Oct. 28, 1930. G. C. BREIDERT 1,779,657

SELF COOLED ELECTRIC MOTOR

Filed May 3, 1929

Fig. 1.

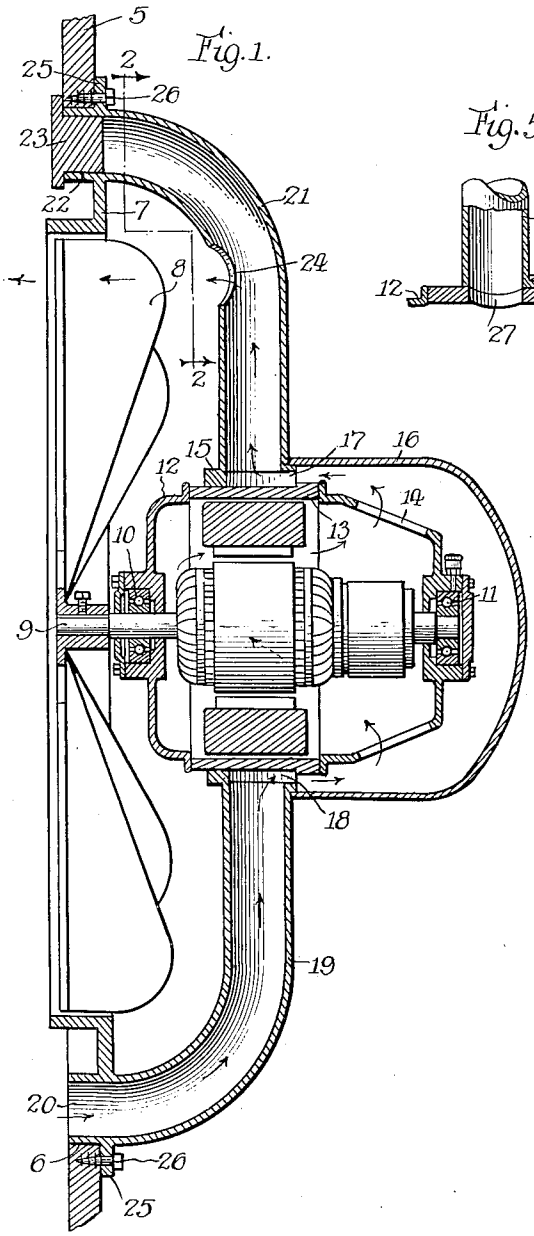



Fig. 5.




Fig. 2.

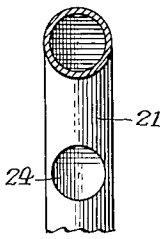



Fig. 3.

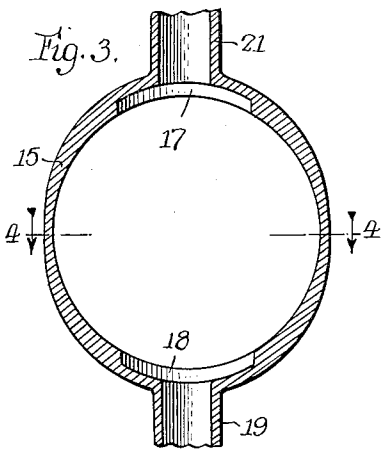
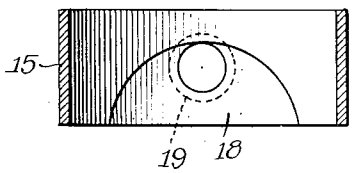



Fig. 4.




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# UNITED STATES PATENT OFFICE

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## SELF-COOLED ELECTRIC MOTOR

Application filed May 3, 1929. Serial No. 360,145.

This invention relates to the art of self-cooled electric motors, and in its chief intended application relates more specifically to electric motors used to operate ventilating fans of the propeller type.

Self-cooled electric motors operating direct driven propeller fans, wherein the motor is equipped with a protective hood or casing open on its end nearest the fan, and with an inflow pipe for cool air communicating at one end with the hood and at its other end with the space outside the room in which the fan and motor are located are known in patents to Ilg, No. 831,284, September 18, 1906, and No. 1,244,334, October 23, 1917, and to Sutcliffe, No. 1,441,460, January 9, 1923. In the devices of all the above patents, the cool air is induced through a single inflow pipe communicating with the lower side of the hood and flows from the latter through an opening located opposite the central portion of the fan where the suction effect of the latter is weakest; and in the device of the Sutcliffe patent above identified the air inflow pipe forms one of a group of motor-supporting arms.

The chief object of my present invention is to improve on the devices of the above-noted patents in the directions of simplifying the structure and reducing cost of manufacture and obtaining a stronger induced current of cool air through the motor and its hood or casing. This object is secured mainly by providing a plurality of tubular motor-supporting arms, one of which communicates with the space outside the room in which the fan and its motor are located, while another is formed with a lateral air eduction opening or port that is preferably located behind the deepest or peripheral portion of the fan where the air inducting action of the latter is strongest.

My invention, its manner of operation, and advantages will be readily understood by those skilled in the art from the following detailed description, taken in connection with the accompanying drawing, wherein I have illustrated a simple and practical embodiment of the invention, and in which—

Fig. 1 is a central axial section through a ventilating fan equipped with my present improvement and mounted on a wall;

Fig. 2 is a detail sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a sectional detail of the ported motor-supporting ring;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary view, illustrating a slight modification.

For the purposes of this description, the section of Fig. 1 will be assumed to be a vertical section; but it equally well represents a horizontal section or an oblique section, since the apparatus as an entirety can be mounted in any angular position about the axis of the fan and motor as desired or as determined by the shape of the wall opening which it occupies.

In the drawing, 5 designates a wall which may be assumed to be an external wall of a kitchen or a laboratory, having an opening 6 in which is set a fan-supporting panel 7. As herein shown, the space to the right of the wall 5 may be assumed to represent the interior of the room or chamber to be ventilated, and the space to the left of said wall may be assumed to represent the outer atmosphere or another room or chamber into which the fan discharges. The panel 7 may be ring-shaped to fit a round wall opening, or rectangular to fit a transom opening, or any other shape conforming to the shape of the opening it is designed to occupy.

8 designates a ventilating fan of the propeller type which is mounted on a fan shaft 9 disposed coaxially with the fan opening of the panel 7 and journaled in anti-friction bearings 10 and 11, the bearing 10 being carried by a front hood member 12 that covers the front end of the field frame 13 of an electric motor, and the bearing 11 being carried by a rear frame piece extension 14 secured to the field frame. The motor is supported from the panel 7 by a saddle ring 15 embracing the field frame 13 and connected to the panel 7 by radial tubular arms or pipes hereinafter described. Completely covering the outer end of the motor, or that which is remote from the fan 8, is a hood member 16, the open inner end of which may be secured

to the motor-supporting ring 15, which latter may similarly support the front hood member 12. Thus it will be seen that the front hood section 12, the ring 15, and the rear hood section 16, together constitute a hood or casing completely enclosing the motor.

In the upper and lower sides of the inner periphery of the supporting ring 15 there are formed shallow ports or passageways 17 and 18, each closed on one edge of the ring but opening through the opposite edge and communicating with the interior of the hood, as clearly shown in Fig. 1.

From the lower side of the ring 15, there extends a downwardly and forwardly curved pipe 19, the upper end of which registers with the port 18 and the lower end of which registers with an opening 20 in the lower side of the panel 7 and communicates with the space outside the wall 5. From the upper side of the ring 15, there extends an upwardly and forwardly curved pipe 21, the lower end of which registers with the port 17, and the upper end of which may register with an opening 22 in the upper portion of the panel 7 and be closed by a plug 23. In that portion of the wall of the pipe 21 which lies adjacent to and opposite the peripheral portion of the fan 8 is formed an opening 24, which opening is located in the path of the strongest portion of the air current created by the fan, whereby the suction of the fan induces a flow of cold air through the pipe 19, the motor casing, and the lower or inner portion of the pipe 21, as indicated by the arrows; this air current penetrating and bathing the parts of the motor and preventing overheating of the latter.

In Fig. 5, I illustrate a slight modification, wherein the laterally opening ports 17 and 18 in the ring 15 are dispensed with, and the inner ends of the pipes 21 and 19 register with holes 27 in the field frame 13 of the motor between adjacent pole-pieces of the latter.

It will be observed that in the described construction, the hollow arms or tubes 19 and 21, which form conduits for the cooling air, also form the connections between the motor saddle ring 15 and the panel 7; and a very strong and rigid motor and fan support may be provided by making the parts 7, 15, 19 and 21 as an integral casting, as indicated in the drawings; but, of course, said parts may be formed as separate elements suitably united, if desired. The portion of the pipe 21 beyond the opening 24 may be closed or blanked in any suitable or convenient way, as by being cast solid, or by the plug shown, that does not interfere with its function as a supporting or carrying member for the motor saddle ring 15. And while I have illustrated but a single pipe 21 ported at a point lying in the strongest portion of the air current, it is obvious that two or more such pipes might be employed spaced at equal angles with each other and the inflow pipe 19 to better distribute the load of the motor and fan on the panel. And to secure the panel in the wall opening, it may be formed with integral lugs 25 apertured to take fastening screws 26, these lugs preferably being located adjacent to the outer ends of the supporting pipes 19 and 21.

I claim—

1. The combination with a wall formed with an opening, of an electric motor mounted on one side of said wall, a casing enclosing said motor, a propeller type fan driven by said motor opposite said opening, an air inflow pipe connecting the space on the other side of said wall with the interior of said casing, and an air outflow pipe communicating at its inner end with the interior of said casing and at its outer end supported by said wall, said outflow pipe being closed at its outer end and formed with a discharge opening located between its ends and behind said fan.

2. The combination with a wall formed with an opening, of an electric motor mounted on one side of said wall, a casing enclosing said motor, a propeller type fan driven by said motor opposite said opening, an air inflow pipe connecting the space on the other side of said wall with the interior of said casing, and an air outflow pipe communicating at its inner end with the interior of said casing and at its outer end supported by said wall, said outflow pipe being closed at its outer end and formed with a discharge opening located behind the peripheral portion of said fan.

3. The combination with a wall formed with an opening, of a panel mounted in said opening and itself formed with a fan opening, an electric motor mounted on one side of said wall, a casing enclosing said motor, a propeller type fan driven by said motor opposite said fan opening, an air inflow pipe communicating at its inner end with the interior of said casing and at its outer end connected to and opening through said panel, and an air outflow pipe communicating at its inner end with the interior of said casing and at its outer end secured to said panel, said outflow pipe being closed at its outer end and formed with a lateral discharge opening located between its ends and behind said fan.

4. The combination with a wall formed with an opening, of a panel mounted in said opening and itself formed with a fan opening, an electric motor mounted on one side of said wall, a casing enclosing said motor, a propeller type fan driven by said motor opposite said fan opening, an air inflow pipe communicating at its inner end with the interior of said casing and at its outer end connected to and opening through said panel, and an air outflow pipe communicating at its inner end with the interior of said casing

and at its outer end secured to said panel, said outflow pipe being closed at its outer end and formed with a lateral discharged opening located between its ends and behind the peripheral portion of said fan.

5. The combination with a wall formed with an opening, of a panel mounted in said opening and itself formed with a fan opening, an electric motor on one side of said wall, a casing enclosing said motor, a motor-supporting ring formed with ports communicating with the interior of said casing, a propeller type fan driven by said motor opposite said fan opening, an air inflow pipe registering at its inner end with a port of said ring and at its outer end connected to and opening through said panel, and an air outflow pipe registering at its inner end with another port of said ring and at its outer end secured to said panel, said outflow pipe being closed at its outer end and formed with a lateral discharge opening behind and facing the peripheral portion of said fan.

6. The combination with a wall formed with an opening, of a panel mounted in said opening and itself formed with a fan opening, an electric motor on one side of said wall, a casing enclosing said motor, a motor-supporting ring formed with ports communicating with the interior of said casing, a propeller type fan driven by said motor opposite said fan opening, an air inflow pipe registering at its inner end with a port of said ring and at its outer end connected to and opening through said panel, and an air outflow pipe registering at its inner end with another port of said ring and at its outer end secured to said panel, said outflow pipe being closed at its outer end and formed with a lateral discharge opening behind and facing the peripheral portion of said fan, said inflow and outflow pipes constituting the sole means for connecting said motor to, and supporting it from, said panel.

GEORGE C. BREIDERT.