Nov. 18, 1930. J. W. KLEIN 1,781,927

SIGNAL DEVICE

Filed May 21, 1929 2 Sheets-Sheet 1

Fig 1.

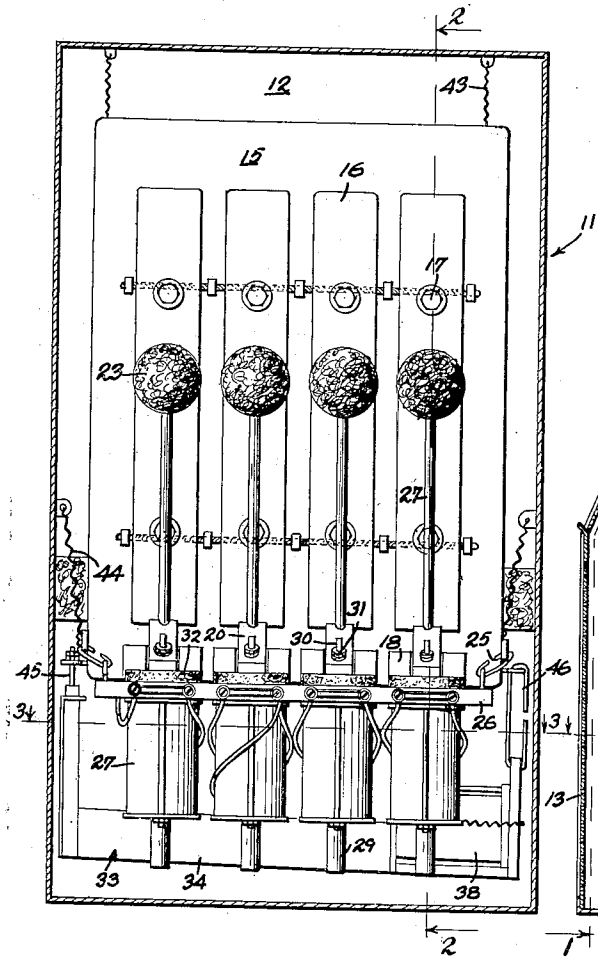
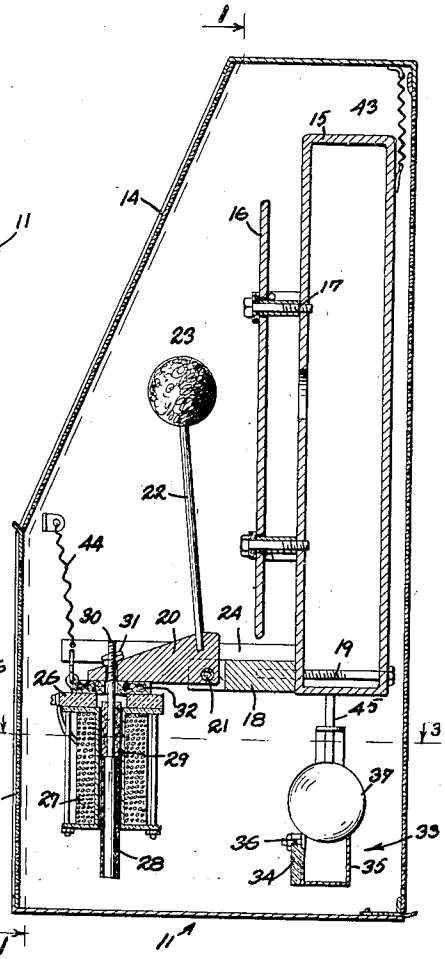


Fig 2.



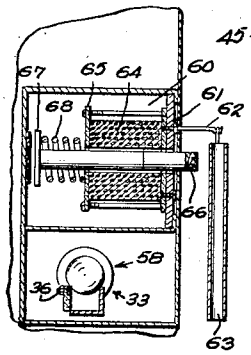
Inventor
J. W. Klein
by Hazard and Miller
Attorneys

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Filed May 21, 1929 2 Sheets-Sheet 2

Fig. 5.



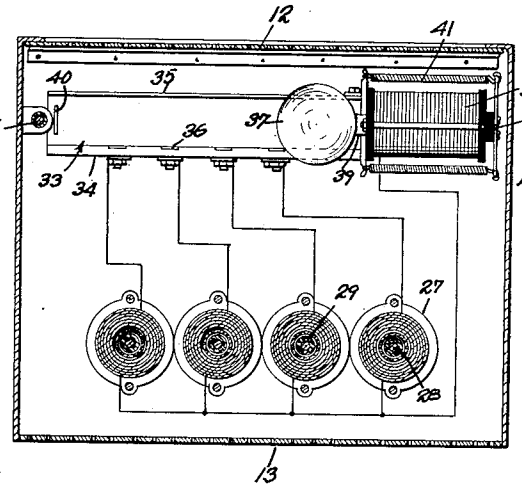
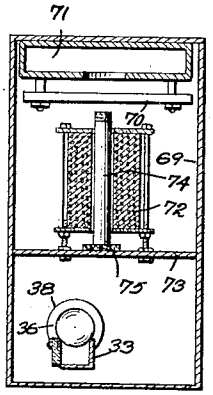


Fig. 3

Fig. 6.



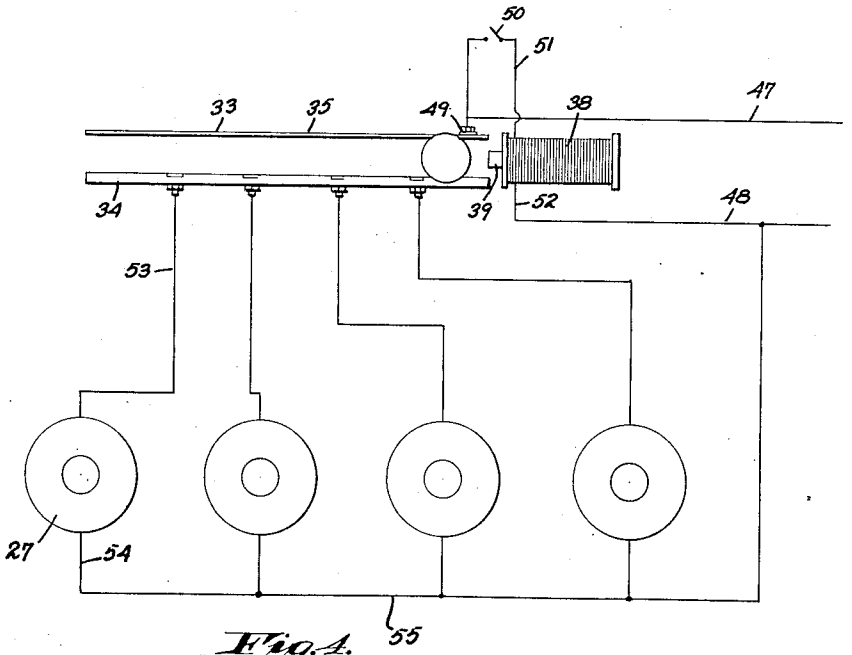


Fig. 4.

Inventor
J. W. Klein
by Hazard and Miller
Attorneys

Patented Nov. 18, 1930 1,781,927

UNITED STATES PATENT OFFICE

JOSEPH W. KLEIN, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO THE ELECTRIC SIGNAL COMPANY, LIMITED, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA

SIGNAL DEVICE

Application filed May 21, 1929. Serial No. 364,817.

My invention is a musical signal device suitable for use as a door call or for other audible calls.

An object of my invention is a signal device which is preferably electrically operated and will give a series of sounds of different pitch, thereby effecting a musical call.

A further object of my invention is utilizing a series of electro-magnetic and operating hammers or strikers which strike gongs, and in combination with these I utilize a movable circuit closer, the circuit closer when operated making a connection through the electro-magnetic device operating the hammers. The series of gongs are of different pitch and arranged to give a pleasing musical sensation.

A further object of my invention is the construction of the circuit closer operated by an electro-magnetic device in which the circuit closing element is given an impulse longitudinally of the track and closes the circuit as it moves along the track.

In constructing my invention I utilize a track having a pair of rails, one of the rails being insulated and having electrical contacts spaced therealong. A ball or roller is adapted to roll on the tracks and close the circuit between the contacts and the other rail. This ball is given an impulse by the armature of a solenoid when said solenoid is energized by pushing a push switch. The ball therefore rolls along the track which has a slight upward inclination and at the end of its motion rolls back.

The circuits along the contacts closed by the ball lead to a plurality of solenoids which have their armatures loosely connected to pivotally mounted hammers, these hammers being adapted to each strike a gong. Therefore as the ball rolls along the track the solenoids are energized one after the other, thereby causing a succession of notes from the gongs.

My invention is illustrated in the accompanying drawings, in which

Figure 1 is an inside elevation being taken on the line 1—1 of Fig. 2 in the direction of the arrows;

Fig. 2 is a vertical transverse section on the line 2—2 of Fig. 1 in the direction of the arrows;

Fig. 3 is a horizontal view taken on the line 3—3 of Fig. 1 or 2 in the direction of the arrows;

Fig. 4 is an electric wiring diagram of the device;

Fig. 5 is a cross-sectional view of an alternative form with the gongs directly operated by the solenoid;

Fig. 6 is a cross sectional view of a modification of the type of Fig. 5.

In constructing my invention I utilize a box-like structure 11 having a removable back panel 12 and a removable front panel 13. The front face 14 is preferably perforated to allow the sound to pass out freely. Inside of this box-like structure I have a resonator 15. In front of the resonator there are a series of gongs 16 spaced from the resonator by sleeve bolts 17. These gongs are mounted to have slight motion. In front of the resonator there is a series of blocks 18 secured thereto by bolts 19. Each of these blocks has a lever 20 mounted on a pivot 21 and extending upwardly from the lever there is a hammer arm 22 with a hammer 23 thereon, the hammer being adapted to strike the gongs.

A pair of bars 24 extend forwardly of the ends of the resonator and suspend an insulating plate 26 from the bars 24 by means of links 25. A series of electric coils 27 are suspended from the insulating plate 26 and with the metal cores 28 form solenoids. Each core has a sound dampening sleeve 29 of rubber or felt and has a threaded end 30 with a nut 31 thereon. A felt 32 is secured to the lower surface of each of the levers 20 and rests on the insulating plate 26.

The circuit closer arrangement comprises a track 33, one rail 34 being of insulating material and the other rail 35 conducting. The insulating rail has a series of contacts 36 and a ball 37 rolls on the rails and is adapted to form an electric connection between the contacts and the conducting rail 35. A solenoid 38 is positioned at one end of the rails and its armature 39 is adapted to strike the ball and roll it along the rails,

the rails having a slight upward inclination. The ball is biased to return to the solenoid and if desired, a spring bumper 40 may be mounted on the end of the track to give the ball an impulse to start its return journey. The armature of the solenoid is retracted by springs 41.

In order to prevent vibration carrying from the solenoids to the resonator and the gongs or from the gongs to the metal box, the resonator and the interior apparatus so far described are suspended by springs 43 and 44 from the top and sides of the box and the track is suspended by a bolt 45 and a hook 46 from the resonator.

The electrical connections comprise lead-in wires 47 and 48. The wire 47 is indicated as being connected at 49 to the rail 35 and also to a switch 50 which is connected by a lead 51 to one side of the solenoid 38. The other side of the solenoid is connected by a lead 52 to the lead-in wire 48. From the contacts 36 there are lead wires 53 which connect to the coils 27 and from these coils there are leads 54 connecting to a common lead 55 connecting back to the power line 48.

From this construction it will be seen that the ball normally rests against the armature 39 of the solenoid 38, but when the switch 50 is closed there is a current through the solenoid 38 forcibly moving the armature outwardly and striking the ball to roll it along the track. The ball in rolling forms a circuit closer between the contacts 36 and the conducting rail 35 so that each of the coils 27 is energized, thus giving a forcible upward movement to the armatures 28.

The connection between the armatures and the levers 20 produce a limited lost motion so that upon the energization of the solenoid, the armature will strike a quick blow upon the lever 20 immediately upon the ball passing the associated contact. When the solenoid is de-energized, the armature immediately drops and retracts the hammer from the gong. Such retracting action causes the sound to be clear and distinct without any muffled effect, very much the same as the action of a piano hammer.

It will be seen from my construction that the gongs sound twice, this being on the movement of the ball outwardly from the solenoid and on its return down the track. Therefore by my construction, even if the circuit closing switch is maintained in the closed position, there are only the two soundings of the gongs on the outward and return movement of the ball. Therefore if my signal device is used in place of a door-bell, there is no annoyance due to the continuous ringing from a continuously closed switch.

In Fig. 5 I show a modified construction illustrating a box 60 which may be inserted in a wall, this having a face plate 61 with a series of hooks 62 extending from such face plate and there is a tubular gong 63 depending from each hook. There is a solenoid 64 for each gong and each solenoid has an armature 65 which extends outwardly through an aperture in the face plate, each solenoid having a pad 66 on its outer end and having a head 67 on the inner end. A spring 68 bears against the head and the solenoid winding, tending to retract the armature and the head may abut against the pad 68 at the back of the box. The circuit closer has a track 33 and a solenoid 38 similar to the construction shown in Figs. 1 through 4. Each of the solenoids 64 is connected to a contact 36 on the track.

With this construction, on energizing the solenoid 38 the ball is struck and rolls upwardly on the track, closing the circuit to each of the solenoids 64 in succession. The armature in being thrust outwardly gives a direct blow on the gong 63 and is retracted by the spring 68. The return movement of the ball by gravity gives a second blow to the gong. This construction eliminates the hammers and other details of the construction shown in Figs. 1, 2 and 3, operating the gongs directly by the solenoid armatures.

In Fig. 6 I show a modified form of the device of Fig. 5. This utilizes a box 69 having a plurality of gongs 70 in the form of flat plates depending from the resonance box 71. A series of solenoids 72 are mounted on a partition 73 in the box 69 and each has an armature 74 with a pad on the top, the armature being adapted to drop by gravity on a pad 75. This construction utilizes the same form of track 33 as illustrated in Figs. 1 through 5 with an actuating solenoid 38 for the ball. In this type, when the ball rolls along the track it closes the circuits to each of the solenoids 72 in succession. The action of the solenoids thrusts the armatures upwardly, striking the gongs and they return by gravity. As the ball rolls down by gravity it causes the second operation of the gongs.

Various changes may be made in the principles of my invention without departing from the spirit thereof as set forth in the description, drawings and claims.

I claim:

1. A signal device comprising in combination a plurality of sound producing devices, each having a tone differing from the remainder, an electrically operable striker and a circuit therefor for each of said devices, switch means operable through a cycle of positions to successively close said circuits in a predetermined order, and manually actuatable means for operating said switch means, said switch means comprising a roller, a track therefor having a plurality of insulated contact portions thereon, each in one of said circuits, and means for projecting said roller

over said track to successively bridge said contact portions.

2. A signal device comprising in combination a plurality of sound producing devices, each having a tone different from the remainder, an electrically operable striker and a circuit therefor for each of said devices, switch means operable through a cycle of positions to successively close said circuits in a predetermined order, said switch means comprising a metal roller, a track therefor inclined to the horizontal, having a plurality of insulated contact portions thereon, each in one of said circuits, and means for projecting said roller in one direction over said track against the force of gravity, whereby the movement of said roller will bridge said contacts in a predetermined order when moving in one direction and in the reverse order when returning by gravity.

3. A signal device comprising in combination a plurality of sound producing devices, each having a tone different from the remainder, an electrically operable striker and a circuit therefor for each of said devices, switch means operable through a cycle of positions to successively close said circuits in a predetermined order, said switch means including a roller, a track therefor inclined to the horizontal comprising a continuous contact rail, and an insulating rail having a plurality of contacts thereon connected selectively in said circuits, means for projecting said roller along said track in one direction from a normal position, against the force of gravity, gravity acting to return the roller to said normal position to thereby successively close said circuits in a predetermined order, and manually controlled means for actuating said projecting means.

4. A signal device comprising in combination a plurality of sound producing devices, each having a tone different from the remainder, an electrically operable striker and a circuit therefor for each of said devices, switch means operable through a cycle of positions to successively close said circuits in a predetermined order, said switch means comprising a metal roller, a track therefor inclined to the horizontal, having a plurality of insulated contact portions thereon, each in one of said circuits, and magnetic means for projecting said roller in one direction over said track against the force of gravity, whereby the movement of said roller will bridge said contacts in a predetermined order when moving in one direction and in the reverse order when returning by gravity, and a manually operable switch for actuating said magnetic means.

5. A signal device comprising in combination a track having a rail of conducting material and a rail of non-conducting material, a plurality of contact members on the non-conducting rail, a bridging piece on the track and movable therealong to bridge between said contact members and said conducting rail, said track being inclined relative to said bridging piece whereby said bridging piece is normally biased by gravity to one end of said track, electromagnetic means for producing an impact upon said bridging piece to move the same along the track against the force of gravity, a plurality of electromagnetically operated sound producing devices and circuits therefor each connected to one of said contact members.

In testimony whereof I have signed my name to this specification.

JOSEPH W. KLEIN.