Since the new double-frame films of a given number of frames are twice as long as the single-frame films, and due also to the fact that sound slide-film productions run to much greater length than silent, need for a take-up has been created, and this feature is embodied on the new *S. V. E.* model *AA*. It has a threefold purpose: It not only acts as a take-up for the film, but rewinds it ready for projection, puts it into its own container, and eliminates handling the film except at the ends. A new type of film-can makes it possible to attach the empty can to the bottom of the film-track, the film-can acting as a take-up for the strip of film. It automatically winds the film from the outside to the inside, so that the film is ready for rethreading into the top magazine without the necessity of rewinding or otherwise handling the film.

Up to this time the present single-frame slide-films have seemed to meet the needs in the sales field adequately, and it is our opinion that the industrial motion picture producers will continue to prefer the single-frame as standard for their purpose, but that remains to be seen.

However, a great deal has been said recently in educational circles about the desirability of the use of visual equipment in the classroom where such equipment is as easily available to the teacher as a book or a map. The Picturol method provides just that; and this new tri-purpose equipment with a very portable sound-on-disk reproducer will, we believe, adequately fulfill the daily requirements of the classroom teacher for visual-auditory equipment, accompanied, of course, by the existing single-frame and the resultant libraries of educational double-frame slide-films with sound.

DEVELOPMENTS IN SOUND SLIDE-FILM EQUIPMENT*

F. FREIMANN**

Sound slide-films, or talking still pictures, are being used extensively by large national merchandisers as a sales and training medium. The programs, produced for these organizations on films and disks, are on the subjects of sales and service training, and for inspirational meetings, direct consumer solicitations, and on special subjects such as announcement of changes of company policies, advertising programs, and so forth.

These programs consist of a series of interesting still pictures illustrating the subject matter, manually synchronized with the audible text by the operator, who receives his cues for advancing the pictures from a melodious tone superimposed upon the recording. The pictures are changed as frequently as necessary to follow the sequence of the continuity. Each picture is arrested long enough to illustrate a thought to be absorbed by the audience.

Although the pictures are stills they express action, change with such frequency, and are of such wide variety that interest never lags. The average program of 15

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* Presented at the Spring, 1936, Meeting at Chicago, Ill.

** Electro-Acoustic Products Company, Ft. Wayne, Indiana.

minutes' duration is comprised of not less than 60 excellent pictures. The films are of standard 35-mm. size, and the records are 12- or 16-inch disks, providing a program of 9 to 15 minutes per side.

To most engineers, sound slide-film equipment, and perhaps the medium as a whole, appears very elementary. It is interesting to note, however, that the very simplicity of the medium and the equipment is the foundation of the commercial success that has been attained.

Although some efforts had been made to promote the use of sound slide-films since 1931, during the period of its development only a few commercial organiza-

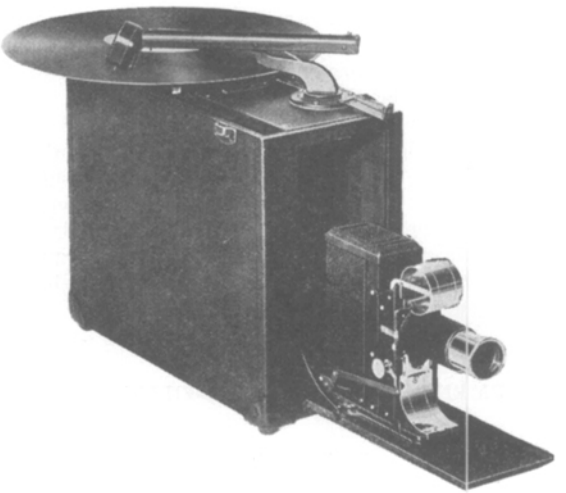

FIG. 1. "Illustravox Senior."

tions adopted the medium, and then exclusively for sales training. In 1933 less than 500 machines were in the field. The excellent results achieved by those organizations using the medium were so conspicuous that, coupled with the aggressive promotion of the film producers and equipment manufacturers, over 200 of the largest national organizations are now operating more than 20,000 equipments distributed throughout this country and abroad. Some of the reasons for the wide and universal acceptance are briefly:

(*1*) The effectiveness of the medium.
(*2*) The simplicity and low cost of sound slide-film productions.
(*3*) The comparatively short time required to produce a complete show.
(*4*) The low cost of duplicates, which can be distributed at the cost of a few dollars per set.
(*5*) The low cost of equipment, making wide distribution possible. This equipment is available at prices ranging from approximately $40 to $120.
(*6*) The portability of the equipment and the simplicity of operation.

The first commercial machines were a rather crude combination of a standard slide-film stereopticon stored in two portable cases housing an amplifier, loud speaker, electrical pick-up, and 33 1/3-rpm. motor and turntable. The combination weighed close to 80 pounds. Modern equipment is now available for every purpose. The machines are designed for small group showings, for daylight showings, and for large audiences of up to 200 persons. They weigh from 20 to 40 pounds.

The original combination was modified in various forms to fulfill efficiently the four essential requirements of this type of equipment, namely:

(*1*) Projection of a uniformly sharp picture with sufficient brilliance for showing in a semi-dark room.

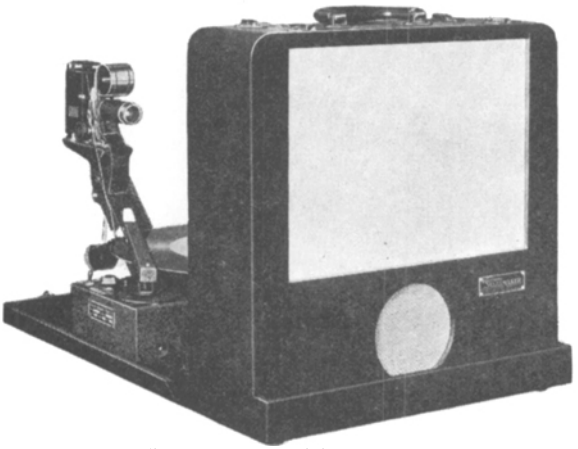

FIG. 2. "Salesmaker," with translucent screen.

(*2*) Acceptable quality of sound to provide pleasing reproduction of music and voice with good articulation.

(*3*) Portability: the equipment to be light and compact enough to be conveniently carried by man or woman, in the form of a neat package.

(*4*) Convenience of operation: provide features enabling the operator to set up the apparatus quickly, thread the projector, and show a picture with sound, with a minimum of effort and time.

The *Illustravox Senior* is representative of a machine for sound slide-film presentations to large audiences (Fig. 1). Its compactness is evident. The case is 18 inches high, 17 inches long, and 7 1/2 inches wide. The complete unit weighs 38 pounds. It embodies a 200-watt stereopticon capable of projecting a 10-ft. picture of good quality under favorable room conditions. The principal components contained within the case are the projector, the motor and turntable, pick-up, amplifier, and loud speaker.

The projector is mounted upon a cast aluminum door, which is conveniently dropped into the operating position. The metal door provides a firm foundation

for the projector, which when in the operating position is adequately ventilated by being suspended outside the case. The projector is aligned with the screen by a tilting mechanism in the base of the projector. The projectors are equipped with a high-quality optical system designed for maximum efficiency and uniformity of light and sharpness of picture. Ample ventilation of lamp and condensing lenses, coupled with an effective heat-ray filter, minimizing the temperature at the film, insures safe operation under all conditions of temperature and humidity. A comparatively large film magazine accommodating a strip of film fifteen feet long, a receding aperture plate to free the film when in motion, and a highly polished film-track are incorporated to lessen film wear.

A governor-controlled, $33^1/_3$-rpm. motor and comparatively heavy turntable provide the constant record speed. A crystal pick-up is used on a balanced tone-arm because of its light weight and uniform frequency response. It is a high-

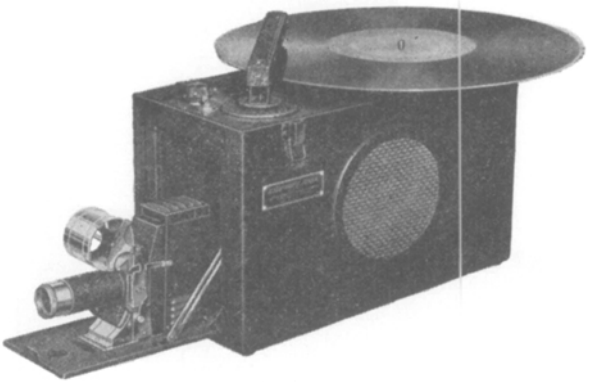

FIG. 3. "Illustravox Junior."

impedance device, connected directly to the grid of the first amplifier tube through a potentiometer.

A two-stage amplifier incorporating one type *6D6* tube and two type *43* tubes delivers a power output of 4 watts to the speaker. A voltage-doubler type of rectifier is used in preference to a power-transformer type because of the smaller weight and the adaptibility to universal operation. The amplifier complete with tubes weighs but $2^1/_2$ pounds.

An 8-inch electrodynamic loud speaker is mounted in a steel rim in the side of the case. It is readily detachable for mounting in an identical rim in a separate baffle board. For small group showings the loud speaker remains in the carrying case. For large audiences it is mounted in a small baffle board carried in the record compartment of the case, and is placed below the screen in front of the audience.

The over-all frequency response of the complete sound reproducing equipment from pick-up through the speaker varies only 8 db. over a frequency range extending from 80 to 6000 cps.

A volume control and switches for the projector and motor are mounted upon

the amplifier chassis and are accessible through the tube access door at the rear of the machine. The pictures are advanced by the operator by a remote-control cable. With all the controls directly in front of the operator, he can be comfortably seated behind the machine. When the unit is assembled in its carrying position it contains all accessories, except the screen, necessary for a complete show.

A medium sized machine developed for individual and small group showings, and specifically designed for satisfactory projection under daylight conditions, is represented in the *Illustravox Salesmaker* (Fig. 2). This unit contains all the component parts and accessories required for a complete show. It is in effect a compact, portable little theater. The unit assembled for transportation is $6^1/_2$ inches wide, 18 inches high, and 19 inches long, and weighs only 28 pounds. It can be set up and put into operation in two or three minutes, wherever a power outlet is available.

The center portion of the case incorporates a rubberized silk translucent screen and the loud speaker, and performs the functions of a shadowbox. The front side of the case, when removed, exposes the screen and loud speaker. This section provides storage space for the records. The rear section when dropped down forms the foundation for the amplifier chassis and projector.

The projector is a 100-watt unit mounted upon a substantial aluminum casting which when in the operating position elevates the projector, centering it with the screen. The projector can also be mounted in a plane parallel to the case for projecting a large picture upon a wall screen. Under such conditions the section of the case housing the loud speaker is detached from the base, placed in front of the wall screen, and the speaker connected to the amplifier by means of a flexible cable.

The amplifier, motor, and pick-up are within the metal chassis. The amplifier differs from that of the *Senior* machine in that only one power tube is used in the output stage, providing an output of $2^1/_2$ watts to a 6-inch speaker. The tubes are mounted at the end of the chassis for adequate ventilation and accessibility, and protected with a metal tube guard. The pick-up and motor are identical to those used in the *Senior* model. A wide-angle lens of $1^1/_2$-inch focal length is used to project a picture upon the translucent screen, and a 3-inch focal length lens is carried as an accessory for projecting a picture upon a larger screen.

The *Illustravox Junior* is a very compact, light-weight machine, designed for small group showings and for individual sale presentations (Fig. 3). The case containing all components and accessories including a small screen is only 13 inches high, $15^3/_4$ inches long, and $6^1/_4$ inches wide, and the complete equipment weighs but 20 pounds. It is similar in construction to the *Senior* machine. A 100-watt projector is mounted upon a door in one end of the case which drops down into operating position. The position of the door is adjustable for elevating the projector. The pictures are advanced by means of a remote-control cord extending through the rear of the machine.

The pick-up and turntable are identical to those of the other models. The amplifier is also of the same type, and provides an output of $2^1/_2$ watts to a 5-inch speaker, which is mounted in the side of the case.

All three models described are made for universal operation, working on either direct or alternating current, as well as for alternating current only.