

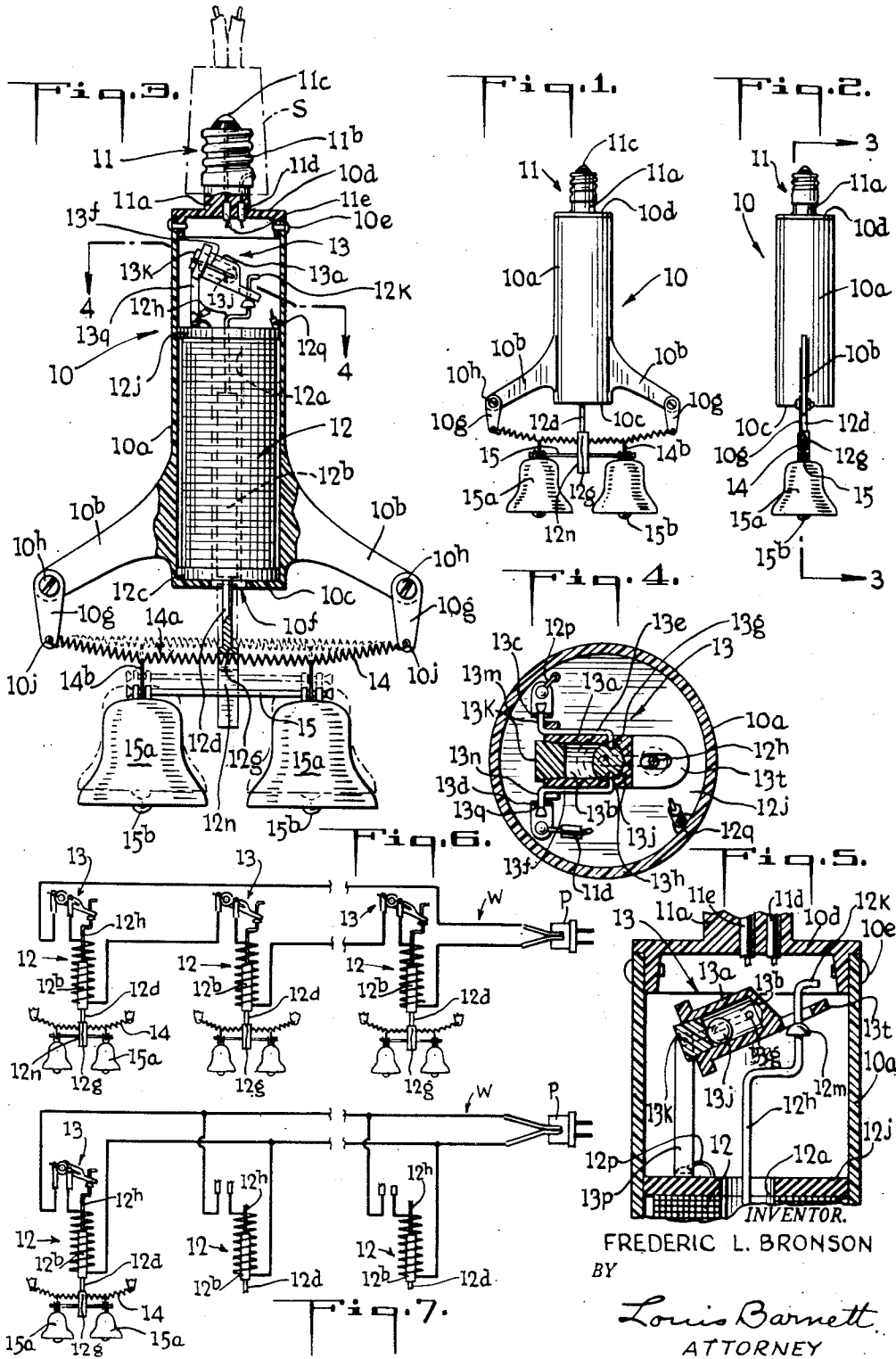
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CHRISTMAS TREE BELL RINGING INSTRUMENT

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CHRISTMAS TREE BELL RINGING
INSTRUMENT

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This invention relates to electrical operated bell ringing devices, and more particularly is directed to a Christmas tree bell ringing ornament operated by electric power through a portable wiring, such as used for decorating Christmas trees and other display purposes.

Among the objects of the invention is to generally improve bell ringing devices of the character described comprising a few and simple parts which are readily assembled to form a neat and appealing ornamental decoration, which shall be reliable in operation, which shall be relatively cheap to manufacture yet attractive in appearance, and which shall be efficient and practical to a high degree in use.

Other objects of the invention will in part be obvious and in part hereinafter pointed out. The invention accordingly consists of features of construction, combination of elements, arrangement of parts which will be exemplified in the construction hereinafter described and of which the scope of application will be indicated in the following claims.

In the accompanying drawings in which one illustrated embodiment of this invention:

Figs. 1 and 2 are front and side elevational views, respectively, of an improved decorated electrical bell-ringing device constructed to embody the invention.

Fig. 3 is an enlarged cross-sectional view taken on line 3—3 in Fig. 2, exposing the interior construction of the improved device and showing the mercury switch in closed circuit position.

Fig. 4 is a greatly enlarged cross-sectional view taken on lines 4—4 in Fig. 3, showing a detailed interior construction of the simplified mercury switch.

Fig. 5 is a greatly enlarged fragmentary cross-sectional view showing details of the mercury switch construction with said switch in open circuit position.

Fig. 6 is a diagrammatic view showing a plurality of improved bell-ringing devices connected in series circuit to form a portable set, and

Fig. 7 is a diagrammatic view similar to Fig. 6 showing a plurality of improved devices connected in a parallel portable circuit.

Referring in detail to the drawing 10 denotes an electrically operated bell-ringing device constructed to embody the invention such as may be used as a Christmas tree ornament or for other decorative purposes.

As seen from Figs. 1 to 5 device 10 may have an enclosing casing 10a formed as an elongated tubular structure having outwardly extending

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arms or spread branches 10b from the exterior side of casing 10a up from extreme lower end closure 10c thereof. Device 10 when made as a complete unit for connecting in circuit, as for example, to conventional type of socket S, may have a screw base 11 to fit said socket S in the well understood manner, said screw base 11 projecting in axial alignment with said casing 10a from upper end cover 10d thereof, opposite said lower end closure 10c, as shown in Figs. 1 to 3.

If desired said branch arms 10a and lower end closure 10c may be molded, pressed, cast or otherwise formed as an integral structure and upper end cover 10d formed part of central insulating post 11a of screw base 11 on which contact ferrule or shell 11b is securely mounted in space relation to center contact 11c of said screw base 11. The latter with said end upper cover 10d may be removably mounted and secured in a firm seated position by suitable fastener means such as rivets 10e as shown in Figs. 2 and 5.

Securely mounted to occupy lower and mid-portions of casing 10a there may be a suitable electrically operated reciprocating motor of any well known construction, and as here shown, is seen to comprise an improved solenoid magnet coil 12 wound with a central axial bore 12a in which is fitted for sliding movement a permeable, that is, magnetizable armature or plunger bar 12b which is made shorter than the length of bore 12a. As shown in Fig. 3, lower end 12c of solenoid magnet coil 12 rests on the interior side of casing end closure 10c. The latter may be provided with a clearance through-opening 10f wherethrough an extension bar 12d freely passes, said bar 12d being carried to project down from lower end of armature 12b and beyond said end closure 10c to terminate in a striker or vibrator fitting 12g.

Armature 12b on the upper end thereof opposite said extension bar 12d also carries rod 12h which projects up through bore 12a and above upper end 12f of solenoid coil 12a. Said rod 12h may through a suitable loose interconnection, such as, terminating bent end stop 12k on rod 12h and bead 12m secure on the latter a spaced distance down from stop 12k between which an eye-connection portion 13t of an electrical operating switch 13 is actuated.

Electric switch 13 may be an improved quick make-and-break type, and of miniature size to readily fit and operate within casing 10 above solenoid 12 and below upper cover 10d thereof.

As seen from Figs. 3, 4 and 5, said switch 13 may be constructed of insulating material, such

as plastic or fibre having a body 13a formed with a recess or chamber 13b, said eye-connection portion 13t extending as a swinging end of said body 13a. The other end of said body 13a may be trunnioned between metallic bearings 13c and 13d which journal shaft ends 13m and 13n, respectively, of current conductor element 13e and 13f, respectively, said elements 13e and 13f being secured to extend along opposite sides of the body 13a and project therethrough into chamber 13b with switch terminal ends 13g and 13h of elements 13e and 13f, respectively, exposed, said terminal ends 13g and 13h serving to close a power supplying electric circuit on being bridged by a mercury globule 13j trapped within said chamber 13b by stopper or plug 13k which is securely fitted as a closure on a single open end of chamber 13.

Shaft ends 13m and 13n of elements 13e and 13f opposite switch terminal ends 13g and 13h, respectively, provide self-cleaning electrical connection with said metallic bearing 13c and 13d, respectively, the latter terminating spaced metallic stanchions 13p and 13q, respectively, which are secured to upstand on solenoid upper end 12j. Stanchions 13p may be connected in said circuit with one end 12p of the winding of solenoid magnet coil 12, and stanchion 13q connected through conductor wire 11d with base shell 11b, the other end 12q of solenoid coil 12 through conductor wire 11e connecting with base center contact 11c.

Arm branches 10b, if desired, may each be provided with suitable adjustable spread extensions, such as arms 10g secured by bolts 10h, free ends 10j of arms 10g providing anchorages for the opposite ends of a stretched elastic spanning member, for example, elongated helical spring 14, a mid-section 14a of which passes between tines 12n of vibrator fitting 12g when the latter is fork-shaped. If desired fitting 12g may be directly attached to spring mid-portion 14a instead of providing the loose connection shown in Figs. 1 to 3.

From spring 14, preferably at the mid-section 14a thereof, on an interconnecting bar 15, ends of which hang from said mid-portion 14a, through links 14b, there may be suspended one or more sound producing means, such as here shown, a pair of bells 15a each having a free swing striker 15b. By tensioning spring 14 through spread adjusting arms 10g, a desired degree of vibratory movement may be delivered to bells 15a and strikers 15b on reciprocating abutment of said fitting 12g with said spring mid-section 14a in the manner hereinafter described.

Current carrying elements 13e and 13f, and particularly shaft ends 13m and 13n, and terminal ends 13g and 13h thereof, respectively, may be practically kept in proper electrical condition without requiring attention by making said elements 13e and 13f of bronze or a suitable nickel alloy, such as so-called "German silver."

As clear from Figs. 1 to 3, tines 12n, or the like structures that may be provided as part of fitting 12g serve to restrict side movement of spring mid-section 14a so that the latter is in most favorable position for receiving effective vibration or blows from the armature movement with fitting 12g therewith or thereon.

After constructing and assembling bell-ringing device 10 as described above and shown in Figs. 1 and 5, the operation and utility of the invention will be apparent.

Device 10 may be suspended from a Christmas tree or incorporated in other forms of decora-

tions by providing a portable power circuit including a conventional tap-plug P connected through flexible wiring W with a plurality of said sockets S in series, or in multiple as shown diagrammatically in Figs. 6 and 7, each device 10 being screwed into a socket S in the well understood manner as indicated in Fig. 1.

On connecting tap-plug P to a household or commercial current electrical power supply (not shown) the solenoid magnet coils 12 are energized since normally each armature 12b is dropped down and switch 13 is in closed circuit position, shown in full lines in Figs. 1 and 4, the circuit extending from socket S successively to base shell 11b, conductor wire 11d, stanchion 13q, switch element 13f, globule 13j, switch element 13e, stanchion 13p, coil end 12p, coil 12, coil end 12q, conductor wire 11e and back to base center contact 11c.

This energizing of each solenoid magnet coil 12 will slidably draw, that is, raise armature 12b through magnetization thereof into bore 12a lifting rod 12h, from the position shown in Figs. 3 and 4 to that shown in Fig. 5. In the fully raised or extreme up-stroke position, switch 13 is tilted on trunnion bearing 13c and 13d sufficiently to cause globule 13j in chamber 13 to break the circuit between terminal 13g and 13h, de-energizing each solenoid magnet coil 12. Each armature 12b is thus released from its magnetic attraction permitting the weight of armature 12b due to gravity to become effective which on dropping with fitting 12g strikes the latter on spring mid-portion 14a a hammer blow for vibrating spring 14 and jangle bells 15a and strikers 15b to produce a desired ringing sound.

The making and breaking of the circuit operation through switches 13 will continue so long as electric power is provided to tap-plug P successively producing repeated hammer blows for continuously vibrating spring 14 to ring bells 15a. It has been found that when device 10 has the solenoid magnetic coil 12 thereof designed for a 120-volt circuit, energizing said coil 12 will reciprocate armature 12b over 100 strokes a minute with said improved mercury type switch 13.

It is contemplated in commercializing the invention by providing device 10 either as single units each connected in circuit through portable wiring fitted with a single socket S at one end thereof and a tap-plug or plug P at the other end of such portable wiring all of well understood construction, or as a series circuit connecting said devices 10 with wiring W and tap-plug P in form of a set as is clear from Figure 6. Also, in the form of a plurality of shunted or parallel connected devices 10 may be connected in multiple circuit through sockets S, forming a set, as shown diagrammatically in Fig. 7.

It will thus be seen that there is provided an improved device in which the several objects of the invention are achieved and which are well adapted to meet the conditions of practical use.

As various possible embodiments of the invention may be made in the above invention and as various changes may be made in the embodiment above set forth, it is to be understood that all matters herein set forth and shown in the accompanying drawing are to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. In a decorative electrically operated bell ringing device including a switch controlled electrically operated motor having an enclosing cas-

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ing, a resilient supporting structure carried to extend from the exterior of said casing, sound producing means secured to said structure for movement therewith, and impact means for actuating said structure and sound producing means during the operation of said motor.

2. In a decorative electrically operated bell-ringing device of the character described including solenoid magnet coil having an axial bore and permeable armature mounted to reciprocate in said axial bore, a switch mounted along the path of movement of said armature connected in circuit with said magnet coil, an extension of the armature operatively connected to move the switch for making and breaking the circuit energizing said coil, a hammer fitting mounted for movement by said armature to be projected in a path beyond said coil, said fitting being in a striking position with respect to a sounding bell of said device, a casing for housing the magnetic coil and switch, spaced apart arms extending from said casing between which the path of movement of said fitting projects, and a resilient support anchored to and stretched in tension between said arms for supporting said sounding bell in the path of said fitting movement.

3. In a decorative electrically operated bell-ringing device as defined in claim 2, in which said hammer fitting terminates in a fork having spaced apart tines between which said support stretches for retaining the latter against displacement from the path of projected movement of fitting.

4. In a decorative electrically operated bell-ringing device including a switch controlled electrically operated motor having an enclosing casing, a resilient supporting structure carried to extend from the exterior of said casing, impact means connected for movement in a pre-determined path during the operation of said motor to actuate said structure, said structure forming a tensioned anchorage in said path for supporting a sounding bell of said device.

5. In a decorative electrically operated bell ringing device including a mercury switch supported over and connected in circuit with a solenoid magnet coil having a vertically disposed axial bore, a sliding magnetizable armature cooperatively mounted in said bore effective to raise said armature into said bore when said coil is energized and to be lowered by gravity when said coil is deenergized, said switch having a body of insulating material trunnioned at one end on current carrying metallic bearing support from an upper end of said coil and connected in said circuit through current conductor elements which provide make and break terminals for said mercury switch effective to make the circuit through said switch when said armature is lowered by gravity and to break the circuit through the switch when said armature is raised, a casing for enclosing said magnet coil and switch, a hammer fitting secured slide with a lower end of said armature for movement beyond said casing, and a resiliently tensioned support for a sounding bell of said device carried by said casing in said path of movement for actuating said support.

6. In a decorative electrically operated bell ringing device including a mercury switch supported over and connected in circuit with a solenoid magnet coil having a vertically disposed axial bore, a sliding magnetizable armature cooperatively mounted in said bore effective to raise said armature into said bore when said coil is

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energized and to be lowered by gravity when said coil is de-energized, said switch having a body of insulating material trunnioned at one end on current carrying metallic bearing support from an upper end of said coil and connected in said circuit through current conductor elements which provide make and break terminals for said mercury switch effective to make the circuit through said switch when said armature is lowered by gravity and to break the circuit through the switch when said armature is raised, a casing enclosing said coil and switch having at one end spread apart branch arms extending from an exterior side thereof, a circuit plugging connector terminating the other end of said casing, a support on said arms for suspending a sound producing bell, and a fitting carried at a lower end of said armature aligned to intermittently actuate said support for sounding the bell.

7. In a decorative electrically operated bell ringing device, a vibratory support string for suspending sound producing bells thereon, a switch supported over and connected in circuit with a solenoid magnet coil having a vertically disposed axial bore, a sliding magnetizable armature cooperatively mounted in said bore effective to raise said armature into said bore when said coil is energized and to be lowered by gravity when said coil is de-energized, a hammer fitting carried at a lower end of said armature effective to strike said vibrating support string on the gravity lowering stroke of the armature, said switch being operated by said armature to be opened when the armature is magnetically attracted and closed when the armature is released.

8. In a decorative electrically operated bell ringing device including a mercury switch supported over and connected in circuit with a solenoid magnet coil having a vertically disposed axial bore, a sliding magnetizable armature cooperatively mounted in said bore effective to raise said armature into said bore when said coil is energized and to be lowered by gravity when said coil is de-energized, a hammer fitting carried at a lower end of said armature effective to strike a sound producing means on the gravity lowering stroke of the armature, said switch having a body of insulating material trunnioned at one end on current carrying metallic bearing support from an upper end of said coil and connected in said circuit through current conductor elements which provide make and break terminals for said mercury switch effective to make the circuit through said switch when said armature is lowered by gravity and to break the circuit through the switch when said armature is raised.

9. In a decorative electrically operated bell ringing device including a mercury switch supported over and connected in circuit with a solenoid magnet coil having a vertically disposed axial bore, a sliding magnetizable armature cooperatively mounted in said bore effective to raise said armature into said bore when said coil is energized and to be lowered by gravity when said coil is de-energized, said switch having a body of insulating material trunnioned at one end on current carrying metallic bearing support from an upper end of said coil and connected in said circuit through current conductor elements which provide make and break terminals for said mercury switch effective to make the circuit through said switch when said armature is lowered by gravity and to break

the circuit through the switch when said armature is raised, a casing enclosing said coil and switch, having spread branch arms extending from the exterior side thereof, a vibratory support strung between said arms for suspending a sound producing bell thereon, and a hammer fitting carried at a lower end of said armature aligned to intermittently strike said vibratory support on the gravity lowering stroke of the armature.

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