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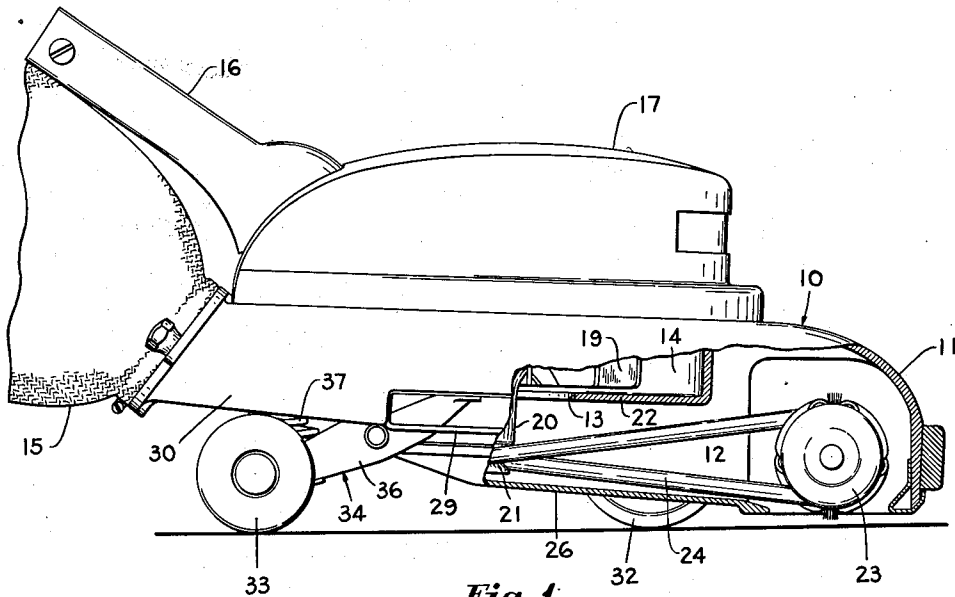
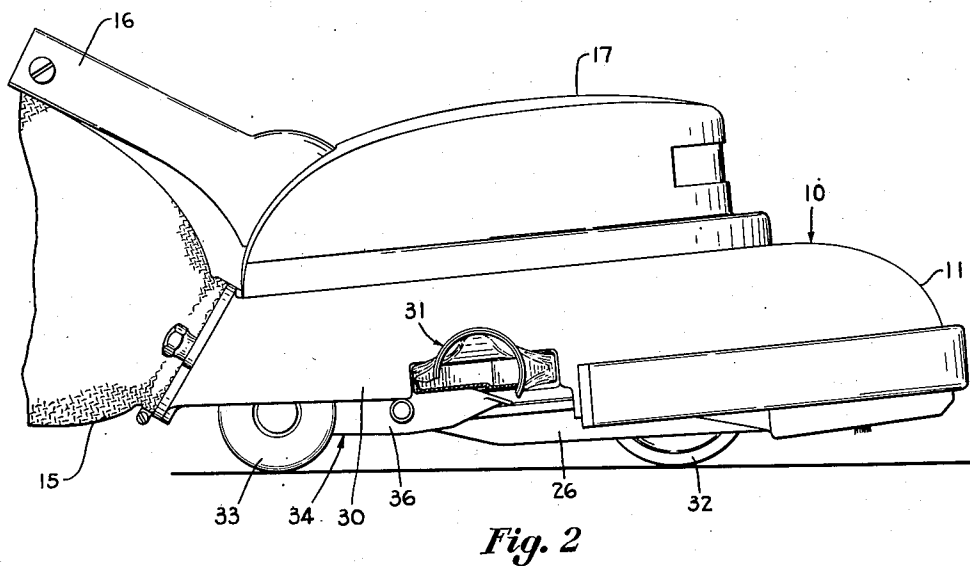
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2,450,846

CONVERTER FOR SUCTION CLEANERS

Filed May 12, 1943

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

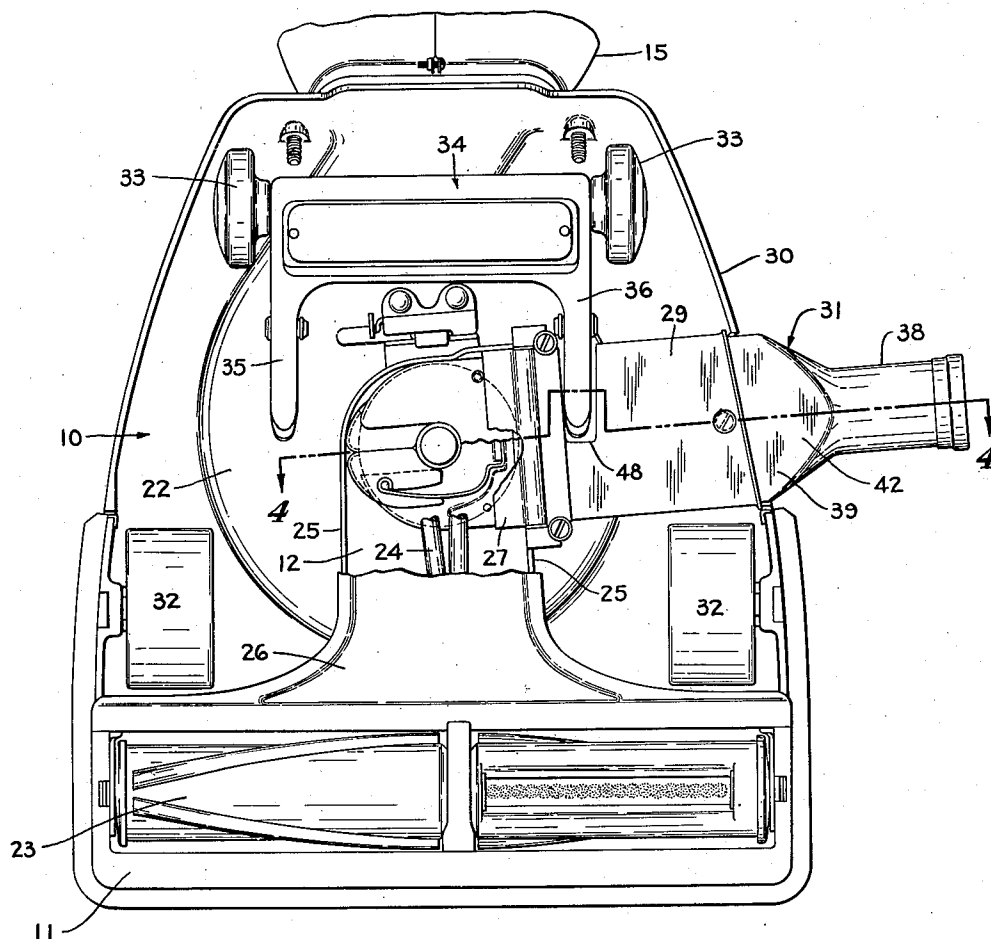


Fig. 3

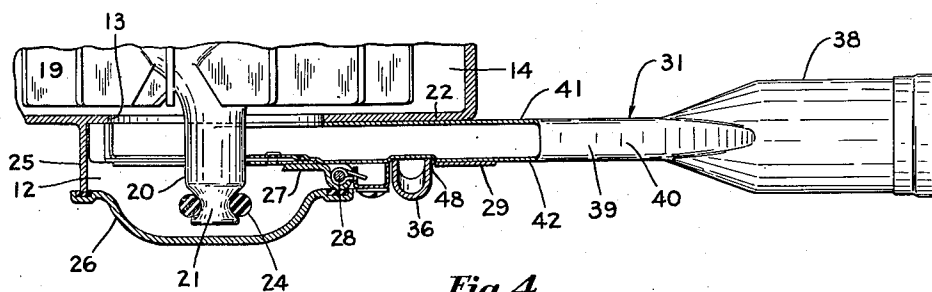


Fig. 4

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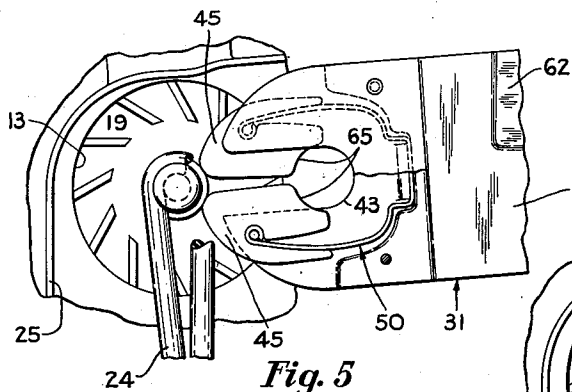


Fig. 5

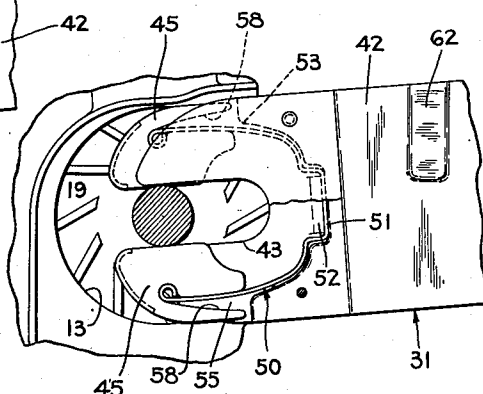


Fig. 6

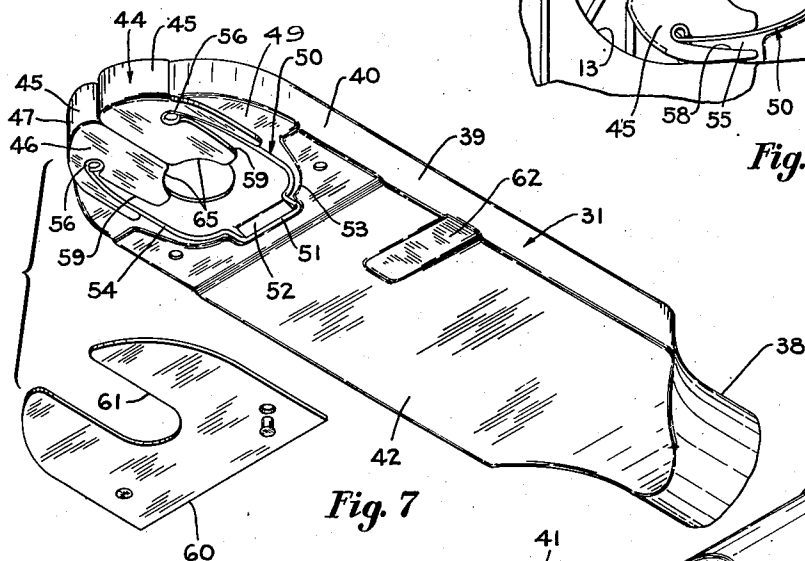


Fig. 7

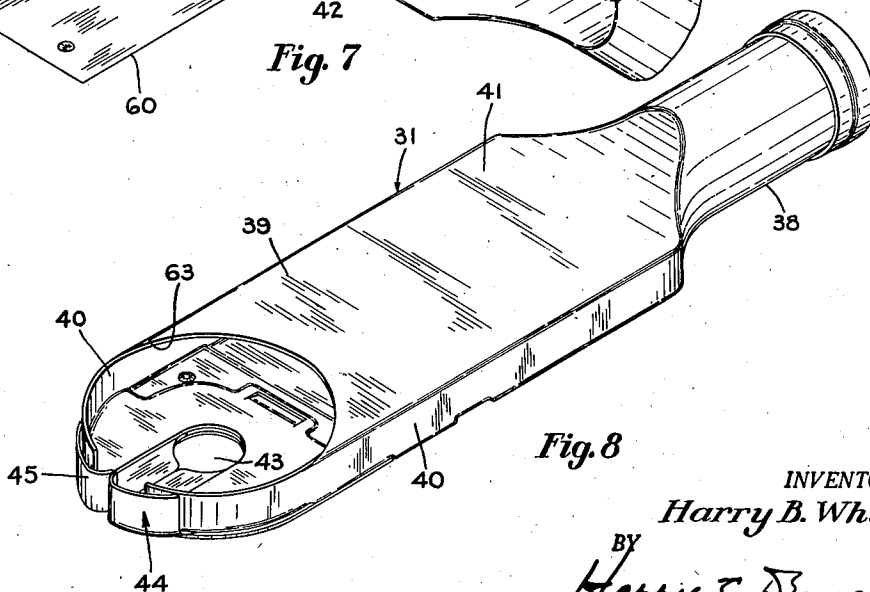


Fig. 8

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4 Sheets-Sheet 4

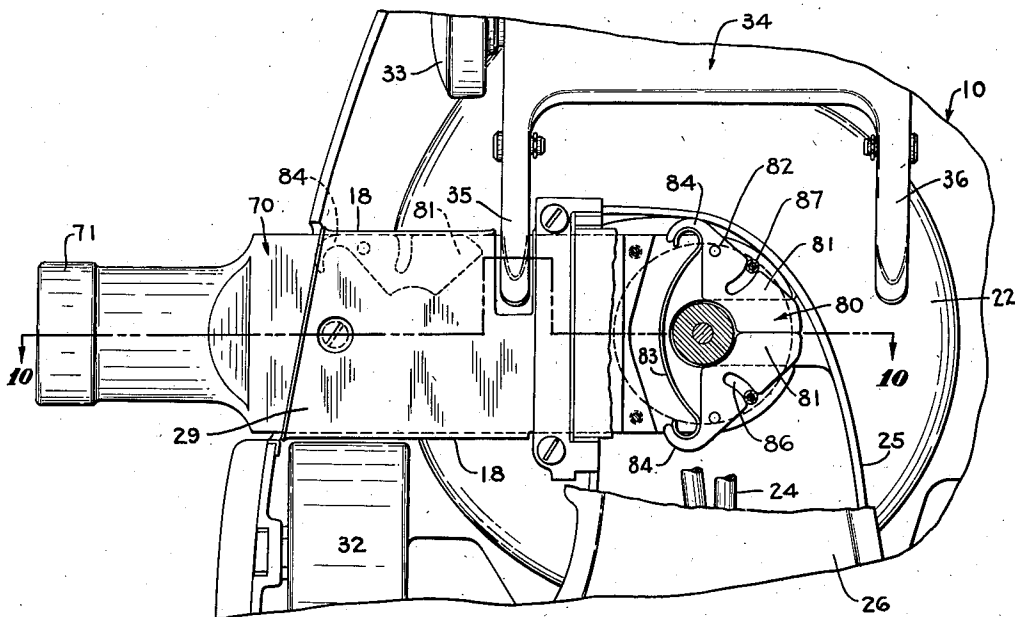


Fig. 9

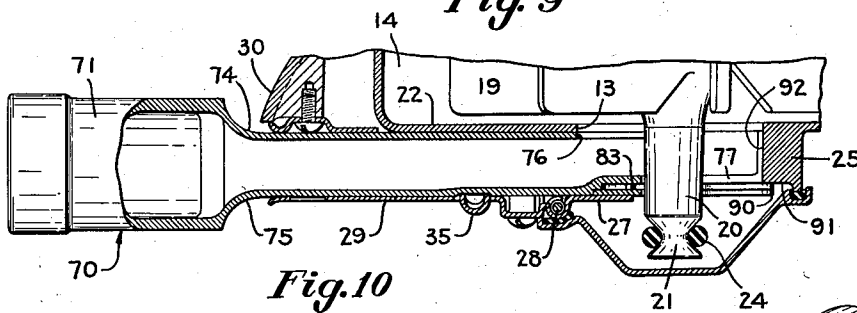
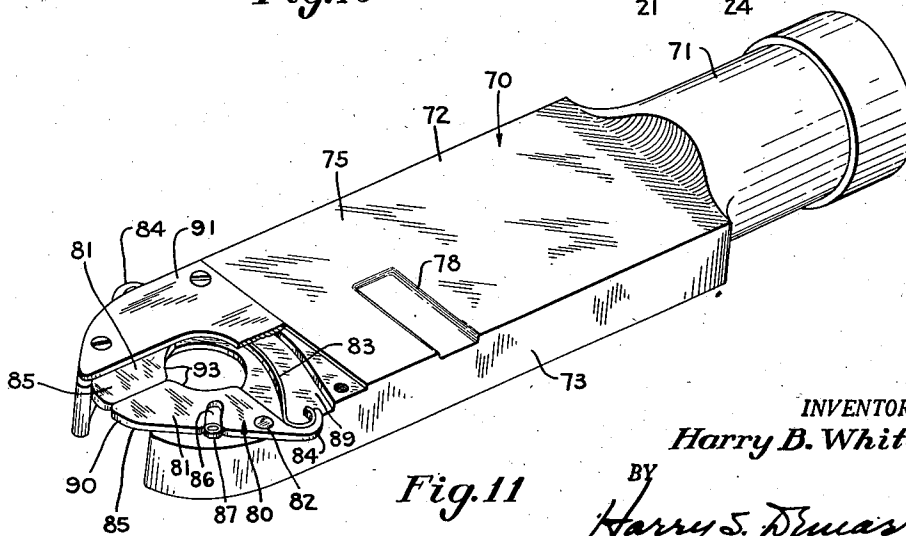


Fig. 10



UNITED STATES PATENT OFFICE

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CONVERTER FOR SUCTION CLEANERS

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6 Claims. (Cl. 15—16)

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The present invention relates to suction cleaners generally and more particularly to a new and improved dusting tool converter and its connection to the suction cleaner for converting the cleaner from an on-the-floor unit to an off-the-floor unit.

An object of the invention is to provide a new and improved suction cleaner. Another object is to provide a new and improved converter element for off-the-floor cleaning. A further object is to provide a converter element having valve means to enclose the motor shaft. Another object is to provide a converter element having valve means actuated by the motor shaft to seal the cleaner nozzle from the suction creating means. Another object is to provide a converter element having valve means actuated by the cleaner body to receive the motor shaft and seal the cleaner nozzle from the suction creating means. Other objects and advantages of the invention will be apparent from the following specification and drawings wherein:

Figure 1 is a side elevation, with certain parts broken away, of the suction cleaner in position for on-the-floor cleaning;

Figure 2 is a side elevation of the suction cleaner in position for off-the-floor cleaning;

Figure 3 is a bottom plan view of Figure 1 showing the converter element in position;

Figure 4 is a section along the line 4—4 of Figure 3;

Figure 5 is a bottom view of the converter element being initially inserted into contact with the motor shaft to move the converter valve toward open position;

Figure 6 is a bottom view showing the converter valve moved into open position;

Figure 7 is an exploded perspective view of the converter;

Figure 8 is a perspective view of the converter removed from the cleaner body;

Figure 9 is a bottom plan view with parts broken away, of another embodiment of the invention;

Figure 10 is a section along line 10—10 of Figure 9, and

Figure 11 is a perspective view of the converter element removed from the cleaner body.

The embodiment of the invention disclosed in Figures 1 to 8 comprises a suction cleaner having a body 10 provided with a nozzle 11 interiorly connected through a suction air passageway 12 with an eye 13 of a fan chamber 14 from which rearwardly extends an unshown exhaust passageway for conveying dirt-laden air into a dirt-filtering bag 15 removably attached at its lower end to the

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cleaner body 10 and at its upper end supported by a handle 16 pivotally mounted on the body. A housing 17 encloses an unshown motor positioned on the cleaner body above the fan chamber 14 and its shaft extends downwardly through the chamber 14 where it carries a fan 19, and provided at the lower end of the motor shaft is a pulley 20 in the suction air passageway 12, a belt engaging groove 21 on the pulley 20 being spaced below the bottom wall 22 of the fan chamber 14. An agitator 23 is rotatably mounted in the nozzle 11 and is driven by a power-transmitting belt 24 connected to the pulley groove 21.

The suction air-passageway 12 extends from the nozzle 11 to the fan eye 13 and is formed by a wall 25 depending from the cleaner body and a removable bottom plate 26. An opening is provided in the wall 25 of the suction air passageway 12 adjacent the fan eye 13 and is normally closed by a spring actuated valve 27 pivotally mounted along its lower edge by a pin 28 supported on a converter receiving casing 29. The converter receiving casing 29 is of rectangular cross-section and extends from the valve 27 transversely of the cleaner body 10 to the depending skirt 30 of the latter for reception of a dusting tool converter element 31 when the cleaner is converted to off-the-floor cleaning.

The cleaner body is supported on front and rear wheels 32 and 33, respectively, the front wheels 32 having a greater tread area than the rear wheels to maintain the nozzle 11 in proper adjustment with the surface being cleaned. The rear wheels 33 are rotatably supported on a bracket 34 pivotally attached to the cleaner body 10 and is provided with forwardly extending arms 35 and 36 which normally are urged by a spring 37 to abut the fan chamber bottom wall 22 for maintaining the cleaner nozzle 11 in its proper range of adjustment for on-the-floor cleaning. The arm 36 of the wheel supporting bracket projects through an opening 48 in the converter receiving casing 29 to act as a barrier to prevent insertion of the converter element 31 into the suction air passageway unless the nozzle 11 is raised off the surface into position for off-the-floor cleaning.

The converter element 31 which converts the cleaner for off-the-floor cleaning comprises a hollow body having at one end a tubular portion 38 to which is removably connected an unshown flexible hose provided at its opposite end with a suitable unshown cleaning tool for engagement with the surface to be cleaned. Adjacent the tubular portion 38 is a rectangular portion 39

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formed with opposed side walls 40, 40 a top wall 41 and a bottom wall 42. At the forward end of the converter body in the top wall 41 is an opening 63 of substantially the size of the fan eye 13, and a slot 43 is formed in the side wall 40 and the bottom wall 42 for the reception of that part of the pulley 20 which extends between the fan chamber bottom wall 22 and the belt 24.

The slot 43 is closed by a valve 44 having two cooperating sections 45, 45 each of which has a bottom wall 46 and a side wall 47 which form part of the bottom and side walls 42 and 40, respectively, of the converter element when the valve is closed. The valve sections 45 are movably supported on a depressed portion 49 of the converter bottom wall 42 by means of a substantially U-shaped spring 50 having its bight portion 51 supported between a projection 52 and a shoulder 53 at the edge of the depression 49, and the arms 54 of the spring 50 fit in elongated slots 55 in the valve sections 45 and have their ends 56 pivotally mounted in enlarged circular ends of the slots 55 of the valve sections 45. The slots 55 are larger at their marginal ends to accommodate the movement of the valve sections to open and closed positions. When the valve sections are closed, the spring arms 54 engage the marginal wall 58 of the slots 55 and the meeting edges of the valve sections are in a plane extending longitudinally through the center of the slot 43, and when the valve sections are in open position the spring arms 54 engage the marginal side walls 59 of the slots 55. Also, when the valve sections 45 are in open position, the spring arms 54 abut the shoulder 53. The spring 50 is enclosed between the converter bottom wall 42 and a removable plate 60 which is provided with a slot 61 in register with the slot 43. A depression 62 is provided in the converter wall 42 for receiving the barrier 36 to lock the converter element in proper position in the cleaner body.

In normal on-the-floor cleaning, the cleaner body is moved over the surface being cleaned by the handle 16 and the rotating agitator 23 dislodges the dirt from the surface covering. The suction creating fan draws the air and dirt through the nozzle and suction air passageway and discharges the dirt-laden air into the dirt bag 15.

To convert the cleaner for off-the-floor cleaning, pressure is exerted on the rear end of the motor housing 17 to raise the nozzle from the surface covering and cause the barrier 36 on the wheel bracket 34 to move downwardly away from the cleaner body and out of the converter receiving casing 29 whereby the converter element 31 may be inserted. When the converter element is in proper position and pressure removed from the motor housing, the barrier 36 moves into the recess 62 and holds the converter element in position and also maintains the agitator 23 out of engagement with the surface covering.

As the converter element 31 passes through the converter receiving casing 29, the valve sections about the valve 27 and pivot it downwardly into the suction air passageway 12. Thereafter the forward walls of the valve sections 45 contact the motor pulley 20 and due to such engagement and the continued movement of the converter element 31 into the suction air passageway 12, the valve sections 45 are separated against the force of the spring 50. After the valve sections 45 have passed the motor pulley 20, the spring 50 moves the valve sections together to close the valve about the pulley 20 and cut off communica-

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tion between the nozzle 11 and the fan chamber 14. In this position of the converter element 31, dirt-laden air is drawn through the unshown dusting tool and flexible hose, the converter element 31, fan eye 13, into the fan chamber 14 and is discharged by the fan 19 into the dirt bag 15.

The foregoing conversion for off-the-floor cleaning can be made, if desired, while the belt 24 is rotating the agitator 23, and these parts remain in operation while the converter element 31 is in use. In order to reconvert for on-the-floor cleaning, pressure is exerted on the rear end of the motor housing 17 to move the barrier 36 out of the depression 62 to unlock the converter element 31 which can then be removed from the converter receiving casing 29. Upon removing the converter element 31 the inner end 65 of the valve sections 45 engage the motor pulley 20 which separates the valve sections 45 to clear the motor pulley 20 and thereafter the spring 50 moves the valve sections 45 to their closed positions.

Another embodiment of the invention is disclosed in Figures 9 to 11 and comprises a converter element 70 which converts the cleaner for off-the-floor cleaning and is provided with a hollow body having at one end a tubular portion 71 to which is removably connected an unshown flexible hose provided at its opposite end with a suitable unshown cleaning tool for engagement with the surface to be cleaned. Adjacent the tubular portion 71 is a rectangular portion 72 formed with a side wall 73, a top wall 74 and a bottom wall 75. At the forward end of the converter body in the top wall 74 is an opening 76 of substantially the size of the fan eye 13, and a slot 77 is formed in the side wall 73 and the bottom wall 75 for the reception of that part of the pulley 20 which extends between the fan chamber bottom wall 22 and the belt 24. A depression 78 is provided in the converter bottom wall 75 for receiving the barrier 36 to lock the converter element 70 in proper position in the cleaner body.

The slot 77 is closed by a valve 80 having two cooperating sections 81, each of which is pivoted on a pin 82 mounted on the converter bottom wall 75, and the valve sections 81 are normally urged to slot-closing position by means of a leaf spring 83 having its opposite ends anchored in arcuate ends 84 at the rear of the valve sections 81. The valve sections 81 have a slot-closing portion 85 at their forward ends and meet in a vertical plane passing substantially through the longitudinal center of the converter element 70. Each of the valve sections 81 is provided with an arcuate marginal slot 86 which receives a pin 87 mounted on the converter bottom wall 75, the pins 87 functioning to limit the outward movement of the valve sections 81 as they move to open position with respect to the slot 77 in the converter element. The rear arcuate ends 84 of the valve sections project beyond the side wall 73 of the converter element when the valve sections 81 are closed. The valve sections 81 are arranged between a depressed area 89 of the converter bottom wall 75 and a removable plate 91 secured to the bottom wall.

The cleaner is placed in position for off-the-floor cleaning in the manner previously described by depressing the rear end of the cleaner body so that the converter element 70 may be inserted into the converter receiving casing 29. As the converter element 70 is inserted in the converter receiving casing 29, the projecting arcuate rear ends 84 of the valve sections 81 abut the

side walls 18 of the converter receiving casing 29 and cause the valve sections 81 to uncover the slot 77 by movement to the dotted position shown in Figure 9, to thereby completely expose the slot. As the forward end of the converter element enters into the suction air passageway 12, the valve sections 81 being in open position, the slot 77 receives the belt pulley 22, and as the projecting rear ends 84 of the valve sections enter the enlarged suction air passageway 12, the valve sections 81 are moved to slot closing position about the motor pulley 20 by the leaf spring 83.

When the converter is in proper position, the forward marginal edges 90 of the valve sections 81 seat beneath the lower defining edge 91 of the depending wall 25, and the forward end of the converter element 70 abuts the vertical surface 92 of the depending wall 25 to thereby form a seal against the passage of air therebetween. In this position of the converter element 70, dirt-laden air is drawn through the unshown dusting tool and flexible hose, the converter element 70, fan eye 13, into the fan chamber 14 and is discharged by the fan 19 into the dirt bag 15.

In order to reconvert for on-the-floor cleaning, pressure is exerted on the rear end of the motor housing 17 to remove the barrier 35 out of the depression 78 in the converter element 70 to thereby unlock the latter and permit its removal from the converter receiving casing 29. Upon removing the converter element 70, the motor pulley 20 contacts the arcuate defining edges 93 of the valve sections 81 to move the latter to open position, the diameter of the motor pulley 20 being such that the normally projecting ears 84 of the valve sections 81 are shifted so as not to project beyond the side wall 73 of the converter element. The extreme rear ends 84 of the valve sections 81 are arcuate so that upon engagement with the inner marginal edge of the converter receiving casing 29 they enter the latter and maintain the valve sections 81 in slot open position by contact with the vertical side wall 18 of the converter receiving casing 29. When the converter element 70 is completely removed from the converter receiving casing 29, the spring 83 moves the valve sections 81 to slot-closing position.

I claim:

1. In a suction cleaner, a cleaner body having a nozzle, a fan chamber having a fan eye, a suction air passageway between said nozzle and fan eye, a fan in said fan chamber, a shaft extending through said fan eye into said air passageway, a motor for driving said fan and shaft, means defining a port in said air passageway adjacent said fan eye for receiving a converter element, a converter element having a slot passing transversely of said shaft, and a valve forming side and bottom walls of said converter element for enclosing said shaft upon insertion of said converter element to seal said nozzle from said fan chamber, means on said valve engageable with said shaft to open said valve for passage of said converter transversely of said shaft, and means connected with said valve for thereafter closing said valve about said shaft.

2. A dusting tool converter for suction cleaners having a nozzle, a fan chamber having a fan eye, a suction air passageway between said nozzle and fan eye and having a port adjacent said fan eye, a motor for driving a suction creating fan in said fan chamber and driving a shaft extending through said fan eye into said air passageway,

comprising a conduit adapted to be inserted through the port into the air passageway in register with the fan eye, said conduit having a slot to receive the shaft, a valve on said conduit forming side and bottom walls of said converter to enclose the shaft and close said slot to seal said nozzle from said fan chamber, means on said valve engageable with the shaft to open said valve for passage of said converter transversely of the shaft, and means connected with said valve for thereafter closing said valve about the shaft.

3. In a suction cleaner, a cleaner body having a nozzle, suction creating means, a suction air passageway between said nozzle and suction creating means, power means for driving said suction creating means extending into said air passageway, means forming a port in said passageway for receiving a converter element, a converter element insertable in said port into said passageway, means forming a slot in said converter element for receiving said power means, and a valve movably mounted on said converter element to enclose said power means and close said slot, and means engageable with said cleaner during insertion of said converter to move said valve to open position to receive said power means, and resilient means to close said valve to seal said nozzle from said suction creating means and connect the latter to said converter element.

4. In a suction cleaner, a cleaner body having a nozzle, suction creating means, an air passageway between said nozzle and suction creating means, power means for driving said suction creating means and extending into said air passageway, a converter casing connected to said air passageway, a converter element insertable in said casing, means forming a slot in said converter element for receiving said power means, and a valve movably mounted on said converter element to enclose said power means and close said slot, means engageable with said casing to open said valve to receive said power means, and means connected with said valve to close said valve to seal said nozzle from said suction creating means and connect the latter to said converter element.

5. A dusting tool converter for suction cleaners having a nozzle, suction creating means, an air passageway between said nozzle and suction creating means, power means for driving said suction creating means and extending into said air passageway, and a casing connected to said air passageway, comprising a conduit adapted to be inserted in said casing, said conduit having a slot for receiving said power means, a valve movably mounted on said conduit to enclose said power means and close said slot, said converter having means engageable with said casing to open said valve to receive said power means, and means to close said valve to seal said nozzle from said suction creating means and connect the latter to said converter.

6. A dusting tool converter for suction cleaners having an air passageway connecting a nozzle and suction creating means, an air passageway having a port, and drive means in the air passageway, said converter comprising a conduit adapted to be inserted through the port into the air passageway, said converter having an opening to receive the drive means, a valve movably mounted on said conduit to enclose said drive means and close said opening to seal the nozzle from the suction creating means, said converter having means on said valve engageable with the suction clean-

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er as said converter is inserted through the port into the air passageway to thereby open said valve for the reception of the drive means, and resilient means operable to move said valve to enclose the drive means and close said opening after the latter has received the drive means. 5

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