



*Norelco*

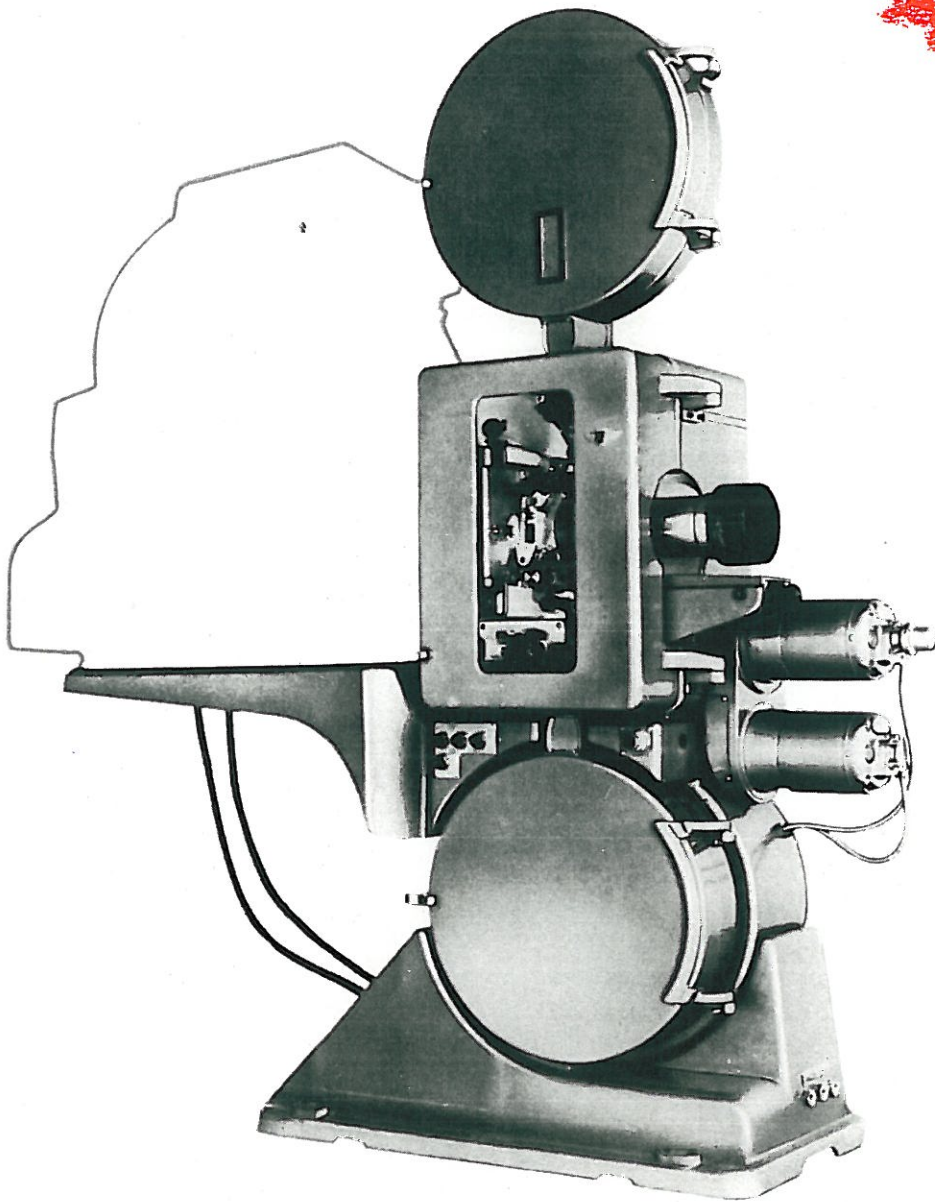
**UNIVERSAL  
70-35  
PROJECTOR**

For the  
**Modern theatre**  
hard top  
or drive-in



**DESIGNED FOR THE FUTURE . . . AVAILABLE TO-DAY**

## NORELCO 70/35



NORELCO Universal 70/35  
— the first successful 70 mm  
projector in the world.

Developed in co-operation  
with the American Optical Co.,  
Southbridge, Mass., U.S.A. —  
the inventors of the  
TODD-AO 70 mm system.

NORELCO 70/35 — a roomy,  
husky projector

Easy to use  
Easy to maintain  
Easy to keep clean  
Easy on the film  
Easy to buy

Designed for 70 mm —  
a breeze for 35 mm.

Quality proven, backed by  
over 5 years of use in more  
than three hundred theatres,  
studios and laboratories  
thru-out the world.

NORELCO 70/35 — the  
projector which established  
a record of more than 1600  
runs with the same 70 mm  
print.

NORELCO 70/35 —  
the choice of leading  
projectionists.

Installed in the finest theatres  
in the world.

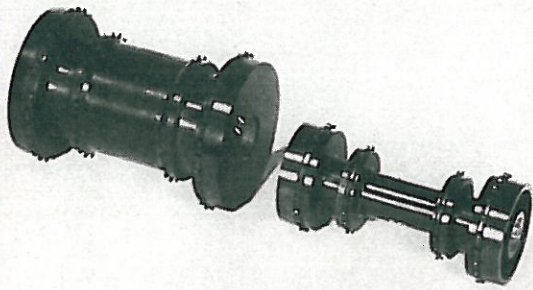


Fig. 1. Holdback and Intermittent Sprockets

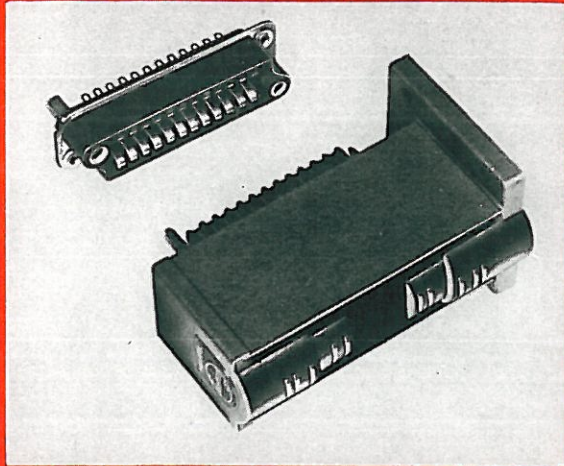


Fig. 2. 10 Track Magnetic Cluster

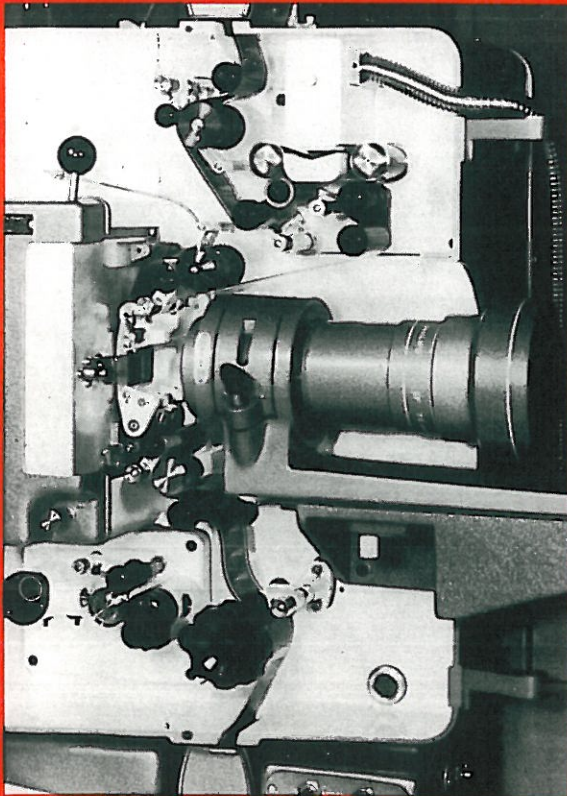


Fig. 3. Film path — Magnetic Sound



70 MM FILM with Six Soundtracks.



35 MM FILM WITH Optical Soundtrack.

Note the much larger 70 mm Picture area as compared to that of 35 mm.

## MULTI - PURPOSE

The NORELCO Universal 70/35 Projector is suitable for use with all 70 mm film systems such as Todd-AO, Super Technirama, Panavision 70, Grandeur 70 and Camera 65, and all the usual 35 mm systems in which the film travels vertically, such as standard 1 : 1.37, Cinemascope with optical sound tracks, Cinemascope with 4 magnetic tracks, Mag-optical prints and the various Wide-Screen ratios.

It has been possible to achieve this versatility by designing the NORELCO 70/35 specially as a 70 and 35 mm projector with excellent facilities for the rapid changeover between 70 and 35 mm film. The number of operations required to change from one film width to the other is so small that the whole job can be performed in the matter of minutes. Mistakes that could result in film damage are practically impossible. For example, the sprockets (Fig. 1), all of the idler rollers and the fire-traps are suitable for both 70 and 35 mm films without any alteration. The magnetic cluster (Fig. 2) and the sound drums are suitable for 6 track 70 mm prints and 4 track 35 mm magnetic prints *without change* and USING THE SAME THREADING PATH. This eliminates tricky changes and the possibility of damaging the film or causing interruption in a performance. Exceptional roominess, smooth contours and a minimum of rollers (Fig. 3) make the NORELCO 70/35 projector the easiest to operate and maintain.

A handy storage case (Fig. 4) contains all of the parts required for changing from 70 mm to 35 mm. The case is fitted with a holding pin for each item and a quick glance suffices to determine the state of the conversion.

The case also contains an assortment of aperture plates for all possible 70 and 35 mm systems. Thanks also to the very efficient water cooling, the aperture plate remains so cool that it can be replaced very quickly, and without tools.

Lenses can also be very quickly exchanged. The focusing is not altered when the lens is changed, and the difference between the position of the center line of 70 and 35 mm films is automatically compensated for.

The film speed can be switched from 24 to 30 frames per second so that all 70 mm films can be projected.

## IDEAL FOR 70 MM FILM AND 35 MM TOO!

70 mm film makes very large demands on a projector. Not only is the film twice as wide, but the height of each frame is 5 perforations instead of 4, so that at 24 frames/sec the film speed is 25% more than normal, and at 30 frames/sec 56% higher. The forces arising during the film transport are therefore greater, and this has been taken fully into account in the construction of the NORELCO 70/35.

The film gate (Fig. 5) is curved, so that the film has a great stiffness in the transverse direction. This prevents buckling of the film, and thus improves the sharpness of the picture.

The shaft for the intermittent sprocket (Fig. 6) is supported by bearings on both sides of the sprocket, thus giving rock-steady projection.

The projector, as well as the base and the lamphouse bracket, are of very sturdy construction, preventing vibrations due to the accelerated film speed. The lens holder (Fig. 7) is also very solidly constructed in order to keep the big (4") lenses needed for 70 mm projection free from vibration, and in order to be able to focus them with the greatest possible accuracy. All shafts and gear-wheels are over-sized. The use of exclusively spiral gear transmission with alternate steel and novotex wheels ensures quiet running (Fig. 8).

The whole mechanism is thoroughly lubricated automatically by a built-in gear-wheel oil pump. Intermittent mechanism oil is constantly renewed by a freshly filtered supply. Magnets in the filter provide added wear protection.

The life of the projector constructed in this way is even longer than that of a normal 35 mm projector, despite the heavier load put on it by the 70 mm film.

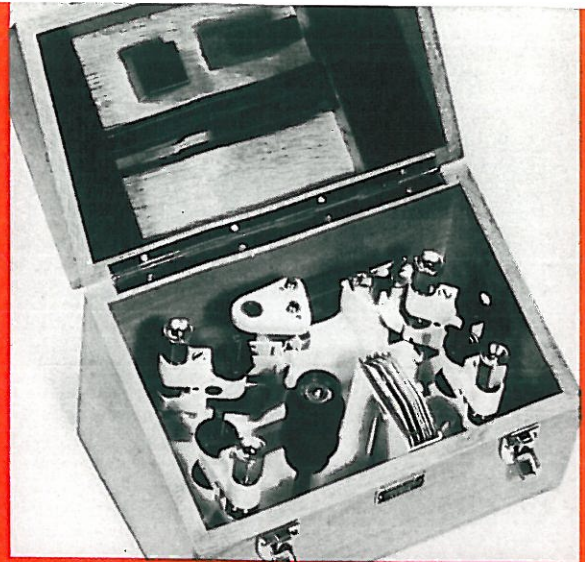
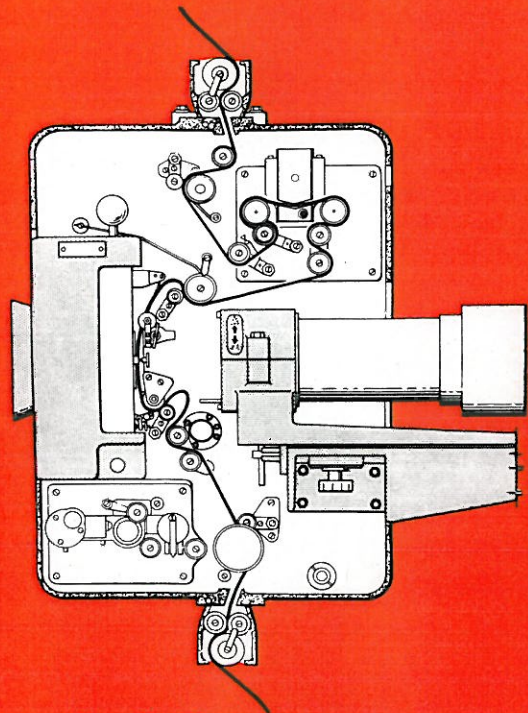
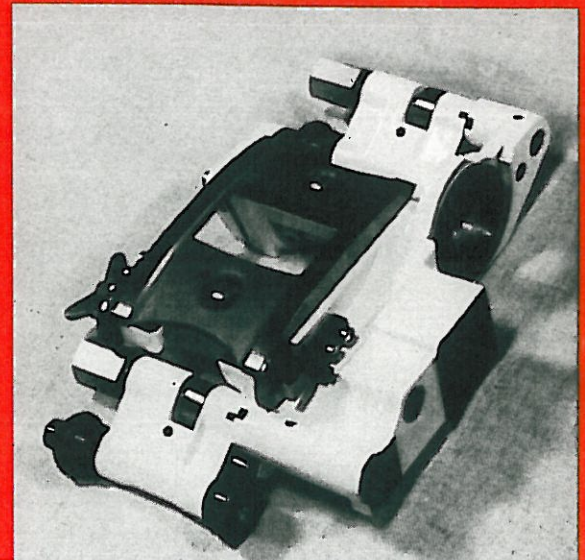


Fig. 4. 35 MM Conversion Chest



Threading Diagram for Magnetic Sound.

Fig. 5. Curved Film Gate



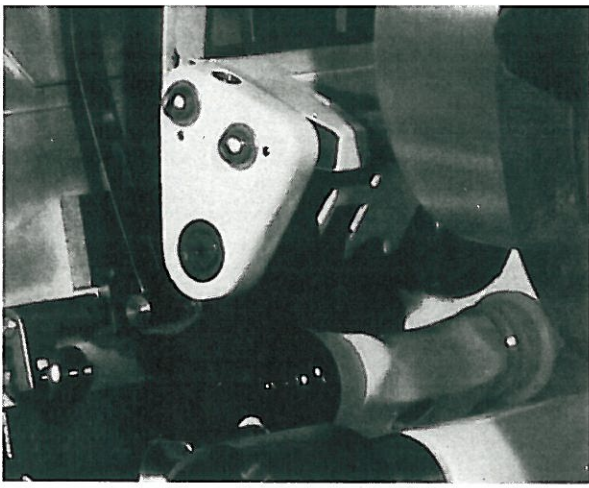


Fig. 6. Outboard Bearing on Intermittent

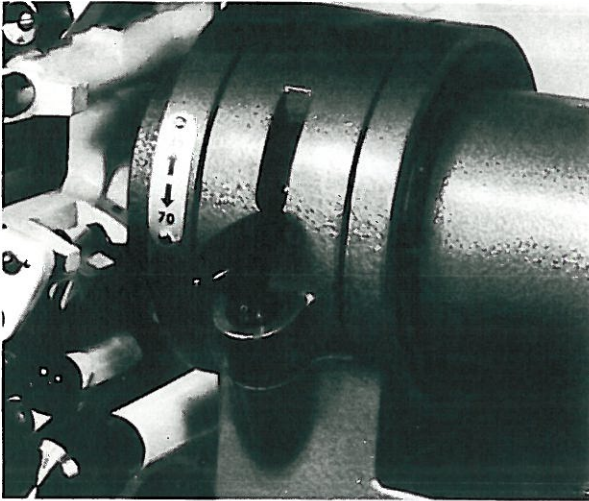


Fig. 7. Lens Holder

Fig. 8. Interior of Gear Box

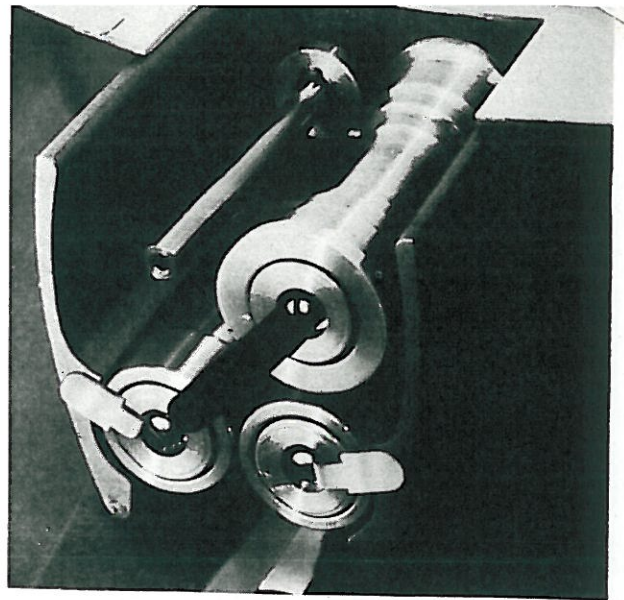
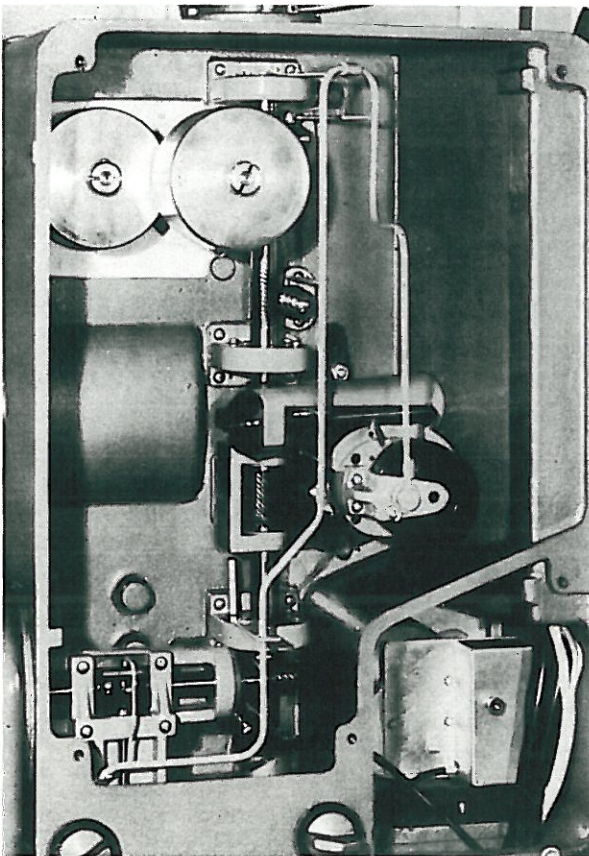


Fig. 9. Upper Fire Trap

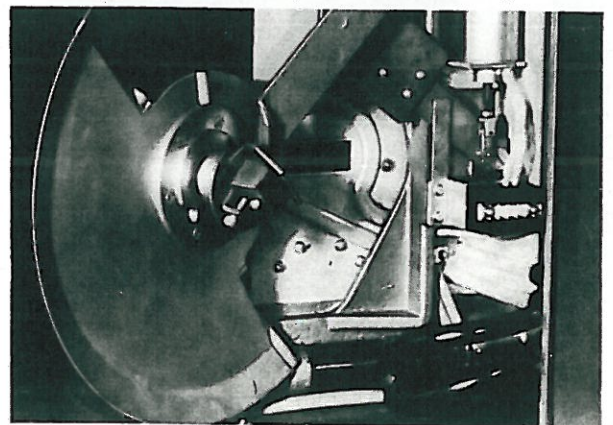
Special care has been taken with the film path, because of the greater cost of 70 mm prints. The number of rollers has been kept to a minimum. The fire-trap rollers (Fig. 9) run on ball bearings. All rollers are grooved, so that scratching is impossible. A large number of teeth of the 30-tooth sprockets are always engaged, so that the strain on the perforations is as small as possible.

## MAXIMUM LIGHT INTENSITY

A great light intensity is needed to project the big pictures in 70 mm theatres and drive-ins. The NORELCO 70/35 can be easily adapted to use all well known types of arclamps. The combined water and air cooling ensures that even very high light intensities will not damage the film by drying out the film base.

The projector is so constructed that even for the biggest arclamps the beam reaches the aperture plate without obstruction. The single-blade conical shutter (Fig. 10) gives the maximum possible light passage efficiency. It is constructed with air scoops on leading and trailing edges that provide turbulence for cooling.

Fig. 10. Single Blade Shutter, Cooling Plate and Changeover Dowser (Heat Shield Removed)



## EXCELLENT SOUND REPRODUCTION

Magnetic sound reproduction is completely free from wow and flutter. This is largely due to the gear driven sprocket between the upper magazine and the sound head, the use of two statically and dynamically balanced flywheels and a carefully designed filter.

A NORELCO exclusive is the flanged drums, located either side of and close to the magnetic cluster, assuring positive alignment of the sound tracks with the pick-up head. This careful design feature eliminates cross-talk and volume variations due to film weave or mis-tracking.

Equal care has been taken with the optical soundhead (Fig. 12) for 35 mm film, a unique NORELCO design whereby the film itself acts as a practically inertia-free buffer, eliminating all the irregularities caused by the teeth of the take-up sprocket engaging in the film perforations. The sound track is projected with a magnification of X 13.5 on the scanning slit. The magnified sound track is visible through an inspection window, so that the correct position of the sound track with respect to the slit can be accurately adjusted. The film is supported for its full 35 mm width, eliminating the disadvantage of the sound track extending beyond the drum, unsupported.

## SIMPLE OPERATION

The threading of the film is very simple, thanks to the small number of rollers and their logical and well spaced arrangement. The pad rollers are closed by means of a press button. The skate pressure in the film gate is centrally adjusted by means of a single knob. The lenses are quickly and easily replaced, and do not alter their focus when changed. The projector is switched on and off by built-in push buttons.

## LITTLE MAINTENANCE

The projector is easy to keep clean, thanks to its roominess and well spaced components, the hard smooth lacquer and rounded contours. In practice, lubrication consists in changing the oil once every 250 hours.

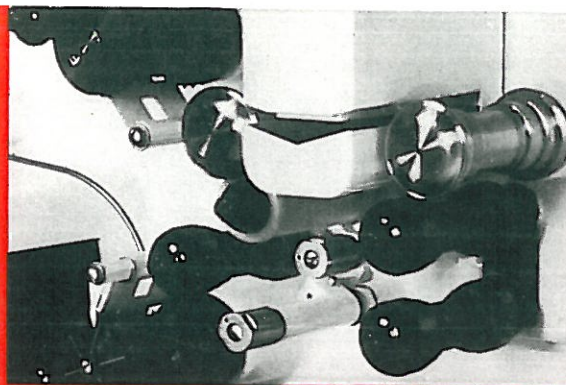


Fig. 11. 70/35 MM Magnetic Soundhead. See Gear Driven Feed Sprocket in Upper Left Corner.

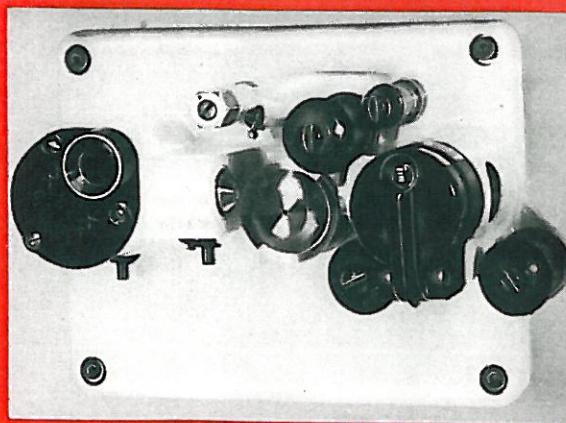
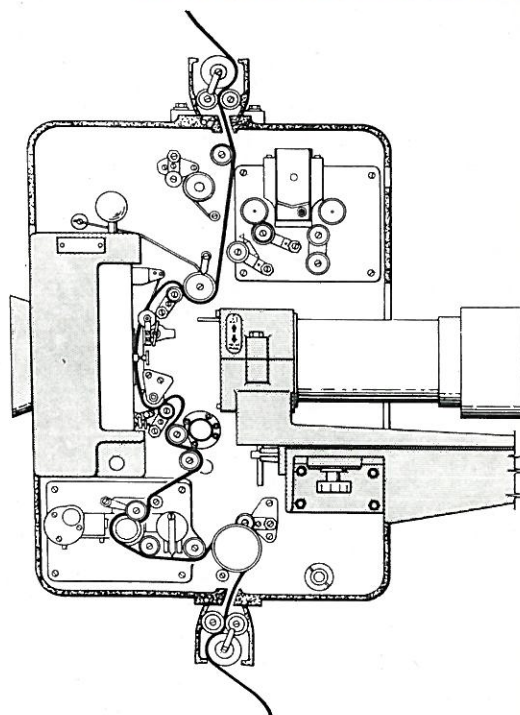
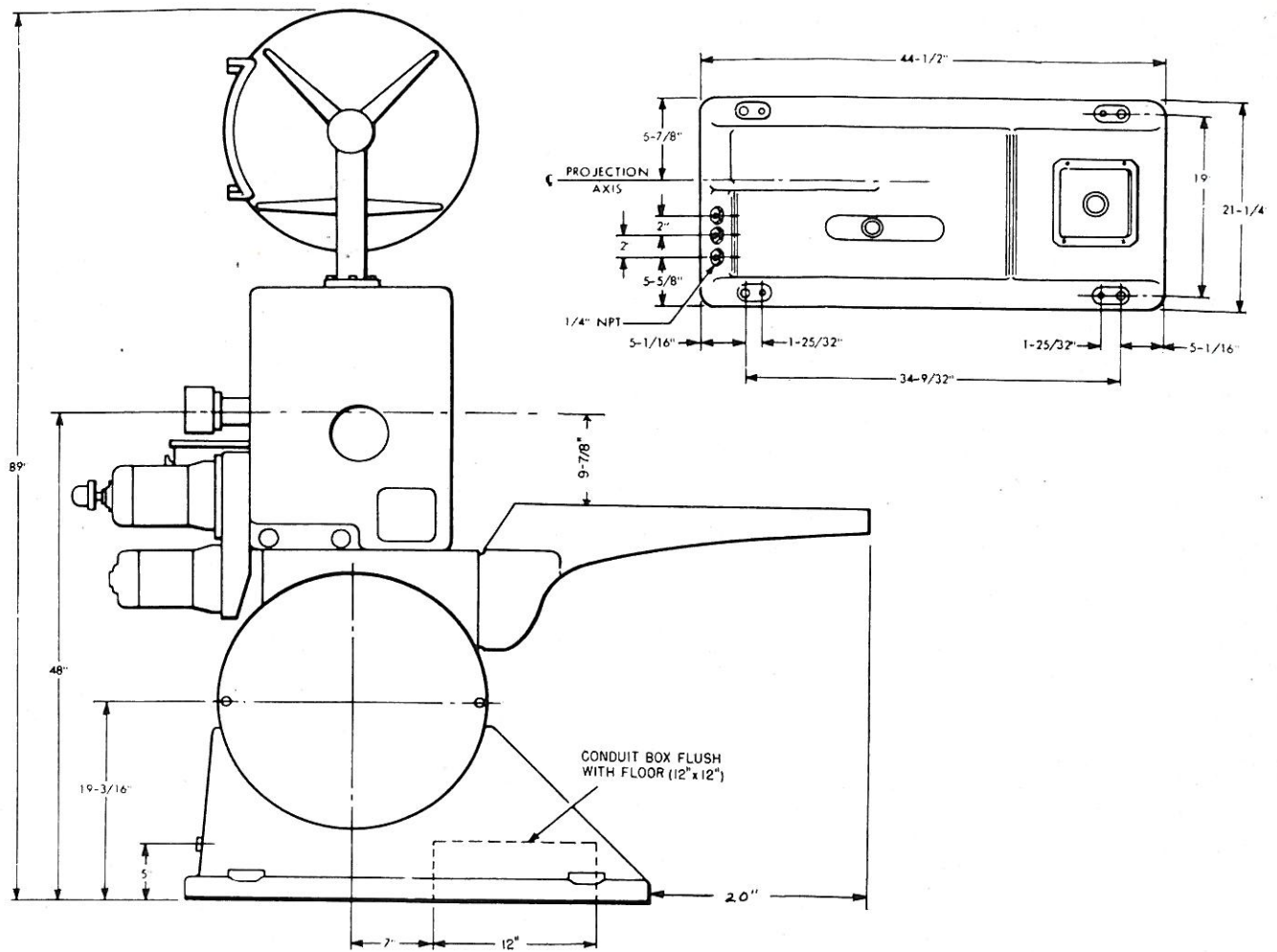


Fig. 12. Optical Soundhead



Threading Diagram for 35 MM. Optical.

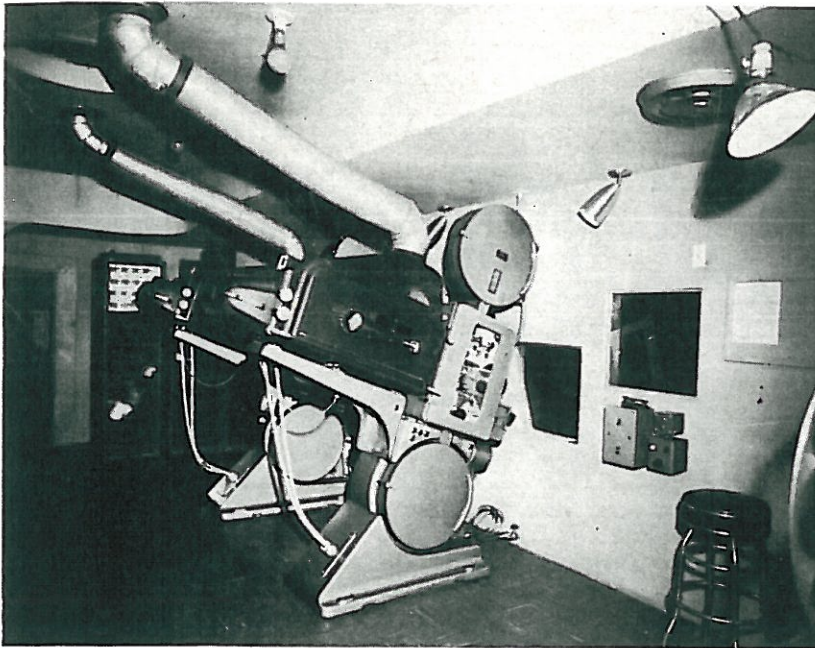


## TECHNICAL DATA

<b>REEL DIAMETER:</b>	22 inches.	<b>LUBRICATION:</b>	Gear driven pump — positive, triple filtered and metered flow to all points including intermittent.
<b>MOTORS:</b>	1800 R.P.M. Synchronous. 115 volts. 60 cycles.	<b>INTERMITTENT MOVEMENT:</b>	Double bearing — heavy duty.
<b>PHOTO CELL:</b>	Type 918.	<b>FILM SPROCKETS:</b>	Hardened aluminum alloy.
<b>EXCITER LAMP:</b>	4 Ampere. 9 Volts. Prefocused base.	<b>MAGNETIC CLUSTER:</b>	Combination 10-track, prealigned.
<b>CHANGEOVER DOWSER:</b>	Built-In.	<b>WIRING:</b>	Internal wiring factory installed.
<b>DOWSER VOLTAGE SUPPLY:</b>	Built-In.	<b>OPTICAL SOUND:</b>	Built-in optical pre-amplifier, 500 ohm output impedance.
<b>WATER COOLING:</b>	Built-In.	<b>MAGNETIC SOUND:</b>	Adaptable to all modern multi-channel amplifier systems.
<b>PROJECTION ANGLE:</b>	Adjustable from 15° upward to 28° downward.	<b>Each NORELCO 70/35 Projector:</b>	
<b>SHUTTER:</b>	Single blade — double speed — high efficiency, conical with integral air scoops.		Shipped in 8 wood crates, consisting of — Projector mechanism with built in magnetic and optical sound heads, upper base, lower base, upper magazine, lower magazine, lamp house bracket, and motor drive assembly.
			<b>WEIGHT</b> — per projector — 1690 lbs.

### UNDERWRITERS' APPROVED

North American Philips Company, Inc. reserves the right to make changes in design, construction and specifications, details of which do not appear in this catalog issue. Supplemental data is available on changes which may have been necessary due to operational or design modifications and improvements.



## TYPICAL NORELCO BOOTH

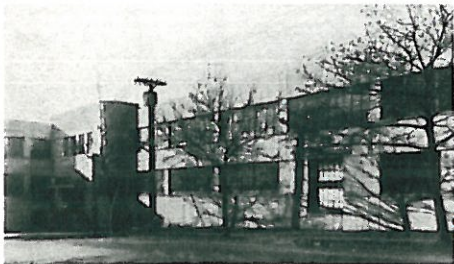
More than 300 installations in the U.S.A. and Other Countries.

---

Used in the largest studios and laboratories –  
Twentieth-Century Fox, M.G.M., DeLuxe, Technicolor and Eastman-Kodak.

Other Norelco Equipment includes:

- The FP-20 unitized 35 MM projector for arc lamps.
- The FP-20-S shutterless 35 MM projector with the revolutionary pulsed discharge lamp providing a bright, flicker-free picture.
- Theatre sound systems with transistorized amplifiers, selective switching and loud speakers.



*Distributed by: Motion Picture Equipment Division,*  
**NORTH AMERICAN PHILIPS COMPANY, INC.**

100 East 42nd Street, New York, 17, N.Y. Phone: Oxford 7-3600

In this modern plant in Mount Vernon, New York, major parts of the NORELCO projector are manufactured and assembled.

---

AVAILABLE THRU YOUR NORELCO THEATRE SUPPLY DEALER

**NATIONAL THEATRE SUPPLY CO.**  
**500 PEARL ST.**  
**BUFFALO 2, N. Y.**