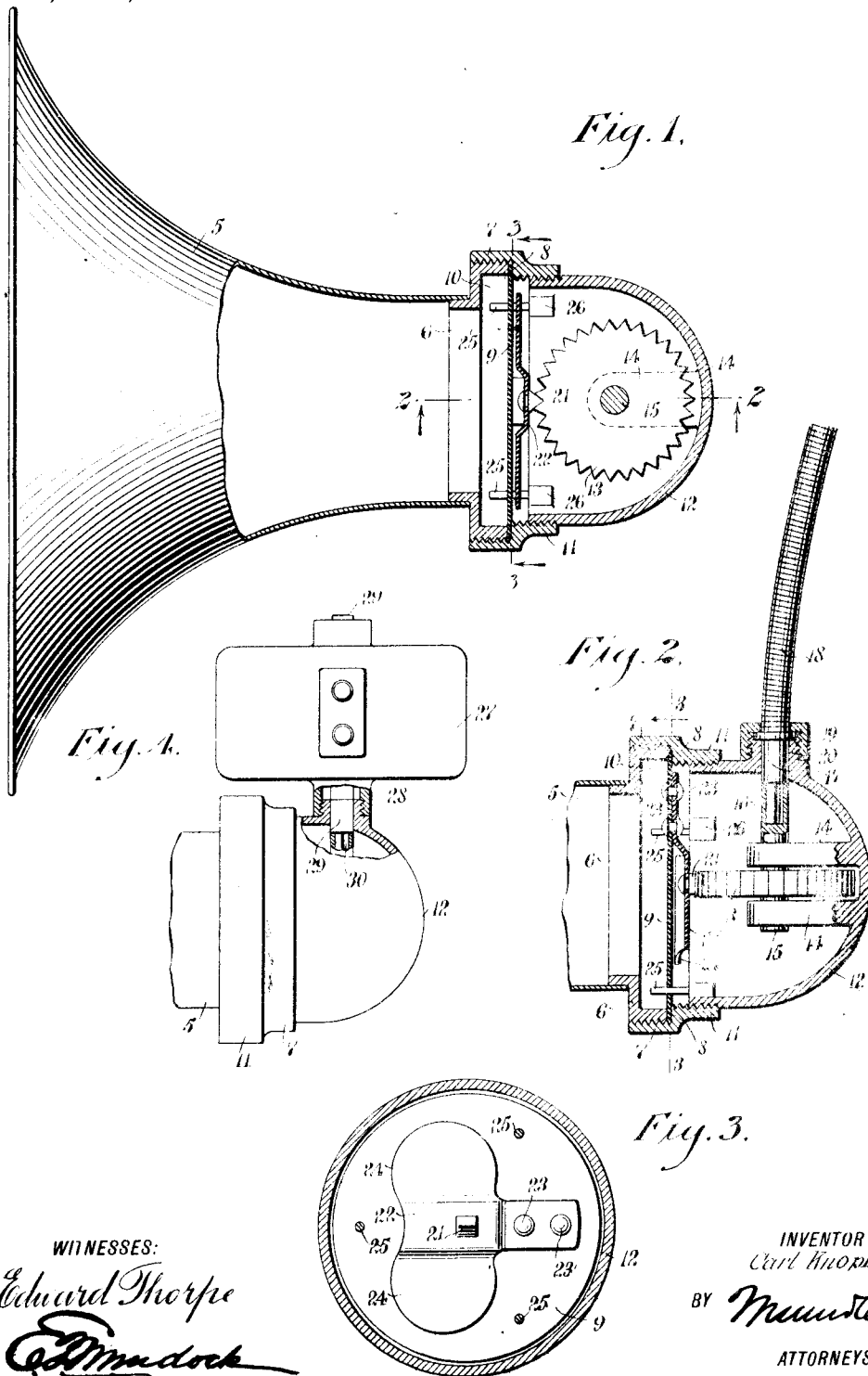


C. KNOPF.
HORN OR SIGNALING DEVICE.

APPLICATION FILED MAY 6, 1910. RENEWED APR. 1, 1913.

1,184,353.

Patented May 23, 1916.



WITNESSES:
Edward Thorpe
Edmund

INVENTOR
Carl Knopf
BY *Mumford*
ATTORNEYS

UNITED STATES PATENT OFFICE.

CARL KNOPE, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO LOVELL-McCONNELL MANUFACTURING COMPANY, A CORPORATION OF DELAWARE.

HORN OR SIGNALING DEVICE.

1,184,353.

Specification of Letters Patent.

Patented May 23, 1916.

Application filed May 6, 1910, Serial No. 559,726. Renewed April 1, 1913. Serial No. 758,266.

To all whom it may concern:

Be it known that I, CARL KNOPE, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Horn or Signaling Device, of which the following is a full, clear, and exact description.

My invention relates particularly to that type of horn in which vibration is imparted to a diaphragm by means of a rotor in the form of a toothed wheel. My invention relates particularly to the means for producing the sound waves and for securing the desired adjustment of the toothed wheel in respect to the diaphragm.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a side view partly in section, of a horn or signaling device constructed and arranged in accordance with the present invention; Fig. 2 is a sectional view taken on the line 2—2 in Fig. 1, showing the vibrator chamber as having attached thereto a flexible shaft for rotating the vibrator; Fig. 3 is a cross section taken on the line 3—3 in Fig. 2; and Fig. 4 is a side view, partly in section, showing the horn or signaling device as having applied thereto an electric motor for operating the vibrator.

In the drawings, a horn embodying my invention is illustrated as having a bell-shaped resonator 5, fixedly secured to a diaphragm clamping member in the form of a cast metal collar 6. This collar has oppositely extending cylindrical flanges, to one of which the resonator is secured, and the other of which is externally threaded. A second diaphragm clamping member in the form of a collar 7, is also provided with oppositely extending cylindrical flanges, separated by a shoulder 8. Both of these collars are interiorly threaded, and one of them receives the flange 10 of the collar 6.

The shoulder 8 constitutes a seat for a diaphragm 9 which is held between the said

shoulder 8 and the end of the flange 10 of the collar 6. The diaphragm 9 is constructed from any suitable resilient vibratory material and its periphery is clamped between the edge of the flange 10 and the shoulder 8 by screwing the collars 6 and 7 together. The collar 7 is provided with a flange 11 to engage the screw threads formed on a casing 12, which latter has end standards 14, 14 to support a shaft 15. The shaft carries a toothed wheel 13 and in one end is formed a square recess to receive the squared end 16 of the rotary head 17 carried by the flexible shaft 18. The shaft 18 is held against longitudinal movement by a flange engaging beneath a screw coupling 19 which is threaded to engage a boss 20 formed on the casing 12. The teeth of the wheel 13 engage with a stud 21, mounted on the said diaphragm. The stud 21 is rigidly mounted on the cupped section 22 of an auxiliary vibrator, which is rigidly secured to the diaphragm 9 by rivets 23, 23. The vibrator is provided with spread end sections 24, 24, which are fan-shaped and disposed in close juxtaposition to the diaphragm 9 or separated slightly therefrom.

The stud 21 and the teeth of the wheel 13 are straight sided and therefore require that the stud 21 and the wheel 13 shall maintain their relative positions. It is for this purpose that the pins 25, 25 are provided which are rigidly set in sockets 26, 26 integrally formed on the end 12. The pins 25, 25 are extended slidably through perforations provided in the diaphragm 9. This axial adjustment between the casing 12 and the diaphragm does not disturb the relative radial positions of the said diaphragm stud 21 and wheel while permitting the necessary movement of the casing 12 to separate the same from the diaphragm and thereby adjust the relation between the stud 21 and the wheel 13. This adjustment, it will be understood, is accomplished by rotating the casing 12 within the flange 11 of the collar 7. The threads within the flange 11 feed outward or inward the cup 12, while the diaphragm 9 is held on the shoulder 8.

When it is desired to rotate the casing 12, the collar 6 is first rotated to move the edge of the flange 10 from contact with the diaphragm 9 to permit the said diaphragm to rotatively slide on the shoulder 8 of the collar 7. When the proper adjustment between the wheel 13 and the stud 21 has been obtained, the collar 6 is revolved to force the flange 10 against the diaphragm 9 to hold the same fixedly in position. In thus locking the diaphragm 9, the casing 12 is locked and the adjustment of the said wheel and the diaphragm and stud 21 thereon is secured against disarrangement.

In Fig. 2 of the drawings there is illustrated a method of rotating the wheel 13 wherein is employed a flexible shaft 18. In certain instances it is desired to rotate the wheel 13 by employing a small electric motor 27 as shown in Fig. 4 of the drawings. The casing for the motor 27 is provided with a lateral opening tubular extension 28 which is adapted to fit the screw threads formed on the boss 20. The motor is provided with an armature shaft 29 the end whereof is provided with a squared extension 30. When the motor is secured upon the boss, the armature shaft passing therethrough, the squared extension 30 is seated within the perforation formed in the shaft 15 in the same manner as the squared end 16 of the flexible shaft 18.

When the horn is provided with the motor 27 attached as shown in Fig. 4 of the drawings, the wheel 13 is rotated whenever the electric circuit for operating the motor is completed. When the horn is suitably mounted on an automobile or other vehicle, and the flexible shaft, with its rotating attachment is disposed on said vehicle, the operation is as follows: When it is desired to sound an alarm, the shaft 18 is rotated by the chauffeur, thereby revolving the wheel 13. As each of the spurs of the wheel 13 pass over the stud 21, it operates to displace outwardly from the wheel 13 the said stud, and to force the sections 24, 24 against the diaphragm 9, thereby producing in the diaphragm a vibration. With the passage of each of the teeth, and the recession of the section 22 from the diaphragm 9, an independent vibration is set up in the sections 24 of the vibrator, which, through the rigid connection of said vibrator to the diaphragm, is communicated to the said diaphragm. The vibrator being of lighter material, and varying in construction, will produce a set of vibrations differing from that produced by the diaphragm 9. The interweaving, varied vibrations thus imparted to the diaphragm, and by the diaphragm to the air contained within the body of the resonator 5, results in the formation of com-

plex sound waves. By reason of the striking of the teeth upon the stud 21, there is produced a cicadous sound. The commingling of all the tones produces a distinctive and individualized alarm.

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

1. A horn or signaling device including a diaphragm, means for vibrating said diaphragm including a rotor, separate supports for said diaphragm and said rotor, said supports being relatively rotatable about an axis at right angles with said diaphragm to effect adjustment of said rotor and diaphragm toward and from each other, and means for preventing relative rotation of said diaphragm and said rotor support.

2. An alarm or signaling device, including a diaphragm, two annular detachably connected diaphragm clamping members, retaining the peripheral portion of said diaphragm therebetween, a resonator secured to one of said members, a casing having threaded engagement with the other of said members, and adjustable toward and from said diaphragm by a rotary movement about an axis at right angles to said diaphragm, a shaft projecting through the wall of said casing and substantially parallel to said diaphragm, and a rotor carried by said shaft for vibrating said diaphragm, and adjustable toward and from the latter by said rotation of said casing in respect to the diaphragm clamping members, and locking means normally preventing the rotation of said casing in respect to the diaphragm clamping members.

3. A horn or signaling device, including a diaphragm, a toothed rotor, and means for vibrating said diaphragm upon the rotation of said rotor, said means including an intermediate flexible member engaging with said diaphragm at a plurality of points, and having a portion intermediate of its ends spaced from said diaphragm, and in the path of the teeth of said rotor.

4. A horn or signaling device including a diaphragm, a toothed rotor rotatable about an axis substantially parallel to the diaphragm, a diaphragm support, a rotor support, connections between said supports whereby the rotor may be adjusted toward and from the diaphragm by a rotary movement of one support in respect to the other about an axis substantially at right angles to the diaphragm, and means connecting the diaphragm to the rotor support for preventing rotary movement of the diaphragm in respect to the rotor during such adjustment.

5. A horn or signaling device including a diaphragm, a wear-piece having a substan-

5 tially straight line contact surface, a rotor
mounted to rotate about an axis substantially
parallel to the diaphragm, a diaphragm
support, a rotor support, one of said sup-
ports being rotatable about an axis substan-
tially at right angles to said diaphragm for
effecting relative adjustment of said dia-
phragm and rotor toward and from each
10 other, and means for holding said wear-piece
with its contact surface extending in the

general direction of the axis of the rotor
during said adjustment.
In testimony whereof I have signed this
specification in the presence of two subscri-
ing witnesses.

CARL KNOPE.

Witnesses:

MORTON A. EDELSTEN,
MAUD N. JARNY.