

June 9, 1953

J. B. LOVICK

2,641,015

NAP DEFLECTOR AND VALVE CONTROL FOR VACUUM CLEANER NOZZLES

Filed April 22, 1949

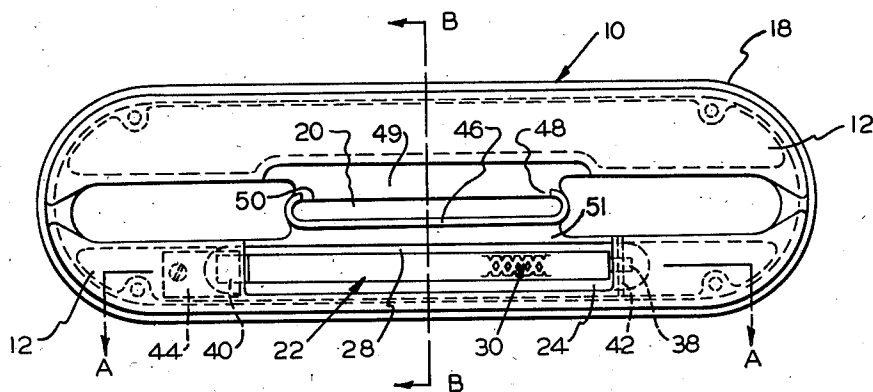


FIG. I

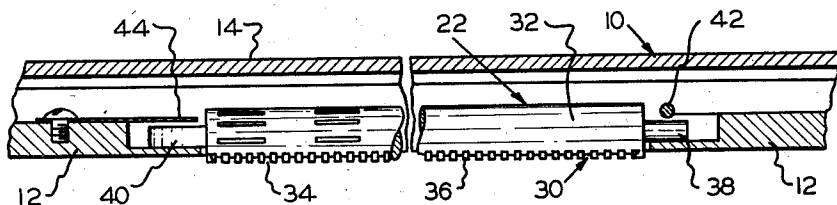


FIG. II

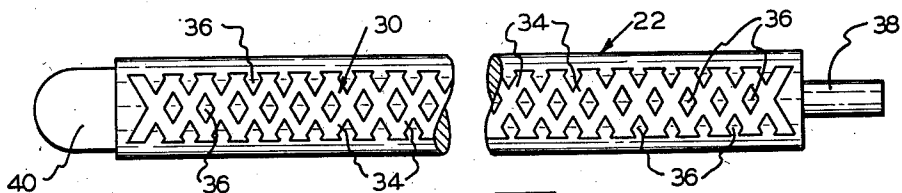


FIG. IV

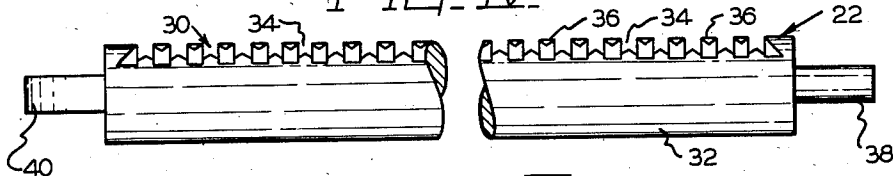


FIG. V

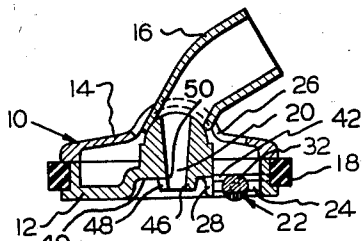


FIG. III

Inventor

JOHN B. LOVICK

By Beaman Paton

UNITED STATES PATENT OFFICE

2,641,015

NAP DEFLECTOR AND VALVE CONTROL FOR
VACUUM CLEANER NOZZLESJohn B. Lovick, Los Angeles, Calif., assignor to
Filtex Corporation, Los Angeles, Calif., a cor-
poration of California

Application April 22, 1949, Serial No. 89,056

7 Claims. (Cl. 15—369)

1

This invention relates to sweepers for carpets and like surfaces and more particularly to vacuum sweepers and to the nozzle assembly thereof. More specifically, but not exclusively, the invention relates to vacuum sweepers having a nozzle assembly incorporating a valve roller member as disclosed in Patent No. 2,157,077, granted to the present assignee.

It is an important object of the present invention to provide a member for use on a carpet sweeper which member is able to penetrate the nap, pile or fibres of a carpet, or like surface, with a kind of combing action without however causing damage thereto, as by pounding or pulling, but which combing action will separate the fibres and permit a thorough cleaning operation to be performed, including in particular the removal of deeply embedded sand or dust particles.

It is also an object of the invention to provide a carpet or like sweeper with a comb-action member which is optionally positionable for combing the carpet or like surface or is adjustable to a non-combing or inactive position.

A further object of the invention is to improve the nozzle assembly as disclosed in said Patent No. 2,157,077 by adapting the valve roller to partake of a combing action when moved over a carpet or like surface, whereby to penetrate between the carpet surface fibres and permit the removal of deeply seated sand or dust particles without, however, causing damage to the surface fibres.

Yet another object of the invention is to provide an improved vacuum sweeper nozzle assembly of the character disclosed in said prior Patent No. 2,157,077, as to the entrance to the suction chamber being formed with a side opening which increases the effective cleaning area of the nozzle by distributing the high velocity air over a larger area and which facilitates the removal of hair and the like by subjecting it to a body of horizontally moving air, rather than relying upon its removal by the air suction lifting action alone.

The above and further objects and advantages, residing in the arrangement, combination and construction of parts will appear clear from a consideration of the following detailed description and the appended claims when taken in conjunction with the accompanying drawings in which:

Fig. I is an underneath plan view of a vacuum cleaner nozzle assembly incorporating a comb-action valve roller in accordance with the present invention,

Fig. II is an enlarged longitudinal section on the line A—A of Fig. I,

2

Fig. III is a cross-section on the line B—B of Fig. I,

Fig. IV is a plan view of the valve-comb roller seen in Fig. I but on an enlarged scale compared therewith, the figure being a plan view on the fluted roller portion by which the combing action is obtained and the center portion of the roller being shown broken away for ease of illustration, and

Fig. V is a side elevation of Fig. IV.

Referring to the drawings, there is shown in Figs. I to III a vacuum sweeper nozzle assembly, indicated generally at 10, which nozzle assembly is of the same general construction as disclosed in the aforesaid prior Patent No. 2,157,077 and includes a base portion 12, adapted to maintain close contact with the surface to be swept, and a top portion 14, upon which the handle socket 16 is pivotally mounted, the base and top portions being surrounded by the conventional rubber buffer strip 18.

The base 12 is formed with a suction chamber 49 which communicates with a central elongated suction slot 20, adjacent one side of which there is mounted the combined deflector and valve device body, indicated generally at 22, which is mounted for transverse sliding motion and rotational adjustment in a chamber 24 formed beneath the top portion 14 and opening through an elongated slot 26 therein to the atmosphere and through an elongated slot 51 to suction chamber 49. This deflector valve body, in conjunction with the elongated opening 28, forms a suction relief valve and by-pass arrangement as fully disclosed in the said prior patent.

It is desired to mention at this point, however, that the present invention is not confined in its application to such a valved air by-pass arrangement but resides primarily in the form and construction of the body 22 to enable the same to function selectively as a valve and as a nap deflector having a combing action with respect to a carpet or like surface over which the nozzle assembly is moved in the operation of the sweeper. Thus, the device is so movable and adjustable in the nozzle assembly that it is capable in one rotationally adjusted position of functioning only essentially as a by-pass control valve, and capable in another position of functioning as both a valve and nap deflector.

Dealing now with the body 22 per se and with particular reference to Figs. IV and V it will be seen that the body has a fluted surface portion, indicated generally at 30, and a plain cylindrical surface portion, indicated at 32.

The fluted portion is defined by criss-cross slots

3

34 and lands 36 defined by the slots, which lands are generally of rectangular shape, being shown completely so at the center and partly so at each side (Fig. IV).

It has been found by experiment that the dimensions of both the slots and the lands defined thereby are quite important, if the maximum and desired cleaning action is to be performed, with a minimum amount of damage to the carpet fibres, by the action of this fluted roller surface passing over a carpet or the like. Fig. IV shows a proven satisfactory arrangement as to dimensions and shape, according to which the fluted surface is shown formed by equal criss-cross slots of approximately .046 inch equally spaced at approximately .077 inch to define the desired lands, with the cross slots intersecting at approximately 60° and defining one central row of complete four-sided lands and two outside rows of end truncated lands, as shown.

The rectangular shape of the lands 36 (it being appreciated that the word "rectangular" is not used in its properly accepted sense, since the side included angles need not be exactly 90°) is of importance as this presents angular pointed surfaces to the carpet fibres which control the parting of the nap fibres, it having been found that an included angle of approximately 60°, or not less than 60°, is preferable if a tendency to shear the fibres, rather than merely deflect and part them to the passage of free air therebetween is to be avoided.

It is to be understood, of course, that the employment of a fluted surface with rectangular or diamond shape lands having a greater or a lesser area, or spaced closer or farther apart, will effect various carpets and rugs in different ways. For instance, an Oriental or heavy Axminster carpet will be found to have closely grouped, long, thin fibres, standing free and substantially free from the base of the carpet. A frieze or hand weave type rug, however, will be found to have closely grouped and twisted fibres, giving a "tufted" condition. The employment of a fluted surface substantially as shown in Figs. IV and V will be found to have the desired combing action over a variety of types of carpets with the minimum destructive possibility to the carpet fibres or "tufts."

Referring again to Figs. IV and V, it will be seen that the device 22 has a central cylindrical trunnion 38 at one end and a central flattened detent trunnion 40 at the opposite end.

Turning now to Figs. I and II, it will be seen that the body 22 is mounted in position on the base of the nozzle assembly by having its cylindrical trunnion 38 engaged between the base 12 and a fixed cross pin 42 mounted in spaced relationship behind the said base and by having its flattened trunnion 40 retained between the base 12 and a leaf spring 44 secured behind the base and serving as a detent to releasably hold the body 22 against rotation while permitting its bodily transverse shifting movement. The construction and arrangement are such that by manually turning the body 22 the spring 44 can be readily deflected to permit the body to be rotated and optionally reversed in position to locate either its fluted surface portion 30 or its plain cylindrical surface 32 at the front for contact with the carpet or like surface to be cleaned. This constitutes an important advantage since it permits the user of the sweeper to render the fluted body surface active or inactive at will, depending upon the particular surface to be

4

cleaned. Thus the fluted body surface can be readily adjusted to the inactive position in the sweeping of carpets or like surfaces which would be liable to be damaged thereby, whereas the fluted surface can be readily brought into active position when the desired combing action is considered to be capable of being both advantageously and usefully employed to assist in the removal of embedded sand or dust particles, for example.

Referring further to Figs. I and III, it will be seen that whereas one side of the entrance to the elongated suction slot 20 is defined by a depending lip 46 the opposite side, that is the side remote from the body 22, is cut away to form an edge 50 parallel to lip 46 defining an elongated side opening 48, the effect of which is to increase the extent of the cleaning area present at the underneath surface of the nozzle assembly, by distributing the volume of high velocity air over a correspondingly increased area, besides facilitating removal of hair, lint or the like by subjecting it to a body of horizontally moving air instead of relying upon removal thereof solely by the lifting action through the suction duct 20. The lower edge of lip 46 terminates at a predetermined distance from the floor-engaging surface of the base portion 12 while the opposite cut-away edge 50 terminates a greater distance from said surface in order to effect an upward curve of varied form in the rug or carpet when suction is applied to the suction slot 20. As an example of the relative proportions of said predetermined distances, the distance between edge 50 and the floor-engaging surface may be approximately twice that between lip 46 and the floor-engaging surface.

Having thus described my invention, what I claim as novel and wish to secure by Letters Patent is as follows:

1. The combination comprising a vacuum sweeper nozzle body having a rug contacting face, said body containing a suction chamber opening downwardly through the face and an elongated laterally extending passage through the face at one side of the chamber forming an air by-pass communicable with the atmosphere, means forming an opening between the chamber and the passage, an elongated agitator member extending longitudinally relative to the passage at a location adjacent the contacting face, said member having along one side thereof a first surface carrying projections adapted to penetrate and deflect a carpet nap and having along another of its sides a second relatively smooth surface, means mounting said member for bodily transverse movement within the passage toward and away from an air by-pass restricting position adjacent said chamber in response to reverses in direction of movement of the nozzle, and means releasably holding the member against rotation from either of two positions of adjustment in one of which only said first surface is turned downwardly to lower said projections to carpet penetrating and deflecting position and in the other of which said projections are turned upwardly above the carpet and only said second relatively smooth surface is lowered into engagement therewith, said member being capable of said bodily transverse movement in both positions of adjustment.

2. The combination comprising a vacuum sweeper nozzle body having a rug contacting face, said body containing a suction chamber opening downwardly through the face and an

5

elongated passage at one side thereof forming an air by-pass communicable with the atmosphere, means forming an opening between the chamber and the passage, an elongated rotatable member extending longitudinally of the passage adjacent said face, said member being of generally cylindrical form and having along one side thereof a first surface carrying projections adapted to penetrate and deflect a carpet nap and having along another of its sides a second relatively smooth surface, mounting means at each end of said member cooperable with respective ends of said passage and adapted to enable bodily transverse movement of the member toward and away from an air by-pass restricting position adjacent said chamber in response to reversals in direction of movement of the nozzle, and means releasably holding the member against rotation from either of two positions of adjustment in one of which said first surface only is turned downwardly to lower said projections to carpet penetrating and deflecting position and in the other of which said projections are turned upwardly above the carpet and only said second relatively smooth surface is lowered into engagement therewith, said member being capable of said bodily transverse movement in both positions of adjustment.

3. The combination of claim 2, in which said releasable holding means comprises a spring detent.

4. The combination comprising a vacuum sweeper nozzle body having a rug contacting face, said body containing a suction chamber opening downwardly into the face and an elongated laterally extending passage through the face at one side of the chamber forming an air by-pass communicable with the atmosphere, an elongated agitator member extending longitudinally of the passage adjacent the face, means forming an opening between the chamber and the passage, said member having along one side thereof a first surface carrying projections adapted to penetrate and deflect a carpet nap and having along another of its sides a second relatively smooth surface, a pair of trunnions projecting from opposite ends of said member, one of said trunnions being non-circular in cross section, guide ways in said body receiving the trunnions and supporting said member for bodily transverse movement of the member in the passage toward and away from an air by-pass restricting position adjacent said opening in response to reversals in direction of movement of the nozzle body, and a spring engaging said non-circular trunnion and releasably holding the member against rotation from either of two positions of adjustment in one of which said first surface is turned downwardly to lower said projections to carpet penetrating and deflecting position and in the other of which said projections are turned away from the carpet and said second relatively smooth surface is lowered into engagement therewith.

5. A vacuum sweeper nozzle adapted to the removal of both deep-seated dirt and surface litter comprising a body having a suction chamber opening downwardly through a lower side thereof and having an elongated suction slot disposed centrally in the chamber and having elongated parallel side edges, a base portion of said body having a floor-engaging surface, said edges of said suction slot being removed a predetermined distance from the plane of said floor-engaging surface to provide a space therebetween

6

whereby to effect an upward curve in the rug or carpet when suction is applied, said body having an elongated air by-pass slot parallel to and spaced laterally from the suction chamber, said base portion having an opening between the by-pass slot and the suction chamber, an elongated reversible agitator adapted to control passage of air through said by-pass slot mounted lengthwise in said by-pass slot and having two surfaces of differing asperity, the ends of the agitator and respective ends of the slot having slidable connections therebetween permitting motion athwart said slot, said connections having components cooperable to releasably hold the member against rotation from either of two positions of adjustment, and further cooperable to permit reversal of said agitator in a rotatable direction between said two positions of adjustment.

6. A vacuum sweeper nozzle adapted to the removal of both deep-seated dirt and surface litter comprising a body having a suction chamber opening downwardly through a lower side thereof and having an elongated suction slot disposed centrally in the chamber and having elongated parallel side edges, a base portion of said body having a floor-engaging surface, one of said edges being removed a predetermined distance from the plane of said floor-engaging surface to provide a space therebetween, the other of said edges being removed from the plane of said floor-engaging surface a distance greater than the first defined distance whereby to effect an upward curve of varied form in the rug or carpet when suction is applied, said body having an elongated air by-pass slot parallel to and spaced laterally from the suction chamber, said base portion having an opening between the by-pass slot and the suction chamber, an elongated reversible agitator adapted to control passage of air through said by-pass slot mounted lengthwise in said by-pass slot and having two surfaces of differing asperity, the ends of the agitator and respective ends of the by-pass slot having slidable connections therebetween permitting motion athwart said slot, said connections having components cooperable to releasably hold the member against rotation from either of two positions of adjustment, and further cooperable to permit reversal of said agitator in a rotatable direction between said two positions of adjustment.

7. A vacuum sweeper nozzle adapted to the removal of both deep-seated dirt and surface litter comprising a body having a suction chamber opening downwardly through a lower side thereof and having an elongated suction slot shorter in length than the suction chamber disposed centrally in the chamber, said suction slot having elongated parallel side edges and rounded end walls joining said side edges, a base portion having a broad flat floor-engaging surface, one of said side edges and said end walls comprising a rim removed a predetermined distance from the plane of said floor-engaging surface to provide a clear space therebetween, the other of said side edges being removed from the plane of said floor-engaging surface a distance in the magnitude of about twice the first defined distance whereby to effect an upward curve of varied form in the rug or carpet when suction is applied in the suction slot, said body having an elongated air by-pass slot longer than the suction slot and parallel to and spaced laterally from the suction chamber at the side thereof remote from said other side edge of the suction

slot, said base portion having an opening between the slot and the suction chamber, an elongated reversible agitator adapted to control passage of air through said by-pass slot mounted lengthwise in said by-pass slot and having two surfaces of differing asperity, the ends of the agitator and respective ends of the slot having slidable connections therebetween at a location spaced upwardly with respect to the floor-engaging surface and permitting motion athwart said slot, one of said connections having components cooperable to releasably hold the member against rotation from either of two positions of adjustment, and further cooperable to permit reversal of said agitator in a rotatable direction between said two positions of adjustment, one of said components being resilient.

JOHN B. LOVICK.

References Cited in the file of this patent

UNITED STATES PATENTS

	Number	Name	Date
5	1,035,852	Brandt	Aug. 20, 1912
	1,036,978	Drum	Aug. 27, 1912
	1,980,438	Riebel	Nov. 13, 1934
	2,157,077	Kroenlein	May 2, 1939
	2,227,299	Cranmer	Dec. 31, 1940
10	2,278,382	Ross	Mar. 31, 1942
	2,556,022	Atiyeh	June 5, 1951

FOREIGN PATENTS

	Number	Country	Date
15	201,639	Great Britain	Aug. 3, 1923
	593,623	Great Britain	Oct. 22, 1947