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SUCTION NOZZLE WITH ADJUSTABLE CLEANING OPENING

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Fig. 3

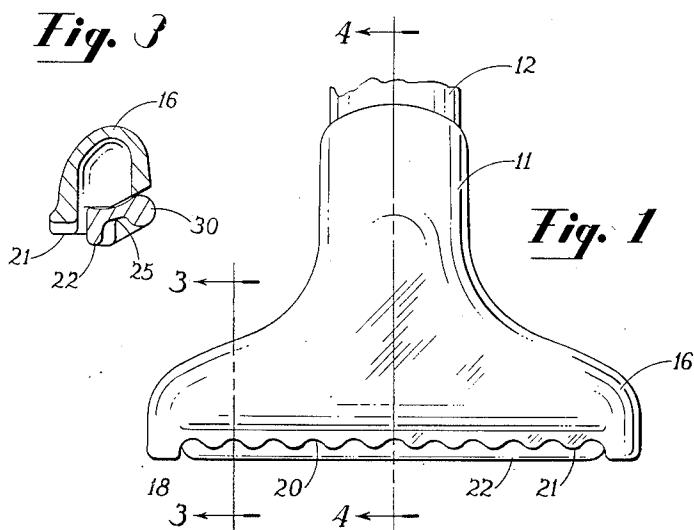


Fig. 1

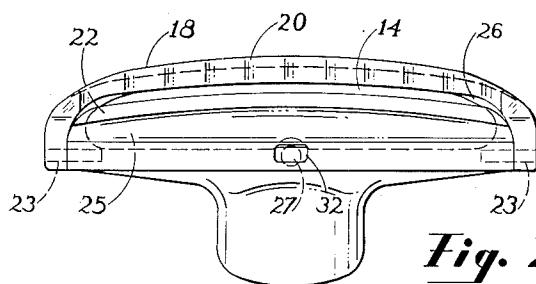


Fig. 2

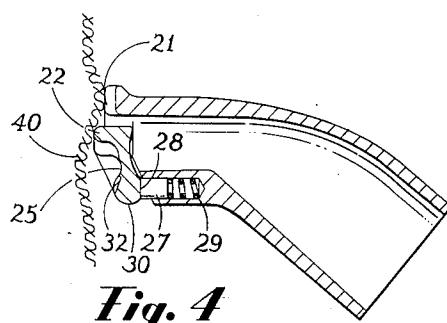


Fig. 4

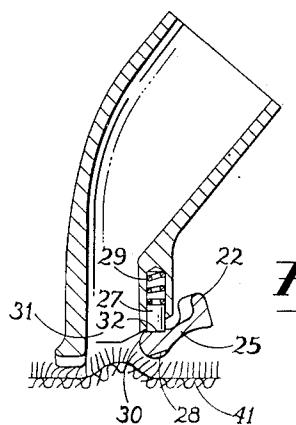


Fig. 5

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## UNITED STATES PATENT OFFICE

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SUCTION NOZZLE WITH ADJUSTABLE  
CLEANING OPENINGCharles L. Brown, Jr., Stamford, Conn., assignor  
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3 Claims. (Cl. 15—402)

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This invention relates to an improved cleaner nozzle and more particularly to a nozzle adapted for use with the conventional tank type of vacuum cleaner for cleaning curtains, drapery, short pile fabrics, upholstery and furniture coverings, slip covers and the like.

Although the cleaner nozzle of this invention is of an improved general purpose type, it is especially adapted for use in the cleaning of fabrics.

It is an object of this invention to provide a cleaner nozzle which is adaptable to remove surface dust and dirt and by a simple adjustment can be used to remove dust and dirt more deeply imbedded in the fabric.

Another object of the invention is to provide a cleaning tool which has an adjustable cleaning opening which in one position of adjustment provides a nozzle having sufficient supporting area in the nature of lips to prevent the fabric being cleaned from being drawn deeply into the nozzle opening and sealing the latter, while in another position of adjustment is highly effective for deep dirt cleaning, particularly of pile fabrics.

Another object is to provide a nozzle which can be moved with great ease and rapidity over the surface of a thin or lightweight fabric, such as a curtain, and releasably engages the surface of the fabric while removing dust, dirt, light threads, hairs, and the like therefrom.

Still another object is to provide a nozzle having ridges formed in its cleaning edge and so arranged as to maintain a substantial amount of continuous suction at the leading edge of the nozzle.

A further object is to provide a cleaning tool which is efficient, quiet in operation, and easy to handle.

Another object is to provide a cleaning nozzle which can be conveniently inserted into restricted spaces and corners of upholstered furniture.

Still other and further objects of this invention and advantages thereof will be apparent from the following description, especially when considered in connection with the accompanying drawing forming a part of this specification and in which:

Figure 1 is a front plan view of the cleaning nozzle;

Figure 2 is a bottom plan view showing the movable flap member in position within the suction opening;

Figure 3 is a cross-sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view taken on the line 4—4 of Fig. 1, the nozzle being shown cleaning a curtain fabric; and

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Figure 5 is a cross-sectional view similar to that of Fig. 4 but with the movable flap member in position outside the suction opening, the nozzle being shown cleaning a pile fabric.

Referring now more particularly to the drawing, a cleaner nozzle 11 is shown adapted for use with the conventional type of tank or upright suction or vacuum cleaner unit upon connection therewith by means of a wand 12 and a flexible hose, the wand serving as a rigid hollow handle for extending the operator's reach and variously otherwise improving and adapting the utilization of the nozzle to the needs of the operator.

With such a nozzle, a strong suction current of cleaning air is obtained, and entrained foreign matter, such as dust, hair, lint, cotton and other threads, and similar materials are readily removed from the surface and interstices of the cloth or fabric being cleaned, and then passed through the mouth 14 of nozzle 11, to wand 12 and through the flexible hose connection, etc., to the vacuum cleaner unit for subsequent disposal.

The nozzle 11 comprises a hollow body portion 16 having a formed and preferably arcuate shaped contacting surface 18 including a pair of lip-like members, more specifically, a fixed front lip 20 and a pivotally mounted rear lip 22. The pivoted member 22 is provided with lip portions on opposite sides thereof which are selectively presentable for contact with the surface undergoing cleaning, as shown in Figs. 4 and 5, respectively.

The lips 20 and 22 are so positioned in Fig. 2 as to define a suction opening 14 of fixed length but of variable cross-sectional area depending upon the position of pivoted member 25 which may be swung into or outside of the suction opening 14.

The suction cleaner nozzle herein described contemplates the provision of lips specifically designed to effect a highly efficient flow of cleaning air therebetween whereby a thorough removal of dust from a cloth surface is quickly effected while simultaneously preventing any sealing action on the part of the cloth with respect to the nozzle opening 14, especially when the pivoted member 25 is in the position resulting in a suction opening of such small cross-sectional area as that shown in Figs. 2, 3 and 4.

The swingable flap 25 is pivotally secured at the ends of lip 20 by means of pins 23 and when in closed position as shown in Fig. 2 abuts at its ends against stops or ledges 26 formed on the interior surface of lip 20 at the ends thereof. Flap 25 in this closed position reduces the cross-sectional area of the inrushing air flow, reducing the suction opening to the narrow passage 14.

shown in Fig. 2. The flap is held in this position by spring actuated detent 27 which presses against a flat surface 28 cut in the hinge portion of flap 25.

In closed position, the lip 22 of flap 25 displaces the fabric being cleaned a considerable distance from the suction opening 14 as shown in Fig. 4. This displacement together with the narrowing of the cross-sectional area of the nozzle opening serves to keep the fabric being cleaned from entering the mouth of the cleaning tool.

When swung to its open position, as shown in Fig. 5, flap 25 is removed entirely from the open or suction end of the cleaning nozzle, and the hinge edge 30 of the flap 25 then serves as the rear lip of suction opening 31. In this position the flap is held securely in position again by spring actuated 27 which this time presses against flat surface 32 cut in another face of the hinge portion of flap 25 in juxtaposition with detent 27. In this open position the nozzle is admirably adapted for cleaning fabric which is held down and/or securely in place as in upholstery covering, slip covers and the like.

In either position of flap 25, it is to be noted that no air space is provided for the entrance of an air current by way of the rear lip of the cleaner nozzle. The forward lip 20, on the other hand, is provided with a serrated edge in the form of a plurality of raised elements 21 between which flows the necessary high speed air current for efficient removal of surface and imbedded dirt from the fabric being cleaned.

If flap 25 is in either of the positions shown in Fig. 3 or 5 and the opposite position is desired, merely releasing the flap 25 by swinging it manually counter-clockwise or clockwise, respectively, enables the operator to release the detent 27 from its corresponding abutment against flat portion 28 or 32 and reengage the detent with 32 or 28 upon completion of the corresponding swing. In the reduced cross-sectional area position, the extension of lip 22 below or anterior to the suction opening 14 aids in keeping the fabric out of the open mouth of the cleaning nozzle. A greater air speed is thus obtained and more efficient surface cleaning effected thereby. In this position the nozzle is better able to remove threads, hairs, and similar strongly adhering articles from the surface of the fabric 40, Fig. 4. Furthermore, the serrated edge 20 on the front lip of the cleaning tool helps to maintain an uninterrupted flow of air through the opening 14. In any event, the materially reduced cross-sectional area results in a greatly concentrated suction of air and hence facilitates the removal of objects which adhere tenaciously to the fabric surface.

Forward nozzle lip 20 has raised portions 21 thereon which also provide additional surface contacting means to prevent clogging of the suction opening by the fabric. The rearward nozzle lip 22, in the position shown in Figs. 2, 3 and 4, below the raised portion 21 and although maintaining flat closed contact with the fabric surface displaces the cloth surface still farther out of the suction opening 14.

However, when flap 25 is lifted out of the mouth of the suction nozzle 11 and swung to its open position, Fig. 5, where spring detent 27 pressed outwardly by spring 29 locks or holds the hinged flap 25 by contact against flat facing 32, then the greatly enlarged cross-sectional suction opening thereby obtained enables the cur-

tain or similar fabric 41, Fig. 5, to be drawn into the nozzle opening.

In its opened condition, the nozzle is better adapted to clean fine pile fabric such as plush, velvet and the like, since the short upright filaments comprising these materials are flared outwardly upon being taken internally of the opening 31 and entrapped dust particles are shaken loose therefrom and entrained in the air suction stream.

In either mode of operation, the raised portions 21 on the serrated forward lip 20 serve to hold the cleaned surface of the fabric distended and allow a swift current of air to flow over the fabric and remove surface dust and interstitial dust, as well as any hair, loose threads, and the like on the surface of the fabric being cleaned.

It is to be understood that although but one embodiment of the invention has been shown and described, this is merely by way of illustration and that the scope of this invention is to be limited solely by the appended claims.

What I claim is:

1. In a suction nozzle, a hollow body having a pair of lips, one of which is serrated and fixed, said lips being adapted to contact the surface being cleaned and defining a suction opening, and a member pivotally connected to said body and having contours forming a plurality of lips each being selectively positionable substantially generally parallel with said fixed lip to define said suction opening, said member being swingable from a position in which one of its contours produces a suction opening of maximum cross-sectional area to a position in which another of its contours produces a suction opening of minimum cross-sectional area but of length equivalent to the suction opening of said first mentioned position, and a detent means for holding said member in each of said positions.

2. In a suction nozzle, a hollow body having a pair of lips, one of which is fixed, said lips being adapted to contact the surface being cleaned and defining a suction opening, the fixed lip of said pair of lips having an arcuate shape and being serrated over that portion thereof contacting the surface being cleaned, and a member pivotally connected to said body and having contours forming a plurality of lip portions each being selectively positionable substantially generally parallel with said fixed lip to define the other lip of said pair of lips, said member being swingable from a position in which one of its contours produces a suction opening of maximum cross-sectional area to a position in which another of its contours produces a suction opening of minimum cross-sectional area but of length equivalent to the suction opening of said first mentioned position, and a single spring pressed detent for holding said member in each of said positions.

3. In a suction nozzle, a hollow body having a pair of lips, one of which is fixed, said lips being adapted to contact the surface being cleaned and defining a suction opening, the fixed lip of said pair of lips having an arcuate shape and being serrated over that portion thereof contacting the surface being cleaned, and a member pivotally connected to said body and having contours forming a plurality of lip portions each being selectively positionable substantially generally parallel with said fixed lip to define the other lip of said pair of lips, said member being swingable from a position in which one of its contours forms a straight lip and produces a

suction opening of maximum cross-sectional area to a position in which another of its contours forms a curved lip conformed with said fixed lip and produces a suction opening of minimum cross-sectional area but of coextensive 5 length with the suction opening of said first mentioned opening, and a pair of flat surfaces on said member substantially diametrically opposite each other and a single spring pressed detent engageable with said surfaces for holding said 10 member in each of said positions.

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