United States Patent

Stehlin

[15] **3,684,240**

[45] **Aug. 15, 1972**

[54] **VALVES**

[72] Inventor: **Theodore A. Stehlin,** 54 Grace Walk, Pasadena, Calif. 91105

[22] Filed: **Nov. 27, 1970**

[21] Appl. No.: **93,353**

[52] **U.S. Cl.**.....**251/252,** 251/367, 285/DIG. 14, 285/330, 85/5 B, 137/550

[51] **Int. Cl.**.....**F16k 31/528**

[58] **Field of Search** .....137/550; 251/215, 251, 252, 251/256, 367; 285/DIG. 14, 330; 85/5 B; 24/213, 215

[56] **References Cited**

UNITED STATES PATENTS

2,642,256	6/1953	Stehlin	251/252
2,710,763	6/1955	Gilbert	285/330 X
2,629,577	2/1953	Luterick	251/21 S
1,585,163	5/1926	Milner	251/252 X
1,897,572	2/1933	Cornell	137/550 X
2,896,905	7/1959	Stehlin	251/251 X
1,722,723	7/1929	Walker	85/5 B
2,195,492	4/1940	McDonald	285/330
2,583,786	1/1952	Marzucco	85/5 B

Primary Examiner—Henry T. Klinksiek
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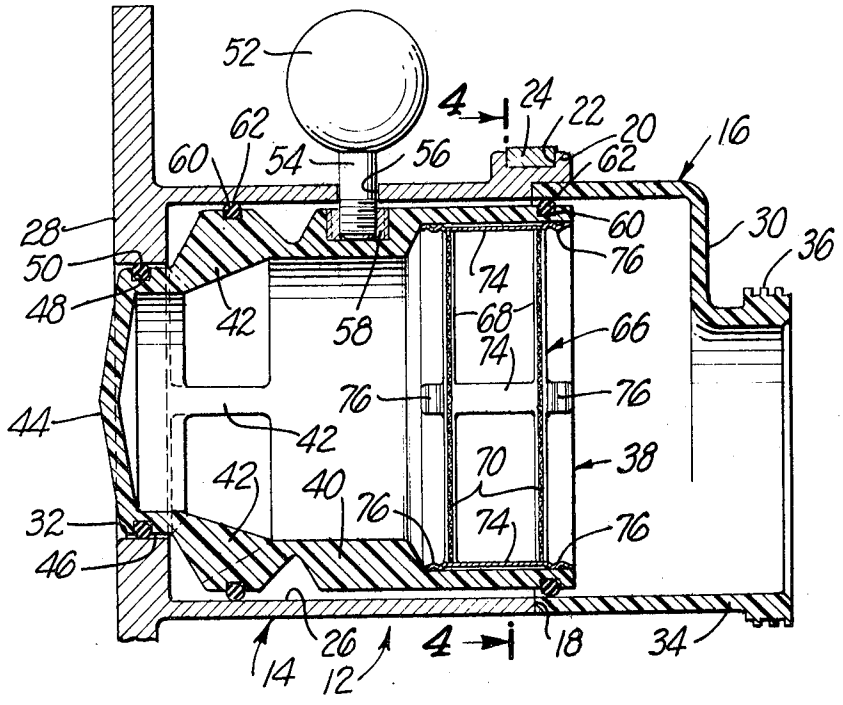
[57] **ABSTRACT**

A valve particularly adapted to be used in the bottom of a tank and particularly desirable for use in connection with food products because of the ease with which it may be disassembled and cleaned can be constructed utilizing a two part cylindrical housing having an inlet opening in one end of the housing. A movable poppet is located within the housing in such a manner that a handle attached to the poppet body and extending out through a diagonal slot in the housing may be moved in the slot so as to move a poppet head serving as a valve closure with respect to this inlet opening. Seals are carried by the poppet body so as to engage the interior of the housing in order to prevent leakage out around the handle.

2 Claims, 8 Drawing Figures



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SHEET 1 OF 2

FIG. 1.

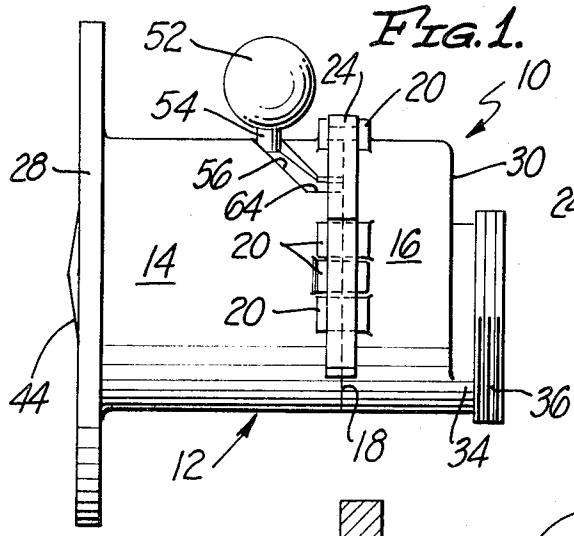

FIG. 2.

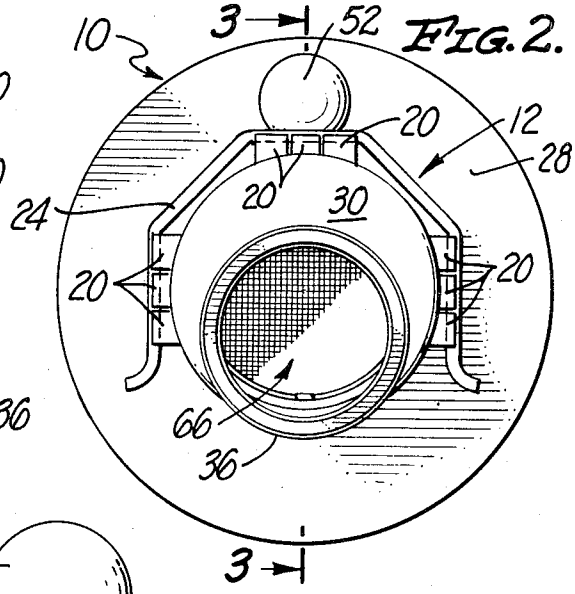

FIG. 3.

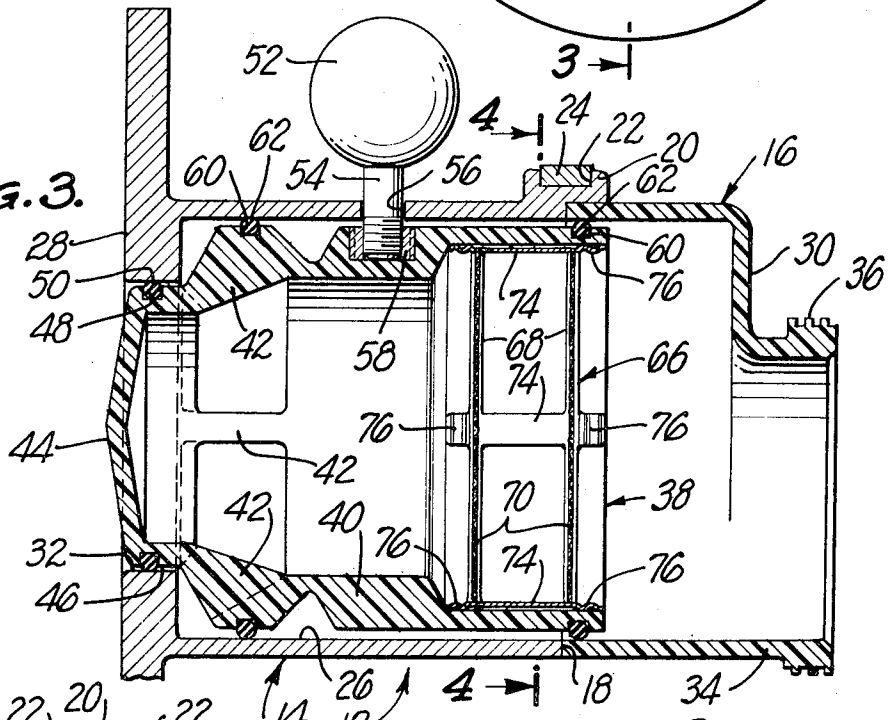

FIG. 4.

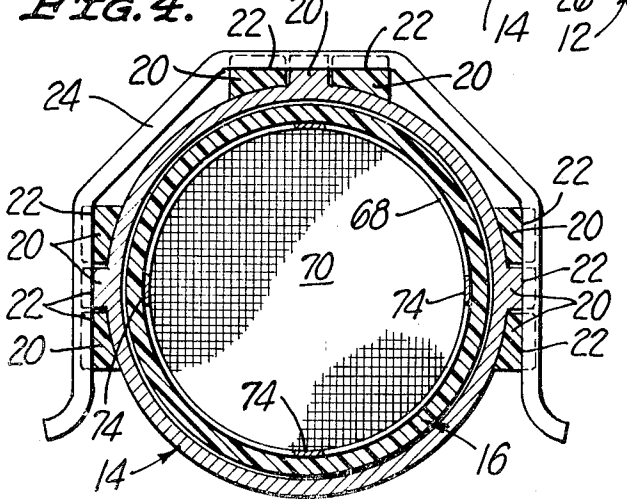

FIG. 5.

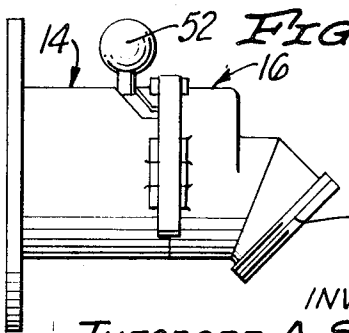

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FIG. 6.

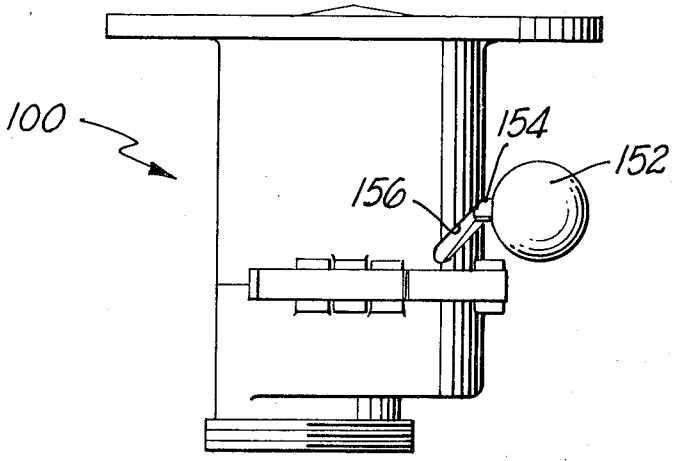


FIG. 7.

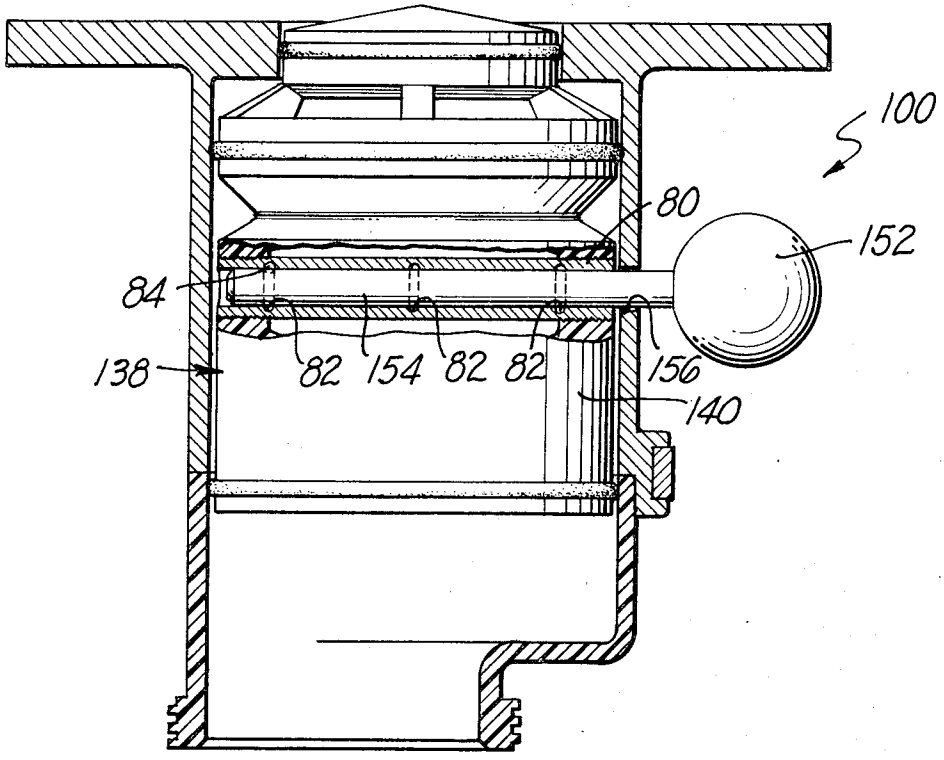
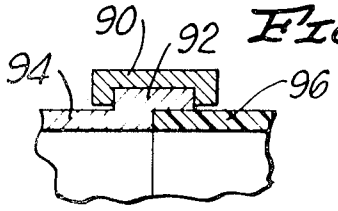


FIG. 8.



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VALVES

BACKGROUND OF THE INVENTION:

Valves of various types have been used since virtually the advent of plumbing. The number of different types of valves used for different applications is extremely large. In spite of this there is a very definite need for new and improved valves in certain specialized fields.

One field where this need is manifested is in the food and dairy field. In this field it is frequently necessary to install a valve at the bottom of a tank so that the contents of the tank may be easily drained. The valve used for such an application must, of course, be capable of exercising or performing the established function of a valve with as little difficulty as possible. Other factors are, however, highly important to this field.

In the food and dairy field cleanliness is extremely important. Prior valves used in this field have tended to be somewhat difficult and complex to take apart for cleaning purposes. Frequently they have also been relatively difficult to clean once disassembled. With present labor costs it is considered imperative that any acceptible valve in the food and dairy field be constructed so that it can be disassembled in a minimum of time with a minimum of difficulty and so that it can be easily cleaned in a very short period.

SUMMARY OF THE INVENTION

An objective of the present invention is to provide new and improved valves. The invention more specifically is directed to providing new and improved valves which are primarily intended to be used in the food and dairy field, but which are also capable of being used for other applications. A further objective of the present invention is to provide valves as herein described which can be incorporated directly into the bottoms of tanks.

Other objectives of the invention are to provide valves for purposes as herein indicated which may be easily and conveniently constructed at a comparatively nominal cost, which may be easily and conveniently disassembled and assembled by even comparatively unskilled labor in compratively short time intervals, and which when disassembled may be easily and conveniently cleaned with a minimum of difficulty.

In accordance with this invention these objectives are achieved by providing valves constructed so as to include a cylindrical housing body having an end wall with a centrally located inlet opening. The housing body in such a valve has a diagonally extending slot which is traversed by an outwardly extending handle extending from a movable poppet within the housing. Such a poppet has a cylindrical poppet body carrying a closure head for the inlet opening. By moving the handle relative to the housing the poppet is both rotated and moved longitudinally of the housing so as to move the closure head relative to the inlet opening so as to achieve a valving function. Seals are provided has hereinafter indicated.

BRIEF DESCRIPTION OF THE DRAWINGS:

The details of the construction of valves in accordance with this invention are best more fully explained with reference to the accompanying drawings in which:

FIG. 1 is a side elevational view of a valve constructed in accordance with this invention;

FIG. 2 is an end elevational view thereof;

FIG. 3 is a cross-sectional view taken at line 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view taken at line 4—4 of FIG. 3;

FIG. 5 is a side elevational view similar to FIG. 1 illustrating how the outlet shown in FIG. 1 may be replaced with a different outlet extending at an angle to the body of the valve;

FIG. 6 is a side elevational view corresponding to FIG. 1 of a modified valve constructed in accordance with this invention;

FIG. 7 is a cross-sectional view of the valve shown in FIG. 6, this view corresponding to FIG. 3;

FIG. 8 is a view showing a modified clamping member which may be used with valves as shown in the preceeding figures.

The accompanying drawings are primarily intended to be used for explanatory purposes in connection with this invention. Because of this they are not to be taken as showing precise valves in accordance with this invention drawn to scale. It will be realized from a careful consideration of these drawings and of the remainder of this specification that the features or principles of this invention as defined by the appended claims can be embodied within other somewhat differently appearing valves through the use or exercise of routine engineering skill.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIGS. 1 to 4 of the drawings there is shown a valve **10** of the present invention which is primarily intended to be mounted vertically instead of horizontally as shown in the drawings. This valve **10** can, however, be utilized horizontally if desired. It includes a valve housing **12** formed so as to include an inlet part **14** and an outlet part **16** which fit together along a line or juncture **18**. Adjacent to this juncture **18** fingers **20** extend from both of the parts **14** and **16** in such a manner as to interfit or overlie one another so as to stablize or position the parts **14** and **16** as shown.

It will be noted that there are three sets of these fingers **20** in the valve **10**, two of the sets being located on diametrically opposite sides of the housing **12** and the third set located midway between these two sets on one side of the housing **12**. These fingers **20** are formed so that grooves **22** in each of these fingers **20** are in the same plane. This allows a more or less inverted U-shaped clip **24** to be used to hold the parts **14** and **16** together. This clip **24** in accomplishing this function fits within the grooves **22**. Preferably, but not necessarily this clip **24** is a spring clip so as to resiliently engage the grooves **22**. It will be realized that the housing **12** may be easily assembled or disassembled through the use of this clip **24**.

When the housing **12** is assembled as shown the parts **14** and **16** together define an internally cylindrical housing body **26** having attached end walls **28** and **30**. The end wall **28** preferably extends in a flange-like manner from the housing body **26** as shown so that it may conveniently be attached to the bottom of a tank as a part of the wall of such a tank. However, if desired

other known attaching means or mounting means may be used with the valve **10**.

This same wall **28** preferably includes a round inlet opening **32** located so that its center is axially aligned with the axis of the housing body **26**. It will be noted that the inlet opening **32** in the embodiment of the valve shown has the shape of a cylinder. If desired other known beveled or related shapes may be used in the valve **10** for the opening **32**, although the particular shape illustrated is considered preferable in providing for adequate closure of the valve **10**, even when parts are not formed as precisely desired. The end wall **30** opposite the wall **28** preferably carries a tabular extension **34** serving as an outlet opening. This extension **34** may be provided with external threads **36** to be used in attaching this outlet of the valve **10** to an appropriate line.

Within the interior of the housing body **26** there is located a poppet **38**. This poppet **38** is formed so as to include a generally cylindrical poppet body **40** which carries a series of connecting or support arms **42** serving as a connecting structure to support a closure head **44**. This closure head **44** has a cylindrical exterior **46** capable of fitting within the inlet opening **32**. A small groove **48** is formed in the exterior **46** for the purpose of holding a conventional elastomeric O-ring **50** so that this O-ring **50** will fit against and form a seal with the interior of the opening **32** when the poppet **38** is in a closed position as shown in FIG. **3**.

The poppet **38** is adapted to be moved to an open position in which it is at the right of the position shown in FIG. **3** and in which the closure head **44** is spaced from the opening **32** through the use of a small handle **52**. This handle **52** includes a short shaft **54** which projects through a slot **56** in the housing body **26** as shown. This shaft **54** is preferably screwed into a small insert **58** in the poppet **38** so that it can be conveniently removed in disassembling the valve **10**. It will be noted that the slot **56** extends diagonally around a part of the outside of the inlet part **14** so that one end of this slot **56** is closer to the inlet opening **32** than the other end of the slot. With the slot **56** having this configuration whenever the handle **52** is turned the poppet **38** is both rotated and moved longitudinally or axially of the housing body **26**.

In order to prevent leakage out through the slot **56** the periphery of the poppet body **40** is provided with two circumferential grooves **60**, each of which carries a small elastomeric O-ring **62**. These O-rings extends from the poppet body **40** so as to always make contact with and form seals with the interior of the housing body **26**. With the structure shown although the location of such seals will vary depending upon the position of the poppet **38** within the valve **10** such seals will always be in parallel planes located on opposite sides of the slot **56**.

In the valve **10** it is preferred to include within the inlet part **14** a small notch **64** in effect forming a dog-leg type extension of the slot **56**. This notch **64** leads to the juncture **18** so as to permit the poppet **38** to be removed from the inlet part **14** when the outlet part **16** has been removed from the remainder of the valve **10** during disassembly. This expedient avoids the necessity of having to remove the handle **52** from the poppet **38** in disassembling the valve **10** and of course eliminates alignment problems in reassembling the handle **52** on the poppet **38** during reassembly of the valve **10**. This notch **64** is also sealed off by the O-rings **62** at all times during the operation of the valve **10**.

For many applications it is necessary or desirable to incorporate within the valve **10** a strainer structure. In this valve **10** such a structure comprises a removable cage **66** consisting of two circumferential bands **68** carrying filter screens **70** and longitudinal supports **74**. The ends **76** of these supports **74** are preferably bent slightly so as to resiliently engage the interior of the poppet body **44** in such a manner that the cage **66** is adequately supported against displacement during use. With this method of construction the described strainer structure can be easily removed for cleaning purposes.

It will be noted that in the valve **10** the extension **34** is directed in the same direction as the housing body **26** so as to provide for essentially straight through flow within the valve **10**. The outlet part **16** can be modified so as to accommodate flow into connected piping located at an angle to the body part by simply forming the extension **34** so that it projects at an angle to the axis of the housing body **26**. This type of structure is indicated in FIG. **5**. Since the parts shown in FIG. **5** are identical with the parts described in the preceeding in the interest of convenience and brevity they are shown in the drawings by the identical numerals previously employed in this specification and utilized in FIGS. **1** to **4** of the drawings.

In FIGS. **6** and **7** of the drawings there is shown a modified valve **100** of the present invention which is essentially extremely similar to the valve **10** previously described. Also for convenience of explanation and illustration and in the interest of brevity various parts of the valve **100** which are identical to or substantially identical to various parts of the valve **10** are not separately described herein and are indicated in this specification where necessary for explanatory purposes and in the drawings by the numerals previously used to indicate such parts preceeded by the numeral "**1**".

In the valve **100** the insert **58** used in connection with the poppet **38** in the valve **10** is replaced by a tube **80** which extends completely across the interior of the poppet **138**. This poppet **138** is of course sealed at both of its ends around its exterior to the poppet body **140**. Within the interior of the tube **80** there may be provided end and center circumferential detent grooves **82** which are adapted to receive a conventional spring loaded positioning detent **84** on the shaft **154** of the handle **152**.

With this structure the shaft **154** is longer than the previously described shaft **54**. It can merely be inserted through the slot **156** into the tube **80** in assembling the valve **100**. When it is inserted fully as shown in FIG. **7** it extends across the diameter of the poppet **138** so as to tend to equalize forces on opposite sides of the poppet **138** as the valve **100** is opened and closed. This is considered desirable in preventing any tendency towards poppet distortion during the operation of the valve **100**. If for any unexplained reason significant leverage is required in order to operate the valve **100** the handle **152** may be pulled out so that the detent **84** is located in the center most of the detent grooves **82** instead of being located in one of the end most of these grooves **82** as normal.

With the valve **100** the precise detent **84** structure may be replaced by other equivalent means such as are commonly used for securing a shaft in position. Thus, for example, it is possible to utilize as the handle **152** and shaft **154** a commercial type of structure in which when an exposed button on the handle **152** is pushed the detent **84** will be automatically released. If desired a common rod may be used to actuate the valve **100** by being inserted within the tube **80**. With the valve **100** the notch **64** is not considered necessary or desirable.

It will be realized that many modifications may be made in the valve **10** and **100** as described. Thus, for example, it is possible to utilize instead of the clip **24** a modified clip **90** as shown in FIG. **8** of the drawings having a U-shaped cross-sectional configuration which straddles fingers **92** corresponding to the fingers **20** previously described extending from body parts **94** and **96** corresponding to the parts **14** and **16**. Changes of this type involving routine engineering are to be expected in valves utilizing the novel features employed in the valves **10** and **100** herein described.

I claim:

1. A valve which comprises:

a two-part valve housing having a cylindrical housing body and end walls attached to said housing body at both of its ends, said housing having an inlet part and an outlet part, said parts fitting together between said ends, said housing including holding means for holding said inlet and said outlet parts together,

a round inlet opening in one of said end walls, said inlet opening being centered about the axis of said body,

an outlet opening in the other of said end walls;

a slot located in said housing body so as to extend around a part of said housing body in a diagonal path such that one extremity of said slot is located closer to said inlet opening than the other extremity of said slot,

a poppet having a cylindrical poppet body, a closure head and a perforate connecting structure connecting said closure head and said poppet body, said closure head being of smaller dimension than said poppet body and being symmetrical about the axis of said poppet body,

said poppet being movably located within said housing body so that the exterior of said poppet body is adjacent to the interior of said housing body and so that said closure head is located on the end of said poppet body closest adjacent to said inlet opening, said poppet being capable of being moved between the end walls of said housing,

said closure head being capable of fitting against said end wall having said inlet opening during movement of said poppet body within said housing body so as to close and seal said inlet opening,

a handle carried by said poppet body and extending outwardly of said housing body through said slot, said poppet being capable of being moved so as to open and close said inlet opening by moving said handle within said slot, and

two separate body seal means, each of said seal means forming a seal between the interior of said housing body and the exterior of said poppet body, said seal means being located on opposite sides of said slot and extending completely around the interior of said housing body and the exterior of said poppet body so as to seal off said slot from the interior of said housing body at all times during the operation of said valve.

2. A valve as claimed in claim **1** wherein:

said poppet includes a tube extending across its interior, said tube being located between said body seal means and

said handle includes a shaft capable of being inserted through said slot into said tube.

* * * * *