

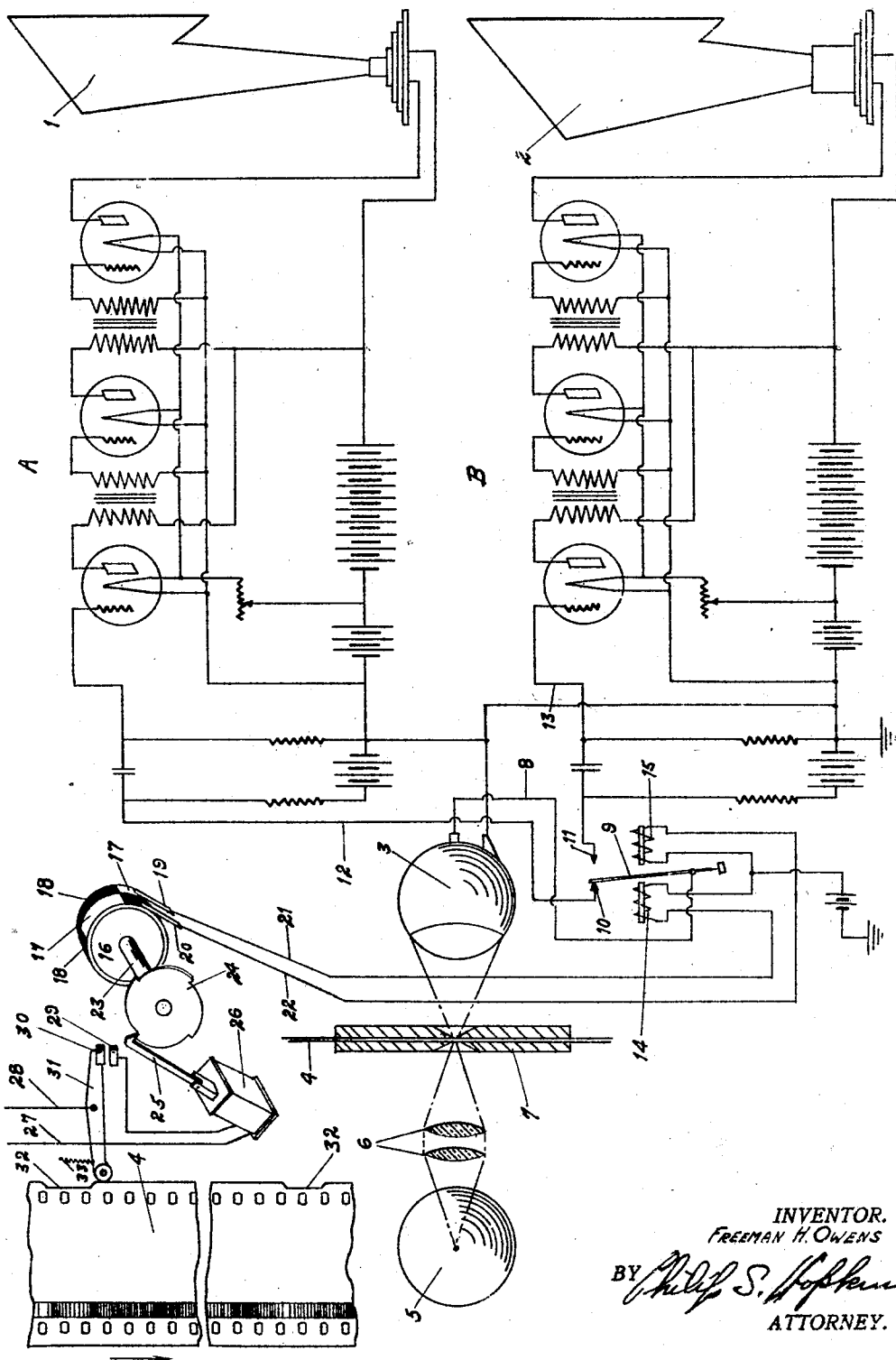
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SOUND REPRODUCING APPARATUS

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SOUND REPRODUCING APPARATUS

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The invention relates to improvements in sound reproducing apparatus, the principal object of the invention being to provide a device of this character having a plurality of independent amplifiers and loud speakers, and means for automatically bringing into action the particular amplifier and speaker best adapted for reproducing a given type of sound record that is to be reproduced.

Another object is to provide for the automatic change from one amplifier to the other, by the sound film itself.

Other objects and advantages of the invention will appear as the description proceeds. The drawing accompanying this specification is a diagrammatic view of an apparatus embodying the features of the invention, and showing a fragment of a film to illustrate the manner in which it actuates the switch-closing lever for bringing into action the desired amplifier and speaker.

As is well known, amplifiers which are adjusted to reproduce voice frequencies most accurately may not be entirely satisfactory for the reproduction of instrumental music frequencies because of the difference in frequency ranges of voice and musical instruments. The present invention, therefore, contemplates the provision of means whereby, simultaneously with a change from vocal to instrumental music or vice versa, the amplifier best adapted for the reproduction of the voice or music as the case may be, will be automatically cut in.

Referring to the drawing, two separate amplifying units are shown, designated generally A and B each connected with a loud speaker, 1 and 2 respectively. These amplifiers and speakers are so constructed and adjusted that one is of proper arrangement for voice frequencies and the other for musical instrument frequencies. The units A and B are separately wired to receive the output of a light-sensitive element such as photo-electric cell 3, which receives light rays modulated by passing through a sound-record carried by a traveling film 4. The drawing illustrates a conventional reproducing unit, comprising a lamp 5, focusing lens 6 and film-supporting gate 7 having the usual slit

through which the light rays are focused on the sound-record to be thereby modulated before passing to the photo-electric cell. In the device as illustrated one terminal of the photo electric cell is connected by a wire 8 with a pivoted contact member 9, which is adapted to move laterally into contact alternately with terminals 10 and 11. The terminal 10 is connected by a wire 12 with the amplifying unit A while the terminal 11 is connected by a wire 13 with the amplifying unit B. It will thus be seen that when the contact member 9 is in contact with terminal 10 the output of the photo electric cell will be delivered to the unit A and its loud speaker 1, and when the contact member 9 is moved over into contact with terminal 11 the output of the cell will be delivered to the unit B and its loud speaker 2.

For automatically moving the contact member 9 from one contacting position to the other, a pair of electromagnets 14 and 15 are provided one disposed at each side of the contact member 9, whereby, when the magnet 14 is energized contact member 9 will be attracted into contact with terminal 10 and when magnet 15 is energized the contact member 9 will be attracted in the opposite direction and will thus swing over into contact with terminal 11.

For alternately energizing the electromagnets 14 and 15, a rotatable drum 16 is provided, said drum having on its surface, adjacent to its opposite ends alternately disposed conducting and insulating portions 17 and 18, the portions adjacent to one end being disposed in staggered relation to those adjacent to the opposite end and the conducting portions being electrically connected with a source of energy. In frictional contact with the surface of the drum are a pair of brushes 19 and 20 so disposed that when one brush is in contact with a conducting portion of the drum the other brush is in contact with an insulating portion. The brushes are connected with the electromagnets 14 and 15 respectively by wires 21 and 22 whereby on the rotation of the drum the said electromagnets will be alternately energized.

In the present instance I have shown means

for imparting a step-by-step movement to the drum whereby when it has been rotated into position to energize one of the electromagnets it will remain in that position until rotated another step. Said means comprises a notched or ratchet disk 24 secured to the shaft 23 on which the drum is mounted, the notches of which disk are engageable by the hook-shaped end of an armature 25 which is operated by a solenoid 26. The solenoid is connected by conductors 27 and 28 with a source of electrical energy (not shown), in the circuit of which solenoid is included a normally open switch comprising a fixed contact 29 and a movable contact 30. The movable contact in the present instance is carried at one end of a pivoted lever 31, the opposite end of which carries a roller in engagement with one of the side edges of the film 4, whereby the lever is normally maintained in switch-opening position. For intermittently operating the lever thereby to close the switch momentarily, the film is provided in its edge with notches 32, disposed at such points where it is desired to change from one amplifier and speaker to the other. A coil spring 33 is attached at one end to the lever and at its opposite end to a fixed point, whereby the lever is maintained under tension tending to close the switch. It will thus be obvious that when one of the notches 32 arrives opposite the lever, the latter, under the tension of its spring, will be swung into switch-closing position, whereupon the solenoid will be energized so as to cause its hooked armature 25 to rotate the disk 24 one step, consequently moving the drum 16 so that the contact and insulated portions thereof which are brought into contact with the respective brushes 19 and 20 are reversed, whereby the speaker which was in action up to that time is cut out and the other speaker brought into action. The notches 32 are of sufficient length to permit the solenoid to be energized only long enough to impart one operative movement to the armature 25. By the time that movement has been completed, the end wall of the notch has engaged the roller on the end of the lever, thus causing the roller to ride upon the edge of the film and swing the lever against the tension of its spring so as to open the switch, which will remain open until another notch arrives opposite the lever.

I claim:—

1. A sound reproducing apparatus, comprising a reproducing unit, means for supporting a traveling film having a sound record in operative relation to said unit, a plurality of vacuum tube amplifiers adapted to receive the output of the reproducing unit, and means for automatically cutting in either of said amplifiers.

2. A sound reproducing apparatus, comprising a reproducing unit, means for supporting a traveling film having a sound rec-

ord in operative relation to said unit, a plurality of vacuum tube amplifiers adapted to receive the output of the reproducing unit and means controlled by the record-carrying film for automatically cutting in either of said amplifiers.

3. A sound reproducing apparatus, comprising a reproducing unit, means for supporting a traveling film having a sound record in operative relation to said unit, a plurality of vacuum tube amplifiers, each connected in normally open circuit with the output of the reproducing unit, movable means for closing either of said circuits, and automatically operative means for actuating said circuit closing means.

4. A sound reproducing apparatus, comprising a reproducing unit, means for supporting a traveling film having a sound record in operative relation to said unit, a plurality of vacuum tube amplifiers each connected in normally open circuit with the output of the reproducing unit, a movable member for closing either of said circuits, electromagnetic means for operating said circuit-closing means, and means selectively actuated by the record-carrying film for energizing said electromagnetic means thereby to close the circuit of either of said amplifiers at a predetermined point in the travel of the film.

5. A sound reproducing apparatus, comprising a reproducing unit, means for supporting a traveling film having a sound record in operative relation to said unit, a plurality of vacuum tube amplifiers electrically connected in open circuit with the output of said unit, a pivoted member adapted to maintain either of said circuits closed, electromagnets corresponding in number with the amplifiers and adapted to attract said pivoted member from one circuit closing position to another, and means actuated by the record carrying film for selectively energizing said electromagnets at predetermined points in the travel of the film.

6. A sound reproducing apparatus, comprising a reproducing unit, means for supporting a traveling film having a sound record in operative relation to said unit, a plurality of vacuum tube amplifiers electrically connected in open circuit with the output of said unit, and means controlled by the record carrying film for selectively closing the circuits to said amplifiers.

7. A sound reproducing apparatus, comprising a reproducing unit, means for supporting a traveling film having a sound record in operative relation to said unit, a plurality of amplifiers electrically connected in open circuit with the output of said unit, electromagnetic means for selectively closing the circuits to said amplifiers, a rotatable contact member for alternately maintaining said electromagnetic means energized, elec-

trically actuated means for rotating said contact member, a switch in the circuit of said electrically actuated means, and tension means for closing said switch, said switch being normally maintained open by contact with the edge of the record-carrying film and said film having cut away portions at predetermined points in its edge thereby to permit momentary closing of the switch.

- 10 8. A sound reproducing apparatus, comprising a reproducing unit, means for supporting a traveling film having a sound record in operative relation to said unit, a plurality of amplifiers electrically connected in
15 open circuit with the output of said unit, electromagnetic means for selectively closing the circuits to said amplifiers, a rotatable contact member for alternately maintaining said electromagnetic means energized, a solenoid
20 adapted to rotate said contact member, a spring-actuated switch in the circuit of said solenoid, means carried by said switch and adapted to engage the edge of the record-carrying film thereby to maintain the switch
25 open against the tension of its spring, said film having cut away portions at predetermined points in its edge thereby to permit momentary closing of the switch.

In testimony whereof, I affix my signature.

30 FREEMAN H. OWENS.

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