

June 4, 1940.

A. A. FORSBERG

2,203,650

SUCTION NOZZLE

Filed Jan. 24, 1938

2 Sheets-Sheet 1

Fig. 1.

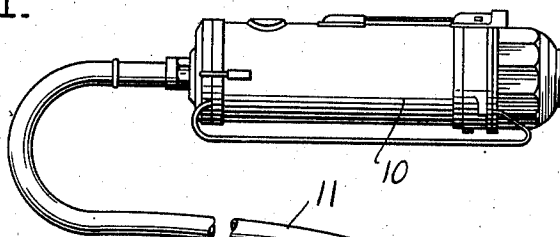


Fig. 2.

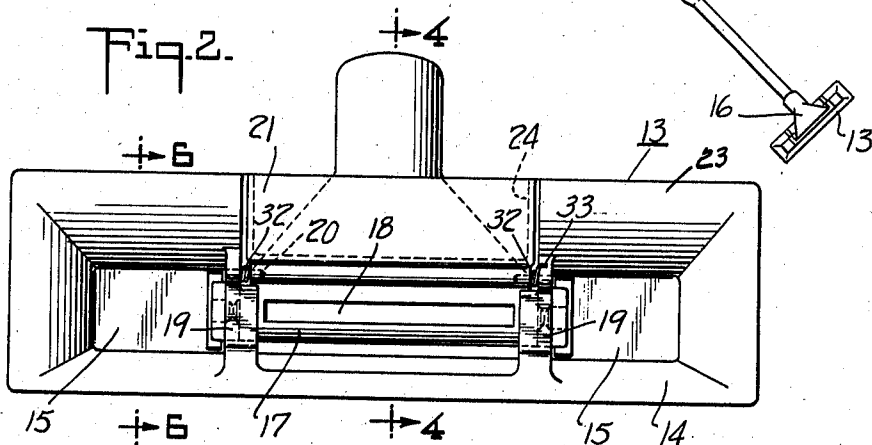
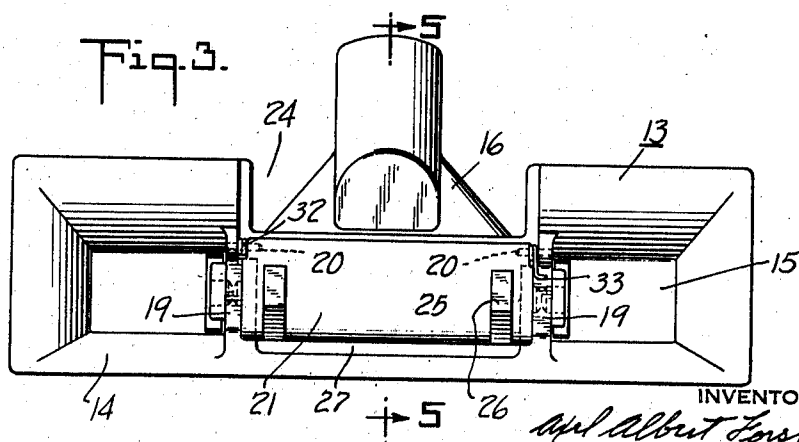


Fig. 3.



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Fig. 4.

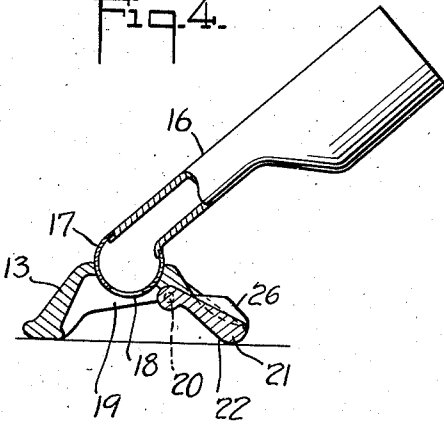


Fig. 5.

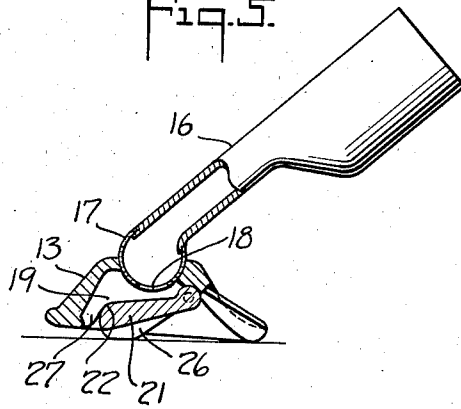


Fig. 6.

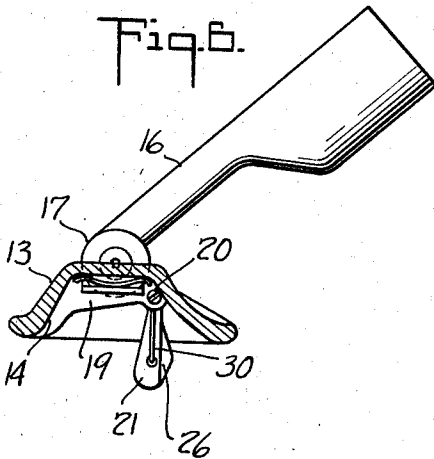


Fig. 7.

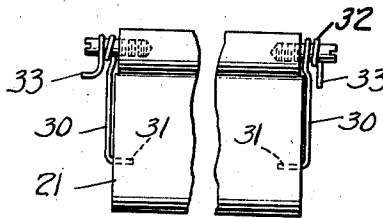
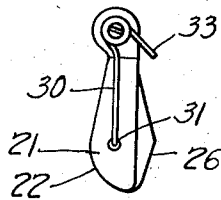


Fig. 8.



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UNITED STATES PATENT OFFICE

2,203,650

SUCTION NOZZLE

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Application January 24, 1938, Serial No. 186,544
In Germany January 25, 1937

4 Claims. (Cl. 15-155)

My invention relates to vacuum cleaners and more particularly to an improved suction cleaning nozzle for use in connection therewith.

It is desirable, in order to effect different types of cleaning, to have a suction nozzle provided with at least two different types of suction openings, either of which may be employed at will. For instance, when removing ordinary dirt from a rug it is advantageous to use an elongated suction opening having as great an extent as possible in order that a maximum area may be cleaned in a minimum of time. The length of such opening is of course limited by the degree of vacuum that is available. On the other hand, when threads, dog hairs or the like, which adhere strongly to the surface of the rug are encountered, it is necessary to produce an intensified flow of air in order to remove such objects. According to the present invention such intensified flow is obtained by closing off a portion of the nozzle opening. In order to accomplish this a pivotal member is provided which may be swung from a position outside of the nozzle opening to a position in which it reduces the cross-sectional area of the opening thus resulting in a concentrated flow of air. Furthermore, this member is so arranged that it may be shifted from either position to the other by merely lifting the nozzle from the floor and then replacing it on the floor again. The nozzle may be moved in this manner by means of a rigid handle normally connected thereto, and hence it is not necessary for the operator to stoop down in order to change the nozzle opening.

Further objects and advantages of my invention will be apparent from the following description considered in connection with the accompanying drawings which form part of this specification and of which—

Fig. 1 is a view showing a vacuum cleaner unit to which is connected a nozzle in accordance with the present invention;

Fig. 2 is a bottom view on a larger scale than that of Fig. 1, showing the improved nozzle with the movable member in one position;

Fig. 3 is a view similar to Fig. 2, but with the movable member in another position;

Fig. 4 is a cross-sectional view taken along the line 4-4 of Fig. 2;

Fig. 5 is a cross-sectional view taken on the line 5-5 of Fig. 3;

Fig. 6 is a cross-sectional view taken on the line 6-6 of Fig. 2, but with the movable member in a position intermediate to the position shown in Figs. 4 and 5;

Fig. 7 is a side view of a portion of the device shown in the preceding figures; and

Fig. 8 is an end view of Fig. 7.

Referring more particularly to Fig. 1, reference character 10 designates a vacuum cleaner unit within the casing of which is located a fan for producing a suction and a dust bag for removing dirt from the air drawn into the cleaner. The suction inlet of cleaner 10 is connected by means of a flexible hose or the like 11 with a rigid hollow handle member 12, to the opposite end of which is connected the suction nozzle 13.

Nozzle 13 includes a hollow body 14 formed with an elongated suction opening 15. The walls of the body which surround the opening 15 are adapted to slide over the surface being cleaned. A handle connection member 16 is pivotally mounted on the body member in well known manner so that the handle 12 may be pivoted in order that the nozzle may be moved under low furniture or the like. The lower end of member 16 is formed with a cylindrical surface 17 in order to permit pivoting, and an opening 18 establishes communication between the interior of body 14 and the interior of member 16.

A pair of bridge members 19 extend laterally across the opening 15 of the body. As will be seen more particularly from Figs. 3 and 4, bridge members 19 divide the upper part of the interior of the hollow member into a central and two end chambers. Pivotaly secured to bridge members 19 by means of pins 20 is a swingable member 21. The face 22 of member 21 is formed with the same, or substantially the same contour as the face 23 of the rear portion of the nozzle body which forms the rear lip of the nozzle opening. This rear lip is interrupted, as is indicated at 24, in Fig. 3, and member 21 is adapted to be swung into this space, and when in position therein the member 21 forms a continuation of the portions of the rear lip which are disposed on either side of it. The face 25 of member 21 is preferably formed with a plurality of projections 26. When swung to the position shown in Figs. 3 and 5, the ends of the member 21 contact the bridge members 19 in a manner such as to substantially prevent flow of air therebetween. The dimension of member 21 from its free end to the pivot 20 is such that a space 27 is left between the free end of the member and the forward lip of the nozzle body. Furthermore, this distance is greater than the vertical distance from the surface on which the nozzle is used to the pivot 20. Preferably, the thickness of member 21, including the projections 26, is such that, when the

member is in the position shown in Fig. 5, that is, in contact with the bridge members 19, the forward lip of the nozzle is lifted slightly off the surface to be cleaned.

The operation of the above described device is as follows:

With the member 21 in the position shown in Figs. 2 and 4, this member in effect forms a portion of the rear lip of the nozzle and is entirely removed from the suction opening 15. Under these conditions air may enter the nozzle through the entire length of the suction opening and the nozzle, when it is reciprocated back and forth over a surface, is able to clean a strip of the surface as wide as the opening 15 is long. However, if it is desired to have a more concentrated suction for the purpose of removing threads or the like which adhere strongly to the surface, the nozzle body is lifted by means of the handle 12 far enough so that the member 21, due to its weight, can swing in a clockwise direction about the pivot 20. The inertia of member 21 carries it past a vertical position, and if the nozzle is again placed on the floor at this time it will force the member 21 to continue to pivot in a clockwise direction to the position shown in Fig. 5. Under these conditions, the member 21 being in contact with the bridge member 19 completely blocks off the two ends of the suction opening 15 and materially reduces the cross-sectional area of the center portion of the opening, leaving only a narrow slot 27 for the inflowing air. This results in a very concentrated suction at this place, which is able to remove objects which tenaciously adhere to the surface. The space between the projections 26 in member 21 provides a channel for the air to enter the slot 27, through which channel the air travels a high velocity, thus aiding in removing the threads or the like. Inasmuch as the forward lip of the nozzle is held slightly above the surface, air is also able to enter the slot 27 through the space. In order to return the member 21 to its original position, it is only necessary to lift the nozzle from the surface, whereupon the weight of the nozzle causes it to pivot in a counterclockwise direction and when the nozzle is placed on the surface after the member 21 has passed a vertical position, the member will be forced further in a counterclockwise direction to its position shown in Fig. 4.

In order that the suction effect will not retain member 21 in the position shown in Figs. 3 and 5 even if the nozzle is lifted from the floor, it may be desirable to provide spring means for initiating movement of the member in a counterclockwise direction. Such springs are designated by reference characters 30 and comprise pieces of resilient wire having ends 31 engaging recesses formed in member 21, portions 32 encircling pivots 20 and ends 33 bearing against bridge members 19. The strength of springs 30 should preferably be so chosen that they will counteract the effect of suction on the member 21, thus causing the member to pivot in a counterclockwise direction in substantially the same manner as it pivots in a clockwise direction.

While I have shown one more or less specific embodiment of my invention it is to be understood that this has been done for purposes of illustration only and that the scope of my invention is not to be limited thereby, but only by the appended claims when viewed in the light of the prior art.

I claim:

1. In a suction nozzle, a hollow body having lips adapted to contact the surface being cleaned and defining a suction opening, and a member pivotally connected to said body and having a contour substantially the same as that of one of said lips, said member being swingable from a position in which it forms a portion of said one of said lips and is in contact with said surface to a position reducing the cross-sectional area of said opening, the distance from the free end of said member to the pivotal connection being substantially greater than the distance from said pivotal connection to the plane of said opening, whereby said member is prevented from pivoting when said opening is in contact with said surface.

2. In a suction nozzle, a hollow body having lips adapted to contact a surface being cleaned and defining a suction opening, one of said lips being interrupted for a substantial distance, and a member pivotally connected to said body and having a length substantially equal to that of said interruption, said member having a contour substantially the same as that of said interrupted lip and being swingable from a position in which it occupies the space provided by said interruption to form a portion of said interrupted lip and is in contact with said surface to a position reducing the cross-sectional area of said opening, the distance from the free end of said member to the pivoted connection being substantially greater than the distance from said pivoted connection to the plane of said opening, whereby said member is prevented from pivoting when said opening is applied to said surface.

3. In a suction nozzle, a hollow body formed with an elongated suction opening, spaced bridge members extending transversely of said opening, and a member pivotally connected to said body and swingable from a position outside said body to a position in contact with said bridge members, the distance from the free end of said member to the pivotal connection being substantially greater than the distance from said pivotal connection to the plane of said opening, whereby said member is prevented from pivoting when said opening is in contact with a surface to be cleaned, the pivoted member having a length at least as great as the distance between said bridge members and a width less than the width of said opening, whereby the pivoted member when in the second-named position serves to block flow past said bridge members from the end portions of said opening and to reduce the cross-sectional area of the portion of said opening disposed between said bridge members.

4. In a suction nozzle, a hollow body formed with an elongated suction opening, spaced bridge members extending transversely of said opening, and an element having a length substantially equal to the distance between said bridge members, and a width less than the width of said opening said element being pivotally connected to said body and swingable from a position outside said body to a position in contact with said bridge members, the pivoted member when in the second-named position serving to reduce the area of the portion of said opening between said bridge member and to block off flow past said bridge members from the end positions of said opening, and the thickness of said pivoted member being such as to slightly space said body from a surface being cleaned.

AXEL ALBERT FORSBERG.