C. H. SMITH.

SIGNALING HORN.

APPLICATION FILED NOV. 8, 1913.

1,243,772. Patented Oct. 23, 1917.

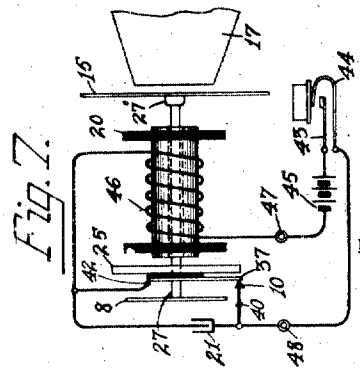

Fig. 7.

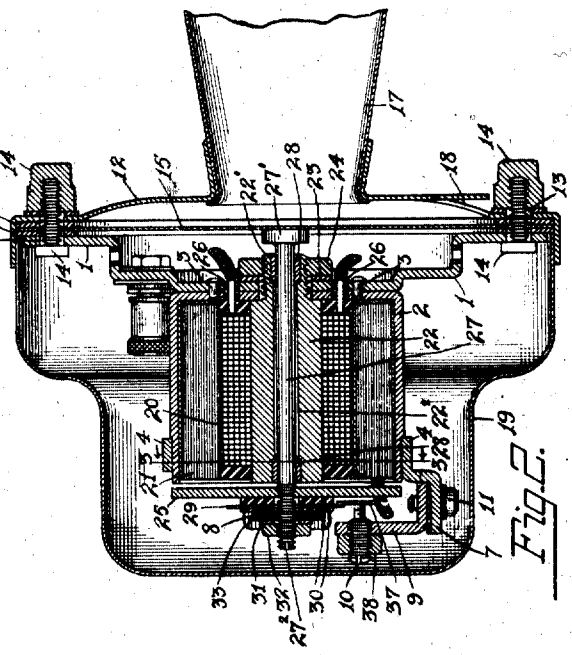

Fig. 2.

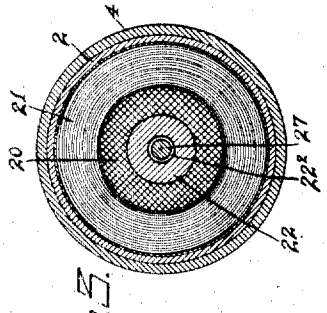

Fig. 3.

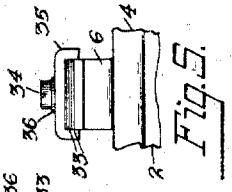

Fig. 5.

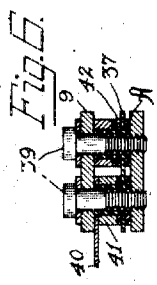

Fig. 6.

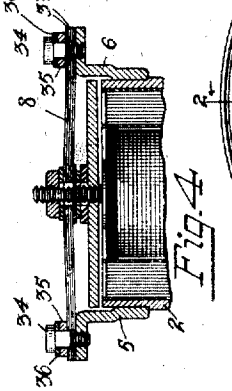

Fig. 4.

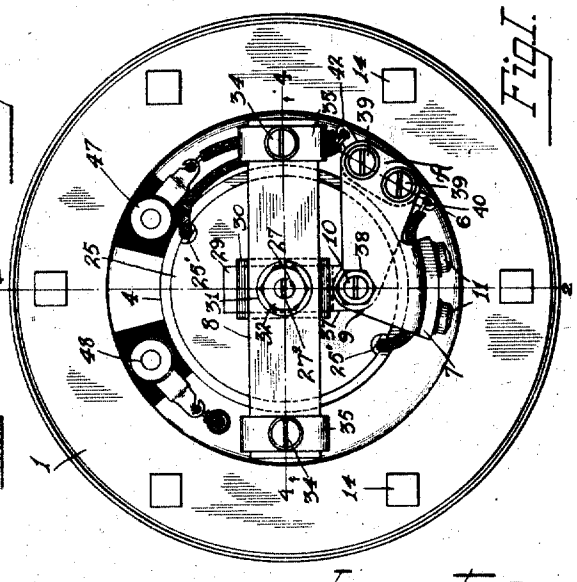

Fig. 1.

Witnesses:

George E. Mueller

Wm. Berghahn

Inventor:

Charles H. Smith.

By Curtis B. Camp

Attorney.

UNITED STATES PATENT OFFICE.

CHARLES H. SMITH, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SIGNALING-HORN.

1,243,772. Specification of Letters Patent. **Patented Oct. 23, 1917.**

Application filed November 8, 1913. Serial No. 799,842.

To all whom it may concern:

Be it known that I, CHARLES H. SMITH, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Signaling-Horns, of which the following is a specification.

My invention relates to signaling devices and has to do more particularly with devices of the character generally employed as warning signals for automobiles, motorcycles, etc., and more commonly known as automobile horns. The objects of my invention are to provide a signaling device having an improved and simplified arrangement of its operating and condenser elements, being of substantial construction and cheap to manufacture. Other features of my invention will be more fully described in the following specification.

For a more complete understanding of my invention, reference may be had to the accompanying drawing in which like reference characters denote like parts and in which—

Figure 1 is a rear elevation of the preferred embodiment of my invention with its cap removed;

Fig. 2 is a sectional view on the line 2, 2 of Fig. 1 looking in the direction of the arrow indicated thereon;

Fig. 3 is a transverse sectional view of the shell, magnet and condenser along the line 3, 3 of Fig. 2;

Fig. 4 is a sectional view on the line 4, 4 of Fig. 1 looking in the direction of the arrows indicated thereon, illustrating fastening means for the bridged spring member.

Fig. 5 is a side view of a portion of the bridging member shown in section in Fig. 4.

Fig. 6 is a sectional view on the line 6, 6 of Fig 1, illustrating the mounting means of the interrupter.

Fig. 7 is a circuit diagram adapted for the device illustrated in Figs. 1 to 6.

Referring now more in detail to the construction of the preferred embodiment of my invention, it comprises a front plate 1, circular in shape, being so drawn and formed as to allow the shell or cup-shaped member 2 to be fastened to said front plate 1, in any suitable manner, preferably as shown in the drawing by the rivets 3. A ring-shaped member 4 is fastened to the upper portion of the shell 2, in any suitable manner, being preferably driven on. The ring 4 has ears 5, 6 and 7 extending upwardly, being bent outwardly at right angles to form a mounting and fastening means for the bridged retractile spring member 8. The upwardly extending ear 7 affords a fastening means for the plate 9, the said plate 9 carrying the adjustable contact screw 10 and the interrupter A. The plate 9 is fastened to the ear 7 by means of the screws 11, being suitably insulated from the ear 7.

A face plate 12 is provided which fits over the circular front plate 1, the face plate 12 and the front plate 1 having a plurality of holes 13 through which the clamping screws 14 pass to firmly clamp the thin metal diaphragm 15 and the two washers 16 between the front plate 1 and the face plate 12 by means of the nuts 14^1. The washers 16 are made of any suitable material but I preferably use a material of cork composition as it is resilient, and allows a greater amplitude of vibration than a hard substance, as metal. The face plate 12 has a bell or horn 17 attached to it in any suitable manner. An opening 18 is located below the bell or horn 17, which allows water or any other foreign material to be expelled, which may have entered through the bell or horn 17. An outer casing 19 fits in the angular portion of the front plate 12 and may be held securely in place in any suitable manner.

The electromagnet 20 and condenser 21 are housed in the shell 2, the electromagnet 20 being preferably made up of a single winding. The core 22 of the magnet 20 has a threaded end 22^1 extending through the shell 2 and the front plate 1. A washer 23 is placed between the plate 1 and the nut 24 and the nut 24 is then screwed down to firmly hold the magnet 20 in the shell 2. The shell 2 serves as a containing member for the magnet 20 and condenser 21, and also acts as a pole piece therefor, when the said magnet is energized to attract its armature 25. The efficient magnetic field thus provided aids in giving the armature added strength in transmitting striking power to the hammer rod 27 to operate the diaphragm 5.

The terminals of the winding pass through insulating bushings 26 which are fitted in

the shell 2 and front plate 1, the said winding terminals being then brought out and attached to their respective binding posts. The condenser 21 is ring-shaped and formed to fit around the magnet 20. In a horn in which a condenser is used it is usually made as a separate element and in designing apparatus one must take into consideration the placing of the condenser. As a condenser is usually bulky it takes up considerable space thus increasing the size of the signaling device. The method I employ in locating the condenser in the shell 2 around the magnet 20 reduces the size of the apparatus considerably, making a compact containing member of the shell 2 and also doing away with the manufacture of a separate containing member for the condenser. I do not wish to be limited to that construction because two condensers formed semi-circularly may be fitted around the magnet 20. Before the condenser 21 is set in the shell 2, a thin layer of paraffin, or another suitable compound, is poured in the bottom of the shell. The condenser is then set in the shell around the magnet 20 and paraffin or any other suitable compound is poured in to fill up the remaining space in the shell. The terminals of the condenser extend up through the armature 25 and as the armature is circular in form and of the same size as the periphery of the shell, notches 25^1 are cut in the periphery of the armature to allow the terminals of the condenser to be brought out.

The core 22 of the magnet has an opening 22^2 through its center extending the length of the core. This opening permits the hammer rod 27 to pass through it to operate the diaphragm in response to the vibration of the armature 25. Bushings 28 are set in the ends of the core to act as bearings for the hammer rod. The hammer rod 27 has an enlarged portion 27^1 which acts as a hammer in operating the diaphragm. The other end of the rod is threaded through the armature 25. A contact breaking strip 29 is placed between two pieces of insulation 30 to insulate it from the armature. The threaded portion of the rod is passed through the said contact spring and pieces of insulation, and the bridged spring member 8. A washer 31 is placed on top of the spring member 8 and a nut 32 screwed down to firmly clamp the spring member 8, contact springs 29 and armature 25 together. A slot 27^2 is cut into the threaded end of the rod 27 so that the said rod may be adjusted properly.

The bridged spring member 8 is preferably made of a plurality of thin metal strips 33. The bridged spring member has as its supporting means the ear extensions 5 and 6 of the ring 4, the angular portions of the ears 5 and 6 being threaded to receive the screws 34. A clamping plate 35 whose ends are bent at right angles, is placed over the metal strips 33 and a washer 36 is placed between said clamping plate 35 and the screw 34.

I provide an interrupter A comprising a vibratile contact spring 37 and an adjustable stationary contact 10 threaded into the supporting piece 9 and locked in adjustment by the lock-nut 38. Spring 37 is attached to the plate 9 and is held in place by the clamping screws 39.

Fig. 6 is a sectional view through the center of the clamping screws 39 and illustrates the method in which the contacts are insulatingly mounted. Fig. 2 is a sectional view and shows how the plate 9 is insulated from the ear extension 7 of the ring member 4. A terminal 40 and washer 41 are secured in electrical contact with the stationary contact screw 10 and a terminal 42 is provided which is secured in electrical contact with the vibratile spring contact piece 37. I provide a set of binding posts 47 and 48 which may be fastened to the front plate 1 in any suitable manner and insulated therefrom. The binding posts serve as fastening means for the terminals of the leads that extend to the operating switch or button 43, 44.

Referring to Fig. 7, I illustrate diagrammatically a circuit arrangement for the signaling device. As illustrated, it comprises a set of controlling contacts 43, and 44 and a battery 45 included in circuit with the winding 46 of the magnet 20. The apparatus is illustrated diagrammatically, the like reference characters denoting like parts.

In the present embodiment of my invention I preferably give a normal flexure to the spring 8 and diaphragm 15, and when contacts 43, 44 are closed armature 25 is attracted increasing the flexure of diaphragm 15 so that when contacts 10, 37 are interrupted, the electromagnet is deënergized allowing the retraction of armature 25 by the action of spring 8 and diaphragm 15 until contacts 10, 37 are again closed at which time the electromagnet is once more energized. In this way magnet 46 is intermittently energized to cause the vibration of diaphragm 15 to produce the sound such as is common to devices of this character. As is well known, in electromagnets which require a comparatively large current flow and in which the circuit is rapidly interrupted, there is a sparking of the contacts which interrupts the circuit, and to obviate this sparking the condenser 21 is connected across these contacts.

Although in illustrating my invention I have chosen to embody it in a signaling horn, it will be apparent that the arrangement of the condenser and electromagnet is not limited to such use and I contemplate

applying it in other ways than that shown, and also in other forms. Therefore I do not desire to be limited to the exact structure as shown and described but aim to cover all such changes and modifications as come within the spirit and scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. A signaling horn including a sounding diaphragm, a circular front plate to which said diaphragm is secured, a cup-shaped casing intraperipherally positioned in respect to said plate and firmly secured thereto, an electromagnet within said casing and having its core in magnetic relation to the said casing whereby said casing serves as a magnetic pole for said magnet, an armature for said magnet, a pair of dependent ears extending from said casing for supporting a bridged retractile spring, connecting means for said diaphragm and armature extending through the center of the magnet core, said connecting means serving to connect said armature to said bridged retractile spring, and a third ear extending from said casing supporting an interrupter contact controlled by said armature.

2. A signaling device including a diaphragm, a circular front plate to which said diaphragm is secured, a cylindrical cup-shaped casing provided with an integrally formed wall and bottom securely fastened to said plate, a magnet positioned within said casing provided with a core extending through the bottom of said casing and plate whereby said casing forms a magnetic pole for said magnet, a ring shaped collar secured to the free extremity of said casing, a pair of ears integrally formed with said collar for supporting an armature, a third ear carrying an interrupter contact, and connecting means for said armature and diaphragm extending through the core of said magnet.

3. A device of the character described including a circular front plate, a cylindrical cup-shaped casing secured to said plate, an electromagnet located within said casing, a condenser positioned between said magnet and said casing, and a cylindrical collar secured to said casing provided with three dependent ears two of said ears supporting an armature for said magnet and the other of said ears carrying an interrupter contact.

4. A signaling horn including a diaphragm, a circular cup-shaped mounting plate to which said diaphragm is secured, a cylindrical casing provided with integrally formed side piece and bottom firmly secured to said plate, a magnet situated within said casing and having its core extending through said plate and firmly secured thereto, a cylindrical condenser lying between the wall of said casing and said electromagnet, an armature operatively related to said magnet and extending over the edge of the wall of said casing, a cylindrical collar carried by said casing for supporting said armature, and connecting means for said armature and diaphragm extending through an opening in the magnet core.

5. A signaling device including a circular front plate, a cylindrical casing having a rearwardly open cup fastened to said front plate, an electromagnet within said casing, a condenser between said electromagnet and the wall of said casing, a ring-shaped member secured to the free end of said casing, a bridge member supported by said ring shaped member, and an armature carried by said bridged member for controlling a diaphragm operating member.

6. A signaling horn comprising a diaphragm, suitable supporting means therefor including a front plate, a cylindrical cup-shaped casing intraperipherally positioned with respect to said plate, an electromagnet located within said casing and having its core at a right angle to the diaphragm and extending through the bottom of said casing and said front plate, a pair of integrally formed supporting members attached to the rear of said casing for supporting a bridged spring member, an armature operatively related to said magnet and casing, a connecting member connecting said armature to said bridged spring member and extending in operative relation to said diaphragm, and a third ear formed integrally with said other ears supporting an interrupter contact controlled by said armature.

7. A device of the character described including a circular front plate, a cylindrical casing having a rearwardly open cup secured to said plate, an electromagnet centrally located within said casing, a core for said electromagnet having its one end threaded and extended through an aperture in said casing and front plate, a nut for the threaded portion of said core to securely hold said core in position, a cylindrical condenser positioned between said electromagnet and the wall of said casing, an armature suitably positioned in operative relation to the free end of the magnet core and the wall of said casing, armature and contact supporting means carried by the free end of said casing, and a connecting member extending through an orifice in said core connecting said diaphragm to said armature.

8. A device of the character described including a circular front plate, a cylindrical cup-shaped casing secured to said plate, an electromagnet centrally located within said casing, a core for said electromagnet having

its one end provided with threads and extending through an orifice in said casing and front plate, a nut for engagement with the threaded portion of said core to securely hold the core in place, a ring shaped condenser positioned between said electromagnet and the wall of said casing, means secured to said casing for supporting a diaphragm operating armature, and connecting means extending through an orifice in said core connecting said armature to said diaphragm.

9. A signaling device of the character described including a circular front plate, a cup-shaped casing intra-peripherally positioned in respect to said plate and firmly secured thereto, an electromagnet located within said casing and having a core extending through an orifice in said casing and front plate, a condenser positioned between said magnet and said casing, an armature for said electromagnet, a pair of interrupter contacts, and a cylindrical collar secured to said casing provided with dependent ears for supporting said armature and said interrupter contacts.

10. A signaling device of the character described including a circular front plate, a cup-shaped casing intra-peripherally positioned in respect to said plate and firmly secured thereto, an electromagnet located within said casing and having a core extending through an orifice in said casing and front plate, a condenser positioned between said magnet and said casing, an armature for said electromagnet, a pair of interrupter contacts, a cylindrical collar secured to said casing provided with dependent ears for supporting said armature and said interrupter contacts, and an operating member connecting said armature to said diaphragm extending through the core of said magnet.

11. A signaling horn including a circular front plate, a cylindrical casing having a rearwardly extending open cup firmly secured to said front plate, an electromagnet located within said casing having a core extending through an orifice in said casing and front plate, a condenser between said electromagnet and the wall of said casing, an armature for said electromagnet, a ring-shaped member secured to the free end of said casing, a bridged member supported by said ring-shaped member to which the said armature is attached, and an operating member connecting said armature to said diaphragm supported by said bridged member.

Signed by me at Chicago, county of Cook and State of Illinois, in the presence of two witnesses.

CHARLES H. SMITH.

Witnesses:
GEORGE E. MUELLER,
M. R. ROCHFORD.