Dec. 17, 1935. H. B. WHITE 2,024,261

SUCTION CLEANER

Filed Dec. 1, 1933 3 Sheets-Sheet 1

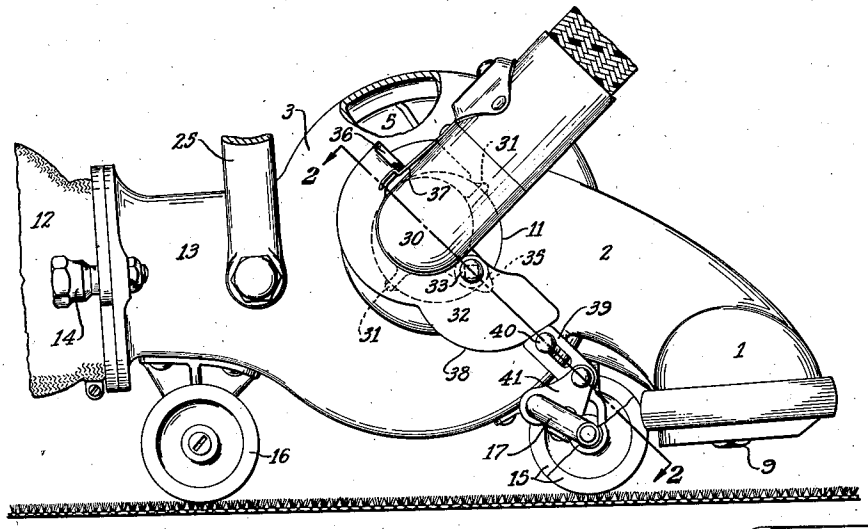


Fig. 1

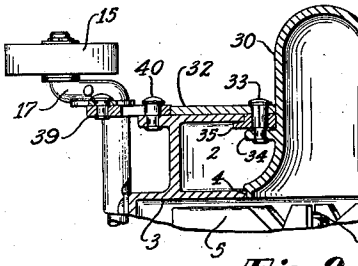


Fig. 2

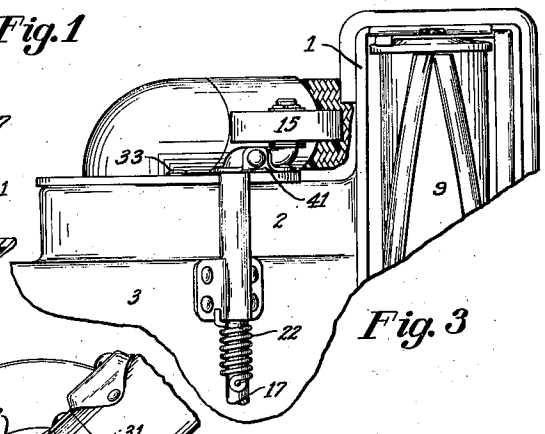


Fig. 3

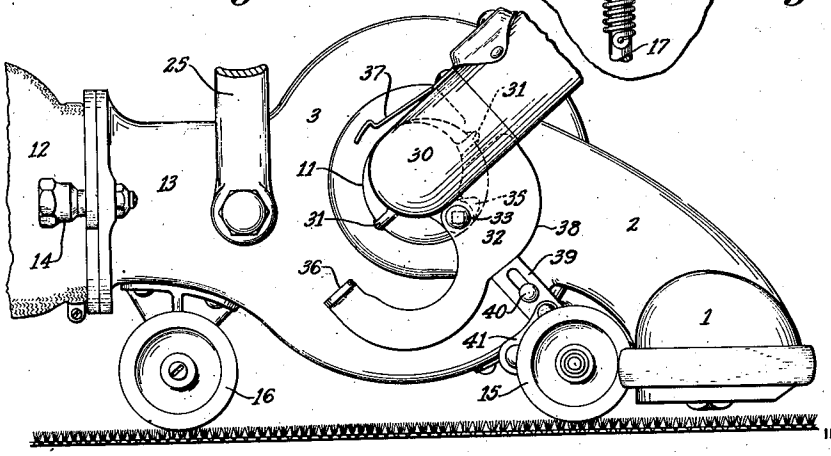


Fig. 4

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SUCTION CLEANER

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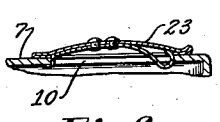


Fig. 6

Fig. 5

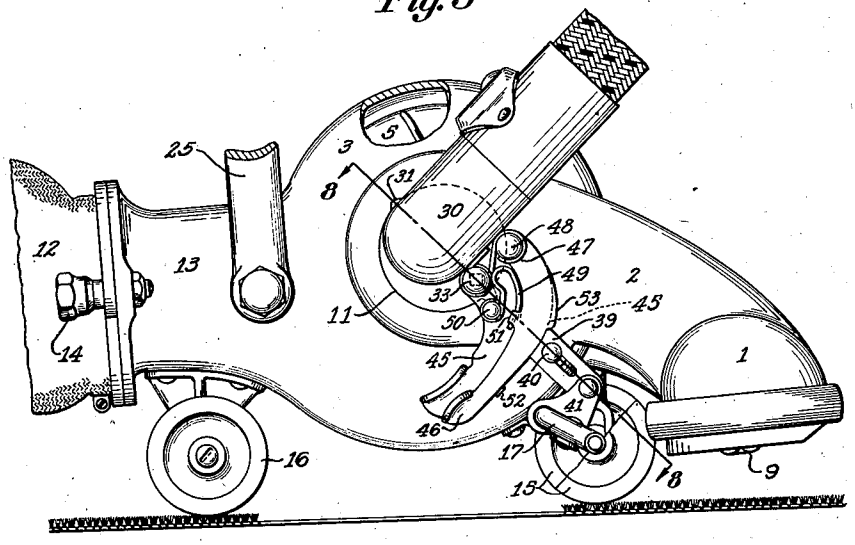


Fig. 7

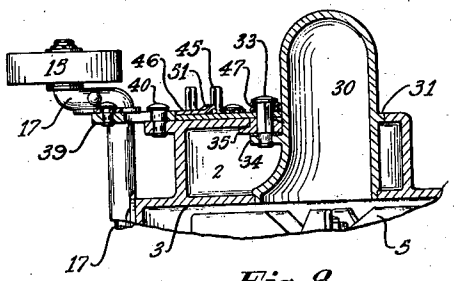


Fig. 8

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SUCTION CLEANER

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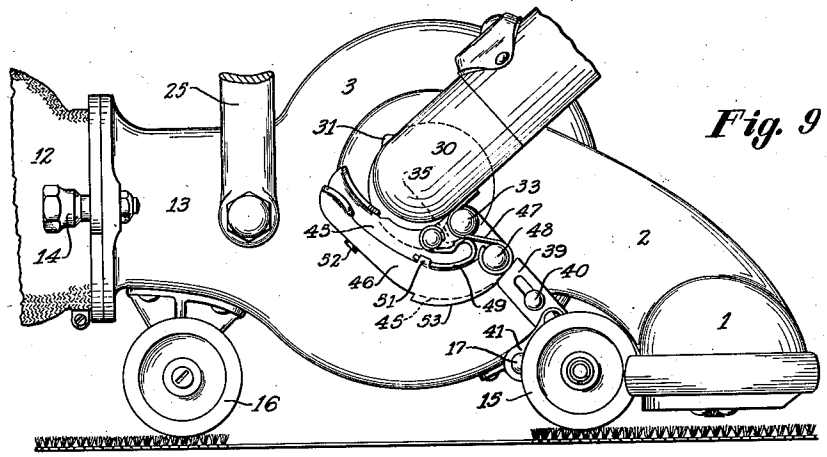


Fig. 9

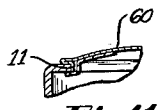


Fig.11



Fig.12

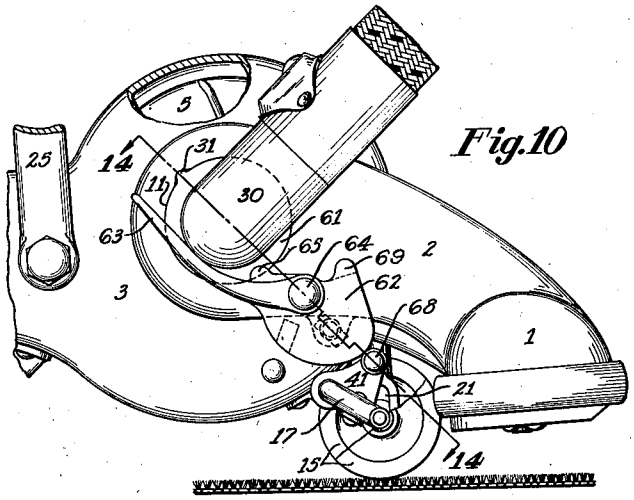


Fig.10

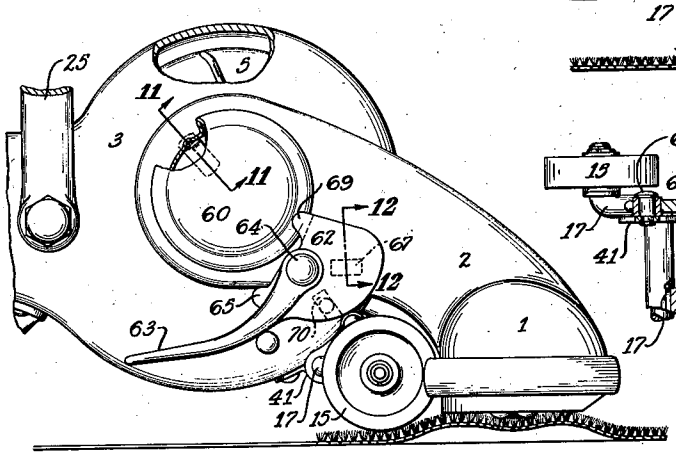


Fig.13

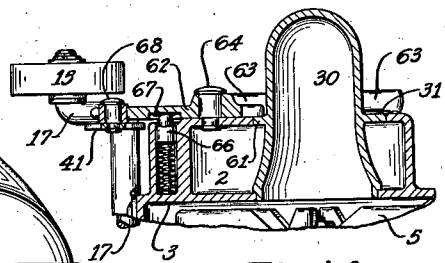


Fig.14

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UNITED STATES PATENT OFFICE

2,024,261

SUCTION CLEANER

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Application December 1, 1933, Serial No. 700,387

13 Claims. (Cl. 15—9)

The present invention relates to suction cleaners in general and particularly to new and novel improvements in a combined suction cleaner and dusting tools. More specifically the invention comprises the provision of means in a suction cleaner which function, during the period of dusting tool use, to prevent contact of the driven agitator with the surface covering.

It is an object of the invention to provide a new and improved suction cleaner. A further object is the provision of new and novel improvements in the combination of a suction cleaner and dusting tools. A still further object is the provision of means in a suction cleaner which function to eliminate agitator contact with the surface covering during the period of dusting tool use. A still further object is the provision of means which raise the nozzle and the agitator from contact with the surface covering during the period of dusting tool use. Still another object is the provision of means which, in locking the dusting tool converter to the suction cleaner, automatically position the surface covering agitator so that contact with the covering is impossible. 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 character refers to like parts throughout:

Figure 1 is a side elevation of a suction cleaner constructed in accordance with the present invention with the dusting tool locked in place;

Figure 2 is a partial section upon the line 2—2 of Figure 1;

Figure 3 is a partial bottom view of the cleaner shown in Figure 1;

Figure 4 is a side view of the cleaner with the dusting tool unlocked and ready for removal;

Figure 5 is a side elevation of the opposite side of the cleaner;

Figure 6 is a section upon the line 6—6 of Figure 5 showing the removable cover plate for the motor driven pulley;

Figure 7 is a side elevation of a second modification of the present invention with the dusting tool converter attached to the machine and locked in place thereon;

Figure 8 is a section upon the line 8—8 of Figure 7;

Figure 9 is a side view of the second embodiment with the locking means for dusting tool converter positioned so that the converter may be removed from the cleaner proper;

Figure 10 is a partial side view of a third embodiment of the present invention, the locking means securing the converter in place upon the cleaner;

Figure 11 is a partial section upon the line 11—11 of Figure 13;

Figure 12 is a section upon the line 12—12 of Figure 13;

Figure 13 is a partial view of the same side of the cleaner shown in Figure 10 but with the dusting tool converter removed and the cover plate locked in place by the locking means;

Figure 14 is a section upon the line 14—14 of Figure 10.

The use of dusting tools with a suction cleaner is well known in the suction cleaner art for the purpose of increasing the range of usefulness of the cleaner. The more efficient surface covering cleaners embody agitating means which impart a positive vibration to the covering and assist the cleaning air in the cleaning function. With the dusting tools attached to the cleaner proper the agitating means usually continue to function and it becomes desirable to provide means to remove the agitator from contact with the surface covering.

In the suction cleaner constructed in accordance with the present invention the cleaner proper is a floor-cleaning unit which is adapted to receive and seat the converter of a dusting tool unit. Means are provided which lock the dusting tool converter in its place on the cleaner and these means are so constructed that their adjustment to lock the converter in place automatically functions to raise the agitator from the surface covering. In the present specification three preferred embodiments of this invention are disclosed.

Referring now to Figures 1 to 6, inclusive, the first preferred embodiment of the present invention is disclosed. The cleaner proper is seen to comprise a nozzle 1 which is interiorly connected by a passageway 2 to the eye 4 of the fan chamber 3. A rotary fan 5 is mounted upon the extended end of the motor shaft 6 within the chamber. The cleaner motor is arranged with its axis parallel to the nozzle 1, in a well known manner, with the opposite end of the shaft 6 extended into a passageway 7 where it is formed as a pulley and is connected, by means of a belt 8, to the rotary agitator 9 which is rotatably mounted within the nozzle 1. Agitator 9 is so positioned that it is adapted to contact the surface covering undergoing cleaning in the on-the-floor operation of the machine.

As is clearly seen in Figure 5 the channel 7 is normally closed opposite the motor shaft 6, by a removable plate 23 which is provided with spring leaf locking means of a common and well known type. The relationship is such that the removal of the cover plate permits of the adjustment of the belt on the shaft. In the functioning of the machine upon the surface covering as an on-the-floor cleaner, the opening 11, formed in the air channel or passageway 2 immediately opposite the eye 4 of the fan chamber, is similarly closed by a removable cover plate.

A dust bag 12 is removably secured to the exhaust outlet 13 of the fan chamber by means of manually adjustable locking nut 14, 14 in a common and well known manner.

The machine is movably supported upon front wheels 15, 15 and rear wheels 16, 16, the front wheels being pivotally mounted upon a crankshaft 17 which extends across the machine immediately behind nozzle 1. A manually rotatable nut member 18, carried by a bracket 19 on channel 7, encloses a threaded vertical shaft 20 at its upper end. The lower end of shaft 20 is slotted and slidingly encloses an offset arm of the shaft 17. The crankshaft is normally maintained in the upper position permitted by the slot 21 in the shaft 20 through being spring-pressed upwardly by means of a spring 22. It is clear that the crankshaft may be pivoted within an angular range determined by the length of the slot 21 without change in the height-adjusting means, it being necessary only to overcome the force exerted by the spring 22.

The construction of the cleaner proper is completed by a pivoted handle 25 through which the operator can exert a propelling force to move the cleaner over the surface covering.

It being desired to convert the cleaner into a unit adapted for off-the-floor cleaning the operator removes the cover plate from the opening 11 in passageway 2 corresponding to the plate 23 over opening 10 in the passageway 7. Through the opening 11 the end of the dusting tool converter 30 is inserted into seating relationship with the eye 4 of the fan chamber 3. The converter member 30 is properly alined relative to the machine through being provided with radially extending shoulders 31, 31 which seat within similarly shaped recesses formed in the opening 11.

Converter 30 is provided with a pivoted locking member or plate 32 carried upon a pin 33 rotatably mounted in an integral shoulder 34 on the converter. The pin 33 is irregular in cross section in the plate 32 and rotates as the plate is pivoted. A lock nut 35 with a cam shoulder is positioned on the pin 33 between the plate 32 and the shoulder 34 and rotates with the pin. With the plate 32 pivoted to the locking position shown in Figure 1, and in which it is retained by the leaf spring 37, the shoulder of nut 35 is forced against the inner edge of the opening 11 and the converter is urged into seating relationship with the eye 4 of the fan chamber. With the plate 32 pivoted to the unlocked position, however, the entire nut 35 lies within the confines of opening 11 and out of contact therewith and the converter member can be withdrawn.

In moving the locking plate 32 from its initial position, that shown in Figure 4, to the locking position, that shown in Figure 2, a function in addition to locking function is accomplished. This comprises raising the cleaner nozzle, and the agitator contained therein, upwardly from the surface covering and out of contact therewith; that is, from the position shown in Figure 4 to the position shown in Figure 1. In order to accomplish this function the outer edge of the locking plate 32 is shaped as a cam, as indicated at 38. To cooperate with this cam there is provided a contact element or slide 39 which slides upon a pin 40 carried by the casing. The opposite end of the arm 39 is pivotally carried by a bracket 41 which is itself fixedly secured to the offset portion of the crankshaft 17. The relationship is such that as the locking plate 32 is pivoted from its initial position, shown in Figure 4, to the locking position, shown in Figure 1, the cam face 38 forces the contact member 39 downwardly resulting in the downward pivotal movement of the crankshaft. This, of course, results in the raising of the nozzle and the agitator. The pivotal movement of the crankshaft without adjustment of the manual adjusting means 18 is possible as the crankshaft slides within the slot 21 in the vertical adjusting arm 20.

Referring now to Figures 7 to 9, inclusive, a second preferred embodiment of the invention is disclosed in which the suction cleaner proper is the same as that described in the first embodiment; the difference between the two constructions residing in the locking construction for the converter 30. In this variation the locking means comprise two pivoted plates, 45 and 46. Plate 45 is mounted on the pin 33, as was plate 32 in the first embodiment, and the locking nut 35, pivots therewith. A coil spring 47 encircles the pin 33 outside the plate with one of its ends extended along the exterior of the converter member 30 and with its other end enclosing a pin 48. The second plate 46 is pivotally mounted flat upon the plate 45 by this same pin. A second spring 49 is carried by a pin 50 on the plate 45 and contacts a lug 51 formed on the plate 46, exerting a force which tends to pivot the plate 46 counterclockwise. The extent of the pivotal movement of plate 46 under the influence of spring 49 is limited by a lug 52 formed integrally on the lower edge of plate 45 which extends adjacent its outer edge.

To attach the converter which is provided with locking means constructed in accordance with this second embodiment, the unit is positioned so that the shoulder or key 31, mates with its seat in the opening 11 thereby insuring proper alignment. The locking means in this initial position will be arranged with the plates 45 and 46 as shown in Figure 9, the locking wedge 35 being positioned as shown in dotted lines. The locking function is accomplished by exerting a downward force upon the overturned shouldered end of the plate 45, resulting in the pivoting of that plate in a counter-clockwise direction about its supporting pin 33. As the plate 45 pivots it carries with it the plate 46 which advances relative to the contact arm 39, the cam face 53 at the edge of plate 46 forcing that member downwardly. The force exerted by spring 49 is sufficient to overcome any opposing force present in the arm 39. Upon the end of cam 53 being reached the locking arm 39 slides beyond the end thereof and the lock is secured in position, coil spring 47 functioning to hold the end of the cam locked against the contact arm. With the movement of 53 relative to the arm 39 that member has been forced downwardly, the crankshaft 17 being pivoted therewith, and the parts have assumed the relationship shown in Figure 7. The nozzle 1, and the agitator 9 positioned therein, is then positioned at a considerable height above the sur-

face covering undergoing cleaning, and entirely out of contact therewith.

In order to remove the dusting tool converter the operator need only exert an upward force upon the shouldered outer end of the arm 46 sufficient to pivot it against the force exerted by the spring 49 to disengage the end of the cam 53 from the arm 39. The force exerted by the spring 47 then pivots the entire assemblage in a clockwise direction to the position shown in Figure 7 in which it is removable.

Referring now to Figures 10 to 14, inclusive, the third preferred embodiment of the invention is disclosed. This construction differs from that aforedescribed in that the locking means for the converter are carried by the body of the cleaner instead of by the converter. The lock here functions to lock both the converted and the cover plate 60 which replaces it, as well as performing the nozzle-and-agitator-positioning function. The converter 30 is again provided with a shoulder 31 which seats within a corresponding notch in the opening 11. A circular flange 61 is formed integrally on the converter and seats in the opening 11, lying flush with the exterior surface thereof. The locking means comprises a plate 62 having a cammed side and formed with an elongated lever 63 adapted to be grasped by the hand. Both lever 63 and plate 62 pivot about the supporting pin 64. In its converter-locking position the arm 63 extends closely adjacent the converter 30 and a radially extended shoulder 65 of the plate 62 overlies the flange 61, securing the converter in place. Displacement of the plate from this position is prevented by a spring-pressed detent 66 which seats within a channel 67 formed on the interior face of the plate. With the plate and arm 63 so positioned the point of greatest radius on the cammed side of plate 62 contacts a roller on the rigid pin 68 carried by the bracket 41 and holds the crank shaft 17 in its lowest position permitted by the slot 21. The agitator and the nozzle are then positioned above the surface covering, as shown in Figure 10.

With the locking construction functioning to secure the cover plate 60 in place the second radially extended projection 69 on the plate 62 overlies the marginal flange of the cover plate. In this relationship the arm 63 extends to a lower position than that first described. Compare Figures 10 and 13. The plate 62 is held in this position through the spring-pressed detent 66 seating within a second inwardly facing channel, indicated by the reference character 70. The detent is removable from either seat 67 or 70 by a force exerted directly upon the handle member 63. In this cover-plate securing relationship of the plate 62 the exterior cam contacts the pin 68 at a point of smaller radius from the supporting pin 64 and the shaft 17 is positioned in its uppermost position permitted by the manual adjusting means.

To remove either the converter or the cover plate 60 from the cleaner it is necessary only to pivot the arm 63 to a mid-position in which both the projecting shoulders 65 and 69 of the plate 62 are spaced at the side of the opening 11.

I claim:

1. In a suction cleaner of the type including suction-creating means, and a driven agitator; means supporting said agitating means relative to a surface covering undergoing cleaning, a dusting tool unit adapted to be connected to said suction-creating means, said unit being movable to and from a seating position relative to said suction-creating means, means to lock said unit in place, and means operated by said locking means to adjust automatically said supporting means to raise said agitator above the surface covering undergoing cleaning.

2. The construction defined by the preceding claim wherein the means supporting said agitator relative to the surface covering combined with a manually adjustable means to adjust its height relative thereto, said manual height-adjusting means being so constructed that the raising of said agitator upon the locking of said unit is accomplished without change in said height-adjusting means.

3. In a suction cleaner of the type including a portable body, suction-creating means, and driven agitating means; means adjustably supporting said agitating means relative to a surface covering undergoing cleaning, a dusting tool unit adapted to be connected to said body and to said suction-creating means, means to lock said unit to said body, and means connected to said supporting means adapted to cooperate with said locking means and be actuated thereby upon locking said unit to said body to adjust said supporting means to move said agitating means relative to the surface covering undergoing cleaning.

4. In a suction cleaner of the type including a portable body, suction-creating, and agitating means; means supporting said agitator relative to a surface covering undergoing cleaning, means to adjust said supporting means to raise and lower said agitator, a dusting tool unit adapted to be connected to said body and to said suction-creating means, means to lock said unit to said body, said locking means including means to actuate said adjusting means to raise said agitator when said locking means are moved to the locked position.

5. In a suction chamber of the type including a body, suction-creating means in said body, and an agitator carried by said body; means movably supporting said body, manually adjustable means to adjust said supporting means to raise and lower said body and agitator relative to the surface covering, additional means to adjust said supporting means independently of said manually adjustable means, a dusting tool unit adapted to be connected to said body and to said suction-creating means, means to lock said unit to said body, said locking means being formed to cooperate with said additional means to actuate same to raise said body and agitator relative to the surface covering undergoing cleaning.

6. The construction defined by the preceding claim characterized by the fact that the variation of body height and agitator height by said additional adjusting means is accomplished without change in said manually adjustable means.

7. The construction defined by the second preceding claim characterized by the fact that said locking means are carried by and are removable with said unit.

8. The construction defined by the third preceding claim characterized by the fact that said locking means are mounted on said body.

9. In a suction cleaner of the type including a body having a nozzle and a dusting tool seat, suction-creating means connected to said nozzle, a driven agitator, and adjustable supporting means for said nozzle and agitator; a dusting tool unit adapted to be positioned on said seat and connected to said suction-creating means, said unit including an air passageway and locking means to secure said unit to said seat, said

locking means including a part extended into contact with means movable with said supporting means, said part being shaped to exert a moving force on the means with which it contacts to lower said supporting means when said locking means are moved to the locked position.

10. The construction recited by the preceding claim characterized by the fact that the force-exerting part of said locking means comprises a cam and by the further fact that said cam extends into contact with a slidable element pivotally connected to said supporting means.

11. The construction recited by the second preceding claim characterized by the fact that said supporting means comprise a crankshaft and rotatable wheels and by the fact that the force-exerting part of said locking means comprises a cam.

12. In a suction cleaner of the type including suction-creating means and a driven agitator; a dusting tool unit adapted to be connected to said suction-creating means, means movably supporting said agitator relative to a surface covering undergoing cleaning, means to adjust said supporting means to vary the height of said agitator relative to said surface covering within its working range, and second means to vary the height of said agitator, said second means including means to secure said dusting tool unit in place relative to said suction-creating means.

13. In a suction cleaner of the type including suction-creating means, and a driven agitator; means supporting said agitating means relative to a surface covering undergoing cleaning, a dusting tool unit adapted to be connected to said suction-creating means, said unit being movable to and from a seating position relative to said suction-creating means, means to lock said unit in place, means movably relative to said suction-creating means and not removable with said unit to receive force from said locking means to raise automatically said agitator above a supporting surface covering.

HARRY B. WHITE.

CERTIFICATE OF CORRECTION.

Patent No. 2,024,261. December 17, 1935.

HARRY B. WHITE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 8, claim 2, after "covering" insert the word are; and line 40, claim 5, for "chamber" read cleaner; page 4, second column, line 17, claim 13, after "movably" insert the word mounted; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of March, A. D. 1936.

Leslie Frazer

(Seal) Acting Commissioner of Patents.