

March 21, 1944.

L. F. FERRIS ET AL
ADVERTISING APPARATUS

2,344,541

Filed Feb. 10, 1942

2 Sheets-Sheet 1

FIG. 1.

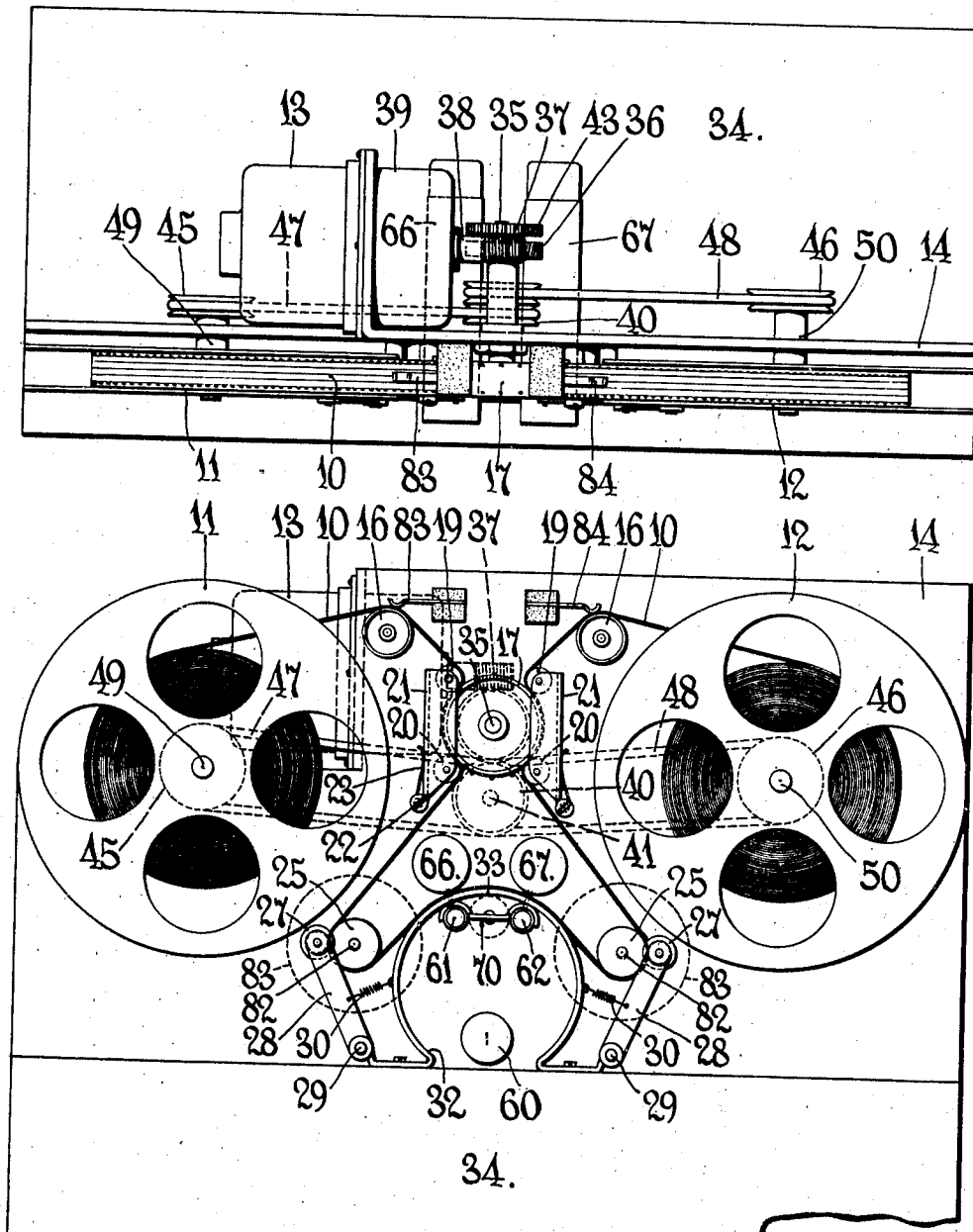


FIG. 2.

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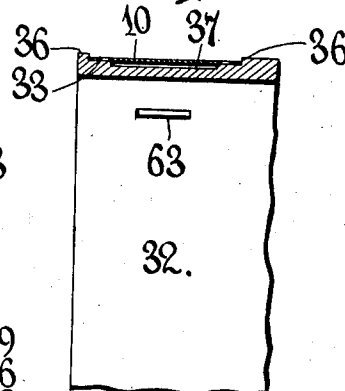
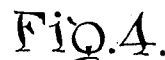
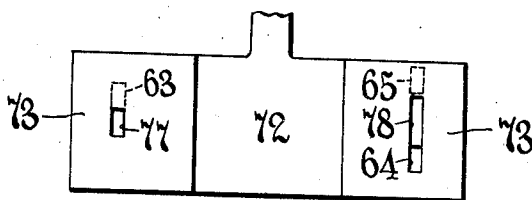
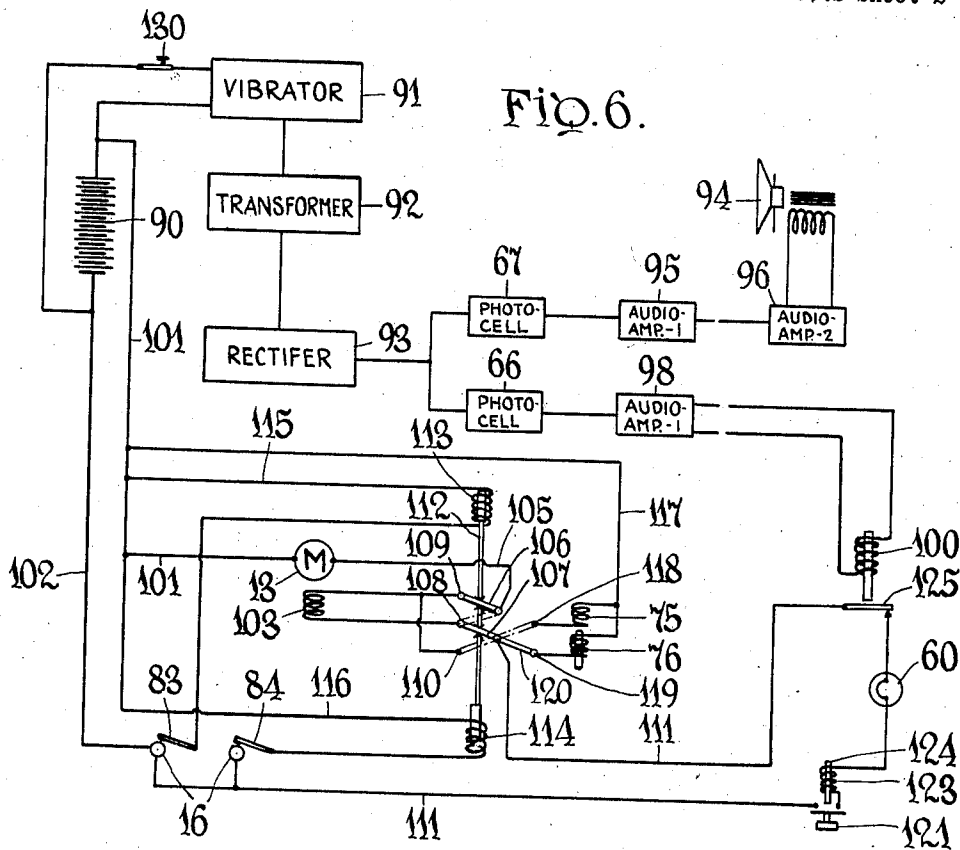
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2 Sheets-Sheet 2



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2,344,541

ADVERTISING APPARATUS

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4 Claims. (Cl. 179—100.3)

This invention relates to sound reproduction and has particular reference to apparatus useful, among other things, in producing audible advertising, spot announcements, and the like.

The present invention is of particular value for use in conjunction with urban buses and the like where advertising announcements may be tied in with the bus itinerary in such a way that particular announcements will occur at points where they are calculated to be most effective. For instance, each particular announcement may be arranged to occur when the vehicle is passing or stopped near the department store or other place of business which is sponsoring the particular announcement.

In one form of the application of the principles of our invention, apparatus is provided whereby a succession of announcements, commercial or otherwise, may be individually begun at varying time intervals by a simple manual impulse, as for instance, the pressing of a button. Automatic means are provided whereby the sound reproducing means automatically comes to a stop at the conclusion of an individual announcement or predetermined cycle of sound reproduction.

In one form of the apparatus of our invention a photographic film strip is provided with a pair of oppositely extending sound tracks whereby the film may be run through the reproducing means first in one direction then in the other, both runs being operative to reproduce sound, without the usual idle rewind operations. Our invention further contemplates the provision, in association with each sound track, of a related control track for automatically stopping the apparatus by light means at the conclusion of a predetermined increment of sound reproduction.

In the drawings:

Fig. 1 is a top plan view of one form of apparatus arranged in pursuance of the principles of our invention;

Fig. 2 is a front elevational view of the apparatus of Fig. 1;

Fig. 3 is a detailed plan view of a shiftable light guiding element of the apparatus of Figs. 1 and 2;

Fig. 4 is a fragmentary cross sectional view of the film scanning track portion of the apparatus;

Fig. 5 is a detailed view of a fragmentary strip of film for use with the apparatus of Figs. 1 through 4; and

Fig. 6 is an electrical wiring diagram of the apparatus in which the conventional amplifying portions thereof are shown schematically.

Like characters of reference denote like parts throughout the several figures of the drawings

and the numeral 10 designates a photographic film strip extending between and secured at its opposite ends to a pair of reel elements 11 and 12. Motive means are provided for moving the film alternately from one reel to the other and back again, for sound reproduction, and such means may comprise a reversible electric motor 13. For convenience, the reels 11 and 12 may be rotatably disposed against one side of a vertical panel 14, with the motor 13 secured against the opposite or rear side of the panel. In the illustrated instance a portion of the panel 14 is bent rearwardly as at 15 to receive the motor 13.

Tracing the film 10 in its passage from the reel 11 to the reel 12, it passes over an idle roller 16 disposed against the front face of the panel 14, thence downwardly past and in engagement with a sprocket wheel 17, the teeth of which have driving engagement with the marginal perforations of the film strip. The film strip may be held in engagement with the sprocket wheel 17 by means of a pair of rollers 19 and 20 carried in a channel shaped bracket 21 which is secured to the panel 14 for pivotal movement as at 22. A torsion spring 23 may be provided for urging the bracket 21 and consequently the rollers 19 and 20 against the film strip 10, thereby preventing accidental disengagement of the film strip from the sprocket wheel 17, the while permitting ready release of the rollers 19 and 20 for threading the film 10 into place prior to operation and for removing the same for replacement.

From the lower spring pressed roller 20 the film passes over an idle roller 25 and the film is preferably held in engagement with the roller 25 by a roller 27 which is carried at the outer end of an arm 28 which is pivotally mounted as at 29. A spring 30 extends between the arm 28 and a fixed part of the structure to urge the arm 28 pivotally and thereby yieldably press the roller 27 against the film 10 in its passage over the roller 25.

From this point the film passes the actual scanning station where the visual sound record printed thereon is translated into a light impulse of varying intensity and then, by means of a photoelectric cell, into an electrical impulse of correspondingly varying intensity. The scanning means comprises a film track which, in the illustrated instance, takes the form of a bracket 32 having an arcuate upper peripheral portion 33 across which the film may pass. The bracket 32 may be secured to a table portion 34 which also serves as a base for the panel 14.

As appears from Fig. 4, the peripheral track

portion 33 is provided with film guiding flanges 36 and is relieved as at 37 to avoid frictional abrasive contact with the sound track portions of the film 10. The several guiding rollers and associated instrumentalities so far described in passage of the film 10 from the reel 11 to the portion 33 of the bracket 32 are duplicated between the bracket 32 and the opposite reel 12. These parts are accordingly given like characters of reference and need not be redescribed individually. One feature worth noting is that the single drive sprocket 17 is engaged at its right hand periphery, as seen in Fig. 2, by the film 10 in its upward passage to the reel 12, and thus the single drive sprocket 17 serves to drive the film both to and from the scanning station regardless of the direction of the film.

For driving the sprocket 17 the shaft 35 thereof, which is journaled in the panel 14, is provided with a worm wheel 36 at the back of the panel for meshing engagement with a worm 37 which may be fixed directly to the rotor shaft 38 of the motor 13. It is desired that the rotational speed of the sprocket 17 be substantially constant to insure fidelity in sound reproduction and it is accordingly desirable to associate a governor in the drive from the motor to the sprocket 17. In the illustrated example a governor having a centrifugally responsive speed control switch is designated 39 in Fig. 1. Such switches are available as commercial devices of general adaptation and the details thereof need therefore not be shown here. To facilitate speed control the electric motor 13, which as will presently appear has a direct current operating circuit, is series wound.

It is desired that whichever of the reels 11 and 12 happens, at any given time, to be the winding reel, be driven to avoid the accumulation of slack film and to this end a central drive pulley 40, having a mounting shaft 41 carried by the panel 14, is provided. A pair of intermeshing gears 43 and 44 fixed for rotation with the sprocket shaft 35 and the pulley shaft 41 are provided for driving the pulley 40. The pulley 40 may be a double sheave pulley and has driving connection with pulleys 45 and 46 associated with the reels 11 and 12, respectively, as by means of belts 47 and 48, respectively.

The reels 11 and 12, together with pulleys 45 and 46, have mounting shafts 49 and 50, respectively. The driving connection between the pulley 45 and the reel 11 embodies a one-way clutch of any conventional form (not shown) so that only counter-clockwise rotation of the pulley 45 is communicated to the reel 11. The pulley 46 likewise has one-way driving connection with the reel 12 so that, conversely, only clockwise rotational impulses are transmitted from the pulley 46 to the reel 12. As a result of this construction each of the reels 11 and 12 is driven by its associated pulley when it is winding but will be idle when it is unwinding. The belts 47 and 48 are sufficiently slack to permit slippage when the reel tends to wind film faster than it is being fed by the sprocket 17 and thereby they serve to maintain a light tension on the film.

A fragmentary strip of film 10 is shown in Fig. 5 and as there illustrated is purely a phonogram, not for pictorial reproduction. The recording on the film comprises a pair of sound tracks 55 and 56 and a pair of related film control tracks 57 and 58. The usual marginal feeding perforations for engagement by the teeth

of the drive sprocket 17 are designated 59 in Fig. 5.

Assuming Fig. 5 to be taken as the film would appear in plan from the front of the apparatus, the outer sound track 55 and the related control track 57 are effective when the film is feeding from reel 11 to reel 12 and, conversely, the inner sound track 56 and its related control track 58 are effective when the film is feeding from reel 12 to reel 11. The lateral film position is constant in the form of apparatus now being described and the necessary adjustments for scanning the proper pair of sound and control tracks is fully automatic and will now be described.

A light source is indicated at 60 in Fig. 2 and is arranged to direct its rays upwardly through a pair of spaced lenses 61 and 62 of conventional cylindrical form. These lenses are supported against the panel 14 and are disposed closely beneath the peripheral film track portion 33 of the bracket 32. The track portion of the bracket 32 has a light slit 63 and a pair of aligned light slits 64 and 65, the light slit 63 being above the lens 61 and the pair of light slits 64 and 65 being above the lens 62. These slits, together with the lenses, are for passage of light through the film 10 to a pair of photo-electric cells, 66 and 67 respectively. The cell 66 is adapted to operate from either of the control tracks 57 and 58 of the film 10 and the cell 67 is adapted to operate from either of the sound tracks 55 and 56 thereof. Accordingly, the slit 63 is of a length equal to the width of the two control tracks and is in lateral registry therewith and the slits 64 and 65 register respectively with the outer and inner sound tracks 55 and 56.

To provide for ready change-over of the scanning mechanism, upon reversal of the direction of movement of the film, light screening means, designated generally 70 in Fig. 2 are provided. Operation of the screening means is arranged to occur automatically upon reversal of the film in a manner which will presently appear.

The screening means includes a plate member 72 whose marginal portions 73 are curved to overlie the lenses 61 and 62 and whose medial portion may be attached to the armature of electromagnetic means for positioning the plate 72. The electromagnetic means is shown in the wiring diagram, Fig. 6, and comprises a pair of coaxial solenoids 75 and 76. A plan detail of the plate member 72 appears in Fig. 3 and as there shown the plate member 72 has an opening 77 for cooperation with the slit 63 and a second opening 78 for cooperation with the slits 64 and 65.

When solenoid 76 is energized the plate will be moved to and held in the position shown in Fig. 3 and the slit 65 will be closed off while the slit 64 is open to permit scanning of the outer sound track. Simultaneously the opening 77 will expose only the front half of the slit 63 whereby the front control track 57 is rendered effective. Obviously, if the solenoid 76 be de-energized and the solenoid 75 energized, the plate 72 will move rearwardly to render the sound track 56 and the control track 58 effective.

The light source 60 is in the form of an incandescent lamp and, in the present example, is interposed in the circuit for energizing the motor 13. The reaction of the light from the lamp 60, modified by the sound tracks of the moving film 10, on the photo-electric cell 67 is translated into audible sound, generally speech, in a conventional manner indicated schematically in Fig. 6.

Before proceeding to a description of the elec-

trical portion of the apparatus, it is noted that the idle rollers 25 are fixed to shafts 82 journaled in the panel 14 and the shafts 82 have secured thereto, preferably at the rear or inside of the panel, flywheels 83. This again is a conventional expedient designed to produce smooth and uniform movement of the film 10 over the track portion 33 of the bracket 32.

Attention is also called to a pair of spring fingers 83 and 84, one arranged to bear against the film 10 as it passes each of the rollers 16. Each of the fingers 83 and 84 have insulated mountings as at 85 and 86 and cooperate with their associated rollers 16 to form a pair of switches normally held open by the presence of the film 10 therebetween. The film 10, however, is perforated adjacent each of its ends so that as an end of the film is reached finger 83 or 84, whichever is adjacent the reel which is nearly unwound, will extend through the perforation in the film and make contact with its roller 16. The manner in which such contact is arranged to effect reversal of the motor 13 will presently appear.

Since the apparatus of the present invention is intended particularly for vehicular use it is shown herein as powered by a direct current source which may be the conventional vehicle storage battery and is designated 90 in the wiring diagram, Fig. 6.

Referring further to Fig. 6, the photo-electric cell 66 which serves as the motor control element and the photo-electric cell 67 which receives the sound modulated light from the sound tracks of the film 10 are both shown arranged in such a way as to be provided with direct current energy of proper potential by a conventional vibrator, transformer and rectifier combination interposed between the battery 90 and each of the photo-electric cells 66 and 67, these three elements being designated 91, 92 and 93 respectively in Fig. 6.

The sound modulated light impulse of the photo-electric cell 67 is reproduced at a loud speaker 94, there being as many stages of audio amplification interposed between the output circuit of the photo-electric cell 67 and the speaker 94 as occasion requires. In the present instance two stages of amplification are shown, designated respectively 95 and 96. It is to be understood that any conventional circuits and amplifiers may be employed in amplifying the sound modulated electrical output of the photo-electric cell 67 and transferring such output to the speaker 94.

The photo-electric cell 66, whose sole function is to interrupt the operation of the film moving motor 13 at predetermined intervals under the control of control tracks of the film, is also provided with one or more stages of amplification and in the illustrated instance an audion for this purpose is designated 93. The output of the final audion amplifier of the photo-electric cell 66 is arranged, at predetermined light impulses, to energize in electromagnet 109 whose motor circuit controlling function will presently appear.

The motor 13 receives its energy from the battery 90 by means of a lead 101 and the return conductor of the motor circuit is designated 102 in Fig. 6. The motor of the present example is series wound to facilitate regulation of the speed thereof by the conventional governor 39. The motor of the illustrated instance has a field coil designated 103 and means for reversing the direction of the current through such field coil, for effecting reversal of the direction of rotation of the motor 13 will now be described.

The lead from the armature of the motor 13 is designated 105 and communicates with a pivotal switch arm 106 which is one of a pair of jointly pivoting switch arms, the other being designated 107. One end of the field coil 103 terminates at the reversing switch in a terminal 108 and the other end of the field coil terminates in a pair of terminals 109 and 110 disposed at opposite sides of the terminal 108. The second switch arm 107 has a lead 111 therefrom which extends to communication with the battery return conductor 102.

It will be obvious from the foregoing, to those skilled in the art, that with the switch arms 106 and 107 in the full line position of Fig. 6 current will flow in one direction in the field coil 103, while shifting of the switch arms 106 and 107 to the dotted line positions of Fig. 6 will reverse the direction of current through the field coil 103 without changing the direction of current through the armature of the motor and accordingly reverse the direction of rotation of the motor. Joint shifting of the switch arms 106 and 107 is effected by means of a bar 112 which is under the control of a pair of electro-magnets 113 and 114. In Fig. 6 the magnet 113 has been energized to move the switch arms to the full line position. Energization of the magnet 114 will obviously move the switch arms to their dotted line positions.

Each of the electro-magnets 113 and 114 is connected across the circuit 101, 102, leading from the battery 90 by means of conductors 115 and 116 respectively. Each of these conductors terminates in a contact element, these contact elements being the fingers 83 and 84, respectively, previously described. The return 102 to the battery has electrical connection with the previously described rollers 16. From the foregoing it will be seen that whenever an end of the film is approached the central perforation (not shown) provided near such end of the film will cause the adjacent contact finger 83 or 84 to make contact through the perforation with its assorted roller 16 and thereby establish the desired one of the magnet circuits 115 or 116 to shift the position of the switch arms 106 and 107 and reverse the motor.

For simultaneously shifting the position of the screen member 72 of Figs. 2 and 3 the pair of coaxial electro-magnets 75 and 76 previously described are energized in the following manner. The electro-magnets 75 and 76 have a common lead 117 from the beginning side 101 of the motor circuit. The opposite ends of the windings of magnets 75 and 76 comprise terminals 118 and 119 respectively and the lower switch arm 107 has a rearward extension 120 which automatically connects the last mentioned end of each of the windings of the magnets 75 and 76 with the return conductor 111, in accordance with reversals in the direction of rotation of the motor 13.

For readily and selectively initiating an increment of sound reproduction a normally open manual switch 121 is interposed in the conductor 111 of the motor circuit. To cause the switch 121, upon initial manual closing, to remain closed until the motor circuit is opened by means which will presently be described, a portion of the circuit 111 comprises a solenoid winding 123, the core 124 of which serves to retain the switch 121 in closed position whenever the motor circuit is energized.

For automatically opening the motor circuit at the conclusion of an increment of sound reproduction and thereby restoring the switch 121 to

open position, a normally closed switch 125 is interposed in the conductor 111. This switch is adapted to be opened by the electro magnet 100 upon energization of the latter by a light impulse on the photo-electric cell 66 through one of the control tracks of the film 10. In Fig. 5 the control track 57 is shown as having a transparent area 127 which is located in such manner as to transmit a light impulse therethrough to the control cell 66 upon the conclusion of an increment of sound reproduction.

It will be noted that the sound track 55 which cooperates with the control track 57 has a silent space as at 123 which occurs between successive increments of sound recording. The relative longitudinal distance between the transparent area 127 of the control track 57 and the space 123 on the sound track 55 is occasioned by the angular spacing of the control cell 66 and the reproducing cell 67 with respect to the sound track 33.

A manual control switch 130 is provided for energizing the speaker and control track circuits preliminary to manual instigation of increments of sound reproduction through manipulation of the switch 121. The several amplifier, power and rectifier tubes as well as the transformer and other appurtenances incident to the purely electrical part of the apparatus may be housed in a suitable compartment within the table portion 34 of the device.

While a complete and specific embodiment of the principles of our invention is set forth in the foregoing by way of example, it is to be understood that many modifications will occur to those skilled in the art and may be made without departing from the spirit or scope of the present invention which is not to be considered as limited otherwise than as defined in the appended claims.

We claim:

1. Advertising announcement apparatus for cooperation with a photographic film sound record bearing parallel sound tracks extending in opposite directions thereon, a pair of reels each engaging an end of said film, sensing means disposed between said reels for reproducing the sound recorded on the sound tracks, means for driving the film past said sensing means in either direction for reproducing the record of either of the sound tracks, and means sensitive to the direction of movement of the film for rendering the sensing means sensible to the proper one of the two sound tracks.

2. Advertising announcement apparatus for cooperation with a photographic film sound record bearing parallel sound tracks extending in opposite directions thereon, a pair of reels each engaging an end of said film, sensing means disposed between said reels for reproducing the sound recorded on the sound tracks, means for adjusting the sensing means to reproduce one or the other of the sound tracks, means for driving the film past said sensing means in either direction for reproducing the record of either of the sound tracks, and means sensitive to the direction of movement of the film for actuating said adjusting means to render the sensing means sensible to the proper one of the two sound tracks.

3. Sound reproducing apparatus for cooperation with a photographic film sound record having a pair of parallel sound tracks extending in opposite directions therealong, each sound track having a plurality of sound messages extending lengthwise thereof, light sensitive means for reproducing the sounds impressed thereon, motor means for moving said film past said light sensitive means, a pair of control tracks on said film, one of said pair of control tracks being synchronized with each of the sound tracks, and other light sensitive means controllable by said control tracks, manual means for establishing an operating circuit for said motor and a motor circuit interrupting relay controlled by said other light sensitive means for automatically stopping said motor at the conclusion of a predetermined sound message reproducing interval along said film.

4. Sound reproducing apparatus for cooperation with a photographic film sound record having a pair of parallel sound tracks extending in opposite directions therealong and each having a plurality of independent sound messages spaced lengthwise therealong, light sensitive means for reproducing the sounds impressed thereon, motor means for moving said film past said light sensitive means, a motor circuit interrupting relay operable automatically for stopping said motor at the conclusion of a predetermined sound message reproducing interval, and means for controlling said motor means whereby said film may be moved in opposite directions for reproducing the recorded sound of either of the two sound tracks.

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