

March 31, 1970

R. M. PETRUCCI ET AL
CHEMICAL FEEDING APPARATUS

3,503,418

Filed March 4, 1968

FIG. 1

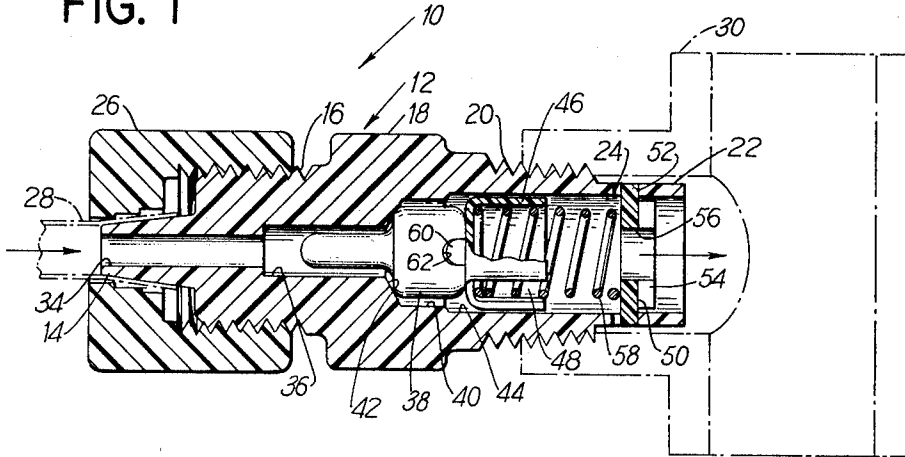


FIG. 2

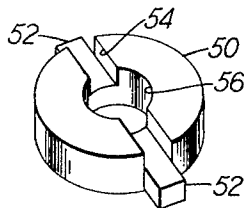


FIG. 3

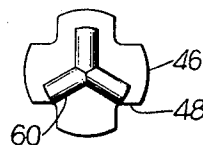
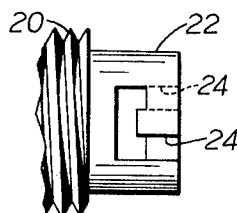


FIG. 4



INVENTORS
RAYMOND MARK PETRUCCI
THEODORE CLIFFORD DE PAOLA
BY

Thuray Schaff
ATTORNEY

1

3,503,418

CHEMICAL FEEDING APPARATUS

Raymond Mark Petrucci, Waterbury, and Theodore Clifford De Paola, Meriden, Conn., assignors to American Machine & Foundry Company, a corporation of New Jersey

Filed Mar. 4, 1968, Ser. No. 710,315

Int. Cl. F16k 15/02, 17/04

U.S. Cl. 137—515

5 Claims

ABSTRACT OF THE DISCLOSURE

An anti-syphoning valve for use between the pump of an additive fluid and a watering system having means for permitting fluid to flow in one direction only and upon operation of the pump only.

The invention here disclosed relates to anti-syphoning devices, and, in particular, to improvements in valves to prevent the undesired flow of liquid additives to a material needing treatment, when the additive transfer mechanism, usually a pump, is not in operation. The device of the present invention has specific application, for example, in connection with the introduction of a chlorine bearing liquid into a domestic water system as described in our pending application Ser. No. 595,479, now Patent No. 3,397,642, filed Nov. 18, 1966. In the aforementioned application there is disclosed a diaphragm pump for feeding chlorine, for example, dependent upon need and operation of the water system. The device of the present invention is adaptable as a valve control preventing the unwanted feeding of chlorine when such a pump is not in operation.

It is a specific object of the invention to provide a valve of the class mentioned which is of simple and sturdy construction, requiring little or no skill to assemble, install or repair, and which may be operated for long periods without maintenance.

It is a further object to provide an anti-syphon valve having novel means of centralizing and loading the flow controlling valving means therein.

The above objects and others, and advantages not explicitly set forth will be apparent from the following specification and appended drawings, of which

FIGURE 1 is a longitudinal center-line section of one embodiment of the invention,

FIGURE 2 is a perspective view of the spring abutment on an enlarged scale,

FIGURE 3 is an end view of the spring guide, and

FIGURE 4 is a fragmentary side elevation of the body of FIGURE 1 as seen in the direction indicated at line 4—4.

Throughout the drawings like parts are indicated by like numbers.

Turning first to FIGURE 1: The complete unit 10 comprises a body 12 having a plurality of diameters, the smallest of which is the tapered portion 14. Viewing from left to right portion 14 is succeeded by the male threaded part 16, followed by the major diameter portion 18, having, preferably, a ribbed or knurled outer surface suited for digital gripping. Beyond is a second male threaded part 20, which in turn gives way to a generally plain cylindrical section 22 having a pair of J slots 24 formed in its outer end (see FIGURE 4), whose function will be later explained. A union nut 26 engages the thread at 16 and, in cooperation with the tapered portion 14, may be used to make a leakproof connection between a convention tube 28 leading for example from a diaphragm pump not shown. The other threaded part 20 provides means for installing the present device into a pipeline of the water system (not shown) via, for ex-

2

ample, a T fitting as indicated by dotted lines 30. It will be understood that the above described connections form no part of the inventive device, but are merely illustrative of its environment when in use.

As shown, the body 12 is hollow and has a through passage of varying diameter. Again viewing FIGURE 1 from left to right, the smallest diameter passage 34 is simply a conduit for fluid, which would flow in the direction indicated by the arrows, it is succeeded by a slightly larger passage 36 affording space for fluid flow and also for the stem of a poppet valve 38. Passage 36 in turn gives way to chamber 40 of somewhat larger diameter, wherein is situated the head of the valve 38 with adequate radial clearance for the passage of fluid. The shoulder formed at the transition from passage 36 to chamber 40, serves as a seat 42 with which the valve 38 may have fluid tight engagement. The passage is further enlarged, as at 44, to house a cup-like spring guide 46 having a wall longitudinally slotted, as shown at 48, in a convenient number of places to permit the passage of fluid. A spring abutment 50 is also carried in the enlarged passage 44. As shown in FIGURE 2, the abutment 50 is provided with a pair of lugs 52 for locking engagement, in the well known manner, in J slots 24 and a screw-driver slot 54 to facilitate insertion or removal. An axial opening 56 to permit the flow of fluid is also provided in the abutment 50. A compression spring 58 is located partly within said guide 46 and has one end in thrusting engagement with the abutment 50 so that thrust from the said spring is transmitted through the guide 46 to the head of valve 38, which is thereby urged to its seat 42. As will be seen by reference to FIGURES 1 and 3, the end of guide 46 has three ribs 60 extending radially and axially thereof; they are arranged symmetrically and are proportioned to engage with suitable grooves 62 in the head of valve 38 whereby the latter is centered in chamber 40 and held concentric with its seat 42.

Generally speaking there are two types of service in which a valve of the class disclosed may be used. In the first type the installation would be substantially as shown in FIGURE 1 where an additive is delivered by a pump, such as a small diaphragm pump (not shown) via tube 28 to a T-connection located 30 in the suction line of a pump drawing water for example from a well. Here the suction of the water pump would be effective at the T-connection and could, but for the valve, draw additive through the additive diaphragm pump without the additive pump being actually operated. A similar effect could occur if the water pump were shut off and it had no foot valve in its suction line. In a case of this nature it is necessary that the spring 58 so load the valve 38 that the suction encountered cannot move it from its seat. In this case it will be apparent that the valve will operate to pass fluid only when fluid is delivered through tube 28 in sufficient pressure to overcome the biasing force of spring 58 on the poppet valve 38. Whenever the pump leading to tube 28, or any other source of fluid to tube 28 is not in operation the valve will refuse to operate and this chlorine will not be syphoned into the water system.

In the second class of service the valve may be installed without tube 28 so as to admit air into a line when the pressure therein becomes sub-atmospheric; in this case the valve acts as a syphon breaker and the spring 58 must allow the valve to open at a very low head. Because of the drastically dis-similar load conditions which may be encountered, two different springs are needed and here the great ease of spring installation afforded by the novel abutment is of noteworthy value.

With the exception of spring 58 the entire structure here disclosed may be, and preferably is, made of

3

moulded synthetic plastic parts needing no machining or finishing and is easily assembled without the use of tools other than a screw-driver to turn the abutment 50 to its locked position; the valve 38 is most desirably made of a moderately soft resilient material such as Hypalon with about an 80 Durometer reading.

It will thus be observed that we have provided a simple, economical device which prevents syphoning in a water system. It will be appreciated that various changes and modifications may be made to the structure described. Therefore, it is intended that the foregoing description is illustrative only of general principles involved and that the invention is to be limited only in accordance with the scope of the following claims.

We claim:

1. A device for controlling fluid flow comprising a body having a passage wherethrough fluid may flow in one direction, a valve seat within said passage, a valve having a grooved head seatable on said seat to close said passage against fluid flow in other than said one direction, resilient means within said passage urging said valve onto said seat, said valve being movable from said seat by fluid pressure against said resilient means to open said passage to fluid flow in said one direction, an abutment affording a point of reaction for said resilient means and guide means having a plurality of ribs cooperating with the grooved head of said valve interposed between said valve and said resilient means affording support thereto and centering said valve in said passage.

2. The device of claim 1 wherein, said passage has a plurality of diameters substantially co-axial with each other, the locus of a transition from one diameter to another in said passage affords said valve seat and movement of said valve, said guide and said resilient means to occur entirely within said passage.

3. The device according to claim 1 wherein the resilient means comprises a helical spring extending along the axis of said passage with one end abutting the abutment and with its other end supported by and abutting said guide, said guide comprises a cup having a bottom wall and having an axially extending wall in sliding guiding engagement with a wall of said passage and surrounding a portion of said spring, said valve having an annular area suited for fluid-tight sealing engagement with said seat and a non-planar area transverse to said passage held concentric with said seat and spaced, at least in part from the wall of said passage whereby space is provided to allow the flow of fluid therethrough.

4. A valve of the class described comprising,

- (1) a body having a through passage, said passage having an internal transverse shoulder constituting a valve seat and said body having,
 - (a) at one end an area suited for sealing engagement with a tube and followed by
 - (b) a male threaded portion adjacent said area suited for engagement with a union nut of known design, and followed by
 - (c) a middle part suited to be gripped for manipulation and said part being followed by
 - (d) a second male threaded portion adapted for screw thread engagement within a pipe fitting and followed by

4

- (e) a nominally cylindrical part smaller in diameter than the root diameter of said second male threaded portion whereby it may pass within a pipe fitting into which said second male threaded portion may be screwed

- (f) the wall of said cylindrical part having a J slot of known design

- (2) a poppet valve formed at least in part of resilient material, located within said passage and being shaped and adapted to

- (a) contact said seat for fluid-tight passage closing engagement therewith

- (b) permit fluid flow through said passage when not in contact with said seat

- (c) interlock with a guide whereby said valve and said guide are maintained in constant axial alignment.

- (3) said guide comprising a cup like member having an axially extending wall and a bottom wall shaped and adapted to interlock with said valve as aforesaid and

- (a) said axially extending wall being split in an axial direction, said split affording space for the flow of fluid

- (4) a helical compression spring situated in said passage, having one end supported by said member and its other end abutting an abutment being biased to press said member in interlocking engagement with said valve whereby said valve is urged on to said seat and

- (5) said abutment comprises a disc-like member located transversely of said passage to engage said other end of said spring and having a radially extending lug for interlocking engagement with said J slot whereby the reactive bias of said spring is transmitted to said body and whereby said abutment, said body, said seat, said valve and said cup-like member and said spring describe a closed stressed loop.

5. The device according to claim 3, wherein:

said abutment comprises a washer-like body having a radially extending lug, and said body is provided with a J slot at its end, said abutment being interlockingly engageable with said J slot for anchorage to said body against axial thrust imposed by said spring.

References Cited

UNITED STATES PATENTS

3,297,049	1/1967	Mosovitz	137—540
3,363,646	1/1968	Foreman	137—540
3,373,894	3/1968	Johnson.	

FOREIGN PATENTS

896,690	5/1962	Great Britain.
---------	--------	----------------

WILLIAM F. O'DEA, Primary Examiner

WILLIAM H. WRIGHT, Assistant Examiner

U.S. Cl. X.R.

137—540, 543.19; 251—337