Dec. 22, 1959 D. A. EPP 2,918,251

OUTLET STRUCTURE FOR IRRIGATION PIPES

Filed July 1, 1957

Fig. 1.

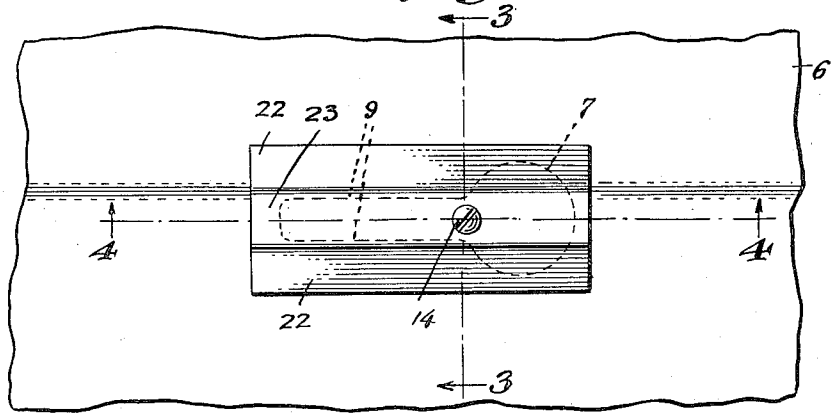
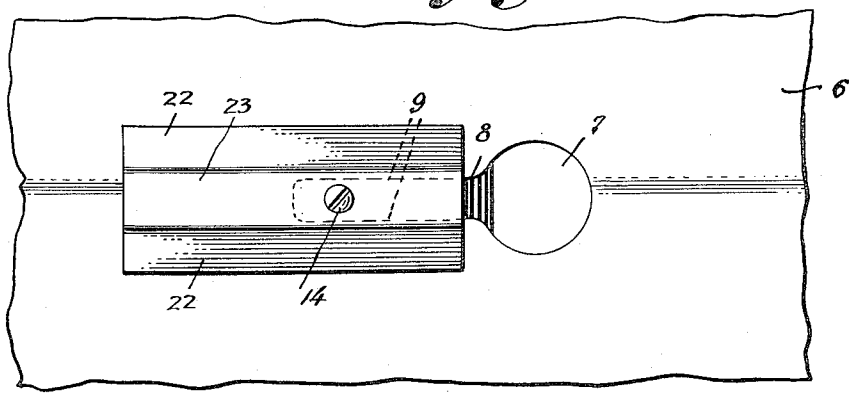


Fig. 2.



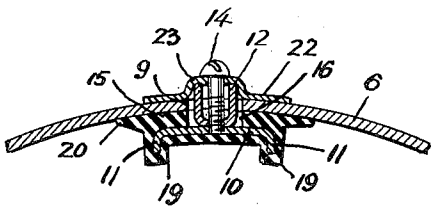


Fig. 3.

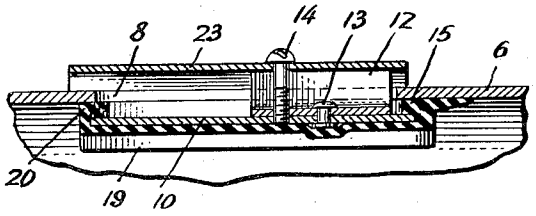


Fig. 4.

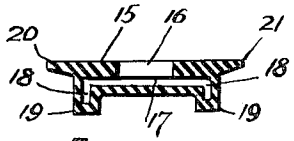


Fig. 5.

INVENTOR.
David A. Epp,
BY
Dwight B. Bass
ATTY.

United States Patent Office 2,918,251
Patented Dec. 22, 1959

2,918,251

OUTLET STRUCTURE FOR IRRIGATION PIPES

David A. Epp, Henderson, Nebr.

Application July 1, 1957, Serial No. 669,358

5 Claims. (Cl. 251—145)

This invention pertains to means to control the flow of water from irrigation pipes of the above-ground type.

The primary object of the invention is to provide a structure for association with the usual thin walled above-ground irrigation pipes wherein the outlet opening within the pipe may be opened to its fullest extent, closed partly, or sealed securely against any flow whatever as occasion demands.

A further object of the invention is to provide an outlet structure of the character and for the purposes stated which is constructed in such manner as to permit of its easy application within and around the outlet opening of the pipe, which is possessed of means for firmly sealing the pipe opening at whatever position the closure member may assume, which is of such construction as to permit its ready application to or removal from the pipe without the exercise of unusual skill and without the necessity of special tools for such operation, which is so constructed as to enable the sealing shoe to be readily and quickly removed and replaced as occasion requires, which may be manufactured by simple processes and at minimum expense, and which will prove highly effective in accomplishing its purposes.

With the foregoing objects in view, together with others which will appear as the description proceeds, the invention resides in the novel construction, combination and arrangement of parts, all as will be described more fully hereinafter, illustrated in the drawings, and particularly pointed out in the claims.

In the drawing:

Fig. 1 is a top plan view of a conventional above-ground type irrigation pipe and illustrating as applied thereto a sealing device embodying the invention,

Fig. 2 is a similar view showing the sealing device moved to open position,

Fig. 3 is a transverse fragmentary sectional view taken upon line 3—3 of Fig. 1,

Fig. 4 is a similar view taken upon line 4—4 of Fig. 1, and

Fig. 5 is a transverse sectional view taken through the sealing shoe embodying the invention.

Referring now more particularly to the drawing, the irrigation pipe, which may be of any desired diameter, is indicated at 6, and usually is a thin walled conduit laid upon the ground as will be understood. At desired points in the length of the pipe, relatively large outlet openings 7 will be cut, the said openings in accordance with the present invention usually taking the form of a circular opening as shown having a reduced neck or slot 8 extending therefrom linearly along the pipe. This slot is usually provided with parallel side walls as indicated at 9.

The closure or sealing element for the opening is of simple construction and involves several readily assembled parts, one of which comprises a substantially rectangular plate 10 formed preferably of metal and being substantially flat, having depending flanges 11 along its longitudinal edges. This plate is of a length greater than the enlarged opening 7 and its reduced neck 9 and is also

of a width in excess of the breadth of said opening. This plate has secured to its upper surface a rigid key member 12 disposed longitudinally of the plate and intermediate the side edges thereof, having one end disposed near to the outermost edge of the enlarged opening 7 and being secured to the plate as by a rivet 13. This key member, as shown in Fig. 3, is of metal and of substantially U-shaped cross section, being of a width to freely slide longitudinally of the pipe and within the reduced opening 9 thereof. The base of this key as well as the adjacent portion of the plate 10 is provided with an interiorly threaded opening to receive the lower end of a screw 14 as shown in the drawing.

The shoe for application to the plate is illustrated clearly in the drawings and comprises an elongated body 15 formed of rubber or other suitable compressible material of a length in excess of the length of the opening 7 and its reduced neck portion 9 and of a breadth greater than the diameter of the circular opening 7. This shoe is provided with a central elongated slot 16 in its upper surface which communicates with an elongated and laterally extended channel 17 to receive the plate 10; the said channel being also in communication with downwardly extending recesses 18 in legs 19 depending from the longitudinal side portions of the shoe. The ends of the shoe have overlying flanges 20 to engage over the ends of plate 10. This shoe is provided along its longitudinal edges with outwardly directed fins or sealing elements 21 as shown.

Due to the flexibility of the shoe, it is a comparatively simple procedure to insert the plate 10 therein with its legs 11 occupying the recesses 18 and the body of the plate occupying the channel 17. Due to the elasticity of the shoe, the latter will tightly conform to the shape and configuration of the plate and its depending flanges and will be securely maintained thereon. It will be observed that the thickness of the plate 10 and the rubber shoe, particularly in the area of the flanges 20, is slightly in excess of the width of the slot 8, however, when the assembled shoe and plate is inserted in the slot end on, with the key in alignment with the larger opening 7, the compression of the shoe permits the unit to enter the opening and slot, after which it is moved to such position as to underlie the slot longitudinally thereof with the key 12 protruding through the opening and slot.

The sealing member also includes a metallic bridge member 22 which straddles the opening 8 and has an upstanding longitudinally disposed bridge member 23 having an opening near one end thereof through which the screw 14 passes. It will be seen, particularly with reference to Fig. 3 of the drawing, that the side members 22 of the bridge element extend substantially beyond the edges of the elongated opening 8 in the pipe and rest upon the outer surface of the latter.

With the parts arranged as shown in the drawing, tightening of the screw 14 brings about a clamping action between the bridge element 23 and the plate 10, causing the upper portion of the shoe to be tightly engaged with the inner surface of the irrigation pipe 6 so as to seal the opening against the passage of liquid. When the opening is to be entirely closed, the sealing element will be moved longitudinally of the elongated opening 8 until the sealing shoe lies entirely beneath the opening 7. Tightening of the screw 14 will then draw the shoe into tight sealing engagement upon the interior of the pipe 6 and entirely around the opening. As occasion may demand, it may be found desirable to partially expose the opening 7 as when a limited flow is desired, in which event the screw 14 will be backed off sufficient to permit longitudinal sliding movement of the entire sealing structure until the fore end thereof uncovers the opening 7 to the desired extent, whereupon screw 14 will be tightened so as to tightly

seal the remainder of the opening. When it is desired to entirely uncover the opening 7, as when a maximum flow is desired, the sealing member may be slid properly to entirely expose the opening whereupon the screw 14 is again tightened.

Should it occur that the sealing shoe becomes defective, due to excessive use and adjustment, the sealing element may be entirely removed by backing off the screw 14, removing the bridge member and lifting the sealing unit through the elongated opening 8 after having first brought it to upstanding position with the key aligned with opening 7, as will be understood. The defective shoe may be easily removed and easily as quickly provided with a new shoe whereupon it is reassembled in the manner described. It will be seen from this construction that I have provided an extremely simple, yet most efficient sealing means for irrigation pipes of the kind under consideration. The plate 10 may be comparatively flat and need not necessarily conform to the contour of the pipe, thus enabling the device to be applied with equally satisfactory results through irrigation pipes varying in diameter. Due to the tight clamping action produced by the screw 14, the upper parts of the shoe 15 will be brought into tight sealing engagement with the interior surfaces of the irrigation pipe surrounding the outlet opening therein.

In this connection, also, the shoe 15 may be molded in substantially flat form, as the clamping action between the plate 10 and the bridge member 22 causes the resilient shoe to precisely correspond with the curvature of the pipe in bringing about the desired tight sealing action.

The invention is here described as applied to a pipe opening disposed longitudinally of the irrigation pipe, however, it will be understood that the same construction here described may equally as effectively be used upon openings disposed circumferentially of the pipe by merely having the plate 10 slightly curved into substantial conformity with the pipe curvature.

I claim:

1. Means for controlling the flow of fluid through a pipe opening in its wall which includes a relatively narrow slot portion and a widened end portion; comprising a plate of a length in excess of the length of said opening and of greater width than the latter, a shoe formed of compressible material enclosing said plate and enveloping the edges thereof, a key member rigid with and rising from said plate inwardly from the lateral edges thereof and disposed longitudinally of the latter, said key member being of a width less than the breadth of said slot portion, the thickness of the shoe and plate with the key rising therefrom being greater than the width of the slot portion and the width of said plate and shoe being greater than any dimension of said widened portion, said plate and shoe at its longitudinal edges being of a thickness substantially equal to the width of said slot portion whereby to permit either of said edges passing through said slot portion when inserted end on therein with said key member aligned with said widened portion, a bridge member overlying said pipe opening with its edges engaging said pipe on opposite sides thereof, and means on said bridge member and said plate to draw the latter toward said bridge member to compress said shoe in tight engagement with the interior of said pipe around all edges of said pipe opening.

2. Means for controlling the flow of fluid through a pipe opening in its wall which includes a relatively narrow slot portion and a widened end portion; comprising a plate of a length in excess of the length of said opening and of greater width than the latter, a shoe formed of compressible material enclosing the bottom and side and end edges of said plate, a key member rigid with and rising from said plate inwardly from the lateral edges thereof and disposed longitudinally of the latter, said key member being of a width less than the breadth of said slot portion, the thickness of the shoe and plate with the key rising therefrom being greater than the width of the slot portion and the width of said plate and shoe being greater than any dimension of said widened portion, said plate and shoe at its longitudinal edges being of a thickness substantially equal to the width of said slot portion whereby to permit either of said edges passing through said slot when inserted end on therein with said key member aligned with said widened portion, a bridge member overlying said pipe opening with its edges engaging said pipe on opposite sides thereof, and means on said bridge member and said plate to draw the latter toward said bridge member to compress said shoe in tight engagement with the interior of said pipe around all edges of said pipe opening.

3. Means for controlling the flow of fluid through a pipe opening in its wall which includes a relatively narrow slot and a widened end portion; comprising a plate of a length in excess of the length of said opening and of greater width than the latter, a shoe formed of compressible material enclosing said plate and enveloping the edges thereof, an elongated key member rigidly secured in the longitudinal center of said plate upon the upper surface thereof and of a width less than the width of said slot, the thickness of the shoe and plate with the key rising therefrom being greater than the width of the slot portion and the width of the plate and shoe being greater than any dimension of said widened portion, said plate and shoe at its longitudinal edges being of a thickness substantially equal to the width of said slot portion whereby to permit either of said edges passing through said slot portion when inserted end on therein with said key member aligned with said widened end portion, a bridge member overlying said pipe opening with its edges engaging said pipe on opposite sides thereof, and means on said bridge member and said plate to draw the latter toward the bridge member to compress said shoe in tight engagement with the interior of said pipe around all edges of said pipe opening.

4. Means for controlling the flow of fluid through a pipe opening in its wall which includes a relatively narrow slot and a widened end portion; comprising a plate of a length in excess of the length of said opening and of greater width than the latter, a shoe formed of compressible material enclosing said plate and enveloping the edges thereof, a key member rigid with and rising from said plate inwardly from the lateral edges thereof and disposed longitudinally of the latter, said key being of a width less than the breadth of said slot portion, the thickness of the shoe and plate with the key rising therefrom being greater than the width of the slot portion and the width of said plate and shoe being greater than any dimension of said widened portion, said plate and shoe at its longitudinal edges being of a thickness substantially equal to the width of said slot portion whereby to permit either of said edges passing through said slot portion when inserted end on therein with said key member aligned with said widened portion, a bridge member overlying said pipe opening with its edges engaging said pipe on opposite sides thereof, and a screw passing through said bridge member and threadedly engaged in said plate to draw the latter toward said bridge member to compress said shoe in tight engagement with the interior of said pipe around all edges of said pipe opening.

5. Means for controlling the flow of fluid through a pipe opening in its wall which includes a relatively narrow slot and a widened end portion; comprising a plate of a length in excess of the length of said opening and of greater width than the latter, a shoe formed of compressible material enclosing the side and end edges of said plate, a key member rigidly secured to the upper surface of said plate in the longitudinal center thereof and spaced inwardly from the lateral edges of said plate, said key member being of a width less than the breadth of said slot portion and of a length less than said plate length, the thickness of the shoe and plate with the key rising therefrom being greater than the width of the slot portion

and the width of said plate and shoe being greater than any dimension of said widened portion, said plate and shoe at its longitudinal edges being of a thickness substantially equal to the width of said slot portion whereby to permit either of said edges passing through said slot portion when inserted end on therein with said key member aligned with said widened end portion, a bridge member of a length substantially equal to the length of said opening overlying said opening with its longitudinal edges resting upon said pipe on opposite sides of said opening, and a screw member passing through the longitudinal axis

of said bridge member and threaded in said key and plate to draw the latter toward said bridge member to compress said shoe in tight engagement with the interior of said pipe around all edges of said pipe opening.

References Cited in the file of this patent

UNITED STATES PATENTS

2,647,539	Stearns	Aug. 4, 1953
2,734,713	Webster	Feb. 14, 1956