

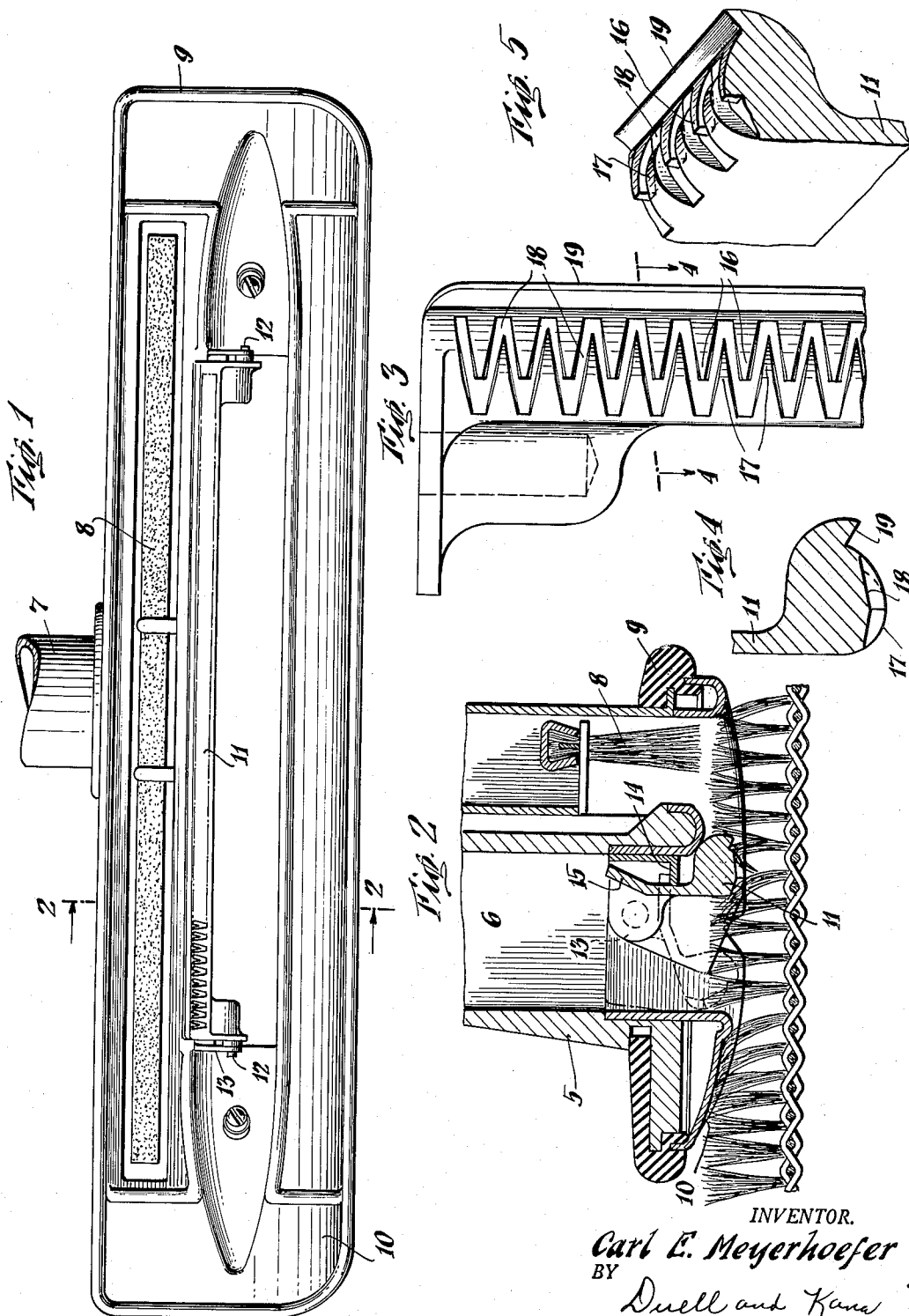
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VACUUM CLEANER NOZZLE HAVING PIVOTED CLEANING ELEMENT

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VACUUM CLEANER NOZZLE HAVING PIVOTED CLEANING ELEMENT

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This invention relates to a functionally and structurally improved nozzle for use with vacuum cleaning apparatus, the present application being a continuation in part of my earlier application, now United States Patent No. 2,659,098 issued November 17, 1953.

It is an object of the invention to furnish a unit of this character which will be particularly efficient in cleaning carpeting regardless of whether the latter presents a relatively soft or hard surface.

A further object is that of providing a nozzle construction combining relatively few parts, each of individually simple and rugged design, which parts may be readily manufactured and assembled to furnish a unitary mechanism operating over long periods of time with freedom from all difficulties.

With these and other objects in mind, reference is had to the attached sheet of drawings illustrating one practical embodiment of the invention and in which:

Fig. 1 is a bottom plan view of a nozzle;

Fig. 2 is a transverse sectional view taken along the lines 2—2 and in the direction of the arrows as indicated in Fig. 1;

Fig. 3 is a face view in enlarged scale of a portion of the comb element which forms a part of the nozzle assembly;

Fig. 4 is a transverse sectional view taken along the lines 4—4 and in the direction of the arrows as indicated in Fig. 3; and

Fig. 5 is a fragmentary perspective view of the operative face of such element.

As is well appreciated, carpeting may be generally divided into one of two groups. The first of these involves cut pile carpets such as broadloom, twists, Axminster, oriental, etc., which present a relatively soft surface to the cleaning tool. The second group embraces uncut pile carpets such as hooked, looped, braided, etc. materials which in comparison with cut pile carpets present a relatively hard surface. Foreign materials such as thread, animal hair, and lint have a tendency to become entwined or entangled with the soft open nap of cut carpeting. On uncut carpeting, this foreign material will remain on or substantially on the surface of the carpeting.

It is because of the inherent differences in carpets and the association of foreign material therewith that the removal of such material has been so difficult to accomplish especially where it has been attempted to achieve this result by a single nozzle. The addition of a brush to such a nozzle has the disadvantage that while it may remove surface litter from the carpet, most of this foreign material will cling or remain in association with the brush so that it has to be removed therefrom by hand. An example of the undesirability of using a brush is to be found in the case of a more or less conventional carpet sweeper where foreign material such as has been specified entwines itself around the sweeper brush.

Where a comb structure has been associated with a nozzle, undesirable results have been achieved because

the comb teeth had to be made coarse or blunt in order not to catch on and tear the loops and strands of uncut carpeting. This coarseness or bluntness precluded an efficient picking up of the surface litter from uncut rugs.

By means of the present invention, a construction is provided which will not alone freely move over and in cooperation with the bodies of both cut and uncut carpeting, but will also remove surface or embedded foreign material such as thread, lint, hair etc. therefrom.

Referring primarily to Figures 1 and 2 of the drawings, the numeral 5 indicates the body of a nozzle, which may be formed with a throat portion 6 terminating in a pipe or coupling 7 to which a hose or wand (not shown) may be connected for establishing communication between the throat portion and a suction apparatus. A unit involving a bumper 9 may extend beyond the body of the nozzle and be formed of rubber so that the nozzle will not come into damaging contact with the surfaces of legs and other parts of furniture, splash boarding, etc. Bearing or supporting portions 10 may be disposed adjacent the opposite ends of the nozzle and provide the under face of the same. These are conveniently in the form of plates 10 which are contoured so as to define an entrance portion merging into the throat 6 of the nozzle. As shown especially in Figure 2, a comb element 11 is disposed in advance of that throat portion or passage and is pivotly supported at 12 by, for example, brackets 13. A flange 14 may extend from the rear surface of the nozzle throat and bear against the rear face of comb 11 to arrest rearward movement of the latter.

This same flange or stop may limit forward or clockwise movement of the comb around its pivots 12 as viewed in Fig. 2. To this end the comb may include a rearwardly and upwardly extending surface 15. The latter—when the comb is swung to elevated position—will bear against the upper face of flange 14 as indicated in dot and dash lines in Fig. 2. Thus, upward swinging movement is limited to this position. Conveniently, the nozzle may be provided with a rear well or groove within which a brush 8 may be housed. By suitable mechanism (not shown), this brush may be projected or retracted. When projected it will serve to agitate and dislodge dust particles as the nozzle is shifted over a surface to be cleaned. Accordingly, these particles will be sucked up into the nozzle. A nozzle embodying the present invention may or may not have a brush associated with it. Preferably such a unit will be included at the point indicated so that the nozzle in addition to removing hair, thread and similar materials from all types of rugs, may also be used to remove dust therefrom.

Referring now to the detailed construction of the comb, it will be seen as especially shown in Figs. 3, 4 and 5, that the latter presents on its operative face two rows of opposed teeth, 16 and 17. The teeth 16 may properly be designated as "pick-up" teeth and have relatively blunt forward ends, while the teeth 17 may be designated as guard or forward teeth and preferably terminate in sharp rearward ends. As shown, these rows of teeth are separated by a groove 18 of zig-zag formation in that adjacent teeth in different rows are disposed in overlapping and staggered relationship.

The slot or groove separating the pick-up teeth is as shown in Fig. 3 arranged in a V formation. Accordingly, in combing through tufts of a cut pile carpet, the surfaces of these teeth tend to gently spread the soft nap and to permit each tooth 16 to sink down into the carpet pile instead of just gliding over the same. Therefore, pieces of loose thread or hair entangled in the nap are easily dragged along by the pick-up teeth as the nozzle moves over the carpet surface in a forward direction. As the nozzle is moved rearwardly over this surface, the comb is rocked forwardly around its pivot 12 to the position

shown in dot and dash lines in Fig. 2. Thread, hair, and lint looped around the pick-up teeth, when the comb moves upwardly, are lifted off the carpet pile and into the nozzle throat or aperture 6 restricted by the comb as the latter rocks upwardly. Accordingly, an air stream of high velocity acts on the loops of the foreign material and maintains them suspended until the ends of the threads, etc. are completely released by the rearward motion of the nozzle and consequent movement of the comb. The air then flowing past the comb surfaces carries this material into the vacuum cleaner assembly through the coupling 7.

Teeth 16 and 17 are substantially the same height adjacent the forward ends of the pick-up teeth. However, the guard teeth 17 drop below these teeth towards the rear of the comb as shown in Figs. 4 and 5. Since both teeth are of equal height at the highest point of the comb when the latter is in operative position, the comb glides smoothly over the relatively hard surfaces of hooked and looped rugs. The pick-up teeth cannot sink into the pile of uncut carpets and catch on the tuft loops because the V grooves between the teeth are not sufficiently wide to accommodate the loops. These grooves, with reference to a line perpendicular to the front edges of teeth 16, are shallowest adjacent the high point of the outer contour of the teeth. Accordingly, as can be seen in Fig. 2 (in dot and dash lines) a restriction is produced directly in line with the front edge of the pick-up teeth. Therefore highest air velocities are assured at this point in order effectively to lift foreign material away from the teeth. This assures a cleaning of the comb.

The guard tooth is reduced in height towards its narrow or rear end in order to prevent any possibility of foreign material catching thereon while being sucked away from adjacent pick-up teeth as the comb is in elevated position. This reducing the height of the guard teeth, also provides a greater space at the entrance of the aperture. Accordingly, bulkier material such as lint may be held in place by suction at the time of reduction of area of the aperture. It will be sucked upwardly and removed as soon as the comb rocks in a counter-clockwise position, as viewed in Fig. 2, which will occur at the beginning of the forward stroke of the nozzle over the carpet. To assure such shifting of the comb, the latter may present a flange or edge surface 19. This edge will, of course, engage with tufts as the nozzle is moved in a forward direction over the carpet to assure, under those circumstances, that the comb occupies the position shown in full lines in Fig. 2.

Thus, among others, the several objects of the invention as aforesaid are achieved. Obviously numerous changes in construction and rearrangement of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. In a vacuum cleaner nozzle assembly a comb element to be pivotally supported within a nozzle mouth for rocking movement through an arc of approximately ninety degrees, said element presenting a lower carpet-contacting face defined between longitudinally extending front and rear edges, a row of teeth projecting from said face at a point adjacent said rear edge towards said front edge, a second row of teeth also projecting from said face at a point adjacent said front edge towards said rear edge, the forward ends of said first-named row of teeth being relatively blunt and constituting material engaging and retaining edges, the rear ends of said second row of teeth being relatively sharp and the teeth of said second row being of less height than the teeth of said first-named row at points between the side faces of the latter.

2. In a vacuum cleaner nozzle assembly a comb element to be pivotally supported with a nozzle mouth for rocking movement through an arc of approximately ninety degrees, said element presenting a lower carpet-contacting face defined between longitudinally extending front and

rear edges, a row of teeth projecting from said face at a point adjacent said rear edge towards said front edge, a second row of teeth also projecting from said face at a point adjacent said front edge towards said rear edge, the forward ends of said first-named row of teeth being relatively blunt, the rear ends of said second row of teeth being relatively sharp and said latter teeth being of reduced height towards their ends to extend to a point short of the lower edges of said first-named row of teeth.

3. In a vacuum cleaner nozzle assembly a comb element to be pivotally supported within a nozzle mouth for rocking movement through an arc of approximately ninety degrees, said element presenting a lower carpet-contacting face defined between longitudinally extending front and rear edges, a row of teeth projecting from said face at a point adjacent said rear edge towards said front edge, a second row of teeth also projecting from said face at a point adjacent said front edge towards said rear edge, the forward ends of said first-named row of teeth being relatively blunt, the rear ends of said second row of teeth being relatively sharp and a flange extending from said comb element to contact a surface traversed by the nozzle with which said element is associated to assure rocking movement of said element.

4. In a nozzle for a vacuum cleaner in combination a body including spaced, rigid, front and rear walls having lower edges lying in substantially the same plane and extending upwardly therefrom to define a hollow throat connectable to a suction apparatus, a comb element pivotally mounted by said body to extend between said walls adjacent the lower edges thereof, a face defining a part of said element, two rows of opposed teeth extending from said face and with the teeth in different rows disposed in opposed and staggered relationship, the teeth of one row terminating in material-engaging edges, cooperating surfaces forming a part of said nozzle and element to limit the pivoting of the latter with respect to said walls to an arc of movement of substantially 90°, said element at one extreme of movement extending downwardly adjacent said rear wall and within said throat to a point where said teeth project below the lower edge of said rear wall and the teeth of said one row extend in the direction of said front wall, said element at its opposite extreme of movement extending from a point adjacent the rear wall across the space between said walls to a point at which the comb face lies adjacent the front wall with the material-engaging edges of said one row of teeth extending upwardly and a flange projecting from said element for engagement with the surface over which said nozzle is reciprocated to assure a pivoting of said element.

5. In a nozzle for a vacuum cleaner in combination a body including spaced, rigid, front and rear walls having lower edges lying in substantially the same plane and extending upwardly therefrom to define a hollow throat connectable to a suction apparatus, a comb element pivotally mounted by said body to extend between said walls adjacent the lower edges thereof, a face defining a part of said element, teeth extending from said face and terminating in material-engaging edges, cooperating surfaces forming a part of said nozzle and element to limit the pivoting of the latter with respect to said walls to an arc of movement of substantially 90°, said element at one extreme of movement extending downwardly adjacent said rear wall and within said throat to a point where said teeth project below the lower edge of said rear wall and in the direction of said front wall, said element at its opposite extreme of movement extending from a point adjacent the rear wall across the space between said walls to a point at which the comb face lies adjacent the front wall with the material-engaging edges of said teeth extending upwardly, said teeth being disposed in a row formation and spaced from each other, a second row of teeth also extending from the face of said element and arranged in opposed relationship to

5

the teeth of the first-named row, the adjacent teeth of different rows being disposed in spaced and overlapped relationship to define between said rows a zig-zag groove; the material-engaging edges of said first-named row of teeth being relatively blunt and the second row of teeth terminating in edge portions which are relatively sharp and extend toward said rear wall.

6. In a nozzle for a vacuum cleaner in combination a body including spaced, rigid, front and rear walls having lower edges lying in substantially the same plane and extending upwardly therefrom to define a hollow throat connectable to a suction apparatus, a comb element pivotally mounted by said body to extend between said walls adjacent the lower edges thereof, a face defining a part of said element, teeth extending from said face and terminating in material-engaging edges, cooperating surfaces forming a part of said nozzle and element to limit the pivoting of the latter with respect to said walls to an arc of movement of substantially 90°, said element at one extreme of movement extending downwardly adjacent said rear wall and within said throat to a point where said teeth project below the lower edge of said rear wall and in the direction of said front wall, said element at its opposite extreme of movement extending from a point adjacent the rear wall across the space between said walls to a point at which the comb face lies adjacent the front wall with the material-engaging edges of said teeth extending upwardly, said teeth being disposed in a row formation and spaced from each other,

6

a second row of teeth also extending from the face of said element and arranged in opposed relationship to the teeth of the first-named row, the adjacent teeth of different rows being disposed in spaced and overlapped relationship to define between said rows a zig-zag groove; the second row of teeth providing guards for the teeth of said first-named row and said guard teeth being of less height than said first-named teeth at points between the same.

References Cited in the file of this patent

UNITED STATES PATENTS

1,192,408	Frame	July 25, 1916
1,878,345	Sutter	Sept. 20, 1932
1,899,107	Riebel	Feb. 28, 1933
1,936,367	Riebel	Nov. 21, 1933
1,980,438	Riebel	Nov. 13, 1934
2,140,874	Juelson	Dec. 20, 1938
2,157,077	Kroenlein	May 2, 1939
2,237,724	Cranmer	Apr. 8, 1941
2,278,382	Ross	Mar. 31, 1942
2,325,739	Brock	Aug. 3, 1943
2,333,409	Brown	Nov. 2, 1943
2,377,778	Hallock	June 5, 1945
2,511,238	Beede	June 13, 1950
2,659,098	Meyerhoefer	Nov. 17, 1953

FOREIGN PATENTS

30,833	Sweden	May 20, 1911
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