

May 19, 1942.

C. G. TROXLER

2,283,833

SUCTION CLEANER

Filed July 15, 1939

3 Sheets-Sheet 1

Fig. 1

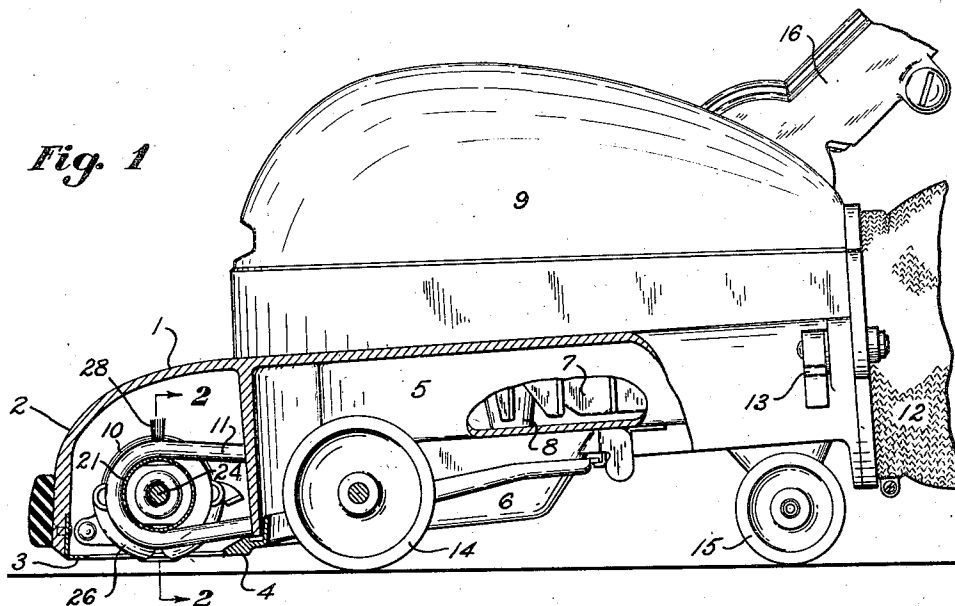
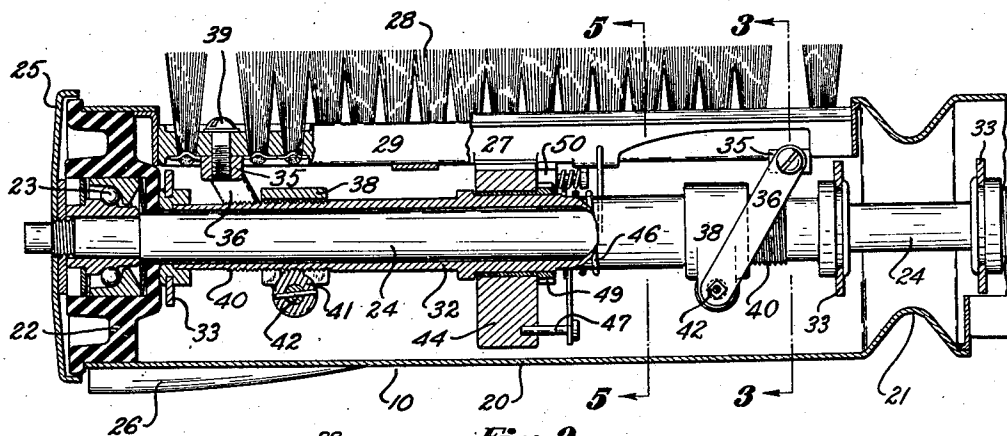


Fig. 2

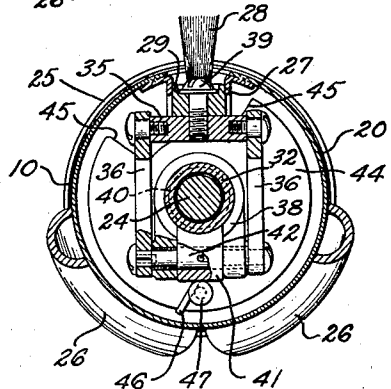


Fig. 3

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3 Sheets-Sheet 2

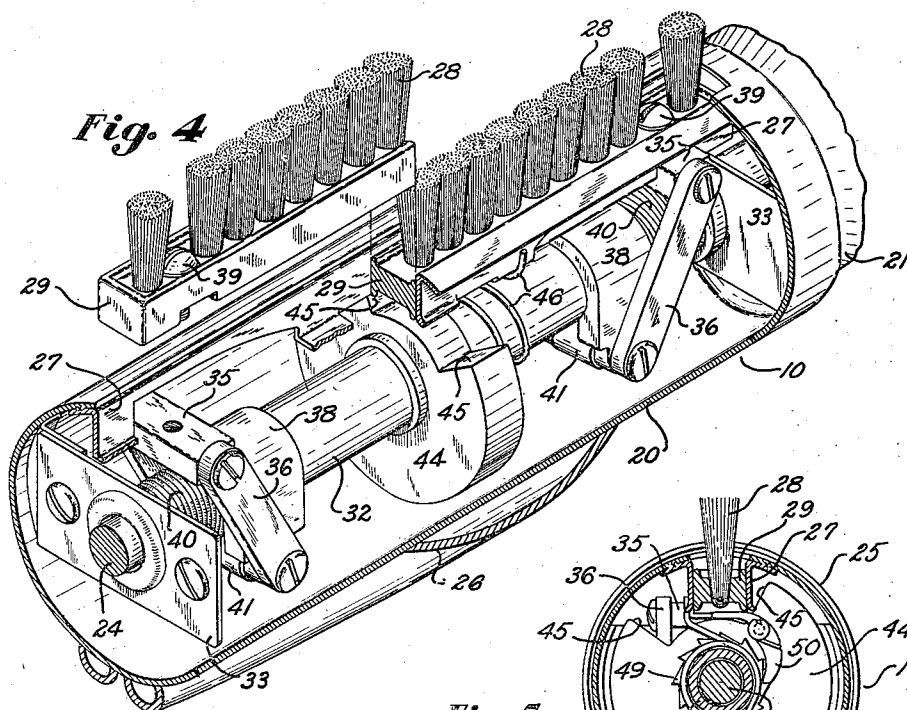


Fig. 5

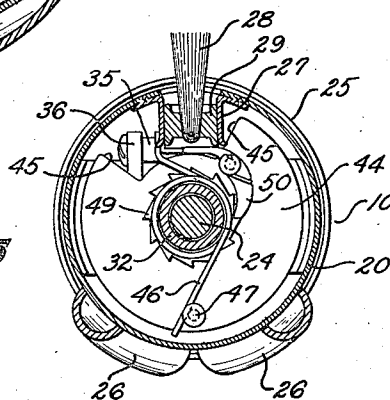
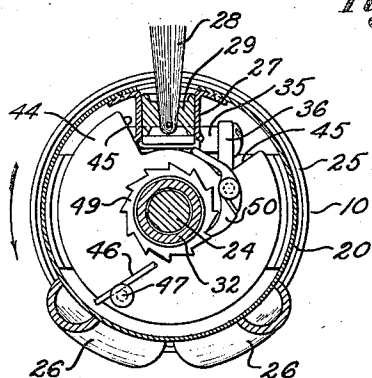
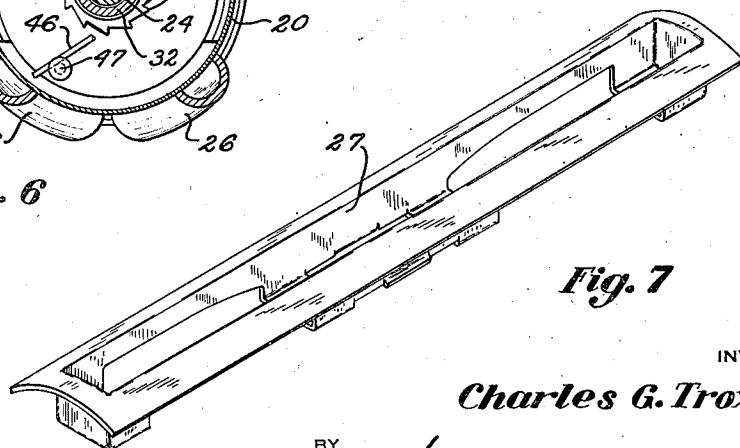


Fig. 6



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3 Sheets-Sheet 3

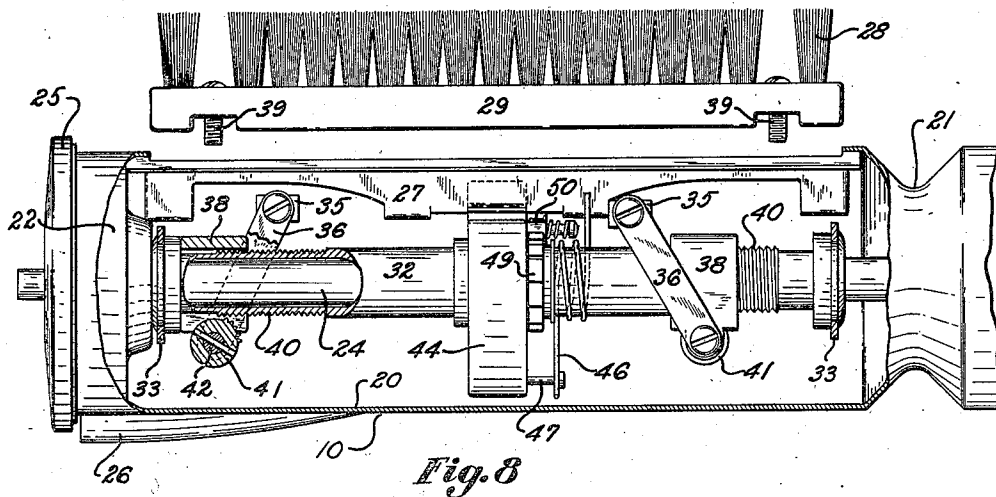


Fig. 8

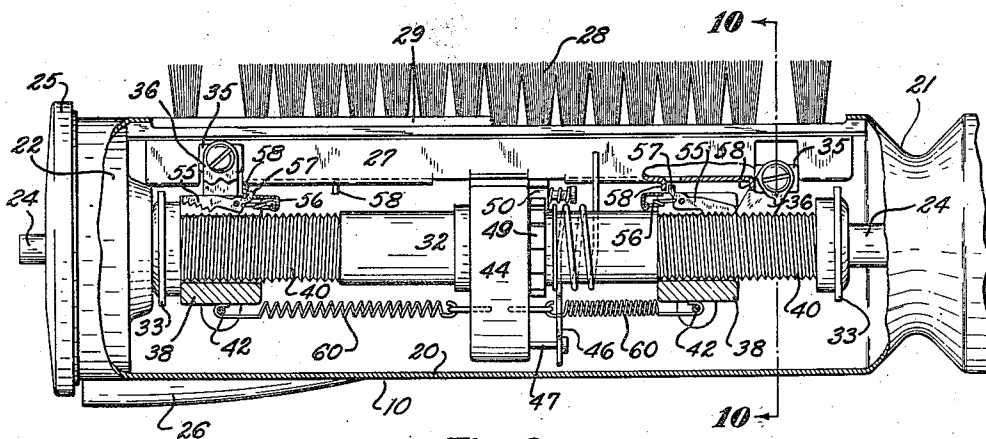


Fig. 9

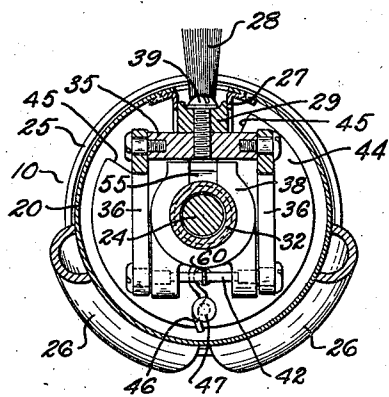


Fig. 10

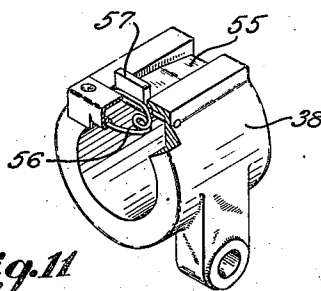


Fig. 11

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2,283,833

SUCTION CLEANER

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Application July 15, 1939, Serial No. 284,577

22 Claims. (Cl. 15—183)

The present invention relates to suction cleaners in general and particularly to new and novel improvements in suction cleaner agitators. More specifically the invention comprises a rotary agitator in a suction cleaner in which automatic adjustment of the bristle length occurs each time the agitator is placed in use.

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 rotary agitator for a suction cleaner. A further object of the invention is to provide a new and improved rotary agitator incorporating agitating elements subject to wear in use in combination with means which automatically adjust such means to compensate for the wear. A still further object of the invention is to provide a rotary agitator for a suction cleaner in which the agitating element subject to wear is given an adjustment each time the cleaner is placed in use. Another object of the invention is to provide a rotary agitator for a suction cleaner embodying a flexible brush element subject to wear in combination with automatic means which move the brush radially outward each time the cleaner is placed in use to compensate for wear. 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 preferred embodiments of the invention are disclosed:

Figure 1 is a side elevation of a suction cleaner embodying the present invention with certain parts broken away and shown in section;

Figure 2 is a partial longitudinal section through the agitator constructed in accordance with the present invention, being a section taken upon the line 2—2 of Figure 1;

Figure 3 is a transverse cross section through the agitator upon the line 3—3 of Figure 2;

Figure 4 is a view in perspective of a portion of the agitator with certain parts broken away to show the interior thereof;

Figure 5 is a transverse section upon the line 5—5 of Figure 2 and illustrates the relationship of the inertia weight when standing and when rotating at constant speed;

Figure 6 is a view similar to Figure 5 and illustrates the position of the inertia weight during a period of acceleration of the agitator;

Figure 7 is a view in perspective of the brush seat removed from the agitator body;

Figure 8 is a partial side view of the agitator comprising the first embodiment with certain parts broken away and shown in section and with the brush removed, the working parts at the opposite ends of the brush being illustrated in different intermediate positions of the re-setting

operation looking forward to the insertion of a new brush;

Figure 9 is a partial longitudinal section through an agitator constructed in accordance with the second embodiment of the invention which incorporates automatic resetting means for the brush adjusting mechanism;

Figure 10 is a section upon the line 10—10 of Figure 9;

Figure 11 is a view in perspective of the inertia-weight-actuated adjusting nut or actuator normally positioned within the agitator body.

The rotary agitator which forms an important part of the modern suction cleaner incorporates both rigid beating elements and flexible brush elements. In cleaner operation these contact the surface covering undergoing cleaning to dislodge therefrom the embedded foreign material and to straighten the pile of the covering. The flexible brush elements are subject to wear and if no adjustment is made in time they become entirely inoperative as their radial extension becomes less than that of the rigid beating elements. In the agitator constructed in accordance with the present invention means are provided which give to the brush element what is conceived to be an average radial adjustment each time the cleaner is placed in use. Over a large number of uses the brush length will be decreased upon an average of a certain amount for each use. The adjustment of the present invention makes use of this fact and each time the agitator is placed in operation the brush element is projected radially an extent which is equal to this average wear.

Referring again to the drawings and to Figure 1 in particular, a modern suction cleaner is illustrated in which an agitator constructed in accordance with the present invention is embodied. The cleaner is seen to comprise a main casing 1 embodying a nozzle 2 having front and rear surface-contacting lips 3 and 4, respectively. The fan chamber 5 is interiorly connected to the nozzle 2 by an air passageway 6 and is seen to house a suction-creating fan 7 which is mounted upon the lower end of the motor shaft 8. The motor itself is unshown but is positioned immediately above the fan chamber 5 in the enclosing motor housing 9. The rotatable agitator, indicated generally by the reference character 10, is located within the nozzle 2 in a position in which it is adapted to contact a surface undergoing cleaning between the lips 3 and 4. A driving belt 11 connects the agitator in a common manner to the lower extremity of the motor shaft 8. A removable dirt container or filter bag 12 is removably secured at the exhaust outlet of the fan chamber by manually operable means 13 and is adapted to receive the foreign material which passes through the machine and to remove it from the transporting air. The cleaner is mov-

ably supported upon front and rear wheels 14 and 15, respectively, while a pivoted handle 16 provides the means by which the operator can propel the machine.

Referring now to Figures 2 to 8, inclusive, in particular, the first preferred embodiment of the invention is illustrated. The agitator is seen to comprise a cylindrical body 20 formed centrally with a reduced portion 21 which functions as a belt-seating pulley. The ends of the hollow cylindrical body 20 are closed by end plates 22 each of which carries a ball bearing 23. A non-rotatable supporting shaft 24 extends the length of the body 20 and from the ends thereof and seats in the inner races of the bearings 23. At each end of the agitator a stationary thread guard plate 25 is screw threaded upon the end of the shaft 24 to prevent the accumulation of foreign material around the supporting bearing. On the surface of the agitator, and extended radially therebeyond, are helically extending rigid beater elements 26 while positioned within a brush seat 27 is the flexible brush agitating element 28. Brush 28 includes a rigid metallic back 29 which is adapted to be radially adjusted in its seat 27 to change the radial extension of the brush. While only one-half of the agitator length is shown it is to be understood that the other end is substantially identical thereto.

To accomplish the radial adjustment of the brush there is provided upon each side of the centrally located pulley 21 a hollow supporting shaft or cylinder 32 which concentrically encloses the agitator-supporting shaft 24 and is itself carried at its ends by transversely extending plates 33 which are supported from the interior walls of the agitator body 20. Being directly carried by the cylindrical body 20 the hollow shaft 32 rotates therewith and relative to the stationary supporting shaft 24. The shaft 32 is, however, adapted to be rotated in its supports.

The adjustable brush 28 is positioned within its seat 27 in the agitator body and is guided thereby. At each end of the brush is a cross bar 35 of a frame which includes side arms 36 pivoted at the ends of bar 35 and pivoted at their opposite extremities to a nut or actuator 38 which encloses and is axially slidable upon the hollow shaft 32. The shaft 32 is itself externally screw-threaded at each of its ends for a considerable distance, as indicated at 40, and the nut element 38 is adapted to slide axially over this threaded portion being connected thereto by a toothed pinion 41 which it carries and which is rigidly connected to the transverse pin 42. The latter extends transversely of shaft 32 and is rotatable in nut element 38, being non-rotatably secured at its end to the frame arms 36. The relationship is such that the rotation of threaded shaft 32 causes the toothed pinion 41 to be advanced axially on the shaft together with nut 38. As the opposite ends of the arms 36, which are fixed to the pinion 41 and rotatable therewith, are secured to the rigid brush back 29 by the removable screws 39 it is clear that relative movement between the nut 38 and the shaft 32 results in the changing of the angular position of arms 36. Should the rotation of the shaft 32 cause the nuts 38 to advance toward the ends of the shaft 32 from an initial position as illustrated in Figure 2, for example, it is clear that the pivoting of the arms 36 would result in the brush element 28 being moved radially outward. The constructions at the opposite ends of each brush element work alike and the mechanism by which the

shaft 32 is rotated to accomplish adjustment of the nut 38 is accomplished will now be described.

Substantially midway of its length the cylindrical shaft 32 seats an inertia weight 44 which is rotatable relative to the supporting hollow shaft 32 within limits as permitted by the contact of the sides 45 of a cut-out sector therein with the sides of the seat 27. A coil spring 46 encircles hollow shaft 32 adjacent the weight 44 and at one of its ends contacts the brush seat 27 and at its opposite end, by means of a pin 47, contacts the weight 44 and at all times urges it in a counterclockwise direction as viewed in Figures 5 and 6. With the agitator standing or rotating at constant speed the effect of this spring is to maintain the weight 44 with one side 45 of the sector in contact with the abutment therefor formed upon the seat 27. During the period of agitator acceleration when the machine is being placed in use, however, the agitator rotating in the direction of the arrow of Figure 6, the inertia effect of the weight 44 overcomes the force of spring 46 and the weight rotates from the position illustrated in Figure 5 to that illustrated in Figure 6. To translate this movement of weight 44 relative to the agitator body 20 into rotation of the nut-supporting hollow shaft 32, there is provided a step-by-step mechanism comprising a gear wheel or ratchet 49 fixed to the shaft with which cooperates a spring-pressed dog or pawl 50 carried by the weight 44. The relationship is such that weight 44 is free to rotate counter-clockwise relative to cylinder 32, as viewed in Figures 5 and 6, the dog 50 slipping over the teeth of the gear wheel 49. Such movement occurs under the actuation of the spring 46. Upon the weight 44, however, moving in a clockwise direction, as it will during a period of acceleration of the agitator, the rotation of the weight 44 from the position illustrated in Figure 5 to that illustrated in Figure 6 causes the cylinder 32 to rotate with the weight through the coaction of the dog and ratchet. The gear teeth are so spaced that the return of the weight to its initial position, as illustrated in Figure 5, permits the dog to engage the following gear tooth. It is clear that successive periods of acceleration result in successive angular adjustments of the cylindrical shaft 32.

The operation of the agitator constructed in accordance with this first embodiment of the invention is as follows: With a new brush positioned in the brush seat the adjusting mechanism will be related as illustrated in Figures 2 and 4, the adjusting nuts 38 being at their inner positions and the frames comprising the supporting bars 35 and parallel arms 36, making the greatest possible angle with the agitator shaft. The brush is positioned at its innermost radial position and slightly within the preferred radial extension for cleaning. Let it be assumed that the cleaner is placed into use by the operator causing current to pass through the driving motor which rotates the motor shaft 8, the suction-creating fan 7, and the agitator 10. Cleaning air is drawn through the nozzle 2, the fan chamber 5 and exhausted into the dirt bag 12 in the usual manner. The rotation of the agitator immediately effects an adjustment of the brush. When standing the weight 44 was related to the agitator body 20 as illustrated in Figure 5. The acceleration of the agitator in gaining speed caused the weight 44 by its inertia to move from the position illustrated in Figure 5 to that illustrated in Figure 6; this movement being accompanied by

the rotation of the hollow shaft 32 to the same extent by the co-action of dog 50 and gear wheel 49. The rotation of the cylindrical shaft 32 a fraction of a turn cause the nuts 38, the pinions 41 of which mesh with the teeth 40 of shaft 32, to be moved toward the end of that shaft in each instance a very slight distance. This slight movement of the nuts 38 causes the arms 36 of the brush-supporting frames to be moved very slightly toward a true radial position and results in the brushes moving slightly outwardly to their desired operating position. Upon the agitator reaching a constant speed of rotation the spring 46 acting upon the weight 44 causes that weight to pivot counter-clockwise as viewed in Figures 5 and 6 and to return to its original position as illustrated in Figure 5. There it remains until the cleaner is removed from operation and subsequently started again at which time a readjustment takes place. Every time the agitator is placed in operation the brush 28 is moved radially outward.

When the brush has finally received its last adjustment and no further adjustments are possible, a condition which results when the frame arms 36 extend exactly radially relative to the supporting shaft 24, it becomes necessary to replace the worn brush 28 and to insert a new brush. In the embodiment here described it is also necessary manually to reposition the adjusting mechanism that the new brush may be automatically adjusted. Reference to Figure 8 will make clear the manual adjustment of the adjusting mechanism which must take place. Upon the worn brush being removed the axially movable nut or actuator 38 will be at their outermost positions, the position illustrated for the nut at the left hand side of Figure 8. Upon the detachment of the brush element by the removal of screws 39, it is possible to pivot the brush-supporting frame comprising the arms 36 and the brush support 35 toward the weight 44. This results in the disengagement of the toothed pinion 41 from the threads 40 of the cylinder 32 and enables the operator to propel the nut 38 from the outer position illustrated at the left hand side of Figure 8 to the inner position as illustrated by the other nut in the same figure. In the case of the right hand nut in Figure 8 the supporting frame and nut 38 have been manually propelled to their inner position and the frame is now ready to be pivoted in a clockwise direction so that it assumes the position illustrated in Figure 2 in which the brush support 35 is in position to receive the brush. When both nuts 38 and their frames are positioned centrally with the arms pivoted outwardly as indicated in Figure 2 the new brush can be attached and the device is ready for operation.

Referring now to the second embodiment of the invention illustrated in Figures 9 to 11, inclusive, a construction is provided in which the resetting of the adjustment is automatically accomplished and the operator need not attend thereto as in the first embodiment. In this embodiment the details of construction are as disclosed and described in the first embodiment except as hereinafter explained. The nuts or actuators 38 are again adjustable upon the rotatable cylindrical hollow shaft 32 which is itself actuated by the inertia weight 44 as in the first embodiment. The brush 28 is again seated at each of its ends upon the frame comprising the support 35 and the pivoted arms 36 which are car-

ried by the nut 38. In this embodiment, however, the toothed pinion of the first embodiment has been entirely omitted and the nut 38 is connected to the threads 40 of the cylinder 32 by means of a toothed dog 55 which is pivotally mounted to the nut and which is acted upon by a coil spring 56 which moves over center with respect to the pivotal axis of the dog within the range of arcuate pivotal movement thereof. The dog 55 is provided with an upstanding abutment 57 and there are provided on the underside of the brush seat 27 spaced abutments or lugs 58 which the shoulder 57 of the dog is adapted to contact at the opposite ends of the travel of the nut 38. In addition to the construction illustrated in the first embodiment there are provided coil springs 60 which extend between the weight 44 and the nuts 38 which springs at all times tend to draw the nuts to their central or initial positions. In this embodiment of the invention the construction of the inertia weight 44, and its function in rotating the cylindrical hollow shaft 32, is identical with that described in the first embodiment.

The operation of this second embodiment of the invention in the use of the cleaner is identical to the operation of the first embodiment with the exception that the contact between the nuts 38 and the threads of the shaft 32 is, in the present embodiment, established through the toothed dogs 55 rather than the toothed pinion 41. The rotation of the shaft, by the inertia mass 44 in the period of acceleration in the agitator, again functions to advance the nuts 38 from the central positions, that in which they most nearly approach the centrally located weight 44, and advances them toward the ends of the shaft 32. This movement again causes the frame including the arms 36 and support 35 to be moved from a position making an extreme angle with the axis of rotation to one in which it extends substantially radially to give the maximum radial adjustment.

In the present embodiment, however, as the nuts are advanced to their outermost positions the outer lug at each end of the brush seat contacts the abutment 57 of the toothed dog which moves into contact therewith. As the nut carrying the dog continues to advance this contact causes the dog to be pivoted from its meshing relationship with the thread 40, as illustrated at the right hand side of Figure 9, to a position in which it is out of mesh therewith, as illustrated at the left hand side of Figure 9. So soon as this pivotal movement of the dog has reached a certain point the coil spring 56 moves over center with respect to the pivotal axis of the dog and maintains the dog in its declutched position. Immediately the dog is free from the threads 40 of the shaft 32 the coil spring 60 acting upon the nut 38 draws it back to its innermost position in which it contacts the cylinder 32 at the ends of threads 40, as illustrated at the right hand side of Figure 9. In its innermost position the abutting shoulder 57 of the dog 55 contacted the inner depending lug 58 of the brush seat to cause the dog to be pivoted downwardly and again into mesh with the threads 40. Again the coil spring 56 moves over center and maintains the dog in its clutched relationship.

This construction has the advantage that it is not necessary for the operator to reset the adjusting device manually the resetting operation being automatically performed by the construction itself. When the readjustment has been

made the operator need only remove the brush securing screws 39, position a new brush in the agitator and the entire device is ready for a complete new sequence of operation.

I claim:

1. A rotary agitator for a suction cleaner including a body, means to support said body for rotation, an agitating element subject to wear in use mounted for radial adjustment relative to said support means, and agitator-rotation-operated means to project said element radially a predetermined increment of distance from its last position in use each time said agitator begins to rotate.

2. In a rotary agitator for a suction cleaner, a body, means mounting said body for rotation, a brush, means mounting said brush for radial movement on said body, and agitator-rotation-operated means including a progressive adjustment mechanism connected to said brush to adjust said brush radially a predetermined distance equal substantially to the average decrease in radial extension with wear of said brush during each use period.

3. In a rotary agitator for a suction cleaner, a body, means to support said body rotatably, a brush, means mounting said brush for radial movement on said body, and means including an inertia-weight-operated progressive adjustment mechanism connected to said brush to adjust said brush a radial increment each time the agitator is accelerated and to secure the brush in its adjusted position.

4. In a rotary agitator for a suction cleaner, a rotatable hollow cylindrical body, an agitating element subject to wear in use mounted for radial movement on said body, and automatic means to adjust said element a radial increment each time the agitator is placed in use and to secure it in adjusted position, said means including an inertia weight and means to transmit relative movement of said weight and said body into movement at said brush.

5. A rotary agitator for a suction cleaner comprising a cylindrical body, supporting means to mount said body for rotation about a longitudinal axis, an agitating element, means to adjust said element radially on said body each time the agitator is placed in use, said last-mentioned means comprising an inertia weight carried by said body and movable relative thereto during acceleration of said body, means connected to said element and movable between inner and outer radial limits therewith, and a step-by-step mechanism to transmit the movement of said weight relative to said body into movement of said means connected to said element.

6. A rotary agitator for a suction cleaner comprising a cylindrical body, supporting means to mount said body for rotation about a longitudinal axis, an agitating element, means to adjust said element radially on said body each time the agitator is placed in use, said last-mentioned means comprising an inertia weight rotatable relative to said body during acceleration thereof, spring means to return said weight to its normal position at the end of the acceleration, a radially adjustable frame connected to said brush, a rotatable member to adjust said frame radially, and a step-by-step mechanism between said inertia weight and said rotatable member.

7. A rotary agitator for a suction cleaner comprising a cylindrical body, supporting means to mount said body for rotation about a longitudinal axis, an agitating element, means to adjust said

element radially on said body each time the agitator is placed in use, said last-mentioned means comprising a movable inertia weight, a threaded shaft parallel to the axis of rotation of said body rotatably supporting said weight, a nut seated on said shaft and adapted to be advanced thereon upon its rotation due to the motion of said weight, a frame pivotally connected to said nut and to said element and adapted to have its element end shifted radially with said element, said weight-actuated means acting to rotate said shaft in the acceleration of said body.

8. A rotary agitator for a suction cleaner comprising a hollow cylindrical body, a shaft rotatably supporting said body and extended longitudinally therethrough, an agitating element carried by said body and movable radially relative to the axis of rotation, and means to adjust said element comprising a threaded hollow shaft in said body concentric with said supporting shaft, means mounting said hollow shaft for independent rotation on said body, an inertia weight movable relative to said body during acceleration, step-by-step means connecting said weight to said hollow shaft to rotate said shaft upon movement of said weight relative to said body, a nut seated on said threaded hollow shaft and non-rotatable relative to said body, said nut being adapted to advance on said hollow shaft as it rotates, and means connecting said nut to said element to advance said element radially as said nut is advanced on said hollow shaft.

9. A rotary agitator for a suction cleaner comprising a hollow cylindrical body, a shaft rotatably supporting said body and extended longitudinally therethrough, an agitating element carried by said body and movable radially relative to the axis of rotation, and means to adjust said element comprising a threaded hollow shaft in said body concentric with said supporting shaft, means mounting said hollow shaft for independent rotation on said body, an inertia weight mounted for arcuate rotary movement on said hollow shaft, means resiliently urging said weight in one direction, means to rotate said hollow shaft upon the movement of said weight in the opposite direction during the acceleration of the agitator in starting, a nut seated on said threaded hollow shaft and non-rotatable relative to said body, said nut being adapted to advance on said hollow shaft as it rotates, and means connecting said nut to said element to advance said element radially as said nut is advanced on said hollow shaft.

10. A rotary agitator for a suction cleaner comprising a hollow cylindrical body, a shaft rotatably supporting said body and extended longitudinally therethrough, an agitating element carried by said body and movable radially relative to the axis of rotation, and means to adjust said element comprising a threaded hollow shaft in said body concentric with said supporting shaft, means mounting said hollow shaft for independent rotation on said body, an inertia weight rotatably mounted on said hollow shaft and adapted to be moved relative thereto during acceleration of said body, a step-by-step mechanism to rotate said hollow shaft upon rotation of said inertia weight during such acceleration, means to return said weight to its initial position, and means to translate the rotary movement of said hollow shaft into radial movement at said agitating element.

11. A rotary agitator for a suction cleaner comprising a hollow cylindrical body, a shaft

rotatably supporting said body and extended longitudinally therethrough, an agitating element carried by said body and movable radially relative to the axis of rotation, means to adjust said element comprising an inertia weight within said body mounted for movement about said shaft, means resiliently holding said weight in one position with a force less than the inertia force of said weight during acceleration of said agitator, and means to translate the movement of said weight in one direction into radial movement at said agitating element.

12. A rotary agitator for a suction cleaner comprising a hollow cylindrical body, a shaft rotatably supporting said body and extended longitudinally therethrough, an agitating element carried by said body and movable radially relative to the axis of rotation, means to adjust said element comprising an inertia weight within said body mounted for arcuate rotary movement about said shaft, spring means normally holding said weight in one position, said weight being adapted to move against the force exerted by said spring under its own inertia during acceleration, and step-by-step means to translate the movement of said weight against said spring into radial movement at said agitating element.

13. In a rotary agitator for a suction cleaner, a rotatable body, a surface agitating element, and means to adjust said element step-by-step radially relative to the axis of rotation of said body, said means comprising an inertia weight movable during acceleration of said body, an actuator movable within limits on said body, a step-by-step mechanism connecting said weight to said actuator, and means connecting said element to said actuator.

14. The structure recited in the preceding claim characterized in that said actuator and connecting means include manually resetting means operable upon the detachment of said agitating element.

15. In a rotary agitator for a suction cleaner, a rotatable body, a surface agitating element, and means to adjust said element step-by-step radially relative to the axis of rotation of said body, said means comprising an inertia weight movable during acceleration of said body, an actuator movable within limits on said body, a step-by-step mechanism connecting said weight to said actuator, means connecting said element to said actuator, and means automatically to reset said actuator upon reaching one limit of its travel.

16. A rotary agitator for a suction cleaner including a body, means to support said body for rotation, an agitating element subject to wear in use and including a base and mounted for radial adjustment relative to said support means, and agitator-rotation-operated means to project said element base a predetermined radial distance beyond its position during the immediately preceding use period.

17. A rotary agitator for a suction cleaner including a body, means to support said body for rotation, an agitating element subject to wear in use and including a base, feeding and supporting means mounting said element relative to said body for step-by-step radial movement relative to the axis of rotation, and agitator-rotation-operated means to actuate said feeding and supporting means to increase the radial distance of said element base from the axis of rotation each time the agitator is placed in use.

18. In a rotary agitator for a suction cleaner, a brush element subject to wear and to decrease in radial extension in use, means mounting said element for radial adjustment relative to the axis of agitator rotation, and agitator-operation-actuated means to adjust automatically said means mounting said element a predetermined radial increment of distance equal substantially to the average decrease in radial extension of said element each use period each time the agitator is placed in use.

19. In a rotary agitator for a suction cleaner, a brush element subject to wear and to decrease in radial extension in use, means mounting said element for radial adjustment relative to the axis of agitator rotation, a weight rotatable about the axis of agitator rotation and mounted for movement relative to the brush upon a change of the speed of rotation of the agitator, and means to translate the said movement of said weight to said means mounting said element to adjust said element a radial distance outwardly relative to the axis of rotation equal substantially to the average decrease in radial extension of said element during each use period.

20. In a rotary agitator for a suction cleaner, a brush including bristles subject to wear and decrease in length and adapted for use until said bristles wear from a maximum to a minimum length, means mounting said brush for rotation about the axis of rotation of said agitator and for radial movement relative thereto within limits determined by the positions of said brush with bristles of maximum and minimum lengths extended to the said predetermined radial distance from the axis of agitator rotation, and agitator-rotation-operated means to reposition said means mounting said brush and to adjust said means radially outward a distance equal to the average decrease in bristle extension in a period of use.

21. In a rotary agitator for a suction cleaner, a brush including bristles subject to wear and decrease in length and adapted for use until said bristles wear from a maximum to a minimum length, means mounting said brush for rotation about the axis of rotation of said agitator and for radial movement relative thereto within limits determined by the positions of said brush with bristles of maximum and minimum lengths extended to the same predetermined radial distance from the axis and step-by-step means including an agitator-acceleration displaced weight to move said brush radially outward a predetermined increment of distance each time the agitator is placed in use.

22. In a rotary agitator for a suction cleaner, a rotatable cylindrical body, a brush including bristles subject to wear and decrease in length and adapted for use until said bristles wear from a maximum to a minimum length, means within said body mounting said brush for rotation about the axis of rotation of said agitator and for radial movement relative thereto within limits determined by the positions of said brush with bristles of maximum and minimum lengths extended to the same predetermined radial distance from the axis of agitator rotation, and agitator-rotation-operated means within said body to reposition said means mounting said brush and to adjust said means radially outward a distance equal to the average decrease in bristle extension in a period of use.

CHARLES G. TROXLER.