

MR. DEPUE: If you have a very fine and expensive production, would you risk making just one negative on 16-mm?

Six years ago the company with which I am connected made direct recordings of voice—not music but voice—that have been holding up very well. Prints have been made from it just recently, and there has been no trouble, but we have always been fearful that, if anything should happen to the negative we should have nothing to go back to. If we had a standard size we would reproduce and make another negative.

MR. BENFER: If the 16-mm. field is to grow and assume a professional aspect, then all conventions and things found advantageous to the professional field should be adhered to in the 16-mm. field. When the production is of sufficient importance to warrant duplicate negatives taken simultaneously, the same procedure could be followed in the 16-mm. field. This recorder is an attempt to give the 16-mm. industry the facilities for professional recording and distribution of its product.

### A NEW SINGLE-SYSTEM RECORDING ATTACHMENT FOR STANDARD CAMERAS\*

A. REEVES\*\*

When sound was first introduced, it was believed that there existed but two possible classes of users of sound-camera equipment: the studio, which could use a large permanent or semipermanent double-film recording installation; and the travelling cameraman, best exemplified by the newsreel cameraman, whose ends seemed best served by a portable, single-film sound-and-picture recording camera.

During recent years it has been found that there is another important group, the specialized needs of which have as yet received little attention. This group comprises those who use direct-recorded sound, but need to use it only occasionally, being able to film much of their footage silent and later "dub in" whatever sound, narration, or music may be necessary. This group includes many newsreel cameramen (for fully half of today's newsreel scenes are made silent, and later dubbed to a narrative or musical sound background); the makers of travel-films; many makers of commercial, industrial, or educational films; studio cameramen sent to distant locations for the making of process backgrounds; and the very considerable army of owners of professional silent picture cameras whose work does not warrant the discarding of their expensive silent picture equipment or the purchase of conventional sound equipment. All of them could make use of direct sound recording if it did not involve an undue amount of bulky added equipment.

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It is primarily to meet this need that the Art Reeves single-system sound recording attachment has been developed (Fig. 1). This device is precisely what its name implies: a single-system recording unit which may be attached to any standard camera using outside-type magazines. Granting, of course, that the camera has been mechanically silenced for use with sound, no alteration in the camera itself is necessary, other than the use of a longer take-up belt.

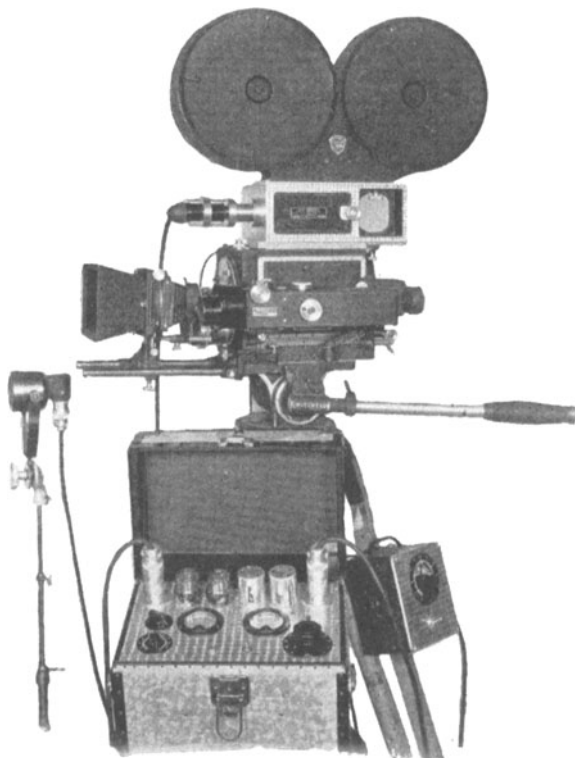


FIG. 1. The Art Reeves Single-System Sound Recording Attachment in use on a Mitchell Camera. Recording unit is mounted between camera-head and magazines and may be removed at any time.

The recording unit consists of a small housing which is simply interposed between the camera-head and the film magazines (Fig. 2). In it the unexposed film from the feed magazine passes over a relieved idling roller and then forward to pass over the recording drum. From this drum the film curves back and downward over another idler, and passes into the camera-head in the usual manner. The feed to the take-up magazine is a straight line from the camera-head to an idling roller which guides it through the take-up magazine's light-trap.

The recording drum is of conventional type, driven only by the friction of the film passing over it. The drum is direct-connected to a heavy, magnetically damped flywheel which ensures uniform motion of the film. Stroboscopic measurements of the film motion past this drum show its movement to be equal to that on the best double-system recorders.

Recording is done at this drum. While any type of recording unit may be employed, the device is designed for use with the Art Reeves "Line-O-Lite" recording glow-lamp and its apertureless optical system. This lamp is more than ordinarily well suited to single-system recording, for sound and picture exposures may be balanced more closely with it than by most other methods.

In addition to a strong visual radiation, the "Line-O-Lite" has a remarkably strong ultraviolet radiation, and gives most of the advantages of ultraviolet recording. It has been found that the most suitable gamma for sound-tracks re-

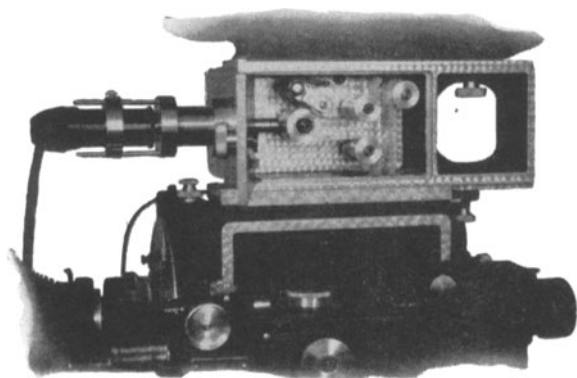


FIG. 2. Close view of Reeves Single-System Sound Recording Attachment. Sound-track is recorded by standard Reeves Line-O-Lite glow lamp, which permits sound-track gamma of 0.6 to 0.65.

corded with this lamp is in the region between 0.60 and 0.65. This is identical with picture negative gamma in most of the best laboratories. Thus the negative may be developed for picture values with assurance that if the picture is correctly exposed, the sound-track negative will also be satisfactory. The first of these devices made was fitted to a standard Mitchell camera, and has already seen extensive use on commercial production. The author has several times seen sound-and-picture negative made with it, and sent to the laboratory with the simple notation, "Develop for picture," and later viewed the scenes so treated. The sound quality was fully comparable to that secured with a good double-system recorder.

The amplifier and battery cases for this equipment have been designed for extreme portability and simplicity. Each of these two cases is less than a foot square and is covered with galvanized metal to resist hard usage and tropical weather conditions. The amplifier uses four tubes, and has been simplified to make its use in the field simple, even to individuals not trained in the technic of

sound recording. When the main switch is turned, one control brings a needle on the filament-current indicator to a red-marked "normal" point. Another control adjusts the volume indicator to a predetermined minimum-level point. The main gain control is then simply operated as may be required to keep the maximum volume from overrunning a marked maximum limit.

An equalizer is fitted to the circuit, and may be cut in or out by throwing a single switch. This equalizer is useful for minimizing the "tubby" effect so often encountered when recording in places where acoustics are poor. A noise-reduction circuit is also an integral part of the amplifier, and a plug is supplied for monitoring head-phones.

The frequency-response of the amplifier is flat from 100 cycles to a point considerably above 7000 cycles. The response of the glow-lamp is flat over the entire usable frequency range.

There is, it must be admitted, one slight disadvantage to this system, albeit a small one. The standard separation between sound and picture projection apertures is  $19\frac{1}{2}$  frames, with the sound ahead of the picture. The construction of this attachment throws the sound 21 frames behind the picture. Thus, in printing, the sound must be moved forward  $40\frac{1}{2}$  frames to be in synchronism. But since virtually all sound prints, including many made with single-system recorders, are printed in two operations, this is hardly to be regarded as a serious disadvantage.

On the other hand, the extreme portability of the outfit, and the fact that it is a detachable unit and does not require any alteration of the camera, offer definite advantages. When sound is not needed, the unit may be completely removed from the camera, leaving a standard silent picture camera. When sound may perhaps be needed, the unit complete with batteries, microphone, and cables, may be carried with ease, even in a small car. With the exception of the microphone stand, the entire sound unit occupies less space than a single camera-magazine case.

The advantages of such equipment for modern newsreel and commercial camerawork will be obvious. In addition, the author visualizes extensive application in several other fields. First is in the making of travelogues, where in perhaps a majority of instances silent scenes, later to be accompanied by narrative or music, may be most common, but where actual, synchronized recording of unusual tribal music, unusual scenes where actual sound is an important factor, may also be desirable.

Second is the making of studio process backgrounds on distant and unusual locations. In such assignments, the picture is, of course, of chief importance; but frequently it may be desirable to make direct recordings of the sounds actually related to these scenes, as in some cases they can not authentically be recreated in a studio sound department.