March 15, 1955 L. J. FAITH-ELL 2,703,903

COMBINATION SUCTION CLEANER NOZZLE AND BRUSH MEMBER

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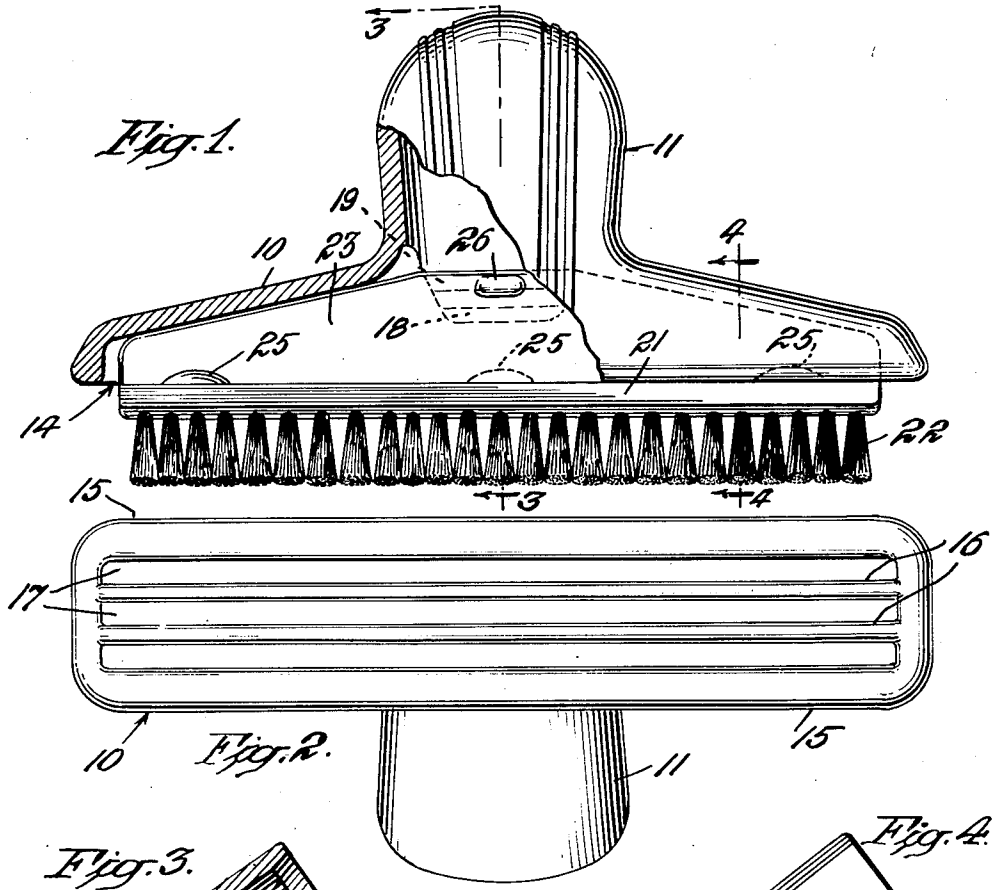


Fig. 1.

Fig. 2.

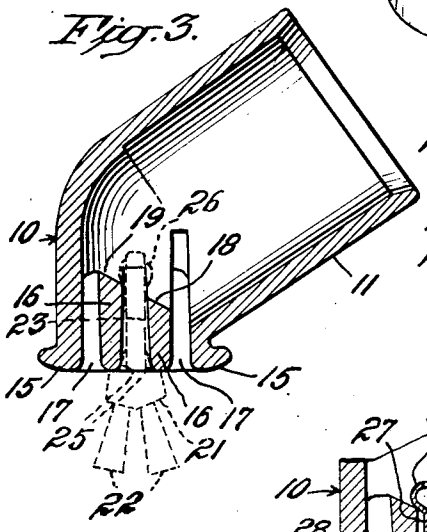


Fig. 3.

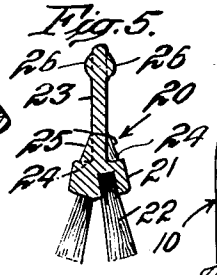


Fig. 5.

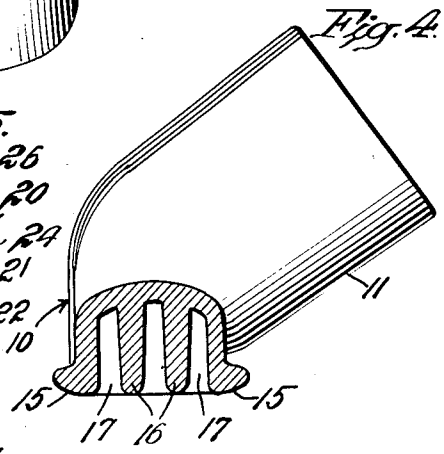


Fig. 4.

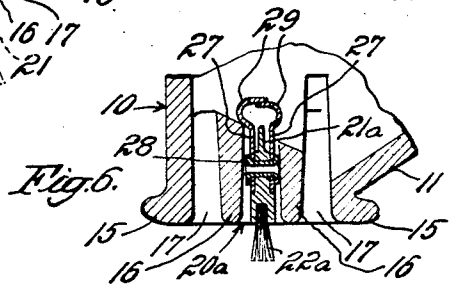


Fig. 6.

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COMBINATION SUCTION CLEANER NOZZLE AND BRUSH MEMBER

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Claims priority, application Switzerland December 22, 1949

5 Claims. (Cl. 15—365)

My invention relates to a combination suction cleaner nozzle and brush member. This application is a continuation-in-part of my application Serial No. 78,513, filed February 26, 1949.

It is an object of my invention to provide an improved suction cleaner nozzle and removable brush member therefor which can be positioned on the nozzle and removed therefrom with a minimum of effort, thereby providing a simple and convenient suction cleaner tool which can be conveniently employed for a variety of surface treating operations. I accomplish this by providing longitudinal ribs in the interior of a nozzle body to subdivide the latter into several passages at the vicinity of an elongated suction inlet opening, such passages essentially being the same in length as the inlet opening, and resiliently attaching a brush member to the nozzle body with the aid of one or more of the ribs.

Further objects and advantages of my invention will become apparent as the following description proceeds, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of my invention, reference may be had to the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a front elevation, partly in section, of a nozzle and removable brush member associated therewith illustrating an embodiment of the invention;

Fig. 2 is a bottom plan view of the nozzle shown in Fig. 1, the brush member being removed to illustrate details more clearly;

Fig. 3 is a transverse section taken on line 3—3 of Fig. 1;

Fig. 4 is a transverse section taken on line 4—4 of Fig. 1, the brush member being removed;

Fig. 5 is a transverse section of the brush member taken on line 3—3 of Fig. 1; and

Fig. 6 is a fragmentary transverse section similar to Fig. 3 illustrating another form of removable brush member embodying the invention.

Referring to the drawing, the nozzle and brush member combination for suction cleaners in Figs. 1 to 4 which I have shown embodying my invention comprises a hollow nozzle body **10** having a reduced annular portion **11** which serves as a connector or outlet socket adapted to be attached to a suction conduit of a vacuum cleaner and through which air is drawn when the nozzle is placed in operation.

The hollow interior of the body **10** provides a passage through which air is drawn toward the annular portion **11** from an elongated suction inlet opening **14** defined by surface engaging lips **15**. The body **10** may be formed of any suitable metal or synthetic resinous material, the surface engaging lips **15** being shaped to facilitate movement of the nozzle over a surface being cleaned or otherwise treated.

The hollow body **10** is provided with longitudinally disposed partitions or ribs **16** to subdivide the interior thereof into a plurality of channels or passages **17** extending between the suction inlet opening **14** and connector or outlet socket **11**, the ribs or partitions **16** extending longitudinally of the suction inlet opening **14** between the transverse end walls of the body **10**. The ribs **16** desirably are formed integrally with the hollow body **10** and may subdivide the interior of the latter into passages

17 which may be approximately the same in size. Each partition or rib **16** extends across the entire longitudinal dimension of the inlet opening **14** defined by the surface engaging lips **15**, the intermediate portions thereof adjacent the outlet socket **11** being recessed at **18** and **19** to establish communication between the channels or passages **17** so that the subdivided air streams flowing therethrough will merge before being drawn into the outlet socket **11**. As best shown in Fig. 3, it will be seen that the rib **16** nearer to the rear surface engaging lip **15** is formed with a notched or recessed portion **18** of greater depth than a recessed portion **19** of the rib adjacent to or nearer to the front engaging lip.

When nozzles like those just described and illustrated are attached to a suction conduit of a vacuum cleaner and moved over a surface to be cleaned, air is drawn into the nozzle at the suction inlet opening **14**. The air drawn into the ends of the suction inlet opening **14** flows through the passages or channels **17** in a direction substantially parallel to the ribs or partitions **16** and sweeps over the opposing surfaces thereof.

Since the ribs **16** extend in a direction which is transverse to the normal direction of movement of the nozzle over a surface being cleaned, the ribs are effectively utilized to loosen dust and other foreign matter tending to adhere to the surface. By providing recessed portions **18** and **19** on the ribs **16** at the region immediately in front of the inlet end of the outlet socket, the subdivided air streams passing through the channels or passages can merge before flowing through the outlet socket. In this way an enlarged space is provided at a region intermediate the ends of the nozzle through which threads can readily pass from the suction inlet opening **14** directly to the outlet socket **11**, and the likelihood of threads adhering to the ribs **16** is minimized.

In accordance with my invention the ribs or partitions **16** are desirably formed in such a manner that a brush member **20** may be removably secured thereto. The member **20** comprises a thicker central portion **21** having bristles **22** fixed thereto, and a backbone **23** which is essentially flat and formed so that it can be readily slipped into position between the ribs **16**, for example, as seen in Fig. 1 and diagrammatically indicated in Fig. 3.

At opposite sides of the backbone **23** the central portion **21** is formed with shoulders **24** which extend lengthwise the full length thereof and limit the extent of inward movement of the backbone within the channel or passage between the ribs **16**. Hence, the shoulders **24** essentially constitute the top surface of the central portion **21** and the backbone projects therefrom at a region between the sides of the central portion. In order to provide a snug fitting of the brush member **20** in the nozzle **10** several protuberances or bulges **25** are provided at the juncture of the central portion **21** and backbone **23**.

At the region the bulges **25** merge into the surfaces of the backbone **23** the bulges are rounded or curved, the thickness of the bulges being greatest at the shoulders **24**, as best seen in Figs. 1 and 5, respectively. Two bulges **25** are provided at regions near the end of the backbone **23** at one side thereof and a single bulge is provided at a central region of the backbone at the opposite side thereof, thereby providing more or less a three-point gripping of the brush member **20** when it is inserted into position within the nozzle body **10**. In order to hold the brush member **20** in the gripped position just described the top edge of the backbone at a central region thereof is formed with projections or catches **26** at both faces thereof. Irrespective of the manner in which the brush member is inserted into position between the ribs **16**, one of the projections or catches **26** overlies the top exposed edge of the rib formed with the recess **19** and adjacent to the front engaging lip **15**. When the ribs **16** are formed of a synthetic resinous material, such as that commercially known as "Bakelite," the ribs **16** are spaced apart a distance slightly less than the distance between the outer extremities of the projections **26**. The resiliency of the ribs **16** allows them to spread apart a sufficient distance as the brush member **20** is being inserted into position and, when one of the projections **26** passes over the top of the rib **16** having the recessed portion **19**, it more or less snaps or moves abruptly into its holding position. The thickness of the backbone **23**, except at

the region of the projections **27**, is such that it fits more or less loosely in the nozzle passage **17** so that, when removal of the brush member **20** from the nozzle body **10** is desired, the central portion **21** can be grasped with the fingers of one hand and readily removed from the nozzle body while the latter is being held by the other hand.

In Fig. 1 it will be noted that the top edge of the backbone **23** conforms to the shape of the interior of the nozzle body **10** and desirably is slightly shorter than the inlet opening **14** to facilitate insertion and removal of the brush member **20** into and from the nozzle body **10**.

In accord with the invention the brush member may be resiliently held in the nozzle body **10** in a variety of ways. For example, the brush member may be provided with one or more resilient clips or other fastening elements employed which are attached to the ribs for securely holding a brush member in position. Another form of the invention making use of resilient clips is shown in Fig. 6 for a brush member **20***a* having a central portion **21***a* to which bristles **22***a* are fixed, and a pair of spring clips **27** secured to the central portion **21***a* by a tubular rivet **28**. The spring clips **27** are formed with rounded outer end portions **29**, the extreme ends of which overlap and are in sliding relation.

When the brush member **20***a* is positioned in the middle channel or passage **17** the spring clips **27** move toward one another and, after the rounded outer end portions **29** clear the edges of the ribs **16** at the region of the recessed portions **18** and **19**, the spring clips move outwardly and resiliently hold the brush member **20***a* in position. It will be understood that in both of the embodiments described, the brush members **20** and **20***a* can be readily positioned in the hollow nozzle body **10** and removed therefrom without the use of tools, thereby facilitating the use of such a brush member when necessary.

In view of the foregoing, it will now be understood that the top edges of the ribs **16**, which are at the recessed portions **18** and **19** and removed from the suction inlet opening **14**, essentially form ledges and the protuberances **26** in Fig. 5 and rounded portions **29** of the spring clips **27** in Fig. 6 constitute catches which, when moved into the immediate vicinity of the ledges at the top edges of the ribs **16**, are automatically locked at such regions on the ribs **16**. The catches **26** in Fig. 5 and catches **29** in Fig. 6 overlie and project over the ledges at the top edges of the ribs **16** to physically restrain and hold the brush member **20** in position on the nozzle body **10**. Stated another way, the ledges at the top edges of the ribs **16** are operable to restrain uninhibited separating movement of the brush member from the nozzle body **10** and are in the path of movement of the catches **26** of Fig. 5 and rounded clip portions **29** of Fig. 6 when movement is initially imparted to the brush member to separate the latter from the nozzle body.

Further, the ledges at the top edges of the ribs **16** are rendered ineffective to restrain separation of the brush member from the nozzle body and permit such separation when sufficient separating force is applied to such parts. In the embodiment of Figs. 1 to 5 the ribs **16** or internal partitions of the nozzle body are capable of yielding and moving transversely to the direction in which they extend, thus allowing the catches **26** to pass through the gap **17** between adjacent ribs **16** in the act of moving the catches toward and from their brush holding position at the top exposed regions of the ribs **16**. In the embodiment of Fig. 6 the rounded spring clip portions **29** are capable of yielding and moving transversely to the direction of the ribs **16** when mounting the brush on the nozzle body and removing the brush therefrom.

While I have shown several embodiments of my improved combination suction cleaner nozzle and brush member, I do not wish to be limited to the particular constructions set forth. For example, the brush member **20** may be positioned in the passage **17** formed between the rib **16** having the recessed portion **18** and the rear wall or trailing edge of the nozzle body **10** which defines the rear surface engaging lip. In such case the brush member **20** is loosely held in position because the projections **26** are too far removed from the central portion **21**. However, even in such position the brush member **20** is held and supported on the nozzle body and may be effectively used for certain surface treating operations. It may be desirable in certain instances to provide several brush members each having projections **26** located at the proper distance from the central portion **21** so that one brush member can be used in the middle passage **17** and another in the rear passage of the nozzle body **10**. Therefore, I intend in the following claims to cover all changes and modifications which do not depart from the spirit and scope of my invention.

What is claimed is:

1. A suction cleaner nozzle comprising a hollow body provided with an elongated suction inlet opening and an outlet socket spaced therefrom through which air is withdrawn, longitudinal rib means in said body at the suction inlet opening to subdivide the latter into several passages, said rib means having surface portions within said hollow body forming ledge means, an elongated brush member including a backbone, holding means for removably holding said brush member in position on said nozzle body at the vicinity of the elongated inlet opening, said last-mentioned means comprising one or more protuberances on said backbone forming catch means which overlie and project over said ledge means of said rib means to physically restrain and hold said brush member when the latter is positioned in said hollow body with said backbone in one of said passages, said backbone at the region which includes said protuberance or protuberances being thicker than the width of the gap in said one passage at the immediate vicinity of the ledge means, and said rib means being movable, when said brush member is separated and withdrawn from said body, to increase the width of the gap in said one passage at the immediate vicinity of said ledge means sufficiently to render said catch means ineffective to physically restrain and hold said brush member in position on said body.

2. The suction cleaner nozzle structure set forth in claim 1 in which said rib means comprises a partition which defines a longitudinal wall of said one passage and is resilient and will yieldingly move from its normal position in a direction from the opposite longitudinal wall of said one passage, when said brush member is separated and withdrawn from said body, to increase the width of the gap in said one passage at the immediate vicinity of said ledge means to render said catch means ineffective to physically restrain and hold said brush member in position on said body.

3. The suction cleaner nozzle structure set forth in claim 1 in which said rib means includes a parir of ribs or partitions in spaced apart relation which define said one passage, each of said partitions being resilient and capable of flexing from its normal position in a direction from the other partition, when said brush member is separated and withdrawn from said body, to increase the width of the gap in said one passage at the immediate vicinity of said ledge means to render said catch means ineffective to physically restrain and hold said brush member in position on said body.

4. The suction cleaner nozzle structure set forth in claim 1 in which said backbone includes several protuberances, in addition to said protuberance or protuberances forming said catch means adapted to overlie and project over said ledge means, which are arranged to bear against at least one wall of said one passage immediately adjacent the elongated inlet opening to provide a snug and stable position for said brush member on said nozzle body when held in position thereon.

5. A suction cleaner nozzle comprising a hollow body provided with an elongated suction inlet opening and an outlet socket through which air is withdrawn, said body having spaced apart elongated side walls defining the leading and trailing edges of the suction inlet opening and shorter end walls connecting the side walls, partitioning in said body at the vicinity of the suction inlet opening to subdivide the latter into several passages extending lengthwise of said side walls, said partitioning at a region within said body having a ledge, an elongated brush member including a backbone, a catch forming a unitary part of said backbone, said catch overlying and projecting over the ledge of said partitioning to physically restrain and hold said brush member when the latter is positioned on said hollow body with said backbone in one of the passages therein, said backbone at the region which includes said catch being thicker than the width of the gap between the opposing faces of said one passage at the immediate vicinity of said ledge and into which passage said backbone is inserted for said catch to

overlie and project over the ledge of said partitioning, said catch and said ledge constituting means to detachably hold said brush member on said hollow body, and said partitioning being movable in a direction normal and transverse to the elongated direction of said suction inlet opening to allow said catch to pass through said one passage in the act of moving said catch toward and from its brush holding position.

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