OPTICAL REDUCTION SOUND PRINTER*

M. E. COLLINS**

A new machine for optically reducing sound prints from 35 to 16 mm., known as the *RCA PB141* optical reduction printer, is complete in itself with all parts mounted upon the main casting, which in turn is mounted upon a base and

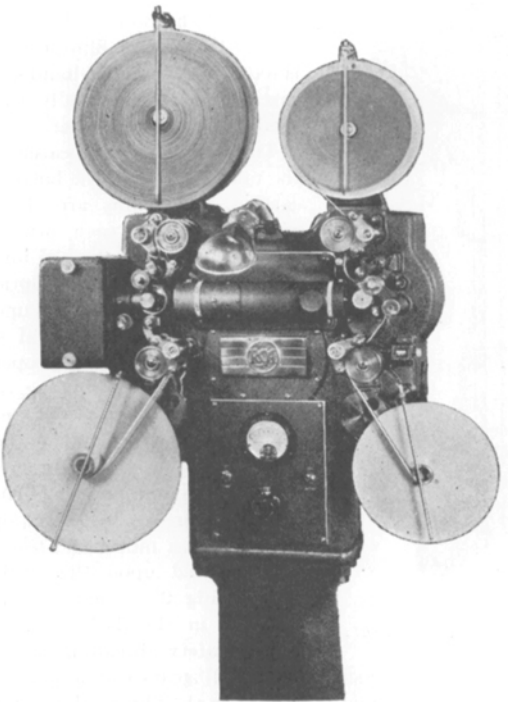

FIG. 1. RCA model *PB141* optical reduction printer.

pedestal equipped with casters so that the unit may easily be moved. The unit may be used in this form, or the base and pedestal may be removed and the printer mounted upon a table.

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** RCA Manufacturing Co., Camden, N. J.

As normally supplied, the printer operates on a 220-volt, 3-phase supply, 50 or 60 cycles. The printing lamp requires a low voltage (12 volts) d-c supply, which is not supplied as part of the printer.

An important feature of the machine is the use of a rotary stabilizer mechanism for moving both the 35-mm. and 16-mm. film at constant speed past the point where scanning and printing are accomplished. The drums over which the films pass do not subject the film to abrasion as would possibly occur with a film gate type of construction. The stabilizer drum units are in no way mechanically connected to the film sprockets or other gear-driven mechanisms, thereby avoiding reactions from those sources that might impair the quality of the printed sound-track.

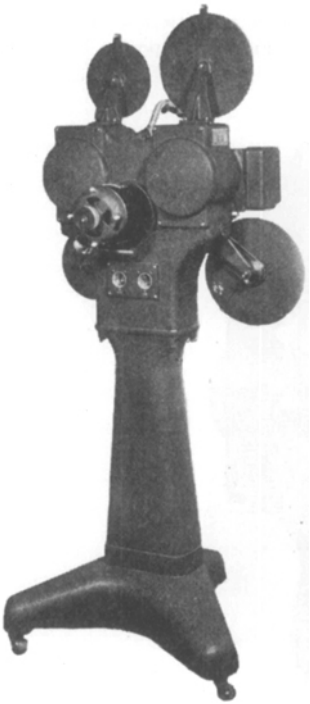

FIG. 2. Rear view of printer.

On the left-hand side of the printer (Fig. 1) is located the 35-mm. film-propelling mechanism. The 16-mm. film-propelling mechanism is located at the right-hand side of the printer casting and is essentially the same as that used on the 35-mm. side.

The feed reels are located at the top and the take-up reels at the bottom of the printer casting. The films are threaded with the emulsions facing each other. Immediately to the left of the 35-mm. film-driving mechanism is located the optical system that focuses the scanning beam upon the negative being printed. The optical system used to reduce the track in the proper proportion in both the horizontal and the vertical planes is located between the two films and is in the same horizontal plane as the illuminating optics. All optical adjustments are completed and sealed at the factory. The control panel is located directly below the optical system.

The printer motor and the receptacle panel are mounted upon the back of the main casting (Fig. 2). The unit is intended to be operated in the darkroom, and is provided with a safety threading lamp. The back of the printer is completely enclosed, and all gears run in oil. A handwheel is provided at the back of the motor for testing the film motion before applying the power. A footage counter indicating 35-mm. feet is provided.

The optical system projects an image of a portion of the moving 35-mm. sound-track upon the surface of the 16-mm. film, which image moves in the same direction and exactly at the same speed as the 16-mm. film, so that no relative motion between the image and the 16-mm. film occurs. The 35-mm. track is illuminated by an aperture image, but this image is not narrow, as is the scanning slit used in reproducers. The scanning image is about 0.010 inch wide, and at a frequency of 10,000 cycles about 6 waves are imaged upon the 16-mm. film. The border

lines for either side of the sound-track of the 16-mm. film are produced by making the scanning mask for the 35-mm. sound-track longer than the standard 16-mm. track width. The edge of the scanning aperture adjacent to the picture frame is adjustable so as to compensate for any slight variation in location of the picture frame or picture frame lines that may have resulted when the 35-mm. sound print or negative was printed in a commercial 35-mm. printer. This permits blocking off such irregularities as might otherwise appear upon the 16-mm. sound print.

A sufficient range of illumination is provided so that satisfactory reductions can be made from both variable-width and variable-density records, whether negatives or positives. In general, the printer lends itself equally well to two types of reduction:

(*1*) 16-mm. prints directly from 35-mm. negatives or duplicate negative sound-tracks.

(*2*) 16-mm. duplicate negatives from 35-mm. positive sound-tracks.

Optically reduced 16-mm. sound-tracks are superior in quality to sound-tracks produced by processes involving contact printing. This is attributable, in variable-width work, to increased effective contrast of the negative; and, in both variable-width and variable-density work, to the absence of contact printing losses due to imperfect contact and slippage between negative and raw stock. Also, the printer is superior to those optical reduction printers that scan the 35-mm. film with a thin line of light without producing a printing image whose longitudinal magnification is equal to the ratio of the film speeds. In such printers, slit loss occurs similar to that occurring in recorders and reproducers. The *PB141* printer is free of such losses.

THYRATRON REACTOR THEATER LIGHTING CONTROL*

J. R. MANHEIMER**

The reasons for the use of electronic tube control of theater lighting have been discussed previously by the writer in a paper[1] describing a rectifier tube control employing reactances, such as was installed in the Center Theater at New York. The present paper deals with a type of board for accomplishing similar results in a slightly different manner, which was installed in the Metropolitan Opera House, also at New York.

The thyratron reactor equipment has several distinctive features. The first is automatic voltage regulation of each lighting circuit, to maintain a lamp voltage corresponding to the position of the intensity control. This makes it possible, without the series type of dimmer, to change the number and size of lamps on a particular circuit and yet maintain the same circuit voltage without readjusting the setting of the intensity control.

The second is the method of pre-setting and maintaining proportionate fading

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