Nov. 8, 1960 J. F. MAHAN 2,959,184

SYPHON DEVICE

Filed April 2, 1957

Fig. 1.

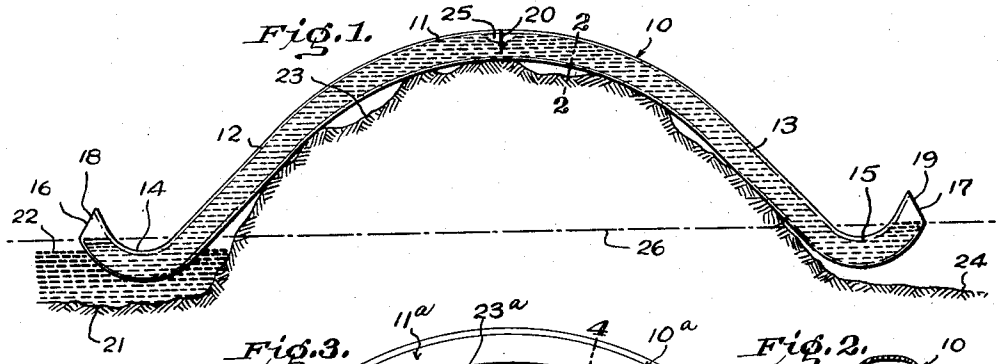


Fig. 3.

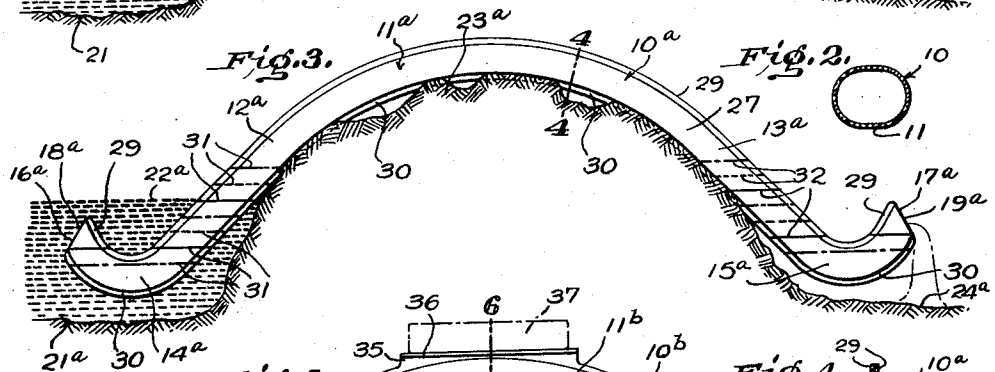


Fig. 2.

Fig. 5.

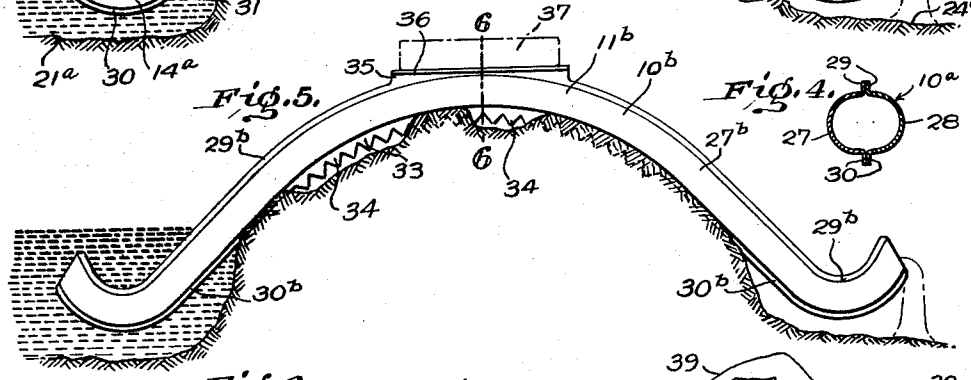


Fig. 4.

Fig. 6.

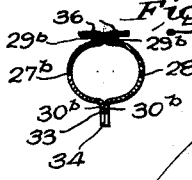


Fig. 7.

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SYPHON DEVICE

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The present invention relates to syphons, and especially to those of the type used for irrigating purposes, and it consists in the combination, construction, and arrangement of parts herein described and claimed.

In the irrigation systems used at the present time throughout a great part of the country, water is delivered in metered quantities into irrigation ditches formed with embankments for retaining the water. Because of normal differenes in elevation of the land and depths of such ditches, water placed in the ditches does not always maintain an equal depth throughout the length of the ditch. Moreover, the actual flow of water into such ditches will cause inequalities in the depth of water in different parts of such ditches. Again, the embankments at either side of the ditch are not always uniform in height with respect to the ditch proper. At present, it is customary for the farmer having water delivered in this manner to his irrigation ditches to prime a plurality of syphons and position them at convenient places over the embankments so that one end of the syphon in each case will lie in the water in the irrigation ditch and the other end will be free to deliver water from such ditch to the fields to be irrigated. Because of the inequalities set forth above, syphons quite often lose their prime due to the water level receding momentarily below the intake end of such syphons. Whereupon, when the water again rises in the ditches, the syphons are of no use unless reprimed, and if not so reprimed, the water will tend to overflow the embankment at such point. Hence, with present systems, it is necessary either to employ additional labor to maintain the syphons in constantly primed condition or to accept losses caused by erosion of the embankments and consequently soil erosion and crop damage in the adjacent fields, as well as a loss of irrigation water.

The present invention which may be utilized under the conditions set forth includes a construction whereby a prime once placed in the syphon will be maintained even though the water in a ditch in which the inflow end of such syphon is placed recedes below such inflow end from time to time. This, however, can be maintained only so long as the opposite open ends of the syphon are at substantially the same elevation.

It is accordingly an object of the invention to provide a novel syphon which will hold its prime so as to automatically reestablish flow if the water at the inflow end of the syphon recedes below the intake point and then subsequently raises above such point.

A further object of the invention is to provide in a device of the above indicated character, novel means of construction whereby the syphon tube is made in two sections and is reinforced by attaching flanges of said sections throughout the length of said syphon.

A further object of the invention is to provide in a device of the class described, novel means for aiding in the retention of the device in a set position.

A further object of the invention is to provide, in a device of the character set forth, a novel manner of constructing a platform upon which a level may be placed to determine the elevation of opposite open ends of the syphon relative to one another.

A still further object of the invention is to provide, in a device as indicated above, a novel angled arrangement of the lips at opposite open ends of the syphon tube for facilitating the priming of the device.

It is also an object of the invention to provide a device as set forth in the preceding objects which is simple and substantial in construction, economical to manufacture, and thoroughly efficient and practical in use.

These, together with various auxiliary features and objects of the invention which will later become apparent as the following description proceeds, are attained by the present invention, preferred embodiments of which have been illustrated by way of example only in the accompanying drawings, wherein:

Figure 1 is a side elevation of an embodiment of the invention showing it primed, positioned upon a ditch embankment, and utilizing priming water to indicate the elevations of the opposite open ends of the syphon relative to one another;

Figure 2 is a cross section taken on line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 1 of a modified form the invention may assume, showing the syphon in operative position and having one end thereof emerged in water in an irrigation ditch and its other end positioned in a field to be irrigated, and showing a different manner of leveling the device;

Figure 4 is a cross section taken on line 4—4 of Figure 3;

Figure 5 is also a side elevation of a further modified form of the invention shown in operative position as in Figure 3 and having a leveling platform and an embankment-gripping means thereon;

Figure 6 is a cross section taken on line 6—6 of Figure 5; and

Figure 7 is a side elevation of the form of invention shown in Figure 1 and showing the movement of the syphon and hands holding same in full and dotted lines in the act of priming the syphon.

Referring now more specifically to the accompanying drawings wherein like numerals designate similar parts throughout the various views, attention is directed first to the syphon tube illustrated in Figures 1 and 2 wherein there is indicated generally by the numeral **10**, a single transparent tubular member of thin wall construction and of symmetrical shape having a central arch portion **11**, outwardly and downwardly divergent leg portions **12** and **13** extending from said arch portion, and short outwardly and upwardly directed curved end portions **14** and **15** projecting from said divergent legs. Both ends of the tubular member **10** are open, as at **16** and **17**, and the lips **18** and **19** at said open ends are arranged on substantially straight planes that slightly converge (toward one another) as they extend upwardly for a purpose to be set forth as the description proceeds. Midway of the length of the transparent tubular member and at the crest of the central arch portion **11**, there is provided a transversely extending marking **20**, the purpose of which will subsequently be defined.

There is also shown in Figure 1 an irrigation ditch **21** containing water **22** and bordered by an embankment **23** which separates the ditch **21** from a field **24** to be watered. The syphon tube is shown as straddling the embankment **23**, as being primed with water from the ditch **21**, and as having an air bubble **25** in said prime water that is visible through the transparent wall of said tube, while the water **22** in the ditch **21** is shown as having receded to a level below the open inflow end **16** of the syphon tube.

In the operation of this form of the invention, it will be apparent that water 22 may be metered into the ditch 21 for eventual use in the field 24, whereupon a plurality of syphons illustrated may be primed and positioned over the embankment 23 at convenient positions for the watering of the field 24. Priming of the syphons and the producing and maintaining of an air bubble 25 in the prime water of each syphon for leveling purpose may be accomplished in different ways. One way is to submerge the entire syphon in the ditch water while it is positioned on one of its sides; close the open ends 16 and 17 of the syphon with the palms of the operator's hands when a proper quantity of water is in the syphon to produce the bubble 25; and maintain said ends closed with said hands until after the syphon has been placed on and leveled over the embankment. In order that the ends 16 and 17 may be positioned at the same elevation, it is only necessary to arrange the syphons upon the embankment 23 in such a manner that the bubble 25 in the prime water is centered at the marking 20, thus indicating that the ends 16 and 17 are at the same heights. When so positioned, and the level of water 22 is above the opening 16, water will flow through the syphon and out of the open end 17 onto the field 24. Should the water 22 become lower in level than the inlet opening 16, syphoning action will cease until the level of the water 22 again becomes higher than said inlet opening. During such interval, the syphon tube will hold its prime due to the fact that the inlet and outlet ends thereof are upturned, thus maintaining the water of the prime within the syphon by atmospheric pressure. Hence, once the syphons of the present invention have been set properly in their selected positions, it is no longer necessary to tend them. Consequently, there is a saving of labor and/or a prevention of loss due to the various factors hereinbefore set forth.

It will be observed that the opposite end portions of the tubular member are identical in construction, and when the open ends 16 and 17 are at the same elevation, said open ends, while being in close proximity to the curved end portions 14 and 15, are a sufficient distance above the inside curvature of said curved end portions, as indicated by the horizontal dash and dot line 26, to maintain a column of water in the tube when water in the irrigation ditch 21 drops to a level below the inflow open end 16 of the tube. The purpose of terminating the tubular member adjacent the curvature of the curved end portions 14 and 15 is to facilitate priming and to obtain a faster flow of water during syphoning. In view of such construction, it is essential that both open ends 16 and 17 be at the same elevation in order that they provide efficient traps which accounts for the necessity of the above-defined leveling means.

In the form of the invention illustrated in Figures 3 and 4, the size, shape, and general arrangement of the tubular member 10^a is similar to that previously described and illustrated in Figure 1, there being a central arch portion 11^a, divergent legs 12^a and 13^a, and upturned curved end portions 14^a and 15^a that have open ends 16^a and 17^a, there being lips 18^a and 19^a at the open ends 16^a and 17^a and arranged on planes that converge as they extend upwardly. The tubular member 10^a, in this case, may be made of either transparent or opaque material and is constructed in two longitudinally extending identical side sections 27 and 28, both being provided with upper and lower longitudinal edge flanges 29 and 30, respectively, that abut and are united to similar flanges of one another, thus providing upper and lower stiffening ribs extending the entire length of the thin-walled syphon tube.

Should the tube sections 27 and 28 be molded of clear thermoplastic material and united by cementing in the customary manner, the same method as that previously described for leveling the tube may be employed, namely, the registering of an air bubble in the prime water and

visible through the transparent tube with a central marking on the syphon tube. However, should the tube sections 27 and 28 be of metal stamping construction or other material that is opaque and are united by seam welding or the like, it is necessary that other means be employed to indicate the elevation of the opposite ends of the syphon tube relative to one another. In the present instance, this is accomplished by also utilizing the ditch water and providing a plurality of horizontally extending spaced parallel lines 31 and 32 on the outer sides of both end portions of the tubular member and attaching flanges 29 and 30 thereof for alignment with the surface level of water 22^a in the ditch 21^a, the line 31 selected for leveling purposes being the one nearest the surface level of the water 22^a, which differs according to quantity of water in the ditch 21^a and height of the embankment 23^a. The object of having the lines 31 and 32 on both end portions of the syphon tube is because both ends of the syphon tube are identical and either may be used as an inflow or as an outflow according to their positions relative to the ditch 21^a and field 24^a.

The form of invention illustrated in Figures 5 and 6 is somewhat similar to that disclosed in Figures 3 and 4 in that the tubular member 10^b is constructed of two sections 27^b and 28^b which are united at upper and lower longitudinally extending abutting flanges 29^b and 30^b on both sections. In this case, the lower flange 30^b of either or both of the sections 27^b and 28^b is of greater width at the central arch portion 11^b of the tube, as shown at 33, and has formed along the lower edge of this portion of greater depth, serrations or like irregularities 34 for engagement into the embankment 23^b so as to aid in the holding of the syphon tube in adjusted position.

The material forming the upper flanges 29^b on the tube sections 27^b and 28^b is also of greater width at the center of the central arch portion 11^b, as at 35, and free edges of this greater width portion of both sections are turned at right angles to opposite sides to provide a platform 36 which is on a horizontal plane parallel to an imaginary horizontal line extending through opposite open ends of the syphon tube. A spirit level 37 or like instrument, indicated by dash and dot lines, may be placed upon the platform 36 for adjusting the opposite open ends of the syphon tube to the same elevation.

Figure 7 illustrates a method of priming the syphon tube, and while directed to the form of invention disclosed in Figure 1, the same method can just as well be applied to the syphon tubes shown in the other forms of the invention, as the end constructions of all forms are the same, and it is the particular and previously described end construction that makes this priming method possible. The operator grips the syphon tube 10 at the central arch portion 17 with one hand, as shown at 38, and rests the palm of his other hand 39 on the lip 19 at the open end 17 of the tube. With the other open end 16 of the tube submerged in the ditch water 22, the tube is moved back and forth in substantially horizontal directions, as indicated by the double arrow 40. During the stroke backward, the end 17 of the tube is closed with the hand 39, as shown in dotted lines, and during the forward stroke, the hand 39 is removed from the end opening 17, as shown in full lines. Water forced into the tube at its submerged end 16 during the forward strokes expels air within said tube outwardly through its open end 17, while air remaining within the tube is trapped by the hand 39 and the reduced pressure thereof will keep the water in the tube from running out the open end 16 during the back stroke. It therefore can be seen that the angled planes on which the lips 18 and 19 at the end openings 16 and 17, respectively, are arranged to play an important part in conjunction with the short upturned curved end portions 14 and 15 in effecting and maintaining efficient priming of the syphon.

In view of the foregoing description taken in conjunc-

tion with the accompanying drawings, it is believed that a clear understanding of the construction, operation, and advantages of the syphon tube will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there are herein shown and described preferred embodiments of the invention, various changes may be made without departing from the spirit and full intendment of the invention.

What is claimed is:

1. A syphon device comprising an elongated tubular member of symmetrical shape having a main central arched portion and short outwardly and upwardly directed end portions that have their free ends open, said end portions diverging from one another as they extend upwardly and extending upwardly so slight that traps are formed therewith only when both open ends are at substantially the same elevation, said open ends having the lips thereof on planes converging as they extend upwardly, said elongated tubular member being composed of a pair of longitudinally extending opposite side sections, stiffening flanges extending along longitudinal edge

portions of said sections, and adhering means attaching the flanges of one section to the flanges of the other section, said attached flanges of the sections being at the vertical center line of the tubular member and extend above and below its tubular portion.

2. A syphon device as defined in claim 1 further characterized by the provision of irregular edges on the flanges extending below the tubular portion of the central arch member.

3. A syphon device as defined in claim 1 further characterized by the provision of oppositely turned lateral portions on the flanges extending above the tubular portion of the tubular member so as to provide a level platform that is parallel with an imaginary horizontal line between opposite open ends of the tubular member.

References Cited in the file of this patent

UNITED STATES PATENTS

2,435,049	Minges	Jan. 27, 1948
2,660,805	Rothstein	Dec. 1, 1953
2,791,232	Downs	May 7, 1957
2,839,072	Leyva	June 17, 1958