(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 588 562 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **93307134.2**

(22) Date of filing : **09.09.93**

(51) Int. Cl.[5] : **B05B 1/30,** B05B 1/20

(30) Priority : **15.09.92 GB 9219498**

(43) Date of publication of application :
23.03.94 Bulletin 94/12

(84) Designated Contracting States :
AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

(71) Applicant : **LECHLER LIMITED**
160 Matilda Street
Sheffield, S1 4QG (GB)

(72) Inventor : **Sheldon, William**
2 Rectory Gardens
Todwick, Sheffield S31 0JU (GB)

(74) Representative : **Houghton, David et al**
Hulse & Co. Eagle Star House, Carver Street
Sheffield S1 4FP (GB)

(54) Valve.

(57) A construction comprising a valve characterised by an attachment means (1,2,3), a nozzle means (6) provided on the attachment means (3), a housing means (11) on the attachment means (2) diametrically opposite said nozzle means, piston (12) and associated plunger means (14) located within the housing, said piston and associated plunger means being biased towards the nozzle means and whereby the plunger means closes an outlet (7) through the nozzle means, guide means (15,16) being provided for the plunger means, said guide means extending across said attachment means, there being inlet openings through the guide means, and said guide means being structured to generate laminar flow of any fluid passing through said openings and to the outlet through the nozzle means. Blockage by debris is prevented by having the plunger penetrate the nozzle to a considerable degree to leave a narrow orifice opening at the end of the nozzle.

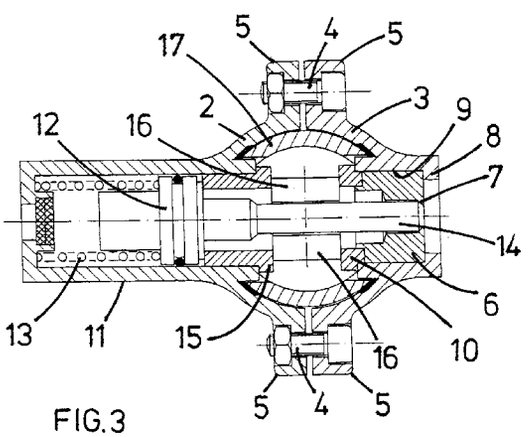

FIG.3

EP 0 588 562 A1

This invention relates to valves and is particularly concerned with spray nozzle valves.

When spray nozzles are used in contaminated environments, and especially when the spray nozzles are only required to be employed intermittently, major problems can occur if debris builds up within the orifice of the nozzle. When pressure is reapplied such debris can compress in the orifice with consequent blocking rendering the nozzle ineffective.

The object of the present invention is to provide a valve, particularly, but not necessarily exclusively, for a spray nozzle, that avoids those disadvantages mentioned above.

According to the present invention, a valve comprises an attachment means, a nozzle means provided on the attachment means, a housing means on the attachment means diametrically opposite said nozzle means, piston and associated plunger means located within the housing, said piston and associated plunger means being biased towards the nozzle means and whereby the plunger means closes an outlet through the nozzle means, guide means being provided for the plunger means, said guide means extending across said attachment means, there being inlet openings through the guide means, and said guide means being structured to generate laminar flow of any fluid passing through said openings and to the outlet through the nozzle means.

It will readily be understood that the valve of the invention is intended to be secured to a fluid feed pipe and to secure the nozzle means in an outlet from the feed pipe. Thus, the attachment means may be a generally cylindrical two-part clamp, one clamp part being provided with a nozzle and the other clamp part being provided with the housing for the piston and plunger means, the feed pipe being provided with a hole diametrically opposite the outlet, and of a diameter to enable the introduction therethrough of the guide means for the plunger means. It is therefore simply the case of securing the two-part clamp to the pipe such as by appropriate bolts to locate the nozzle against the outlet from the pipe and to position the plunger means, the biasing means associated with the piston means, for example a spring, causing the plunger means to close the outlet through the nozzle means.

When activation of the spray nozzle is required, pressure fluid is supplied to the feed pipe and which passes through the openings in the guide means to apply pressure to the piston until the biasing force is overcome, and when the plunger means is withdrawn to open the nozzle opening. Particularly when, and as is desirable, a nozzle insert is provided, the arrangement is such that the plunger means in its closed position penetrates to an appreciable degree the nozzle insert leaving no more than a small exposed orifice opening and which of itself may be of frusto-conical configuration. It will therefore readily be appreciated that, irrespective as to the environment in which the spray nozzle is intended to operate an no matter how intermittent is the required operation of the spray valve, it is virtually impossible for contamination, such as in the form of dirt or debris, to penetrate into the nozzle opening and be compacted there, with a consequent substantial elimination of any risk of the nozzle becoming blocked during its period of inactivity.

By ensuring laminar flow of liquid to the nozzle, there is the substantial reduction of turbulence in the liquid flow emerging from the nozzle, and consequent significant improvement on the effectiveness of the spray jet from the nozzle.

One embodiment of the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a front elevation of valve means in accordance with the invention;

Figure 2 is a rear elevation of the valve means of Figure 1;

Figure 3 is a sectional side elevation on the line III-III of Figure 1; and

Figure 4 is a perspective view of one form of employment of the valve means of Figures 1 to 3.

In the drawings, a valve means in accordance with the invention is formed by an attachment means 1 formed by two cooperating part-circular members 2, 3 to embrace around a pipe, and secured together by bolts 4 extending through flanges 5 on the part-circular members 2, 3. On the member 3 is a nozzle 6, the orifice 7 of which is of frusto-conical configuration, the nozzle lying within an annular flange 8 of a bore 9 through the part-circular member 3, there being a sealing ring 10 to seal the nozzle to the bore.

To the opposite side and on the part-circular member 2, is a housing 11 within which is a piston 12 spring-loaded by a spring 13, the piston having a plunger 14 that extends across the part-circular members 2 and 3, to enter the nozzle 6, the spring 13 biasing the piston and such that the valve means is in a normally closed condition with the end of the plunger 14 closing the orifice 7 of the valve of the nozzle 6. The orifice through the nozzle is formed by a first inwardly extending, counterbored portion terminating in the orifice 7 itself of small depth, and such that the plunger in the closed position penetrates into the nozzle to a considerable degree.

The plunger extends through a guide means 15 also extending diametrically across the part-circular members 2 and 3, the guide means 15 having spaced, radial plate-like members 16 the inner edges of which form a guide for the plunger, but which serve the additional function of providing access openings between the plates to permit fluid to flow to the nozzle and causing a laminar flow of fluid to and through the nozzle.

Thus, it is simply a case of forming two diametrically opposed holes in a pipe 17 or, as is particularly

shown in Figure 4, the provision of three pairs of opposed holes to provide three valve means and hence spray jets, at the same location, and clamping the or each set of part-circular members 2, 3 around the pipe and such that the nozzle 6 extends through a respective hole in the pipe and the plunger extends through the opposite respective hole, a respective guide/laminar flow means 15 bridging respective holes.

At the point that a spray jet is required, pressure water is fed to the pipe 17 at an inlet end, and with the opposite end of the pipe 17 closed, there is a relatively rapid and progressive buil-up of pressure within the pipe until such as pressure on the piston is sufficient to overcome the loading of the spring 13 causing a retraction of the piston along the housing 11 and the withdrawing of the plunger closing the orifice 7, and when a spray jet issues from the or each nozzle 6.

By providing the laminar flow control means 15 within the pipe, turbulence of fluid issuing from the nozzle orifice 7 is reduced to a considerable degree in comparison with the simple opening of an outlet hole in the pipe and as a consequence, a considerably more effective jet of fluid is caused to issue. Also by forming the orifice in the nozzle of generally frusto-conical configuration, and with the plunger 14 penetrating the nozzle to a considerable degree, there is the substantial, if not complete avoidance of foreign matter lodging in the nozzle orifice irrespective as to the environment in which the valve means is intended to operate and irrespective as to the longevity of any period where spraying of fluid is not required.

Claims

1. A valve characterised by an attachment means (1, 2, 3), a nozzle means (6) provided on the attachment means (3), a housing means (11) on the attachment means (2) diametrically opposite said nozzle means, piston (12) and associated plunger means (14) located within the housing, said piston and associated plunger means being biased towards the nozzle means and whereby the plunger means closes an outlet (7) through the nozzle means, guide means (15, 16) being provided for the plunger means, said guide means extending across said attachment means, there being inlet openings through the guide means, and said guide means being structured to generate laminar flow of any fluid passing through said openings and to the outlet through the nozzle means.

2. A valve as in Claim 1, characterised in that the attachment means 1 is a generally cylindrical two-part clamp (2, 3), one clamp part (3) being provided with the nozzle (6) and the other clamp part (2) being provided with the housing for the piston (12) and plunger means (14).

3. A valve as in Claim 1 or Claim 2, characterised in that the attachment means are secured to a feed pipe (17), the feed pipe being provided with diametrically opposed holes, one to receive the nozzle (6) and the other to be co-axial with the housing (11) and through which the plunger (14) passes.

4. A valve as in Claim 3, characterised in that the guide means (15, 16) extend across the feed pipe co-axially with the diametrically opposed holes.

5. A valve as in any of Claims 1 to 4, characterised in that the piston (12) is biased by biasing means (13) to cause the plunger (14) to close an orifice (7) through the nozzle 96).

6. A valve as in Claim 6, characterised in that the orifice (7) is of generally frusto-conical configuration at the end of a counterbore through the nozzle (6).

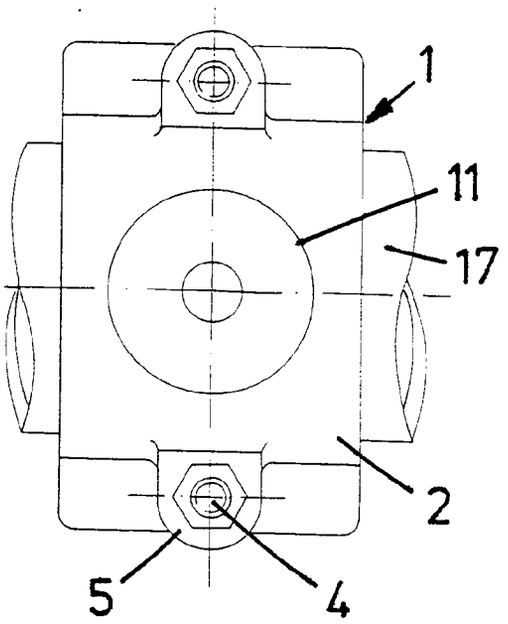

FIG.2

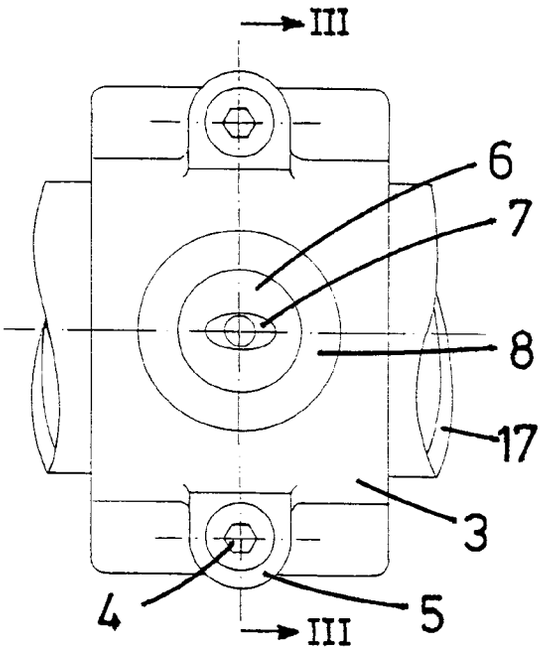

FIG.1

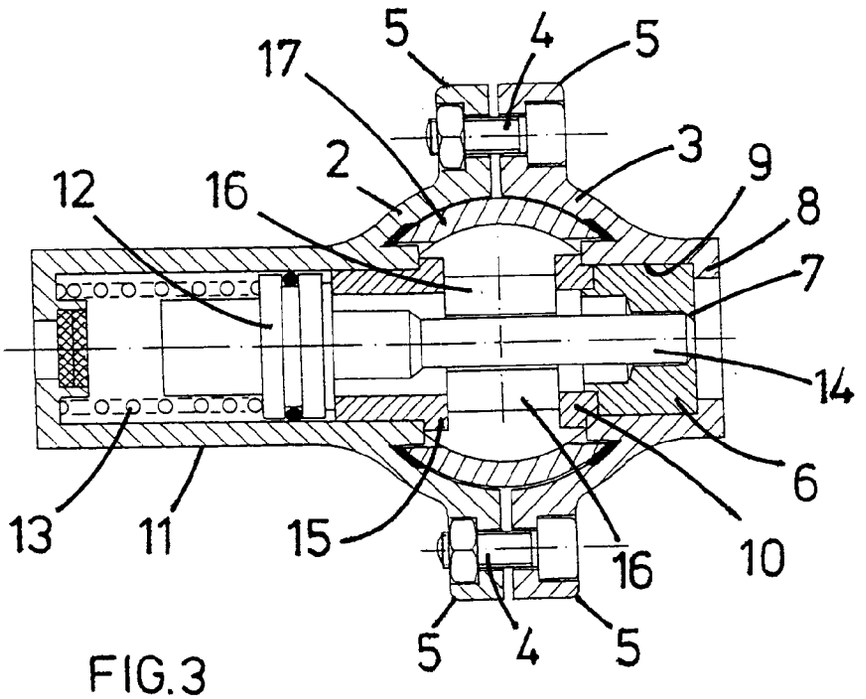

FIG.3

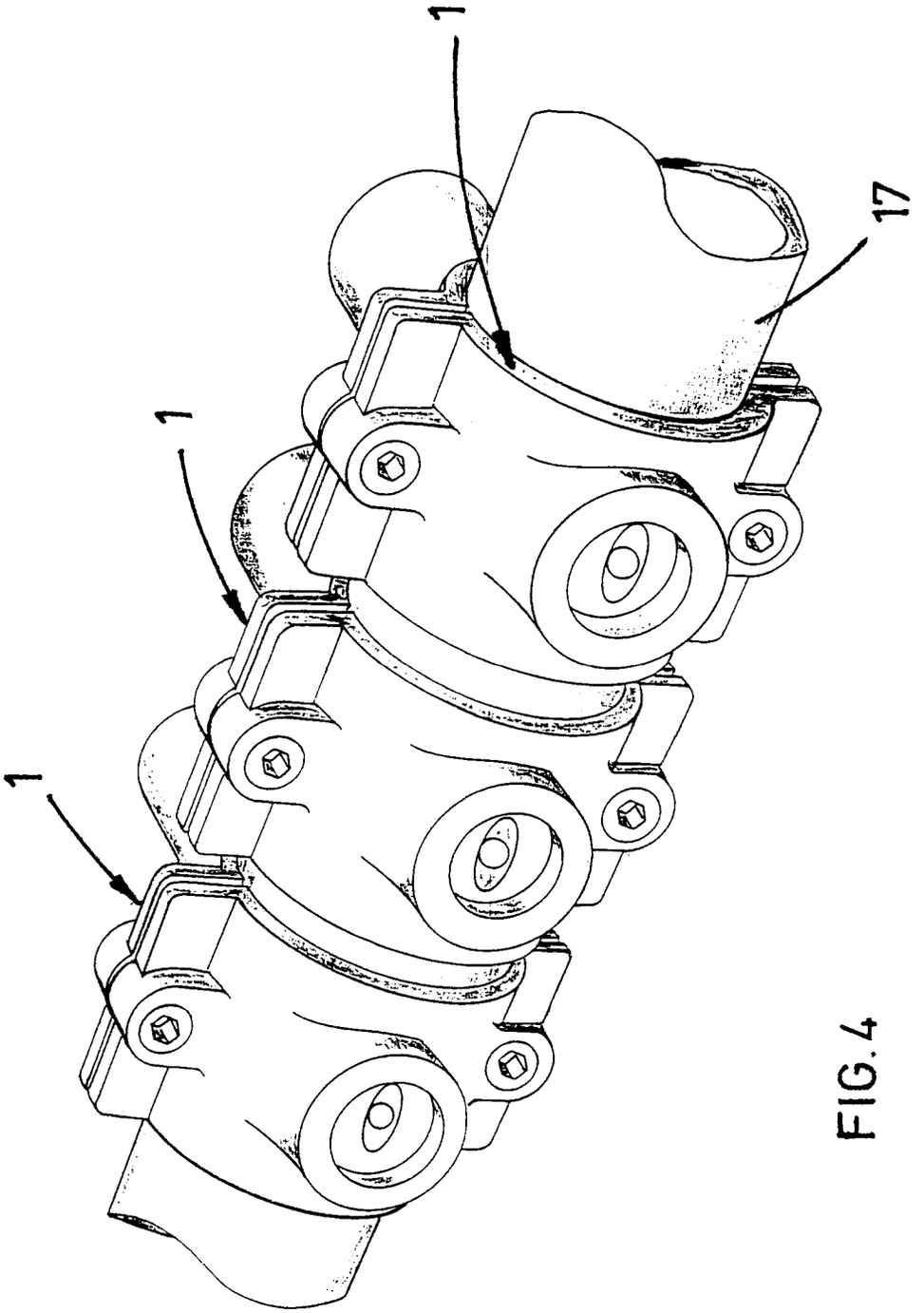

FIG.4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 30 7134

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	FR-B-2 407 751 (ACMAR) * figure 1 *	1	B05B 1/30 B05B 1/20
A		2-5	
A	DE-B-2 137 118 (LECHLER) * figure 1 *	2,3	
A	US-A-4 081 141 (COURSON ET AL) * figure 1 *	3,4	
A	US-A-4 852 773 (STANDLICK ET AL) * figures 1,3 *	1,6	
A	EP-A-0 040 068 (NORDSON) * figures 1,2 *	1,6	
A	US-A-1 879 012 (ARMSTRONG) * figure 1 *	1,6	
A	US-A-3 788 546 (BAILEY ET AL) * figure 1 *	6	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	US-A-3 820 723 (SHIPINSKI) * figure 2 *	6	B05B B03B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	29 NOVEMBER 1993	SCHLABBACH M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)