April 7, 1959 G. E. STEWART ET AL 2,880,938

FLUID PRESSURE CLEANING DEVICE

Filed Dec. 23, 1957

FIG. 1

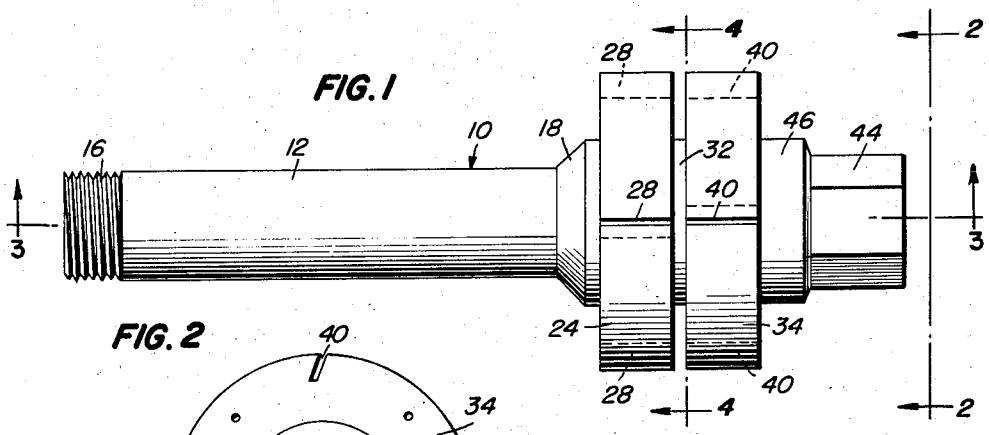


FIG. 2

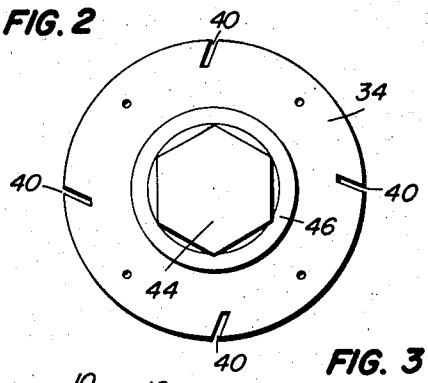


FIG. 3

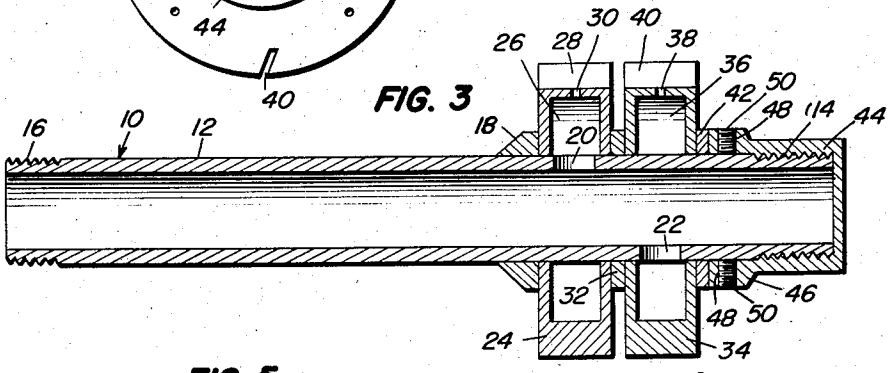


FIG. 5

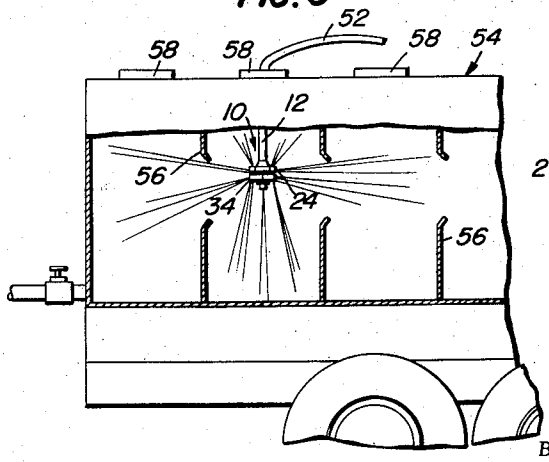
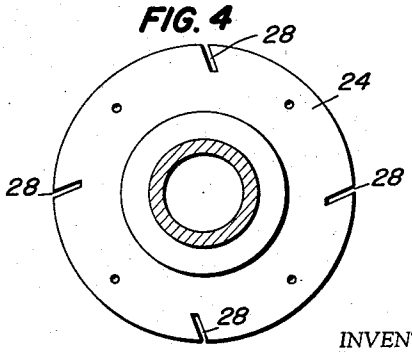


FIG. 4



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FLUID PRESSURE CLEANING DEVICE

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4 Claims. (Cl. 239—245)

This invention relates to cleaning devices, and it particularly relates to cleaning devices for hollow tanks and the like wherein fluid under pressure is ejected effectively into all parts of the tank.

Although there have previously been provided fluid pressure cleaners of various types for cleaning hollow tubes, tanks and the like, none of these prior devices have effectively combined simplicity with ruggedness of construction and efficiency of action.

It is, therefore, one object of the present invention to provide a cleaning device of the fluid pressure type which is simple in construction, easy to use and which has so few parts that there is little likelihood of breakdown.

Another object of the present invention is to provide a cleaning device of the fluid pressure type which is extremely effective in its cleaning action and which does not require a separate source of power.

Other objects of the present invention are to provide an improved cleaning device, of the character described, that is easily and economically produced, which is sturdy in construction, and which is highly efficient in operation.

With the above and related objects in view, this invention consists in the details of construction and combination of parts, as well be more fully understood from the following description, when read in conjunction with the accompanying drawing in which:

Fig. 1 is a side elevational view of a device embodying the present invention.

Fig. 2 is a front elevational view taken on line 2—2 of Fig. 1.

Fig. 3 is a longitudinal sectional view of the device on line 3—3 of Fig. 1.

Fig. 4 is a view taken on line 4—4 of Fig. 1.

Fig. 5 is a fragmentary side view, partly in section and partly in elevation, of a tank, showing the device of the present invention in use.

Referring now in greater detail to the drawing wherein similar reference characters refer to similar parts, there is shown a cleaning device, generally designated **10**, comprising a tubular shaft **12** open at each end and provided with external screw-threads at each end, as at **14** and **16**.

Intermediate the ends of the shaft **12** but closer to the front end thereof is provided a collar **18** affixed to the exterior of the shaft as by welding or the like. Between this collar **18** and the front end of the shaft **12** are provided a pair of openings in the shaft shown at **20** and **22**. The openings **20** and **22** are spaced apart axially of the shaft **12** and are also provided on opposite sides of the shaft (as best shown in Fig. 3).

The front face of the collar **18** is flat and adjacent this flat face is a hollow disc **24** rotatably positioned on the shaft **12**. The disc **24** is provided with an annular interior chamber **26** which is in fluid communication with four slots **28** on the periphery of the disc **24** through holes **30** (as best shown in Fig. 3). The slots **28** are slanted from bottom to top in a counterclockwise direction (as best shown in Fig. 4).

At the front side of the disc **24** is provided a spacer ring **32** and on the opposite side of the spacer **32** there is provided a second disc **34** rotatable on the shaft **12**. This disc **34** is similar to disc **24** in that it is provided with an annular interior chamber **36** having communication through holes **38** with four peripheral slots **40**. These slots **40** are directed, from bottom to top, in an inclined clockwise direction (as best shown in Fig. 2).

Adjacent the front face of disc **34** is provided a spacer ring **42** in surrounding relation to the shaft **12**. This spacer **42** is positioned between the disc **34** and an adjusting nut **44**. The nut **44** is internally threaded to engage the threads **14** at the front end of shaft **12**, and is provided with a widened collar portion **46**. A plurality of radial, screw-threaded bores **48** are provided in the collar portion **46** to receive Allen-head type set-screws **50**. These screws **50** are tightened to hold the nut **44** in adjusted position and loosened to permit adjustment of nut **44**.

In operation, the shaft **12** is connected by a hose (such as shown at **52** in Fig. 5) to a source of pressure fluid which may be a liquid under pressure, steam, compressed air or the like; the hose being threadedly coupled to the threads **16** at the rear end of shaft **12**. The nut **44** is then adjusted to provide a closer or looser fit between the discs **24** and **34** and the spacers **32** and **42** so as to permit faster or slower rotation of the discs on the shaft **12**. Then the pressure fluid is allowed to flow into the shaft **12** and out through the openings **20** and **22** into the chambers **26** and **36** and out through the slots **28** and **40**. As the fluid emerges from the slots **28** and **40**, it not only forms a series of sprays around the two discs but also acts to rotate the discs, the direction of rotation being determined by the inclination of the slots **28** and **40**. Since the slots **28** are inclined oppositely to slots **40**, the discs **24** and **34** will rotate in opposite directions, thereby effecting a substantially continuous annular spray which, at the same time, has not only the initial force of the compressed fluid but also the centrifugal force resulting from the rotation of the discs **24** and **34**.

In Fig. 5, the device of this invention is shown applied to the task of cleaning the inside of a tank on an oil-tank vehicle or the like shown at **54**. The tank is disclosed as having a series of compartments formed by upper and lower baffles **56**, each having a top opening as at **58**. To clean each compartment, it is merely necessary to insert the hose **52** with the device **10** thereon into each opening **52** and then turn on the pressure. The compactness of the device **10**, the flexibility of the hose **52** and the relatively great force of the fluid stream issuing from the discs **24** and **34** permit a most effective and rapid cleaning of all parts of each compartment of the tank.

Although this invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. A cleaning device comprising a tubular shaft, a plurality of spaced openings in said shaft, said openings extending laterally from the hollow interior of said shaft to the periphery thereof, a pair of flat circular discs rotatably mounted on said shaft, each of said discs having an internal annular chamber therein, each disc encompassing one of said openings and having its annular chamber in fluid communication with the corresponding opening, a series of inclined slots on the periphery of each disc, the inclination of the slots of one disc being opposite to that of the slots of the other disc, said slots being in fluid communication with the corresponding annular chamber of the corresponding disc and being radially inclined.

2. A cleaning device comprising a tubular shaft, external screw-threads at each end of said shaft, one of said screw-threaded ends being adapted to be coupled to a hose and the other of said screw-threaded ends threadedly receiving an internally-threaded adjusting cap nut closing the said end of said tubular shaft, a plurality of axially-spaced, rotatable flat, circular discs on said shaft positioned between said nut and a collar on said shaft, and each of said discs having radially inclined slots on the periphery thereof in fluid connection with the interior of said shaft, the inclination of the slots in adjacent discs being opposite to each other.

3. The cleaning device of claim 2 wherein said shaft has a plurality of lateral openings connecting its hollow interior to the periphery thereof, each of said openings being aligned with one of said discs, a chamber in each disc in communication with the corresponding opening, and passage means between each chamber and the slots on the corresponding disc.

4. The cleaning device of claim 2 wherein spacers are provided between the discs and between the discs and the nut, said cap nut being axially movable to adjust the pressure on the spacers and discs and thereby adjust the speed of rotation of said discs, said cap nut being provided with set-screws to hold it in axially adjustable position.

References Cited in the file of this patent

UNITED STATES PATENTS

130,798	Finley	Aug. 27, 1872
153,844	Pungs	Aug. 4, 1874
165,668	Galvin	July 20, 1875
1,645,227	Cease	Oct. 11, 1927
2,631,061	Nelson	Mar. 10, 1953

FOREIGN PATENTS

936,610	France	Feb. 23, 1948
825,916	Germany	Dec. 27, 1951