

MR. SCOTT: The American Standards Association has, within the past year or so, set a new standard reference level, which is about 7 db. below what we used to regard as the threshold. The new level is 10^{-16} watt per sq. cm. Compared to earlier sound-level meters, this one reads about 7 db. higher.

MR. RICHARDSON: What are supposed to be the practical benefits of the instrument in a theater? Does it in any way aid the projectionist in adjusting the sound-level?

MR. SCOTT: In some theaters the instruments have been found quite useful for checking the level of reproduction as well as for making other measurements as described in the paper. It is possible to mount the microphone anywhere in the auditorium and run an extension cable to the instrument, which can be in the projection room, and thus to keep an actual acoustical check on the level in the auditorium.

COMPLETE CUE-MARK ELIMINATION AND AUTOMATIC CHANGE-OVER*

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The change-over system described here has been developed for the purpose of eliminating faulty change-overs in the process of projecting motion picture film. This equipment makes instantaneous, precise, automatic change-overs from one projector to another, and never fails to make the complete change-over at exactly the correct moment.

The system eliminates necessity for visual cue marks of any type, such as are now placed on film by projectionists and by producers in processing the film, and consequent replacements by the exchanges due to such marking and mutilation are avoided. The system also reduces fire hazard considerably.

Change-overs done by this system are not visible to the eye. Faulty changes from one projector to the other are entirely eliminated. Not a single frame of the picture or one spoken word of the sound record is lost. Fade-out changes are properly timed, and perfect continuity of both picture and sound is assured.

More efficient use of curtains, lights, and other effects used in modern motion picture theaters is afforded by relieving the projectionist of much eye-strain and tension in his work and permitting him to devote more attention to the actual management of his projection room and to the supervision and maintenance of his equipment.

Projectionists have often been unjustly criticised for their inability to see the indistinct and mutilated cues placed upon the films. Under the best of conditions, cues can be missed. The cues inserted by the producers are often indistinct because of the background. Many films, therefore, are mutilated by the projectionists in their many efforts to create satisfactory cue marks. These cues may consist of grease pencil marks, sticker, punches, scratches with sharp instruments, notches cut out of the edges, or tinfoil glued to the film. They may

* Presented at the Spring, 1937, Meeting at Hollywood, Calif.

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be placed at various distances from the end of the film, and the last projectionist running such film is left with the alternative of calculating and interpreting the previous timing, or of adding a new mutilation or cue-mark of his own.

The equipment is fully automatic in operation. It is not necessary for the projectionist to operate any switch, or otherwise assist in the functions of starting the projector motors, or of timing and operating the dowers and fader in their proper order. The electrical circuit is so arranged that the regular motor switches, dower switches, and sound change-over device (fader or key) may be used at any time independently of the A. C. O. Upon installation, the regular controls usually employed in the projection room need not be changed, removed, or altered in any way.

The equipment consists of the following units which combine to render the device completely automatic:

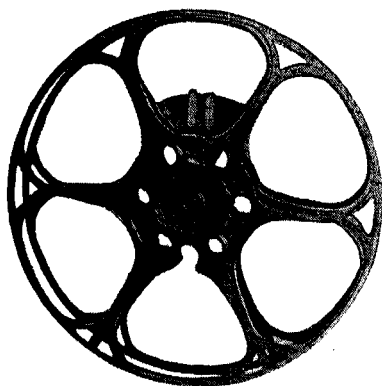


FIG. 1. Mounted film cue clips,
finger up.

Film cue-clips are attached by means of a side-plate to the film reels. When set by the projectionist when the film is rewound, these clips predetermine the exact time at which the desired change-over shall take place. The unwinding film releases each finger or cue-clip at the proper time. The release of the finger or cue-clip actuates plunger shafts within the spindle and operates mercury switches contained within the top-magazine switch housing. The mechanical features of this arrangement have been thoroughly tested over a period of several years and have proved to be dependable and satisfactory.

The system includes a pair of top-magazine spindle assemblies and mercury switch housings, one of which is installed on each projector in place of the regular spindle on the top-magazine bracket. The assembly is easily mounted on the top-magazine hanger casting with two set-screws. The A. C. O. spindle takes the place of the old one. No electric wires, contactor, switches, *etc.*, are used inside the upper film magazine. The spindle shafts are standard for use on any 35-mm. projection equipment. Spindles are fitted with a specially designed

brake mechanism, permitting exact adjustment of film tension at any time even while the projector is in operation.

Economies that the A. C. O. can be expected to effect are noticeable in the saving of carbons and electric power. No long period of waiting is required for visual motor-start and change-over cues to appear upon the screen, during which time the operator must necessarily burn both projector arcs.

The A. C. O. System performs three distinct operations, automatically:

(1) At a proper predetermined point the A. C. O. takes its cue from the film being projected, and, automatically actuates a switch, starting the oncoming projector motor. This motor-start may indicate to the projectionist that he should strike the arc on the incoming projector.

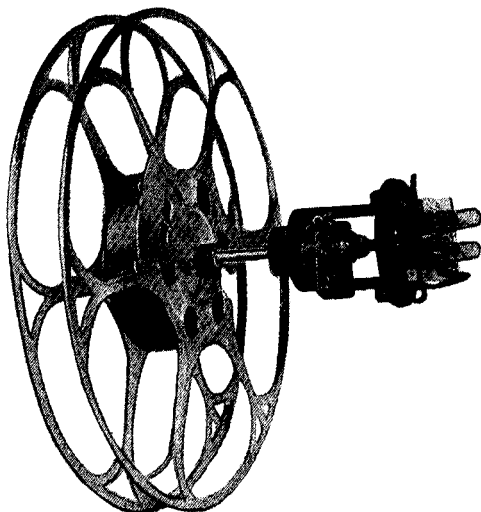


FIG. 2. Top-magazine spindle (*open*) mounted on reel.

(2) At the next predetermined point the A. C. O. takes another cue from the film being projected, and actuates the switch that controls the dowsers.

(3) At the second predetermined point the switch controlling the sound change-over is actuated. Both the dowsers and the sound change together.

There can be neither black nor white screens, nor the loss of a single spoken word. Being electrical and mechanical in operation, change-overs made by the A. C. O. are not subject to human failure or error and leave nothing to chance.

The control cabinet unit (115 volt a-c. 3 amp.) is mounted on the projection room wall, usually between the projection machines, conveniently accessible to the projectionist. It comprises a centralized control, through automatic mechanical-electrical interlocks, which governs the operations of starting and stopping the motors and making the various changes of dowsers and sound. A convenient switchboard enables the projectionist to operate the equipment at will with the greatest flexibility and selectivity.

The dowers are designed to fit each projector head and are a standard part of the equipment. They are small and compact, neatly designed, durably constructed, and very efficient in operation. The dowser shutter travels only $\frac{3}{4}$

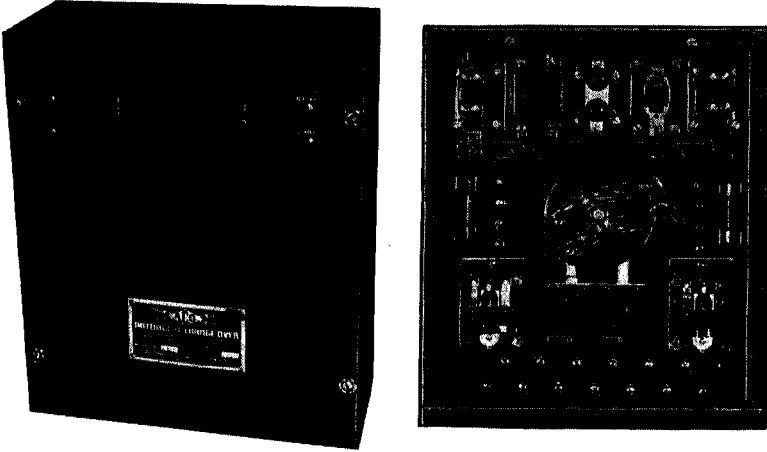


FIG. 3. Main control cabinet; (left) exterior; (right) interior.

inch and its action is very fast and practically noiseless. The magnetic coils have a large overload capacity and all fittings are extra-heavy. The dowers are specially designed to operate with the A. C. O. change-over equipment, but may also be operated separately and independently if desired. Any other

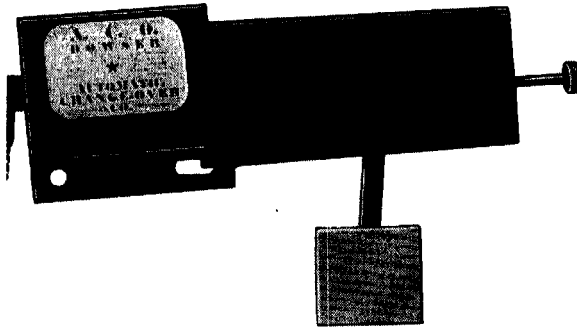


FIG. 4. A. C. O. dowser.

standard dowser will also operate satisfactorily when used in conjunction with A. C. O. equipment.

The A. C. O. equipment has been thoroughly tested in actual theater operation over a period of six years, and has proved conclusively that it meets all of the essential requirements.