

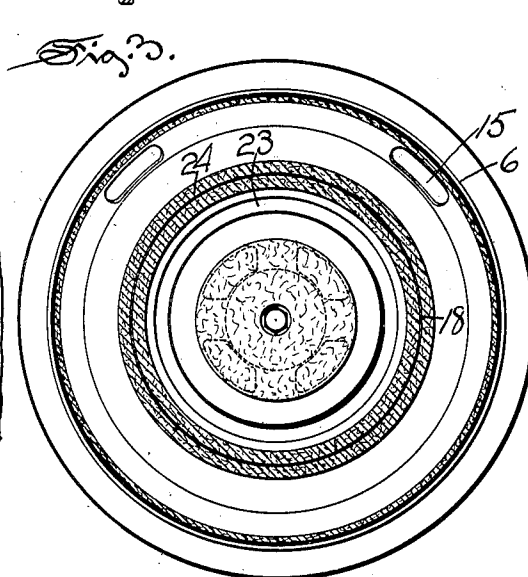
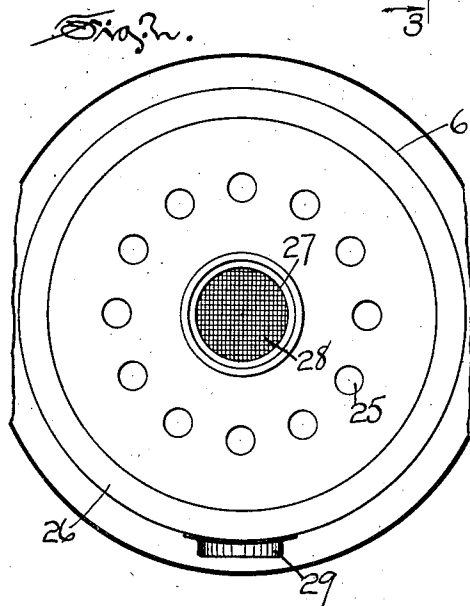
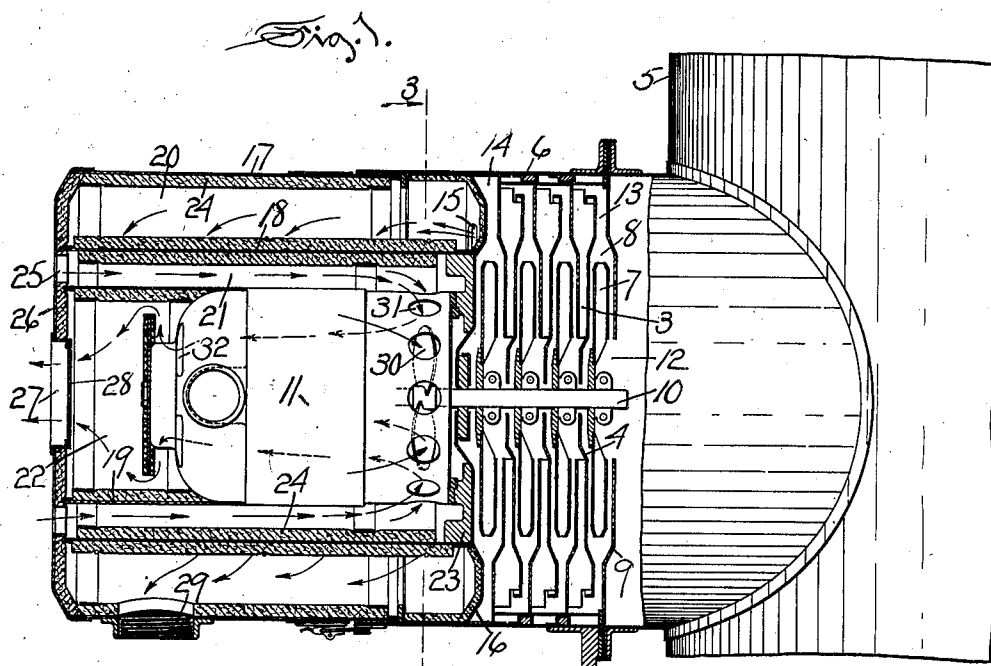
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MOTOR MOUNTING FOR VACUUM CLEANERS

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MOTOR MOUNTING FOR VACUUM
CLEANERS

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My invention relates to mechanism for creating flow of air for vacuum or pressure purposes more especially as applied to pneumatic cleaning apparatus, and an object of my invention, among others, is the production of an apparatus in which air currents may be utilized in a particular manner for cooling the motor employed as a part of the apparatus; a further object of the invention is to muffle the noise incident to a rush of air through the structure; and a still further object of the invention is the production of an apparatus which is simple in construction and operation and particularly efficient in the results obtained by its use.

One form of an apparatus embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawing, in which—

Figure 1 is a view in elevation of a portion of a pneumatic cleaning apparatus and in central lengthwise section through the pump for creating flow of air, parts beyond being omitted.

Figure 2 is an end view of the same.

Figure 3 is a view in section on a plane denoted by the dotted line 3—3 of Fig. 1, the motor being shown in full.

In the accompanying drawing the numeral 5 denotes a portion of a dust separator commonly employed in vacuum cleaning apparatus and to which is secured the case 6 of a pump of the fan type operating under centrifugal action for creating a partial vacuum to induce flow of air through the separator 5 in which the dust and dirt are separated from the air currents in a manner that will be readily understood by those skilled in the art. This pump enclosed within the case 6 comprises fan blades 7 rotating in chambers 8 formed by plates 9 and 4 which are separated to provide chambers to receive the blades 7 and which are also separated to provide back flow passages for flow of air toward the axial center of the apparatus as shown in Fig. 1. The blades 7 are secured to a shaft 10 comprising an extension of the shaft of the motor 11. It may be a separate shaft coupled to the motor shaft if desired.

In operation the air drawn through the separator 5 passes in at the eye 12 of the pump and is forced outward by centrifugal action of the fan blades 7 into chambers 13 and from which it passes from the successive chambers through passages 3, toward the shaft 10 and which air again is forced outwardly, this operation being repeated until an outlet chamber 14 is reached

from which the air passes through openings 15 in an end plate 16 which closes this end of the fan case.

A motor casing 17 is secured to the fan case 6 as an extension thereof. This motor casing is divided by an intermediate shell 18 and an inner shell 19 into three air circulating chambers 20, 21 and 22, the chamber 22 being an inner outlet chamber and the chamber 20 being an exhaust chamber. The motor 11 is secured at its inner end to a supporting ring 23 fast to the end plate 16 and the greater part of its outer surface forms one wall of the chamber 21, as shown in Fig. 1, the front end of the motor being located in the outlet circulating chamber 22.

The walls of the chambers 20, 21 and 22 are lined with sound insulating material 24 to deaden the noise which would otherwise be created by the rush of air through these chambers. Inlet openings 25 are formed in the front end 26 of the motor case and an exhaust opening 27 is formed at the center of said front end, the openings 25 being into the circulating chamber 21 and the opening 27 being from the circulating chamber 22. A screen 28 is placed across the opening 27 and an exhaust outlet 29 opens from the chamber 20.

In operation the air from the fans is forced through the openings 15 into the outer circulating chamber 20 at the top of the latter and passing circularly around the chamber in the direction indicated by the arrows this air passes out through the exhaust outlet 29.

A circulating fan 30 is secured to the shaft 10 within a chamber in the rear end of the motor shell. This fan operates to draw air inwardly through the openings 25 and through openings 31 into the chamber in the rear end of the motor shell and to force such air forwardly through the structure of the motor shell into the front end of the circulating chamber 22 and outwardly therefrom through the exhaust opening 27. This air passes from within the motor shell through openings 32 into the outlet circulating chamber. It will be noted that this arrangement provides means for supplying air to cool the motor separate and distinct from the air current produced by the fan comprising the pump. The cooling of the motor does not therefore depend upon circulation of air used for cleaning purposes so that in the event that the supply of air to the main pump should be shut off, as by stopping the operation of the cleaning tools which supply said air, there would be no danger of the motor being injured from excessive heat-

ing, as the supply of air to the motor independently of said fan is sufficient to prevent such injury.

It will further be noted that the lining for the chamber containing the motor as well as for the chamber communicating with the main fan or pump muffles the whistling sound caused by air passing through the outer chamber and the whining sound caused by the motor, the wall 18 between the two chambers being lined on opposite sides to effect this purpose.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim:

1. A vacuum cleaning apparatus comprising a fan case, fans within said case for forcing air therethrough, a motor case, a motor case chamber in which said motor case is contained, a motor supported within said motor case and having a shaft projecting into the fan case and supporting the fans therein, said motor case chamber having an unobstructed annular circulating chamber surrounding it and separated therefrom with inlet openings from the fan case into said surrounding chamber on one side and at the end thereof, and an exhaust passage from the opposite side and near the opposite end of said chamber to create a free and unobstructed circulating flow of air entirely around said motor case chamber and motor substantially the whole length of said motor case chamber.

2. A vacuum cleaning apparatus comprising a fan case, fans within said case for forcing air therethrough, a motor case projecting from the end of the fan case, a motor supported within the motor case and having a shaft extending into the fan case to support and operate the fans therein, said motor case having a chamber with concentric walls forming a clear unobstructed annular space immediately surrounding the motor which forms a portion of one wall thereof with a wall of substantially the diameter of the motor projecting in extension of the front end thereof completing the formation of said chamber, a concentric row of closed spaced inlet openings in the front end of the motor case directly into the end of said chamber, an exhaust circulating chamber into which said motor extends, said chamber being clear and open and of substantially the diameter of the motor and having an exhaust outlet at the center thereof, and means for circulating air through said inlet openings and the chamber communicating therewith into direct paths to a circularly arranged row of openings into the chamber containing said motor and through the structure of said motor and out of said exhaust circulating opening.

3. A vacuum cleaning apparatus comprising a fan case, fans within said case for forcing air therethrough, a motor case projecting from the end of the fan case, a motor supported within the motor case and having a shaft extending into the fan case and supporting the fans therein, said motor projecting into a motor chamber in said motor case, a shell comprised in said motor case and surrounding said motor and motor chamber and spaced from the wall of the latter,

thereby creating an annular chamber surrounding said motor and clear from end to end for the unobstructed circulation of air therethrough and having inlet openings arranged in a circle extending completely around and opening into the front end thereof, insulating linings within said shell and within said motor case; the latter having an unobstructed exhaust opening in the center thereof, and means for drawing air into said inlet openings through the chamber surrounding the motor case and forcing said air through the motor structure into the motor chamber and out of said exhaust opening.

4. A vacuum cleaning apparatus comprising a fan case, fans within said case for forcing air therethrough, a motor case projecting from the end of the fan case, a motor shell, a motor supported within said shell which is extended to form a housing in the end thereof with spaced apart openings arranged in a row completely around the walls of said casing, a shaft projecting from the motor through said housing into the fan case and supporting and operating the fans in said fan case, said motor case having a chamber immediately surrounding the motor which forms a portion of one wall of said chamber, oppositely spaced walls completing the formation of said chamber which is annular and clear and unobstructed from end to end completely surrounding the motor with inlet openings in the front end of the motor case and arranged in a circular row completely around the end of and into said chamber, an exhaust circulating chamber of substantially the diameter of the motor and into which said motor extends, said chamber having an exhaust outlet in the center thereof, and means within said housing in the extension from the motor shell for circulating free and unobstructed stream of air through said inlet openings from end to end of the chamber communicating therewith into the chamber containing said motor and through the structure of the motor and out of said exhaust circulating motor.

5. A vacuum cleaning apparatus comprising a fan case, fans within said case for forcing air therethrough, a motor case projecting from the end of the fan case, a motor supported within the motor case and having an extension rearwardly from its shell to constitute a housing with openings arranged in a row extending completely around and through the walls of said extension, means for closing the chamber within said housing, a shaft extending from the motor through said housing into the fan case to support and operate said fans, said motor shell having an annular chamber immediately surrounding it clear and free from end to end and said shell forming a portion of one wall of said chamber with oppositely spaced walls completing the formation of said chamber, inlet openings into the front end of the motor case into the chamber surrounding the motor, an exhaust circulating chamber into which the front end of said motor extends with a central exhaust opening from said exhaust circulating chamber, and a fan secured to said shaft within said housing to circulate air through said inlet openings and the chamber communicating therewith into the chamber containing said motor and through the structure of said motor and out of said exhaust circulating opening.

6. A vacuum cleaning apparatus comprising a fan case, fans within said case for forcing air therethrough, a motor case projecting from the end of the fan case and having an annular cir-

culating chamber therein completely free and clear from end to end and with openings from the top of the fan case to said circulating chamber and an exhaust opening on the opposite side and at the opposite end of said chamber, a motor 5 supported at the end of the fan case and having a shaft projecting into the fan case to support and operate the fans therein, an inner shell spaced from the walls of the motor case to form an annular circulating chamber within the motor 10 case free and clear completely therearound and from end to end and immediately surrounding said motor and also surrounding an exhaust circulating chamber completely unobstructed and into which said motor projects with openings 15 into said last mentioned circulating chamber, insulating linings on the opposite walls of each of said circulating chambers, a closed chamber in the rear end of the motor shell with openings thereinto from the circulating chamber immediately 20 surrounding the motor, and a circulating fan secured to said shaft within said closed chamber to circulate air through the openings thereto through the structure of said motor into said outlet circulating chamber and the exhaust 25 opening therefrom.

7. A vacuum cleaning apparatus comprising a

fan case, fans located within said case for forcing air therethrough, a shaft supporting said fans, a motor casing projecting from the end of the fan case and having annular outer and intermediate and central circulating chambers, 5 each providing a free and unobstructed space completely therearound and from end to end, openings from the fan case into the outer chamber on one side only thereof, an exhaust opening 10 from the opposite end of said chamber and on the opposite side thereof, a motor shell comprising a portion of one wall of the inner chamber that is free and unobstructed completely therearound and from end to end thereof, a tubular 15 wall of substantially the size of the motor shell and extending from the front end thereof to complete said intermediate chamber, inlet openings arranged in a row at the front end of and completely around said intermediate chamber, 20 openings from the opposite end of said intermediate chamber through the side wall of said shell into the chamber therein, a circulating fan secured to said shaft within said shell to draw air thereinto, and a large exhaust opening from the 25 front end of the central chamber at the side thereof.

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