Aug. 30, 1955 J. PETRY 2,716,745

ELECTRICALLY OPERATED BELL RINGING DECORATIVE DEVICE

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Fig. 2.

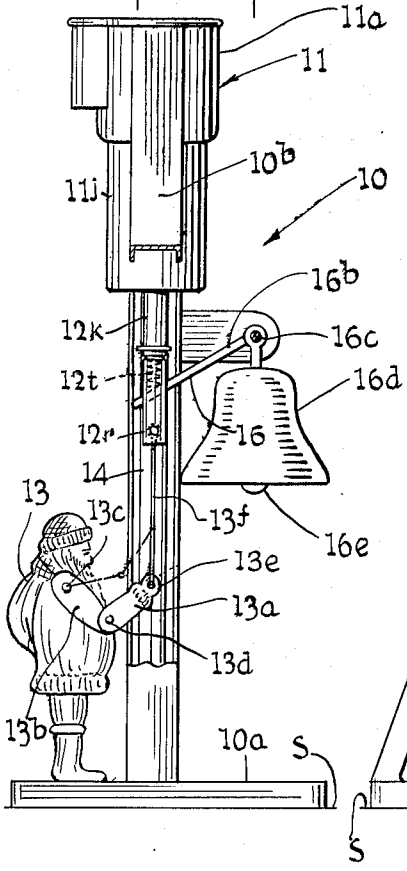

Fig. 1.

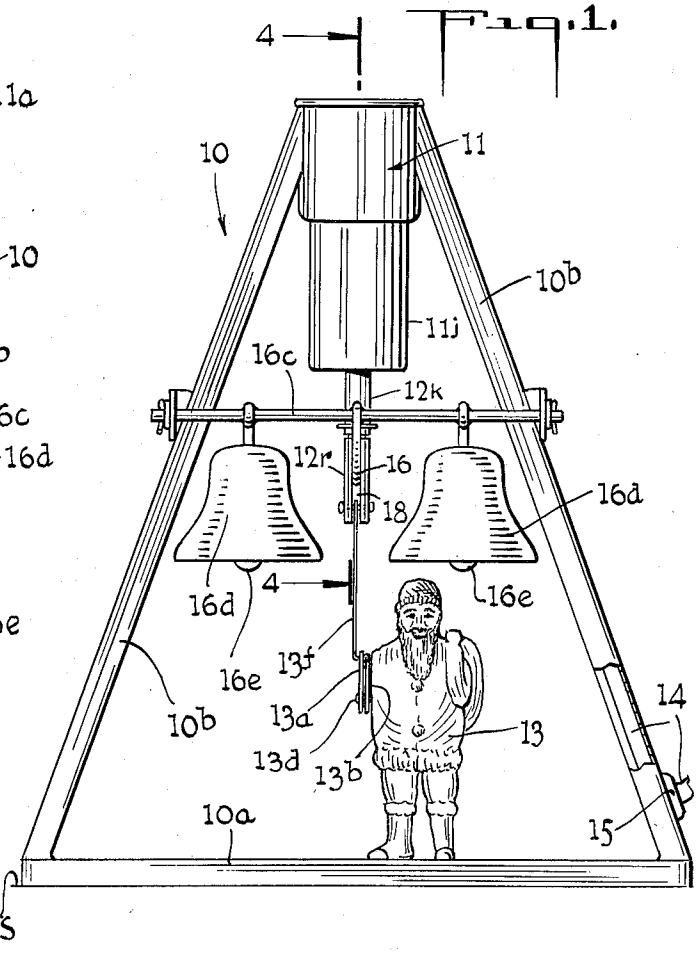

Fig. 3.

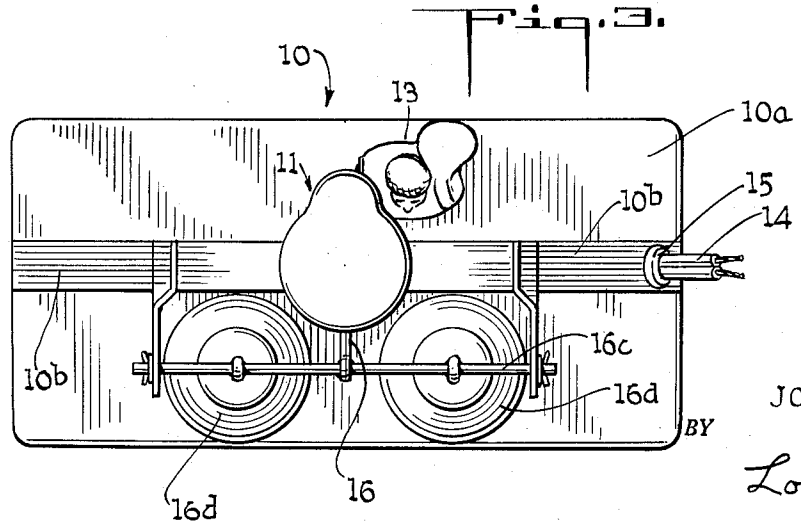

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Fig. 4.

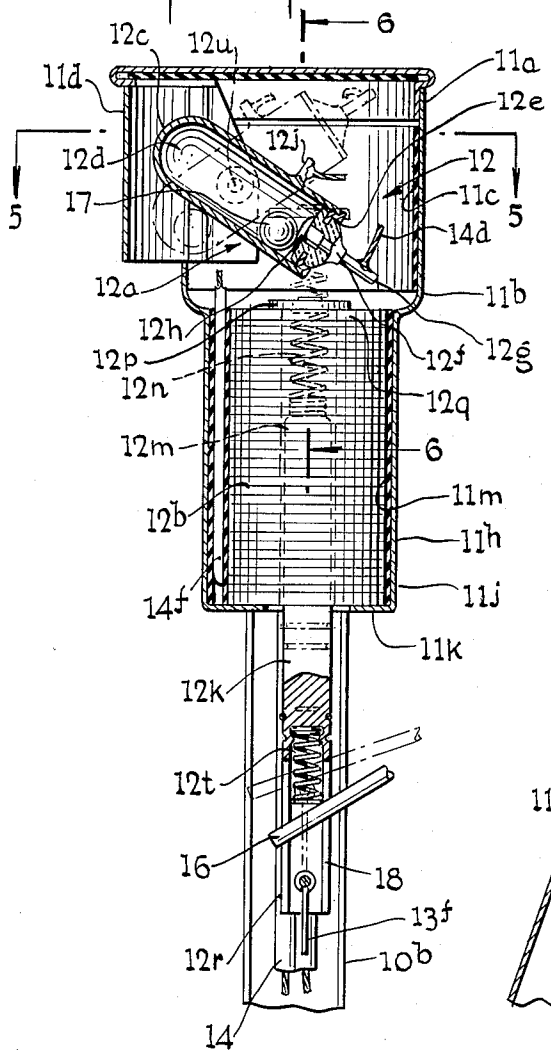


Fig. 5.

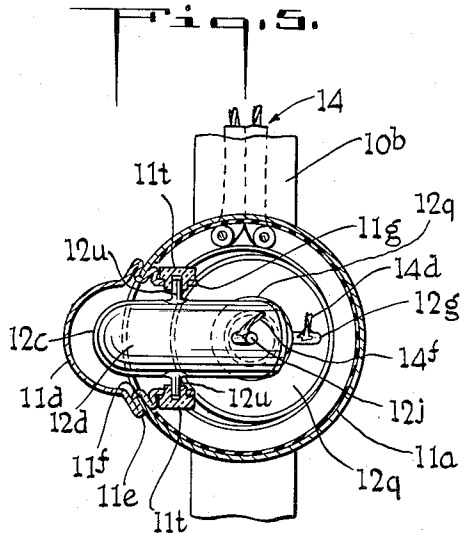


Fig. 6.

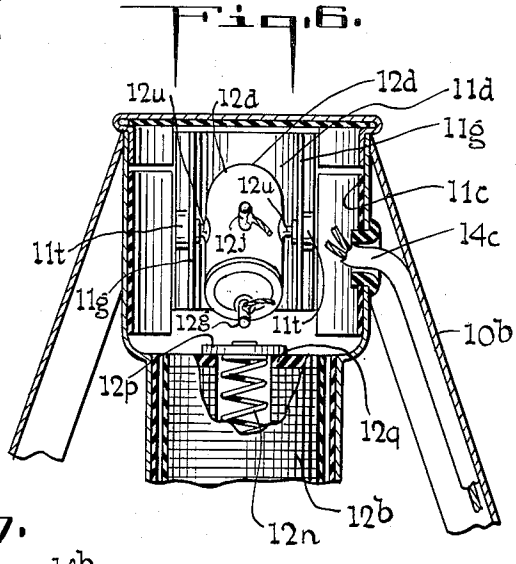
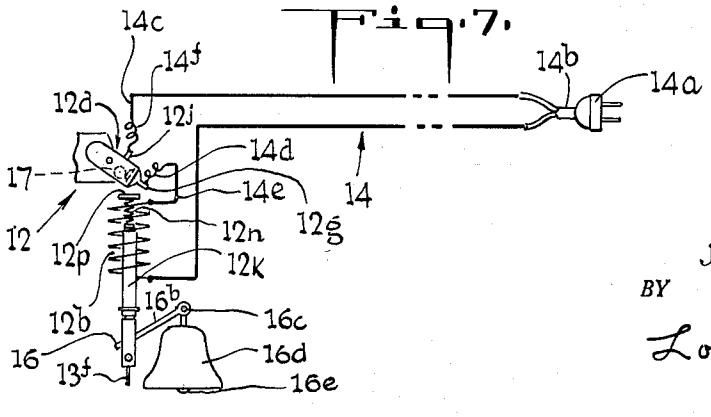


Fig. 7.



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ELECTRICALLY OPERATED BELL RINGING DECORATIVE DEVICE

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7 Claims. (Cl. 340—398)

This invention relates to electrically operated animated bell ringing devices, and more particularly is directed to Christmas tree or other decorative display ornament including a bell type of sound producing means operated electrically through a portable wiring power supply such as may be used in trimming Christmas trees and for other decorative display or show purposes.

Among the objects of the invention is to generally improve animated devices of the character described comprising few and simple parts which are readily assembled to form neat and appealing decorative ornaments, which shall be reliable in operation, which shall smoothly function, which shall be rugged in construction and capable of withstanding rough handling, which shall be 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 and arrangements of parts which will be exemplified in the construction hereinafter disclosed, the scope of the application of which will be indicated in the claims following.

In the accompanying drawing in which one embodiment of the invention is shown,

Figs. 1, 2 and 3 are front elevational, side elevational and top plan views, respectively, of an improved decorative electrically operated bell-ringing device suitable as an animated Santa Claus figure Christmas tree ornament constructed to embody the invention, Fig. 2 being partly broken away to expose the moving parts.

Fig. 4 is an enlarged cross-sectional view taken on line 4—4 in Fig. 1 showing the interior of said improved device with the mercury switch thereof in a closed circuit position, the open circuit position of said switch being shown in dot and dash lines.

Figs. 5 and 6 are enlarged cross-sectional views taken on lines 5—5 and 6—6 in Fig. 4, respectively, showing a detail assembly and movable mounting of the switch parts and connections, and

Fig. 7 is a diagrammatic view of one of the improved devices shown in Figs. 1 to 3 connected in a portable plug-in electric power circuit.

Referring in detail to the drawing **10** denotes an electrically operated decorative bell ringing device constructed to embody the invention, and in the form here shown incorporates an animated Santa Claus figure adapted to be articulated with the ringing operation to form a Christmas tree ornament and for other show or decorative purposes.

As seen from Figs. 1 to 6, said device **10** may be constructed to have a horizontally extending base frame member **10***a* from opposite ends of which angular disposed channel-frame struts **10***b* projected thereabove for rigidly supporting a casing **11** in which the electrically operated mechanism indicated generally at **12** is housed at a spaced distance above the frame base **10***a* on which animated figure **13** upstands all in the manner hereinafter described.

Device **10** may have said mechanism **12** connected to a suitable electric supply power source in any well understood manner, and as here indicated in Fig. 7, has portable extension wiring **14** terminating in a conventional tap plug **14***a* at ends **14***b* thereof and the other ends **14***c* of wiring **14** connecting with series circuit therewith a tiltable mercury type switch **12***a* and solenoid magnet coil **12***b* which are both housed in casing **11**, as is clear from Figs. 4 to 7.

Casing **11** may be constructed to have an upper section compartment **11***a* of circular cross-sectional shape formed with an outer wall which for strength and economy of production may be made as a sheet metal shell **11***b* having suitable insulating liner **11***c* extending along inner surface of shell **11***b*, a mid-portion of said shell **11***b* and liner **11***c* being pierced by an insulating thimble or bushing **15** through which wiring ends **14***c* pass into casing compartment **11***a* for connecting with switch **12***a* housed therein as is clear from Figs. 4–7.

As seen in Figs. 1, 3, 4, 5 and 6 wiring ends **14***c* after passing through bushing **15** from upper compartment **11***a* may be passed along the adjacent channel section strut **10***b*, and hence through bushing **15** provided in said strut **10***b* adjacent base **10***a* so that the wiring in and about device **10** is practically concealed.

Casing shell **11***b* may have an outwardly bulged or U-shaped portion **11***d* to provide clearance for closed end **12***c* of an elongated cylindrical shaped capsule **12***d* of switch **12***a*. Said outwardly bulged or U-shaped portion **11***d* may be provided with spaced slide seams **11***e* that may removably engage and clamp with edges **11***f* of said casing shell **11***b* as shown in Fig. 5.

Extreme inward edge borders **11***g* of said portion **11***d* beyond seams **11***e* extend into said casing upper compartment **11***a* to provide supports for insulating block bearings **11***t* in which oppositely disposed outwardly extending stub shafts **12***u* from said switch capsule **12***d* are journalled for trunnioning said capsule **12***d* adjacent said closed end **12***c* thereof. The other end **12***e* of said capsule **12***d* opposite closed end **12***c* may be provided with a tight sealed closure **12***f* of insulating capping material having a central metallic connector terminal **12***g* provided with a head portion **12***h* positioned within capsule **12***d* and insulated therefrom. Free or tail end of terminal **12***g* extends beyond said capping seal **12***f*, and through a slack coil end **14***d* may be joined in circuit with one end of wiring jumper **14***e* connecting with solenoid magnet coil **12***b*.

Capsule **12***d* which may be formed of metal may have a terminal connector **12***j* projecting therefrom at a spaced distance from said free end of terminal **12***g*, said connector **12***j* being joined in circuit with one of the wiring ends **14***c* through a slack coil end **14***f* as is clear from Fig. 7.

As circuit making and breaking means, a drop or globule **17** of mercury is confined in capsule **12***d* which completes the electrical circuit when said capsule **12***d* is downtilted with globule **17** lodged between terminal connection head **12***h* and the adjacent wall of the capsule **12***d* as shown in full lines in Figs. 4 and 7. Said capsule **12***d* has stub shafts **12***u* thereof positioned closer to the closed end **12***c* than to the sealed end **12***f* so that when device **10** rests on a horizontal level surface capsule **12***d* will, due to gravity, normally be in said full line circuit closing position.

Casing **11** as seen from Figs. 4 to 6 may also be constructed to have a lower section compartment **11***h* positioned under upper section compartment **11***a* adjoining and communicating with the latter, said lower compartment **11***h*, as here shown, may be of circular cross-section shape of slightly less diameter than upper compartment **11***a* with outer sheet metal shell **11***b* of the latter extended down as at **11***j* provided with an inturned bottom side **11***k* to enclose solenoid magnet coil **12***b*. Lower com-

partment shell extension 11*j* may be provided with suitable insulating liner 11*m* and extreme end portion 14*f* of one of the wiring ends 14*c* may be extended through lower compartment 11*h* to connect with solenoid magnet coil 12*b* as is clear from Figs. 4 to 7.

Solenoid magnet coil 12*b* in lower compartment 11*h*, may be formed with an axial bore in which a vertically disposed freely slidable core plunger or armature 12*k* made of permeable material, such as steel or iron is mounted, said armature 12*k* passing through casing bottom side 11*k*. Upper end 12*m* of said armature 12*k* may be provided with suitable resilient shock absorbing means, such as a helical wound compression spring 12*n*, which may terminate in a capping disc 12*p* that is of sufficient diameter to serve as a stop for seating on the upper insulating side 12*q* of solenoid 12*b* to limit the down movement of armature 12*k*. Said capping disc 12*p* on retraction of armature 12*k* into the solenoid magnet coil 12*b* is constructed and arranged to yieldably lift the capsule sealed end 12*f* thereby tilting capsule 12*d* for movement from the full line to the dotted line position to interrupt by breaking the circuit through globule 17, compression spring 12*n* serving to absorb any jarring blow caused by said disc 12*p* striking capsule end 12*f* as is clear from Figs. 4, 6 and 7.

Lower end 12*r* of armature 12*k* which projects below the level of casing bottom side 11*k* carries a slotted fitting 18 through which a free end 16*a* of a vertically swingable crank arm 16 extends, said arm end 16*a* being cushioned by a suitable anti-shock means, as for example, by providing a helical wound interposing compression spring 12*t* extending within said fitting 18 over said crank arm end 16*a* as shown in Figs. 1 and 4.

Crank arm 16 has end 16*b* opposite said free end 16*a* secure to turn with a horizontal mounted bar 16*c* which may be journalled for rotation between spaced apart bearing brackets 10*c* supported from struts 10*b*. Said bar 16*c* may carry to swing therewith sound producing means such as one or more conventionally constructed bells 16*d* each having a clapper 16*e*.

As seen from Figs. 1 to 3, 4, and 7, bar 16*c* may be positioned in spaced offset relation with respect to armature lower end 12*r* and at a spaced distance above frame base 10*a* and said Figure 13. The latter when in the form simulating Santa Claus, may be provided with upper and lower arm portions 13*a* and 13*b*, respectively, hinged at shoulder and elbow 13*c* and 13*d*, respectively. Hand end 13*e* of said Figure 13 which when positioned as shown in Figs. 1 to 3 may be connected through a wire or string 13*f* extending down from lower end of fitting 18 so that armature 12*k* on being drawn into solenoid magnet coil 12*b* and released will articulate arm portions 13*a* and 13*b* to correspond with motions simulating bell ringing operation with the simultaneous swinging of bells 16*d*.

After constructing and assembling animated bell-ring device 10 as described above and shown in Figs. 1 to 4 and wired as shown in Fig. 7 to receive electric power, the operation and utility of the invention will be apparent.

Device 10 may be supported on a Christmas tree, incorporated in other forms of decorative and display paraphernalia or used as an independent unit supported by means of frame base 10*a* on a horizontal surface S, and and on connecting tap plug 14*a* to a household or commercial electric supply source (not shown) through portable extension wiring 14 in the well under-stood manner as is clear from Fig. 7, magnet coil of solenoid 12*b* will be energized since normally armature 12*k* is dropped down with switch 12*a* in a closed circuit position, shown in full lines in Figs. 1, and 4–7, the circuit then being completed between wiring ends 14*c* in passing successively from capsule terminal connector 12*j*, capsule 12*d*, globule 17 in circuit making or "on" position, terminal connector 12*g*, jumper 14*e*, and solenoid magnet coil 12*b*.

Solenoid magnet coil 12*b* will then be energized and will slidingly draw or raise, that is, retract armature 12*k* elevating capping disc 12*p* to tilt switch capsule 12*d* trunnioning on bearing 11*t* from the full line position to the dotted line position shown in Fig. 4. In the fully raised or extreme up-stroke of armature 12*k* the tilting of switch 12*a* is such as to cause globule 17 to flow from said circuit making or switch "on" position toward capsule closed end 12*c* to a switch "off" position thereby breaking the circuit between terminal connection head end 12*h* and the wall of capsule 12*d*. Armature 12*k* will thereupon be released on discontinuance of the magnetic effect due to deenergizing of solenoid 12*b*, and will be dropped due to gravity to an extreme down stroke position as limited by said disc 12*p* seating on the upper side of solenoid 12*b*. These up and down strokes of armature 12*k* will rock crank arm 16 and swing bar 16*c* and bells 16*d* to produce sounds on being struck by clappers 16*e*.

The making and breaking of the circuit operations through switch 12*a* will continue in successive cycles reciprocating armature 12*k* as long as electric power is provided to tap plug 14*a* and the swinging of bells 16*d* controlled to produce at desired intervals pleasing sound effects with the attractive animation of Figure 13 by articulation of arm portion 13*a* and 13*b* as is clear from the full and dotted line positions thereof shown in Fig. 2.

In providing the ends of armature 12*k* with shock absorbing springs as described above smooth operation free from jarring is attained.

It will thus be seen that there is provided an animated bell ringing device of the character described whereby the several objects of this invention are achieved and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is 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 of the character described including a base, struts upstanding from said base, a bell swingably mounted from said struts, at one level above said base, a solenoid magnet coil connected in an electric circuit supported between said struts over said base at a level above said bell, an armature slidably mounted to extend through said solenoid coil for actuation thereby, a switch positioned over said solenoid coil in the path of movement of the armature for making and breaking said circuit on reciprocation of said armature, a figure carried by said base having an articulatable appendage extending below the level of said bell, and linkage members interconnecting said armature, bell and appendage to ring the bell and simulate bell ringing movements by said appendage on reciprocation of said armature when making and breaking the circuit through said switch.

2. In a decorative electrically operated bell-ringing device of the character described as defined in claim 1 in which said switch is mounted for tilting movement in the making and breaking of said circuit and said solenoid positioned to reciprocate the armature vertically, said armature having an upper end fitted with a resilient stop member to contact said switch in tilting the latter to a circuit breaking position.

3. In a decorative electrically operated bell-ringing device of the character described as defined in claim 1 in which said switch is mounted for tilting movement in the making and breaking of said circuit and said solenoid positioned to reciprocate the armature vertically, said linkage members including a loose-connection fitting and a resilient element carried at a lower end of said armature to cushion the bell ringing movements.

4. In a decorative electrically operated bell ringing

device of the character described as defined in claim 1 in which said switch is mounted for tilting movement in the making and breaking of said circuit and said solenoid positioned to reciprocate the armature vertically, said armature having an upper end fitted with a resilient stop member to contact said switch in tilting the latter to a circuit breaking position, said linkage members including a loose-connection fitting and a resilient element carried at a lower end of said armature to cushion the bell ringing movements.

5. In a decorative electrically operated bell-ringing device of the character described as defined in claim 1 in which said switch and coil are enclosed in a casing having an upper compartment for said switch and an adjoining lower compartment for said coil with the armature extending down beyond said lower compartment.

6. In a decorative electrically operated bell ringing device including a mercury switch connected in circuit with a solenoid magnet coil having a vertically disposed axial bore, a sliding magnetizable armature cooperatively mounted to extend in said bore effective to raise said armature into said bore when said coil is energized and to be gravity lowered when said coil is deenergized, said switch having a metallic capsule shaped body closed at one and open at the other end thereof, said body being trunnioned adjacent said closed end on insulating bearings, an insulating closure for said capsule body open end formed with a through-extending current carrying terminal, said body and terminal being connected in said circuit by a mercury globule to provide make and break switch operations when the armature is lowered by gravity and when the armature is thereafter raised, respectively, said armature carrying a loose connection fitting connecting with a linkage for actuating a bell ringing operation, a helical coil compression spring terminating an end of said armature positioned to resiliently contact said capsule body adjacent said capsule closure when the armature is in said raised position.

7. In a decorative electrically operated bell ringing device including a mercury switch connected in circuit with

a solenoid magnet coil having a vertically disposed axial bore, a sliding magnetizable armature cooperatively mounted to extend in said bore effective to raise said armature into said bore when said coil is energized and to be gravity lowered when said coil is deenergized, said switch having a metallic capsule shaped body closed at one and open at the other end thereof, said body being trunnioned adjacent said closed end on insulating bearings, an insulating closure for said capsule body open end formed with a through-extending current carrying terminal, said body and terminal being connected in said circuit by a mercury globule to provide make and break switch operations when the armature is lowered by gravity and when the armature is thereafter raised, respectively, said armature carrying a loose connection fitting connecting with a linkage for actuating a bell ringing operation, a shock absorbing spring element incorporated in said fitting for cushioning the movement of said linkage, and a shock absorbing end portion carried by said armature for resiliently contacting said switch.

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