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ROTATING NOZZLE SPRAY GUN

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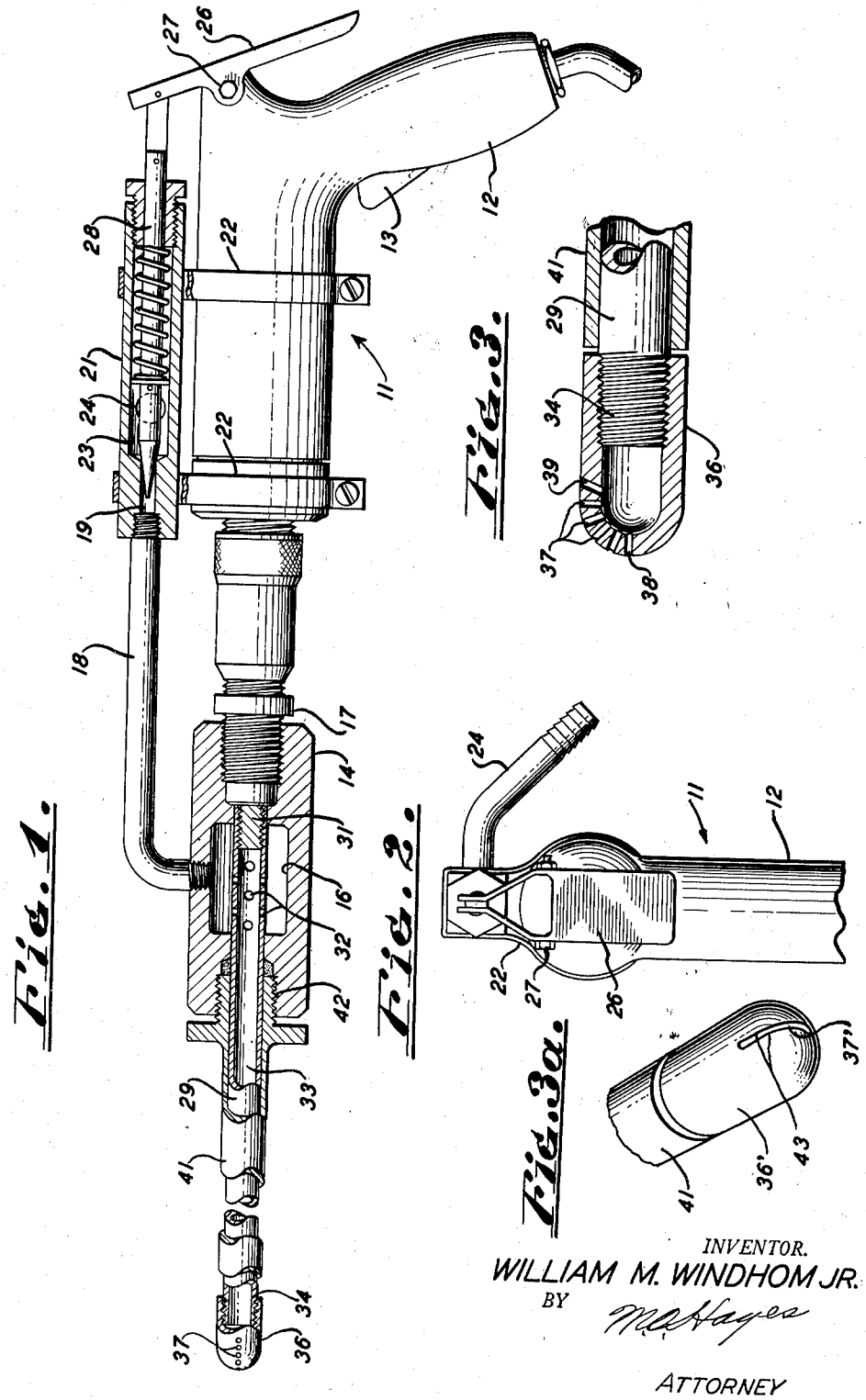

Fig. 1.

Fig. 3.

Fig. 2.

Fig. 3a.

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ROTATING NOZZLE SPRAY GUN

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This invention relates to portable, rotating nozzle spray guns, and more particularly to spray guns in which the material being sprayed is not atomized by use of air.

Heretofore, it has been customary in applying preservatives to metal surfaces, particularly ferrous metals, to use conventional spray guns which atomize the preservative by the use of air as the atomizing element. It has been frequently observed that in applying such preservatives, the use of air as an atomizing agent at high relative humidity promotes rust on the metal surfaces due to the depositing thereon of water droplets along with the preservative.

It is an object of this invention to provide a spray gun which will obviate the above disadvantages by creating a covering spray without the use of atomizing air.

Another object of this invention is to provide a spray gun which insures a complete coverage of surfaces to be coated, particularly internal surfaces, such as cylinder walls.

A further object of this invention is to provide a rotating nozzle spray gun which is simple and inexpensive in construction and requires little skill in operating.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following description.

The apparatus of the instant invention comprises generally a portable rotary power unit having a driving shaft. A preferred power unit is the type having a pistol grip handle depending therefrom and an activating trigger for controlling the power unit. A housing is fixedly mounted to the power unit circumjacent the driving shaft and is provided with a fluid chamber.

A fluid valve connected to the chamber by a conduit is rigidly mounted to the top of the power unit and is linked to a trigger pivotably mounted on the power unit handle for actuating the valve. A rotatable tube extends into the fluid chamber, where it is mounted on the driving shaft, and is perforated to communicate with the chamber. The tube terminates at its exterior end in a hemispherical perforated nozzle. A sleeve fixed to the housing circumjacent the tube serves to support the tube to prevent whipping during rotation.

In operation, fluid under pressure is supplied to the valve. When the valve is actuated the fluid enters the chamber by means of the conduit, passes thru the perforations in the tube

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wall and into the tube, from which it is ejected thru the perforations in the nozzle. Upon actuating the power unit, the shaft rotates, thereby causing the rotation of the tube fixed thereto, and resulting in a fine rotating spray.

A preferred embodiment of the instant invention has been illustrated in the accompanying drawings, wherein:

Fig. 1 is a partially sectioned view of the instant invention;

Fig. 2 is a view looking at the pistol grip end of Fig. 1;

Fig. 3 is an enlarged section of the perforated nozzle of the instant invention; and

Fig. 3a is an enlarged perspective view of a modification of the nozzle.

Referring to Figs. 1, 2, and 3 of the drawings, 11 designates a portable, rotary power unit having a pistol grip 12 and an actuating trigger 13 on the grip for starting and stopping the power unit 11. A housing 14 having a fluid chamber 16 is fixedly mounted onto the threaded front end 17 of the power unit 11.

The conduit 18 connects the fluid chamber 16 with the outlet 19 of a fluid valve 21, which is rigidly mounted to the power unit 11 by means of two brackets 22 clamped around the barrel of the power unit 11. Fluid is supplied under pressure into the valve chamber 23 thru a conduit 24. A second trigger 26, pivotably mounted to the power unit handle at 27, is linked to the valve needle 28 for controlling the valve 21.

A tube 29 extends into the fluid chamber 16 and is threaded onto the end of the driving shaft 31 of the power unit 11. Tube 29 is perforated at 32 within the chamber 16 so that fluid under pressure may freely pass from the chamber into the interior 33 of the tube 29. To the exterior end 34 of the tube 29 is mounted a nozzle 36, having radial perforations 37 extending in a line from the tip 38 of the nozzle 36, to a terminal perforation 39 at an angle of approximately 115° from the nose of tip 38. A supporting sleeve 41 is fixed to the housing 14 by means of the threaded portion 42 and serves to prevent whipping of the tube 29 during rotation.

Operation

The operation of this spray gun is as follows. Let us assume that it is desired to coat the walls of an engine cylinder without removing the piston therefrom. The spark plug of the cylinder is removed and the nozzle 36 of the apparatus is inserted to a position just below the top wall of the cylinder. The trigger 13 and the

trigger 26 are pressed simultaneously, actuating the power unit 11 and the fluid valve 21 respectively. Fluid under pressure entering into the valve chamber 23 thru the conduit 24 is permitted by the retraction of the valve needle 28 to escape thru the outlet 19 into the chamber 16 by means of the conduit 18. From the chamber 16 the fluid enters the interior 33 of the tube 29 thru the perforations 32 and, traveling forward the length of the tube, is ejected thru the perforations 37 in the nozzle 36 mounted at the end 34 of the tube. The fluid leaves the nozzle in a fan shaped series of jets starting from the tip 38 of the nozzle 36 and terminating at the terminal perforation 39 which is directed away from the tip 38.

Since the nozzle 36 is being rotated simultaneously with the ejection of the fluid, the fluid impinges equally on the whole circumference of the cylinder and also on the top wall thereof. By progressively inserting the nozzle deeper into the cylinder, the individual jets sweep successively across the cylinder walls thereby insuring absolute coating of the whole cylinder interior. In practice, it has been found that only one or two turns of the nozzle are necessary to completely coat the cylinder.

Fig. 3a shows a modification of the nozzle 36 having, instead of perforations, a slit 37' which is formed by first slitting the nozzle 36' and then pressing the slit together forming the very thin jetted slit 37', because the outside edges 43 of the slit 37' will be closer together than the inside edges (not shown). The operation of this nozzle is virtually the same as the operation of the perforated nozzle.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

What is claimed is:

1. A portable spray gun comprising a portable rotary power unit having a driving shaft, said power unit having a pistol grip handle depending therefrom and an actuating trigger on said handle for controlling said power unit, a housing fixedly mounted to said power unit circumjacent said shaft, said housing having a fluid chamber therein, a fluid valve rigidly mounted to said power unit, a conduit connecting said fluid chamber to the outlet of said fluid valve, actuating means linked to said valve and pivotally mounted to said power unit handle for actuating said fluid valve, a rotatable tube extending into the end of said fluid chamber, mounted on said driving shaft, and being perforated within said fluid chamber, said tube extending outwardly substantially beyond said housing, a hemispherical perforated nozzle mounted to the exterior end of said tube, a supporting sleeve fixed to the outer end of said housing circumjacent said tube and receiving and supporting said tube to a point adjacent said nozzle, and means for supplying fluid under pressure to said chamber thru said valve.

2. A portable spray gun comprising a portable rotary power unit, said power unit having a pistol grip handle depending therefrom, and an actuating trigger on said handle for controlling said power unit, a housing having a fluid chamber therein, a fluid valve rigidly mounted to said power unit, a conduit connecting said fluid chamber to the outlet of said fluid valve, actuating means linked to said valve and pivotally mounted to said power unit handle for actuating said valve, a rotatable tube adapted to be driven by said driving unit, extending into said fluid chamber and communicating therewith, said tube extending outwardly substantially beyond said housing, a nozzle mounted to the exterior end of said tube, a supporting sleeve fixed to the outer end of said housing circumjacent said tube and receiving and supporting said tube to a point adjacent said nozzle, and means for supplying fluid under pressure to said chamber.

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