July 23, 1935. B. C. BECKER 2,008,676

SUCTION CLEANER

Filed Aug. 3, 1933

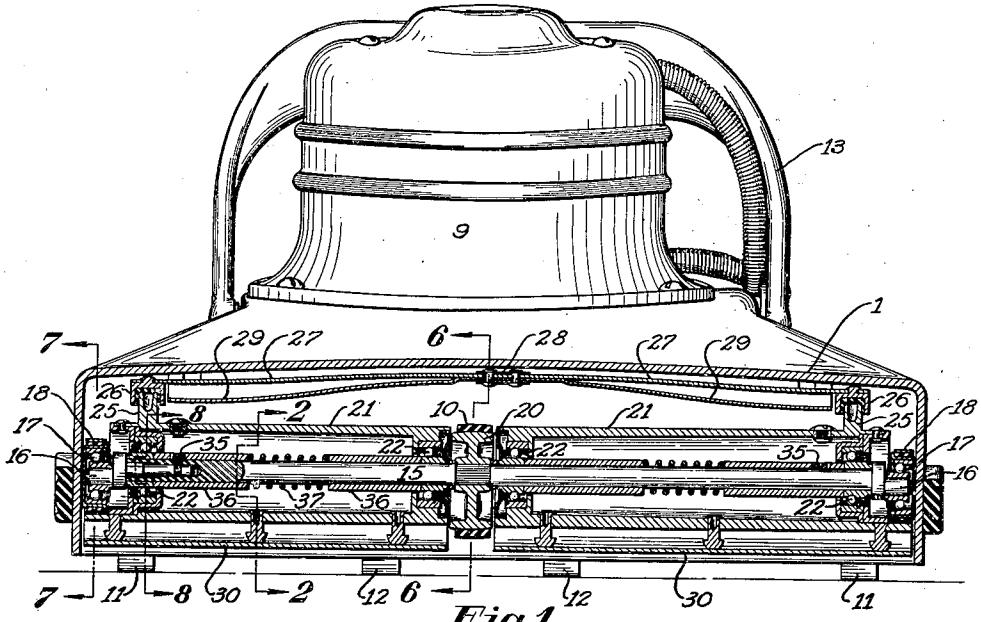


Fig. 1

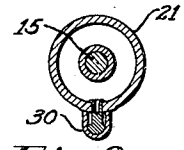


Fig. 2

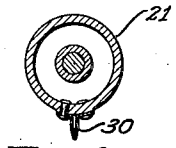


Fig. 3

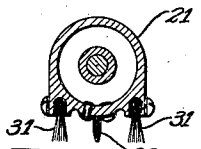


Fig. 4

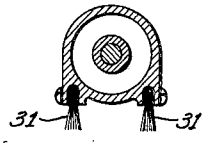


Fig. 5

Fig. 6

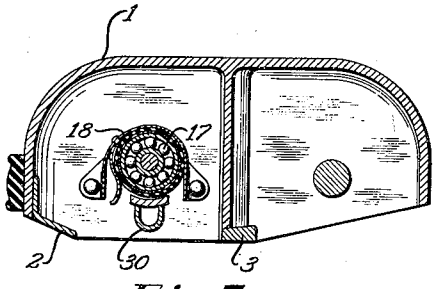


Fig. 7

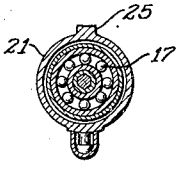


Fig. 8

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SUCTION CLEANER

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13 Claims. (Cl. 15—6)

The present invention relates to suction cleaners in general and particularly to a new and improved agitator for a suction cleaner. More specifically, the invention comprises the provision, in a suction cleaner, of an agitator within the cleaner nozzle which is of the beating and pile-deflecting type and which is driven by a power-transmitting belt. Applicant does not represent that he is the inventor of the basic invention comprising gyrating agitators, but only that he is the inventor of the improvements disclosed and claimed.

It is an object of the present invention to provide a new and improved agitator for a suction cleaner. It is another object to provide, in a suction cleaner, a surface-contacting agitator which travels in a relatively small orbit and which is driven by means of the usual belt and pulley connections. Still another object is the provision, in a suction cleaner, of a positive beating agitator having a relatively small component of movement across the surface covering undergoing cleaning. 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.

Referring now to the drawing:

In Figure 1 is shown a vertical cross section through the nozzle of a modern suction cleaner provided with an agitator constructed in accordance with the present invention;

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

Figure 3 is a section similar to Figure 2 through a second preferred embodiment of the agitator;

Figure 4 is a section similar to Figure 2 through a third preferred embodiment of the agitator;

Figure 5 is a section similar to Figure 2 through a fourth preferred embodiment of the agitator;

Figure 6 is a section upon the line 6—6 of Figure 1;

Figure 7 is a section upon the line 7—7 of Figure 1;

Figure 8 is a section upon the line 8—8 of Figure 1.

The present invention is shown embodied in a modern suction cleaner including a nozzle 1 having front and rear surface-contacting lips 2 and 3. Nozzle 1 is interiorly connected to fan chamber 4 by means of the air passageway 5 which leads from the nozzle to the inlet 6 of the fan chamber. A suction-creating fan 7 is positioned within the chamber 4 and is rotated by the motor shaft 8 which is extended therethrough from the motor casing 9 positioned immediately thereabove. Shaft 8 is shaped as a driving pulley at its lower end and is connected to the power-transmitting belt 10 which extends forwardly to the nozzle 1. The cleaner is movably supported upon front and rear supporting wheels 11, 11 and 12, 12, respectively, and a pivoted handle 13 is provided by which the operator may propel the machine in its operation.

The agitator constructed in accordance with the present invention is shown positioned within the nozzle 1. A longitudinally extending shaft 15 is provided with eccentric stub-shafts 16, 16 at its ends which are rotatable within and which carry bearings 17, 17. The end walls of the nozzle are provided with bearing-receiving seats 18, 18 which are adapted to receive and seat the bearings when the agitator has been inserted into the nozzle between the lips 2 and 3.

Substantially midway of its length the shaft 15 is provided with a pulley 20 which is keyed thereto in any suitable manner and is itself centered upon the stub-shafts 16, 16, and therefore eccentric relative to the shaft 15. Upon the opposite sides of pulley 20 are positioned cylindrical bodies 21, 21 which are concentric with the shaft 15 and which are rotatably mounted relative thereto by bearings 22, 22 at their ends. To prevent the rotation of bodies 21, 21 vertical posts 25, 25 are formed at the outer ends thereof which are enclosed within seats 26, 26. These seats are provided with resilient inner surfaces and are carried by leaf springs 27, 27 mounted centrally of the nozzle as indicated at 28. Transverse housing members 29, 29 inclose the springs 27, 27 in spaced relationship to prevent the accumulation of foreign matter therearound.

At the bottom of each cylinder 21 and extending longitudinally thereacross is provided a surface-contacting beater element 30, the two elements 30, 30 extending substantially the entire width of the nozzle 1. Elements 30, 30 may be secured to the bodies 21, 21 in any suitable manner and are shown riveted thereto.

As shown in Figures 1, 2, 6, 7 and 8 the surface-contacting beater element is relatively rounded at its surface-contacting point. As shown in Figure 3, the element 30 is thinner at its point of surface contact and better adapted to extend between the pile of the surface covering undergoing cleaning. In the embodiment shown in Figure 4 the thin surface-contacting element 30 is combined with brushes 31, 31 upon the opposite sides thereof which are also carried by body 21. In Figure 5 the element 30 has been eliminated and brushes 31, 31 only are provided.

For purposes of manufacturing convenience the shaft 15 has been shown counterbored at its end in order that the stub-shaft 16 may be secured thereto. Locking screws 35, 35 extend into the counterbore and seat within a circumferential groove formed in the body 16. Also for manufacturing design sleeves 36, 36 inclose the shaft 15 within the bodies 21 and contact at their outer ends the inner races of the bearings 22, 22. Spiral springs 37, 37 encircle the shaft 15 and through contacting the inner ends of the sleeves 36, 36 urge them apart and maintain the correct relationship between the bearings 22, 22.

In the operation of the suction cleaner provided with an agitator constructed in accordance with the present invention, upon the operator closing an operating switch an electric current passes through the cleaner motor and the suction-creating fan 7 rotates. A reduced pressure is created by fan 7 which is effective within the nozzle 1 to lift the surface covering undergoing cleaning into contact with the lips 2 and 3. The rotating shaft 8 drives the power-transmitting belt which in turn rotates the pulley 20 which, through being carried by the shaft 15 and being centered upon the stub-shafts 16, 16, rotates shaft 15 about the shafts 16, 16 as an axis. The cylinders 21, 21 are carried by the shaft 15 but are held against rotation by the cooperating posts 25, 25 and their seats 26, 26. As a result of this relationship each point of each cylinder revolves in a circle the diameter of which is equal to twice the eccentricity of the shaft 15 relative to the stub-shafts 16, 16. This movement is imparted to the agitator elements carried by the cylinders and each element 30 moves in a path having a diameter equal to twice the eccentricity of the shaft 15 about stub shafts 16, 16. As the pulley 20 is rotated at high speed by the power-transmitting belt 10 a positive beating action is imparted to the surface covering between the lips 2 and 3 by the surface-contacting elements. With the construction shown in Figure 2 a positive beating action alone is provided. With the construction shown in Figure 3 the beating action is coupled with a penetrating and pile-deflecting action, while with the embodiment shown in Figure 4 the functional operation of the construction of Figure 3 is accompanied by a brushing function through the movement of the brushes 31, 31.

I claim:

1. In a suction cleaner including a nozzle, suction-creating means connected to said nozzle, a driving shaft, and a belt from said shaft extended to said nozzle; an agitator comprising spaced means mounted within the nozzle and rotatable about a longitudinal axis across said nozzle, means eccentrically carried by and extended between said spaced means, a pulley rigidly carried by said eccentrically carried means and connected to said belt to rotate said spaced means, a surface-contacting agitating element, and non-rotatable means rotatably seated upon said eccentrically carried means and supporting said agitating element.

2. In a suction cleaner including a nozzle, suction-creating means connected to said nozzle, a driving shaft, and a belt from said shaft extended to said nozzle; an agitator comprising supporting means rotatable about a longitudinal axis across said nozzle and including a portion displaced from said axis, a non-rotatable body mounted on the displaced portion of said rotatable supporting means and extended across said nozzle, a pulley to rotate said supporting means connected thereto and positioned intermediate the ends of said body and centered on the axis of rotation, said pulley being connected to said belt, and a surface-contacting agitating element carried by said body and moved thereby in an orbit for the purpose of agitating the surface covering undergoing cleaning upon the rotation of said rotatable supporting means.

3. In a suction cleaner including a nozzle, suction-creating means connected to said nozzle, a driving shaft, and a belt from said shaft extended to said nozzle; an agitator comprising a shaft extended across said nozzle, stub-shafts eccentrically supporting said shaft for rotation, a cylindrical body rotatably seated upon said shaft, means preventing the rotation of said body, a driving pulley carried by said shaft intermediate its ends and centered upon the axis of rotation through said stub-shafts, and a surface-contacting agitating element carried by said body adapted to move in an orbit whose magnitude is dependent upon the eccentricity of said shaft relative to said stub-shafts.

4. The construction recited in claim 3 characterized by the fact that said agitating element is a rigid member rigidly carried by said body.

5. The construction set forth in claim 3 characterized by the fact that said element is an elongated rigid thin element adapted to penetrate the pile of a surface covering undergoing cleaning.

6. In a suction cleaner including a nozzle, suction-creating means connected to said nozzle, a driving shaft, and a belt from said shaft extended to said nozzle; an agitator comprising a shaft extended across said nozzle, stub-shafts eccentrically supporting said shaft for rotation, a cylindrical body rotatably seated upon said shaft, means preventing the rotation of said body, a driving pulley carried by said shaft intermediate its ends and centered upon the axis of rotation through said stub-shafts, and surface-contacting agitating elements carried by said body and adapted to move in an orbit whose magnitude is dependent upon the eccentricity of said shaft relative to said stub-shafts, one of said elements being a rigid beater element and one of said elements being a brush, said elements being positioned closely adjacent and adapted to contact the same portion of the surface covering undergoing cleaning upon movement of the machine in operation.

7. In a suction cleaner, an agitator comprising a non-rotatable body, a surface-contacting agitating element carried by said body, a shaft extended thru said body and rotatable relative thereto, eccentrically positioned stub-shafts at the ends of said shaft, means rotatably mounting said stub-shafts and means to rotate said shaft about said stub-shafts as an axis to actuate said agitating element.

8. The construction recited in claim 7 characterized in that said body is cylindrical and encloses said shaft for substantially its entire length.

9. The construction defined in claim 7 characterized in that said agitating element is a rounded beater.

10. The construction recited in claim 7 characterized in that said agitating element is an elongated rigid agitating element having a rounded surface-contacting portion.

11. The construction recited in claim 7 characterized in that said agitating element is an

elongated rigid thin element adapted to penetrate the pile of a surface covering undergoing cleaning.

12. The construction recited in claim 7 characterized in that said agitating element is a brush.

13. In a suction cleaner, an agitator including a surface-contacting element, a rotatable shaft non-rotatably supporting said element, means to rotate said shaft, and means to cause said element to move in an orbit not enclosing said shaft upon the rotation thereof.

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