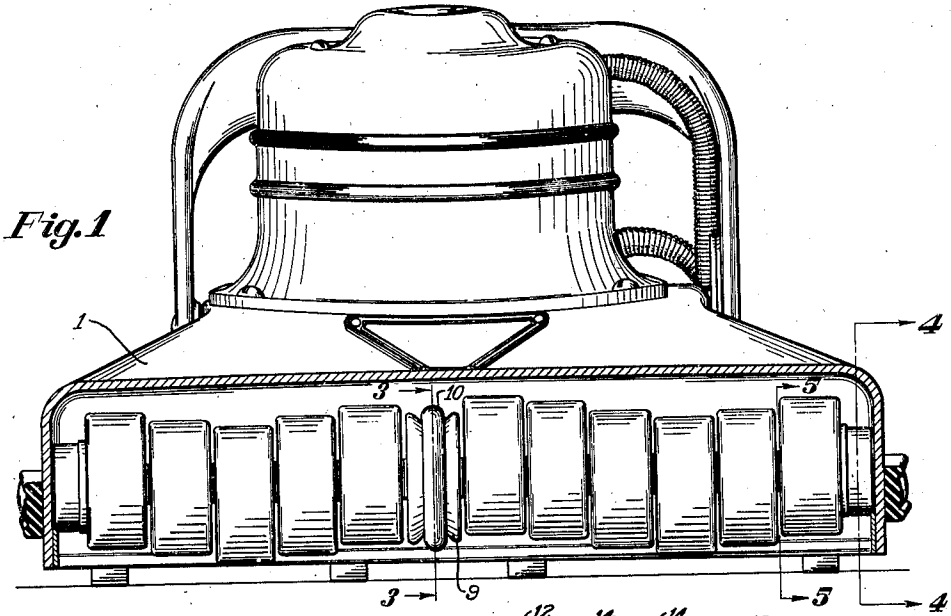
June 23, 1936. S. R. CUMMINGS ET AL 2,045,295

SUCTION CLEANER

Filed June 26, 1933

Fig. 1



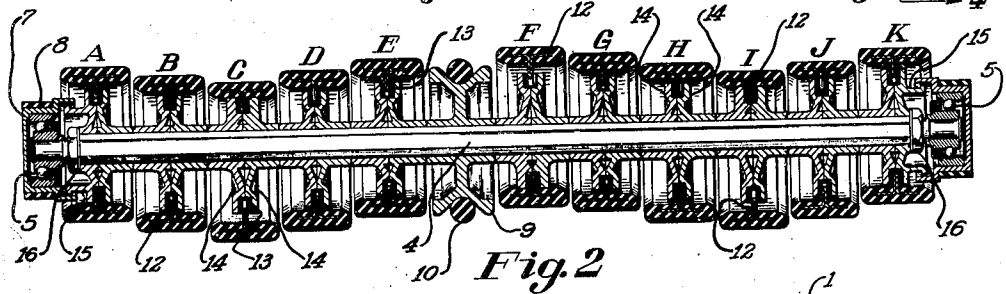


Fig. 2

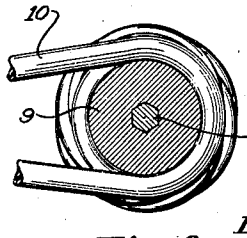


Fig. 3

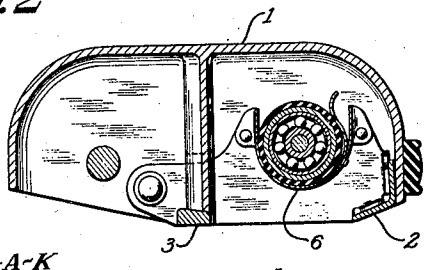


Fig. 4

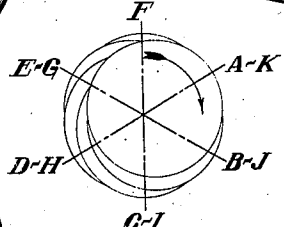


Fig. 6

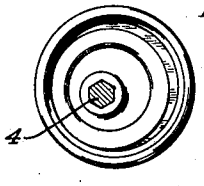


Fig. 5

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SUCTION CLEANER

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Application June 26, 1933, Serial No. 677,580

3 Claims. (Cl. 15—13)

The present invention relates to suction cleaners generally and particularly to a new and improved rotary agitator for a suction cleaner.

It is an object of the present invention to provide a new and improved suction cleaner rotary agitator. Another object is the provision, in a suction cleaner, of a rotary agitator in which the surface-beating elements are loosely and rotatably mounted relative to the main body of the agitator which they encircle. Still another object is the provision of a suction cleaner rotary agitator in which the surface-beating elements are loosely mounted relative to their own supporting means which are arranged longitudinally of the agitator in a definite manner. These and other more specific objects will appear upon reading the following specification and claims, and upon considering in connection therewith the attached drawing to which they relate.

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

Figure 1 is a front view of a suction cleaner showing a section through the nozzle with an agitator constructed in accordance with the present invention embodied therein;

Figure 2 is a longitudinal cross section through the agitator comprising the present invention;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a section upon the line 4—4 of Figure 1;

Figure 5 is a section upon the line 5—5 of Figure 1;

Figure 6 is a diagrammatic showing of the arrangement of the beater elements.

The agitator comprising the present invention is shown embodied in the nozzle 1 of a well-known type of suction cleaner. The functional operation of this type of machine is well-known and it is believed that it is only necessary to state that in its operation the surface covering undergoing cleaning is lifted upwardly from the supporting surface into contact with the front and rear nozzle lips 2 and 3, respectively, by the reduced pressure existing within the nozzle. The agitator positioned within the nozzle contacts the lifted covering and dislocates the imbedded foreign matter therein and the air passing through the nozzle removes it to the dirt receptacle which forms part of the cleaner.

In the present invention the agitator is constructed in a definite manner, and comprises an elongated longitudinally extending hexagonal shaft 4, the ends of which are rotatably carried in bearings 5, 5. The outer races of the bearings are enclosed by cup thread guards 7, 7, which in turn are encircled by rings 8, 8 of sound deadening material. Seats 6, 6 are provided on the nozzle end walls which surround the agitator end construction and removably position the agitator in the nozzle.

Substantially centrally of the shaft 4 is positioned the agitator pulley 9 and which is contacted by the power-transmitting belt 10. Upon each side of the pulley 9 to the ends of the hexagonal portion of the shaft 4 are beater elements, A to K, inclusive, formed as encirling rings or cylinders and preferably made of a resilient material such as rubber. Each beater element is provided with a radially extending inner flange 12 which encircles and seats within a rubber-lined circular channel 13. The internal diameter of the flange 12 is greater than the diameter of the bottom of the channel 13 so that each beater member is permitted a limited radial movement relative to its seat and so to the shaft 4. The sides of the channel 13 slidingly position the radial flanges, however, looseness or rattling being prohibited.

Each channel 13, there being one for each ring, is formed by a pair of cooperating seat sections 14, 14, each of which comprises a radially extending disc and a central hub portion non-rotatably seated upon the shaft 4. The hub portion of each seat section 14 is eccentrically positioned in its disc so that the channel 13 formed at the peripheries of the closely adjacent pairs of discs, is eccentrically positioned relative to the axis of rotation of the agitator. In each section 14 the thickness of the walls of the disc along any particular radius is determined by that radius, the shorter radii having greater wall thickness in order to provide dynamic balance in each seat member.

The seat sections for the beater elements are identical with the exception of the two end sections which are provided with longitudinally extending walls having flanged ends, and indicated generally by the reference characters 15, 15. These walls cooperate with the thread guards 7, 7 to prevent the accumulation of foreign matter such as threads and hair etc. in the space adjacent the agitator-supporting bearings 5, 5. In positioning the seat sections on the shaft 4 they are arranged so that starting from one end of the agitator the true centers of the seating channels 13, 13 etc. advance around the true axis of rotation in a helix. The construction is held in assembled relation by nuts 16, 16 at the end of the hexagonal portion of the shaft

4 immediately adjacent the end seat members.

In the operation of the agitator constructed in accordance with the present invention the driving belt 10 rotates the agitator about the supporting bearings 5, 5 at high speed. Each beater element is centrifugally thrown in the direction of the shaft 4, its limiting position being that in which its radial flange 12 contacts that part of the circular channel 13 having the minimum radius. When the beater element has assumed this position and has substantially reached a state of equilibrium it will rotate with the shaft and in contact with its supporting seat as stated. As the channels 13, 13 are eccentric relative to the axis of rotation in a definite manner, as indicated supra, the beater elements will also assume a definite relationship relative to the shaft. Figure 6 diagrammatically illustrates the relative positions of the various beater elements relative to the shaft in the operation of the agitator in a clockwise direction. Beater elements A and K, found at the opposite ends of the agitator assume the same relative angular positions relative to the axis of rotation, as do the beater elements B and J, C and I, D and H, E and G. Element F is displaced 180 degrees from the pair of elements C and I. In operation upon a surface covering a beater element at each end of the agitator would simultaneously strike the covering undergoing cleaning. Immediately thereafter the two adjacent beater elements would strike the covering, and so on until each beater element had delivered one blow, following which the two original beater elements would again strike the covering. The point to be stressed is that the series of beating blows delivered by the agitating elements advances along the axis of the agitator in a definite sequence as the agitator elements are arranged helically about the axis of rotation. As each beater element strikes the surface covering undergoing cleaning it would be deflected inwardly only to be again thrown outwardly by centrifugal force. The presence of the rubber lining in each channel 13 results in a minimum of noise and the loose mounting of the beater elements insures a minimum of wear on the surface covering undergoing cleaning.

We claim:

1. A rotary agitator for a suction cleaner including a body mounted for rotation about its longitudinal axis, said body formed with eccentric seats each including a resilient channel, a flat surfaced beating cylinder of rubber encircling said body having a radially extending flange slidably and rotatably seated in said channel.

2. A rotary agitator for a suction cleaner including an elongated shaft, a pulley mounted on said shaft, a plurality of pairs of seat members mounted on said shaft, each member including a hub portion and a radially extending disc, the discs of each pair of members cooperating to form an eccentric circular channel about said shaft and the hub portions of adjacent members contacting and spacing said channels, encircling beaters having a portion seated in said channel, and means rotatably supporting said shaft.

3. A rotary agitator for a suction cleaner including an elongated shaft, a pulley mounted on said shaft, a plurality of pairs of seat members mounted on said shaft, each member including a radially extending disc and an eccentric hub portion, the discs of each pair of members cooperating to form a circular channel eccentric with respect to the shaft, resilient lining means in said channels, encircling beater elements having radially extending portions seated in said channels and permitting rotation and limited radial movement of said beaters relative to said shaft, and means rotatably supporting said shaft, each of said seat members being dynamically balanced.

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