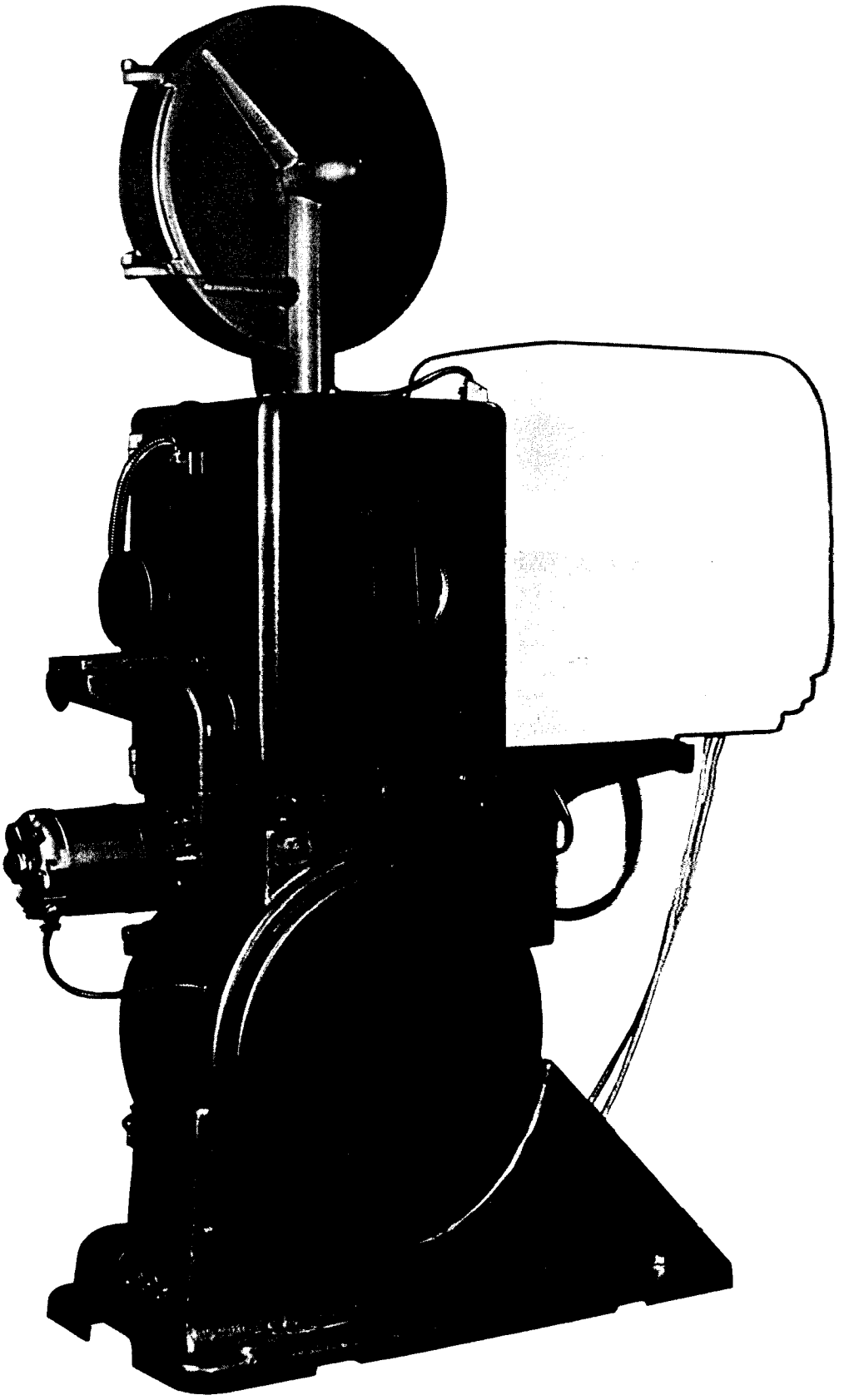


Fig. 3 - Three-Quarter Side View

NORELCO UNIVERSAL 70/35 PROJECTOR
MODEL AA II

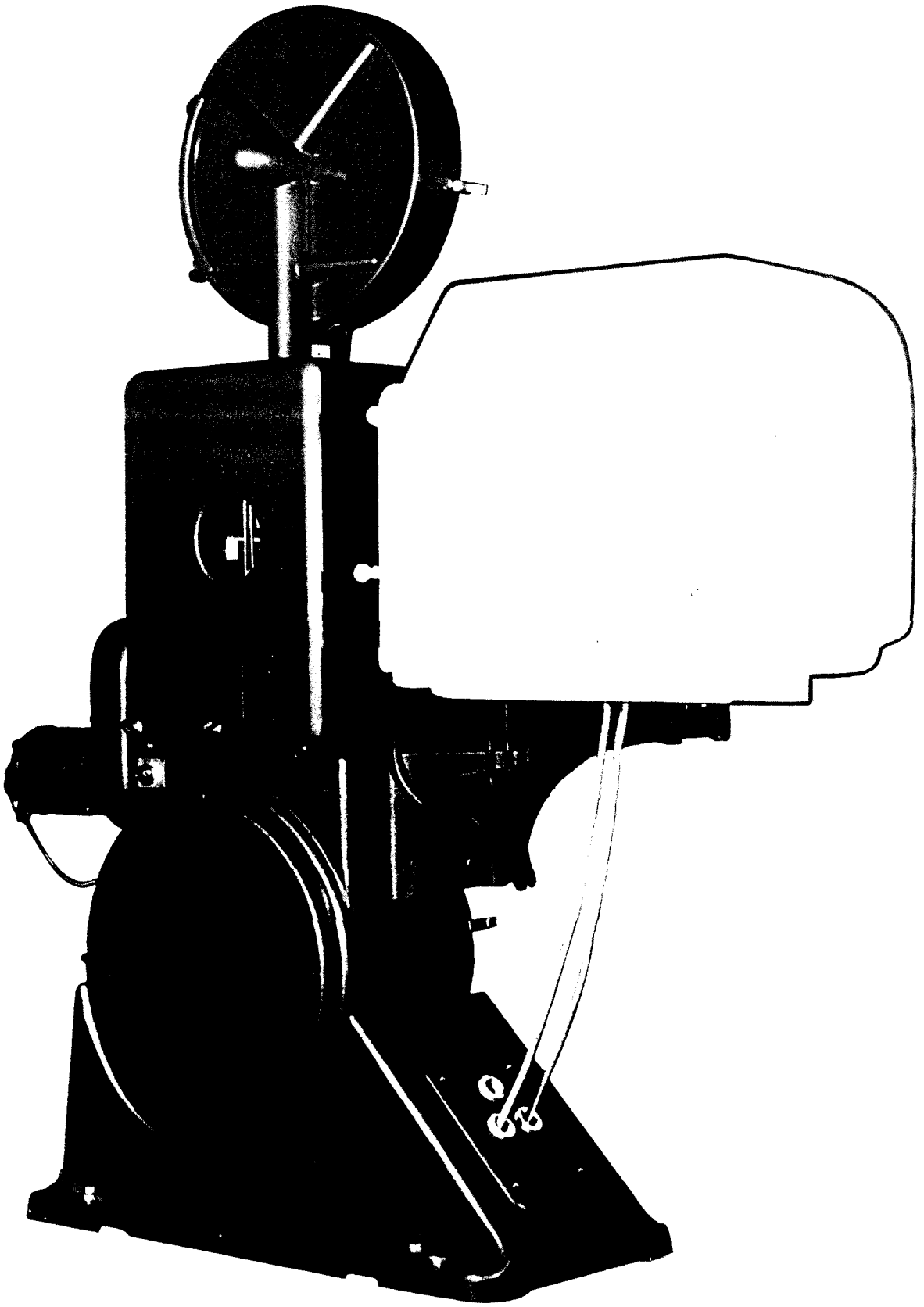


Fig. 4 - Three-Quarter Rear View

NORELCO UNIVERSAL 70/35 PROJECTOR
MODEL AA II

24. Cleaning

a. Overall Check for Cleanliness. Before operating the projector, go over the entire assembly with a clean, dry cloth to remove any grease or dirt present as a result of shipping, assembling, and installing.

b. Magazines. Wipe out the inside of the magazines first with a cloth dampened with a petroleum solvent and then with a clean, dry cloth.

c. Fire Trap Rollers. Remove the upper and lower fire trap rollers and clean them with a cloth dampened with a petroleum solvent.

CAUTION

The fire trap rollers are permanently lubricated. Do not immerse the rollers in cleaning fluid, as this may dissolve the lubricant.

d. Film Compartment. Wipe out the inside of the film compartment with a clean, dry cloth. Use a small brush to clean the pad rollers and sprockets and then wipe them with a cloth dampened with a petroleum solvent. Clean the film gate and all surfaces contacted by the film with a cloth dampened with a petroleum solvent.

CAUTION

Always be careful not to smear the optics of the optical soundhead and the lenses in the lens mount.

e. Lenses. Clean the lenses carefully by the accepted method used in cleaning precision optics. Do not disassemble the lenses.

25. Lubrication

a. Automatic Oil System. Before filling the oil reservoir with special Todd-AO projector oil, make sure the oil drain cap (13) (Fig. 7) is tight. Also check the oil filter to be sure it is clean and that the oil filter cap (16) is tightly installed. If the projector is to be tilted forward or backward at any angle up to 20°, the oil level in the oil level window (17) (Fig. 5) must be even with the top of the red circle. If the projector is to be tilted forward at any angle greater than 20°, the oil level must be even with the bottom of the red circle.

NOTE

Clean the oil filters and change the oil in the projector head after 20 hours of operation. Wash the filters and change the oil again after 50 hours, 100 hours, and every 250 hours thereafter. Wash the filter with a petroleum solvent.

b. General Check of Lubrication Points. In addition to filling the oil reservoir as described above, all lubrication points of the projector should be checked. Refer to Paragraph 36 for complete lubrication data.

26. Water System

a. Before operating the projector, the water supply should be turned on and allowed to run long enough to discover any leaks that may occur in the outside connections, inside connections, or piping.

b. Adjust the water flow switch (10) (Fig. 20) so that it will respond to whatever water system is used. (The pressure of a water recirculating system differs from that of a city water system.) Make the adjustment by removing the cover from the water flow switch and turning the adjusting screw so that the switch operates when the water stops circulating. Make sure that the arc lamp will not start unless water is circulating through the system and that the arc lamp is automatically shut off when the water is turned off.

CAUTION

Never operate the projector when the water is turned off. Both the arc lamp and the cooling plate are water-cooled.

27. Test Run Without Film Installed

CAUTION

Using the inching knob (9) (Fig. 1), turn the projector through several cycles by hand to see that all working parts are operating freely and properly.

a. Motor Switches. After hand-operating the projector as described above, set the motor selector switch (22) (Fig. 1) for the 30 frames per second motor and press the motor start pushbutton (20). Allow the projector to operate for a few seconds, then press the motor stop pushbutton located next to the motor start pushbutton. Repeat this procedure, but this time stop the projector by pressing the motor stop pushbutton (20) (Fig. 2) on the left side of the projector. Next, set the motor selector switch (22) (Fig. 1) for the 24 frames per second motor and repeat the procedure, thus testing

all of the motor pushbutton switches and the motor selector switch. Do not operate selector switch while projector is running.

b. Oil Pump. After testing the motor switches as described in *a* above, start the projector and check the operation of the oil pump. Oil should flow from the ends of all the pipeline outlets onto the several gears located in the left side of the projector head.

c. Framing Light and Upper Magazine Light. During the test run, check to see if the framing light and upper magazine light are lighted.

d. Dowser and Buckle Switch. Before installing film in the projector, check the operation of the dowser (7) (Fig. 6) by manually tripping the film buckle switch actuating lever while the projector is running. The operation of the dowser and the minimum speed safety switch may also be checked by grasping the inching knob with a gloved hand and slowing the speed of the motor.

28. General

The Todd-AO projector is designed to accommodate Todd-AO 70mm film with magnetic sound, 35mm film with magnetic sound, or 35mm film with optical sound. When changing from Todd-AO 70mm film with magnetic sound to 35mm film with magnetic sound, or vice versa, it is necessary to change the pad rollers (3) (Fig. 25) and (10), nylon pressure roller (5), film gate (25), aperture plate (20), and pressure bands (21).

NOTE

Pressure bands for 35mm film are ¼-inch wide; the bands for 70mm film are 3/8-inch wide.

Also, when 35mm nitrate film is to be used, special red fire trap rollers (2) and (11) must be installed. An adapter kit containing all of the interchangeable parts, including the special red fire trap rollers, is furnished with each projector. Always check to see if the right parts are mounted before starting to thread the projector. New projectors are delivered with parts mounted for Todd-AO 70mm film. See Paragraph 29 for instructions covering removal and installation of interchangeable parts. Operating procedure is covered in Paragraph 33. Operating instructions for the Todd-AO theater sound unit are covered in Section VIII. Operating instructions for the automatic focus drift compensator are covered in Section IX.

29. Removal and Installation of Interchangeable Parts

a. Pad Roller. The upper pad rollers (3) (Fig. 25) and the lower pad rollers (10) are removed, installed, and adjusted as follows:

(1) *Removal.*

(a) Push the pad roller (6) (Fig. 21) away from the sprocket (5).

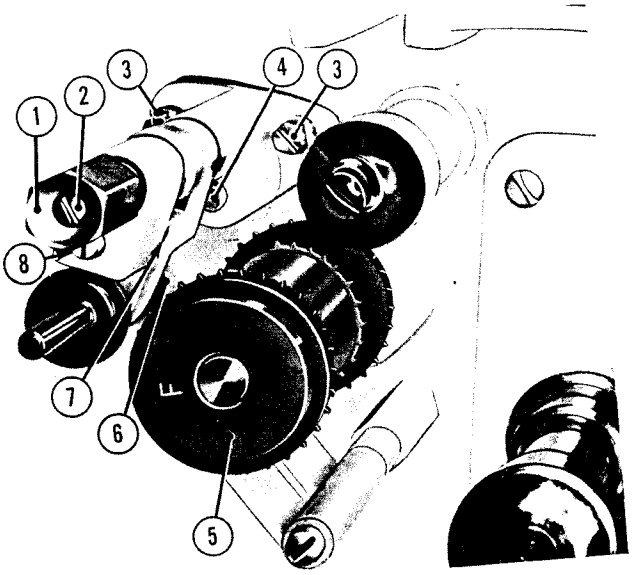
(b) Loosen the two mounting screws (3) that hold the pad roller assembly to the projector head and remove the pad roller assembly.

(2) *Installation.*

(a) Place the pad roller assembly in position, making sure it is properly seated.

(b) Tighten the two mounting screws (3) (Fig. 21).

(3) *Adjustment.* The spring tension of the pad roller is adjusted by loosening the screw (2) (Fig. 21), turning the knob (1) as required, and tightening the screw (2). The clearance of the pad roller (6) against the sprocket (5) is adjusted by loosening the lockscrew (7) and turning the clearance adjusting screw (8). The clearance adjusting screw (8) changes the relationship of the conical adjusting points (4). The clearance adjustment is made as follows:



1. Release and tension adjusting knob
2. Locking screw
3. Mounting screw
4. Conical adjusting point
5. Sprocket
6. Pad roller
7. Lockscrew
8. Clearance adjusting screw

Figure 21. Close-Up of Pad Roller Assembly.

(a) Place two thicknesses of film over the sprocket (5) and turn the pad roller (6) by hand; it must turn freely.

(b) Add a third thickness of film to the sprocket. With the third thickness of film added, the pad roller (6) should rub lightly against the film.

(c) If the clearance is not correct, loosen the lockscrew (7) and turn the adjusting screw (8) in or out as necessary to obtain the clearance described in *(b)* above.

b. Nylon Pressure Roller. The nylon pressure roller (5) (Fig. 25) is removed and installed by removing the slotted cap at the end of the roller. Adjustment of spring tension is made in the same manner as described in *a*(3) above. In this case, however, the two rollers should contact each other lightly with no clearance between them.

c. Film Gate.

(1) *Removal.* Before attempting to remove the film gate, turn the inching knob (9) (Fig. 1)

until the [illegible] indicator (3) (Fig. 22) is
accurately [illegible] Remove the film gate as
follows:

(a) [illegible] release lever (1) (Fig. 22) and
open the [illegible] plate (7).

(b) [illegible]osen the thumbscrew (5) (Fig. 23)
that hold[illegible] film [illegible] pad rollers (3) and (7) as
shown in [illegible]igure

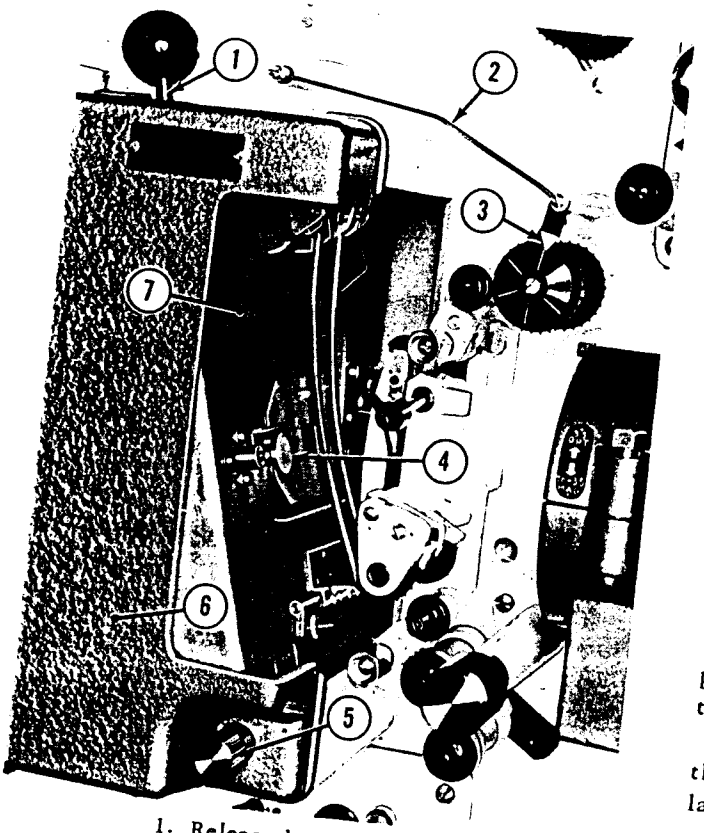
(c) Open the film gate as shown in Figure 24, taking [illegible]om the intermittent sprocket with the little [illegible]ger of the right hand.

(d) Grasp the filmstripper (1) (Fig. 24) is held awa[illegible]

(e) Pull the film gate straight out away from the projector head.

CAUTION

When removing the film gate, be sure it does not hit the teeth on the intermittent sprocket.



1. Release lever
2. Film buckle switch lever
3. Open shutter indicator
4. Cooling plate release knob
5. Knurled holding knob
6. Cooling plate cover
7. Cooling plate

Figure 22. Projector Prepared for Film Gate Removal.

(2) *Installation.*

(a) Hold the film gate as shown in Figure 24.

(b) Push the film gate into position by moving it directly toward the projector head.

CAUTION

When installing the film gate, be sure it is held properly. Move the film gate into position slowly and carefully, making sure that the filmstripper (1) (Fig. 24) clears the intermittent sprocket (2) and that the film gate clears the pressure bands on the aperture plate. Always be sure the film gate is properly seated before tightening the thumbscrew.

(c) When the film gate is properly seated, tighten the thumbscrew (5) (Fig. 23).

d. Aperture Plate. Several sizes of aperture plates are furnished with the adapter kit shipped with each projector. Be sure the correct aperture plate is selected for the type of film to be run. Remove and install the aperture plate as follows:

(1) *Removal.*

(a) Turn the latch that holds the aperture plate 90° to release the aperture plate.

(b) Slide the aperture plate out of its position in the cooling plate, being careful not to damage the pressure bands.

NOTE

The aperture plates are made with a slight lengthwise curvature to provide tension against the holding latch. Do not attempt to straighten the aperture plates.

(2) *Installation.*

(a) Insert the aperture plate in the cooling plate. Be sure the aperture plate is centered on the centering pin.

(b) Hold the aperture plate firmly against the face of the cooling plate and turn the holding latch 90° to lock it in position.

e. Pressure Bands.

(1) *Removal.* Before removing the pressure bands, open the cooling plate as shown in Figure 23. Use the special tool contained in the adapter kit to unhook the pressure bands (10) (Fig. 23).

CAUTION

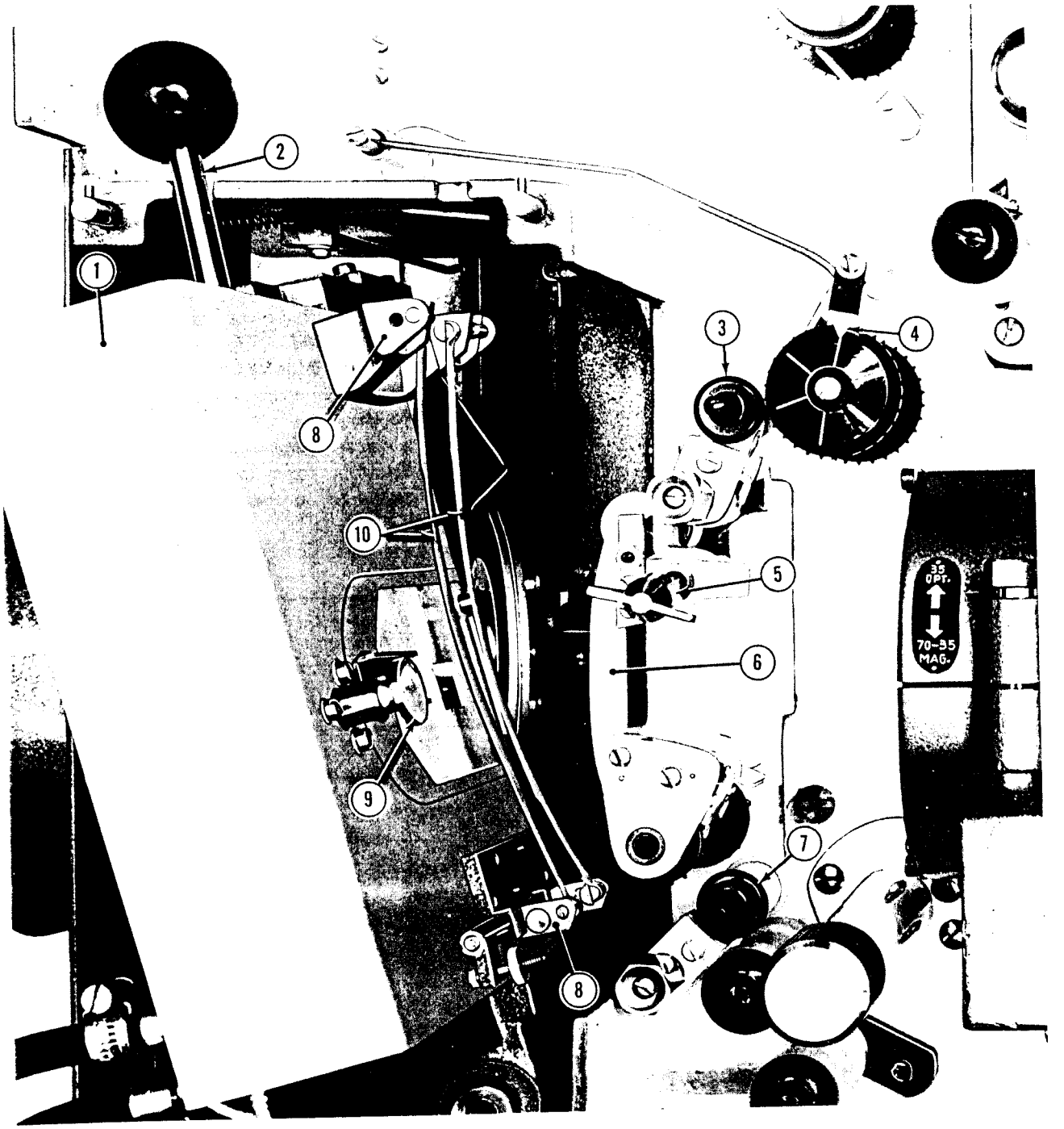
Never try to remove the pressure bands by pulling them from the center. This will damage the engaging ends

of the pressure bands and prevent them from holding the film properly.

(2) *Installation.* Hold the pressure band at the end and push it onto the pressure band holder.

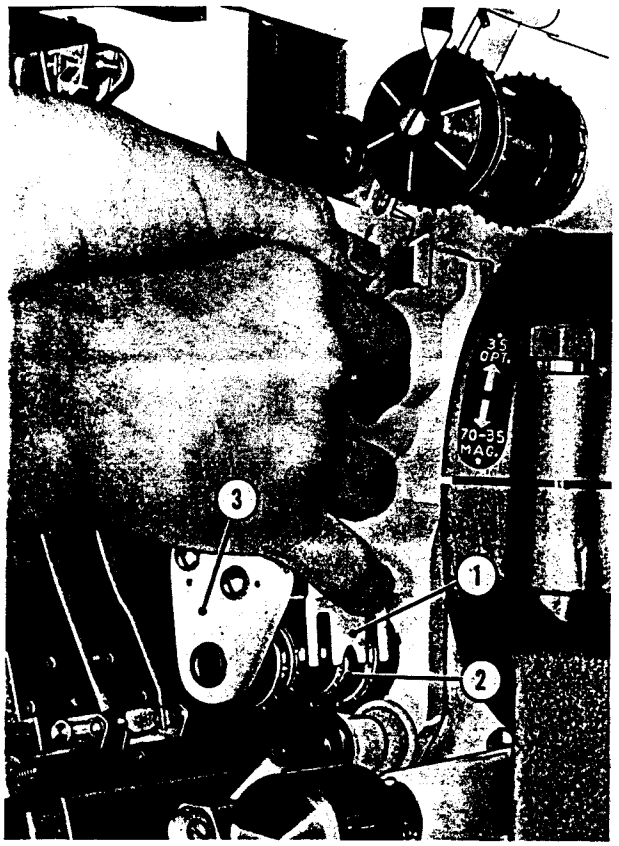
CAUTION

The pressure bands must be installed so that the cutout portions nearest the end of the bands are on the lower inside position, facing each other.



1. Cooling plate
2. Release lever
3. Pad roller for intermediate feed sprocket
4. Open shutter indicator
5. Thumbscrew
6. Film gate
7. Pad roller
8. Pressure band holder
9. Release knob
10. Pressure bands

Figure 23. Projector Prepared for Pressure Band Removal.



1. Filmstripper
2. Intermittent sprocket
3. Film gate

Figure 24. Method of Holding Film Gate.

30. Setup For Todd-AO 70mm Film With Magnetic Sound (Fig. 25)

a. General. Figure 25 shows the setup and threading for Todd-AO 70mm film with magnetic sound. Interchangeable parts are identified in Paragraphs 28 and 29. All interchangeable parts used with Todd-AO 70mm film are color coded red. See Paragraph 33 for complete operating procedure.

b. Lens Mount Pin. The lens mount pin (27) (Fig. 25) must be in the "down" position for Todd-AO 70mm film. To change the position of the lens mount pin, first loosen the lens mount clamping bolt (9).

c. Threading Todd-AO 70mm Film. Before starting to thread the projector, set the framing indicator (14) (Fig. 5) in the center position by turning the framing knob (15) as necessary. By setting the framing indicator in the center position, later framing adjustments may be made in either direction.

(1) Open the cooling plate (1) (Fig. 23).

(2) Open all of the pad rollers.

(3) Install the loaded reel in the upper magazine and pull out enough film to permit full length threading and anchoring in the take-up reel in the lower magazine.

(4) Thread the film over the guide roller (1) (Fig. 25) and through the fire trap rollers (2) in the upper fire trap. Be sure this is done as shown in Figure 25.

(5) Thread the film through the magnetic soundhead as shown in Figure 25, through the film gate, and all the way down to the hold-back sprocket (13) (Fig. 25), leaving all of the pad rollers open.

(6) Set the film so that it is properly framed and close the pad roller on the intermittent sprocket (19).

(7) Set the upper loop (22).

CAUTION

The method of threading described in these instructions is the minimum loop method. This means that the projector is pulled down for threading when it is at its minimum loop phase in its cycle of operation. This is when the intermittent has just pulled the film down and the shutter has turned 90° to reach its open (vertical)

1. Upper fire trap guide roller
2. Upper fire trap rollers
3. Upper pad roller
4. Upper feed sprocket
5. Nylon pressure roller
6. Red tension indicator
7. Pivoting guide roller
8. Adjustable guide roller
9. Lens mount clamping bolt
10. Lower pad roller
11. Lower fire trap rollers
12. Lower fire trap guide roller
13. Hold-back sprocket
14. Optical soundhead
15. Sound drum
16. Pressure roller
17. Guide roller
18. Pad roller for intermittent sprocket
19. Intermittent sprocket
20. Aperture plate
21. Pressure band
22. Upper loop
23. Intermediate feed sprocket
24. Pad roller for intermediate feed sprocket
25. Film gate
26. Lower loop
27. Lens mount pin
28. Exciter lamp housing

Figure 25. Setup for Todd-AO Film with Magnetic Sound and 35mm Film with Magnetic Sound (Minimum Loop Setting) (Legend).

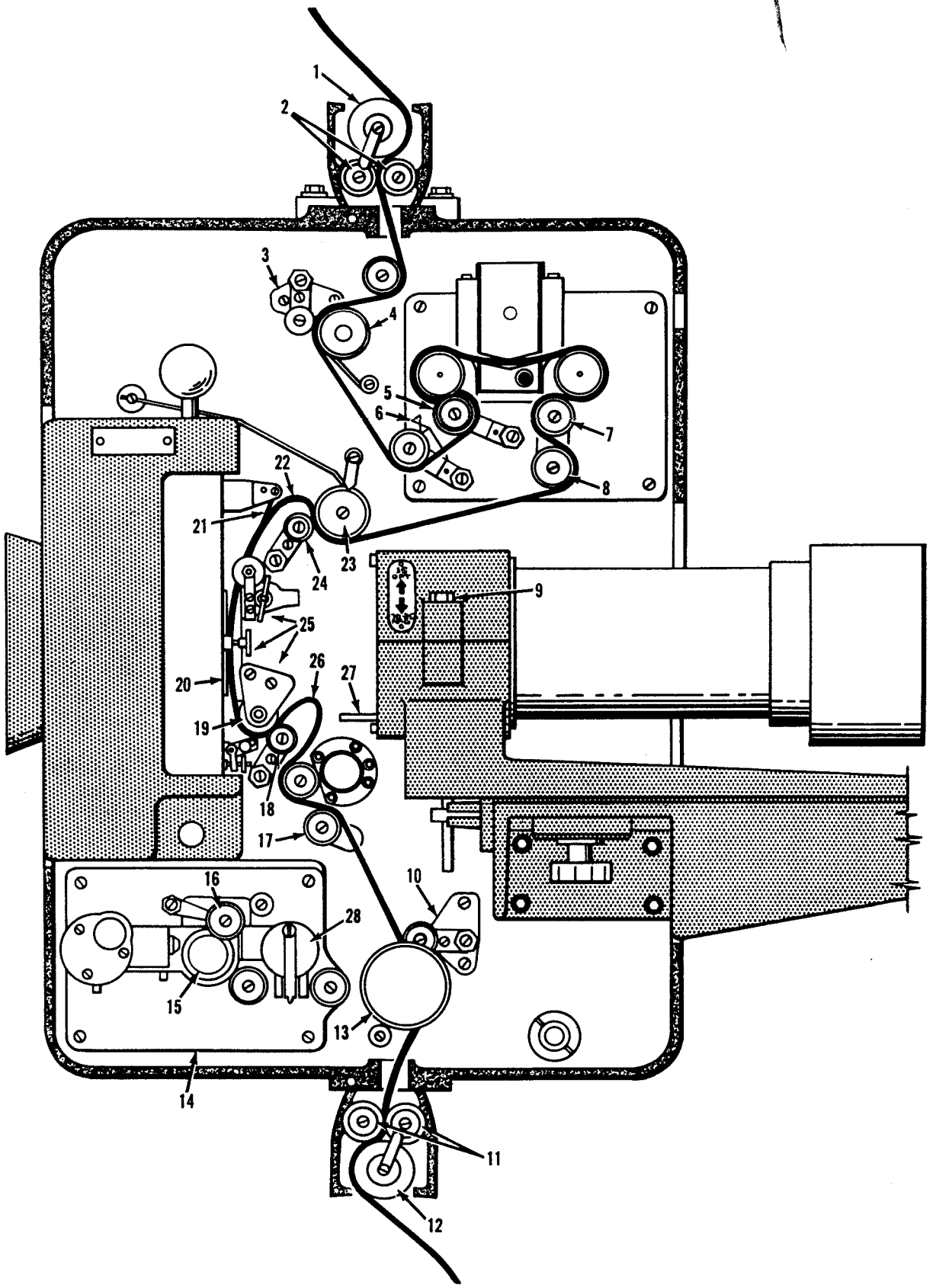


Figure 25. Setup for Todd-AO 70mm Film with Magnetic Sound and 35mm Film with Magnetic Sound (Minimum Loop Setting).

position. At this point the open shutter indicator must be aligned as shown in Figure 22. When setting the upper loop by the minimum loop method, the film should lie closely over the pad roller (24) (Fig. 25) leaving only enough slack for the framing adjustment. Be sure the projector is in the correct phase of its cycle before setting the upper loop. Otherwise, unnecessary film breakage may occur.

NOTE

If the operator prefers to thread the projector by the maximum loop method, the projector must be pulled down for threading at the last point when the shutter is open just before the intermittent begins its pull down movement. In this case the open shutter indicator (3) (Fig. 22) must be set to indicate an open shutter at this point. When the projector is threaded by the maximum loop method, the upper loop should be approximately 1¼ inches above the pad roller (24) (Fig. 25) when the pad roller is closed. If the maximum loop method is used, the lower loop must be set at its minimum.

(8) After setting the upper loop, close the pad roller (24) against the intermediate feed sprocket (23).

(9) Thread the film through the magnetic soundhead and over the upper feed sprocket (4).

NOTE

For proper sound synchronization, the film must measure 24 frames from the magnetic pick-up head to the frame that is over the aperture. If the film does not measure 24 frames, it may be adjusted by removing the guide roller (7), loosening the nut on the guide roller bracket, and pivoting the roller (8) inward or outward as required.

(10) Obtain the proper tension through the magnetic soundhead by tightening or loosening the film until the red tension indicators (6) are aligned.

NOTE

The function of the small knob (5) (Fig. 26) at the bottom of the magnetic pick-up head is to press the film against the magnetic pickup with the proper amount of pressure. For Todd-AO 70mm film the knob should be set at zero or 70. For 35mm film the knob should be set at 35. Be sure to set the knob at zero when removing the cover from the magnetic pick-up head.

(11) Close the pad roller against the upper feed sprocket.

(12) Set the lower loop (26).

NOTE

At this point in the cycle of operation of the projector the lower loop is at its maximum. The top of the loop should extend about ¾ of an inch above the pad roller (18). Minimum loops result in quieter operation.

(13) Close the pad roller on the hold-back sprocket.

NOTE

The loops should be as small as possible without causing film breakage. Large loops are inclined to flap during operation and cause undesirable noise in the projector.

(14) At this point, recheck the framing of the film in the aperture plate. This is done by turning the inching knob and observing the film as it passes the aperture plate. The film, in its stopped position, must frame accurately in the aperture plate. If the framing adjustment is out by less than one sprocket hole, the correction may be made by turning the framing knob (15) (Fig. 5). One frame range in adjustment is available, but is not recommended as standard practice.

(15) After checking the framing, thread the film through the lower fire trap rollers (11) (Fig. 25), over the guide roller (12) into the lower magazine, and anchor it on the take-up reel.

31. Setup For 35mm Film With Magnetic Sound (Fig. 25)

Figure 25 also shows the setup and threading for 35mm film with magnetic sound. The threading for 35mm film with magnetic sound is the same as it is for the Todd-AO 70mm film with magnetic sound except that the 35mm film runs on the inner sections of the stabilizers and the picture should precede the sound by 28 frames instead of 24 frames. However, the setup for 35mm film requires

that all interchangeable parts for 35mm film be installed. These parts are color coded blue.

NOTE

Pressure bands for 35mm film are ¼-inch wide.

Refer to Paragraph 29 for instructions on the removal and installation of interchangeable parts. With the exceptions mentioned above, Paragraph 30 covers the threading instructions for 35mm film with magnetic sound. See Paragraph 33 for complete operating procedure.

32. Setup For 35mm Film With Optical Sound

a. General. Figure 26 shows the setup and threading for 35mm film with optical sound. As in the case of 35mm film with magnetic sound, all the interchangeable parts are color coded blue. The lens mount pin (27) (Fig. 26) must be in the "up" position. Prepare the projector for threading in the same manner described in Paragraph 30c (1) through (3). See Paragraph 33 for complete operating procedure.

b. Threading 35mm Film with Optical Sound.

(1) Thread the film through the upper fire trap as described in Paragraph 30c(4) and shown in Figure 26.

(2) Pass the film directly to the intermediate feed sprocket (23) (Fig. 26), bypassing the magnetic soundhead.

(3) Thread the film through the film gate (25) and optical soundhead (14) as shown in Figure 26, leaving the pad rollers open.

(4) Set the film so that it is properly framed and close the pad roller (18) on the intermittent sprocket (19).

(5) Set the upper loop (22) as described in Paragraph 30c(7).

(6) After setting the upper loop, close the pad roller (24) against the intermediate feed sprocket (23).

(7) Set the lower loop by holding the forefinger on the pad roller (18) and passing the film over the forefinger.

(8) After setting the lower loop and removing the slack in the film, close the lower pad roller (10) on the hold-back sprocket (13).

NOTE

For proper synchronization of optical sound, the sound takeoff precedes the picture by 20 frames.

(9) Thread the film through the lower fire trap rollers (11), over the guide roller (12) and into the lower magazine. Anchor the film on the take-up reel.

33. Operating Procedure (all films)

a. Projector Setup. Be sure that the proper interchangeable parts are installed for the type of film to be run. Interchangeable parts for Todd-AO 70mm film are color coded red and parts for 35mm film are color coded blue. See Paragraph 29 for instructions for the removal and installation of interchangeable parts.

b. Lens Mount Pin. The lens mount pin must be in the "down" position for Todd-AO 70mm film and 35mm film with magnetic sound, and in the "up" position for 35mm film with optical sound. To change the lens mount pin, first loosen the clamping bolt (9) (Fig. 25). The correct position of the lens mount pin for each setup is shown in Figures 25 and 26.

c. Framing Indicator. Before starting to thread the projector, set the framing indicator (14) (Fig. 5) in the center position by turning the framing knob (15) as necessary. By setting the framing indicator in the center position later framing adjustments may be made in either direction.

d. Motor Selector Switch. Set the motor selector switch (5) (Fig. 3) for either 30 frames per second (Todd-AO 70mm film) or 24 frames per second (35-mm film) as required.

e. Water Cooling System. Open the intake valve of the water cooling system.

NOTE

The intake valve of the water cooling system is located outside of the projector. Consequently, this valve does not appear in any of the illustrations in this instruction book.

f. Threading. Threading for the different types of film is shown in Figures 25 and 26. However, before any threading is attempted, the following procedure must be followed:

(1) Open the cooling plate (see Paragraph 29c(1)).

(2) Open all of the pad rollers.

(3) Install the film in the upper magazine and pull out enough film to permit full length threading and anchoring in the take-up reel in the lower magazine.

(4) Refer to Paragraphs 30, 31, and 32 for instructions for threading the different types of film.

g. Test Run with Film Installed. After the projector is threaded, check all pad rollers to see if they are closed. Turn the projector through several cycles by hand to see if it runs smoothly. When it is certain that the projector is working properly,

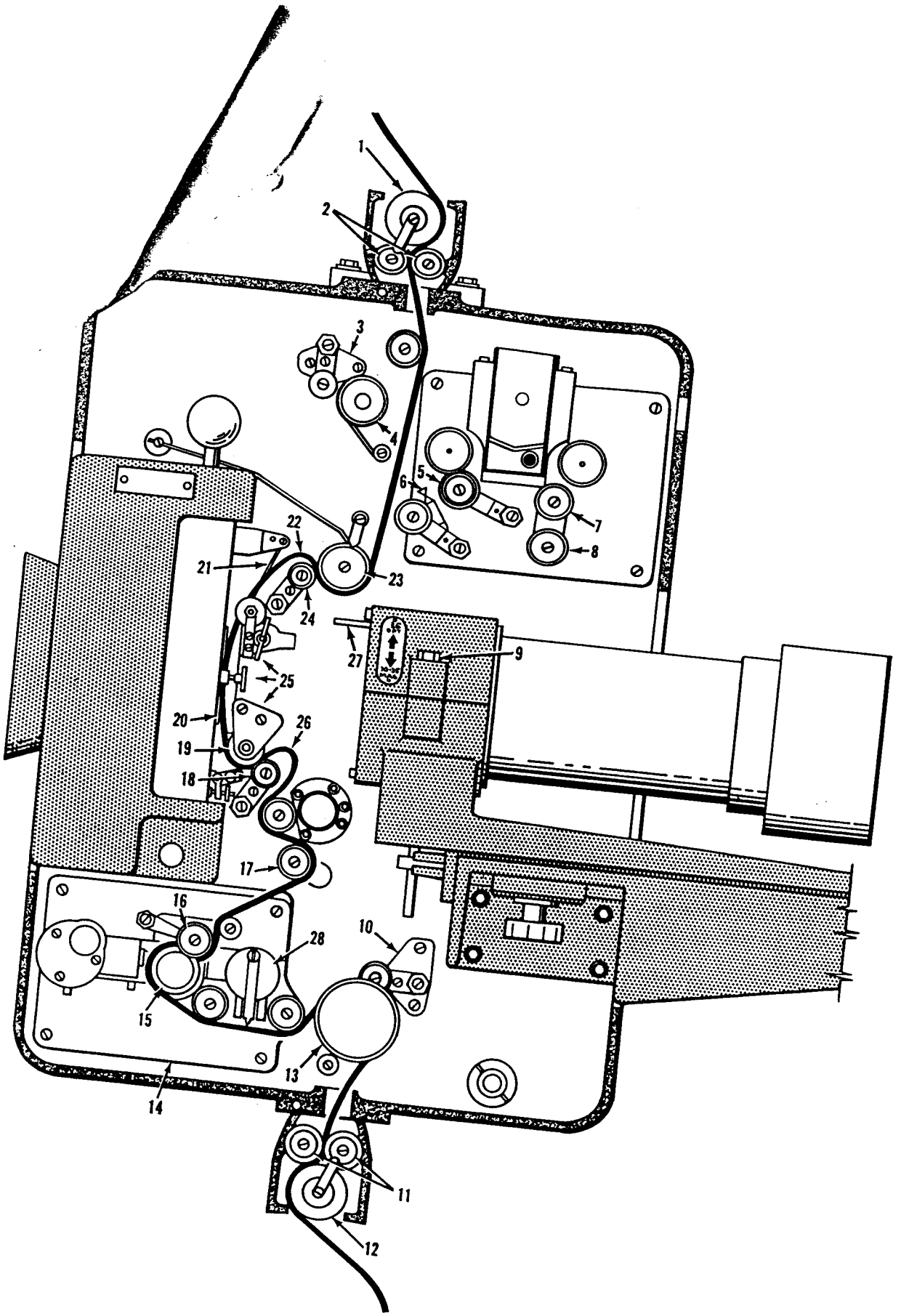


Figure 26. Set-up for 35mm Film with Optical Sound (Minimum Loop Setting).

1. Upper fire trap guide roller
2. Upper fire trap rollers
3. Upper pad roller
4. Upper feed sprocket
5. Nylon pressure roller
6. Red tension indicator
7. Pivoting guide roller
8. Adjustable guide roller
9. Lens mount clamping bolt
10. Lower pad roller
11. Lower fire trap rollers
12. Lower fire trap guide roller
13. Hold-back sprocket
14. Optical soundhead
15. Sound drum
16. Pressure roller
17. Guide roller
18. Pad roller for intermittent sprocket
19. Intermittent sprocket
20. Aperture plate
21. Pressure band
22. Upper loop
23. Intermediate feed sprocket
24. Pad roller for intermediate feed sprocket
25. Film gate
26. Lower loop
27. Lens mount pin
28. Exciter lamp housing

Figure 26. Setup for 35mm Film with Optical Sound (Minimum Loop Setting) (Legend).

start the projector and check the following:

(1) *Picture Focus.* The focusing point for the Todd-AO projector is not the center of the screen, but a point one-third of the distance from either end of the screen. The picture is properly focused when it is sharpest at this point.

(2) *Framing.* If the film is threaded correctly, improper framing may be corrected by turning the framing knob (15) (Fig. 5) as required.

(3) *Pressure Band Tension.* With the projector in operation, turn the pressure band tension adjusting knob (4) (Fig. 28) in a counterclockwise direction until the picture becomes unsteady; then retighten the knob until the picture is steady.

34. Cleani

a. Pad Rollers. During operation the pad rollers tend to accumulate a coating of wax. Remove the rollers at least once each week and clean them thoroughly with a cloth dampened with a petroleum solvent.

b. Film Gate. Remove the film gate (Par. 29*c*) at least once each week and clean it with a cloth dampened with a petroleum solvent. Be sure all wax is removed.

c. Fire Trap Rollers. Remove the fire trap rollers (2) (Fig. 25) and (11) at least once each week and clean them thoroughly with a cloth dampened with a petroleum solvent.

CAUTION

The fire trap rollers are permanently lubricated and should not be immersed in the cleaning solvent as this may dissolve the lubricant.

d. Interior of Projector Head. At least once each week wipe out the entire interior of the projector head with a cloth dampened with a petroleum solvent.

e. Exterior of Projector. Clean the exterior of the projector periodically with a petroleum solvent. Remove any excess grease, oil, or accumulated dirt.

f. Interior of Magazines. Wipe out the interior of the magazines at least once each week with a cloth dampened with a petroleum solvent.

g. Oil Filter. At least once each week remove the oil filter cap (19) (Fig. 2) and remove the oil filter and clean it thoroughly with a petroleum solvent having a high flash point.

h. Lenses. Clean the lenses in the approved method.

NOTE

Do not remove the lenses from the lens barrel. Clean only the exterior surface of the outer lenses.

35. Lubrication

a. Oil System. All of the main shaft drive bearings are lubricated by the automatic oil system. Consequently, these points need no attention from the operator. All that is necessary is to be sure the oil system is working properly. The oil filter should be checked periodically for cleanliness. Whenever a filter becomes damaged or difficult to clean, replace it with a new filter. When replacing the oil filter, be sure the knurled end of the filter is out toward the filter cap. The oil should be changed whenever it appears discolored or seems to be losing its lubricating quality. Special Todd-AO projector oil must be used. (See Paragraph 25*a* for instructions for filling the oil reservoir.) Figure 27 shows the lubrication points of the projector.

b. Film Gate Edge Guide Bearings. Apply a drop of projector oil to the film gate edge guide bearings (14) (Fig. 27) once each day and whenever the gate is changed.

c. Intermittent Sprocket Bearing. Apply a drop of projector oil to the intermittent sprocket bearing (12) once each day and whenever the gate is changed.

d. Pad Rollers. Remove the pad rollers (10) once each week and apply one drop of projector oil to each pad roller shaft.

e. Guide Rollers and Pressure Rollers. Remove the rollers (11) from their respective shafts at least once each week and apply one drop of projector oil to each roller shaft.

f. Friction Brake Disk. Place several drops of gear oil on the friction brake disk (1) once each month. Use enough oil to penetrate the entire disk, but not enough to cause dripping.

g. Friction Clutch Disk. Lubricate the friction clutch disk (6) in the same manner as the friction brake disk (see *f* above).

h. Drive Shaft Bushing. Apply a small amount of bearing grease to the drive shaft bushing (4) when the projector is installed.

i. Lower Reel Drive Gear. Apply a small amount of gear grease to the lower reel drive gear (5) when the projector is installed and once every three months thereafter.

j. Film Buckle Switch Levers. Apply one drop of projector oil to all pivot points of the film buckle switch levers (2) once each month.

36. Adjustments

Drive Belt. Check the drive belt once each month for proper tension. The belt should run with no slack, but it should not be stretched.

1. Friction brake disk
2. Film buckle switch levers
3. Oil drain cap
4. Drive shaft bushing
5. Lower reel drive gear
6. Friction clutch disk
7. Oil filter cap
8. Oil pump
9. Oil lines
10. Pad rollers
11. Guide rollers and pressure rollers
12. Intermittent sprocket bearing
13. Oil level window
14. Film gate edge guide bearings

Figure 27. Lubrication Chart (Legend).

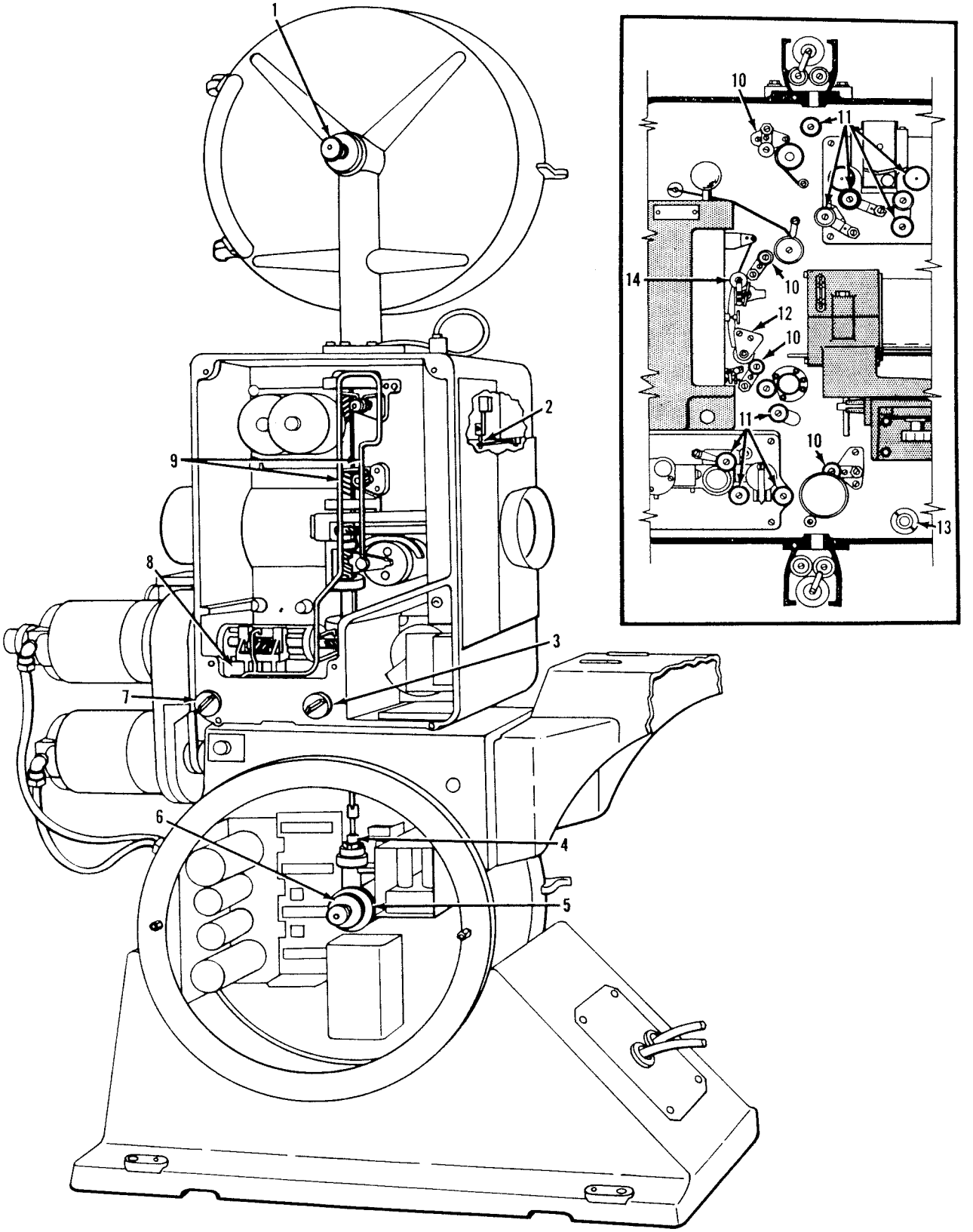


Figure 27. Lubrication Chart.

37. General

The Todd-AO projector is designed to operate with minimum service requirements. Nevertheless, emergencies may sometimes arise which require the operator to diagnose the reason for unsatisfactory operation or failure of the projector or any of its components. To assist the operator, this section lists various symptoms, each of which is followed by a list of probable causes of the trouble. A possible remedy is described opposite the probable cause.

38. Projector Motors Fail To Start

	Probable cause	*Possible remedy*
a.	Open circuit to projector motor.	Check 115-volt supply through motor start contactor.
b.	Film buckle switch tripped.	Check the film buckle switch lever action.
c.	Faulty motor start capacitor (14) (Fig. 4).	Replace the motor start capacitor (Par. 53).
d.	Faulty start switch or selector switch.	Check all switch contacts for proper operation.

39. Recurring Film Breakage

	Probable cause	*Possible remedy*
a.	Loops too small	Check size of upper loop and lower loop (see Paragraph 30c (7) and (12)).
b.	Pad roller or guide roller does not run freely.	Check the operation of all pad rollers and guide rollers.
c.	Damaged or broken sprocket.	Replace any defective sprockets.

40. Picture and Sound not Synchronized

	Probable cause	*Possible remedy*
a.	Wrong number of frames from the soundhead to the frame in the aperture plate.	With Todd-AO 70mm film, the picture precedes the sound by 24 frames. With 35mm film with magnetic sound, the picture precedes the sound by 28 frames. With 35mm film with optical sound, the sound precedes the picture by 20 frames. (See NOTE following Par. 30*c* (9)).
b.	Film incorrectly threaded.	Check the appropriate threading diagram (Fig. 25 or 26) and make any necessary changes.

41. Projector Noisy in Operation

Probable cause	*Possible remedy*
a. Loops too large.	Check the size of the loops (Par. 30c (7) through (13)).
b. Faulty lubrication.	Make sure the automatic oil system is working properly and that all lubrication points are lubricated (Par. 35).

42. Shutter Tailing

Probable cause	*Possible remedy*
Shutter not adjusted correctly.	Make sure the shutter cuts off the arc lamp beam just before the intermittent sprocket starts to move the film. Loosen the clamping ring screws (11) (Fig. 6) and set the shutter in the proper position.

43. Cooling Plate Holder

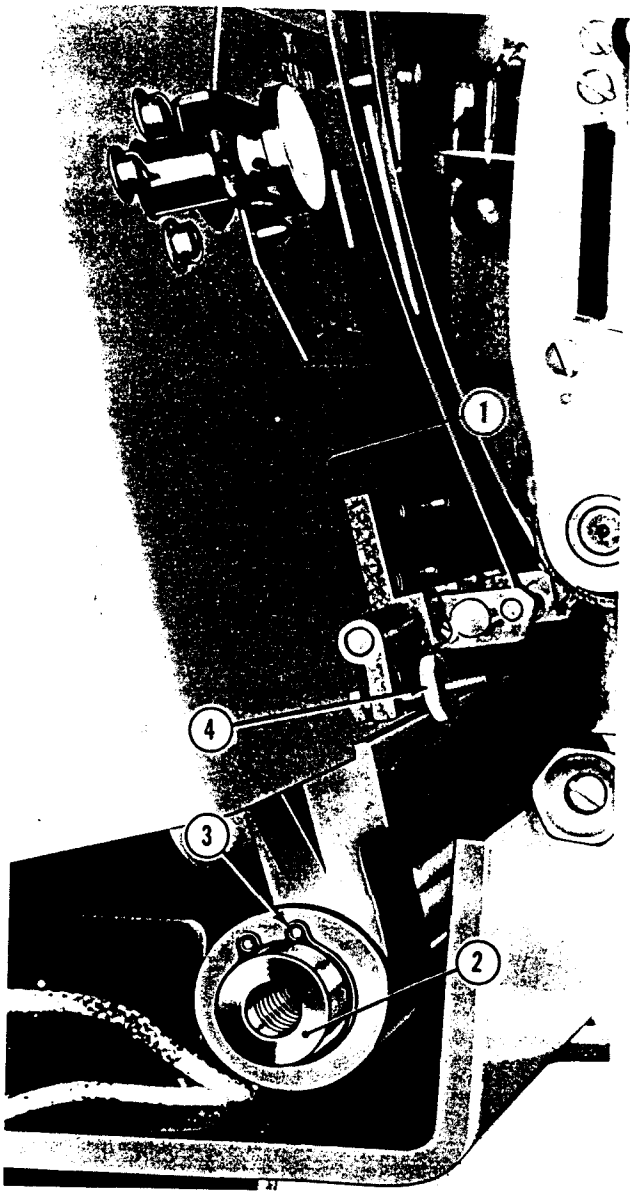
a. Removal. Be sure the cooling plate is opened before attempting removal of the cooling plate holder (Par. 29*c*(1) (*a*)).

(1) Remove the retaining ring (3) (Fig. 28) at the end of the cooling plate holder hinge stud (2).

(2) Disconnect the electrical leads (3) (Fig. 29) from the terminal strip (2).

(3) Disconnect the water lines (4).

(4) Pull the cooling plate holder from the hinge stud (2) (Fig. 28).



1. Cooling plate
2. Cooling plate hinge stud
3. Retaining ring
4. Pressure band tension adjusting knob

Figure 28. Cooling Plate in Position for Removal.

b. Installation.

(1) Install the cooling plate holder on the hinge stud (2) (Fig. 28) and install the retaining ring (3).

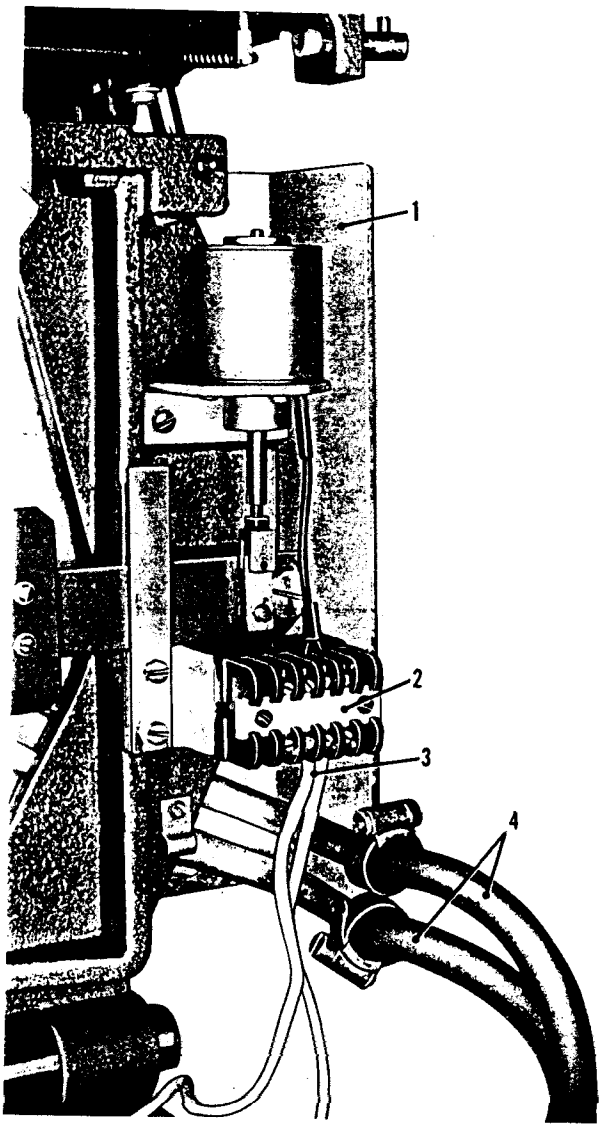
(2) Connect the electrical leads (3) (Fig. 29) to the bottom third and fourth terminals of the terminal strip (2).

(3) Connect the water lines (4).

44. Intermittent Mechanism

a. Removal.

(1) Remove the cover from the left side of the projector head.



1. Cooling plate
2. Terminal strip
3. Electrical leads
4. Water lines

Figure 29. Cooling Plate, Rear View.

(2) Remove the oil feeder line from the intermittent mechanism.

(3) Remove the film gate (Par. 29c) and the intermittent sprocket.

(4) Turn the framing knob (4) (Fig. 30) as far as it will go in a clockwise direction.

(5) Remove the screw (1) through the hole in the projector head wall.

(6) Turn the framing knob (4) as far as it will go in a counterclockwise direction and remove the second screw (1).

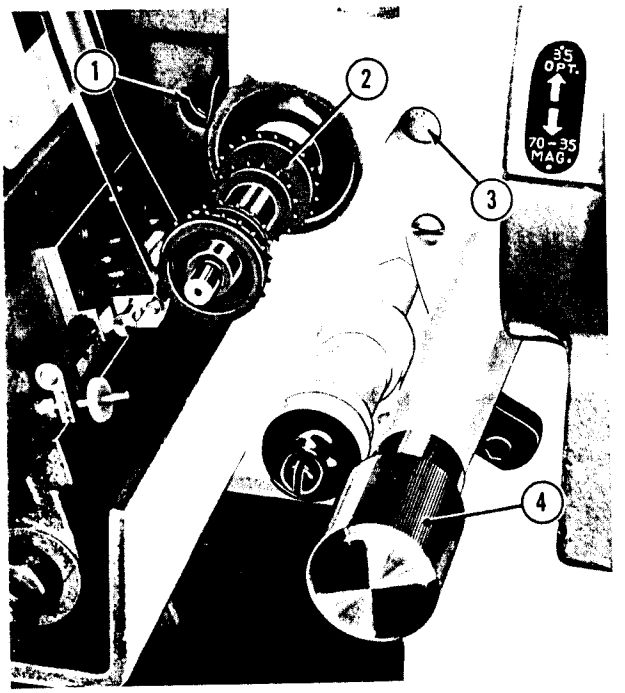
(7) Return the framing knob to the center position with the horizontal line through the center of the framing reference hole (3). The reference marks on the intermittent flywheel and housing on the left side of the projector head must now be opposite each other as shown in Figure 31.

(8) Remove the intermittent mechanism from the left side of the projector head.

CAUTION

Pull the intermittent mechanism out carefully to avoid damaging the gears.

b. Installation. Install the intermittent mechanism in the reverse order of removal (*a* above), making sure the reference marks are in the position shown in Figure 31.



1. Screw
2. Intermittent sprocket and shaft
3. Framing reference hole
4. Framing knob

Figure 30. Removing the Intermittent Mechanism.

NOTE

Be sure to tighten the screw that locks the intermittent sprocket (2) (Fig. 30) to the shaft.

45. Lens Mount

a. Removal. Before removing the lens mount, loosen the lens mount clamping bolt (9) (Fig. 25) and remove the lens barrel from the lens mount.

(1) Loosen the hold-down bolt (5) (Fig. 17).

(2) Turn the focusing knob (2) in until the turnbuckle handle (7) is released at the end of the engaging bushing (6).

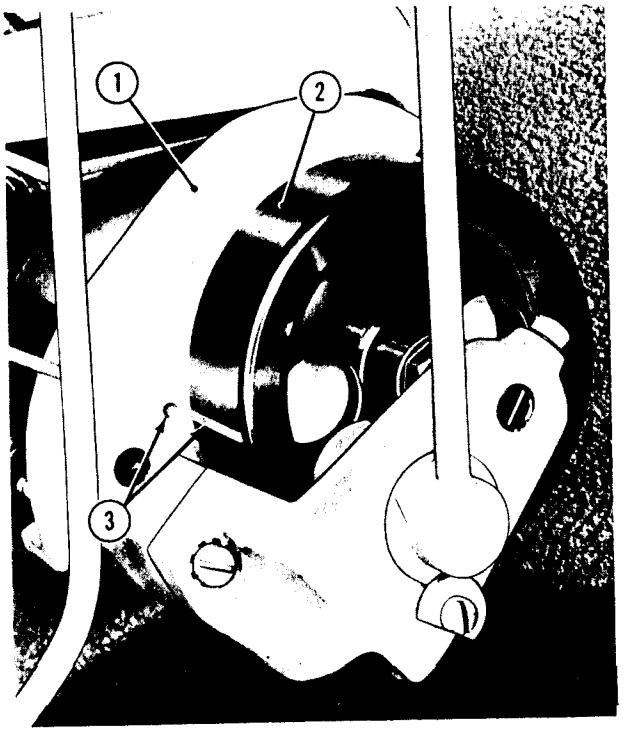
(3) Place the turnbuckle handle (7) in the shorter slot of the engaging bushing and turn the focusing knob (2) in the opposite direction until the turnbuckle handle is seated in the engaging bushing (6).

(4) Remove the hold-down bolt (5) and remove the lens mount.

b. Installation. Refer to Paragraph 18 for installation instructions for the lens mount.

46. Lens Mount Bracket

a. Removal. Before removing the lens mount bracket, remove the lens mount (Par. 45). To remove the lens mount bracket, remove the four Allen-head screws (4) (Fig. 17).



1. Intermittent housing
2. Flywheel
3. Reference marks

Figure 31. Reference Marks, Intermittent Mechanism.

(2) Remove the oil feeder line from the intermittent mechanism.

(3) Remove the film gate (Par. 29c) and the intermittent sprocket.

(4) Turn the framing knob (4) (Fig. 30) as far as it will go in a clockwise direction.

(5) Remove the screw (1) through the hole in the projector head wall.

(6) Turn the framing knob (4) as far as it will go in a counterclockwise direction and remove the second screw (1).

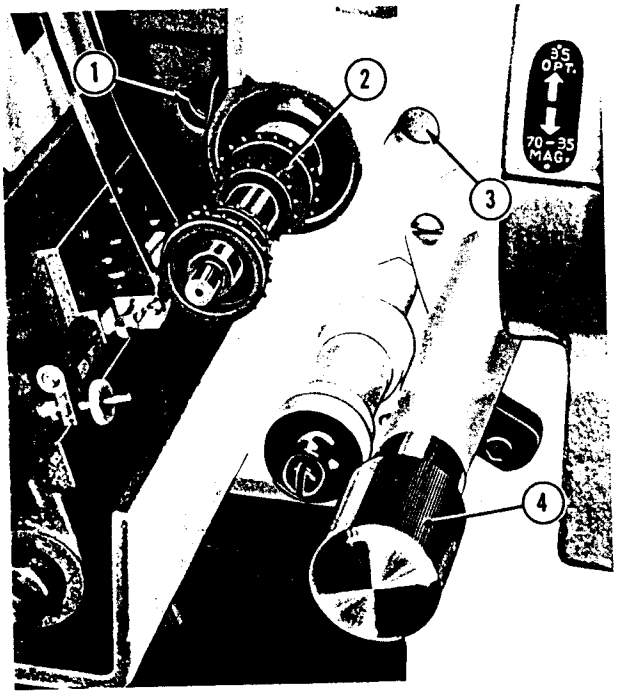
(7) Return the framing knob to the center position with the horizontal line through the center of the framing reference hole (3). The reference marks on the intermittent flywheel and housing on the left side of the projector head must now be opposite each other as shown in Figure 31.

(8) Remove the intermittent mechanism from the left side of the projector head.

CAUTION

Pull the intermittent mechanism out carefully to avoid damaging the gears.

b. Installation. Install the intermittent mechanism in the reverse order of removal (*a* above), making sure the reference marks are in the position shown in Figure 31.



1. Screw
2. Intermittent sprocket and shaft
3. Framing reference hole
4. Framing knob

Figure 30. Removing the Intermittent Mechanism.

NOTE

Be sure to tighten the screw that locks the intermittent sprocket (2) (Fig. 30) to the shaft.

45. Lens Mount

a. Removal. Before removing the lens mount, loosen the lens mount clamping bolt (9) (Fig. 25) and remove the lens barrel from the lens mount.

(1) Loosen the hold-down bolt (5) (Fig. 17).

(2) Turn the focusing knob (2) in until the turnbuckle handle (7) is released at the end of the engaging bushing (6).

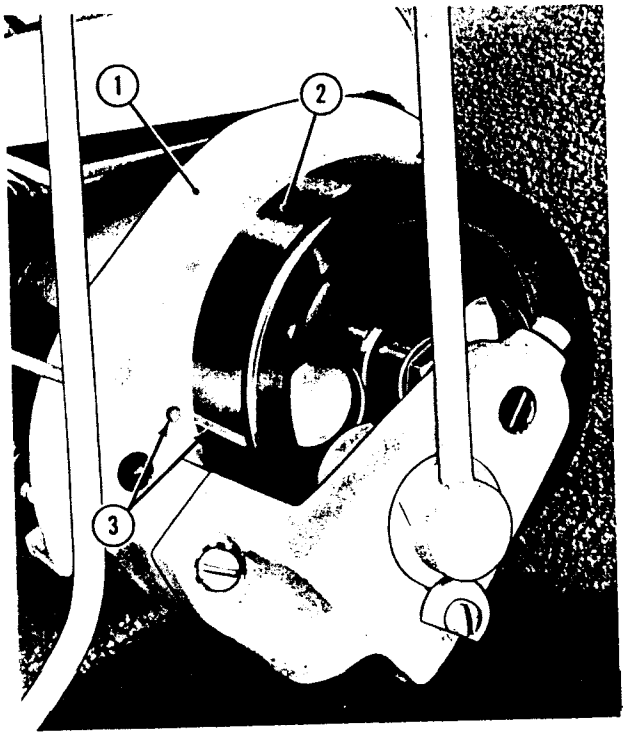
(3) Place the turnbuckle handle (7) in the shorter slot of the engaging bushing and turn the focusing knob (2) in the opposite direction until the turnbuckle handle is seated in the engaging bushing (6).

(4) Remove the hold-down bolt (5) and remove the lens mount.

b. Installation. Refer to Paragraph 18 for installation instructions for the lens mount.

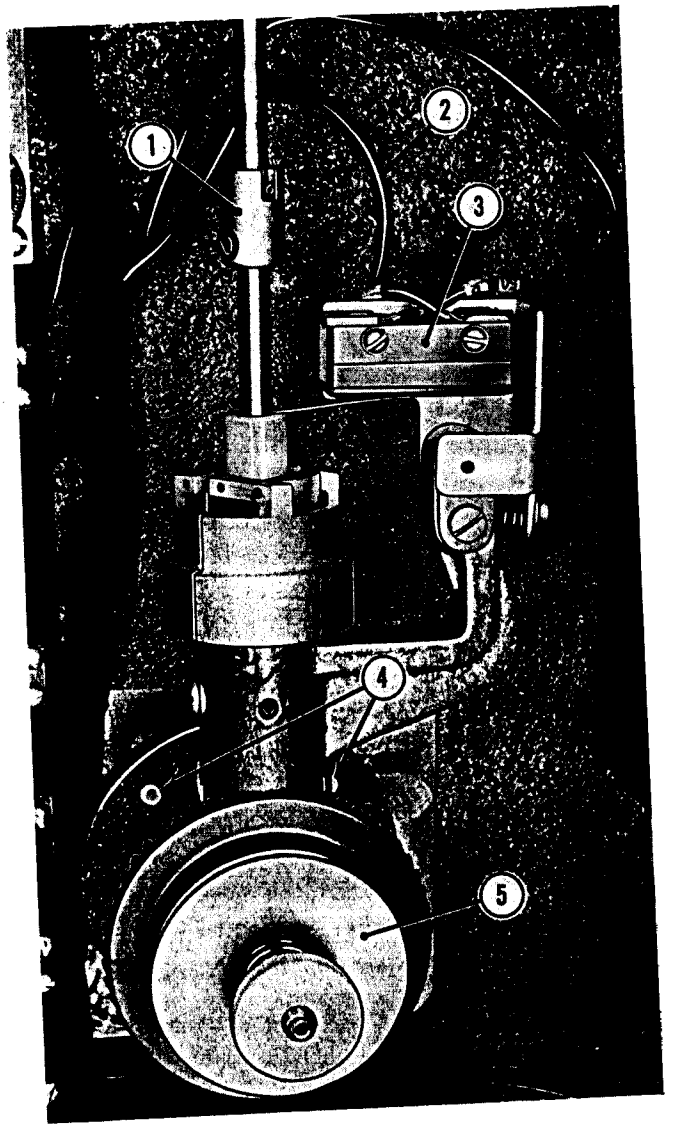
46. Lens Mount Bracket

a. Removal. Before removing the lens mount bracket, remove the lens mount (Par. 45). To remove the lens mount bracket, remove the four Allenhead screws (4) (Fig. 17).



1. Intermittent housing
2. Flywheel
3. Reference marks

Figure 31. Reference Marks, Intermittent Mechanism.



1. Main shaft coupling
2. Electrical leads
3. Minimum speed safety switch
4. Mounting bolts
5. Lower reel drive assembly

Figure 34. Lower Reel Drive Assembly.

52. Motor Drive Assembly

a. Removal.

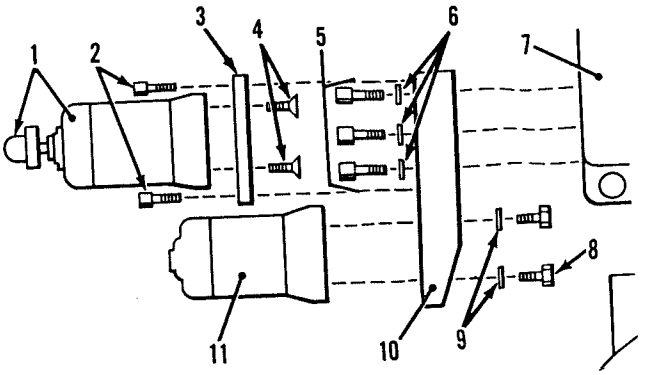
(1) Disconnect the electrical conduit from the motors.

(2) Remove the four cap screws (8) (Fig. 35) and washers (9) and remove the lower motor (11).

(3) Remove the four Allen-head screws (2) and remove the upper motor (1) and adapter plate (3) from the drive housing (10).

(4) Remove the Gilmer belt from the upper motor.

(5) Remove the six Allen-head screws (5) and washers (6) and remove the drive housing.



1. Upper motor and inching knob
2. Allen-head screws
3. Adapter plate
4. Flat-headed screws
5. Allen-head screws
6. Flat washers
7. Projector head
8. Cap screws
9. Flat washers
10. Drive housing
11. Lower motor

Figure 35. Motor Drive Assembly, Partial Exploded View.

(6) If necessary, remove the four flat-headed screws (4) and remove the adapter plate (3) from the upper motor (1).

b. Installation. Refer to Paragraph 14*b* for instructions covering installation of the motor drive assembly.

53. Motor Start Capacitors and Motor Run Capacitors

CAUTION

Capacitors sometimes carry a dangerous accumulated electrical charge. Always ground the capacitor terminals before starting removal by touching a wire to each terminal and to the projector frame. Use an insulated wire with bare ends.

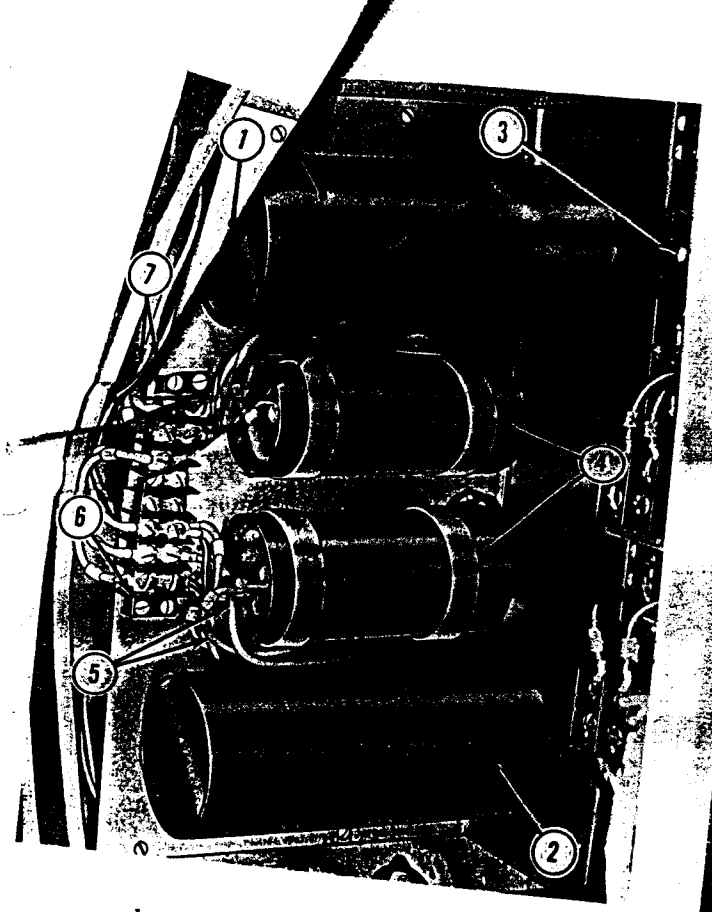
a. Removal.

(1) Disconnect the capacitor leads (5) (Fig. 36) from the terminal strip (6).

NOTE

The capacitor mounting screws are located between the capacitors and cannot be seen in Figure 36.

(2) Using a thin screwdriver, remove the ca-



1. Capacitor mounting plate
2. Motor run capacitor
3. Mounting screw
4. Motor start capacitors
5. Capacitor leads
6. Terminal strip
7. Motor leads and power input leads

Figure 36. Capacitors and Capacitor Mounting Plate.

pacitor mounting screws and remove the capacitor.

b. Installation. Install the capacitor in the reverse order of removal (*a* above).

54. 90-Volt Selenium Rectifier

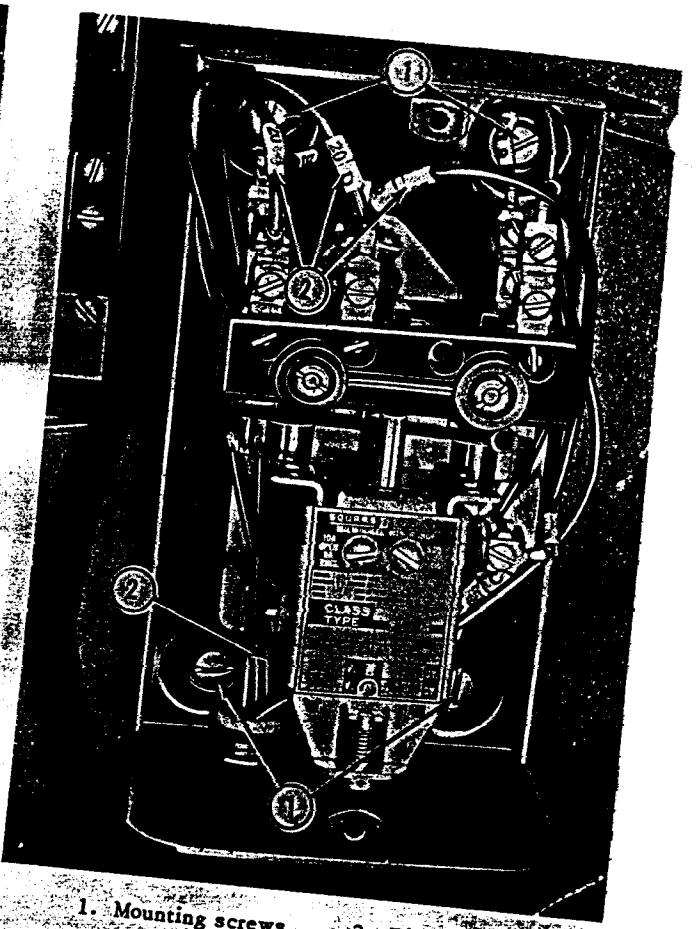
a. Removal. The 90-volt selenium rectifier is mounted on the back of the capacitor mounting plate (1) (Fig. 36). Before removing the rectifier from the capacitor mounting plate, remove the plate from the upper base. Proceed as follows:

(1) Disconnect the motor leads and power input leads (7) from the terminal strip (6).

(2) Remove the three mounting screws (3) from the capacitor mounting plate (1) and remove the plate.

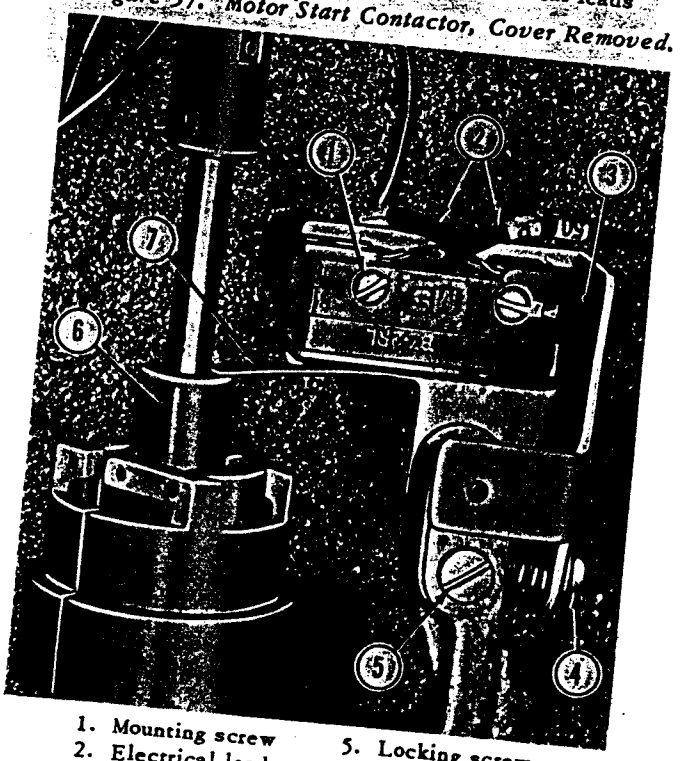
(3) Remove the four screws that hold the rectifier to the mounting plate and remove the rectifier.

b. Installation. Install the rectifier in the reverse order of removal (*a* above).



1. Mounting screws
2. Electrical leads

Figure 37. Motor Start Contactor, Cover Removed.



1. Mounting screw
2. Electrical leads
3. Bracket
4. Adjusting screw
5. Locking screw
6. Bushing
7. Actuating lever

Figure 38. Minimum Speed Safety Switch.

55. Motor Start Contactor

a. Removal.

(1) Remove the two screws that hold the cover on the motor start contactor and remove the cover.

(2) Disconnect the electrical leads (2) (Fig. 37).

(3) Remove the four mounting screws (1) (Fig. 37) that hold the contactor to the wall of the upper base and remove the contactor.

b. Installation. Install the motor start contactor in the reverse order of removal (*a* above).

56. Minimum Speed Safety Switch

a. Removal.

(1) Disconnect the electrical leads (2) (Fig. 38).

(2) Remove the two mounting screws (1).

b. Installation. Install the switch in the reverse order of removal (*a* above).

c. Adjustment of Minimum Speed Safety Switch. The switch must be set so that the switch actuating lever (7) (Fig. 38) operates the switch at approximately one half the travel distance of the bushing (6). Adjust the switch as follows:

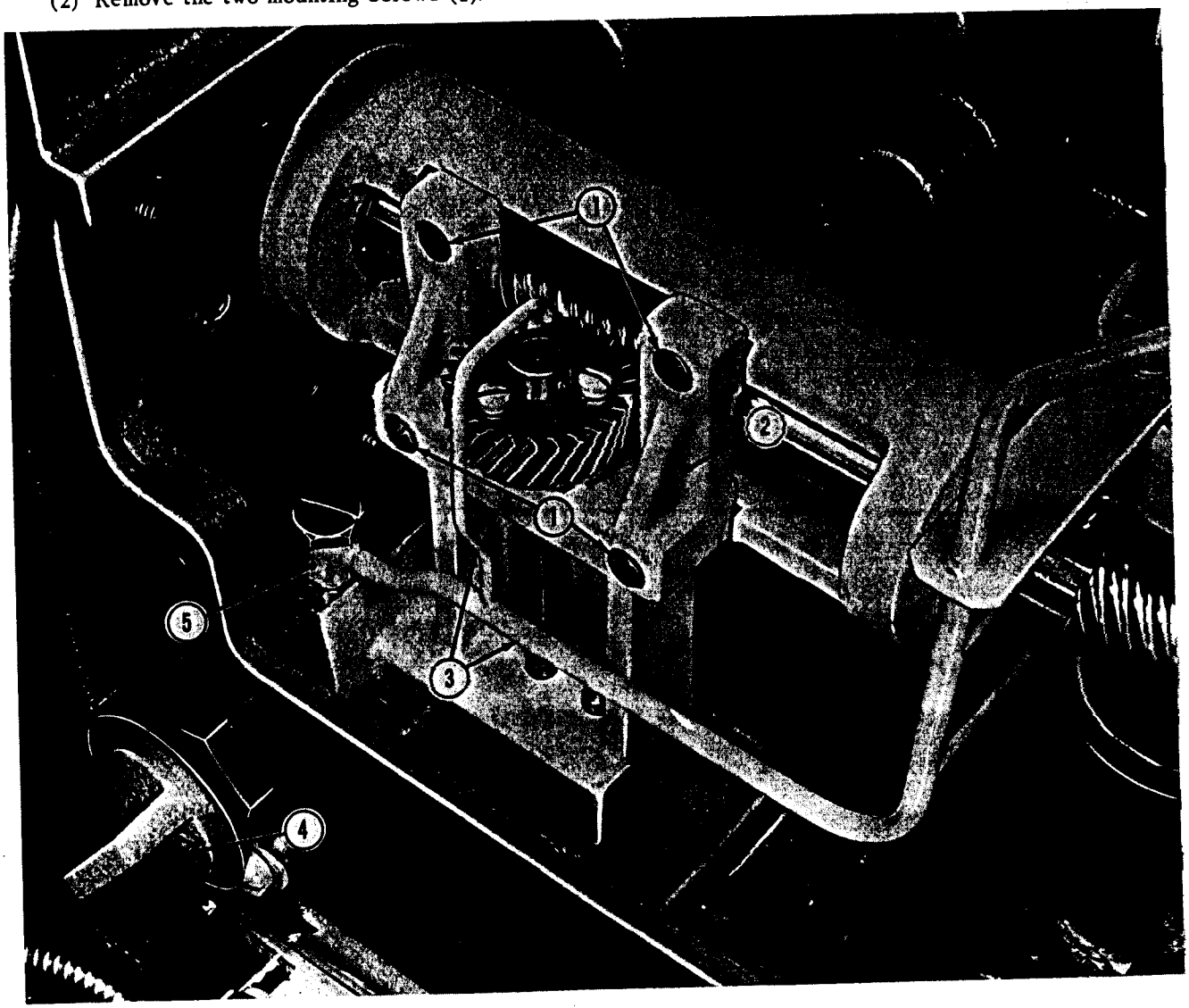
(1) Loosen the locking screw (5).

(2) Using an offset screwdriver, turn the adjusting screw (4) until the desired position of the switch is obtained.

(3) Tighten the locking screw (5).

57. Oil Pump

a. Removal. Before removing the oil pump, be sure the oil system is drained as completely as possible.



1. Mounting screws
2. Oil pump
3. Oil line
4. Oil filter cap
5. Oil line connecting plug

Figure 39. Oil Pump.

(1) Disconnect the oil line (3) (Fig. 39) by removing the oil line connecting plug (5).

(2) Remove the oil filter cap (4) and the oil filter.

(3) Remove the four mounting screws (1) and remove the oil pump (2).

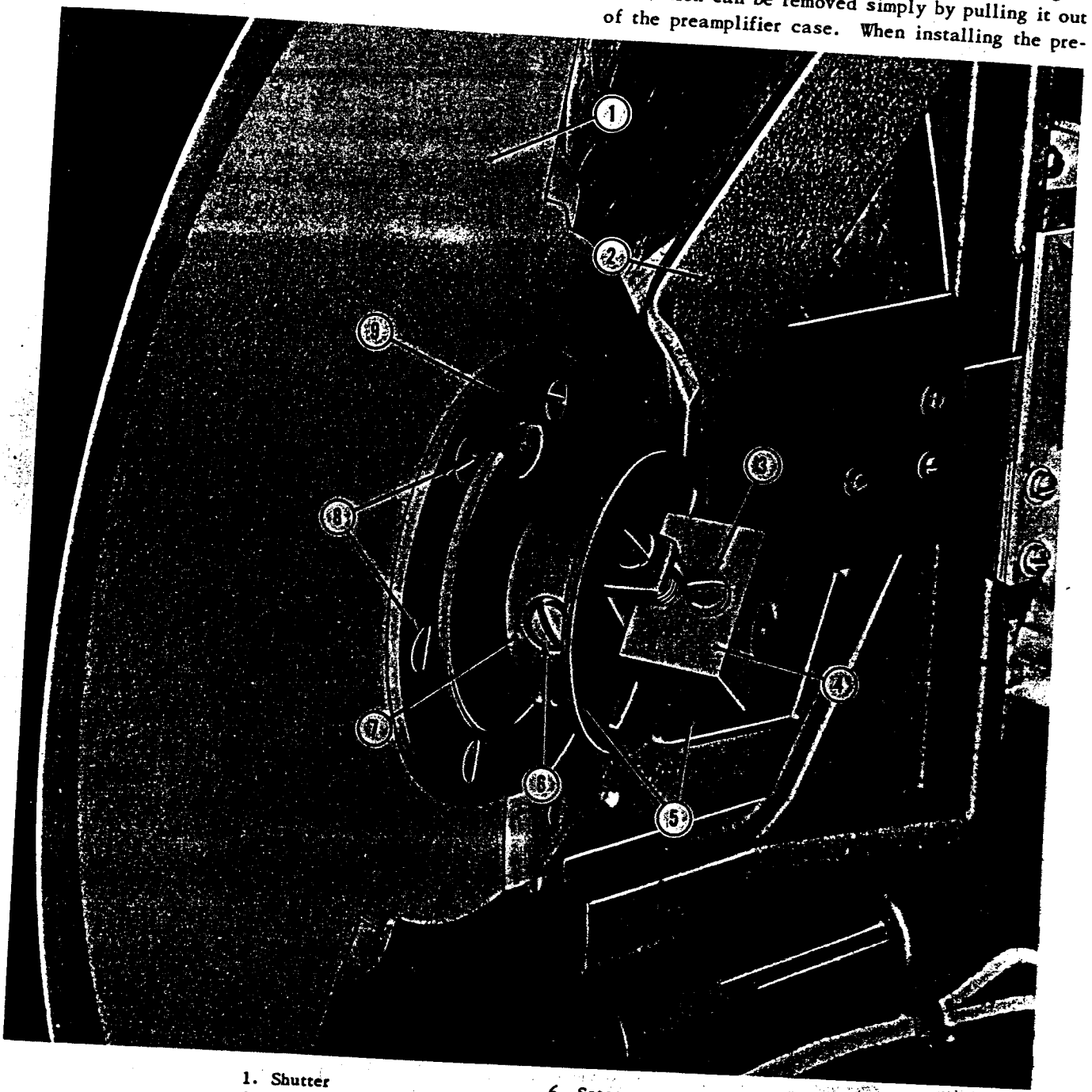
b. Installation. Install the oil pump in the reverse order of removal (*a* above).

58. Photocell

The photocell is installed in the photocell compartment (11) (Fig. 7). The photocell is removed after removing the compartment cover.

59. Optical Preamplifier

The optical preamplifier (6) (Fig. 4) is a plug-in unit which can be removed simply by pulling it out of the preamplifier case. When installing the pre-



1. Shutter
2. Centrifugal locking arm
3. Locking screw
4. Retaining block
5. Centrifugal stop assembly
6. Setscrew
7. Hub
8. Shutter mounting screws
9. Clamping ring

Figure 40. Shutter Removal.

amplifier, be sure all tubes are properly installed and that the unit is completely plugged in and seated properly.

60. Shutter and Shutter Shaft Assembly

a. Removal. Before removing the shutter and shutter shaft assembly, disconnect the oil line (5) (Fig. 7) and move the oil feeder away from the worm of the shutter shaft assembly. In addition to moving the oil line feeder, remove the cooling plate holder (Par. 43) and the projector head panel covering the shutter compartment.

(1) Remove the locking screw (3) (Fig. 40) and remove the retaining block (4).

(2) Remove the setscrew (6) from the hub (7) and remove the hub.

(3) Remove the shutter mounting screws (8) and remove the shutter (1).

(4) Remove the four mounting screws (2) (Fig. 41) and remove the shutter shaft assembly (3) through the hole in the projector head wall (1).

b. Installation of the Shutter Shaft Assembly. Install the shutter shaft assembly in the reverse order of removal (*a* above).

c. Installation and Adjustment of the Shutter.

(1) Install the shutter on the hub shoulder of the shutter shaft assembly.

CAUTION

Be sure the shutter is properly seated on the hub shoulder of the shutter shaft assembly before installing the clamping ring (9) (Fig. 40) and mounting screws (8). If the mounting screws (8) are tightened on the shutter when it is improperly seated, the shutter may be forced out of shape.

(2) Install the clamping ring (9) and mounting screws (8), leaving the screws just loose enough to allow the shutter to turn on the hub shoulder without turning the shutter shaft.

(3) Turn the inching knob (9) (Fig. 1) until the intermittent just starts the pull-down movement. At this point, the shutter must close the aperture.

(4) Tighten the shutter mounting screws (8) (Fig. 40).

NOTE

The shutter must be set accurately in relation to the movement of the intermittent sprocket. If necessary, loosen the shutter mounting screws and readjust the shutter until it is set accurately.

(5) Install the hub (7) (Fig. 40) on the shutter shaft, leaving the setscrew (6) loose.

(6) Install the centrifugal stop assembly (5) on the shutter shaft so that it clears the centrifugal locking arm (2) by approximately one-eighth of an inch and is parallel to the straight edge of the shutter blade.

(7) Tighten the locking screw (3).

(8) Insert one thickness of film between the hub and the centrifugal stop assembly and tighten the setscrew (6). The centrifugal stop assembly should be just loose enough to move outward without binding.

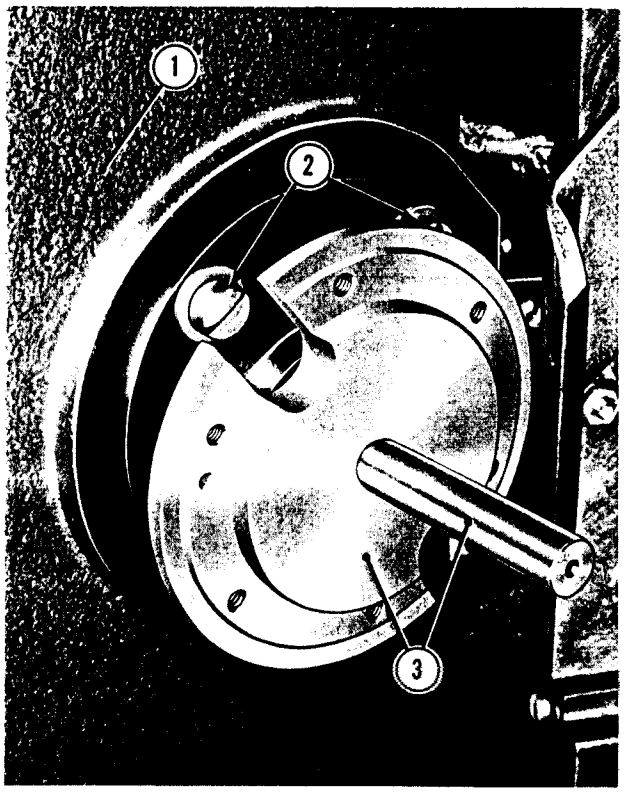
61. Water Flow Switch

The water flow switch (7) (Fig. 4) is mounted on a bracket installed in the upper base.

a. Removal.

(1) Disconnect the unions at the top and bottom of the flow switch.

(2) Using an Allen-head wrench, remove the two Allen-head screws at the right rear of the flow switch.



1. Projector head wall
2. Mounting screws
3. Shutter shaft assembly

Figure 41. Shutter Shaft Assembly, Shutter Removed.

NOTE

The Allen-head screws mentioned in (2) above are accessible between the right side of the water flow switch and the outside wall of the upper base. If the water lines prevent removal of the Allen-head screws, disconnect the water lines and move them out of the way.

b. Installation. Install the water flow switch in the reverse order of removal (*a* above).

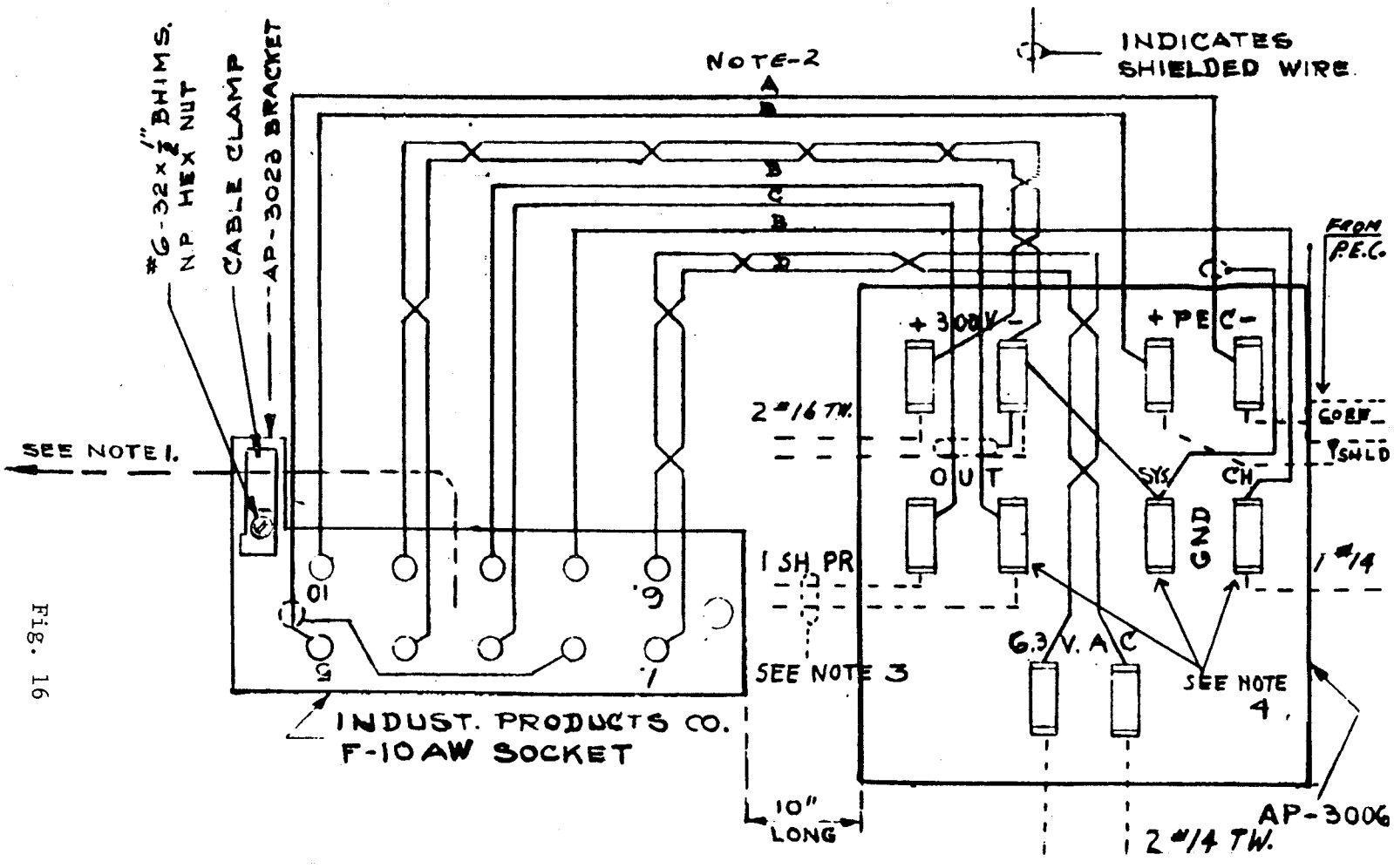
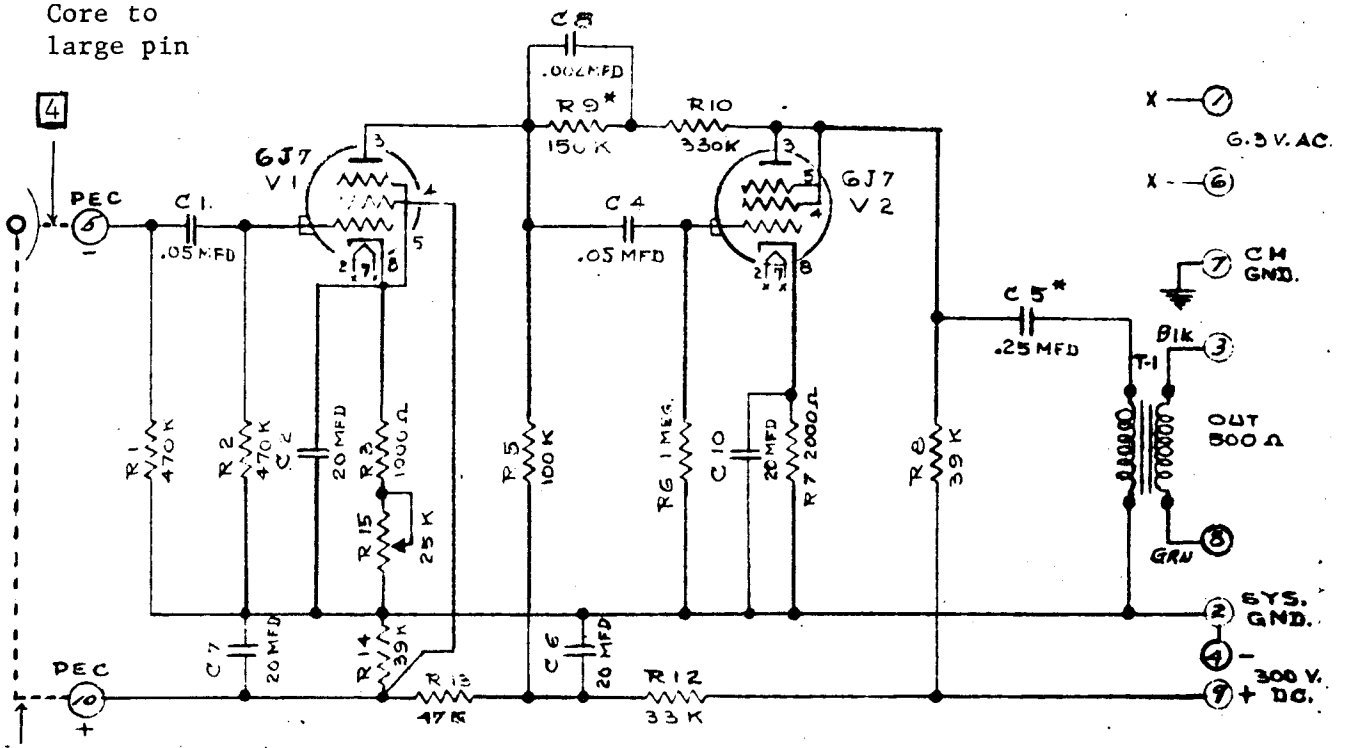


Fig. 16

NOTES:

1. Cabled wires leave socket along path shown by broken line, under clamp. Free length of cable 10 inches.
2. Identification of Wires:
   - A - Belden RG-62 U Cable.
   - B - Alpha #1551 Standard #22 (twist as shown).
   - C - Suprenant 2 SW 728N - US 2 #20 shielded.
   - D - Alpha #1555 Standard #18 (twisted).
3. Broken lines denote external wiring.
4. Arrange grounds as req'd.

	North American Philips Co. Inc. N.Y.N.Y. Motion Picture Equipment Division
11-26-63 FJP	3030-114 CABLE ASSEMBLY for 3050-1 Optical Pre-Amplifier



[2] [4] PEC Socket Connections - when this amplifier is used shield is connected to small pin, core to large pin.

(1) (10) Plug-in connector terminals.

OPERATING DATA	
GAIN (10 Meg Input)	Max. 47 DB. Min. 37 DB.
POWER OUTPUT	2% Total Harmonics + 12 DBM.
OUTPUT NOISE LEVEL	- 65 DBM.
POWER SUPPLY REQUIRED	6.2V. AC, 0.6 Amp. 300V. DC, 6.5 MA
P.E.C. SUPPLY FURNISHED	65V-85V. DC

FREQUENCY RESPONSE

CURVE	R9	C5	40	70	130	300	500	1KC	2KC	3KC	5KC	7KC	8KC
A	680,000	.25MFD	+0.5	+2.5	+2.8	+1.4	+0.7	0	-0.3	-0.5	-0.8	-1.5	-1.9
B*	150,000	.25MFD	-3.0	-0.4	+0.8	+1.0	+0.6	0	-	-	-	-	-
C	47,000	.25MFD	-4.5	-2.0	-0.6	-0.1	0	0	-	-	-	-	-
D	47,000	.1 MFD	-9.2	-4.8	-1.0	-0.3	0	0	-	-	-	-	-

*As Shipped

		North American Philips Co. Inc. N.Y. N.Y. Motion Picture Equipment Division
11-26-63	FJP	SCHEMATIC 3050-1 Optical Pre-Amplifier

Fig. 15

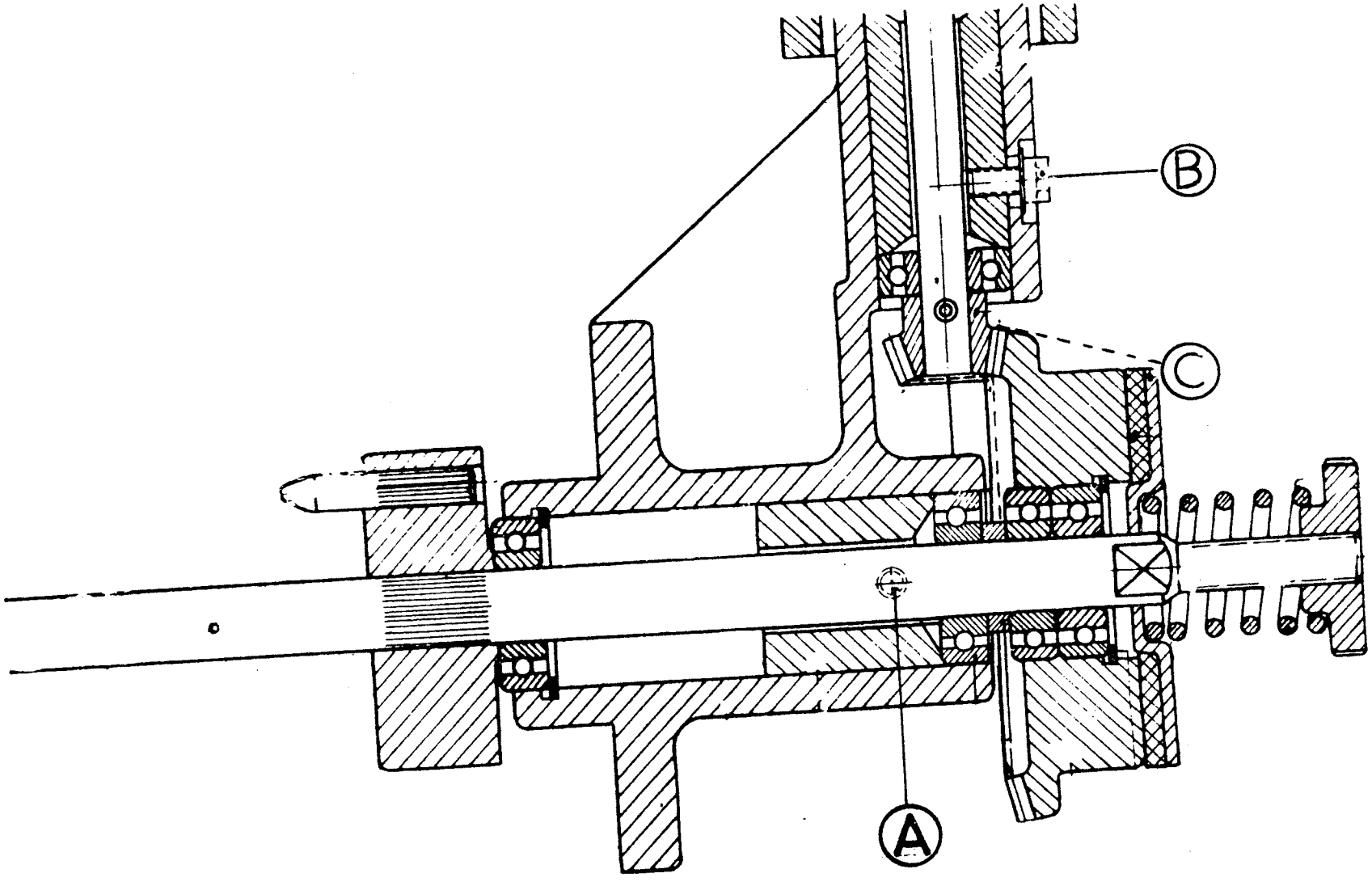


Fig. 1

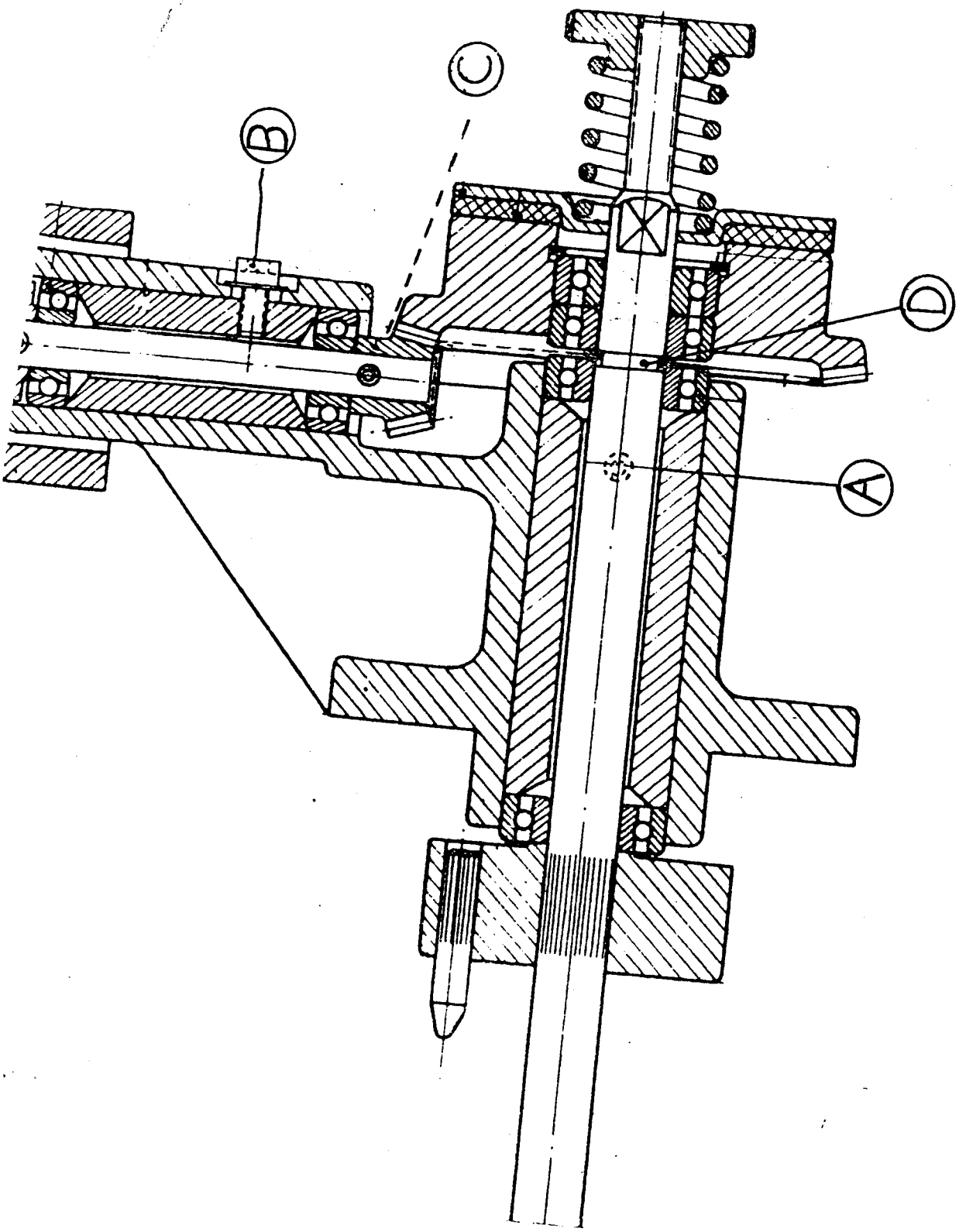
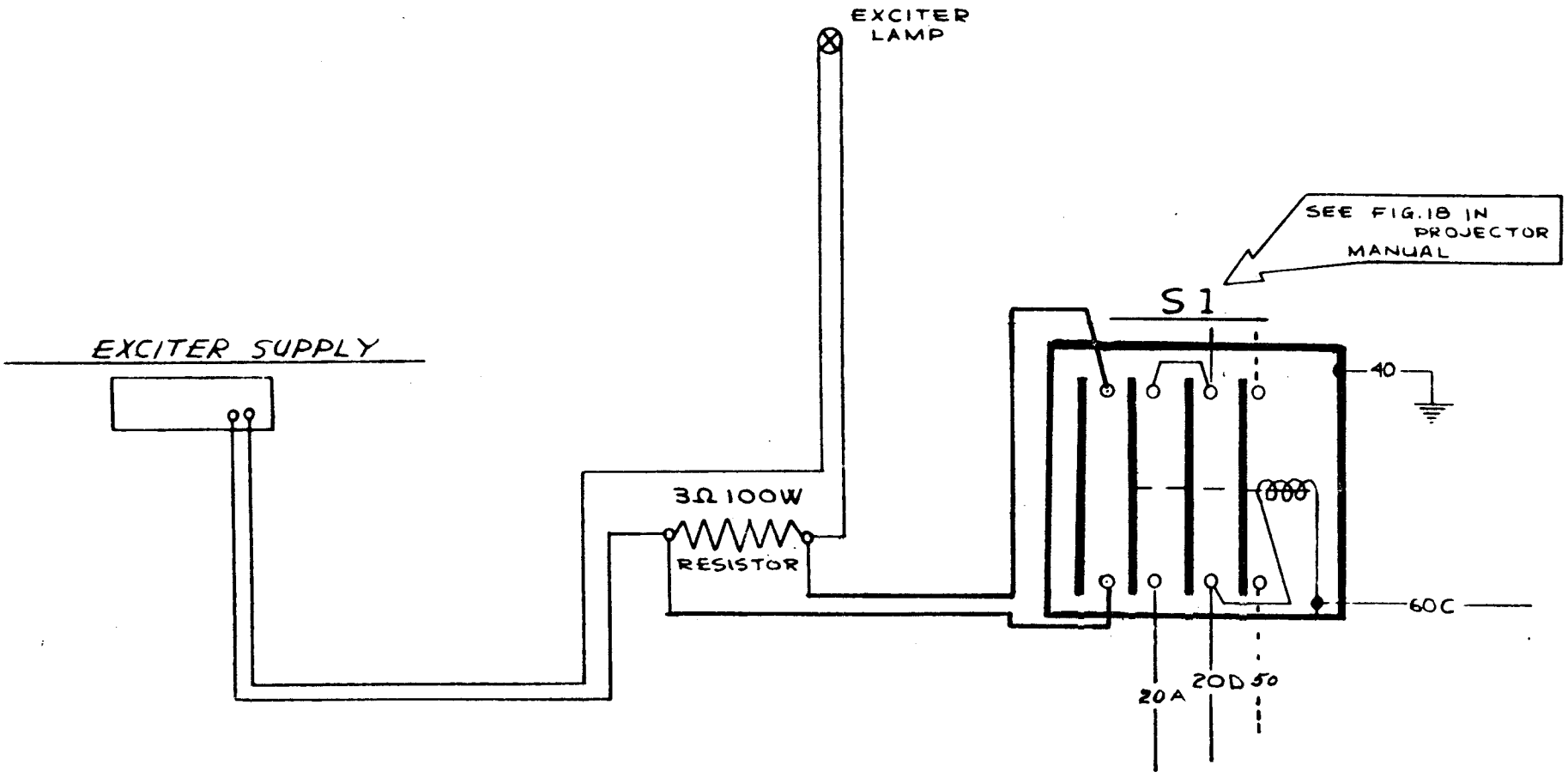


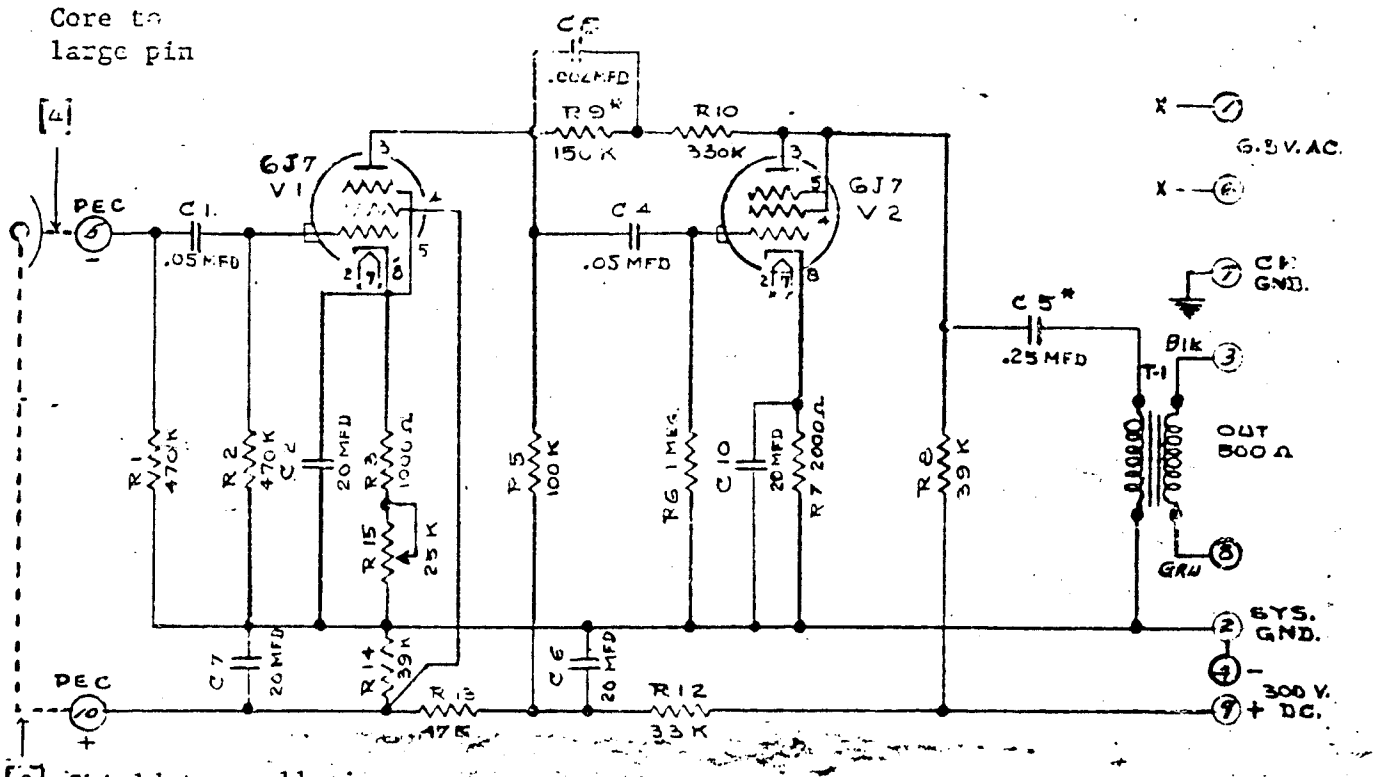
Fig. 2



SUGGESTED PRE-HEAT WIRING

SEE THEATER SERVICE INSTRUCTION # 3

4-28-64 FJP	North American Philips Company, Inc. New York, N.Y.



[2] [4] PEC Socket Connections - when this amplifier is used shield is connected to small pin, core to large pin.

① ⑩ Plug-in connector terminals.

OPERATING DATA	
GAIN (10 Meg Input)	Max. 47 DB. Min. 37 DB.
POWER OUTPUT	2% Total Harmonics + 12 DBM.
OUTPUT NOISE LEVEL	- 65 DBM.
POWER SUPPLY REQUIRED	6.2V. AC, 0.6 Amp. 300V. DC, 6.5 MA
P.E.C. SUPPLY FURNISHED	65V-85V. DC

FREQUENCY RESPONSE

CURVE	R9	C5	40	70	130	300	500	1KC	2KC	3KC	5KC	7KC	8KC
A	680,000	.25MFD	+0.5	+2.5	+2.8	+1.4	+0.7	0	-0.3	-0.5	-0.8	-1.5	-1.9
B*	150,000	.25MFD	-3.0	-0.4	+0.8	+1.0	+0.6	0	-	-	-	-	-
C	47,000	.25MFD	-4.5	-2.0	-0.6	-0.1	0	0	-	-	-	-	-
D	47,000	.1 MFD	-9.2	-4.8	-1.0	-0.3	0	0	-	-	-	-	-

*As Shipped

		North American Philips Co. Inc. N.Y. N.Y. Motion Picture Equipment Division
11-26-63	FJP	SCHEMATIC 3050-1 Optical Pre-Amplifier

Fig. 1

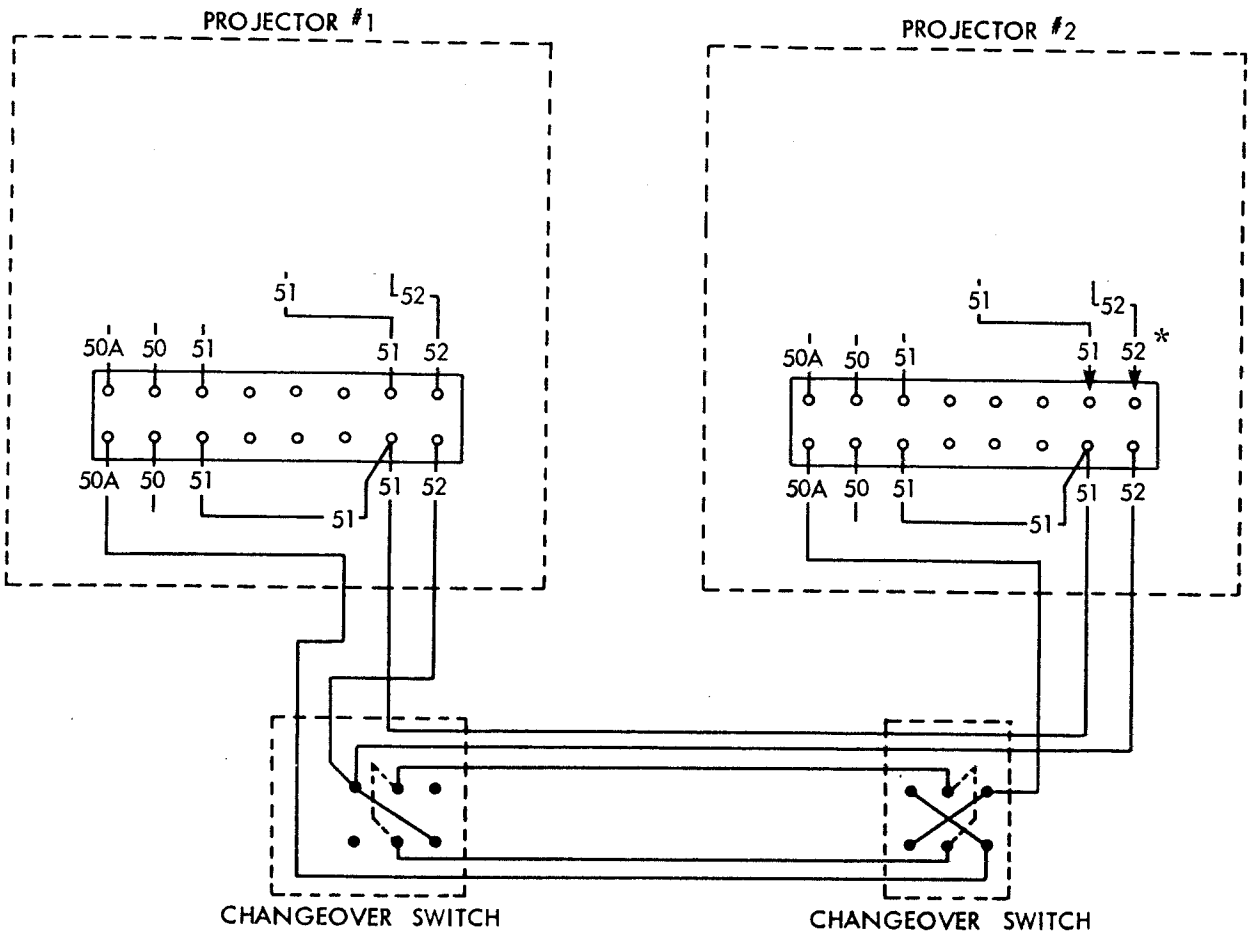


Fig. 12

CHANGEOVER WIRING DIAGRAM
for a 2-Projector Installation
using wall mounted D.P.D.T.
switches.

*NOTE: The CX 1701 Filter leads #51 and #52 must be disconnected from the lower terminal strip on one of the projectors when using this circuit. In the event of failure of the rectifier circuit in use, the unused rectifier can be put into use by reconnecting #51 and #52 in its associated base after disconnecting #51 and #52 leads from the defective circuit. In other words, this arrangement provides a spare rectifier circuit.

5-7-63	North American Philips Co. Inc.
FJP	New York, N.Y.

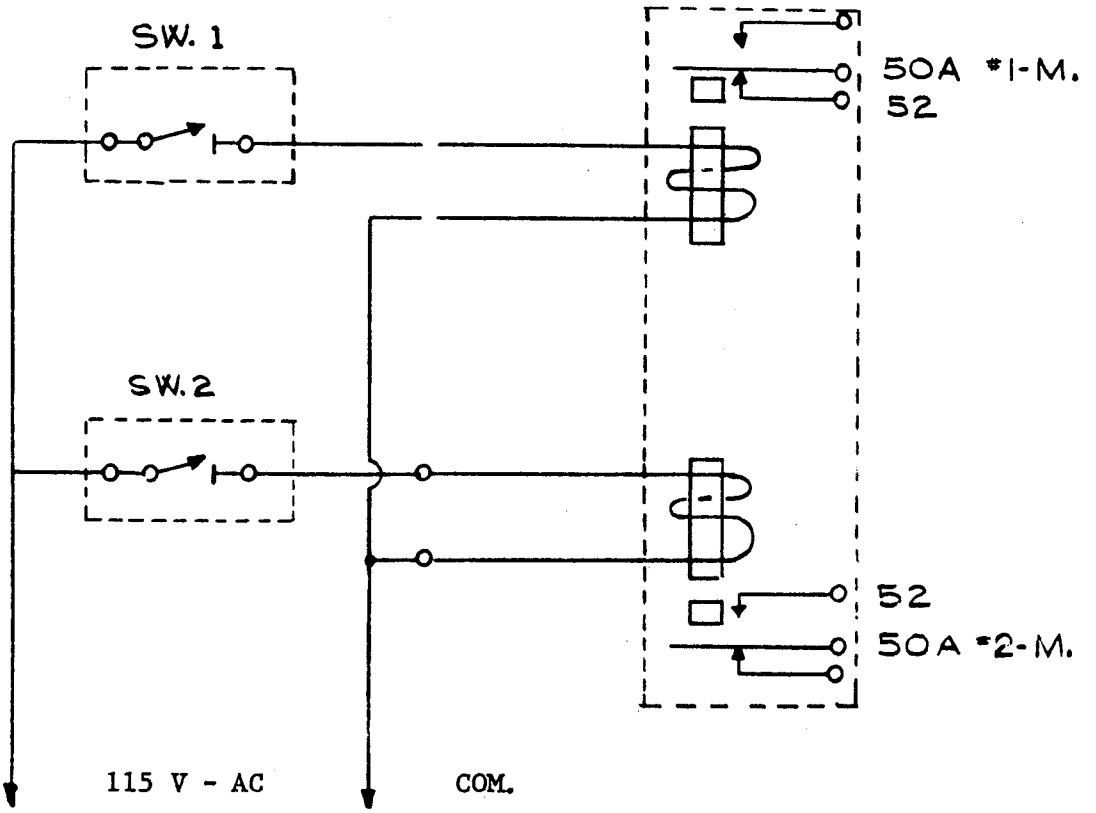


Fig. 13

CHANGEOVER WIRING DIAGRAM
for a 2-Projector Installation
using foot operated switches.

MATERIAL...

SW. 1) S.P. Momentary-Contact Foot Switches
SW. 2) (Normally Open)

REL.1 Latching Relay LK Series - Type LK 17A
115 V. A.C. Coils
Potter-Brumfield, Princeton, Ind.
(or equivalent)

NOTE: Terminals 50A & 52 will be found on lower (8) terminal strip in upper bases of each projector. 50A is lower left, 52 is lower right.

5-7-63	North American Philips Co. Inc.
FJP	New York City

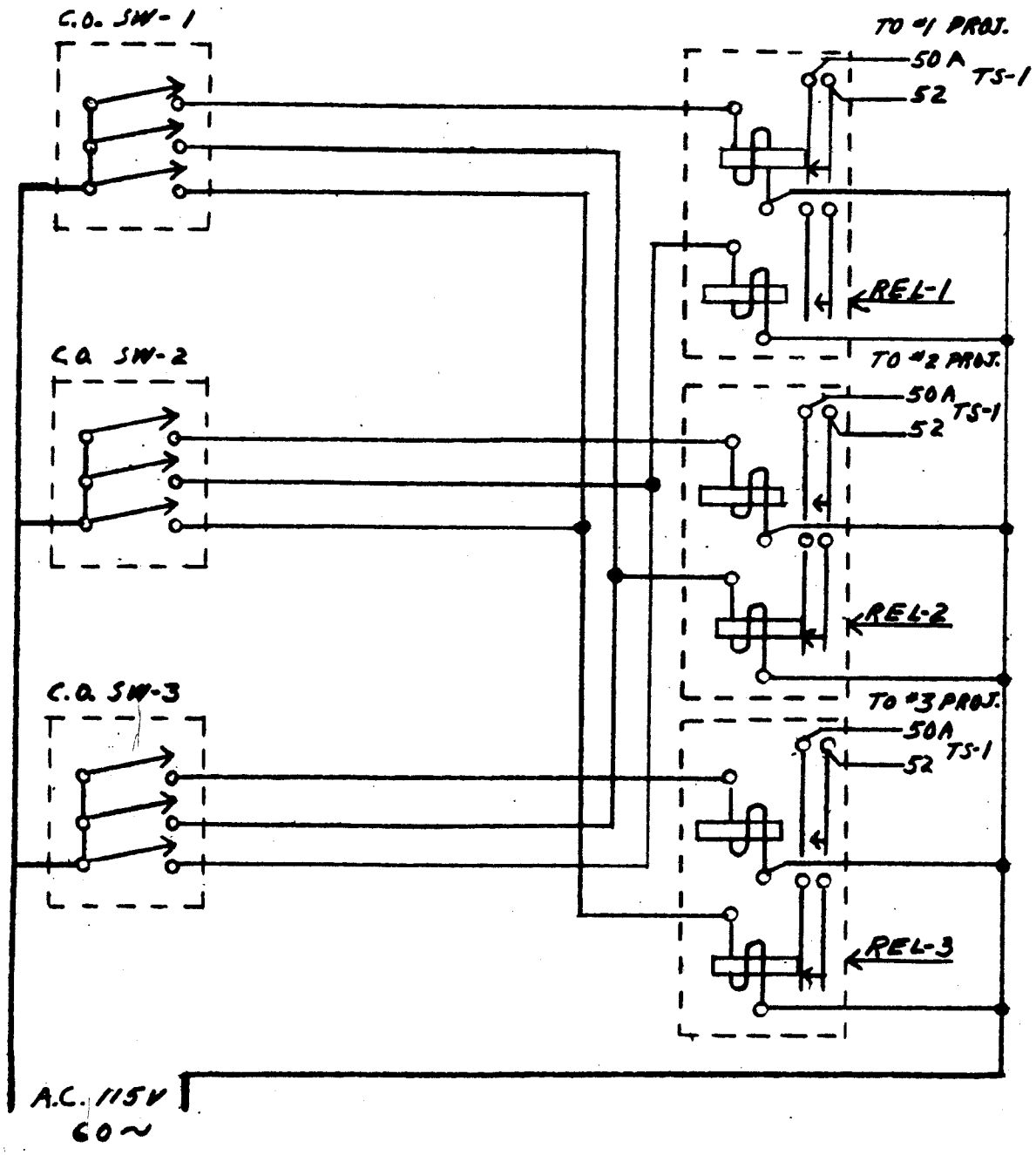


Fig. 14

CHANGEOVER WIRING DIAGRAM
for a 3-Projector Installation
using foot operated switches.

Material Req'd:

C.O.Sw. 1-2-3	(3)	3 P. Momentary contact-Switches-Norm. Open.
Rel. 1-2-3	(3)	Potter Brumfield-Type LK 17A Latching Relays.2-AC-115-V 60 Cycle Coils Each

5-7-63	North American Philips Co. Inc.
FJP	New York City