

Century

## 70/35 MM PROJECTOR . . .

In a Class  
All By Itself



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**BOXOFFICE MAGAZINE**

*See following pages for details.*

Century

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**CENTURY PROJECTOR CORPORATION**

NEW YORK 19, N. Y.

# CENTURY MODEL JJ 70/35 MM PROJECTOR

## NON-STOP CHANGEOVER FROM 70 TO 35mm

By WESLEY TROUT



Wesley Trout

talent to the development and manufacture of fine projection and sound equipment and considerable credit is due Larry Davee, president and engineer, in the advancement and progress of this company.

The new Century 70-35mm, known as Model JJ has the familiar physical aspect of its predecessors—the well-known Model C, CC, H and HH 35mm projectors. The design is based upon the long and successful experience of building the latter models, plus approximately three years co-operative development on widefilm projectors with 20th Century-Fox Film Corp.

The new Model JJ's unique in construction because one can obtain all the various components—projector mechanism, optical and magnetic sound heads, and upper and lower magazines—in separate units, thereby adding strength, stability, ease of installation and simplicity in servicing any

unit. This is a very outstanding feature for making modernization in progressive steps when adding widefilm projection.

Let us make this statement a little clearer for the novice. In other words, the installation of the Model JJ projector and sound heads is not unlike that of a standard 35mm projector. Each unit can easily be installed separately without any special tools. Moreover, each unit is replaceable for easy servicing or replacement in a matter of minutes. The components are easy to get at because there is sufficient space in the housing in order to do so, again making servicing a simple matter for the projectionist and service engineer. Too, the manufacturer has kept in mind the construction and design of the equipment for almost any foreseeable expansion for the present 70mm and 35mm film dimensions, as well as other possible refinements.

The projection of 70mm film with its larger picture area has proved very outstanding, when used in conjunction with the special projection lamps for wider film projection and the beautiful sound reproduction from magnetic six-channel sound. A brilliant picture can be better obtained with 70mm film on a large screen, provided, of course, suitable high intensity arc lamp is used and optically aligned.

In a matter of only a few minutes, one can change from 70mm to 35mm projection. This means that 35mm standard film

can be projected from the time the tail end of this film runs out to the time of starting threading 70mm film. This makes it possible to project either news, cartoon or standard-width (35mm) film without any stops for changing from one film dimension to the other. This is very good because most programs will consist of a feature and short subjects, running an *intermission after the entire program has been presented*. We want to point out that you can change, at the same time, from magnetic to optical sound reproduction.

### OBTAIN ROCK-STEADY PICTURE

Before we proceed further, we want to bring out the information that a much better projected image can be had with 70mm width film because a large picture can be projected without so much grain showing up as when a 35mm print is "blown up." Of course, it is understandable that any up or down, or side-sway, will show up more, but this is taken care of by precision-built intermittent movement and greatly improved gate and tension shoes, plus lateral guide rollers. So, a rock-steady picture can be projected with any of the late model 70-35mm projectors.

While we are on the subject of picture steadiness, we want to tell you about the Century intermittent movement. It is the heart of a projector and must be precision-built for a perfect projected picture. Briefly, this movement has all the accuracy and stamina of years of experience in design and manufacture of projectors.

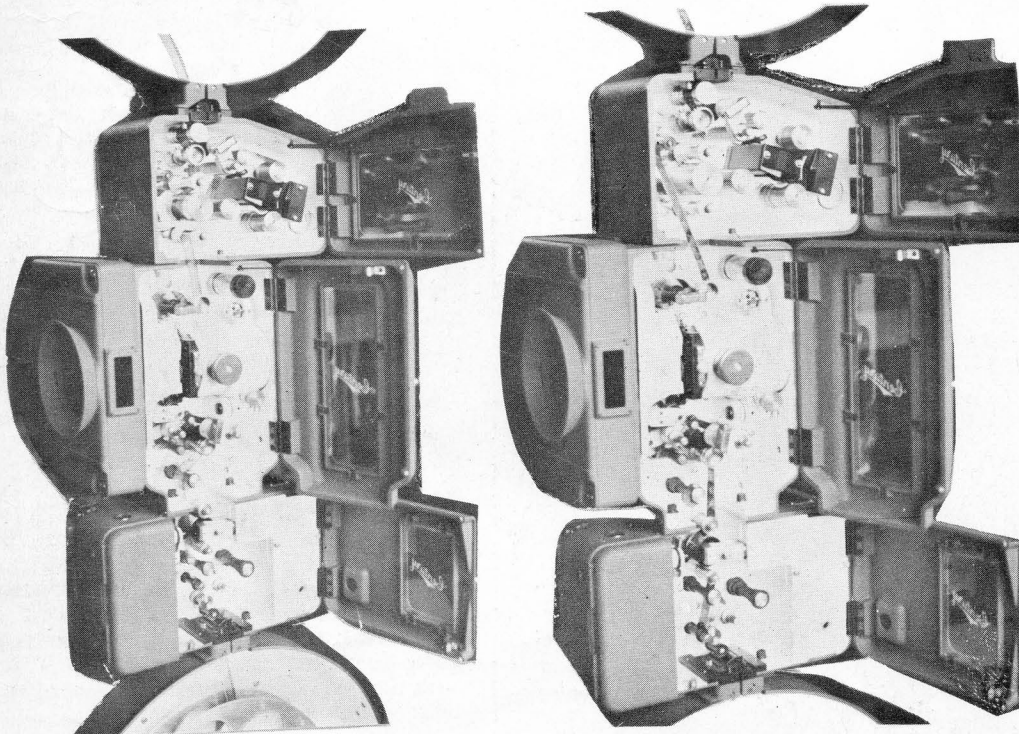
It is a standard 70-35mm movement of geneva starwheel and cam design, but, of course, the parts are of larger dimensions, larger shafts, larger starwheel and cam and larger radii, for 70mm projection. Considerable research and experimentation was necessary to find exactly the right material, weight, hardness and design to give undeviating steadiness to the projected picture with longer life and wearing qualities, plus a fairly quiet operating unit which Century achieved in construction of this extra-heavy intermittent movement.

### DOUBLE INTERMITTENT SPROCKET

Moreover, we want to particularly bring to your attention the precision-built double intermittent sprocket, made of special duraluminum having a hardness at the wearing surfaces harder than the steel of standard sprockets. This double sprocket will give years of long service, day-in-and-day-out. The sprockets can easily be changed without removing the intermittent movement from the projector mechanism. Moreover, they can be reversed for additional wear and still maintain a steady picture, due to the unique design of the sprocket.

All the other sprockets are double (for 70-35mm projection) and made of exceptionally hard steel for longer wear. The diameter and tooth shape has been specially designed for running either width film

The MODERN THEATRE SECTION



### THREADING FILM FOR MAGNETIC OR OPTICAL SOUND

These photos illustrate how to thread film (35mm) for magnetic sound, passing the optical reproducer. When running 35mm magnetic sound CinemaScope film, it is important to thread the film as indicated as per photo on the left; photo on the right shows how to thread 35mm film in the optical sound head. For better sound reproduction, be sure to keep all the sprockets, pad rollers and gate clean. Make sure the pad rollers turn freely and do not "ride" the sprockets. Set pad rollers thickness of two films from the face of the sprocket.

BOXOFFICE :: September 7, 1959



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perfectly. Century sprockets, by the way, have been carefully designed to give long service with highest quality performance.

There has been much discussion as to "correct" sprocket dimensions for long film life and sprocket teeth wear. The design of Century projector sprockets, over a period of many years, has proved very satisfactory and therefore there has been no deviation from one design (shape of sprocket teeth) to another for simply experimental purposes—they designed the "right" type and stayed with it over a period of many years. Over a period of years there has been much discussion with pros and cons relative to sprocket shape and whether soft or hard sprocket teeth were best. The final result? Hardened sprockets for longer service, and less film sprocket damage, has been conclusively proved.

Another outstanding feature of the Model JJ mechanism is the ease with which the pad rollers can be changed in seconds. The pad rollers are double pad roller type for each sprocket, and they are mounted and clearly marked so that the change-over from 70mm to 35mm operation is accomplished by simply *rotating the assembly a half turn*; there are three such pad rollers in the projector. The projectionist need only to make a quick glance (after threading the projector for either film width) to tell him if the right pad roller is in place to run the film selected. There is, of course, provision for adjusting the rollers on the film. These rollers, sprockets, and magazine rollers, should be cleaned every day.

Other very, very important units are the film trap shoes. They are hard and polished (chromium metal) and permanently held in exact contour insuring the proper curvature of the film for perfect focus. Also, the complete film trap is water-cooled down to the mounting of the shoes, which are insulated from the water cell to prevent the condensation of water on any metal part touching the film and yet providing for complete absorption of all radiant heat transmitted from the projection arc, thereby keeping this area cool to help prevent buckling of film, etc.

Each film trap with its properly curved shoes slides out of and into the mounting on large accurately positioned gibs and is very firmly and accurately held in correct operating position. The design applies to either the 70 or 35mm trap. The film trap and film gate may be changed easily to operate with almost any film dimension in a few minutes, or less. These components should be carefully cleaned every day for better projection and longer service. Use a stiff-bristle tooth brush and soft, lintless cloth for cleaning purposes.

For your information, we want to point out that the Century 70-35mm film traps are carefully designed to take all the possible damaging heat away from the film, allowing only that heat which is inseparable from the projected light to impinge on the projected picture area. Frankly, we have always held the opinion that a well designed water-cooling system for film traps serves much better than forced-air cooling, and will more so reduce the damaging heat on film. Air-cooled aperture and film track, more or less, simply cools the aperture. The air sucked in by a blower is at projection room temperature, which is often not very cool and therefore does not do as good a job as a water-cooled system.

However, air-cooled traps work fairly satisfactorily if the amperage is not too high. The writer certainly favors the well-designed Century water-cooled film trap, and some of the other leading makes of projectors that use only water-cooled traps for best results.

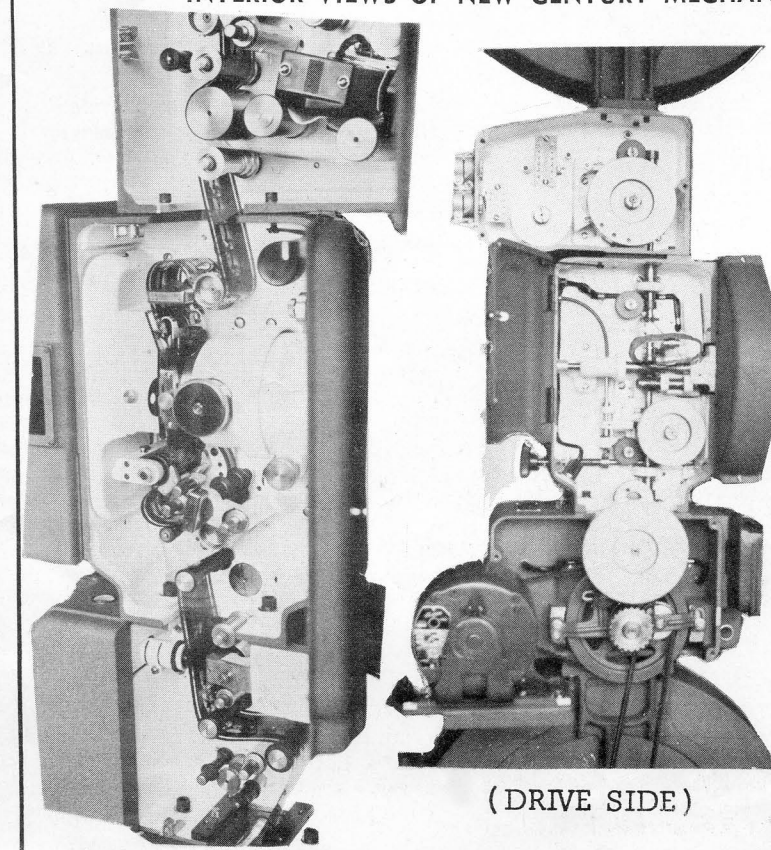
## WATER-COOLED HEAT SHIELDS

Water-cooled heat shields, used on some makes of projectors, do not keep the heat from the film, nor do they greatly help the operating temperature of the aperture plate, but do help, of course, to keep the parts cooler to a limited extent. The object of the water-cooled heat shields is to help absorb some of the stray heat going into the projector, but we are definitely interested in keeping the heat from damaging the film. This method does not do the job as well as an efficient water-cooled aperture, as incorporated in the standard line of Century water-cooled projector mechanisms.

We don't want to go any further in the discussion of cooling the units on which the hot spot from high intensity lamps is projected, due to limited space and rather a controversial subject. Briefly, we believe each projector manufacturer has certainly tried, and succeeded, in helping to eliminate all the damaging heat from damaging the film. They have handled this problem in a very capable manner and certainly reduced the heat damage to film to a minimum.

The curve of the Century film trap shoes has been designed to obtain a maximum stabilizing effect for the film during the projection cycle and at the same time to reduce, as much as possible, the pull on the film in order to save and avoid damage to film sprocket holes. Film stabilizers are used at the upper loop to reduce film noise and damage.

## INTERIOR VIEWS OF NEW CENTURY MECHANISM



At left, running 70mm film on the new Century Model JJ mechanism. Note how the film is threaded in the magnetic sound head, mechanism, and down through the optical sound head. To save wear on some of the optical sound head parts, note how film is by passed. Right, this photo shows the vertical shaft which drives the magnetic sound head, the gear train, shafts, intermittent movement, optical sound head stabilizer, take up drive unit and motor. The shafts run in sealed-in-for-life ball bearings. There are only a few places requiring oiling; the intermittent movement requires special type of oil.

(DRIVE SIDE)

## CURVED GATE SHOES

**THE FILM GATE**—The design of the film gate gives a freedom of movement to the gate shoes, allowing them to self-align with the film trap shoes and at the same time make a very rigid, quiet support in the direction of travel, insuring a steady projected picture. The gate shoes are curved to fit the film trap shoes. The shoes are heavy and solid, and have a hard polished chromium plate. They will give long service if kept clean and properly adjusted.

The mechanism, magnetic and optical sound heads should be kept clean. Cleaning of the entire projector should be a daily routine. Lubrication should be taken care of as recommended by the manufacturer; likewise, the adjustment, replacement of parts or units, should be done as instructed in the manufacturer's maintenance book. Do not make any adjustment until you have checked your service book on the correct procedure; failure to follow such advice might lead to trouble and cause poor operation of the projector.

**LENS MOUNT**—The lens mount in the Model J, is very rugged in construction and is patterned after the H and HH Model mechanisms. The design is such that there is freedom and ease in opening the gate via the gate knob; moreover, the lens mount itself provides for shifting the cen-

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ter line of the lens to the center line of the film under the control of a calibrated, designated adjustment knob. A feature of this design is that the knob, under certain conditions, could be used to accurately position the picture on the screen, if necessary. This optical center line adjustment is necessary because of the difference in the picture center between standard and widefilm (35mm and 70mm).

## EASY TO ALIGN PICTURE

The calibrated knob adjustment in the new lens mount is an important feature because it eliminates the need of eccentric adapter bushings which must always be rotated into proper position to compensate, of course, for the center line shift. This arrangement does prevent any "errors" in positioning the projected image on the screen. The lens mount is unique, therefore, because it makes it easy to align the picture for 70mm or 35mm projection, and the lens will be placed in correct optical alignment for either width film, thereby insuring optimum screen results, according to Davee.

Moreover, the lens clamp is longer and makes better contact over a considerable portion of the lens barrel—in other words, the entire mount becomes a complete clamp, not just a strip around the lens barrel. For obtaining the highest possible light efficiency consistent with good mechanical design, the Model J mechanism is equipped with double rear shutters of the disc design, which have been found to produce more light on the screen. The shutters run at a conservative speed and are absolutely synchronized with the intermittent movement. They are correctly set when they leave the factory, but if the occasion should arise to reset them,

consult your instruction book on the correct procedure.

Another very outstanding feature of the Century projector mechanism is that all heat shields and shutter guards are capable of being used with light paths having a speed of F 1.5 to F 1.6. In other words, the Model J mechanism has provided a path for the highest light transmission with a minimum of flicker possible within the known factors of motion picture engineering at this time. The design of the light shields and shutter guards prevents any obstruction to the light from any of the leading makes of high intensity projection lamps.

## COOL WITHOUT AIR BLOWER

And by the way, the unique design of the shutter guard employs the air-circulating power of the shutter blades (otherwise thrown away) to circulate a large volume of air around the non-water-cooled shields and heat-absorbing filters to carry away any excess of heat developed by the projection arc in this area. The devices used in this projector to remove heat keep the mechanism cooler without any auxiliary air blower being necessary.

The magazines are 24 inches in diameter to take 22 or 23-inch reels and allow sufficient space around the reel for better operating condition for the projectionist. The spindles are one-half inch in diameter and drive the reels through pins. Both 35mm and 70mm reels may be used in the magazines. However, if one-half inch spindles are used for 70mm reels, then special 35mm reels are necessary, thereby providing fast change from one film width to the other. Moreover, if a decision is made to operate for a long period of time 35mm film, a simple change of the operating spindles can easily be made by the projectionist, and when 70mm is run again, it is an easy matter to change back. We suggest using the special 35mm reels to save time changing.

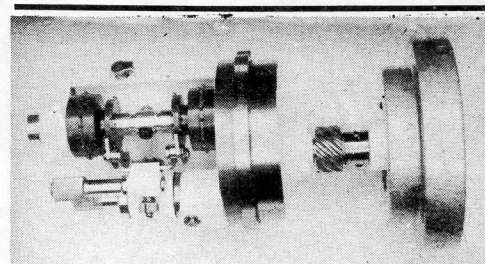
**THE OPTICAL SOUND HEAD**—The optical sound head is essentially a standard, proven, Century design modified to bypass the 70mm film. We want to point out the film stabilization used in this sound head won an Academy of Arts and Sciences Award. It is unit-built and easy to keep in perfect adjustment for fine sound reproduction.

**THE MAGNETIC SOUND HEAD**—This unit is of very rugged construction and follows the same design methods as the optical sound head. It is easy to thread and the film paths are simple and direct and leave plenty of room for handling 70mm film.

There are, of course, two magnetic pickup heads incorporated in the sound head. One provides reproduction for 35mm magnetic CinemaScope sound tracks (four or single-track), and a second provides for the reproduction of 70mm six-channel reproduction. There are two separate film paths (one for 35mm and one for 70mm). The projectionist can easily recognize at a glance whether he has threaded up the right head and bypassed the one not to be used, etc.

The design of this sound head is such that the magnetic sound head is driven from a direct extension of a vertical shaft from the projector mechanism. Film is pulled smoothly from the upper magazine, assuring good sound reproduction; the film stabilization being of the tight-loop design, controlled accurately by proper tension and good stabilization design. The loop size

can be checked via a gauge which is large and prominently marked with a red line. A most excellent feature. Each pickup head has its own cable-plug arrangement for easy servicing, and the heads are accurately aligned at the factory for optimum quality sound reproduction. They can be checked, of course, with special test film if replacement is made at any time. The entire sound head is easy to service and install. The design of both sound heads produce even film travel and elimination of flutter or wows, when kept properly adjusted as recommended by the manufacturer.



*The heart of any motion picture projector is the intermittent movement. The new Model JJ intermittent is exceptionally rugged in construction for projection of either 70mm or 35mm films. It requires very little attention and will give years of service, if properly lubricated and adjusted. Note the heavy flywheel and double intermittent sprocket for running either 35mm or 70mm, and the arrangement of the intermittent shoes.*

## HEAVY-CONSTRUCTION GEAR DRIVE

The gear drive, except for the extension of the vertical shaft to the magnetic sound head, is the same heavy construction which has been used in all the other models built by this company, modified, of course, where necessary for the running of 70mm film.

**FILM SPEEDS**—The now accepted standard is 24 frames per second, but if necessary to run a picture 30 frames per second, the projector can be changed easily for this now obsolete speed.

**CHANGEOVER OPERATION**—To change the three pad rollers from 70 to 35mm operation, simply slide out the film trap and gate; slide in the 35mm film trap and gate. You simply have to turn over the three pad rollers. To change back to 70mm, the same operation is followed.

**FILM TRAP AND ROLLERS**—The 35mm fire traps are removable when running 70mm

film. Both the upper and lower fire trap units are interchangeable so that there is no mixup when making a fast change from one width film to the other.

The new projector has the familiar physical aspect of its predecessors—the proven and well-known Model C, CC, H and HH models. It is a very fine projector with many unique features.

Reprint of an article by Mr. Wesley Trout in the September 7, 1959 edition of Boxoffice — The Modern Theatre Section.