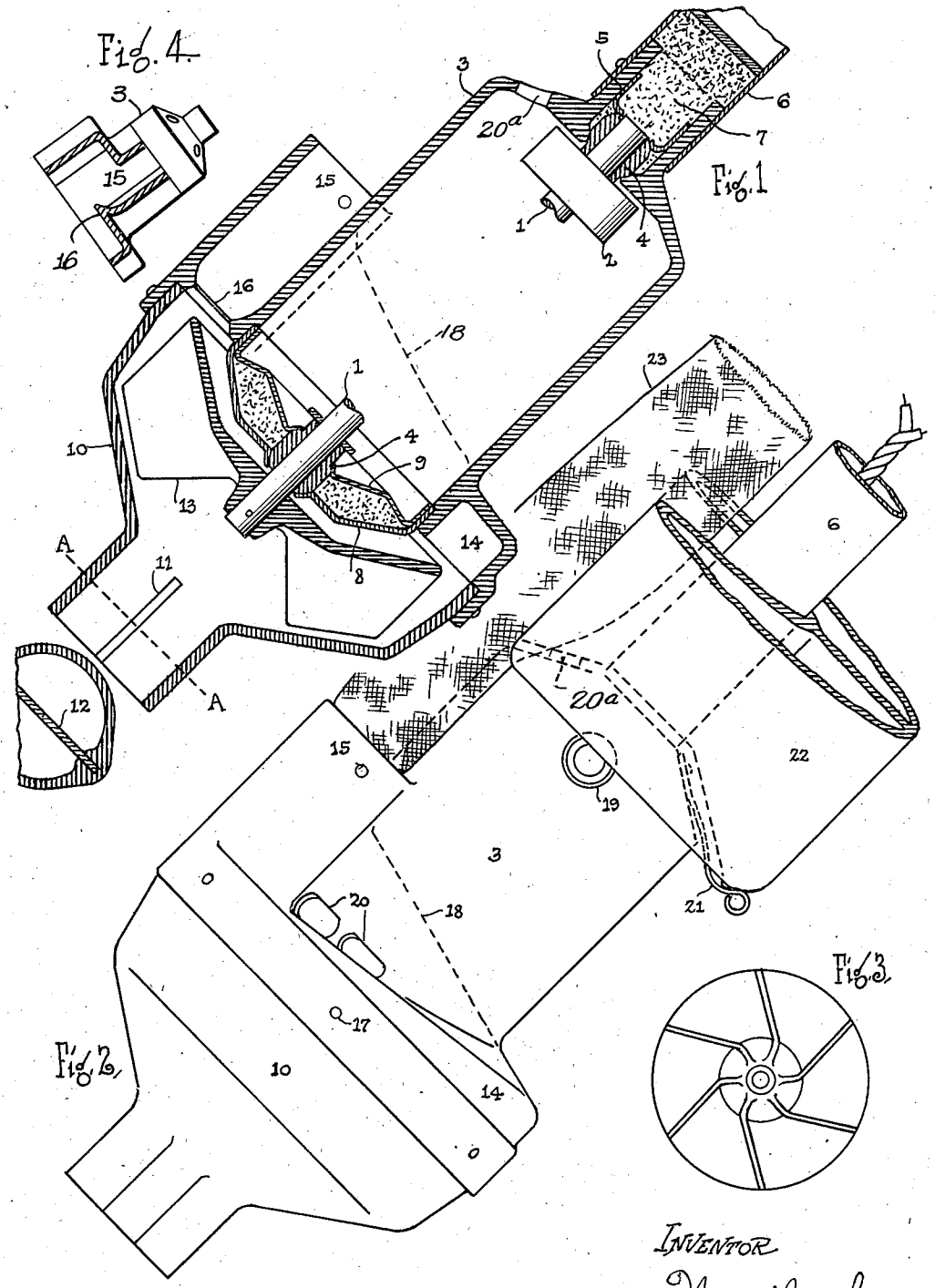
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MOTOR SUCTION UNIT

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INVENTOR

Ward Leathers

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MOTOR SUCTION UNIT

Ward Leathers, Haworth, N. J., assignor, by mesne assignments, to The Quadrex Corporation, a corporation of Delaware

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2 Claims. (Cl. 230—117)

The specific object of my invention is to produce a motor-suction unit for an electric broom.

A further object of my invention is to produce a motor-suction unit for suction cleaning purposes of high efficiency per electric energy consumed and at the same time eliminate the bulk and clumsiness of the device in common use.

A further object of my invention is to make an ideal motor-suction unit for that type of suction cleaner where the motor unit is rigid with the handle and the nozzle is rigid with said unit, or flexibly attached thereto, or articulated thereto. A further object of my invention is to produce a neat, compact, motor-suction unit in combination with filtering means and dirt disposal as set forth in my co-pending patent application No. 563,508.

I have accomplished this purpose by inventing a new form of fan and housing therefore, which when applied to the purposes set forth, is a new and conspicuous addition to improvements in the art of suction cleaners.

In order to set forth my invention in such clear terms that all may understand, I have prepared the following specifications to which I have appended a drawing of which—

Figure 1 is a longitudinal cross-section of motor suction unit.

Figure 2 is a side elevation.

Figure 3 is the fan therefor.

Figure 4 is a partial view of the device showing a portion of the outlet member 15 in section to disclose the baffle 16.

In Figure 1, a motor shaft 1—1, supports a commutator 2 and the usual rotor windings, not shown. The case 3 therefore also holds within its cylindrical walls the usual magnets and coils. The shaft 1 may be supported on any suitable bearings 4. These bearings are of the usual self-oiling, self-aligning variety. The upper bearing is held in a spherical face in the die-casting 3 by a spring clip 5. A handle 6 is joined to the upper end of the casting 3 and oiled felt 7 provides an ample supply of lubrication. The lower bearing is held in a spherical face in a stamping 8 by a spring clip 9 between which is disposed oil soaked felt for lubricating purposes. The casting or stamping 10 is wholly annular except as shown at the inlet provided with a slot 11 (more clearly shown filled by a spring 12 for holding a sweeper mechanism in the section at the dotted line AA). A fan 13 is shown with a frustroconical back which permits of the turning of the air through substantially two 45° angles instead of through two 90° angles as is common practice in vacuum cleaner manufacturing. The casing is so designed that the fan has a free spill to the pressure side around its entire periphery. This spills into an expanding chamber 14 which increases in depth in the direction of rotation to the point of exhaust 15, (this expanding chamber is more clearly illustrated in Figure 2). A fin 16 integral with the casting 3 serves the function of a scoop or baffle aiding in turning the air to its outlet port. By this construction high efficiencies are obtained with the smallest bulk and manufacturing economies are realized since the convolute expansion chamber is a part of the casting 3 where heretofore it has been an awkwardly and expensively devised part of the fan housing 10. The parts 10 and 3 may be joined in any desired manner.

Figure 2 illustrates more specifically how my invention is particularly adaptable to that kind of suction cleaner which holds the motor fan rigid with the handle. Here the parts 3 and 10 are joined together by screws or pins 17. Expansion chamber 14 is shown expanding in a clockwise direction and following on the far side of the motor on the dotted line 18. 19 is the brush holder and 20 and 20a are ventilator ports for ventilating the motor housing 3. A spring 21 rigidly attached to the top of the motor housing 3 is designed to hold a dirt receptacle 22 in place. The tubular duct 23 is suitably attached to the outlet part 15 and connects with a filter device not shown, suitably supported on the handle, said filter device in turn being suitably connected with the dirt receptacle 22. However, my present invention not being directed to these features, I have not shown them herein but refer to my co-pending application Serial No. 563,508, Pat. No. 1,916,006, where these features are disclosed.

Figure 3 shows the front view of the fan 13 designed for clockwise motion.

The herein construction is adapted to a light weight high-powered vacuum cleaner with all the parts including the motor-suction-unit mounted directly on the handle. The hollow helical upper portion 14 of the fan casing gives a highly efficient fan discharge and therefore a highly efficient suction effect at the nozzle of the cleaner. Moreover, it is combined with the motor housing 3 in a manner which provides for and increases the ventilation of the motor which is an important consideration in a lightly portable, high-powered vacuum cleaner. Thus the hollow helix 14 completely surrounds the motor housing 3 and its inner wall is also the wall of said housing

so that the continuous rush of air up into and out of the hollow helix cools the wall of the motor housing and the contained motor. With this external cooling is combined means for constantly circulating air internally through the motor housing, said means comprising the openings **20** and **20***a* at the bottom and top of the housing as to which it will be noted (Fig. 2) that the helical upper portion **14** of the fan casing is such that it permits the lower openings **20** to be made through the wall of the motor housing adjacent the bottom thereof by locating them at the lowest portion, namely the starting portion of the helix, thereby permitting full ventilation of the motor chamber from top to bottom, the other opening **20***a* being through the top of the motor housing. As elsewhere explained, the frustro-conical construction of the fan causes it to deliver the air not only outwardly against the walls of the fan chamber but also upwardly into the helical upper portion of said chamber.

Having set forth my invention in terms so clear that all those familiar with these arts can understand, I wish it understood that many departures may be made from the detailed conclusions illustrated and described without departing from the spirit of my invention.

I claim:—

1. In a portable suction cleaner, the combination of an electric motor and a housing therefor, a handle for the cleaner secured to the upper end of said housing, the shaft of said motor projecting through a bearing in the bottom of said housing, a suction fan on the end of said shaft below the bottom of said housing, a casing for said fan having a dust-laden-air inlet at the bottom thereof for connection with a cleaner-nozzle, the upper portion of the fan casing being a hollow helix which spirals substantially completely around the motor casing beginning with its low portion at the bottom of the motor housing and ending with its high portion extending from the bottom of the motor housing well up on the side of said housing, said hollow helix being in full communication at the bottom with the underlying portion of the fan casing, the inner wall of said hollow helix being also the wall of the motor housing and thereby serving to cool the motor, the high portion of the helix having an upwardly directed delivery opening for the dust-laden-air from the fan chamber.

2. The portable suction cleaner claimed in claim 1 further characterized by said cleaner having additional means for cooling the motor, comprising openings at the upper portion of the motor housing and through the side wall of said housing adjacent the bottom thereof at the aforesaid low portion of the helix.

WARD LEATHERS.