Oct. 18, 1960 D. I. DOYLE 2,956,734

VACUUM CLEANER HEAD ASSEMBLY

Filed Aug. 27, 1953

FIG. 2

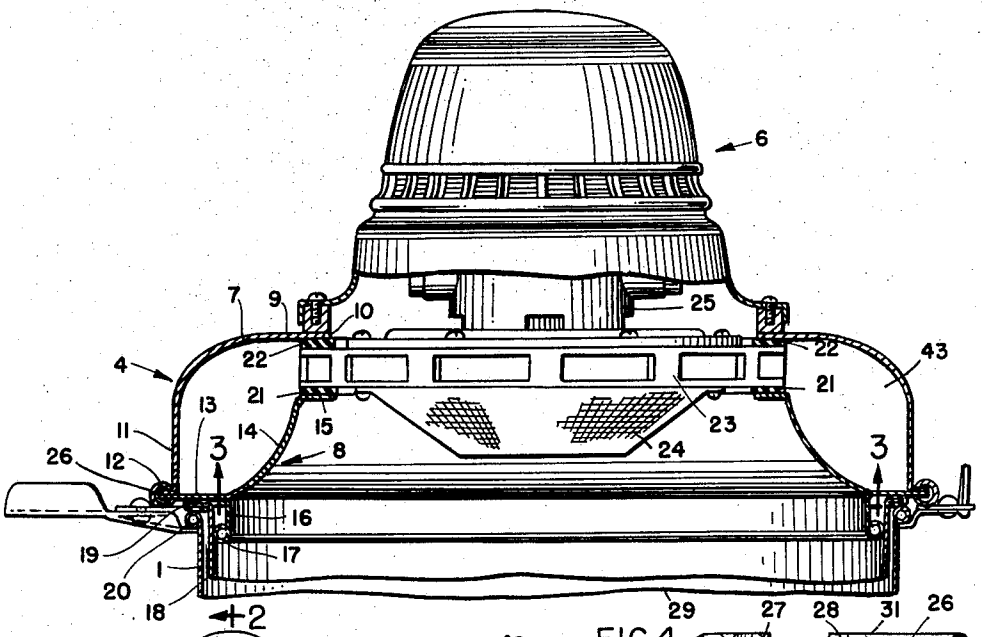


FIG. 1

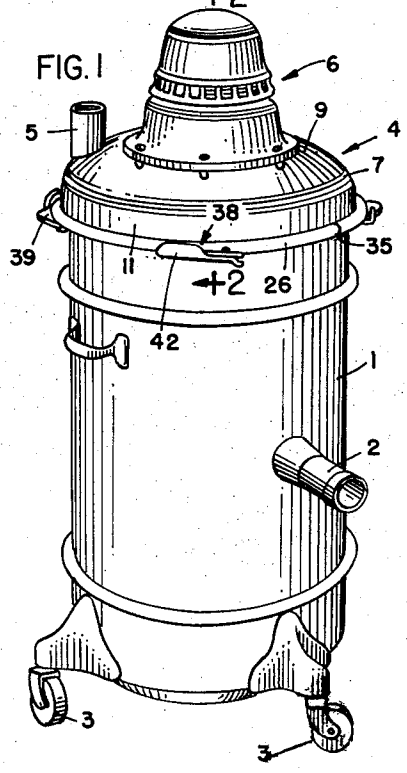


FIG. 4

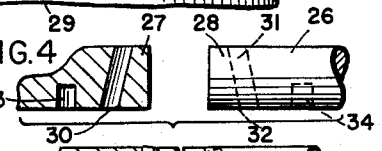


FIG. 5

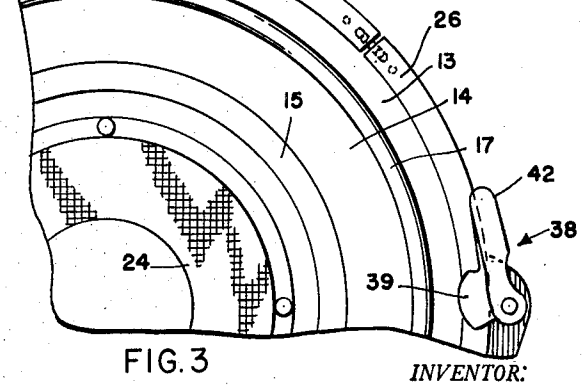


FIG. 3

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VACUUM CLEANER HEAD ASSEMBLY

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5 Claims. (Cl. 230—133)

This invention relates in general to tank type vacuum cleaners and is particularly directed to an improved structure of head assembly which is designed to be removably mounted at the upper open end of the tank and permit quick and easy access to the interior of the tank.

One of the main disadvantages in tank type vacuum cleaners heretofore on the market has been the difficulty in disassembling the various parts to obtain access to the interior of the tank. The motor for driving the fan wheel which creates the vacuum is customarily mounted at the upper end of the vertically positioned tank and it must be assembled with respect to the remainder of the structure in such a manner that the entire assembly, including the motor and the means for mounting it, may be able to be lifted upwardly and removed from the tank. At the same time there must be suitable means for securely fastening the head assembly to the tank during use of the machine.

It is therefore one of the principal objects of the present invention to provide a head assembly for tank type vacuum cleaners which may be quickly and easily removed from the tank and yet which may also be securely fastened to the tank when the vacuum cleaner is in use.

Another object of the invention is to provide a head assembly for a tank type vacuum cleaner which includes mounting means for the fan wheel housing from which the motor and fan wheel may be disassembled and which also includes a novel arrangement of parts which cooperate to enable the head assembly to be securely fixed to the tank during operation of the machine and which may be quickly and easily removed therefrom when desired.

A further and more specific object of the invention is to provide a head assembly which includes generally a dome member and a plate member which have clamped therebetween the fan wheel housing and which themselves are secured together so that the entire assembly may be applied to and removed from the vacuum cleaner tank.

Still another object of the invention is to provide a head assembly for a tank type vacuum cleaner wherein a dome member and a plate member have matching flanges at their outer peripheral edges and wherein a clinch ring is adapted to secure the two members together as a unitary assembly.

A still further object of the invention is to provide a head assembly for a tank type vacuum cleaner wherein a dome member and a plate member are secured together by means of a clinch ring and wherein the clinch ring has mounted thereon suitable clamping elements for removably mounting the head assembly on the open upper end of the tank body.

Still another object of the invention is to provide a head assembly wherein a clinch ring is adapted to secure together a dome member and a plate member which also have clamped therebetween a fan wheel housing thus enabling the entire assembly to be removed from or applied to the open upper end of the vacuum cleaner tank.

Other objects and advantages of the invention will become apparent upon reading the following description

taken in conjunction with the accompanying drawing in which:

Fig. 1 is a perspective view of a tank type vacuum cleaner embodying the present invention;

Fig. 2 is an enlarged vertical sectional view through the head assembly and taken along the plane of line 2—2 of Fig. 1;

Fig. 3 is a fragmentary under plan view of the assembly taken along the plane of line 3—3 of Fig. 2;

Fig. 4 is a fragmentary elevational view partly in section of the clinch ring in open position; and

Fig. 5 is a view similar to Fig. 4 but showing the clinch ring in its closed position.

Referring now more particularly to the drawing and especially to Figs. 1 and 2, there is illustrated a form of tank type vacuum cleaner to which the present invention is particularly applicable and which includes a tank body 1 having an air inlet opening 2 protruding therefrom and to which a hose may be attached for the suction of air from the atmosphere. If desired, the entire machine may be made mobile by mounting castors 3 at the bottom thereof.

The head assembly at the upper part of the tank is indicated generally by the numeral 4 and may have extending therefrom an air outlet opening 5. The motor shroud assembly is indicated generally at 6 and is located above the head assembly and may be removably mounted thereon. The details of the motor shroud assembly form no part of the present invention, but for a further understanding thereof reference is made to my copending application, Serial No. 376,841, filed August 27, 1953, now Patent No. 2,798,973.

The head assembly embodying the present invention consists essentially of two main members. The outer member may be termed a dome and is indicated by the numeral 7 and the inner member may be termed a top plate which is indicated generally by the numeral 8 in Fig. 2. The dome 7 has a substantially flat upper surface with a centrally disposed opening therethrough, which opening is defined by the edges 10 in the flat portion 9. The dome member then extends downwardly to form the peripheral sides 11 and terminates at its lower edge in an outwardly extending annular flange 12.

The plate member 8 includes an annular edge portion or flange 13 which when assembled with the dome abuts the under side of the flange 12. The inner edge of the annular flange 13 then extends in a generally inwardly and upwardly direction, as indicated at 14, and then terminates in an inwardly extending annular flange 15. This plate 8 also includes another annular flange member 16 which extends downwardly from the juncture of the two parts 13 and 14 and which terminates in a curled edge portion 17.

Some tank type vacuum cleaners utilize an external dust bag and others employ an internal dust bag for filtering the dust from the air before the air is permitted to return to the atmosphere. The present invention is adapted for use with either type of vacuum cleaner but, for purposes of illustration only, the invention has been shown herein as employing a dust bag disposed within the tank 1. The dust bag is indicated in Fig. 2 by the numeral 18 and is provided at its upper peripheral edge with an outwardly extending annular flange 19 adapted to rest upon the curled upper edge 20 of the tank body 1.

It is thus seen that the dust bag 18 rests upon the upper edge of the tank body and the head assembly is adapted to rest upon the outwardly extending flange 19 of the dust bag. If desired, the flange 19 may be covered with a suitable resilient material to aid in reducing noise and to prevent metal-to-metal contact.

The annular flange 15 formed as a part of the plate member 8 is preferably provided with a ring of resilient

sealing material, such as rubber or the like, as shown at 21. Likewise, a similar resilient sealing ring 22 may be applied to the under side of the dome 4 adjacent the edge 10 of the opening in the top surface thereof. The fan wheel housing 23 may then be received between the resilient sealing rings 21 and 22 and clamped therebetween so that any vibration which might occur during the operation of the machine, and which may be caused by the motor or fan wheel, will be absorbed by this resilient mounting means for the fan wheel housing.

The fan wheel housing 23 may have associated therewith a stabilizing unit 24. The details of the fan wheel, its housing, and stabilizing unit form no part of the present invention, but a more clear understanding as to the functioning of these parts may be had by reference to my earlier filed copending application, Serial No. 342,521, filed March 16, 1953, now Patent No. 2,778,563.

The fan wheel motor is mounted within an upright housing 25 which in turn is secured to the upper side of the fan wheel housing 23.

Suitable securing means are provided for fastening together the dome 4 and the plate 8 to form a unit thereof. In the present invention the clinch ring 26 having an annular groove around the inner side thereof is adapted to receive the two abutting flanges 12 and 13 of the dome and plate members respectively. When this clinch ring 26 is in position and locked, it securely holds the dome and plate together so that these members together with all of the other parts mounted thereon may be lifted as a unit from the tank body 1.

A novel form of fastening means has been designed for use with the clinch ring 26 to secure the two ends thereof in abutting relation, in which position the ring will effectively clamp and retain the dome 4 and the plate 8 in assembled relation. Figs. 4 and 5 illustrate this fastening means more clearly where it will be seen that the ring 26 is split to provide the ends 27 and 28 which are normally held in spaced relation by the inherent tension in the ring. An opening 29 is formed adjacent the end 27 entirely through the ring and is inclined upwardly or inwardly toward the end 27 of the ring. One side of the opening 29 at its lower end is preferably cut away, as at 30, for a purpose which will be presently disclosed.

A similar opening 31 is provided adjacent the end 28 of the ring and has a like cut away portion 32 at its lower end so that the two openings 29 and 31 are similar in size and shape and slope toward each other at their upper ends.

Each end 27 and 28 of the ring is also provided with openings 33 and 34, but these latter openings need not extend entirely through the ring. The openings 33 and 34 are adapted to receive a suitable tool which may be operated to force the two ends of the ring together to the position shown in Fig. 5. When the two ends 27 and 28 are thus brought together, a wire fastening element 35 may be inserted within the openings 29 and 31. Thus, one end 36 of the fastener 35 may be received within the opening 29 and the other end 37 thereof may be received in the opening 31. The remainder of the fastener will span the distance between the lower ends of the openings 29 and 31 and the cut away portions 30 and 32 will permit the under side of the fastener to bear snugly against the under side of the ring 26.

It will thus be seen that in initially assembling the head assembly the dome 4 and plate 8 are brought together so that their respective flanges 12 and 13 will be in abutting relation, in which position the fan wheel housing will also be clamped between the two members within the resilient mounting rings 21 and 22. The clinch ring 26 is then applied so that the annular groove therein will receive the two flanges 12 and 13. The clinch ring is then operated upon to close the free ends thereof, as shown in Figs. 4 and 5, whereupon the fastening wire 35 will be inserted in the openings 29 and 31 and thus retain the ring 26 in its clinching position. Since the motor shroud assembly and motor are all mounted on the dome 4, it will be evident that all of the parts may be removed from or applied to the tank body when the head assembly is removed or set in place thereon.

Suitable means are also provided to secure the head assembly in place on the tank body while the machine is in use. For this reason, clamping members 38 are mounted in spaced relation on the under side of clinch ring 26. Each clamping member includes a plate 39 welded or otherwise secured to the underside of the ring 26 and a clamping element 40 pivotally mounted on the plate 39. The clamping element has associated therewith a wedge portion 41 and a handle 42 so that when the head assembly is in position on the upper end of the tank body 1, as shown in Fig. 2, the handle 42 of the clamping member 40 may be rotated to bring the wedge 41 into position immediately below and in contact with the rolled or curled edge 20 of the tank body 1. Manipulating the clamping members in this way rigidly secures the head assembly to the tank body and yet simplifies the procedure of removing the head assembly since it becomes necessary only to release the several clamping members to bring the wedge 41 out from under the curled edge 20, whereupon the entire assembly may be lifted upwardly and removed from the tank body. This is done whenever it is desired to reach the interior of the tank body for cleaning the tank or removing and cleaning the filter bag therein.

The clinch ring and the clamping members associated therewith enable the head assembly to be mounted on the tank body with a relatively high compression therebetween on a resilient mounting and yet only limited manual action is necessary either to secure the head assembly in place or to release it for removal.

The annular passage 43 formed between the dome member 4 and the plate 8 provides an air passage to direct the filtered air back to the atmosphere. That is to say, when the fan wheel within the housing 23 draws air inwardly from the atmosphere, this air will pass upwardly through the stabilizer 24 and outwardly through the ports in the fan housing 23 and into the annular passage 43. The outlet opening 5 shown in Fig. 1 is in communication with the air passage 43, thereby to exhaust the air to the atmosphere. If, however, an external filter bag is used, the air will follow the same path but will be exhausted into a filter bag on the outside of the machine before being allowed to reach the atmosphere.

It is thus seen that the head assembly construction of the present invention has numerous advantages over those heretofore known. The clamping means provide a tight seal between the head assembly and the tank body and yet permits a release of the head assembly with a minimum amount of manual action. The arrangement also provides for a resilient mounting for the fan wheel housing, thereupon reducing vibration and noise.

Changes may be made in the form, construction and arrangement of parts from those disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes fall within the scope of the claims appended hereto.

The invention is hereby claimed as follows:

1. A head assembly for tank type vacuum cleaners comprising, a dome members adapted to have the vacuum producing motor and fan wheel mounted thereon, an outwardly extending annular flange around the lower edge thereof, an annular plate member disposed below said dome with portions thereof spaced from the dome to provide an annular air passage, an outwardly extending flange around the periphery of said plate member in abutting relation with the flange on said dome, a clinch ring having an annular groove on the inner surface thereof to receive said flanges, fastening means to secure said clinch ring around said flanges, thereby forming a unitary assembly, and means on said clinch ring adapted to

removably secure said assembly to a vacuum cleaner tank.

2. A head assembly for tank type vacuum cleaners comprising, a dome member adapted to have the vacuum cleaner motor and fan wheel mounted thereon, an outwardly extending annular flange around the lower edge thereof, an annular plate member disposed below said dome with portions thereof spaced from the dome to provide an annular air passage, an outwardly extending flange around the periphery of said plate member in abutting relation with the flange on said dome, a clinch ring having an annular groove on the inner surface thereof to receive said flanges, fastening means to secure said clinch ring around said flanges, thereby forming a unitary assembly, and a plurality of wedge clamping means rotatably mounted on said clinch ring adapted to removably secure said assembly to a vacuum cleaner tank.

3. A head assembly for tank type vacuum cleaners comprising, a dome member having an opening in the top thereof, an annular plate member having a central opening therein and disposed below said dome in spaced relation thereto to provide an annular air passage, the portion of said dome around the opening therein forming a dome flange and the portion of said plate around the opening therein forming a plate flange, a fan wheel housing supported between said dome and plate flanges, abutting flanges extending outwardly around the peripheral edges of said dome and plate members, a split clinch ring having normally spaced apart ends and a groove on the innner side thereof to receive said abutting flanges and clamp them together, means to secure the ends of said clinch ring in substantial abutting relation, thereby forming a unitary assembly, and means on said clinch ring adapted to removably secure said assembly to a vacuum cleaner tank.

4. A head assembly for tank type vacuum cleaners

comprising, a dome member adapted to have the vacuum producing motor and fan wheel mounted thereon, an annular plate member disposed below said dome with portions thereof spaced from the dome to provide an annular air passage, flanges on said dome and plate member in abutting relation, a clinch ring having an annular groove on the inner surface thereof to receive said flanges, fastening means for said clinch ring thereby to secure said dome and plate member together and form a unitary assembly, and means on said clinch ring adapted to removably secure said assembly to a vacuum cleaner tank.

5. A head assembly for tank type vacuum cleaners comprising, a dome member having an opening in the top thereof, an annular plate member having a central opening therein and disposed below said dome in spaced relation thereto to provide an annular air passage, the portion of said dome around the opening therein extending inwardly and forming a dome flange and the portion of said plate member around the opening therein extending inwardly and forming a plate flange, a fan wheel housing supported upon said plate flange and clamped thereagainst by said dome flange, a clinch ring securing said dome and plate members together, thereby forming a unitary assembly, and means on said clinch ring adapted to removably secure said assembly to a vacuum cleaner tank.

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