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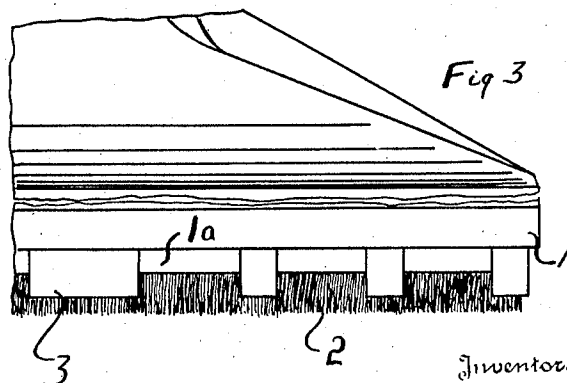
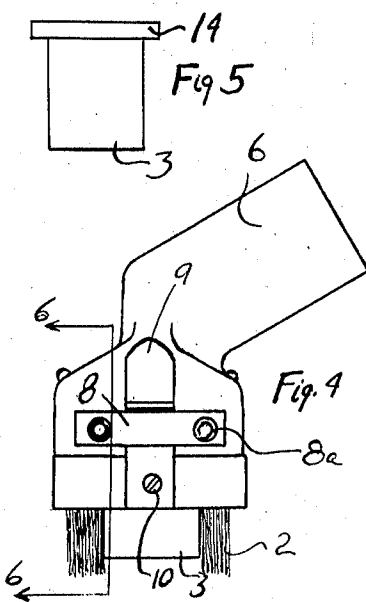
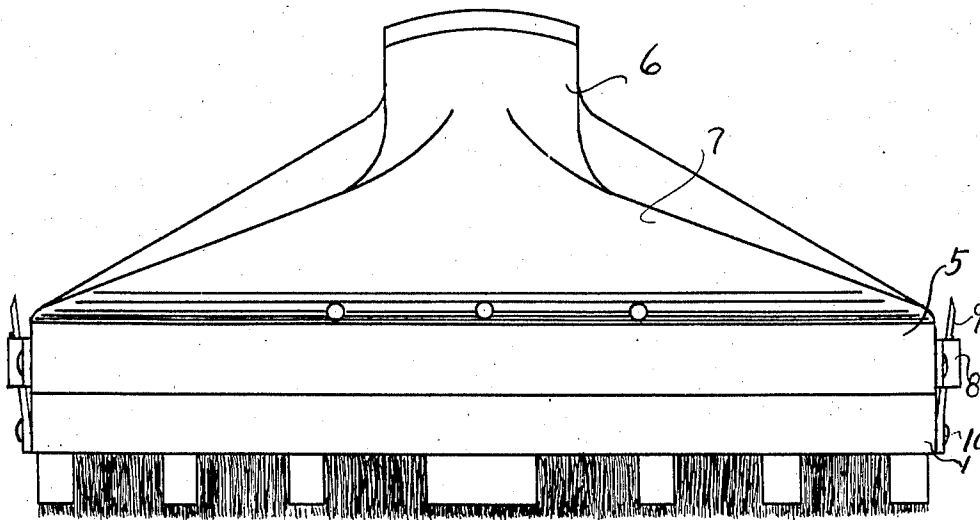
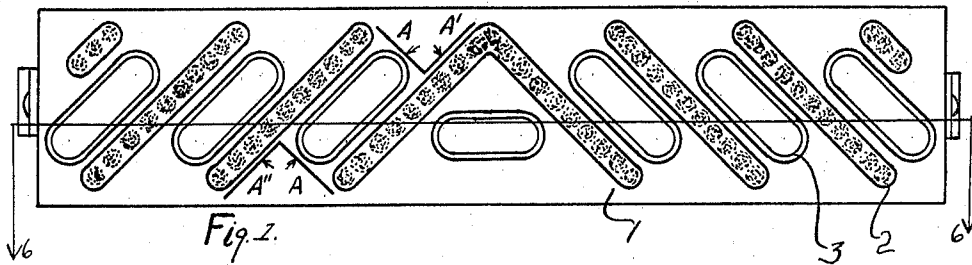
D. M. DOW ET AL

2,130,635

VACUUM CLEANER

Filed Sept. 10, 1937

3 Sheets-Sheet 1



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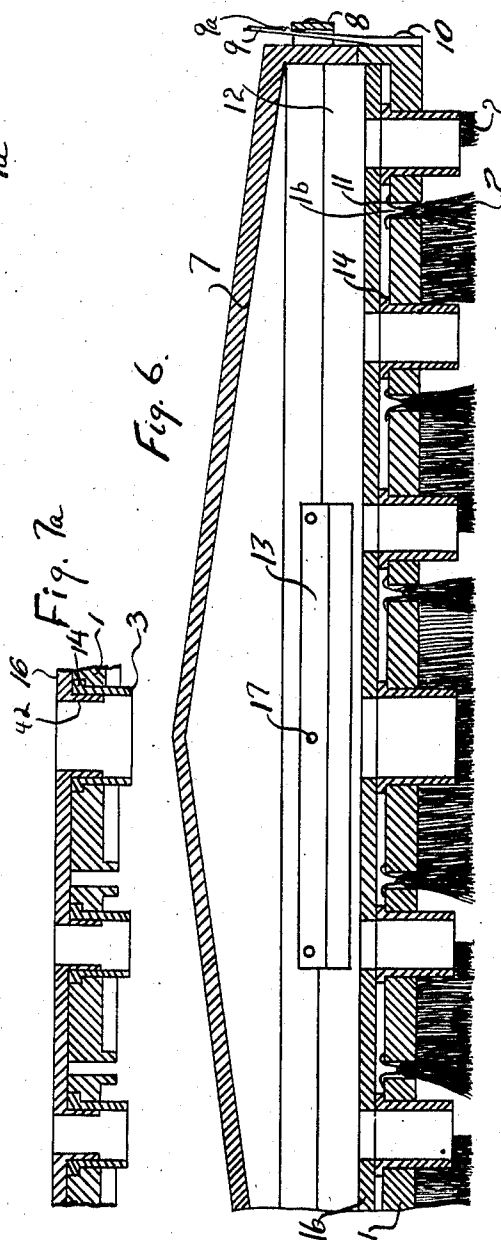
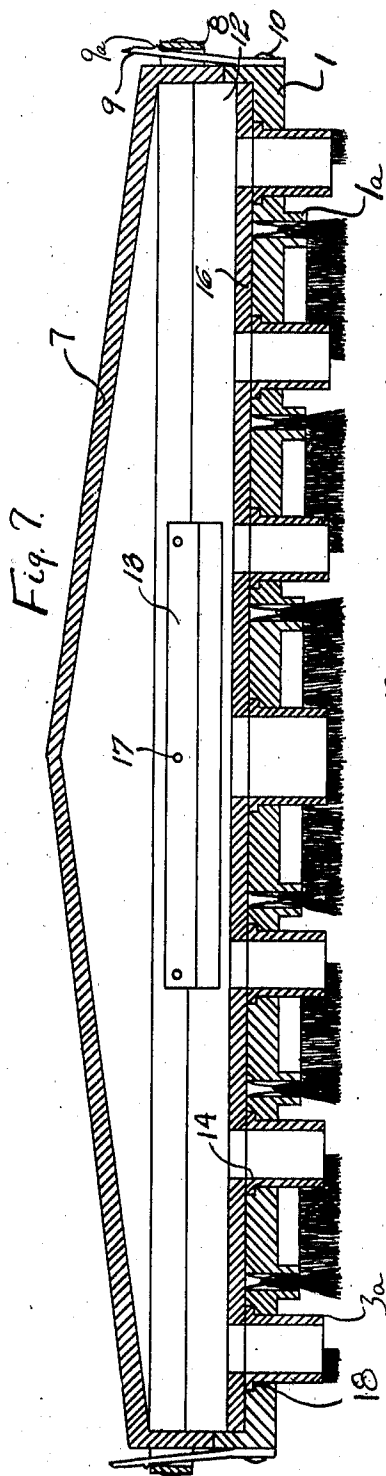
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VACUUM CLEANER

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3 Sheets-Sheet 2



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VACUUM CLEANER

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Fig 8.

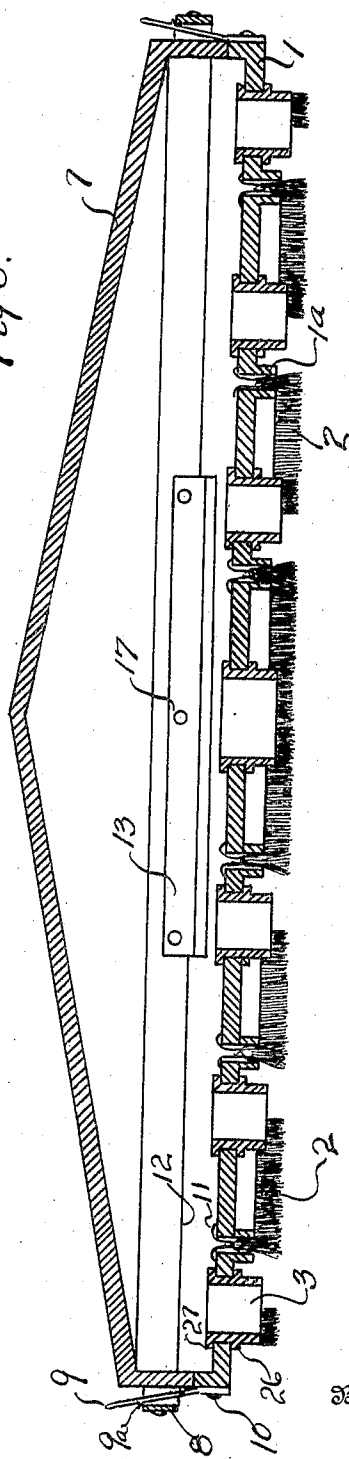
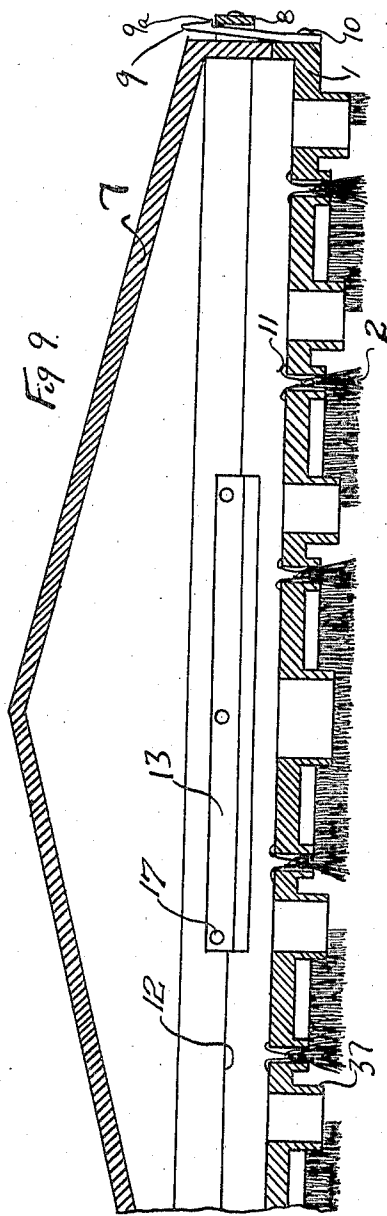


Fig 9.



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UNITED STATES PATENT OFFICE

2,130,635

VACUUM CLEANER

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4 Claims. (Cl. 15-158)

This invention relates to vacuum cleaners and more particularly relates to a brush adapted to be used in connection with a wand type cleaner and adapted to be used either as a wall brush or as a floor tool.

An object of the invention is to provide cleaning efficiency in a wand type floor and wall brush.

Another object of the invention is to provide means to convert the floor tool of an ordinary suction type nozzle to a combination brush and suction type nozzle.

Another object of the invention is to provide a vacuum cleaner brush construction in which the unit suction is increased over those provided in prior art devices.

Further objects of the invention will appear to those skilled in the art to which it appertains upon a reading of the specification which taken in connection with the accompanying drawings sets forth the preferred embodiment of the invention and modifications thereof. It is to be distinctly understood that the disclosures set forth are not to be taken as limitations on the invention, but the invention is limited only by the appended claims which define the scope of the invention, and all modifications and variations in construction embodying the invention that come within the spirit and scope of the invention are intended to be included within the scope of such claims, and in which disclosure:

Fig. 1 shows a bottom view of the brush;

Fig. 2 shows a side view of the brush attached to the cleaner nozzle;

Fig. 3 shows a variation of the brush construction from that shown in Fig. 2;

Fig. 4 shows an end view of the structure set forth in Fig. 1;

Fig. 5 shows one of the suction tube inserts adapted to be inserted in the brush back;

Fig. 6 is an enlarged longitudinal sectional view taken substantially on the line 6-6 of Figs. 1 and 4;

Figs. 7, 8 and 9 are views similar to Fig. 6 but show modifications of the invention;

Fig. 7a is a partial view similar to Fig. 7 showing a variation in the construction of a holding plate.

The preferred embodiment of the invention set forth in Figs. 1, 2, 4, and 6 shows a brush and suction tool assembly in which numeral 1 denotes a brush-back or supporting element made preferably of some metallic substance and preferably of a die cast construction, although a pressed metal construction may be substituted if desired. The brush-back element 1 is capable

of attachment to the nozzle of the cleaner and is of such a size and shape that the exterior dimensions of the nozzle and brush back are identical.

In order to provide a strong unit suction on a given area of surface being cleaned there is provided in the floor tool and brush assembly a series of flattened tubular members or inserts 3 that are fitted into correspondingly shaped and sized apertures in the brush back. The inserts are maintained in position by a backing plate 16 which has apertures therein corresponding in size and position to the apertures provided in the inserts 3. Attention is called to the fact that each of the inserts 3 has a head element or collar 14 which overlays or rests upon the top of the bristle holder 1, Fig. 6, as shown. In order to retain the inserts 3 in position a plate 16 is provided which closely fits the interior of the brush back. The lip agitators 12, hereinafter described in more detail are normally assembled onto walls 5 of the nozzle when it is used as a straight suction tool. When the brush is assembled or attached to the nozzle, the agitators 12, apply a pressure to plate 16, thereby holding the inserts firmly in position.

Arranged in the brush-back 1 is a series of bristles preferably made up in the form of tufts that are assembled into the backing element and retained therein by wire element 11. The tufts are drawn up into the aperture or slot 1b, shown in Fig. 6. The wire elements or other suitable securing means 11 are then pressed down against the top surface of the backing element 1 and soldered or otherwise permanently and rigidly secured or integrated thereto. It is obvious from the fact that the brushes are drawn up firmly and tightly into the slot 1b that they thereby rigidly maintain the brushes in position in the backing element.

The brush bristles or tufts 2 are arranged in rows extending obliquely across the face of the brush back that is lowermost and adjacent to the surface being cleaned. The rows 2 of tufts or bristles extend to within very short distances of the front and rear edges of the brush back. Some of the rows of brushes are shown as extending across one end portion of the brush back in one direction of obliqueness and the rows at the opposite end portion of the brush back extend at substantially right angles to the rows of the first group or transversely thereto. It will be understood however that all rows of bristles or tufts may extend in the same direction without impairing the effectiveness of the device. The

suction inlets 3 are somewhat elongated and are disposed with their longest dimensions in parallel relation to the rows so that the cleaning effectiveness may be maximum. The rows of bristles extending to the edge of the brush back form between parallel rows of bristles or tufts dust receiving passageways A. Dust, dirt and grit lying upon a floor enter these passageways and by reason of the brush action, dirt that engages side A' will be urged under the suction inlet. This action takes place because the rows of bristles extend obliquely across the direction of travel of the brush back and bristles. When movement is in the opposite direction, side A'' will be effective. It will be apparent that irrespective of the forward or backward direction of travel, either side A' or A'' will always direct the dust and dirt particles toward the lower openings of the suction inlets and will not become entangled in the brushes nor will they have to pass through brush bristles in order to get to the suction inlet. The brushes are thereby caused to perform in their most natural manner, namely, pushing dirt under the suction inlet and not requiring the filtering of the dirt through the bristles.

The brush-back 1, as pointed out above, is secured to the nozzle of the normal floor tool by means of retaining elements 8 and 9. The element 8, which is in the form of a distended U-shaped element is secured to the nozzle wall by means of screws or rivets 8a, or the element 8 may be spot-welded to the nozzle. The element 9 is a spring adapted to be actuated by finger pressure at the end thereof and it has a lug, hook, or projection 9a that is capable of locking itself above the element 8 and thereby firmly engaging the brush-back against the lower portion of the nozzle head.

The spring finger grip 9 is secured to the brush-back by means of a screw or rivet 10. The brush is detached from the nozzle by pressing element 9 thereby releasing lug 9a from the element 8 and thus permitting the brush to be disassembled from the nozzle proper.

The nozzle consists of a housing 7 to which is secured a tube 6, to which a tubular wand is secured, preferably welded in order to enhance the maneuverability of the floor tool. As set forth above there is assembled within the floor tool an agitator 12, the details of which are not shown but are somewhat similar to those shown in U. S. Patent No. 1,980,438; and is removably held in the nozzle by means of a spring clip 13 that is riveted or screwed by means 17 to the nozzle wall 5. It is evident from the above that a simplified brush construction has been provided in which the inserts, should they become worn, are capable of ready replacement and thereby obviate the necessity of replacing the entire brush when one or more of the tubes or inserts 3 have become worn. Further attention is invited to the fact that the brush bristles extend below the ends of the inserts or tubes 3 an appreciable distance thereby enabling the brushes to accomplish to the fullest extent their intended purpose, and yet at the same time enabling the suction produced by the cleaner to withdraw from the surface undergoing cleaning treatment the dust, grime, and grit that has become loosened by the brushes. The structure is comparatively light and simple in operation, construction, and in assembly and disassembly so that the ordinary user, operator, or housewife can avail herself of the usefulness and utility of the brush or she may use the

straight suction tool to which the brush is secured, all as desired.

There is set forth in Fig. 7 a modification of the structure described in connection with Fig. 6. The same type inserts are employed and the function and purpose are, of course, identical. The agitator is secured into the nozzle proper and held therein by means of spring clips 13, normally secured into the housing by rivets and screws 17. The same type of attaching elements 8, 9, and 9a are provided for ease of attachment and detachment.

Particular attention is invited to the fact in this brush assembly that the plate 1 constituting the brush-back is pressed out or counterbored as at 18 to receive the inserts or tubes 3a that are provided. The purpose of this pressing out or counterboring is to leave the top surface of the brush-back smooth and to decrease the overall height of the combined nozzle and brush assembly. The shoulder or collar 14 of the insert as shown in Fig. 7 is fitted into the pressed out or counterbored opening 18 and on the top of collar 14 there is assembled the plate 16 which is in direct contact with the top of the brush-back.

Further attention is invited to the means for increasing the rigidity or stiffness of the brush bristles. To this end there is provided an increased length of channel opening by means of extensions 1a provided on the brush-back. These extensions extend below the bottom surface of the brush-back and by means thereof a smaller length of brush bristles is exposed and extended below the extension 1a. The result of this construction is that the brush tuft or brush insert is thereby increased in stiffness or rigidity and enables the brush to more quickly and efficiently loosen the grit, dust, and dirt that normally is embedded and retained in the surface undergoing cleaning treatment. The brush tufts are retained in position and in the brush-back by means that are described in connection with Fig. 6.

The extended length of slot wall just described may be provided in Fig. 6 and its use is optional in any of the disclosures set forth.

There is set forth in Fig. 7a a variation of the backing plate which has as its principal object the idea of preventing the removal of the usually resilient inserts 3 by buckling them and then withdrawing them through the opening provided for their reception in brush-back 1. To this end the plate 16 is provided with an extension 42 integral with 16 which fits snugly within insert 3. When therefore plate 16 is inserted in the brush-back the portion 42 will fit within the insert to firmly and positively retain head 14 on or in element 1 in position and prevent the buckling of the insert and make possible its consequent removal. This form of plate is readily exchangeable for the plate 16 of Fig. 6 and in fact may be used in any form in which the inserts are retained in the brush-back by means of an auxiliary plate.

A further modification of the brush assembly is set forth in Fig. 8. The objects and purposes of this shape of construction are to still further decrease the over-all height of the brush and to this end there is provided a modified brush-back. The general exterior shape of this brush-back is identical to the brush-back 1 disclosed and described in connection with Fig. 6. The mode of brush assembly or the way the brush tufts are locked into the brush-back is likewise identical. The extensions 1a corresponding to

the extensions 1a of Fig. 7 are provided for stiffening the brush tufts extending therefrom. These extensions are preferable although not actually necessary. The same nozzle 7 is shown having disposed therein an agitator of the type described in Patent No. 1,980,438, and retained in the nozzle by means of spring clip 13 shown riveted or screwed by means 17 or otherwise secured to the wall 7 of the nozzle. The same means and mechanism for retaining the brush-back against the nozzle 7 by means of elements 8, 9, and 9a, as set forth, are employed.

A different type of insert construction is employed in this modification as disclosed in section in Fig. 8. Particular attention is invited to the fact that the backing plate 16 provided in the other disclosures thus far described is eliminated. The insert itself is equipped with two collar-like constructions 26 and 27, or the insert in other words is grooved. The collar constructions 26 and 27 are retained by the wall portion of the brush-back 1 and the inserts, of course, are manually or otherwise inserted into the construction and are capable of a ready disassembly and do not require the backing plate as set forth above.

The modification set forth in Fig. 9 shows the same nozzle construction 7 as set forth above, having secured therein an agitator 12 secured and held in position in the nozzle proper by means of a spring clip 13 which is held by means of screws or rivets 17 into the wall of the nozzle. In this particular modification the tubular portion 37 is integral with the brush-back 1 as shown and corresponds to the tubes 3 illustrated in the other figures of the drawings. The same mode of securing the nozzle and brush back together by means of elements 8, 9, and 9a, is likewise employed. Brush elements 2 are secured within the slots and extend therein as shown by means of wire or other brush holding elements 11 that are integrated or otherwise secured to the brush-back 1.

In the preferred embodiment and in the various modifications described, the inserts 3 are preferably made of rubber or any other highly resilient substance or other resilient construction to eliminate scratching surfaces or tearing the fabric of furniture or the like. In the modification shown in Fig. 9, the brush-back may be made entirely of rubber or it may be made of some light metal although the kind and variety of material is not particular to the individual invention.

The above is considered to set forth the gist of the invention so fully that anyone skilled in the art to which it pertains can by a reading and perusal of the drawings taken in connection with the specification and description thereof build and produce the construction shown and described.

That which is considered novel and useful and which it is desired to protect by Letters Patent of the United States Patent Office is as follows:

We claim:

1. A suction tool that has in cross section the form of an elongated rectangle and is adapted for

bare floor cleaning, having in combination, a nozzle, an oblong brush holding plate detachably secured to and extending across the mouth of the nozzle, a series of substantially continuous, straight, parallel rows of downwardly extending brush bristles in said plate arranged obliquely to the longitudinal axis of the brush holding plate, a series of elongated suction inlets extending through said plate and having their longest dimension extending between and in parallel relation to said rows of brush bristles, said rows of bristles extending substantially to the longitudinal edges of the brush holding plate and providing at said edges unobstructed spaces between adjacent rows of bristles which communicate with the respective suction inlets, the foregoing construction being such that said rows of bristles direct toward said suction inlets the dust and dirt particles entering said spaces as said tool is moved to and fro transversely of its longest dimension.

2. In a suction tool for use on a vacuum cleaner and adapted for bare floor cleaning, including: a nozzle whose mouth is substantially in the form of an elongated rectangle, a brush supporting plate substantially in the form of an elongated rectangle, detachably secured to said nozzle and fitted over said nozzle mouth, a series of substantially straight, continuous parallel rows of downwardly extending brush bristles attached to said brush supporting plate, said parallel rows being disposed obliquely and extending substantially all the way across said brush supporting plate, said brush supporting plate having a series of suction inlets therein arranged between said rows of brush bristles, rubber inlet tubes positioned in said suction inlets and extending below said plate, a retaining member adapted to engage the upper portions of said rubber tubes and clamp said rubber tubes against said brush supporting plate, said rows of parallel brush bristles being spaced to form passageways therebetween leading to the lower ends of said suction inlet tubes whereby as the suction tool is moved to and fro over a surface being cleaned dirt particles entering said passageways are urged by said oblique rows of bristles toward said suction inlets.

3. A device as defined in claim 1, in which the rows of said brush bristles carried by one half of said oblong brush holding plate are disposed at substantially 90 degrees to the rows of said brush bristles carried by the other half of said holding plate, the rows of said brush bristles positioned on the central portion of said holding plate being arranged in the shape of a V with a suction inlet extending across the mouth thereof.

4. A device as defined in claim 1 which includes tubes of flexible material in said suction inlets, holding means comprising a pair of spaced apart collars arranged at one end of each of said tubes, said collars being adapted to receive sections of said brush holding plate therebetween to hold said tubes in place on said plate.

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