United States Patent [19]

Holubinka

[11] **3,708,824**

[45] **Jan. 9, 1973**

[54] SUCTION-CLEANING IMPLEMENT

[76] Inventor: **Siegmund B. Holubinka,** 1022 North Main St., Naperville, Ill. 60540

[22] Filed: **Jan. 22, 1971**

[21] Appl. No.: **108,895**

[52] **U.S. Cl.** **15/397,** 15/416, 15/420

[51] **Int. Cl.** **A47l 9/02**

[58] **Field of Search** 15/397, 415–419

[56] **References Cited**

UNITED STATES PATENTS

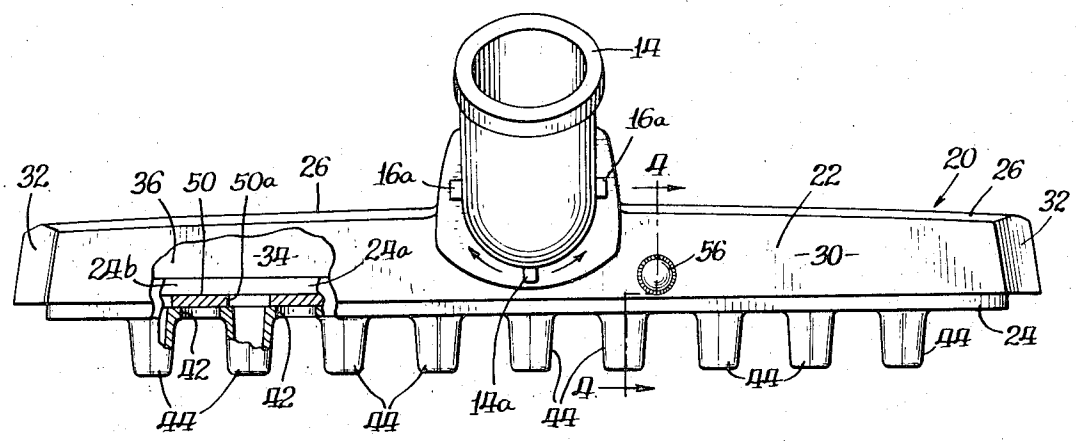
2,219,802	10/1940	Björkman	15/418
963,049	7/1910	Kenney	15/397 X

Primary Examiner—Edward L. Roberts
Assistant Examiner—C. K. Moore
Attorney—Evan D. Roberts

[57] **ABSTRACT**

A pneumatic suction-cleaning implement for use with a vacuum cleaner on rugs, and the like, comprising a suction nozzle structure having wall means movable over a surface to be cleaned. Means is provided defining first and second nozzle openings on spaced-apart levels in said wall means, and valve means is provided for selectively directing suction flow between said first and second openings in order to clean at a lower level deep-down at the base of the nap of a high-pile rug or at an upper level on the top of the rug.

7 Claims, 8 Drawing Figures



PATENTED JAN 9 1973

3,708,824

SHEET 1 OF 2

Fig. 1.

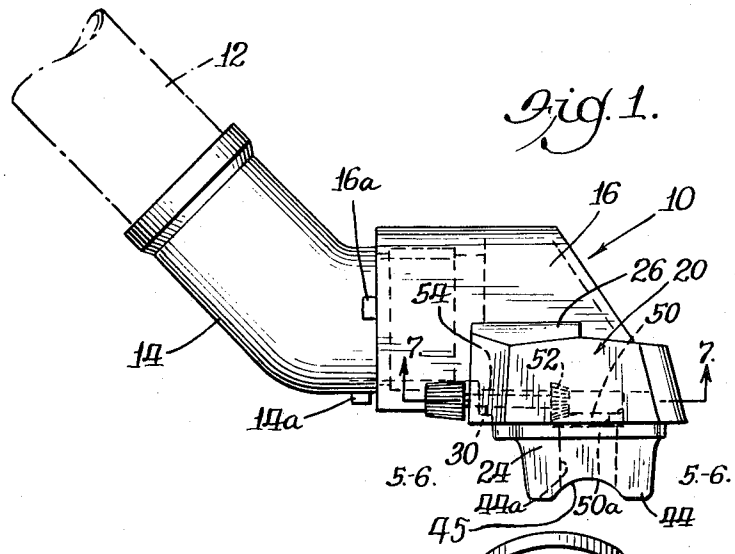


Fig. Д.

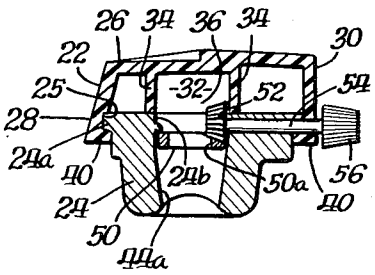
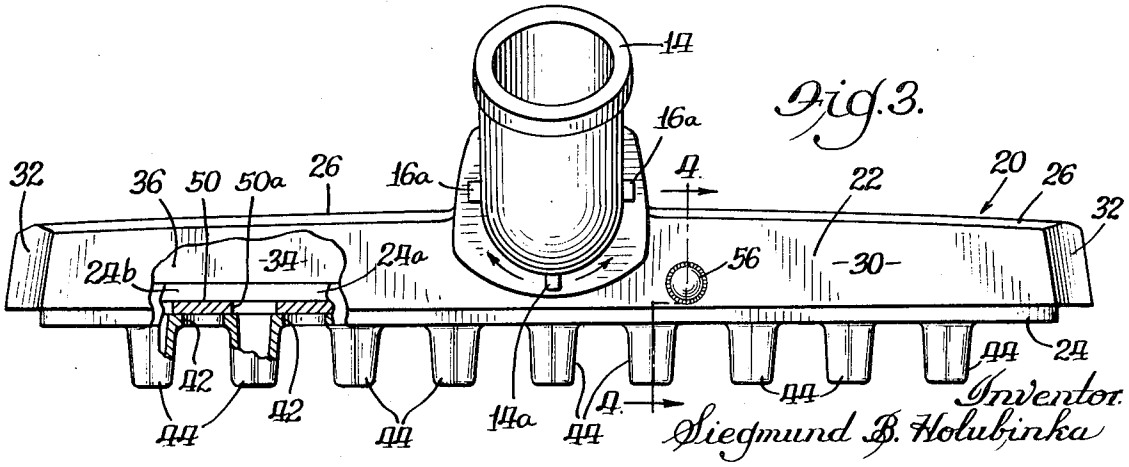


Fig. 2.

Fig. 3.



Inventor
Siegmund B. Holubinka

Fig. 5.

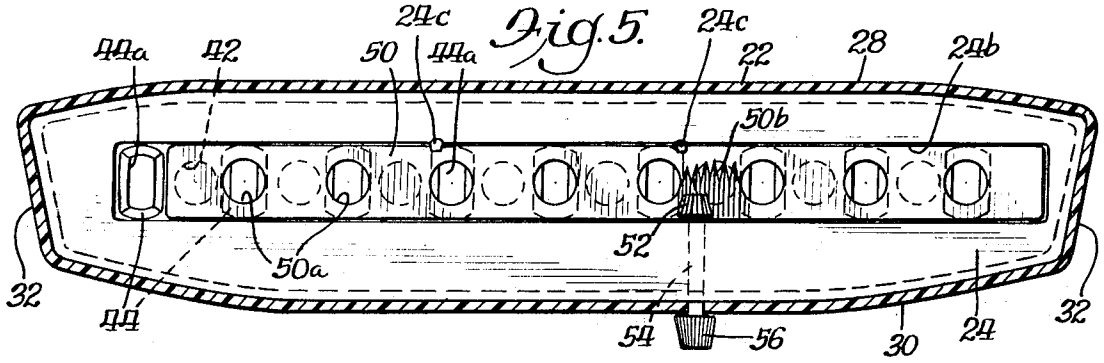


Fig. 6.

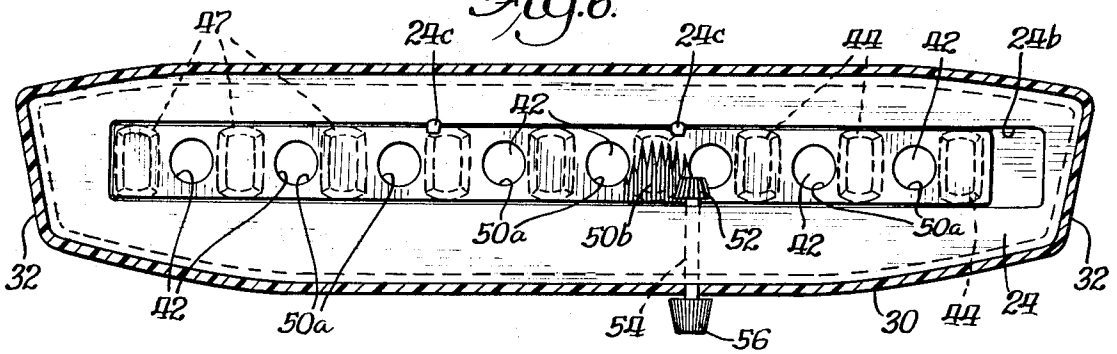


Fig. 7.

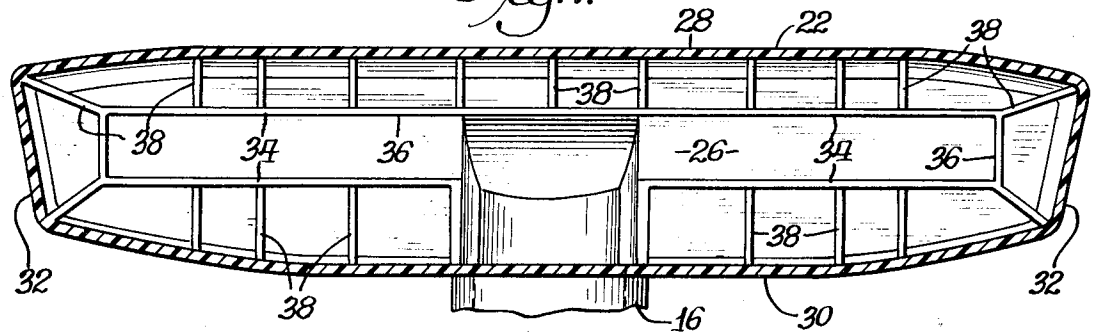
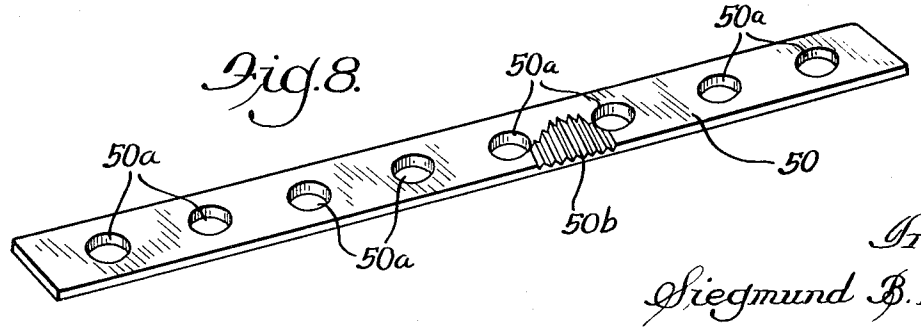


Fig. 8.



Inventor:
Siegmund B. Holubinka

SUCTION-CLEANING IMPLEMENT

The present invention is directed towards a new and improved suction cleaning implement and, more particularly, to a suction nozzle for use with vacuum cleaners and especially adapted for cleaning high-pile rugs, and the like, having a long nap, as well as ordinary rugs and carpets.

Presently available suction-cleaning attachments for vacuum cleaners do not provide for good cleaning suction at a lower level along the base of the nap or pile of a rug. Moreover, when cleaning shag or high-pile rugs, penetration of the pile to get down to the lower levels is not afforded except in specific implements especially designed for this purpose with long nozzle fingers, like the teeth of a comb, adapted to project down into the rug. These special implements are not suitable for cleaning the upper surface of ordinary short nap, close-weave rugs or carpets.

Accordingly, it is a desirable feature and an object of the present invention to provide a suction-cleaning implement which is capable of effectively providing good cleaning action at two different selected levels. At a lower level, the implement of the invention picks up dirt at the base of the pile, and the dirt may also be picked up on top of the rug surface at the upper ends of the pile.

Another object of the present invention is to provide a new and improved vacuum cleaner suction nozzle of the character described including means for switching between high and low level suction.

Another object of the present invention is to provide a new and improved suction-cleaning nozzle of the character described which is neat in appearance, easy to use, and easy to change between high or low level suction pickup.

Briefly, the foregoing and other objects and advantages of the present invention are accomplished in a new and improved vacuum cleaner suction implement for cleaning all types of rugs and carpets including shag and high-pile rugs, and the like, which implement comprises a suction nozzle structure with wall means having a first and second suction opening defined therein lying on spaced-apart, high and low levels. Valve means is provided for collectively directing suction flow between the first and second suction openings.

For a better understanding of the present invention, reference should be had to the following detailed description taken in conjunction with the drawings, in which:

FIG. 1 is a side elevational view of a new and improved vacuum cleaner suction nozzle implement in accordance with the features of the present invention;

FIG. 2 is a bottom plan view of the suction implement looking upwardly;

FIG. 3 is a rear elevational view of the suction implement;

FIG. 4 is a transverse, cross-sectional view of the suction implement taken substantially along line 4—4 of FIG. 3;

FIG. 5 is a horizontal, cross-sectional view of the suction implement taken along line 5—5 of FIG. 1 and showing the selector valve means in one operative position;

FIG. 6 is a view similar to FIG. 5 and showing the selector valve means in an alternate operating position;

FIG. 7 is a horizontal, cross-sectional view taken substantially along line 7—7 of FIG. 1; and

FIG. 8 is a perspective view of the selector valve means of the suction implement of the present invention.

Referring now, more particularly, to the drawings, therein is illustrated a new and improved, vacuum cleaner, suction nozzle implement generally referred to by the reference numeral **10** and constructed in accordance with the features of the present invention. The suction implement **10** is especially well suited for use in cleaning shag or high-pile, long-nap rugs, and the like, as well as ordinary rugs and carpets. The implement provides for suction cleaning at two different levels so that a rug may be cleaned at the base of the pile and at an upper level on the top or upper surface of the nap. The suction nozzle implement **10** is adapted to be connected to a source of suction through a flexible hose **12** (FIG. 1, dotted line) and includes a swivel mounted connecting elbow **14** having an open upper end for receiving the end of the hose. The elbow includes a lower, horizontal leg which projects inwardly and is connected for axial rotation on a rearwardly and upwardly projecting central inlet chamber **16**. In order to limit the relative pivotal movement of the elbow **14** with respect to the inlet chamber **16**, a stop lug **14a** is formed on the underside of the lower elbow leg for limiting engagement with stop lugs **16*a*** on either side of the elbow when axially rotated in the direction of the arrows (as shown in FIG. 3). The right- and left-hand stop lugs **16*a*** are integrally formed on the rear wall of the inlet chamber radially outward of the circular inlet opening in which the lower elbow leg is seated.

As best shown in FIGS. 1 and 2, the inlet chamber **16** is positioned adjacent the center of an elongated suction nozzle housing indicated generally by the reference numeral **20**. The housing **20** is formed in two pieces comprising an upper or top section **22** and a lower or bottom section **24**, as shown in FIG. 4. The upper housing section **22** is preferably formed of flexible plastic material, such as polyvinylchloride, in an injection molding process and includes a top wall **26**, front and rear longitudinal sidewalls **28** and **30**, and a pair of short opposite end walls **32**. The interior of the upper housing section is formed with a pair of spaced-apart parallel, longitudinally extending stiffening ribs **34** which define the sides of a central suction channel **36** extending in opposite directions laterally with respect to the inlet chamber **16**. In addition to the longitudinal stiffening ribs **34**, a plurality of short, transverse, stiffening ribs **38** are provided between the ribs **34** and the outer sidewalls, as best shown in FIG. 7.

In accordance with the present invention, the lower housing member **24** is preferably formed of relatively heavy, strong and rigid material, such as cast metal, hard plastic, and the like, and the upper surface of the lower section **24** forms the bottom wall of the suction housing **20** when assembled with the upper half section **22**. The lower section is formed with an outwardly projecting lip **24*a*** extending around the periphery for engagement within a continuous peripheral groove **25** (FIG. 4) defined in the sidewalls **28** and **30** and the end walls **32** of the upper housing section. A holding lip **40** is formed on the lower edges of the side and end walls of the upper housing section **22** in order to seal beneath

the peripheral projection 24*a* on the lower housing section 24 and provide an airtight enclosure.

In accordance with the present invention, the lower housing section 24 is formed with a plurality of spaced-apart, upper suction apertures 42 arranged in a single row in alignment along the center of the housing longitudinally in communication with the flow channel 36. The flow channel 36 is substantially smaller in transverse cross section than the whole housing in order to maintain a sufficiently high suction velocity to provide excellent cleaning action. Intermediately spaced between adjacent upper level suction apertures 42, a plurality of downwardly projecting hollow teeth 44 are provided, each having a lower level suction opening 44a at the lower end thereof.

The lower level section openings at the lower end of the downwardly projecting hollow teeth 44 are adapted to pick up dirt and debris from a lower level adjacent the base of the nap or fibers of a rug while the upper level suction apertures 42 are provided to pick up dirt and material on the upper surface of a rug. The hollow teeth or fingers 44 act like the teeth of a comb to spread and separate the rug pile at the base for pickup of dirt at a lower level. It will thus be seen that the suction nozzle implement 10 is well adapted for suction cleaning at different levels in a rug including a lower level at the base of the rug pile and on the upper surface.

In accordance with the present invention, a sliding selector valve 50 (FIG. 8) is provided for switching between the upper and lower level suction inlets. The selector valve includes a plurality of circular suction openings 50*a* at spaced intervals equal to the spacing between the teeth 44 and upper level openings 42 in the housing wall. The valve selector is mounted for longitudinal sliding movement on the lower housing member 24 between two positions. In one position the upper suction inlet apertures 42 are blocked or closed off and in the other position the upper ends of the hollow teeth 44 are closed or blocked off. The spacing between the apertures 50*a* provided in the sliding selector valve 50 is equal to spacing between each adjacent pair of teeth 44, and this spacing is equal to the spacing interval between each pair of adjacent upper level suction openings 42. Because of this, either the upper or lower level suction openings can be completely closed off, depending upon the position of the selector valve 50, or an intermediate position may be set up wherein suction openings on both levels are partially open.

As best shown in FIG. 5, when the elongated selector valve 50 is in a position on the right, the openings 50*a* therein are aligned with the upper ends of the hollow teeth 44 and suction is drawn through the teeth and the low level openings 44*a* at their lower ends. Movement of the selector valve 50 to a position on the left, as shown in FIG. 6, aligns the valve apertures 50*a* with the upper level openings 42, so that the suction is drawn from an upper level. Intermediate positions of the selector valve 50 permit suction to be drawn from both the lower and upper levels.

The selector valve 50 slides along the bottom surface of an elongated longitudinal groove 24*b* formed in the lower housing section 24 directly below the suction channel 36 in the upper housing section 22. The valve 50 is freely slidable between opposite ends of the groove, and the length of the groove is dimensioned so that opposite ends provide stops for aligning the valve between its alternate high and lower level suction positions, as shown in FIGS. 5 and 6. The groove 24*b* is dimensioned slightly larger in width than the sliding selector valve 50 to provide free sliding movement and the valve is maintained in contact against the bottom surface of the groove by means of lugs 24*c* on the top side, which are formed by gouging out portions of the housing material along the edges of the groove after the valve has been positioned in place.

The valve is moved longitudinally within the groove between alternate positions by means of a beveled gear 52 mounted on the inner end of a control shaft 54 which extends through a passage formed in the lower housing section 24 transverse to the longitudinal axis thereof. A control knob 56 is provided at the outer end of the shaft which is readily accessible from the rear of the nozzle housing. The beveled gear 52 is adapted to engage rack teeth 50*b*, formed in the upper surface of the selector valve strip 50 (best shown in FIG. 8) and rotation of the knob 56 in one direction moves the valve member towards one end of the groove 24*b* while rotation of the knob in the opposite direction moves the valve in an opposite direction. The housing is appropriately labeled adjacent the control knob 56 to indicate in which direction the knob should be turned to provide for high or low suction pickup.

It will thus be seen that the vacuum cleaner suction nozzle implement of the present invention provides means whereby a housewife can adjust the nozzle to provide suction both at an upper level and a lower level deep down within the pile of a rug. The teeth 44 provide combing action and the lower suction openings 44*a* provide for pickup of the material dislodged by movement of the teeth through a rug. It should be noted that the lower suction openings 44*a* extend upwardly onto the opposite sidewalls of the teeth, as shown best in FIG. 1. Moon-shaped apertures 45 are formed in the teeth sidewalls to permit suction flow into the hollow teeth even though the bottom of the teeth is blocked off completely by contact with a rug or other surface. Because the openings 44*a* at the lower end of the teeth 44 are extended by the moon-shaped recesses 45 on the sides of the teeth, plugging up of the lower level openings in the implement is almost impossible. The implement 10 is easy to use, neat in appearance, and universal in applications for regular close-pile rugs, as well as loose- or long-pile shag rugs, and the like.

While there has been illustrated and described a single embodiment of the present invention, it will be appreciated that numerous changes and modifications will occur to those skilled in the art, and it is intended in the appended claims to cover all those changes and modifications which fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A pneumatic suction air flow cleaning implement for rugs and the like comprising a suction nozzle structure having wall means movable over a surface to be cleaned, means defining a first and a second series of suction inlet openings in said wall means at respective and substantially spaced-apart levels, and valve means

for selectively proportioning the suction flow between said first and said second series of suction inlet openings.

2. The suction cleaning implement of claim 1 wherein said first and second suction inlet openings are arranged at spaced-apart intervals in a line and said second inlet openings are provided at the lower end of spaced-apart and downwardly projecting hollow teeth.

3. The suction cleaning implement of claim 2 wherein said teeth have open upper ends on a level adjacent said first openings, and said valve means includes a member slidable along said line, said member having a plurality of valve apertures defined therein at spaced-apart intervals adapted to line up alternately with said first and second openings.

4. The suction cleaning implement of claim 3 including control means for moving said valve member between a first position blocking said first openings and a second position blocking off flow through said second openings in said hollow teeth.

5. The suction cleaning implement of claim 4 wherein said nozzle structure includes longitudinal groove means in communication with said first and second openings, said valve means being mounted in said groove means for movement between opposite ends thereof between said first and second positions.

6. A pneumatic suction cleaning implement for rugs and the like comprising a suction chamber having a bottom wall for movement over a surface to be cleaned, means defining a plurality of spaced-apart suction holes in said bottom, a plurality of spaced-apart, hollow fingers projecting downwardly of said bottom walls, said fingers having the hollow portions opening at the lower end for suction cleaning and in communication at the upper end with the interior of said suction chamber, and manual valve means movable between alternate positions blocking said suction holes and the upper end of said fingers, respectively.

7. The suction cleaning implement of claim 6 wherein each of said fingers comprises a hollow tubular wall having a lower end defining a suction opening, and an opening means formed in said tubular wall above the level of said lower end and on at least one side thereof.

* * * * *