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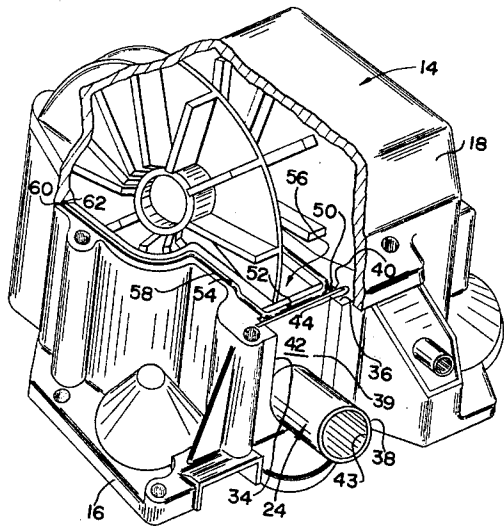
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[54] **MOTOR-PUMP HOUSING**
4 Claims, 9 Drawing Figs.

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15/320
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F03b 11/02
[50] Field of Search **415/219;**
15/320, 412; 280/117 (VC)

[56]		References Cited	
		UNITED STATES PATENTS	
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ABSTRACT: An integral motor-pump for a wet pickup floor conditioner has a housing comprising pump and motor chamber, the housing is divided along a horizontal parting line to form upper and lower housing sections having mating peripheral surfaces for sealing the pump chamber. An outlet port for the pump chamber comprises a U-shaped opening, in the lower housing section, in an outer wall of the pump chamber, extending from the parting line. An insert element has a planar vertical body with a tubular portion extending outwardly therefrom in a general horizontal direction. The marginal edge of the planar body fits in a recess in the opening in the lower housing section while the top edge of the insert element coincides with the parting line of the housing sections. A pump outlet passage extends coaxially through the tubing portion and the planar body of the insert element into the fan chamber. A flexible outlet hose is mounted on the tubing portion. The outlet port is fabricated in this fashion so that reasonably inexpensive molds may be used to fabricate the upper and lower housing sections of the motor-pump housing as unitary members.



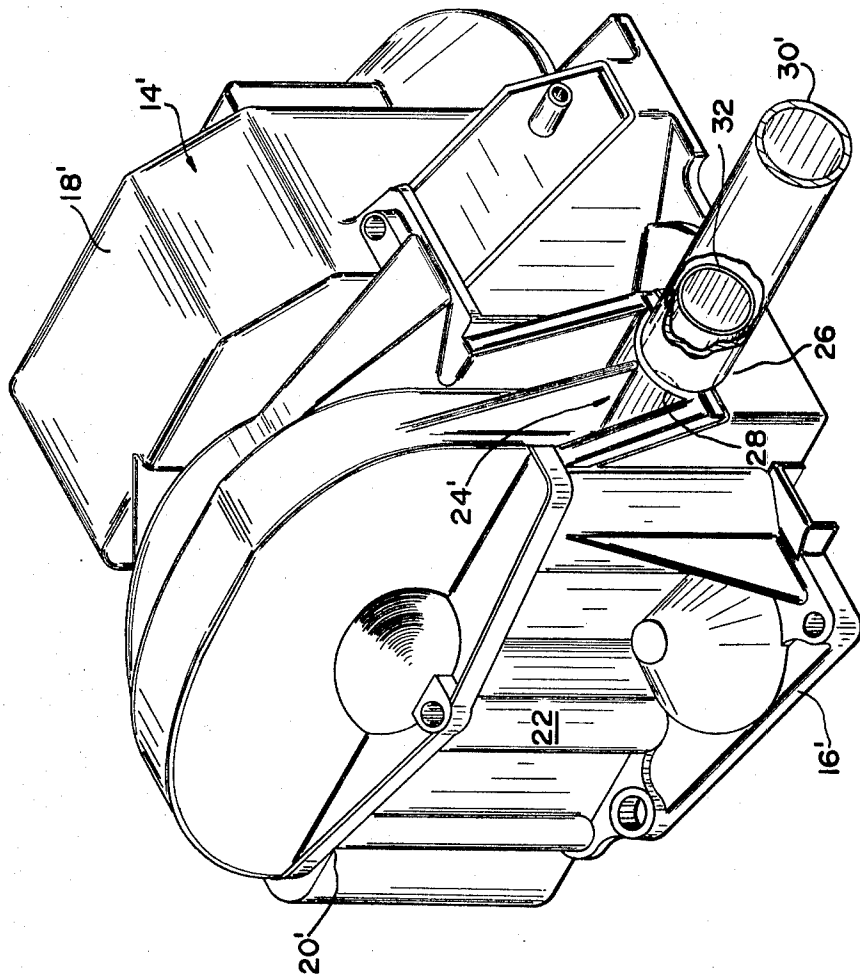
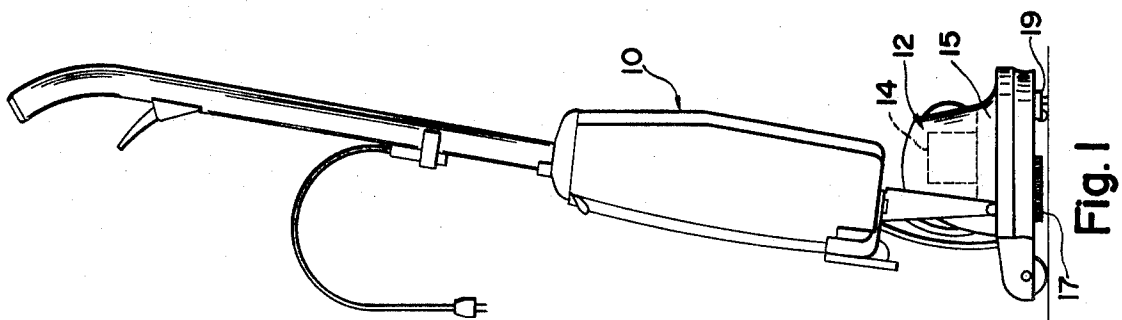


Fig. 2

Fig. 1

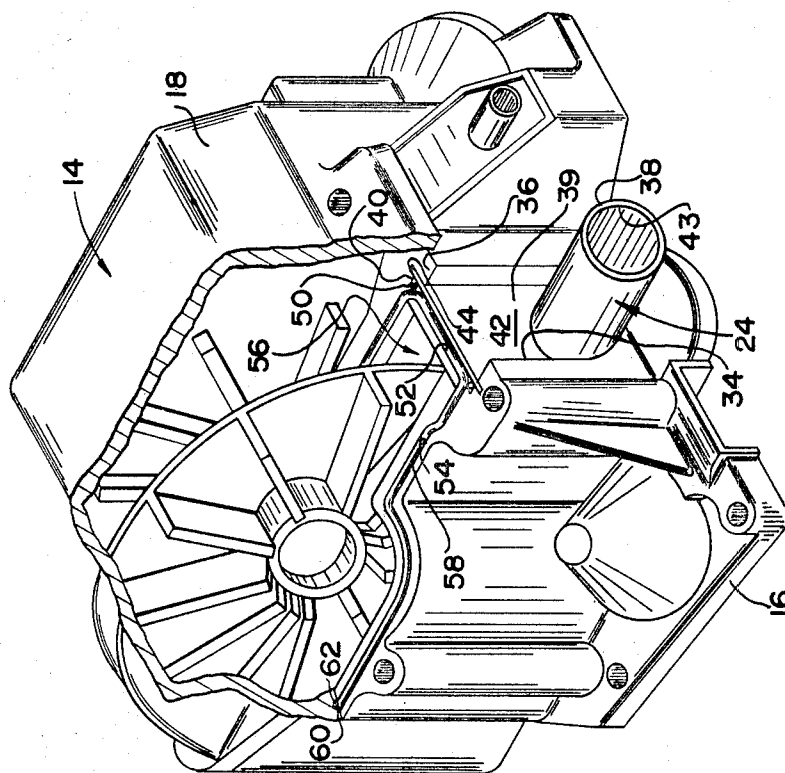


Fig. 4

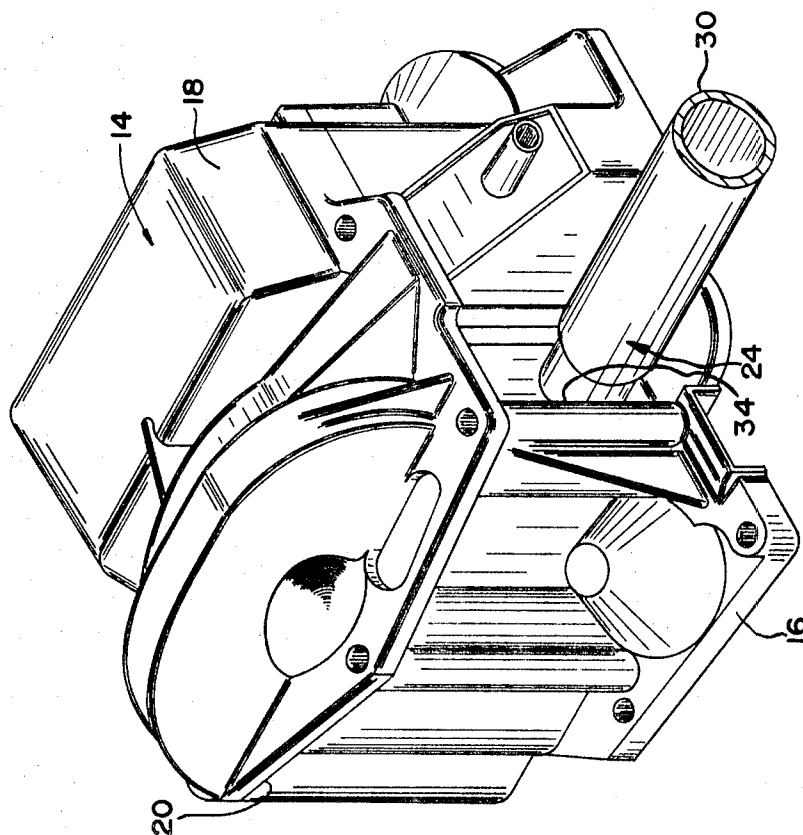


Fig. 3

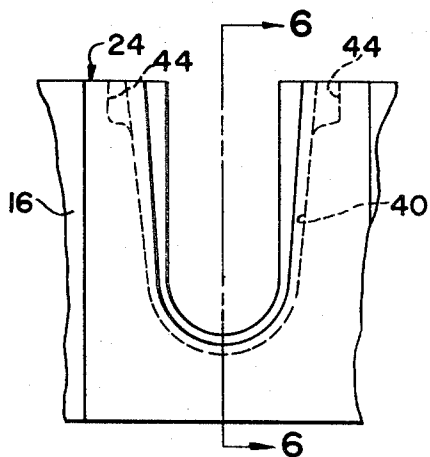


Fig. 5

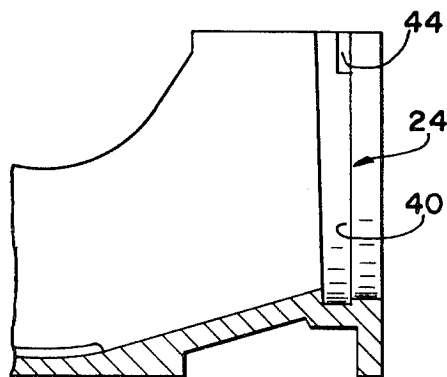


Fig. 6

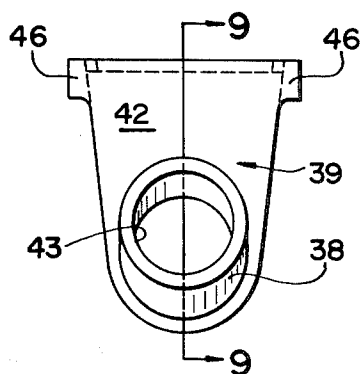


Fig. 7

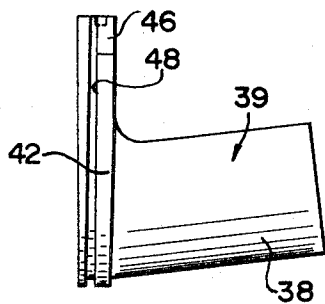


Fig. 8

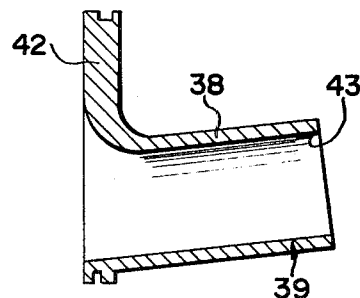


Fig. 9

MOTOR-PUMP HOUSING

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an electrical driven integral motor-pump and more particularly to the design of the housing for the motor-pump for a wet pickup suction nozzle of an ambulatory floor conditioner which permits the housing to be opened for servicing the motor-pump unit without disconnecting a hose from the pump outlet.

2. Description of the Prior Art

The Hoover Company manufactures an ambulatory machine which can be used for scrubbing wet floors and which also removes the dirty water from the floor after the scrubbing operation. An early version of this machine is designated by the Model 3600. The 3600 and later versions are known by the general model name FLOOR-A-MATIC. The FLOOR-A-MATIC machines all have an integral motor-pump housing interiorly arranged generally as described in application Ser. No. 826,798 titled "Motor-Pump Shaft Seal" by Howard L. Allen and Charles D. DeGraff. The motor-pump is used, as part of a "dirty water system", for removing the liquid after the scrubbing operation.

The motor-pump housing is a rather complicated molding made in two sections, a lower housing section adapted to be bolted to the main casting, or body, of the machine, and an upper housing section adapted to seal the pump chamber in conjunction with the bottom housing section and generally to cover and protect the motor chamber. The molds for producing the housing sections are designed to part in the vertical direction, with respect to the housing sections. This requires that if each housing section is to be formed in a single operation, any orifices, or protrusions, that are formed in the molding operation, be vertically oriented or that the mold be of the more complicated retractable-insert type.

The pump outlet port, because of the design of the machine, has to be horizontally oriented, and since a retractable-insert type of mold was too expensive, the outlet was, in the original Model 3600 machine, made in two coacting portions, one integral with each housing section. A cylindrical backing insert was placed in the end of the outlet hose which in assembly was placed in the bottom half of the outlet port, in the lower housing section. When the upper housing section was bolted over the assembly, the hose end became clamped between the outlet port portions in the upper and lower housing sections. With a sealant carefully applied between the outlet port portions of the housing sections at their parting line, and also to the hose end, a watertight seal was obtainable. However, every time that it was necessary to remove the upper housing section, for example, for replacing the motor brushes or repairing the motor, the seal around at least a portion of the hose was broken and the outlet port had to be resealed. This added greatly to the motor-pump housing reassembly time.

SUMMARY OF THE INVENTION

A motor-pump housing has horizontally assembled upper and lower housing sections defining a pump chamber and a motor chamber, the upper and lower housing sections having mating peripheral surfaces for sealing the pump chamber, an outlet port for the pump chamber includes a substantially U-shaped opening through an outer wall of the lower housing section, extending from a mating peripheral surface, for connecting the pump chamber with the exterior of the housing. A recess is formed in the boundary edge of the opening for receiving a U-shaped planar body of an insert element. With the insert element properly fitted in the U-shaped opening, the top of the insert element is coincident with the parting line of the housing sections. An integral tubing portion extends out from the outer face of the U-shaped insert element and has a generally coaxial passage extending entirely through the insert element and through the planar body to connect with the fan chamber.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a FLOOR-A-MATIC machine within which the integral motor-pump unit of the present invention is located.

FIG. 2 is a perspective view of the assembled integral motor-pump housing of the prior version of the FLOOR-A-MATIC machine, Model 3600.

FIG. 3 is a perspective view of the newly designed integral motor-pump housing of the present version of the FLOOR-A-MATIC, Model 3610.

FIG. 4 is a perspective view of the integral motor-pump housing of the Model 3610 FLOOR-A-MATIC with a portion of the upper housing broken away to illustrate the elements within the pump chamber.

FIG. 5 is a detailed elevational view of a portion of the lower housing section of the integral motor-pump housing of FIGS. 3 and 4, illustrating the construction of an opening forming a part of an outlet port for the pump chamber.

FIG. 6 is a cross-sectional view of the opening forming a part of the outlet port taken on line 6-6 of FIG. 5.

FIG. 7 is a front elevational view of an insert element forming a part of the outlet port of the housing of the present invention.

FIG. 8 is a side elevational view of the outlet port insert element shown in FIG. 7, and

FIG. 9 is a cross-sectional view of the outlet port insert element taken on line 9-9 of FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to drawings, in FIG. 1 is illustrated a FLOOR-A-MATIC floor conditioner, generally designated 10, having a working head 12 with a motor-pump housing designated 14 mounted thereon within the outer decorative shell 15. Beneath the working head 12 is a pair of rotary brushes 17 (only one shown) driven by the motor in the motor-pump housing 14 and a wet pickup suction nozzle 19 connected to the inlet of the pump in the motor-pump housing 14.

Looking now to FIG. 2, the prior art motor-pump housing 14' generally consists of first, or lower, and second, or upper, housing sections 16' and 18', respectively, which separate on a horizontal parting line 20'. The interior of the housing 14' is divided into two major chambers (not shown), a pump chamber and a motor chamber. The pump chamber has an axial inlet extending vertically through the protrusion 22 and a tangential outlet port of cylindrical configuration, generally designated 24', extending through a peripheral wall of the pump chamber formed by cooperating portions 26 and 28 of the lower and upper housing sections 16' and 18', respectively.

An outlet hose 30' has a cylindrical metal insert 32 fixed in the inner end thereof to support the hose 30' tightly against the inner circumference of the assembled outlet port 24'. The bolting together of the housing sections, with the hose 30' located between the cooperating portions 26 and 28 of the outlet port 24', results in the hose 30' being tightly clamped in place. However, to provide a watertight connection a liquid sealant is applied to the mating surfaces of the cooperating outlet port portions 26 and 28 and the outer surface of the hose 30'. Any time the upper housing section 18' is removed from the lower housing section 16', the integral upper portion 28 of the outlet port 24' is also removed along with it, breaking the seal of at least the hose 30' with the outlet port 24'. The port portions 26 and 28, and the end of hose 30', must be cleaned and then recoated with a watertight sealant prior to reassembly.

FIGS. 3 and 4 illustrate a redesigned housing 14 for the integral motor-pump consisting of lower and upper housing sections 16 and 18, respectively, which separate on a horizontal parting line 20. An outlet port 24 for the internal pump chamber 56 (FIG. 4) includes a vertical, U-shaped, opening or channel 34 formed through an outer wall of the lower housing section 16 into the pump chamber 56, from the upper planar

mating surface 36. The portion 28 of the outlet port 24', integral with the upper housing section 18', which extended down into the outlet port portion 26 of the lower housing section (FIG. 2) has been completely eliminated in the new design and the mating surface of the upper housing section 18 (FIG. 4) is now planar.

The protruding outlet port portion 26 of the lower housing section 16' (FIG. 2) has also been completely eliminated and the outer wall of the pump chamber 56 is now planar with the U-shaped opening formed therein. The U-shaped opening 34 has a peripheral recess 40 in its boundary edge within which the marginal edge of the planar body 42 of an insert element 39 is received. The upper ends of the recess 40 have deep rectangular sockets 44 (FIGS. 4-6) to accommodate locating ears 46 on the upper end of the planar body 42 (FIGS. 5, 7 & 8). The planar body 42 of the insert element 39, as shown in FIGS. 7 through 9, has a groove 48 extending around its entire periphery, including a groove portion 52 across the top edge. When the insert element 39 is mounted in the U-shaped channel 34, an elastomeric seal 50 (FIG. 4) is fitted in the portion of the peripheral groove 48 extending around the marginal edge, (the sides and the curved lower portion of the body 42). The seal 50, when not compressed is thicker than the groove 48, and extends beyond the periphery of the planar body 42 of the insert element 39. When the body 42 of the insert element 39 has been received in the recess 40 the compression of the elastomeric seal 50 results in a watertight connection.

The insert element 39 also has a rigid tubular portion 38 extending out from the outer face of the planar body 42. A generally coaxial passage 43 extends through the tubular portion 38 and the planar body 42. The tubular portion 38 provides means for mounting a flexible outlet hose 30 (FIG. 3), the hose being fitted over the tubular portion 38 and clamped or adhesively attached thereto in any conventional manner. With the hose 30 fitted over the tubular portion 38 of the insert element 39, the hose 30 need not be disconnected when the upper housing section 14 is removed.

The groove portion 52, across the top or upper edge of the insert element 39, matches up with a corresponding groove 54 formed in the upper mating surface 36 of the lower housing section 16. The groove 54, including the groove portion 52, completely surrounds the pump chamber 56. An elastomeric seal 58 is fitted in the composite groove to seal the pump chamber 56 in conjunction with the upper housing section 14 which has a corresponding groove 60 formed in its mating surface, which also has an elastomeric seal 62 located therein.

The elastomeric seals 58 and 62 in the mating surfaces of the housing sections 16 and 18, and the top edge of the insert element 39, are thicker than the grooves in which they are fitted and extend across the parting line 20 when not compressed. When the housing sections are assembled, the seals 58 and 62 abut to fully seal the pump chamber against any fluid leakage.

I claim:

1. A housing for an integral motor-pump comprising:

- a. first and second housing sections defining a motor chamber and a pump chamber therewith, said first and second housing sections having mating peripheral surfaces for sealing said pump chamber along a parting line when said housing is assembled;
- b. an outlet port for said pump chamber including a substantially U-shaped opening through an outer wall of said first housing section, extending from a mating surface of said first housing section and connecting said pump chamber in the interior of said housing with the exterior of said housing;
- c. recess means formed in the boundary edge of said opening in said outer wall of the first housing section; and
- d. an insert element sealing said opening, said insert element including: (1) a substantially U-shaped planar body having a marginal edge and a top edge; (2) said marginal edge of said planar body of said insert element being received in said recess in said boundary edge of said opening in said first housing section, said top edge of said planar body of said insert element substantially coinciding with said parting line, a tubular portion projecting outwardly from said planar body for fitting a flexible tube thereon and (3) a passage extending generally coaxially through said tubular portion and said planar body of said insert element to connect said pump chamber within said housing with the exterior of said housing.

2. A housing for an integral motor-pump as recited in claim 1, wherein groove means are formed in the marginal edge of said planar body of said insert element and elastomeric sealing means is fitted in said marginal groove means and trapped between the bottom of said groove means and the bottom of said recess under compression, whereby said insert element forms a watertight connection with said first housing section.

3. A housing for an integral motor-pump as recited in claim 2, wherein a groove portion is formed across the top edge of said planar body, groove means in said peripheral mating surface of said first housing section around said pump chamber and with said groove portion in the top edge of said insert element forming a groove completely surrounding said pump chamber.

4. A housing for an integral motor-pump as recited in claim 1, wherein said body section of said insert element has a pair of opposed ears extending outwardly of said marginal edge and in the plane of said planar body, said ears being located adjacent said top edge of said planar body, and opposing sockets extending into the wall of said first housing section through said recess on opposite sides of said opening adjacent said parting line, whereby said position of said top edge of said insert element is positively located with respect to said parting line of said housing sections.

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