

fine grain of Supreme negative makes it additionally valuable for this type of work.

In perfecting the Supreme negative emulsion, not the least consideration was given to its aging characteristics. Before the first regular production was coated, several months were spent in studying the aging characteristics of the final experimental coatings. These tests were conducted on accelerated and normally aged material. It was not until the stability of the film had been proved fully equal to that of Superpan negative that it was adopted for production.

REFERENCES

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² DERSCH, F., AND DUERR, H.: "A New Method for the Dry Hypersensitization of Photographic Emulsions," *J. Soc. Mot. Pict. Eng.*, **XXVIII** (Feb., 1937), p. 178.

³ MEYER, H.: "Sensitometric Studies of Processing Conditions for Motion Picture Films," *J. Soc. Mot. Pict. Eng.*, **XXV** (Sept., 1935), p. 239.

NEW BACKGROUND PROJECTOR FOR PROCESS CINEMATOGRAPHY*

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A new type of background projection apparatus has been developed using the Mitchell sound or eccentric movement identical with the one used in the latest cameras, except for some minor details (Fig. 1).

The principal objectives in designing this equipment were freedom from maintenance and elimination of excessive noise. Freedom from maintenance is accomplished by elimination of heating of the mechanism and by use of the eccentric movement which has relatively little wear. The noise is reduced by the eccentric movement since the accelerations are low, due to the use of eccentrics instead of cams.

It has been found from experience that it is necessary, in order to have steady background projection, to have pilot-pins that give positive registration using the same holes for projection as used in exposing the original film. Thus the present projectors in most studios in Hollywood today are built around a camera movement having pilot-pins. The film in this movement is guided through a narrow channel composed of very light steel plates which reciprocate in a direction parallel to the lens axis in order to push the film on and off the pilot-pins. In order to reduce the inertia it is necessary to make the plates as light as possible; consequently the spill light that strikes the plates causes them to warp and, in time, to require considerable maintenance. The new projector using the eccentric

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movement similar to the Mitchell camera movement has a fixed film-race, with the pull-down claws and pilot-pins entering the film in this fixed race and moving it in the direction of travel only, so that a heavier and more rigid construction may be used around the aperture. The movement has also been modified to accommodate a very large angle of light. The regular pilot-pin bearings have been offset downward so that they do not interrupt any of the beam of light, and, at the same time, the bearings themselves are removed from the heat so that the pins will not freeze, due to oil evaporating from the bearings if subjected to excessive heat.

The present method of illuminating the aperture in order to get a reasonably uniform light on the film is to cover an area of several inches in diameter on the

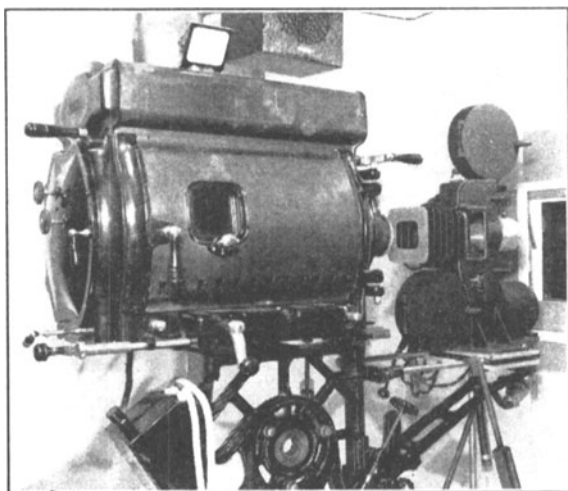


FIG. 1. Background projector.

front of the projector and to use only the center portion of this area. This method necessarily throws considerable heat on the projector with a corresponding rise in temperature, sufficient at times to cause the mechanism to freeze. To overcome this difficulty a radiator consisting of a series of fins extending from the edge of the usable light-beam, outward in all directions for approximately $1\frac{1}{2}$ inches, was placed between the lamp and the main body of the projector. This radiator defines the light that falls upon the aperture and prevents any spill light from falling upon the main body of the projector. The radiator is insulated from the main body of the projector by means of a thin disk of relatively poor conducting material so that a rather steep gradient is maintained between the radiator and projector. The difference of temperature is of the order of 100°F across approximately $\frac{1}{8}$ inch of non-conducting material. Thus the difficulties caused by excessive heating of the mechanism are removed.

The projector is equipped with an interlock motor and synchronizing device for setting the shutter in phase with the camera shutter after interlock has been established.

Probably the most interesting question in connection with a projector of this type is: "Is the picture steady?" In answering this it can be pointed out that the projector has been tested in several of the major studios both visually and photographically, and has proved itself capable of projecting extremely steady pictures. The machine is at present being used by the Technicolor Motion Picture Corporation in some experimental work to demonstrate the possibility of process work in connection with their system of color photography, and has proved quite satisfactory for such use.