March 30, 1954 G. F. MARTIN 2,673,619

VACUUM CLEANER ADAPTER UNIT

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Fig. 1.

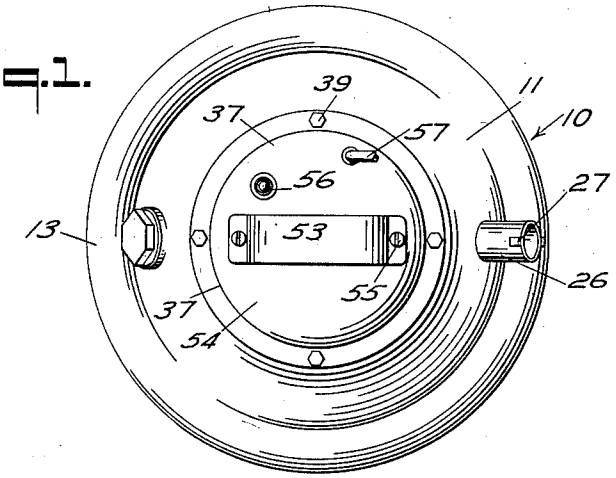
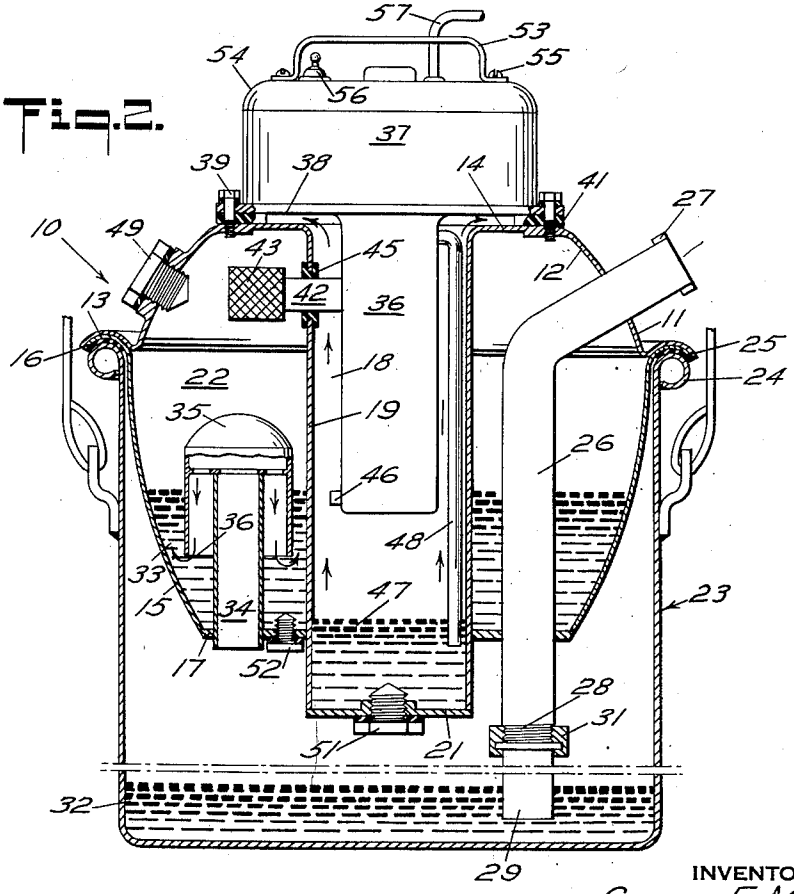


Fig. 2.



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VACUUM CLEANER ADAPTER UNIT

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8 Claims. (Cl. 183—14)

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The present invention relates generally to a portable adaptor unit for providing a vacuum for cleaning purposes and, more particularly, to an adaptor unit suitable for generating a vacuum for wet and lather cleaning purposes.

Many cleaning methods employ various aqueous solutions, soap or detergent dispersions or lather mixtures which later must be removed from the surface or fibrous material being cleaned. Manual napping methods, often employed to remove the residual cleansing material, are slow and do not remove the material efficiently. However, provision of a vacuum device adapted to operate satisfactorily under the peculiar conditions met with these cleansing methods would greatly facilitate and improve the cleansing process.

A vacuum device to be suitable for the purposes mentioned must be provided with certain especial features including ample storage capacity for the fluids collected and facilities for suppressing carryover of materials within the machine when sudsy or foamy materials are being removed. Moreover, such a device should also be adapted for use in removing dry dust and dirt thereby providing a single unit of universal utility.

It is therefore, an object of the invention to provide a compact portable vacuum generating unit which may be fitted to a suitable container to provide a vacuum cleaning device.

Another object of the invention is to provide a positive action vacuum generating unit which may be universally employed for suctioning aqueous cleansing solutions, dispersions and foamy materials as well as dry dust and dirt from various surfaces including fibrous materials.

Still another object of the invention is to provide a vacuum generating unit which may be attached to a suitable container whereby said container serves as the collector portion of a vacuum suctioning device.

A further object of the invention is to provide a vacuum generating unit adapted to remove dust or foam from the suction air stream and thereby prevent entry of such material into the pump portion of the unit.

The invention possesses other objects and features of advantages, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing may be adopted within the scope of the invention as set forth in the claims.

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With reference to the said drawing:

Figure 1 is a plan view of the vacuum cleaner adaptor unit of the invention;

Figure 2 is a vertical cross sectional view of the device taken along the plane 2—2 of Figure 1.

In general, the vacuum cleaner adaptor unit 10 of my invention is constructed with a generally spherical outer casing adapted to rest upon and engage the upper mouth rim of a suitable container which container then serves as a collector chamber for materials deposited from the suctioned air stream. Such unit includes an electrically driven vacuum pump arrangement disposed within a central well in said casing. Provision is also made therein for attachment to an external suction work nozzle and for multiple filter removal of entrained solid and liquid particles from the suctioned air stream.

More particularly, as may best be seen in Figure 2, the casing 11 of the adaptor unit 10 may be constructed with an upper generally hemispherical member 12 having an outwardly projecting, downwardly convex, flanged rim 13 and an annular upper planar surface area 14. Lower portions of the casing may be provided as a similar lower hemispherical member 15 having an outwardly projecting, downwardly convex, flanged rim 16 nesting within and hermetically attached to the convex portion of the rim portion 13, which member 15 is also provided with an annular lower planar surface area 17. Accordingly the nested rims 13 and 16 form a circumferential flanged ridge around the casing. To complete the casing 11, there is provided a well portion 18 defined by a generally cylindrical wall 19 extending downwardly from the inner peripheral edge of the upper annular surface 14 to be hermetically attached to the inner marginal edge of the lower annular surface 17 terminating in a bottom wall member 21. Alternatively, the annular surface 17 may be extended so as to partially or wholly cover and be attached to said bottom wall member 21. With this manner of construction there is provided within the casing 11 an annular reservoir 22 surrounding said well portion 18 and which is employed for filtering purposes more fully described hereinafter.

Any container 23 capable of withstanding the vacuum pressure and which is equipped with a mouth portion having a peripheral rim 24 adapted for engagement by the lower convex surface of the flanged rim 16 is suitable for combining with the adaptor unit 10 and to serve as a collector chamber therefor. Preferably the

rim 24 is of the rolled type shown and a hermetic seal is effected between the container mouth rim 24 and the flanged adaptor unit rim 16 (or circumferential ridge) by attaching a resilient washer 25 by means of suitable adhesive to said lower convex surface of the rim 16.

Means for attaching an external hose (not shown) to the adaptor unit 10 may be provided by a tubular conduit 26 passing upwardly through the annular reservoir 22 and emerging through wall portions of the upper casing member 12 at an appropriate location between the planar surface 14 and flanged rim 13 thereof, to terminate in a socket portion 27 adapted for attachment of the hose. Downwardly, the conduit 26 passes through the lower annular surface 17 of the lower casing member 15 and projects somewhat within the container 23, terminating in an exteriorly threaded portion 28.

In the event that dry dusty materials are to be suctioned an extension tubular portion 29 is attached by means of an internally threaded collar 31 to the threaded conduit portion 28 whereby discharge from the conduit is effected in lower portions of the container 23. Moreover, a quantity of water 32 may be introduced therein whereby the discharged air stream passes through the water and entrained dirt is deposited therein. In the event that foaming solutions or lathered cleaning compounds are to be suctioned the extension 29 is preferably removed to reduce carryover of materials which might otherwise be introduced into the air stream by excessive foaming caused by the bubbling action.

Following passage through the collector chamber of the container 23, the suctioned air stream is conducted through the annular reservoir 22 wherein the air stream is subjected to multiple filtering operations designed to remove residual materials therefrom.

More particularly such reservoir 22 is partially filled with a fluid filter medium 33 and the air stream is bubbled therethrough. Efficient contact between the air stream and filter medium 33 is obtained with the bubble cap arrangement illustrated in Figure 2. Such bubble cap arrangement includes a conduit portion 34 extending within the annular reservoir 22 from the lower annular surface 17 of the lower casing member 15 which conduit 34 terminates above the level of the filter medium 33. A bell shaped cap 35 supported upon the portion of the conduit deflects the air stream downwardly beneath the fluid level whereby the air stream bubbles from beneath the immersed lower rim 36 of the cap 35 and upwardly through the filter medium 33.

When the device is employed to suction dry dusty materials the medium 33 may be ordinary water; however, in the event that soapy or lathery materials are to be removed the medium 33, advantageously, in an aqueous solution of an antifoaming agent such as cetyl alcohol thereby alleviating difficulties which might be caused by entrapment of excessive quantities of foaming materials.

To furnish the necessary suction for drawing the air stream through the various collecting and filtering operations indicated in the foregoing, there is required a relatively large capacity, positive action pump 36. Rotary vane type pumps and high speed gear pumps are especially suitable for this purpose and are preferred. Illustratively, such pump 36 may be of the type disclosed in my copending application, Serial No. 24,991, filed May 4, 1948, now Patent No. 2,621,604 dated December 16, 1952, which is shown only in outline in the accompanying drawing.

As illustrated therein, the pump 36 is attached to and is driven by an electrical motor 37 whereby such pump 36 projects outwardly from the lower face 38 of the motor housing. Accordingly, the pump 36 may then be suspended within the well 18 and positioned therein by attachment of the lower face wall 38 of the motor housing to the annular surface 14 of the upper casing member 12. Preferably a resilient mounting is employed for this purpose as, for example, an arrangement wherein screws 39 passing through perforations formed in the lower wall 38 of the motor housing and engaging upper casing member 12 apply gripping pressure thereto through resilient washers 41.

Connection between the pump 36 and the annular reservoir 22 is furnished by a conduit 42 which is inserted through an opening in the upper portion of the cylindrical well wall 19. One end portion of the conduit 42 is attached to the intake port of the pump whereby the other end of said conduit projects within the annular reservoir 22 and supports a terminal filter assembly 43 disposed thereon. Such filter assembly 43 includes a supported fibrous filter medium adapted to remove residual particles from the air stream suctioned from the reservoir 22 and thereby prevent entry of such materials into the pump. Appropriately the conduit 42 is arranged in water and airtight relation with said wall 19 by providing a resilient grommet 45 encircling the conduit and engaging the marginal edges of said opening in the wall 19.

It may be noted that air emerging from the discharge port 46 of the pump, is released in the lower portion of the well 18 and is conducted upwardly through said well 18 to flow outwardly beneath the lower motor housing face 38 thereby cooling the motor 37.

Lower portions of the well 18 serve as an oil sump from which oil 47 may be pumped through conduit 48 as required in normal operation of the pump 36. It will be appreciated that the oil discharged by the pump after passage therethrough will collect in said sump and be continuously recirculated.

Several plugs are employed to facilitate draining and servicing of the well and reservoir. Access to the filter assembly 43 may be had by providing a large plug 49 at an appropriate location on the upper casing member 12 between the upper planar surface 14 and rim 13. Such access is desirable as occasional cleaning and servicing of the filter assembly 43 is required in normal operation. Moreover, the filter medium 33 may be easily introduced into the reservoir 22 through the plug opening. Drain plugs 51 and 52 located in the bottom wall 21 of the well 18 and lower annular surface 17 of the lower casing member 15, respectively are provided to allow draining of the oil 47 and solution 33 whenever necessary.

To assist in carrying or manipulating the unit a metal strap handle 53 may be attached to the upper surface 54 of the motor housing as by means of screws 55 inserted through perforations formed in the end portions of said handle. A switch 56 placed in close proximity with said handle may serve to control operation of the motor and a rubber covered cord 57 may serve to furnish a power connection to the motor 37.

What is claimed is:

1. A vacuum cleaner adaptor unit adapted for use with an open mouthed container, comprising

a spherical casing adapted to rest upon and engage mouth portions of said container in hermetic relation which casing is provided with planar upper and lower surface areas and with a lubricant-containing well portion extending downwardly from said upper surface area, whereby said casing defines an enclosed annular reservoir surrounding the well portion, an intake conduit adapted at the exterior end for connection with a suction hose and passing through said annular reservoir and adapted to discharge within said container, means for conducting air from said container to within said annular reservoir, means for contacting air conducted from said container with a fluid medium disposed within said reservoir, electrically driven vacuum pump means disposed within said well portion, and conduit means connecting the intake of said pump with said annular reservoir.

2. A vacuum cleaner adaptor unit in combination with a container having a single rimmed opening at the open top thereof, said unit comprising a casing having a circumferential flanged ridge adapted to engage the rim of the opening of said container in hermetic relation, said casing being provided with a well portion having a bottom and sealed sides extending inwardly from a surface thereof, whereby said casing defines an enclosed annular reservoir surrounding the well portion, a conduit adapted at the exterior end for connection with a suction hose and passing through said annular reservoir to discharge within said container adjacent the bottom thereof, a fluid filter medium disposed within said annular reservoir, a conduit leading from within said container and opening above the level of the fluid medium contained within said reservoir, means for contacting an air stream emerging from said conduit with said fluid medium within the reservoir, electrically driven vacuum pump means disposed within said well portion, and a conduit attached at one end to the intake part of said pump and the other end projecting within said annular reservoir.

3. The device as defined in claim 2 wherein said means for contacting said airstream with said fluid medium comprises a bell shaped cap attached to said conduit and having the rim thereof immersed within the fluid medium.

4. A vacuum cleaner adaptor unit for use with a container having an upper opening defined by a rolled rim, comprising a generally spherical casing member having a circumferential flanged ridge adapted to engage said container rim in hermetic relation and provided with upper and lower planar surface areas and also with a well portion adapted to hold a quantity of fluid therein, said well portion extending downwardly from said upper surface area, whereby said casing defines an enclosed annular reservoir surrounding the well portion, an intake conduit adapted at the outer end thereof for attachment of a suction hose and extending through and subjacent said annular reservoir and adapted to terminate within said container, a fluid filter medium disposed within said annular reservoir, a conduit extending from said lower planar casing surface and terminating above the level of said fluid medium, a cap disposed on the upper terminus of said conduit within the annular reservoir and having the rim portion immersed in said fluid medium, an electrically driven vacuum pump disposed within said well portion, and a conduit attached at one end to the intake port of said pump and having the other end provided with filter means and disposed within said annular reservoir above said fluid medium level.

5. The device as defined in claim 4 wherein said casing is formed with an upper hemispherical member having an annular planar upper surface and a downwardly convex flanged rim, with a lower hemispherical member having an annular planar lower surface and a downwardly convex flanged rim nested in hermetic relation within the convex rim portion of the upper hemispherical member and with a cylindrical wall joining the inner marginal edges of said upper and lower annular planar surfaces, which cylindrical wall provided with a bottom wall member forms said well portion of said casing.

6. The device as defined in claim 4 wherein said fluid filter medium comprises an aqueous solution of an antifoaming agent.

7. The device as defined in claim 4 wherein the lower end of said intake conduit is provided with a detachable extension.

8. The device as defined in claim 4 wherein said filter means provided on the conduit attached to the intake port of said pump comprises a supported fibrous filter mat.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,070,578	Bowman	Feb. 16, 1937
2,219,567	Spielman	Oct. 29, 1940

FOREIGN PATENTS

Number	Country	Date
450,858	Germany	June 1, 1926
372,426	Great Britain	May 12, 1932