GENERAL INSPECTION

A general inspection will be adequate in most cases, especially where the projector has been checked periodically and its general performance known in advance. In any case, the preliminary check will soon indicate if there is any need to disassemble the projector for a more elaborate overhaul.

PROCEDURE

A. INSPECTING THE PROJECTOR

Set-up

Set the machine up as for a show and check all cords and plugs in the process. Make certain that the power cord plug is fully engaged onto amplifier male receptacle.

Belts and Pulleys

Replace belts if stretched or kinked. Check pulleys for excessive wear.

Sprockets

Make sure the sprocket guards have the proper clearance and see that the sprocket teeth are not worn. Worn and undercut teeth can be extremely damaging to film.

Rollers

Make sure all rollers are clean and revolve freely. Make a special check to see if the rollers have any flat surfaces. If so, replace.

Gate

Clean the channel and pressure plate, aperture and sound drum. Remove all encrusted emulsion. An orangewood manicure stick is very good for removing encrusted emulsion and "fuzz" from the edges and corners of the aperture. Check carefully for wear of side tension film guides and rails on which the film rides.

Lens

Clean the projection lens carefully. Use lens cleaning tissue in preference to a handkerchief although this is satisfactory if it is laundered soft and the glass not pressed hard. (Remember that optical glass is much softer than ordinary glass).

Lamp

Check the lamp for light output and discoloration.

Clutch and Film Trip

The trip should operate freely. Clutch pulleys must be free and have visible end play, if end play is not visible, the clutch actuating spring may be out of position, acting against pulley rather than against the ball retainer.

Takeups

The operation of these is best checked with film threaded on the projector. Inadequate pull or jerkiness may require new belts or adjustment of the clutch pulleys.

Film Scratches

Make a loop of about 36" of new (light struck) film which is very soft. Run it through the projector for several minutes. This will quickly indicate scratching caused by any element in the film path. If any abrasion marks appear, inspect each individual part of projector - (channel, pressure plate, sound core, sprockets, rollers, film shoes) for source of scratching. Check and clean very carefully.

Lubrimatic Oil System

The lubrimatic oil system is designed for maximum performance with a minimum of maintenance and attention. It is arranged to "demand feed" the shuttle cams. The wicking on the oiler tube should be positioned so that it touches only the main cam when the high lobe of the cam passes the wick. Provision for external oiling is found on the main body immediately under the rear reel arm.

B. INSPECTING THE SOUND REPRODUCTION SYSTEM

Exciter Lamp

Remove and check for excessive blackening and for sagging filament. Wipe clean and replace. Using a single frequency film, 3000 or 5000 cycle, either listen to or check output of amplifier with a db meter. Move exciter lamp in all directions to determine whether output increases. Be certain that solder contact base and socket base is clean and unoxidized, scrape or sand the contact if required.

Photo Voltaic Cell

Correct functioning can be determined by turning amplifier volume control full on with no film in the mechanism. Photo voltaic cell breakdown may also be checked by listening to a test film with another photo voltaic cell in the projector. Photo voltaic cells may be compared by using a standard test film and amplifier output checked with VTVM.

5 AMP Circuit Breaker (Fuse)

The circuit breaker is for the protection of the amplifier, and it will automatically trip if shorted. All that is necessary is to press the button, to reset.

Test Film

Use a sound subject. The S.M.P.T.E. "Jiffy" test reel or some other good subject with which you are thoroughly familiar will enable you to quickly recognize any variation from standard which will point up need for further investigation.

Sound Quality

a. Wows. Slow speed oscillations are usually caused by improper operation of the impedance roll assembly. Make sure that the impedance flywheel is working smoothly and the pressure roller runs free.

b. Flutter. Relatively high speed oscillations are usually caused by improper functioning of the sound sprocket filter mechanism. Check the clearance and smoothness of the sound sprocket and its roller. (See page 9.)

CLEANING THE SOUND LENS

Normal Cleaning

Remove the sound drum by pulling directly out after loosening set screw. Use pipe cleaner to clean the film channel slot and the groove in the top of the sound lens. Also clean the lower side of the sound lens inside the sound drum. Be sure no lint remains on lens or slot. Also be sure sound drum is fully seated with slot in top position.

Hundred Hour Cleaning

Remove sound drum as above. Remove screws A and B. (Illustration I). Lift out sound channel with the sound lens assembly and place in inverted position. Next remove screws C and D (Illustration II) and lift out sound lens unit. (WARNING - Do not tamper with or loosen screw "E" which is sealed with glyptol. To do so will necessitate return of the entire assembly to the factory or nearest Victor Service Center for re-setting of lens). With a clean lintless cloth polish sound slot "F" (Illustration III) by placing cloth over thumb nail. Also polish condenser lens "G" (Illustration IV). Reassemble sound drum in reverse order of disassembly, taking care that position of screw E is as noted in Illustration II.

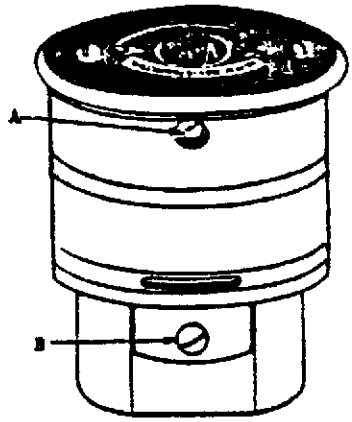


Illustration I

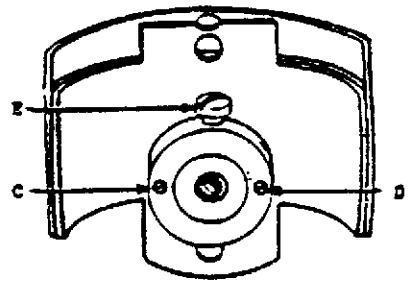


Illustration II

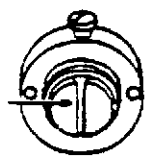


Illustration III

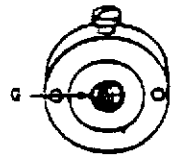


Illustration IV

GENERAL OVERHAUL

A periodical overhauling is indicated when the equipment has been in frequent use even though the General Inspection shows that it is functioning satisfactorily. Such an overhaul may be likened to the 10,000 and 20,000 mile checkups on your car.

The following overhaul procedure is indicated also where there is any question about the proper performance of the projector, irrespective of the amount of use it has had.

The General Overhaul involves dismantling the projector as below:

1. Remove Projector from the Case

The projector is held in the case by four screws at the bottom of the case and two at the top. Remove these mounting screws and lamphouse cover assembly. Slide projector forward, tilt carefully to gain access to the projector power plug and photo voltaic cell cable plug. Disconnect these plugs and remove projector.

2. Remove the Lamphouse

Loosen lamphouse cover lock screw. Remove lamphouse cover and lamp. Insert Allen wrench into opening of fan housing and loosen fan screw. Remove shutter guard and projector side panel. Remove four screws holding lamphouse base assembly to the main casting of projector. Disconnect wires leading to main casting and remove "C" washer holding rewind pulley. Remove casting assembly allowing the fan to lie inside the fan housing.

3. Shuttle

Part 48016-A is the heart of the entire mechanism and must be checked carefully.

a. Check cam follower, 47531, for wear on both the main cam and oscillator cam wear surfaces.

b. Check ball seat of shuttle to ascertain excessive wear. Felt pad, 47633, must be oily at all times.

c. When installing a new shuttle, the oscillating sleeve and hub assembly, 47520-A, should be adjusted to allow the shuttle teeth in their pulldown position, to extend through the film channel 1/16" plus or minus 1/64. Use 6" steel rule. This adjustment of moving the oscillating assembly can be made by using tool, T-9159.

d. SHUTTLE OSCILLATING SPRING

Make sure that shuttle spring, 47638, is adjusted to seat properly against the cam follower.

1 - Loosen #5-40 screw holding flat tension spring on cam follower.

2 - Rotate this so that the height from the casting to the pressure tip can be measured.

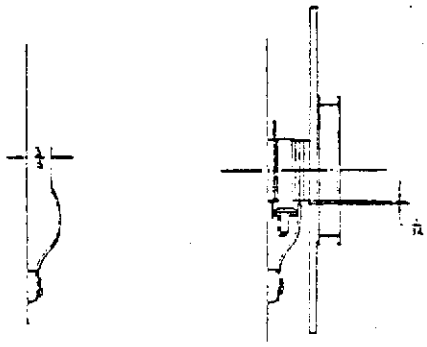
3 - Temporarily tighten the screw in this position.

4 - Check spring distance from inside surface to casting. This distance should be 3/8". Adjust accordingly as required.

5 - Loosen screw and replace over cam follower and tighten so that top of spring is approximately 1/32" below oscillator shaft washers adjacent to main cam.

6 - Recheck shuttle pawls at film gate to hold 1/16" maximum projection of pawls through film channel in pulldown position. Adjust if required.

In the event of any question of the best functioning of this vital part, replace the entire shuttle to circumvent subsequent complaints.



4. Drive Belts

"O" Ring drive belt, 47609, and flat belt, 47610, should be checked and replaced if they show signs of wear.

5. Belt Idler

Remove pulley by removing "C" washer, see that bearing is held tight by push on fastener. Soak felt wick in oil and replace onto bearing making certain that felt rests on the oilite surface and is spaced away from the Idler plate. Reassemble.

6. Safety Shutter

If a dark shadow appears either at the top or bottom of the screen, the fire shutter, 50819-A-3 is out of adjustment and the shutter aperture must be aligned with the optical centerline. This is done by adjusting the eccentric on the screw holding the safety shutter lever directly over the center of the motor. This adjustment raises or lowers the fire shutter in relation to the main aperture. Make certain that the shutter slides quite freely between the guides, so that when mechanism is tripped it will drop of its own weight.

7. Flywheel Units

The necessary end play for flywheel shafts is 004. Occasionally this tolerance will need adjusting. Use a feeler gage to check this. In the absence of a feeler gage, a single film thickness (.006) is satisfactory for this adjustment. Do Not tighten up end play too close to the bushing or too much drag will occur. This is worse than if they were a bit loose. The filter flywheel 47223A should be checked to make certain that the filter springs are not touching the gear assembly. This would result in an uneven action and poor sound reproduction. One of the filter springs is straight while the other one has a small bend or angle.

8. Takeup Pulleys

Uneven action of the takeup pulleys causes jumpy action of the takeup and may result in the film "spilling over". This uneven action, in turn, may be caused by wear or oil and grease in the assembly. The takeup clutch assembly 26836A should be checked to see if it is working correctly and is clean. This assembly must be removed from the projector to disassemble. Extreme caution should be exercised in taking this assembly apart so that the clutch actuating spring and the small clutch balls will not become lost. It may be reassembled dry or with light oil. In reassembling, care should be taken to have the clutch actuating spring engage the ball retainer, and when assembled the spring should have no lateral pressure on the pulley. This can be determined by ascertaining the "free" end play of the pulleys.

9. Film Shoes—Upper and Lower

Film shoes should be properly adjusted to drive sprocket. Clearance between shoe and sprocket should be .009 to .015 or 1 1/2 to 2 1/2 film thicknesses. To adjust with gage #70-9705:

1 - Remove the main feed sprocket and take-up clutch assembly. CAUTION: Be careful not to lose thrust washers which are located between the feed sprocket and the bearing hub.

2 - Insert shaft of gage to simulate feed sprocket from the operating side of projector.

3 - Close film shoes onto gage.

4 - Loosen screws holding film shoe brackets located on gear side of projector.

5 - Slide the top film shoe bracket up and away from the gage shaft.

6 - Slide the lower film shoe bracket down and away from the gage shaft.

7 - With fingers, press film shoes against the gage. Apply this pressure directly over the sprocket teeth area near the outer edge of each shoe, at the same time, keeping the shoes parallel to the slots in the casting. Tighten the screws which were loosened in #4 above.

8 - Check shoes for alignment and good open-and-close spring action.

9 - Remove gage. Replace take-up clutch assembly, thrust washers, and feed sprocket. Be sure to maintain an end play of .004 as noted on Page 9 under Tolerances. Recheck position of film shoes with relation to sprocket.

The dimensions of the 70-9705 gage include the equivalent of two thicknesses of motion picture film. No film should be used with this tool.

ALTERNATE FIELD ADJUSTMENT

If the gage is lost or misplaced, the adjustment described can be made by using the take-up clutch assembly and feed sprocket as follows:

Loosen feed sprocket set screws. Wrap two thicknesses of film around sprocket and close film shoes. Remove take-up clutch assembly and insert shaft of clutch assembly from operating side of projector through the feed sprocket. Follow steps 4 through 9.

10. Feed Sprocket

Part #36154 should be checked after excessive use for grooves in the sprocket teeth which will result in film noise. If this should occur, sprocket should be replaced holding .004" end play.

11. Sound Sprocket

The teeth of the sound sprocket #30368-A will also become grooved after extensive use which will result both in noise and flutter in sound reproduction. This should also be replaced when sprocket is worn.

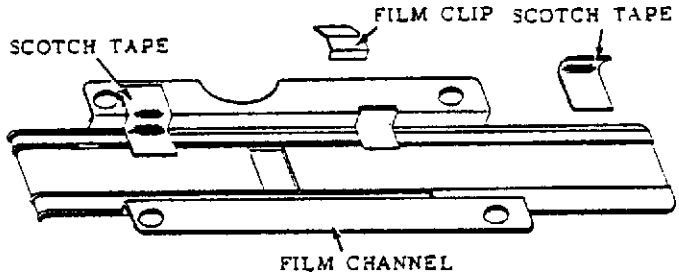
12. Hand Control Shaft

The hand control shaft 48469 requires a little grease in the slotted shaft end and oil on the bearing area. This shaft should be checked when the projector is given a complete overhaul.

13. Film Channel Clips

Clean Part No. 19316 thoroughly and check for wear on film guiding edge. To replace Tension Clips, a piece of Scotch tape holding the clip onto the channel, (see sketch), will prevent them from falling into the projector when the channel is removed. Unscrew the four screws holding the film channel, lift off.

Place new film tension clips into openings on the film channel and hold them in place by applying Scotch tape. (See sketch) Slide film channel under safety trips and align the tension clips over the tension spring, place channel into position. Reinstall four holding screws. Check tension clips to be sure they are spring loaded and free floating.



14. The Film Channel

47519 should be checked for worn rails. if these show wear, the channel should be replaced.

15. Pressure Plate

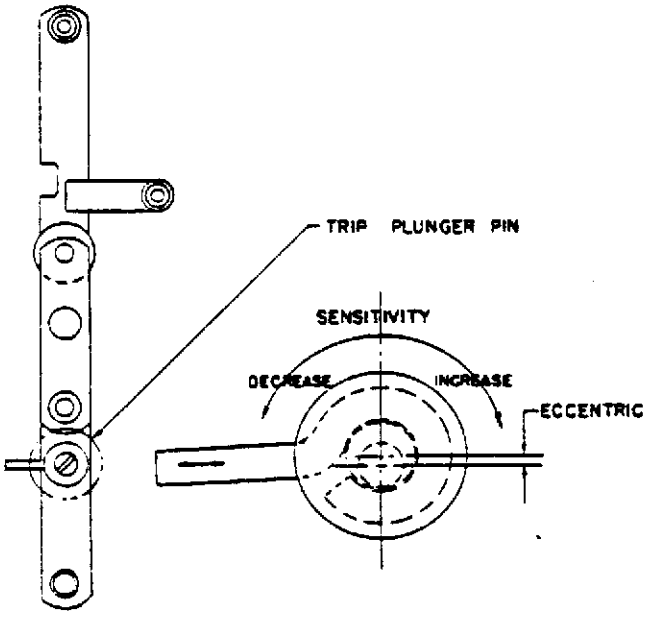
The pressure plate for 48022-P should float freely. If binding, remove pressure plate by loosening two screws (48024) that are adjacent to the pressure plate guides. Remove pressure plate, guides, springs and remove from hole any foreign matter which may have accumulated. Replace springs 48030 and reassemble. CAUTION: SPRINGS 48030 SHOULD NEVER BE STRETCHED TO INCREASE TENSION. If too much tension is applied it will result in excessive shuttle pawl wear and loss of loop when running new film.

16. Lens Mount

The Lens mount may be aligned to correct a picture that is out of focus on one side by adjusting the lens mount stop screw #19301, located under and to the inside of the lens mount. Make adjustment while projecting picture on the screen. The projector should be at 90° with the screen when performing this operation.

17. Film Trip Mechanism

This assembly is adjustable within limitations to either increase or decrease the sensitivity of the trip. Adjustments can be made through the opening in the trip cover.



46145-A
AUTO TRIP LEVER ASSEM

18. Projection Lamp

It is good practice to allow motor to run for a few minutes after the lamp has been turned off to cool the lamphouse and the lamp. When replacing EJL lamp, grasp by the neck to avoid finger marks on reflector. Do not operate lamp without lamphouse cover.

19. Projection Lamp & Motor Switches

Circuitry is arranged so that motor switch must be turned on before lamp can be turned on.

20. Oscillating Gear Assembly

The oscillating gear assembly, 47520A, should be checked for wear making certain there is not over .003" end play as this assembly controls action of the shuttle.

21. Exciter Lamp

If the exciter lamp, BSS, lights intermittently, check for corroded contact on the lamp socket base. This can be quickly corrected by scraping base clean with sharp tool or polishing it with a piece of emery cloth. See page 5, paragraph B.

22. Impedance Loop Roll Assembly

Inspect impedance Loop Roll Assembly part 30369A for uneven wear or flats.

Assembly should spin easily with minimum end play of .002 to .005.

23. TOLERANCES

30369-A	Impedance Roll (end play)	.002 to .005
30368-A	Sound Sprocket (end play)	.001 to .004
26836A	Feed Sprocket Clutch and Shaft Assembly (end play)	.001 to .004
47520A	Oscillating Gear Assembly (end play)	.001 to .003
48017-A	Shuttle Pawls extend through Film Channel 1/16" + or - 1/64 Distance between upper and lower pawl	.272
47638	Spacing between under side of spring and casting to be 3/8"	

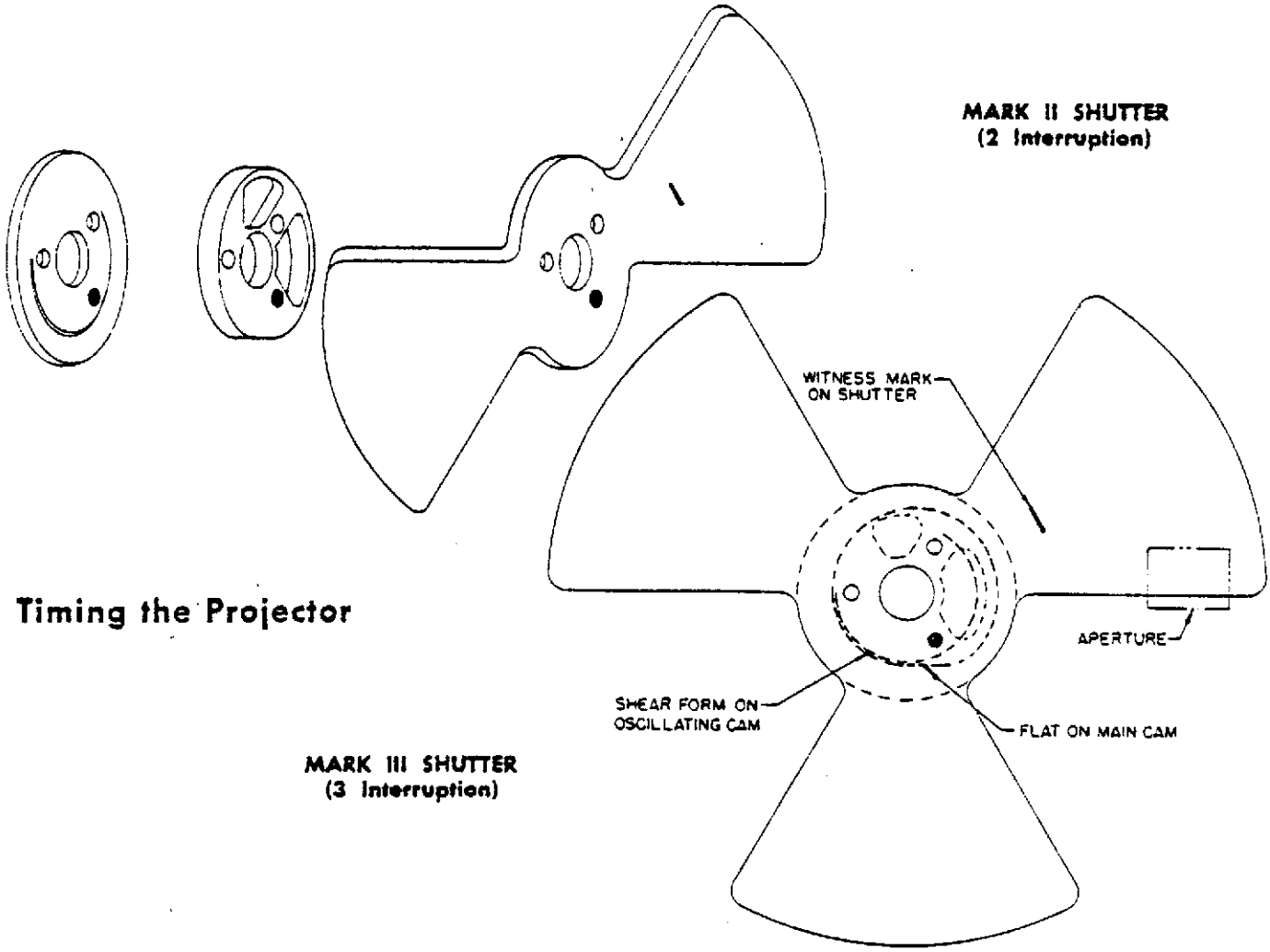
NOTE: Single Film Thickness is .006 inches, in the absence of proper thickness gage. A single film thickness may be used for making field adjustments for end play.

24. Timing the Projector

Remove head from 3/56 x 3/4 long screw, leaving screwdriver slot to use as pilot and insert into one hole in oscillator. Assemble oscillator cam with hole in center of shear form onto this screw, add spacer, assemble main cam with hole at sharp radius onto this screw, add spacers as required to allow shutter to clear framing mechanism.

Assemble shutter onto screw with witness mark blade at aperture and with location of blades as shown.

When the shuttle is in the top of its pulldown position, the shutter blade with witness mark must cover the aperture. This applies to both two interruption and three interruption units. In changing from Mark II to Mark III care should be exercised in retaining shutter and cam combination in pairs as these are balanced as a set. If travel ghost appears at the top of the picture the shutter is following and should be rotated clockwise slightly with respect to the cam. Tighten (3) screws to keep shutter blade from shifting.



Timing the Projector

Some Possible Projector Troubles and their Remedies

1. Premature Lamp Blow Out

a. High Line Voltage:
This is nearly always the cause of the trouble. Check line with a good meter. The power companies often boost the supply voltage to compensate for heavy loads in outlying districts. Voltages also tend to vary with the general industrial load and may vary greatly in different parts of the same area at the same time.

2. Main Line Fuse Blows

This indicates a short or ground in the wiring. Test the projector and amplifier separately. Localize the fault by disconnecting motor, lamp, etc., as necessary until the faulty part is found.

3. Motor Will Not Run

a. Check cords and plugs.

b. Check main switch contacts.

c. Check circuit breaker.

4. Loss of Top Loop

Check for:

a. Improper seating of upper film shoe.

b. Torn film perforations.

5. Loss of Lower Loop

Check for:

a. Torn film perforations.

b. Film not threaded properly at gate.

c. Untreated new film.

d. Film shoes and gate clearance.

e. Excessive wear of shuttle.

6. Film Scratches

This is usually due to an accumulation of hardened emulsion on aperture plates or film channel because these parts have not been kept clean. It may also be due to physical damage to extremely smooth surface of gate plates or wear of guides on back film channel, aperture plate, or sound drum. If so, replacement is indicated.

7. Pictures Unsteady

a. Film badly shrunken and perforations chipped.

b. Wear on shuttle or other parts of intermittent mechanism.

c. Pressure plate not properly seated in film channel.

d. Sapphire missing from upper shuttle pawl.

8. Flicker

a. Cam replaced "out of time."

b. Light shutter "out of time."

9. Film Spills Over

a. Insufficient friction on feed spindle.

b. Worn takeup clutch.

c. Rewind belt not in place on reel arm.

10. "Motor-Boating"

a. Sound drum not replaced properly, causing film misalignment.

b. Impedance roll sticking.

11. Film Tears at Drive Sprocket

a. If sprocket is replaced without hardened thrust washer between it and the casting, the sprocket teeth will not align with groove of idler rollers.

b. Film shoes too tight. Adjust with 2 thicknesses of film.

12. Film Perforations Chip

a. Worn sprocket teeth.

b. Worn shuttle or shuttle teeth.

c. Tension at gate insufficient.

d. Badly shrunken film.

13. Insufficient Light on Screen

a. Dirty lens.

b. Low line voltage.

c. Dirty screen.

d. Lamp improperly seated.

14. Picture Partly Out of Focus

a. Projector not at 90° angle with screen.

b. Dirt on lens.

c. Lens mount alignment (Item 16, Page 9).

15. Travel Ghost

A picture with a streaked effect, particularly on white scenes, is caused by light shutter not properly timed. (See Page 10.)

Possible Amplifier Troubles and their Remedies

1. Hum

a. Check all condensers, particularly filter condensers. Tighten all screw terminals.

b. Check phone and mic. jack.

2. Noise

a. Try reversing plug in power supply line.

b. Check speaker cord and connections.

c. A loose connection, particularly in the plugs connecting to the projector.

3. Low Volume

a. Check position of sound core assy.

b. Exciter lamp improperly installed.

c. Dirt or oil on sound lens.

d. Low line voltage.

4. No Sound Response

a. Check power source, exciter lamp switch, cords, etc. Check circuit breaker.

b. Check speaker for ground, short, or open circuit.

c. Check 2 ampere fuse inside amplifier.

d. Check exciter lamp.

5. Circuit Breaker (Fuse)

a. Trips if power switch on -- probably a short in power transformer.

b. If amplifier warms up and then the circuit breaker trips, check rectifier, output transistors, and filter condensers.

Amplifier Electrical Check Points

In event of suspected amplifier trouble a few quick checks can isolate the section at fault.

The circuit board has 4 check points numbered test point (1) +56 volts "E", test point (2) +15 volts, test point (3) 1/2 "E" and test point (4) bias. See Schematic 80-25 48729. Test points 1 and 2 when checked and found faulty (low voltage or no voltage) will indicate trouble in the main chassis assy. (48705-A) Test points 3 and 4 if found not to conform to the schematic, indicate circuit board trouble. Replace 48728-A Circuit Board Assembly.

If all voltages check out to the schematic and there is no sound or distorted sound the power transistor section may be defective. Change Sub-Chassis Assembly, 48704-A.