United States Patent [19]

Williams

[11] **3,906,667**

[45] **Sept. 23, 1975**

[54] **IRRIGATION SYSTEM**

[76] Inventor: **Earl Evan Williams,** 113 S. Queen St., Shippensburg, Pa. 17257

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[21] Appl. No.: **471,341**

[52] **U.S. Cl.** **47/38**

[51] **Int. Cl.²** **A01G 27/00**

[58] **Field of Search** 47/38, 34, 1.2

[56] **References Cited**

UNITED STATES PATENTS

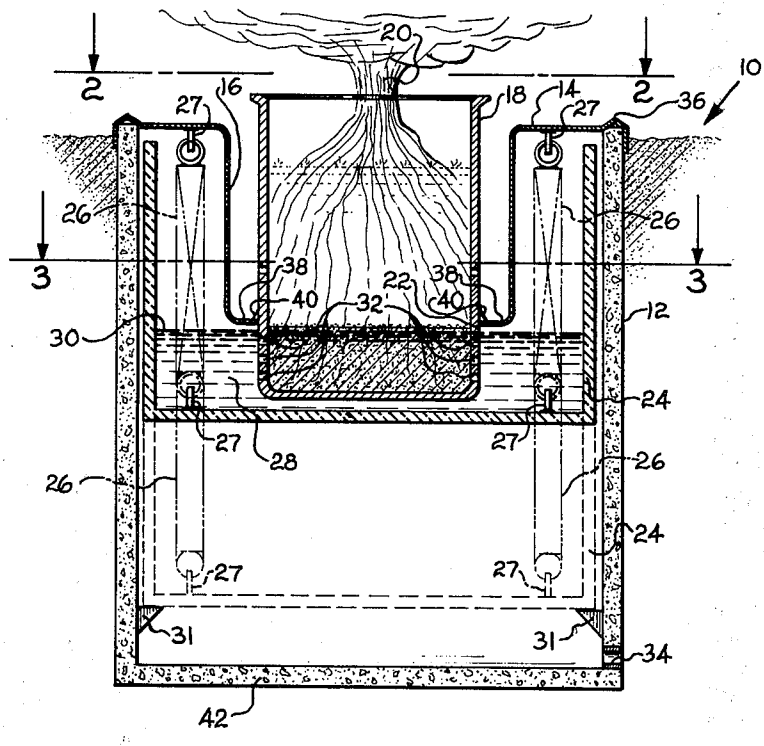
1,780,279	11/1930	Smith	47/38
2,499,885	3/1950	Sommetz	47/38
2,885,825	5/1959	Longacre	47/38
3,168,797	2/1965	Patassy	47/38
3,293,799	12/1966	Keller et al.	47/38

Primary Examiner—Stephen C. Pellegrino
Attorney, Agent, or Firm—Thomas Hooker

[57] **ABSTRACT**

A constant level irrigation system for watering a potted plant includes a vertically moveable reservoir, a pot support for holding the pot so that it extends below the surface of the water in the reservoir and means for raising or lowering the reservoir to maintain the level of the water in the reservoir constant independent of the amount of water in the reservoir.

11 Claims, 6 Drawing Figures



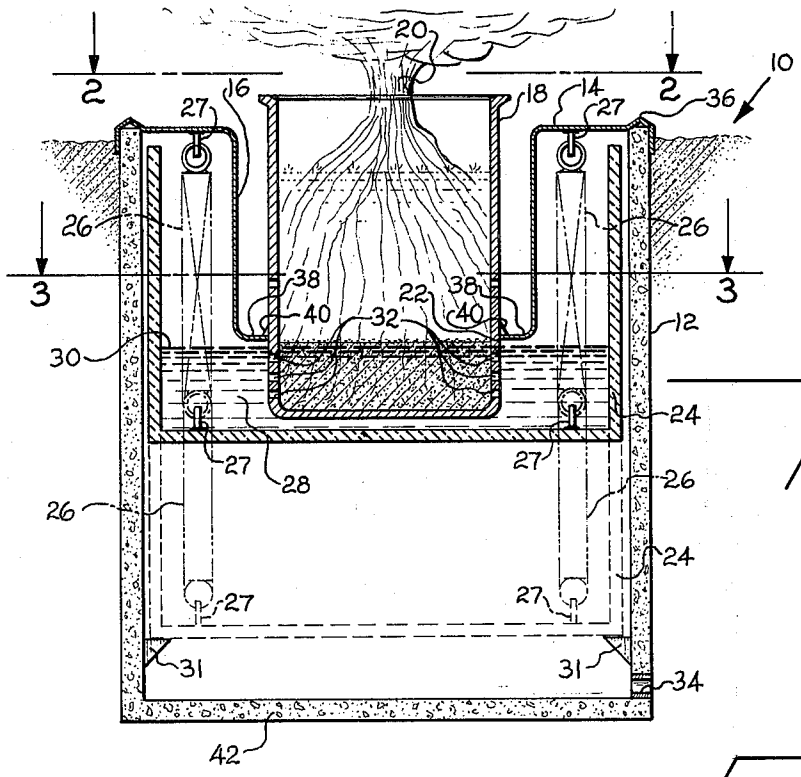


Fig. 1

Fig. 2

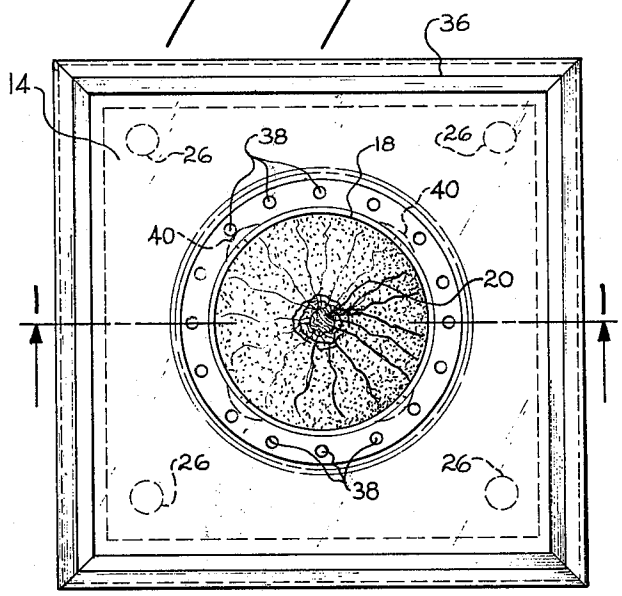


Fig. 3

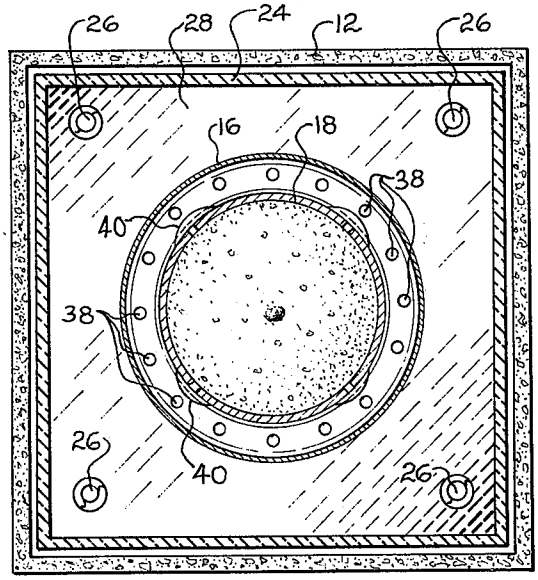


Fig. 4

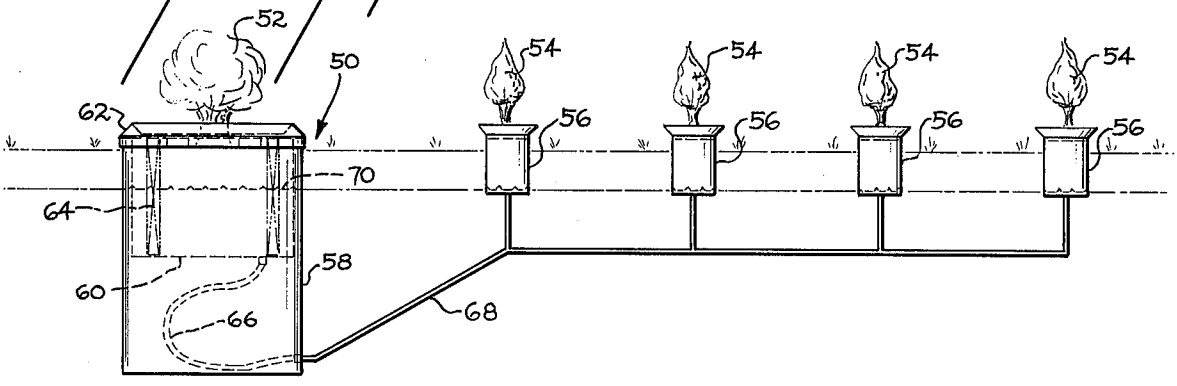


Fig. 5

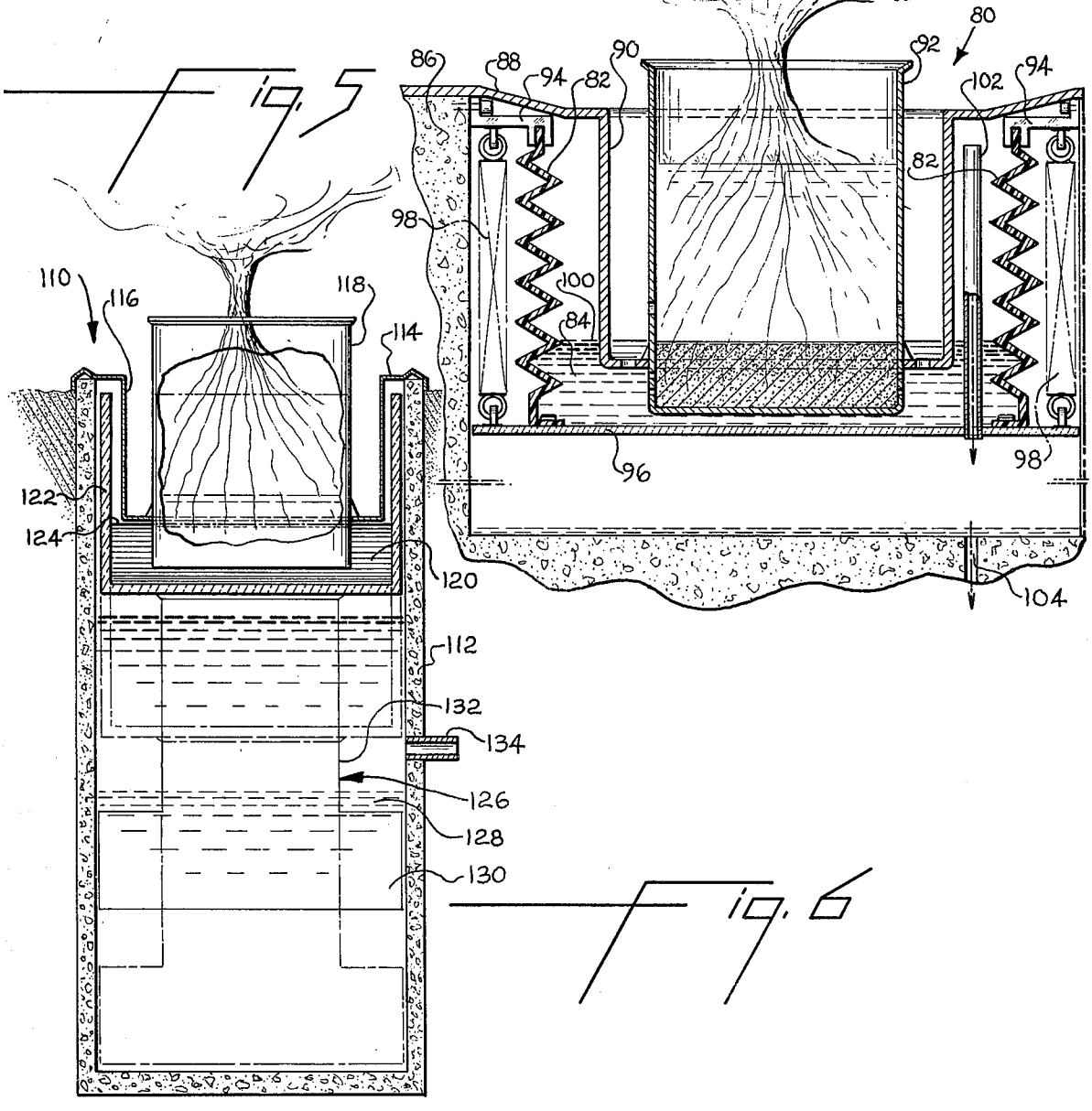


Fig. 6

IRRIGATION SYSTEM

The invention relates to plant irrigating systems and particularly to an automatic irrigating system for providing potted plants with an constant-level source of water. The irrigating system includes a reservoir pan which holds a reservoir of water and is supported by a specialized spring system so that as the amount of water in the reservoir varies, the pan is moved up or down to maintain the level of the reservoir constant. The potted plant extends below the level into the water in the reservior and is thus provided with a constant level source of water. The water flows from the reservoir into the pot to be used by the plant. The level of the water in the reservoir pan is automatically adjusted. An external power source is not required.

The irrigating system of the invention is particularly useful in watering plants or flowers in cemeteries or other locations where normally a minimum of attention or maintenance is available. Rain water falling on a collecting surface replenishes the reservoir of water and enables the plant to receive a constant supply of water during rainless periods. Thus, the limited rainfall available in a semi-arid climate may be collected and used to water the plant during an entire growing season.

United States Patent No. **2,713,753** discloses a constant water level irrigating system where the level of the water is maintained by a float valve such that when the water level lowers the valve is opened and an additional supply of water flows into the tank from a remote source. United States Patent No. **1,780,279** shows a plant on a support with a surrounding supply of water which evaporates to provide moisture for the leaves of the plant. The plant support includes a spring-backed grip maintained against the bottom of the plant pot to catch the overflow of water. Neither of these patents teaches a constant level, selfpowered irrigating system in which a reservoir of water is moved up or down relative to a held plant pot to maintain the level of the reservoir constant with respect to the pot.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings illustrating the invention, of which there are two sheets.

IN THE DRAWINGS

FIG. **1** is a sectional view illustrating an irrigating system according to the invention;

FIGS. **2** and **3** are views taken along lines **2—2** and **3—3** respectively of FIG. **1**; FIG. **4** is a view illustrating a modification of the irrigating system of FIG. **1** where a constant water level is maintained both in the main irrigator and in a number of adjacent pots; and

FIGS. **5** and **6** are sectional views similar to that of FIG. **1** illustrating further embodiments of the invention.

The constant water level irrigator **10**, illustrated in FIG. **1**, includes a hollow outer case **12** with a cover **14** fitted over the upper open end of the case **12**. The cover includes a centrally located cylindrical support **16** extending down into the case **12**. A pot **18** containing soil and a plant **20** rooted in the soil is held by support **16** and extends through an opening **22** in the bottom of the support. The case **12** may be buried in the ground with cover **14** exposed slightly above ground level.

A reservoir pan **24** is fitted closely within the interior walls of case **12** and is supported therein by four springs **26** extending between brackets **27** on the lower surface of cover **14** and on the bottom of the pan. The pan contains an amount of water **28** having a constant water level **30** which is automatically maintained slightly below the bottom of the pot support **16**. A number of small openings **32** are provided in the walls of pot **18** below water level **30** to permit free passage of water into the pot. A drainage opening **34** is provided in the bottom of case **12** to allow any water overflowing pan **24** to drain from the irrigator.

Cover **14** includes a slightly raised lip **36** extending around the circumference of the outer case. The lip assures that rain water falling on the surface of the cover drains into pot support **16**, through openings **38** at the bottom thereof, and into the pan **24** to increase the water reservoir **28**. An extended rain water collecting surface may be provided.

Support brackets **40** on the outside of the pot **18** rests on the bottom of support **16** to hold the pot in place with the lower portion extending through opening **22** and into the constant level water reservoir **28** within pan **24**. If desired, a number of sets of support brackets **40** may be provided on the pot in order to vary the depth to which the pot extends below the constant level surface **30**.

As water is added to the reservoir **28**, the weight of the reservoir **28** increases, springs **26** are elongated and the reservoir and pan are lowered with respect to the fixed plant pot **18**. The spring constants of springs **26** are such that the weight of new water added to the reservoir lowers the pan sufficiently to maintain the level of water **30** in the reservoir constant. Thus, as the reservoir **28** is filled with water, the pan **24** is lowered toward the position shown in dotted lines in FIG. **1** and the springs **26** are correspondingly elongated. When the pan is full of water, it rests on stops **31** and additional water added to the reservoir overflows the pan and flows out of case **12** through overflow opening **34**. In this way, water does not collect below reservoir pan **24** and the level **30** is maintained. If desired, the bottom **42** of outer case **12** may be omitted together with opening **34**.

Water from reservoir **28** flows into pot **18** through the lower holes **32** to provide moisture for the plant growing in the pot. As water is used up in the reservoir, the weight of the reservoir decreases, springs **26** raise the reservoir and pan **24**, and assures maintenance of constant reservoir level **30**. In this manner, a constant supply of water is provided to pot **18** over a relatively long period of time.

FIG. **4** illustrates an irrigating system using an irrigator **50** similar to irrigator **10** of FIGS. **1** through **3** to provide a constant-level water reservoir not only for a plant **52** in the irrigator **50**, but also for a number of additional plants **54** each growing from a separate pot **56** located adjacent to the irrigator **50**.

Irrigator **50** includes a buried outer case **58** with an inner reservoir pan **60** supported from cover **62** by springs **64**. The reservoir of water maintained in the pan **60** is kept at a constant level in the same manner as in the reservoir **10**. A flexible tube **66** is attached to pan **60** and leads to a buried pipe **68** connected to the bottom of each of the pots **56**. The constant level **70** of the water reservoir in pan **60** is slightly above the bottom of pots **56**. In this manner, the reservoir in pan **60**

is extended to and includes the bottom of each of the pots **56** and the plants **54** are provided with a constant-level water supply. This type of irrigating system is particularly useful in automatically watering plants at a grave site or in another area where reduced maintenance is desired. Also, the reservoir may be replenished by rain collected from the surfaces of the markers and stones, thus increasing the water available for supply to the various plants in the irrigation system.

FIG. **5** illustrates an irrigator **80** which is similar to that of FIG. **1,** but uses a collapsible reservoir pan **82** to hold the water reservoir **84.** A buried cement outer case **86** is provided with an extended area cover **88** closing the top of the case and having a central pot support **90** for supporting pot **92** as in irrigator **10.** Brackets **94** are secured to the case **86** and project into the opening just below cover **88.** The brackets **94** support the top of a vertically collapsible wall **82,** the bottom of which is secured to support plate **96.** The plate **96** and wall **82** define reservoir **84.** Springs **98** are attached between the brackets **94** and the outer portions of plate **96** beyond flexible wall **82** and function identically to springs **26** of irrigator **10** to assure that the level **100** of the reservoir is maintained constant despite variation in the volume of water in the reservoir. An overflow tube **102** extends up from plate **96** so that when reservoir **84** is full of water, excess water flows through the tube and out of the irrigator **80** through overflow **104.**

Irrigator **110,** illustrated in FIG. **6,** operates similar to the irrigators previously described through the use of a fluid-float spring system for maintaining the watering reservoir at a constant level. The irrigator **110** includes an outer case **112** which is somewhat deeper than the cases previously described. A cover **114** fits over the top of the case and includes a pot support **116** which extends down into the case **112** and has a central opening for receiving pot **118** with a plant and soil therein. Constant level watering reservoir **120** is held in reservoir pan **122** which moves up and down within case **112** depending upon the amount of water in the reservoir **120.** The reservoir **120** is maintained at a constant level **124** located above the bottom of pot **118.** As in the previously described embodiment, the pot may be adjusted on support **116** so that it extends to a greater or lesser extent below reservoir surface **124.**

The reservoir pan **122** and reservoir **120** therein are supported by a float assembly **126** which is immersed in a float reservoir **128** in the lower portion of case **112.** The float assembly **126** extends down into reservoir **128** from the bottom of reservoir pan **122** and includes a first float **130** which fits closely within the interior opening of case **112** and second float **132** extending from float **130** to the bottom of pan **122.** The cross sectional area of float **132** is one-half of the interior cross sectional area of the lower portion of case **112.**

With the float assembly **126** and pan **122** in the raised position as shown in solid lines in FIG. **5,** float **130** is completely immersed within the reservoir **128.** The displacement of this float and the portion of float **132** immersed in reservoir **128** supports pan **122.** As additional water is added to reservoir **120,** the weight carried by the float assembly is increased and the pan **122** and float assembly are lowered into reservoir **128.** The cros sectional area of pan **122** is essentially equal to that of the lower portion of case **112** and is twice the cross sectional area of the annular portion of reservoir **128** above float **130.** This relationship assures that when water is added or removed from reservoir **120,** the float and pan are raised or lowered due to the change in weight of the reservoir **120** and the constant level **124** is assured.

The addition of one inch of water to the reservoir **120** will cause the float assembly **126** to sink lower in the reservoir **128** sufficiently to displace an equal volume of water. The pan and float assembly will move downward **1** inch and at the same time, the level of the reservoir **128** will move up one inch. The result is that the float is immersed in two additional inches of water to provide the added buoyancy required to maintain the fixed level **124** of reservoir **120.** Similarly, removal of water from reservoir **120,** primarily through seepage into pot **118** and adsorption into the root system of the plant growing in the pot, will decrease the weight of the reservoir so that the float system will rise and maintain the constant level **124.** An overflow **134** is provided in case **112** at a level below the bottom of pan **122** when it is in its full or lower most position. If the pan **122** is overfilled, the excess water flows down into reservoir **128** replenishing it, if necessary, with the excess being drained from case **112** through the overflow.

In the irrigator of FIG. **6,** the float assembly is buoyed by a reservoir of water which is replenished by overflow from the watering reservoir located above it. In some situations, it may be desirable to use a fluid other than water in the fluid-float spring sytems. In that case, the density of the fluid may not equal the density of the water in the upper reservoir and in order to maintain the constant level of the upper reservoir, the cross sectional area of the float at the surface of the fluid-float spring reservoir must equal the surface area of the reservoir and the density of the fluid in this reservoir must equal the ratio of the surface area of the water in the reservoir pan to the surface area of the fluid in the fluid-float spring reservoir. If a specialized fluid is used for the float reservoir, it may be desirable to provide a barrier between that reservoir and the upper portion of the outer case **112** to prevent water overflowing reservoir pan **22** from reaching the lower float reservoir.

While the irrigators of the present invention are all illustrated as being buried with the plants watered by them projecting above ground level, it is obvious that the outer cases of the irrigators may be located above ground level, if desired. For example, irrigators containing small trees or shrubs may be located on city sidewalks for beautification purposes.

While I have illustrated and described preferred embodiments of my invention, it is understood that these are capable of modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

What I claim as my invention is:

1. A constant level irrigating system comprising a support, a pot or like vessel on the support for holding a plant to be watered by the irrigating system and having a water entry opening therein, a reservoir pan surrounding the pot so that when water is placed in the reservoir pan the opening is below the surface of the water in the reservoir pan, and means interconnecting said reservoir pan and said support for automatically raising or lowering said reservoir pan as the water level in the reservoir pan changes to maintain the surface of the water at a constant level with respect to the opening

despite the addition of level to or removal of water from the reservoir pan.

2. A constant level irrigating system as in claim **1** wherein said means comprises a spring system connected between said pot support and reservoir pan to support the reservoir pan against the force of gravity.

3. A constant level irrigating system as in claim **2** including a number of tension springs connecting said reservoir pan and support, such springs being arranged around the circumference of the reservoir pan.

4. A constant level irrigating system as in claim **3** wherein the springs are located within the reservoir pan.

5. A constant level irrigating system as in claim **3** wherein the springs are located outside the reservoir pan.

6. A constant level irrigating system as in claim **1** wherein said means comprises a float and reservoir spring system having a reservoir, a fluid in the reservoir, a float attached to the reservoir pan and extending into the reservoir, the cross sectional area of the float at the surface of the reservoir equaling the surface area of the reservoir, and the density of the fluid equaling the ratio of the surface area of the water in the reservoir pan to the surface area fluid in the reservoir.

7. A constant level irrigating system as in claim **1** wherein the side wall of said reservoir pan is collapsible and the top of such wall is secured to the support.

8. A constant level irrigating system as in claim **1** comprising an additional pot located away from said reservoir pan and support and at about the same vertical level as said first named pot, and a closed fluid conduit connecting the interior of the reservoir pan and the interior of said additional pot whereby water is maintained in said additional pot at the same constant level as water in the reservoir pan.

9. A constant level irrigating system as in claim **8** wherein said fluid conduit includes a flexible portion at the reservoir pan, such portion permitting movement of the reservoir pan with respect to the first named pot.

10. A constant level irrigating system as in claim **1** including surface means for collecting rainfall, a water flow path from said surface means to the reservoir pan whereby rain water falling on such surface flows into the reservoir pan to replenish the water therein, and overflow means for preventing overfilling of the reservoir.

11. A constant level irrigating system as in claim **10** wherein said water flow path extends past said support.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,906,667
DATED : September 23, 1975
INVENTOR(S) : Earl E. Williams

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, line 1, change "level" to

--water--.

Signed and Sealed this

sixth Day of *January 1976*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks