ers are provided in the magazine and guide-roller housing. These rollers are quickly adjustable by hand for either half-width or standard film. In the sound-head itself, two hardened guiding fingers are provided that can readily be swung into position for half-width film. These fingers are shown swung back out of position in Fig. 4.

The lower magazine design permits the Simplex head to have the same angle of tilt relative to the pedestal as originally provided in the standard machine when equipped with the standard lower magazine. The additional take-up spindle is driven by the normal take-up spindle shaft by means of a *V*-belt (Fig. 1), thereby eliminating noise. The entire double-film unit, except for the sheet-iron magazine door, is constructed of cast aluminum. It is finished in baked black enamel.

Tests of this novel design in Hollywood studios have shown the double-film attachment to be thoroughly reliable over an extended period of use under ordinary conditions. The installation of the units on the projector is a simple operation. Maintenance, due to the simplicity of design, is reduced to a minimum, while the ease of threading and operating makes the attachment very attractive to the projectionist.

REFERENCE

[1] DAVIDSON, J. C.: "A New High-Quality Film Reproducer," *J. Soc. Mot. Pict. Eng.*, **XXVIII** (Feb., 1937), No. 2, p. 202.

A COMBINED VIEWING AND PROJECTION MACHINE WITH OR WITHOUT SOUND*

I. SERRURIER**

When editing motion pictures it is frequently desirable to view a larger image of the scene than is possible through the magnifier of the conventional Moviola film-viewing machines now generally used in the cutting rooms.

To see the picture on a small screen is much easier for the eyes of the film editor, who works with pictures of this kind for many hours each day. It is of particular benefit when synchronizing pictured lip movements with the corresponding sound-track, and when "previewing" all or part of a picture with the director or others, near the end of the film editor's work.

For several years the Moviola Company has manufactured special projectors for this purpose, but the use of a projector makes it necessary to interrupt the work in the cutting room and to move to a darkened projection room. Moreover, the film in the projector is harder to get at, and runs vertically downward, with the picture upside down in the aperture while the picture on the screen is right side up.

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To overcome these disadvantages common to all conventional projectors, a modification of the Moviola design has been developed, called the "Preview Moviola." It incorporates all the established Moviola features, and, in addition, makes it possible to view a considerably enlarged image of the picture alongside the film, with all details in the same relative positions as in the picture on the film under the viewing lens.

The new design is wholly self-contained, and does not require that the room be darkened. It is essentially an addition to the present Moviola design, and requires no adjustment to change from normal Moviola operation to larger-image viewing. It is possible at any time, even when the film is running, to change from the former to the latter or *vice versa*.

The basic feature of the new design is a cast aluminum shadow-box, which is mounted below the regular Moviola picture head and extends along the same axis as the regular viewing lens. The image is projected through the shadow-

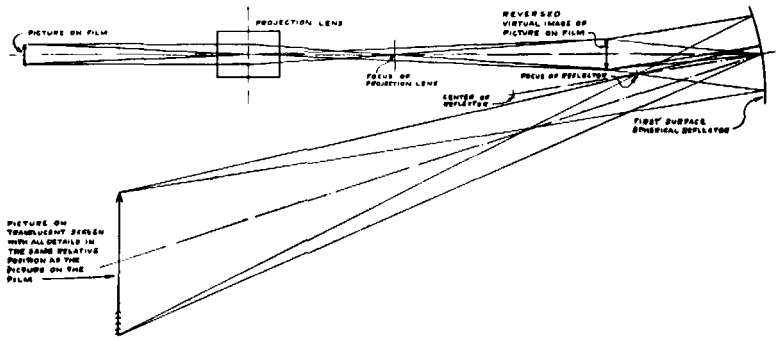

FIG. 1. Optical arrangement of preview machine.

box to a spherical mirror at the bottom, which reflects it upward and slightly to the right, to a focus on a ground-glass screen, $5^1/_4$ by $6^1/_2$ inches in size, mounted beside the regular viewing magnifier (Fig. 1).

The light for projecting comes from a 6-volt, 50-cp. or 100-cp. Mazda globe mounted in a lamp house very similar to those that hold the exciter lamps for Moviola sound pick-ups. The lamp house is mounted upon a hinge so that it may be swung over the regular viewing magnifier when it is desired to project the picture upon the larger screen (Fig. 2).

The magnifier serves as the condenser when projecting, and it was by practical experiment rather than calculation and design that it was found that this regular magnifier would serve very satisfactorily as a condenser, without any alteration of its parts. Even the hinged mounting of the magnifier remains unchanged, so that it can readily be lifted up to afford access to the film itself for making identifying markings.

Below the film-carrying aperture is fitted a shutter of the barrel type, which can be disconnected when it is not wanted to use the shutter, as in extreme slow-

speed projection. The shutter can readily be disconnected or reconnected, and it is impossible to reconnect it out of time with the film movement.

Beneath the shutter is mounted a standard Series *I* projection lens, which projects a virtual image a short distance in front of the spherical mirror at the bottom of the shadow-box. This mirror, which is necessarily a first-surface mirror, reflects the image upward and somewhat laterally to form a real image on the ground-glass screen, which is, of course, well shaded from room light.

In addition to the standard Moviola mechanism for framing the image at the viewing aperture, it was necessary to be able to frame the image reflected by the mirror to the ground-glass screen, and to frame it both up and down and laterally. This was achieved by mounting the mirror in a gimbal mount, free to move on two

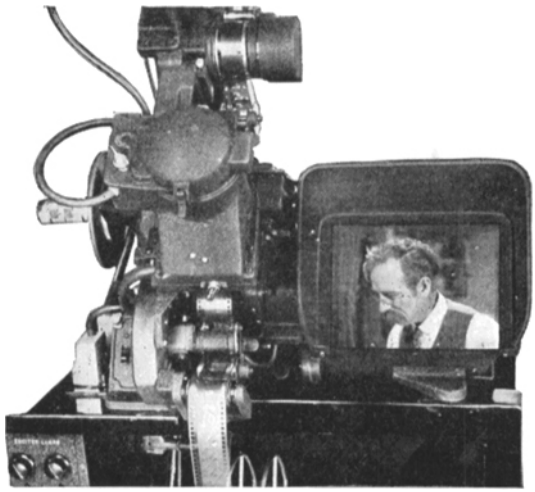

FIG. 2. Large-image viewing in the Preview Moviola.

axes. A metal arm, rigidly attached to the mirror mount at its lower end, extends upward inside the shadow-box. A guiding rod, parallel to the side of the film, is provided for the arm, and vertical framing of the picture on the screen is accomplished by sliding the end of the arm along this rod. The guiding rod is mounted eccentrically on pivots in the top and bottom of the shadow-box, and by turning it slightly on the pivots it moves slightly sidewise, thus causing a lateral motion of the picture on the screen. This adjustment makes it possible also to put the image of the sound-track on the screen.

It seemed desirable to provide also adjustment so that the screen image could be made to fit exactly the frame around the screen, or somewhat larger or smaller, as desired by the operators. This was made possible by mounting the entire reflector assembly, including the gimbal ring mounting and its controlling ram, so that its location could be adjusted along the axis of the projecting lens. This

is quite a delicate adjustment, and a very slight variation in the location of the spherical reflector makes a substantial difference in the size of the picture on the screen. This construction also has the further advantage that slight variations of the focal length of the projection lenses and reflectors to be used in machines of this type may be easily taken care of.

The first-surface reflector is very well protected in the entirely enclosed shadow-box, which does not have to be opened for adjustment after the machine is placed in operation.

When using the Preview Moviola, the change from ordinary Moviola magnifier viewing to projection on the ground-glass screen is effected by merely swinging the projection lamp house upon its hinge into a position directly over the magnifier, as has previously been stated. A pair of mercury switches in the base of the lamp

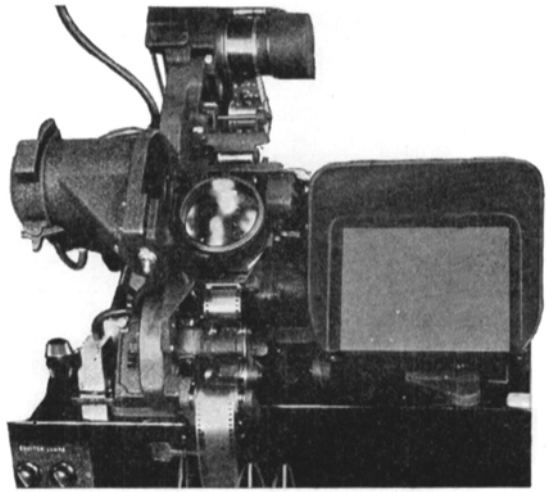

FIG. 3. The Preview Moviola, with the shadow-box.

house automatically turn off the viewing lamp and turn on the projection lamp. At the same time an automatic mechanical linkage folds away the opal glass diffusing panel below the viewing aperture and a white reflecting plate which reflects the light for magnifier viewing from the viewing lamp. This viewing lamp is necessarily placed to one side in order to provide a free channel for projection. Swinging the projection lamp house to one side reverses these automatic actions and instantly renders the frame in the aperture visible through the magnifier (Fig. 3).

All other features of the machine are identical with those of standard Moviolas, and the picture-head described here can be combined with one or more standard Moviola sound-heads for sound on composite film or for sound on separate film. The motor drive can be either variable-speed, nearly constant speed, or synchronous speed, and the direction of rotation is instantly reversible. An electric brake can be applied for stopping on the frame that is under the lens. The machine

shown in Fig. 4 is fitted to reproduce sound from composite sound-track as well as from a separate sound-track. Film may be fed into the machine either from short rolls held in the hand or from reels mounted upon double-action feed and take-up spindles.

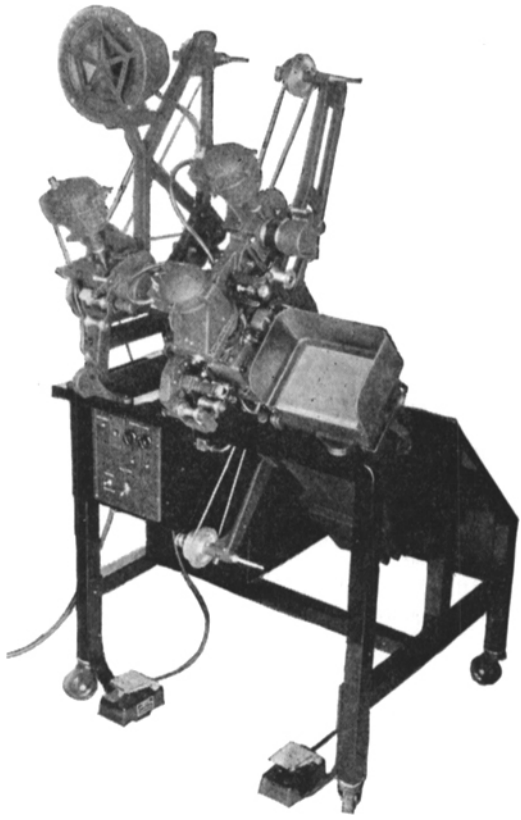

FIG. 4. The complete unit.

The new model, in brief, combines all the features of previous Moviolas, and, in addition, by means of the special self-contained projection feature, permits the operator at any time to view an enlarged image of the scene without leaving the cutting room or making any special adjustments of this machine.