

- [54] VACUUM CLEANER NOZZLE
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- [51] Int. Cl. **A47I 9/02**
- [58] Field of Search **15/369, 373, 397, 402,**
15/416

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[57] **ABSTRACT**
 A vacuum cleaner nozzle movable over a deep pile

g and the like and having a body with a suction chamber portion and a retractable pivotable rake with hollow tines providing air flow passages when the rake is extended and pulled through the pile in order to exert a suction cleaning effect down to the bottom of the pile. The nozzle may also include a narrow rear wall portion on each tine with diverging sides toward a front wall portion so that the tines of the rake thereby act as pile penetrating plows when the nozzle is pulled across deep pile rugs. The disclosure also includes a releasable retainer for retaining the rake in a retracted position as for surface cleaning and a movable cam for urging the rake from its retracted position toward an automatic operating position for cleaning a deep pile rug. In the automatic operating position, the tines of the rake automatically pivot backward as the nozzle is pushed forward, and pivot to an extended pile penetrating position as the nozzle is pulled backward. The disclosure also includes a movable valve in the nozzle body movable by the rake between a first location blocking air flow through the nozzle inlet when the rake is in extended automatic operative position for deep cleaning and grooming of long pile fibers, and movable to a second location blocking the flow of air into and through the hollow tines when the rake is in retracted inoperative position as when the nozzle is used for surface cleaning.

11 Claims, 5 Drawing Figures

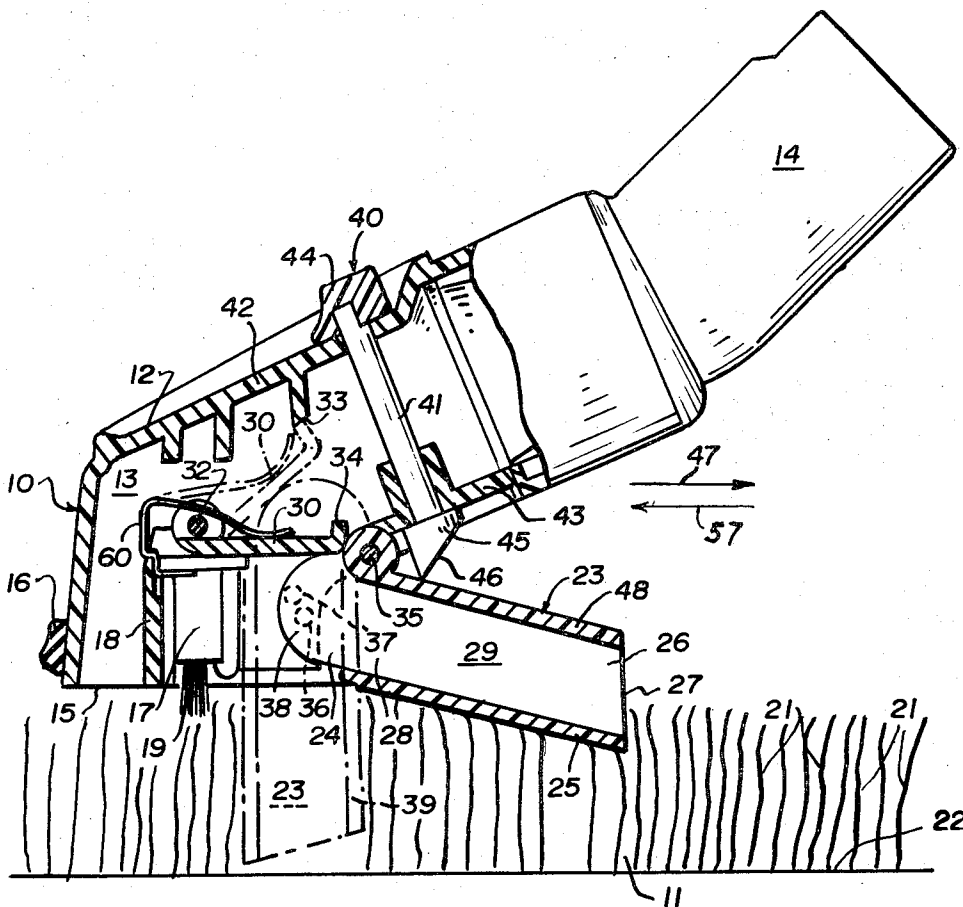


FIG. 1

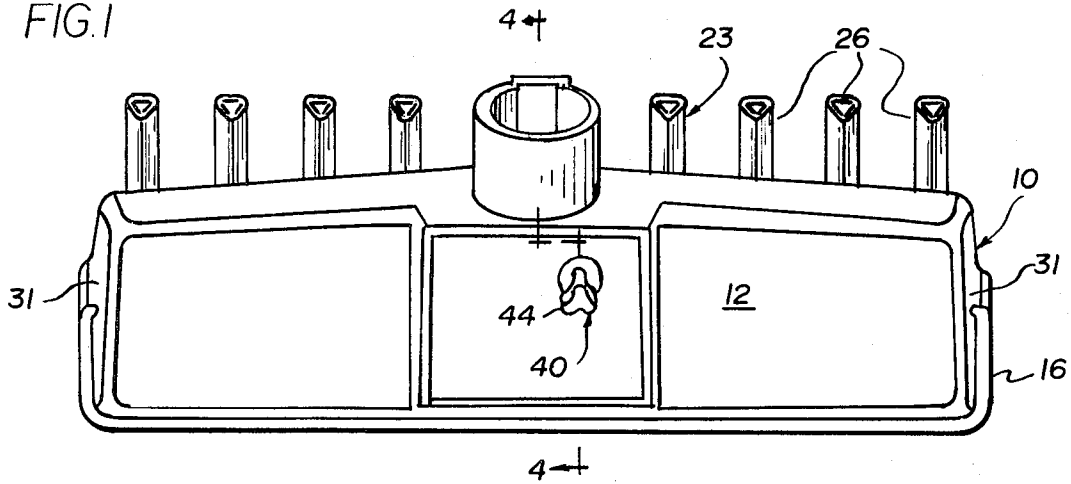


FIG. 2

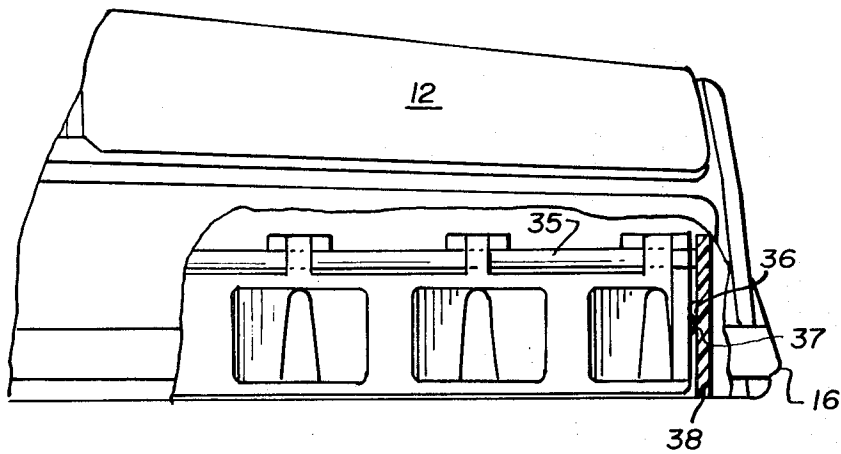


FIG. 3

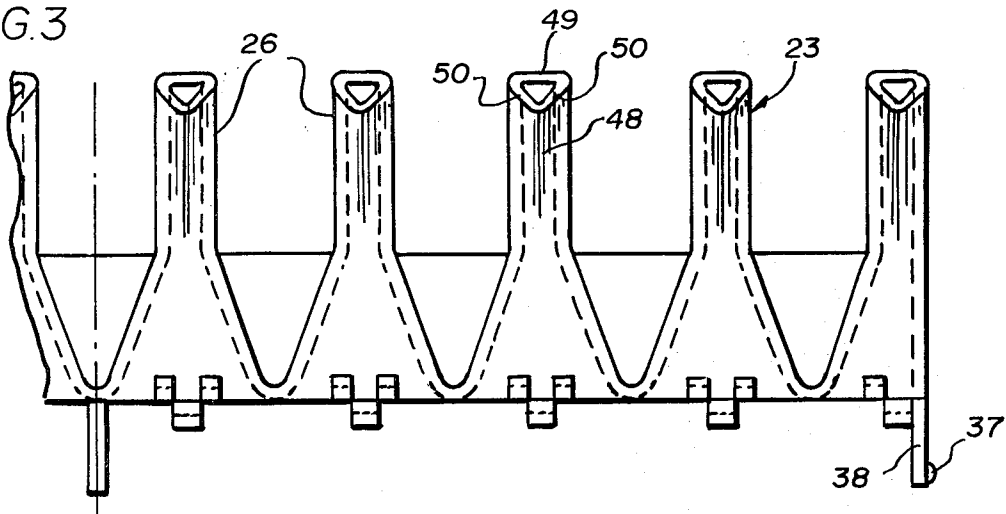


FIG. 4

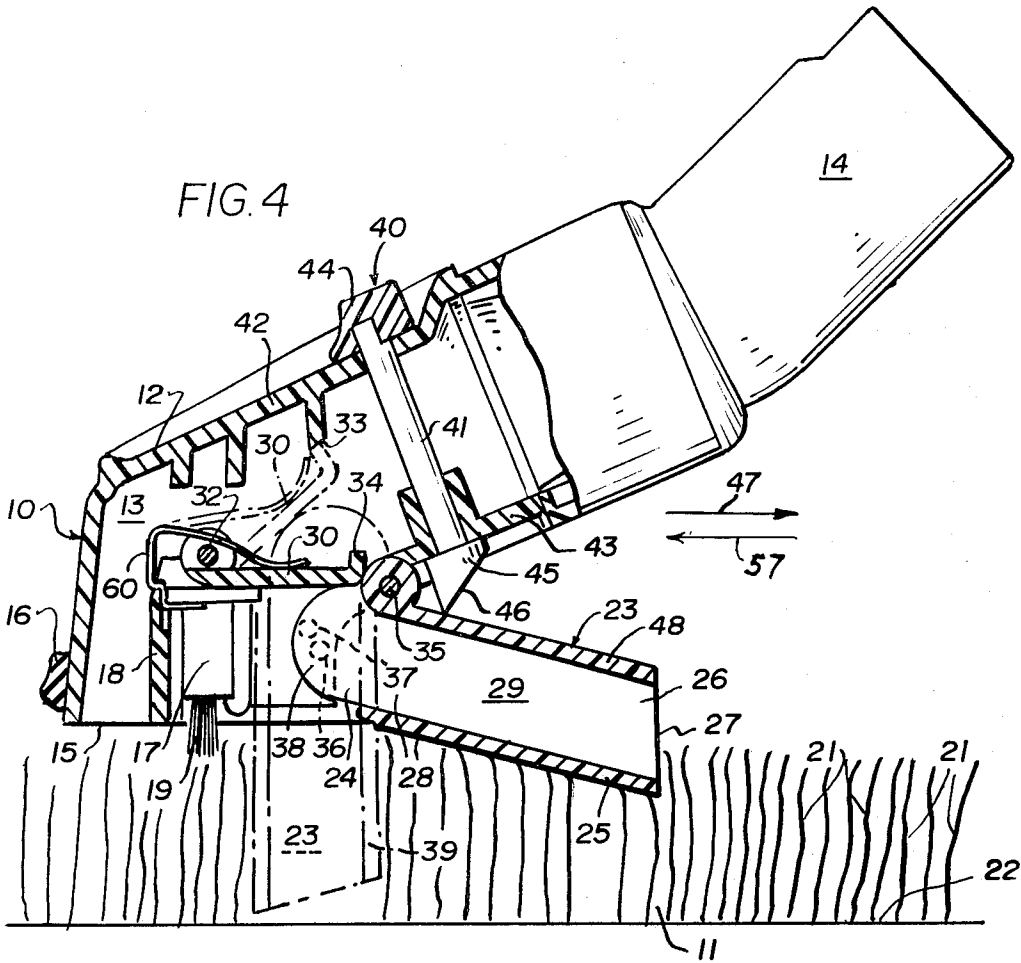
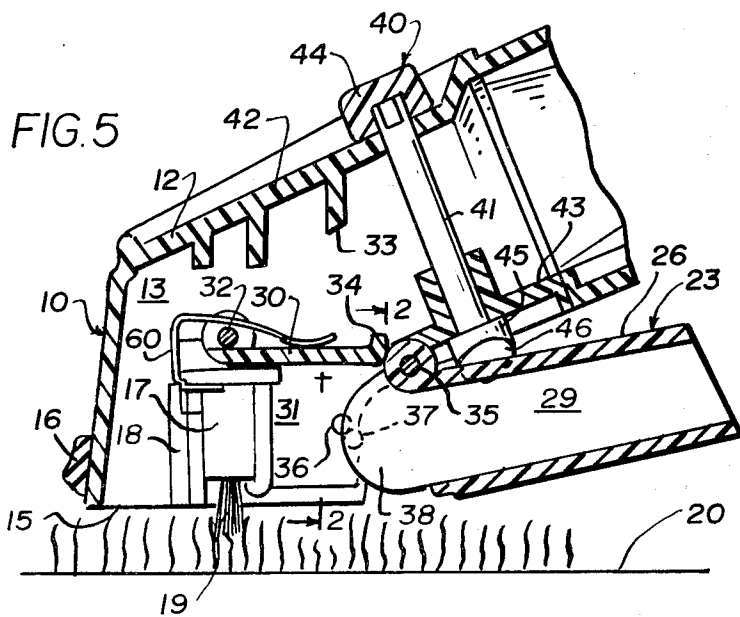


FIG. 5



VACUUM CLEANER NOZZLE

BACKGROUND OF THE INVENTION

This invention relates to a vacuum cleaner nozzle apparatus particularly adapted for cleaning deep pile rugs and having a movable rake with hollow air flow tines movable to inoperative retracted position when the nozzle is used for rug surface cleaning and the like and movable to projected operative position for penetrating the pile when the nozzle apparatus is pulled across the rug.

Another feature of the invention is to provide a combination rug tool which can be used for deep cleaning and grooming of long pile rug fibers, and for surface cleaning.

A further feature of the invention is to provide a shag rug cleaning attachment with a rake which can automatically switch from a downwardly extending pile penetrating position to a rearwardly extending position as the rake is pulled and pushed across a carpet.

Still another feature of the invention is to provide a vacuum cleaner nozzle apparatus with a pivotally movable rake having hollow air flow tines in combination with a movable valve that is movable to block air flow through the nozzle entrance when the tines are in extended operative position and to block the air flow through the tines when the rake is in retracted inoperative position.

A still further feature of the invention is to provide extendable hollow tines that are narrower on a rear edge than a forward edge so that when the tines are pulled through deep pile each tine acts as a plow to separate and clean between the fibers of the pile.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a vacuum cleaner nozzle apparatus embodying the invention.

FIG. 2 is a fragmentary front elevational view of the apparatus showing one end thereof and broken away and in section substantially along line 2—2 of FIG. 5.

FIG. 3 is a fragmentary rear side elevational view of the rake only.

FIG. 4 is a sectional view taken substantially along line 4—4 of FIG. 1.

FIG. 5 is a view similar to FIG. 4 but showing the rake in fully retracted position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings there is illustrated one embodiment of a vacuum cleaner nozzle apparatus 10 movable over a deep pile rug 11 and the like during cleaning with the apparatus comprising a hollow body 12 with a suction chamber portion 13 therein adapted to be subjected to vacuum when attached at the neck 14 to a customary canister type vacuum cleaner through a tubular wand and flexible hose (not shown).

The body 12 has a lower entrance end 15 through which air is drawn by the suction during surface cleaning as shown in FIG. 5. This entrance end 15 is surrounded by a customary resilient bumper strip 16.

Extending transversely of the nozzle body 12 is a customary brush unit 17 retained in a housing 18 so that the linearly aligned rows of bristles 19 may project

below the entrance end 15 and aid in the cleaning of the rug or carpet 20 in the customary manner.

In order to provide for cleaning between the fibers 21 and at the base 22 of the deep pile rug 11 there is provided on the nozzle body 12 a retractable pivotable rake 23 having an upper portion 24 at the vacuum cleaner body 12 and a lower portion 25 comprising a plurality of extended hollow tines 26 for combing through the fibers 21 and cleaning them. In the illustrated embodiment, there are ten substantially evenly spaced tines 26. Each tine 26 has an open lower end 27, open upper end 28 and an air flow passage 29 therebetween for conducting a dirt laden air stream in the customary manner. The passages 29 in the plurality of tines empty into the suction chamber 13 when the comb or rake 23 is in its extended operative position shown in FIG. 4, wherein the rake 23 automatically pivots about a hinge rod 35 between a downwardly extending pile penetrating position (shown in broken lines in FIG. 4) assumed when the nozzle apparatus is pulled rearwardly for deep cleaning and a rearwardly extending intermediate position shown in solid lines in FIG. 4 which rearwardly extending position is assumed as the nozzle apparatus is pushed forwardly for surface cleaning. This pull and push, to and fro movement of the nozzle apparatus and rake cleans and grooms the long pile shag rug 11.

Mounting means are provided for mounting the rake on the nozzle body 12 for the above described pivotal movement between the above extended operative positions shown in FIG. 4 wherein the nozzle apparatus 10 is used for cleaning and grooming of deep pile rugs, and a retracted position shown in FIG. 5 wherein the nozzle apparatus 10 is used for surface cleaning and the rake portion thereof is inoperative.

In order to control air flow through the hollow tine passages 29 there is provided an elongated flap valve 30 extending substantially the full length of the nozzle body 12 between the ends 31 thereof. This flap valve 30 is hingedly mounted at one edge to a hinge rod 32 that also extends horizontally between the ends 31 of the nozzle body. The valve is movable about its rod 32 between a first location shown in broken lines in FIG. 4 blocking the entrance end 15 or nozzle inlet when the rake is in its broken line extended position of FIG. 4 for deep cleaning and a second location as shown in solid lines in FIGS. 4 and 5 where it blocks the flow of air into and through the passages 29 in the hollow tines 26 when the rake 23 is in either its intermediate position or its retracted inoperative position. When this occurs the air is freely drawn through the suction inlet or entrance end 15 for effective surface cleaning while no air is drawn under suction through the tine passages 29.

The rake 23 is provided with end flanges 38 which are shaped and positioned to move the flap valve 30 to the desired position (see FIGS. 3, 4 and 5). The curved cam shape of each end flange 38 as it may contact the lower surface of flap valve 30 determines the position of the flap valve 30 at any angle of the rake from the position shown in broken line in FIG. 4 to the retracted position shown in FIG. 5. End flange 38 is shaped to provide no movement of the flap valve 30 as the rake is moved from the position shown in FIG. 5 to the position shown in solid line in FIG. 4. As the rake is moved toward the position shown in broken lines in FIG. 4, the curved cam shape of end flange 38 provides a rapid rise of flap valve 30 such that the flap valve sears against an

integral valve seat 33 formed in body 12 (FIG. 4) before the rake reaches the position shown in broken line in FIG. 4. A resilient spring 50 (FIGS. 4 and 5) is utilized to provide positive contact between flap valve 30 and end flange 38 during movement of the flap valve, and for positive seating of flap valve 30 against an integral valve seat 34 formed in body 12 (FIGS. 4 and 5).

As indicated above, the nozzle body 12 is provided with a pair of integral valve seats 33 and 34 which are engaged by the movable flap valve 30 in its two above described extreme positions. Adjacent the valve seat 34 which is engaged by the valve 30 as shown in FIGS. 4 and 5 when the rake 23 is in its intermediate position or its inoperative position is a second transverse hinge rod 35 which comprises the mounting means for the rake 23 for pivotal movement between its two positions as previously described.

In order to retain the rake 23 in fully retracted position as shown in FIG. 5 there are provided releasable retaining means. In the illustrated embodiment this retaining means comprises a projection or elevation 36 on the inner surface of each end wall 31 of the nozzle and a similar projection or elevation 37 on each end flange 38 of the rake 23 (see FIGS. 2 and 3). When the rake is in retracted position as shown in FIG. 5 the end wall elevation 36 is above and in engagement with the similar elevation 37 on the rake. These engagements of the two pairs of elevations serve to retain the rake resiliently and releasably in retracted position. Downward movement on the rake 23 from the position shown in FIG. 5 to the positions shown in FIG. 4 serves to displace the resilient end flanges 38 of the rake and permit movement of the rake to its automatically pivotable positions shown in FIG. 4 for deep pile cleaning as previously described.

In order to aid this displacement there is provided a rotatable cam member 40 comprising a shaft 41 extending through the top 42 and bottom 43 of the nozzle body 12 provided on its upper end with a knob 44 accessible for turning the rod 41 about its longitudinal axis and a bottom end 45 having an inclined cam surface 46 thereon.

As shown in FIG. 5 when the cam member 40 is turned to one position the inclined cam surface 46 is adjacent and against a tine 26 of the rake 23. When the cam member is rotated approximately 180° the inclined cam surface 46 presses downwardly against the tine at an area adjacent the hinge rod 35 to move the rake 23 from the position of FIG. 5 to the position of FIG. 4 during which the elevations 36 and 37 are snapped past each other so that the rake is free to rotate to its fully extended operative pile penetrating position 39 when the nozzle is pulled rearwardly across the deep pile rug 11 in the direction indicated by the arrow 47 of FIG. 4, and pivot between position 39 shown in broken lines in FIG. 4 and the rearwardly extending position shown in solid lines in FIG. 4 when the nozzle is pushed forwardly across the deep pile rug 11 in the direction indicated by the arrow 57 of FIG. 4. This causes the tines of the rake to be fully extended on the pulling stroke for complete deep penetration and thorough cleaning of the fibers 21 and the base 22 of the rug and causes the tines to be pivoted rearwardly to the position shown in solid lines in FIG. 4 on the pushing stroke for surface cleaning of the rug fibers.

In the illustrated embodiment the rear wall 48 of each tine 26 is relatively narrow while the front wall 49 is wider and the two are connected by diverging side walls 50 with the result that the narrow rear wall 48 in combination with the diverging sides 50 causes each tine to function as a plow in moving through and between the fibers 21 thereby aiding in the cleaning operation.

Having described our invention as related to the embodiment shown in the accompanying drawings, it is our intention that the invention be not limited by any of the details of description, unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the appended claims.

1. A vacuum cleaner nozzle apparatus movable over a deep pile rug and the like during cleaning, comprising:

a body having a suction chamber portion adapted to be subjected to vacuum, and a suction inlet;

a retractable rake having an upper portion at said body and a lower portion comprising a plurality of extended hollow tines for combing said rug, each tine having a lower end, an upper end and a passage therebetween for flow of air into and through said tines into said chamber;

mounting means for mounting said rake on said nozzle body for movement between extended operative position and retracted inoperative position;

a valve in said body movable between a first location blocking said inlet when said rake is in said extended position and a second location blocking said flow of air into and through said tines when said rake is in said retracted inoperative position; and

means for moving said valve between said first and said second locations.

2. The apparatus of claim 1 wherein there are provided releasable retaining means for retaining said rake in said retracted position.

3. The apparatus of claim 2 wherein said retaining means comprises yieldable engaged members on said body and said rake that are in engagement when said rake is in the retracted position to maintain the retracted position and with means for forcibly displacing the retracted rake toward extended position thereby displacing said members from their engagement.

4. The apparatus of claim 3 wherein said displacing means comprises a rotatable cam member on said nozzle body rotatable to urge said rake from said retracted position.

5. The apparatus of claim 1 wherein said rake is provided with hinged attaching means for attaching the rake to said body for arcuate movement of the rake between said first and second positions.

6. The apparatus of claim 1 wherein there are provided spaced valve seats in said suction chamber body adapted to be engaged selectively by said valve, and said valve moving means comprises means on said rake for engaging and moving said valve from said first position to said second position upon said movement of the rake to said retracted position.

7. The apparatus of claim 1 wherein said rake when in retracted position is projected away from the front of the nozzle body, each said tine having a narrow rear wall portion with diverging sides toward a front wall portion and thereby acting as a pile penetrating plow when the nozzle apparatus is pulled across a deep pile

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rug, the rake being forced to a rearwardly extending position when the nozzle apparatus is pushed across said rug.

8. A vacuum cleaner nozzle apparatus movable over a deep pile rug and the like during cleaning, comprising:

a body having a suction chamber portion adapted to be subjected to vacuum, and a suction inlet;

a retractable rake having an upper portion at said body and a lower portion comprising a plurality of extended hollow tines for combing said rug, each tine having a lower end, an upper end and a passage therebetween for flow of air into and through said tines into said chamber;

hinged attaching means for attaching the rake to said body for arcuate movement between a downwardly extending position and a rearwardly extending intermediate position;

a valve in said body movable between a first location blocking said inlet when said rake is in said downwardly extending position and a second location blocking said flow of air into and through said tines when said rake is in said rearwardly extending intermediate position; and

valve operating means in said body for engaging and moving said valve from said first position to said second position upon said movement of the rake to

said intermediate position.

9. A vacuum cleaner nozzle apparatus movable over a pile rug and the like during cleaning, comprising: a body having a suction chamber portion adapted to be subjected to vacuum, and a suction inlet, a pivotable rake having an upper portion at said body and a lower portion comprising a plurality of extended hollow tines for combing said rug, each tine having a lower end, and upper end and a passage therebetween for flow of air into and through said tines into said chamber; mounting means for mounting said rake on said nozzle body for pivotal movement between an extended operation position for deep cleaning of long pile rug fibers and a retracted position for surface cleaning; a valve in said body movable between a first location blocking said inlet when said rake is in said extended operative position and a second location blocking said flow of air into and through said tines when said rake is in said retracted position; and means for moving said valve between said first location and said second location.

10. The apparatus of claim 9 wherein said moving means includes cam means associated with said rake.

11. The apparatus of claim 9 wherein said moving means includes resilient means for positively seating said valve in one of said locations.

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