T. WEISS & T. A. WALTHER.

ELECTRICAL SIGNALING DEVICE.

APPLICATION FILED OCT. 21, 1911.

1,028,980. Patented June 11, 1912.

Fig. 1.

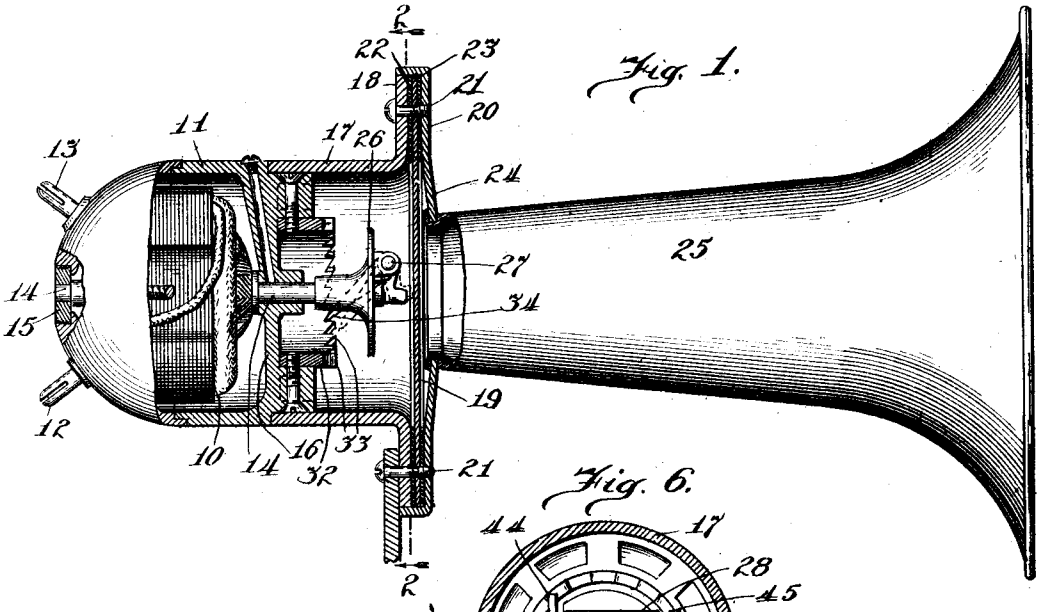


Fig. 6.

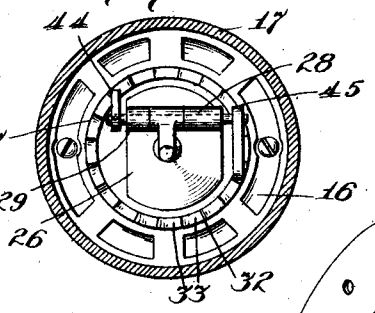


Fig. 2.

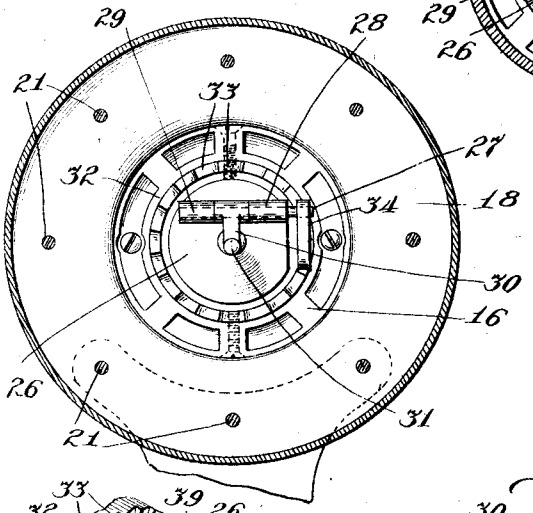


Fig. 3.

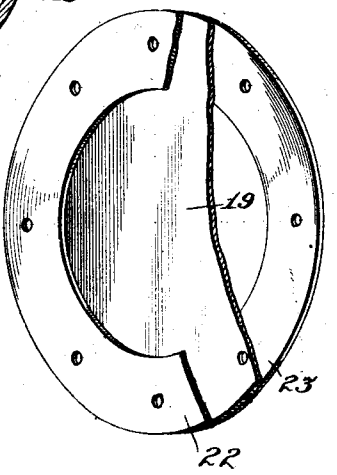


Fig. 5

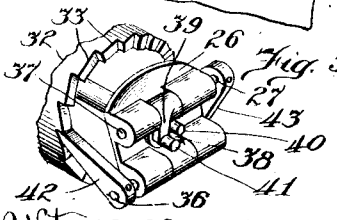
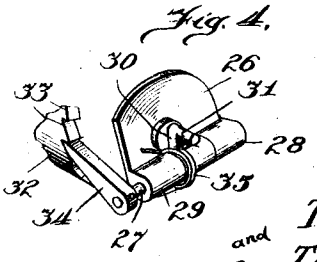


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ELECTRICAL SIGNALING DEVICE.

1,028,980. Specification of Letters Patent. Patented June 11, 1912.

Application filed October 21, 1911. Serial No. 656,060.

To all whom it may concern:

Be it known that we, THEODORE WEISS and THEODORE A. WALTHER, citizens of the United States, and residents of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Electrical Signaling Devices, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to that class of devices in which there is employed a diaphragm, usually in the form of a metal disk, a tapper for striking the diaphragm, and an electric motor for actuating the tapper.

The objects of the invention are to secure an improved mechanical action of the tapper mechanism and an improved quality of tone, together with increased volume.

The invention consists in a structure of the type named, in which the tapper is oscillatable, being mounted upon a rocker shaft which is moved in one direction by the action of a series of cams or ratchet teeth upon an arm projecting laterally from the shaft, relative movement of the cams or ratchet teeth and the arm being produced by an electric motor, and the tapper being retracted either by a spring or by the rebound from the diaphragm.

One form of embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a detail longitudinal section of the device, shown partly in elevation; Fig. 2 is a transverse section on the line 2—2 of Fig. 1; Fig. 3 is a perspective, partly on the same plane as Fig. 2 but looking in the opposite direction, some of the parts being broken away; Fig. 4 is a detail perspective of the tapper mechanism; Fig. 5 is a detail perspective similar to Fig. 4, showing a modified form of construction; and Fig. 6 is similar to Fig. 2 but shows a still further modification.

A rotary electric motor 10 is housed within a suitable casing 11 carrying suitable terminals, as 12, 13, to which the lines of an electric circuit may be attached. The shaft 14 of the armature of the motor is journaled in a suitable box 15 at the rear end of the casing, and in a partition wall 16 at the forward end of the compartment within which the motor is located.

A ring 17, shown as of the same diameter as the motor casing 11, projects forwardly from the latter and incloses the tapper mechanism. The forward end of the ring 17 is provided with a radial flange 18 against which the diaphragm 19 is seated and to which it is clamped by means of an annular plate 20, held by a plurality of screws, as 21. Preferably a pair of packing rings 22, 23, are interposed, respectively, between the flange 18 and the plate 20, and the inner portion of the latter is inclined forwardly, as shown at 24, to permit the free vibration of the diaphragm. A horn or amplifier 25 is fitted to and secured within the central opening in the plate 20, and may take any preferred form.

The armature shaft 14 projects forwardly into the chamber inclosed by the ring 17, and upon its forward end there is mounted a head which preferably takes the form of a disk 26. A rocker shaft 27 is journaled in boxes 28, 29, mounted upon the forward face of the disk 26, the axis of the rocker shaft being located a short distance from the diameter of the disk which it parallels. The tapper consists of an arm 30, projecting laterally from the shaft to the center of the disk, carrying at its free end a forwardly projecting head 31, which is normally spaced a short distance from the center of the diaphragm 19 and may be thrown thereagainst by a slight turning movement of the shaft 27.

A ring 32 is fixed within the chamber inclosed by the ring 17, encircling the armature shaft and being concentric therewith. The forward edge of the ring 32 is serrated, being provided with an annular series of ratchet teeth or cams 33. A finger 34, fixed upon one end of the shaft 27, rides upon the teeth 33. Relative rotary movement of the ratchet teeth and the finger 34 about the axis of the armature shaft imparts forward impulses to the tapper as the finger rides upon the inclined faces of the teeth, throwing it against the diaphragm. The recoil of the tapper is accomplished either by the reaction of the diaphragm or by the tension of a retracting spring 35 acting upon the tapper, or by both of these agencies.

We have found in practice that the spring may be dispensed with but that when used the quality of the tone produced is improved.

While in the construction illustrated the rotary member of the tapper-actuating mechanism is the finger 34 and its supporting shaft, the cam ring being fixed, it is obvious that the same results may be secured by the reverse arrangement.

In the modification illustrated in Fig. 5, there are present two parallel rocker shafts 36, 37, mounted upon the disk 26, and at opposite sides of its diameter which they parallel, each carrying a tapper arm 38, 39, projecting substantially to the axis of the armature shaft, each arm carrying a tapper head 40, 41, the two heads being located side by side and each acting independently of the other; each rocker shaft is provided with a finger, as 42, 43, for engaging the ratchet teeth 33, these fingers being relatively at opposite ends of the shafts with which they are associated. By this construction the frequency of the blows upon the diaphragm may be increased over that secured by the construction hereinbefore described, being doubled in number if the same number of ratchet teeth be employed. While it is important that the blows struck upon the diaphragm shall be approximately at its center, this result is secured in the construction of Fig. 5. Preferably the fingers 42 and 43 are so disposed with reference to the ratchet teeth 33 that the tapper heads 40 and 41 act in alternation.

In the form of construction illustrated in Fig. 6 of the drawings, the shaft 27 is provided with a finger at each end for riding upon the ratchet teeth 33, such fingers being designated by the numerals 44 and 45, respectively. These fingers are oppositely directed with reference to the axis of the shaft 27, and are so related to the ratchet teeth that when one of them, as 44, is at the apex of one of the teeth the other one, as 45, is at its lower portion. The shaft 27 is thus positively actuated in both directions.

We claim as our invention—

1. In a signaling device, in combination, a diaphragm, a supporting member facing the diaphragm, an oscillating tapper carried by the support and arranged to strike the diaphragm, a spring urging the tapper away from the diaphragm, a circular ratchet having its axis perpendicular to the diaphragm, a finger in fixed relation with the tapper and engaging the ratchet, and means for imparting relative rotary motion to the support and the ratchet.

2. In a signaling device, in combination, a diaphragm, a rotary motor having its shaft perpendicular to the diaphragm, a rocker shaft carried by and transverse to the shaft of the motor and having a laterally projecting tapper positioned to strike the diaphragm, a stationary annular ratchet concentric with the motor shaft, and a finger fixed upon the rocker shaft and engaging the ratchet.

3. In a signaling device, in combination, a diaphragm, a rotary motor having its shaft perpendicular to the diaphragm, a rocker shaft carried by and transverse to the shaft of the motor and having a laterally projecting tapper positioned to strike the diaphragm, a stationary annular ratchet concentric with the motor shaft, a finger fixed upon the rocker shaft and engaging the ratchet, and a spring urging the tapper away from the diaphragm.

4. In a signaling device, in combination, a diaphragm, a rotary motor having its shaft perpendicular to the diaphragm, a pair of parallel rocker shafts carried by and transverse to the motor shaft, each rocker shaft being provided with a laterally projecting tapper positioned to strike the diaphragm, a stationary annular ratchet concentric with the motor shaft, and a pair of fingers, one fixed upon each of the rocker shafts and each engaging the ratchet.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."