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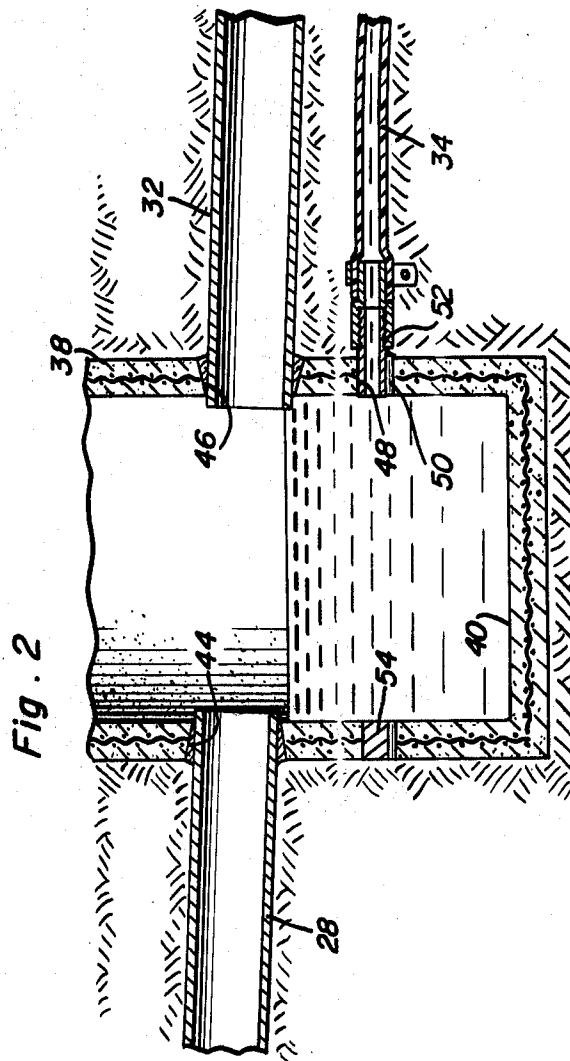
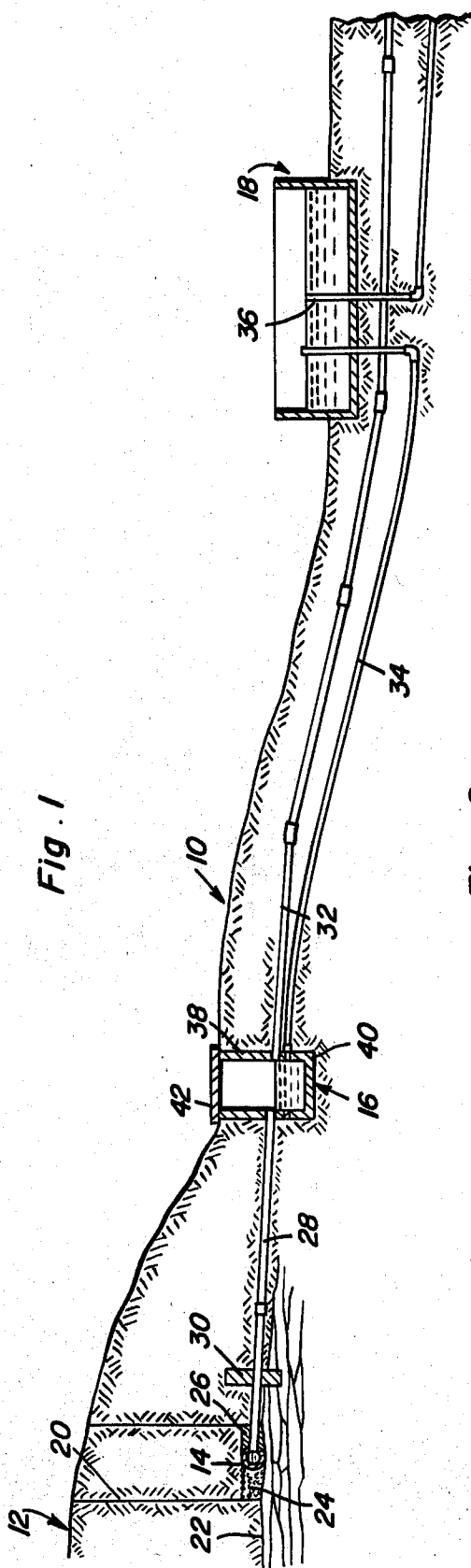
LA MAR M. EARNHART

3,559,408

SPRING DEVELOPMENT SYSTEM

Filed Sept. 26, 1968

2 Sheets-Sheet 1



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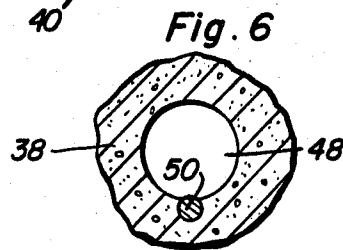
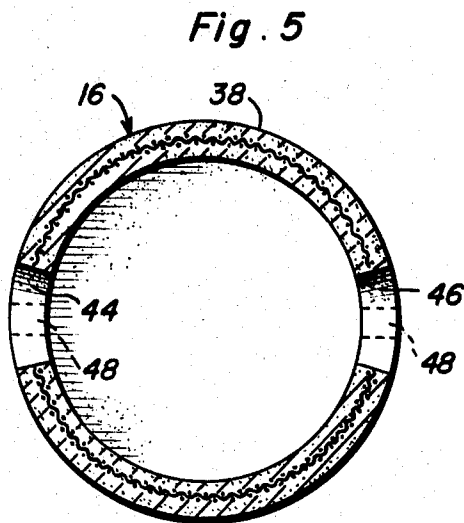
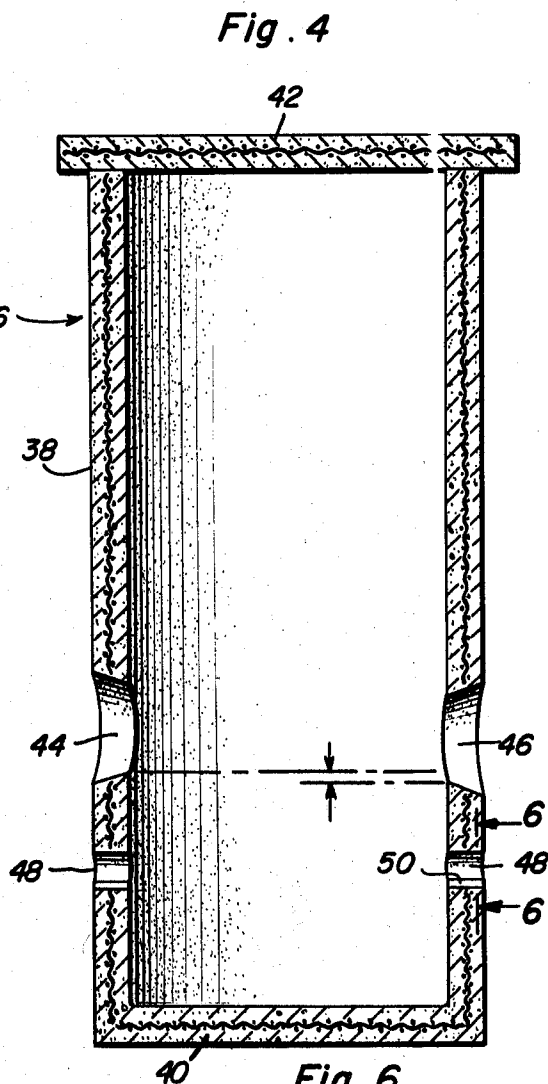
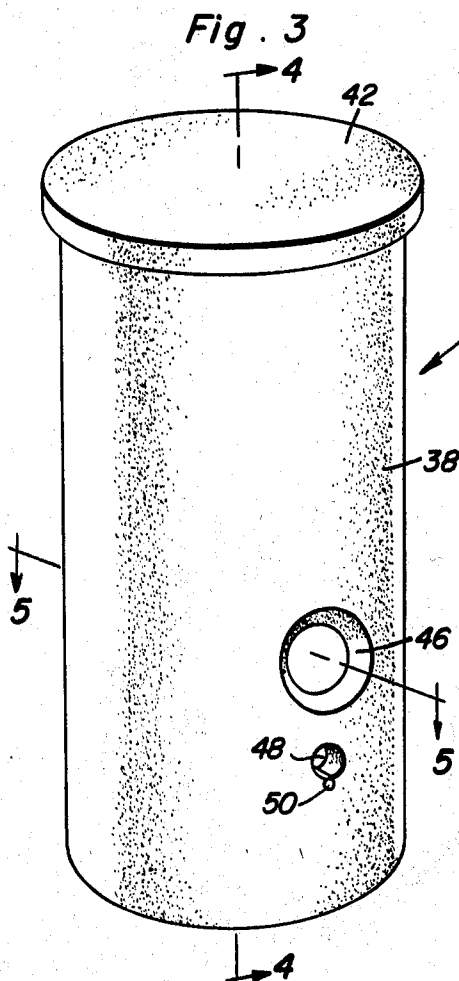
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LA MAR M. EARNHART
SPRING DEVELOPMENT SYSTEM

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2 Sheets-Sheet 2



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3,559,408

SPRING DEVELOPMENT SYSTEM

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10 Claims

ABSTRACT OF THE DISCLOSURE

The system contemplates the provision of a precast water collection box or reservoir communicated with collector drain tile in a spring or seep area through an inlet pipe, and communicated with a trough or holding tank through an outflow pipe. The box includes an overflow outlet pipe with the various pipes communicating with the precast box at predetermined points above the bottom thereof, the inlet pipe and the overflow outlet pipe being received and mortared within tapered precast holes for simplifying the assembly.

The present invention is concerned with spring development systems, and more particularly relates to a unique collection box, the manner in which the box is constructed, and the manner in which the box is incorporated and operates in the system.

It is a primary intention of the instant invention to provide a uniquely constructed spring collection box which greatly facilitates the installation of the system and which, in the installed system, provides for a more efficient operation of the system, avoiding most of the problems generally associated with such systems, including the introduction of pollutants into the system and the possibility of the developed area becoming water saturated.

In achieving the above objects, it is contemplated that the spring collection box of the instant invention be precast and of reinforced concrete, having several pipe connecting openings defined therein for engagement therewith by an inlet pipe communicating with the collector tile in the spring area, an overflow pipe generally aligned with the inlet pipe and offset downwardly approximately one inch therefrom, and one or more outflow pipes leading to stock or holding tanks.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a longitudinal cross-sectional view through the spring development system;

FIG. 2 is an enlarged cross-sectional view through the spring collection box and the communicating pipe sections;

FIG. 3 is a perspective view of the spring collection box;

FIG. 4 is an enlarged transverse cross-sectional view taken through the spring collection box substantially on a plane passing along line 4-4 in FIG. 3;

FIG. 5 is a transverse cross-sectional view through the box taken substantially on a plane passing along line 5-5 in FIG. 3; and

FIG. 6 is an enlarged cross-sectional detail taken sub-

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stantially on a plane passing along line 6-6 in FIG. 4.

Referring now more specifically to the drawings, reference numeral 10 is used to generally designate the spring development system. This system includes a spring or seep area 12 having laterally branching collector drain tile 14 positioned therein, a spring collection box 16 downstream from the seep area 12, and a trough or holding tank 18 downstream from the collection box 16.

In placing the collector tile 14, a trench 20 is dug transversely across the spring or seep area 12 down to an impervious or water-tight layer 22. The tile 14, which is preferably four inch drain tile, is laid in the trench 20 on top of the impervious layer 22 with gravel or rock 24 on the uphill side of the tile 14 and tightly tamped clay 15 or poured concrete 26 on the lower side of the tile so as to intersect and keep the water from escaping into the soil on the downhill side of the collector tile 14.

An elongated inlet pipe 28, preferably formed of sewer tile with sealed joints, communicates the collector tile 20 14 with the spring collection box 16. An appropriate concrete anti-seep cutoff wall 30 is provided about the inlet pipe 28 immediately below the collector tile 14 so as to prevent any seepage along the pipe 28.

Communicated with the box 16 in generally opposed relation to the inlet pipe 28 is a downhill extending overflow outlet pipe 32. This overflow pipe extends to an area remote from the developed area so as to prevent any overflow and possible water saturation of the developed area.

Also extending from communication with the collection box 16 is at least one reduced diameter outflow pipe 34 which communicates with a watering trough or holding tank 18, also provided with an overflow line 36.

Referring now specifically to the spring collection box 35 16, this box is to be prefabricated or precast, formed of reinforced concrete so as to define a hollow cylindrical unit with an open upper end. Both the annular wall 38 of the box 16 and the bottom wall or floor 40 are preferably to be two inches thick with the transverse internal diameter thereof being eighteen inches. A removable precast concrete top or lid 42 is also provided for sealing the box 16 while still allowing for convenient access thereto for inspection purposes or the like. The annular box wall 38 is provided with a pair of generally opposed openings or holes 44 and 46 which accommodate the inlet and overflow outlet pipes 28 and 32. The openings 44 and 46 are each tapered inwardly from an outside diameter of six inches to an inside diameter of five inches, the five inch inside diameter being just sufficient so as to allow for a sliding reception of the pipes 28 and 32. The basis for the tapered configuration of the holes 44 and 46 is so as to provide a convenient means for properly mortaring the pipes 28 and 32 in the holes 44 and 46 without requiring access to the interior of the box 16, such being extremely difficult because of the height of the box, approximately four feet, and the narrow interior diameter thereof. With the tapered configuration and the relatively close fit between the pipes and the inner ends of the holes, the mortar can be properly packed in the holes from the exterior of the box 16 without the mortar falling into the interior of the box itself. Finally, noting the dimension lines in FIG. 4, the hole 46 through which the overflow outlet pipe 32 is communicated, is located slightly below the inlet pipe opening 44, this distance being approximately one inch

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whereby an overflow or excess build-up of water in the box 16 will drain through the downhill overflow pipe 32 and not result in a backflow through the inlet pipe 28. This provision of an overflow outlet in the collection box is considered particularly significant as a means for avoiding a water saturation of the development area and water-logging of the collector tiles during periods of high rainfall. With regard to locating the openings 44 and 46 in the box 16, the lowermost portion of the inner edge of the opening 44 will normally be positioned thirteen inches from the inner surface of the floor 40, and the lowermost portion of the inner diameter of the opening 46 will be located approximately twelve inches above the inner surface of the floor 40.

Located vertically below each opening 44 and 46 is a second pair of openings 48, each positioned approximately seven inches from the inner surface of the bottom 40 and each being approximately one and one-half inches in diameter. While two such openings 48 have been illustrated, any practical number thereof can be provided depending upon the number of troughs or holding tanks 18 to be fed. Each of the openings 48 is particularly adapted to rigidly mount one end of an elongated outflow pipe 34 which feeds a trough 18. It is contemplated that the actual connection includes a short metal rod 50 embedded within the concrete immediately below and along each hole 48 and an appropriate pipe connector 52 welded to this rod 50. Other appropriate connection means can also of course be utilized. Incidentally, it shall be appreciated that the fact that the overflow outlet pipe opening 46 is spaced several inches above the outflow pipe openings 48 allowed the development of a head of water which insures a proper flow outward through the outflow pipe or pipes 34. Further, with regard to FIG. 2, the arrangement shown therein assumes only a single watering trough is being fed, and as such, an appropriate plug 54 has been mounted within the unused opening 48.

In normal operation, the water in the spring or seep area 12 flows along the impervious layer 22 to the collector tiles 14 which collect and direct the water to the communicated intake pipe 28 for an introduction of the water into the collection box 16. The water in the box 16 flows through the outflow pipe or pipes 34 into an appropriate downhill trough or holding tank. Should any increase in flow occur beyond that which can appropriately be held in the box or fed into the trough, the water will discharge directly from the box 16 through the overflow outlet pipe 32 for discharge away from the spring development area, thus avoiding a water saturation of the area and possible pollution of the system resulting therefrom.

The specific construction of the precast collection box 16 is also considered particularly important in simplifying the installation of the system, not only by avoiding the necessity of an in situ construction of the box 16, but also by enabling a simplified engagement of the pipes therewith as well as handling of the collecting water while the lower portion of the system is being installed. For example, the provision of the various openings through the side walls enables the construction of the box with a solid flat bottom which can be properly seated within a ground hole before the pipes are connected therewith. In addition, the holes 48 are particularly useful in providing for a controlled flow of the collected water while the mortar used in setting the ends of the pipes 28 and 32 hardens so as to provide sealed joints. Further, the openings 48, in conjunction with the outflow pipes 34 coupled thereto, can be used to direct water away from the development site so as to maintain the site dry during the construction of the water trough, holding tank or the like, after the pipes 34 can be connected to the constructed trough or holding tank for the supplying of water thereto. In this manner, actual construction of the entire system can be effected at one time through a progressive control-

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ling of the water from the spring or seep area as the system is constructed down therefrom. Finally, it should be appreciated that the above set forth dimensions, while considered preferable in most instances, can be varied as long as the relative relationship between the components is maintained.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be restored to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A spring development system comprising a spring area, collector means located within the spring area for the gathering of water therein, inlet pipe means having one end thereof in water receiving communication with the collector means and a collection box, said collection box being located downstream from said collector means and having a first inlet opening defined therein, said inlet pipe means having a second end engaged within the collection box opening for a movement of water from the collector means into the collection box, said collection box having a second outflow opening located in a horizontal plane below the first inlet opening, an outflow pipe having one end engaged within said second opening in flow receiving communication with the collection box, holding tank means downstream from the collection box, said outflow pipe having the second end thereof in flow discharging communication with said holding tank means, for a movement of water from the collection box into the holding tank means, a third overflow opening defined in said collection box and located in a plane above said second outflow opening and slightly below said first inlet opening, said third overflow opening being directed downstream therefrom and an overflow outlet pipe having one end thereof engaged within said third opening in flow receiving communication with the collection box.

2. The system of claim 1 wherein said collection box is prefabricated of reinforced concrete.

3. The system of claim 1 including a plurality of outflow openings defined in said box at approximately equal height.

4. The system of claim 1 wherein the first inlet opening and the third overflow opening are tapered inwardly from the exterior of the box to the interior thereof, defining, in each instance, a greater diameter at the exterior of the box and a lesser diameter at the interior of the box, the inlet pipe means and the overflow outlet pipe being of diameters so as to provide for a close sliding engagement within the corresponding openings relative to the lesser inner diameters thereof whereby a tapered mortar receiving space is provided annularly about each hole received pipe increasing outwardly from the lesser inner diameters.

5. In a spring development system, a collection box, said collection box including a peripheral upstanding wall, a closed bottom, and a removable top, said upstanding wall having a first inlet opening defined laterally therethrough in spaced relation above the bottom, a second outflow opening defined therethrough also in spaced relation above the bottom and located in a horizontal plane below the first inlet opening, and a third overflow opening defined therethrough, also in spaced relation above said bottom, said third overflow opening being located in a plane spaced above said second outflow opening and slightly below said first inlet opening.

6. The collection box of claim 5 wherein said first inlet opening and said third overflow opening are each of a tapered configuration, tapering from a larger diameter at the exterior of the wall to a lesser diameter at the interior of the wall.

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7. The collection box of claim 6 including an embedded connecting element locked within the wall and communicating with said outflow opening.

8. The collection box of claim 7 wherein said first inlet opening and said third overflow opening are substantially diametrically opposed from each other.

9. The collection box of claim 5 wherein said first inlet opening and said third overflow opening are substantially diametrically opposed from each other.

10. The collection box of claim 9 wherein said collection box is prefabricated of reinforced concrete.

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