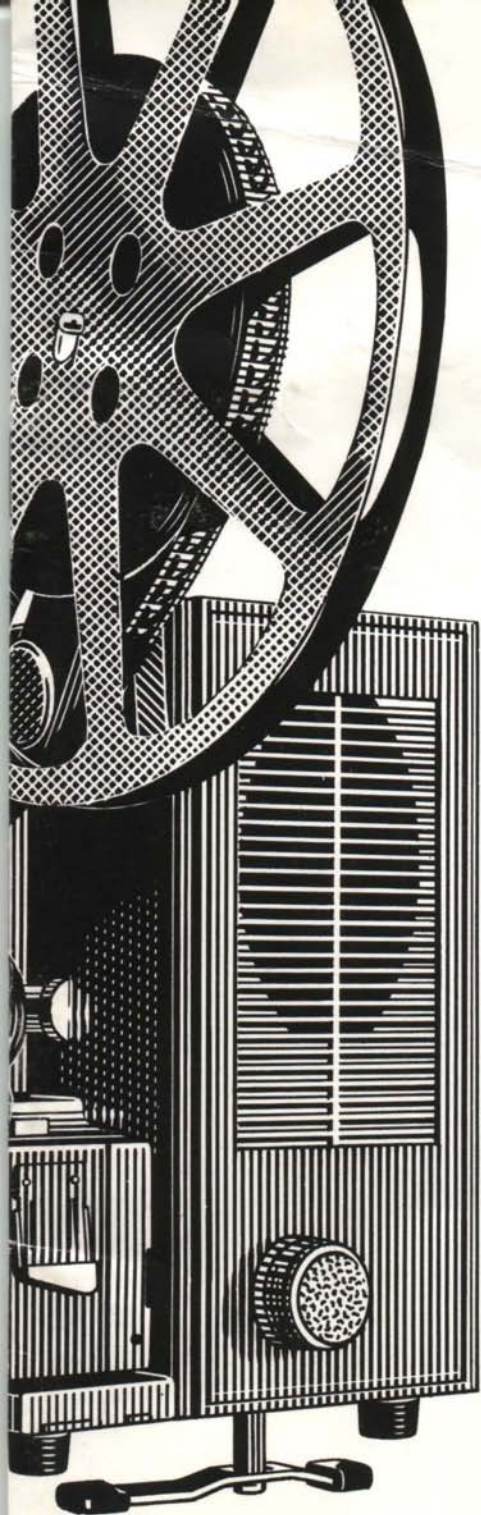




BELL & HOWELL



**TQ II &
TQ II SPECIALIST
1652 1653 1655 1658**

16MM FILMOSOUND

ENGLISH

Foreword

This is a long instruction manual but that is not because your projector is difficult to use. The operating procedure, as you will discover, is simple. The reason the manual is a long one is that the projector will have a long working life. From time to time, lamps will fail and sooner or later you may encounter films which are in too poor a condition to be projected without special techniques. We want you to know what to do when these things happen so that your presentations are never spoiled.

As you will probably be eager to show a film as quickly as possible, we offer a "reading plan". Stages 1 to 31 should be studied before you set up the projector for the first time, or while you are doing it. Stage 32 — concerned with difficulties — can be left until difficulties arise (although you will be a better projectionist if you read this section before your first presentation so that you know what to do if anything goes wrong).

Stages 33-50 have been included because there are certain teaching applications in which users may wish to thread or unthread the projector manually. If, like the majority of users, you always leave the projector to thread itself automatically, this section need not be read. Finally, there are Stages 51-69 on routine maintenance. These are important but can be ignored until you have projected a few spools of film and become familiar with the controls.

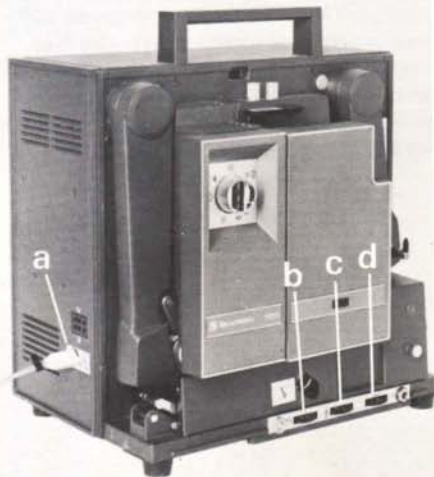


Each numbered illustration in this manual relates to the stage with the same number. In the text, a combination of a number and a letter refers to a detail in the similarly numbered (and usually adjoining) illustration. For example, 3a is the voltage selector pointer a in the illustration to Stage 3. Numbers in quotation marks, e.g. "3", refer to a similarly numbered part of the projector itself. Instructions which apply to some but not all models in the TQII and TQII Specialist ranges are printed in *italic type*. References to the "bar" of the function switch apply to Specialist models only. In other models the function switch is a circular knob with a dot in the position of the bar.

Connections to power supply

- 1 Place the projector on a stand or other firm support. Press the button by the carrying handle and pull the top of the side cover towards you, subsequently lifting the cover off the projector. *Unless you intend to use the small loudspeaker built into the projector, unwind all or part of the speaker cord stored alongside the auditorium loudspeaker inside the side cover and connect the plug at the end of this cord into the socket 1a at the back of the projector. Stand the side cover by the screen, facing the audience.* Set the three amplifier controls 1b, 1c and 1d, to their "0" positions. Any permanent magnet loudspeaker or loudspeaker system with an impedance of between 4 and 16 ohms may be connected through socket 1a.

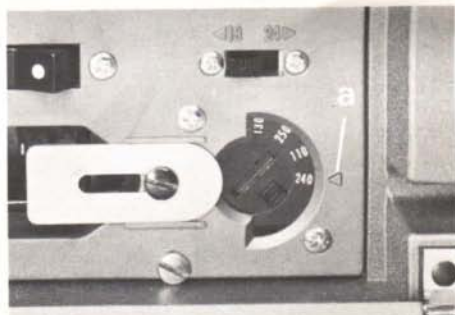
1



- 2 Pull down the rear flap and remove the power lead. **Do not connect the power lead to the mains until you reach Stage 7.** This projector is suitable only for alternating current (AC) supplies of 50Hz or 60Hz and may be seriously damaged if connected to direct current (DC) supplies. If you have any doubt about whether your supply is AC or DC, seek the advice of a competent electrical contractor or your local electricity office before connecting the projector to the mains.

- 3 Check that the setting of the voltage selector corresponds to the voltage of your local supply. To change the setting, first remove the moulded power lead connector from its socket in the rear compartment (if it has already been inserted), move the sliding cover to the left and then use a small coin or screwdriver to rotate the selector until the correct voltage setting appears against the pointer 3a. As the selector is rotated clockwise, the settings appear in the following sequence: (A models) 240/110/250/130/220/150 or (B models) 210-220/100/230/115/200/127. If there is no setting exactly corresponding to your supply, set the selector to the next **higher** voltage. On a 230V supply, for example, the "240" setting should be used.

3

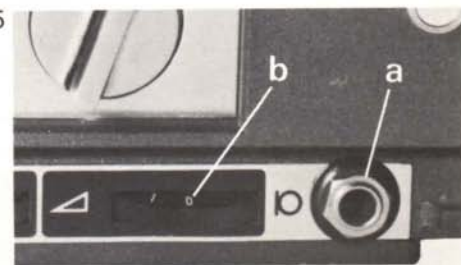


- 4 If necessary, fit a suitable power plug to the power lead. The three coloured wires in this lead should be connected to the plug terminals as follows

COLOUR	PLUG TERMINAL
brown	live
blue	neutral
green/yellow	earth (ground)

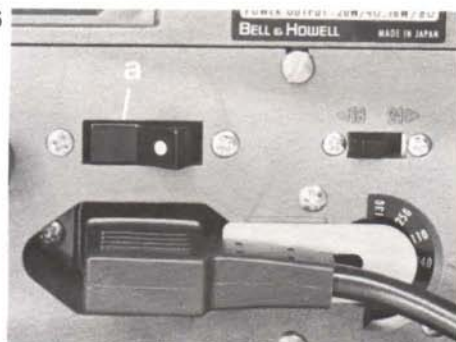
- 5 To use the projector amplifier for announcements or a commentary, connect a microphone to socket 5a. This socket may also be used for a tape recorder or record player. Any device connected to 5a should have an impedance of between 150 and 10,000 ohms. The sound level of speech or music through 5a is regulated by the volume control 5b. When the socket is in use, film sound tracks cannot be reproduced.

5



- 6 Check that the power switch 6a is in the "off" position ("0" side of switch depressed) and insert the power lead connector into the projector socket. It will fit only in the correct position, with the lead extending towards the voltage selector.

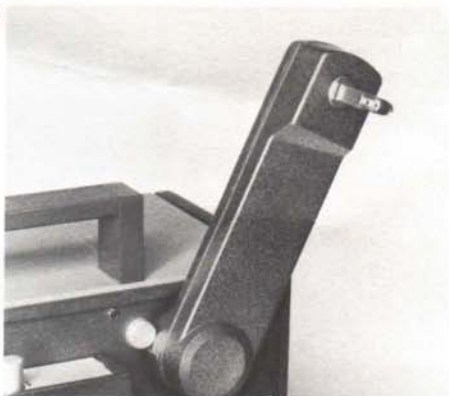
6



Automatic threading

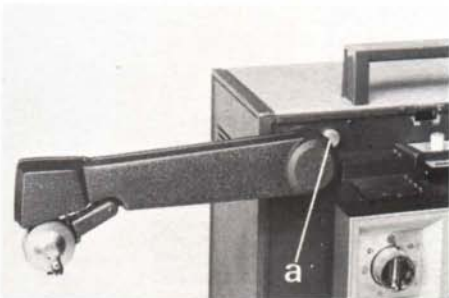
- 10** Raise the front spool arm until, with a click, it locks in the running position.

10



- 11** Raise the rear spool arm until it locks with a click at the "7 o'clock" position (this is a special position not used in normal operation). Press the release button 11a and raise the arm further. Release 11a and continue to raise the arm until, when horizontal, it again locks with a click.

11



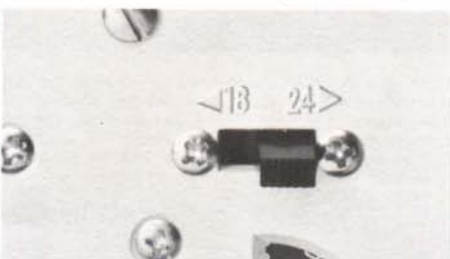
- 7** Connect the power plug to the mains supply. Set the main power switch to "on" by depressing the side marked with a red dot. Light from the threading light aperture and red indicator will show that the exciter lamp is now in operation.

7



- 8** Set the speed switch to "24" or "18" depending upon whether the film you are going to show is intended to be projected at 24 or 18 fps (frames per second). Almost all professionally made sound films need the 24 fps position. Old silent films and some films with magnetic sound tracks need 18 fps. If the action on the screen is unnaturally fast or slow, or if speech is excessively deep or high pitched, the wrong speed has been chosen. The speed can be changed without stopping the projector.

8



- 9** Lay the power lead into the curved slot and close the rear flap. The projector is now ready to be threaded.

9a



9b

- 12** Place the spool carrying your film on the front spool spindle (if necessary lifting the spool lock 12a until it is in line with the spindle) in such a way that the film hangs down from the front of the spool. Check that the sprocket holes are on the side of the film furthest from the projector. If they are on the projector side when the film is hanging down from the front of the spool, rewinding is required (as described in Stage 24). Secure the spool by pressing the spool lock until it clicks into position at right angles to the spindle.

12



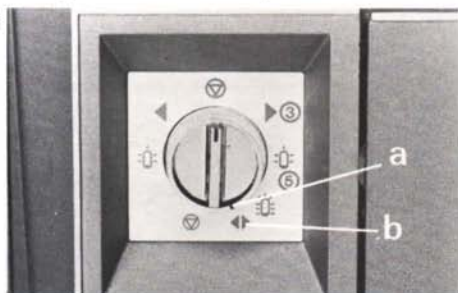
- 13** Attach to the rear spindle an empty spool, of sufficient capacity for the film you are going to show, and secure it with the lock. The projector will accept spools of up to 2,000ft (600m) capacity. The spool supplied carries 1,600ft (480m) of film.

13



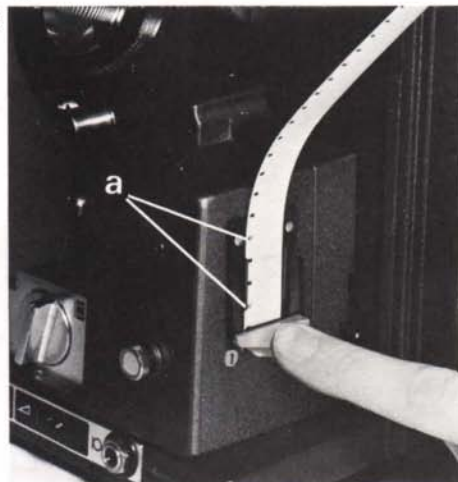
- 14** If necessary, set the outer ring of the function switch to its anticlockwise position, so bringing the notch 14a into alignment with the arrow symbol 14b.

14



- 15** Place the tip of the film in the cutter numbered "1" and, after ensuring that the two small studs 15a have entered two of the perforations, press the cutter handle firmly towards the projector until, with a click, it trims the film. Make sure before operating the cutter that enough film is being trimmed away for all damage in the region of the tip to be removed.

15



- 16** Press the automatic threading lever "2" downwards and to the right so that it locks in the threading position (16a). Rotate the bar 16b of the function switch to the arrowed position labelled "3" to start the projector mechanism.

16



- 17** Holding the film horizontally, slide the tip into the slot below the blue roller "4". When you feel the film being drawn in by the projector mechanism, release it.

17

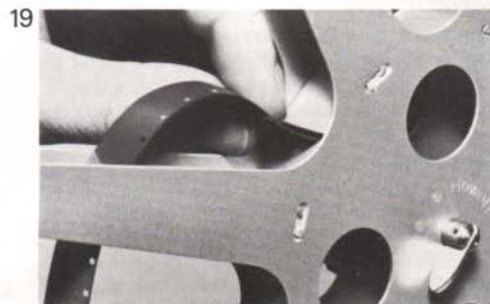


- 18** Watch the exit rollers at the rear of the projector and take hold of the film as soon as it emerges. When about 24in (60cm) of film has passed the exit rollers, turn the function switch bar back to the vertical "off" position. Pull gently on the film until, with a click, the threading lever returns to its original (running) position 18a.

18

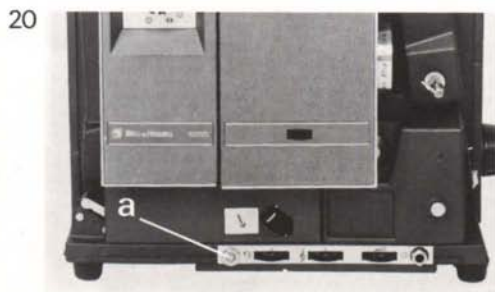


- 19 Pass the film in a clockwise direction under the rear spool and attach the tip to the hub of the spool, either by inserting it in a slot or using any clip provided. Turn the spool gently clockwise by hand to take up all the slack film between the spool hub and the projector.



Projecting the film

- 20 Advance the switch bar to "3". The film will now begin to move through the projector. When the whole of the leader section has passed the entry roller "4"—or, on a professionally made film, just after the last numbered frame on the printed leader has passed under this roller—advance the switch bar one more click to "5" to light the projection lamp and throw the picture on the screen.



Lamp economy

Your projector gives you a choice of two light intensities. When the switch bar is pointing to the first lamp symbol "5", the lamp receives less than the voltage for which it is designed. In this under-run condition, the life of the average lamp will be usefully prolonged. For economy, therefore, use the "5" position whenever it gives a sufficiently bright picture. For the maximum light, turn the switch bar fully clockwise; the lamp will now receive the correct voltage and, in consequence, have the normal life expectancy.

In addition to this useful "economy" setting of the lamp, the projector has an exclusive safety device to warn you if, because of variations in the supply voltage, the lamp is being over-run. In some localities and at certain times of day, the mains supply may rise appreciably above the nominal value, so reducing the life expectancy of the lamp. Should this happen when you are using a TQII Specialist projector, you will be warned that action is required by the flashing of the red excess voltage indicator 20a.

*If the indicator flashes when the projection lamp is being run at full brightness, immediately turn the switch bar back to the economy position "5". If the flashing persists, switch the projector off, disconnect the power plug from its receptacle, and inspect the voltage selector 3a. If the setting is different from the nominal mains voltage, correct it before resuming projection. If the setting agrees with the nominal voltage, set the selector to the next **higher figure** according to the following table:*

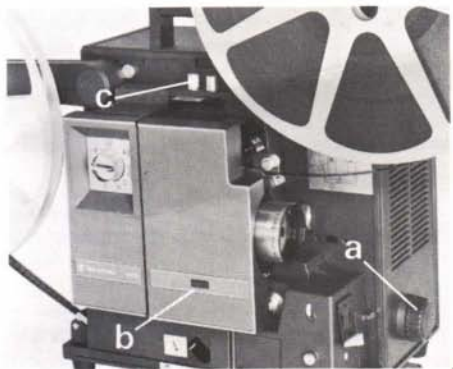
NOMINAL MAINS VOLTAGE		TRY SETTING NUMBERED...	
A Models	B Models	A Models	B Models
110V	100V	130	115
130V	115V	150	127
220V	200V	240	210-220
240V	210-220V	250	230

Try only these settings. If there is no alternative setting for your nominal voltage, or if the warning flashes continue, there may be a fault or a non-standard supply voltage and your dealer should be asked to investigate. An occasional flash—at, say, intervals of two seconds or longer—means that the projection lamp is being only slightly over-run; in these circumstances, although its average life may be reduced, it is safe to continue the performance.

Do not worry about a single flash each time you move the switch bar to a lamp position. This is a feature of the design to show you that the warning system is working correctly. If the indicator does not flash at these times, you have lost the protection of a valuable safety device and your dealer should be asked to make any necessary adjustments.

- 21** As soon as the picture is on the screen, centre it by using the tilt control 21a. Adjust focus with control 21b. If the line separating adjacent frames is visible at the top or bottom of the picture, remove it by rotating the framer control 21c.

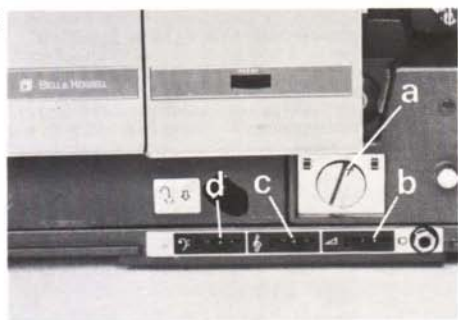
21



- 22** Set the sound track selector switch 22a according to the type of sound recording on the film, turning it to the right for optical sound and to the left for magnetic sound. A magnetic sound track is easily recognised as a continuous brown band along the edge of the film opposite to the sprocket holes.

Advance the volume control 22b until there is a satisfactory level of sound. If the tonal quality of the sound does not suit the film or the auditorium, adjust the separate tone controls to increase (+) or decrease (−) the proportion of treble 22c or bass 22d. In auditoria where echo is a problem, it may be helpful to decrease the bass response and, for the maximum intelligibility of speech, increase the treble.

22



ready for the performance. Turn the volume control back to zero and later, immediately after starting the projector to begin the performance, advance it smoothly to the number you selected originally: with sound, a fade-in is more agreeable than a sudden start.

Remember that people and their clothes absorb sound, so that a volume level suitable for an empty hall may be inadequate when the audience are in their seats. Sample the sound as soon as you can – moving some distance from the projector to do so – and make any further adjustment that seems desirable.

The position of the loudspeaker is important. It should be as close to the screen as possible and at about the same height as the heads of a seated audience. The best way to overcome echo from the rear walls or ceiling is to regard the loudspeaker as a "searchlight" and aim it so that the beam would illuminate a seat in the centre of the auditorium.

- 23** At the end of the spool of film, move the switch bar back to the arrow position "3" as soon as the last picture frame has been projected, simultaneously turning the volume control to "0". Turn the bar to the vertical "off" position when the film has run out of the projector on to the rear spool. If you are going to rewind the film immediately, proceed as in Stage 24. If the presentation is to continue without interruption, open both spool locks and remove the full and empty spools. Load and project the next spool as in Stages 12-23.

- 24** To rewind a film after projecting it, leave the spools where they are. Pressing the release button 24a, raise the rear spool arm a few degrees and release the button. Continue moving the arm until it locks in a vertical position. Carry the tail of the film from the underside of the rear spool to the underside of the now-empty front spool 24b and secure it in the slot or clip of the spool hub. Move the switch bar anticlockwise to the arrowed position. As soon as the spools start to rotate, press the rewind button 24c fully down and then release it. When all the film has returned to the front spool, move the switch bar to the vertical "off" position.

24



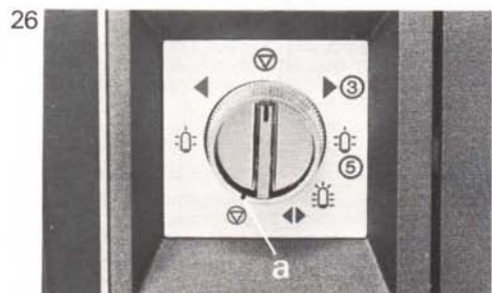
To please your audience

Although the adjustments described in Stages 21 and 22 take only a few seconds, your presentation will be more polished if you have aligned and threaded the projector, and set the focus, framing and sound controls, before the audience arrives. After making these adjustments, stop the projector by turning the switch bar to the vertical "off" position and then, turning the bar one click anticlockwise, run the film through the projector in reverse until the first picture or title frame is below the blue entry roller "4"

Special features

- 25 Reverse motion.** At any time during a presentation, the film may be reversed by turning the switch bar anticlockwise to one of the two "reverse" positions. If you do not wish the audience to see the action backwards, but just to repeat a scene, use the arrowed position of the bar; if, however, backward action is a part of your presentation, use the position with the lamp symbol. (In reverse, the lamp is always run at the reduced "economy" voltage and the sound is automatically cut off.)

- 26 Still pictures.** The action of the film can be "frozen" at any time, to allow detailed study of a single frame, by moving the outer ring of the function switch to its clockwise position 26a. Automatically, the light reaching the film is reduced to prevent overheating of the stationary frame. If you have been projecting at the "economy" setting of the lamp switch, you can increase the brightness of a still picture by advancing the switch bar to the full brightness setting. It is advisable to readjust focus when showing stills. To revert to normal projection, see Stage 28.

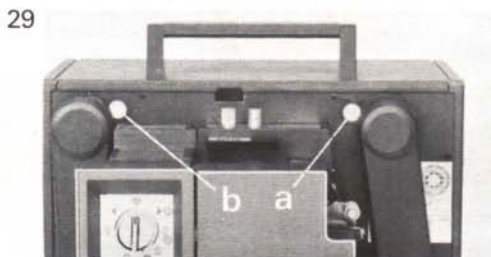


- 27 Animation.** This Bell & Howell invention allows a succession of still pictures to be shown, and examined frame by frame, at your own choice of speed. Set the outer ring of the function switch for still projection, as described in Stage 26. To change from one stationary frame to the next, tap the animation lever 27a. If, however, you wish to move on for a few frames before showing another still picture, press the lever down until the next frame to be examined is on the screen, and then release it.

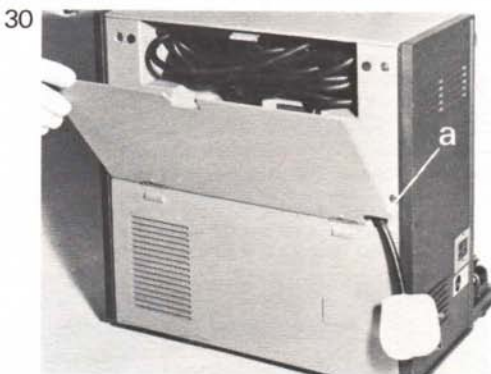


- 28** After showing a still or using animation, there is no need to switch the lamp off before reverting to normal running. Just move the outer ring of the function switch back to the running position and then readjust the focus setting. Your presentation will be more polished if you turn the volume control to "0" before normal projection is resumed and then advance it again to fade in the sound after the film has started to move.

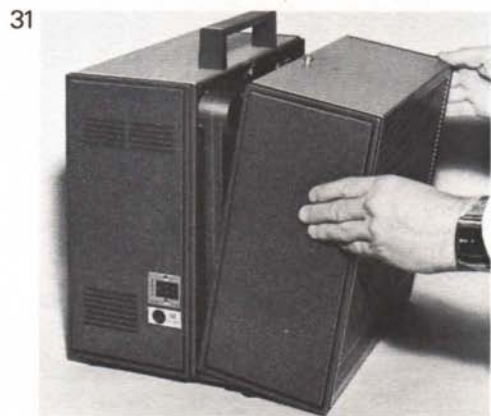
- 29** At the end of the presentation, if time and circumstances permit, run the projector mechanism for about two minutes in the "3" position of the switch bar to cool the lamp. While this is being done, fold the locks on the two spindles to their angled positions. Press the release buttons of the front (29a) and rear (29b) spool arms and lower the arms as far as they will go. Turn the tilt control fully clockwise. Set the switch bar to the "off" position. Remove the plug of the loudspeaker lead from its socket at the back of the projector and wind the lead round the carrier inside the side cover.



- 30** Open the rear flap, press the main power switch to "off" and withdraw the power lead from its socket. Coil the lead tidily and store it in its compartment. If there is no room for your mains plug, allow this to hang outside the compartment through the slot at the back 30a.



- 31** Lower the side cover on to its attachment points on the base of the projector and then push it closed at the top until the securing catch engages.



Film problems

32c

- 32** So reliable is the Bell & Howell film transport system that with films in good condition no problems should arise either in threading or during projection. Even with faulty films, a satisfactory presentation will often be possible because of a device designed to reset, automatically, "lost loops" resulting from the most common forms of film damage — broken perforations or badly made joins. For other kinds of film fault, there are further safety devices to ensure that existing damage is not made worse.

Threading and projection difficulties are likely to take one or other of the following forms:—

- a Problem** Film not drawn into projector after being pushed under "4".

Cause *Outer ring of function switch in still picture position.*

Remedy *Move outer ring to arrowed position.*

Cause Tip of film bent or otherwise damaged.

Remedy Use trimmer to remove damaged tip (Stage 15).

- b Problem** Tip of film enters projector after being inserted under "4" but reappears as shown.

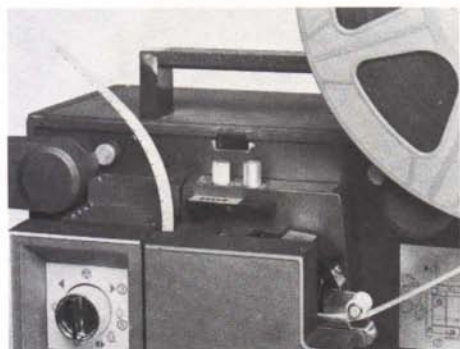
Cause Failure to set automatic threading lever (Stage 16).

Remedy Reverse projector to remove film and repeat from Stage 16.

Cause Excessive inward curvature of film (probably due to long storage on a small spool).

Remedy Remove film as above. Correct excessive curvature by winding the first ten frames of leader into small cylinder in the direction opposite to the original curve. Repeat from Stage 16.

32b



- c Problem** Film enters projector but loop then rises as shown.

Cause Damaged leader.

Remedy Reverse projector to remove film and trim off damaged portion. Repeat from Stage 16.

Cause Film gate partly open.

Remedy Reverse projector to remove film, pull open lens mount (Stage 63) and close fully. then repeat from Stage 16.



- d Problem** No stable picture, but only a varying pattern on screen.

Cause Automatic threading lever still at "thread" position.

Remedy Pull gently on film (Stage 18) until threading lever sets itself with a click. Alternatively, reverse projector to remove film and start again at Stage 16.

- e Problem** Intermittent jerking of picture on screen.

Cause Broken or strained perforations are causing automatic loop reformer to operate.

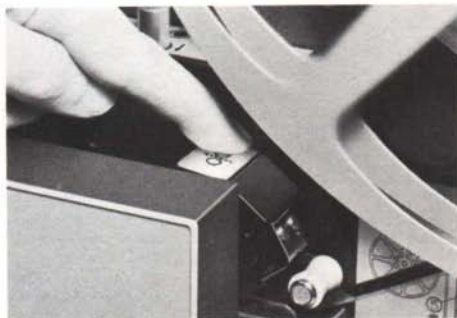
Remedy None required if, between jerks of the picture, projection is normal. If it is not, see F below.

- f Problem** Picture normal, then becomes and remains unsteady; heavier than normal sound from projector mechanism and possibly distorted sound from loudspeaker.

Cause A bad join, or condition of perforations too poor for the automatic loop reformer to make all necessary corrections.

Remedy Leave projector running but press system restorer 32f fully down for a few seconds, then release it. This action momentarily brings the whole of the automatic threading system back into operation, thus restoring the correct relationships between the film and the sprocket wheels, film gate and sound system. Do not use the system restorer when the projector is running in reverse.

32f



g Problem Scratch appearing on screen.

Cause This is almost certainly an existing scratch. Examine film coming down from front spool. If scratch remains on screen but is not seen entering projector, proceed to ...

Remedy Switch off immediately. Inspect and clean film path between entry roller "4" and projection aperture in gate (Stages 63, 64).

h Problem Scratch not visible on screen but visible on film at rear of projector.

Cause Almost certainly an existing scratch but outside the projected area. Examining film as it runs from front spool will show whether this is so. If scratch is not present at entry roller "4" but **continues** to be present at exit from projector, some abrasive particle has probably been carried by the film into the projector.

Remedy Switch off and clean entire film path (Stages 63, 64). If scratching persists, stop the projector and, unthreading progressively if necessary as described in Stages 45-50, determine the exact point in the film path, and on which side of the film, the scratch begins. Concentrate then on removing all foreign matter from this area. Films may be encountered which have been "spliced" with wire staples or similarly abused. If you are unlucky enough to meet one of these, it may on its way through the projector have roughened part of the film path sufficiently to cause scratching of subsequent films. Check carefully for scratches and do not project again until a Bell & Howell audio-visual dealer has repaired or replaced any damaged part.

i Problem Any film transport difficulties not covered by the remedies above.

Causes Such difficulties are very rare and will in almost all cases be due to serious imperfections in the film. If film is not running normally after operation of the system restorer (Problem F), switch off and remove it manually as described in Stages 45-50. Repair or remove any damaged section if the film is your own property. Otherwise, rethread manually (Stages 33-44) at the point where the last of the damage is clear of the exit rollers of the projector.

j Problem Projector does not run, threading light and red window on exciter lamp cover not lit.

Causes No mains supply, or main power switch still at "off".

Remedy Check and correct.

Cause Failure of main fuse.

Remedy Replace fuse with one of the correct rating as described in Stage 59, noting that it must be of the "thermal" or surge-resisting type. If the replacement fuse fails, do not fit another but ask your audio-visual dealer to examine the projector.

k Problem Sound but no picture.

Cause Failure of projector lamp.

Remedy Replace lamp (Stages 51-55).

l Problem Picture but no sound.

Cause Failure of exciter lamp (red window on exciter lamp cover not illuminated).

Remedy Replace exciter lamp (Stages 56-58). If new lamp does not operate, there is an electrical fault needing the attention of your audio-visual dealer.

Cause Break in speaker cord or fault in side cover loudspeaker.

Remedy Remove plug of speaker cord from back of projector. If sound now comes from projector's internal speaker, there is a fault in the plug, cable or (very unlikely) the side cover speaker. Examine the cable for obvious signs of damage and make a temporary repair. If there are no such signs, seek the help of an audio-visual dealer.

Cause *Track selector switch at wrong setting for the film.*

Remedy *Set switch to other position (Stage 22).*

Cause Electrical fault.

Remedy After making sure that there is sound on the film you are showing (if you hear a hiss from either loudspeaker when the volume control is turned fully up, suspect the film before suspecting the projector and try another film), ask your audio-visual dealer to test and repair.

m Problem Low sound.

Cause Volume control not sufficiently advanced.

Remedy Advance.

Cause Dirt in region of sound optical system.

Remedy Clean (Stage 66).

n Problem Unpleasant sound from a film sound track known to be good.

Cause Unsuitable setting of tone controls.

Remedy Return both controls to "0", then try other settings.

Cause Excessive loop at sound drum.

Remedy Correct with system restorer (Problem F).

Cause "Wow" caused by pinching of film as it winds on to rear spool.

Remedy Bend spool flanges until film is winding on steadily.

Cause Fault in projector sound system.

Remedy Ask your audio-visual dealer to correct.

o Problem Screen goes white.

Cause Broken join.

Remedy See introduction to "Manual Threading" section below.

Manual threading and unthreading 33

Introduction.

The automatic threading system of this projector is fast, effective, and (because it cannot "make mistakes") kind to films. Manual threading is, therefore, recommended only if you do not wish to project a spool from the beginning but, instead, need to start at some intermediate point.

Even then, if your selected scenes are not far from the beginning, you may prefer to rely upon automatic threading and then leave the projector, with the lamp off and the sound turned down, to advance the film to the correct point. Similarly, manual unthreading will in normal circumstances be necessary only if, after showing part of a film, you need to remove it from the projector before the front spool is empty.

One other reason for manual unthreading may arise if a weak join in the film has failed at some point of the film path. This problem can often be solved by using the switch bar. Allow one part of the film to run out of the projector to the rear. Reverse the mechanism and run the other part out at the front. Rethread the front part automatically and, when the tip emerges from the projector, insert it under the loose turns of film on the rear spool until it is held sufficiently firmly to be taken up normally as the spool rotates. Always have the main access door open (Stage 34) when using the forward and reverse switch positions to clear the film from the projector. You can then keep the film path under observation. If the film is "bunching" at either side of the broken join, switch off at once and manually unthread that part of the film which cannot be safely run out of the projector under power.

In the instructions which follow, it is assumed that the film is to be unthreaded and threaded at some intermediate point — that is, with a partially loaded spool on each of the spool spindles.

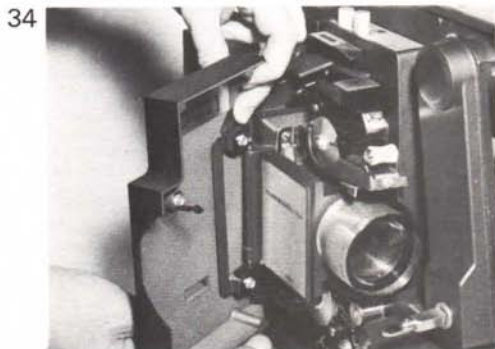
Manual threading and unthreading are both easier if the projector is on a high stand or — after you have removed the power lead and closed the flap of the power lead compartment — lying on its side.

Manual threading

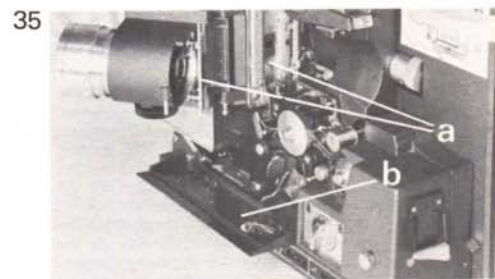
- 33** Mount the two loaded spools on their correct spindles — with the film to be projected on the front spindle — and secure them with the spool locks. Pull off a loop of film about 4ft (1.2m) long for threading.



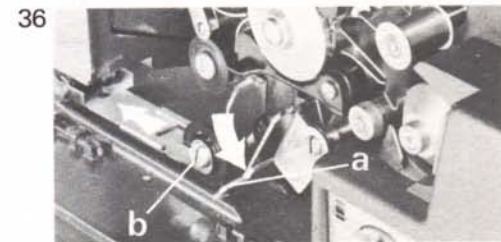
- 34** Pull open the main access door. Depress the black spring above the upper hinge and lift the door upwards until it disengages from the hinge posts.



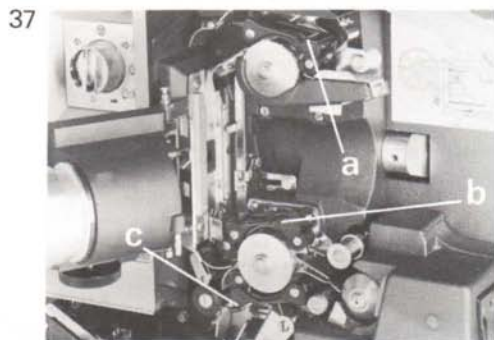
- 35** Pull the front of the lens barrel towards you to open the film gate 35a. Pull down the lower access door 35b.



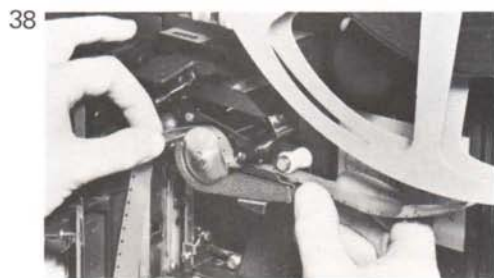
- 36** Ensure that the automatic threading lever is in the "run" 36a and not the "thread" position. If it has been set to "thread", release it by light backward pressure on roller 36b.



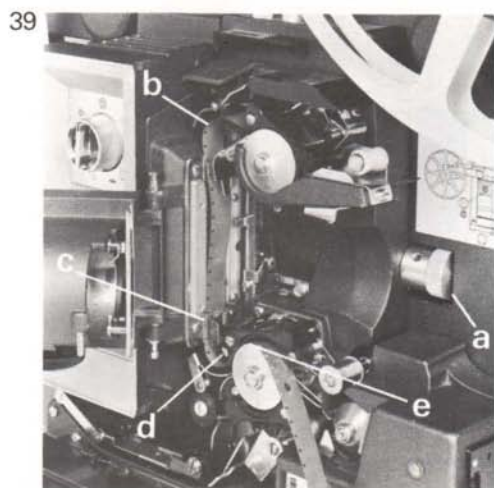
- 37** By upward pressure at 37a and 37b, raise the first and second sprocket guards until they click into their open positions. Press down at 37c to open the third sprocket guard.



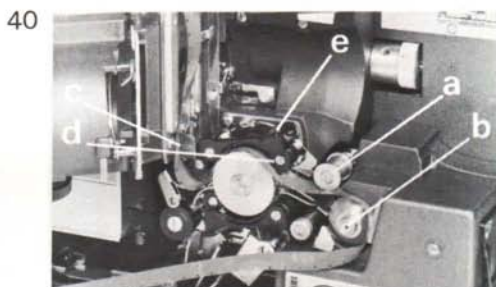
- 38** Holding the film in both hands, slide it under roller "4" and then into the space between the first sprocket guard and the upper sprocket wheel. Engage the sprocket holes with the sprocket teeth, then press down the sprocket guard until it clicks into the closed position.



- 39** Rotate the manual advance (inching) knob 39a until the three teeth of the shuttle in the film gate are extended. Now, leaving a free loop at 39b, slide the film partly into the slot 39c and at the same time carry it under roller 39d and into the space 39e between the sprocket guard and sprocket wheel.



- 40** Without pushing the film so far towards the projector that the sprocket teeth engage with the perforations, carry it forward under roller 40a and around the sound drum 40b, leaving it as in the illustration. Returning to the film gate, and preserving the loop above the gate, engage the perforations with the shuttle teeth, easing the film fully into the slot 40c and under roller 40d and sliding the perforations into engagement with the teeth on the sprocket wheel. Press the front 40e of the sprocket guard until it closes with a click.



- 41** Slide the film behind the edge guide 41a below the sound drum. From there, and without pushing the film fully in towards the projector, lead it over roller 41b and into the space between the lower sprocket guard and the sprocket wheel. Continuing this action, carry the film downwards and around the roller 41c and lay it in the exit slot 41d below the three rollers. The film should now be correctly seated round the sound drum and in the exit slot, but not yet pushed into engagement with the sprockets on the underside of the sprocket wheel.



- 42** Pull lightly but steadily on the film now extending from the rear until the rollers move as far as they will go in the directions shown by arrows in the illustration. Still keeping the film under tension, press it towards the projector at 42a to bring it into alignment with the sprocket wheel. Gradually reduce the tension until the perforations are engaged by the sprocket teeth. Press the lower sprocket guard 42b upwards until it closes with a click and release the film at the rear. Finally, after satisfying yourself that the film is lying flat in the gate, swing the lens mount to the closed position. Rotate the rear spool clockwise to absorb all surplus film between the rear exit roller and the spool. Close the lower access door.



43 Check that threading is correct by rotating the manual advance knob in an upward direction 43a. The loops above and below the gate should grow bigger and smaller alternately and the amount of film between the sound drum and the top and bottom of the sprocket wheel should remain constant. If in the course of threading the loop above or below the gate has become too small, open the sprocket guard above the lens, ease the film out of engagement with the sprocket teeth, and "feed" one or more frames of film into the loop 43b above the gate. As soon as the projector is set to run, the automatic loop former 43c will distribute this extra length correctly between the upper and lower loops.



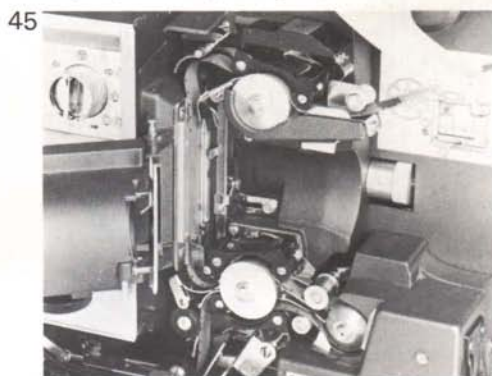
44 Replace the main access door by fitting the two "fingers" on the door over the narrowest parts of the hinge posts on the projector and then push the door down until the catch engages with a click. Close the door. Project as in Stage 20.



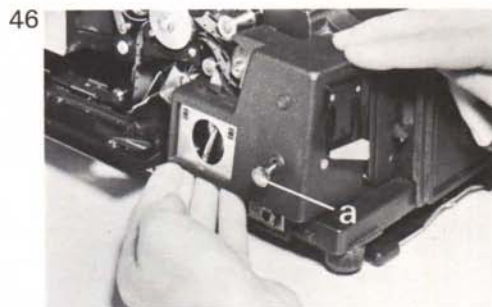
Unthreading

Unthreading is almost the reverse of manual threading and can therefore be more briefly described.

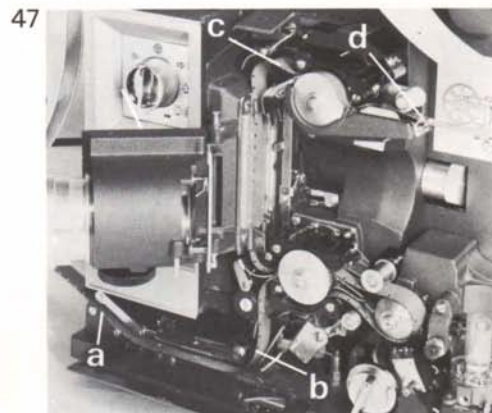
45 Remove the main access door and pull on the lens to open the gate. Open the lower access door and (as in Stage 37) the three sprocket guards.



46 Unscrew the knob 46a securing the exciter lamp cover and pull the cover carefully away from the projector.

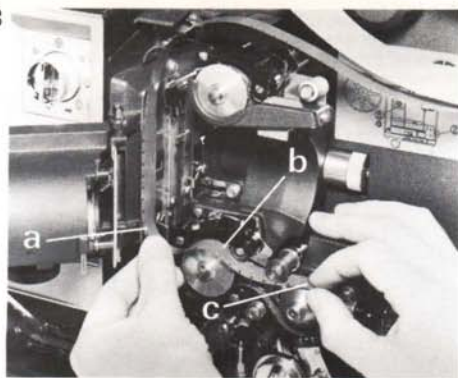


47 Holding the film at 47a and b, and bringing your hands slightly together, ease it away from the slot behind the lower access door. Holding it at 47c and d, and again bringing the hands together to disengage the perforations from the sprocket teeth, lift it away from the upper sprocket wheel.



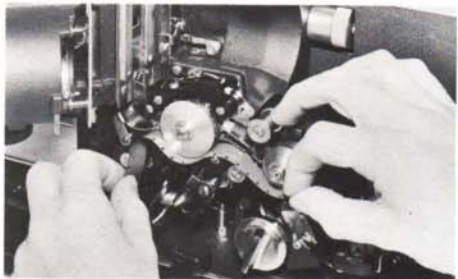
48 Slide the film clear of the film gate and the slot 48a. Hold it as shown and disengage it from the upper part of the lower sprocket wheel at 48b and the sound drum at 48c.

48



- 49 Finally, again holding the film as shown and bringing the hands together, disengage it from the lower part of the sprocket wheel. Remove the two loaded spools, for safety winding up all surplus film.

49



- 50 Replace the exciter lamp cover, ensuring that it is correctly seated all round, and tighten the securing screw. Close the lens mount and lower access door and (Stage 44) replace the main access door. There is no need to close the sprocket guards. This will be done automatically next time the automatic threading lever is used.

Caring for your projector

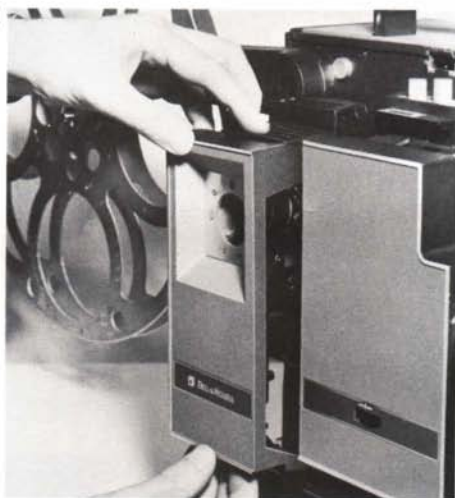
This Bell & Howell projector is easy to maintain. There are no bearings to be lubricated, no thermionic valves to become less efficient with time and no special adjustments requiring tools. The only routine tasks, in fact, are regular cleaning and the occasional replacement of lamps.

Replacements

Alongside the loudspeaker in the side cover are spaces for storing a spare projection lamp, a spare exciter lamp and spare fuses. Because lamps fail without warning, it is advisable during a presentation to place spare lamps near the projector ready for immediate use.

- 51 Projection lamp. No light on the screen, when the projector is otherwise functioning normally, indicates that the projection lamp has failed. Set the main power switch at the back of the projector to "off". Remove the lamphouse cover with a straight pull away from the projector.

51



- 52 Remembering that if the lamp has just failed it will be hot, disengage the retaining clip 52a by firm downward pressure and leave it hanging free.

52



- 53 Grasp the failed lamp as shown and pull it directly towards you out of its sockets. Holding the replacement lamp in a clean cloth, insert the pins of the lamp in their sockets — taking care not to touch either the reflector or the bulb — and push the lamp as far towards the projector as it will go. If either the reflector or bulb are touched with bare fingers, apply household alcohol with a fluff-free cloth to remove any contamination and allow to dry.

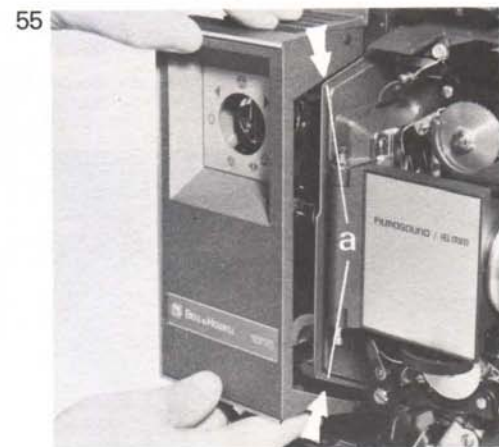
53



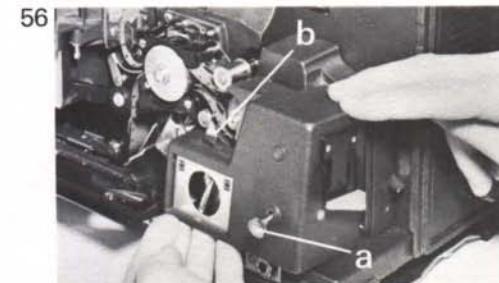
- 54** Grasping the retaining clip and lamp base between finger and thumb, raise the clip until it clicks into the notch in the lamp base.



- 55** Replace the lamphouse cover, holding it so that the two parts arrowed in the illustration are outside the two flanges 55a on the projector and with the function switch centred in its hole. Press the cover firmly towards the projector until the securing spring engages to hold it in position. Set the main power switch back to "on" and continue projecting.



- 56** **Exciter lamp.** If the projector is otherwise working normally but there is no light behind the red window in the exciter lamp cover, the most likely cause is a failed exciter lamp. Pull open the main access door and set the main power switch to "off". Unscrew the securing knob 56a and, taking care not to strain the film with the edge guide 56b, lift the cover away from the projector.



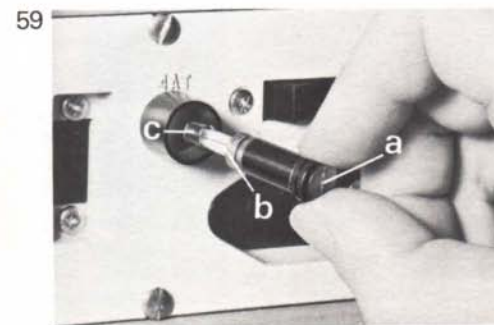
- 57** Push the exciter lamp securing lever 57a towards the projector to free and raise the exciter lamp. Rotate the lamp until the three slots in its ring can disengage from the studs on the projector and remove it.



- 58** Fit the ring of the new lamp over the three studs — there is only one position in which this can be done — and rotate the lamp until the studs are at the narrow ends of the slots in the ring. Pull the securing lever 58a all the way back to its running position. Replace the exciter lamp cover, reset the main power switch to "on" and close the main access door.



- 59** **Main fuse.** The circumstances in which the main fuse may need to be replaced are explained in Stage 32J. Set the main power switch to "off" and remove the power lead from the projector socket. Unscrew the fuseholder 59a with a coin or screwdriver and pull it out, subsequently pulling the tubular fuse 59b from its clip in the holder. Replace with a fuse of the thermal or surge-resisting type (normally marked 4AT or T4A on one of the metal caps 59c). Screw the fuseholder back into its socket, connect the power lead and set the power switch to "on". If the replacement fuse fails quickly, do not fit another. Ask your audio-visual dealer to investigate.



Magnetic head replacement. The magnetic playback head supplied with the projector is for "full width" magnetic sound tracks. It can be replaced with heads for half-width magnetic tracks. These heads, available from Bell & Howell audio-visual dealers as accessories, are available in two forms: for a half-width magnetic track on the outer part of the sound track area and for half-width magnetic track on the inner part. By this means, a film suitably recorded can be given two alternative magnetic sound tracks, side by side, and either can be selected for a presentation by fitting the appropriate magnetic head.

- 60** To change a magnetic head, set the main power switch to "off", remove the exciter lamp cover, then pull off the knob of the sound track selector switch.



- 61** Pushing the magnetic head as far towards the projector as it will go, rotate anticlockwise until it is horizontal and pull it straight off its mounting post.



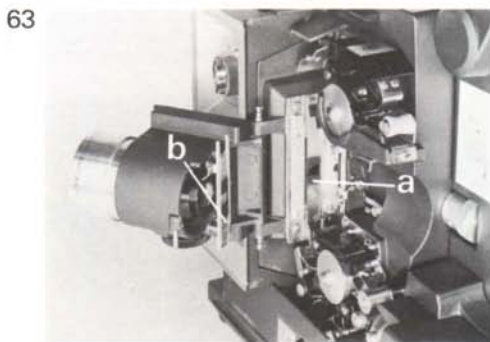
- 62** Head replacement is the reverse of the removal procedure. Hold the head with the pin 62a pointing towards the front of the projector, slide it on its mounting post and push it as far as you can towards the projector. Maintaining this inward pressure, rotate the head clockwise until it reaches its stop. Release the head, allowing the internal spring to return it to the running position and finally pulling it gently towards you to ensure that it is correctly seated. Replace the knob of the sound track selector switch, which will fit only in one position, and push it fully on to its shaft. Replace the exciter lamp cover and set the main power switch to "on".



Cleaning

All external parts of the projector should be dusted from time to time for the sake of its appearance. Some parts must be cleaned regularly for the sake of the films you will be using. These are the parts coming into contact with the film, which can easily be scratched as it moves from spool to spool by even small accumulations of abrasive dirt.

- 63** **Picture gate.** Before every presentation and, if the last film shown was dirty, even before threading another spool, the film gate should be cleaned. Open the main access door and pull open the lens mount. Brush away all dirt from the rear aperture plate 63a and from the pressure plate 63b on the lens mount. Films which have not been well lubricated by their supplier may cause a deposit of emulsion to adhere to the rails of the pressure plate and (more rarely) of the aperture plate. Inspect these rails carefully from time to time and do so whenever the characteristic "clicking" sound of the film transport becomes heavier. Remove any deposit of emulsion, however small. If it cannot be dislodged by brushing, use a sharpened match stick, an orange stick or a piece of hard plastic to scrape it away. **Never use any kind of metal object for cleaning any part of the projector.** Brush away any fluff that may have collected around the apertures in the rear or front plates but do not insert a brush more than 2mm into the rear plate aperture as this could damage delicate parts inside.



- 64** **Film path.** Inspection of the projector when it is threaded will show where the films run and where, therefore, accumulated dust could cause damage. Wherever you find dust, brush it away. A "puffer" brush, obtainable from any photographic accessory shop, is useful for this. So, in certain areas, is an ordinary pipe cleaner, but care must be taken that the wire in a pipe cleaner does not scratch any component in the film path.

- 65** **Projection lens.** The surface coatings on high-quality lenses are delicate and it is better to let a few specks of dust stay on a lens than to clean a lens too often. When you suspect that dirt on either of the exposed surfaces is affecting picture quality, remove the lens by rotating the focus control 65a towards the rear of the projector and withdrawing the lens 65b from its mount. Use a very soft brush or puffer brush to remove loose dust from the lens surface. Then, with a clean lens tissue, gently polish the surface clean, breathing on it if any marks are difficult to remove. Take care never to touch the surface of a lens with a bare finger. If this happens by accident, cleaning should be done immediately because a fingerprint can leave a permanent pattern on the lens. If there are any marks which cannot be removed with gentle polishing, resist the temptation to rub more energetically. Use a lens tissue just moistened with a

proprietary lens cleaning fluid and afterwards polish the surface dry with another clean tissue. To replace the lens, insert it in its mount while rotating the focus control towards the front of the projector.

65



66 Sound system. The glass surfaces of the sound optic are well protected by the exciter lamp cover and will seldom need attention. If the maximum sound output obtainable seems to have diminished, apply a soft and clean brush carefully to the area (arrowed) between the rear of the sound optic and the sound drum. Any other cleaning of the sound optical system should be done by a Bell & Howell audio-visual dealer, who will make any necessary readjustments if the precise alignment of the system is disturbed.

66



The magnetic head should occasionally be taken out (Stage 60) and lightly brushed to remove any particles of magnetic oxide. Do not attempt to remove obstinate accumulations of oxide from the head with any tool or fluid. This is a delicate component, adjusted in the factory to a high degree of precision. If it cannot be cleaned by gentle brushing, ask your dealer to do the job.

67 Cables. It will not in any way affect the performance of your projector, but it will make projecting more pleasant, if you run the power and speaker cords through a duster before coiling them up at the end of a presentation. Often lying on the floor, they quickly become dirty and, unless cleaned, will mean that you start your next presentation with soiled hands.

Service

68 For any advice not given in this instruction manual, and for any adjustments, consult a Bell & Howell audio-visual dealer. He will be glad to help, applying to your

problem not only his expert knowledge but also, if necessary, the special servicing tools and instruments made or recommended by Bell & Howell. Although the projector will run for long periods without any attention, other than the regular cleaning you do yourself, it is wise to ask the dealer to examine it from time to time — preferably annually if the machine is in frequent use. He knows how to restore its performance to its peak, if there has been any deterioration you have failed to notice, and so keep the projector serviceable for many years to come.

Storage

69 The projector should be stored in a dry place away from excessive heat. If your use of it entails frequent road journeys, a "mattress" made of a thick sheet of foam rubber is a sensible investment because it will reduce the vibration which might otherwise shorten the life of your lamps.

Accessories

70 The Bell & Howell accessories available for the projector include:

Alternative projection lenses to give larger or smaller pictures at a given projector/screen distance than the standard 2in/51mm lens supplied with the projector.

Anamorphic lens and adaptor for CinemaScope and similar films.

Zoom lens to give a range of picture sizes without changing lenses.

Remote control attachment enabling the still picture and animation functions described in Stages 26 and 27 to be operated at up to 15ft/4.5m from the projector.

Half-track magnetic replay heads.

Slip-on protective cover with side pocket for manual and small accessories.

Your audio-visual dealer will give you details of all these and also be able to supply you with additional spools and spare lamps.

Guarantee

This new Bell & Howell projector is guaranteed to be free from imperfections in both material and workmanship for one year from date of original purchase. Should any part of the projector be defective, it will be replaced or repaired free of charge (except for transportation), providing the projector has been operated according to the instructions in this manual. No liability is assumed for film which is damaged or is unsatisfactory for any reason and no liability is assumed for interruptions in operation of the projector.

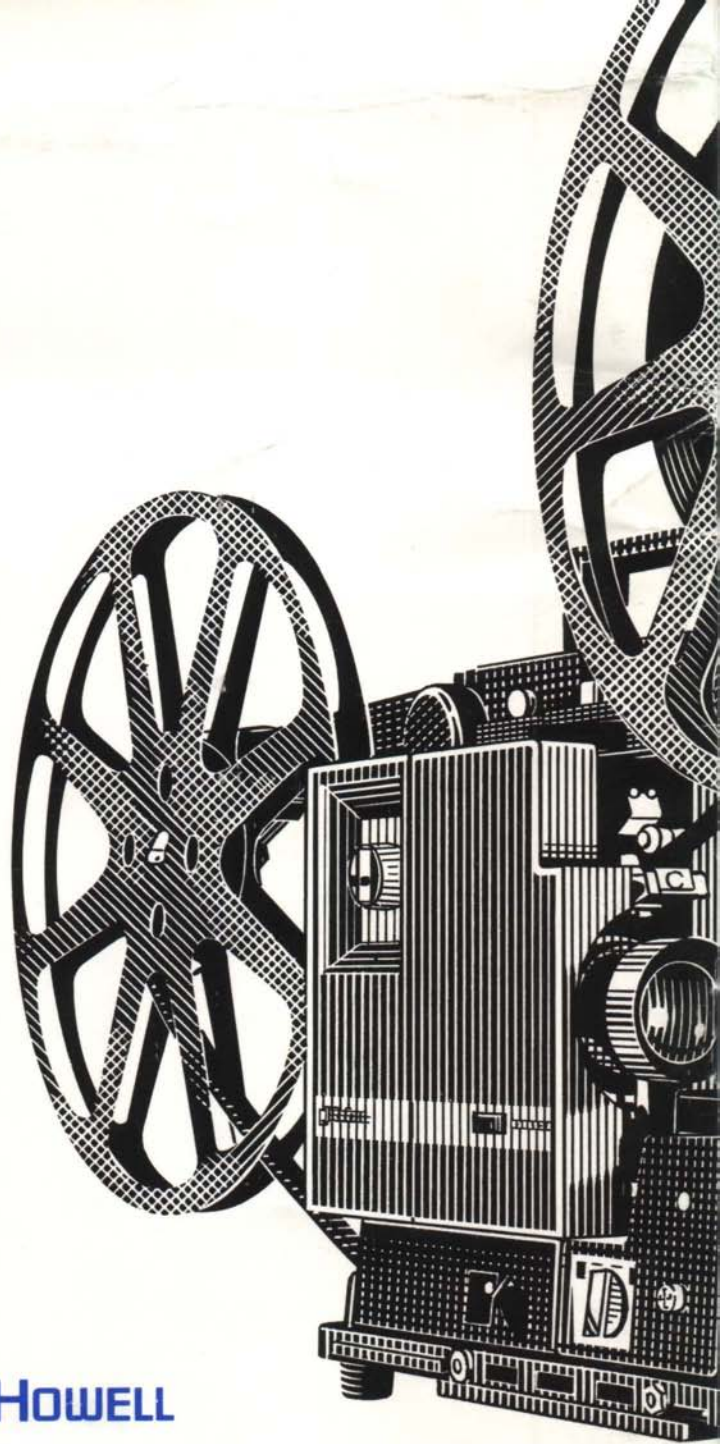
This guarantee is void:

A If the projector has been damaged by accident or mishandling.

B If the projector has been serviced by other than Bell & Howell approved service stations.

C If adaptations or accessories other than those made or recommended by Bell & Howell have been made or attached.

This guarantee does not extend to lamps, which are covered by the lamp manufacturers' own warranties.



BELL & HOWELL