Film-Tech

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Service Manual

for the British Made

VICTOR

16 mm. SOUND-ON-FILM

ANIMATOPHONE

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ANIMATOPHONE

VICTOR ANIMATOGRAPH CORPORATION (LONDON) LTD.
9 CAVENDISH SQUARE, LONDON, W.1

Telegraphic Address : **Kinevue, Wesdo, London.**

Telephone : **Langham 2621**

The Victor Guarantee

Each new British-made Victor 16 mm. Sound-on-Film Animatophone manufactured and/or supplied by us is guaranteed to be free from defects due to faulty material and workmanship for the period of TWELVE MONTHS from the time of delivery to the Retail Purchaser.

Our obligation under this Guarantee is limited to repairing or replacing at our factory any part of the machine—excluding valves, projector, exciter and pilot lamps and photo-electric cells—which shall within such period of TWELVE MONTHS be returned to our Distributor for transmission to our Head Office or Factory free of cost to us, and which on examination be found to have been so defective at the time of delivery to the Retail Purchaser and that such part has not been interfered with in any way or damaged through maltreatment.

This undertaking is in lieu of all other guarantees or warranties expressed or implied and of all other obligations or liabilities on our part directly or otherwise available to the original purchaser or any other person. No agent is authorised to assume for us and we do not accept any liability except as above set forth.

ILLUSTRATIONS

DIAGRAMS

INDEX

GENERAL DESCRIPTION

Film Capacity :

From 100 to 1,600 ft. of either silent or sound 16 mm. film. With additional extension arms up to 2,000 ft.

Power Requirements :

110 volts, 50 to 60 cycles, A.C. Watts 950.

Dimensions :

Projector—
Outside case—$14\frac{1}{2} \times 9\frac{1}{2} \times 13\frac{1}{2}$ in.

Speaker—
Outside case—$18\frac{1}{2} \times 10\frac{1}{2} \times 16\frac{1}{2}$ in.

Step-down Transformer—
$10 \times 7 \times 5$ in.

Weight :

Projector— 50 lb.
Speaker— 45 lb.
Transformer—27 lb.

Illustration 0.

SETTING-UP EQUIPMENT

1. Remove back from speaker case by loosening two catches at top. Swing back open and slide to one side.

2. Remove cover of speaker at front of speaker case.

3. Insert one end of speaker cable in one of the sockets on speaker—it does not matter which one as sockets are wired in parallel. The other socket is used when a second speaker is required.

4. See that matching panel on speaker is plugged into Figure 1 when one speaker is used and Figure 2 when two speakers are used, etc.

5. Set speaker at front of room, fairly high, facing slightly downward towards the centre of the audience.

6. Connect other end of speaker cord in socket No. 2 (*Illus.* 6).

7. Connect step-down transformer lead into socket No. 2 (*Illus.* 6) having first checked that the transformer input voltage tappings correspond with mains voltage.

Illustration 1.

Illustration 2.

Threading Film :

1. Remove reel arms from bottom of case. Place in sockets so that shafts are at the front.

2. Place take-up belts in small pulleys on both reel arms for small reels and in large pulleys for 1,600 ft. reels. Nearest, or inside belt goes to rear arm. Back or outside belt goes to front arm. Both belts must be crossed (see *Illus.* 5), so that both reels revolve clockwise when machine is running in forward motion. Feed reel goes to rear and take-up reel at front.

3. (Refer to *Illus.* 4). Open upper and lower film shoes (M) and (G) by pulling out on pivot ends shown by arrow. Open tension rollers against (A) and (C) by pressing down. (*Illus.* 3). (1) Thread film straight across from full reel to hub of take-up reel. (2) Pull generous loop of film down to bottom of case. (*Illus.* 4). Thread film under sound sprocket (A), over sound drum (B), and under impedance roller (C). Next open lens mount (D) and thread film up in front of roller (E), between red rollers (F), to under side of drive sprocket and close film shoe (G), over in front of front film roller (H) and back of roller (I). Now go back to impedance roller (C) and thread back from impedance roller, under and behind roller (J), into film channel (K), and close lens mount. (*Illus.* 5). Thread film behind and over roller (L), over top of drive sprocket, close upper film shoe (M) and continue behind the roller (N) as shown. Check both upper and lower film shoes to ascertain that they are locked in closed position and that perforations of film fit over sprocket teeth. Threading now appears as shown in *Illus.* 5.

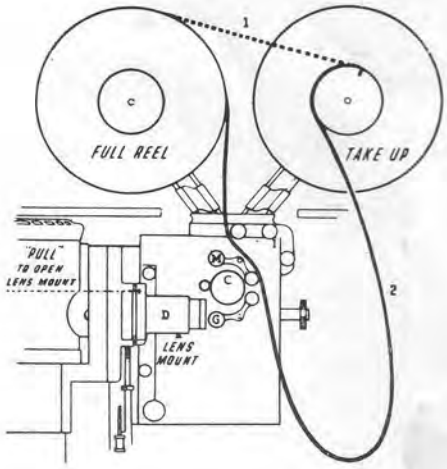


Illustration 3.

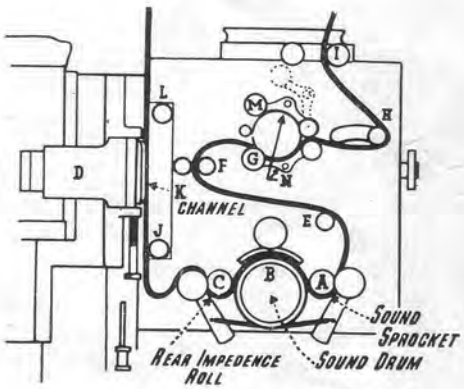


Illustration 4.

Synchronisation :

For perfect synchronisation of sound and picture, there must be exactly 25 ''frames'' or pictures between aperture (K) and sound gate (B), loop as shown in *Illus.* 4.

Hand Operating Knob :

Revolve a few turns to check movement of film and to make sure film is in channel (K) and that loops remain as shown in *Illus.* 5.

Silent Film Threading :

Same as for sound film except omitting sound head (A, B, C, E) with lower film loop from in front of roller (J) to behind roller (F).

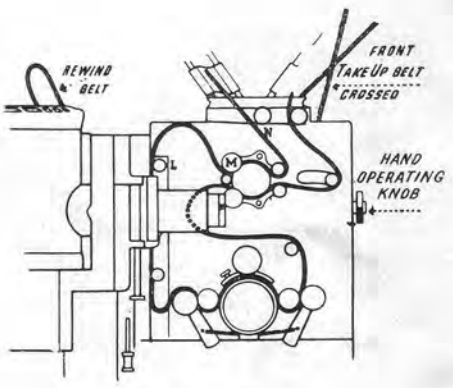


Illustration 5.

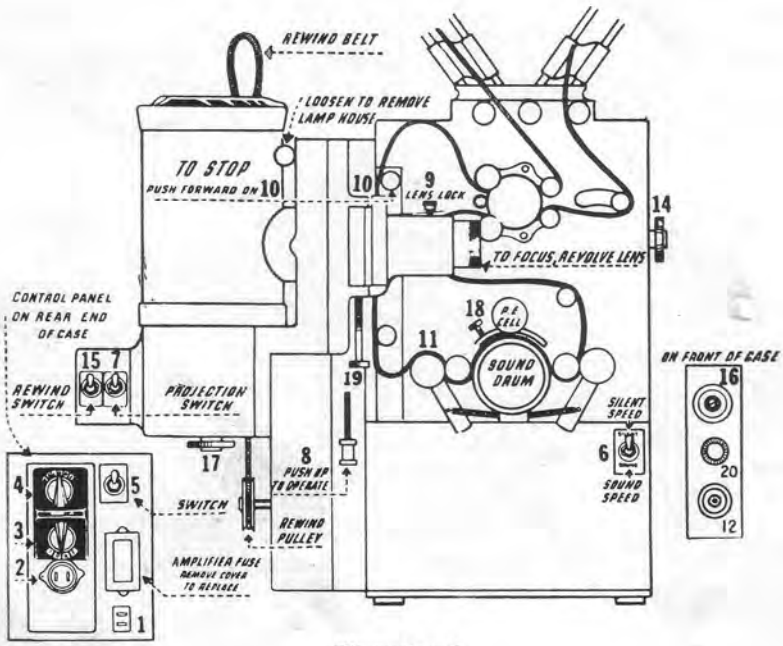
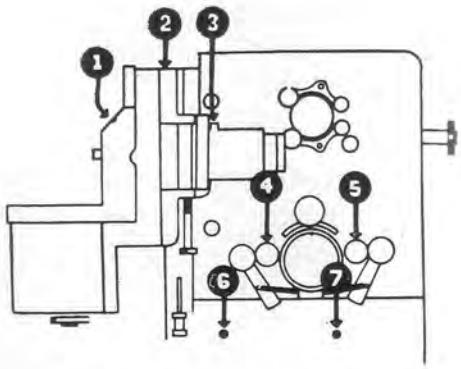


Illustration 6.



Oil 7 places marked by red dots.

Illustration 7.

OPERATING INSTRUCTIONS

(*Illus.* 6)

To Set Up for Operation :

See control panel on rear of projector case. Set tone control (3) at midway position. Set volume control knob (4) at midway position. Push down exciter switch (5). For sound film push down speed switch (6).

To Run Film :

To start projector—raise operating lever (8). Push down projection switch (7) (motor and lamp now operating).

To Focus Picture :

Loosen lens lock screw (9). Revolve lens in mount until focus is sharp. To frame : Turn knurled framing screw (19).

To Tilt Projector :

Use knurled knob located on top of projector case near the front centre. Revolve anti-clockwise to raise the projector until image is properly positioned on the screen. Revolve clockwise to lower to original position.

To Stop Projector :

Push forward on roller shaft (10). Switch-off (7).

To Rewind :

Remove take-up belt from reel pulley. Attach rewind belt to rear pulley (belt not crossed), thread end of film back from take-up reel to rear and empty reel. Set motor to slow speed on switch (6.) Press down on rewind switch (15).

Photo-Cell Voltage :

(See upper round opening (16) on right front of case) adjust with small screw-driver. Check setting before each show with exciter lamp on and with volume turned on full (without film) turn voltage control clockwise until excessive humming or squealing begins. Turn knob slowly back until hum is less noticeable. Then turn volume back to "low." Too much photo-electric cell voltage results in objectionable noise ; too little, in loss of volume.

To Reverse Projector :

Push down roller shaft (11) as far as it will go. To resume forward movement, push up on roller shaft (11).

To Show Stills :

Stop projector by pushing forward on shaft (10). Raise still lever. Bring desired picture into position by revolving hand operating knob (14).

To Use Microphone or Record Player :

Plug into jack (12). Use control (20) for volume adjustment.

OILING (*Illus.* 7)

There are only seven places to oil, each indicated by a red dot. Three or four drops of oil at each of these seven places before operating projector, are fully sufficient. Do not use more oil than directed.

GENERAL INSPECTION

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

PROCEDURE

A.—INSPECTING THE PROJECTOR

1. **Set-up :**

Set the machine up as for a show and check all cables and plugs in the process.

2. **Belts :**

Replace belts if stretched or kinked.

3. **Sprockets :**

Make sure the sprocket guards have the proper clearance and see that the sprocket teeth are not worn. Worn teeth can be extremely damaging on film. See paragraph 14—General Overhaul Section.

4. **Rollers :**

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

5. **Gate :**

Clean the gate, pressure plate, aperture and sound drum. An orangewood manicure stick is very good for removing encrusted emulsion and for getting the corners of the aperture free from fuzz. Check carefully for wear of guides or "rails" on which the film rides.

6. **Shuttle :**

Check for wear on shuttle teeth.

7. **Lens :**

Clean lens carefully. Use lens cleaning tissue or chamois leather. (Remember that optical glass is much softer than ordinary glass).

8. **Lamphouse :**

Release the lamphouse locking screw and remove the lamphouse. Clean the condenser and reflector with tissue.

9. **Lamp :**

Check the lamp for excessive blackening adjacent the condenser, and wipe it clean. If the glass is blistered or if the filaments seem to sag, replace the lamp immediately.

10. **Motor :**

(*a*) Check the motor brush accessible from the front. If worn, remove the projector from case and check the other brush, replacing them if necessary.

(*b*) Make sure that the bearing surface of the brush is smooth and shiny. If rough and oily the commutator needs cleaning.

(*c*) The commutator can be cleaned moderately well if not in bad condition by using a small piece of cheesecloth or extra fine abrasive.

11. **Speeds :**

Turn the motor on, listening to its sound and see that it operates at silent and sound speeds. (Count 80 and 120 revolutions of the 12-tooth feed sprocket per minute for the speeds respectively). The operation of the switches can be determined at this time.

12. **Governor :**

If the speed is incorrect, the governor can be adjusted by removing the grille underneath the case.

(*a*) First of all, clean the contact points. The sound speed (24 F.P.S.) contacts can be recognised by the heavier spring and also by the fact that the 16 F.P.S. speed contacts are held down by a straight lug while the other lugs are curved.

(*b*) If the speeds are still off, turn the contact screw in a clockwise direction to speed up or anti-clockwise to slow down.

(*c*) Clean the copper slip rings at the back of the governor and make sure the brushes are not worn and that they are making good contact.

13. **Clutch and Trip :**

Check the operation of these units.

14. **Take-ups :**

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

15. **Illumination :**

Turn on the lamp and make sure the light on the screen is even all the way across. (A photo-cell type exposure meter will be found useful for this although visual inspection will usually be satisfactory). If necessary adjust the lamp sideways in the lamphouse by slackening knurled nut (17) *Illus.* 6. Lock tight when in desired position.

16. **Scratches :**

Make a continuous loop of about 24 in. of new (unused) film which is very soft and run through the mechanism a dozen times or so. This will quickly indicate if there is any scratching at the gate. If any abrasion marks show up, the front and back gate plates and other parts such as sprocket guards must be cleaned and checked very carefully.

17. **Noise :**

If the machine is noisy, an overhaul is indicated. (See General Overhaul).

B.—INSPECTING THE SOUND SYSTEM

18. **Exciter Lamp :**

Remove and check for excessive blackening and for sagging filament. Wipe clean and replace. Make sure the lamp is aligned with the slit. This can be seen easily when photo-electric cell is removed and a piece of paper held in its place.

19. **Photo-Cell :**

Remove cap, wipe clean. (Correct functioning of the photo-cell can be determined by noting the hiss when the amplifier is turned on and without film, and with the photo-cell voltage adjusting screw set properly. Sometimes photo-cell breakdown will be checked best by listening to a test film with another photo-cell in the machine).

20. **Sound Drum and Slit :**

Clean these very carefully. An ordinary pipe-cleaner is as effective as anything. Lens tissue or even cheesecloth, with or without an orangewood stick is satisfactory. Make sure the guides are not worn.

21. **Valves :**

While the operating of the valves can be gauged by listening to a test reel, it is urged that they be removed and checked in a standard valve tester. A good tester will show when a tube is near the end of its useful life and will avoid subsequent trouble if the machine is used a lot just after an incomplete check.

22. **Fuse :**

Some users seem to think this is not important and have replaced the regular fuse with other fuses up to 10 amp. capacity. The fuse is for protection and 2 amp. is the maximum size to be used, except with machines bearing serial number Prefix B, where a .25 amp. fuse is to be used.

23. **Test Film :**

Use a sound object, with which you are thoroughly familiar. Then you can quickly recognise any variation from standard and investigate further.

24. **Sound Quality :**

(*a*) Wows. Slow-speed variations usually caused by improper operation of the impedance roller assembly. Make sure the flywheel is working smoothly and that the pressure roller is free.

(*b*) Flutter. Relatively high-speed variations usually due to improper functioning of the sound sprocket filter mechanism. Check the clearance and smoothness of the sprocket and its roller.

25. **Sound Controls :**

Check the operation of switches, volume and tone controls. Listening to the sound while operating the latter will indicate whether the amplifier needs further attention.

26. **Speaker :**

Wipe off dust from speaker cone and make sure it is not cracked or broken.

SOME COMMON PROJECTOR TROUBLES AND THEIR REMEDIES

1. **Lamps Blow Out Prematurely :**

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

(*b*) Incorrect Lamp Used : The lamps usually stocked by the dealer are rated for 110 volts and are suitable for line voltages of from 100 volts to 115 volts.

2. **Main Fuses Blow :**

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

3. **Motor Will Not Run :**

(*a*) Check cables and plugs.
(*b*) Check motor brushes.
(*c*) Check main switch contacts.
(*d*) Check mains fuse.

4. **Speed Variation :**

Clean governor contact points and readjust setting if necessary. See General Inspection, paragraphs 12 (*a*) and (*b*).

5. **Loss of Top Loop :**

(*a*) Main sprocket guard may not be seating properly.

(*b*) Film perforations may be torn.

6. **Loss of Lower Loop :**

(*a*) Torn perforations.
(*b*) Film not threaded properly at gate.
(*c*) Check sprocket guards and gate clearance.
(*d*) Excessive wear of shuttle and cam.

7. **Film Scratches :**

This is usually due to an accumulation of hardened film dust on aperture plates (or sprocket guards). It may also be due to physical damage to extremely smooth surface of gate plates or wear of guides on back film channel, aperture plate, or sound drum. If so, replacement is indicated.

8. **Pictures Unsteady :**

(*a*) Film badly shrunken and perforation chipped.

(*b*) Wear on shuttle and cam or other parts of intermittent mechanism.

(*c*) Wear on aperture and pressure plates.

9. **Flicker :**

(*a*) Speed on governor set too slow.

(*b*) Cam gear replaced "out of time." See General Overhaul, paragraph 15.

10. **Film Over-runs Feed Spool :**

Insufficient friction on feed spindle. See General Overhaul, paragraph 12.

11. "**Motor-Boating**" :

Sound drum not replaced all the way in, causing film misalignment.

12. **Film Tears at Sprocket :**

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

13. **Film Perforations Chip :**

(*a*) Worn sprocket teeth.
(*b*) Worn shuttle or shuttle teeth.
(*c*) Tension at gate insufficient.
(*d*) Badly shrunken film.

14. **Insufficient Light on Screen :**

(*a*) Still picture shutter "up."
(*b*) Dirty lens, condenser, or reflector.
(*c*) Lamp old, blackened or dirty.
(*d*) Low-line voltage.
(*e*) Dirty screen.
(*f*) Position of lamp. See General Inspection, paragraph 15.

15. **Picture Partly Out of Focus :**

(*a*) Gate alignment tampered with—must be parallel. *Illus.* 9. Screw No. 18177.

(*b*) Dirt on lens.

(*c*) Projector not square with screen.

16. **Travel Ghost :**

A picture with a "streaky" effect on the screen usually indicates the cam or shutter has been replaced "out of time." See General Overhaul, paragraph 15.

GENERAL OVERHAUL

The General Overhaul involves dismantling the projector in four or five main operations as below :

1. **Remove Projector from Case :**

The projector is held in the case by four screws at the bottom of the case. After removing the screws, tilt the projector forward carefully to gain access to the plugs connecting the projector to the amplifier. Disconnect these plugs.

2. **Remove Amplifier :**

The amplifier is held in the case by two screws at the side (near the controls) and four screws at the rear.

3. **Remove Lamphouse :**

Loosen the thumbscrew holding the lamphouse and remove that. Then remove the five screws holding the remaining part of the lamphouse unit to the main casting of the projector. This exposes the shutter and intermittent mechanism, etc. (*Illus.* 11).

4. **Remove Side Plate :**

This plate is held by four screws and covers the take-ups, clutch pulleys, flywheels, etc. (*Illus.* 10).

5. **Remove the Motor :**

This is necessary only when the commutator or bearings need attention. To remove the motor from its housing, proceed as follows :

(*a*) Remove two screws from front and also back of housing.

(*b*) Remove brushes.

(*c*) Remove wires and terminal plate.

THE MAIN INTERMITTENT MECHANISM

Under the following headings are given the steps most often necessary for properly checking the projector mechanism. Owing to the extreme accessibility of the mechanism, replacements even of vital parts are easy and positive. The numbers given refer to the spare parts list and assembly photographs.

6. **Large Cam Oscillating Gear :**

(*a*) If improperly engaged with small cam gear, the machine will be noisy. To adjust, loosen the two screws on part 17967 and the two screws adjacent screw 18030 (*Illus.* 11). Screw 18030 is an eccentric. Turning it moves the two cam gears apart or closer. The proper position will be the quietest but care must be taken not to set the gears too close together. After adjusting, be sure to tighten the above locking screws.

(*b*) The gear itself rarely needs attention but must be removed to get at the shuttle tension spring, 18068. To do this, loosen the two screws on the casting lug adjacent the spiral gear shown in *Illus.* 10.

7. **Shuttle :**

This part 37416 is the heart of the entire mechanism and must be checked carefully.

(*a*) Check for wear or looseness of the sides of the shuttle against the heart-shaped cam. Replace if there is play between cam surfaces and shuttle. Care must be taken when replacing shuttle that the claws withdraw clear of the film channel and also give sufficient engagement to the film. This adjustment is carried out by loosening the two screws referred to in paragraph 6 (*b*) and positioning the oscillating gear assembly until the correct claw engagement and withdrawal is retained.

(*b*) Make sure the shuttle teeth are not badly worn or rough. Minor rough spots on shuttle teeth can be stoned smooth provided care is used. (Caution is urged if this is tried).

In the event of any question of the best functioning of this vital part, replace the entire shuttle rather than take any chances of subsequent complaints.

8. **Main Drive Belt :**

Remove belt retaining guard 18218 (*Illus.* 11), and replace belt if necessary. (Be sure to replace this with the short "step" to the right.)

9. **Starting Lever Unit :**

If the roller 37381 is loose on the shaft replace the entire assembly.

10. **Safety Shutter :**

It may be necessary to adjust the eccentric screw (the screw at the lower end of the spring) 18015. This adjustment raises or lowers the safety shutter with relation to the main aperture. The alignment of the two can be readily seen.

Make sure that the shutter slides quite freely between the guide screws 17979 and 17981, so it will drop of its own weight.

11. **Flywheel Units :**

The only adjustment likely to be needed here is so the shafts on which they are fastened have a slight end play, approx. ·004. Do *not* tighten them up too close to the bushing or too much drag will occur. This is worse than if they were too free.

12. **Take-up Pulleys :**

Uneven action of these pulleys (18123, *Illus.* 10) causes a jumpy action of the take-up and may result in the film "spilling over." This uneven action may be caused by oil becoming "gummy" and clogging the ratchet action.

Loosen the set screw holding the pulleys on the shaft and be careful when sliding it off the shaft that it does not come apart. Place on a flat surface and lift the pulley pieces apart. Clean the "runways" and check the rollers, 18070, replacing them if necessary. It is easy to check the action of the ratchets by hand after replacement on the shaft. This assembly should be run free of oil.

13. **Governor :**

Once in a while the brushes need replacement. (The governor itself rarely needs replacement, but slip rings require occasional cleaning). Remove motor from projector. Then loosen the locking screw on the governor hub and slide off the motor shaft. In replacing, allow the proper clearance for the brushes.

14. **Sprocket Guard :**

The sprocket guard rollers are set to the proper clearance by adjusting the curved guide lock members 37478 and 37479. These are fastened on the main casting by the shafts of the right-hand rollers and by small screws in the slots at the free ends. Loosen the two screws and set the guides until the back roller is just touching the sprocket flange—then lock the screws.

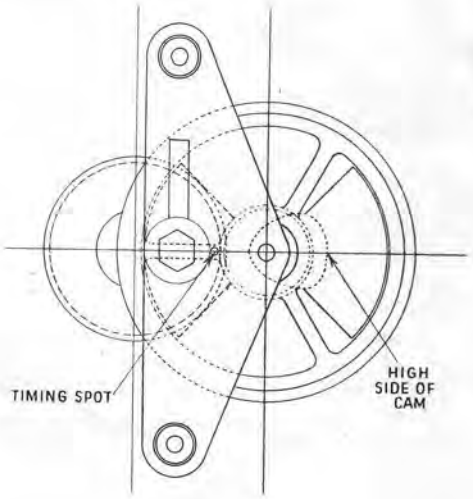
15. **Timing the Projector :**

The Victor projector is the simplest to time and it is almost impossible to do it incorrectly. Only TWO simple precautions have to be observed.

(*a*) Replace the cam pulley shutter and gear assembly 37391 with the small end of the cam centred (horizontally) against the punch mark on the large cam oscillating gear 37406. (It will be noticed that one "spoke" of the pulley is over the centre punch mark of the oscillating gear.

(*b*) While the two gears are still set horizontally as above, set the shutter assembly 37360 so that the blades are horizontal also. This places the open part of the shutter at the top and at the bottom, then replace the support plate 37356.

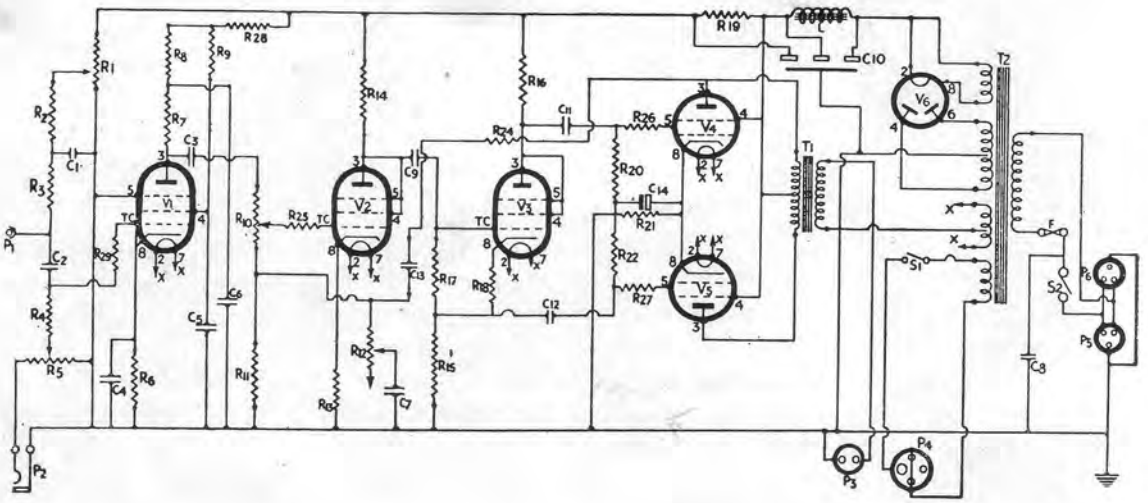
If these things are done the projector will be set correctly but it is always a good idea to turn it over by hand and make sure ; just check that the shuttle teeth start to pull down while the shutter is closed.



Shutter to be in this position when spot on oscillating gear is in line with rib of cam pulleys—with high side of cam in position as shown.

AMPLIFIER WIRING DIAGRAM

Illustration 8.



Circuit Ref.	*Description*
R1	Potentiometer, 250,000 ohms.
R2, R17, R25 ..	Resistor, 1 megohm, ⅓ watt, 20% tolerance.
R3	Resistor, 4,700,000 ohms, ⅓ watt, 20% tolerance.
R4, R9	Resistor, 2,200,000 ohms, ⅓ watt, 20% tolerance.
R5	Potentiometer, 50,000 ohms.
R6	Resistor, 2,200 ohms, ⅓ watt, 20% tolerance.
R8, R14	Resistor, 100,000 ohms, ⅓ watt, 20% tolerance.
R7, R20, R22, R28	Resistor, 470,000 ohms, ⅓ watt, 20% tolerance.
R10	Potentiometer, 1,000,000 ohms.
R11, R26, R27 ..	Resistor, 10,000 ohms, ⅓ watt, 20% tolerance.
R13	Resistor, 4,700 ohms, ⅓ watt, 20% tolerance.
R15, R16	Resistor, 22,000 ohms, 1 watt, 10% tolerance.
R18	Resistor, 1,000 ohms, ½ watt, 20% tolerance.
R19	Resistor, 22,000 ohms, ½ watt, 20% tolerance.
R21	Resistor, 200 ohms, 10 watt, 10% tolerance.
R24	Resistor, 100,000 ohms, ⅓ watt, 20% tolerance.
R12	Potentiometer, 5,000 ohms.
C1, C8, C11, C3, C9.	Condenser, Paper 0.1 UF 500 v. WKG 20% tolerance.
C2, C13	Condenser, 0.01 UF 500 v. WKG 25% tolerance.

Circuit Ref.	*Description*
C12, C7	Condenser, Paper 0.1 UF 250 v. WKG 25% tolerance.
C4	Condenser, Electrolytic 10 UF 25 v. WKG—20%+50%.
C5	Condenser, Paper 0.05 UF 500 v. WKG 20% tolerance.
C6	Condenser, Electrolytic 2 UF 500 v. WKG—20%+50%.
C10	Condenser, Electrolytic, 16+16+8 UF 450 v. WKG—20%+50%.
C14	Condenser, Electrolytic, 25 UF 50 v. WKG—20%+50%.
V1, V2, V3 ..	Valves, Osram Z 66.
V4, V5	Valves, Osram KT 66.
V6	Valve, Osram U 52.
L1	Choke 2H at 160 MA.
F	Fuse ·25 amp or 2 amp.
S2	Switch.
S1	Switch, Single Pole, Single Throw
T1	Transformer, 6,600 ohms to 600 ohms.
T2	Transformer, Input 110 v. 40/60 Cycles ; Output 385-0-385 at 160 MA, 5 v. 3 amps, 6.3 v. 3.3 amps, Centre tap, 5v. 6.5 amps.
P1	Plug and Socket.
P2	Telephone Jack.
P3	Two-Pin Plug and Socket.
P4	4-Pin Socket.
P5, P6	Mains Connector (Apparatus Member).
R29	Resistor, 22,000 ohms, ⅓ watt, 20% tolerance.

AMPLIFIER VOLTAGE CHECK

For Models without Serial Number Prefix Letter

Meter Used—1,000 ohms per volt
Volume Control—Maximum

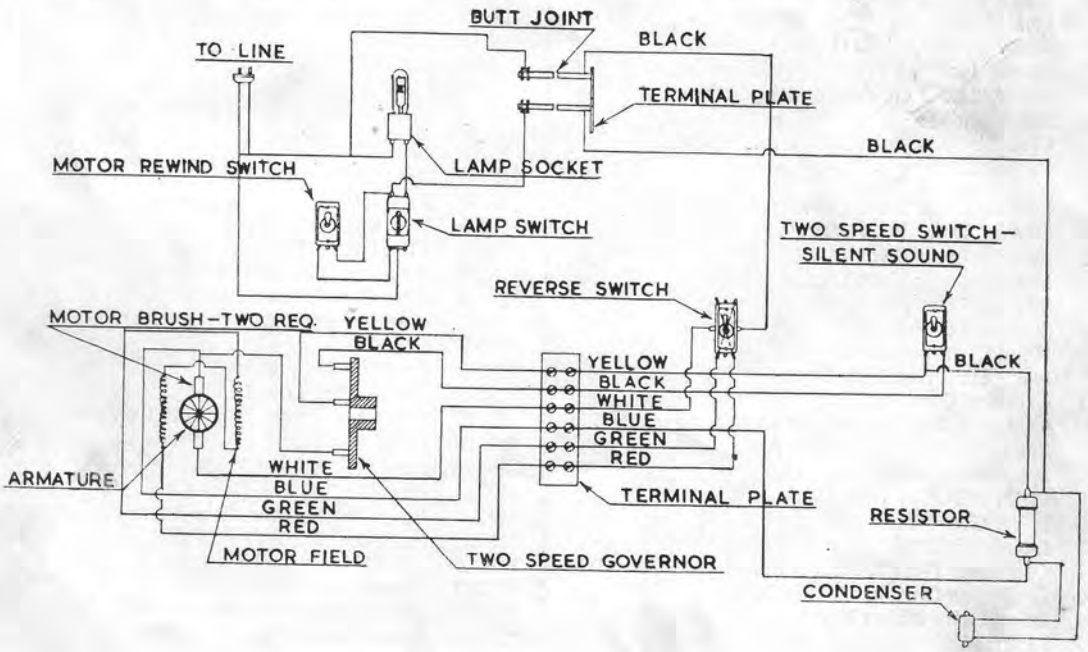
Component	Meter Range	Reading
Output Valves V4 and V5		
A Screen (Pin 4)	500 v.	465 v.
B Anode (Pin 3)	500 v.	460 v.
Phase Inverter V3		
A Anode (Pins 3, 4, 5)	500 v.	220 v.
Driver V2		
A Anode (Pins 3, 4, 5)	500 v.	190 v.
Pre-Amplifier Valve V1		
A Screen (Pin 4)	250 v.	10-15 v.
B Anode (Pin 3)	250 v.	10-12 v.
Grid Bias Reading		
V.1 Pre-Amplifier (Pin 8)	5 v.	.3—.4 v.
V.2 Driver (Pin 8)	5 v.	2.5—2.7 v.
V.3 Inverter (Pin 8)	100 v.	60—65 v.
V.4, V.5 Output (Pin 8)	100 v.	38—40 v.

For Models with Serial Numbers Prefixed A and B

Meter Used—1,000 ohms per volt
Volume Control—Maximum

Component	Meter Range	Reading
Output Valves V4 and V5		
A Screen (Pin 4)	500 v.	310 v.
B Anode (Pin 3)	500 v.	300 v.
Phase Inverter V3		
A Anode (Pins 3, 4, 5)	500 v.	160 v.
Driver V2		
A Anode (Pins 3, 4, 5)	500 v.	120 v.
Pre-Amplifier Valve V1		
A Screen (Pin 4)	250 v.	9—10 v.
B Anode (Pin 3)	250 v.	9—10 v.
Grid Bias Reading		
V1 Pre-Amplifier (Pin 8)	5 v.	.2—.25 v.
V2 Driver (Pin 8)	5 v.	1.7—2 v.
V3 Inverter (Pin 8)	100 v.	38—40 v.
V4, V5 Output (Pin)	100 v.	20—24 v.

MOTOR WIRING DIAGRAM—TWO-SPEED GOVERNOR



SPARE SERVICE PARTS

Ref. No.	*Description*
*17856	2.BA. Cap Nut
17864	Motor Switch
*17865	Lamphouse Terminal Plunger
17867	Lamp Socket
17869	Lamp Adjusting Stud Assembly
17876	Still Picture Shutter Lever Pivot
17877	Lamphouse Terminal Plunger Spring
17878	Lamphouse Terminal Plunger Insulating Washer
*17880	Rewind Belt Guard
17881	Lamp Adjusting Nut
17885	Loop Tension Roll Arm Assembly
17886	Tension Roll Grip
17887	Loop Tension Roll Arm Sub-Assembly
*17892	Loop Tension Roll Assembly
*17894	Sound Sprocket Tension Roll Arm Assembly
17895	Reverse Sprocket Tension Idler Roll
17897	Sound Sprocket Tension Roll Arm Sub-Assembly
*17901	Sound Sprocket Tension Roll Assembly
17907	Tension Roll Spring Hook
*17909	Lamp Switch
*17911	Reverse Switch
17923	Cap Nut 4.BA. (Hexagon)
*17940	Sound Sprocket Flywheel Hub Assembly
17942	Filter Springs (Sound)
*17948	Sound Sprocket Assembly
*17949	Sound Sprocket Gear Shaft
*17950	Sound Sprocket Drive Gear
17951	Sound and Silent Switch Insulator
17953	Sound Channel Cap and Nameplate Assembly
*17965	Body Terminal
*17967	Shutter Housing Dowel Plate Assembly
*17971	Jack Shaft Collar
*17973	Shutter Drive Gear
*17974	Intermediate and Drive Gear Assembly
17975	Jack Shaft Support Washer Assembly
17976	Jack Shaft Oil Tube
*17979	Safety Shutter Guide (Upper)
*17980	Shutter Housing Terminal Plate Insulator
*17981	Safety Shutter Guide (Lower)
*17983	Safety Shutter Trip Spring
*17992	Feed Sprocket Drive Pinion Assembly
17997	Cam Shaft Pin
18008	Starting Lever Knob (Lower)
18011	Starting Lever Plate Spring Hook
18013	Starting Lever Pivot
18014	Starting Lever Pivot Washer
*18015	Starting Lever Spring
18016	Starting Lever Knob (Upper)
*18017	Hand Operating Knob
18019	Hand Shaft Retaining Screw
18022	Cam and Gear Assembly
*18030	Cam and Oscillating Gear Centre Adjusting Pin
18036	Spiral Gear Shaft and Hub Assembly
18037	Spiral Inter-Pinion Assembly
*18038	$\frac{5}{16}$ in. BSF. Cap Nut
18040	Spiral Gear Thrust Ball
*18041	Inter-Spiral Pinion Thrust Washer
18051	Oscillating Gear Shaft Sleeve and Bush Assembly
18053	Oscillating Gear Thrust Washer
18056	Spiral Drive Pinion Key
18057	Reverse Take-up Clutch Cam Assembly

Ref. No.	*Description*
*18063	Shuttle Rod Bearing Assembly
*18064	Shuttle Oiler
18068	Shuttle Spring
18070	Reel Shaft Clutch Roller
*18081	Reel Arm Holding Screw
*18084	Automatic Trip Plunger
*18090	Automatic Trip Roll (Inside)
*18091	Automatic Trip Roll (Outside)
18092	Hand Trip Knob
*18097	Trip Lever Tension Spring
*18098	Tension Roll Spring
18108	Tilt Knob
18112	Tilt Feet
18116	Film Trap Roll
18117	Film Trap Roll Shaft
*18118	Take-up Operating Lever Assembly
*18122	Take-up Snubber Spring
*18123	Reverse Take-up Clutch Pulley Assembly
18124	Reverse Take-up Clutch Pulley Bearing
*18125	Take-up Feed Roll
18126	Take-up Belt
18134	Small Shoe Grooved Roll
18139	Small Shoe Roll (Outer)
18140	Small Shoe Roll (Inner)
*18146	Reflector
*18148	Conza Condenser
18150	Condenser Retaining Ring
*18168	Pilot Light Socket
18171	Aperture Plate Guide
*18175	Aperture Spring
18176	Lens Mount Spring
*18177	Lens Mount Stop Screw
*18178	Lens Mount Lock Plate
18179	Lens Mount Lock Plate Spacer
18181	Lens Pivot Plate Screw 7.BA.
18182	Lens Mount Stop Pin
18183	Lens Mount Lock Plunger
18184	Lens Mount Lock Spring
18185	Lens Tension Spring Assembly
*18191	Photo-Electric Cell Tube and Cap Assembly
*18200	Lens Mount Lock Screw
*18201	Film Support Roll
18202	Film Guard
18203	Film Guard Spacer
*18204	Film Channel Tension Clip (2)
18205	Film Channel Tension Spring
18206	Film Guard Screw Roller
18207	Film Guide Screw
*18208	Framing Screw
*18209	Framing Screw Knob
18210	Sound Core Lock Screw
18217	Drive Belt Guard Assembly Complete
*18218	Drive Belt Guard
18222	Rewind Belt
18223	Case Rewind Belt Hook
*18226	Body Front Cover Plate Assembly
*18228	Resistor (68 Ohms)
*18229	.5 mfd. Condenser
*18247	Base Support Sleeve Assembly
*18250	Base Support Washer
*18251	Base Support Rubber Washer

Ref. No.	Description
*18252	Wire Clamp
18256	Motor Pulley Core
*18263	Motor Terminal Plate and Support Assembly
*18277	Governor Brush and Spring Assembly
*18278	Motor Brush and Spring Assembly
*18279	Motor Brush Holder Plug
*18282	Motor Support Sleeve
*18283	Motor Rewind Pulley
*18284	Motor Terminal Plate Insulator
18286	Motor Bearing Felt
18288	Core Cap Bracket
18303	Rubber Feet for Case
18307	3-pin Socket (used on Loud Speaker and Amplifier)
18308	3-pin Plug (used on Loud Speaker Lead Assembly)
18310	Speaker Wander Plug
18399	P.73 Socket (for Transformer and Projector). See also 37592.
18400	P.73 Plug (for Connecting Mains to Transformer)
18411	Fuse Cover
37302	Carrying Case complete with Fittings
*37307	Lamphouse Casting
37309	Still Picture Shutter Assembly
37313	Power Line Lead Wire Assembly
*37314	Motor or Two-Speed Switch
*37315	Lamphouse Body Plate
37318	Lamphouse Plunger Sleeve
*37320	Projector Body
37321	Shutter Housing
*37327	Loop Roll Shaft Assembly
*37329	Loop Flywheel and Hub Assembly
37330	Speaker Unit Complete
37332	Sound Core and Key Assembly
*37333	Sound Core
37334	Sound Lens Assembly (Special Adjustment)
*37339	Sound Sprocket Gear Hub Assembly
*37343	Sound Unit Casting and Oiler Assembly
*37351	Shutter Housing Terminal Plate and Body Assembly
*37352	Safety Shutter Assembly
*37355	Support Plate Assembly
37356	Shutter Support Plate Assembly
37358	Jack Shaft
37360	Shutter Assembly
*37366	Feed Sprocket Shaft Assembly
37369	Feed Sprocket Gear
*37374	Feed Sprocket Body Assembly
*37376	Hand Operating Shaft
*37381	Starting Lever Plate Assembly
*37385	Starting Lever
*37391	Cam Pulley Assembly
37393	Cam Pulley
37394	Cam Pulley Bearing
*37395	Cam Shaft and Support Assembly
37400	Spiral Intermediate Pinion
*37406	Oscillating Gear Shaft and Sleeve Assembly
37408	Spiral Drive Pinion
37409	Oscillating Gear Hub Assembly and Oscillating Washer and Drive Gear Assembly
37413	Oscillating Gear
*37416	Shuttle and Pawl Assembly
*37422	Shuttle Bearing Clamp
37426/A	Reel Shaft Assembly (Front)
37426/B	Reel Shaft Assembly (Rear)
37427/A	Reel Arm Rod, Bearing Sleeve and Lock Nut Assembly (Front)
37427/B	Reel Arm Rod, Bearing Sleeve and Lock Nut Assembly (Rear)
*37436	Reel Arm Socket Roller and Roller Shaft Assembly
37437	Reel Arm Socket
*37441	Automatic Trip Lever Assembly
37446	Reel Arm Pulley and Reel Shaft
37450	Tilt Plate and Key Plate Assembly
37451	Tilt Rack Bar and Foot Assembly
37454	Tilt Gear Assembly
37460	Tilt Rod Assembly
37463	Tilt Plate Outside
37471	Speaker Only (Vitavox K.12/20)
37472	Speaker Cabinet
37474	Speaker Output Transformer
*37476	Upper Film Shoe Assembly
*37477	Lower Film Shoe Assembly
*37478	Film Shoe Plate (Upper)
*37479	Film Shoe Plate (Lower)
*37485	Lamphouse Lock Screw
*37486	Lamphouse Body and Parts Assembly
*37493	Condenser Mount
37494	Condenser Spring
*37495	Lamphouse Cover
*37501	Exciter Lamp Base Plate Assembly
*37505	Exciter Lamp, 5 v. 6.5 amp.
37506	P.E.C. Socket Wiring and Lamp Assembly
*37507	Pilot Light Cap
*37512	Lens Mount
37513	Lens Mount Pivot Plate and Spring Pin Assembly
37515	Aperture Retaining Plate Assembly
*37516	Aperture Plate and Rivet Assembly
*37521	P.E.C. Socket Wiring and Lamp Con. Assembly
37528	Film Support Shaft
*37529	Film Channel
37531	Rewind Belt Trap Assembly
37543	Projector Case Rear Flange and End Flange
37550	Projector Case (only) [Assembly
37554	Mains Transformer
*37556	Drive Belt Friction Disc
37557	Motor Complete
37558	Motor Field
37559	Motor Armature
*37560	Drive Belt Friction Flange Assembly (Front)
*37562	Drive Belt Friction Flange Assembly (Rear)
37566	Motor Fan Assembly
*37568	Fan Body and Blade Assembly
*37569	Motor Cap Governor End Assembly
*37572	Motor Cap Pulley End
*37573	Motor Bearings
*37580	Two-Speed Governor Assembly
*37581	Photo-Electric Cell GS.44 (4-pin)
*37583	Drive Belt
37592	Safety Cover for Standard P.73 Socket (18399)
37593	P.73A Safety Plug (for connecting Transformer to Projector)
43404	Screening Can

**These parts are all shown in the illustrations on the pages following. The parts not marked with an asterisk are representative of those items not illustrated.*

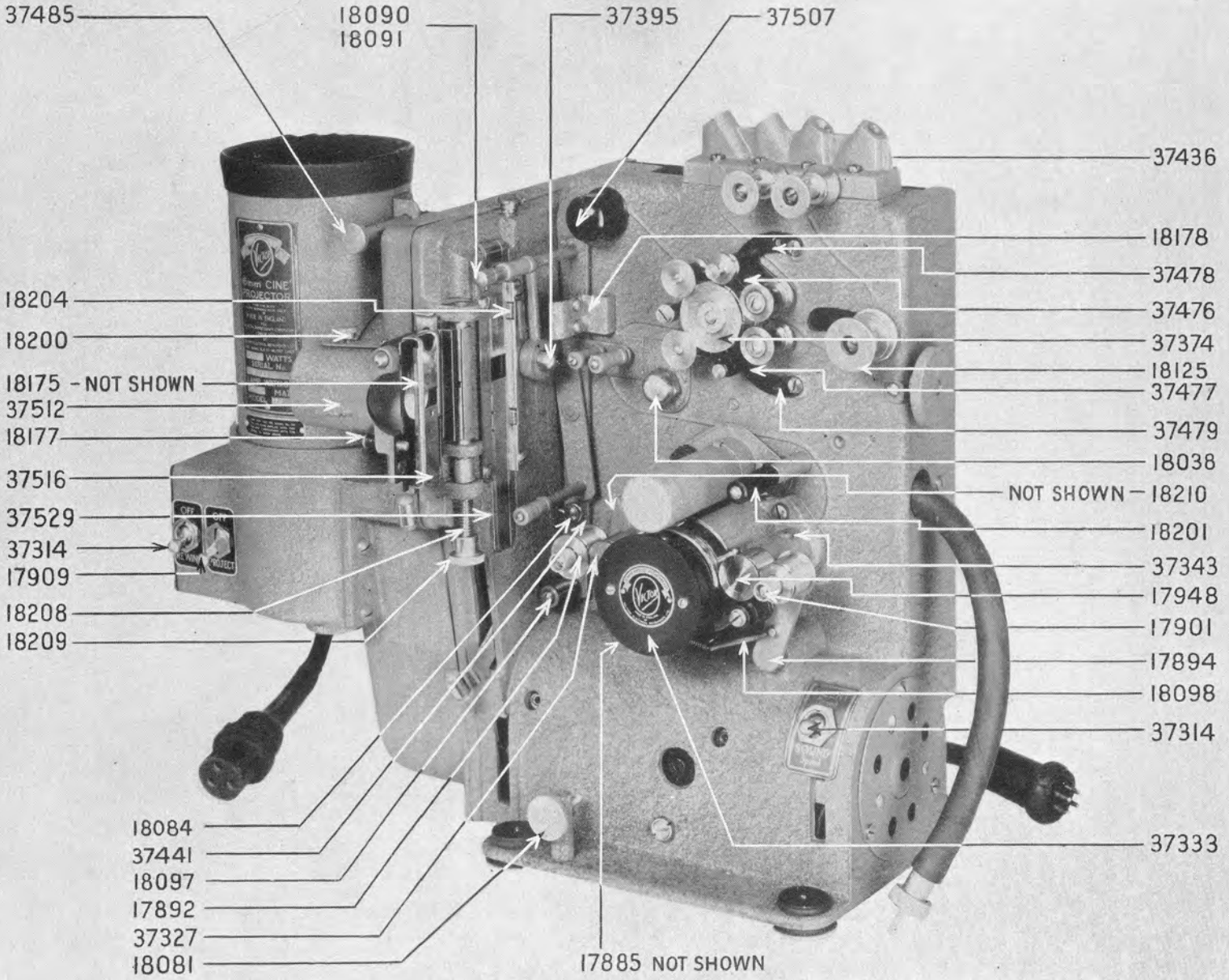


ILLUSTRATION 9

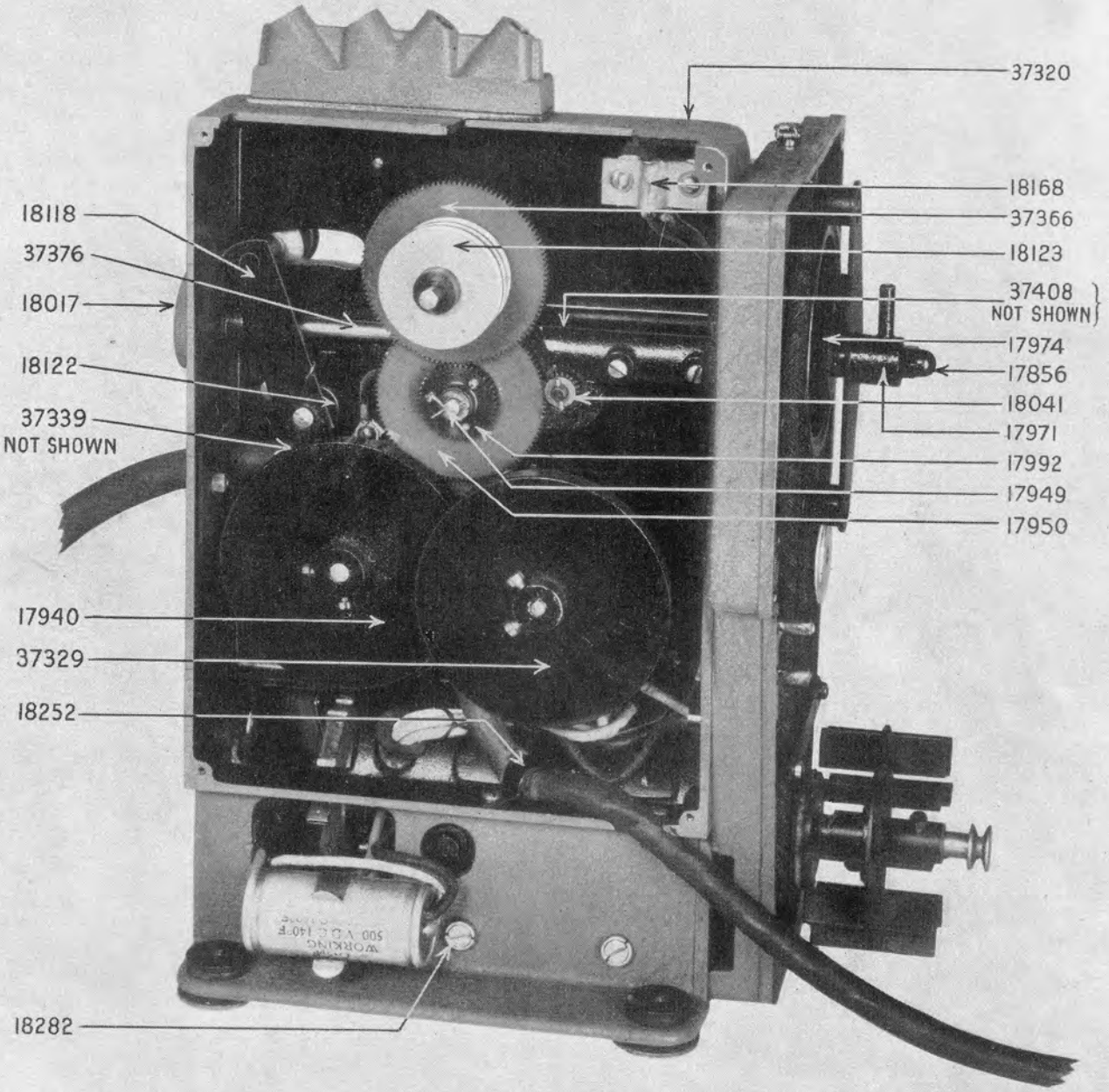


ILLUSTRATION 10

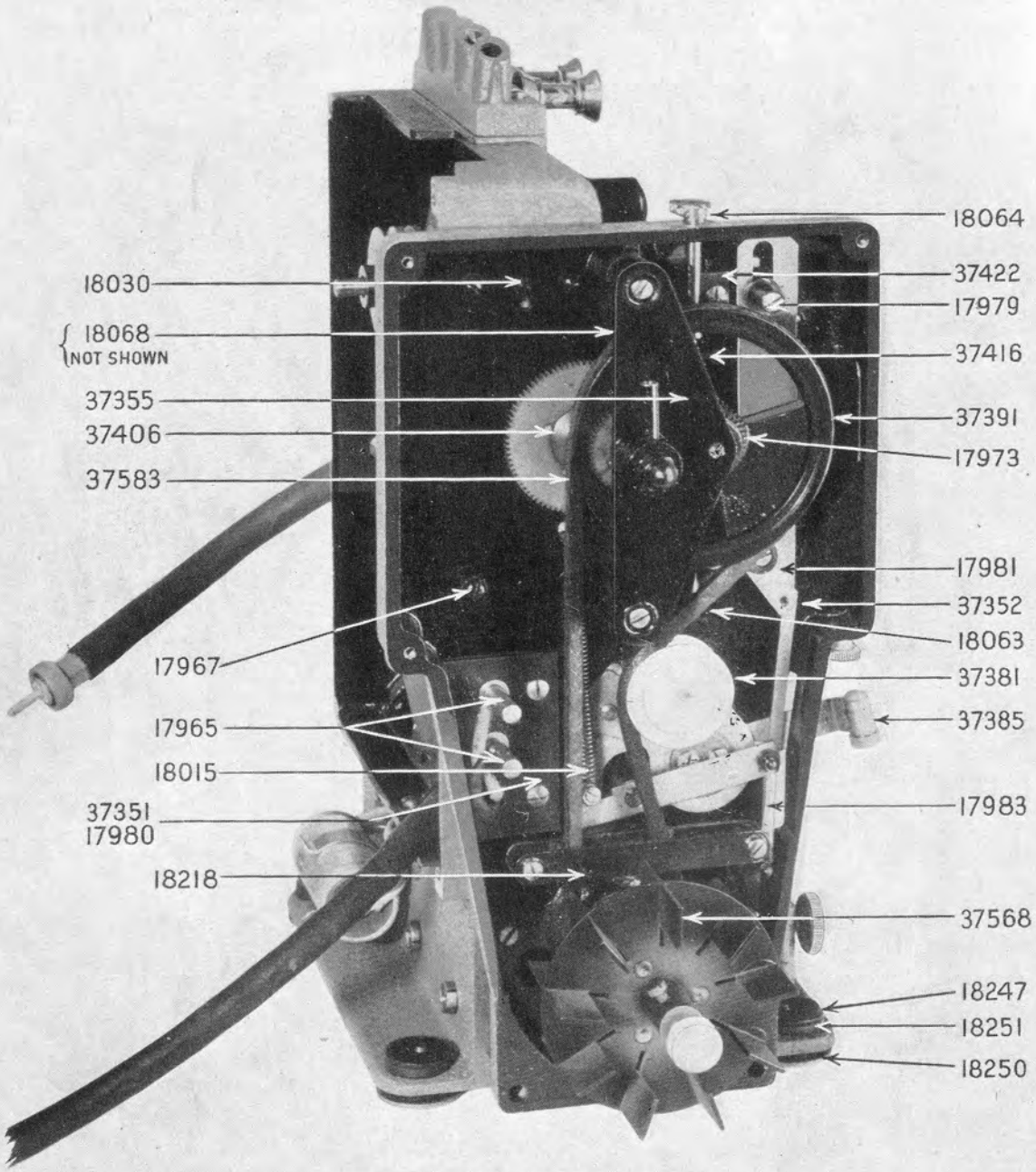


ILLUSTRATION II

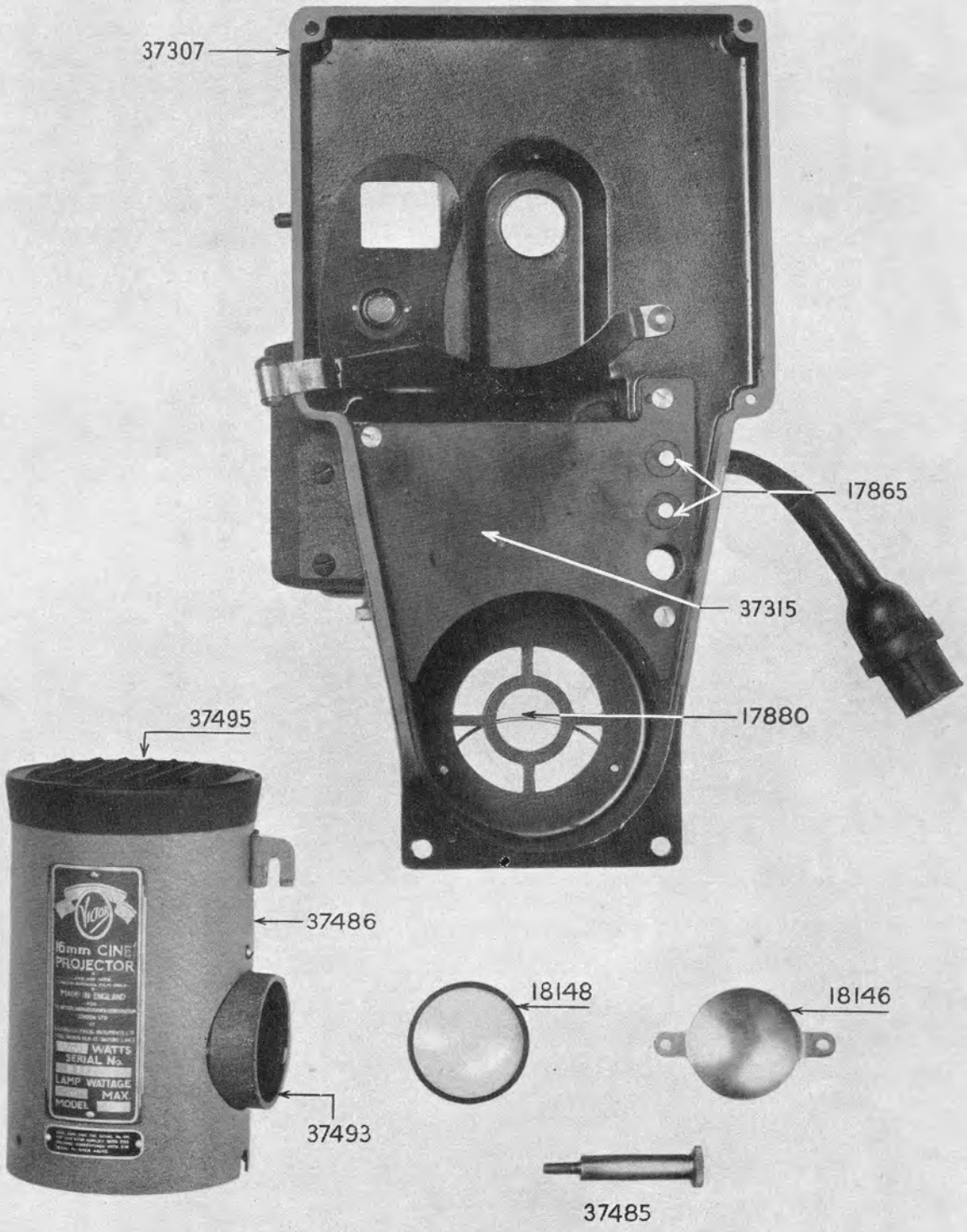


ILLUSTRATION 12

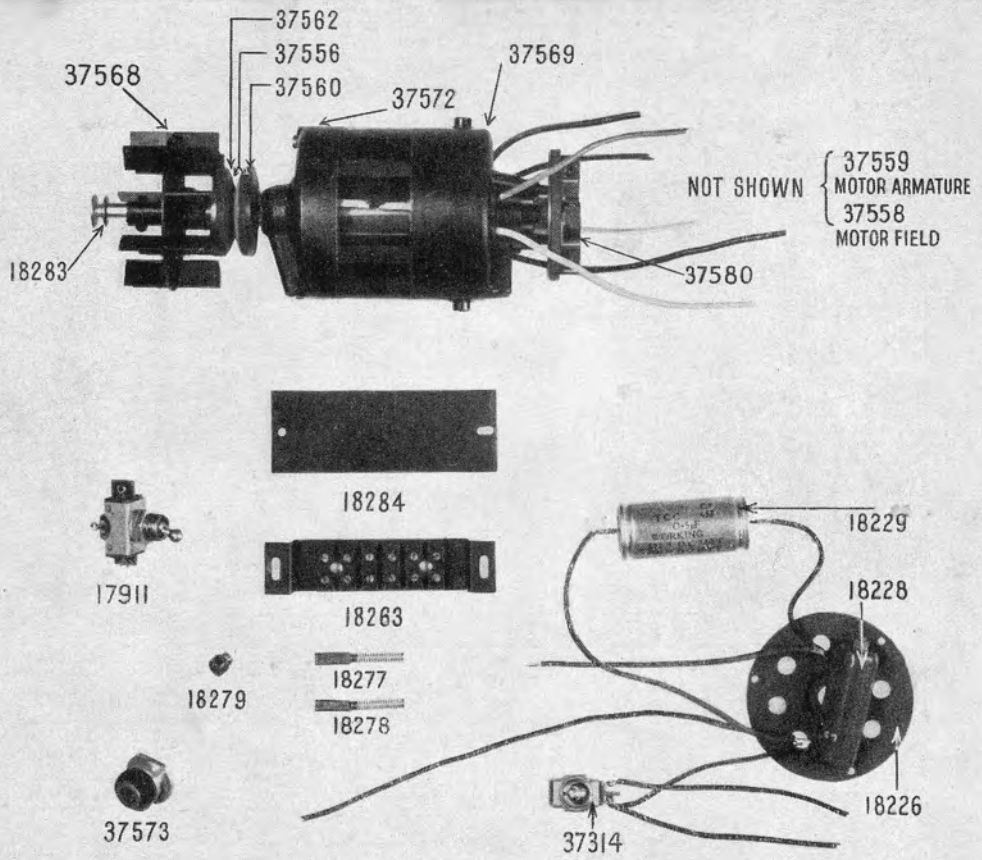


ILLUSTRATION 13

ILLUSTRATION 14

AMENDMENTS

VICTOR SERVICE MANUAL

Since the Victor Service Manual was issued there have been some modifications and amendments made to the instructions and reference numbers. Service engineers are advised to amend their Manuals in accordance with the under-mentioned details so that any misunderstanding may be avoided when ordering by the reference numbers.

Page

3 INDEX—for "Ghost.....5", read "Ghost.....10."

4 PARAGRAPH 6—for "Socket No. 2 (Illus. 6)," read "Socket No. 1 (Illus. 6)."

6 ILLUSTRATION 6, Control Panel Switches—for No. 4 read No. 3, for No. 3 read No. 4.

TO REWIND—First line, for "reel pulley," read "rear pulley."

7 PARAGRAPH 12, section (a), third line—delete "and also" down to "are curved."

8 PARAGRAPH 22, FUSE, fifth line—after "prefixed B" insert "and following letters."

PARAGRAPH 23, first line—for "Object," read "Subject."

9 PARAGRAPH 1—Insert "(c) Weakness of contact spring in lampholder."

PAGARPAPH 2—for "MAIN FUSES BLOW," read "MAINS SUPPLY FUSES BLOW."

10 PARAGRAPH 8, first line—after "remove," insert "Support Plate Assembly 37355 and."

Third line—for "This" read "18218."

12 AMPLIFIER WIRING DIAGRAM. Illus. 8.

Note : .25 amp. fuses are connected in series with the centre tap H.T. Secondary of Transformer T.2 to earth in projectors with serial numbers prefixed B and following letters. Fuse F shown in diagram is applicable to 2 amp. fuse in projectors without prefix letter or prefixed with letter A.

13 MOTOR WIRING DIAGRAM—A "Short circuit" is shewn immediately across the line input terminals. This should be deleted.

14 ADD 17936 Film Sound Channel and Spacer Assembly.
17991 Feed Sprocket Drive Gear Assembly.
18009 Starting Lever Assembly.

DELETE Item 18063.

AMEND TO READ 17864 Motor or Two-Speed Switch.
18134, 18139, 18140 for "Small" read "Film."

15 ADD 37364 Sound Core complete Assembly with Optics and Film Channel.
37421 Shuttle Rod Bearing.
37475 Terminal Plate Assembly—Loud Speaker Chassis with Matching Transformer.
43402 Power Pack Transformer T2—350 v.
43412 Output Transformer T.1.

DELETE items numbered 18286, 37314, 37332, 37333, 37334.

AMEND TO READ 18307 2-pin Jones Socket.
18308 2-pin Jones Plug.
37471 Speaker Unit (Vitavox K12/20).
*37560 to 37561.
*37562 to 37563.

16 ILLUSTRATION 9—INSERT arrowhead of No. 37436.

CORRECT No. 37314 (twice) to 17864 ; 37333 to 37364.

17 ILLUSTRATION 10—The arrowhead of 17971 Jack Shaft Collar, should be positioned immediately under the arrowhead of 17974.

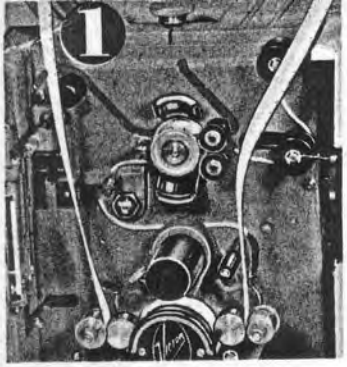
18 ILLUSTRATION 11—Correct No. 18063 to 37423.

20 ILLUSTRATION 13—Correct No. 37314 to 17864.

ILLUSTRATION 14—Correct No. 37333 to 37364.

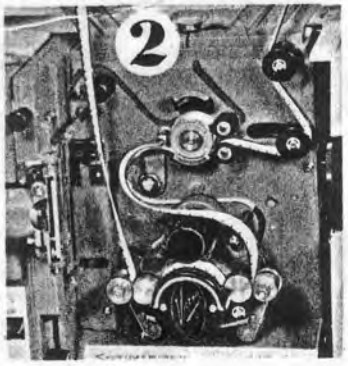
VICTOR ANIMATOGRAPH CORPORATION (LONDON) LTD., LONDON, W.C.I

FEBRUARY, 1949.



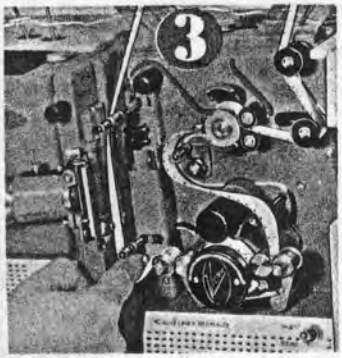
RED

"Over sound drum"—After threading film directly from supply reel to top of take-up reel, pull enough film from supply reel to cover nameplate below projector motor. Slide film over sound drum. Engage sprocket holes on teeth of sound sprocket. Close front and rear tension rollers.



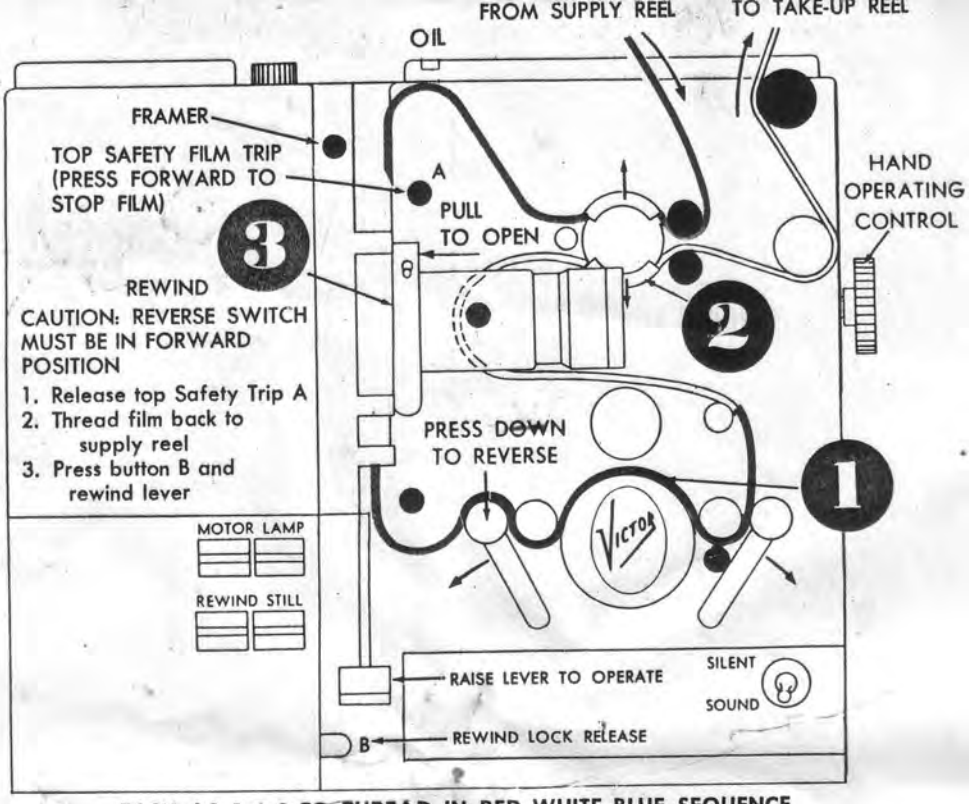
WHITE

"Under single drive sprocket"—Thread film loosely behind middle Safety Film Trip and to underside of single drive sprocket. Engage sprocket holes with teeth of drive sprocket and flip bottom film shoe closed. Loop film around snubber rollers.



BLUE

"Through film gate"—Place film in film gate channel allowing bottom loop the size of your index finger for proper sound synchronization.



EASY AS 1-2-3 TO THREAD IN RED-WHITE-BLUE SEQUENCE

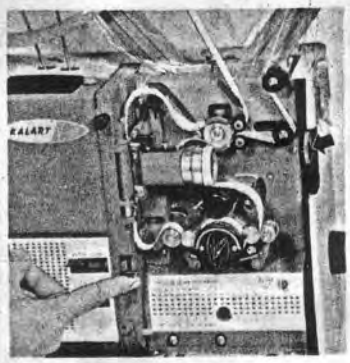
1 You need sound "Over Sound Drum"

2 Film has to move "On to Single Sprocket"

3 You need a picture "Through Film Gate"

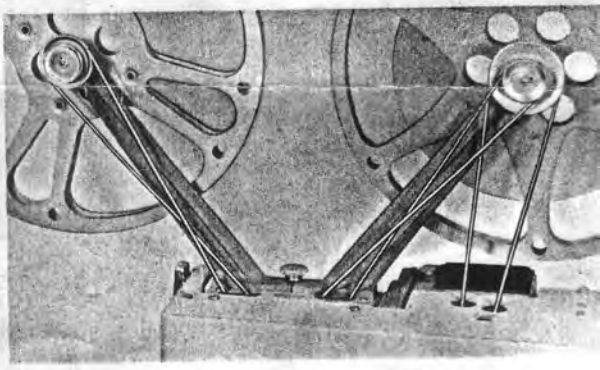
IF INCORRECTLY THREADED OR FILM IS DEFECTIVE • **SAFETY FILM TRIPS** AUTOMATICALLY STOP PROJECTOR. CHECK LOOPS AND RAISE STARTING LEVER —

Close swing-out lens and thread film over top of drive sprocket engaging teeth with sprocket holes. Flip top film shoe closed.



THAT'S ALL

Projector is now threaded for picture and sound.



SPRING BELTS IN OPERATING POSITION

Place rewind belt on large pulley of rear reel arm. Place reverse belt on small pulley adding half-twist. Take up belt is placed on front reel arm; use small pulley for 400′ reel—large pulley for reels greater than 400′. Add half-twist to belt.

When replacing cover be sure spring belts are free of twists and kinks. Loop two front belts (take up and reverse) around raised clips on top of projector. The rewind belt is looped around the reel arm retaining screw.

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