Film-Tech

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MODELS 641 & 642

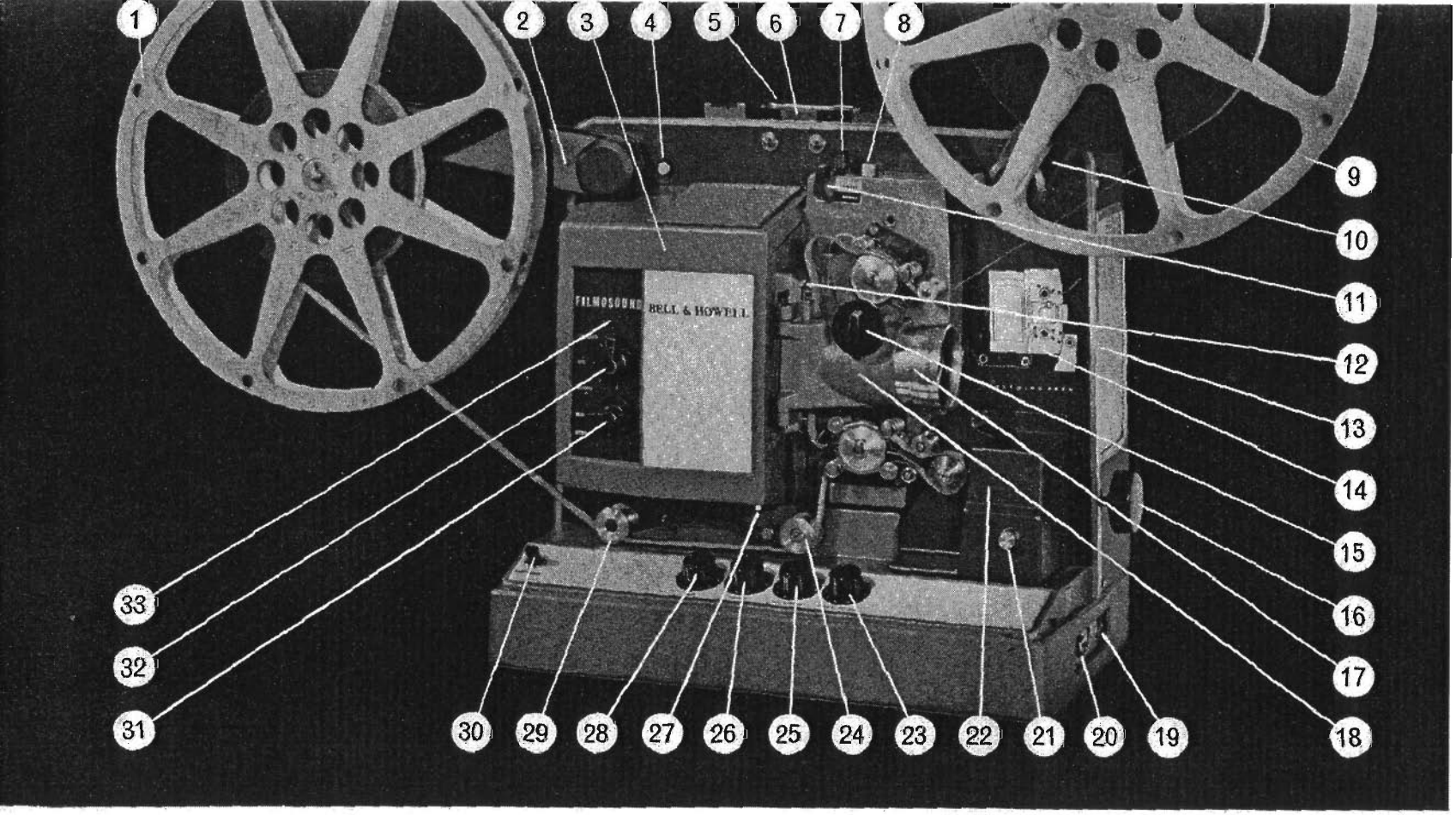
BELL & HOWELL

FILMOSOUND

16mm sound projector

instruction manual

Rank Precision Industries Limited



FILMOSOUND MODEL 642

1. Take-up Reel
2. Rear Reel Arm
3. Lamphouse Cover
4. Arm Release Button
5. Carrying Handle
6. Cover Latch Button
7. Framing Control
8. Rewind Button
9. Feed Reel
10. Front Reel Arm
11. Speed Selector
12. Variable Aperture Control
13. Speaker
14. Threading Diagram
15. Focusing Knob
16. Tilt Control
17. Projector Lens
18. Lens Mount
19. Accessory Speaker Outputs
20. Microphone Input
21. Securing Screw
22. Exciter Lamp Cover
23. Optical Volume Control
24. Guide Roller
25. Microphone Volume Control
26. Treble Control
27. Lamphouse Lock Button
28. Bass Control
29. Guide Roller
30. Animation Button
31. Still Picture Control
32. Direction Switch
33. Control Panel

FILMOSOUND 641/642

INSTRUCTION MANUAL

GENERAL INFORMATION

Before attempting to operate the Filmosound projector it is advisable to study carefully the instructions provided in this manual. An initial examination of the key illustration inside of the front cover is particularly recommended as this will enable the user to become familiar with the names and location of the various controls referred to at an early stage.

Queries arising from the operation of this equipment will be gladly dealt with by the Accredited Bell & Howell agent who supplied the machine.

Should difficulty be experienced in this respect, please contact the manufacturers at the following address:

RANK PRECISION INDUSTRIES LIMITED,
SERVICE DEPARTMENT, HIGH STREET,
MITCHELDEAN, GLOUCESTERSHIRE
TEL.: DRYBROOK 421

Outside the United Kingdom please contact your local Bell & Howell distributor.

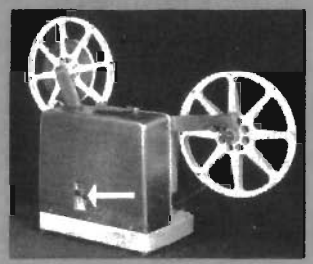
If it is intended that the equipment be used by more than one person, it is recommended that this instruction manual be kept with the projector at all times.

Should further copies of the manual be required for distribution to individuals concerned with the operation of the equipment these may be obtained from the manufacturer. (Please quote Part Number 58953.)

You are now the owner of a BELL & HOWELL FILMOSOUND and, in your own interests, it is important that you should register your equipment without loss of time.
To do this, fill in the registration card, which you will find overleaf, detach it, and post it to us within seven days of the date of purchase of the equipment. You will receive an acknowledgment of receipt by return of post. Prompt registration will not only record your ownership of the equipment and entitle you to the protection of our guarantee, but may also assist materially in its recovery if it is lost or stolen.

IMPORTANT

The Model and Serial Number of your equipment must always be quoted in all correspondence, claims, etc. These will be found on the name-plate situated on the back cover of the projector immediately above the power input receptacle (arrowed in the illustration).



GUARANTEE

This product of Rank Precision Industries Limited is guaranteed to be free from defects in materials and workmanship for one year from date of original purchase.

Should, in our opinion, any part of this equipment be defective in materials or workmanship it will be replaced or repaired free of charge (except for carriage), provided the equipment has been operated according to the instructions accompanying it.

This guarantee and undertaking does not extend to projection lamps or valves or other proprietary articles, which normally will be guaranteed by the manufacturer concerned.

No liability is assumed for damage to film, and no liability is assumed for loss, damages or expenses resulting from interruptions in the operation of equipment.

This guarantee and undertaking is only in favour of the initial retail purchaser. It is void:–

(a) If the equipment has not been registered by completing the accompanying registration card and returning it within seven days, in the case of a purchase in the United Kingdom to Rank Precision Industries Limited or, in the case of a purchase abroad, either to Rank Precision Industries Limited or to their accredited overseas agents within 21 days of the date of original purchase.

(b) If in our opinion the equipment has been damaged by accident, misuse or negligent handling or operation.

(c) If the equipment has been altered, repaired or serviced by other than approved Service Agents appointed by Rank Precision Industries Limited.

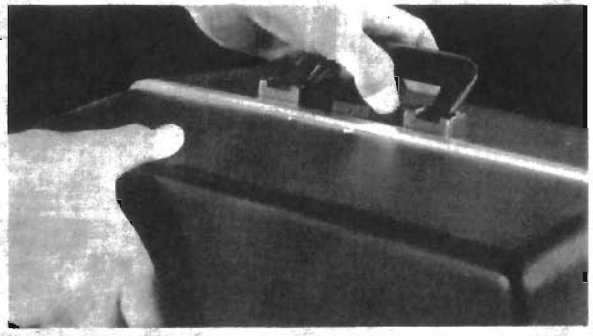
(d) If adaptations or accessories other than those manufactured or recommended by Rank Precision Industries Limited have been made or attached.

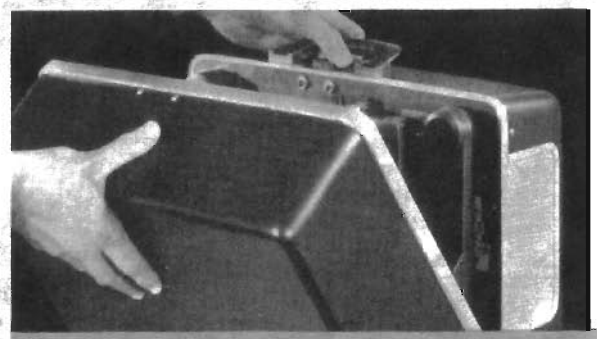
RANK PRECISION INDUSTRIES LTD.

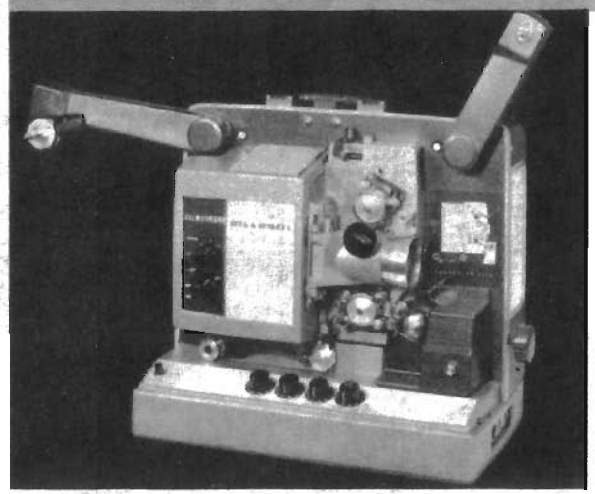
CONTENTS

TECHNICAL DATA

	MODEL 641	MODEL 642
Operating Voltage	200/250 volts, 50 cycles, A.C. only. (Transformers available for alternative A.C. supplies).	
Projector Lamp	200 to 250 volts – 750 or 1,000 watts. (115 volts – 750, 1,000 or 1,200 watts with accessory transformer).	
Exciter Lamp	Pre-aligned 6 volt 1 amp.	
Control Panel Lamp	6 volt 3 watt Festoon Type.	
Valves	6BR8, EL84(3) EZ81	ECC83, EL84(3) EF86(3), EZ81
Photo Cell	Photo Diode type OAP 12	
Fuse	2 amp. 1¼" type BS646	
Amplifier Output	6 watts	15 watts
Output Load Impedance	16 ohms	8 or 16 ohms
Dimensions	Length 15 7/8" Width 9¾" Height 14½" 40·3 cms 24·7 cms 36·8 cms	
Weight	32½ lbs. 14·8 kgs.	36½ lbs. 16·6 kgs.







Lift the projector by the Carrying Handle and support the base to place it on the stand or other suitable support from which it is intended to carry out projection. The Tilt Control should face toward the screen.

The stand should preferably be high enough to avoid interference with the projected picture by members of the audience and, during preparation, it is advisable to check that other possible obstructions, such as suspended light fittings, are clear of the projected beam.

Attention to these simple details in advance will save time and inconvenience at a later stage.
Slide the Cover Latch Button to the left and lift off the Projector Cover.

Extend the Front and Rear Reel Arms by swinging them upwards until a positive click is heard, then apply gentle downward pressure to lock them in position.

PREPARATION

It should be noted that further upward movement of the Rear Reel Arm is provided for the rewinding operation (see Section 7) and care should be taken to see that the arm is not inadvertently placed in this position for normal operation of the projector. (To retract the Reel Arms at the end of a show, press the Arm Release Buttons and swing the arms downwards to enclose them within the confines of the projector body, before replacing the cover.)

It may be found convenient at this stage to examine the method of removal and installation of the Exciter Lamp, Projector Lamp and Condenser Unit as outlined in Sections 13 and 14, and to become familiar with the location of the various operating controls indicated on the key illustration at the front of the manual.

ELECTRICAL CONNECTIONS

The equipment is designed for use direct from alternating current supplies of 50 cycles per second within a voltage range of 200 to 250.

Other A.C. voltages can be accommodated by the use of accessory transformers, details of which are provided in Section 11 of the manual. Before making any electrical connections it is essential to check the voltage and type of supply from which it is desired to run the equipment and if doubt exists it is advisable to consult the local electricity supply authority.

The voltage selector, which is located within the lamphouse, must be adjusted to suit the supply before the projector is connected to it.

To make this adjustment first fully raise the Rear Reel Arm, press upwards on the Lamphouse Lock Button and swing the Lamphouse Cover to the left to open it. Lift the Voltage Selector Plug, rotate it until the appropriate voltage group (200-210, 220-230, or 240-250) is centrally aligned with the indicator arrow, then push it down until it is firmly seated. Close the Lamphouse Cover.

The three wires at the end of the mains lead should now be connected to a suitable earthed mains connector similar to the types illustrated, as follows:

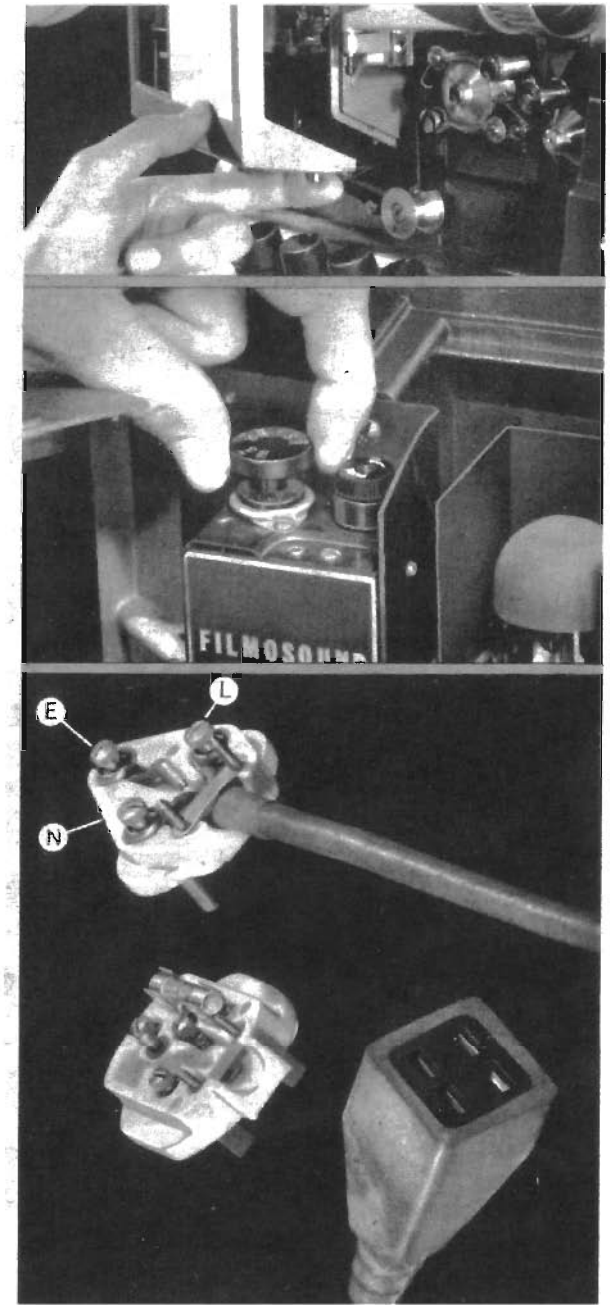
Green wire to large (Earth) pin.

Black wire to Neutral pin (left hand side viewed from rear of plug).

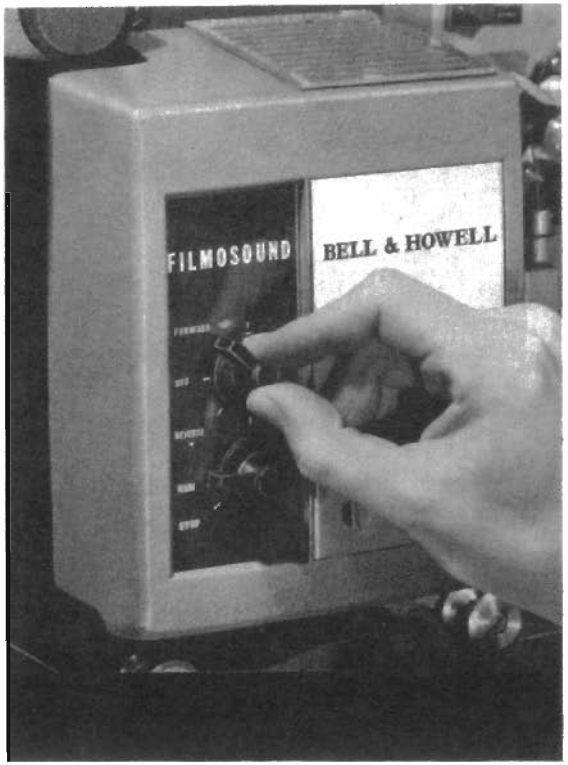
Red wire to Live pin (right hand side viewed from rear of plug).

To assist identification, certain plugs have these positions marked with the letters E (Earth), N (Neutral), and L (Live), and with the type of fused plug shown, the cartridge fuse is located in the live lead. The above coding system applies to Great Britain only.

Caution: Always make connections secure and avoid loose strands of wire which could possibly create a short circuit.



PRELIMINARY TEST



Initially, all controls should be in the 'OFF' position and the Still Picture Control (Model 642) should be set at 'Run'. The Volume and Tone Controls (Model 641) and Bass, Treble, Microphone and Optical Volume Controls (Model 642) should be at the zero position.

Plug the mains lead in to the receptacle at the rear of the projector (due to its design it cannot be incorrectly located), and connect the end which terminates with the three-pin plug to the mains supply socket. Switch on the mains supply.

The Control Panel will be illuminated immediately and the amplifier energized. Rotate the Tone Control (Model 641) or Bass Control (Model 642) clockwise to switch on the Exciter Lamp.

Turn up the Volume Control (Model 641) or Optical Volume Control (Model 642) until circuit noise is audible from the Speaker to confirm that the sound system is functioning, then return this control to the zero position.

Turn the Direction Switch clockwise one step to run the projector and then clockwise a second step to switch on the Projector Lamp.

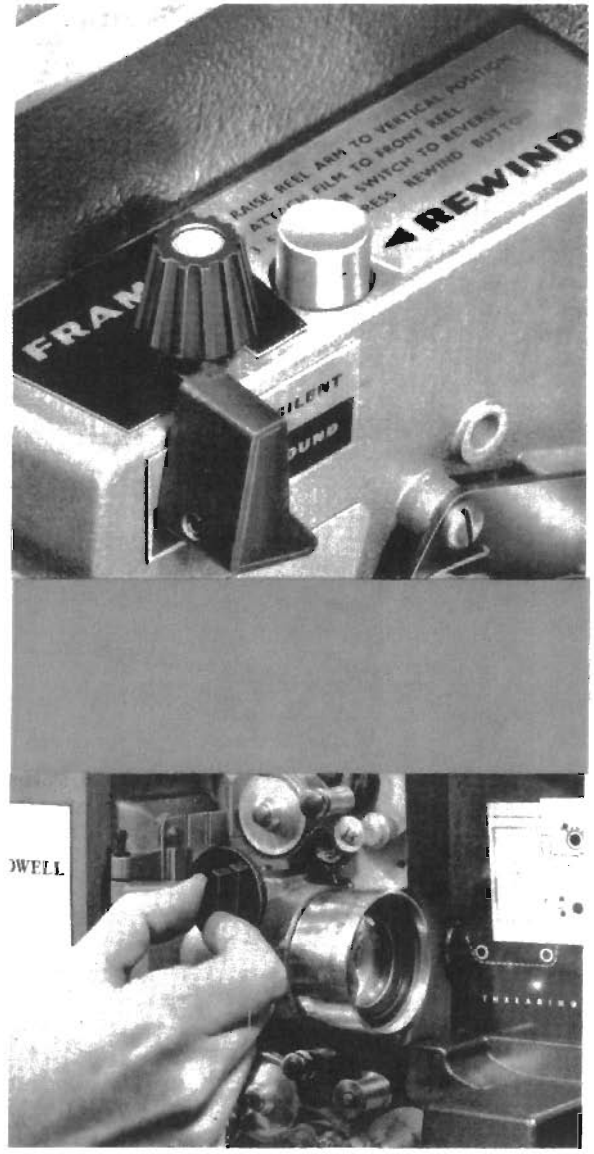
Set the Speed Selector to the appropriate position (Sound or Silent) for the type of film to be projected. The pointed section of this control should be aligned with the selected speed.

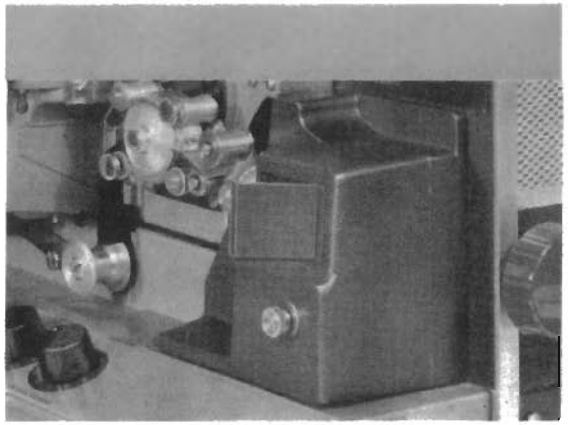
Note: *Do not attempt to alter the setting of the Speed Selector unless the projector is running.*

Rotate the Focusing Knob in either direction until a sharply defined outline of the illuminated picture aperture is visible on the screen, moving the projector stand bodily if necessary for lateral adjustment and using the Tilt Control to give the desired elevation until the outline completely covers the screen and preferably overlaps slightly on to the black masking.

It may be necessary to alter the distance between projector and screen to achieve the desired picture size, or alternatively, to substitute a lens of suitable focal length as indicated by the projection tables under Section 19. When the correct position has been thus established, return the Direction Switch to 'Off'.

The projector is now ready for threading the film.





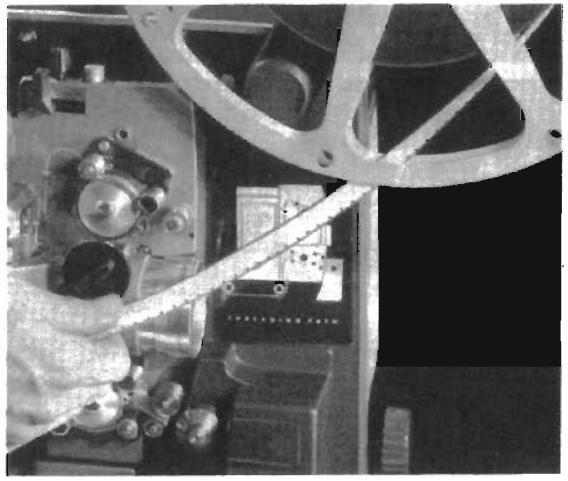
To illuminate the threading path in a darkened room, open the hinged flap at the front of the Exciter Lamp Housing, and switch on the exciter lamp.

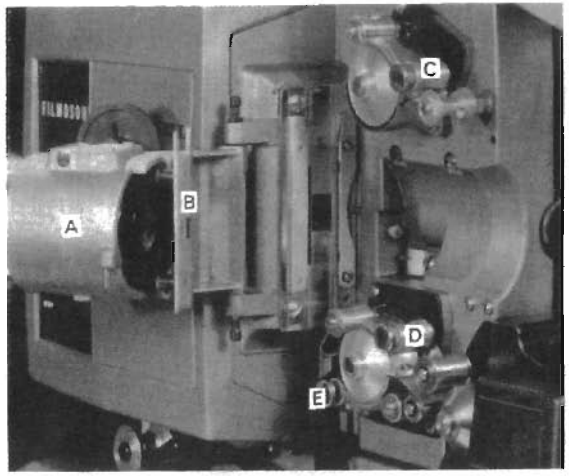
Examine the reel of film to be projected. If this is correctly wound, the perforations should be nearest to the operator when the reel is placed in position on the Front Reel Arm spindle with the film leaving the reel from the top in a clockwise direction, as illustrated. As an additional check the image on the film in this position should be inverted and laterally reversed when viewed in the direction of the screen.

Place the reel of film on the Front Reel Arm spindle, supporting the arm and exerting pressure on the reel until it is held securely in position by the spring ball retainer on the spindle. Unwind approximately five feet of film from the reel.

Grasp the Lens Mount (A) and pull away from the projector to swing the Lens and Pressure Shoe assembly (B) open.

THREADING THE FILM

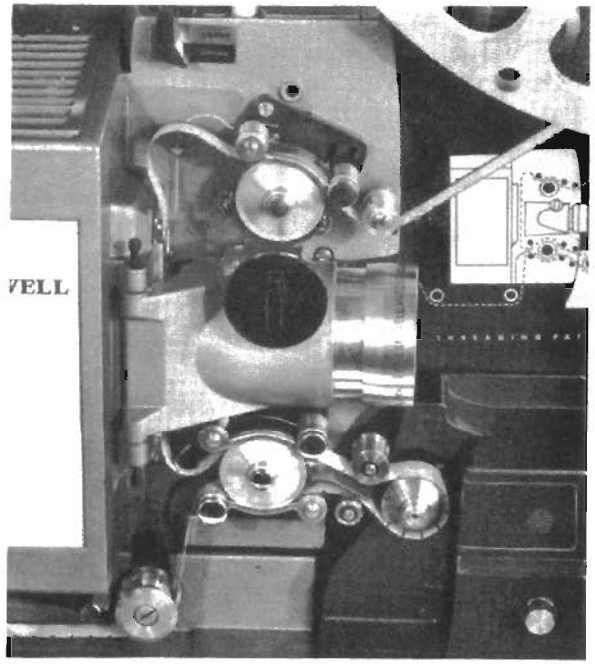


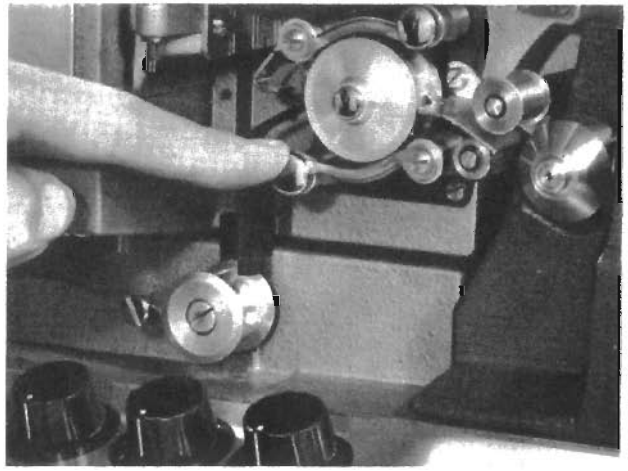


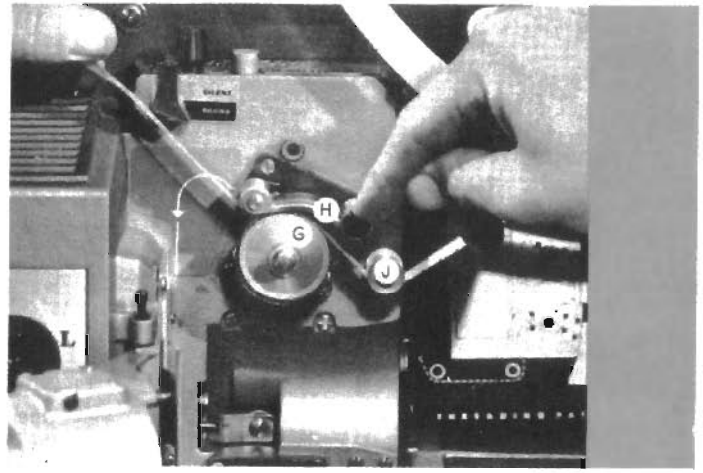
Open the three Sprocket Guards by exerting pressure on the Release Buttons (C), (D), (E). (Inward and upward pressure on the first two buttons—inward and downward on the third) as illustrated overleaf.

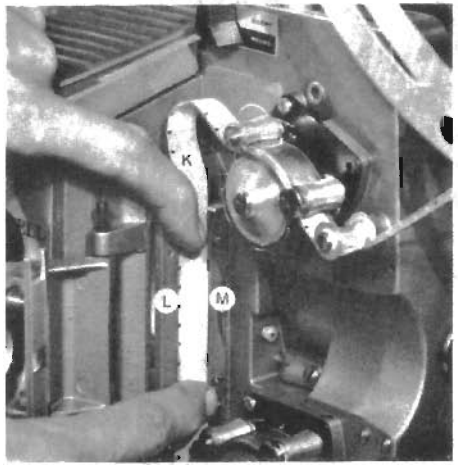
Follow the threading diagram printed on the front of the machine and if necessary refer to the illustration on the right showing the machine threaded.

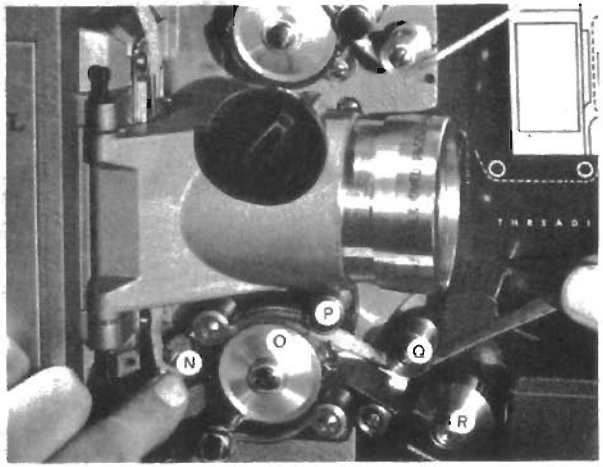
Guide the film *under* the Front Roller (J) and on *top* of the Upper Sprocket (G) engaging the film perforations on the sprocket teeth. Close the First Sprocket Guard (H).

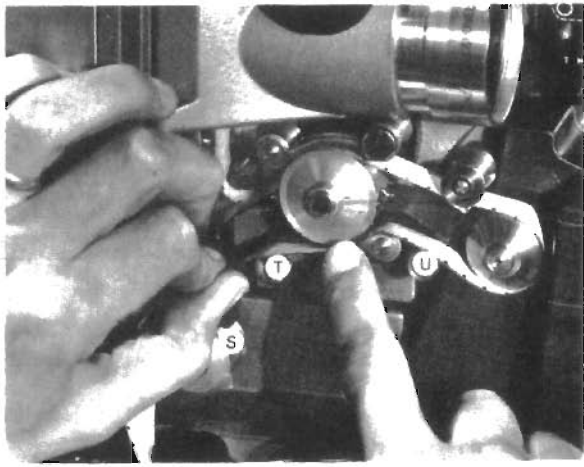












Locate the film on the Aperture Plate (K) exerting side pressure with the edge of the film on the Sprung Guide Rail (M) so that the film is held evenly between both Fixed (L) and Sprung Guide Rails. Form a loop with the film corresponding with the guide line marked on the projector casing. Maintain this loop and close the Lens Mount so that the Pressure Shoe lies perfectly flat between the Guide Rails.

Thread the film *under* the Loop Restorer (N) (with very little clearance between the film and the loop restoring arm) and *over the top* of the Lower Sprocket (O) ensuring that the film perforations correctly engage the sprocket teeth. Press *inward and downward* to close the Second Sprocket Guard (P).

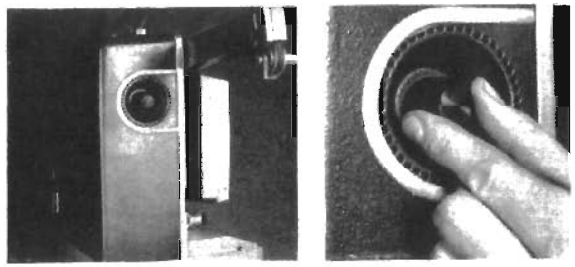
Guide the film *under* the Upper Stabilizer (Q), *around* the Sound Drum (R), *over the top* of the Lower Stabilizer (U) and *under* the two Guide Rollers (S), but at this stage do not engage the film perforations on the Lower Sprocket teeth. For perfect sound reproduction it is now necessary to tension the film on the Sound Drum as follows.

Pull the film firmly towards the rear of the projector until the Stabilizers open to their extreme position, then slowly release tension to permit the Stabilizers to pull the film back to the first available set of perforations that will engage the sprocket teeth and close the Third Sprocket Guard (T).

Guide the film from under the two Guide Rollers to the Take-up Reel, locate the end of the film in the slot of the reel hub and rotate this clockwise to take up slack film.

INCHING KNOB

Before switching on the projector it is advisable to check for correct threading by rotating the Inching Knob in an anti-clockwise direction to move the film through the film gate. If correctly threaded, the film should track smoothly and evenly through the sprockets and gate with both upper and lower film loops maintained in their original position. Loss of either film loop will necessitate repositioning of the film along the threading path and repeating the inching operation until the correct condition is achieved.



OPERATION

SOUND FILM PROJECTION

Check that the Speed Selector is set at the 'Sound' position. Remember that if it is necessary to alter the speed setting the projector must be running.

Set the Still Picture Control to 'Run' and all amplifier controls to the zero position.

Turn the Tone Control (Model 641) or Bass Control (Model 642) clockwise to switch on the exciter lamp.

Start the projector as previously described and focus the picture as soon as an image appears, then advance the volume control until a sound level is obtained which will permit comfortable and clear reception from any point in the auditorium.

Adjust the Bass and Treble controls (or Model 641 Tone Control) for maximum fidelity of sound reproduction. For critical adjustment, separate bass and treble controls are fitted to all models except the Filmosound 641.

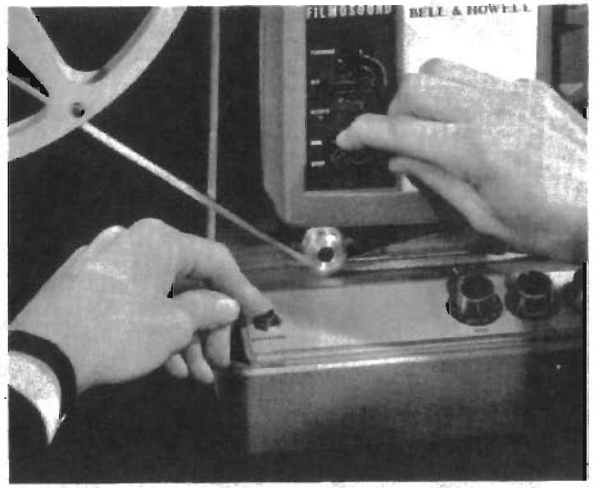
Sound reproduction will vary according to the acoustic characteristics of the location in which the equipment is being used, but judicious use of both Tone and Volume Controls will help to overcome adverse conditions due to poor acoustics.

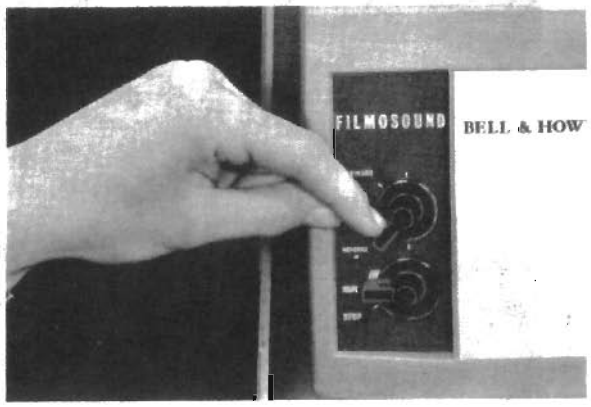
If the picture appears cut off at the top or bottom of the screen, turn the Framing Control in either direction until the picture is correctly framed.

As the 'End' title appears on the screen, switch off the projector lamp and turn down the volume as soon as the narration ceases. Allow the remainder of the film 'tail leader' to run through the projector on to the take-up reel before moving the Direction Switch to 'Off'.

SILENT FILM PROJECTION

Switch on the projector momentarily to set the Speed Selector to 'Silent'. Switch off and thread the film in the same manner as for 'Sound' projection. Unless a microphone or record player is used to provide commentary or musical accompaniment, all amplifier controls should be set at the zero position. All other operations are as described for sound film projection.





STILL PICTURE PROJECTION

(Not applicable to Model 641)

To project a still picture, the film can be stopped at any time by switching the Still Picture Control to 'Stop'. Immediately this control is operated a solenoid-actuated safety screen is brought into position between the lamp and the film to protect the film from heat damage. Because of this, there will be a noticeable decrease in picture brilliance. It will be necessary to adjust the lens for sharp focus with a still picture. Re-focus as soon as normal projection is resumed. With the Still Picture Control at 'Stop', the Animation Button can be depressed to advance the film as necessary. This facility operates on the 'Forward' or 'Reverse' setting of the Direction Switch.

REVERSE PROJECTION

To reverse the direction of the film through the projector, turn the Direction Switch anti-clockwise to 'Reverse', pausing momentarily at the 'Off' position. It is not advisable to turn the switch direct from 'Forward' to 'Reverse' without pause. Further movement of the switch in the same direction will illuminate the lamp.

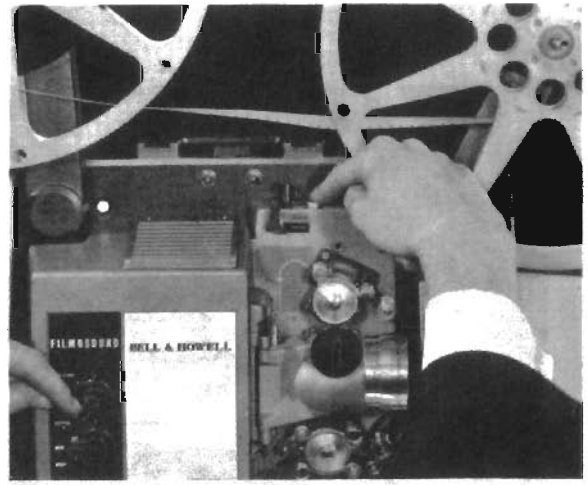
During reverse projection of sound film the Volume Control should be set at zero to eliminate unintelligible noise. On resuming normal forward projection, remember to advance the Volume Control to the required setting.

REWINDING

When projection is completed and the entire film has passed through the projector on to the take-up reel, turn the Direction Switch to 'Off'. Firmly grasp the Rear Reel Arm with the left hand and swing the arm up to the vertical position. Lead the film from the rear reel to the bottom of the front reel and engage the end of the film in the slot of the reel hub. Rotate the reel in an anti-clockwise direction to take up slack film and wind two or three turns on to the reel manually.

Turn the Direction Switch to 'Reverse', press and hold down momentarily the high speed Rewind Button to start rewinding.

Switch off the projector as soon as this operation is completed, press the Arm Release Button, and return the Rear Reel Arm to the normal operating position.

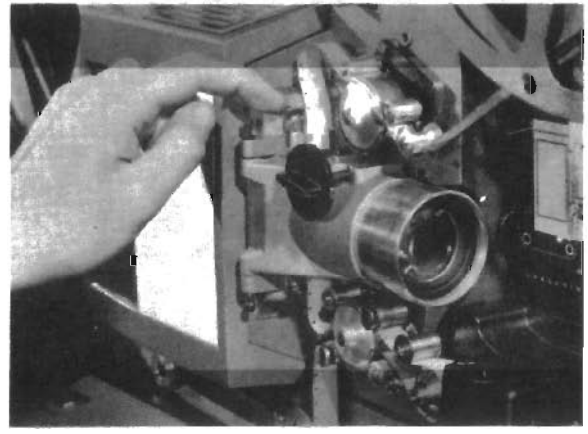


WIDE SCREEN PROJECTION

The Variable Aperture Plate fitted to the Filmosound enables the projected picture to be adjusted either before or during projection to any screening ratio between 1.34 to 1 (normal) and 1.85 to 1 (Wide Screen and VistaVision).

The entire area of the illustration shown on the right represents the normal picture ratio of 1.34 to 1, while that section confined within the blue borders indicates the 1.85 to 1 ratio.

For maximum effect when using the Wide Screen ratio a wide-angle (short focal length) lens should be fitted to the projector. Adjustment of the screening ratio is effected by movement of the Variable Aperture Control located at the top of the picture gate.



PUBLIC ADDRESS SYSTEM

MICROPHONE

A good quality crystal or high impedance dynamic microphone may be used with the projector amplifier to provide a first class public address system or to supply a commentary to silent films. The microphone should be connected to the Microphone Input Socket and the Microphone Volume Control advanced to a position just below the point at which the system 'howls'. In cases where intermittent 'howling' occurs while speaking into the microphone, it may be necessary to retard the volume control still further and to adjust the Tone Control until a stable condition is achieved.

RECORD PLAYER

Any good quality record player with either a crystal or a high impedance magnetic pick-up may be used to reproduce through the amplifier. The plug from the pick-up should be connected to the microphone input socket and the volume controlled by means of the Microphone Volume control on the projector. If a volume control is fitted to the record player this can be initially set at the minimum position necessary to provide a suitable signal level through to the projector amplifier. It is important to ensure that the equipment is earthed to avoid the possibility of mains hum interference.

ACCESSORY SPEAKER

Filmosound projectors incorporate a specially matched 6 inch elliptical speaker to provide adequate performance for the smaller auditoria. For the larger hall where greater sound volume is necessary, the accessory speaker should be used to ensure first class sound reproduction. This speaker is supplied complete with a 50 foot speech lead and when this is plugged into the output socket of the projector amplifier, the built-in speaker is automatically disconnected.

The speaker should normally be located in front of the screen either centrally or at one side and preferably high – at least above audience ear level, if possible directed downward towards the centre of the auditorium. Unless a perforated screen is used the speaker should never be placed behind the screen.

Every possible care should be taken to locate the speech lead so that it cannot be accidentally pulled by the feet of the audience, resulting in an interruption in the programme or even damage to the equipment.

The transformer units described here are not included with the basic equipment, but are available as accessory items at extra cost.

1.5 KVA TRANSFORMER UNIT

This is for use where the A.C. mains supply is 190/250 volts 50 cycles and it supplies 240 volts for the projector mechanism and amplifier, at the same time supplying 115 volts to the projector lamp.

BEFORE CONNECTING TO THE MAINS SUPPLY

It is essential that the tapping screw (C) is set for the correct mains input volts. Select the tapping which includes the voltage of your local supply (if this falls between two of the marked ranges, choose the higher) and insert the screw in that position. The transformer is now ready to be connected to the projector.

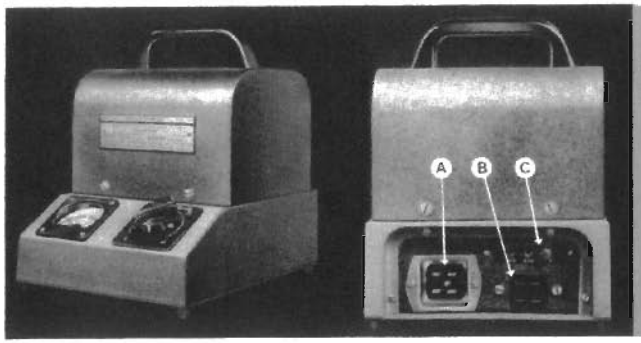
Take the 6 ft. lead (209001) and plug one end into the transformer outlet (B), then connect the other end to the receptacle on the projector. Confirm that the projector voltage selector is set for 240 volts.

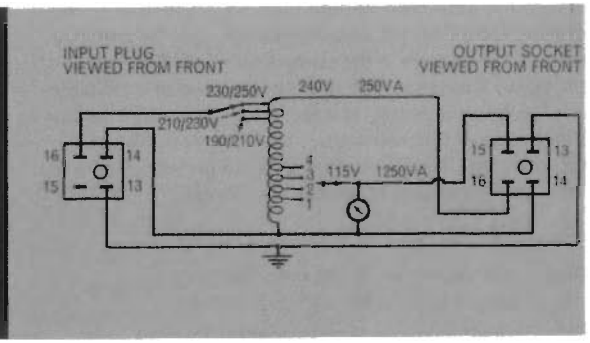
The connector on the end of the 25 ft. mains lead (026496) should then be plugged into the input receptacle on the transformer (A) and the free end connected to a suitable 3-pin plug by connecting the red and black wires to the smaller points in the mains plug and the green wire to the larger earth pin. Confirm that the projector lamp in use is rated at 115 volts.

Switch on the projector and lamp and set the transformer selector switch so that the meter reads 115 volts. The clear regions on either side of the 115V mark on the scale represent a voltage variation of approximately $2\frac{1}{2}$ per cent (plus or minus).

By means of the selector switch it will be possible to change the voltage applied to the projector lamp, but the unit should be so adjusted that when in use, the meter needle always remains within the clear areas surrounding the 115V mark.

If the meter reading cannot be raised above the lower (i.e. left hand) limit by means of the selector switch, disconnect the unit from the mains, reset the tapping screw to the next lower voltage range, and repeat the adjustments as instructed.



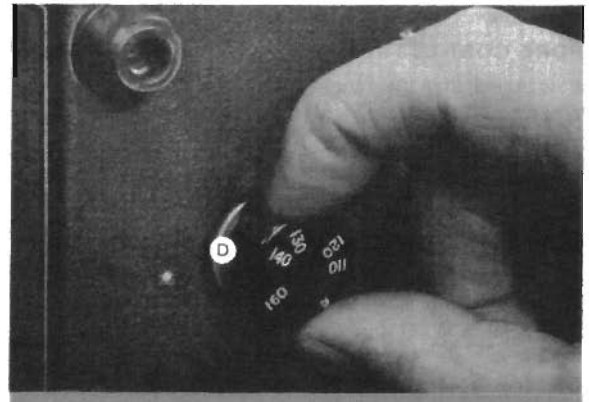


300 VA TRANSFORMER UNIT

This is for use where the A.C. mains voltage supply is 110, 120, 130, 140 or 160 volts 50 cycles. It supplies the 240 volts necessary to operate the projector mechanism and amplifier and at the same time supplies the input mains voltage to the projector lamp.

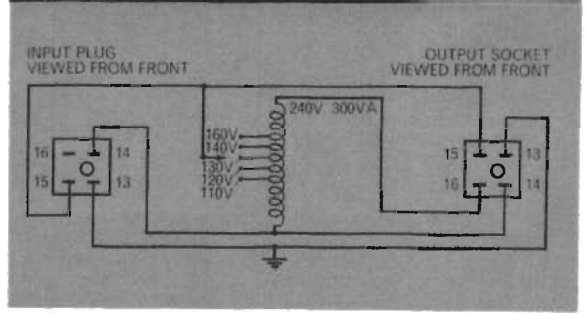
BEFORE CONNECTING TO THE MAINS SUPPLY

The voltage control knob beneath the base of the transformer should be set to the appropriate mains voltage. To do this, simply pull out the control knob (D), located on the base of the unit, rotate it so that the correct mains voltage marking is opposite the white dot, and then press the knob back into position. The transformer is now ready to be connected to the projector.



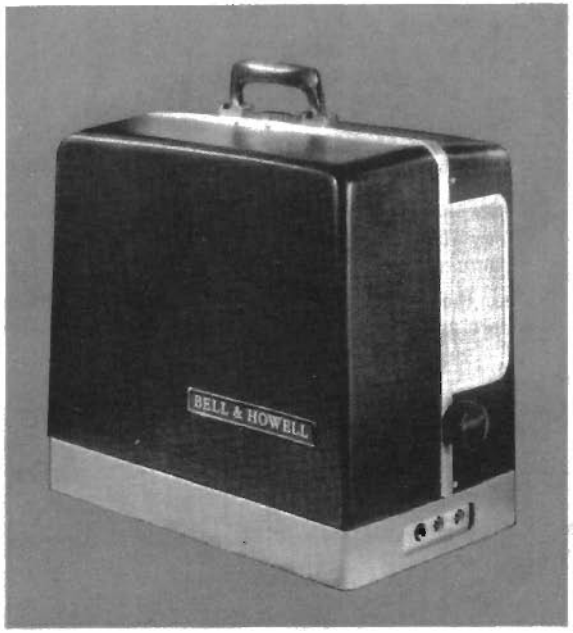
Take the 6 ft. lead (209001) (supplied with the transformer) and plug one end into the transformer outlet (B), and the other to the receptacle on the projector. Confirm that the projector voltage selector is set for 240 volts.

The connector on the end of the 25 ft. lead (026496) (supplied with the projector) should then be plugged in to the input receptacle (A). All connectors can only be matched together when they are in the correct position. The free end of the mains lead should then be connected to a suitable 3-pin plug by connecting the red and black wires to the smaller points in the mains plug, and the green wire to the larger earth pin. Always confirm that the projector lamp in use is rated to conform to the supply voltage.



Input 110, 120, 130, 140, 160 volts 50 cycles.

Output across pins 14.16 240 volts. 300 VA.
across pins 15.14 – as input voltage.



CARE & MAINTENANCE

The Filmosound range of 16mm. projectors is built to the highest standards of quality and precision for which Bell & Howell are world famous. Component parts of the projector are specially designed by expert craftsmen and constructed of selected, high grade materials to give maximum performance with negligible maintenance. If any part receives damage, thus requiring replacement, this can be carried out economically and in the minimum time due to the unit construction system employed in the design of the projector.

A nation-wide chain of Bell & Howell Accredited Service Agents staffed by factory trained technicians provides complete facilities for the repair and testing of all Filmosound equipment.

PERMANENT LUBRICATION

Filmosound projectors employ the exclusive Bell & Howell system of factory-sealed lubrication which eliminates the need for oiling by the user. This ensures that all parts of the mechanism receive exactly the right amount of lubrication at all times to give extended service and longer life.

REMEMBER—DO NOT OIL THE PROJECTOR

It is recommended that periodical inspection and any necessary adjustment of the equipment is carried out by a Bell & Howell Accredited Service Agent as this system of protective maintenance is an economical method of ensuring that the equipment is always in first class condition.

STORING THE EQUIPMENT

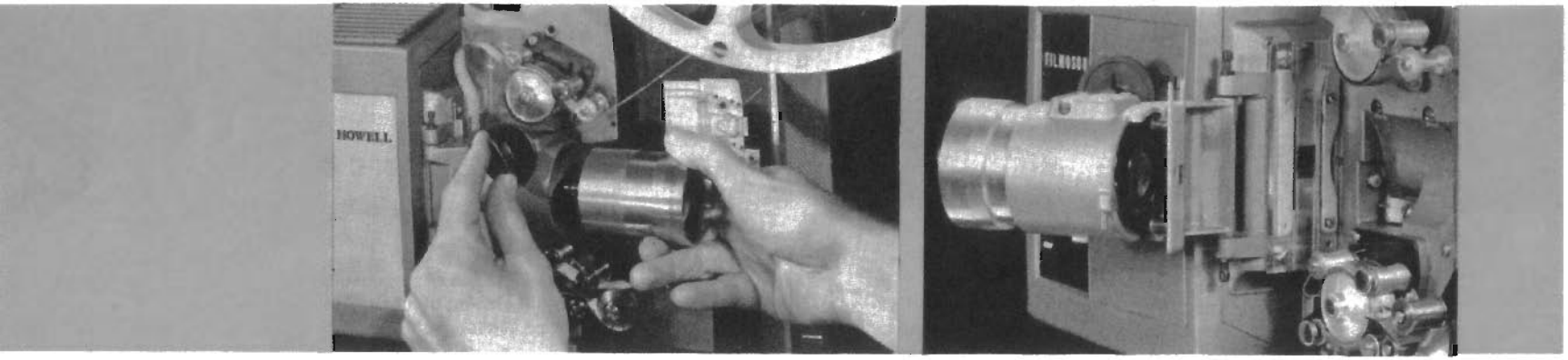
Always store away from conditions of excessive heat or moisture. Wherever possible keep in a carton or other enclosure to prevent the entry of dust. Protective covers available as accessories will assist in keeping the exterior of the case free from abrasions.

CLEANING

PRESSURE SHOE AND APERTURE PLATE

Grasp the Lens Mount and swing it outward to open. Gently wipe the Pressure Shoe with a clean cloth to remove accumulated foreign matter.

Clean the Aperture Plate, Guide Rails and the edges of the picture aperture. When cleaning the Picture Aperture ad-



PROJECTION LENS

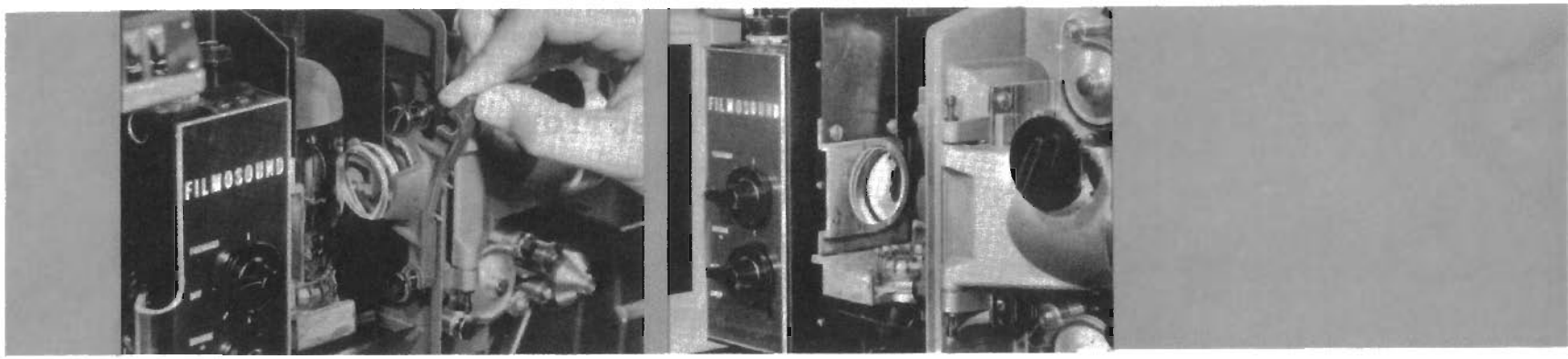
To remove for cleaning, turn the Focusing Knob anti-clockwise until the lens protrudes as far as possible from its mount, grasp the lens and pull out. With a good quality camel hair brush, carefully remove dust from the surfaces of the front and rear glass elements, then very lightly polish with a lens tissue or a clean, soft and lintless cloth. Avoid excessive pressure on the glass surfaces as this can sometimes cause scratching which will result in poor definition of the projected image. If marks are still present after polishing, repeat the operation using lens cleaning fluid which is obtainable from Bell & Howell dealers. When the lens is clean insert it into the mount and turn the Focusing Knob clockwise to engage.

just this to its maximum by means of the Variable Aperture Control and carefully insert the gate cleaning brush exercising extreme care to avoid undue pressure on this component.

Never attempt to carry out cleaning operations when the projector is running. If cleaning of the Pressure Shoe/ Aperture Plate area has not been carried out at regular periods, it is possible that dust and emulsion deposit may accumulate in the form of a hard coating which normal methods of cleaning will fail to remove. In this case a sharpened piece of wood or plastic should be used gently to scrape off the deposit. NEVER USE METAL OBJECTS FOR THIS PURPOSE.

CONDENSER UNIT

To gain access to the Condenser Unit, raise the Rear Reel Arm, press upwards on the Lamphouse Lock Button and



swing the Lamphouse Cover to the left. Grasp the Upper Support Lug of the unit and swing outward, then raise slightly to permit the bottom arm of the unit to clear the Lower Support Lug, before withdrawing. Carefully clean the accessible glass surfaces with lens tissue or a soft clean cloth.

The lenses of the unit should never be removed from the mount. Replace the Condenser Unit by inserting the main assembly into the housing recess, locating the Bottom arm over the Lower Support Lug and pressing the Top arm into place over the Upper Support Lug. If the interior of the unit requires cleaning, it is recommended that this be carried out by a Bell & Howell Accredited Service Agent.

LAMP REFLECTOR

Remove the projector lamp from its socket and gently wipe the surface of the lamp reflector with a clean, soft cloth or lens cleaning tissue, to remove any foreign matter.

Extreme care should be exercised during this operation to avoid accidental displacement of the reflector as even the slightest misalignment of this component will result in reduced light output. For this reason it is advisable to support the reflector from the rear while cleaning.

Before replacing the lamp, ensure that the reflector is fully and evenly located within its recess under pressure of the spring retaining clip which bears on the rear surface of the reflector to hold it in position.

LAMP EJECTION AND REPLACEMENT

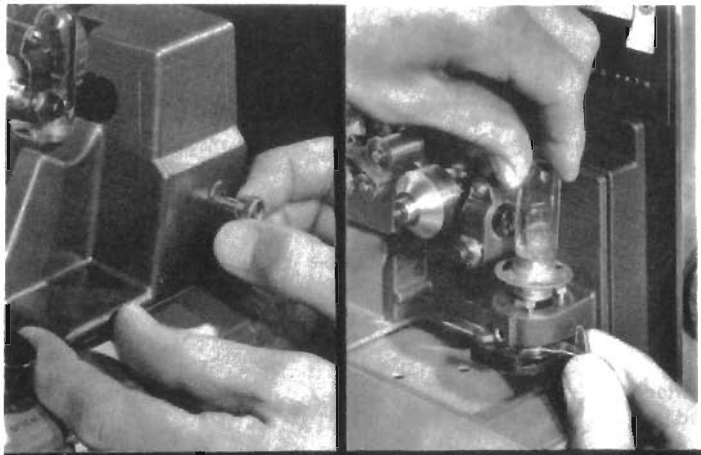
PROJECTOR LAMP

Switch off the projector and disconnect the mains supply. Ensure that the Rear Reel Arm is fully raised.

Press the Lamphouse Lock Button to open the Lamphouse Cover.

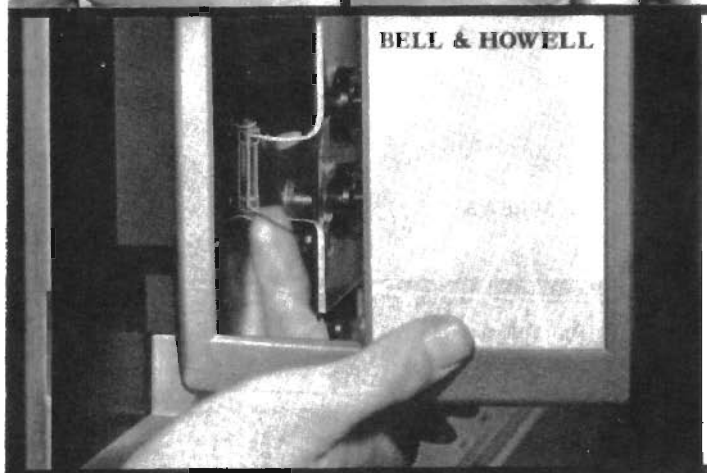
Grasp the top of the lamp and exert upward pressure on the Lamp Ejection Lever to force the lamp from its socket. If the lamp is hot use a glove or other form of protection for the hand.

To replace the lamp, locate it in the socket and rotate it slowly until the lamp drops into position. (The lamp base is keyed and will only locate in the correct position.) Press down until the lamp is firmly seated. Close the Lamphouse Cover.



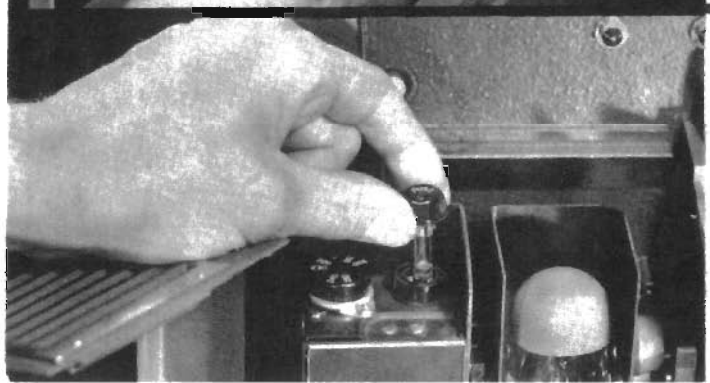
EXCITER LAMP

Loosen the securing screw holding the Exciter Lamp Cover in place and remove the cover evenly without tilting. Swing the Lamp Lock Lever right to release the lamp, then rotate the lamp until it can be removed from the guide pins. To replace, locate the new lamp over the guide pins (it will fit in only one position) then rotate clockwise until the pins reach the narrow end of the slots. Swing the Lamp Lock Lever left to lock the lamp in position. Replace the Exciter Lamp Cover by sliding evenly into place and tighten the securing screw to hold in position.



CONTROL PANEL LAMP

Place the Rear Reel Arm in the rewind position. Open the Lamphouse Cover. The Control Panel Lamp is mounted on the left of the Lamphouse behind the Control Panel. This lamp is of the festoon type and is held between two spring metal contacts. To remove, simply ease out from the contacts. To replace, locate one end of the lamp on one of the contacts, apply slight pressure then ease the other end of the lamp into position until secure. Close the Lamphouse Cover.



FUSE REPLACEMENT

A 2 amp cartridge fuse is located next to the Voltage Selector at the top of the Lamphouse. To remove it, first ensure that the equipment is disconnected from the mains supply then press and turn the top of the fuse holder anti-clockwise and lift upwards until the holder is free from its recess. Pull out the defective fuse and replace with a new one, then depress and turn the cap of the fuseholder clockwise into its socket.

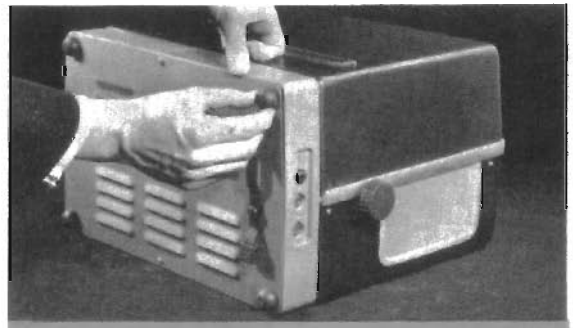
REPLACEMENT OF VALVES

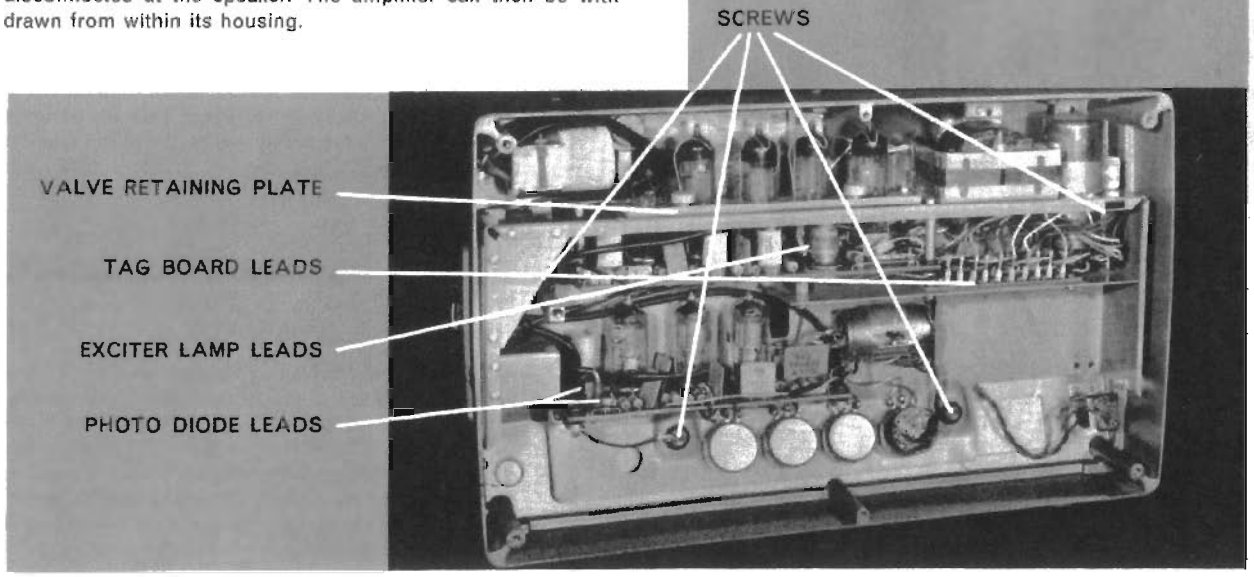
Complete access to valve positions is effected by removal of the cover at the base of the machine after first unscrewing by hand the four rubber feet, two screws on opposite sides of the base and one screw securing the spreader bar of the Tilt Unit.

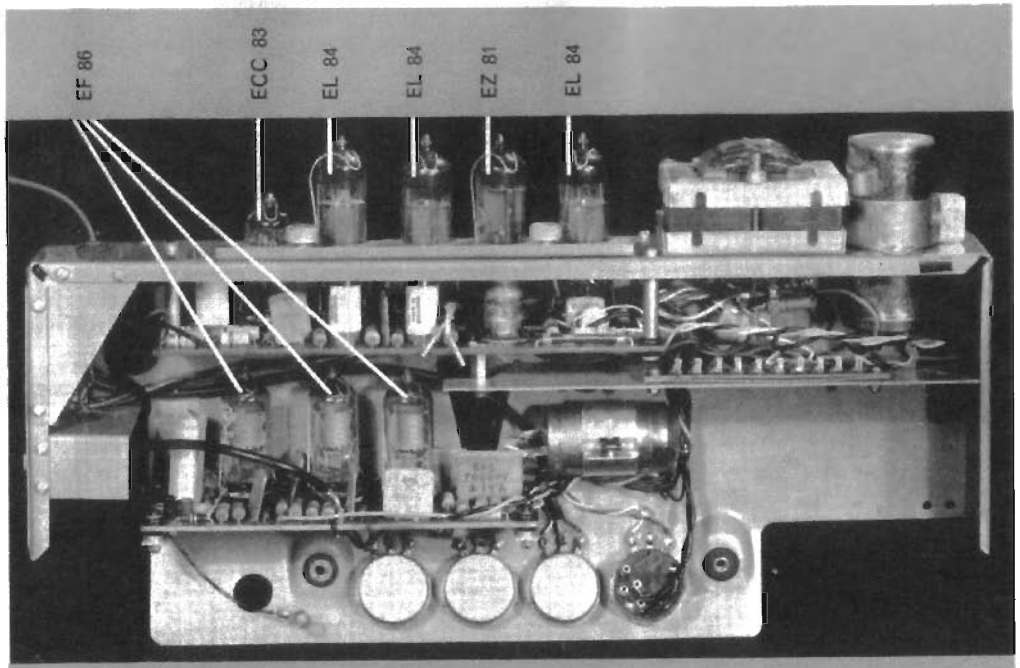
To assist in correct location of the valves the circuit boards at the valve sockets are marked with the type reference and whenever valves are removed from their sockets care should be taken to ensure that these are replaced in the correct position.

Note that in the illustration the upper bank of valves is supported by a Valve Retaining Plate secured by two screws and slotted for adjustment.

If, for any reason, it is necessary to remove the complete amplifier from the projector body proceed as follows:–detach the ten leads from the Tag Board. The ends of these leads terminate in miniature sockets which are a push fit on the metal contacts. Disconnect the Exciter lamp leads and the Photo Diode leads before removing the four screws. The screened lead must then be disconnected at the speaker. The amplifier can then be withdrawn from within its housing.



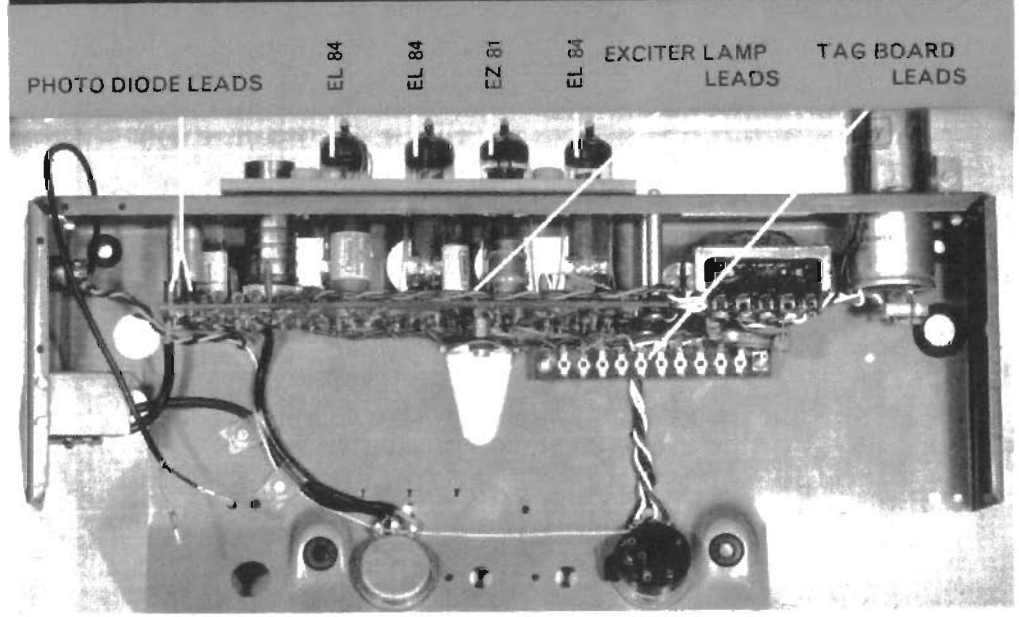




Filmosound 642 amplifier

Although the valves used in the amplifiers are readily available from most radio supply stores, for peak performance it is recommended that replacements be obtained from a Bell & Howell Accredited Agent.

VALVE TYPES



Filmosound 641 amplifier

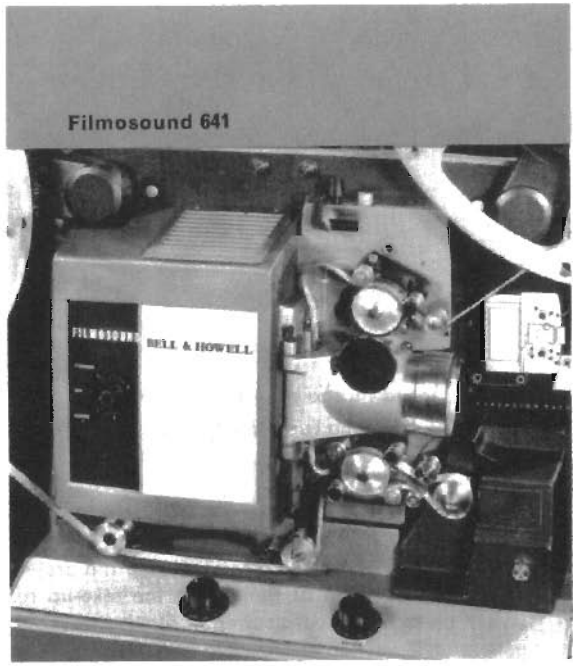
PROJECTED PICTURE SIZES

Upper dimension is width of picture
Lower dimension is height of picture

Picture dimensions are calculated with variable aperture plate fully extended (1.34 to 1 ratio)

DISTANCE IN FEET FROM FILM PLANE TO SCREEN

	LENS FOCAL LENGTH						
	25 mm	32 mm	40 mm	2" 50 mm	64 mm	80 mm	100 mm
8	3' 1" 2' 4"	2' 5" 1' 10"	1' 11" 1' 5"	1' 6" 1' 2"			
10	3' 11" 2' 11"	3' 0" 2' 3"	2' 5" 1' 10"	1' 11" 1' 5"	1' 6" 1' 2"		
12	4' 8" 3' 6"	3' 8" 2' 9"	2' 11" 2' 2"	2' 3" 1' 9"	1' 10" 1' 4"		
15	5' 10" 4' 4"	4' 6" 3' 5"	3' 8" 2' 9"	2' 10" 2' 1"	2' 3" 1' 9"		
20	7' 9" 5' 10"	6' 1" 4' 6"	4' 10" 3' 8"	3' 10" 2' 10"	3' 0" 2' 3"		
25	9' 8" 7' 3"	7' 7" 5' 8"	6' 1" 4' 6"	4' 9" 3' 7"	3' 9" 2' 10"	3' 0" 2' 3"	2' 5" 1' 10"
30	11' 8" 8' 10"	9' 1" 6' 10"	7' 3" 5' 5"	5' 9" 4' 3"	4' 7" 3' 5"	3' 8" 2' 9"	2' 11" 2' 2"
35	13' 7" 10' 2"	10' 7" 7' 11"	8' 6" 6' 4"	6' 8" 5' 0"	5' 4" 4' 0"	4' 3" 3' 2"	3' 5" 2' 6"
40		12' 2" 9' 1"	9' 8" 7' 3"	7' 8" 5' 9"	6' 1" 4' 6"	4' 10" 3' 8"	3' 11" 2' 11"
45		13' 8" 10' 3"	10' 11" 8' 2"	8' 7" 6' 5"	6' 10" 5' 1"	5' 5" 4' 1"	4' 4" 3' 3"
50		15' 2" 11' 4"	12' 1" 9' 1"	9' 7" 7' 2"	7' 7" 5' 8"	6' 1" 4' 6"	4' 10" 3' 8"
60			14' 7" 10' 11"	11' 6" 8' 7"	9' 1" 6' 10"	7' 3" 5' 5"	5' 10" 4' 4"
75				14' 4" 10' 9"	11' 4" 8' 6"	9' 1" 6' 10"	7' 3" 5' 5"
100					15' 2" 11' 4"	12' 1" 9' 1"	9' 8" 7' 3"
125						15' 2" 11' 4"	12' 1" 9' 1"
150							14' 7" 10' 11"



USEFUL ADVICE

The success of any film presentation depends a great deal on the preparations made prior to the commencement of screening. Generally speaking, the majority of breakdowns experienced are due to minor faults which almost certainly can be avoided by thorough, routine checking and adjustment.

Where possible, always allow plenty of time to set up the equipment, arrange seating and carry out a test run before the show so that, when the audience assembles, it will only be necessary to switch off the house lights and start the projector.

Ensure that all cables (power and speech) are securely connected and, if possible, out of reach of the audience.

Ideally the projector on its stand should be located well back from the rear row of seats and high enough to prevent obstruction of the picture by the heads of the audience. The projected picture should completely fill the screen and preferably overlap slightly on to the black masking. To achieve this it may be necessary to select an accessory lens of the required focal length (see Section 17).

It is advisable to keep available a spare exciter and projector lamp in case a replacement is necessary during projection. In addition a gate cleaning brush should be included with these spares to remove foreign matter from the picture gate aperture between reels.

Films for showing should be placed in the correct order in a convenient and accessible position.

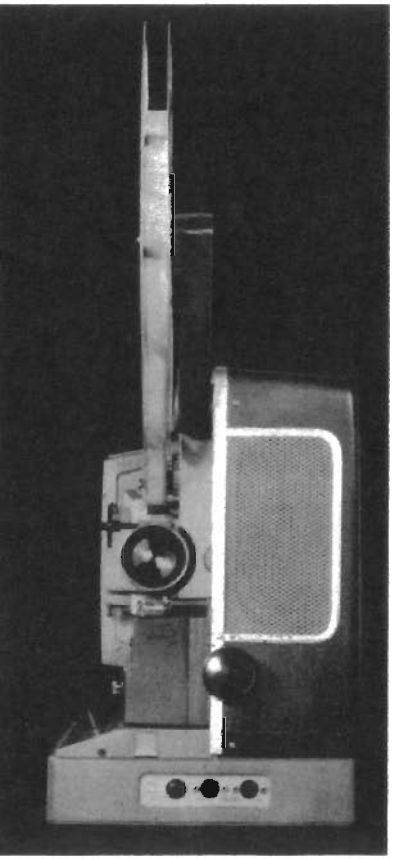
Always check that they are correctly wound on the reels (sound films should have the perforations nearest to the operator with the film leaving clockwise from the top of the reel when in position on the reel arm).

It is unprofessional and disturbing to the audience to show the leader numbers on the screen – the hand is quite an effective mask for this. Similarly, the lens should be covered (or projector lamp switched off) at the end of the film to prevent the effect of a dazzling white screen without a picture. Always remain near the projector throughout the performance in order to make any necessary adjustments. Watch the screen closely for development of any picture defects. If scratching of the film should develop, stop the machine at once, remove the film from the gate and sprockets and trace back until the source of damage is located. Common causes of film scratch are:

(a) Dirty picture gate.

(b) Dirty or sticking rollers (intermittent scratch).

(c) Incorrect size of film loop (causing contact with parts of machine).



Perforation damage may be due to:

(a) Faulty threading (perforations not registered correctly with sprocket teeth).

(b) Bent or warped reels.

If the film should break during projection, and the break is not due to a fault of the machine, stop the projector and wind the loose end of film on to the take-up reel, then switch on to resume projection. If film break occurs at the gate area, it will be necessary to re-thread the film. Do not attempt to repair a film which has been rented from a library, but notify the library of the damage when the film is returned.

Other films can be repaired quite simply by the use of an efficient splicer which can be obtained from all Bell & Howell dealers.

Finally, if advice, assistance or spare parts are required a nation-wide chain of Bell & Howell dealers is at your service. The address of your local dealer can be obtained by writing to:

RANK PRECISION INDUSTRIES LTD.,
MITCHELDEAN, GLOUCESTERSHIRE. Tel.: Drybrook 421

EMERGENCY TROUBLE GUIDE

Defect	*Possible Cause*
EQUIPMENT DOES NOT FUNCTION	**a** Mains lead not making proper contact. **b** No current at mains socket (check with lamp or other appliance). **c** Mains fuse blown.
NO SOUND	**a** Speech lead disconnected. **b** Exciter lamp not on. **c** Volume control not advanced. **d** Film incorrectly threaded. **e** Obstruction of the sound optical system by excessive dirt or foreign matter. **f** Absence of sound record on film. Check with known film. **g** Burned out exciter lamp. **h** Fuse in lamphouse blown. **k** Valves in wrong sockets or not fully seated. **l** Defective valve.
INADEQUATE VOLUME	**a** Volume control insufficiently advanced. **b** Dirty or dense sound track on film. **c** Dirt or foreign matter obstructing sound optic. **d** Defective valves or photo diode. **e** Defective, dirty or misaligned exciter lamp. **f** Low mains voltage.
POOR QUALITY SOUND	**a** Speed selector set in silent position. **b** Other causes under the heading 'Inadequate Volume'. Noises such as humming, oscillations, or whistling can result from defective valves, photo-diode.
	c Film incorrectly threaded. **d** Poor acoustics.
NO PICTURE	**a** Power supply disconnected. **b** Lamp not turned on. **c** Projector lamp failure.
INSUFFICIENT PICTURE BRILLIANCE	**a** Extraneous light on screen. **b** Blackened projector lamp. **c** Dirty projection lens. **d** Low mains voltage. **e** Condenser unit incorrectly fitted.
LOSS OF FILM LOOP	**a** Badly damaged film or obstruction, due to foreign matter.
FILM SCRATCHING	**a** Dirty gate of film path causing emulsion build up. Clean as instructed. **b** Inefficient film handling. Hold by edges, avoid contact with ground.

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