Nov. 22, 1949 R. L. HALLOCK 2,488,625

COMBINATION RUG NOZZLE AND FLOOR BRUSH

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Fig. 1

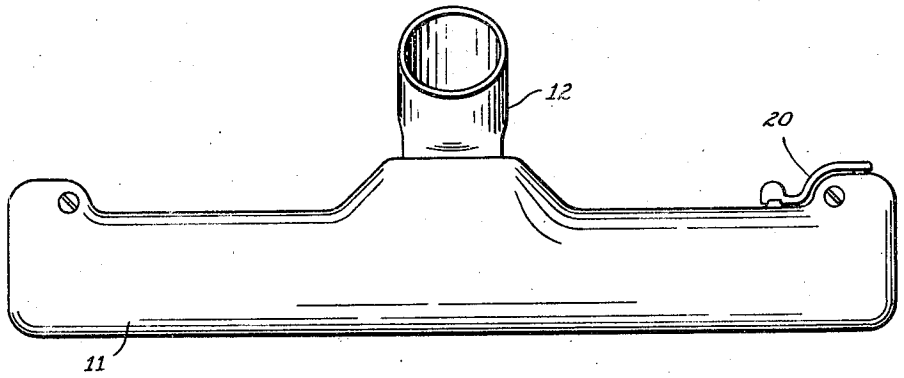


Fig. 2

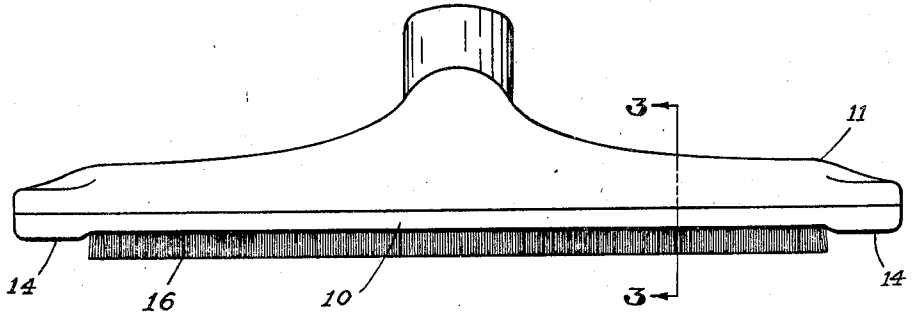
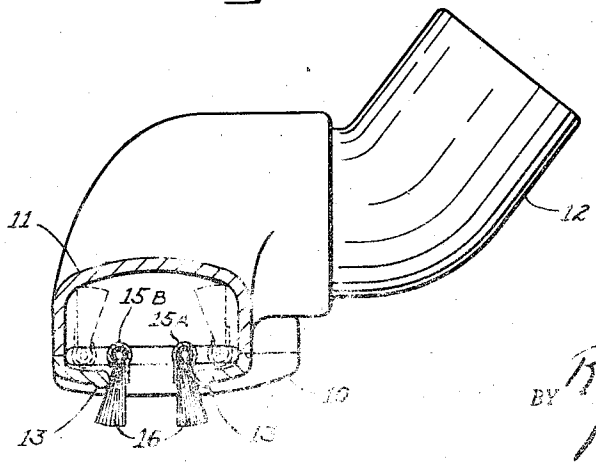


Fig. 3



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Fig. 4

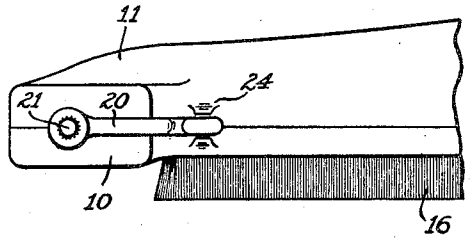


Fig. 5

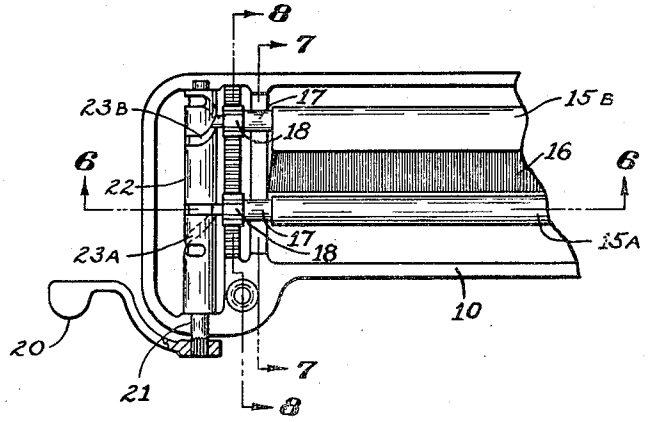


Fig. 7

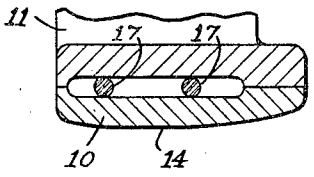


Fig. 6

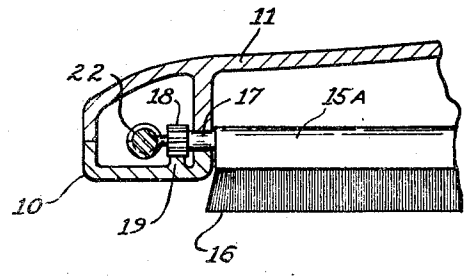
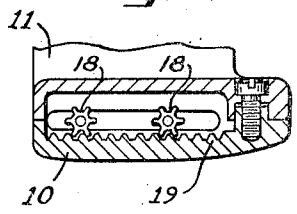


Fig. 8



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2,488,625

COMBINATION RUG NOZZLE AND FLOOR BRUSH

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7 Claims. (Cl. 15—373)

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This invention relates to nozzles for vacuum cleaners and is particularly concerned with convertible nozzles which may be selectively used for a plurality of types of cleaning operations.

The invention is more specifically concerned with the provision of a nozzle which may be used for cleaning rugs or similar pile fabric material and which may be readily converted for use on bare floors or other surfaces where a brush is more advantageously applied during the cleaning operation.

Convertible nozzles having plain surface contacting lips adapted for use in rug cleaning and having in combination therewith movable brush sections which can be adjusted to operative position for cleaning bare floors have heretofore been suggested but such devices have involved complicated mechanical structures which render them difficult to manipulate, costly to manufacture, and subject to maladjustment which renders them inoperative. Such devices also frequently provided for the brush mounting either exteriorly of the nozzle body where in inoperative position it is unsightly and unattractive, or they provided a mounting within the body in such a manner that the brushes materially limit the suction opening therethrough thus detracting from the efficiency of the nozzle.

It is among the objects of the present invention to provide a convertible nozzle of simple and unique construction avoiding the above and other objections which have been raised with regard to former devices of this character.

More specifically it is among the objects of the present invention to provide a combined and convertible rug and bare surface cleaning nozzle which may be readily and simply converted and which avoids the use of a multiplicity of delicately adjusted parts.

Still further object of the invention is to provide a suction cleaning nozzle having adjustable brushes which may be folded into inoperative position wholly within the confines of the nozzle body and which may be readily swung to operative position therefrom.

Another important object of the invention is the provision of means for removing foreign matter which may become attached to the bristles of the brushes. This object is achieved by the positioning of the brushes, when not in use, within the air passage where the air will pass over the brush surfaces in a direction opposite to that of its passage when the brushes are in extended position.

Numerous other objects and features of the

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present invention will be apparent from a consideration of the following specification taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a top plan view of one embodiment of the present invention;

Fig. 2 is a front elevation of that form of the invention shown in Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary view of the manipulating end of the nozzle;

Fig. 5 is a detailed view of the manipulating end of the nozzle with the cover removed;

Fig. 6 is a vertical section taken on line 6—6 of Fig. 5;

Fig. 7 is a transverse vertical section taken on line 7—7 of Fig. 5, and

Fig. 8 is a similar section taken on line 8—8 of Fig. 5.

In general terms, the preferred embodiment of the present inventive concept may be defined as comprising a substantially hollow suction nozzle having a suction opening bounded by smooth lips designed for gliding movement over a rug to provide for the normal suction cleaning thereof. Within the body there is mounted a pair of longitudinally extending brushes arranged to move both pivotally on their longitudinal axis and bodily toward one another, the arrangement being such that in inoperative position the bristles extend vertically upwardly within the body and in a plane outwardly of the inner edges of the lips to provide a free and unobstructed air passage from the lips through the nozzle body. When the brushes are to be used for the cleaning of bare floors they are pivotally moved to direct the bristles downwardly and with such movement the axes of the brushes move bodily toward one another so as to permit the brushes to extend vertically downwardly between the lips of the opening.

Among the improved features of the present invention is the provision of a simple rotary actuating member for the brushes by which the combined movement above referred to is accomplished through successive operation of the brushes so as to avoid interference therebetween and also the provision of a rack and pinion arrangement by which such rotary and bodily movement of the brushes is accomplished.

Referring more specifically to the drawings, the nozzle comprises a body 10 having a cover 11 to which is secured a suitable swivel connector 12 to which a hollow handle or wand may be ap-

plied for manipulating the nozzle and for directing suction to the hollow body. The lower face of the body is provided with a conventionally elongated suction opening bounded by smooth rug engaging lips 13, the ends of the body 10 being preferably provided with downwardly extending gliding surfaces 14 which support the nozzle during rug cleaning.

Mounted within the body there is a pair of longitudinally extending brushes comprising elongated backing pieces 15A and 15B which mount the bristles 16. The ends of the back members are provided with pintles 17 on which are mounted pinions 18 which ride on and mesh with the teeth of transversely extending racks 19 formed in the opposite ends of the body 10. At the manipulating end of the nozzle, as shown in Figs. 4 to 8, inclusive, there is provided a manually operable actuating lever 20 which engages the operating end 21 of a cylindrical cam 22 which is rotatably mounted in the manipulating end of the nozzle. The cam 22 is provided with a pair of axially spaced cam grooves 23A and 23B each of which receives an extending end of one of the pintles 17 at the manipulating end of the nozzle. A portion of each of these grooves is in the form of a spiral, the pitch of the spiral portion of one groove being opposite to that of the other. The remaining portion of each groove is circular, and the major circular portion of groove 23A is at the inner end while the major circular portion of groove 23B is at the outer end. Also, the outer end of groove 23A and the inner end of groove 23B is each circular for a relatively short distance.

When the device is to be used for rug cleaning the brushes are in the position indicated by broken lines in Fig. 3, the backing members being at the extreme ends of the racks 19 with the brushes extending vertically upwardly from the backing members and lying between the lips 13 and the side walls of the cover 11, thus permitting an unobstructed air passage through the lips and through the body.

When it is desired to convert the nozzle to bring the brushes into use, the handle 20 is rotated thus rotating the cam 22. Inasmuch as the pintle 17 of back member 15A is received in the short circular outer portion of groove 23A, rotation of the cam at first does not move the pintle, but as soon as the latter enters the spiral portion it is displaced parallel to itself towards the center of the nozzle. However, due to the engagement of the pinion 18 with the rack 19, the back member 15A is also caused to rotate. This combined lateral and rotating movement brings the back member 15A and the bristles carried thereby from the position shown by broken lines to that shown by full lines in Fig. 3. The back member 15A reaches the latter position as the pintle 17 thereof leaves the inclined portion and enters the major circular or dwell portion at the inner end of cam groove 23A, and hence continued rotation of the cam does not impart further movement to the pintle. During the first part of the rotation of the cam, the pintle of back member 15B occupies the circular or dwell portion of cam groove 23B, and thence is not moved until back member 15A has been moved far enough through the nozzle opening to be out of the way of member 15B and its bristles. However, during the latter part of the rotation of the cam, the pintle of back member 15B enters the spiral portion of groove 23B, and the back member 15B is hence moved laterally and rotated to operative position while the back member 23A remains stationary. It will be seen that by such successive movements each brush is in turn swung through the lip opening, which opening may thus be limited to the size of one brush only.

When in operative position the pintle of back member 15A occupies the major circular portion of groove 23A, as aforesaid, while the other pintle occupies the short circular section at the inner end of groove 23B. Hence, both pintles are in circular portions of the cam grooves and therefore any tendency for the brushes to be rotated as a result of their movement over the surface being cleaned cannot rotate the cam, as it could if either of the pintles were in spiral portions of the grooves, and consequently such rotation of the brushes is prevented.

Reverse movement of the brushes is imparted by simple reverse movement of the handle 20, which by the action of the cam successively returns the brushes by combined rotary and bodily movement thereof to the inoperative position shown by the broken lines in Fig. 3.

From the foregoing it will be seen that the present structure provides a nozzle with a simple arrangement whereby a relatively narrow main lip opening is permitted and in which the brushes when in inoperative position are wholly concealed within the body in such a manner as to preclude any obstruction of the air passage therethrough. Of course, it will be understood that the invention is not limited to the specific structural details shown by way of illustration and that numerous changes, modifications, and the full use of equivalents may be resorted to in the practice of the invention without departure from the spirit or scope thereof as outlined in the appended claims.

What I claim is:

1. In a combination rug nozzle and floor brush for a vacuum cleaner, a hollow body having an air flow passage leading from an elongated suction opening of less width than said passage, a brush element rotatably mounted within said body on an axis adjacent to and substantially parallel to said elongated opening, said element including bristles extending substantially normal to said axis, and means for displacing said axis away from said opening and rotating said brush about said axis from an active position with said bristles extending outwardly from said opening to an inactive position with said bristles within said passage and disposed to one side of said opening and extending substantially parallel to the direction of air flow through said passage.

2. In a combination rug nozzle and floor brush for a vacuum cleaner, a hollow body having an elongated suction opening of less width than said body, a brush element rotatably mounted within said body on an axis adjacent to and substantially parallel to said opening, and means for displacing said axis away from said opening and rotating said brush approximately 180° from an active position with said brush extending outwardly through said opening to an inactive position with said brush wholly within said body and disposed to one side of said opening.

3. In a combination rug nozzle and floor brush for a vacuum cleaner, a hollow body having an elongated suction opening of less width than said body, a pair of brush elements rotatably mounted within said body on axes adjacent to each side of and substantially parallel to said opening, said

brush elements including bristles having a length greater than half the width of said opening, and means for displacing the axis of one of said brushes away from said opening and rotating said one brush approximately 180° from an active position with said one brush extending outwardly through said opening to an inactive position with said one brush wholly within said body and disposed to one side of said opening and thereafter maintaining said one brush in said inactive position while displacing the axis of the other brush away from said opening and rotating said other brush approximately 180° from a similar active position to a similar inactive position.

4. In a combination rug nozzle and floor brush for a vacuum cleaner, a hollow body having lips bounding a suction inlet opening of less width than said body, a pair of brushes mounted within said hollow body adjacent to said opening, said brushes including bristles having a length greater than one-half the width of said opening, means for selectively retaining both of said brushes in an active position projecting through said inlet opening and in an inactive position wholly within said hollow body, and means for successively moving said brushes through said inlet opening from one of said positions to the other.

5. In a combination rug nozzle and floor brush for a vacuum cleaner, a hollow body having an elongated suction opening of less width than said body, a toothed rack within said body extending transversely of said opening, an elongated brush element, a pinion gear secured to said element and meshing with said rack, and means for displacing said brush element transversely with respect to said elongated opening from an active position in which said element is in line with said opening to an inactive position in which it is to one side thereof, the meshing of said pinion with said rack simultaneously causing said brush element to rotate from said active position in which said brush extends outwardly through said opening to said inactive position in which said brush is wholly within said body.

6. In a combination rug nozzle and floor brush for a vacuum cleaner, a hollow body having an elongated suction opening of less width than said body, a toothed rack within said body extending transversely of said opening, a pair of elongated brush elements, said brush elements including bristles having a length greater than one-half the width of said opening, a pinion gear secured to each element and meshing with said rack, and means for displacing said brush elements successively and in opposite directions transversely with respect to said elongated opening from active positions in which said elements are in line with said opening to inactive positions in which they are on opposite sides of said opening, the meshing of said pinions with said rack causing said brush elements to be successively rotated from said active positions in which said brush elements extend outwardly through said opening to said inactive positions in which said brush elements are wholly within said body.

7. In a combination rug nozzle and floor brush for a vacuum cleaner, a hollow body having an elongated suction opening of less width than said body, a toothed rack within said body extending transversely of said opening, a pair of elongated brush elements, said brush elements including bristles having a length greater than one-half the width of said opening, a pinion gear secured to each element and meshing with said rack, a cam follower secured to each brush element, and cam means having a track engaged by each follower, one of said tracks having an inclined portion and a dwell portion aligned with a dwell portion and an oppositely inclined portion, respectively, of the other track whereby actuation of said cam means displaces said brush elements successively and in opposite directions transversely with respect to said elongated opening from active positions in which said elements are in line with said opening to inactive positions in which they are on opposite sides of said opening, the meshing of said pinions with said rack causing said brush elements to be successively rotated from said active positions in which said brush elements extend outwardly through said opening to said inactive positions in which said brush elements are wholly within said body.

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