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AUTOMATIC PRIMER VALVE FOR SEALING FLOOR DRAIN TRAPS AND THE LIKE

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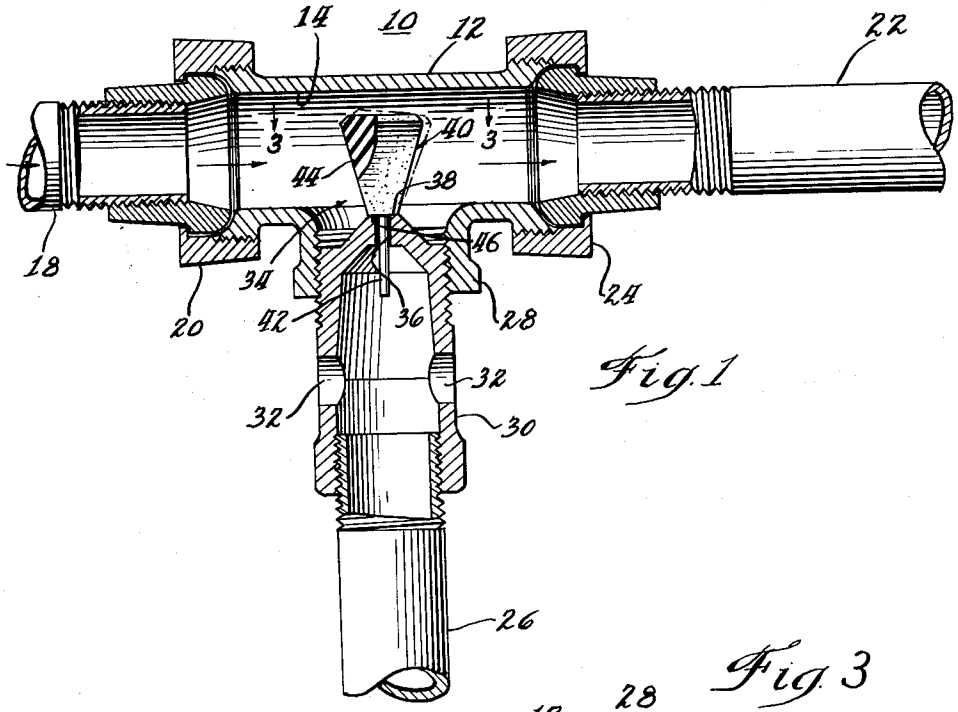


Fig. 1

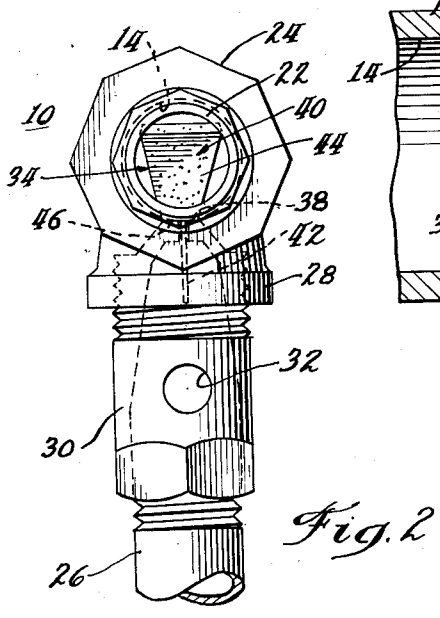
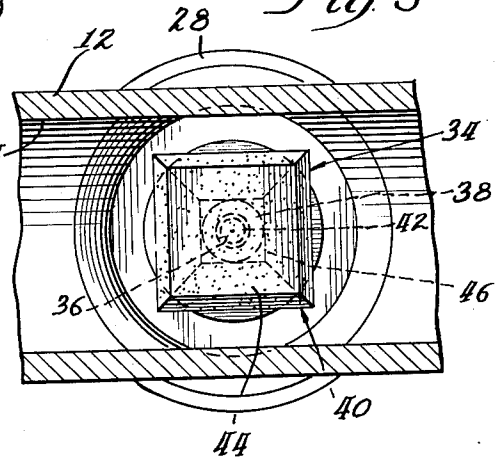


Fig. 2

Fig. 3



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AUTOMATIC PRIMER VALVE FOR SEALING FLOOR DRAIN TRAPS AND THE LIKE

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The present invention relates to primer valves and particularly to automatic primer valves for sealing floor drain traps and the like.

The primary object of the present invention is to provide a new and improved primer valve which is effective in operation yet simple and economical to manufacture.

A further object of the present invention is to provide a new and improved automatic primer valve which supplies a small amount of fluid as to a floor drain trap during periods of fluid flow through a passageway in which the primer valve is associated.

Another object of the invention is the provision of a new and improved simple and economically made primer valve comprising a movable element including a stem fitting loosely into a primer flow passage and a poppet located in the main flow passage, the poppet having a configuration such that it is moved from a normal position whenever flow takes place in the main passage.

In brief, the primer valve of the present invention comprises a valve body having a generally cylindrical main fluid flow passage from which there extends downwardly a transverse or branch primer passage of small size and having a valve seat at its upper end. It comprises further a movable valve element comprising a rod or stem somewhat smaller than the branch primer passage and disposed for slight generally lateral movement in the primer passage. The movable valve element includes also an actuating or poppet element mounted within the main flow passage and attached to the end of the stem and seating on the aforementioned valve seat. The poppet element is dimensioned to restrict flow through the main flow passage sufficiently so that the element is moved laterally by the fluid flow a small extent as determined by the stem. This movement opens the valve seat so that a small amount of fluid can flow downwardly through the branch primer passageway and at quantities determined by the relative size of this passageway and the stem. This flow occurs during the main flow of fluid through the flow passage and stops when the main fluid flow is stopped. The poppet is preferably in the form of a truncated four-sided pyramid attached to the stem so that the smaller end is disposed at the bottom for seating upon the valve seat.

Other objects and advantages of the present invention will become apparent from the ensuing description of an illustrative embodiment thereof in the course of which reference is had to the accompanying drawing in which:

FIG. 1 is a vertical sectional view through a primer valve constructed in accordance with the present invention, the view being partly in section and the primer valve being illustrated by solid lines in its closed position, i.e., when there is no fluid flow through a main passage, and by dotted lines in its open position, in which there is fluid flow through both the main and branch primer passageways to actuate the valve to its open position;

FIG. 2 is an end elevational view of the valve shown in FIG. 1; and

FIG. 3 is an enlarged horizontal cross sectional view taken along the line 3—3 of FIG. 1.

Referring now to the drawing, the primer valve as a whole is indicated by the reference character **10**. It comprises a valve body **12** having within it a generally cylindrical main fluid flow passage **14**. The flow through the passage may be in either direction but for the purpose of description, it will be assumed that the flow is from left to right as indicated by the arrows. The fluid is supplied to the flow passageway through an inlet conduit **18** coupled to the valve body by a union type coupling **20**. The flow from the fluid passageway **14** is to a point of utilization through an outlet conduit **22** coupled to the valve body by a second union type coupling **24**.

The primer valve of the present invention is designed to provide a small flow of fluid through conduit **26** leading as to a floor drain trap or the like, not shown, to maintain a seal in the latter. This limited flow occurs whenever the fluid flows through the main passage **14** thereby to maintain an adequate amount of fluid in the drain thereby effectively to seal it. The conduit **26** is connected to a lateral boss **28** on the valve body through a fitting **30** having apertures **32** therein to provide a vacuum break in the line **26**.

In accordance with the present invention, there is provided a primer valve indicated as a whole by the reference character **34**. It includes a small diameter vertically disposed primer passageway **36** formed in the generally conical upper end of fitting **30** and having an annular valve seat **38** at the upper end of flow passage **36**.

Under no flow conditions, the primer passageway **36** is closed by a movable valve element **40** comprising a short stem or rod **42** projecting downwardly through the passageway and having dimensions somewhat smaller than the passageway, thereby to provide a restricted flow of fluid from the passageway **14** through the conduit **26**, as will be described hereinafter. To the upper end of the stem **42** there is attached a truncated four-sided generally pyramidal actuating or poppet element **44**, the smaller truncated end **46** of which seats upon the valve seat **38** under no flow conditions.

When no fluid flows through the main passageway **14**, the passageway **36** is closed by the engagement of movable poppet element **44** and the valve seat **38**, the seating being effected by gravity. When fluid flows through the passageway **14**, it effects lateral movement of the poppet element **44** with the result that the valve portion **46** is sort of tipped relative to the valve seat **38** whereby a limited amount of liquid flows through primer passageway **36** and around the stem **42**. Thus, whenever a liquid flows through the main flow passage **14** a small amount of fluid is supplied through primer passage **36** and conduit **26** to the trap seal.

The pyramidal element **44** is dimensioned to restrict the flow of fluid through the passage **14** so that the element is moved laterally by the flow. Accordingly, the pyramidal element fills a substantial portion of the passage **14** but still permits adequate flow through line **22** to the place of utilization.

It has been found that the flat four-sided truncated generally pyramidal shaped element is effective under wide pressure conditions to permit flow through the primer passageway **36** and to close the passageway in the absence of fluid flow through passage **14**. When flow is started, the primer valve may sometimes spin a little but it generally ends up perpendicular to the direction of the flow, as illustrated in the drawing.

The poppet element **44** has been made a synthetic rubber, such as neoprene, which has a density of about 1.15 as compared with a density of 1 for water. It has a hardness of about 65 plus or minus 5 Durometer. When made as described, the primer valve opens when fluid flows through the passageway **14** and it closes under the influence of gravity when the flow stops. The primer valve can be made readily and economically and it can similarly be installed in a pipe line.

While the specific construction of the poppet element has been found most satisfactory for varying flow and

pressure conditions, others may be used. For example, a triangular truncated pyramidal shape operates, but not as satisfactorily. It does not feather as well as the four-sided construction to present a flat side at right angles to the direction of flow and thus does not operate the valve quite as well.

While the present invention has been described in connection with details of particular embodiments, these details are not intended to be limitative of the invention except insofar as set forth in the accompanying claims.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A primer valve comprising a body having a generally cylindrical main fluid flow passage, a transverse downwardly extending primer passage of small size communicating with said flow passage and having a valve seat at its flow passage end, and a valve element mounted within said flow passage, said valve element comprising a stem somewhat smaller than said primer passage and disposed for generally lateral movement in said primer passage, and a truncated four-sided generally pyramidal element disposed within said main flow passage and attached to the end of said stem with its smaller end adapted to seat upon the valve seat, said element being dimensioned to restrict flow through said main flow passage sufficiently so that the element is moved laterally by the flow, whereby said primer passage is closed by said element when there is no flow through said main flow passage and flow through said main flow passage effects lateral movement of said pyramidal element and of said stem thus permitting a slight flow of fluid to take place through said primer passage as long as fluid flows through said main flow passage.

2. A primer valve comprising a body having a generally cylindrical main fluid flow passage, a primer passage of small size communicating with said flow passage and having a valve seat at its flow passage end, and a valve element mounted within said flow passage, said valve element comprising a stem somewhat smaller than said primer passage and movably disposed in said primer passage, and a truncated four-sided generally pyramidal element disposed within said main flow passage and attached to the end of said stem with its smaller end adapted to seat upon the valve seat, said element being dimensioned to restrict flow through said main flow passage sufficiently so that the element is moved laterally by the flow, whereby said primer passage is closed by said element when there is no flow through said main flow passage and flow through said main flow passage effects lateral movement of said pyramidal element and of said stem thus permitting a slight flow of fluid to take place through said primer passage as long as fluid flows through said main flow passage.

3. A primer valve comprising a body having a generally cylindrical main fluid flow passage, a primer passage of small size communicating with said flow passage and having a valve seat at its flow passage end, and a valve element mounted within said flow passage, said valve element comprising a stem somewhat smaller than said primer passage and movably disposed in said primer passage, and a pyramidal shaped poppet element disposed within said main flow passage and attached to the end of said stem and having a portion adapted to seat upon the valve seat, said element being dimensioned to restrict flow through said main flow passage sufficiently so that the element is moved laterally by the flow, whereby said primer passage is closed by said element when there is no flow through said main flow passage and flow through said main flow passage effects lateral movement of said poppet element and of said stem thus permitting a slight flow of fluid to take place through said primer passage as long as fluid flows through said main flow passage.

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