May 3, 1932. C. W. EBELING 1,856,092

SWITCHING APPARATUS

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Fig. 1.

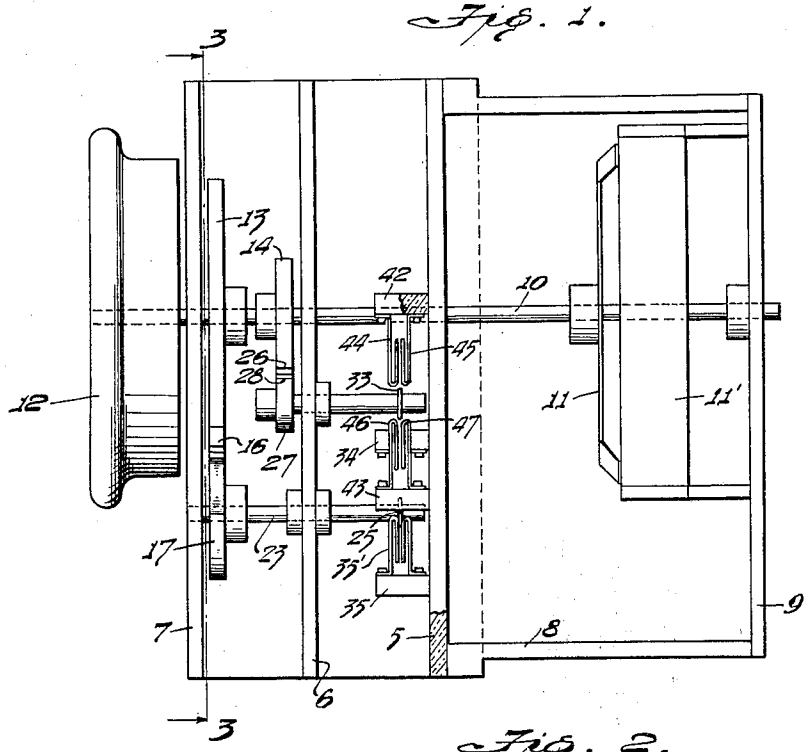

Fig. 2.

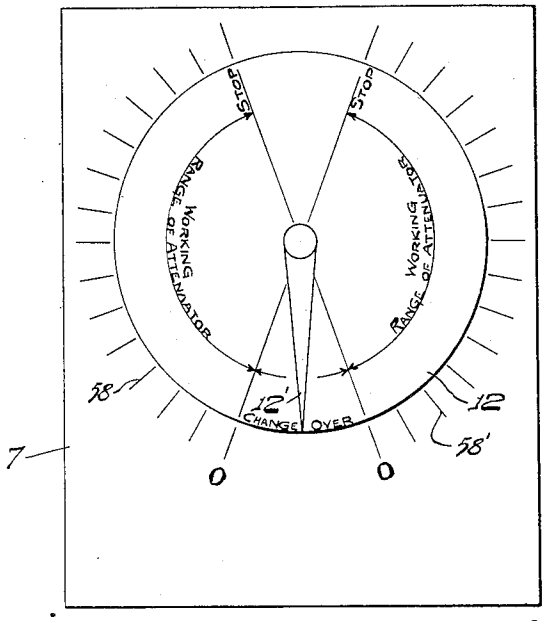

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Fig. 3.

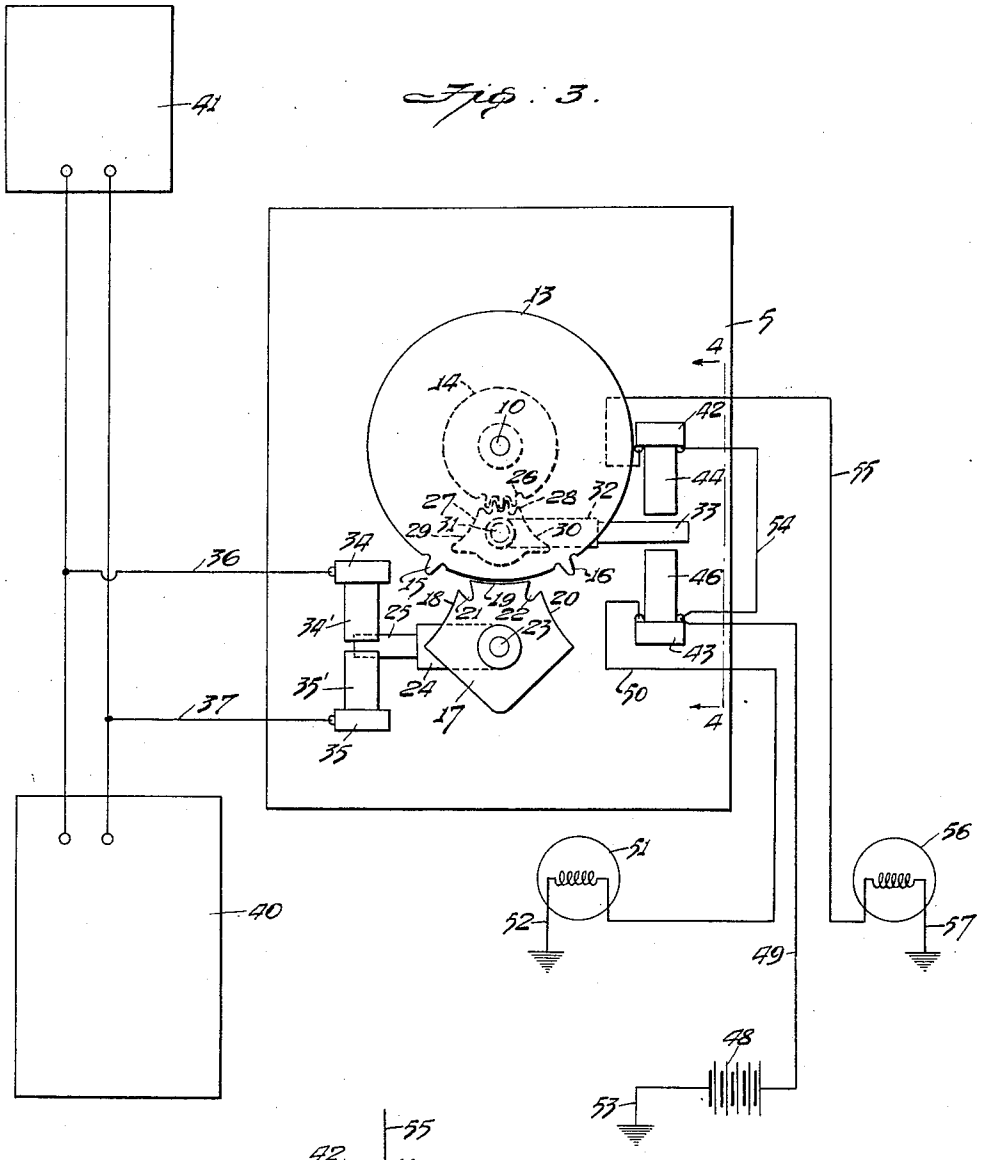
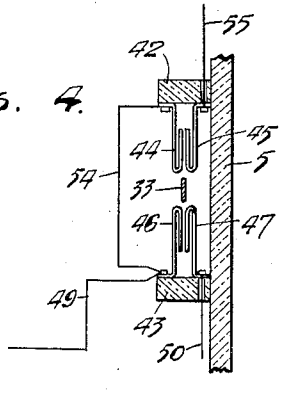


Fig. 4.



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Patented May 3, 1932 1,856,092

UNITED STATES PATENT OFFICE

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SWITCHING APPARATUS

Application filed April 18, 1930. Serial No. 445,451.

The present invention relates to improvements in a switching apparatus, one object of the invention being the provision of an apparatus of this type which is adapted primarily for use in connection with sound-on-film apparatus where at least two motion picture projecting machines are employed, and in which two exciting lamps, one for each machine, are also employed and whereby, by the manipulation of the switch the loud speakers of the amplifying system are shunted during the period between the cutting out of one exciter lamp and the cutting in of the other exciter lamp, or vice versa.

Another object of this invention is a provision of a switching device in which by the manipulation of a main shaft, a shunting switch is first operated and momentarily held in such position during the time that one element is disconnected from a source of electrical energy and until another or similar element is connected to said source.

Still another object of this invention is a provision of a device of this character which is readily inter-connected between the loud speakers of an amplifying system and the exciter lamps of a sound-on-film apparatus, thus producing a thoroughly practical and efficient device for this purpose.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangements of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings

Figure 1 is a view in side elevation of the complete frame-work of the present switching apparatus showing the parts in their relative positions.

Figure 2 is a front view thereof.

Figure 3 is a section taken on line 3—3 of Figure 1 showing an electrical diagram connected therewith to illustrate one circuit arrangement to be controlled by the switching apparatus.

Figure 4 is an enlarged detailed sectional view taken on line 4—4 of Figure 3 showing the switch member in neutral position.

Referring to the drawings, the numeral 5 designates a panel of insulating material, there being attached thereto a forward frame-work 6 and a front panel 7, while attached to the rear face thereof is a frame 8 having a rear plate 9, the whole being so constructed as to be a unitary member.

Journalled in this structure is a main shaft 10 which operates a movable arm 11, which operates in conjunction with an attenuator network or rheostat 11′, the detailed construction of which is not herein shown.

Mounted upon the forward end of the shaft 10 external of the casing or frame-work is an operating disc or knob 12 provided with a pointer or indicator 12′, the purpose of which will presently appear. Keyed on and movable with the shaft 10 within the frame-work are two discs or cams 13 and 14, the cam 13 being circular throughout the greater portion of its circumference, but being provided with two periphery teeth 15 and 16. A Geneva member 17 mounted upon a shaft 23 and as particularly shown in Figure 3 is provided with three curved surfaces 18, 19 and 20, which coincide with the smooth surface of the cam 13, the surface 19 being further provided with notches or recesses 21 and 22 for the reception at the proper time of the respective teeth 15 and 16 as the cam 13 is rotated to oscillate the member 17 and in turn oscillate an arm 24 of insulation which in turn carries a metallic shunting switch 25.

It will thus be seen that as the cam 13 is moved in either direction, as for instance, to the left as viewed in Figure 3 that the tooth 16 will engage the notch 22 and will therefore move the member 17 so that the shunting member 25 thereof would be moved downwardly and that the continued movement of the member 13 would cause the tooth to be disengaged and the surface 20 be brought into sliding contact with the cam 13, so that member 17 will be caused to come to rest. A further manipulation of the cam 13 in this particular direction will have no effect upon the shunting switch 25 but a movement in

the opposite direction will bring the tooth 15 into action and cause the shunting switch 25 to be moved in the opposite direction or upwardly.

The cam 14 is for manipulating a modified Geneva member 27 mounted upon the shaft 31 and provided with the toothed portion 28 for engagement with teeth 26 of the cam 14, this member 27 being further provided with the curved surfaces 29 and 30, which coincide with the smooth curved surface of the cam 14. Attached to and for movement with the member 27 is an arm 32 of insulating material to which is also connected a metallic switch or arm 33.

In this description it will be noted that when the disc 14 is rotated clockwise that the teeth 26 would engage the teeth 28 of the member 27 and will cause the contact or switch member 33 to be moved upwardly until the surface 30 is brought in contact with the circumference of the cam 14 at which time no further movement will be imparted to the arm 33 regardless of the further movement of the member 14, and that to shift the arm 33 from its extreme upper position to the extreme lowermost position the disc 14 is operated counter clockwise so that the teeth 26 will act upon the teeth 28 and bring the curved surfaces 30 into contact with the periphery cam, the continued movement of the cam 14 having no further effect upon the member 27.

When the present device is used in connection with a sound amplifying system having the usual amplifiers 40 and loud speakers 41, it is desirable that no undesirable noise during the switching operation be transmitted through the loud speakers and in order to prevent this the shunting switch 25 is provided, said switch normally being in contact with the respective contacts 34′ or 35′ and only being placed in a central or shunting position during the manipulation of the switch 33 and just previous to the dis-connection thereof from one pair of contacts 44 and 45 or 46 and 47. This shunting action is clearly illustrated in Figure 3 causing the contacts 34′ and 35′ to close the shunt connection 36 and 37 to the conductors 38 and 39, and therefore isolate the speakers 41 from the amplifiers 40. These respective contacts 34 and 35 are attached to and supported from blocks 34 and 35 respectively formed of insulating material and carried by the panel 5 of the present structure.

Also carried by the panel 5 and at the proper place thereon are two spaced blocks 42 and 43 of insulating material, which in turn support their respective pairs of spring contacts 44 and 45, and 46 and 47, respectively, or as particularly illustrated in Figures 1 and 4. Either pair of these contacts are normally engaged by the switch 33 while the normal position of the switch 25 is in non-bridging relation to the contacts 34′ and 35′.

Briefly stated, one circuit arrangement for controlling the respective exciter lamps 51 and 56 is illustrated in Figure 3 and is as follows:

One for the exciter lamp 51 including a battery 48, a conductor 49, the contacts 46, 33, and 47, a conductor 50, an exciter lamp 51, the ground connection 52 and the second ground connection 53.

When the switch 33 is moved to the opposite direction to engage the contacts 44 and 45, the circuit to energize the exciter lamp 56 includes the battery 48, the conductor 49, a conductor 54, the contacts 44, 33, and 45, a conductor 55, the exciter lamp 56 and the grounds 57 and 53.

From the foregoing description it is evident that a switching apparatus connected according to and embodying the present invention will absolutely eliminate the undesirable noise when making a shift over in the present universally used type of "fader" in sound-on-film apparatus, and that during that particular instant of the cutting out of one exciter lamp and the cutting in of the second exciter lamp, that the loud speakers in the amplifying system are shunted from the line and are therefore "dead."

As illustrated in Figure 2, the change-over takes place by movement in either direction of the knob 12 so as to bring the indicator 12′ thereof to either zero position, the shunt switch 25 during this movement having been brought into shunting operation during the change-over of the switch 33 from one pair of contacts to the other pair and the movement of the shunting switch 25 from bridging or shunting position to its neutral position, the continual movement of the knob in that particular direction, as, for instance, clockwise, as illustrated in Figure 2 being ineffective in its operation of the respective switches 25 and 33 but effective with relation to the attenuator and according to the dial markings 58 or 58′ upon the panel 7, the present apparatus being so constructed that the volume increases from zero to the point of stop, or anywhere within the working range as indicated in Figure 2.

What is claimed is:

1. A switching apparatus including a supporting structure, a main shaft journalled therein, a shunting switch mechanism mounted therein, a selective switch also mounted therein, a pair of oppositely disposed cooperating switch contacts associated with the latter and adapted to be contacted thereby, one at a time, means for selectively operating the main shaft, two cooperating Geneva movements attached to the main shaft and mounted in the supporting structure whereby the shunting switch is in neutral position

and the other switch is in closed position, or vice versa.

2. A switching apparatus including a supporting structure, a main shaft journalled therein, a shunting switch mechanism mounted therein, a selective switch also mounted therein, a pair of oppositely disposed cooperating switch contacts associated with the latter and adapted to be contacted thereby, one at a time, means for selectively operating the main shaft and two cooperating Geneva movements operably connected to the main shaft, whereby the shunting switch is in neutral position when the other switch is in closed position, or vice versa, following the shunting switch being brought into and held in operation during the dispatch of the other switch from one time to the other.

3. A switching apparatus including a supporting frame, a main shaft mounted therein, a means for selectively operating the main shaft, two cooperating Geneva movements attached to the main shaft and supported in the frame-work and a switch under the control of each movement.

4. A switching apparatus including a supporting frame, a main shaft mounted therein, cooperating pointer and dial mechanism for selectively operating said main shaft, two cams mounted upon the main shaft and movable therewith, two switches, and two Geneva members, one to each switch disposed for cooperative operation with the respective cams and so disposed relative thereto that one switch is in neutral position and the other switch is in closed position, or vice versa.

In testimony whereof I affix my signature.

CHARLES W. EBELING.