April 8, 1941. G. H. CRANMER 2,237,725

SUCTION NOZZLE

Filed Jan. 23, 1939

Fig. 1.

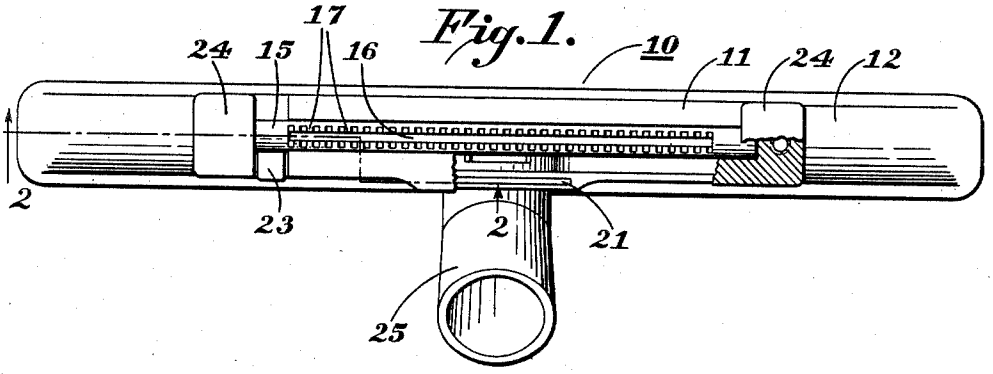


Fig. 2.

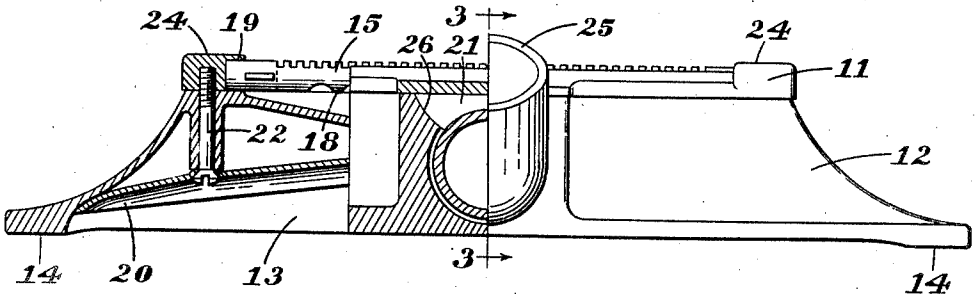


Fig. 3.

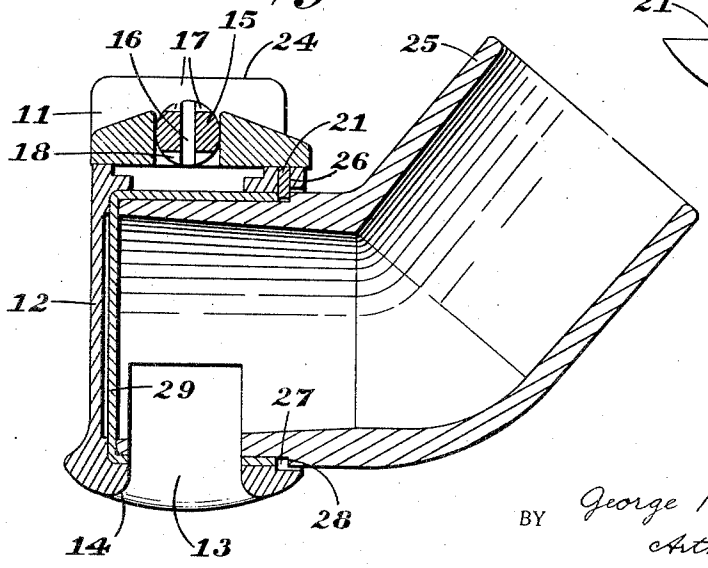
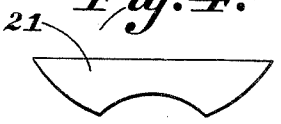


Fig. 4.



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2,237,725

UNITED STATES PATENT OFFICE

2,237,725

SUCTION NOZZLE

George Horace Cranmer, Philadelphia, Pa., assignor to Electrolux Corporation, New York, N. Y., a corporation of Delaware

Application January 23, 1939, Serial No. 252,279

4 Claims. (Cl. 15—156)

My invention relates to suction nozzles, and more particularly, to suction nozzles for cleaning rugs.

In cleaning rugs there are different conditions to be met depending upon the type of rug to be cleaned, and the type of dirt to be removed by the suction nozzle.

Dirt embedded in the pile of a rug is most conveniently removed by a suction nozzle having smooth lips and producing a flow of a large volume of air through the rug pile. In removing surfaced dirt, hairs, threads, and the like, it is desirable to produce a high velocity of air flow along the rug surface. An agitator for separating or loosening hairs, threads, etc., tenaciously adhering to the surface of the rug is desirable, especially in the case of high pile rugs, such as Oriental rugs.

In accordance with my invention, an improved suction nozzle is provided with a relatively large suction opening having smooth lips surrounding it for removing embedded dirt, and a relatively narrow suction opening with an agitator bar for removing surface dirt.

My invention also contemplates the construction of such a nozzle with a minimum number of parts and with minimum of separate securing means.

What I consider to be novel and my invention may be better understood by reference to the following specification and appended claims when considered in connection with the accompanying drawing, in which

Fig. 1 is a top plane view of my improved suction nozzle;

Fig. 2 is a rear elevation, partly in section along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged detailed sectional view taken along the line 3—3 of Fig. 2; and

Fig. 4 is an enlarged detailed view of a key for securing a pivoted elbow to the nozzle.

Referring to the drawing 10 indicates a suction nozzle body having a top part 11 and a bottom part 12. The bottom part 12 is provided with an elongated suction opening 13 surrounded by smooth lips 14. Suction opening 13 is used for the general cleaning of rugs and for removing dirt embedded in the rug pile. The smooth lips 14 seal against a rug surface and so cause air to pass through the rug pile. Two guide plates 20, one of which is shown at the left in Fig. 2, secured within the nozzle body 10 serve to direct the air from the ends of the suction opening 13 toward the center. For removing surface dirt, hairs, threads, and the like, the top 11 is provided with a rod 15 having a central passage 16. Passage 16 communicates with the interior of the body 10 and provides a suction opening smaller than the suction opening 13 and sufficiently small to produce a high velocity flow of air when connected to a vacuum cleaner. Rod 15 is provided with spaced lugs 17 located at each side of the passage 16. Lugs 17 may be formed by milling the rod 15 at right angles to the pasasge 16. The height of the lugs 17 is greatest adjacent the passage 16 forming a sharp edge at the passage 16. Spaced lugs 18 are provided on the reverse side of rod 15 adjacent each side of the passage 16. The lugs 18 are longer, wider and spaced farther apart than the lugs 17. The spaces between lugs 18 are curved producing smooth side edges on the lugs 18 for a purpose that will be pointed out below. The novel features of rod 15 are covered by an application filed by me concurrently herewith Serial No. 252,278.

The ends of rod 15 enter recesses 19 in top 11, as shown at the left in Fig. 2. Rod 15 may be bowed out at its center to frictionally engage top 11 and hold the rod in a selected position. Top 11, rod 15, and guide plates 20 are secured to bottom 12 by a plurality of screws 22. A finger grip 23 is connected to the rod 15 for convenience in rotating the rod to a position to present lugs 17 or lugs 18 as desired. Adjacent the extremities of rod 15, two gliding surfaces 24 extend outwardly from the top 11 and serve the dual functions of factilitating the movement of the nozzle along a rug surface and locating either the lugs 17 or the lugs 18 at the surface of the rug. A pivoted elbow 25 communicates with the interior of the body 10 and may be connected to a vacuum cleaner, not shown, through the intermediary of a suction conduit. Elbow 25 is secured to body 10 by means of a key 21 which fits in a slot 26 provided in the bottom 12. Key 21 enters a groove 27 formed by a shoulder 28 in elbow 25 and the end of a sleeve 29 extending over the end of elbow 25. Key 21 is held in position by engagement with top 11, as shown in Fig. 2. When elbow 25 and body 10 are in the relative positions shown in Fig. 2, the suction produced by a vacuum cleaner is communicated to the suction opening 13. By rotating the body 10 about the elbow 25 through an angle of 180 degrees, communication is established with the passage 16.

When the nozzle body 10 is to be used for cleaning a rug, it is connected to a vacuum cleaner as by means of the connection of a suction conduit

to elbow 25. The embedded dirt is removed from the rug by traversing it with the bottom 12 in contact with the rug surface. When it is desired to remove surface dirt, hairs, threads, and the like, the nozzle body 10 is rotated on the elbow 25 to a position with the top 11 in contact with the rug. With the rod 15 in the position shown in Figs. 1 to 3, the lugs 17 engage the rug surface. The end extensions 24 serve to position the lugs 17 at the surface of the rug pile. Air entering the passage 16 travels along the surface of the pile and due to the relatively small cross-sectional area of the passage 16 attains a high velocity. As the nozzle is moved across a rug, the high velocity air flow will carry the surface dirt including the loose hairs, threads, etc., into the passage 16. Hairs, threads, or the like which are adhering tenaciously to the surface of the rug pile are loosened by the lugs 17. The forward edges of the lugs 17 adjacent the rear of the passage 16, determined by the direction of movement of the nozzle, serve to loosen the threads and the like. The lugs 17 on the opposite side of the passage 16 serve to guard the sharp edges of the other lugs 17 and prevent them from becoming deeply embedded in the rug pile. Regardless of the direction of movement of the nozzle one set of lugs 17 serve to loosen the threads and the other set on the opposite side of passage 16 serve as guards for the first set. The spaces between the lugs 17 permit a flow of air right at the surface of the pile from both sides into the passage 16. The passage 16 being of uniform cross-section throughout its extent the velocity of the air is maintained in its passage therethrough and there is no tendency for dirt picked up by high velocity air being precipitated again due to a reduction in the velocity as the air enters the nozzle. An important advantage obtained from the location of the lugs 17 on each side of the central passage 16 is the equal facility with which surface dirt may be removed upon movement of the nozzle in a forward or reverse direction.

In cleaning hooked rugs which have looped threads at the surface instead of the free ends of a pile, as do other rugs, there is a possibility that the lugs 17 may catch in the surface threads. The lugs 18 are wider and do not have the sharp side edges of the lugs 17 due to the curved surfaces between the lugs 18. The lugs 18 will not catch in looped surface threads and so may be used for cleaning hooked rugs. The lugs 18 perform the same function as the lugs 17 and if desired may be used for the surface cleaning of other rugs especially low pile rugs.

In the assembly of the suction nozzle body 10, the elbow 25 is inserted in position in bottom 12 and the key 21 dropped in the slot 26. The guide plates 20 are then inserted within the bottom 12 and the screws 22 passed through the openings in plates 20 and bottom 12. The rod 15 is then inserted in the top 11 with its ends extending into the recesses 19. The top 11 and rod 15 are then placed on bottom 12 and secured thereto by the screws 22. The two screws 22 alone serve to secure all of the parts of the nozzle in assembled relation. The key 21 pivotally secures the elbow 25 to the nozzle body 10 without any exposed securing means.

What I claim is:

1. A suction nozzle including a bottom part having a suction opening, a top part having a second suction opening, an elbow extending through an opening into said bottom part adapted to communicate in one position with said first-named suction opening and in another position with said second-named suction opening, said elbow having an annular groove, a key located within said bottom part and extending from the top of said bottom part into the groove in said elbow, and means to secure said top part engaging said key to said bottom part whereby said elbow is rotatably locked in position.

2. A suction nozzle including a bottom part having a suction opening and a side opening, said bottom part having a slot extending from the top to the side opening of said bottom part, a tubular member extending through the side opening of said bottom part and having an annular groove positioned in line with said slot, a flat key located in said slot extending into said groove, a top part having a second suction opening and extending over the slot in said bottom part, and means to secure said top part to said bottom part.

3. A suction nozzle including a body member having a suction opening and a side opening, a slot in said body member extending from said side opening to the top of said body member, a tubular member extending into said side opening and communicating with said suction opening, said tubular member having an annular groove registering with said slot, a flat key located in the slot of said body member and extending into said groove, a cover for the top of said body member overlying said slot, and means to secure said cover to said body member.

4. A suction nozzle including a body member having a suction opening and a side opening, said body member having a slot extending from said side opening to the top of said body member, a tubular elbow extending through said side opening and communicating with said suction opening, said elbow having an annular groove registering with the slot in said body member, a plate located in said slot and extending into said groove, a top for said body member having a portion overlying said slot and said plate, and means to secure said top to said body member whereby said elbow is rotatably locked in position.

GEORGE HORACE CRANMER.