July 8, 1958 S. F. LACHOWICZ 2,841,812

TANK TYPE VACUUM CLEANER NOZZLE

Filed March 23, 1956

FIG. 1

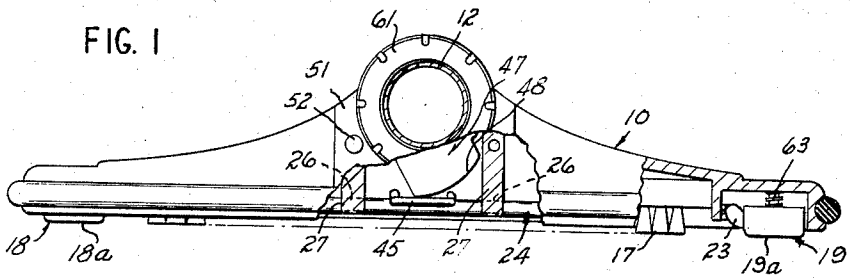


FIG. 2

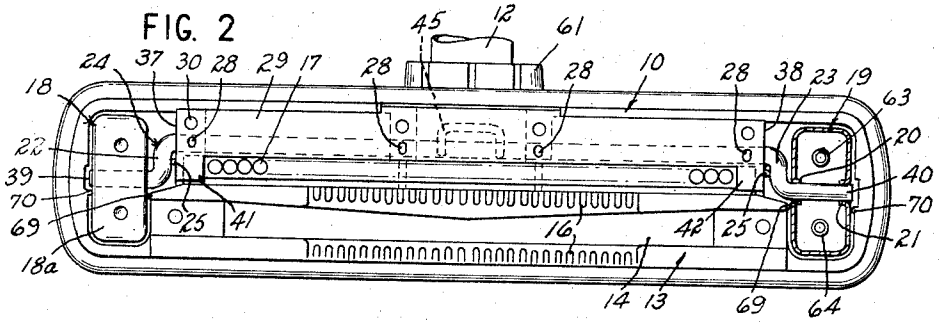
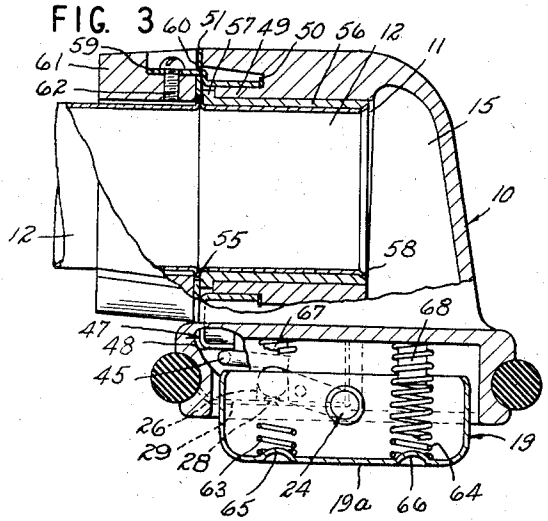


FIG. 3



INVENTOR.
STANLEY F. LACHOWICZ

BY

Lindsey and Prutzman

ATTORNEYS

United States Patent Office

2,841,812

Patented July 8, 1958

2,841,812

TANK TYPE VACUUM CLEANER NOZZLE

Stanley F. Lachowicz, New Britain, Conn., assignor to Landers, Frary & Clark, New Britain, Conn., a corporation of Connecticut

Application March 23, 1956, Serial No. 573,396

5 Claims. (Cl. 15—355)

This invention relates to vacuum cleaner nozzles and more particularly to a nozzle attachment for use with a tank type cleaner having a novel and improved arrangement for adjusting the height of the nozzle relative to a surface to be cleaned.

It has been found that the usual rug cleaning nozzles associated with tank type vacuum cleaners, if designed to produce satisfactory suction on short pile rugs will become choked when used on a deep pile rug with the result that the nozzle is locked to the rug by the suction of the cleaner, thus seriously impeding and even preventing manipulation of the nozzle. Conversely, when the nozzle is designed to prevent choking on deep pile rugs, the nozzle is inadequate for use with short pile rugs. Accordingly, many attempts have been made to provide a nozzle which can be adjusted for use on deep, as well as short pile rugs. The devices developed, however, have been for the most part complex, quite often requiring a plurality of individual adjustments to obtain proper setting of the nozzle, and further, in many cases, because of the structure employed, resulted in an undesirable reduction in the cleaning capabilities of the nozzle.

It is therefore the purpose of this invention to provide a novel and improved means of varying the height of a vacuum cleaner nozzle relative to a surface being cleaned while retaining the optimum cleaning capabilities of the nozzle.

It is another purpose of this invention to provide a nozzle of the type described wherein the adjustment of the nozzle height may be accomplished by an exceedingly simple operation by the user.

Other objects will be in part obvious, and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Fig. 1 is a rear elevation of a vacuum cleaner nozzle incorporating the present invention with a portion of the nozzle cut away to illustrate certain of the elements of the inveniton;

Fig. 2 is a bottom view of the nozzle of Fig. 1; and

Fig. 3 is an enlarged side view of the nozzle of Fig. 1 with a portion of the nozzle in cross section and including fragmentary side view of a member assembled with the nozzle which is adapted to receive a vacuum cleaner wand.

The present invention is intended for use with a rug cleaning nozzle of a tank type cleaner wherein the nozzle is mounted on the end of an elongated wand. Accordingly, the drawings and following description are based on the use of the invention in combination with such a nozzle.

With reference to the drawings and particularly Fig. 3, a nozzle constructed in accordance with the invention is comprised of a transversely elongated hollow body member **10** having a rearwardly directed internal air passage **11** adapted to receive one end of a wand connector **12** which in turn is adapted to be connected at its outer end to one end of a vacuum cleaner wand (not shown). A nozzle plate member **13** as best shown in Fig. 2 is mounted to the bottom of the nozzle body **10** and is provided with a suction slot **14** which provides for the admission of air into an internal vertically arranged cavity **15** in the nozzle body which, as can be seen in Fig. 3, communicates with the rearwardly directed air passage **11**. The plate member **13** is provided with two parallel rows of combing teeth **16** with the individual teeth extending transversely of the nozzle plate **13**. A brush **17** is also mounted within the nozzle rearwardly of the nozzle plate **13** and extends generally parallel to the suction slot **14** with the bristles thereof extending downwardly of the nozzle for engagement with a rug to loosen the dirt therein for removal by the suction air drawn through the nozzle.

In accordance with the invention, a pair of nozzle supporting shoe members **18** and **19** are disposed within the nozzle at each transverse end thereof. The shoe members are generally in the form of a rectilinear cup-like member with the top thereof open and are respectively provided with bearing surfaces **18***a* and **19***a* which are sufficiently large in area to preclude any gouging or marring of the rug by the shoe members and further, to provide easy manipulation of the nozzle. The control shaft **24** is disposed internally of the nozzle and is pivotally journaled in recesses such as **26** provided in the bottom edges of vertical ribs such as **27** of the nozzle. The shaft **24** is retained within the recesses **26** by means of upwardly struck projections such as **28** on a cover plate **29** which is mounted to the bottom of the nozzle by means such as screw **30**. As can be seen from Figs. 2 and 3, the shaft **24** is provided with crank arms **22** and **23** at the ends thereof, and the crank arms are provided at their outer ends with crank pins **39** and **40**, respectively, on which the shoe members are pivotally mounted intermediate their ends as at **20**, **21** in the case of shoe member **19**. The shaft **24** is restricted in any longitudinal movement thereof by projections such as **25** provided on vertical ribs **37**, **38** of the nozzle body which engage the crank arms **22** and **23** of the shaft.

As can be seen in Fig. 2, the cover plate **29** is provided with a pair of ears **41**, **42** which extend under the brush **17** to retain the brush within the nozzle. The brush is normally resiliently maintained in engagement with the ears **41** and **42** by means of a leaf spring (not shown) which is disposed between and engages the top of the brush and a portion of the nozzle body. The brush is thus automatically adjustable by any application of an upwardly directed force to the bristles thereof between an upper limit wherein the brush engages the upper wall of the nozzle body as illustrated in Fig. 1 and a lower portion wherein the bottom of the brush body would engage the ears **41**, **42** of the cover plate.

The control shaft **24** is provided with a follower **45** which is attached to the shaft intermediate its ends by any suitable means such as welding and extends generally radially of the shaft whereby if a downwardly directed force is applied to the follower, the shaft **24** will be rotated in a counterclockwise direction as viewed in Fig. 3.

Associated with the follower is a cam **47** having an arcuate cam surface **48**. The cam **47** is rotatably mounted on an annular rearwardly extending flange **49** centrally located on the nozzle body with a washer-like spring **50** mounted on the flange **49** and disposed between the cam and the nozzle body to impede the rotation of the cam and thus tend to retain the cam in any desired rotated position. The cam **47** is retained on the nozzle and in engagement with the spring **50** by means of a cam retaining plate **51** secured to the rear of the nozzle body by means

such as screw **52** which extends through the plate for engagement with one of the vertical ribs such as **27**. The cam retaining plate also retains a sleeve **56** within the air passage **11** by engagement with an annular flange **57** on one end of the sleeve. The wand connector **12** is received within the sleeve **56** and is turned or spun over the end of the sleeve as at **58** and provided with an annular bead **55** which engages the flange **57** of the sleeve so that in effect the cam retaining plate retains the wand connector within the nozzle.

The cam **47** is provided with rearwardly directed arms such as **59** which extend through slots **60** in the cam retaining plate **51**, the rotation of the cam being limited by the length of the slots **60**. A knob or control wheel **61** is mounted on the arms **59** of the cam and connected thereto by means such as screws **62** whereby rotation of the control wheel **61** will rotate the cam **47** which in turn will result in a rotation of the control shaft **24**.

This rotation of the control shaft **24** will, of course, result in a vertical movement of the outer ends of the crank arms **22**, **23**, which vertical movement is transferred to the shoe members **18** and **19** to vary the extension thereof below the nozzle body. In order to maintain the cam follower **45** in engagement with the cam surface **48**, and for other reasons to be more fully explained, a pair of coil springs **63** and **64** are in accordance with the invention associated with each of the shoe members. As can be seen in Fig. 3, the springs **63** and **64** are each mounted at one end on upwardly struck projections or dimples **65**, **66** of the shoe member and at the other end on depending lugs **67**, **68** on the nozzle body. The springs **63**, **64** are preferably of equal strength and serve to urge the shoe members in opposite directions about their pivotal axis in order to maintain the bearing surfaces **18***a* and **19***a* of the shoes parallel with the bottom plane of the nozzle. As will be later apparent it is further preferred that the springs **63**, **64** be sufficiently light in force to permit limited pivotal movement of the shoe members as a result of and during normal use of the nozzle.

Projections such as **69** and **70** are provided on the nozzle housing for engagement with the vertical sides of the shoe members to maintain the shoe members in substantial alignment and prevent their being canted within the nozzle whereby adjustment and pivotal movement thereof might be impaired.

From the above it can be seen that during the normal operation of the nozzle the weight of the nozzle is supported on the bearing surfaces **18***a*, **19***a* of the shoe members and that if it is desired to vary the height of the nozzle plate **13** relative to the bearing surface of the shoe members, it is merely necessary to, far example, rotate the control wheel **61** in a counterclockwise direction as viewed in Fig. 1 whereby the control shaft **24** will be rotated in a counterclockwise direction as viewed in Fig. 3, resulting in an upward movement of the outer ends of the crank arms **22**, **23** of the control shaft and thus the shoe members **18** and **19**. Conversely if it is desired to increase the vertical distance between the nozzle plate and the bearing surfaces of the shoe members, it is merely necessary to rotate the control wheel in a clockwise direction to permit the springs **63** and **64** to urge the shoe members downwardly to an extent permitted by the cam surface **48**. As can be seen, the adjustment of the shoe members which are located at the extreme transverse ends of the nozzle is controlled by a single member located centrally of the nozzle for ease of adjustment and the operator is assured that by a simple manipulation of this control member both shoe members will be accurately adjusted as desired and that each shoe member will be adjusted an equal amount relative to the other.

It is to be noted that in the use of a nozzle constructed in accordance with this invention there is permitted a certain amount of pivotal movement of the shoe members relative to the nozzle housing which enhances the cleaning capabilities of the nozzle, particularly when the shoe members are in their lowermost adjusted position as when used with a deep pile rug. In a normal use of the nozzle with the operator moving the nozzle forwardly or to the right as viewed in Fig. 3, the shoe members will be tilted downwardly relative to the nozzle at their forward ends and upwardly at their rearward ends or in other words in a clockwise direction relative to the nozzle. Conversely, on the movement of the nozzle rearwardly or to the left as viewed in Fig. 3, the shoe members will be pivoted in a counterclockwise direction. This pivotal movement of the shoe members provides for easier manipulation of the nozzle, and further, as can be seen from the above description on the forward movement of the nozzle, the dirt-loosening operation of the brush **17** is improved inasmuch as this portion of the nozzle is at that time moved downwardly relative to the rug.

Thus, it can be seen that there has been provided a rug cleaning nozzle of novel construction which will provide efficient cleaning of deep pile, as well as short pile rugs and wherein the adjustment necessary to vary the height of the nozzle relative to the rug is simple while assuring accurate adjustment and automatic equalizing of the adjustment of the shoe members relative to each other.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

1. In a vacuum cleaner nozzle assembly, a transversely elongated hollow nozzle housing having a bottom surface provided with an elongated aperture for the passage of suction air into the nozzle, an elongated shaft disposed longitudinally of the aperture and within the nozzle housing and provided with a crank arm at each end, a shoe member associated with each crank arm disposed at each transverse end of the nozzle housing and having a bearing surface disposed below the bottom surface of the nozzle housing adapted to slide over the surface being cleaned, the shoe members each being pivotally connected intermediate the ends thereof to the outer end of its associated crank arm for vertical movement relative to the nozzle housing in response to rotation of the shaft, means resiliently urging each of the shoes in opposite directions about its pivotal axis, and means disposed centrally of the nozzle housing to selectively rotate the shaft.

2. In a vacuum cleaner nozzle assembly, a transversely elongated hollow nozzle housing having a bottom surface provided with an elongated aperture for the passage of suction air into the nozzle, a crank arm pivotally mounted within the nozzle housing adjacent each transverse end thereof and disposed generally transversely of said aperture for vertical movement of one end thereof relative to the nozzle housing, a shoe member associated with each crank arm disposed at each transverse end of the nozzle housing and having a wide bearing surface spaced vertically from the bottom surface of the nozzle to support the nozzle on a surface to be cleaned, the shoe members being pivotally connected intermediate the ends thereof to said one end of an associated crank arm for vertical movement relative to the nozzle housing with said one end of the crank arm and for pivotal movement about an axis parallel to the transverse axis of the nozzle housing, spring means resiliently tending to maintain said bearing surface of the shoe members in substantial alignment with the bottom surface of the nozzle housing, and manually movable means on the nozzle housing to rotate

the crank arms to vary the vertical spacing of the bearing surfaces of the shoe members and said bottom surface.

3. In a vacuum cleaner nozzle assembly, a transversely elongated hollow nozzle housing having a bottom surface provided with an aperture for the passage of suction air into the nozzle, an elongated shaft disposed longitudinally of the aperture and within the nozzle housing and provided with a crank arm at each end, a shoe member disposed at each transverse end of the nozzle housing and pivotally connected intermediate its ends to the outer end of each crank arm for vertical movement relative to the nozzle housing, each shoe member being provided with a wide substantially flat bearing surface disposed below the bottom surface of said housing, equalizing spring means urging each of the shoe members in opposite directions about its pivotal axis and tending to resiliently maintain said bearing surface in substantial alignment with said bottom surface, a follower member on the shaft, and a manually movable cam mounted on the nozzle housing and cooperating with the follower member on the shaft to selectively rotate said shaft to vary the vertical disposition of the bearing surfaces of the shoe members relative to said bottom surface.

4. In a vacuum cleaner nozzle assembly, a transversely elongated hollow nozzle housing having a bottom surface provided with an aperture for the passage of suction air into the nozzle, a cam disposed centrally of and rotatably mounted on the nozzle housing, a control wheel connected to said cam for rotation therewith, a shaft extending longitudinally of the aperture and received within the nozzle housing for pivotal movement about its longitudinal axis, a cam follower extending radially of said shaft for engagement with said cam, said shaft provided with a crank arm at both ends, a shoe member connected intermediate the ends thereof to the outer end of each of the crank arms for limited pivotal movement about an axis parallel to the transverse axis of said nozzle housing, each shoe member having a wide flat bearing surface to support the nozzle relative to a surface to be cleaned, and a pair of springs associated with each shoe member and engaged therewith and with the nozzle housing to urge the shoe member in opposite directions

about the pivotal axis thereof and to urge the shoe member vertically relative to the nozzle housing in a direction to urge the said cam follower into operative engagement with the cam.

5. In a vacuum cleaner nozzle assembly, a transversely elongated hollow nozzle housing having a bottom surface provided with an elongated aperture for the passage of suction air into the nozzle, a rearwardly extending annular flange centrally disposed on the nozzle body and forming an aperture for the passage of suction air from the nozzle, a cam rotatably mounted on said annular flange and having a rearwardly extending arm, said cam having a cam surface disposed radially of said annular flange, a control wheel connected to the arm of said cam for rotation therewith, a plurality of vertically disposed ribs within the nozzle housing, extending transversely of the aperture in said bottom surface and each provided with a recess in the bottom edge thereof, a shaft extending longitudinally of the aperture and pivotally received within the recesses in said ribs, a cam follower extending radially of said shaft for engagement with said cam, a crank arm at each end of said shaft, a crank pin extending from the outer end of each crank arm parallel to said shaft, a rectilinear shoe member mounted intermediate the end thereof on each of the crank pins, each shoe member being mounted for limited pivotal movement relative to the nozzle housing and transversely of said aperture and each having a bottom bearing surface to support the nozzle relative to a surface to be cleaned, and a pair of coil springs associated with each shoe member engaged with the nozzle housing and the shoe member to urge the shoe member in opposite directions about its pivotal axis.

References Cited in the file of this patent

UNITED STATES PATENTS

2,421,661	Taylor	June 3, 1947
2,682,682	Lewyt et al.	July 6, 1954

FOREIGN PATENTS

278,261	Switzerland	Jan. 3, 1952
687,545	Great Britain	Feb. 18, 1953