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BELL, YOKE AND COIL ASSEMBLY FOR RECIPROCATING SIGNAL DEVICES

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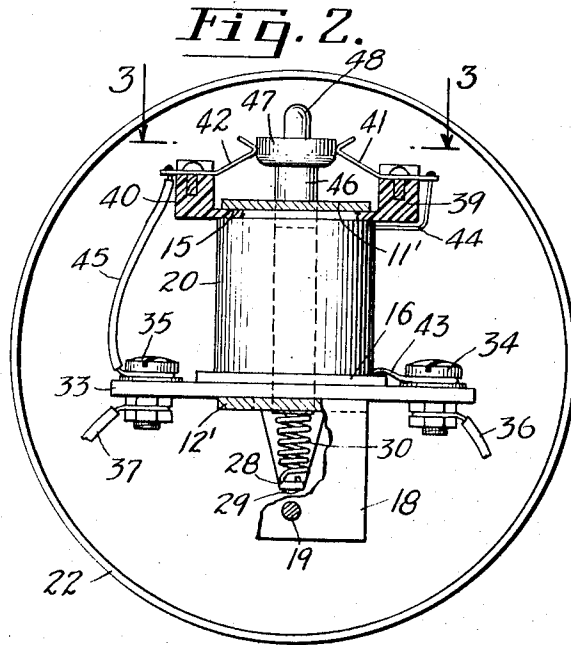
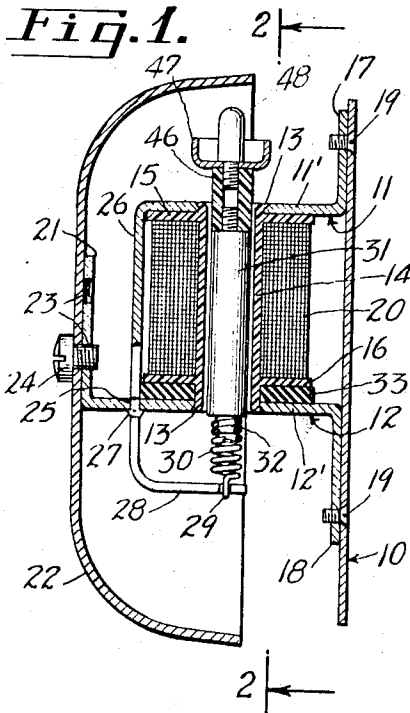


Fig. 3.

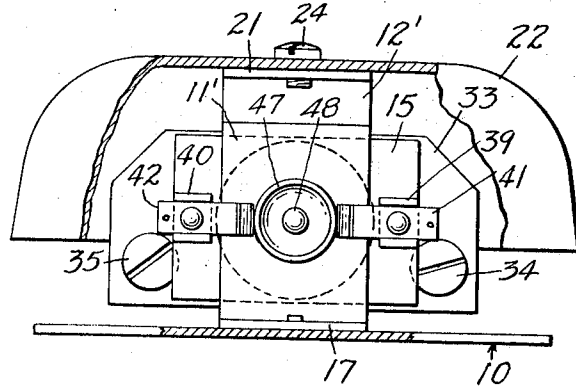


Fig. 4.

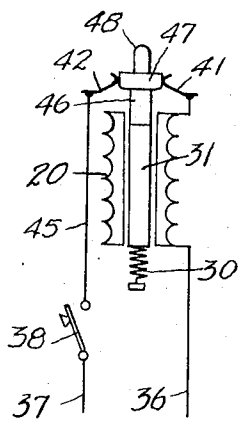
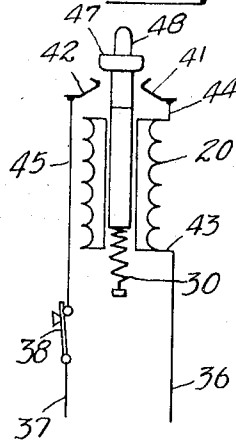


Fig. 5.



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**BELL, YOKE AND COIL ASSEMBLY FOR  
RECIPROCATING SIGNAL DEVICES**

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10 Claims

**ABSTRACT OF THE DISCLOSURE**

A reciprocating signal mechanism employing a yoke-type frame for support of a coil, bell and components of an assemblage is disclosed. The yoke comprises two inter-fitting sheet metal parts coupled together through the medium of a mounting plate. The striker end of the plunger of the coil supports a circuit maker and breaker.

**BACKGROUND OF THE INVENTION**

The invention deals with a signaling device employing a simple and economical form of coil construction where the windings are mounted directly on the core of a plastic spool and where the supporting yoke for the spool comprises two sheet metal parts of simple and economical construction, one part having means for support of a signaling device thereon. Further, the invention deals with a structure where the other part of the yoke provides a mounting for the spring engaging the plunger of the coil in movement of the plunger in one direction.

Signaling devices or reciprocating members of the type and kind are generally known in the art, as evidenced, for example, by the following United States patents: Ham, Patent No., 2,893,001, June 30, 1959; Jolly, Patent No. 2,946,905, July 26, 1960; Gilman 3rd et al., Patent No. 2,984,832, May 16, 1961; Cassell, Patent No. 3,027,554, Mar. 27, 1962; McKee, Patent No. 3,249,933, May 3, 1966.

However, to applicants' knowledge, the structural combination forming the subject matter of this application is distinctly new.

**SUMMARY OF THE INVENTION**

In summarizing the invention, it will be apparent that the coupling of the two sheet metal members of the yoke with the mounting plate provides a simple assemblage for the support of the unique spool structure, particularly in providing on the one member the mounting for the bell or other signaling device and on the other member the tensional means for operating the plunger or core of the coil in one direction. Further, it is new to provide the arrangement of the terminal plate between the spool and one of said members, the mounting of the contacts on one rim of the spool and the insulated support of the plunger striker and the disc for making and breaking the circuit between said contacts in the reciprocating or vibratory movement of said plunger.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

FIG. 1 is a sectional view through the device, with parts of the construction being shown in elevation.

FIG. 2 is a view, generally looking in the direction of the arrows 2—2 of FIG. 1, showing parts of the construction in elevation and parts broken away.

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FIG. 3 is a view looking generally in the direction of the arrows 3—3 of FIG. 2.

FIGURE 4 is a diagrammatic view of the wiring assemblage showing the plunger in normal open circuit position; and

FIG. 5 is a view, similar to FIG. 4, showing the plunger in the position assumed by initial closing of the circuit.

The assemblage comprises what might be termed a yoke frame supporting the various parts of the assemblage, the frame comprising a mounting plate 10 for attachment of the device to any suitable support by fastening devices passed through said plate. Mounted on the plate 10 are spool supporting members 11 and 12, having apertured parallel plates 11' and 12' for receiving and supporting flared ends 13 of a plastic spool core 14, having inwardly set rim ends 15 and 16. The plates 11', 12' have angularly offset mounting ends 17 and 18 and screws or similar fastenings 19 are employed to fix said ends to the mounting plate 10, as diagrammatically seen in FIG. 1. At 20 is shown the conventional winding on the core 14 of the spool between the rim ends. The member 12 or the plate 12' thereof has an angular extension 21 for support of a bell or other signaling device 22, 21 having two or more threaded apertures 23 therein for support of 22 in different sizes and at 24 is shown the screw for fixing the bell to the support 21.

In assemblage of the members 11 and 12, the plate 12' of the member 12 has an aperture 25 to receive a bridging portion 26 extending at right angles to 11' and constituting part of the member 11, the positioning of the assemblage being controlled by a stake 27, as diagrammatically noted. In making this assemblage, an angularly extending arm 28, at the end portion of 26, is passed through the aperture 25, the arm 28 having a recessed end portion for the support of one end 29 of a spring 30, the other end of the spring being fixed to a reduced end of a metal plunger 31, as seen at 32. The plunger 31 is mounted in and freely movable longitudinally of the core 14 of the spool.

Between the plate 12' and the rim 16 is a terminal supporting plate 33 of insulating material, end portions of this plate having terminals or posts 34 and 35, with which circuit wires 36 and 37 from a source of electric supply are coupled, the wire 37 including a switch 38 controlling this circuit.

The rim 15 of the spool has oppositely arranged projecting blocks 39 and 40, note FIGS. 2 and 3, which are channelled at the upper ends for key mounting of spring contacts 41, 42. From the posts 34 extends a wire 43 to one end of the winding 20 and from the other end of the winding is a wire 44 which extends to the contact 41.

From the post 35 is a wire 45 which extends to the spring contact 42, as clearly seen in FIG. 2 of the drawing. The wiring has been omitted from the showing in FIG. 3 for simplification.

Mounted on the other end of the plunger 31 is a bushing 46, note FIG. 1, on the free end of which is supported a circuit maker and breaker disc 47 through the medium of a striker tip 48 positioned in close proximity to the periphery of the bell 22, so that, upon closing the switch 38, as noted in FIG. 5 of the drawing, the solenoid, comprising the wound spool, will move the plunger in the direction of the bell and then immediately the spring 30 will return the plunger to the closed circuit position between the contacts 41 and 42 and this reciprocating movement will continue as long as the switch 38 is retained in closed circuit position. Upon breaking the circuit through the switch 38, the plunger will return to the position shown in FIGS. 2 and 4, preparatory to the next operation of the device.

It will be apparent that the winding on the spool is such as to impart the cycle of operations noted above.

From the foregoing, it will be apparent that the entire structure of the reciprocating device or mechanism is extremely simple, not only in the structure of the several parts, but in the assemblage and mounting of the parts, the spool of the structure defined being a plastic molding which is readily assembled in the two plates 11', 12' of the yoke by the flaring of the ends of the core 14 of the spool, which ends project beyond the rim ends. Here, it might be well to point out that the rim end 15 differs from the rim end 16, in that the spring contact supporting blocks constitute an integral part of the rim 15. The offset projecting arm 28 may be said to comprise a tail on the yoke assembly, which is sufficiently spaced from the end 32 of the plunger for normal positioning of the spring 30, the spring being controlled to bring the circuit maker and breaker 47 to the position shown in FIGS. 2 and 4, completing the circuit through the contacts 41 and 42 or other means can be provided, for example, on the bushing 46 to accomplish the same result. The dish or cup-shaped contour of the breaker 47 compensates for slight variations in the stop position thereof, as will be apparent.

It will be understood that the present drawings and description illustrate one of many adaptations and uses of the invention, keeping in mind that the device in question may be considered a reciprocating mechanism. By employing the yoke assemblage, what might be termed a tight electromagnetic circuit is maintained and here it should be kept in mind that the circuit maker and breaker or interrupter is mounted on and constitutes an integral part of the reciprocating plunger, but insulated therefrom. This prevents current from going through the bell or other actuated medium and to ground, should the contacts weld or freeze to the circuit maker and breaker or interrupter at any time.

With the present disclosure, the operation would be to vibrate or create a multitude of actions of the bell as long as the electric circuit is kept closed. However, this same principle of actuation of the plunger would have many other types of applications in reciprocating mechanisms of different types and kinds.

In the illustration in FIG. 1 of the drawing, clearance between the plunger 31 and the core 14 is exaggerated simply to indicate freedom of movement. However, it is the intent and purpose to maintain the plunger in close relationship to the coil and this is made possible by providing the simplified spool structure shown, with the windings 20 directly thereon. It will also be apparent that the size of the yoke and the wound bobbin or spool will determine the voltage and power which will be required in the use of the device or mechanism.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A device of the character defined comprising a yoke supporting a plastic spool having a tubular core with coil windings thereon, end portions of the core having integral rims, said yoke comprising two intercoupled sheet members joined and coupled by a mounting plate, means seating ends of said core in said members, a plunger movable longitudinally of said core, a spring coupled with one end of said plunger and with an offset part of one of said members to move said plunger in one direction, the other of said members having offset means for support of a signaling means, one of said rims having means supporting a pair of spaced spring contacts, the other end of the plunger having insulation means supporting a circuit maker and breaker operatively engaging said spring contacts, as well as means actuating said third named means, and said coil windings and spring contacts being in an

electric circuit, the closing of which will move said plunger in a direction moving the sixth named means into operative position against the action of said spring.

2. A device as defined in claim 1, wherein said second named means comprises an angular extension including means for support of signaling means of different characteristics.

3. A device as defined in claim 1, wherein said yoke includes a terminal supporting plate, to which circuit wires from a source of supply are coupled, as well as circuit wires extending to the coil and one of said spring contacts.

4. A device as defined in claim 1, wherein the offset part of the first named member includes an arm, the free end portion of which supports one end of said spring.

5. A device as defined in claim 1, wherein the intercoupling of said sheet members comprises an aperture in one member, through which a portion of the other member passes in forming the yoke, within which said plastic spool is arranged.

6. A device as defined in claim 1, wherein said fifth named means comprises a bushing of insulating material coupled with the end of the plunger and with which said circuit maker and breaker and sixth named means are coupled.

7. A device as defined in claim 6, wherein said circuit maker and breaker comprises a dish-like part, said sixth named means comprising a striker tip, and said signaling means comprising a bell, peripheral walls of which overlie said tip.

8. A device as defined in claim 1, wherein part of the yoke defined by said sheet members comprises spaced parallel plates having angularly offset mounting ends establishing coupling with said mounting plate.

9. A device as defined in claim 8, wherein intercoupling of said sheet members comprises a bridging portion on one of said parallel plates passing through and fixed to the other of said plates, and said second named means comprising an extension of said bridging portion terminating in an angularly offset arm.

10. A yoke and coil assembly for devices and mechanisms of the character defined comprising two intercoupled sheet metal members, said members having spaced parallel plates, one of which includes an integral bridging portion passed through and fixed to the other plate defining a yoke in which a coil is mounted between said plates, one end of the plates having offset portions for mounting the yoke, the coil including a reciprocating metallic plunger mounted in the core of a plastic spool supporting the windings of said coil, said bridging portion including an extension projecting beyond the second plate and including an arm supporting a spring coupled with one end of said plunger, insulated means supporting spaced electrical contacts adjacent the first named plate of said yoke, insulated means supporting a circuit maker and breaker at the other end portion of said plunger for operatively engaging said contacts, and said circuit maker and breaker, in combination with said spring, controlling reciprocating movement of the plunger in said coil.

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