April 30, 1929. H. B. SHERMAN 1,710,844

LAWN SPRINKLING APPARATUS

Filed July 5, 1927

Fig. 1.

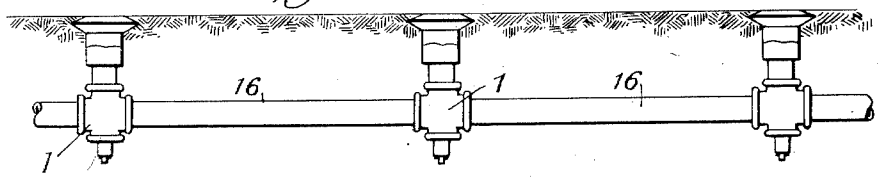



Fig. 2.

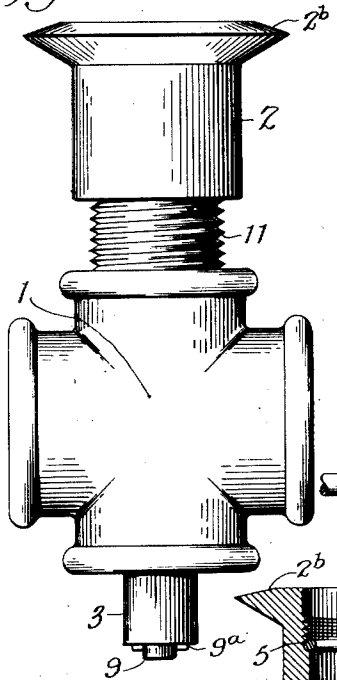



Fig. 3.

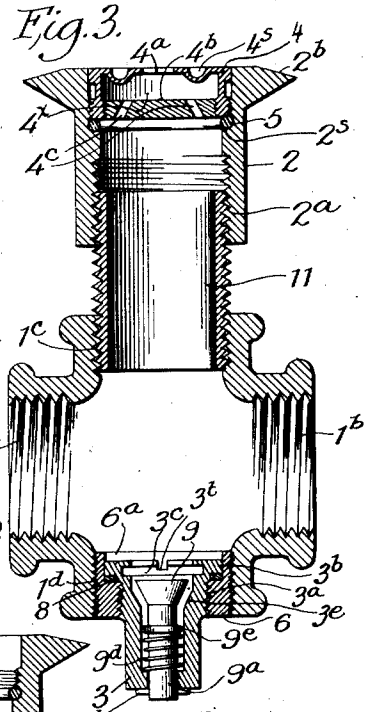



Fig. 5.

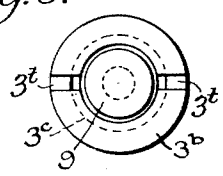



Fig. 4.

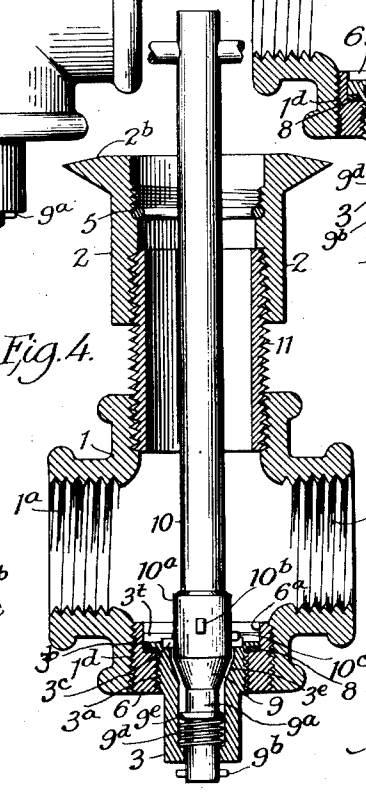



Fig. 7.

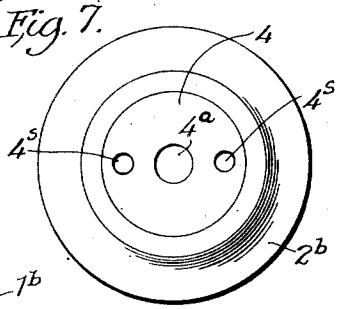
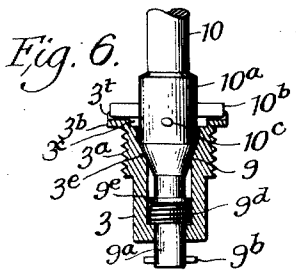



Fig. 6.




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# UNITED STATES PATENT OFFICE.

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## LAWN-SPRINKLING APPARATUS.

Application filed July 5, 1927. Serial No. 203,443.

This invention is an improvement in underground lawn sprinkler systems and its objects are to provide a system which can be cheaply and easily installed by ordinary labor, and is automatically self-draining when not in use and to provide automatic drain valves that can be easily removed and replaced without having to dig up any portion of the system, and which will be reliable and efficient in operation.

Where underground sprinkling systems are used in places subject to freezing, it is necessary to drain the system to prevent injury thereto. Sprinkler systems are installed in ground that may be level or undulating. In order to drain the system the piping is commonly led back to a drain valve at the low point of the system to provide against bursting of the pipes in the winter. In such a case deep excavating is necessary, and it is usually necessary to have the aid of a surveyor in laying the pipes, therefore such a system is expensive to install, and to drain at one common low point is dangerous as the drain might become stopped. Another objection to such systems in lawns is the fact that the deep excavations injure the lawn and produce hollows or mounds following the course of the piping. The deeper the excavation, the more the ground will settle; and to compensate for this settlement little mounds of earth must be left over the excavations which mounds later may either sink below the surface, or have to be cut off in order to make the lawn surface level.

The ideal underground sprinkler system is one in which the pipes can be laid very near the surface of the ground and be provided with automatic draining means under each sprinkler head, or under a sufficient number of heads, to insure the system being freely drained when not in use, and obviate the necessity for opening the drains in the fall and of closing them in the spring, and to save the labor of so doing, and the annoyance and trouble caused by forgetting to open the drains or to close them.

My present invention provides a system which possesses these desirable features and advantages, and a further very important advantage of having the automatic drain valves so placed that they can be readily removed and replaced in case of trouble.

Every automatic drain through faulty workmanship or some other unforeseen reason, may give trouble. Ordinarily, in such case, the valve or head would have to be dug up at considerable expense, and the lawn disfigured, to get at the faulty drain valve either by breaking or removing parts, or by some other complicated and expensive method.

In my invention this very serious difficulty is overcome by having the automatic drain valve readily removable through the sprinkler head; each drain valve being a small compact assembly that can be easily removed and replaced, and is so inexpensive that a defective one can be thrown away and a new one substituted therefor.

In the accompanying drawing I have illustrated a sprinkling apparatus embodying the invention, and will describe the same with reference thereto, and refer to the claims for summaries of the invention, and the novel features of construction, and the novel combinations of parts, for which protection is desired.

In said drawing Fig. 1 is a diagrammatic view of part of a sprinkler system embodying my invention. Fig. 2 is an enlarged side view of one of the associated sprinkler heads, cross connectors, and drain valves. Fig. 3 is a vertical section through Fig. 2. Fig. 4 is a view similar to Fig. 3 but with the sprinkler disc removed showing the novel tool used to remove or replace the drain valve. Fig. 5 is a top plan view of the drain valve, removed. Fig. 6 is a view of the tool and drain valve, attached. Fig. 7 is a top plan view of the sprinkler head, detached.

In carrying out my invention I provide a number of units each comprising a body 1, to which is attached a sprinkler head 2 and a drain valve 3. Body 1 may be a commercial brass fitting such as a cross or a tee, and the sprinkler head 2 be detachably attached thereto, above the fittings, and the drain valve 3 detachably attached to the fitting at the lower end thereof; said drain valve is arranged to open automatically when there is no water pressure in the pipes and it can be removed through the fitting by removing the sprinkler head, or a part of the head, as hereinafter described. A number of these units may be placed at different points in the lawn, or area to be sprinkled, with the sprinkler head up-

permost and the drain valve lowermost, and the bodies of adjacent units may be interconnected by water pipes 16, water being supplied to these units by connecting one or more of the pipes 16 to any suitable water supply. The body farthest removed from the inner pipe or at the end of the system might be a commercial T, the shape of the body depending upon the number of water supply or distributing pipes to be connected therewith.

In the particular embodiment of the invention illustrated in the drawings the body 1 is provided with horizontally disposed openings, $1^a$ and $1^b$ on opposite sides, which are preferably internally threaded for engagement with the externally threaded ends of the pipes 16. The body is also provided with upper and lower vertically disposed openings $1^c$ and $1^d$, the upper one of which is connected with the sprinkler head 2, and in the lower one of which the drain valve 3 is mounted.

In the construction illustrated each sprinkler head comprises a tubular body 2 and a removable sprinkling chamber 4. The body 2 is preferably internally threaded as at $2^a$ to engage the threaded upper end of a pipe section 11, the lower end of which is threaded into the opening $1^c$ of the body 1. This pipe section 11 may be of any desired length according to the depth at which the body is placed below the surface of the ground where the sprinkler head is to be used; and the parts should be so adjusted that the upper end of the head 2 is flush with the surface of the ground as indicated in Fig. 1.

The body 2 is preferably provided with a peripheral flange $2^b$ at its upper end 1 which flange is preferably beveled on its upper and lower sides as shown, this flange is adjusted to the level of the ground by turning the head on the section 11, and it will prevent dirt entering the head when the sprinkling chamber is removed, and not obstruct the passage of a lawn mower or lawn roller or catch the foot of a person walking thereover.

The sprinkler head 2 is provided with a removable sprinkling chamber 4 consisting of a hollow cylindrical member having a central opening $4^a$ for the escape of water and a removable bottom member $4^b$ which is provided with oppositely inclined inlet passages $4^c$. The sprinkling chamber 4 is shown as provided in its upper surface with diametrically opposite recesses $4^s$ (see Figs. 3 and 7) so that it can be removed by a special spanner wrench (not shown) provided with spaced lugs adapted to engage the holes $4^s$. The water enters the sprinkling chamber 4 through the passages $4^c$ at an angle and runs around in the chamber, the two streams coming together and breaking and then issuing from the orifice and producing a fan-shaped spray or mist.

Said sprinkler chamber is removable from and replaceable as a unit in the head 2, and is provided with external threads adapted to engage internal threads in the head 2 as shown in Figs. 3 and 4, and when screwed home the chamber seats upon a lead gasket 5 (Figs. 3 and 4) supported on a shoulder $2^s$ in the head. This lead washer 5 makes a water-tight joint between this sprinkling chamber 4 and head 2 which joint can be easily broken. If this joint was made by contact of two like metal surfaces, it would be impossible after a period of time to remove the sprinkling chamber from the head as the parts would become firmly united by oxidization.

In the construction shown the drain valve 3 is adapted to be removably mounted in the lower end of the body 1 and access can be had to this drain valve by removing the sprinkler head 2 or the sprinkling chamber 4. Removing the sprinkling chamber 4 permits access to the drain valve without allowing dirt to get into the pipes. By means of a suitable tool the drain valve can be removed from or inserted in position through the sprinkling head 2 and body 1.

The drain valve is preferably made to screw into the lower end of the body 1; which is preferably a commercial brass fitting and can be prepared for engagement with the drain by properly machining its lower opening, or by inserting therein a bushing as hereinafter explained.

In the construction shown in the lower opening $1^d$ of the unit body 1, is fitted or threaded a collar or bushing 6, which has an axial internally threaded opening, and an enlarged axial recess $6^a$ at the upper end thereof.

In the construction shown the drain valve has a cylindrical casing having an externally threaded portion $3^a$ adapted to engage the threaded portion of the body 1, and above this a peripheral flange $3^b$ which fits within the enlarged recess $6^a$ in the body or bushing, and a water-tight joint is formed between the flange $3^b$ and body of bushing by a lead or other washer 8. The drain valve can be made tight by the use of such washer and does not have to be screwed rigidly into the fitting.

The casing 3 has a valve seat $3^e$ in its upper end for engagement of valve 9 which has a stem $9^a$ that extends loosely through an opening in the lower end of casing 3 and may be retained by a pin $9^s$. The valve 9 is normally held open by means of a spring $9^d$ interposed between the bottom of body 3 and an annular flange $9^e$ on the stem $9^a$. The drain valve is so constructed that when the sprinkler head, or sprinkling chamber, is removed the drain valve can be readily inserted in or removed from position by means of a suitable tool, the upper end of the drain valve casing being suitably formed for engagement with such tool.

In the construction shown the casing 3 is provided in its upper end with diametrically opposite slots $3^t$ for the engagement of a

wrench, and with an annular groove $3^e$ in the inner wall of the casing 3 above the valve 9. When this construction is employed I provide a special wrench 10 which has a head $10^a$ on its lower end having radially projecting lugs $10^b$ adapted to engage the slots $3^t$, and it also has a rounded tit $10^c$ below and intermediate lugs $10^b$, said tit $10^c$ being adapted to be passed through one of the slots $3^t$ and then engaged with the annular groove $3^c$.

When the tit $10^c$ is engaged with the groove $3^c$ the wrench 10 can be turned until the lugs $10^b$ engage the slots $3^t$, then the drain valve casing can be bodily turned to screw same into or out of position.

The drain valve when unscrewed can be lifted from position by reason of engagement of the tit $10^c$ with the channel $3^c$. When the valve has been screwed home, the lugs $10^b$ can be disengaged from the notches $3^t$ by an upward pull and then the wrench turned to disengage tit $10^c$ from the groove $3^c$, the tit passing through one of the slots $3^t$ (see Fig 5). Of course when the drain valve 3 is to be placed in or removed from body 1, the head 2, or the sprinkling chamber 4, should be removed, as indicated in Fig. 4.

The drain valve casing 3 can thus be inserted through the head, and can be removed through the head. The construction is such that the removable sprinkler head permits access to the drain valve below; said drain valve opening automatically when there is no pressure in the pipes, and being removable and replaceable through the head without having to disturb the fittings.

It will be seen that I am able to put the drain valve casing in through the head and make it water-tight in the bottom; and also able to remove it in a similar way. While the above described means for placing or removing this valve are efficient, there are other ways in which it could be unscrewed and lifted.

It will be seen that by removing the sprinkling chamber access can be had through the head down through the body immediately below, to the automatic drain valve casing, which can be readily removed and replaced without having to dig up any portion of the system, and the lead or similar washers enable the valve casing and sprinkler head to be set up tight without becoming rust locked, thereby enabling the parts to be unscrewed and removed and replaced without having to dig up or break any parts of the apparatus.

The device as shown requires no mechanical skill in placing it in service, and any owner can readily repair the valves or replace same in the system without requiring the services of a plumber or other mechanic. The drain valve casings can be made very cheaply; and the user can keep a few extra valves on hand for insertion in place of any valves which in course of time might give trouble.

I claim:

1. For a lawn sprinkling apparatus, a unit comprising a body portion provided with openings respectively for connection with water pipe, sprinkler head, and drain valve casing; a sprinkler head connected with an upper opening of the body and a drain valve casing removably secured in a lower opening of the body and insertable and removable through the upper opening of the body without disturbing the body portion.

2. For a lawn sprinkling apparatus, a unit comprising a body portion provided with openings respectively for connection with water pipe, sprinkler head and drain valve casing; a sprinkler head connected with the uppermost opening of the body; a drain valve in the lowermost opening of the body and insertable and removable through the said head when the unit is in position in the ground; the sprinkler head having a removable part to permit access to and removal of the drain valve, and said drain valve casing being removable and replaceable through the said head.

3. For a lawn sprinkling apparatus, a unit comprising a body portion provided with openings respectively for connection with water pipe, sprinkler head, and drain valve casing; a sprinkler head connected with an upper opening of the body and having a removable sprinkling chamber; and a drain valve casing in the bottom opening of the body of less diameter than the sprinkling chamber and insertable and removable through the opening in the head when the sprinkling chamber is removed.

4. For a lawn sprinkling apparatus, a unit comprising a body portion provided with openings respectively for connection of a water pipe, a sprinkler head and a drain valve; a sprinkler head connected with the upper opening of the body; a removable drain valve casing in the bottom opening of the body provided with means for engagement with a suitable tool whereby the drain valve casing may be inserted or removed by said tube from the body when the unit is in position in the ground; said drain valve being removable and replaceable through said head.

5. For a lawn sprinkling apparatus, a unit comprising a body portion provided with openings respectively for connection of a water pipe; a sprinkler head, and a drain valve; a sprinkler head connected with an upper opening of the body and having a removable sprinkling chamber; a removable drain valve casing in the lower opening of the body provided with means for engagement with a suitable tool whereby the drain valve casing can be inserted and removed by said tool when the unit is in position in the ground; the removable sprinkling chamber permitting access to the drain valve, and said

drain valve being removable and replaceable through said head when the sprinkling chamber is removed.

6. For a lawn sprinkling apparatus, a unit comprising a body portion provided with side openings for connection of piping, and top and bottom openings; a removable sprinkler head connected with the top opening of the body; a removable drain valve casing in the bottom opening in the body provided with external threads to engage internal threads in the bushing; and slots in its upper edge and an annular groove adjacent said edge and communicating with said slots for engagement of a suitable tool by which the drain valve may be inserted and removed when the unit is in position in the ground; said casing having a valve seat below the said groove; and an inwardly opening valve in said casing.

7. A valve for the purpose specified, comprising a casing externally threaded to engage internal threads in a bushing, and having a peripheral flange provided with slots in its upper edge, and a groove adjacent such edge and communicating with said slots whereby it is adapted to be engaged by a suitable tool for the purpose of inserting or removing the casing from the object in which it is to be placed or from which it is to be removed; and a valve in said casing, substantially as described.

In testimony that I claim the foregoing as my own, I affix my signature.

HOWARD B. SHERMAN.