Dec. 17, 1935. H. B. WHITE 2,024,260

SUCTION CLEANER

Filed Dec. 1, 1933 3 Sheets-Sheet 1

Fig. 1

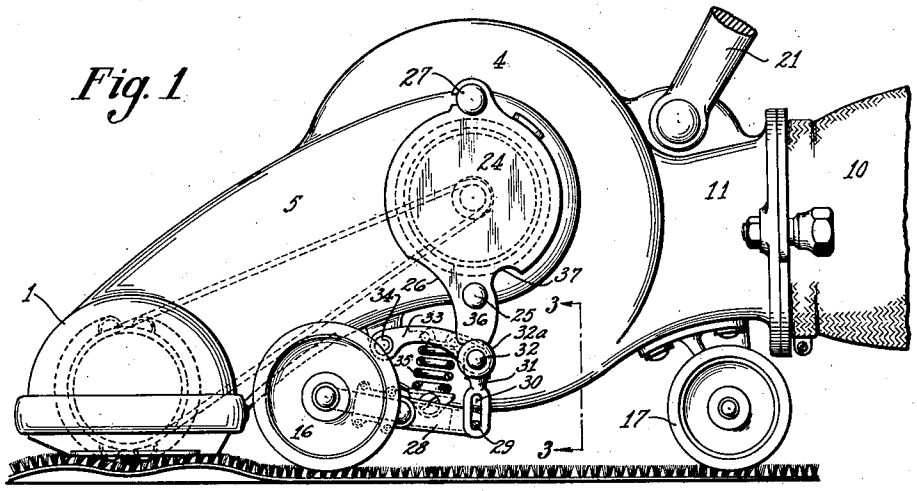


Fig. 3

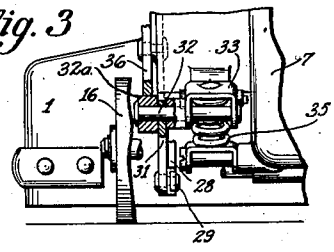


Fig. 2

INVENTOR

Harry B. White

BY

Harry S. Duncan

ATTORNEY

Dec. 17, 1935. H. B. WHITE 2,024,260

SUCTION CLEANER

Filed Dec. 1, 1933 3 Sheets-Sheet 2

Fig. 4

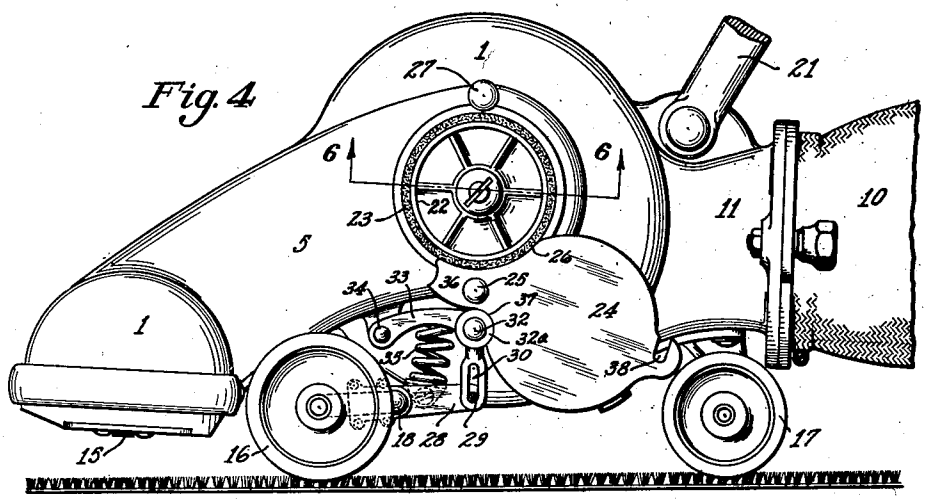


Fig. 5

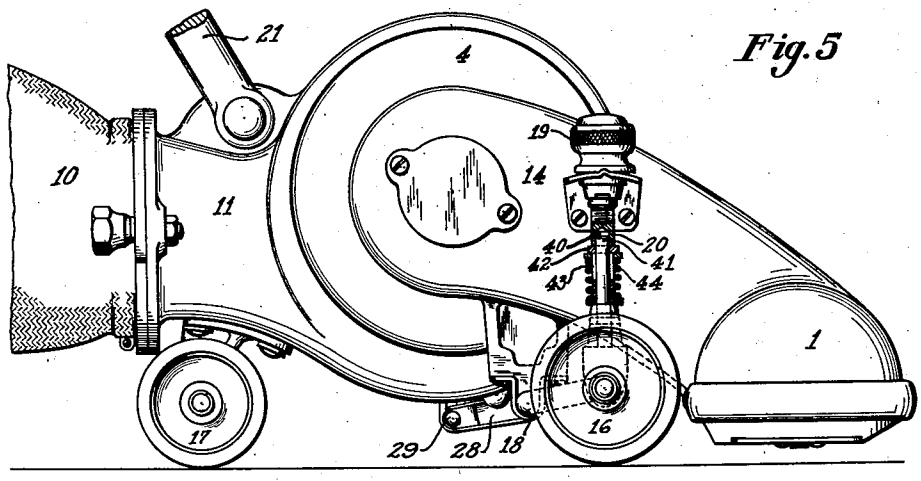


Fig. 6

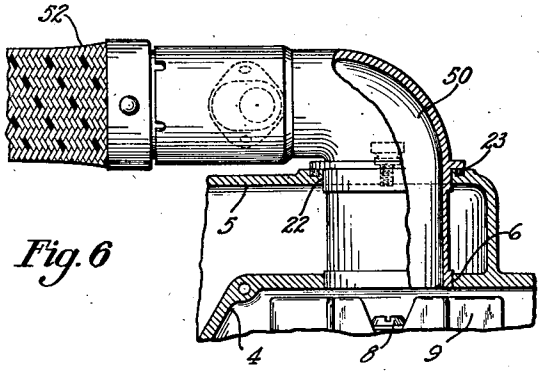
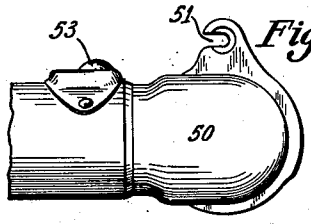


Fig. 7



INVENTOR

Harry B. White

Harry S. Duncan

ATTORNEY

Dec. 17, 1935. H. B. WHITE 2,024,260

SUCTION CLEANER

Filed Dec. 1, 1933 3 Sheets-Sheet 3

Fig. 8

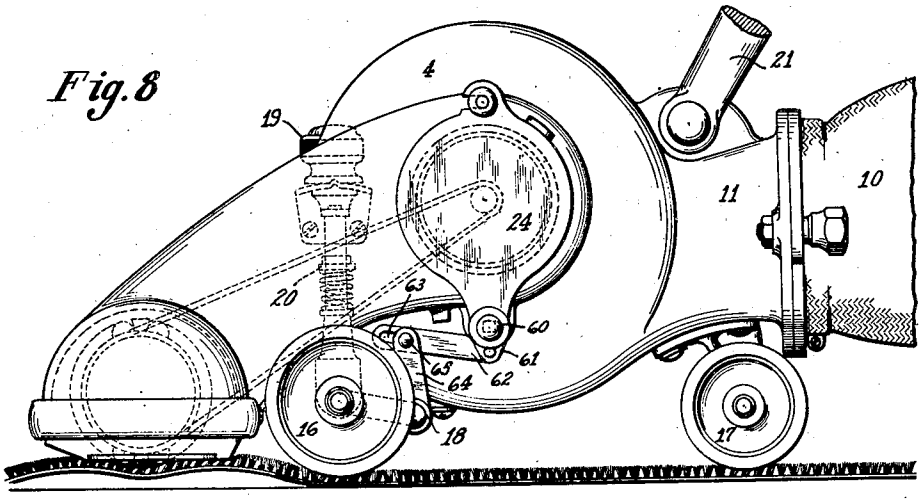


Fig. 9

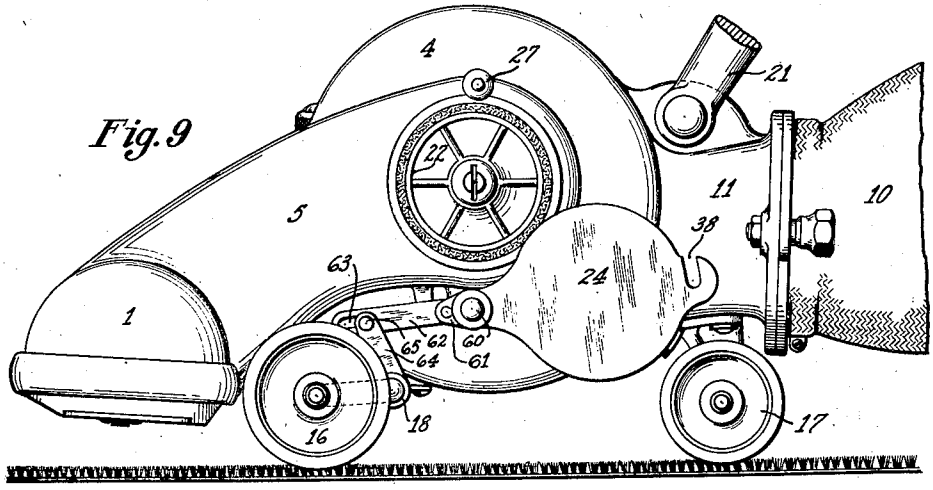
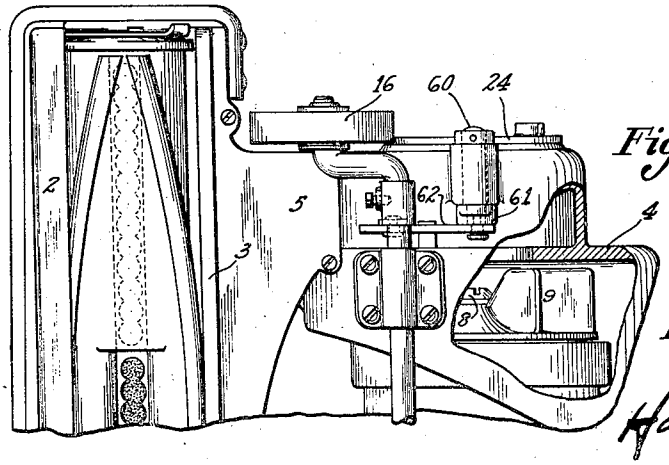


Fig. 10



INVENTOR

Harry B. White

Harry S. Bruarse

ATTORNEY

Patented Dec. 17, 1935

2,024,260

UNITED STATES PATENT OFFICE

2,024,260

SUCTION CLEANER

Harry B. White, Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio, a corporation of Ohio

Application December 1, 1933, Serial No. 700,385

13 Claims. (Cl. 15—9)

The present invention relates to suction cleaners in general, and particularly to new and novel improvements in suction cleaners to improve their operation in off-the-floor cleaning. More specifically the invention comprises the provision of means in the suction cleaner construction which function to lift the cleaner agitator from contact with the surface covering when the cleaner is used with the dusting tools.

It is an object of the present invention to provide a new and improved suction cleaner construction. It is a further object to provide a suction cleaner in which the cleaner agitator is automatically raised from the surface covering undergoing cleaning when the machine is provided with dusting tools. Still another object is the provision of means in the suction cleaner construction which function to raise the cleaner agitator from the supporting surface when the air passageway cover plate is moved to permit the attachment of the dusting tool to the eye of the fan chamber. Still another object is the provision of means which raise the cleaner nozzle and agitator from the surface covering undergoing cleaning when the cover plate on the cleaner body is displaced to permit the attachment of the dusting tool unit. 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 the same reference characters refer to the same parts throughout:

Figure 1 is a side view of a modern suction cleaner embodying the present invention;

Figure 2 is a bottom view of the cleaner shown in Figure 1 with certain parts of the cleaner body broken away;

Figure 3 is a view looking in the direction of the arrows upon the line 3—3 in Figure 1;

Figure 4 is a view of the cleaner shown in Figure 1 with the cover plate displaced to permit the attachment of the dusting tool unit and with the cleaner nozzle and agitator raised from the surface covering undergoing cleaning;

Figure 5 is a view of the opposite side of the cleaner shown in Figure 1;

Figure 6 is a section upon the line 6—6 of Figure 4, but with the dusting tool unit attached;

Figure 7 is a side elevation of the converter, or cleaner end, of the dusting tool unit;

Figure 8 is a side view of a second preferred embodiment of the invention;

Figure 9 is a view similar to Figure 8, but with the cover plate positioned to permit the attachment of dusting tools;

Figure 10 is a partial bottom view of the cleaner shown in Figures 8 and 9 with certain parts of the body broken away.

The modern efficient suction cleaner includes suction-creating means to draw cleaning air over and through the surface-covering undergoing cleaning, and also agitating means to dislocate the embedded foreign matter from the covering that it may be carried away by the moving air. The cleaner is also designed to permit the attachment of a dusting tool unit which enables the suction created by the machine to be effective at a point spaced therefrom in order that drapes, curtains etc. may be cleaned without the necessity of lifting of the machine itself. When used with dusting tools the machine proper remains in one position upon the surface covering for an indefinite period. It is undesirable both from the noise and wear standpoints, that the agitating means act upon a single point of the surface covering for an unlimited period of time regardless of the type of the agitator, whether it be very soft bristles or rigid beating elements. In the cleaner constructed in accordance with the present invention the alteration of the characteristics of the machine in changing it from an on-the-floor cleaner to an off-the-floor cleaner includes the raising of the agitator from its contact with the surface covering. The manner in which this is accomplished will hereinafter be fully disclosed.

Referring again to the drawings, and Figures 1 to 7 inclusive in particular, a modern suction cleaner embodying the present invention is disclosed. The cleaner is seen to comprise a nozzle 1 including front and rear surface-contacting lips 2 and 3, respectively. Nozzle 1 is connected to a fan chamber 4 by means of an air passageway 5 which leads from one side of the nozzle directly to the eye 6 of the chamber. A driving motor 7 is positioned immediately adjacent the fan chamber 4, the shaft 8 being extended therein and carrying the fan 9. The fan 9 functions in the operation of the machine to draw cleaning air through the nozzle 1 and air passageway 5, through the fan chamber 4, and exhausts it into the dust bag 10 which is removably attached to the cleaner exhaust outlet 11.

The end of the motor shaft 8 spaced from the fan chamber 4 is formed as a pulley 12 and is positioned within a passageway or channel 13 which opens into the nozzle 1. A belt 14 extends through this passageway into the nozzle where it surrounds the rotary agitator 15. Agitator 15 is of a well known design and includes brushes and rigid beating elements mounted upon a large diameter cylindrical body. Upon the rotation of the motor shaft, in driving the suction-creating fan 9, the agitator 15 is rotated by the belt 14.

The machine is movably mounted upon spaced pairs of wheels 16, 16 and 17, 17. The wheels 16, 16 are mounted nearest the nozzle 1 and are known as the front wheels, the wheels 17, 17 are

mounted at the rear of the machine being known as the rear wheels. In order that the height of the nozzle and agitator above the surface covering may be changed to adapt the machine for various types of surface coverings, the front wheels 16, 16 are mounted upon a crank shaft 18, and there is provided a nut member 19 at one end of the shaft which, when rotated, vertically adjusts an arm 20 connected to the shaft 18. Arm 20 comprises a plurality of elements, related in a manner which will hereinafter be fully described, which function as a single rigid unit in the adjustment of the wheels by the nut 19. Also, as in the usual cleaner construction, a pivoted handle 21 is provided by which the operator may exert a propelling force.

In order to make possible the use of the cleaner for the cleaning of drapes, curtains etc. the air passageway 5 is provided with a circular opening 22 opposite the opening or eye 6 of the fan chamber 4. This opening is surrounded by a gasket or seal 23 which is embedded in the wall of the passageway.

In the usual relationship of the machine for its on-the-floor cleaning the opening 22 is closed by a member 24 commonly known as a cover plate. Cover plate 24 is mounted upon a pin 25 below opening 22 and is adapted to be pivoted thereabout so that it either overlies the opening 22 sealing it, with the aid of the seal 23, or is positioned at the side of the opening, as illustrated in Figure 4. The edge of the plate is curved at 26 to prevent any overlapping in this open position. A manually adjustable locking screw 27 is positioned above the opening 22 and is adapted to cooperate with a seat 38 formed in the plate 24 to lock that member in place.

A rigid arm 28 is connected to the crank shaft 18 at the cover plate side of the motor and extends to a point below that plate. The end of arm 28 is provided with a pin 29 which slidingly seats within a slot 30 formed in a vertical link 31 which is pivoted at its upper end on a pin 32 carried by an arm 33. Arm 33 is itself pivotally mounted by a pin 34 to the casing of the machine and is spring-pressed upwardly at all times by a coil spring 35. The upward movement of arm 33 is restrained by the downwardly extended shoulder or arm 36 formed on the cover plate 24 which contacts the roller 32a carried by the pin 32 when the cover plate is in the opening-closing position.

With the cover plate 24 positioned as shown in Figure 1 the machine is arranged for on-the-floor cleaning and the seat formed on the shoulder 36 holds the pivoted arm 33 in its position. In this position the spring 35 is compressed and the supporting wheels 16, 16 are permitted free angular adjustment under the control of the adjusting means 19, through an arc determined by the vertical movement of the pin 29 in the slot 30. When the cover plate is pivoted to uncover opening 22, as shown in Figure 4, the roller 32a carried by pin 32 seats within a recess or seat 37 formed in the side of plate 24. Seat 37 is closer to the pivot point 25 of the plate 24 than was the seat formed on the shoulder 36 with the plate in its first position and accordingly the arm 33 has pivoted upwardly under the force exerted by spring 35, as is clearly seen in Figure 4. This movement of the arm 33 under the force exerted by the spring 35 also results in the pivotal movement of rigid arm 28, upon the end of slot 30 contacting the pin 29. As the arm 28 is rigidly connected to the crank-shaft 18 the upward movement of its outer end causes the shaft to pivot thereby lowering the wheels 16, 16 which lifts the nozzle 1 and agitator 15 positioned therein.

This adjustment of the front supporting wheels is accomplished with no change in the manual adjusting means 19 as the vertical arm member 20 construction is formed of two slidable parts.

One of these parts, the upper, is an externally threaded, centrally slotted, hollow cylindrical member 40 which is enclosed at its upper end by the nut 19. The second part comprises a shaft 41 which extends slidingly within the hollow member 40, the relative sliding movement being determined by the pin 42 carried by the shaft, and the slot 43 formed in member 40. An encircling coil spring 44 extends between the pin 42 and a shoulder on the enclosing cylinder and urges shaft 41 into the cylinder. The cylinder 40 and shaft 41 function as a rigid unit in the operation of the machine and in the adjustment of the nut 19, the spring 44 being of such strength that it prevents the sliding of pin 42 downwardly in slot 43. The weight of the machine, in fact, assists the spring 44 when the machine rests on a supporting surface.

The spring 35 acting upon the pivoted arm 33, and in the open position of plate 24 directly upon the arm 28 carried by the crank shaft, is stronger than the spring 44. Upon the release of spring 35, by the pivoting of the cover plate to the open position, the crank shaft is pivoted downwardly and the pin 42 slides to the bottom of the slot 43 compressing the spring 44 and permitting relative movement between cylinder 40 and vertical arm 41 without adjustment of the nut member 19.

With the cover plate 24 pivoted to the open position the converter 50 of the dusting tool unit can be inserted thru the opening 22 to seat in the eye 6 of the fan chamber, as illustrated in Figure 6, a suitable seat or recess 51 being provided in a flange of the converter which is adapted to receive the locking nut member 27. The usual flexible dusting tool hose 52 is removably secured to the converter member 50 by means of an ordinary spring-pressed detent 53, and with the dusting tool connected to the machine the suction created by the fan 9 in the operation of the cleaner is effective at the end thereof where any suitable article-contacting nozzle can be provided.

Referring now to Figures 8 to 10 inclusive in particular, a second preferred embodiment of the invention is disclosed which differs from that first described only in the operation or adjustment of the nozzle height above the surface covering when the cover plate is pivoted to the open position. In the first described embodiment the pivoting of the cover plate permitted a force exerted by the coil spring 35 to lower the wheels. In the present embodiment the wheels are lowered by a force exerted by the operator when he manually pivots the cover plate, the coil spring of the first described embodiment being omitted.

In the present embodiment the cover plate 24 pivots upon a pin 60 which rotates as the plate pivots. Pin 60 carries a crank arm 61 at its opposite end and to this arm is pivoted a link 62 provided with a slot 63. A rigid arm 64 is carried by the crankshaft 18 and is provided with a pin 65 which slidingly seats in the slot 63 formed in link 62. Obviously the crankshaft 18 can be pivoted manually within a range determined by the length of the slot 63 without interference from the auxiliary adjustment mechanism. Upon the

pivoting of the cover plate to its open position the link 62 is moved forward, the end of slot 63 contacts pin 65, and the crankshaft is pivoted in a direction to lower the wheels. The manual adjusting mechanism is constructed as in the first embodiment and does not interfere with the adjustment described.

I claim:

1. In a suction cleaner of the type including a driven agitator, a nozzle, a fan chamber, and an air passageway therebetween provided with an opening adapted to receive a dusting tool converter; a removable cover plate for said opening, means supporting said agitator relative to a surface covering undergoing cleaning, means to adjust manually said supporting means to raise and lower said agitator relative to a surface covering undergoing cleaning, and additional means to control the position of said supporting means independent of said manually adjustable means and operable by movement of said cover plate.

2. In a suction cleaner of the type including an agitator, supporting means therefor, a nozzle, a fan chamber, and an air passageway between said nozzle and chamber and provided with an opening adapted to receive a dusting tool converter; means to adjust the height of said agitator above the surface covering undergoing cleaning including means movably mounting said supporting means relative to said agitator, a cover plate for said opening in said air passageway, and means connecting said mounting means to said cover plate to change the position thereof upon movement of said plate relative to said opening.

3. In a suction cleaner of the type including an agitator, a nozzle, a fan chamber, and an air passageway between said nozzle and chamber and provided with an opening adapted to receive a dusting tool converter; supporting means for said agitator, manually operable means to adjust the position of said supporting means relative to said agitator, and second adjusting means to raise and lower said supporting means relative to said agitator including a cover plate for the opening in said air passageway, characterized by the fact that the moving of said cover plate to open said opening results in the raising of said agitator relative to the surface covering undergoing cleaning and by the further fact that such adjustment of said agitator is accomplished without change in the setting of said manually operable means.

4. In a suction cleaner of the type including a driven agitator, a nozzle, a fan chamber, and an air passageway between said nozzle and chamber and provided with an opening adapted to receive a dusting tool; supporting wheels, means movably mounting said wheels relative to said agitator, a cover plate for said opening adapted to be moved relative thereto, and a system of levers between said mounting means and said plate to adjust the position of said wheels relative to said agitator upon the adjustment of said plate relative to said opening.

5. In a suction cleaner of the type including a driven agitator, a nozzle, a fan chamber, and an air passageway between said nozzle and chamber and provided with an opening adapted to receive a dusting tool; supporting wheels, means movably mounting said wheels relative to said agitator, spring means to lower said wheels, and a cover plate for said opening having means to restrict said spring means when in the closed position.

6. The construction defined by the preceding claim characterized by the fact that said cover plate permits limited movement of said spring means to lower said wheels when moved from its closed to its open position.

7. In a suction cleaner of the type including a driven agitator, suction-creating means, a main passageway connected to said means, and a secondary inlet adapted to receive dusting tools to be connected to said means; means normally closing said secondary inlet, means controlling the height of said agitator relative to the supporting surface, and means interconnecting said closing means and said height-controlling means to operate the latter to raise said agitator upon said closing means being moved to open position.

8. In a suction cleaner, a nozzle, air-moving means, an air passageway connecting said means to said nozzle, and a port adapted to receive dusting tools to be connected to said means; means normally closing said port, means controlling the height of said nozzle relative to the supporting surface, and means interconnecting said closing means and said height-controlling means to operate the latter to raise said nozzle upon said closing means being moved to open position.

9. In a suction cleaner, a nozzle, a fan chamber, an air passageway connecting said nozzle to said chamber and having a dusting tool opening at said chamber, movable closure means normally closing said opening, a driving motor positioned adjacent said chamber with its shaft extended therein, a fan on said shaft in said chamber, an agitator in said nozzle, power-transmitting means connecting said agitator to said motor shaft at a point outside said passageway, means to raise and lower said nozzle relative to a supporting surface, and means interconnecting said closure means and said means to raise and lower said nozzle to operate the latter to raise said nozzle upon said closure means being moved to open position.

10. In a suction cleaner of the type including a driven agitator, suction-creating means, a main passageway connected to said means, and a secondary inlet adapted to receive dusting tools to be connected to said means; a pivoted closure plate normally closing said secondary inlet, means supporting said agitator relative to the supporting surface including a pivoted crank shaft and wheels, spring means arranged to pivot said crank shaft to lower said wheels, and cam means on said closure plate to overcome said spring with said plate in its closed position and to release said spring with said plate in its open position.

11. In a suction cleaner of the type including a driven agitator, suction-creating means, a main passageway connected to said means, and a secondary inlet adapted to receive dusting tools to be connected to said means; a pivoted closure plate normally closing said secondary inlet, means supporting said agitator relative to the supporting surface including a pivoted crank shaft and wheels, and a system of levers connecting said plate to said crank shaft to lower said wheels upon movement of said plate to its open position.

12. The structure set forth in the preceding claim characterized in that said crank shaft is pivotable within certain limits with said closure plate in its closed position.

13. The structure set forth in the second preceding claim characterized in that said crank shaft is pivotable within certain limits with said closure plate in its closed position and in that manually operable means are provided to pivot said crank shaft within those limits.

HARRY B. WHITE.