Dec. 24, 1929. A. A. CLARKE 1,740,918

AIR SUCTION APPARATUS

Filed Feb. 28, 1927

Fig. 1

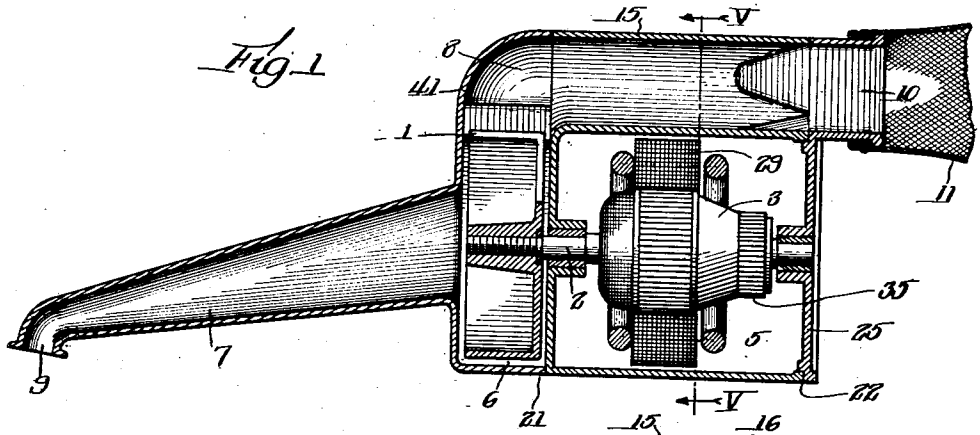


Fig. 2.

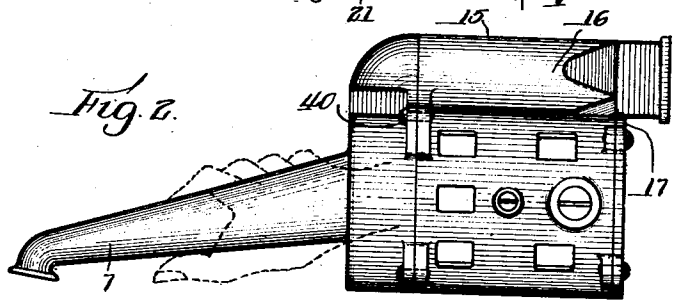


Fig. 3.

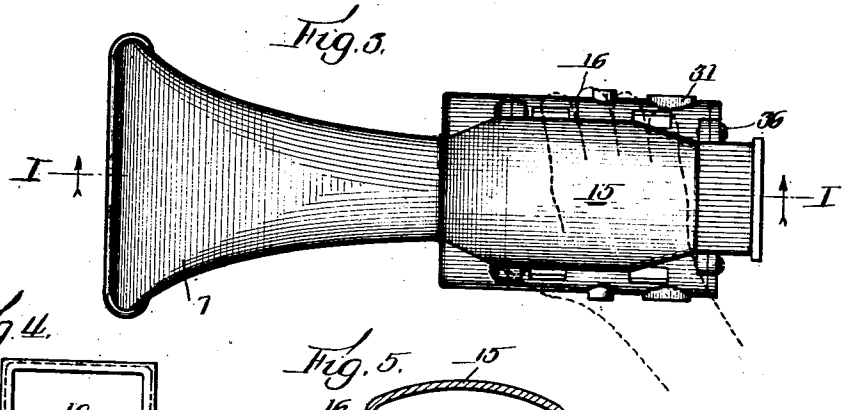


Fig. 4.

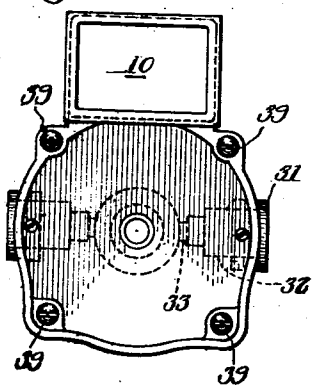
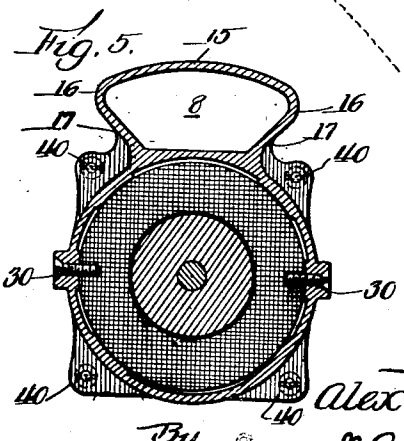


Fig. 5.



Inventor:
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UNITED STATES PATENT OFFICE

ALEX A. CLARKE, OF CHICAGO, ILLINOIS

AIR-SUCTION APPARATUS

Application filed February 28, 1927. Serial No. 171,400.

My invention relates to air-suction apparatus, and it has particular relation to low-weight air-suction cleaners for use in place of hand brushes, whisk brooms, and the like.

Among the objects of the invention is an improved tool of the foregoing character that is provided with a novel grip so combined with the operating members of the cleaner as to permit prolonged handling of the tool by persons of small physical strength without tiring the same; a novel organization of the parts of the tool simplifying and economizing the manufacture thereof while securing efficient cleaning action; and other features which will appear from the following description of an exemplification of the invention, reference being had to the accompanying drawings, wherein

Fig. 1 is a vertical sectional view through a cleaner exemplifying the invention, along line I—I in Fig. 3;

Fig. 2 is a side elevational view of the cleaner;

Fig. 3 is a plan view of the cleaner;

Fig. 4 is an elevational view of the rear side of the cleaner; and

Fig. 5 is a transverse, vertical sectional view of the cleaner along line V—V in Fig. 1.

The tool of the present invention is a modification of the tool described and claimed in my co-pending application Serial No. 169,379, filed February 18, 1927, and distinguishes therefrom in several respects, particularly referred to hereinafter.

The tool comprises a circular fan 1 of a familiar type mounted on a threaded forward end of a shaft 2 of an electric driving motor 3 mounted in the rear of the fan, coaxially therewith. The fan and the motor are housed in a casing constituting a tubular chamber 5 enclosing the motor, a chamber 6 surrounding the fan, a suction nozzle or intake duct 7 extending from a central opening in the fan chamber opposite the center of the fan, and an exhaust or discharge duct 8 extending from the upper side of the fan chamber and leading above the motor chamber and directly adjoining the same. The front end of the nozzle has a relatively narrow, downwardly-directed, elongated intake opening 9. The rear end of the discharge duct 8 forms a delivery port 10, over which may be secured a dust bag 11, only a portion of which is shown.

The suction or intake duct 7 in front of the chamber is of such length and shape as to constitute a grip readily fitting the palm of the operator. This grip is particularly suitable for cleaning operations in which the tool is held in vertical position with the intake opening 9 of the nozzle directed toward a vertically-upstanding cleaning surface. When so operated, the motor hangs directly below the hand of the operator and does not produce any excessive strains as was the case with prior art tools of this type.

A distinguishing feature of the invention is the utilization of the casing portion constituting the discharge duct 8 on the top of the motor chamber as a second grip for operating the tool. As seen in the drawings, the main portion of the discharge duct constitutes a flattened or oval tubular chamber of smaller diameter than the substantially circular motor chamber 5. The upper side 15 of the discharge duct is slightly rounded and is of such width as to fit the palm of the operator. The side walls 16 of the duct are turned inwardly, converging towards the wall of the motor chamber and forming grooves 17 at both sides of the duct along the lines where the two chambers are joined by the wall separating the same. Accordingly, the tool may be conveniently gripped at said portion of the duct, the palm lying on the top of the duct and the fingers having a convenient hold of the tool within the two grooves on the sides of the duct.

With the tool held at said second grip it is particularly adapted for use in horizontal position, as shown in Fig. 1, the weight of the motor hanging directly below the grip at which the tool is held. This balance of the weight is principally responsible for the elimination of tiresomeness on the part of the operator during prolonged handling thereof.

A distinct feature of the invention is the organization of the several parts which permits economical manufacture thereof and

eliminates laborious and expensive machining and assembly operations.

According to the invention, the casing constituting the several chambers and ducts comprises three unitary sections joining each other along two parallel planes 21, 22, transverse to the motor axis, one plane extending through the fan chamber 6 at the point where said chamber adjoins the motor chamber 5 in front of the motor, the other plane being at the rear end of the motor chamber. The motor casing is thus divided into three parts, the front part consisting of the portions constituting the fan chamber 6 and the intake nozzle 7; the central part comprising the side and front walls of the motor chamber 5 and the main portion of the discharge duct 8 which serves as a grip above the motor; and a rear part constituting the back cover 25 for the motor chamber and the rear end and delivery port of the discharge duct.

With the foregoing construction, the manufacture and assembly of the tool is very simple. The three parts of the tool casing may be made by casting, from aluminum for instance, or another light material. Thereupon the cooperating two pairs of surfaces may be readily machined, said surfaces being perfectly plane and parallel to each other. After the casing portions have been so prepared, the motor 3 is inserted into the motor chamber through the open rear end thereof, the front end of the shaft being journaled within the front wall of the motor chamber.

The field core member 29 of the motor is locked in place by means of two locking screws 30 extending through the side walls of the chamber. The side walls of the motor chamber have also brush holder openings 31, in which are mounted brush holder cartridges 32 for guiding brushes 33 cooperating with the commutator 35 of the motor. The rear cover 25 is thereupon fitted over the rear opening of the motor chamber 5, journaling the rear end of the motor shaft and complementing the discharge duct 8, the cover being suitably fasfened by means of a plurality of screws 36.

With the motor so assembled within the casing, the assembly of the tool is completed by securing the front part of the casing over the fan, the front part being held in place by means of a plurality of screws 40 extending through suitable lugs projecting from the casing walls. The fact that the plane along which the front portion of the casing is joined to the motor portion of the casing is perfectly flat, enables said portions to be machined by simple disk grinding operations, greatly facilitating the fit between the two portions, and securing an air-tight joint at the points where the knee portion 41 of the discharge duct joins the staright duct portion on the top of the motor.

I claim as my invention:

1. In a suction cleaner, a rotary fan, an electric fan-driving motor in the rear of said fan coaxially therewith, a casing comprising a chamber surrounding said fan, a chamber surrounding said motor, an intake duct extending from said fan chamber, and a discharge duct extending from said fan chamber and leading adjacent said motor chamber alongside thereof, said discharge duct constituting an elongated protuberance extending alongside said motor chamber and fitting the palm of the operator for gripping the cleaner.

2. In a suction cleaner, a rotary fan, an electric fan-driving motor disposed in the rear of the fan coaxially therewith, a casing comprising a chamber surrounding said fan, a chamber surrounding said motor, an intake duct extending from a central opening in the front wall of said fan chamber, and a discharge duct adjoining said motor chamber alongside thereof, said discharge duct constituting an elongated protuberance extending alongside said motor chamber and fitting the palm of the operator for gripping the cleaner.

3. In a suction cleaner, a rotary fan, a motor coaxially disposed in the rear of the fan for driving the same, a casing comprising a chamber for said fan, a tubular chamber for said motor disposed in the rear of said fan chamber and separated therefrom by a partition wall, an intake duct extending from a central opening in the front wall of said fan chamber, a discharge duct constituting a protuberance extending alongside said motor chamber from the front end to the rear end thereof, said discharge duct having a knee portion communicating with the periphery of said fan chamber, and a delivery port at the end thereof, said protuberance having longitudinal grooves on the sides thereof for gripping the same to operate the tool.

4. In a suction cleaner, a rotary fan, an electric fan-driving motor disposed in the rear of the fan coaxially therewith, a casing comprising a chamber surrounding said fan, a chamber surrounding said motor, an intake duct extending from a central opening in the front wall of said fan chamber, and a discharge duct adjoining said motor chamber alongside thereof, said discharge duct constituting an elongated protuberance extending alongside said motor chamber and fitting the palm of the operator for gripping the cleaner, said casing being divided into two parts along a plane through said fan chamber transversely to the motor axis.

5. In a suction cleaner, a rotary fan, a motor coaxially disposed in the rear of the fan for driving the same, a casing comprising a chamber for said fan, a tubular chamber for said motor disposed in the rear of said fan chamber and separated therefrom by a partition wall, an intake duct extending

from a central opening in the front wall of said fan chamber, a discharge duct constituting a protuberance extending alongside said motor chamber from the front end to the rear end thereof, said discharge duct having a knee portion communicating with the periphery of said fan chamber, and a delivery port at the end thereof, said protuberance having longitudinal grooves on the sides thereof for gripping the same to operate the tool, said casing being divided into three integral sections, along a plane extending through said fan chamber in front of the partition wall separating the motor chamber from said fan chamber, and along a plane extending in front of the rear wall of said motor chamber, said planes being perpendicular to the axis of said motor.

6. In a suction cleaner, a rotary fan, an electric fan-driving motor in the rear of said fan, a casing comprising a chamber surrounding said fan, a chamber surrounding said motor, and an air duct extending from said fan, said air duct constituting an elongated protuberance extending alongside said motor chamber and fitting the palm of the operator for gripping the cleaner.

In testimony whereof I have hereunto subscribed my name this 19th day of February, A. D. 1927.

ALEX A. CLARKE.