Nov. 29, 1927. 1,651,238

F. W. WOOD

ROTARY ANNUNCIATOR DROP

Filed March 25, 1920

Fig. 1,

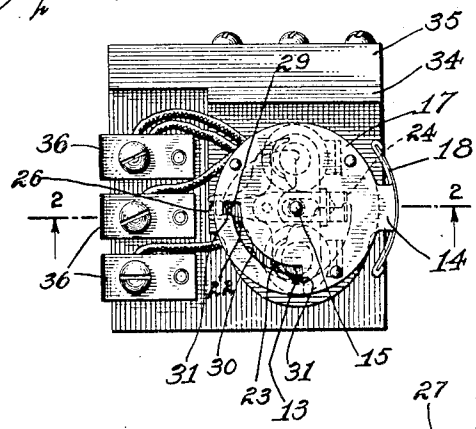


Fig. 2,

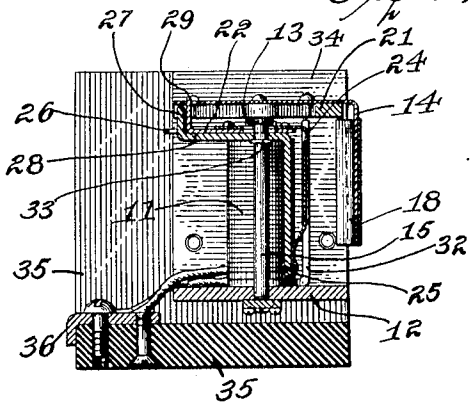


Fig. 3,

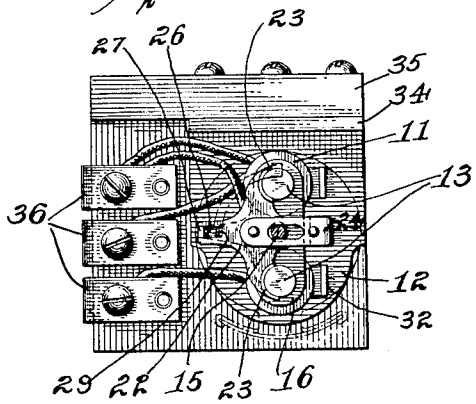
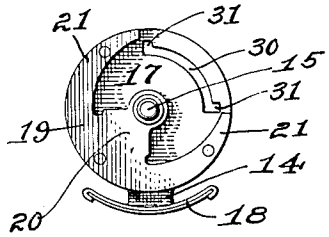


Fig. 4,



Inventor

Frank W. Wood

By his Attorneys

Meyer, Cavanagh & Hyde

Patented Nov. 29, 1927. 1,651,238

UNITED STATES PATENT OFFICE.

FRANK W. WOOD, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO CHAS. CORY & SON, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ROTARY ANNUNCIATOR DROP.

Application filed March 25, 1920. Serial No. 368,727.

My invention relates to annunciators, and is particularly directed to an improved form of electrically operated annunciator drop.

As annunciators are employed for transmitting signals which often are of great importance, absolute reliability under all conditions is a primary requisite. It is, therefore, necessary not only that the drops should be positively and infallibly operated, but also that the drops should not be deranged or shifted unintentionally under any circumstances. Various mechanical disturbances encountered in locations where annunciators are desirable tend to shift the drops, such as continuous vibration, blows, the detonation of explosives, as in firing heavy guns, and changes in the axial position of the annunciator due to movements of the supporting structure, as in ships, airplanes or other vehicles.

It is, furthermore, necessary that each annunciator drop be extremely compact. Moreover, in the usual electrically operated drop, it is highly desirable that means be provided for shifting the drop positively into inoperative position, as well as for shifting it into operative position in the usual way.

An object of my invention is to provide a drop in which the signal is positively locked in its two positions, preventing derangement or unintentional shifting of the drop. A further object is to combine this feature with electrical means for shifting the signal positively into either position. Moreover, in the preferred form I employ the magnetic attraction of each magnet when energized to operate the latch releasing means, as well as to shift the signal. I have also devised a construction of this nature which is extremely compact, simple and cheap in construction, and reliable in operation.

Other objects and advantages of my invention will be apparent from the following description, taken in connection with the accompanying drawings, in which:

Fig. 1 is a top plan view,

Fig. 2 is a section on line 2—2 of Fig. 1,

Fig. 3 is a view similar to Fig. 1, the rotor top being broken away, and

Fig. 4 is a bottom plan view of the rotor.

A pair of ordinary electromagnets 11 are mounted in parallel position on a suitable base 12 of any desired type with poles or polepieces 13 in substantially the same plane. Signal arm 14 is mounted on a rotor whose axis is located between magnets 11. One convenient form of rotor includes a spindle 15 journaled in base plate 12 and in a yoke 16 preferably carried by magnets 11 adjacent poles 13, signal arm 14 being mounted on a rotor head 17 carried by spindle 15. A convenient form of rotor head is disclosed, and consists of a relatively thin plate, preferably of metal such as aluminum. If desired, the signal arm 14 may be integral with the rotor plate 17, and may consist of the usual card holder having a back plate 18 with inturned edges adapted to hold a card. For economy in space back plate 18 should be concentric with spindle 15.

A suitable armature 19 is mounted on either spindle 15, rotor head 17, or both, in position to revolve in a plane just above poles 13 of the magnets 11. Armature 19 is so contoured that the selective operation of either magnet 11 will tend to locate the armature 19 over such magnet, this arrangement providing ready means for shifting the signal arm 14 into either operative or inoperative position, depending upon the magnet 11 which is energized. Any suitable form of armature may be employed, the form disclosed having a central portion 20 which may surround and engage the upper end of spindle 15, and lateral horns 21 extending concentrically about spindle 15 at such a distance that when the spindle is rotated, horns 21 will be located adjacent poles 13 and slightly above them. A convenient construction for the armature consists of a flat plate mounted on the lower side of the rotor plate 17 and connected both to the plate and to spindle 15, with the outer edge of armature 19 flush with the edge of rotor plate 17, this construction strengthening the rotor plate and providing a rigid connection between the relatively thin plate and spindle 15.

Means is also provided whereby the signal arm 14 is locked in either of two positions, such means preferably including an element engaging rotor head 17 to hold it against rotation when the signal arm 14 is in either of such positions, and released upon the energizing of the proper magnet to permit rotation of the signal arm into the other position. For this purpose, I preferably employ a magnetic latch resiliently engaging a suitable notch or aperture in rotor head 17

and retracted magnetically from its notch when one of the magnets is energized to shift the signal arm 14.

One suitable construction for this purpose is disclosed, including a latch plate 22 having laterally extending latch armatures 23 (Figs. 1 and 3) normally spaced slightly from poles 13 and preferably including portions concentric with and normally adjacent the sides of said poles 13, though obviously this arrangement may be considerably varied. Latch plate 22 is normally held in position by any suitable resilient means, such as spring 24, connected at one end to latch plate 22 and mounted adjacent its other end in any suitable way, as by providing a supporting arm 25 extending downwardly from and preferably integral with yoke 16, spring 24 being mounted on arm 25 adjacent its lower end.

With this arrangement, it will be apparent that latch armatures 23 will normally be held slightly spaced from poles 13, in the position indicated in dotted lines in Fig. 1; but upon energizing either magnet the latch armature 23 adjacent the pole of such magnet will be attracted thereto, thus shifting latch plate 22 inwardly against spring 24, which preferably is sufficiently long to prevent any substantial tilting of plate 22, and which may be of sufficient width to resist the torsional effect caused by the attraction exerted on one of the latch armatures 23 only, thus tending to move the entire plate.

However, suitable guide means may be provided for preventing lateral movement of latch plate 22. One convenient arrangement for this purpose includes a parallel sided notch or aperture 26, and a fixed lug 27 slidably engaging the sides of the notch to permit longitudinal and prevent lateral movement of plate 22 relative to the notch 26. Lug 27 may be mounted in any desired way, as by providing an extension 28 of yoke 16, preferably integral therewith. It will be apparent that supporting arm 25, yoke 16, extension 28, and lug 27 may be conveniently stamped from a single sheet of metal having suitable sockets adjacent the ends of yoke 16, adapted to fit over the magnet poles 13, thus providing a very simple and strong construction.

Any preferred form of latch connection between latch plate 22 and rotor plate 17 may be provided. One convenient arrangement includes a latch finger 29 mounted on latch plate 22 and extending upwardly through a slot 30 in plate 17, the slot being concentric with spindle 15 and provided with outwardly extending offsets or notches 31 adjacent its ends. Slot 30 and notches 31 are so located and proportioned that when latch finger 29 is in normal position, it will tend to rest in the notch portions 31, and when so located, will resist any tendency to move the signal arm 14 or other parts of the rotor structure. Upon the energizing of a magnet 11, however, the retraction of latch plate 22 will withdraw latch finger 29 into alinement with slot 30, permitting rotor plate 17 to revolve through the attraction of the energized magnet for armature 19, until latch finger 29 is brought against the opposite end of slot 30; and upon the de-energizing of the magnet, latch finger 29 will move outwardly into the other notch 31, positively locking the rotating parts in position.

However, my invention is not limited to this specific type of latch engagement, as obviously the latch plate 22 might be moved in either direction upon energizing of the magnets, depending upon the location of latch armatures 23, and various types of latch engaging and releasing constructions may be employed to utilize the reciprocation of latch plate 22 under the opposing action of the magnets and spring 24.

It is noted that in the specific construction disclosed, latch plate 22, armatures 23, and latch finger 29 may all be formed from a single integral sheet of metal, providing a cheap and efficient construction.

In the form disclosed, means for increasing the efficiency of magnets 11 by decreasing the reluctance of the magnet circuits is provided, the construction including a conductor rod 32 located adjacent and parallel to each magnet, the upper end of each rod 32 being adjacent to and preferably on a plane with the pole of the corresponding magnet, and the lower end of each conductor rod extending under the magnet preferably into contact with the core thereof.

Conductor rods 32 are composed of a metal which offers slight resistance to the magnetic circuit, it being apparent that with this arrangement the lines of magnetic force need only pass through air across the small gaps between armature 19 and the upper faces of poles 13 and conductor rods 32.

The horns 21 of armature 19 are preferably so constructed and arranged that when signal arm 14 is in either of its two fixed positions, the tip of one horn 21 will be adjacent one pole 13, while the base of the other horn 21, and the enlarged central portion 20 of the armature, will be adjacent the other pole 13, this arrangement providing a ready path for the magnetic circuits and consequent strength and efficiency in the action of the magnets 11.

It will be apparent that I have provided an extremely simple and positive arrangement, in which the signal arm 14 may be shifted into either its operative or inoperative position by energizing the proper magnet, and located in either position by a latch released upon the energizing of either magnet. With this arrangement, the action of

the drop is independent of any physical disturbances, such as blows, vibrations or variations in horizontal position; and positive actuation is assured regardless of the existence of any of these or similar conditions at the time of actuation.

Furthermore, a particularly compact arrangement has been provided, partly through suitable construction and arrangement of the parts, and partly by providing means for increasing the magnet efficiency so that relatively small magnets may be employed. The device is compact, and is self contained, being adapted for mounting in annunciator boxes of the usual type.

Moreover, the rotating parts are readily removed for repair or replacement, and to expose the latch parts and magnets, spindle 15 preferably being provided with a resilient split ring 33 fitting in a socket in the spindle and bearing against the bottom of yoke 16 to prevent upward movements of the spindle.

While base 12 has been shown as provided with a mounting flange 34 attached to a suitable support 35 provided with insulated binding posts 36 to which the magnet wires are connected, it will be understood that this showing is purely illustrative.

While the preferred form of the invention has been described and certain variations therein have been indicated, it will be apparent that numerous other changes may be made without departing from the scope of the invention as set forth in this specification.

I claim:

An annunciator drop comprising a pair of electromagnets, a signal armature rotatable in a path adjacent to a pole of each magnet, a signal operated by movements of the armature, latch means for preventing rotation of the armature, including a latch member resiliently mounted between the magnets, latch engaging means cooperating therewith and operatively related to the signal armature, and a pair of latch armatures integral with the latch member and extending in opposite direction therefrom, each located adjacent a magnet pole; and guide means for controlling the path of movement of the latch member, the construction being such that said latch member is normally maintained in yieldable engagement with the latch engaging means, being released upon the energizing of either magnet by the motion of the corresponding latch armature caused by the attraction of said magnet, permitting the armature to rotate.

Signed at New York city in the county of New York and State of New York this 23rd day of March, A. D. 1920.

FRANK W. WOOD.