March 15, 1932. L. ELL 1,849,515

SUCTION CLEANER NOZZLE

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Fig.1

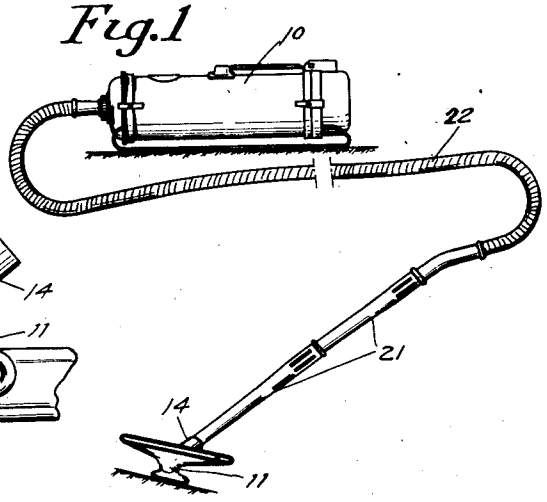


Fig.4

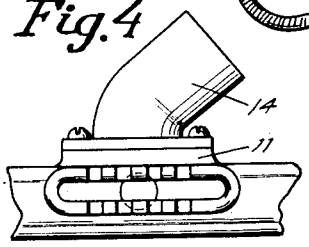


Fig.2

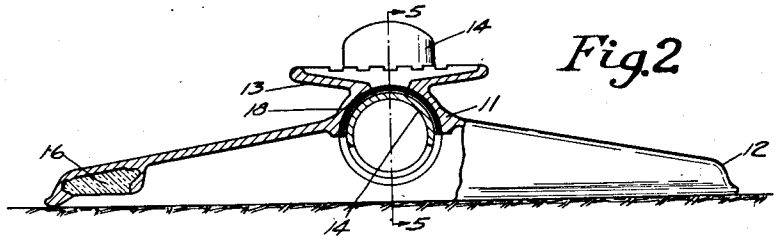


Fig.3

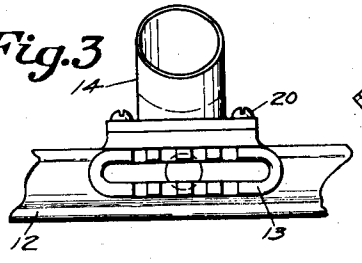


Fig.5

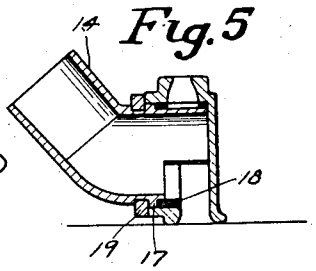


Fig.6

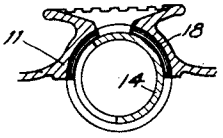


Fig.7

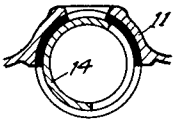
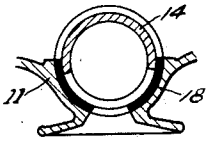


Fig.8



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SUCTION CLEANER NOZZLE

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Fig.9

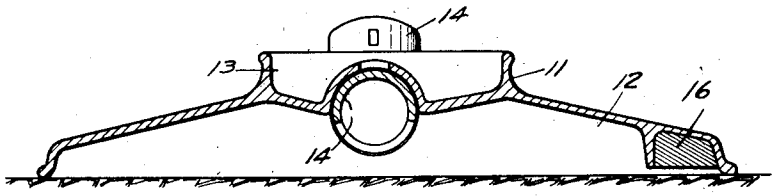


Fig.10

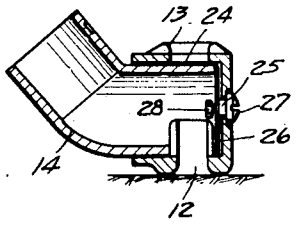


Fig.11

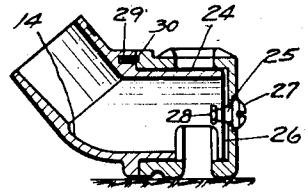
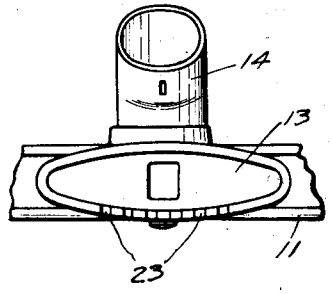


Fig.12



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Patented Mar. 15, 1932 1,849,515

UNITED STATES PATENT OFFICE

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SUCTION CLEANER NOZZLE

Application filed July 16, 1930, Serial No. 468,268, and in Germany July 16, 1929.

This invention relates to suction nozzles for vacuum cleaners and is adapted to be applied to all types of suction pipes.

One object of the invention is to provide a construction of nozzle which is adapted, in addition to its normal suction operation, for picking up bristles, hairs, heavy objects and the like.

A further object of the invention is to provide a suction nozzle having a plurality of suction openings of different sizes or shapes which can readily and quickly be brought successively into operative position.

Another object of the invention is to provide a mounting for a multiple suction nozzle which will enable the nozzle to be operated under furniture or other objects having very low bases.

A still further object of the invention consists in the provision of a nozzle construction having a plurality of suction openings of different sizes or shapes, wherein transfer from one opening to another is automatically effected in part by the simple lifting of the nozzle from the surface being treated.

These and other objects will be seen from the following description read in conjunction with the accompanying drawings.

In these drawings:—

Fig. 1 shows a vacuum cleaner of the type known as the "inside bag" type, fitted with a suction nozzle according to the invention having two suction openings of different sizes;

Fig. 2 is an elevational view, partly in cross section, of the nozzle shown in Fig. 1 rotated through 180°;

Fig. 3 is a plan view of part of the nozzle shown in Figs. 1 and 2;

Fig. 4 is a view corresponding to Fig. 3 with the nozzle connecting member rotated through 90°;

Fig. 5 is a transverse sectional view through the suction nozzle and connecting member along the line 5—5 of Fig. 2;

Figs. 6 and 7 show sectional details of the nozzle shown in Fig. 2 with, however, the connecting member moved downwardly to the respective sides adjacent the surface being treated, as shown in the plan view, Fig. 4;

Fig. 8 is a transverse sectional view of part of the nozzle shown in Figs. 1 and 2;

Fig. 9 is a longitudinal sectional view through a modified embodiment;

Figs. 10 and 11 show preferred means for rotatably mounting the nozzle on a suction pipe or connecting member;

Fig. 12 is a part plan view of the nozzle shown in Fig. 9;

Referring to Fig. 1, 10 denotes a vacuum cleaner of the type known as the inside bag type which is connected with a suction nozzle body 11 by means of a flexible hose 22 and a suction tube 21 comprising a number of parts, and by means of a connecting member 14 hereinafter described. Suction tube 21 and connecting member 14 comprise a rigid handle upon which nozzle body 11, is rotatably mounted. Suction nozzle body 11, as can be seen more clearly from Fig. 2, is provided with two suction mouths 12 and 13 having suction openings, the larger of which, as seen in Fig. 2, is directed downwardly, and is thus located in its operative position, that is, lies against the surface to be treated. The smaller suction mouth 13 is angularly displaced relatively to the larger mouth 12 by about 180° and is therefore upwardly disposed.

Connecting member 14 is rotatably mounted in the suction nozzle body 11 by means of a supporting socket 18 or the like, and, together with the socket 18, is so formed as to provide, in the position of the nozzle shown in Fig. 2, an open connection between the larger of the suction mouths and connecting member 14 and the suction tube 21, while it maintains closed the air passage between the small suction opening and the connecting member and the suction tube.

The halves of the suction nozzle body to the left and right of the vertical center line in Fig. 2 may be termed laterally extending branches. On the left branch shown in Fig. 2 is arranged a metal mass 16 which, on lifting the suction nozzle body from the floor, causes a pivotal or rotary movement of the nozzle body around connecting member 14. One form of arrangement allowing the rotation of the suction nozzle body 11 on connecting member 14 is seen in Fig. 5. Con-

necting member 14 is formed with an annular rib 17 which engages in a groove of the nozzle body formed between the edge of supporting socket 18 and an outer ring 19 which is secured to the nozzle body by means of screws 20. This arrangement prevents immediate withdrawal of the suction nozzle body from the connecting member 14.

If the nozzle is to be moved from its position of normal suction operation, illustrated in Fig. 2, into the operative position of Figs. 1 or 8 for the purpose of sucking up heavy objects, bristles, or the like, which can not normally be removed efficiently with large suction openings, the nozzle is simply lifted up from the floor by the tube 21 serving as handle, whereupon the metal mass 16 (Fig. 2) which preferably consists of lead, or other heavy metal, causes a rotational movement of the nozzle body on connecting member 14 in a counter-clockwise direction, which is sufficient to swing the nozzle body through substantially 90° so that by pressing the nozzle, immediately after this movement, down on the floor, the small suction opening is brought into position on the carpet or the like being cleaned, while the large suction opening is now upwardly directed. In this position, the upwardly directed larger suction opening is closed relatively to the suction pipe 21 by means of the connecting member 14, as can be clearly seen from Fig. 8.

This manner of operation with the suction nozzle is so extraordinarily simple that the suction nozzle, in the shortest possible time and without trouble, can be changed over in the manner described to the large or small suction openings by the mere lifting and pressing down of the handle. On the other hand, the nozzle can be lifted from the floor without the necessity of transferring from the operative position of one opening to that of the other by simply lifting the same only to an extent such that the weight loaded side or branch does not move directly under the handle. Alternatively, one can wait until this side has swung back slightly towards its original position and then press the large suction opening of the nozzle against the surface being treated.

In consequence of the rotatable or pivotal mounting of the nozzle body on the connecting member there results the further great advantage that the tubular handle member 21 of the suction apparatus attached to the connection member, which during normal operation for convenience in manipulation is upwardly inclined, can be rotated through an angle of approximately 90° from its position of normal relationship with the nozzle body and thus moved downwardly to one or other side to lie substantially horizontally adjacent to the surface being treated, which enables the nozzle to be put into operation even under furniture, or the like, having but a small clearance with respect to the floor. Fig. 4 shows the connecting member 14 moved down into its horizontal position to the right.

Fig. 6 shows in section the position which the bearing part of member 14 then assumes. Fig. 7 differs from Fig. 6 only by a somewhat simpler circular shape of the smaller suction mouth. The member 14 of Fig. 7 is forced down towards the opposite side as compared with Fig. 6. From both figures it is, however, obvious, even in this position of the connecting member, that is with the handle horizontal adjacent to the floor, that the suction opening of the suction nozzle body which is turned upwardly is still ineffective, being closed relatively to connecting member 14 or to suction pipe 21 and that communication is established between the hollow handle and only the other suction opening. While a special connecting member 14 has been shown in all the drawings, it is obvious that alternatively the lower end of the suction tube 21 can be correspondingly constructed so that the nozzle body may be rotatably mounted directly thereon.

The rotational supporting of the suction nozzle body on the intermediate connecting member or, as abovementioned, on the suction tube, can obviously be effected in various manners. For example, socket 18, shown in Fig. 5, which may consist of bakelite or a suitable bearing metal, may be entirely omitted. Further, instead of the rib for preventing the suction nozzle body being withdrawn from connecting member 14, other equivalent devices can be used, and it may be of advantage to support the suction nozzle body in order to allow an easy rotational movement by means of a ball or like bearing provided on connecting member 14 or on suction tube 21.

An alternative mounting of the nozzle body on member 14 may be obtained by making the nozzle body to have a sliding fit on said member and pushing the nozzle body thereon from the front where it is held in position by means of springs, the ends of which may rotate in a groove or the like formed in connecting member 14. Further, instead of the special mass 16, shown in Fig. 2, one of the lateral legs or branches of the large suction mouth 12 may obviously be formed heavier than the other during manufacture.

Any desired number of suction openings may be provided on the same suction nozzle instead of the two illustrated, which, on rotation of the suction nozzle, preferably in the described manner, are adapted to be brought successively into operative position. Preferably the floor contacting surface of the small nozzle is formed with small grooves or the like to facilitate the picking up of threads or the like, as shown in Fig. 6. The actual

construction of the nozzles, such as the size and shape of the suction openings, is unimportant, and the nozzles may be provided with any desired characteristic known feature.

On account of the rotatable movement of the suction nozzle body on the connecting member, small leaks may eventually result, through which undesired air flow will take place, so that it may be preferable under certain circumstances to provide intermediate packing layers or the like, which must obviously be so constructed that they do not offer any large resistance to the rotary movement of the nozzle body, in order that the nozzle, on being lifted up from the floor, can pivot freely.

Referring to the modifications shown in Figs. 9 to 12, it will be seen from Fig. 9 that the shank or branch of the nozzle body 11, located on the right, is longer than the left. The metal mass 16, provided in the nozzle of Fig. 1, may, therefore, if desired, be entirely dispensed with as the right hand branch will be inherently heavier than the left.

As in the previous constructions, the connecting member on which the nozzle body is rotatably mounted is denoted by 14, and the nozzle body comprises a large suction opening downwardly directed, in Fig. 9, and a small suction opening upwardly directed. On the front edge of the small suction opening grooves 23 (Fig. 12) are provided which serve for picking up threads or the like, and the arrangement of which, at this actual point has been found to be particularly advantageous.

The embodiments illustrated in Figs. 9–12 differ from those previously described only as far as concerns the location of the connecting member unsymmetrically of the nozzle body to form an unbalanced arrangement and the type of rotatable connection of the nozzle body on the connecting member 14. For this latter purpose, as can be seen from Fig. 10, a cap 24 is provided, which has a press fit over member 14 and is applied to the front of the said member or, alternatively, may be bent over to engage said member for holding purposes. The nozzle body is formed as a sliding fit over cap 24, and in turn is pushed on from the front. The free rotation of the nozzle body on said cap will, as shown in Fig. 10, be facilitated by the provision of a pin 25, centrally arranged in the end face 26 of the cap 24 and having one end formed as a nut 27 and the other end threaded to receive a nut 28 located within cap 24.

The embodiment shown in Fig. 11 differs from that of Fig. 10 only in the provision of a holding device constructed in the form of a ball snap catch, wherein the nozzle body is held in its desired operative position on member 14 by a spring 29 acting against a ball 30. This catch member may, if desired, be so formed as to be automatically released on lifting up the nozzle from the floor when an automatic rotary movement of the nozzle is desired, by lifting the same with a slight upward jerk instead of with a comparatively slow movement.

What I claim is:

1. In a device of the class described, a handle, a nozzle body rotatably mounted on said handle and having a plurality of angularly displaced suction openings, and means automatically causing a rotary movement of said nozzle body with respect to said handle on lifting said nozzle body from the floor by means of said handle.

2. In a device of the class described, a handle, and a nozzle body rotatably mounted on said handle and having a plurality of angularly disposed suction openings, said nozzle body comprising two laterally extending branches, said branches being unsymmetrical with respect to the axis of rotation of said nozzle body.

3. In a device of the class described, a handle, and a nozzle body rotatably mounted on said handle and having a plurality of angularly disposed suction openings, said nozzle body comprising two laterally extending branches of unequal weight.

4. In a device of the class described, a handle, and a nozzle body rotatably mounted on said handle and having a plurality of angularly disposed suction openings, said nozzle body comprising two laterally extending branches of unequal length.

5. In a device of the class described, a handle, a nozzle body rotatably mounted on said handle and having a plurality of angularly disposed suction openings, said nozzle body comprising two laterally extending branches, and a weight member secured to one of said branches.

6. In a device of the class described, a handle, a nozzle body rotatably mounted on said handle and having a plurality of angularly disposed suction openings, said nozzle body comprising two laterally extending branches of unequal length, and a weight member secured to the longer of said branches.

7. In a device of the class described, a handle, a nozzle body rotatably mounted on said handle and having a plurality of angularly displaced suction openings, means for preventing rotary movement of said nozzle body with respect to said handle, and means for overcoming said last mentioned means and for causing rotary movement of said nozzle body with respect to said handle on rapid lifting of the nozzle from the floor by means of said handle.

8. In a device of the class described, a handle, a nozzle body rotatably mounted on said handle and having a plurality of angularly displaced suction openings, and resilient

means for preventing rotary movement of said nozzle body with respect to said handle, said nozzle body comprising two laterally extending branches of unequal weight.

9. In a device of the class described, a hollow handle, and a nozzle body rotatably mounted on said handle and having a pair of oppositely disposed suction openings, said handle and said nozzle body being provided with cooperating openings for selectively establishing communication between said hollow handle and the respective suction openings upon rotation of said nozzle body through an angle of 180 degrees from a position of normal relationship of said handle to said body, said openings being so arranged that communication exists between said hollow handle and only one of said suction openings when said handle is rotated approximately 90 degrees from said position of normal relationship with said body.

10. In a device of the class described, a handle, and a nozzle body rotatably mounted on said handle and having a plurality of angularly disposed suction openings, said nozzle body comprising laterally extending branches, and said branches being unbalanced with respect to the axis of rotation of said nozzle body.

In testimony whereof I have affixed my signature.

LARS ELL.