April 12, 1932. M. TIBBETTS 1,853,709

HORN

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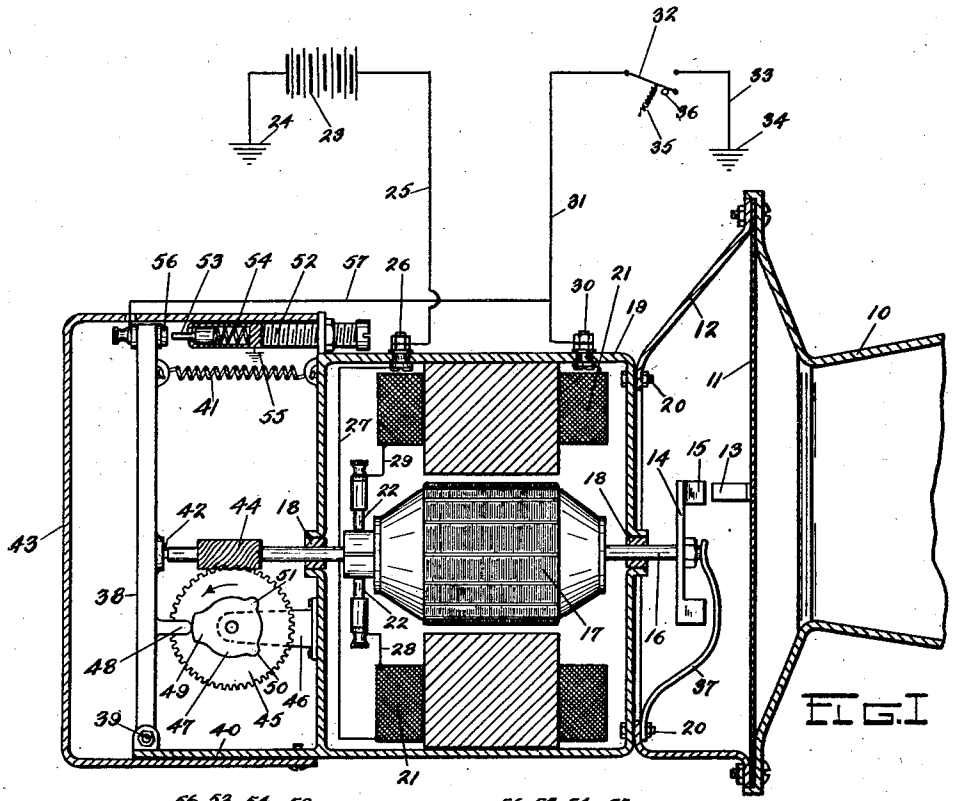


FIG. 1

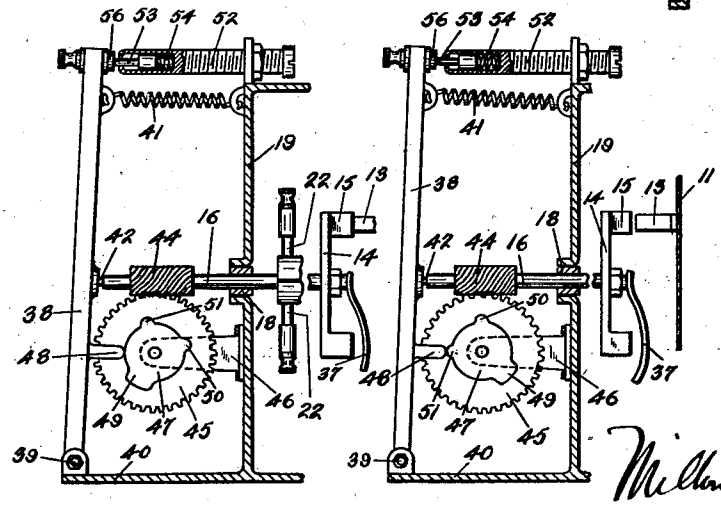


FIG. 2

FIG. 3

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UNITED STATES PATENT OFFICE

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HORN

Application filed December 4, 1924. Serial No. 753,761.

This invention relates to horns and it is shown as particularly adapted to diaphragm horns.

One of the objects of the invention is to provide a horn or sound producing instrument with means for obtaining a distinctive signal.

Another object of the invention is to provide a horn with means for sounding it through a given cycle.

Another object of the invention is to provide a horn with means for automatically carrying the horn through a sounding cycle by merely a single manual closing of the circuit.

Another object of the invention is to provide a horn with means adapted to automatically operate intermittently.

Another object of the invention is to provide a horn with stopping means operated by the horn itself.

Another object of the invention is to provide a horn with means for intermittently sounding the horn with continuous operation of the motor.

Another object of the invention is to provide a motor driven horn with means controlled by the motor for sounding the horn through a given cycle of operations.

Other objects of the invention will appear from the following description taken in connection with the drawings, which form a part of this specification, and in which:

Fig. 1 is a section through a horn embodying the invention;

Fig. 2 is a view of part of the mechanism of Fig. 1 with the parts in another position, and

Fig. 3 is a view similar to Fig. 2 with the parts in a third position.

Referring to the drawings, 10 represents the bell, 11 the diaphragm and 12 the rear supporting part of a diaphragm horn of usual construction. At the middle of the diaphragm is an anvil or striker point 13 and a rotary striker 14 is shown in operative relation thereto. The striker 14 has a series of teeth 15 which are adapted to strike the anvil 13 and thereby vibrate the diaphragm 11, in the usual way.

The striker 14 is mounted on a shaft 16 which forms the armature shaft of a motor 17 and this shaft is mounted in bearings 18 in a casing 19 to which the supporting member 12 is secured as by a series of bolts 20. The field windings of the motor are indicated at 21 and the brushes are shown at 22. The motor may be normally operated from a battery 23, which battery is grounded on one side as at 24, conductor 25, binding post 26, conductor 27 extending to one of the field coils 21, a conductor 28 extending to one of the brushes 22, a conductor 29 extending from the other brush to the other coil 21, binding post 30, conductor 31, switch 32 and conductor 33, to ground 34. The switch 32 is yieldingly held in open position as by a spring 35 and it may be manually closed and held closed, but as soon as it is released the spring 35 will draw it back against a stop 36, thereby opening the circuit.

The motor operated horn so far described is of usual construction and the horn is ordinarily sounded by closing the switch 32, the horn sounding as long as the switch is held closed.

Means are provided for changing this usual operation of the horn. A spring 37 secured as shown by one of the bolts 20, contacts with the forward end of the shaft 16 to thereby yieldingly press the shaft 16 towards the left or away from the diaphragm 11. This spring therefore tends to yieldingly press the striker 14 away from the diaphragm and thus prevent the sounding of the horn though the motor may be operated.

Means are provided at the opposite end of the shaft 16 for yieldingly pressing the striker towards the diaphragm and this second yielding means is stronger than the first yielding means and will therefore overcome it when both are free to act. The second

yielding means is shown in the form of a lever 38 pivoted at 39 to an extension 40 of the casing 19, and a spring 41 connected between the lever 38 and the casing as shown near the top of Fig. 1. The lever 38 contacts with the left-hand end of the shaft 16 as at 42 and by reason of the spring 41 tends to move the shaft 16 towards the right and the striker 14 against the diaphragm 11. A cover 43 is arranged over the lever 38 and its associated mechanism, as shown in Fig. 1.

Means are provided to act upon the lever 38 to withdraw it from its normal function of pressing the striker towards the diaphragm. This means as shown is operated by the electric motor that operates the striker and it comprises a worm 44 on the shaft 16, a worm wheel 45 meshing with the worm and supported in suitable bearings on a bracket 46, and a cam 47 mounted upon or connected to the worm wheel 45. A lug or finger 48 on the lever 38 contacts with the face of the cam 47 so that the cam may control the position of the lever 38. The cam may be provided with any desired number and arrangement of lobes and as shown there are three lobes one of which is larger than the other two. The lobe 49, which is shown in Fig. 1 as in contact with the finger 48, has a greater throw and is longer than the lobes 50 and 51, but each of these lobes is sufficient to withdraw the lever 38 so that the spring 37 will press the striker 14 out of contact with the diaphragm 11, and the depressed portions of the cam between the lobes are so formed that the lever 38 may operate to its full extent to yieldingly press the striker 14 towards the right in opposition to the spring 37 and therefore in contact with the diaphragm 11. Thus it will be seen that in the operation of the motor the horn will be sounded only when the finger 48 is positioned between the various cam lobes 49, 50 and 51.

Means are provided for keeping the motor running as the finger 48 passes over some of the cam lobes and for limiting the pressure of the lever 38 against the striker shaft. As shown, this means comprises a threaded bolt 52 made adjustable as shown and provided with a yielding contact point 53, a spring 54, tending to press the contact point towards the left as shown in Fig. 1. The bolt 52 is grounded as shown at 55 and the point 53 is adapted to make contact with a binding post 56 on the lever 38, said binding post being connected through a conductor 57 with the conductor 31, thereby placing this yielding contact point 53 in parallel with the manually operated switch 32. It will be seen that the contact point 53 automatically closes the motor circuit when the finger 48 rides down off of the cam lobe 49. This closed position of the automatic switch or contact 53 is shown in Fig. 2 where it will be seen that the lever 38 has moved the shaft 16 towards the right and the contact point 53 has closed the circuit through the conductor 57. It will also be seen that the spring 54 has been fully compressed so that the bolt 52, in the position shown in Fig. 2, acts as a stop or limiting means for the movement of the lever 38.

The lobes 50 and 51, as shown in Fig. 3, will move the lever 38 sufficiently to withdraw the striker 14 from contact with the diaphragm 11, but not sufficiently to break the automatic switch or contact 53. Thus the motor will continue to operate after the finger 48 rides up on either cam 50 or 51, but the horn will cease to sound. This position of the parts is illustrated in Fig. 3 where the finger 48 is riding on the cam 51 and the striker 14 has been moved out of contact with the diaphragm 11 but the automatic switch 53 still remains closed. With the motor circuit thus closed, the motor will continue to operate the cam 45 through a complete cycle though the horn will be intermittently sounded during that cycle. The lobe 50 will move against the finger 48 and stop the sounding of the horn as did the lobe 51 and then the horn will again sound while the cam is moving from lobe 50 to lobe 49. Lobe 49 will not only move the lever 38 so that the striker 14 is out of contact with the diaphragm 11, but it will move the lever 38 to a point where the contact 53 is broken, as shown in Fig. 1 and, unless the switch 32 is still held closed by the operator, the motor will stop and the cycle of operation will have been completed. The cycle may again be gone through with by merely closing the manual switch 32 thus starting the motor and operating the cam to the point where the finger 48 will fall between lobes 49 and 51 thereby sounding the horn and closing the switch 53 as above described. By holding the switch 32 closed during the entire cycle, the cycle may be repeated indefinitely, but as soon as the switch 32 is opened the motor will stop at the end of the cycle. It will be understood that the cams 49, 50 and 51 may be of varying heights and dwells so that varied starting and stopping of the sounding of the horn may be carried out. The cams may be so arranged that the sounding of the horn will not be stopped entirely but the pressure merely changed so that the sound itself will be changed.

Other forms and modifications of the device may be used without departing from the spirit or scope of the invention as outlined in the appended claims.

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

1. A horn comprising, in combination, a diaphragm, a rotary striker for the diaphragm, a motor for operating the striker, yielding means for moving the striker in con-

tact with the diaphragm, a second means for moving the striker out of contact with the diaphragm, and means operated by the motor for intermittently withdrawing the yielding means to permit the striker to be moved from operative relation with the diaphragm by the second means.

2. A diaphragm horn comprising, in combination, a motor operated striker, means for yieldingly retaining the striker in operative position, other and weaker means for yieldingly withdrawing the striker from operative position, and a cam operated by the motor for intermittently withdrawing said first named yielding means to permit removal of the striker from operative position.

3. A horn comprising, in combination, a diaphragm, a rotary striker for the diaphragm, an electric motor connected to operate the striker, a yielding device for pressing the striker away from the diaphragm, a stronger yielding device for pressing the striker towards the diaphragm, and means operated by the motor for intermittently withdrawing the stronger yielding device whereby the striker engages the diaphragm intermittently.

4. A horn comprising, in combination, a diaphragm, a rotary striker therefor, an electric motor for operating the striker, yielding means for pressing the striker against the diaphragm, a countershaft geared to be operated by the motor, and a cam on said countershaft adapted to intermittently withdraw said yielding means as the motor is operated whereby the striker engages the diaphragm intermittently.

5. A horn comprising, in combination, a motor for sounding the horn, a source of current, circuit connections from said source to the motor, and a device operated by the motor in a given period of operation of the motor for intermittently stopping the sounding of the horn without stopping the motor and then stopping the motor.

6. A horn comprising, in combination, a diaphragm, a rotary striker therefor, an electric motor for operating the striker, a yielding device for moving the striker to engage the diaphragm, parallel electric circuits for operating the motor, a manually operated switch in one of said circuits, a switch operated by said yielding means in the other of said circuits, a cam operated by the motor for intermittently withdrawing said yielding means, to disengage the striker and means on the cam for actuating said yielding means to open the switch operated thereby.

7. A horn comprising, in combination, a diaphragm, a rotary striker therefor, an electric motor for operating the striker, a yielding device for moving the striker to engage the diaphragm, parallel electric circuits for operating the motor, a manually operated switch in one of said circuits, a switch operated by said yielding means in the other of said circuits, a cam operated by the motor for intermittently withdrawing said yielding means, the cam actuating said yielding means to open the switch operated thereby, and one of the lobes of said cam actuating said yielding means to disengage the striker without stopping the motor.

In testimony whereof I affix my signature.

MILTON TIBBETTS.