

March 29, 1927.

1,622,862

F. E. DETMERS

ELECTRIC AUDIBLE SIGNAL

Filed May 12, 1925

Fig. 1

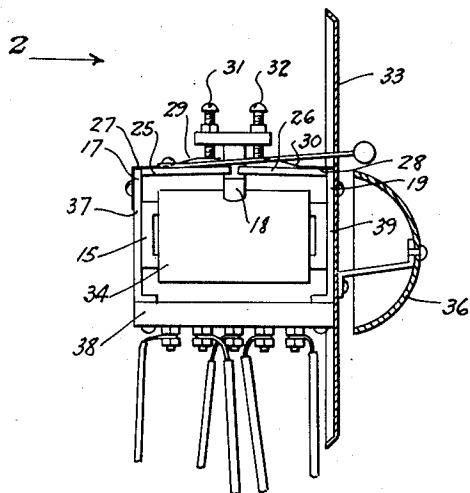


Fig. 2

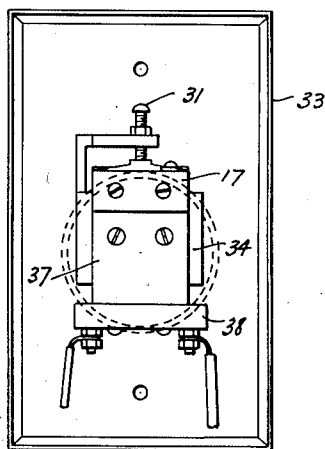


Fig. 3

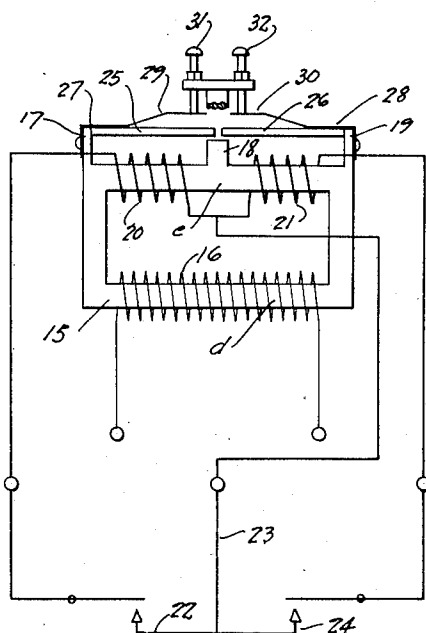
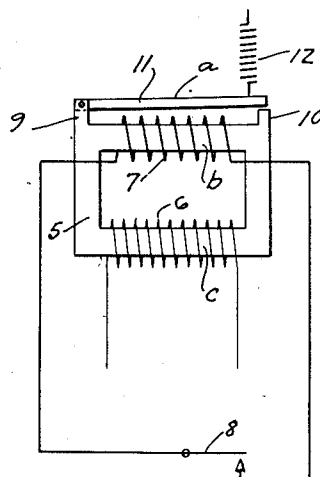


Fig. 4



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Patented Mar. 29, 1927.

1,622,862

UNITED STATES PATENT OFFICE.

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ELECTRIC AUDIBLE SIGNAL.

Application filed May 12, 1925. Serial No. 29,730.

This invention relates to an electrically actuated audible signal, and pertains more particularly to a device operable from a source of alternating or pulsating electrical energy.

The main object of this invention is to provide a unit which can be connected to a circuit supplying ordinary alternating current without the intervention of a transformer or like electrical apparatus. Another object of this invention is to provide a unit which may have a plurality of audible alarms, each alarm being independently operable at will. Other features whereby simplicity, compactness and economy of structure are obtained, will be apparent from the subjoined specification.

Broadly the embodiments of the invention disclosed herein comprise a primary winding, secondary windings corresponding in number to the number of alarms, a closed magnetic path common to the primary and secondary windings and a shunt magnetic path for each secondary winding, each of said shunt paths actuating a vibratable audible alarm by reason of the flow of pulsating or alternating magnetic flux there-through.

These objects together with other objects and corresponding accomplishments are obtained by means of the embodiments of my invention illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevation of a signal having two alarms; Fig. 2 is a rear view thereof as seen looking in the direction of the arrow 2 of Fig. 1; Fig. 3 is a wiring diagram of the structure shown in Figs. 1 and 2; and Fig. 4 is a wiring diagram showing the fundamental circuit for actuating a single audible alarm.

Referring more particularly to Fig. 4, 5 indicates an iron core forming a closed path of low reluctance for magnetic lines of force. The iron core 5 is of the character used for core types of transformers, in which there are two legs for windings. Upon one of these legs is wound the primary 6 adapted to be directly connected to an alternating current circuit. Upon the other leg is wound a secondary coil 7. A switch 8 is included in the secondary circuit for shorting the latter at will. This switch 8 may be the ordinary push button switch used for bells.

At opposite ends of the legs upon which the secondary is wound are horns 9 and 10

formed by extensions of the iron core. Pivally mounted upon horn 9 is an iron armature 11, the free end thereof being arranged to make contact with horn 10. A tension spring 12 normally tends to hold the armature 11 out of contact with horn 10. The iron core and armature 11 forms a figure 8, the armature providing a shunt or upper leg *a*, the secondary leg *b* forming the intermediate leg of the figure and the primary leg *c* forming the bottom leg of the figure. Magnetic lines of force generated and maintained by the primary coil will pass through the magnetic path of least reluctance, namely, through legs *c* and *b*. The lines which normally pass through the leg *a* are inappreciable in their effect upon the operation of the signal. The magnetic lines of force generated and maintained by the secondary coil may pass through either or both of the legs *a* and *b*, and will follow the path of least reluctance. Assume that alternating current is being supplied to the coil 6. An alternating current will then be induced into secondary coil *c*, if the switch 8 is closed. The induced current in the secondary coil is of such phase that the magnetic field produced thereby is in opposition to the magnetic field produced by the primary coil. Its flow through leg *c* will be opposed, and it will seek to pass through leg *a*.

Due to the alternating or pulsating current effect in the secondary winding, the magnetic lines of force produced thereby are alternating or pulsating. A pulsating or alternating field then passes through the armature. The armature is thereby vibrated by reason of the spring 10 opposing the attraction of the core for the armature 11. Thus, upon closure of the switch 8, the armature 11 will be vibrated. The armature may be arranged to operate the clapper of a bell or to operate in the manner of a buzzer, these being well known methods of producing an audible alarm.

Referring to Fig. 3 a closed magnetic core is indicated by 15. A primary coil 16 is wound upon the leg *d* corresponding to leg *c*. The leg *e* is provided with three horns 17, 18, and 19, the horn 18 being at the intermediate part of the leg. Upon leg *e* intermediate horns 17 and 18 is a secondary winding 20, and upon the leg *e* intermediate horns 18 and 19 is a secondary winding 21. Winding 20 may be shorted by a switch 22 connected

to a common conductor 23. Secondary coil 21 may be similarly shorted by a switch 24. Pivoted upon horn 17 is an armature 25 having its free end arranged to contact with horn 18. An armature 26 is pivotally secured to horn 19 and is also arranged to contact with horn 19. Leaf springs 27 and 28 serve for the pivotal attachment of the armatures to horns 17 and 19 and also normally maintain the armatures out of contact with horn 18. Leaf springs 29 and 30 are secured to the armatures and offset therefrom, engaging adjustment screws 31 and 32. By moving the screws the effect of springs 27 and 28 may be counterbalanced enough to provide for efficient operation of the armatures. Upon closing switch 22, secondary winding 20 is short circuited and the magnetic flux therefrom will be shunted through armature 25, thereby vibrating the latter. The flux passes from the armature 25 through horn 18 and back through the portion of the leg *e* about which secondary coil 20 is wound. There is no effect upon the armature 26. Closing switch 24 will cause the magnetic flux to be shunted through armature 26 and vibrate the latter without having any effect upon armature 25. Thus, the unit will cause either armature 25 or 26 to be actuated dependent upon whether switch 22 or switch 24 is closed.

In Figs. 1 and 2, a mechanical structure made in accordance with the diagram of Fig. 3 is shown. The core 15 may be mounted upon a plate 33 for convenience of installation. The primary and secondary windings are shown enclosed within a sheet of insulating material wrapped around the unit as indicated by 34. A horn corresponding to horn 17 may be formed by a strap of iron 37 secured at the end of the core and depends downwardly to provide a means for attaching a terminal block 38, to which the various leads are connected. At the other end of the core is a similar strap 39 providing the other horn corresponding to horn 19 of Fig. 3. The middle horn is indicated by 18. Armature 25 has a bell clapper 35 secured thereto and mounted upon the face of the plate is a bell 36. Armature 26 operates as a buzzer. Thus, there is a single unit combining the elements of a transformer and an actuating electromagnet for the alarm.

The unit may be installed in position, the secondary winding being connected to suitable push buttons and the primary winding to the source of alternating current supplying a house. By a suitable grounding of terminals, the amount of wiring necessary may be decreased. I have shown a struc-

ture in which it is possible to actuate two alarms, either one at will. It is obvious that any number of alarms may be actuated by a single unit.

What I claim is:

1. In a signal, a magnetic core, a primary winding thereon, a plurality of secondary windings on said core spaced from said primary winding, and spaced from each other, magnetic core projections extending from said magnetic core adjacent the ends of said secondary winding, a plurality of resiliently mounted movable armatures corresponding to said plurality of secondary windings extending across the corresponding pairs of magnetic core projections, and disposed with respect thereto and cooperating therewith so as each to form a magnetic shunt across the portion of the magnetic core surrounded by the corresponding secondary winding, connectors corresponding to each of said secondary windings, and a permanently closed electrical connection between the corresponding connectors and each of said secondary windings; said connectors being adapted to be connected with suitable low tension signalling circuits, and said primary winding being adapted to be directly and permanently connected with a high tension alternating current supply circuit.

2. In a signal, a closed magnetic core, a primary winding on one side thereof, a plurality of secondary windings on the opposed side thereof, disposed substantially parallel to said primary winding, and spaced from each other, magnetic core projections extending from said magnetic core adjacent the ends of said secondary winding, a plurality of movable armatures corresponding to said plurality of secondary windings extending across the corresponding pairs of magnetic core projections, and disposed with respect thereto and cooperating therewith so as each to form a magnetic shunt across the portion of the magnetic core surrounded by the corresponding secondary winding, connectors corresponding to each of said secondary windings and permanently closed electrical connection between the secondary windings and the corresponding connectors; said connectors being adapted to be connected with suitable low tension signalling circuits and said primary winding being adapted to be permanently connected with a suitable high tension alternating current supply circuit.

In witness that I claim the foregoing I have hereunto subscribed my name this 2nd day of May, 1925.

FRED E. DETMERS.