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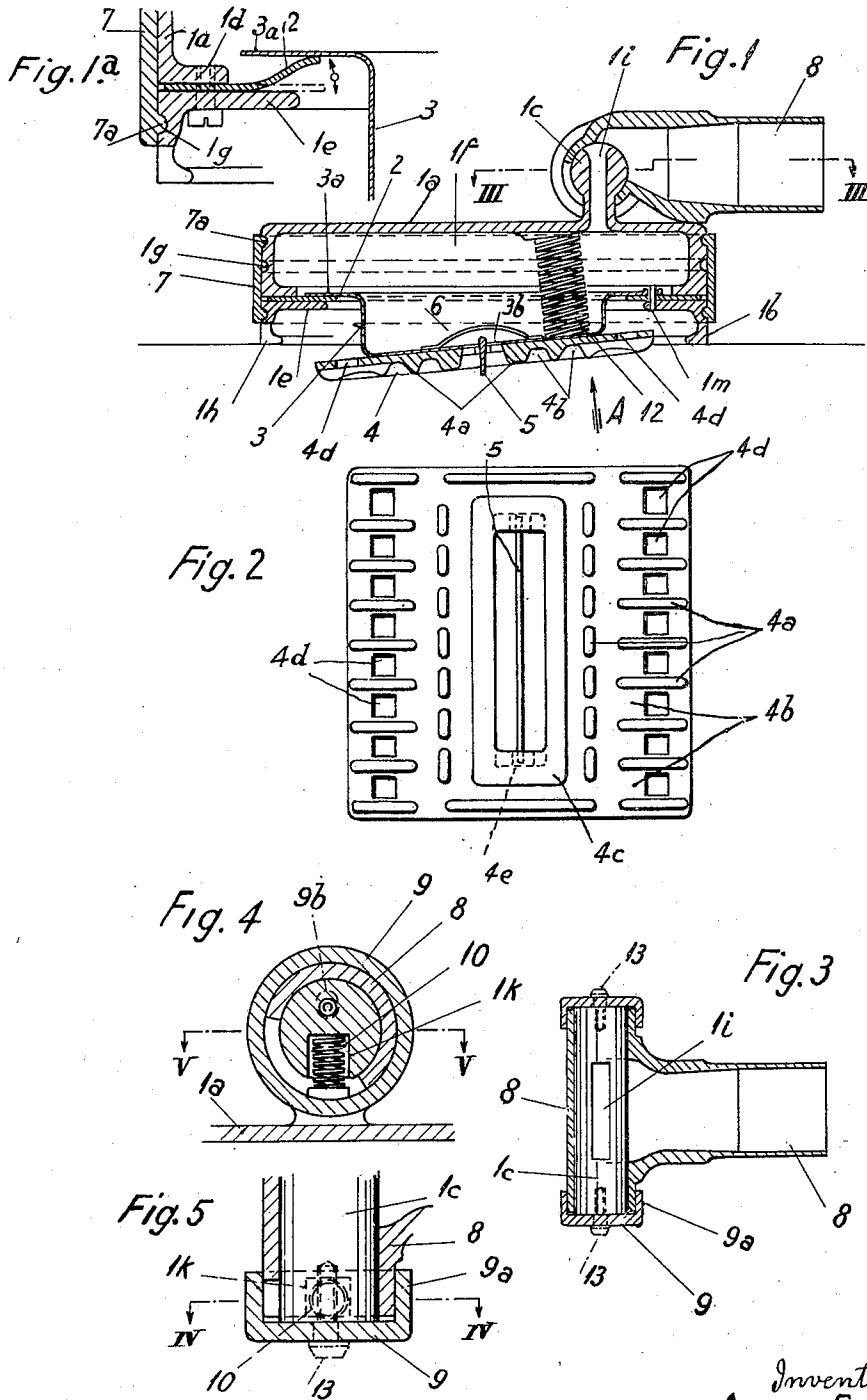
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2,233,252

SUCTION CLEANER

Filed Nov. 2, 1937

2 Sheets-Sheet 1



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Fig. 6

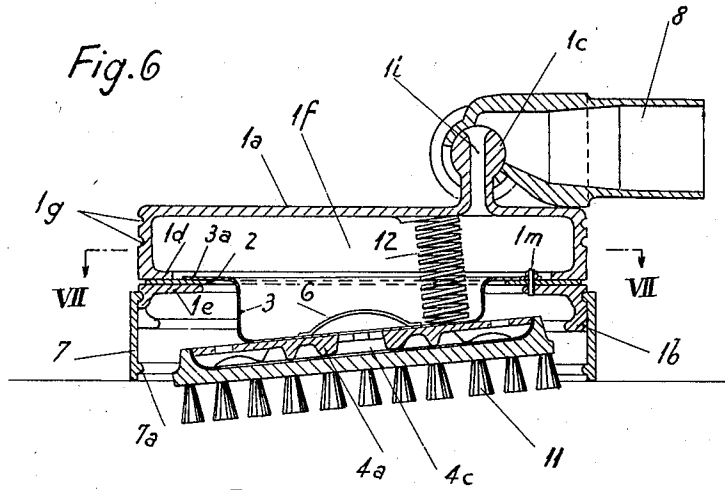
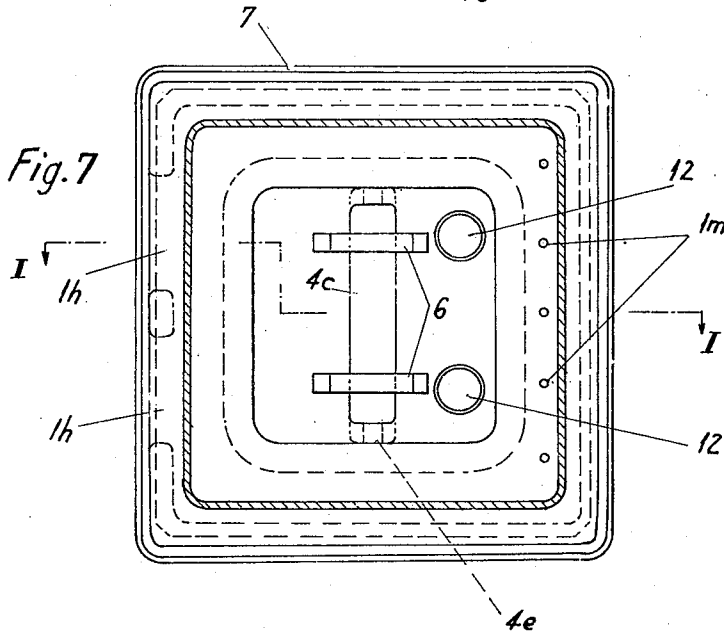


Fig. 7



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UNITED STATES PATENT OFFICE

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SUCTION CLEANER

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5 Claims. (Cl. 15-13)

The present invention relates to suction or vacuum cleaners for cleaning and dusting and has for its object to provide an improved suction cleaner for cleaning by suction and agitation.

According to the invention the suction hood of a cleaner is provided with an inwardly projecting flexible packing strip with an agitator member loosely resting on the projecting portion of said strip, the flexible strip being mounted and arranged in such a manner as to prevent the passage of air between the strip and the agitator member whilst following the movement of the agitator member but separate from said agitator towards the end of the upward movement of the member to permit outside air to enter side suction hood and effect a change of pressure therein to cause downward movement of the agitator member.

The accompanying drawings show by way of example one constructional form of the invention.

Fig. 1 is a section on line I—I of Fig. 7 showing the suction nozzle, the agitator and the adjacent suction tube of an improved vacuum cleaner.

Fig. 1a shows in detail the flexible strip, the adjacent parts of the nozzle and the agitator.

Fig. 2 is a plan view of the agitator plate seen in the direction of the arrow A of Fig. 1.

Fig. 3 is a section on line III—III of Fig. 1. Fig. 4 is a section on line IV—IV of Fig. 5.

Fig. 5 is a section on line V—V of Fig. 4.

Fig. 6 is a section similar to that in Fig. 1, but showing a brush applied to the agitator plate, and

Fig. 7 is a section on line VII—VII of Fig. 6.

1a and 1b indicate the two parts of a suction nozzle. With the upper part 1a of the suction hood is integral a cylindrical pivot pin 1c. The part 1a of the suction nozzle has at its lower end a flange 1d, whilst the part 1b has a corresponding counter flange 1e. Between these flanges is clamped a flexible strip 2 preferably made of rubber. In the part 1b of the suction nozzle are provided openings 1h for the admission of air. Upon the flexible strip rests the edge portion 3a of the agitator member 3. The agitator member 3 is secured against lateral displacement relatively to the part 1b by means of pins 1m. Two springs 12 tend to press the edge portion 3a of the agitator member 3 upon the inwardly projecting portion of the strip 2. Upon the under surface of the agitator member 3 is detachably fixed a plate 4. This plate 4

has raised portions 4a and intermediate depressed portions 4b. The opening 4c, 3b effects communication between the outer air and the suction chamber 1f. Other openings 4d connect the space under the plate 4 with an outer space which is within the path of the air current moving past the flexible strip. Into the opening 4c is inserted a thread catcher 5. The thread catcher 5 consists of a rubber strip the upper part of which is held in a sheet metal mount; the latter has projecting ends which enter into the recesses 4e. The thread catcher cannot drop out of the recesses because it is secured in its position by means of two transverse webs 6. The employment of such thread catchers is very well known in connection with suction cleaners. The thread catcher is held in the agitator by means of two transverse webs 6, and therefore cannot drop out of the recesses 4e. 7 indicates a slide which is continuous around the housing which encloses the outer side of the parts 1a and 1b of the suction nozzle, and is provided with beads 7a fitting corresponding grooves 1g formed in the outer side of the suction hood. The slide may be moved by hand so that the beads 7a engage one or the other of the grooves 1g and thereby raise the cleaner at different heights from the floor.

11 indicates a brush adapted to be applied to the underside of the plate 4. The brush may be fixed to the plate 4 by any suitable device.

The cylindrical pivot 1c is provided with a suction port 1f and is enclosed by a socket member 8, the latter being secured in position upon the pivot by means of two covers 9 provided with flanges 9a. The pivot pin 1c is provided at both ends with recesses 1k in which are lodged springs the lower ends of which bear against the flanges 9a of the covers, whereby the cylindrical pivot 1c is constantly pressed against the upper part of the socket 8. The openings 9b in the covers 9 through which the fixing screws 13 pass, are elongated in the vertical direction to enable the covers 9 to adjust themselves automatically with regard to the pivot pin under the action of the springs 9 to compensate for the wear of the socket 8 or the pivot pin 1c, the joint between the socket 8 and the pivot pin 1c being airtight.

The agitator will exert a beating action upon vacuum being produced in the vacuum chamber 1f of the suction nozzle. The vacuum draws the agitator member 3 together with the free portion of the flexible strip upwards, until the latter detaches itself from its supporting flange

3a and snaps back. At this moment the vacuum in the vacuum chamber is at least partly released and the agitator member is returned to its initial position by its own weight and by the action of the springs 12. Rapid repetition of this operation produces vibrating movement of the agitator.

The sucked in air and the dust particles contained therein pass between the vibrating strip 2 and the edge portion 3a of the agitator member 3 into the vacuum chamber 1f and therefrom through the ported pivot pin directly or by means of a suction tube and suction bag into the vacuum cleaner.

The described apparatus may be used for various purposes. In the position shown in Fig. 1 the cleaner is used for beating and simultaneously vacuum cleaning soft supports such as carpets, cushions, fabrics and the like. When the agitator rests on the support, the opening 3b which is enclosed by the raised portions 4a on the plate 4 is substantially sealed by the support. When the agitator is raised air passes through the openings 1h past the flexible strip 2 into the suction nozzle taking with it the particles of dust dislodged by the agitator. As the agitator is raised the opening 3b becomes free and draws in a certain amount of dust-laden air whilst dust particles dislodged underneath the plate are also guided by the raised portions of the plate into the openings 4d formed therein and from thence into the suction nozzle. Upon inserting the upper bead of the slide 7, which latter is made of a resilient material, for instance rubber, into the middle notch of the suction nozzle, and on detaching the plate 4 from the agitator member 3, and thereby causing the opening 3b of the agitator member 3 to lie freely upon the support to be cleaned, vacuum in the vacuum chamber 1f will be partly released owing to the fact that air will freely flow from the soft support into the space 1f, and the cleaner will now work with suction only. The air will then not pass past the flexible strip and there will be no beating action.

As shown in Fig. 6, the apparatus may also be used for brushing and polishing hard supports such as parquet and inlaid floor or like surfaces. One advantage of using the beater action when brushing or polishing is the fact that the beater action enables the cleaner to be moved much more readily to and fro upon the floor or other support. Moreover, the cleaner may be built comparatively light, as the supplemental beating action will during polishing produce the same action as a heavy brush.

As on employing a brush, the edge 1b of the suction hood is lifted from the support which excessively reduces the suction action, the upper bead of the slide 7 should in this case be inserted into the lowermost notch of the suction hood 1b.

The agitator 3 is fixed at one end by means of pins 1m and during beating oscillates about this edge in a manner similar to a door turning on its hinges.

The under face of the agitator member 3 adjacent to the floor or other support is preferably so shaped as to slope downwards from its axis of oscillation, so that this surface will lie during vibration approximately parallel with the lower edge of the suction hood.

Openings 4c of the plate 4 or the opening 3b

of the agitator member 3 might be made adjustable in size and also be provided with closure means.

The plate 4 preferably consists of material in which electricity of friction can be produced. Such materials are, for instance, hard rubber, rubber, artificial resin, Bakelite, ebonite and so on. This material assists the suction as dust particles are attracted by the electricity of friction produced during the cleaning movement.

Instead of fixing the brush 11 to the underside of the plate 4, the brush might be fixed direct to the under side of the agitator member 3.

I claim:

1. A suction cleaner comprising a housing having a vacuum chamber therein, a suction nozzle connected to the housing, an inwardly extending flange on the nozzle, a flexible strip connected to said flange and extending beyond the flange, an agitator having a flange resting on the free edge portions of the strip to prevent the admission of air to the vacuum chamber when the flange of the agitator is in contact with the flexible strip and to admit air to break the vacuum in the vacuum chamber when said flange is raised above the strip by suction in the vacuum chamber, and means to cause the return movement of the agitator.

2. A suction cleaner defined in claim 1, characterized by having a spring engaging the agitator and the housing to cause the return movement of the agitator.

3. A suction cleaner comprising a housing having a vacuum chamber therein, a suction nozzle connected to the housing, an inwardly extending flange on the nozzle, a flexible strip connected to said flange and extending beyond the flange, an agitator swingably connected to the nozzle and having a flange resting on the free edge portions of the strip to prevent the admission of air to the vacuum chamber when the flange of the agitator is in contact with the flexible strip and to admit air to break the vacuum in the vacuum chamber when said flange is raised above the strip by suction in the vacuum chamber, and means to cause the return movement of the agitator.

4. A suction cleaner comprising a housing having a vacuum chamber therein, a suction nozzle connected to the housing, an inwardly extending flange on the nozzle, said nozzle having an edge which is adapted to be brought into contact with the surface to be cleaned, said edge having air inlets, an adjustable slide on the nozzle for opening and closing said openings, a flexible strip connected to said flange and extending beyond the flange, an agitator having a flange resting on the free edge portions of the strip to prevent the admission of air to the vacuum chamber when the flange of the agitator is in contact with the flexible strip and to admit air to break the vacuum in the vacuum chamber when said flange is raised above the strip by suction in the vacuum chamber, and means to cause the return movement of the agitator.

5. A suction cleaner defined in claim 4, characterized by the provision of inter-engaging beads and recesses on the adjustable slide and nozzle to secure the slide in different positions on the nozzle.

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