

NEW SOUND RECORDING EQUIPMENT*

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Recorder for 16-Mm. Film.—The use of 16-mm. sound-film is growing rapidly though it is yet in its infancy. It has been maintained so frequently in the field that good recordings can not be made directly on 16-mm. film but must be first made on 35-mm., that the statement has become generally accepted as true. It has been rather general practice in the past to attempt to make 16-mm. recordings on 35-mm. equipment with narrow sprockets and the recorder geared down to the proper speed for 16-mm. film. This slowing down of equipment, although fairly satisfactory at the high speed of 35-mm. film, has indeed produced results at slow speed that could not be called satisfactory.

We have designed a recorder for 16-mm. film that produces records comparing favorably with the very best made on 35-mm. equipment and far better than the average 35-mm. output, and having none of the defects looked for in other direct 16-mm. recordings; with the added advantages of convenience, and lessened cost of the direct recording, and without the printing losses necessarily accompanying optical reduction of the 35-mm. record.

Fig. 1 gives an idea of the appearance of the recorder. It is of cast aluminum, of convenient dimensions, light weight, neat in appearance, and the parts so arranged that the threading is simple and convenient notwithstanding the difficulty usually experienced in handling the narrow film. Either the galvanometer or the glow-lamp may be used, but the glow-lamp is recommended because of its simplicity. Cast aluminum magazines of 400-ft. capacity are provided, with friction take-up. The recorder is driven by a synchronous dynamically balanced motor.

The heart of the recorder is, of course, the recording drum, with a newly designed stabilizer exhibiting the same constancy of speed characteristic of all our recorders—such constancy that records made on this equipment compare very favorably in the high-frequency range with the very best 35-mm. records. The recording drum is not oil-damped and is not affected in its operation by any temperature changes, high or low.

Noise Reduction Unit for Glow-Lamp Recording.—The noise-reduction unit shown in Figs. 2 and 3 is self-contained, of either portable or panel mounting type. Its use requires no change in the amplifier already in use, except that as it provides the polarizing voltage for the recording lamp it does away with the batteries or generator now supplying that voltage. Its action is wholly electrical and automatic, without shutters or mechanical parts. The unit follows the general practice in that a portion of the signal is picked up by any convenient method, depending on the amplifier used; this signal current is amplified, rectified, and fed into the compensator, which is the heart of the unit. The polarizing voltage is furnished by an a-c. power pack of conventional design and, by action of the compensator, is adjusted according to the demands of the signal.

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The variation may be such that the current in the recording lamp can be changed over a range of 5 to 25 milliamperes, although such extreme variation is not needed. During the operation of the unit the wave-form of the signal is in no wise altered, and since there is no reactive connection with the amplifier there can arise no motorboating or other reactive difficulty in the amplifier. Convenient means are provided for pre-setting the minimum and maximum current through the lamp, and either may be set anywhere within the above-mentioned range of 5 to 25 milliamperes. After once being adjusted, nothing the signal does can cause the recording-lamp current to go below the minimum or above the maximum value so set, the action of the unit between these limits being entirely automatic. The unit can be used only with Canady glow-lamps.

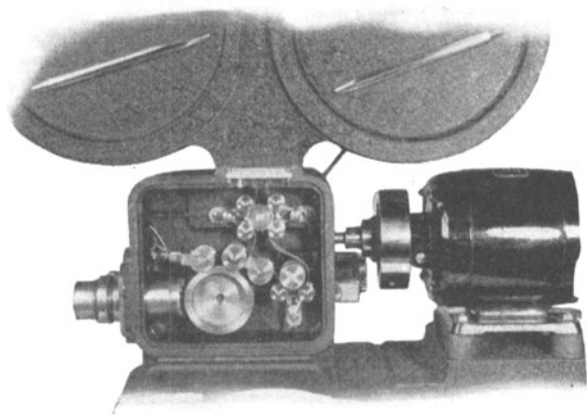


FIG. 1. Sixteen-mm. recorder.

Since early glow-lamp recordings were not entirely satisfactory there has grown up in the studios a prejudice against glow-lamp recording and a belief that glow-lamp equipment can not produce good records. With the addition of this noise-reduction unit there is nothing possible on other types of equipment that can not be reproduced with this glow-lamp equipment, including squeeze-track, and in addition this equipment will produce records not obtainable with any other equipment. In the *JOURNAL* there has been considerable discussion as to the superiority of recordings made on the straight-line portion of the H&D curve over those made at the toe of the curve. It is generally believed that glow-lamps other than the Canady lamps make toe recordings only because they can not rise to the straight-line portion, and there has been some argument to the effect that toe recording is equal to or better than straight-line recording. However, with this lamp the recording may be done at the toe or at any other portion of the H&D curve that the recording engineer may prefer; hence this objection to glow-lamp recording no longer holds.

Referring to Fig. 2, showing the front panel, the socket at the left is the input from the amplifier, the middle one the output, and the right-hand socket the a-c. input. The left knob is the adjustment for the minimum current, the right knob for the maximum current, and the upper knob for a rough adjustment of the polarizing voltage. The tubes shown in the rear view (Fig. 3) are of the conventional type obtainable anywhere.

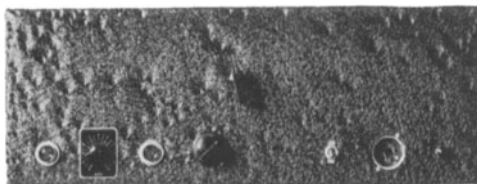


FIG. 2. Noise-reduction unit.

Galvanometer.—The galvanometer shown in Figs. 4 and 5 embodies no new principle but does represent a very definite engineering advance in that every element is so conveniently placed and so adjustably arranged that it can be applied to almost any recorder and varied to suit the individual ideas of the recording engineer.

The lamp house is of cast aluminum, structurally strong, properly ventilated, with cooling vanes machined in the casting. The lamp socket is machined from heavy brass and is adjustable up and down as well as circumferentially, and the

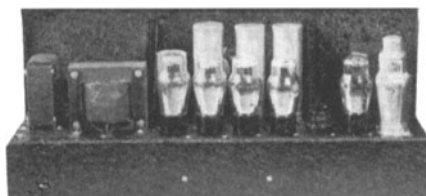


FIG. 3. Noise-reduction unit (rear view, cover removed).

lamp assembly adjustable from side to side. The slit and condensers may be adjusted in their mountings; the galvanometer is adjustable in all directions, as is the cylindrical lens and its mount. The objective may likewise be given various adjustments. This freedom of adjustment of all the component parts permits the engineer to use a wide variety of lamps, slits, condensers, and lenses to suit his own desire and the work contemplated. The galvanometer mirror is oil-damped and has a straight-line output to 10,000 cycles.

Background Projector, Motion Picture.—The projection from the rear of a background, either still or in motion, before which the action takes place, has become

commonplace in the studios producing theatrical motion pictures, but its value to the producer of non-theatrical and advertising pictures is just beginning to be learned.

The requirements of the projector of background motion pictures are extremely rigid. First, the picture must be rock-steady, otherwise the mountains

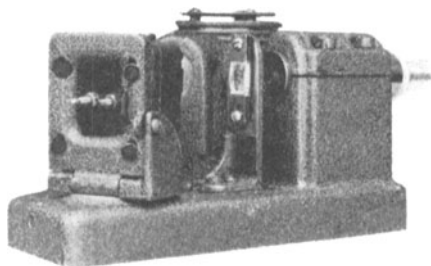


FIG. 4. Galvanometer.

in the background will be dancing behind the actors. No standard met within ordinary motion picture projection is even approximately satisfactory. Second, the projector must be as noiseless as the camera; in fact, it may be nearer the microphone than the camera.

To meet these requirements there has been brought out the projector illustrated in Fig. 6. The steadiness of the film is insured by the use of a claw move-

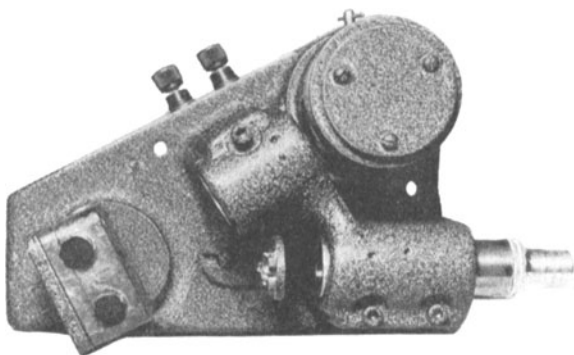


FIG. 5. Galvanometer (top view).

ment. While the film is stopped no part of the film at the aperture is in contact with any movable part of the equipment. This steadiness is also enhanced by the weight of all the parts in continuous motion compared to the very light weight of the only reciprocating part, the claw, and there is no stoppage of motion of any part of the equipment. The claw is actuated by a cam on the shutter-shaft, eliminating all lost motion between the shutter and the movement of the film.

The shafts, including the shutter-shaft, run in ball-bearings. All moving parts are sealed in an oil-tight case and are oiled by a circulating oil pump. The sprockets are of large size, driven through a silent chain, running in oil. The driving power may be applied either to the shutter-shaft or to the gear-shaft extending through the case. The case is of heavy castings, insuring steadiness on the stand, and is solidly bolted together to make it oil-tight and to deaden all noises of the

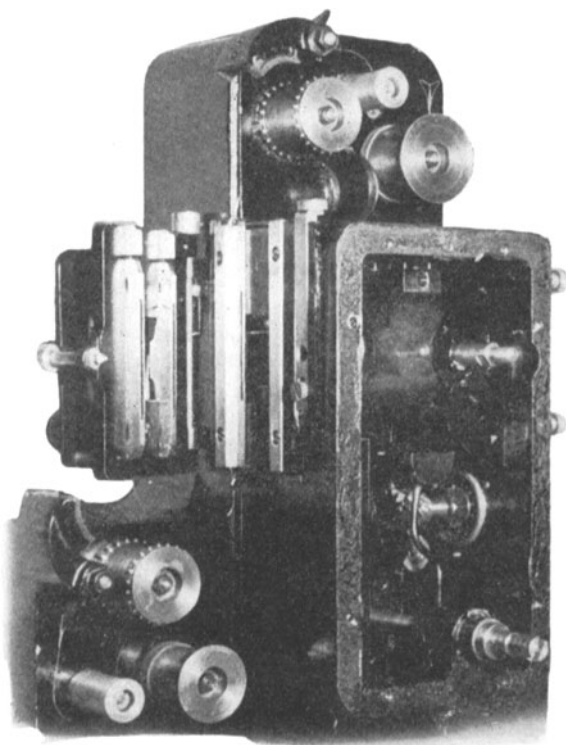


FIG. 6. Projector head for rear projection.

running parts. The noise of the film movement being the only sound heard, a blimp such as surrounds the camera prevents all sound from reaching the microphone.

The tension shoes are very long and the tension is adjustable. There are three claws on each side which, with the long tension shoes and low tension on the film, insure long life of the film. A loop of film has been run through the projector 20,000 times without noticeable wear.