May 6, 1947. M. C. THOMPSON 2,420,109

CLEANING GUN

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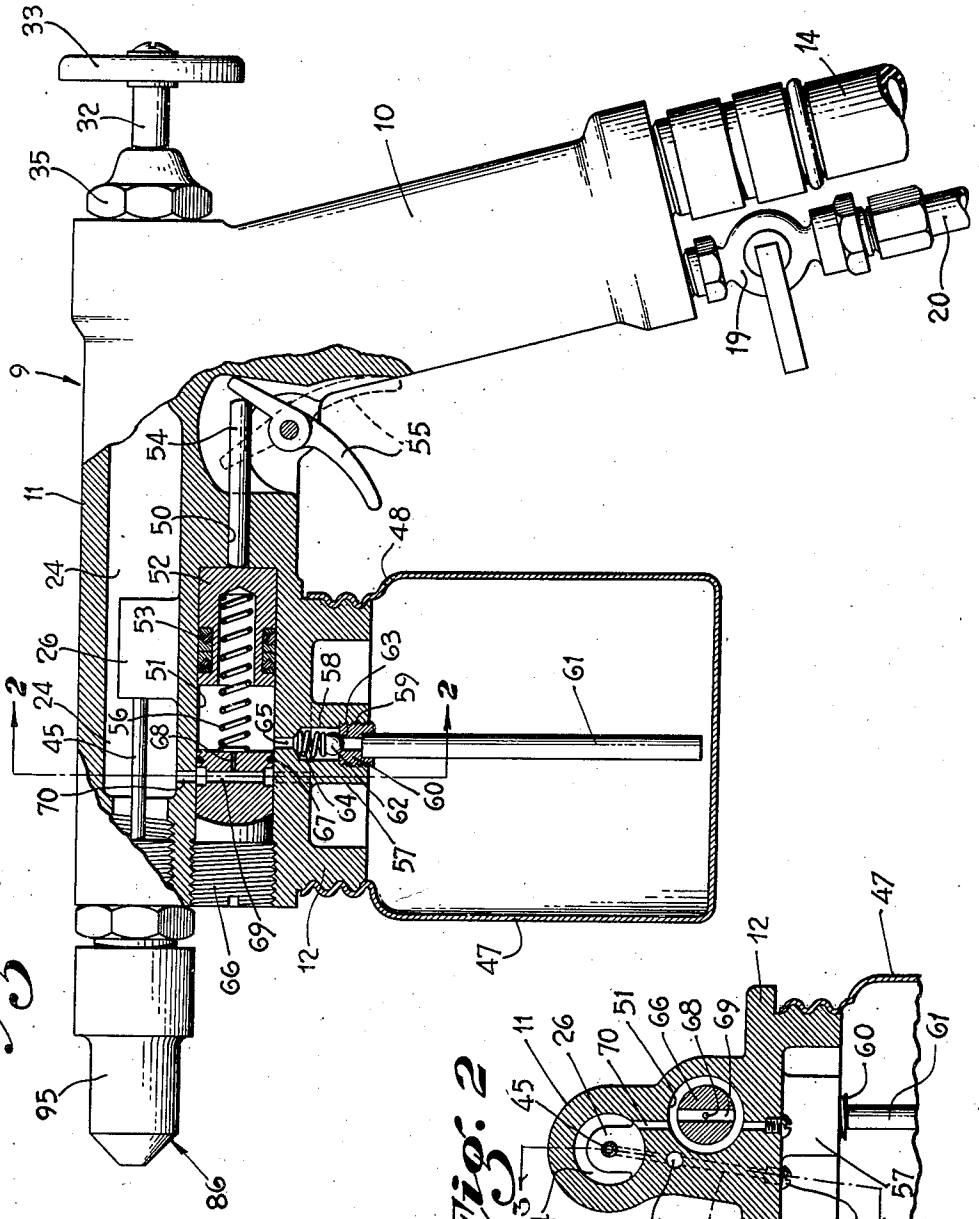

Fig. 1

Fig. 2

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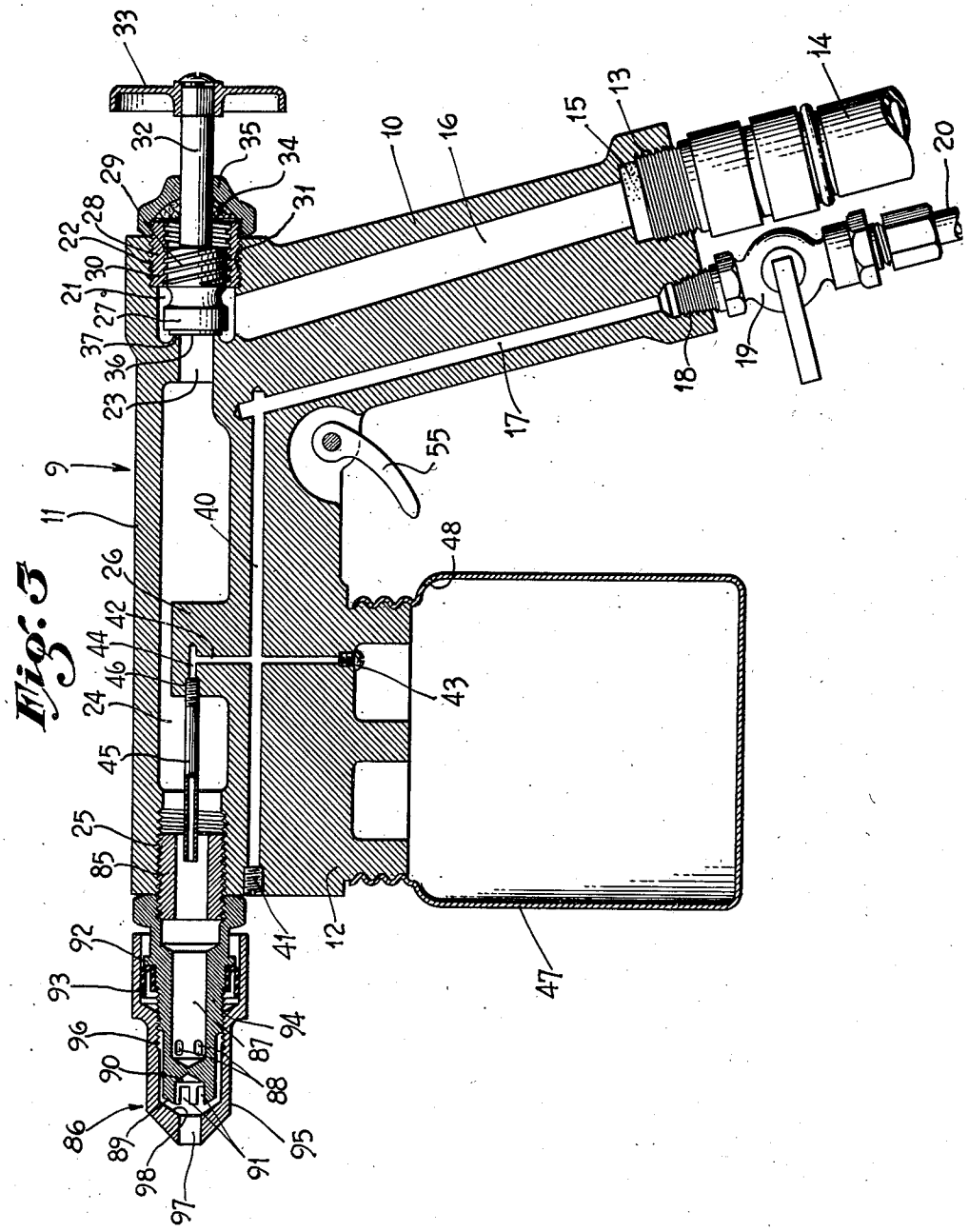

Fig. 5

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Patented May 6, 1947 2,420,109

UNITED STATES PATENT OFFICE

2,420,109

CLEANING GUN

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Application February 7, 1944, Serial No. 521,448

2 Claims. (Cl. 299—84)

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The invention relates to a means for atomizing cleaning liquids of the type shown in my Patents Nos. 2,231,782, dated February 11, 1941, and 2,290,718, dated July 21, 1942, and is particularly adapted to be used in cleaning automobiles, trucks, busses, planes, and other vehicles.

The portable cleaning gun of my invention has a chamber adapted to hold a concentrated cleaning liquid and is adapted to be connected by hoses to a fluid or fluids under pressure. Cleaning liquid is pumped into a stream of fluid or fluids passing through the gun. Suitable control means are provided whereby a spray of fluid or fluids and cleaning liquid or a stream of fluid or fluids without any cleaning liquid may be forced from and regulated at the gun.

The object of the invention is to provide a portable cleaning gun which is economical to manufacture and maintain, and easy to fill, operate and clean.

A further object of my invention is to provide a portable cleaning gun with means for pumping the cleaning liquid from the reservoir assembly of the gun into the fluid stream passing through the gun.

A further object of my invention is to provide means for forcing the cleaning liquid from the reservoir into the fluid stream passing through the gun without subjecting the fluid in the reservoir to pressures greatly in excess of atmospheric pressure or to pressures considerably lower than atmospheric pressure.

My invention has many other objects, advantages, and features, some of which, with the foregoing, will be set forth at length in the following description where I shall outline two forms of my invention, which I have selected for illustration in the drawings accompanying and forming a part of the present specification.

In the drawings:

Figure 1 is a side elevation of the cleaning gun of my invention, partly in section.

Figure 2 is a cross section taken on the line 2—2 of Figure 1.

Figure 3 is a longitudinal section of the cleaning gun taken on the line 3—3 of Figure 2.

The numeral 9 indicates a body member having a handle 10, a longitudinal section 11, and a reservoir supporting portion 12. The handle 10 is provided with internal threads 13 which is

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adapted to be connected to a water hose 14, a gasket 15, and a water passageway 16. The handle 10 is also provided with an air passageway 17 and an internal thread 18 which is adapted to be connected to a valve 19 and an air hose 20.

The longitudinal section 11 is provided with a valve chamber 21, the outer end of which is threaded as indicated at 22, an opening 23 which connects the valve chamber 22 to a mixing chamber 24, the outer end of which mixing chamber 24 is provided with internal threads 25 and a boss 26.

The water passageway 16 communicates with the valve chamber 21 and the flow of water through the gun is adapted to be regulated by means of a valve 27 in the valve chamber 21. The valve 27 is held in place in the body 9 by means of a bushing 28. The threads 29 of the valve engage the internal threads 30 of the bushing 28. The bushing 28 is also provided with external threads 31 which screw into the threads 22 of the longitudinal section 11. The valve 27 is provided with a valve stem 32 having a handle 33. Valve packing gland 34 is maintained in place around the valve stem 32 by means of a cap 35. The handle 33 controls the action of the valve 27 by moving the valve face 36 toward and away from the valve seat 37 which surrounds the opening 23.

The longitudinal section 11 is also provided with an air passageway 40 which communicates with air passageway 17 and which is sealed with a screw plug 41. Air passageway 40 communicates with air passageway 42 which is sealed at its lower end by means of a screw plug 43. The air passageway 42 communicates with an air passageway 44 in the boss 26 and air tube 45 which is threaded into the boss 26 as indicated at 46. The flow of air through the air passageways 17, 40, 42, 44 and 45 is controlled by means of the valve 19. A cleaning liquid reservoir 47 having an opening 48 is adapted to be connected to the reservoir supporting portion 12 of the body 9.

Means are provided to pump cleaning liquid in the cleaning liquid reservoir 47 into the mixing chamber 24. As an instance of this arrangement, the lower part of the longitudinal section of the gun body 9 is provided with a pump assembly in order to pump cleaning liquid from the liquid reservoir 47 into the mixing chamber 24.

A longitudinal bore 50 and a larger longitudinal bore 51 are provided. A piston 52 having fluid seals 53 is adapted to be positioned in the inner end of the bore 51 and is adapted to be operated by means of the rod 54 and the lever action trigger 55, acting against the action of the spring 56.

The boss 57 is provided with a bore 58 and a threaded counterbore 59 into which is threaded a bushing 60 having a tube 61 depending therefrom into the liquid reservoir. A ball check valve 62 is positioned on a valve seat 63 provided on the upper surface of the bushing 60. A spring 64 in the bore 58 is positioned above the ball check valve 62. A passageway 65 connects the longitudinal bore or pump cylinder 51 with the tube 61.

An elongated plug 66 is threaded into the outer end of the bore 51, which plug is provided with sealing means 67, a longitudinal passageway 68 and a passageway 69. The passageway 69 may be provided with a check valve (not shown) and is adapted to connect with the mixing chamber 24 by means of passageway 70.

Means are also provided to atomize the mixture as it leaves the mixing chamber 24, which means may be the same as that shown in my above-mentioned patents. A nipple 85 is threaded into the threaded portion 25 of longitudinal member 11. A nozzle member 86 is adapted to be threaded onto the nipple 85. The nozzle member is provided with a central bore 87 and with a plurality of openings 88 extending from the central bore 87 to the periphery of the nozzle member. The end portion of the nozzle member is beveled as indicated at 89 and is provided with a center cylindrical recess 90 with the wall defining the recess provided with a plurality of slots 91. The slots 91 are directed tangentially with the outer wall of the slots substantially tangent to the cylindrical recess 90. The member 86 is also provided with a shoulder 92 and a pressure seal packing ring 93 is adapted to be placed against said shoulder. The intermediate portion 94 of the nozzle member 86 is threaded and a cap member 95 having threads 96 is adapted to be threaded thereon.

The outer end of the cap 95 is frusto-conical in shape and is provided with a discharge opening 97 and with a beveled portion 98 corresponding to the beveled portion 89 of the nozzle member 86.

The cleaning gun is adapted to be operated as follows:

A supply of cleaning liquid is poured into the cleaning liquid reservoir 47 after which the reservoir is connected to the reservoir supporting portion. The air and water hoses connected to the cleaning gun are then turned on. The water valve 27 is partially opened and the air valve 19 is turned wide open. The cap 95 is adjusted to the proper position to give the desired spray. As the cap 95 is moved inwardly less of the mixture is free to pass around the outer beveled end 89 so that as the cap 95 is moved inwardly a finer spray is obtained.

In order to spray a cleaning solution on the object to be washed, the trigger 55 is retracted, which by means of rod 54 forces the piston 52 to the left against the action of the spring 56, forcing cleaning liquid from the pump cylinder 51 through the passageways 68, 69 and 70 into the mixing chamber 24. When the trigger 55 is released, the spring 56 forces the piston 52 to the right, creating a partial vacuum in the pump cylinder 51. The atmospheric pressure being greater than the pressure in the pump cylinder 51 forces

cleaning liquid through tube 61, lifting ball check valve 62 against the operation of the spring 64 into the pump cylinder 51.

After the cleaning mixture is sprayed on the object to be cleaned, the trigger 55 is released. The valves 19 and 27 are then turned off and the cleaning mixture is rubbed with a rag or mit. The valves 19 and 27 are turned wide open, the cap 95 is moved outwardly to give a straighter and more forceful stream of air and water in order to rinse the object. After the object is completely rinsed, the air and water valves are turned off, although the rinsing operation may be effected by means of water alone.

One of the important advantages of my invention is that pumping means is provided for pumping the cleaning liquid from the reservoir into the fluid stream passing through the gun without subjecting the liquid in the reservoir to pressures varying substantially from atmospheric pressure. The advantages of this construction are many, some of them being that less corrosion takes place, in enabling the reservoir to be constructed of lighter non-ferrous metal, the reservoir is more easily removed from the body of the gun in that pressure does not have to be released, and in that a more positive control is provided with respect to the amount of cleaning liquid forced into the mixing chamber 24.

From the foregoing description taken in connection with the accompanying drawings, the uses, advantages, and operation of my invention will be readily understood by those skilled in the art to which the invention appertains. While I have described the forms of my invention which I now consider to be the best embodiments thereof, I desire to have it understood that the forms shown are merely illustrative and that the invention is not to be limited to the details disclosed herein, but is to be accorded the full scope of the appended claims.

I claim:

1. A cleaning gun comprising a portable body member, a cleaning liquid reservoir attached thereto, a mixing chamber in said body member, valved means for supplying fluid to said mixing chamber, an atomizing discharge nozzle in open communication with said mixing chamber, a pump cylinder, a piston reciprocable in said cylinder, a passageway leading from said reservoir to said cylinder, a separate passageway leading from said cylinder to said mixing chamber, said separate passageway being of restricted cross sectional area for at least a portion of its length, means for moving said piston in a direction to draw cleaning liquid from said reservoir into said cylinder, means for selectively moving said piston in a direction to discharge cleaning liquid from said cylinder through said separate restricted passageway into said mixing chamber whereby to eject at will an atomized spray of fluid containing cleaning liquid or one free therefrom.

2. A cleaning gun comprising a portable body member, a cleaning liquid reservoir attached thereto, a mixing chamber in said body member, valved means for supplying fluid to said mixing chamber, an atomizing discharge nozzle in open communication with said mixing chamber, a pump cylinder, a piston reciprocable in said cylinder, a passageway leading from said reservoir to said cylinder, a separate passageway leading from said cylinder to said mixing chamber, said separate passageway being of restricted cross sectional area for at least a portion of its length, spring means for moving said piston in a direction to

draw cleaning liquid from said reservoir into said cylinder, manually operated means for selectively moving said piston against the action of said spring in a direction to discharge cleaning liquid from said cylinder through said separate restricted passageway into said mixing chamber whereby to eject at will an atomized spray of fluid containing cleaning liquid or one free therefrom.

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REFERENCES CITED

The following references are of record in the file of this patent:

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