

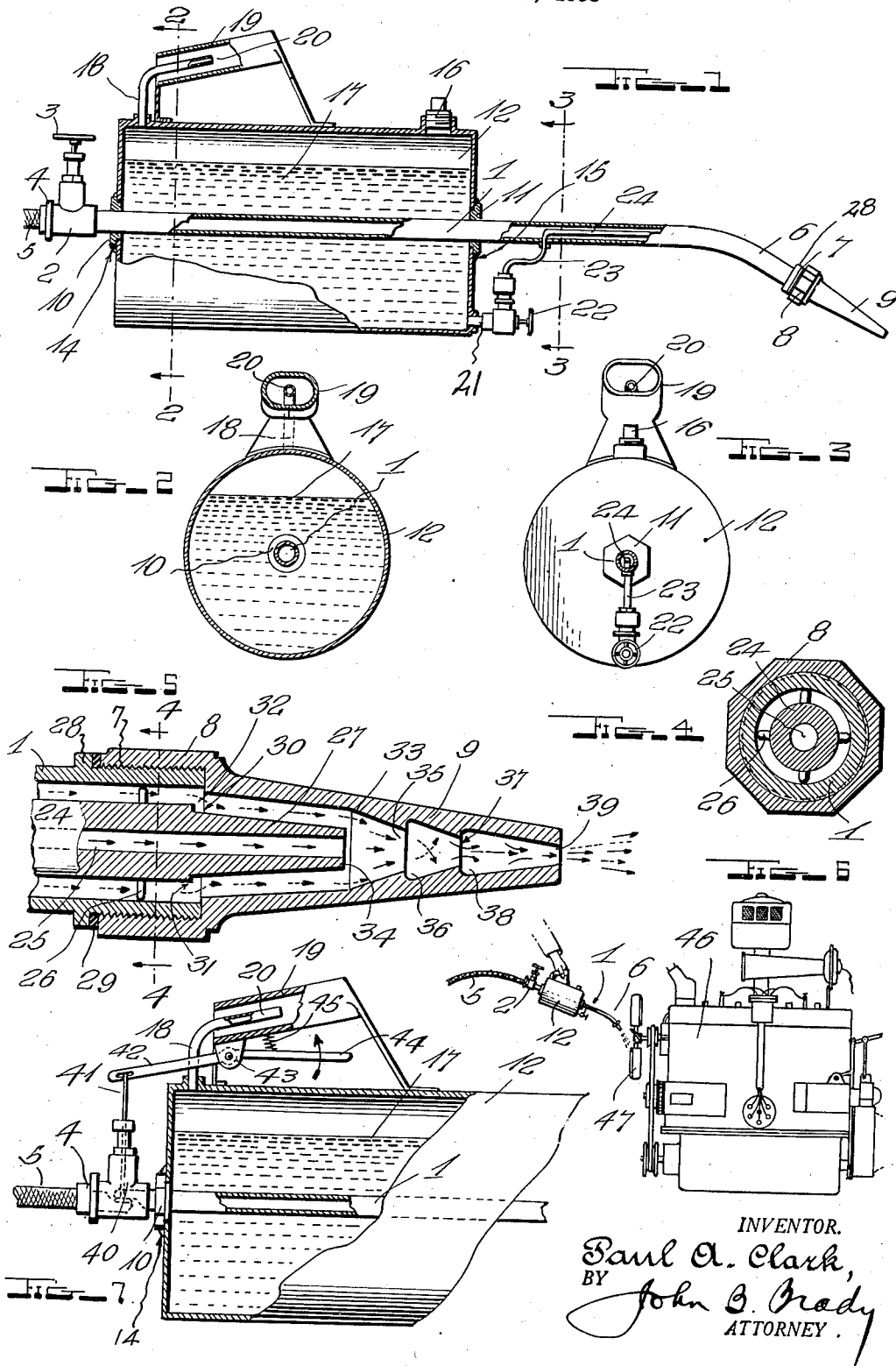
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PRESSURE CLEANING APPARATUS

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PRESSURE CLEANING APPARATUS

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1 Claim. (Cl. 299—84)

My invention relates broadly to pressure cleaning apparatus and more particularly to a construction of portable hand operated pressure cleaning apparatus for effectively removing dirt, grease and surface accumulations of all kinds.

One of the objects of my invention is to provide a construction of pressure cleaning apparatus which may be inexpensively manufactured on a quantity production basis and which may be manually moved within confined spaces for forcing a cleaning spray over the surface to be cleaned.

Another object of my invention is to provide a compact construction of pressure cleaning apparatus embodying a reservoir for cleaning fluid which substantially surrounds a pressure distributing pipe which extends through the reservoir with a tapped connection between the reservoir and a cleaning fluid distributing conduit which extends concentrically within the pressure distributing conduit for delivering pressure cleaning fluid to an atomizing nozzle at the end of the pressure distributing conduit with means for regulating both the pressure and the amount of cleaning fluid supplied to the atomizing nozzle.

Still another object of my invention is to provide a construction of pressure cleaning apparatus having a reservoir for cleaning fluid substantially surrounding a pressure distributing conduit with a connection between the reservoir and a fluid conveying tube and with a pressure equalizing conduit extending from the reservoir and terminating in an opening within the manual supporting means for the pressure cleaning apparatus.

A further object of my invention is to provide a construction of pressure cleaning apparatus embodying a compactly assembled reservoir for cleaning fluid and a pressure distributing conduit having means for manually supporting and moving the pressure cleaning apparatus and under control of the same hand of the operator, adjusting the pressure supplied to the pressure distributing conduit for correspondingly regulating the spraying of cleaning fluid over the surface to be cleaned.

Other and further objects of my invention reside in the construction of pressure cleaning apparatus set forth in the following specification by reference to the accompanying drawing in which:

Figure 1 is an elevational view partially broken away and shown in section for explaining the assembly of the pressure cleaning apparatus of my invention; Fig. 2 is a lateral sectional view

through the pressure cleaning apparatus taken on line 2—2 of Fig. 1; Fig. 3 is a lateral sectional view taken on line 3—3 of Fig. 1; Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 5 showing the relationship of the fluid conveying conduit with respect to the pressure delivering conduit; Fig. 5 is a fragmentary sectional view partially in elevation showing the construction of atomizing nozzle employed in the pressure cleaning apparatus of my invention; Fig. 6 is a pictorial representation illustrating the application of the pressure cleaning apparatus of my invention for the cleaning of automotive engines and parts thereof; and Fig. 7 is a fragmentary elevational view partially broken away and illustrated in section showing one method of adjusting the pressure applied to the pressure cleaning apparatus under manual control of the operator by the same hand with which the pressure cleaning apparatus is supported and directed during cleaning operation.

Referring to the drawing in detail, reference character 1 designates a pressure distributing conduit in the form of a tubular member extending through the reservoir 12 which contains the cleaning fluid. A valve 2 is provided on pressure distributing conduit 1 for controlling through the manually adjustable valve member 3 the pressure delivered through the pressure distributing conduit 1. A hose coupling 4 is provided on valve 2 for establishing connection with the flexible air hose 5. The flexible air hose 5 may lead to the usual compressor available in a service station. The end of the pressure distributing conduit 1 is curved as represented at 6 to facilitate entry of the pressure cleaning nozzle 9 into confined spaces. The end of the pressure distributing conduit 1 is screw threaded at 7 to receive coupling sleeve 8 of the atomizing nozzle 9. Pressure distributing conduit 1 is provided with a flange 28 thereon against which a gasket 29 is seated and against which the end of annular sleeve 8 of nozzle 9 is firmly screwed.

The pressure distributing conduit 1 has spaced flange members 10 and 11 suitably secured thereon in spaced positions depending upon the axial length of the cylindrical reservoir 12. The cylindrical reservoir 12 is centrally apertured at each end and after being centered upon the flange members 10 and 11 is welded to the flange members 10 and 11 as indicated generally at 14 and 15. The reservoir 12 is provided with a filling plug 16 which is screwed into the tubular wall of the container. The reservoir 12 is filled with cleaning fluid represented at 17. A breather pipe

18 extends from the tube of reservoir 12 and projects through the hollow tubular handle 19 which is connected with the upper portion of the reservoir 12. The end of the breather pipe 18 is represented at 20 terminating within the hollow interior of the tubular handle 19 insuring the free flowing of the cleaning fluid 17 through the outlet pipe 21 and through adjustable control valve 22 to outlet tube 23. Outlet tube 23 passes through the wall of the pressure distributing conduit 1 exterior to reservoir 12 and connects to the axially extending tube 24 centrally within pressure distributing conduit 1. The axially extending tube 24 has a central internal bore 25 as shown which is supported in concentric relation to pressure distributing conduit 1 and positively spaced with respect thereto by means of spider arms 26. The axially extending tube 24 is abruptly reduced in cross section at the zone 31 which terminates immediately adjacent the annular interiorly projecting shoulder 30 in atomizing nozzle 9 providing an annular zone 32 intermediate the coating spacially related annular edge portions 30 and 31 through which the air under pressure from pressure distributing conduit 1 is forced. The axially extending tube 24 extends from the abrupt shoulder 31 and is tapered along its exterior wall as indicated at 27 terminating in the end 34 which coacts with the narrowed section 33 of the atomizing nozzle 9. The narrowed section 33 is the reduced section of the nozzle which is interiorly tapered from the interior annular edge 30. Atomizing nozzle 9 is provided with a further interiorly tapered zone beyond the end 34 of the axially extending tube 24 as shown at 35. Immediately adjacent the narrowed zone 35 I provide an enlarged mixing chamber 36 interiorly of the atomizing nozzle 9. This portion of the nozzle is again tapered to a narrowed zone 37 immediately adjacent to which there is an enlarged mixing chamber 38. Chamber 38 has the interior walls thereof tapered to the discharge aperture 39 in the end of the atomizing nozzle.

By reason of the succession of the mixing chambers 36 and 38 intermediate the tapered portions interiorly of the atomizing nozzle, the cleaning fluid delivered from the end 34 of the axially extending tube 24 is broken up into particles and thoroughly atomized under the action of the compressed air rushing by the narrowed gap or zone 32 before being delivered as a high pressure spray from the discharge aperture 39 at the end of atomizing nozzle 9.

In lieu of the manual adjustment of valve 2 by grasping the hand wheel 3 as illustrated in Fig. 1, I may provide means for regulating the pressure control valve by the hand of the operator which also serves to support and direct the pressure cleaning apparatus. In Fig. 7 I have shown a valve 40 disposed between pressure delivering hose 5 and pressure distributing conduit 1 where the valve is adjustable by valve stem 41. Valve stem 41 is connected at one end to the end of rocker lever arm 42 which is pivoted at 43 to a lug member extending from tubular handle 19. Rocker lever arm 42 continues on the opposite side of pivot 43 to form a hand operating lever 44 which is spring pressed by means of spring 45 for normally maintaining valve 40 in

closed position. As the pressure cleaning apparatus is moved over the object to be cleaned and the atomizing nozzle 9 directed to selected positions, the hand of the operator grasping handle 19 may also selectively actuate operating lever 44 for delivering required pressure from pressure supply hose 5 to pressure distributing conduit 1 under control of which the fluid cleaning spray is handled through atomizing nozzle 9.

My invention is applicable for cleaning various surfaces and objects. In Fig. 6 I have shown the pressure cleaning apparatus arranged for cleaning the automobile engine 46 or the fan blades 47. The atomizing nozzle 9 delivers a fine cleaning spray over the surface to be cleaned. The dirt, grease or other scum or coating which is not removed under pressure of the cleaning spray is loosened or so dislodged that it may be readily wiped or scraped from the surface. In using the form of my invention illustrated in Figs. 1 and 6, valves 3 and 22 are adjusted to provide the required flow of air and the quantity of cleaning fluid desired in the spray at the end of the atomizing nozzle. The richness of the spray may readily be controlled by adjustment of either of the valves. The cleaning fluid in the reservoir may readily be replaced through the aperture closed by filling plug 16.

The handle 9 is located adjacent one end of the tank so that when the tank is suspended in normal operation it is in an inclined position as indicated in Fig. 6 so that there is no tendency for any leakage of cleaning fluid to occur through the pressure relief port 20 of breather pipe 18. The handle 9 is so positioned with respect to the center of gravity of the tank or reservoir 12 when loaded that the device will normally occupy the inclined position represented in Fig. 6 while in use.

I have found the pressure cleaning apparatus of my invention very effective in its use. While I have described my invention in certain preferred embodiments, I desire that it be understood that modifications may be made and no limitations upon my invention are intended other than may be imposed by the scope of the appended claim.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

Pressure cleaning apparatus comprising in combination with a reservoir for cleaning fluid, a pressure conveying conduit extending through said reservoir and terminating in a spaced discharge position, a fluid conveying tube connected with said reservoir and concentrically disposed within said conduit with the end of said tube projecting from the end of said conduit, and an atomizing nozzle on the end of said conduit and enclosing the end of said tube, the interior wall of said nozzle and the external surface of the end of said tube being tapered centrally and coacting to produce predetermined velocity of air delivered by said conduit, said nozzle having successive chambers therein of gradually changing diameters adjacent the end of said fluid conveying tube for intermixing particles of cleaning fluid delivered by said tube with the air delivered by said conduit.

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