

Feb. 16, 1937.

F. L. PIERCE

2,070,682

SUCTION CLEANER

Filed April 15, 1935

2 Sheets-Sheet 1

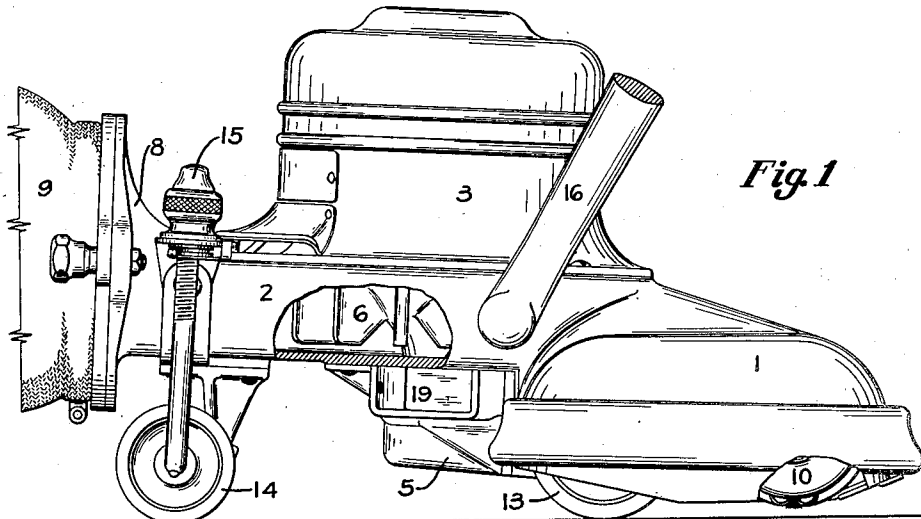


Fig. 1

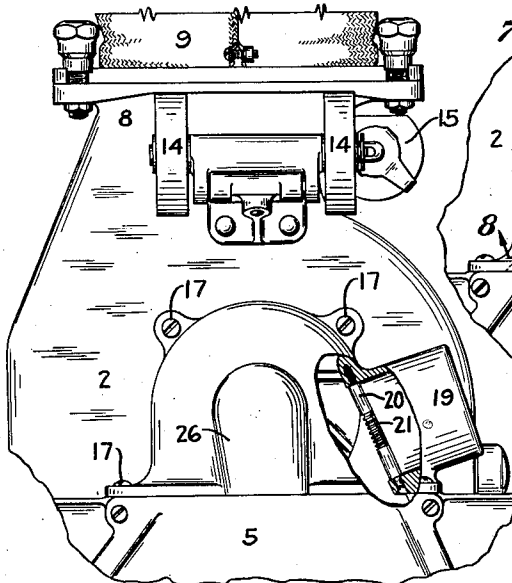


Fig. 2

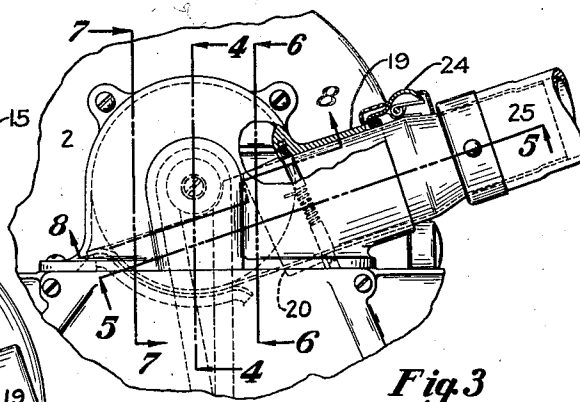


Fig. 3

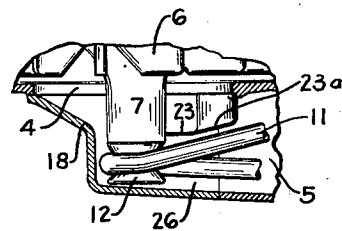


Fig. 4

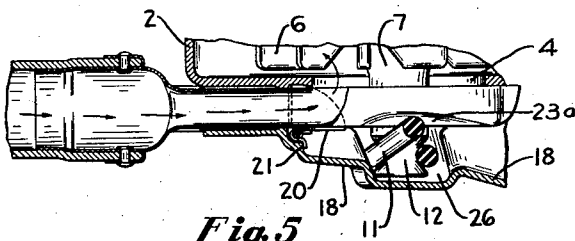


Fig. 5

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2 Sheets-Sheet 2

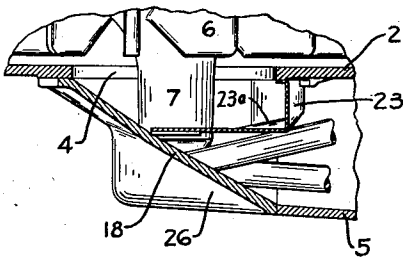


Fig. 6

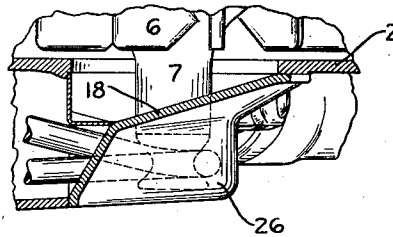


Fig. 7

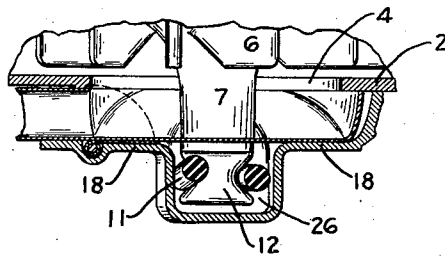


Fig. 8

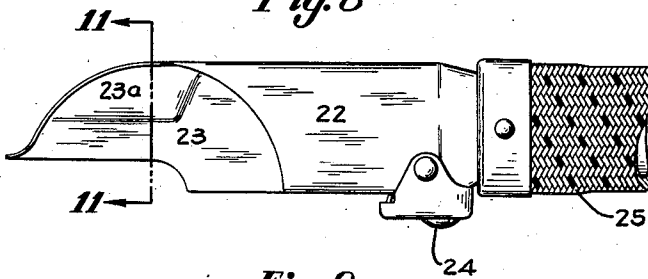


Fig. 9

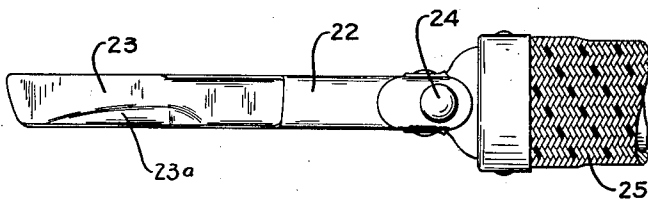


Fig. 10

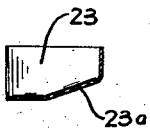


Fig. 11

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SUCTION CLEANER

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Application April 15, 1935, Serial No. 16,381
In Great Britain, April 17, 1934

8 Claims. (Cl. 15—9)

The present invention relates to suction cleaners in general and more particularly to the co-operating features of a suction cleaner and its dusting tools. More specifically the invention comprises an improved dusting tool converter and its connection in the suction cleaner body.

The conversion of a suction cleaner from an off-the-floor cleaning unit to an on-the-floor cleaning unit has been accomplished by a plurality of means. The present invention comprises an improved means for accomplishing that result in a suction cleaner which includes an agitator within its nozzle and power-transmitting means within its air passageway. According to the present invention the conversion of the cleaner is accomplished simply and effectively and air leakage is reduced to a minimum.

It is an object of the present invention to provide a new and improved suction cleaner. It is another object of the invention to provide a new and improved suction cleaning unit adapted for on-the-floor cleaning and for off-the-floor cleaning. A still further object is the provision of a new and improved dusting tool converter. Still another object is the provision of improvements in suction cleaner converters and their seats in the cleaner body. A still further object is the provision of new and novel converting means for a suction cleaner provided with surface-agitating means and power-transmission means. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the drawings to which they relate.

Referring now to the drawings in which a preferred embodiment of the invention is disclosed:

Figure 1 is a side view of a suction cleaner constructed in accordance with the present invention with the casing broken away in parts showing the suction-creating fan positioned in the fan chamber and the agitator in the nozzle;

Figure 2 is a partial bottom view of the cleaner shown in Figure 1;

Figure 3 is a partial bottom view of the cleaner shown in Figure 1 with the dusting tool converter secured in place;

Figure 4 is a section upon the line 4—4 of Figure 3, showing the dusting tool converter in its seat at the eye of the fan chamber;

Figure 5 is a section through the dusting tool converter and seat upon the section line 5—5 of Figure 3;

Figure 6 is a section upon the line 6—6 of Figure 3;

Figure 7 is a section upon the line 7—7 of Figure 3;

Figure 8 is a section upon the line 8—8 of Figure 3;

Figure 9 is a top view of the dusting tool converter;

Figure 10 is a side view of the dusting tool converter;

Figure 11 is a section through the end of the dusting tool converter upon the line 11—11 of Figure 9.

In the drawings is illustrated a modern suction cleaner comprising a nozzle 1, a fan chamber 2 and a motor casing 3. The nozzle 1 is interiorly connected to the fan chamber eye 4 by an air passageway 5, and a suction-creating fan 6 is positioned upon the motor shaft 7 within the fan chamber. Fan 6 functions to draw cleaning air from the nozzle thru the air passageway into the fan chamber and to exhaust it therefrom through the exhaust outlet 8 into the dust bag 9. A rotary surface-covering agitator 10 is positioned within the cleaner nozzle and is connected by the power-transmitting belt 11 to the lower end of the motor shaft 7 which is formed as a pulley 12 in the passageway 5. The rotation of the motor results in the rotation of the agitator 10 and the brushing and beating of a surface covering undergoing cleaning by that member. The cleaner is movably supported upon front and rear wheels 13 and 14, respectively, the latter being provided with suitable height-adjusting means 15, and there is provided a pivoted handle 16 through which the operator can exert the necessary propelling force for the cleaner in on-the-floor cleaning.

The air passageway 5 immediately below the eye 4 of the fan chamber is formed as a separate member which is secured in place by screws 17, 17 etc. At this point the belt 11 seats upon the pulley 12 and the air passageway is shaped to provide a belt channel or groove 26 in its bottom. Groove 26 opens towards the nozzle and at its sides are outwardly extending shoulders 18 which slope from the level of the bottom of the air passageway 5, at a point forward of the pulley or motor shaft, to the top of the air passageway 5 and in contact with the bottom of the fan chamber 2, at a point at the rear of the motor shaft. Shoulders 18 function as an air directive baffle to direct air from the nozzle upwardly to the eye of the fan chamber. As best shown in Figures 6 and 7 the shoulder 18 upon one side of the motor shaft 7 slopes gradually from its uppermost position to the level of the bottom wall

of the air passageway 5, while upon the opposite side of the motor shaft the shoulder slopes more gradually to a point forward of the motor shaft and then more abruptly to reach the level of the bottom wall of the air passageway.

Upon the side of the passageway 5 and adjacent the motor shaft 7 is a port or inlet 19, rectangular in cross section and arranged with its major axis extending transversely across the air passageway forward of the motor shaft. The inner end of port 19 is closed by a pivoted flat valve 20 which is provided with a coil spring 21 the function of which is to hold in port-closing position. The valve 20 is adapted to pivot inwardly to open the inlet in which position it overlies the adjacent shoulder 18 of the air passageway, as illustrated in Figure 5.

To convert the cleaner into an off-the-floor cleaning unit a converter element adapted to seat in and extend through the port 19 is provided. This element is illustrated by itself in Figures 9, 10 and 11 and is seen to comprise an elongated relatively flat body which is formed with a rectangular passageway portion 22 ending in an open topped shell or plate 23 having a semi-circular shape of the dimension of the eye 4 of the fan chamber.

A tubular air conduit or hose 25, of any suitable length, is carried by the main body portion of the converter, and a manually operable spring-pressed detent 24 is provided for securing the converter in place on the cleaner body.

The dusting tool converter is adapted to be inserted into the body of the machine through the port 19 extending across the passageway 5. The insertion of the element results in the downward pivotal movement of the valve 20, to the position shown in Figure 5, where it remains until the converter is withdrawn. The converter member extends completely across the air passageway diagonally, as best illustrated in Figure 3, and the rearward edge of the shell 23 making line contact with the shoulders 18 at the sides of the channel 26, as illustrated in Figures 6, 7 and 8, while the upper edge of the surrounding side wall of the shell 23 makes line contact with the bottom of the fan chamber around the eye 4 completely across the air passageway, as illustrated in the same figures. The shell 23 of the converter is shaped to conform to the motor shaft 7 upon one side, and extends partially there around and closely adjacent thereto, as illustrated in Figure 3 of the drawings, leaving only a relatively small opening in the channel 26 around the shaft through which air can pass. Because the power-transmission belt 11 continues to extend from the pulley 12 with the converter in place, and because that member is between the belt and the top of the fan chamber 2, the bottom of the shell 23 is contoured to avoid the belt, as indicated 23a.

With the converter attached to the machine the air drawn into the machine by the suction-creating means enters through the hose 25 and the converter to the fan chamber. The cleaner nozzle is entirely closed from the fan chamber except for the small leakage which takes place around the motor shaft 7 in the channel 26 which is inappreciable.

The attachment and removal of the converter is exceedingly simple. To insert the converter requires only its manual insertion through the port 19. The spring-pressed detent 24 cooperates with a suitable seat in the port 19 to retain the device in place. To remove the converter

requires only the manual depression of the detent and the withdrawal of the converter member.

I claim:

1. In a suction cleaner adapted for on-the-floor and off-the-floor cleaning, a nozzle, a rotary agitator in said nozzle, a fan chamber, a suction-creating fan in said chamber, a stationary air passageway connecting said nozzle to said fan chamber, a drive shaft extended thru said fan chamber into said passageway and formed as a pulley at its end, a power-transmitting belt connected to said pulley and extended thru said air passageway to said agitator, characterized in that said air passageway is shaped to provide a channel closely enclosing said shaft and said belt at their junction there being shoulders around said channel which include portions which slope downwardly in said passageway and in the direction of said nozzle, and in that said passageway is formed with a converter-receiving port opening transversely of said passageway and above said shoulders.

2. In a suction cleaner adapted for on-the-floor and off-the-floor cleaning, a nozzle, a rotary agitator in said nozzle, a fan chamber, a suction-creating fan in said chamber, an air passageway connecting said nozzle to said fan chamber, a drive shaft extended thru said fan chamber into said passageway and formed as a pulley at its end, a power-transmitting belt connected to said pulley and extended thru said air passageway to said agitator, characterized in that said air passageway is shaped to provide a channel which extends in the direction of said belt and closely encloses said drive shaft and to provide converter-seating-and-sealing shoulders at the side of said channel which include portions more closely approaching said fan chamber than said belt at its junction with said shaft, and in that said air passageway is provided with a port opening diagonally thereacross on an axis between said shaft and said nozzle, and in that valve means normally close said port.

3. A suction cleaner including a nozzle, a rotary agitator in said nozzle, a fan chamber, a suction-creating fan in said chamber, an air passageway connecting said nozzle to said fan chamber, a drive shaft extended thru said fan chamber into said passageway and formed as a pulley at its end, a power-transmitting belt connected to said pulley and extended thru said air passageway to said agitator, said air passageway being shaped to provide a channel closely enclosing said shaft and said belt at their junction and to provide converter-seating-and-sealing shoulders at the sides of said shaft between said pulley and the eye of said fan chamber, a port in said passageway, valve means normally closing said port, and a dusting tool converter seated in said port and extended across said passageway and contacting said shoulders and the top of said passageway and co-operating therewith to seal said nozzle from said fan chamber.

4. A suction cleaner including a nozzle, a rotary agitator in said nozzle, a fan chamber, a suction-creating fan in said chamber, an air passageway connecting said nozzle to said fan chamber, a drive shaft extended thru said fan chamber into said passageway and formed as a pulley at its end, a power-transmitting belt connected to said pulley and extended thru said air passageway to said agitator, said air passageway being shaped to provide a channel closely enclosing said shaft and said belt at their junction and to provide should-

ders at the sides of said channel which slope across said passageway from the wall opposite the eye of said chamber in the direction thereof, a port in said passageway opening transversely thereof, valve means normally closing said port and adapted to be moved to a port-opening position, a dusting tool element seated in said port and including an open-sided and open-ended shell extended across said passageway closely adjacent said shaft and making line contact with the shoulders at the sides of said channel and with the wall of said passageway opposite thereto to seal said nozzle from said fan chamber and to conduct air thru said port and to said fan chamber.

5. In a suction cleaner, suction-creating means, a nozzle, an air passageway connecting said nozzle to said means, said air passageway being formed with an egress to said suction-creating means in one of its walls and with shoulders which slope from the wall opposite said egress in the direction thereof, and a transverse port in said passageway between said shoulders and said nozzle, a dusting tool converter seated in said port and extended across said passageway and making sealing line contact with said shoulders and with the wall of said passageway opposite thereto to seal said nozzle from said suction-creating means and to conduct air thru said port to said egress and so to said suction-creating means.

6. A dusting tool converter for suction cleaners, comprising a conduit adapted to be attached to the end of a dusting tool hose and to be inserted endwise into a port in the body of said cleaner, said conduit being flattened on opposite sides and having an opening adjacent its outer

end, one portion of said opening being formed in one edge intermediate the flattened sides of said conduit and another portion being extended transversely substantially the width of one of the adjacent flattened sides, the edges of said opening being adapted to have sealing contact with predetermined internal surfaces of said body beyond said port.

7. A dusting tool converter for suction cleaners, comprising a conduit adapted to be attached to the end of a dusting tool hose and to be inserted endwise into a port in the body of said cleaner and transversely of the air passageway between the nozzle and fan chamber thereof, said conduit being relatively flat and rectangular in cross section and having one of its side walls curved to form a partially rounded end with a laterally facing opening in the opposite side wall and a substantially semi-circular opening in one of the transverse walls forming a continuation of said lateral opening.

8. A dusting tool converter for suction cleaners, comprising a conduit adapted to be attached to the end of a dusting tool hose and to be inserted endwise into a port in the body of said cleaner and transversely of the air passageway between the nozzle and fan chamber thereof, said conduit being relatively flat and rectangular in cross section and having one of its side walls curved substantially through a right angle to form a partially rounded end and having a laterally facing opening in the other side wall portion and a substantially semi-circular opening in the intermediate transverse wall forming a continuation of said lateral opening.

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