United States Patent Office

3,421,702
Patented Jan. 14, 1969

3,421,702

ADJUSTABLE MULTIPLE FLUID ATOMIZING NOZZLE

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Filed Aug. 2, 1967, Ser. No. 657,981
U.S. Cl. 239—418 4 Claims
Int. Cl. B05b 7/10; B05b 17/00

ABSTRACT OF THE DISCLOSURE

The following sets forth a description of a novel multiple fluid adjustable nozzle arrangement wherein the nozzle position is adjustable over an area defined by a spherical plane. The arrangement of the invention permits adjustment of the nozzle relative to a fixed body portion under actual working pressures and without disturbing fluid flow, thereby eliminating the need to shut down, loosen the nozzle from the body portion and readjust its position, which is typical of many prior art devices.

Thus, in an application such as gear lubrication, wherein a lubricant is atomized by air under pressure at the nozzle tip, adjustment of the nozzle to focus the spray pattern on a particular area is possible in accordance with the invention, at any time during operation, and without disturbing the fixed position of the body.

Detailed disclosure

The present invention relates to improvements in multiple fluid nozzles of the type in which two or more fluids are directed, through discrete passages, to a nozzle orifice where they are ejected towards a predetermined work area.

An objective of the present invention is to provide such a duo-fluid nozzle wherein the nozzle orifice may be adjusted to focus the effluent over a substantial range of work areas from a fixed body position. It is an object of the invention, related to the foregoing, to permit adjustment of the nozzle position under operating conditions, and without loosening and re-tightening fluid connections which might result in leakage of one or more fluids which are under pressure during operation.

These and other objects and advantages of the invention will become clear from the detailed disclosure, when taken in conjunction with the drawings, wherein:

FIGURE 1 is a fragmented view of the device, looking directly towards the nozzle orifices, and illustrating the socket and sealing arrangement of the invention.

FIGURE 2 is a side elevation view of FIGURE 1, sectioned along lines 2—2 thereof; and

FIGURE 3 schematically illustrates an exemplary range of spray patterns, demonstrating the range of adjustability available with a conventional flat spray nozzle mounted on the nozzle assembly of the present invention.

While the invention is susceptible of various modifications and alternative constructions, a particular illustrative embodiment is shown in the drawing and will be described hereinafter in detail. It will be understood that the embodiment described is for the purposes of exemplifying the invention, and does not represent the limits thereof. It is the intention to cover all modifications, equivalents and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring now to the drawings, an exemplary Multiple Fluid Adjustable Nozzle constructed in accordance with the present invention is illustrated generally at **10**. The assembly comprises a body portion **12** formed with a pair of fluid inlets **14** and **16** in the shank portion thereof. It will be understood that the position and arrangement of the inlet ports **14** and **16** may vary considerably, to accommodate the system to which the assembly is to be fixed, without departure from the invention. The illustrated form is but one arrangement which assists in illustration of the invention.

The body portion is formed with a flange **19** which defines a socket **20** of hemispherical contour. A ball **22** of complementary diameter is adapted to be received in bearing relation in the socket as illustrated in FIGURE 2. A retaining cap, shown generally at **24** is provided, having an inturned flange **26** and a threaded collar **28**. The flange **19** of the body is likewise threaded at **30**, and with the ball in place within the socket, as illustrated in FIGURE 2, the retaining cap **24** is screwed onto the body portion thereby securing the ball in the socket while permitting limited rotational movement thereof.

The ball **22** serves as an adjustable carrier for a spray head such as exemplary head **33**, shown in FIGURE 2. In the illustrated form, the body of the spray head is turned down to provide a threaded boss **35** which screws into a central bore **37** in the ball **22**. The face of the ball, which extends beyond the confines of the flange **26** of the cap, is provided with a flat **39**. The plane of the flat is preferably transverse to the axis of the bore **37** in the ball. A complementary annular shoulder **41** is machined on the spray head about the boss, and abuts the flat **39** when the spray head is screwed into the ball. A sealing washer, suitably formed of Teflon or the like, is provided at **43** between the flat on the ball and the shoulder.

The spray head is provided with a central fluid passage **45** which communicates directly with a central orifice in a nozzle member **47**, the specific construction of which is known. The nozzle **47** is retained on the spray head by means of a cap **50**, also in a known manner.

It will be remembered that a feature of the invention herein disclosed is that more than one fluid is emitted from the nozzle, and that until the respective fluids arrive at the nozzle orifice, they remain discrete and separate from one another. To this end, two separate distinct fluid paths must be provided between the body inlets and the nozzle **47**. Furthermore, an attribute of the invention is the capability of the nozzle body **33** to be adjusted into any one of a number of positions over a wide range in order that the emission may be directed to a specific area without moving or otherwise adjusting the position of the main body **12**. This arrangement, of course, permits the main body portion to be rigidly attached to a mounting with a permanent plumbing arrangement which will minimize the possibility of leaks to the inlet body which might result from continuous changing of its position.

In order that the fluids may be communicated through the ball joints, there is provided, in keeping with the invention, distinct passages which provide continuous fluid communication over a range of nozzle positions.

Still referring to FIGURE 2, the socket **20** is formed with a depression or pocket **52** at the base thereof opposite the opening in the main body portion. This depression is in communication with one of the ports, such as the inlet port **14**, through a passage **54**, thus providing fluid communication between the inlet port and the base of the socket. In order to provide direct communication through