SUPER 16-MM. SOUND AND PICTURE PRINTER*

O. B. DEPUE**

When the Society adopted the sound standards as used today, it perhaps did not consider the problem of contact printing. The most important goal sought was to provide ample space for the sound-track without sacrificing the picture area. The optical reduction of picture and of sound was, and undoubtedly will continue to be, the most perfect method of printing. Printing by contact, however, is likely to be done more and more, especially in the case of large-quantity production; and on account of constant improvements in 16-mm. recording, the contact method will be more to the front in the future. The many improvements in sound recorders are being paralleled by more perfect projectors. Therefore, it is necessary to keep abreast of these two branches of the art by the third important link in this chain.

Continuous contact printing with double-row perforations offers no real problem. But printing sound on the same machine raises a difficulty not present in standard-size printers, namely, the edge support of the sound-track side. If a shifting aperture is used for picture and sound or both, the narrow margin of 0.018 inch is the maximum. Now, this is greatly reduced by the shrinking of the negative in developing, as much as 0.004 or 0.005 inch. Then there is the variation of film width, as much as 0.002 or 0.004 inch. The sum of these two factors may reduce the edge support to 0.010 or 0.012 inch. This very narrow support on the sprocket support can and unfortunately sometimes does buckle, and the film may leave the supporting edge flange of the sprocket wheel.

The pressure shoe should have but limited pressure on the positive for this reason. To overcome this defect in the system of printing with various apertures, we have tried to devise a system that would retain as much as possible the common practice in construction and operation. Figs. 1 to 4 show various views of the printer. The one-edge sprocket wheel has no center shaft supporting the sound-track edge, but the full width of the sound-track is supported on a flanged ball-bearing roller and turns by and with the negative and positive. Thus the sound-track edge has as wide a support as the perforated edge, nearly an eighth of an inch. The result is a much more perfect contact while printing the picture. The pressure shoe can have a wider pressure surface, minimizing the danger of buckling the films.

The sound-printing ball-bearing drum has full picture-width support and only the sound-track edge extends over this otherwise solid drum. Therefore the picture and sound-track have adequate support at the point of printing.

The printing lamp is located in the center of this ball-bearing support (Fig. 2) and is a 110-volt, 15-watt Mazda lamp. It draws the direct current from the generator that furnishes current for the 40-watt picture-printing lamp. The cover

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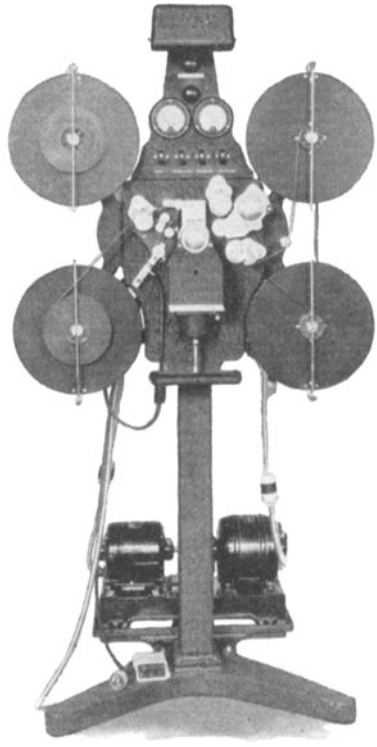

FIG. 1. The printer.

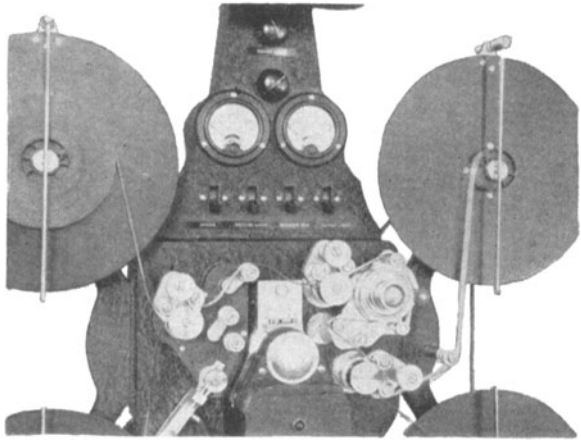

FIG. 2. Close-up showing threading and location of printing lamp.

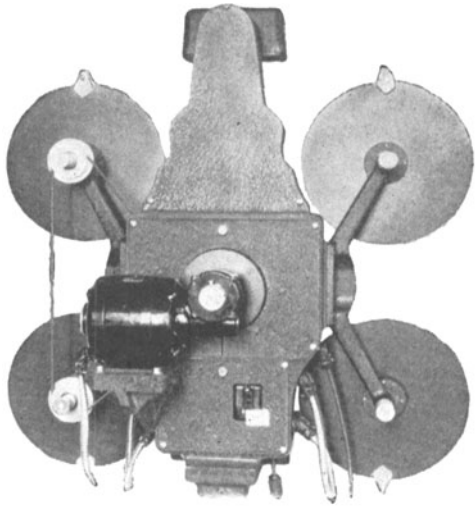

FIG. 3 Motor drive.

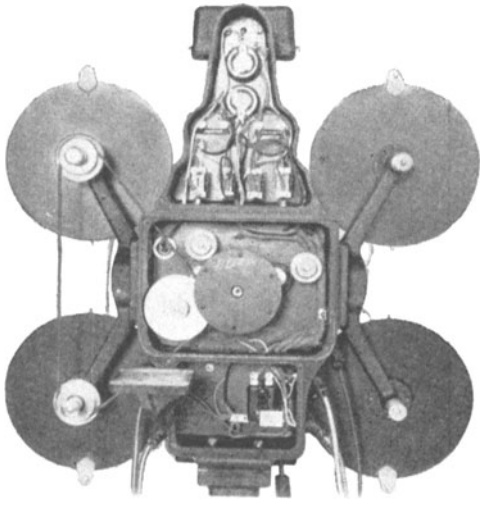

FIG. 4. Automatic cut-out in base of main casting.

for this lamp has provision for a small ultraviolet filter easily inserted and removed. The picture-printing sprocket, having no center shaft, allows the free passage of light to the center of the sprocket and pressure shoe.

At this point, midway between the points where the teeth enter and leave the perforations, there is least movement of the two films, and therefore the more perfect exposure at this point, and a noticeable improvement.

The motor drive (Fig. 3) is a $^1/_8$-hp. synchronous gear reduction 15 to 1. There is a rubber disk 5 inches in diameter and $^1/_4$ inch thick having six holes connecting the motor to the printing sprocket, giving a smooth filtered motion to the mechanism. The gears are grease packed, ball-bearing, and "steel to non-metallic" throughout. All other bearings are oilless or "olite" bronze bushings and will run thousands of hours without re-oiling, requiring but a few drops at times. The motor and generator require oil occasionally. The grease-packed ball-bearings will last the normal life of the bearing, but can be repacked.

The generator voltage is regulated by the field winding rheostat immediately over the voltmeter (Fig. 1). Any voltage from 90 to 130 can be had. The sound-lamp control-knob is immediately over the voltage-control knob and the milliampere indicates the current needed (average about 0.8 ma.).

The automatic cut-out located in the base of the main casting (Fig. 4) will operate on a slow overload or on a dead short circuit, and protect the entire machine. A snap of the lever returns it to normal duty.

All sprocket-wheels are stainless steel and all idlers and rollers are of stainless steel or hardened steel. The speed is 75 feet per minute and the automatic light-control is 112 changes, 22 densities; 75 or 152 change controls can be had.

The printing is regular standard practice where the double system is used; *i.e.*, the picture is printed first. The print is rewound and threaded up with the sound-track and the negative passes through the sound unit only. If a composite negative having picture and sound on the same base is used, then the negative and positive are threaded up over the sound-drum and the sound added in same operation. The positive film is not carried completely around the drum with the negative, but is passed over the two rollers which separate the two except where the exposure is made, immediately under the black rubber roller. Thus the positive is in contact with the negative only slightly more than one inch, and creeping or buckling is eliminated.

A FILM-CEMENT PEN*

R. J. FISHER**

Ever since film cement has been used for splicing motion picture film, many different methods of applying the cement to the splice have been used. The most common of all is the small bottle and brush. Prior to the invention of the pen described here there has been no really practical method.

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