

July 23, 1935.

C. H. TAYLOR

2,008,972

SUCTION CLEANER

Filed Aug. 11, 1933

2 Sheets-Sheet 1

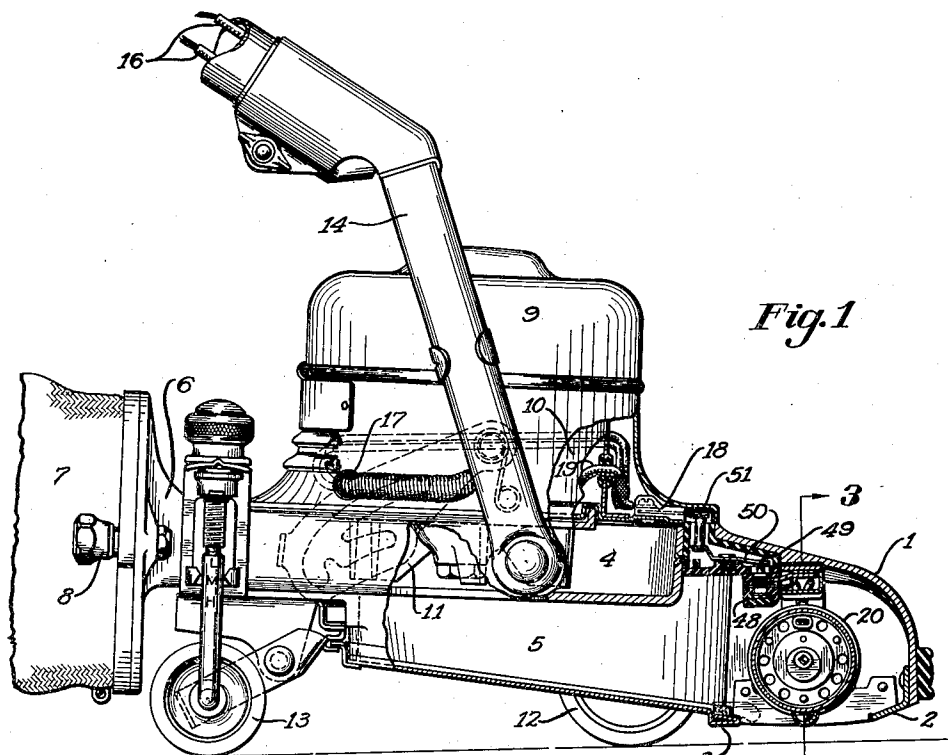


Fig. 1

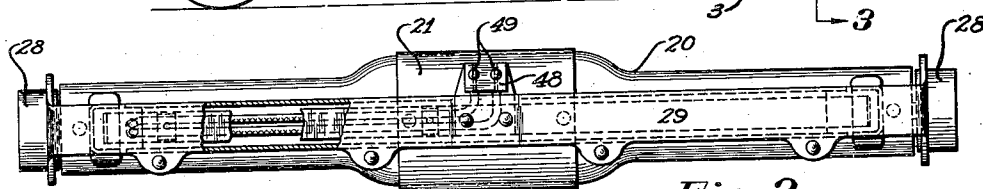


Fig. 2

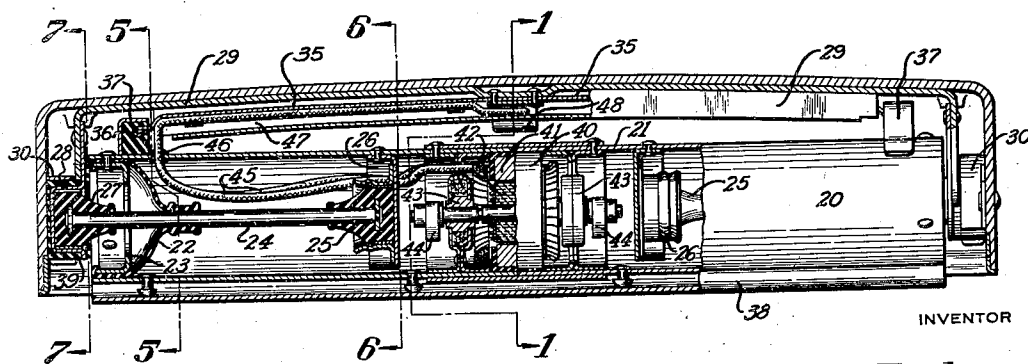


Fig. 3

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2 Sheets-Sheet 2

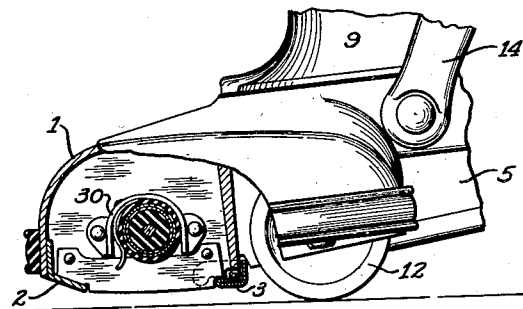


Fig. 4

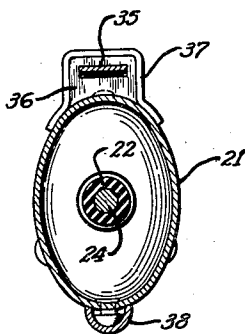


Fig. 5

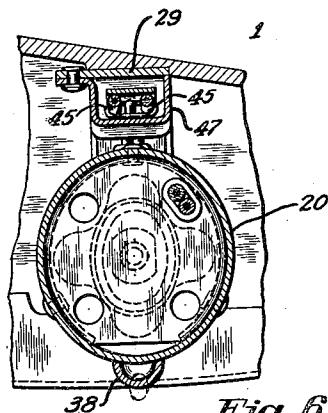


Fig. 6

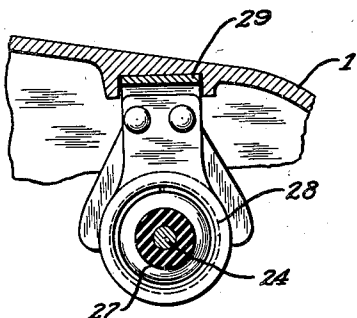


Fig. 7

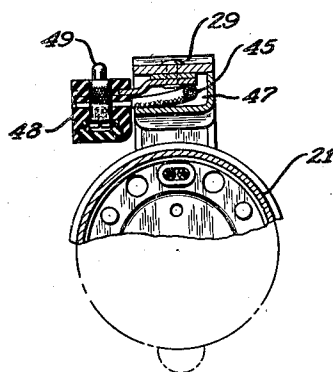


Fig. 8

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SUCTION CLEANER

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Application August 11, 1933, Serial No. 684,636

18 Claims. (Cl. 15-13)

The present invention relates to suction cleaners in general and particularly to a new and improved surface-agitating device in a suction cleaner. More specifically, the invention comprises the provision of a new and novel motor-driven beating agitator in a suction cleaner nozzle.

It is an object of the present invention to provide a new and improved suction cleaner agitator. It is a further object to provide, in a suction cleaner, a beating agitator which is driven by its own motor positioned within the cleaner nozzle. It is still another object to provide, in a suction cleaner, a vibrating beater agitator which is driven by a rotary motor positioned in the cleaner nozzle. It is a still further object to provide, in a suction cleaner, a positive beating agitator which is resiliently mounted within the cleaner nozzle and which is actuated by a rotating driving motor which moves in synchronism with the surface-contacting beating element. These and 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 drawings in which the same reference characters refer to like parts throughout:

Figure 1 is a side elevation of a modern suction cleaner embodying an agitator constructed in accordance with the present invention, certain parts being shown in section upon the line 1-1 of Figure 3.

Figure 2 is a top view of the agitator unit removed from the suction cleaner nozzle.

Figure 3 is a vertical section through the cleaner nozzle upon the line 3-3 of Figure 1.

Figure 4 is a partial section through the cleaner nozzle with the agitator removed therefrom and showing the agitator support.

Figure 5 is a section upon the line 5-5 of Figure 3.

Figure 6 is a section upon the line 6-6 of Figure 3.

Figure 7 is a section upon the line 7-7 of Figure 3.

Figure 8 is a section similar to the section of Figure 1 but on an enlarged scale.

A well known type of suction cleaner is shown in the drawings which comprises a casing including a nozzle 1, having front and rear surface-contacting lips 2 and 3 respectively; and a fan chamber 4 which is interiorly connected by the air passageway 5 to the nozzle 1, and which is open to the exhaust outlet 6. A dust bag 7 is connected by suitable means 8 to the outlet 6. A

motor casing 9 is positioned immediately above the fan chamber 4 and houses a suitable driving motor 10, the shaft of which extends into the fan chamber 4 and carries a suction-creating fan 11 which is effective, in the operation of the machine, to create a reduced pressure in the fan chamber 4 and to draw air from the nozzle 1 and exhaust it into the dust bag 7. As in the usual suction cleaner of this type, front and rear supporting wheels 12 and 13 are provided, as is a pivoted handle 14 by which the operator may exert a propelling force. The incoming power leads to the motor 10 are indicated at 16, 16 and extend through the handle 14 and down and into the motor casing 9 at 17. The leads partially encircle the motor 10 to be connected to a contact block 18, leads 19, 19 extending from that block directly to the motor 10.

The suction-creating means of the cleaner are effective to lift the surface covering undergoing cleaning into contact with the nozzle lips 2 and 3 and to draw air between those lips and the surface covering to remove the foreign matter embedded in the latter. Within the nozzle 1 to co-operate with the flow of air in removing the foreign matter in the surface covering is provided an agitating unit indicated generally by the reference character 20 which is constructed in a new and novel manner as hereinafter described.

Agitator 20 comprises an elongated cylindrical body 21 the cross sectional dimensions of which vary across the nozzle mouth, as is clearly seen in Figures 2, 5 and 6. At substantially its center the body 21 is enlarged for a considerable distance while at the sides thereof the body is narrowed until it is elliptical in cross section with its major axis in a vertical plane, as is seen in Figure 5.

The ends of body 21 are closed by resilient cups 22, 22 which are clamped by means of riveted rings 23, 23 to that body. A supporting shaft 24 extends inwardly from each end of body 21 through the cup 22 to be seated at its inner ends in a resilient rubber seat 25 carried by a suitable support 26 from the top of body 21. The supports 26, 26 are positioned at substantially the ends of the enlarged portion located centrally of the body 21. The outer ends of the shafts 24, 24 are seated in resilient rubber members 27, 27 carried by integral seats 28, 28 at the ends of a frame 29 which extends above and along the entire length of the agitator and in contact with the under side of the nozzle wall. Each cup 28 itself is enclosed in a rubber cup 39 and the entire seat assemblage is removably secured to the end

walls of the nozzle by means of seats 30, 30 carried by the nozzle.

Flexible leaf springs 35, 35 are connected to the frame 29 substantially centrally of the nozzle and extend laterally to points at the ends of the agitator body 21 where they seat in resilient blocks 36, 36 carried in housings 37, 37 on top of that body. These leaf springs 35, 35 make possible, or rather do not impede, the vertical movement of the agitator 20 while limiting to a relatively small extent any rotation or horizontal movement.

Within the body 21, and more particularly within the enlarged portion thereof at its center, is positioned a rotating motor 40, the stationary field 41 of which is carried by the body, the rotating armature 42 being mounted in bearings 43, 43 which are also carried by the body. The armature shaft extends beyond the bearings 43, 43 and supports unbalanced weights 44, 44, as is clearly seen in Figure 3. The electrical current for the motor is obtained from the leads 45, 45 which enter the body 21 at 46, having extended along a channel 47 positioned along the underside of frame 29. Leads 45, 45 extend into an insulating contact block 48 carried by frame 29, each lead ending in a contact 49. When the agitator unit is positioned within the nozzle each contact 49 makes contact with a nozzle-supported contact 50, the opposite end of which extends upwardly and into contact with a contact 51 carried by the contact block 48. This arrangement makes possible the removal of the agitator unit from the nozzle and the removal of the motor from the nozzle casing without necessitating any electrical disconnections requiring tools.

In the operation of the cleaner constructed in accordance with the present invention, cleaning air is drawn through the nozzle and effects the lifting of the surface covering into contact with the lips 2 and 3. The agitator 20 extends substantially into the plane of the nozzle lips being provided with an agitating element 38 which is shown in the drawings as being a rigid beater element and which is adapted to make contact with the surface covering. The current which drives the electric motor 10 also passes through the electrical connections aforescribed to the motor within the body 21. As the armature 42 rotates it carries with it the unbalanced masses 44, 44 which impart to the entire agitator unit a movement in an orbit similar to that shown in connection with the beater element in Figure 6. The mounting of the agitator unit upon the resiliently supported shafts 24, 24 makes possible this movement with a minimum of resistance and the result is the delivery of a beating blow to the surface covering undergoing cleaning having a component of movement parallel to that surface covering which is relatively small.

I claim:

1. In a suction cleaner, a body, an agitator, means mounting said agitator relative to and in operative relationship with said body for free limited translation, and means comprising an unbalanced electric rotary motor directly connected to said agitator for synchronous movement therewith, the unbalanced element of said motor rotating about an axis to impart motion having a vertical component to said agitator.

2. In a suction cleaner, a body, an elongated agitator, means mounting said agitator on said body for free limited translation including motion in a horizontal direction, and means com-

prising an unbalanced electric rotary motor directly connected to said agitator for synchronous movement, the unbalanced element of said motor rotating about an axis to impart motion to said agitator having a horizontal component.

3. In a suction cleaner, suction-creating means, a nozzle connected to said means, an agitator within said nozzle, means mounting said agitator for limited free movement toward and from a surface covering positioned below said nozzle, an unbalanced electric rotary motor in said nozzle connected to said agitator for common displacement therewith relative to said nozzle, the unbalanced element of said motor being rotatable about a horizontal axis.

4. In a suction cleaner, suction-creating means, a nozzle connected to said means, an agitator within said nozzle extended substantially parallel to the plane of the supporting surface, means mounting said agitator for limited free movement in certain directions, an unbalanced mass connected to said agitator and rotatable about an axis substantially parallel to said supporting surface, and means comprising an electric motor to rotate said eccentric mass to cause said agitator to be translated in a continuous orbit to effect the agitation of a surface covering positioned below said nozzle.

5. The construction recited in the preceding claim characterized in that said eccentric mass and said means to rotate said mass are positioned within said agitator.

6. An agitator unit for a suction cleaner comprising a frame adapted to be seated on the cleaner casing, a body, means supporting said body on said frame for free translation within limits, a surface-contacting agitating element carried by said body, and an electric unbalanced rotary motor carried by said body to actuate said element.

7. In a suction cleaner, a casing, an agitator body, means resiliently supporting said body on said casing for limited free movement, an agitating element carried by said body, and an unbalanced electric rotary motor mounted in said body to actuate said element.

8. In a suction cleaner, a casing, an agitator body, a resiliently mounted shaft supporting said body on said casing, a surface-contacting agitating element carried by said body, an unbalanced electric motor mounted in said body to actuate said element, and current-carrying leads connecting said motor to a source of electricity in said cleaner.

9. In a suction cleaner, a surface-contacting agitating element, means mounting said element for movement in a substantially elliptical path having its major axis vertical, and driving means to actuate said agitator positioned in the agitator body.

10. The construction recited by the preceding claim characterized in that said agitator is resiliently mounted and in that said driving means comprises an unbalanced rotary motor.

11. In a suction cleaner, a nozzle, suction-creating means connected to said nozzle, an enclosed body interiorly sealed from the interior of said nozzle, means non-rotatably and movably mounting said body in said nozzle, an agitating element carried by said body in a position to contact a surface covering undergoing cleaning, and body-actuating means positioned inside said body to move said body and agitating element relative to a surface covering undergoing cleaning.

12. In a suction cleaner, a nozzle, suction-creat-

- ing means connected to said nozzle, an enclosed body interiorly sealed from the interior of said nozzle, means non-rotatably and movably mounting said body in said nozzle, an agitating element carried by said body in a position to contact a surface covering undergoing cleaning, an electric motor in said body including an unbalanced element rotatable about an axis parallel to the supporting surface.
13. In a suction cleaner, a nozzle, suction-creating means connected to said nozzle, an enclosed body interiorly sealed from the interior of said nozzle, means resiliently and non-rotatably mounting said body in said nozzle, a surface-contacting agitating element carried by said body, an electric motor in said body including a stator rigidly carried by said body and an unbalanced rotor positioned for rotation about a horizontal axis.
14. An agitator for a suction cleaner comprising a body, a surface-contacting agitating element carried by and movable with said body, supporting means on said body adapted to seat removably on a suction cleaner casing, electrical means in said body to cause said body to vibrate, and contacts carried by said body connected to said electrical means and adapted to be connected with a source of current on a cleaner casing.
15. In a suction cleaner, a body, a surface-contacting agitating element, means movably mounting said element for movement relative to said body and to a surface covering undergoing cleaning in a substantially elliptical path having its major axis vertical, and means to actuate said agitator in said elliptical path to impart agitation to said surface covering.
16. In a suction cleaner, a body, a surface-contacting agitating element, means mounting said element for limited translation relative to said body, means to restrict horizontal translation of said element to a greater extent than the vertical translation, and means to actuate said element in a continuous orbit having vertical and horizontal components for the purpose of effecting the agitation of a surface covering undergoing cleaning.
17. In a suction cleaner, a body, a surface-contacting agitating element, means mounting said element for movement in which each point in said element moves in an elliptical path in a vertical plane relative to said body, and means to actuate said agitator in said elliptical path to effect surface agitation.
18. The construction recited by the preceding claim characterized in that said actuating means are connected to and are movable with said agitating element.

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