June 2, 1931. R. SANTINI 1,808,178

VACUUM BRUSH

Filed Oct. 18, 1926 2 Sheets-Sheet 1

Fig. 1.

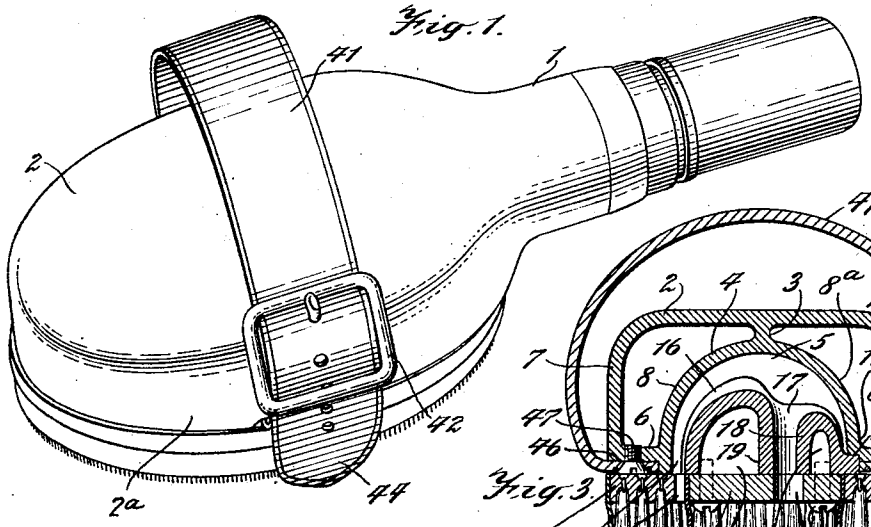


Fig. 3.

Fig. 2.

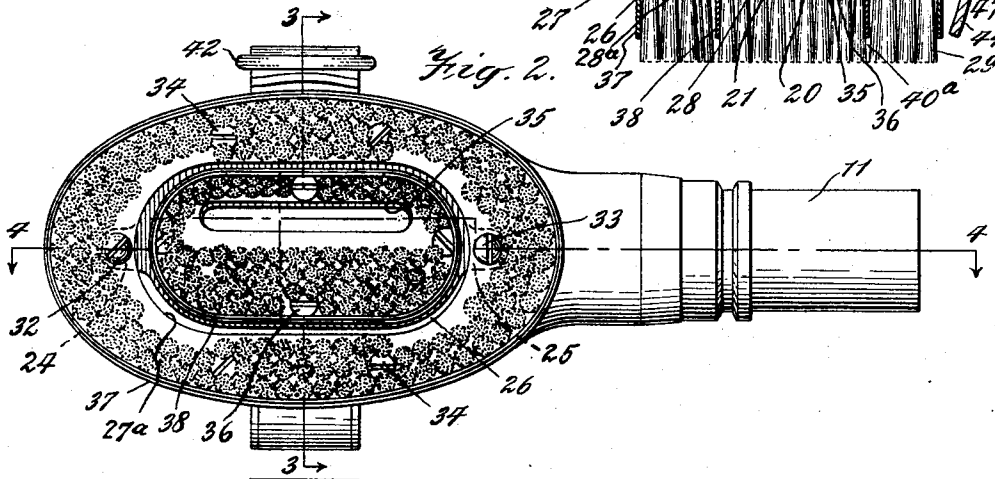
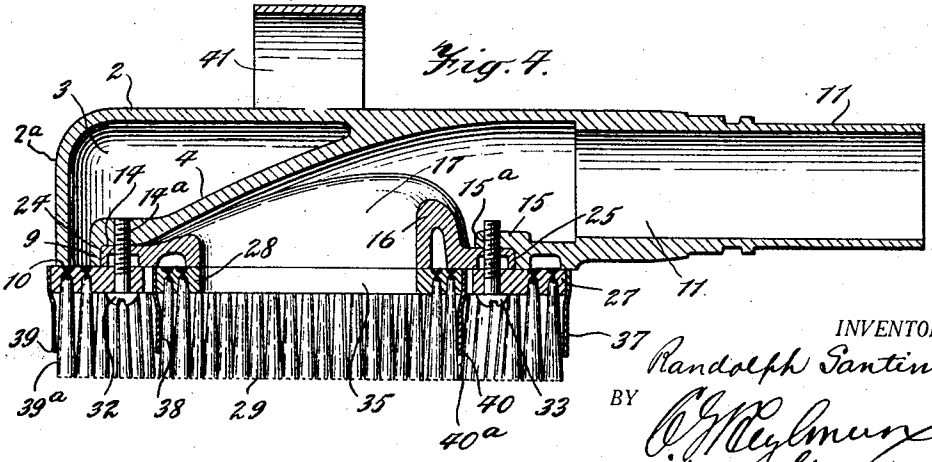


Fig. 4.



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Fig. 5.

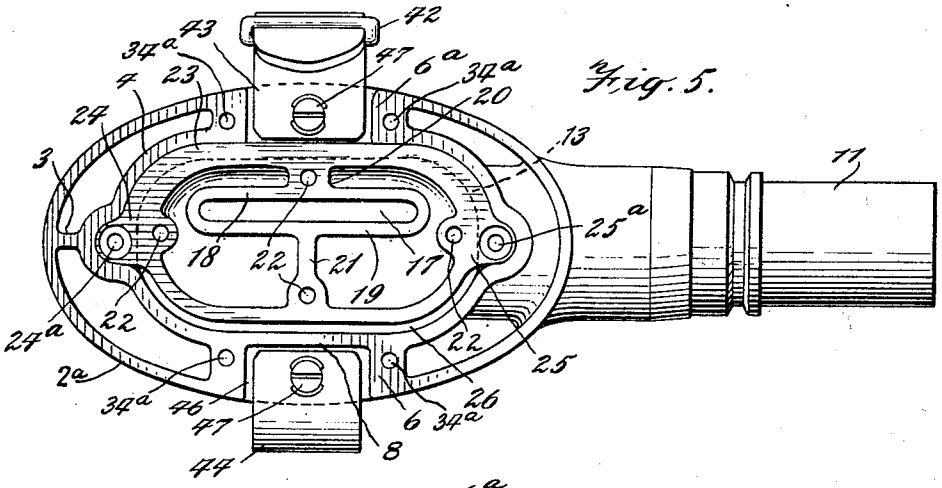


Fig. 6.

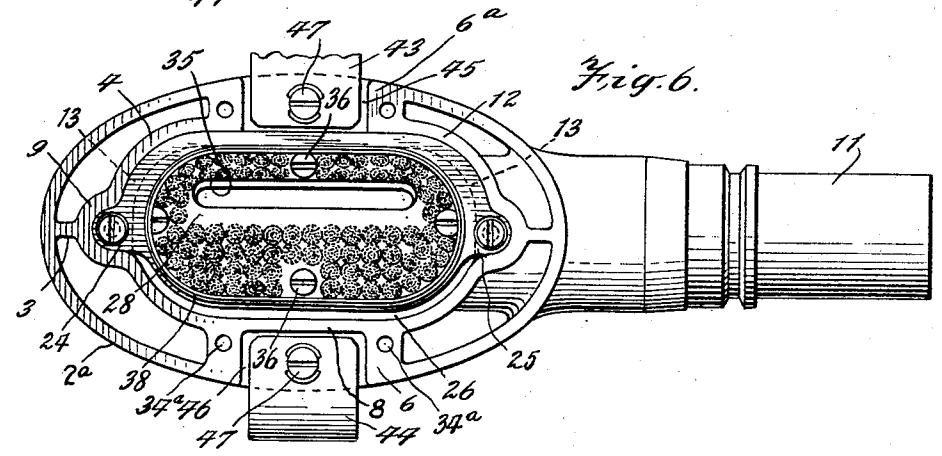
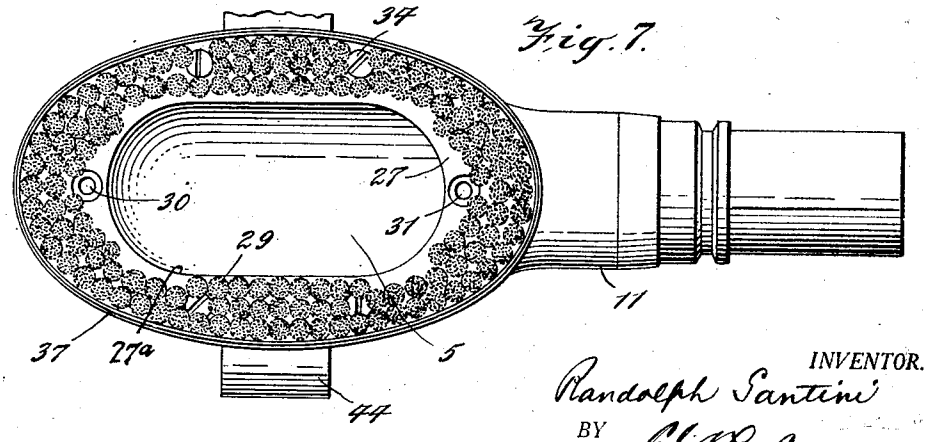


Fig. 7.



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Patented June 2, 1931 1,808,178

UNITED STATES PATENT OFFICE

RANDOLPH SANTINI, OF NEW YORK, N. Y., ASSIGNOR TO ARCO VACUUM CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

VACUUM BRUSH

Application filed October 18, 1926. Serial No. 142,249.

My invention relates to new and useful improvements in brushes, and more particularly to that type of brush which is adapted for use with fluid suction, and known as vacuum brushes.

An object of my invention is to provide a brush which while adapted for general use, is particularly adapted for use in cleaning animals, for example, horses.

Another object is to construct a brush which is rugged, durable, has few parts, and is easily assembled.

The invention consists in the improved construction and combination of parts, to be more fully described hereinafter, and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawings I have fully and clearly illustrated a preferred embodiment of my invention, to be taken as a part of this specification and wherein—

Figure 1 is a perspective view of a preferred embodiment of my novel vacuum brush;

Fig. 2 is a bottom plan view of the assembled brush;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional view on the line 4—4 of Fig. 2;

Fig. 5 is a bottom view with the tufts or bristles removed;

Fig. 6 is a bottom view with the tufts in place on an insert member, and

Fig. 7 is a bottom view of the brush with the insert member removed and with the tufts in place on the back member.

Referring to the drawings by characters of reference, 1 designates a vacuum brush, including a back member 2, preferably made of cast metal, such as aluminum, or it may be made of other material, if desired, such as hard rubber. This back member is preferably made oval in general contour so that it may be conveniently grasped in the hand of the operator when using the brush for cleaning.

The back member 2 is shown as being preferably of hollow or chambered construction having a surrounding flange or wall 2^a, and provided with an internal longitudinal rib 3 supporting a reentrant wall 4 which forms an open recess constituting in part an inner suction chamber 5 within the hollow back member 2, as will be presently described. The outer edge of the wall 4 lies in substantially the same plane as does the outer edge 10 of the said flange 2^a. This inner recess 5 and the back member 2 are both substantially elliptical in plan view, see Fig. 5, the outer edge portions of wall 4 being arranged symmetrically within the back member, said wall 4 being supported by said rib 3 and by lateral plates or webs 6, 6^a which bridge the space between the side walls 7, 7^a, respectively, of the flange 2^a of the back member 2 and the side portions 8, 8^a of the wall 4.

The reentrant wall 4 at its forward edge 9 is flush with the outer edge 10 of the back member 2 and is inclined rearwardly and upwardly, see Fig. 4, so that the recess chamber 5 gradually increases in depth from its forward edge to a point where it merges into an exhaust conduit or tubular port 11. In cross-section the recess chamber 5 is preferably of segmental form, successive segments thereof increasing in depth to the point at which the chamber merges with said conduit 11, and increasing in length of chord toward the mid-section of the chamber, as shown in Fig. 3. The aforementioned elements, namely, back member 2, rib 3, wall 4, plates or webs 6, 6^a and conduit 11 are preferably cast or formed integrally as shown, but such integral construction is not essential to proper functioning of my device, and the same may be built up from several parts if desired.

One of the longitudinal side edges 12 of the reentrant wall 4 is recessed along its inner edge to provide a seat or rabbet 13 which terminates at its ends in sockets 14, 15 in said wall 4 at the ends of the inner chamber 5, said sockets having threaded holes 14^a, 15^a, respectively.

I will now describe means, preferably in the form of an insert member 16, to cooperate with the entrance to the recess 5 to form a suction chamber and to provide inlets thereto of proper area for cleaning by suction or

vacuum, this insert member also preferably including means for restricting the capacity of the chamber 5 to assure a desired suction or vacuum. The insert member 16, preferably hollow and of cast metal such as aluminum, is adapted to be mounted in the inner chamber 5 in a manner to be described, and is substantially semi-ovoid in longitudinal section, see Fig. 4, and in cross-section is substantially semi-circular, see Fig. 3. Through the insert member is a suction slot 17 having substantially parallel side walls 18, 19, said slot extending longitudinally of the insert member and of the back member when the insert member is positioned in the back member 2. Partitions 20, 21, provided with threaded holes 22 to receive fastening means, and also serving as internal strengthening means, join the side walls 18, 19, respectively of the suction slot 17 to the side walls of the insert member 16. When positioned in the recess 5, as shown in Figs. 3 and 5, the insert member conforms generally to the contour of the said recess, but the back of the insert member is spaced from the bottom face of the said recess to provide a suction chamber or passage. The insert member is provided on one side with a supporting flange 23, and at its ends with lugs 24, 25 which engage the seat 13 and sockets 14, 15, respectively. Holes 24^a, 25^a are preferably provided through lugs 24, 25, respectively, to register with the holes 14^a, 15^a heretofore described. The longitudinal side of the insert member opposite to the flange 23, is so formed that when the insert member is in place said side will be spaced from the adjacent side wall 8 of the chamber 5 to provide a suction slot 26 opening through the bottom face of the brush and communicating with said suction chamber 5 and conduit 11. It will also be seen that the slot 17 communicates with the chamber 5 and conduit 11.

It will be noted that in the preferred form shown, the member 16, except for the slots described, constitutes a cover member to close the entrance to the suction chamber formed by recess 5 and said member and that access to said chamber is afforded only through said slots. It will also be noted that the reentrant portion of said member occupies a major portion of the recess 5 so as to restrict the passage therethrough and assure that high degree of suction or vacuum therein desirable for efficient cleaning. It will be seen that the lower edges of the various parts of the back member and the lower face of the member 16 lie in the same plane on the bottom of the brush.

The brush means for the preferred embodiment of my invention comprises outer and inner supports or base plates 27, 28, preferably of wood, in which are mounted, respectively, groups of tufts or bristles 29. The outer support 27 is of such outline in plan view that it will cover or bridge the space between the back member 2 and the reentrant wall 4. Holes 30, 31 are cut through the support 27 directly over the said lugs 24, 25 of insert member 16 and sockets 14, 15 of chamber 5, and screw means 32, 33 are passed therethrough and screwed in to the holes 14^a, 15^a to fasten support 27, insert member 16 and back member 2 together. Other screw means 34 may be passed through the support 27 and threaded directly into openings 34^a in the back member 2 to aid in securing the support 27 rigidly in place.

The inner support 28 is similar in general plan outline to the insert member 16, and has a slot 35 therethrough which, when the support 28 is positioned on the insert member, will aline with the suction slot 17. Suitable means such as screws 36, or the like, may be used to fasten the support 28 to the insert member 16, said screws passing through apertures in said support and being threaded into the openings 22 in the insert member.

Surrounding each of the supports 27, 28 and fixed thereto, is a flexible apron or skirt 37, 38 respectively which confine each of the groups of tufts 29, and each of which is of such depth that it extends over the greater part of the length of the tufts 29. There are thus formed narrow air inlet slots 39^a, 40^a between the free edge 39, 40 of said skirts and the surface to be cleaned, and with which the said tufts are in engagement.

The support 27 and the group of bristles thereon is located laterally outside the boundary or wall of the chamber 5 (see Fig. 7) and surround said chamber, extending about the peripheral portion of the working face of the brush. The support 27 has an aperture 27^a therethrough which registers with the open side of chamber 5. The inner support 28 is positioned within aperture 27^a and the group of bristles carried thereby is located within said group on the support 27.

The inner plate 28 is spaced laterally from the inner edge of support plate 27 to provide a space 28^a alining with the slot 26 so that free access is had to said slot by dirt and other matter agitated or loosened by both groups of bristles.

I have shown hand-grip retaining means 41 generally in the form of an adjustable strap having a buckle 42 fixed to one part 43 of the strap, and a second part 44 adapted to cooperate with said buckle. One end of each part 43, 44 is fastened in a recess 45, 46, respectively, formed in each of the lateral webs 6, 6^a by a screw 47 threaded into the web, or by other fastening means. The retaining means is adapted to pass over the back of the hand of the operator when the brush is grasped in the hand of the operator, and to aid in maintaining a proper grip on the brush and prevent it from slipping from the grasp.

In operation, the conduit 11 is connected by a hose or other means (not shown) to suitable suction-creating means (also not shown) whereby air will be drawn through the brush back 2 and create suction or vacuum in the chamber 5. The path of the air will be under the edges 39, 40 of the aprons 37, 38, through and between the bristles or tufts 29, into each of the suction slots 17, 26 and to the chamber 5, and thence out through the exhaust conduit or port 11 of the brush. Due to the aprons 37, 38, the suction is applied adjacent the surface to be cleaned, and the efficiency of the brush in picking up the dirt and dust loosened by the tufts or bristles is increased. The surface-engaging area of the brush may be made smaller by taking out certain of the fastening screws and removing the outer brush means, including the support 27 with its tufts 29, as shown in Fig. 6. The brush in this form is particularly useful in cleaning around the hocks and other joints of the horses. If a large brush with low suction is desired, the insert member 16 and support 28 may be removed to leave a brush employing only the outer group of bristles as shown in Fig. 7.

It is apparent from the foregoing description that the brush may be readily taken apart for cleaning, repair, or replacement of worn parts, and also for variation of the size of the brush, or variation of the size of the inlet orifices.

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

1. A brush of the character described comprising a back member having an upwardly extending recess in its lower portion, a group of bristles on said back member and surrounding said recess, a member extending upwardly into said recess and carrying an inner group of bristles, said back member and said second-named member forming a suction slot located between said inner and outer groups of bristles and communicating with said recess, said second-named member having a suction slot located within said second group of bristles and communicating with said recess.

2. In a brush of the class described, a back member having a suction chamber, said chamber having an open side, a member overlying the open side of said chamber, said overlying member having a side edge spaced from a side wall of the chamber to form a suction slot, said overlying member having a suction slot therethrough permitting communication with said chamber, and tuft means carried by said back member at the open side of said chamber.

3. In a brush of the class described, a back member having a suction chamber, said chamber having an open side, a detachable cover member overlying the open side of said chamber and having a side edge thereof spaced from a side wall of the chamber to form a suction slot, said cover member having a suction slot therethrough permitting communication with said chamber, and tuft means mounted on said back member and said cover member adjacent said slots.

4. In a brush of the class described, a back member having a chamber therein, said chamber having an open side, said back member having an exhaust port for said chamber, an insert member mounted in said chamber with a side wall thereof spaced from a wall of said chamber to form a suction slot, support means on said back member providing a slot alined with said suction slot, and tuft means carried by said support means adjacent said suction slot.

5. In a brush of the class described, a back member having a chamber therein, said chamber having an open side, said back member having an exhaust port for said chamber, an insert member mounted in said chamber and having a part spaced from a wall of said chamber to provide a suction slot communicating with said chamber, said insert member having a suction slot therethrough in communication with said chamber, a support on said back member adjacent said first-mentioned suction slot, tuft means on said support, a support on said insert member adjacent the second-mentioned suction slot, and tuft means on said last-mentioned support.

6. In a brush of the class described, a back member having a chamber, said chamber having an open side, said back member having an exhaust port in communication with said chamber, an insert member positioned in said chamber and having an edge spaced from an edge of said chamber to form a suction opening, tuft members, and means to fix said tuft members to said back member and to fix said insert member in said chamber.

7. In a brush of the class described, a back member having a chamber therein, said chamber having an open side, a support member carried by the back member, tuft members mounted in the support member, an insert member positioned in the chamber, a support member carried by the insert member, tuft members mounted in said second support member, and means to fix said first support member and said insert member to the back member.

8. In a vacuum brush of the character described, a back member provided with a recess extending upwardly from its lower face, a conduit communicating with said recess and extending rearwardly from said back member, an insert member having a suction opening therethrough in comunication with said recess, said insert member being smaller than said recess at the lower face of said back member and being positioned in said

recess with an edge thereof spaced from a wall defining said recess to form a suction opening, and means to fix said insert member in said back member.

9. In a vacuum brush of the character described, a back member provided with a recess extending upwardly from its lower face, a conduit communicating with said recess and extending rearwardly from said back member, an insert member having a suction opening therethrough in communication with said recess, said insert member being smaller than said recess and being positioned in said recess with a wall threof spaced from a wall of said recess to form a suction opening, a support carried by said insert member and having a slot alined with said first suction opening, tuft members carried by said support adjacent said slot, and means to fix said insert member in said recess.

10. In a vacuum brush of the character described, a back member provided with a recess extending upwardly from its lower face, a conduit communicating with said recess and extending rearwardly from said back member, an insert member having a suction opening therethrough in communication with said recess, said insert member being smaller than said recess and being positioned in said recess with a wall thereof spaced from a wall of said recess to form a suction opening, a support carried by said insert member and having a slot alined with said first suction opening, tuft members carried by said support adjacent said slot, a second support carried by said back member and surrounding said first support and forming in conjunction with said first support a slot alined with said second suction opening, tuft members carried by said second support adjacent said second suction opening, means to fix said first-named support to said insert member, and means to fix said second-named support to said back member and said insert member in said recess.

In testimony whereof I have hereunto signed my name.

RANDOLPH SANTINI.