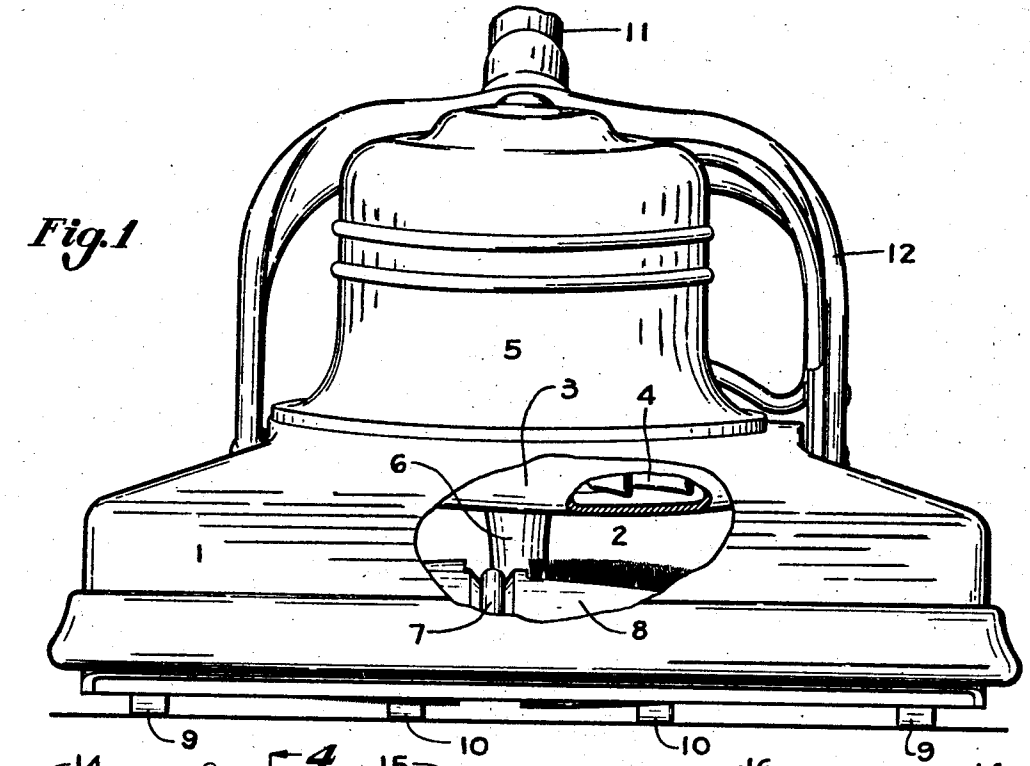
Feb. 3, 1942. S. R. CUMMINGS 2,271,545

SUCTION CLEANER

Filed May 6, 1937

Fig. 1



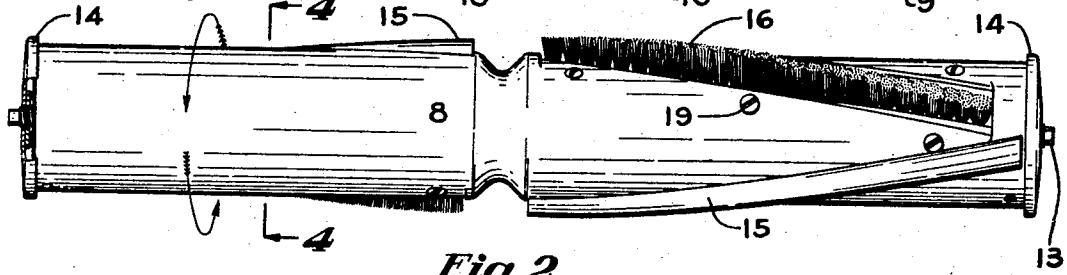


Fig. 2

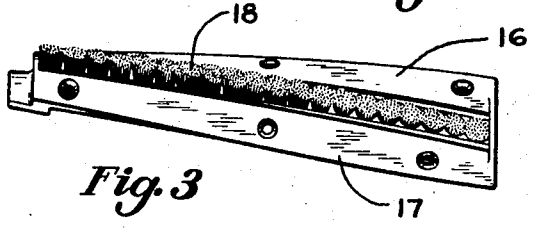


Fig. 3

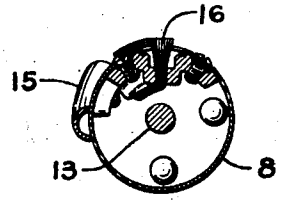


Fig. 4

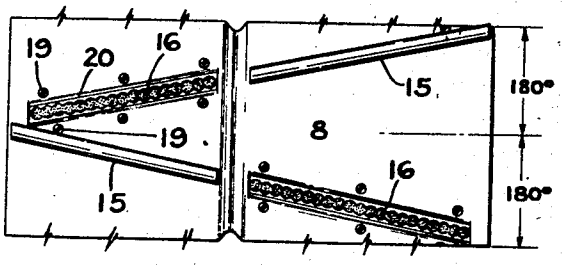


Fig. 5

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SUCTION CLEANER

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Application May 6, 1937, Serial No. 141,088

5 Claims. (Cl. 15—5)

The present invention relates to suction cleaners in general and particularly to surface agitating means in suction cleaners. More specifically the invention comprises a suction cleaner rotary agitator which is so constructed that it agitates the surface covering with efficiency to dislodge therefrom embedded foreign material while creating a minimum of noise.

Rotary beating-and-brushing agitators in suction cleaners are old and well known. Such agitators form a necessary part of the modern efficient suction cleaner. Their incorporation into a suction cleaner, however, results in an increase of the noise of operation of the machine which is undesirable. Experience has disclosed that cleaning effectiveness of such rotary agitators can be expected to vary directly with the noise which they create in operation. Accordingly, decrease in operating noise has heretofore been accompanied by a decrease in operating efficiency.

In the rotary beating-and-brushing agitator constructed in accordance with the present invention for the first time a decreased noise level has been obtained without sacrifice of operating efficiency. This desirable result is brought about by the particular construction which is hereinafter set forth fully.

It is an object of the present invention to provide a new and improved rotary agitator for a suction cleaner. It is a further object of the invention to provide an improved rotary agitator embodying beating and brushing means. Still another object of the invention is to provide a suction cleaner rotary agitator in which the beating and brushing elements are so arranged as to effect maximum cleaning at a minimum noise level. A still further object of the invention is to provide a suction cleaner in which the rotary agitator cooperates with the surface covering undergoing cleaning to dislodge therefrom a maximum of foreign material carried thereby while creating a minimum of noise in so doing. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing.

In the drawing in which a preferred embodiment of the present invention is disclosed:

Figure 1 is a front view of a modern suction cleaner with an agitator constructed in accordance with the present invention embodied therein, certain parts of the casing being broken away;

Figure 2 is a side view of the cylindrical rotary agitator comprising the present invention;

Figure 3 is a side view of the brush element which is adapted to be positioned in the agitator;

Figure 4 is a section upon the line 4—4 of Figure 2;

Figure 5 is a view of the cylindrical agitator shell rolled flat to show the relative positions of the brushing and beating elements thereon.

Referring to Figure 1 of the drawing in particular, a modern suction cleaner is disclosed. The agitator-containing nozzle 1 is shown interiorly connected through an air passageway 2 to a fan chamber 3 within which is positioned a rotary suction-creating fan 4 which is driven by an unshown motor within motor casing 5 positioned immediately thereabove, the motor shaft 6 extending downwardly through the fan chamber 3 and into the air passageway 2 where it is suitably connected by a power-transmitting belt 7 to the rotary agitator 8 in the nozzle. The cleaner is movably supported upon widely spaced front wheels 9, 9 and upon relatively closely spaced rear wheels 10, 10 in a manner common to suction cleaners of this type. Also in a common manner is provided a handle 11 the bail 12 of which is pivotally connected to the cleaner casing at the opposite sides of the fan chamber 3 to provide the operator with means by which the machine may readily be propelled over a surface covering undergoing cleaning.

Referring now particularly to Figures 2 to 5, inclusive, the suction cleaner agitator comprising particularly the present invention is clearly disclosed. The agitator comprises a cylindrical body 8 which is suitably mounted for rotation in any common and well known manner upon the through-supporting shaft 13. Thread guards 14, 14 are screw threaded onto the ends of the shaft 13 and slightly overlie the ends of the cylindrical body of the agitator and serve as protecting guards for the open ends of the agitator as well as means to prevent the accumulation of foreign material about the means which rotatably support the agitator body upon the cylindrical shaft.

Beyond the periphery of the agitator body extend the agitating elements which comprise the rigid smooth surface, rigid beating elements 15, 15 and the flexible brush elements 16, 16. The former are preferably of metal and are either formed integrally in the body of the agitator or suitably secured thereon in any common and well known manner. The brush elements comprise rigid backs 17 and flexible brush elements 18, 18 etc. and are removably secured in the agitator body by screws 19, 19 etc. in such manner that the bristles of the brush element 16 extend

through helically extending slots 20, 20 formed in the agitator body.

It is seen that there are in effect two helically extending rows, each row comprising a beating element, and a brushing element in alignment, and each row wrapped substantially around the agitator through an angle of 180° circumferentially. It is seen that the two helical rows converge at the opposite ends of the agitator to substantially common end points and that in the two rows the brush and beater elements are reversed end for end so that at each end a beater element has a substantially common end with a brush element.

In Figure 2, in particular, a preferred direction of rotation of the agitator is shown by arrows, and to insure that the agitator will be so mounted in the cleaner nozzle that this direction of rotation will be obtained, one end of the shaft 13 is flattened as shown in Figure 2 so that it is adapted to seat only in one end of the nozzle.

In operation upon the rotation of the agitator the surface covering, which is lifted against the agitator by the reduced pressure within the nozzle of the cleaner, is depressed as it is contacted by the brushing and beating elements. Referring to Figure 5 in particular it is seen that as the agitator rotates it is contacted first by relatively flexible brush element 16 (at the bottom right). The bristles of element 16 are sufficiently strong to depress the surface covering after having overcome the initial inertia thereof and are also sufficiently flexible so that the depression is not obtained instantaneously upon the contact therewith by the first bristle tuft. Instead the covering depression builds up along the brush element to a maximum. Upon leaving the brush element the point of depression of the surface covering moves on to and along the aligned beater element to the agitator end. At the agitator end it is necessary to reverse the direction of travel of the depression longitudinally of the agitator and that reversal of direction is taken up by the succeeding brush element 16 which is positioned in the rear of the beater element, or thereabove, as shown in Figure 5.

The relationship is such that the surface covering is separated from the foreign matter positioned therein through being vertically displaced downwardly with such rapidity and force as to separate it from the foreign matter as a result of the inertia thereof. This vertical displacement is accomplished specifically by the contact with the covering of successive rows of agitating elements which depress the covering and which are so arranged upon the rotary agitator body that the point of depression constantly moves back and forth along the length of the agitator.

Each row of agitating elements comprises a flexible brush element and a rigid beating element. The rows are so arranged that the depressed portion of the surface covering travels back and forth across the length of the agitator; and the brush and beater elements in the two rows are so positioned that each part of the surface covering acted upon is contacted by a brush and a beater element.

The brush element embodied in the present invention is not specifically new but instead many common and well known agitator brushes now upon the market will suffice for this purpose.

The agitator is characterized principally by its high efficiency in operation and by its relatively great quietness as compared to the usual suction cleaner rotary agitator of comparable efficiency.

I claim:

1. A rotary agitator for a suction cleaner comprising a rotatable elongated, round smooth-surfaced body, rigid elongated and flexible agitating elements arranged in rows from common ends on said body, the advance element of each row which first contacts the surface covering undergoing cleaning in one direction of rotation being flexible to provide a resilient initial contact with the surface covering undergoing cleaning to displace said covering from said body, said rigid and flexible agitating elements being in helical alignment in each row.

2. A rotary agitator for suction cleaners comprising a rotatable body, a helically extending agitating element on said body adapted to contact a surface covering undergoing cleaning at the leading end of said element to depress it and to move the depression lengthwise of said body as said agitator rotates, the leading end of said element being flexible to reduce the noise of operation, said leading end standing alone and unprotected by parallel elements adjacent thereto, said elements including a rigid portion helically aligned with the remainder thereof.

3. A rotary agitator for suction cleaners comprising a rotatable body adapted to be rotated in one direction when inserted into a cleaner nozzle in one relationship and in the opposite direction when inserted in a reversed relationship and including means to prevent insertion in a reversed relationship, helically extending helically aligned agitating elements on said body adapted to contact a lifted surface covering and to depress it with a depression that travels longitudinally of said body as said agitator rotates, the leading portion of said element first to contact the surface covering being flexible to reduce the noise of operation with said body rotating in one direction only.

4. A rotary agitator for a suction cleaner comprising a rotatable hollow cylindrical body, an elongated opening in the surface of said body, an elongated agitating element insertable through the open end of said body formed with side faces curved to conform to the curvature of said body, extended radially outward through said elongated opening, and lying in contact with the cylindrical wall of said body adjacent to said opening, said opening being too small to permit said element to pass therethrough, and means releasably securing said agitating element in place.

5. A rotary agitator for a suction cleaner comprising a rotatable hollow body, an elongated helically extending opening in said body, a helical brush including flexible bristles extended through said opening and a rigid back formed with faces upon each side of said bristles curved to conform to said cylindrical body when extended helically therein and underlying the sides of said opening to prevent the outward displacement of said brush, and a removable closure member at the end of said body to prevent the entrance of foreign material into said body with said brush in place.

STANLEY R. CUMMINGS.