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MOTOR DRIVEN DEVICE AND MEANS FOR CONTROLLING SAME

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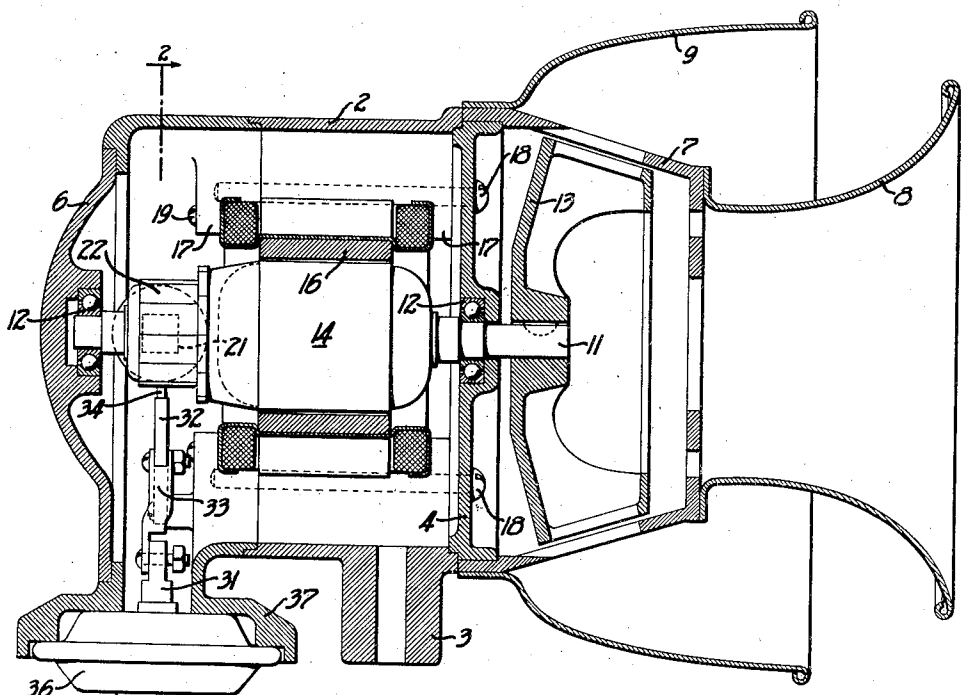


Fig. 1

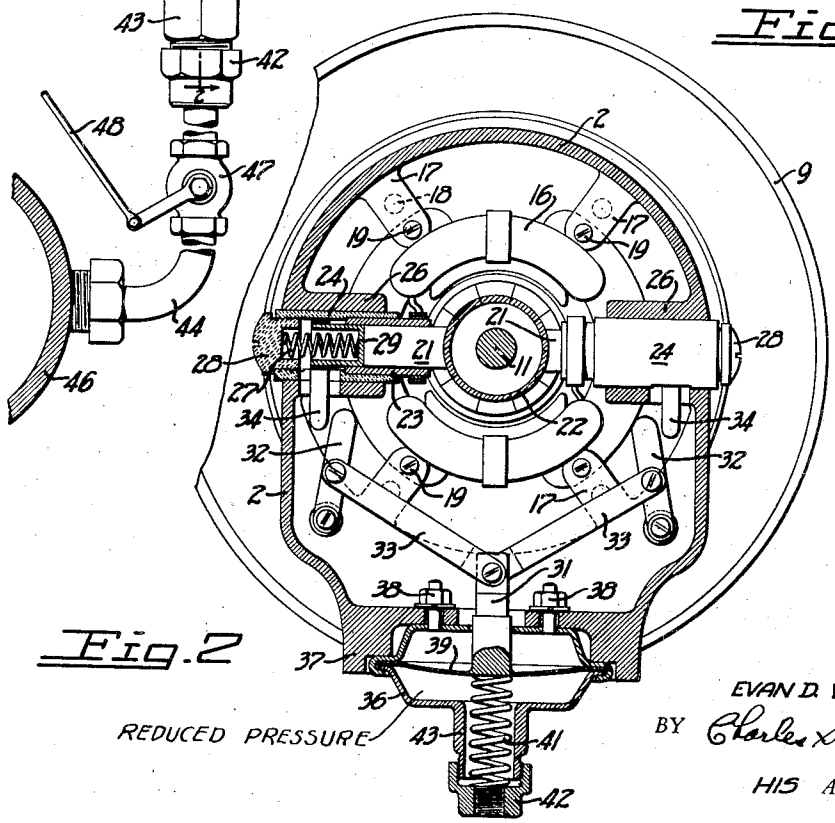


Fig. 2

REDUCED PRESSURE

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MOTOR DRIVEN DEVICE AND MEANS FOR CONTROLLING SAME

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5 Claims. (Cl. 171—324)

It is among the objects of my invention to provide improved means for relieving the brush pressure on a motor commutator, so that an armature and connected rotor, such as the sounding rotor of a siren, are free to revolve without frictional drag.

Another object of my invention is to provide means for accomplishing the above object without interfering with the setting of the brushes or the adjusted brush pressure.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of my invention. It is to be understood that I do not limit myself to this disclosure of species of my invention, as I may adopt variant embodiments thereof within the scope of the claims.

Referring to the drawing:

Figure 1 is a vertical sectional view of a siren embodying the improvements of my invention; and

Figure 2 is a sectional view of the same taken in a plane indicated by the line 2—2 of Figure 1.

In terms of broad inclusion, the motor driven device embodying my invention comprises an electric motor having an armature and associated commutator and brushes. A rotor, such as a sounding rotor of a siren is mounted directly on the armature shaft of the motor. Springs are provided for pressing these brushes against the commutator, and means comprising a counteracting control spring are provided for removing the spring pressure from the brushes to de-energize the armature and simultaneously relieve the commutator of brush drag. The activity of the control spring is preferably regulated by fluid means, such as vacuum. It is contemplated that the vacuum be derived from the intake manifold of the vehicle on which the device is mounted, and preferably the control spring is of sufficient strength to require a driver to throttle down his engine in order to build up enough vacuum to operate the device.

In greater detail, and referring particularly to the drawing, the siren chosen for purposes of illustration and embodying the improvements of my invention comprises a split housing 2 having a mounting boss 3 on its forward portion. An end plate 4 is provided on the forward end of the housing, and a cover plate 6 is provided to close the rear end. The sounding unit is mounted on the forward end plate 4 and comprises a ported casing 7 carrying sound deflectors and projectors 8 and 9. A shaft 11 is journaled in the end plates 4 and 6 in suitable bearings 12, and carries on its forward projecting end the sounding rotor 13 arranged within the ported casing 7.

The shaft 11 also carries the armature 14 of the motor which drives the siren. By this arrangement a single rotating element is provided, having a minimum of frictional resistance, and capable of rotating for a considerable period of time after the current to the motor has been cut off. The field 16 of the motor is clamped between the two halves of the split housing, and is held by lugs 17 projecting inwardly from the housing walls. The several elements are held in assembled relation by screws 18 extending through the end plate 4 and threaded in the outer lugs 17. The field 16 is also preferably fastened to the outer lugs 17 by suitable screws 19 so that when the assembly screws 18 are withdrawn the field 16 will be dismantled as a part of the outer housing portion.

As better shown in Figure 2, the brushes 21 are mounted to slide freely toward and away from the commutator 22. The brush mounting comprises a conducting brush holder 23 supported in the end of an insulating sleeve 24 fitted in a boss 26 formed on the rear portion of the housing. The brush is pressed against the commutator by a spring 27 compressed between an adjusting screw 28 threaded in the rear end of the sleeve 24 and a cup 29 slidable in the holder 23 and bearing against the brush 21. The loading of the brush spring 27 may be adjusted by turning the screw 28, as will be readily understood.

Means are provided for removing the spring pressure from the brushes to stop the flow of current to the armature and to simultaneously relieve the armature of the brush drag on the commutator. By relieving the armature of this frictional drag when the current is cut off, the armature 14 and connected sounding rotor 13 are free to spin and the inertia of these parts will maintain the signal for a considerable period after the motor has been de-energized. The means for removing the spring pressure from the brushes preferably comprises a linkage actuated by a centrally disposed plunger 31.

The linkage includes a pair of levers 32 pivotally mounted on the housing and pivotally connected to the upper end of the plunger 31 by a pair of spreader arms 33. The upper ends of the levers 32 are positioned adjacent a pair of depending arms 34 connected with the cup 29 in which the brush springs are seated. In the down position of the plunger, as shown in Figure 2, the levers 32 are separated from the depending arms 34. Under these conditions the linkage is en-

tirely disengaged from the springs so that the latter are free to exert their full loaded pressure on the brushes. The control means therefore does not interfere with the adjusted spring pressure on the brushes.

The plunger 31 projects into a diaphragm casing 36 which is mounted in a cup portion 37 of the housing by suitable studs 38. The lower end of the plunger is connected to the upper surface of a diaphragm 39 which is clamped between the halves of the casing 36. A spring 41 is compressed between the under surface of the diaphragm and a cap connection 42 threaded on a neck portion 43 of the diaphragm casing.

In the normal inoperative condition of the siren the control spring 41 presses up on the plunger 31 to spread the arms 34 and compress the brush springs 27. In other wards, the control spring 41 works against the brush springs 27, and is designed to be able to simultaneously compress the latter springs. For purposes of adjustment the loading of the control spring 41 may be altered by turning the cap connection 42. With the spring pressure released, the brushes are automatically thrown outwardly from the rotating commutator, which of course breaks the current connection to the armature.

Means are provided for lowering the plunger 31 against the action of the control spring 41 so as to assume the operative position shown in Figure 2, in which the brush springs are free to press the brushes against the commutator. This is accomplished by creating a vacuum in the lower chamber of the diaphragm housing. In sirens adapted for mounting on motor vehicles this vacuum is conveniently available at the intake manifold. As shown in Figure 1, a duct 44 is connected between the casing 36 and the intake manifold 46 of the vehicle engine. A suitable control valve 47 is interposed in this connection and is connected by a pull rod 48 with a suitable operating button in the driver's compartment. In the preferred form of my invention the control spring 41 is made sufficiently heavy to require the driver of the vehicle to throttle down his engine in order to build up sufficient vacuum in the intake manifold to operate the siren.

This arrangement provides an improved control for sirens on vehicles, such as fire-trucks. It is an acknowledged fact that a large percentage of the accidents with fire apparatus is due to the fact that the fire-truck drivers will not slow down at intersections. With their sirens going full blast at any desired vehicular speed the drivers of fire apparatus are tempted to charge across intersections, trusting that their right of way is not going to be obstructed. This often unnecessary and unjustified speed at intersections is not possible with the siren control of my invention, because a decelerating engine is necessary to build up the necessary vacuum in the intake manifold for operating the siren.

If a fire-truck is approaching an intersection at high speed the driver usually realizes the grave necessity of sounding his warning siren. The siren of my invention however will not operate while the high speed is being maintained. It becomes necessary for the driver to lift his foot from the accelerator and allow the engine to throttle sufficiently to build up a working vacuum in the intake manifold. While this forced reduction of vehicular speed is not sufficient to unreasonably delay the fire truck, it is sufficient to prevent the occurrence of many accidents at intersections and at other points where traffic conditions require the use of the siren.

I claim:

1. In an electric motor having an armature and associated commutator and brush, a brush holder, a pressure element slidably mounted in the holder behind the brush, a compression spring seated on the element for pressing the brush against the commutator, and means for retracting the element to compress the spring for removing the spring pressure from the brush.

2. In an electric motor having an armature and associated commutator and brush, a brush holder, a pressure element slidably mounted in the holder behind the brush, a compression spring seated on the element for pressing the brush against the commutator, and means for retracting the element to compress the spring for removing the spring pressure from the brush, said retracting means being entirely disengaged from the element when the motor is operating so that the spring is free to exert its full pressure against the brush.

3. In an electric motor having an armature and associated commutator and brush, a brush holder, a cup slidably mounted in the holder behind the brush, a compression spring seated in the cup for pressing the brush against the commutator, an arm fixed on the cup and projecting through the brush holder, and a lever engageable with said arm for retracting the cup to compress the spring for removing the spring pressure from the brush.

4. In an electric motor having an armature and associated commutator and brush, a brush holder, a cup slidably mounted in the holder behind the brush, a compression spring seated in the cup for pressing the brush against the commutator, an arm fixed on the cup and projecting through the brush holder, and a lever engageable with said arm for retracting the cup to compress the spring for removing the spring pressure from the brush, said lever being entirely disengaged from said arm when the motor is operating so that the spring is free to exert its full pressure against the brush.

5. In an electric motor having an armature and associated commutator and brushes, brush holders, a cup slidably mounted in each holder behind the brushes, compression springs seated in the cups for pressing the brushes against the commutator, arms fixed on the cups and projecting through the brush holders, levers engageable with said arms, links pivotally connected together and to said levers, and a spring connected with the common pivot of said links for moving the levers to retract the cups for removing the spring pressure from the brushes.

EVAN D. WILLIAMSON.