

[54] **SUCTION CLEANER SHAG RUG
NOZZLE CONVERTOR**

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[22] Filed: **April 5, 1971**

[21] Appl. No.: **131,117**

[52] U.S. Cl. **15/397, 15/338**

[51] Int. Cl. **A47I 9/02**

[58] Field of Search **15/328, 338, 397, 396, 393**

[56] **References Cited**

UNITED STATES PATENTS

2,130,635 9/1938 Dow et al. **15/397**

Primary Examiner—Walter A. Scheel

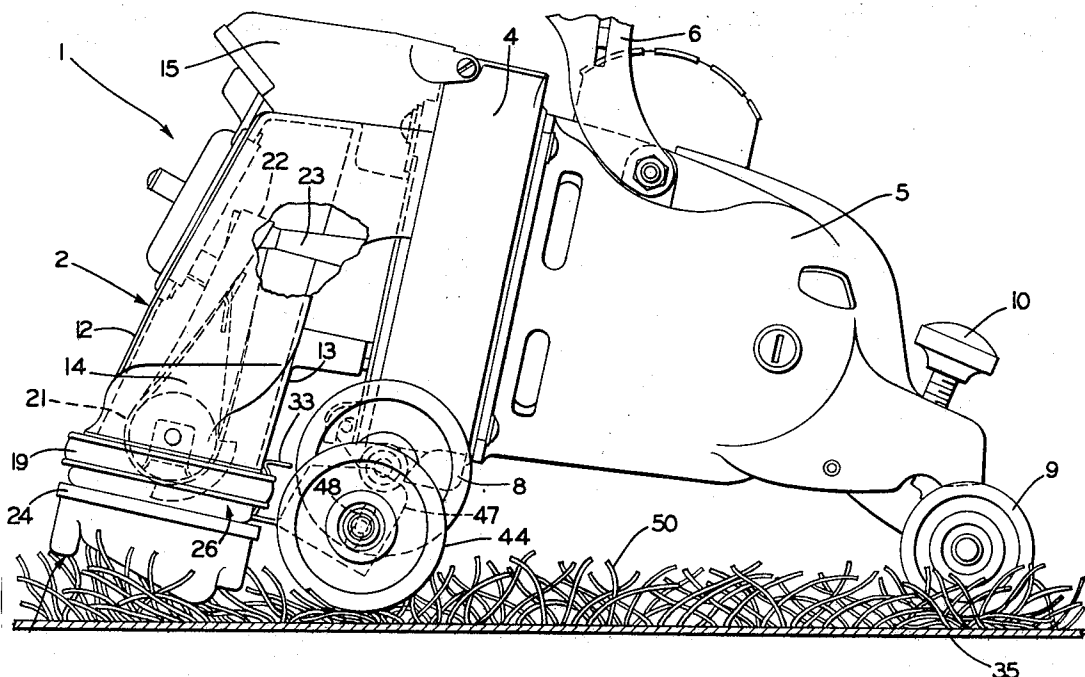
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[57] **ABSTRACT**

A shag rug cleaning nozzle convertor for a usual main suction cleaner nozzle connected to a usual source of cleaning suction. The convertor comprises a wheeled carriage detachably mounted on the main nozzle having a plurality of subnozzles extending transversely beneath and communicating with the main nozzle, raising the main nozzle to a position spaced above the backing of a deep pile shag rug being cleaned. The subnozzles each are provided with a sloped bottom wall and rounded, tapered, streamlined sidewalls formed with an elongated opening extending rearwardly downwardly toward the rug backing and into the shag pile threads. The sloped bottoms prevent the pile from sealing the subnozzle openings and allow air to circulate through the shag pile threads and along the upper backing surface for removal of dirt. The wheeled carriage enables the main nozzle and subnozzles to be moved back and forth easily and freely through the shag rug for cleaning and the subnozzles comb the rug threads or fibers to prevent a neat cleaned appearance.

17 Claims, 12 Drawing Figures



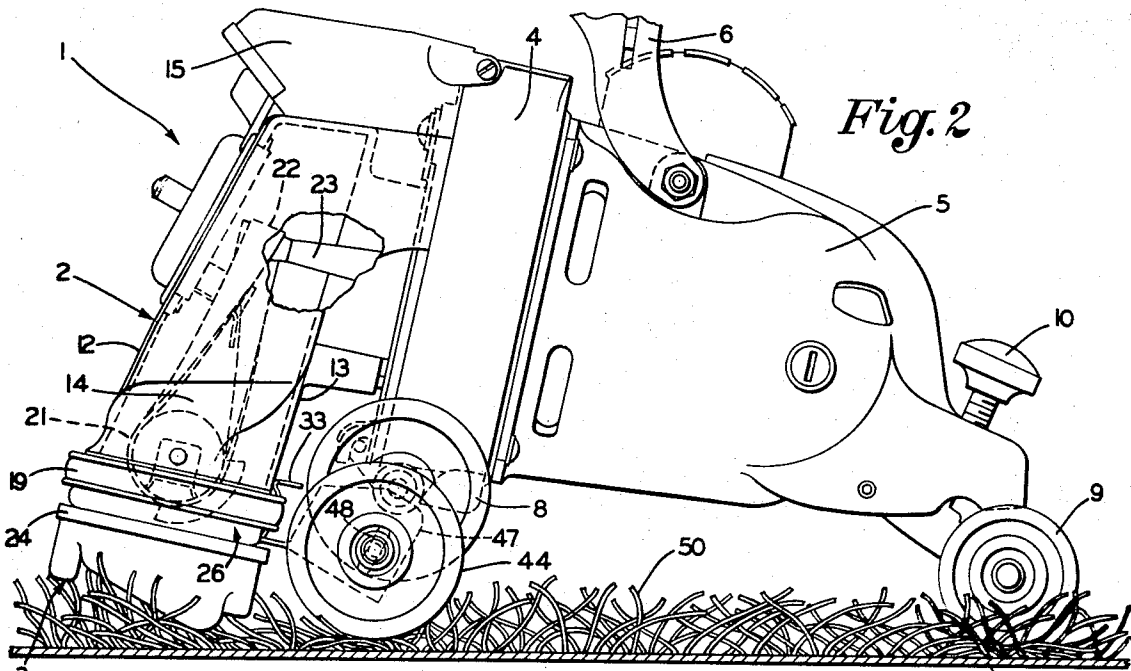


Fig. 2

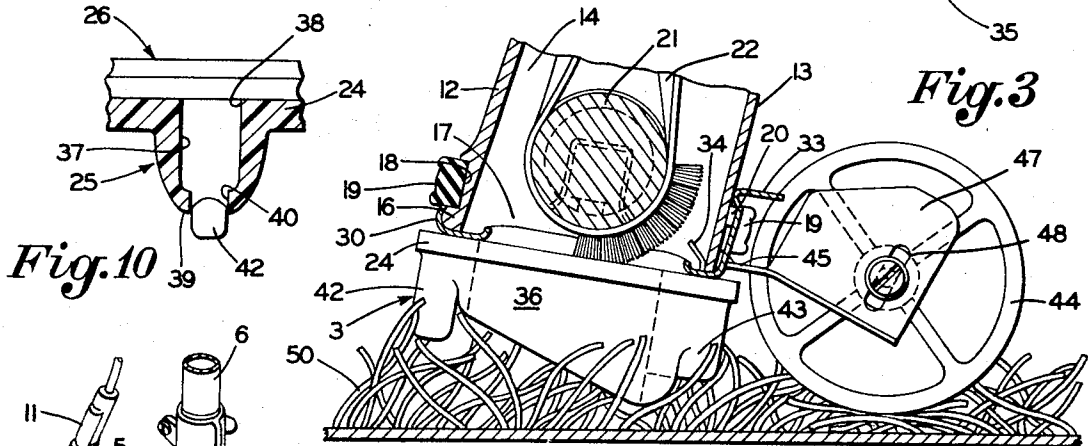


Fig. 3

Fig. 10

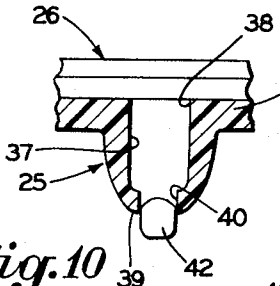


Fig. 11

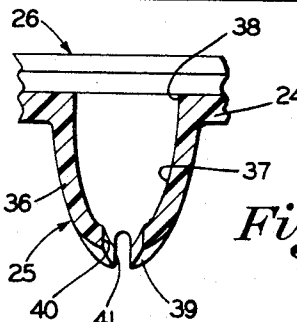
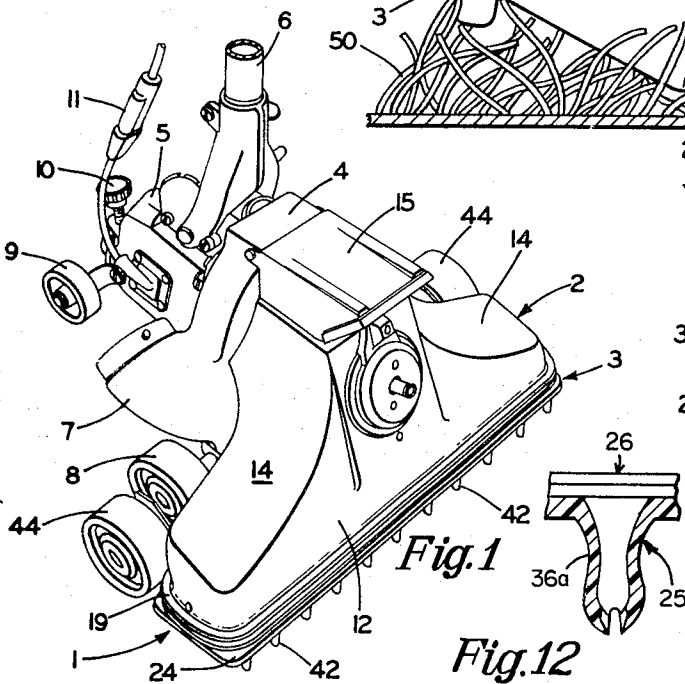
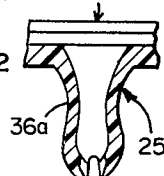
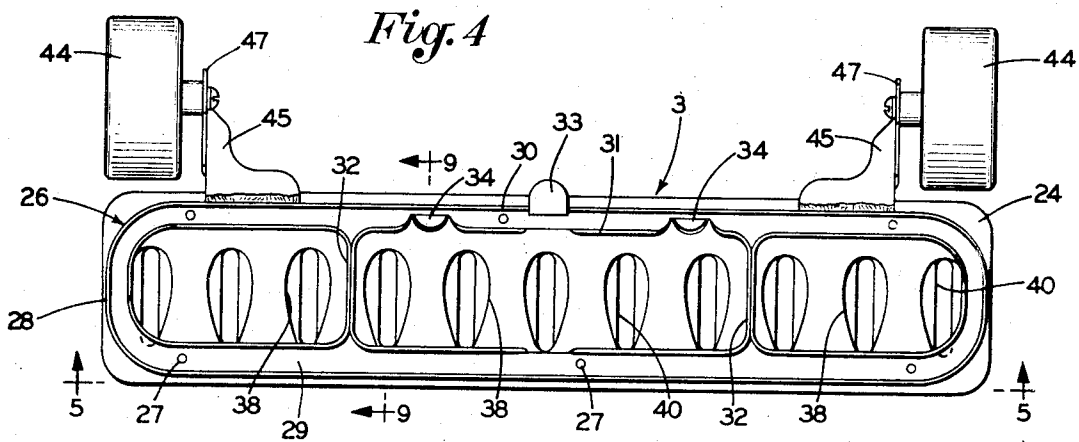
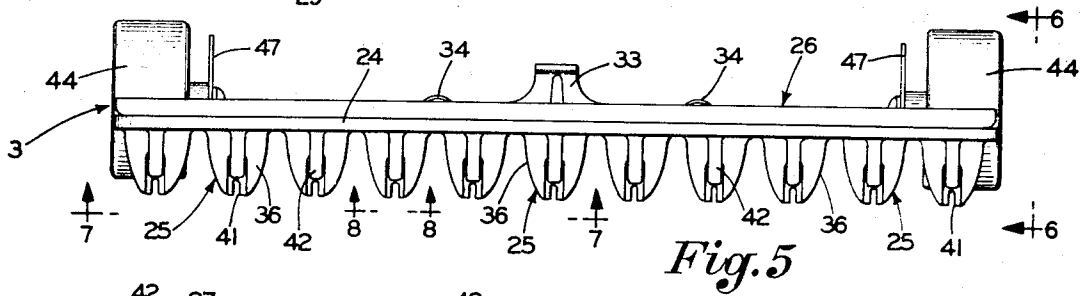
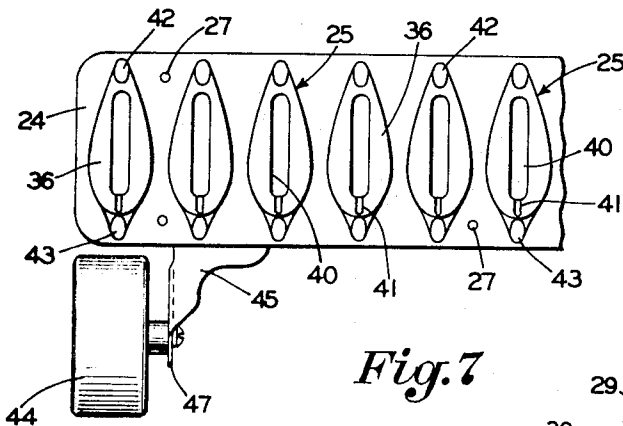
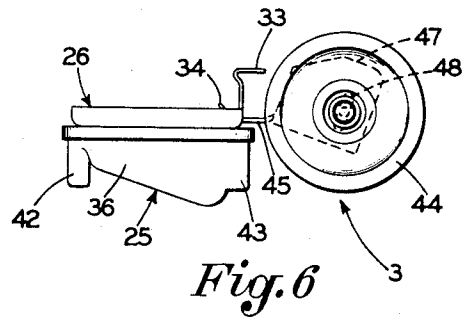
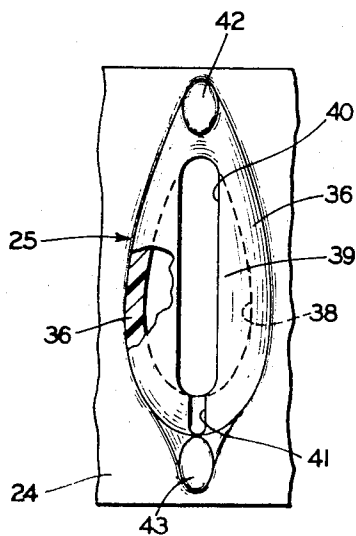
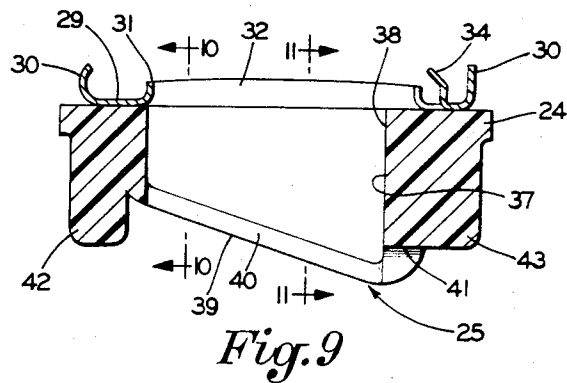


Fig. 1

Fig. 12



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SUCTION CLEANER SHAG RUG NOZZLE CONVERTOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to suction cleaners and more particularly to a suction cleaner nozzle construction for cleaning shag rugs having long and shaggy pile threads or fibers. The improved nozzle construction permits a usual suction cleaner to be used for cleaning the shag rugs without the pile being tangled in and drawn into and sealing the nozzle opening or passage, which would prevent air from circulating through the pile and removing dirt from the rug and which would prevent the cleaner from moving easily back and forth over the rug.

2. Description of the Prior Art

It is practically impossible to operate a high suction movable upright suction cleaner over currently popular shag rugs. These rugs have pile threads or fibers anywhere from 2 to 4 inches long which become tangled and entwined. The high suction seals the main nozzle to the rug making it difficult if not impossible to push the nozzle back and forth through the pile or to clean such rugs effectively.

Revolving brush nozzle suction cleaners also are not entirely satisfactory for cleaning long pile shag rugs. The fibers become tangled in the revolving brush, necessitating frequent separation of the brush and pile and making cleaner movement over the rug extremely difficult. Likewise, certain types of pile rugs can be rapidly worn by brushing out the fibers.

The actual thread or fiber area to be cleaned in shag rugs is considerably greater than the fiber area to be cleaned in usual short pile wool or synthetic fiber rugs or carpets. Thus the individual pile fibers or threads of shag rugs must be cleaned throughout their entire length in addition to cleaning the upper surface of the rug backing beneath the pile in order that the cleaning of the shag rug is effective and complete.

Various devices have been proposed to overcome the problems encountered in the use of usual suction cleaners for cleaning such shag rugs, but these have not proven entirely satisfactory, either because of reduction of the effective suction to enable the cleaner nozzle to be moved over the rug, or because the pile is compressed without effective cleaning. Pile compression also deprives the rug of a desirable fluffy, shaggy appearance.

Rake-like devices for shag rugs have been proposed for manually fluffing and combing the pile to give it an attractive appearance. However these devices do not combine suction with the combing effect, and thus are useful only for improving the rug appearance and do not provide cleaning.

Prior suction cleaner nozzles, as far as I am aware, cannot be moved easily over a shag rug, or cannot effectively clean shag rug fibers throughout their length, or cannot efficiently clean the rug backing, and do not provide the cleaned rug with an attractive, combed, fluffy appearance.

Accordingly, there is an existing need for a suction cleaner nozzle construction for cleaning high pile shag rugs which permits the nozzle to move easily back and forth over and through the shag pile without the pile sealing the nozzle, or becoming tangled in a revolving

nozzle brush, and which separates the shag fibers for complete cleaning throughout the fiber length and for efficiently cleaning the rug backing, and also which leaves the shag fibers when cleaned with a pleasing, uniform and attractive appearance.

SUMMARY OF THE INVENTION

Objectives of the invention include providing a suction cleaner nozzle construction for cleaning shag rugs having a long fiber pile which prevents such rug from sealing the cleaner nozzle under the usual suction developed by the cleaner, which heretofore has occurred with prior nozzle constructions; providing a nozzle convertor construction mounted on wheels for easy movement of the converted cleaner in either direction over the surface of a shag rug thereby facilitating the cleaning thereof; providing a nozzle construction which does not affect to an appreciable extent the effective suction present in the nozzle; providing a nozzle convertor construction which may be used with usual revolving brush nozzles; providing a nozzle construction which has a combing effect on the rug pile enabling the individual fibers to be cleaned throughout their length, and providing effective cleaning of the rug backing; providing a nozzle construction which has a plurality of high velocity subnozzle openings for cleaning the rug backing and between pile threads; providing a nozzle construction which may be adjusted for various lengths of pile to enable the proper setting to be made for each individual shag rug; providing a nozzle construction which avoids compressing the rug pile upon cleaning and which leaves the pile with a uniform, untangled, pleasing appearance; providing a nozzle construction which does not injure the pile fibers from excessive combing or brushing; and providing a nozzle construction which is inexpensive to manufacture and sturdy and durable in use, and which eliminates difficulties heretofore encountered, achieves the objectives indicated and solves problems and satisfies needs existing in the art.

These objectives and advantages are obtained by the suction cleaner shag rug nozzle convertor construction for the main nozzle of a suction cleaner which has walls forming an elongated mouth at its lower end communicating with usual cleaner suction means. The general nature of the convertor may be stated as including a base having a plurality of subnozzle means extending downwardly therefrom; means for detachably connecting the base with the main nozzle of a suction cleaner at a location below and extending substantially coextensive with said main nozzle; wheels mounted on the base to facilitate movement of said subnozzles over the surface of a shag rug being cleaned; preferably frame means on the base having hook and spring clip means forming the detachable connection with the main nozzle; the subnozzle means each being formed with a sloping bottom wall and rounded, tapered, streamlined sidewalls; the bottom wall having an elongated slot formed therein; the streamlined sidewalls having front and rear ends formed with rounded post-like guides each having a bottom surface, the guides separating the pile fibers in a comb-like manner as the subnozzles move back and forth through the pile of a shag rug; a recess formed in the bottom and side walls at one end of each subnozzle communicating with the elongated

slot and located adjacent the bottom surface of one of said guides; the subnozzles each having an enlarged internal chamber, the elongated slots and recesses forming inlets for such chambers and the chambers each having outlet communication through the convertor base; and the elongated subnozzle bottom wall slot and the rounded subnozzle sidewalls which form the internal chamber providing a venturi-like shape for the subnozzle slots, whereby suction air is drawn into the subnozzles through said slots at high velocity to provide strong air currents passing through and circulating around and along shag rug pile fibers being cleaned.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of the invention — illustrative of the best mode in which applicant has contemplated applying the principles — is set forth in the following description and shown in the drawings and is particularly and distinctly pointed out and set forth in the appended claims.

FIG. 1 is a perspective view of a suction cleaner showing the main nozzle with the improved convertor attached thereto;

FIG. 2 is an enlarged side elevation of the parts shown in FIG. 1;

FIG. 3 is an enlarged fragmentary view of portions of FIG. 2 with certain parts in section;

FIG. 4 is a top plan view of the new convertor attachment;

FIG. 5 is a front elevation view of the attachment looking in the direction of arrows 5—5, FIG. 4;

FIG. 6 is an end elevation looking in the direction of arrows 6—6, FIG. 5;

FIG. 7 is a fragmentary bottom view looking in the direction of arrows 7—7, FIG. 5;

FIG. 8 is an enlarged fragmentary bottom view of one of the subnozzles looking in the direction of arrows 8—8, FIG. 5;

FIG. 9 is an enlarged sectional view taken on line 9—9, FIG. 4;

FIG. 10 is a sectional view looking in the direction of the arrows 10—10, FIG. 9;

FIG. 11 is a sectional view looking in the direction of the arrows 11—11, FIG. 9, and

FIG. 12 is a reduced sectional view similar to FIG. 11, showing an alternate subnozzle side wall construction.

Similar numerals refer to similar parts throughout the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A typical upright suction cleaner is generally indicated at 1 (FIG. 1) and has a main nozzle 2 to which the new shag rug convertor attachment 3 is detachably connected. Cleaner 1 may have a fan housing 4, a motor housing 5, an operating handle 6 and a conventional dust bag (not shown) connected with fan housing exhaust outlet 7.

The fan housing 4 and motor housing 5 are supported on front casters 8 and preferably adjustable, double rear casters 9 for movement over surfaces or material to be cleaned. Casters 8 normally support main nozzle 2 above nonshag rugs, carpets, floors and the like for usual suction cleaning operations; and rear

casters 9 are adjusted by adjusting screw 10 to locate nozzle 3 the desired distance above the surface being cleaned. An electrical cord 11 supplies power to a motor in housing 5 from a usual source of power.

The cleaner construction thus far described may be similar to that shown in U.S. Pat. No. 3,444,582. Thus nozzle 2 may have a front wall 12, a back wall 13, end walls 14 and a light hood 15. The lower ends of front wall 12 and end walls 14 terminate in lips 16, which define with the lower end of wall 13, an elongated suction nozzle inlet opening or mouth 17.

A groove 18 in nozzle walls 12 and 14 mount a resilient bumper 19 which projects slightly outward beyond the nozzle lips and protects walls and furniture from being marked or scratched during cleaner operation.

A boss 20 (FIG. 3) projects from back wall 13 adjacent the lower end thereof for a purpose described below.

A usual rotary brush 21 may be detachably mounted within main nozzle 2 driven, preferably by an endless belt 22, from motor shaft 23.

Convertor 3 (FIGS. 4—11) comprises a flat, generally rectangular, base plate 24 having a plurality of subnozzles 25 formed integrally therewith and extending outwardly downwardly therefrom. Base 24 preferably is molded of plastic and formed with rounded corners eliminating sharp projections which could scratch or nick furniture or woodwork.

A mounting frame 26 is connected to base plate 24 by rivets 27 and is adapted to detachably connect convertor 3 to cleaner nozzle 2. As shown, frame 26 has a rectangular shape with channel shaped side and end members 28 and 28a each having a web 29 and flanges 30 and 31. The channel side members are connected by a pair of reinforcing cross members 32. A spring clip 33 extends upward from the rear of mounting frame channel flanges 30 intermediate its ends. Hooks 34 extend upward from the rear mounting frame side member 28 on either side of spring clip 33.

Subnozzles 25 (FIGS. 8—11) have rounded, tapered streamlined sidewalls 36 which form enlarged chambers 37 having teardrop-shaped outlets 38 formed in base 24. The side walls 36 of each subnozzle 25 terminate in a bottom wall 39 which slopes downwardly rearwardly from the front of subnozzle 25 (FIG. 3) and is formed with an elongated slot 40. The side walls of subnozzles 25 preferably are generally teardrop-shaped in horizontal cross section (FIG. 8). The front ends of walls 36 are narrower than the rear ends which are rounded. The subnozzle chambers 37 extend between the outlets 38 and the inlet slots 40.

A recess 41 is formed in bottom wall 39 (FIGS. 8 and 11) at the rear end of each subnozzle 25 and communicates with slot 40 and chamber 37. A high velocity stream of air flows through recess 41 for cleaning the upper surface of the rug backing 35 as the cleaner is moved backward across the rug.

Rounded guides or post-like members 42 and 43 are formed integrally with side walls 36 at the front and rear ends, respectively, of each subnozzle 25. Guides 42 and 43 rake, comb, separate and straighten tangled shag fibers as subnozzles 25 are moved back and forth along a rug and through the rug threads or fibers, in a manner similar to teeth of a comb used in grooming hair.

Convertor 3 preferably has a pair of spaced wheels 44 at the rear of base 24 at either end, and wheels 44 may be mounted on brackets 45 which extend from the base 24 or the frame 26. Ears 47 extend upward from brackets 45 to journal the wheels 44. A slotted connection 48 may be provided for the axles of wheels 44 when it is desired to mount the wheels adjustably with respect to convertor base 24.

Convertor 3 is easily attached to main nozzle 2 first by engaging frame front member flange 30 with nozzle lip 16 and snapping spring clip 33 into engagement with boss 20 on back wall 13 of main nozzle 2, the back nozzle wall 13 being clamped between spring clip 33 and hooks 34.

The cleaner 1 is supported on convertor wheels 44 and rear casters 9 when convertor 3 is mounted on the cleaner for cleaning shag rugs. This wheeled mounting of the shag rug nozzle cleaning attachment permits the convertor nozzle 3 to be moved easily in either direction backward or forward across a shag rug and through the shag fibers. The correct spacing of subnozzles 25 above the rug backing 35 for the particular shag rug being cleaned may be obtained by adjusting screw 10, a different adjustment being made for different shag rug weights or fiber lengths, such fibers being indicated at 50.

In accordance with the invention, convertor 3 is mounted on main nozzle 2 (FIGS. 1-3) of cleaner 1 and the cleaner is moved back and forth over a shag rug in the usual manner, rolling on wheels 44 and rear casters 9.

During such movement the individual fibers are directed along the outside of and to either side of the subnozzle sidewalls 36 by guides 42 and 43. At the same time, the subnozzles extend down into the mass of shag fibers to a location close to the backing 35 and thus comb the fibers. Since the subnozzles tend to separate the fibers and extend downward to a location close to the backing, the action is much like the bow of a boat going through water, and individual fibers are inhibited from being drawn into the subnozzle inlet slots 40.

The slope of the subnozzle bottom walls 39, higher at the front than at the rear when moving to the left in FIG. 3, assists the subnozzles in plowing through the rug fibers and provides a changing location for the air currents drawn along, around and through the fibers as the subnozzles move from front to rear through the fibrous mass. In this manner effective and efficient cleaning of the shag rug is obtained.

During use, a portion of each slot 40 is always a sufficient distance above rug backing 35, due to the slope of bottom walls 39, so that the entire slot 40 cannot be sealed off against the rug backing and fibers, even though the cleaner suction may tend to pull zones of the rug backing upward toward portions of slots 40. The spacing of slots 40 above the rug backing thus provides zones throughout the length of nozzle convertor 3 which communicate with main nozzle 2 so that air flows at all times between and along the rug fibers and into the main nozzle 2 for effectively removing dirt from the rug around the fibers.

Recesses 41 likewise provide high velocity air flow immediately adjacent the rug backing 35 for removing dirt particles in the region of the upper surface of backing 35. This high velocity air flow is most effective

during backward movement of subnozzles 25 when recesses 41 are at the forward location of the moving convertor.

The spacing of slots 40 above the rug backing 35 in permitting air flow and preventing sealing, also prevents resistance to movement of the cleaner back and forth over the rug and through the pile in use of the cleaner 1. At the same time, the fibers are left in a less flattened and fluffier, combed position above backing 35 providing an attractive appearance for the cleaned rug surface.

In prior constructions, as when the usual main nozzle 2 of cleaner 1 is attempted to be used to clean shag rugs, the rug fibers are pulled into the nozzle mouth 17 by the cleaner suction, clog the nozzle, become entangled with the brush, and retard movement of the cleaner along the rug surface.

A particular shape for the frame 26 of the convertor has been shown and described, but the shape and arrangement of the frame and its channel-shaped members may be varied to suit the particular shape of the main nozzle of the particular cleaner with which the convertor attachment 3 is to be used. Likewise, the subnozzle side wall 36 (FIG. 11) although shown convexly may be concavely curved to provide a better combing effect in some types of shag rugs, as is illustrated by side wall 36a, (FIG. 12).

Furthermore, the particular hook and spring clip means illustrated for detachably connecting the convertor 3 to the main nozzle may be varied to suit the particular type of cleaner nozzle to which the convertor is connected as an attachment.

Frequently tank type cleaners are used with a hose and a wand, and different kinds of nozzles are detachably connected to the end of the wand. The improved shag rug nozzle construction may be incorporated integrally in such a detachable nozzle for the wand of a tank type cleaner by providing subnozzles and wheels for such a tank type cleaner nozzle.

Accordingly, the improved nozzle construction provides a nozzle convertor for use with a usual suction cleaner nozzle for cleaning deep pile shag rugs, which is inexpensive in construction, which has a neat appearance, which provides a plurality of subnozzles for cleaning the rug fibers throughout their entire length and imparts a combing effect to the cleaned shag rug, which provides sufficient clearance between the subnozzle inlet slots and the rug backing to prevent the rug from being sealed against the subnozzles that may be moved easily over the rug surface on wheels attached to the convertor, and which incorporates the new and advantageous features herein described, overcomes the prior art difficulties indicated and solves problems and obtains the described new results in the art.

In the foregoing description, certain terms have been used for brevity, clearness and understanding; but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such terms are used for descriptive purposes and are intended to be broadly construed.

Moreover, the description and illustration of the invention is by way of example, and the scope of the invention is not limited to the exact details shown or described.

Having now described the features, discoveries and principles of the invention, the manner in which the suction cleaner shag rug nozzle convertor attachment is constructed and used, the characteristics of the construction, and the advantageous, new and useful results obtained; the new and useful structures, devices, elements, arrangements, parts, and combinations, are set forth in the appended claims.

I claim:

1. Suction cleaner shag rug nozzle construction including a laterally elongated base having front and rear portions; a plurality of laterally spaced subnozzles extending downwardly from the base and each extending between the front and rear base portions; said subnozzles each having a bottom wall sloping downwardly rearwardly from front to rear of the base; the bottom wall being formed with an elongated suction slot; each subnozzle being formed with an enlarged internal chamber communicating between said slot and a source of suction; and wheel means having rug contacting surfaces adapted to be spaced below the subnozzle bottom walls mounted on the base for movement over the surface of a shag rug to be cleaned; whereby as the base is moved on said wheel means back and forth over a shag rug the wheel means hold the subnozzles out of contact with the rug backing, the subnozzles separate and comb the shag fibers, and suction air currents drawn into the subnozzle slots circulate through and along the shag fibers free of sealing of the shag fibers in and around the slots due to the slope of the subnozzle bottom walls thereby permitting easy movement of the nozzle construction over a shag rug being cleaned.

2. The construction defined in claim 1 in which the subnozzles have rounded, tapered, streamlined side walls.

3. The construction defined in claim 2 in which the rounded streamlined subnozzle side walls form the enlarged internal chamber, and in which the slot and chamber walls have a venturi-like shape, whereby suction air is drawn through said slots at high velocity.

4. The construction defined in claim 3 in which the rounded subnozzle side walls are convexly curved.

5. The construction defined in claim 3 in which the rounded subnozzle side walls are concavely curved.

6. The construction defined in claim 2 in which the streamlined side walls have front and rear ends formed with rounded post-like guides.

7. The construction defined in claim 6 in which the guides have bottom surfaces spaced the same distance from the base; and in which one of the guide bottom surfaces is located below the front end of the slot in the sloping bottom wall, and the other guide bottom surface is located above the rear end of the slot in the sloping bottom wall, whereby the guides separate the pile fibers in a comb-like manner as the subnozzles move back and forth through the shag rug pile.

8. The construction defined in claim 6 in which the rear end of the bottom and side walls of each subnozzle is formed with a rearwardly opening recess communicating with the slot and chamber.

9. The construction defined in claim 8 in which the rear guide has a bottom surface and in which the recess is located adjacent the rear guide bottom surface.

10. The construction defined in claim 1 in which the base has upper and lower surfaces, in which the sub-

nozzles extend downwardly from the lower base surface, and in which frame means are provided at the upper base surface for detachable connection with the main nozzle of a suction cleaner.

11. The construction defined in claim 10 in which the frame means includes hook and spring clip means for detachable connection with the main nozzle of a suction cleaner.

12. Suction cleaner shag rug nozzle construction including a main cleaner nozzle, a convertor detachably connected with the main nozzle; said convertor including a laterally elongated base having front and rear portions; a plurality of laterally spaced subnozzles extending downwardly from the base and each extending between the front and rear base portions; said subnozzles each having a bottom wall sloping downwardly rearwardly from front to rear of the base; the bottom wall being formed with an elongated suction slot; each subnozzle being formed with an enlarged internal chamber communicating between said slot through said main nozzle to a source of suction; wheel means having rug contacting surfaces adapted to be spaced below the subnozzle bottom walls mounted on the base for movement over the surface of a shag rug to be cleaned; and means interconnecting the base and main nozzle forming the detachable convertor connection; whereby as the base is moved on said wheel means back and forth over a shag rug the wheel means hold the subnozzles out of contact with the rug backing, the subnozzles separate and comb the shag fibers, and suction air currents drawn into the subnozzle slots circulate through and along the shag fibers free of sealing of the shag fibers in and around the slots due to the slope of the subnozzle bottom walls thereby permitting easy movement of the nozzle construction over a shag rug being cleaned.

13. The construction defined in claim 12 in which the subnozzles have rounded, tapered, streamlined side walls forming the enlarged internal chamber; in which the slot and chamber walls have a venturi-like shape; and in which the side walls have front and rear ends formed with rounded post-like guides.

14. The construction defined in claim 13 in which the rear end of the bottom and side walls of each subnozzle is formed with a rearwardly opening recess communicating with the slot and chamber; in which the rear guide has a bottom surface; and in which the recess is located adjacent the rear guide bottom surface.

15. The construction defined in claim 14 in which the front guide has a bottom surface; and in which the front and rear guide bottom surfaces are spaced the same distance below the base.

16. The construction defined in claim 15 in which the detachable convertor-nozzle connection comprises frame means mounted on the base, and hook and spring clip means on the frame means detachably engageable with the lips of the main cleaner nozzle.

17. A suction cleaner shag rug nozzle convertor cleaning attachment including a base; a plurality of subnozzle means connected to said base and extending downwardly therefrom; wheels mounted on the base to facilitate movement over a rug surface; said subnozzle means each having a sloped bottom wall formed with an elongated opening; and means on the base for

detachably connecting the base to a main suction cleaner nozzle.

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