Oct. 13, 1936. R. C. OSGOOD 2,057,262

MOTOR

Filed April 16, 1934

Fig. 1.

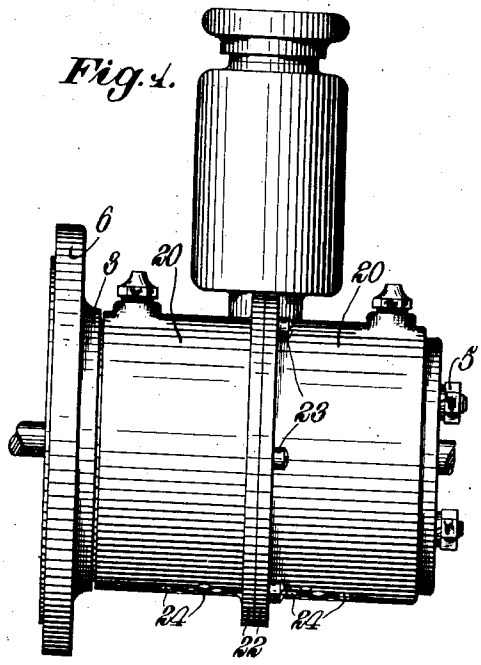



Fig. 2.

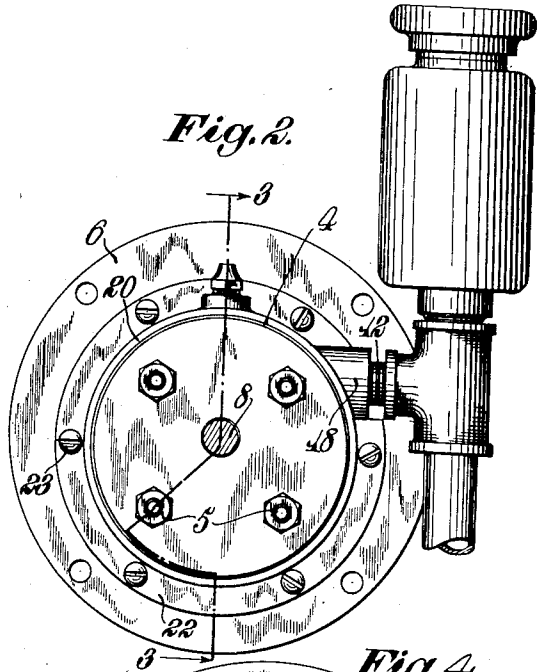



Fig. 3.

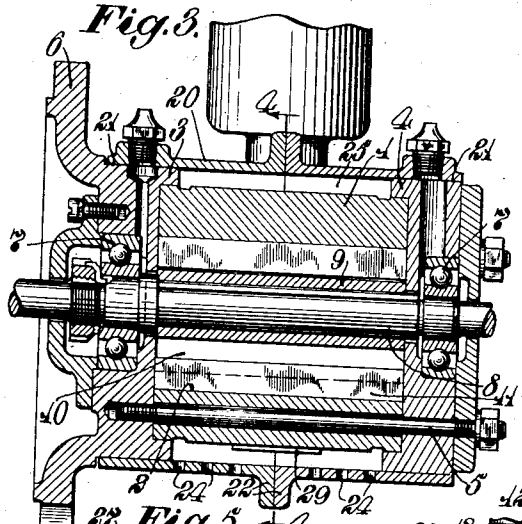



Fig. 4.

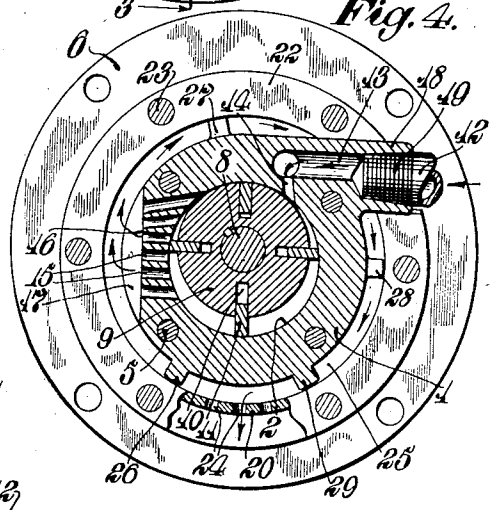



Fig. 5.

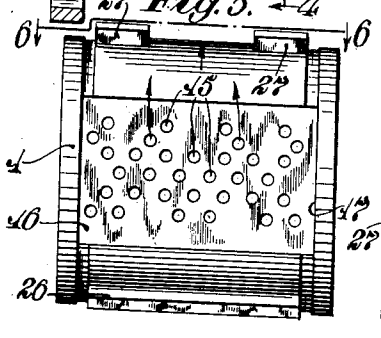
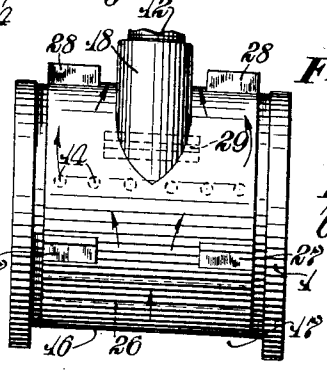



Fig. 6.




Inventor:
Robert C. Osgood.
by Louis A. Mason.
Atty.

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# UNITED STATES PATENT OFFICE

2,057,262

## MOTOR

Robert C. Osgood, Claremont, N. H., assignor to Sullivan Machinery Company, a corporation of Massachusetts

Application April 16, 1934, Serial No. 720,764

11 Claims. (Cl. 121—34)

This invention relates to motors, and more particularly relates to improvements in the heat distributing and exhaust muffling means of a motor of the rotary, pressure fluid actuated type.

An object of this invention is to provide an improved pressure fluid motor. Another object is to provide an improved pressure fluid motor of the rotary type. A further object is to provide an improved muffler means for the exhaust of a pressure fluid motor of the rotary type thereby to silence the screech inherent in the exhaust of such motors. Yet another object is to provide an improved heat distributing means for dissipating heat within the walls of the motor cylinder and for conducting the heat to be dissipated to the motor exhaust passage for preventing the possibility of freezing of water vapor in the exhaust. A still further object is to provide an improved heat distributing means associated with the exhaust muffler whereby elements of the heat distributing means constitute elements of the muffler, whereby an extremely simple and compact motor is possible. These and other objects will, however, subsequently more fully appear.

In the accompanying drawing there is shown for purposes of illustration one form which the invention may assume in practice.

In this drawing,—

Fig. 1 is a side elevational view of the improved motor.

Fig. 2 is an end elevational view of the motor shown in Fig. 1.

Fig. 3 is a central, longitudinally extending, vertical sectional view taken substantially on line 3—3 of Fig. 2 and showing an illustrative form of the improved heat distributing and exhaust muffling means.

Fig. 4 is a cross sectional view taken substantially on line 4—4 of Fig. 3.

Fig. 5 is a side elevational view of the motor cylinder with the outer muffler casing or shell removed.

Fig. 6 is a view similar to Fig. 5 showing the top of the motor cylinder and viewed in the direction of the arrows 6—6 in Fig. 5.

In this illustrative construction, the invention is shown embodied in a rotary motor of the pressure fluid actuated vane type, although it is evident that the same may be incorporated in motors of various other types. The motor shown comprises a motor cylinder 1 having a bore 2 closed by end heads 3 and 4 attached to the cylinder as by bolts 5, as shown in Fig. 3. The head 3 has a bolt flange 6 by which the motor may be secured to any suitable support. Journaled in bearings 7 and carried by the motor heads 3 and 4, respectively, is a rotor shaft 8 extending eccentrically through the cylinder bore and arranged in parallel offset relation with the axial line of the cylinder bore and having secured thereto an eccentric rotor 9. In the present instance, the rotor is of the vane type and has formed therein radial slots 10 having arranged therein sliding vanes 11 engaging the inner wall of the cylinder bore and yieldably held in such engagement as by pressure fluid acting on the inner surfaces of the vanes or otherwise. Pressure fluid may be supplied to the cylinder bore to effect rotation of the rotor through a supply pipe 12, passage 13 and a series of passages 14 communicating with the passage 13, while pressure fluid is exhausted from the motor cylinder through a series of exhaust passages 15, one side of the cylinder being slabbed off or flattened at 16 to form an exhaust chamber 17. The passage 13 is formed in a centrally located projecting boss 18 herein formed integral with the cylinder and within which the supply pipe 12 is threadedly connected at 19. It will thus be seen that when pressure fluid is supplied through the pipe 12 and passages 13 and 14 to the cylinder bore, the pressure fluid acts on the pressure areas of the sliding vanes 11, causing the rotor 9 to rotate; the exhaust pressure fluid passing out from the motor cylinder through the exhaust passages 15.

Now referring to the improved heat distributing and exhaust muffler means, it will be noted that surrounding the motor cylinder 1 is a casing or shell 20 herein of circular form supported at its ends upon the cylindrical external surfaces 21 of the cylinder heads 3 and 4. This outer casing or shell herein comprises two component parts having abutting flanges 22 secured together by screws 23, the two sections of this outer casing or shell being in this instance identical, and each having a series of bottom exhaust ports 24. The casing is bored at the flanges to permit projection of the boss 18. The motor exhaust chamber 17 communicates directly with the chamber 25 formed between the outer shell 20 and the exterior surface of the motor cylinder and the parts of this outer shell and their engagement with the heads are sealed so that all exhaust fluid flowing from the exhaust chamber 17 must flow through the annular exhaust space 25 to the bottom exhaust ports 24. For dissipating heat within the walls of the motor cylinder due to the friction of the

relatively rotatable motor parts, and for conducting the heat to be dissipated to the annular exhaust chamber or space 25 for heating the motor exhaust to eliminate the possibility of freezing of the water vapor contained in the exhaust fluid on the exhaust side of the motor and thus restricting or choking up the exhaust passages, there are formed integrally with or secured to the exterior surface of the motor cylinder a plurality of longitudinally extending baffle-like heat radiating projections or fins 26, 27, 28 and 29 arranged in staggered relation about the cylinder, the projection 26 extending nearly across the annular exhaust space 25 between the heads 3 and 4 (see Fig. 5) and largely closing said exhaust space so that when exhaust fluid flows from the exhaust chamber 17 to the space 25 it is mostly prevented from flowing through the space 25 in the counter-clockwise direction as viewed in Fig. 4. The projections 27, as viewed in Figs. 5 and 6, obstruct the exhaust space 25 near the sides of the latter, these projections extending inwardly from adjacent the heads 3 and 4 in the manner shown in Fig. 6 so that the exhaust fluid is mostly directed thereby toward the center of the exhaust space 25. The central boss 18 of the supply connection then deflects the exhaust fluid flowing through the space 25 laterally toward the sides of the exhaust space, and the projections 28 (see Fig. 6) again direct the exhausting fluid inwardly from the sides of the exhaust space. The projection 29 (in dotted lines in Fig. 6) thereafter deflects most of the exhausting fluid laterally again towards the sides so that the exhausting fluid flowing through the annular space 25 moves primarily in a tortuous path, the fluid exhausting from the space 25 after passing completely around the latter through the bottom ports 24. The baffles or fin-like projections 26, 27, 28 and 29 also act as heat dissipating means for dissipating heat from the walls of the motor cylinder and for conducting such heat to the annular exhaust space 25 so that the fluid exhausting through the space 25 is warmed, and as a result freezing of the motor exhaust is prevented.

As a result of this invention, it will be noted that an improved pressure fluid motor is provided having improved heat distributing and exhaust muffling means whereby the screech of the exhaust inherent in motors of the type disclosed is silenced, while the exhausting fluid is at the same time warmed to prevent freezing. It will further be noted that by associating the heat distributing means with elements of the motor exhaust means, the motor is rendered extremely simple and compact. These and other uses and advantages of the improved motor will be clearly apparent to those skilled in the art.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a motor of the type disclosed, a motor cylinder having a motor element movable therein and fluid supply and exhaust connections, and exhaust muffler means associated with and surrounding said motor cylinder providing an annular exhaust space for receiving the discharge of the exhaust connection and embodying means in said annular exhaust space including deflecting elements forming a tortuous passage for the exhausting fluid as it flows through said annular exhaust space involving alternate opposite deflections of travel longitudinally of the cylinder for directing the exhausting fluid in a tortuous path.

2. In a motor of the type disclosed, a motor cylinder having a motor element movable therein and fluid supply and exhaust connections, and exhaust muffler means associated with and surrounding said motor cylinder providing an annular exhaust space within which said exhaust connection discharges and embodying means in said annular exhaust space including deflecting elements arranged at spaced points about the cylinder forming a tortuous passage involving alternate deflections of travel reversely longitudinally of said cylinder for directing the motor exhaust in a tortuous path as it flows through said annular space, said deflecting elements further constituting means for dissipating heat within the walls of said motor cylinder and said exhaust muffler means conducting the exhaust fluid heated by said heat dissipating means to exhaust.

3. In a motor of the type disclosed, a motor cylinder having a motor element movable therein and fluid supply and exhaust connections, and exhaust muffler means associated with and surrounding said motor cylinder providing an exhaust space within which said exhaust connection discharges and embodying means in said exhaust space forming a tortuous passage involving alternate deflections of travel reversely longitudinally of said cylinder for directing the motor exhaust in a tortuous path as it flows through said annular space, said exhaust muffler means having certain elements thereof constituting means for dissipating heat within the walls of said motor cylinder and said muffler means conducting the exhausted fluid heated by said heat dissipating means to exhaust, said heat dissipating means constituting the means for directing the exhausting fluid in aforesaid tortuous path.

4. In a motor of the type disclosed, a cylinder having a bore, heads closing said bore, a rotor in said bore and journaled within said heads, and fluid supply and exhaust connections for the cylinder, and exhaust muffler means comprising an outer cylindrical shell surrounding and spaced from the motor cylinder to provide an annular exhaust space between the motor cylinder and the outer shell within which said motor exhaust connection discharges, said shell supported by said heads and having exhaust passages spaced remotely from said motor exhaust connection, and means in said exhaust space providing a tortuous passage for deflecting the exhausting fluid flowing through said annular space alternately oppositely in directions longitudinally of the cylinder.

5. In a motor of the type disclosed, a cylinder having a bore, heads closing said bore, a rotor in said bore and journaled within said heads, and fluid supply and exhaust connections for the cylinder, and exhaust muffler means comprising an outer cylindrical shell surrounding and spaced from the motor cylinder to provide an annular exhaust space between the motor cylinder and the outer shell within which said motor exhaust connection discharges, said shell supported by said heads and having exhaust passages spaced

remotely from said motor exhaust connection, and means on said motor cylinder and arranged in the annular exhaust space forming a tortuous passage involving alternate deflections of exhaust travel reversely longitudinally of said cylinder for directing the fluid flowing through the motor exhaust connection in a tortuous path to said shell exhaust passages.

6. In a motor of the type disclosed, a cylinder having a bore, heads closing said bore, a rotor in said bore and journaled within said heads, and fluid supply and exhaust connections for the cylinder, and exhaust muffler means comprising an outer cylindrical shell surrounding and spaced from the motor cylinder to provide an annular exhaust space between the motor cylinder and the outer shell within which said motor exhaust connection discharges, said shell supported by said heads and having exhaust passages spaced remotely from said motor exhaust connection, and means on said motor cylinder and arranged in said annular exhaust space forming a tortuous passage involving alternate deflections of exhaust travel reversely longitudinally of said cylinder for directing the fluid flowing through the motor exhaust connection in a tortuous path to said shell exhaust passages, said means for directing the exhausting fluid in the tortuous path comprising heat radiating fins for conducting heat within the walls of the cylinder to said annular exhaust space.

7. In a motor of the class described, a motor cylinder having a motor chamber therein, a motor element in said chamber movable relative thereto, and fluid supply and exhaust connections, and means for muffling the motor exhaust comprising an outer cylindrical shell surrounding and spaced from the motor cylinder to provide an annular space between the motor cylinder and the outer shell within which said motor exhaust connection discharges, and baffles secured to and extending longitudinally of the motor cylinder and arranged in said annular exhaust space in a staggered relation for deflecting the exhausting fluid alternately in opposite directions longitudinally of the cylinder so that fluid exhausting through said motor exhaust connection is directed through a tortuous path as it flows through said annular exhaust space.

8. In a motor of the class described, a motor cylinder having a motor chamber therein, a motor element in said chamber movable relative thereto, and fluid supply and exhaust connections, and means for muffling the motor exhaust comprising an outer cylindrical shell surrounding and spaced from the motor cylinder to provide an annular space between the motor cylinder and the outer shell within which said motor exhaust connection discharges, and baffles secured to and extending longitudinally of the motor cylinder and arranged in said annular exhaust space in a staggered relation for deflecting the exhausting fluid alternately in opposite directions longitudinally of the cylinder so that fluid exhausting through said motor exhaust connection is directed through a tortuous path as it flows through said annular exhaust space, said baffles also constituting means for conducting heat within the walls of the motor cylinder to said annular exhaust space.

9. In a motor of the type disclosed, a motor cylinder having a cylindrical motor element movable therein and fluid supply and exhaust connections, and exhaust muffler means associated with the motor cylinder including means encircling and spaced from the latter to provide an annular exhaust space for receiving the discharge of said exhaust connection and further including means arranged in said exhaust space in staggered relation to provide a tortuous passage for deflecting the exhausting fluid alternately oppositely longitudinally of said cylinder for directing the motor exhaust in a tortuous path about the exterior periphery of the motor cylinder.

10. In a motor of the type disclosed, a motor cylinder having a cylindrical motor element movable therein and fluid supply and exhaust connections, and exhaust muffler means associated with the motor cylinder including casing means encircling and spaced from the latter to provide an annular exhaust space within which said exhaust connection discharges and further including means arranged in said exhaust space in staggered relation to provide a tortuous passage for deflecting the exhausting fluid alternately oppositely longitudinally of said cylinder for directing the motor exhaust in a tortuous path about the exterior periphery of the motor cylinder, said exhaust deflecting means also constituting elements for dissipating heat within the walls of the motor cylinder, and said exhaust muffler means conducting the exhausting fluid heated by said heat dissipating means to exhaust.

11. In a motor of the type disclosed, a motor cylinder having a cylindrical motor element movable therein and fluid supply and exhaust connections, and exhaust muffler means associated with the motor cylinder including means encircling and spaced from the latter to provide an annular exhaust space within which said exhaust connection discharges and embodying means arranged within said exhaust space providing for alternate deflections of exhaust travel oppositely longitudinally of said cylinder for directing the motor exhaust in a tortuous path about the exterior periphery of the motor cylinder and including exhaust directing elements extending longitudinally of said motor cylinder in staggered relation to provide a tortuous passage, said exhaust directing elements constituting elements for dissipating heat within the walls of the motor cylinder, and said tortuous passage conducting the exhausting fluid heated by said heat dissipating elements to exhaust.

ROBERT C. OSGOOD.