Dec. 5, 1939. G. E. LOFGREN 2,182,344

SUCTION NOZZLE

Filed Dec. 23, 1936 2 Sheets-Sheet 1

Fig. 1.

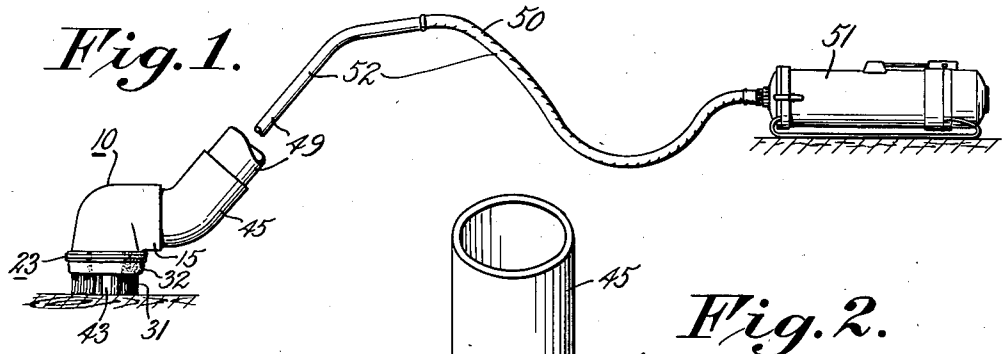


Fig. 2.

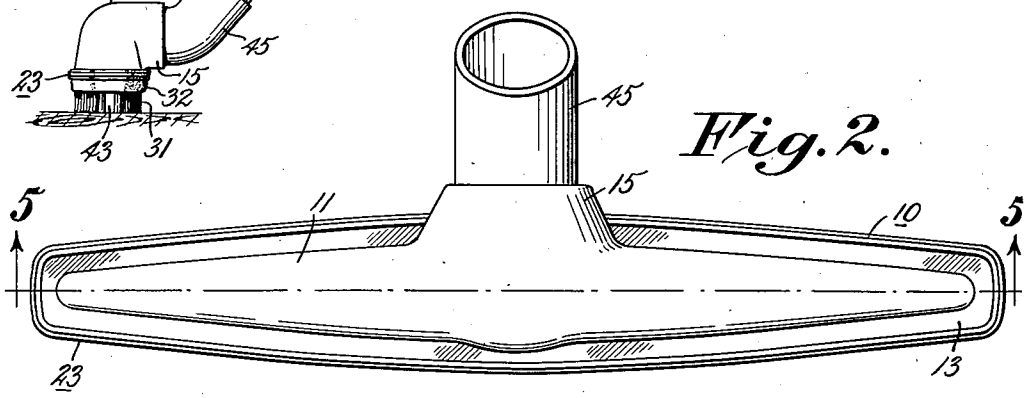


Fig. 3.

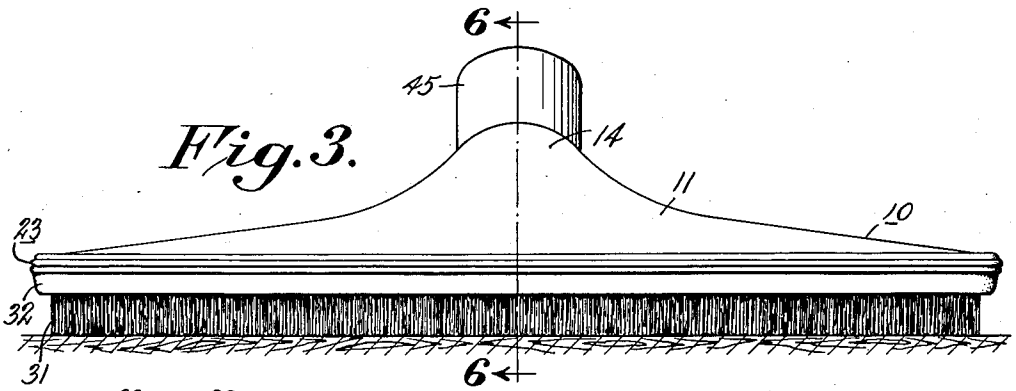
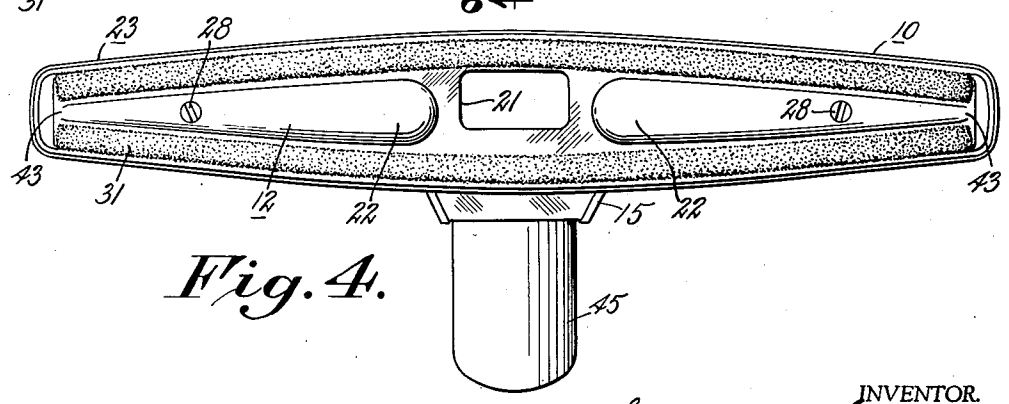


Fig. 4.



INVENTOR.
Gustaf Einar Lofgren

BY Thomas C. Betts
his ATTORNEY.

Dec. 5, 1939. G. E. LOFGREN 2,182,344

SUCTION NOZZLE

Filed Dec. 23, 1936 2 Sheets-Sheet 2

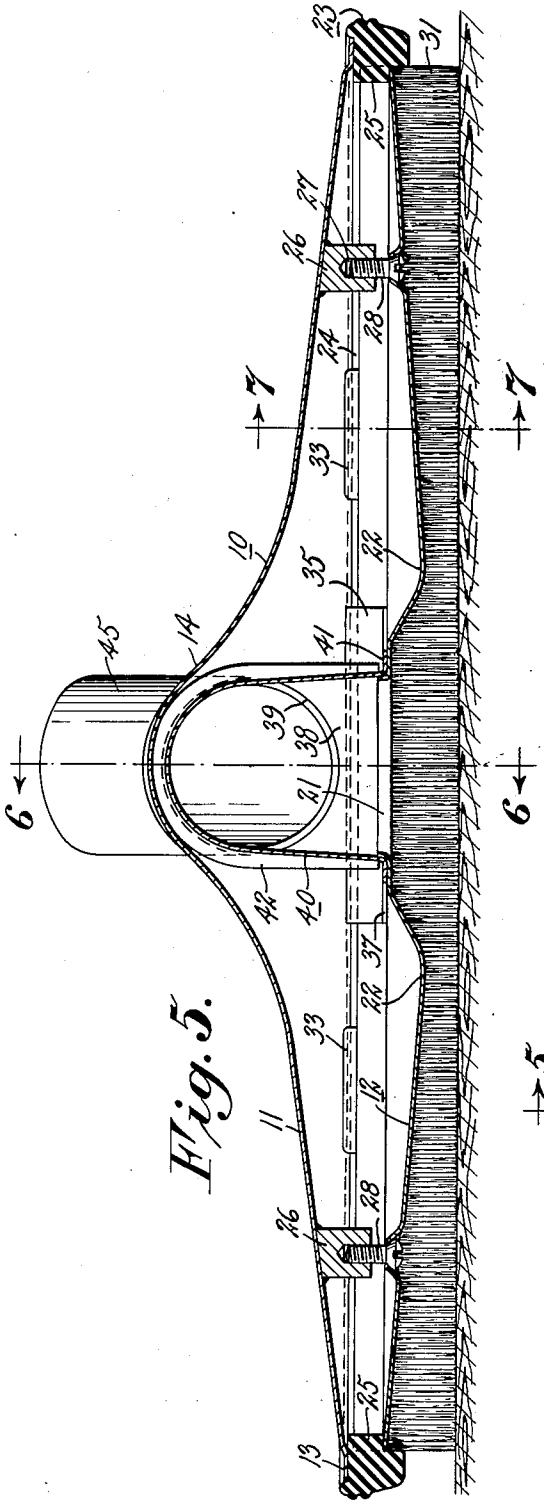


Fig. 5.

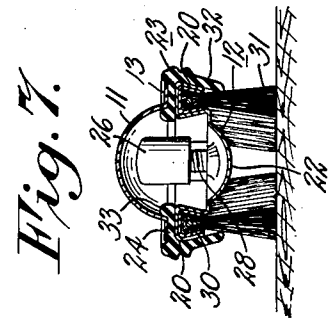


Fig. 7.

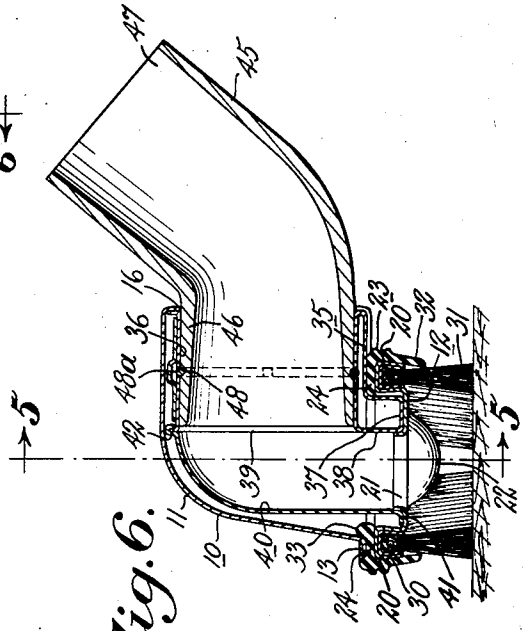


Fig. 6.

INVENTOR.

BY Gustaf Einar Lofgren

Thomas C. Betts

his ATTORNEY.

Patented Dec. 5, 1939 2,182,344

UNITED STATES PATENT OFFICE

2,182,344

SUCTION NOZZLE

Gustaf Einar Lofgren, Riverside, Conn., assignor to Electrolux Corporation, Dover, Del., a corporation of Delaware

Application December 23, 1936, Serial No. 117,255

13 Claims. (Cl. 15—158)

My invention relates to an improved suction nozzle and more particularly to an improved suction floor brush made substantially entirely of metal stamping.

Among the advantages of the suction nozzle in accordance with my invention are lightness of weight, sturdiness, cheapness of manufacture and neatness of appearance.

Further objects and advantages will be apparent from the following description considered in connection with the accompanying drawings, which form a part of this specification and of which:

Fig. 1 is an end view of a nozzle in accordance with my invention, the nozzle being connected to a vacuum cleaner;

Fig. 2 is a top view of the nozzle shown in Fig. 1;

Fig. 3 is a front view of the nozzle;

Fig. 4 is a bottom view of the nozzle;

Fig. 5 is a cross-sectional view taken on the lines 5—5 of Figs. 2 and 6;

Fig. 6 is a cross-sectional view taken on the lines 6—6 of Figs. 3 and 5; and

Fig. 7 is a cross-sectional view taken on the line 7—7 of Fig. 5.

Referring to the drawings, reference character 10 designates generally the improved nozzle. Nozzle 10 includes a hollow upper stamping 11 and a comparatively flat lower stamping 12. Upper stamping 11 is formed with an outwardly extending flange 13 which extends around substantially the entire bottom opening of the hollow stamping. The central part of the upper stamping is comparatively deep by virtue of the fact that the upper portion thereof is arched upwardly as is shown at 14. The central part of the rear wall of the upper stamping projects outwardly as is shown at 15, and is formed with an opening 16.

The longitudinal edges of lower stamping 12 are formed as channels 20 which open downwardly and have closed backs which are disposed above the remainder of the lower stamping. The central portion of stamping 12 is formed with an inlet opening 21 and immediately on either side of the inlet opening the stamping is dished downwardly an appreciable extent, as is shown at 22, which extent decreases gradually toward the ends of the stamping.

A bumper member 23 of rubber or similar soft compressible material includes an inwardly extending flange 24 adapted to extend between the flange 13 of upper stamping 11 and the closed backs of channels 20. At either end of stamping 12 there is a space between the ends of the channels and bumper 23 is formed with an enlarged portion 25 which occupies and closes this space. Lugs 26 may be welded or otherwise secured to upper stamping 11 and are formed with threaded apertures 27 which are engaged by screws 28 which pass through openings formed in lower stamping 12. Screws 28 serve to secure the two stampings together with the flange 24 and the portions 25 of the bumper member clamped therebetween.

Brush holding members 30 are retained within channels 20. Members 30 may be held securely in place by bending the opposite walls of the channel members towards each other after the members have been inserted in the channels. Members 30 carry brush bristles 31 which extend downwardly beyond the lower face of stamping 12 and constitute surface contacting elements. As is shown in Fig. 4, a comparatively narrow space 43 is provided at each end of the nozzle between the two rows of bristles. Bumper member 23 is formed with a downwardly extending flange 32 which overlaps the bristles 31 for a short distance. The inner edge of flange 24 on the bumper member may be enlarged at certain places, as is shown at 33, for the purpose of assuring that the flange cannot be accidentally withdrawn from between the stampings.

A swivel socket member 35 is mounted within the space between the upper end lower stampings and has a cylindrical portion or sleeve 36 which extends to the opening 16 formed in the upper stamping. Member 35 also includes a flat base portion 37 which is welded or otherwise suitably secured to lower stamping 12. Further, member 35 includes a flat vertical wall 38 formed with a central opening 39, which opening communicates directly with the interior of cylindrical portion 36.

A hood member 40 is provided with a flange 41 extending around its lower portion which flange is welded or otherwise suitably secured to the lower stamping 12. The hood member is also provided with a flange 42 in a vertical plane, which flange is crimped around the edge of wall 38 of member 35, whereby an air-tight union between members 35 and 40 is obtained. The lower opening in hood member 40 communicates directly with suction inlet 21 and connects this inlet with the bore of cylindrical portion 36 and prevents communication with the remainder of the space between the upper and lower stampings. Thus hood member 40 constitutes air guiding

means which, with wall 38 forms an air flow channel between opening 21 and sleeve 36.

A hose connection member 45 is rotatably secured within the bore of cylindrical portion 36. This member is preferably in the form of an elbow, one branch 46 of which is received within the cylindrical bore, while the other branch 47 is adapted to receive a suction conduit 52, as shown in Fig. 1. Conduit 52 preferably comprises a hollow rigid portion 49, which also serves as a handle for manipulating the nozzle, and a flexible portion 50 for connecting the handle to a vacuum cleaner unit 51.

The outer surface of branch 46 is formed with an annular groove 48 while a similar groove is formed in the cylindrical bore of member 36. This latter groove is formed by having the opposite ends of portion 36 made with a space between their aligned ends. A spring 48*a* is received within both of the grooves and tends to prevent axial displacement of the member 45, while permitting rotation thereof.

The operation of the above described suction nozzle is believed to be self-evident. With the nozzle connected as shown in Fig. 1, the vacuum cleaner unit 51, to the suction opening of which the hose 50 is connected, draws a current of air through inlet opening 21, hood member 40, member 45, and handle 49 to the hose. The air in passing to the inlet opening 21 flows between the bristles 21 and through the openings 43 at each end of the nozzle and in contact with the surface on which the nozzle is placed. As the nozzle is moved back and forth over the surface, the bristles tend to dislodge dust and dirt thereon, which dust and dirt is picked up by the air stream and carried through the inlet opening 21 and passes with the air to the vacuum cleaner 51, where the dust is separated from the air in the well known manner. The strong flow of air through openings 43 makes it possible to remove dirt from corners, as the narrow end of the nozzle may be readily manipulated into such corners. Also, the influence of this flow is felt at some distance beyond the nozzle.

The dished portion 22, not only strengthens the bottom stamping without adding materially to its weight, but it also results in a more even flow of air from the ends of the nozzle toward the opening 21. It will be noted that, as the space between the two rows of bristles increases from each end toward the center of the nozzle, the downward and lateral extent of dished portion 22 also increases, thus tending to maintain constant the cross-section of the passages through which the air flows. This gives a more even cleaning and prevents a reduction in the velocity of the air as it approaches opening 21, which might result in the deposit of some dirt picked up by the high velocity air stream near the ends of the nozzle.

While I have described one more or less specific embodiment of my invention it is to be understood that this has been done for purposes of illustration only and that it constitutes no limitation of the scope of my invention, which is to be determined by the appended claims viewed in the light of the prior art.

What I claim is:

1. In a suction nozzle, an upper elongated hollow stamping, a lower elongated stamping, said stampings being secured with their peripheral edges in substantially air-tight relationship to substantially enclose a space therebetween, said lower stamping being formed with an opening and said upper stamping being formed with an opening in a side thereof which is in a plane disposed at substantially right angles to the plane of said bottom stamping, and a hollow angular member within and occupying a portion only of said space for conducting air from the aperture in the lower stamping through an angular path to the aperture in the upper stamping and preventing access of the air to said space, the walls of said hollow member being in alignment with the edges of said openings so as to provide for streamlined flow of air therethrough and to prevent accumulation of dust.

2. In a suction nozzle, an upper hollow stamping, a lower stamping secured to said upper stamping to substantially enclose a space therebetween, said lower stamping being formed with an opening and said upper stamping being formed with an opening in a side thereof which is in a plane disposed at substantially right angles to the plane of said bottom stamping, a hollow member within said space communicating with the opening in the lower stamping, the portion of said member adjacent to the opening in the upper stamping being formed with a cylindrical bore, and a tubular member rotatably secured to said bore and extending through the last mentioned opening.

3. In a suction nozzle an upper elongated hollow stamping having a comparatively deep central portion, a lower elongated stamping, said stampings being secured with their peripheral edges in substantially air-tight relationship to substantially enclose a space therebetween, both of said stampings being formed with centrally disposed apertures, and hollow structure disposed within the deep portion of said upper stamping and occupying a portion only of said space and contacting said stampings immediately around the apertures therethrough for conducting air from the aperture in the lower stamping through the aperture in the upper stamping and preventing access of the air to said space, the walls of said hollow structure being in alignment with the edges of said openings so as to provide for streamlined flow of air therethrough and to prevent accumulation of dust.

4. In a suction nozzle, an upper hollow stamping, a lower stamping secured to said upper stamping to substantially enclose a space therebetween, said lower stamping being formed with an opening and said upper stamping being formed with an opening in a side thereof which is in a plane disposed at substantially right angles to the plane of said bottom stamping, a member secured to said lower stamping and including a sleeve extending into the opening in the side of said upper stamping, and air guiding means secured to said member within said space so as to form with a portion of said member an air flow channel from the opening in said lower stamping to said sleeve.

5. A suction nozzle as claimed in claim 4 including an air conduit connection member rotatably secured to said sleeve and extending through the opening in the upper stamping.

6. In a metal floor nozzle, an elongated upper stamping, an elongated lower stamping, two opposite sides of said lower stamping being formed as channels opening downwardly and having their closed backs extending above the remainder of the lower stamping, brush holding members secured in said channels, a strip of compressible material extending around said nozzle and having portions disposed between the backs of said

channels and said upper stamping and having enlarged portions occupying the spaces between the ends of said channels at opposite ends of the lower stamping, and means for securing said stampings together with said strip secured therebetween.

7. A nozzle as defined in claim 6 in which said strip includes a portion extending outwardly beyond the edges of said stampings to act as a bumper.

8. In a metal floor nozzle, a hollow elongated upper stamping, an elongated lower stamping, said upper stamping having an outwardly extending flange, the sides of said lower stamping being formed as channels opening downwardly and having their closed backs extending above the remainder of the lower stamping, brush holding members secured in said channels, a strip of compressible material extending around said nozzle and having portions disposed between the backs of said channels and the flange on said upper stamping and having enlarged portions occupying the spaces between the ends of said channels at opposite ends of the lower stamping, means for securing said stampings together with said strip secured therebetween, each of said stampings being formed with air flow openings, and means within the space between said hollow upper stamping and said lower stamping for conducting air directly from the opening in one of said stampings through the opening in the other.

9. A nozzle as set forth in claim 8 in which the means for conducting air includes a rotatable hose connection member.

10. In a suction nozzle, an elongated member formed with a centrally disposed inlet opening, surface contacting elements extending downwardly from the forward and rear sides of said member to define with said member and the surface being cleaned passages for flow of air from the ends of the nozzle to said inlet opening, said elements being spaced a greater distance apart at the center of the nozzle than at the ends, and projecting portions extending downwardly from said member into said passages on each side of said opening, said projection portions being larger adjacent to said opening than adjacent to the ends of the nozzle to thereby tend to equalize the cross-sectional areas of said passages.

11. In a suction nozzle, an elongated member formed with a centrally disposed inlet opening, surface contacting elements extending downwardly from the forward and rear sides of said member to define with said member and the surface being cleaned passages for flow of air from the ends of the nozzle to said inlet opening, the space between said elements gradually decreasing from the center of the nozzle to the ends thereof, and projecting portions extending downwardly from said member into said passages on each side of said opening, the size of said projection portions decreasing gradually from adjacent to said opening toward the ends of the nozzle to thereby tend to equalize the cross-sectional areas of said passages.

12. In a suction nozzle, an elongated stamping formed with a centrally disposed inlet opening and rows of brush bristles extending downwardly from the forward and rear sides of said stamping to define with said stamping and the surface being cleaned passages for flow of air from the ends of the nozzle to said inlet opening, said rows of bristles being spaced a greater distance apart at the center of the nozzle than at the ends, said stamping being downwardly dished so as to form projecting portions extending into said passages on each side of said opening, said projection portions being larger adjacent to said opening than adjacent to the ends of the nozzle to thereby tend to equalize the cross-sectional areas of said passages.

13. In a suction nozzle, an elongated member formed with a centrally located inlet opening, rows of brush bristles extending downwardly from the sides of said member to define with said member and the surface being cleaned an elongated passage extending a substantial distance on either side of the inlet opening towards the ends of the nozzle for the flow of air to said central inlet opening, said bristles being formed to provide for flow of air therebetween into said passage, and projecting portions extending downwardly from said member into said passage and below the plane where the bristles are connected to the member to thereby reduce the cross-sectional area of the passage, said projecting portions being spaced inwardly from said bristles whereby to permit flow of air between the bristles throughout their entire vertical extent.

GUSTAF EINAR LOFGREN.