MR. MORGAN: What high-frequency unit do you use in the system?

MR. BARNETT: A permanent-magnet dynamic unit, metallic diaphragm. The horn is multicellular—three cells.

MR. READ: The speaker mentioned that the lamp was operated on a-c and that a 120-cycle filter was used. How great was the attenuation?

MR. BARNETT: The 120-cycle attenuation is about 10 db.

SIMPLEX DOUBLE-FILM ATTACHMENT*

W. BORBERG AND E. PIRNER**

The Simplex double-film attachment (Fig. 1) described herein is designed for use with the Simplex 4-Star sound system where separate picture and sound prints are to be run for reviewing purposes in studios or for showing pre-release prints in theaters.

The equipment consists primarily of a large magazine, in which are mounted two take-up shafts and one feed-shaft to accommodate three reels. A film channel, connecting the projector mechanism directly to this magazine, detours the film around the sound mechanism. This avoids congestion, facilitates threading, and permits easy observation during operation (Fig. 2).

The picture print is in the upper magazine on spindle *A*. It is threaded through the projector in the normal manner, but leaves the projector after passing over the lower holdback sprocket and goes through the film-channel over a pair of guide-rollers to the take-up reel, which is mounted on spindle *C*.

The sound-print feed-reel is placed on spindle *D* in the lower right-hand corner of the magazine. The film runs over a pair of guide-rollers to a special gear-driven sprocket which feeds it into the sound mechanism scanner. The film passes through the sound mechanism in the usual manner and then to the take-up reel, which is mounted on spindle *B*. There is ample clearance in the lower magazine to permit the use of three 1000-ft reels with 5-inch hubs.

For ordinary sound and picture projection, where the picture and sound are on the same print, the film is threaded through the projector and sound mechanism in the same manner as in standard projection equipment. In this case (Fig. 3) standard 2000-ft reels with 5-inch hubs can be used in the upper and lower magazines. With a 2000-ft reel in the take-up magazine it is necessary only to shift the guide-roller *a* in the lower magazine. The magazine door is double-hinged, and for single-film operation only one-half of the door need be opened. The clearance, when 2000-ft reels with 5-inch hubs are used, is similar to that in the standard 18-inch magazine.

Special consideration has been given to the importance of insuring smooth film passage through the projector, sound mechanism, and double-film attachment.

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** International Projector Corp., New York, N. Y.

The guide-rollers are equipped with ball-bearings, and have high flanges on both sides. All parts coming into contact with the film are sufficiently undercut to prevent damage to the sound-track and picture area. An extra sprocket is provided to feed the sound-print from the lower magazine into the sound mechanism. This makes threading easy, avoids sharp bends of the film, and thus reduces the

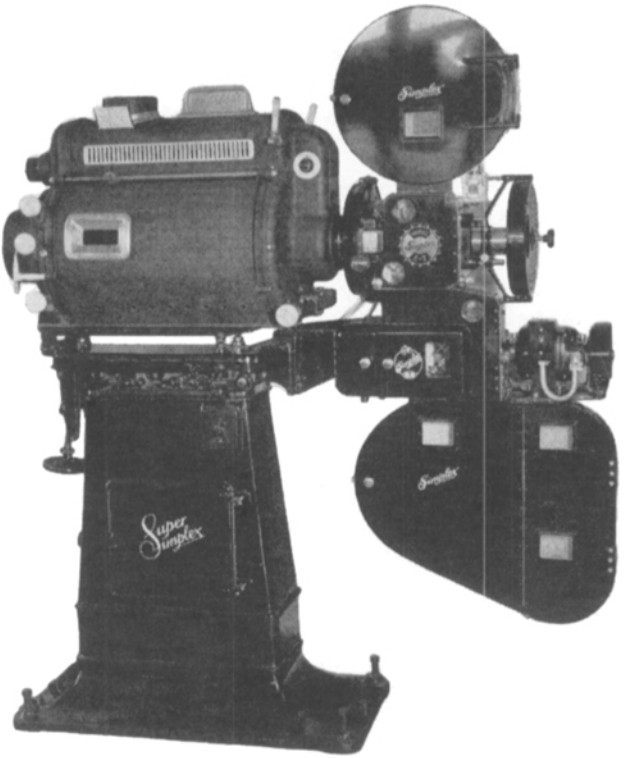

FIG. 1. Simplex double-film attachment.

possibility of patches coming apart. This sprocket is located in the upper part of the film-channel, and is directly geared to the sound mechanism projector drive-gear.

The entire feed-sprocket assembly is mounted on a hinged bracket which engages the feed-sprocket gear with the projector drive-gear, and permits adjustment for proper mesh of teeth without requiring shims (Fig. 4). When combined sound and picture prints are projected, this bracket can be raised to disengage the two gears.

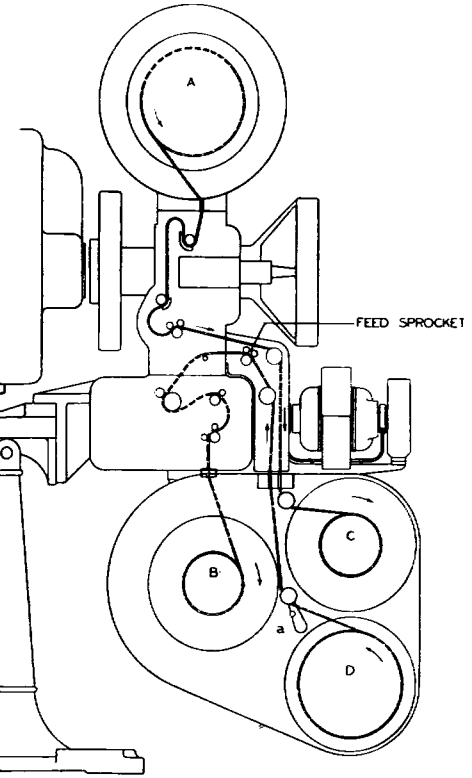

FIG. 2. Film path through projector.

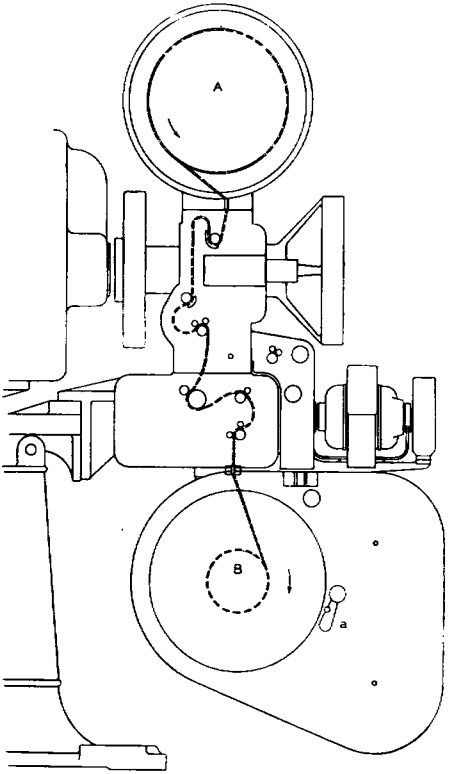

FIG. 3. Standard 2000-ft reels for ordinary sound and picture projection.

Important features of the Simplex double-film attachment are simplicity of adaptation to the projection equipment, elimination of fitting and adjustments on the job, and the elimination of shims for alignment purposes. The double-film attachment is designed for interchangeable use with Simplex *E-7* or Super-Sim-

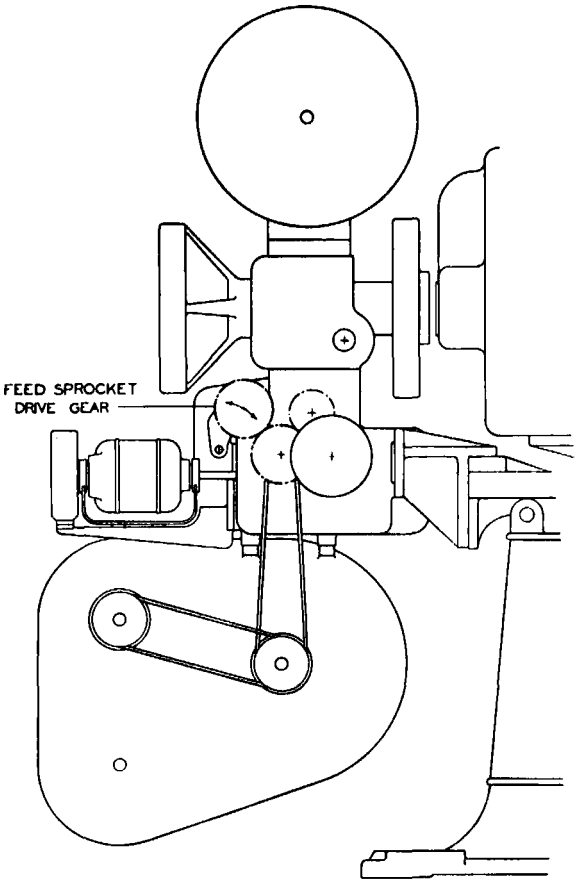

FIG. 4. Showing mounting of feed-sprocket assembly.

plex mechanisms. With this attachment, when used on installations with Super-Simplex or Simplex *SI* pedestals, downward projection angles to 30 degrees and upward projection angles to 3 degrees can be accommodated.

The overall length of projector, sound mechanism, and double-film attachment is increased by only $1^1/_2$ inches over that of the standard Simplex equipment with 18-inch magazines.

DISCUSSION

MR. RICHARDSON: What is the idea of projecting picture and sound-film separately with one projector?

MR. PIRNER: For preview purposes. After the preview all the changes necessary are made, and then the sound and picture are combined on one print.

DR. GOLDSMITH: Is this attachment adaptable to the standard projector?

MR. PIRNER: Yes.

MR. BRADY: What would be the effect of running two prints exactly alike, simultaneously and in perfect synchronism?

MR. FRIEDL: That is a very interesting question, although it is irrelevant to the paper. I believe what you are asking is the effect of superimposing identical prints, in the hope of obtaining stereoscopic effects, and, perhaps, stereophonic sound. Several times at this meeting mention has been made of three-dimensional pictures as being "on the horizon," and as representing a challenge to our technicians. This attachment, however, is not intended to achieve that result. This is only for projecting a picture film and a sound-film simultaneously, for the purpose of previewing. One of its major uses is in preview theaters, particularly in Hollywood. Before going to the expense of a final editing the producers want to try the picture on the public, and later edit it according to the reaction of the public and the comments of the studio executives. Usually the one film has the picture only and the other film the sound-track only. Two complete picture and sound-track films could be projected, but you would get only the picture off one and only the sound-track off the other.

MR. CRABTREE: In the case of a grainy picture, what would be the effect of simultaneously projecting several identical images?

DR. GOLDSMITH: It would be interesting to know whether graininess of the prints would be reduced by superimposed projection of several identical images. Theoretically, and on a basis of statistical averages, this process would reduce graininess. But since graininess in average focused pictures is a relatively mild fault, it would hardly seem worth while to use multiple projection to reduce it.

A NON-INTERMITTENT MOTION PICTURE PROJECTOR*

F. EHRENHAFT AND F. G. BACK**

The problem of non-intermittent film projection was treated in detail by Tuttle and Reid[1] in 1932. Since then a considerable number of various devices for such a projection method has been developed.

Our improvements are based upon the development of a projector designed in such manner that optical compensation is effected by means of a rotating glass prism placed between the film and the projection lens. This projector is very

* Presented at the 1939 Fall Meeting at New York; received October 10, 1939.

** New York, N. Y.