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O. KERSTEN

SIGNALING DEVICE

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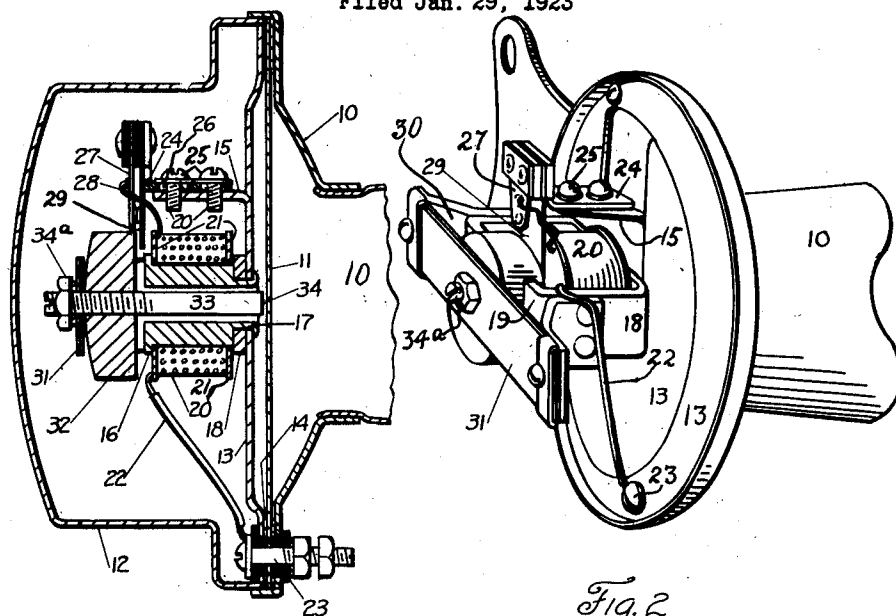


Fig 1

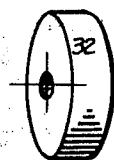


Fig. 3

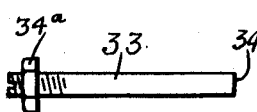


Fig. 4

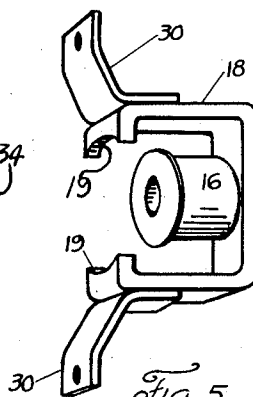


Fig. 5

WITNESS.

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SIGNALING DEVICE.

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The object of my invention is to provide improvements in a signaling device, of simple, durable, and inexpensive construction.

A further object of my invention is to provide a signaling device which is especially adapted for use in connection with an automobile or other vehicle by being specially fitted for the electrical system used with such vehicles.

A further object of my invention is to provide a signaling device which may be operated with a minimum amount of current and at the same time a maximum sound secured therefrom.

A further object of my invention is to provide an electric signaling device wherein the magnetic force secured is enhanced by the structure of the armature and core used and where this magnetic force is further reinforced by the armature supporting structure.

A further object of my invention is to provide an electrical signaling device where the magnetic force applied is so timed that a maximum benefit is secured therefrom.

A further object of my invention is to provide an electric signaling device which may be conveniently made from sheet metal or sheet metal stampings so that the production and assembly cost of the signaling device may be reduced to a maximum.

With these and other objects in view, my invention consists in the arrangement, combination and construction of the various parts of my improved device, as described in the specification, claimed in my claim, and shown in the accompanying drawings, in which:

Figure 1 shows a vertical central sectional view thru one form of my improved device.

Figure 2 shows my improved signaling operating device in perspective, the cover portion thereof being removed.

Figure 3 shows the armature of the device in the form shown.

Figure 4 shows the striker or plunger associated with the signaling device, and

Figure 5 shows the structure for mounting the coil whereby the lines of magnetic force are concentrated and their effect enhanced.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate, generally, an ordinary sheet metal horn structure having at its rear end an enlarged flange designed to be secured to

the horn operating mechanism and forming a support for the diaphragm 11 which in the form of device here illustrated is a substantially circular piece of sheet metal of suitable thickness and elasticity, rearwardly of the diaphragm 11 a cover or cap device 12 is secured, these parts being of ordinary construction and forming no part of my invention except in so far as they form the support therefor and illustrate the application thereof. Secured to the rear face of the diaphragm 11 is a sheet metal disc 13 which is dished or offset so that its outer edges may rest adjacent to the diaphragm 11 and the central portion thereof may be spaced somewhat from the diaphragm, as is clearly illustrated in Figure 1. I preferably provide a spacer and insulating washer 14 between the outside edge of the disc 13 and the diaphragm 11 in order to further space these members apart and to make the contact of their edges more appropriate for signaling purposes. The disc 13 has a central opening therein and a tongue 15 is punched up therefrom adjacent to one side in position to extend perpendicularly to the diaphragm 11. The punching up of this tongue 15 has a double significance in that it forms an air relief between the diaphragm 11 and the disc 13 and also forms a support for the contact structure associated with this signaling device. A hollow cylindrical magnet core member 16 has a sleeve 17 extended therefrom at one end which is designed to extend thru the central opening in the disc 13 and to be turned over or riveted on to the disc 13 thereby securely attaching the magnet core 16 to the disc 13.

A yoke 18 of substantially D shape has a central opening designed to receive the sleeve 17 so that when the sleeve 17 is riveted over on to the disc 13 this sleeve will serve to both hold the magnet core 16 and the yoke 18 in place. This yoke 18 has its ends turned inwardly at 19 and of arcuate shape for a purpose which will hereinafter be mentioned. Mounted on the magnet core 16 is a coil 20 which is held in place by the core 16 and fiber or other suitable washers 21. One end of the coil 20 is connected by a terminal wire 22 with a binding post 23 which extends through the disc 13, the diaphragm 11, and the horn flange 10, but is insulated from the three members mentioned so that the binding post 23 may form a

combined fastening device for securing the parts of the horn together and terminal post for receiving the current necessary to operate the signaling device. Mounted on the tongue 15 is an angular bracket member 24 which is secured in place by the screws 25 which operate in slots 26 so that the horizontal position of the bracket 24 may be varied by moving the bracket along the tongue 15 and then tightening the screws 25 when the bracket is in its proper position. The vertical arm of this horizontal bracket 24 carries a substantially rigid arm 27 upon which is a contact member, and the arm 27 is connected by a terminal wire 28 with the coil 20. This arm is insulated from and supported by the vertical arm of the bracket 24. Similarly supported on but not insulated from the bracket 24 in position substantially parallel with the arm 27 is a second arm 29 which forms the reed or vibrating device for making the contact and breaking it in connection with my improved signaling device. This reed 29 may have a contact thereon designed to co-act with the contact of the arm 27 and is normally in contact therewith.

It will be noted that the reed 29 is secured to the bracket 24 but not insulated therefrom, whereas, the arm 27 is insulated from the bracket 24 and connected through the coil 20 with the current receiving binding post 23. If then the horn frame consisting of disc 13 and its associated parts, be grounded it will be seen that whenever the contact on the reed 29 meets the contact on the arm 27 then that current will be caused to pass thru the coils 20 thereby energizing the coil. Similarly, the separating of these contacts will de-energize the coil. The yoke member 18 has arms 30 extended therefrom in opposite directions and at either end of these arms a laminated spring 31 is secured. This spring extends across above the coil 20, as will be seen by reference to Figure 2. Adjustably mounted on a laminated spring 31 is an armature 32 comprising a disc of comparatively large size and thickness, of magnetic material such as soft iron, which is designed to be supported by the laminated spring 31 in position adjacent to the ends of the magnetic core 16 opposite the disc 13. Extended thru the armature 32 and the laminated spring 31 is a striker bar 33 of non-magnetic material which has a head 34 at its forward end designed to impact against the diaphragm 11. This bar 33 is threaded into the armature 32 and provided with a nut 34^a rearwardly of the laminated spring 31 so that the position of the striker bar 33 relative to the armature may be adjusted by loosening the nut 34^a and then screwing the structure in the armature 32; when the structure has been placed in its desired position then the nut may be tight-

ened to hold it in place. As has been heretofore noted, the yoke 18 has inturned ends 19 having arcuate shape and these ends are curved in order to conform to the curvature of the surface of the armature disc 32, and these ends and the armature are so disposed in my improved signaling device that the gap between these ends 19 and the armature may be just sufficient to permit free movement of the armature. I preferably so adjust the contact carrying bracket 24 that the armature 32 will impact against the reed 29 at the instant that the striker bar 33 impacts against the diaphragm 11. By this structure it will be seen that the entire magnetic force of the coil 20 will be utilized to draw the armature 32 toward the diaphragm 11 to cause the head 34 to ram against this diaphragm with considerable force up until the impact occurs. As soon as the contact is broken the velocity of the armature 32 and its associated parts will stretch the diaphragm 11 somewhat and then the resistance of the diaphragm and the laminated spring 31 will overcome this velocity and cause the diaphragm 32 to rebound.

As soon as the striker clears the diaphragm the contact in the coil 20 will be completed so that the coil will tend to resist the rebound of the armature and this tendency will be further checked by the laminated spring 31. There is a certain rebound from the laminated spring 31 when the diaphragm again changes direction of movement and this rebound together with the pull of the coil 20 again causes the striker to impact against the diaphragm 11 thereby completing the cycle.

Among the many advantages of my improved horn structure, I desire to specifically point out the volume of sound which is secured thereby in proportion to the current used. I believe that this volume is due generally to some three features of my improved construction.

The first of these features is the improved spring mounting for the weighted armature whereby the spring mounting enhances the velocity of the striker at the time that it impacts against the diaphragm and this feature is further emphasized by providing the heavy armature 32 which gives the structure the effect of a hammer in its action. The signaling device is, I believe rendered desirable by the inturning of the ends 19 of the yoke 18. This yoke 18 forms with the armature 30 a circuit for the magnetic lines of a force from the coil 20 which is broken only by the very slight spaces between the armature 20. I believe that this yoke, therefore, forms a path of travel for the lines of magnetic force thereby concentrating them and further enhancing their action. I also believe that this structure

imparts a polarity on the armature 32 which is the same as the polarity at the opposite end of the coil 20 so that the magnetic effect of the coil is further increased by having its armature of a polarity opposite to that of the end of the coil adjacent to the armature. It is, of course, well known that magnets of unlike polarity will attract each other, whereas, magnets of like polarity will repel each other.

The third great advantage resulting from the use of my improved signaling device is that, its entire structure is made from stock which can be readily purchased in sheets or bars, and practically all of the parts can be punched out in a punch press, so that their production may be rapid, accurate and economical. Moreover, the contact device is both removable and adjustable as a unit relative to the balance of the signal assembly. The importance of this feature will be more apparent when it is considered that all of the parts of my improved signaling device are, practically speaking, not the subject for wear and there is little depreciation from use except in connection with the contact devices. Where these contact devices can be removed as a unit and repaired or replaced and readjusted with little or no trouble then the life of a signaling device is largely prolonged and its efficiency increased.

Some changes may be made in the arrangement and construction of the various parts of my improved device without de-

parting from the spirit of the invention therein, and it is my intention to cover by my claim such changes as may be reasonably included within the scope thereof.

I claim as my invention:

In an electric signaling device, a disc shaped diaphragm, a dished disc attached thereto, said disc having a central opening therein and having a second opening adjacent thereto formed by punching a tongue out of said disc and causing the tongue to extend at an angle to the body of said disc, a U shape yoke member having a central opening therein adapted to register with the opening in said disc, a hollow magnet core member having a sleeve extended therefrom, said sleeve being extended through the openings in the disc and yoke and riveted over to secure said members together, a coil mounted on said core, a spring member extended between the ends of said yoke, a relatively heavy armature member disposed between the coil and spring member, a striker bar adjustably mounted in said armature and extended through the coil and disc to position to actuate the diaphragm, means for securing the striker bar to the spring member, a unitary preassembled make and break structure adjustably mounted on said tongue in position to be actuated by the armature, and means for including the coil and make and break structure in an electrical circuit to actuate the signaling device.

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