Sept. 28, 1937. W. H. KITTO 2,094,126

SUCTION CLEANER

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Fig. 1

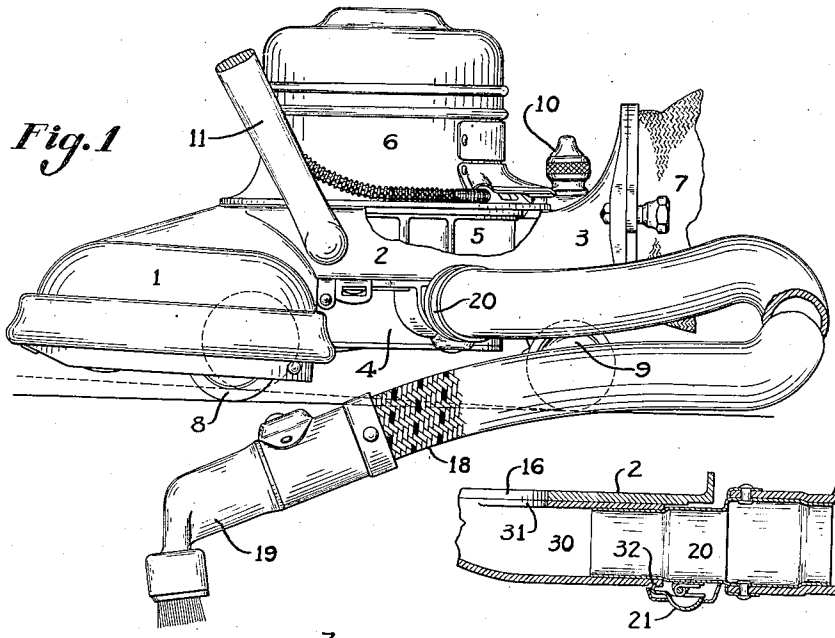
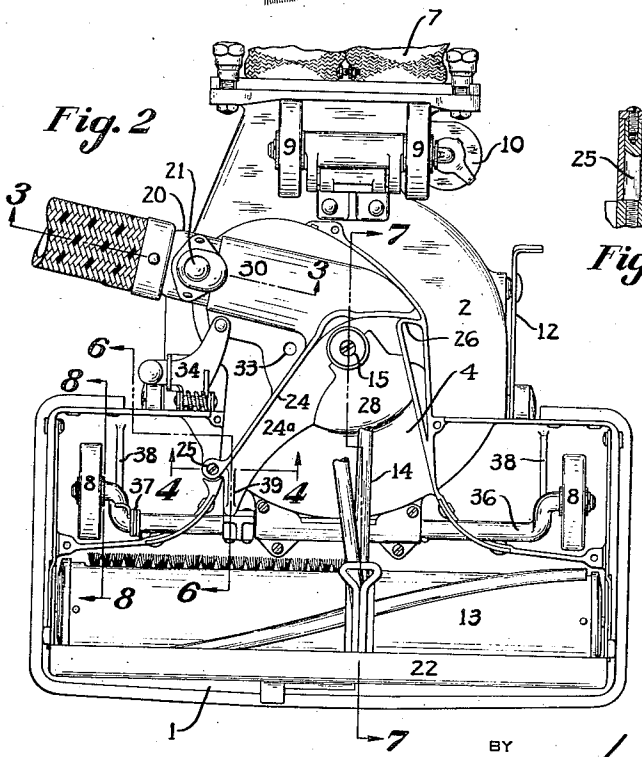


Fig. 3

Fig. 2



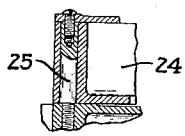


Fig. 4

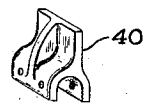


Fig. 5

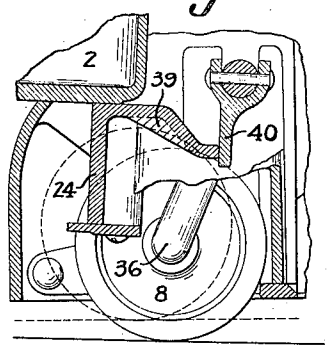


Fig. 6

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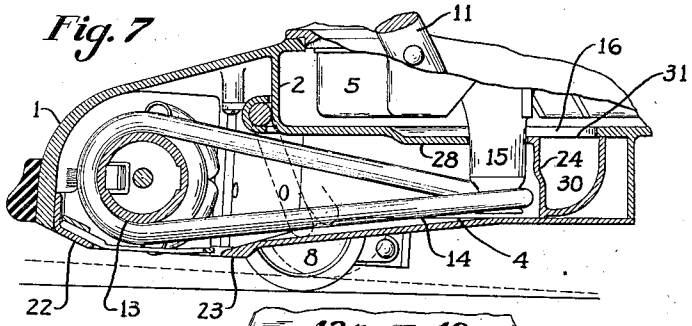
ATTORNEY

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SUCTION CLEANER

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Fig. 7



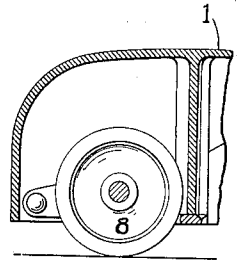
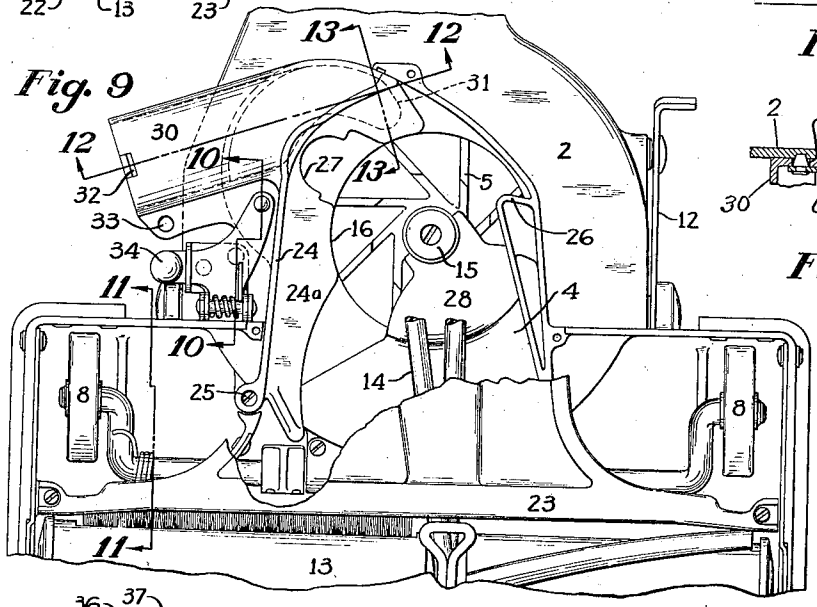


Fig. 8

Fig. 9



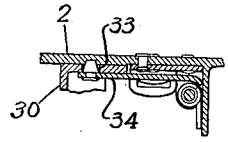


Fig. 10

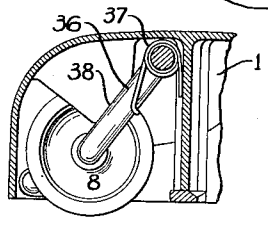


Fig. 11

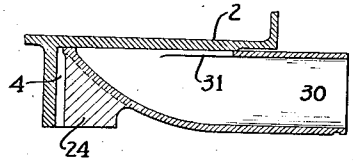


Fig. 12

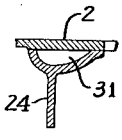


Fig. 13

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UNITED STATES PATENT OFFICE

2,094,126

SUCTION CLEANER

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Application February 11, 1935, Serial No. 5,911
In Great Britain April 10, 1934

15 Claims. (Cl. 15—9)

The present invention relates to suction cleaners in general and particularly to new and novel means for the conversion of a suction cleaner from an on-the-floor cleaning unit to an off-the-floor cleaning unit. More specifically the invention comprises an improved permanently embodied converter mechanism in a suction cleaner.

The use of dusting tools with suction cleaners to enable the suction of the machine to be made available at points spaced above the supporting surface of the machine is well known in the prior art. The provision of means by which the machine can readily be converted from an on-the-floor cleaning unit to an off-the-floor cleaning unit with a minimum of effort expenditure and with maximum efficiency is extremely desirable. It is to this end that the present invention is directed.

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 cleaner embodying converting means capable of altering the machine from an on-the-floor cleaner to an off-the-floor cleaner. A still further object is the provision of an improved conversion mechanism in a suction cleaner. A still further object is the provision of a permanently installed converter in a suction cleaner which is adapted to receive the end of a dusting tool unit and to be actuated thereby. Still another object is the provision of a converter in a suction cleaner which includes means normally forming a part of the air passageway through the cleaner in on-the-floor cleaning which means are actuated by the attachment of a dusting tool hose to connect a second source of air flow to the suction-creating means of the suction cleaner. These and other more specific objects will appear upon reading the following specification and claims, and upon considering in connection therewith the attached 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 modern suction cleaner, with certain parts broken away, illustrating a dusting tool unit connected thereto;

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

Figure 3 is a section through the connection of the dusting tool unit and the converter valve, being taken upon the lines 3—3 of Figure 2;

Figure 4 is a section upon the line 4—4 of Figure 2 illustrating the pivotal mounting of the converter valve;

Figure 5 is a view in perspective of a force-receiving lug carried by the supporting means of the cleaner nozzle;

Figure 6 is a section upon the line 6—6 of Figure 2 showing the mechanism by which the nozzle is raised when the cleaner is converted into an off-the-floor unit and shows the supporting wheel in its off-the-floor cleaning position;

Figure 7 is a longitudinal cross section through the cleaner upon the line 7—7 of Figure 2;

Figure 8 is a section through the wheel pocket of the nozzle casing showing the wheel positioned therein;

Figure 9 is a partial bottom view of the cleaner with certain parts broken away to show the converter valve positioned for on-the-floor cleaning;

Figure 10 is a section upon the line 10—10 of Figure 9, showing the valve-locking mechanism;

Figure 11 is a section upon the line 11—11 of Figure 9, showing a front supporting wheel in its position for on-the-floor cleaning;

Figure 12 is a section through the converter valve upon the line 12—12 of Figure 9;

Figure 13 is a section upon the line 13—13 of Figure 9, illustrating the sealed relationship of the valve conduit with the valve positioned for on-the-floor cleaning.

Referring to Figure 1 of the drawings, in particular, a modern suction cleaner provided with a dusting tool unit is illustrated. The suction cleaner body includes a nozzle 1, a fan chamber 2, and an exhaust outlet 3. The interior of nozzle is connected to the fan chamber 2 by an air passageway, indicated generally as 4, and there is positioned within the fan chamber a suction-creating fan 5 which is rotated at high speed by a motor positioned within the casing 6. In the functioning of the cleaner as an on-the-floor cleaning unit the suction-creating means draws air through the nozzle 1 into the fan chamber and forces it therefrom thru exhaust outlet 3 into a suitable dust bag 7 which is removably attached thereto. The cleaner body is movably supported upon spaced pairs of front and rear wheels 8, 8 and 9, 9 respectively, the latter being provided with height-adjusting means 10 by which they can be raised or lowered for the purpose of raising or lowering the nozzle 1 to accommodate it to different types of surface coverings. As in the usual cleaner construction a pivoted handle 11 is provided, by which the operator can propel the machine in its operation, suitable handle-positioning means, indicated generally by the reference character 12, being provided by which

it can be positioned within a definite position within a definite range of movement.

Within the nozzle 1 of the machine is positioned a rotating agitator 13 provided on its surface with rigid beating elements and flexible brush elements and adapted to agitate a surface covering undergoing cleaning to dislodge therefrom the embedded foreign matter. The agitator is rotated, in the operation of the machine, by a power-transmitting belt 14 which extends therefrom thru the air passageway 4 and to the lower end of the motor shaft 15 which extends downwardly at the center of the chamber eye 16 into air passageway.

When it is desired to use a cleaner in the cleaning of drapes a dusting tool unit is connected to the suction-creating means of the cleaner. This unit comprises an elongated flexible hose 18 at the outer end of which is provided a removable nozzle 19 and at the inner end of which is provided a metallic seat member 20 which carries a spring-pressed detent 21.

The walls of air passageway 4 leading to the nozzle mouth, as defined by the front and rear nozzle lips 22 and 23 respectively, form wheel pockets at the rear corners of the nozzle casing within which the front wheels 8, 8 are positioned. In the usual suction cleaner the side walls of this air passageway 4 are rigid and merely serve to define the connection between the interior of the nozzle and the fan chamber. According to the present invention, however, one side wall 24 of the air passageway is formed as a part of a permanently incorporated converter valve pivoted upon a pin 25 and is movable between two positions, as shown in Figure 2 and in Figure 9. In the position shown in Figure 9 the pivoted wall 24 serves merely as a side of the air passageway 4 and cooperates with the opposite rigid side wall thereof to direct cleaning air to the eye 16 of the fan chamber. In the position shown in Figure 2 it has pivoted forwardly until it extends across the air passageway in abutment with a stop 26 at the opposite side thereof. In this position the flat plate surface 24a of the converter lying adjacent the underside of the fan chamber cooperates with wall 24 in sealing the fan chamber eye from the nozzle thru being provided with a cutaway section 27 which partially encloses the motor shaft 15. A fixed plate member 28 at all times overlies that part of the normal circular eye 16 of the fan chamber forward of the converter valve in this second position, as shown in Figure 2, and cooperates with the converter valve to seal completely the nozzle from the fan chamber.

The converter valve body comprises, in addition to the wall 24 and its plate 24a a conduit passageway 30, the outer end of which is shaped similarly to the seat 20 on the dusting tool unit. The inner end of the conduit, indicated as 31 in Figures 3 and 12, is formed by an opening which faces the fan chamber 2. With the converter positioned for on-the-floor cleaning, as shown in Figure 9, opening 31 of conduit 30 abuts the bottom wall of fan chamber 2 at the side of eye 16. With the converter valve pivoted to its position for off-the-floor cleaning, as illustrated in Figure 2, the opening 31 conforms to the shape of the eye 16 of the fan chamber which remains uncovered by the converter and by the plate 28.

The body of the converter is provided at its forward side adjacent the conduit 30 and exteriorly of the air passageway with spaced seats 33, 33 with which a spring-pressed latch or detent 34 cooperates in the two positions of the converter to retain it against unintended displacement. Detent 34 is positioned immediately in the rear of the nozzle casing and to permit of the pivoting of the converter from the position shown in Figure 9 to that shown in Figure 2 it is first necessary to depress manually the detent 34 to disengage it from the outer seat 33 and then pivot the converter to the nozzle sealing relationship, at which time the detent will seat in the inner seat 33 to lock the converter in place. With the converter pivoted to the position shown in Figure 2, all cleaning air which passes through the cleaner in response to the suction created by the suction-creating fan 5 will enter through the dusting tool unit comprising the nozzle 19, the hose 18 and its connection to the converter which opens into the eye of the fan chamber.

To convert the cleaner from an on-the-floor unit to an off-the-floor cleaning unit the seat 20 of the dusting tool hose is seated in the outer end of conduit 30, as illustrated in Figure 3, the two being retained in locked relationship by the spring-pressed detent 21 cooperating with a seat 32. Manually depressing the lock 34 permits the converter to be pivoted from the position shown in Figure 9 to that shown in Figure 2 by a force exerted directly on the dusting tool unit. The lock 34 locks the valve in the new position and all air entering the fan chamber enters by way of the dusting tool unit, the nozzle being completely sealed therefrom.

To return the cleaner to an on-the-floor cleaning unit, it is only necessary to disengage the locking latch 34 from its seat 33 and to pivot the converter outwardly from the position shown in Figure 2 to that shown in Figure 9, after which the dusting tool hose can be disengaged from the converter and the machine.

With the cleaner connected for off-the-floor cleaning the motor shaft 15 rotates the agitator 13 by means of the driving belt 14 and, in order to prevent any possibility of extended agitation of the surface covering in one place, means are provided to raise the front end of the cleaner. These means comprise a crank shaft 36 upon which the two front supporting wheels 8, 8 are mounted. A coil spring 37 urges crank shaft 36 rearwardly at all times into abutment with stops 38, 38 and in the on-the-floor cleaning relationship the crank shaft is held against the stops as indicated in Figure 11 by this spring, and the wheels are in their uppermost position. Upon the movement of the converter valve to its position for off-the-floor cleaning, the crank shaft is pivoted forwardly, from the dotted line to the full line position shown in Figure 6, by means of a shoulder 39 provided at the forward end of the wall 24 which contacts the lower end of a lug 40 which is fixedly carried by the crank shaft 36 between its ends. The movement of the lug 40 pivots that member and causes the crank shaft to lower the wheels relative to the nozzle casing thereby raising the nozzle and the agitator contained therein.

I claim:

1. In a suction cleaner, a body including a nozzle, a fan chamber and an air passageway therebetween, and a motor-driven fan in said chamber; a wall of said passageway being movable to a second position in which it closes said nozzle from said chamber, and a conduit movable with said wall into registration with the eye of said chamber.

2. In a suction cleaner, a body including a nozzle, a fan chamber and an air passageway

therebetween, and a motor-driven fan in said chamber; a movable converter including a wall forming a part of said passageway, said converter being movable to a position in which said wall extends across said passageway to close said nozzle from said chamber, said converter including a conduit adapted to mate with the eye of said fan chamber in said position.

3. In a suction cleaner, a body including a nozzle, a fan chamber and an air passageway therebetween, and a motor-driven fan in said chamber; a wall of said passageway being movable to a second position in which it closes said nozzle from said chamber, and a conduit movable with said wall into registration with the eye of said chamber, and manually operable means to retain said wall and conduit in each of their positions.

4. In a suction cleaner, a body including a nozzle, a fan chamber and an air passageway therebetween, and a motor-driven fan in said chamber; a movable converter including a wall forming a part of said passageway, said converter being movable to a position in which said wall extends across said passageway to a second position in which it closes said nozzle from said chamber, said converter including a conduit adapted to mate with the eye of said fan chamber at one end and with the end of a dusting tool hose at its opposite end and to be moved by a force exerted therethrough, and means to lock said converter in its passageway-forming position and in its passageway-closing position.

5. In a suction cleaner, the combination of a body including a nozzle, a fan chamber, a motor driven fan in said fan chamber and an air passageway between said nozzle and an opening to said fan chamber, one side wall of said passageway being pivoted to swing toward and from the opening to said fan chamber and adapted to form a closure therefor, and a conduit carried by said pivoted side wall and adapted to communicate with the opening to said fan chamber upon the closure of said passageway therefrom.

6. In a suction cleaner, the combination of a body including a nozzle, a fan chamber, a motor driven fan in said fan chamber and an air passageway between said nozzle and an opening to said fan chamber, one side wall of said passageway being pivoted to swing toward and from the opposite side wall thereof and adapted to form a closure for the opening to said fan chamber in the movement thereof in one direction, and a conduit integral with said pivoted side wall and having a port adapted to register with said opening to said fan chamber upon the closure of said passageway therefrom.

7. In a suction cleaner, a nozzle, a fan chamber, an air passageway extended between said nozzle and said chamber, a driven fan in said chamber, a converter valve pivoted about an axis substantially parallel to the axis of rotation of said fan and including a wall forming a part of said air passageway in one position of said valve, said valve also including a movable conduit opening toward said fan chamber and adapted to register with the eye of said fan chamber in one position of said valve, the wall of said converter extending across said passageway to close said nozzle from said chamber in the last mentioned position.

8. In a suction cleaner including a nozzle, an agitator in said nozzle, a fan chamber having an eye, a fan in said chamber, a motor shaft supporting said fan in said chamber and extended through said eye, an air passageway connecting said nozzle to the eye of said fan chamber, and power transmission means extended in said passageway from said shaft to said agitator; a movable converter valve including a wall and a conduit, said wall forming a part of said air passageway in one position of said converter and a closure between said nozzle and said fan chamber in a second position, said conduit registering with the eye of said fan chamber in the said second position, and means to raise said agitator out of contact with a supporting surface upon the movement of said valve to said second position.

9. In a suction cleaner, the combination of a nozzle, a fan chamber having an opening thereto, a motor driven fan in said fan chamber, an air passageway connecting said nozzle to the opening to said fan chamber, and a converter valve comprising a pivoted side wall section of said passageway adapted to be swung toward and from said opening to said fan chamber from a position along one side thereof, a fixed plate extending over said opening to the fan chamber from one edge thereof and adapted to have abutting contact with said pivoted wall section to completely close said fan chamber from said passageway, and a conduit integral with said pivoted wall section and adapted to communicate with said passageway when the same is closed to said fan chamber.

10. The construction recited by the preceding claim characterized in that manually releasable means lock said converter in each of its positions.

11. The construction recited in the second preceding claim characterized in that said conduit is adapted to receive and seat a dusting tool hose and said valve is adapted to be pivoted by a force exerted therethrough.

12. In a suction cleaner, a nozzle, a fan chamber having an eye, an air passageway having converging side walls connecting said nozzle to said eye, one of said side walls being pivoted forwardly of said eye and movable across said passageway to seal said nozzle from said eye, a conduit carried by said wall and movable therewith into registry with said eye upon said wall being moved to its nozzle sealing position, and means to retain said wall in said positions.

13. In a suction cleaner, a nozzle, a fan chamber having an eye, an air passageway having top, bottom and side walls connecting said nozzle to said eye, one of said side walls being pivoted between said eye and said nozzle and movable to a second position in which it extends across said passageway and cooperates with the remaining walls of said passageway to seal said nozzle from said fan chamber eye, a conduit positioned adjacent said fan chamber, formed with an opening, and movable with said wall, the opening of said conduit being adapted to register with said eye with said wall moved to its nozzle sealing position.

14. In a suction cleaner, the combination of a casing including a nozzle, a fan chamber, and a passageway connecting said nozzle with said fan chamber, supporting wheels carried by said casing and adapted to be adjusted vertically to raise and lower said nozzle relative to the floor surface, a converter valve comprising a hinged side wall portion of said passageway adapted to be swung into and out of a position to close off the fan chamber from said passageway, a conduit integral with said converter valve and adapted to communicate with said fan chamber upon the

closure of said passageway therefrom, and co-acting members carried by said converter valve and said supporting wheels for adjusting the latter in a direction to elevate the nozzle in the movement of said converter valve to converting position.

15. In a suction cleaner, the combination of a wheeled casing including a nozzle, a fan chamber, and a passageway connecting said nozzle with said fan chamber, a support for the casing adapted to be adjusted vertically to raise and lower said nozzle relative to the floor surface, a converter valve consisting of a conduit carried by a section of the wall of said passageway hinged to swing into and out of a position to close said fan chamber from said passageway, and co-acting cam members carried by said converter valve and wheel support for adjusting the latter in a direction to elevate the nozzle in the movement of said converter valve into converting position and tension means acting on said wheel support to return the wheels to their normal position of adjustment with the movement of said converter valve out of converting position.

WILLIAM H. KITTO.