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VACUUM CLEANING NOZZLE ATTACHMENT FOR HIGH PILE RUGS

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Fig. 1.

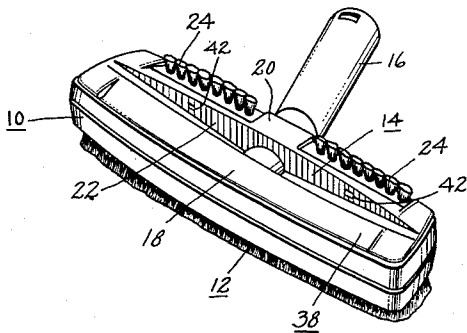


Fig. 2.

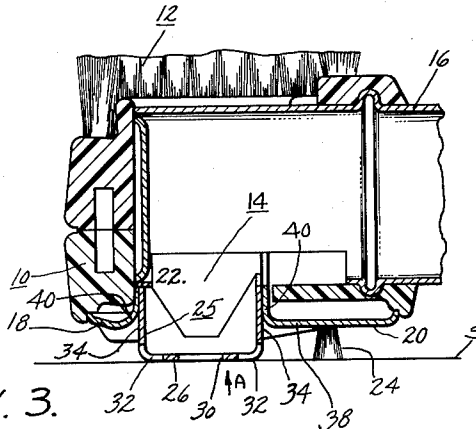


Fig. 3.

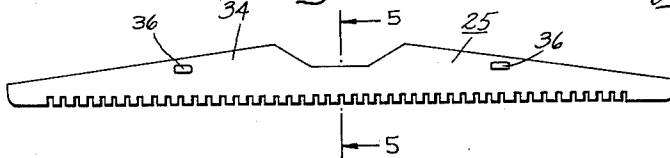


Fig. 4.

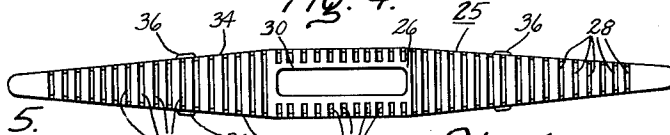


Fig. 5.

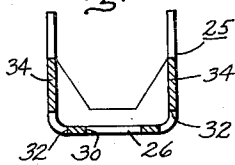


Fig. 6.

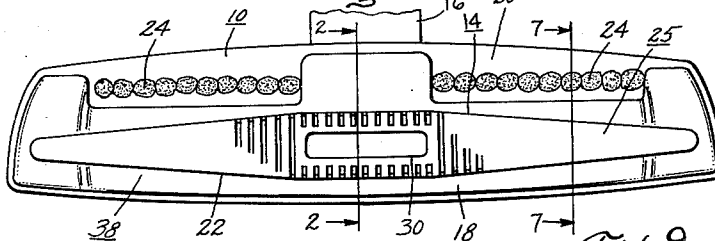


Fig. 8.

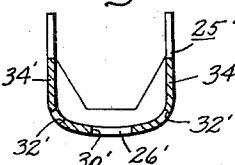


Fig. 9.

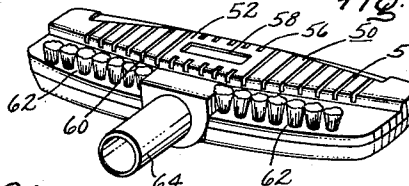
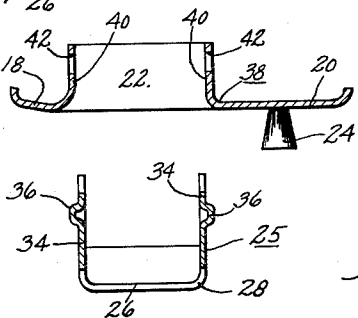


Fig. 7.



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1

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VACUUM CLEANING NOZZLE ATTACHMENT FOR HIGH PILE RUGS

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10 Claims. (Cl. 15—246)

This invention relates to vacuum cleaner nozzles and particularly to those which are well suited for use on high pile rugs, such as those having a nap made of long cotton, nylon or rayon fibers, or the like. More particularly, the invention relates to an attachment for selective use with a vacuum cleaner nozzle that is designed to clean effectively low pile rugs, such as those having a nap made of short wool fibers, which converts the nozzle into one which is highly effective in high pile rugs.

The vacuum cleaner art has devoted much effort and energy in the direction of improving vacuum cleaner nozzles to the end that nozzles be devised which will effectively clean the various types of surfaces which are normally encountered in utilizing vacuum cleaners, particularly in the home. The art has developed some nozzles which are well adapted for cleaning bare floors, and other nozzles which are well adapted for cleaning rugs; however, the art has not satisfactorily treated the matter of providing a nozzle which effectively cleans high pile rugs. Although some effort has been exerted in this direction, with some exceptions, most of it relates to the provision of an additional nozzle in the form of a separate cleaning tool. In view of the fact that vacuum cleaners currently manufactured are often provided with a large number of cleaning tools, the provision of an additional cleaning tool which is well suited for cleaning high pile rugs, to the extent that this type of tool has been provided, merely adds an additional tool to the already large number and increases the cost of the cleaner and attachments.

It is an object of this invention to provide an improved vacuum cleaner nozzle which is particularly adapted for use on high pile rugs.

It is another object of this invention to provide an improved vacuum cleaner nozzle which is well suited for use on rugs of the high pile type, wherein the improved nozzle is effected by temporarily securing an attachment to an existing rug tool of the type which is designed primarily to clean rugs of the low pile type.

Briefly stated, in accordance with one aspect of my invention I provide an attachment for vacuum cleaner nozzles of the low rug pile type comprising a surface contacting wall portion and upwardly extending front and rear walls arranged to be supported in the mouth of such a nozzle, and a plurality of spaced parallel straight slots formed in the surface contacting portion which extend generally in the direction of normal fore and aft movement of the nozzle, the slots extending not only through the surface contacting portion but also partially through the front and rear walls of the attachment.

The above and other objects of the invention, and further details of that which I believe to be novel will be

2

clear from the following description and claims taken with the accompanying drawings wherein:

Fig. 1 is a perspective view of an existing vacuum cleaner tool of the type having a nozzle on one side which is adapted to clean bare floors and a nozzle on the other side which is adapted to clean rugs; the rug cleaning nozzle being fully shown;

Fig. 2 is a central sectional view of the Fig. 1 tool after a high pile rug attachment which incorporates the invention has been inserted into the rug cleaning nozzle and the tool inverted so as to bring the rug cleaning nozzle into contact with the surface S; also, Fig. 2 may be considered to be a sectional view taken substantially on line 2—2 of Fig. 6;

Fig. 3 is a front elevational view of a high pile attachment which incorporates the invention;

Fig. 4 is a bottom elevational view of the Fig. 3 attachment;

Fig. 5 is a sectional view taken substantially on line 5—5 of Fig. 3;

Fig. 6 is an elevational view of Fig. 2 construction looking in the direction of the arrow A in Fig. 2;

Fig. 7 is a sectional view of the high pile rug attachment and of the sole plate of the vacuum cleaner tool to which it is adapted to be secured taken substantially on the line 7—7 of Fig. 6;

Fig. 8 is a view similar to Fig. 5 of a modified high pile rug attachment, and

Fig. 9 is a perspective view of a modified vacuum cleaner rug tool.

Fig. 1 illustrates an existing vacuum cleaner tool of the type wherein two nozzles are provided on opposite sides of the tool, each being adapted to clean a different type of surface, and a swivel tube is associated therewith so as to selectively place either nozzle into contact with the surface and into communication with the interior of the tube. In Fig. 1, the existing vacuum cleaner tool 10 is illustrated as being formed of a body having a bare floor cleaning nozzle 12, which is shown as being in contact with a floor surface, and a rug cleaning nozzle 14, which is shown as facing upwardly and, therefore, not being in contact with a floor surface. The swivel tube 16 is constructed and connected with the body of the tool in such a manner as to be pivotal relative thereto and to allow one or the other of nozzles 12 or 14 to be placed into contact with the surface and into communication with the interior of the tube. It will be understood that the tube 16 is connected with an appropriate vacuum cleaner hose or tubing so as to be connected to a source of suction.

The vacuum cleaner tool described thus far is an example of an existing vacuum cleaner tool to which an attachment which incorporates the present invention may be temporarily secured to convert the rug cleaning nozzle from one which is adapted to clean low pile rugs to one which is adapted to clean high pile rugs. It should be clearly understood that the novel attachment contemplated by the instant invention may be used in conjunction with other known vacuum cleaner tools, and its use is not limited to any type of tool, such as the dual nozzle tool illustrated.

The rug cleaning nozzle 14 generally comprises walls which form a forward lip 18 and a rearward lip 20 between which is formed the elongated nozzle cavity 22. A row of bristle tufts 24 is mounted on each lateral side of the rearward lip 20. When the rug cleaning

nozzle 14 is utilized on the surface of a low pile rug, it operates to effectively and efficiently clean it. However, when the rug cleaning nozzle 14 is used on a high pile rug, several operational difficulties occur which result in difficult and inefficient operation. For example, because the nap of a high pile rug is subject to packing, it does not remain fluffy or resilient when being cleaned, and has a tendency to seal off the nozzle lips. This tendency is accentuated by the fact that most known high pile rugs have a very thin and flexible backing, such as a layer of latex. Sealing of the nozzle lips results in the nozzle becoming embedded in the rug, and being substantially locked in place. This makes it extremely difficult to push the tool across the surface of the rug. On other types of high pile rugs, such as those of the loop pile type, the shaggy construction of the rug causes mechanical snagging and impedance to movement of the nozzle, and results in poor dirt removal.

In order to transform the rug cleaning nozzle 14 into an effective cleaning nozzle for high pile rugs, an attachment 25, which incorporates the instant invention, is temporarily secured to the rug cleaning nozzle 14 to temporarily convert it into a rug cleaning nozzle which effectively and efficiently cleans high pile rugs. Such an attachment is illustrated in Figs. 3, 4 and 5 by itself. In Fig. 4, the portion of the attachment which contacts the surface is shown, and it will be seen that the attachment 25 comprises an elongated, substantially flat wall 26 having a plurality of spaced, parallel, elongated, straight slots 28 formed therein and extending in a direction which is generally normal to the direction of the greatest dimension of the attachment, a centrally disposed, large opening 30 formed therein, and a plurality of spaced, parallel, straight slots 32, which are generally parallel to slots 28, formed on opposite sides of the opening 30. In Fig. 5 it will be seen that the flat wall 26 is the bottom wall of the attachment which is formed by a thin sheet of material having the ability to spring slightly, which also forms side walls 34 that are generally perpendicular to bottom wall 26, and that the referred-to slots and opening completely penetrate the material. It will also be noted in Fig. 5 that the slots (of course only slots 32 are illustrated in Fig. 5, but what is about to be said applies equally to the slots 28) extend around the side edges of the bottom wall 26 and upwardly partially into the upstanding side walls 34 of the attachment to a height above the top of the bottom wall 26.

A plurality of oppositely extending nipples 36 (see Figs. 3 and 4) are provided on the upstanding side walls 34. The nipples are tapered and cooperate with portions of the existing vacuum cleaner tool to temporarily secure the attachment in the rug cleaning nozzle 14, as will become apparent. From Figs. 3, 4, 5 and 7, it will be observed that the attachment 25 lends itself to production out of sheet material and may be formed by being drawn out of sheet metal, or by being molded or cast out of plastic material, such as nylon or the equivalent. In Fig. 3, it will be observed that a central portion of each of the upstanding side walls 34 is cut away for the purpose of clearing certain internal parts of the rug cleaning nozzle 14 when the attachment 25 is secured to the rug cleaning nozzle.

Referring again to the existing vacuum cleaner tool 10, it will be observed from Figs. 2 and 7 that much of the conventional rug cleaning nozzle 14 is formed by the sole plate 38. Sole plate 38 is formed out of sheet material and is connected to the body of the tool 10 in such a manner that it provides the surfaces of the forward lip 18 and the rearward lip 20, and retains the strips of bristle tufts 24 on the rearward lip 20. The entrance to the nozzle cavity 22 is defined by the sole plate, and the cavity is formed in part by the upstanding walls 40 of the sole plate. A plurality of openings or depressions 42, corresponding in number to the number of nipples 36, are

located in the upstanding walls 40 of the sole plate and cooperate with said nipples to permit easy insertion and removal of portions of attachment 25 into and out of the rug cleaning nozzle 14. The tapered configuration of the nipples facilitates such insertion and removal.

In order to convert the rug cleaning nozzle 14 to one which is adapted for cleaning high pile rugs, the attachment 25 is secured to the nozzle by aligning the nipples 36 with the openings 42 and then snapping the attachment into place. When the attachment is secured to the nozzle 14, the nipples 36 are disposed in the openings or depressions 42. Because of the resilient nature of the material of which the attachment 25 is made, insertion and removal of portions of the attachment by snapping them into and out of the rug cleaning nozzle 14 is facilitated. Also, because the attachment is symmetrical, it is not necessary to orient it in any particular manner before securing it to the nozzle, hence, it cannot be improperly secured to the sole plate 38 inadvertently.

Figs. 2 and 6 illustrate an existing vacuum cleaner tool having an attachment incorporating the instant invention secured thereto. It will be observed in Fig. 2 that when the attachment is secured to the existing tool 10 and placed on surface S, the wall 26 of the attachment 25 makes planar contact with the surface S, and no part of the rug cleaning nozzle 14 contacts the surface S, other than the strips 24 of bristle tufts. To clean a high pile rug, the tool with the attachment secured thereto is moved back and forth over the rug in the usual manner. During such movement, the slots in the attachment extend generally fore and aft in the direction of movement, and the bristle tufts facilitate the dislodgment and removal of dirt and litter. When the assembly illustrated in Figs. 2 and 6 is utilized to clean high pile rugs, it has been found in practice that a good job of picking up talc, sand, string, cotton, toothpicks, etc., is done. In this regard, it should be noted that the central opening 30 is suitably large to allow the passage of rather large articles, such as toothpicks, hairpins, cigarette butts and the like, into the nozzle, whereas the slots 28 and 32 operate to remove litter from the surface of high pile rugs, and to remove a suitable amount of embedded dirt.

The dimensions of the slots in the attachment are important, for they must permit just the right amount of leakage into the nozzle to prevent sealing. It should be noted in this regard that when the attachment 25 is secured to an existing tool, there are no nozzle lips which may seal against the rug. This obtains, because the slots 28 and 32 extend partially into the upstanding side walls 34 of the attachment. Therefore, even though the wall 26 is pressed into planar contact against a high pile rug surface, a seal will not be created, because air will leak into the nozzle through the portions of the slots 28 and 32 that extend into the upstanding side walls 34. These same portions of the slots while being of sufficient height to prevent the creation of a seal, are not high enough as to allow enough leakage into the nozzle to effect the operating vacuum and air velocity to the point that dirt pickup efficiency is lost. The dimensions of the slots 28 and 32 are also such as to prevent loops of high pile rugs from being drawn into the nozzle, and yet not so restrictive as to prevent the entry of a sufficient amount of cleaning air. During operation, the slots function to perform a combing action on the high pile rug surface and provide a pleasing appearance on the rug surface after the attachment has passed over it. The attachment seems to fluff up the rug pile and help it regain its resilient appearance.

In one working model of the attachment 25 which was found in practice to be highly efficient in cleaning high pile rugs, the attachment was approximately 10.5" long and was received in a nozzle cavity of comparable size formed in an existing vacuum cleaner tool of the type illustrated in Fig. 1. The attachment was shaped substantially

as illustrated in Figs. 3, 4, 5 and 7, and had a width at its central portion of approximately 1". The central opening 30 was substantially rectangular and had the dimensions of 1.76" by .38" and the slots 28 measured .068" wide by .12" deep (in the upstanding side walls) and were as long as the width of the attachment where they are located. Each of the slots 28 was separated by a strip of the sheet material which forms the surface 26 of the attachment which was .12" wide and very thin (considerably less than .12"). The foregoing dimensions represent one dimensional relationship which was found to be highly successful in practice. It will be understood that other attachment shapes and dimensional relationships will also function satisfactorily, so long as the functional performance of the attachment is as set forth above.

Fig. 8 illustrates a modified attachment 25' wherein the corresponding elements to those in the Figs. 1 through 7 modification are indicated by similar reference numerals with a prime added. The only difference between the Figs. 1-7 and Fig. 8 modifications is that the Fig. 8 modification does not have a flat surface which contacts the rug surface, but rather a smoothly curved, upwardly concave wall 26'.

Fig. 9 illustrates a complete, high pile rug tool. However, it should be realized that the preferred embodiment of the invention resides in the Fig. 1 through 7 version, wherein the inventive concept is incorporated in an attachment which may be selectively secured to an existing cleaning tool to temporarily render the latter capable of efficient utilization as a high pile rug, cleaning tool, and which may be removed when it is desired to clean other types of floor surfaces. One reason for preferring the Figs. 1-7 modification is that it has the practical advantage of affording the benefits of a separate high pile rug cleaning tool without requiring the addition of a separate tool to an already large number of cleaning tools.

In Fig. 9, the complete rug tool 50 is illustrated as comprising a body having a flat wall 52 which is adapted to be placed contiguous with a high pile rug to be cleaned, and which includes a plurality of slots 54 and 56, and an enlarged opening 58, all of which are similar to the corresponding elements formed in the wall 26 of the attachment 25 of the Figs. 1-7 modification. The wall 52 may have an offset portion 60 on which may be mounted strips 62 of bristle tufts. A connector tube 64 is connected to the body of the Fig. 9 rug tool and adapted to be connected to a source of suction.

To utilize the Fig. 9 rug tool, the wall 52 is juxtaposed to a high pile rug and the rug tool is moved back and forth over the rug surface; the rug tool will clean a high pile rug effectively in the same manner as movement of the cleaning tool and attachment assembly of Figs. 1 and 7 over a high pile rug will clean it. Therefore, in both versions, a rug cleaning nozzle is provided which is highly effective on high pile rugs. In both versions, it will be noted that the rows of bristle tufts extend to about the plane of the surface of the wall of the attachment 25 or tool 50 which contacts the high pile rug. In both instances, the bristle tuft supporting portions are spaced above the surface being cleaned during operation, and the rows of bristle tufts operate in a known manner to assist in dislodging and removing litter. In the case of existing rug tools, such as rug tool 10, the row of bristle tufts may already be incorporated in the rug cleaning nozzle. It is, therefore, solely necessary to design the attachment 25 so that it projects from the rug cleaning nozzle to the extent that the plane of its wall 26 passes substantially through the tips of the bristles in the rows of bristle tufts. In the case of the Fig. 9 rug tool, the rows of bristle tufts may be provided in the rug tool and likewise will extend substantially to the plane of the surface 52.

As will be evident from the foregoing description, certain aspects of my invention are not limited to the particular details of construction of the examples illustrated,

and I contemplate that various and other modifications and applications will occur to those skilled in the art. It is, therefore, my intention that the appended claims shall cover such modifications and applications as do not depart from the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An attachment for insertion into a vacuum cleaner nozzle comprising a substantially flat wall that is adapted to be disposed substantially horizontally to contact a floor surface to be cleaned, upstanding side walls connected to said surface contacting wall at the periphery thereof and being substantially perpendicular thereto, and a plurality of spaced, parallel, narrow, straight slots formed in said surface contacting wall; said slots extending completely through said surface contacting wall between said side walls, and said slots also extending partially into and through said side walls to a height above the top of said surface contacting wall.

2. An attachment for a vacuum cleaner nozzle of the low rug pile type which has a nozzle opening, said attachment comprising a thin walled flexible member that is adapted to be secured to the nozzle so as to cover the nozzle opening thereof, said attachment having a bottom wall that is adapted to contact a floor surface to be cleaned, said bottom wall being smoothly curved so as to be concave in an upward direction, upstanding side walls connected to said bottom wall at the periphery thereof, and a plurality of spaced, parallel, straight, narrow slots formed in said bottom wall and extending completely therethrough between said side walls, said slots also extending partially into and through said side walls to a height above the top of said bottom wall.

3. A device as defined in claim 1 wherein an opening which is large relative to the width of said slots is disposed in said surface contacting wall.

4. An attachment for selective use with a rug cleaning nozzle of the type which is well suited for cleaning rugs of the low pile type and which has a forward and a rearward lip which co-operate to define a nozzle cavity, said attachment being adapted to be temporarily secured to the nozzle by having portions mounted in said cavity to thereby convert said nozzle to one which is well suited for cleaning high pile rugs, said attachment comprising a substantially flat bottom wall that is adapted to be spaced from the nozzle lips when the attachment is secured to the nozzle, and to be disposed substantially horizontally to contact a high pile rug, and upstanding side walls connected to said bottom wall along its periphery and being substantially perpendicular thereto, a plurality of spaced, parallel, narrow, straight slots formed in said bottom wall, said slots extending completely through said bottom wall between said side walls, said slots also extending partially into and through said side walls to a height above the top of said surface contacting wall, whereby the portions of said slots which extend partially into said side walls prevent complete sealing of said attachment to said high pile rug when said attachment is secured to the nozzle, said bottom wall is in contact with said high pile rug and a source of suction is connected to the nozzle.

5. A device as defined in claim 4 wherein said upstanding walls are thin, flexible and adapted to be snapped into and out of the nozzle cavity.

6. A device as defined in claim 5 wherein said attachment is operatively associated with such a nozzle and a plurality of nipples are formed on said side walls, and a plurality of recesses are formed in said cavity, and said nipples and recesses are located so that said nipples are adapted to be received in said recesses when said upstanding walls are snapped into said nozzle cavity.

7. A device as defined in claim 4 wherein an opening which is large relative to the width of said slots is provided centrally of said bottom wall.

8. A device as defined in claim 4 wherein said attach-

ment is operatively associated with such a nozzle and a row of bristle tufts is disposed on said rearward lip, said tufts extending substantially to the plane of said bottom wall when said attachment is secured to said nozzle.

9. A device as defined in claim 4 wherein said attachment has a greater transverse dimension than its fore and aft dimension, and wherein said slots extend generally fore and aft.

10. An attachment for insertion into a vacuum cleaner nozzle comprising an elongated, narrow, substantially flat wall that is adapted to be disposed substantially horizontally to contact a floor surface to be cleaned, and upstanding side walls secured thereto and being generally perpendicular thereto, said surface contacting wall having a central opening, a plurality of spaced, parallel, narrow, straight slots on each lateral side of said opening and extending completely through said surface contacting wall between said side walls, said slots extending partially into and through said side walls to a height above the top of said surface contacting wall, and said slots extending in the general direction of the narrow dimension of the wall.

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930,134
1,035,852
1,404,889
2,130,311
2,185,042
2,276,886
2,314,073
2,331,501
2,718,712
2,728,933
2,758,330
2,789,308
2,799,040

6,797
74,182
291,790
719,029

References Cited in the file of this patent

UNITED STATES PATENTS

Blackall ----- Aug. 3, 1909
Brandt ----- Aug. 20, 1912
Owen ----- Jan. 31, 1922
Parham ----- Sept. 13, 1938
Strong ----- Dec. 26, 1939
Smith ----- Mar. 17, 1942
Campbell ----- Mar. 16, 1943
Rand et al. ----- Oct. 12, 1943
Brucker et al. ----- Sept. 27, 1955
Pieper et al. ----- Jan. 3, 1956
Sloan ----- Aug. 14, 1956
Seck ----- Apr. 23, 1957
Hageal ----- July 16, 1957

FOREIGN PATENTS

Great Britain ----- Sept. 21, 1906
Denmark ----- May 5, 1952
Great Britain ----- Aug. 28, 1928
Great Britain ----- Nov. 24, 1954