

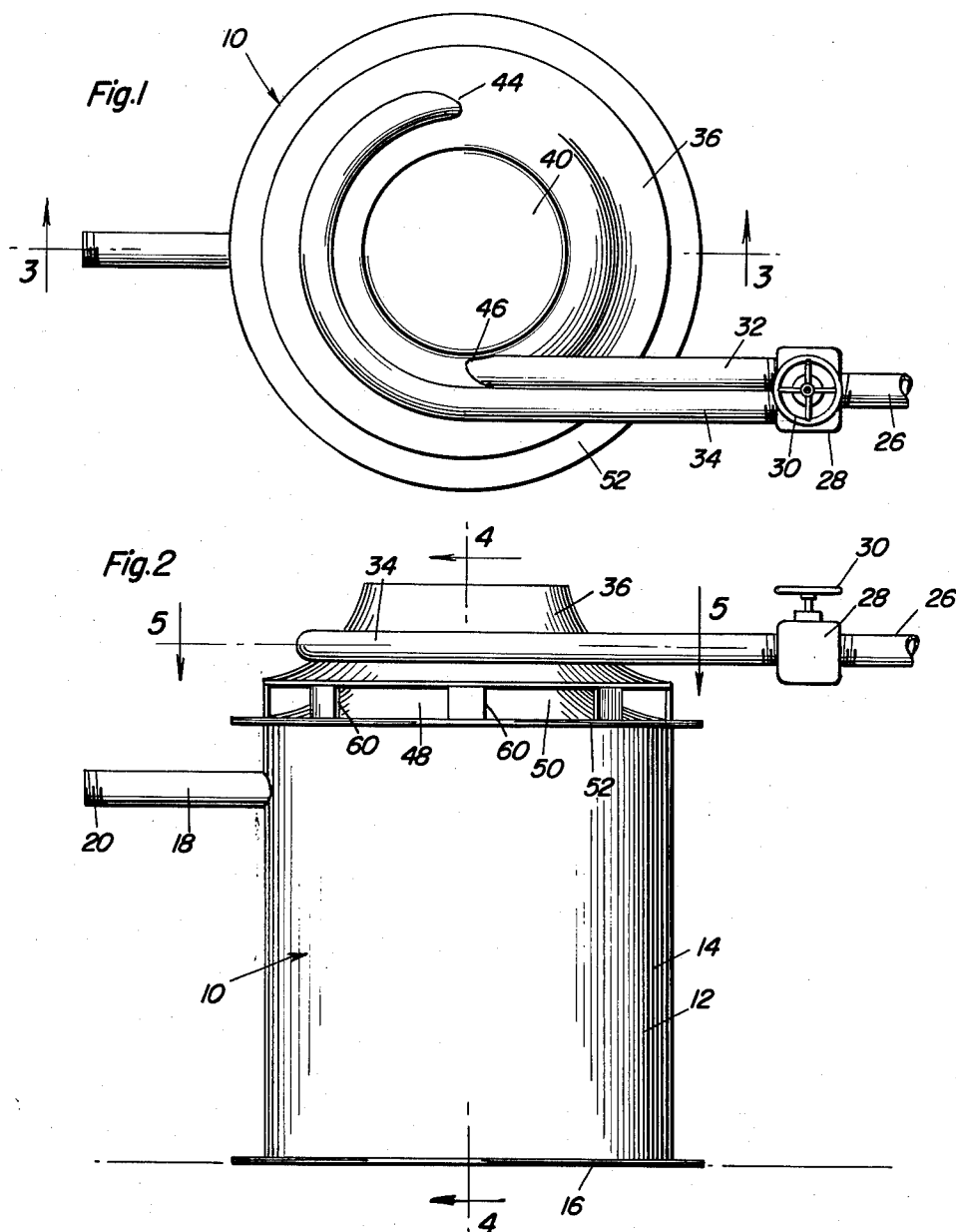
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D. ARBISI
VACUUM DEVICE

3,063,223

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2 Sheets-Sheet 1



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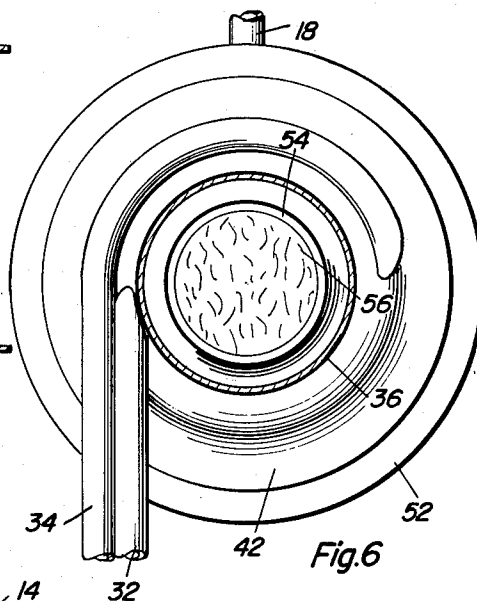
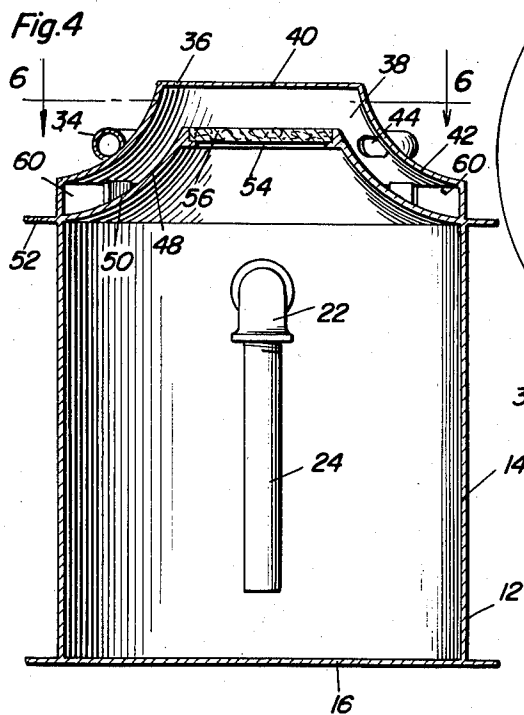
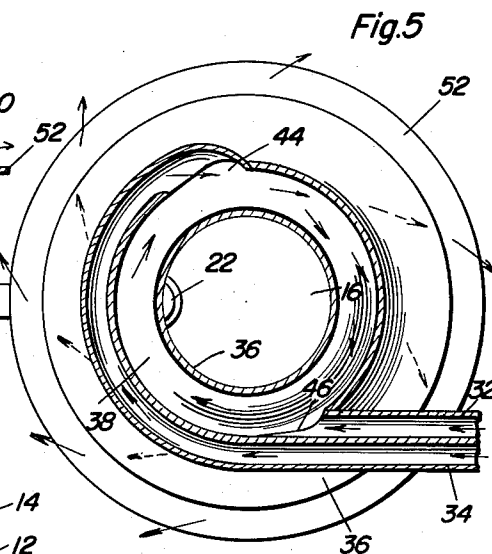
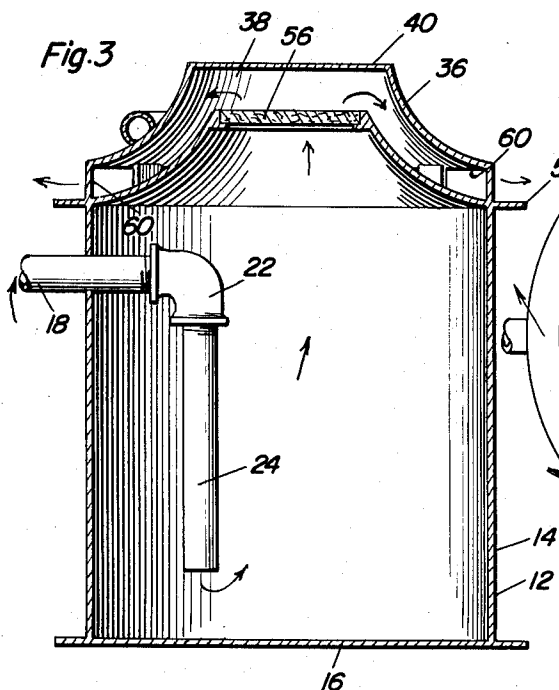
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D. ARBISI
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VACUUM DEVICE

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3 Claims. (Cl. 55-468)

This invention relates to a suction producing device and more particularly to a unit which has multiple purposes.

An object of the invention is to provide a suction producing unit which may be used for a number of purposes, for instance as a vacuum cleaner to collect dust, dirt and the like, a paint sprayer, a fertilizer applicator, a vacuum pump and any other accessory or device requiring suction for operation.

A further object of the invention is to provide a vacuum device having a container that is provided with a throat opening in which a low pressure zone is established. This low pressure zone causes a draft from the interior of the container, through an atmospheric line which may be left vented to the atmosphere for the accumulation of dust and dirt, which may have a suction hose connected to it or which may be operatively connected in many other ways to appliances, devices or any other object requiring a source of suction for either primary or supplemental operation.

Another object of the invention is to provide a portable unit adapted to be connected with an available or furnished source of air under pressure, and by which to convert the air pressure source into a suction producing medium, drawing air under considerable pressure into a container and exhausting the air through a low pressure zone formed in a throat that is structurally connected with the container.

In a principal embodiment of the invention the suction zone is formed of a pair of spaced adjacent plates, each being generally circular and between which a swirling air pattern is formed by high pressure from the pressure source. The swirling action very closely resembles in pattern and function a vortex wherein, aerodynamically, the center is a low pressure region. This low pressure region is the previously referenced zone which tends to draw air into the vortex, and it is this which constitutes the source of suction made from the air under pressure delivered from any source of available air pressure.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation shown and described, as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a top view of a device in accordance with the invention.

FIGURE 2 is a side view of the device in FIGURE 1.

FIGURE 3 is a sectional view taken on the line 3-3 of FIGURE 1.

FIGURE 4 is a sectional view taken on the line 4-4 of FIGURE 2.

FIGURE 5 is a sectional view taken on the line 5-5 of FIGURE 2.

FIGURE 6 is a sectional view taken on the line 6-6 of FIGURE 4.

In the accompanying drawings there is a portable vacuum device 10 which may be used for the various purposes mentioned previously. The vacuum device is portable and is mechanically simple and is adapted to take advantage of any available source of air under pressure or a furnished source, such as an air compressor. Device 10 is made of a container 12 having a cylindrical side wall 14, a bottom 16 and a suction inlet conduit 18. The

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suction inlet conduit may have a fitting, screw thread 20 or an equivalent mechanical element or assembly thereon by which to couple additional hoses, lines or the like to the inlet conduit 18. Elbow 22 is on the inner end of conduit 18 and has a pipe 24 attached thereto and extending downwardly in container 12 near the bottom 16 thereof.

Pipe 26 diagrammatically represents a source of air under pressure with respect to the described apparatus and may therefor be connected to a compressor or some other available air pressure generator for such purpose. Valve 28 is in pipe 26 and is manually controlled, moving between an opened and closed position by hand wheel 30 or any other type of valve operator. There are two compressed air conductors 32 and 34 that extend from valve 28. These are attached to a top wall 36 of a closure assembly for the container 12 at places spaced 180° from each other. Compressed air conductor 32, then, is shorter than conductor 34 with conductor 34 having a curved end portion so that the open ends of the conductors discharge into an annular vortex passage portion of chamber 38 in the same direction to set up a swirling motion of compressed air, said annular passage portion being defined between annular portions of walls 36 and 48. The top wall 36 therefore includes a flat upper plate portion 40 and the annular portion 42 attached to the upper edge of side wall 14. The portion 42 of the top wall 36 is approximately in the form of a truncated cone with the section being smoothly curved. There are inlet ports 44 and 46 at an axially upper inlet end of said annular vortex passage portion in the portion 42 of top wall 36, these ports being in registry with the ends of the pressurized air conductors or conduits 34 and 32 (FIGURE 5).

The chamber 38 communicates with the interior of the container 12 through a throat formed within the closure assembly. The upper part of chamber 38 is defined by top wall 40. The lower part of chamber 38 is defined by an intermediate wall 48 having an annular portion 50 of the same shape as portion 42 but slightly larger so that there is a laterally protruding rim 52 extending beyond the marginal edges of wall 14. The wall 48 therefore forms centrally thereof, a throat portion extending between the interior of the container and the chamber 38 to define an air inlet opening 54. A screen or filter 56 extends across the air inlet opening. As shown by the arrows in FIGURE 3 the air enters opening 54 in passing through the throat portion from the interior of container 12 to enter chamber 38.

There is a plurality of discharge openings or air outlets 60 in the portion of wall 14 between walls 36 and 48 communicating with an axially lower outlet end of said annular vortex passage portion. The air discharge openings 60 axially spaced from inlets 44 and 46 and opening 54 function as air outlets for two streams of air, the one stream being that produced by the compressed air entering inlets 44 and 46, the other being the stream of air admixed therewith after passing through air inlet conduit 18, the interior of container 12 and air inlet opening 54.

In use, air under pressure is applied to chamber 38 by entering at diametrically opposed places in the annular vortex passage portion of the chamber through ports 44 and 46. The air applied in this way sets up a swirling motion of air very closely resembling a vortex. Since the center of the vortex is sub-atmospheric, a suction is produced tending to draw air through the opening 54 of the throat portion to admix with the vortex. Accordingly, the interior of container 12 becomes a suction chamber, drawing air through air inlet conduit 18. This may be used as a vacuum cleaner or as a source of suction ultimately derived from the pressurized air available

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through the conductor 26. Valve 28 is used as a control for the suction produced in this way.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A vacuum device comprising, a container having side walls, a bottom and a top, a suction inlet for the container, said top comprising inner and outer spaced walls each having truncated upwardly converging substantially conical portions defining an annular passage therebetween, said outer wall having an imperforate transverse portion closing the upper end of its truncated portion and the inner wall defining a passageway at the top of its truncated portion below the transverse portion of the outer wall, fluid pressure inlet means for discharging fluid tangentially into an upper portion of said annular passage and fluid outlet means at a lower portion of said annular passage whereby downwardly diverging vortex flow of fluid is created in said annular passageway to form a low pres-

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sure area at the passageway in the top of the truncated portion of the inner wall thereby to cause fluid to flow from the suction inlet means through the top passageway and out the outlet means.

2. The combination of claim 1 including filter means seated on an upper end of the truncated portion of the inner wall whereby said flow of fluid from the suction inlet passes therethrough.

3. The combination of claim 1 wherein said outlet means is formed by a plurality of circumferentially spaced openings between the outer and inner walls.

References Cited in the file of this patent

UNITED STATES PATENTS

509,400	Ruble	Nov. 28, 1893
1,612,838	Schutz	Jan. 4, 1927
1,950,828	Thompson	Mar. 13, 1934
2,475,832	Gilliland	July 12, 1949
2,565,907	Bertin et al.	Aug. 28, 1951
2,863,525	Lucian	Dec. 9, 1958

FOREIGN PATENTS

691,380	France	of 1930
1,125,777	France	July 16, 1956