April 3, 1934. F. W. THOROLD ET AL 1,953,837

LAWN SPRINKLING DEVICE

Filed July 17, 1931

Fig. 1.

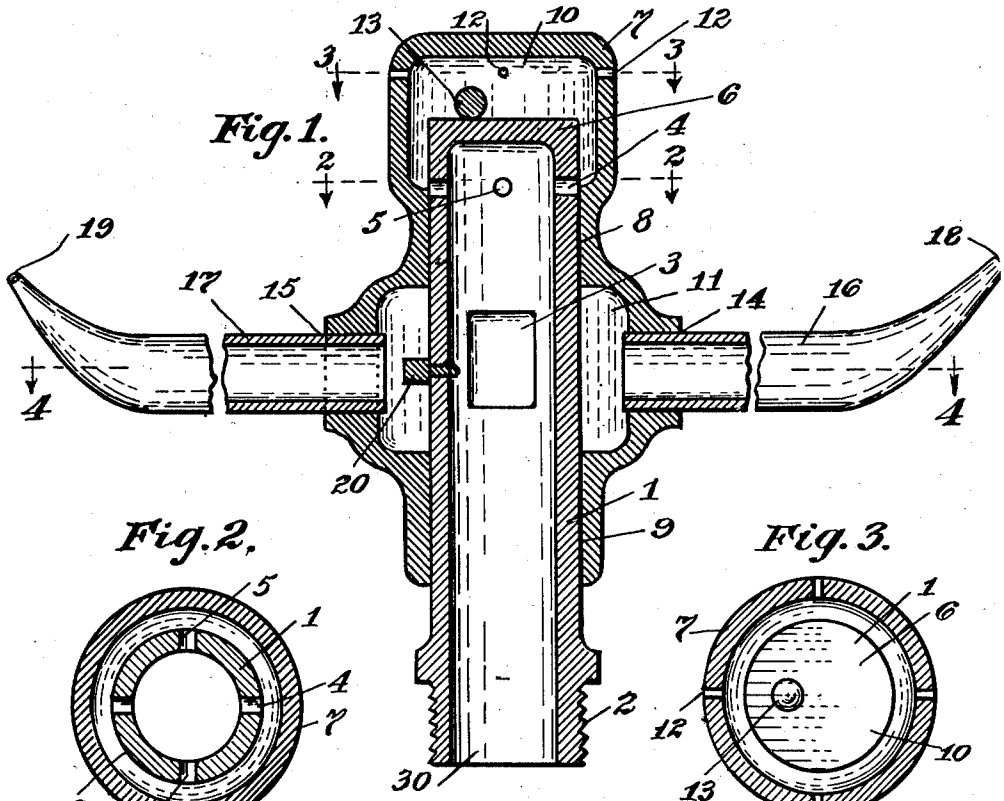


Fig. 2.

Fig. 3.

Fig. 4.

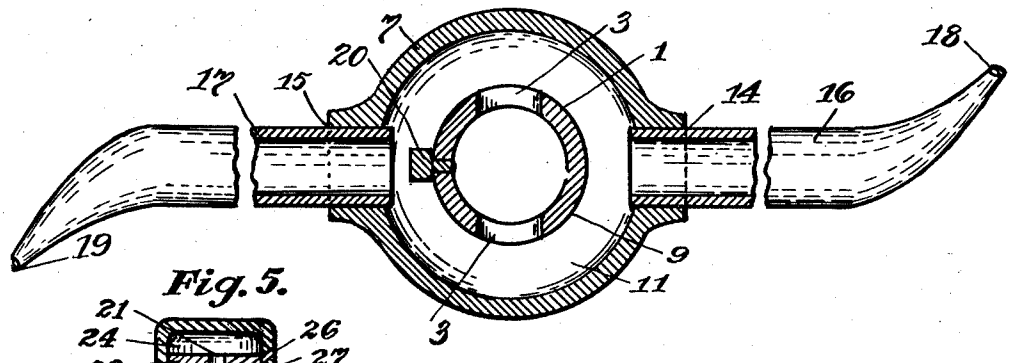
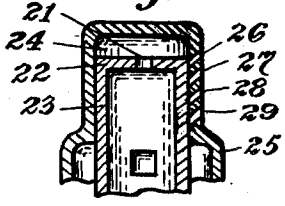


Fig. 5.



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LAWN SPRINKLING DEVICE

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3 Claims. (Cl. 299—69)

The present invention relates to lawn sprinkling devices of the rotary head type and has for its object the provision of a sprinkler, the head of which is supported on a fluid bearing when the device is in operation, by means of the pressure of the fluid, acting within an enclosed pressure chamber in said head. The head of the device is revolubly mounted in vertical bearings on a central hollow shaft, but the weight of the head and its appurtenant parts as will be described herein, is supported in a floating manner by the water pressure within said head acting on the closed upper end of said shaft.

In the present invention, it will be seen that all but the vertical guide bearings of the head have been omitted and thus any downward thrust due to the weight of the revoluble head and from the water jets is supported by fluid under pressure in lieu of horizontally disposed bearings commonly used in devices of the kind in hand.

In the accompanying drawing forming part of the present specification is shown a complete example of our invention, and a modified form of floating head used in connection therewith,

Figure 1 is a vertical side view of the sprinkler shown partly in section.

Figure 2 is a transverse horizontal section on line 2—2 of Fig. 1.

Figure 3 is a transverse horizontal section on line 3—3 of Fig. 1.

Figure 4 is a horizontal section on line 4—4 of Fig. 1.

Figure 5 is a vertical central partial section of a modified type of inner and outer casting used in connection with our device.

The numeral 1, indicates a closed-ended hollow casting or shaft, having a threaded end 2, adapted to be attached to a system of piping having water under pressure therein. Said pipe 1, is provided with a pair of opposed apertures 3, 3 in the side walls thereof, and is provided with a plurality of smaller apertures 4 and 5 near the upper closed end 6, of the said casting. The purpose of these apertures will be explained below. The upper end of the hollowed casting 1, is "machined" on the exterior periphery thereof, to form a vertical bearing with the head casting 7 of the device, at points 8 and 9.

The head casting 7 is formed as shown clearly in Fig. 1 of the drawing, having a pressure chamber 10, formed therein, and a second chamber 11, for purposes described below. The head 7 is also provided with a number of small apertures 12, shown in Figs. 1 and 3 of the drawing, said apertures being for the purpose of relieving fluid pressure contained in the chamber 10, as will be explained herein. Within the pressure chamber 10, is a small ball 13, on which the head 7 rests when the device is not in operation, said ball resting on the closed end 6 of the pipe 1. The head casting 7, is provided with two apertures 14, 15, which may be threaded or otherwise, but adapted to receive the water conveying pipes 16, 17, which lead to the nozzles 18 and 19, respectively. Within the chamber 11, is a small screw 20, which is mounted as shown in Fig. 1 in the side wall of the hollow casting 1, for the purpose of preventing the head 7 from becoming dismounted on the casting 1. In the Figure 5 of the drawing, is shown a modified type of device in which the aperture 21 is placed in the closed end 22, of the inner tubular casting 23, and same corresponds to the apertures 4, 4 in the first described form of the invention. Said aperture 21, is for the purpose of permitting fluid pressure to pass from the interior of casting 23 into the pressure chamber 24 of the head 25. There is also provided for in this type of invention a series of apertures 26, 27, 28, and 29, preferably of increasing diametrical size as shown in Fig. 5 in the head 25, for the purpose of relieving the pressure in the chamber 24, as will be further described herein.

The operation of the device in hand is as follows: The water is admitted through the lower end of pipe 1, at point 30, from a water supply system and traverses said pipe 1, passes through the orifices 3, 3 into the chamber 11, of the head casting 7, from thence into a pipe 16 and 17 and into a plurality of nozzles represented by 18 and 19 of the drawing. The revolution of the head 1, is accomplished in the ordinary way by the turning of the nozzles in a rearward direction from the direction of revolution of the device. The fluid pressure extends also upwardly through the pipe 1, and through the apertures 4, 5, into a pressure chamber of the head 7. When the pressure becomes great enough to lift the head 7, same rises upwardly as is readily understood, but in so doing, it is seen from Fig. 1 of the drawing that said head begins to shut off the fluid pressure passing through the apertures 4, and if the said apertures become completely closed, no further pressure is admitted therethrough. In order to relieve excessive pressure in the chamber 10, the apertures 12, 12 are provided. By selecting properly sized apertures 12 and 4, the head may be held automatically at any desired elevation with a portion of the apertures 4 in operation according to the pressure used in the pipe or tubular casting 1.

It will be seen that we provide a pressure chamber 10, between the head 6 of the fixed tubular casting 1, which is used as a pintle, for the floating or movable head 7, and also provide an automatic means for controlling the pressure in said pressure chamber, so that the head 7 can only rise to a proper and desired point of elevation. When the head 7, is thus floating on the fluid pressure in chamber 10, it will

be seen that the use of bearings to carry the vertical weight of the head and any downward components of the jets is obviated entirely, only guide bearings at 8 and 9 on the pintle 1 being necessary, so the friction of the bearings of a revolving assembly as is usually found in the character of devices in hand is almost entirely eliminated.

It will be noted in the Fig. 1, that the balance necessary between the pressure in the chamber 10 and the weight of the head 7, in order to keep the head at a certain desired point of elevation is accomplished by varying the size of the apertures 4 and 5 in the tubular casting 1, the said holes 4 and 5 being always larger in size than the apertures 12, 12 of the head 7.

However, in Fig. 5 of the drawing, it is seen that the aperture 21 remains constant and as the pressure in chamber 24 becomes greater and lifts the head 25 upwardly, the successive apertures 26 to 29 inclusive become uncovered in turn and thus prevent any successive pressure in chamber 24, from blowing the head from the casting 23. The apertures 26, 27, 28, etc. it is noted are graduated in size, the smallest one being nearest the top of the head 25, so that as the pressure in chamber 24 becomes greater, a larger and larger aperture is opened in the head 25 to relieve the excessive pressure.

The horizontal bearings of revoluble head sprinklers have to carry the weight of the revolving parts; and the downward thrust of the jets of water issuing from the distributor nozzles of such device. It is thus seen that the friction on any horizontal bearing is a big factor in the operation of the sprinkler, and in the wear of its parts.

In our invention, this entire vertical load is carried on water maintained in the pressure chamber 10, formed in the head of the device, and is transferred to the fixed hollow shaft 1 without the use of any metal-to-metal horizontal bearing and without the use of any metal part to hold the head down into operative position on said hollow shaft. A vertical bearing is provided but merely to act as a guide and hold the head in proper vertical position on the hollow shaft, and insure ease of operation.

Attention is drawn to the fact that consideration must be given to the leakage of fluid from distributing chamber 11 to the pressure chamber 10 along the bearing 8, when determining the size of the various apertures in the closed hollow shaft and the floating head.

We claim:

1. In a sprinkler of the rotary head type the combination of a hollow cylindrical spindle closed at its upper end, provided in its lower portion with an inlet opening for liquid under pressure and means for supporting the spindle in vertical position, of a rotary head having an upwardly extending bore formed therein closed at its upper end constructed and arranged to receive the upper end of the spindle and to permit the head to rotate and to have a vertical movement thereon, the spindle being provided with an opening for discharging liquid into said head, the spindle being so constructed as to permit liquid to be delivered under pressure into said bore between the upper end of the spindle and the closed upper end of the bore of the head to effect a lifting of the head, the rotary head having an outlet opening therein arranged to permit escape of liquid so delivered between the upper end of the spindle and the upper end of the bore of the head, means for controlling the volume in said space between the upper end of the spindle and the upper end of the bore of the rotary head by the vertical movement of the rotary head on the spindle comprising an opening in the side wall of one of these elements in position to be opened or closed by the side wall of the other, and said rotary head being provided with liquid discharge means constructed to impart rotation to said head during discharge of liquids.

2. In a sprinkler of the rotary head type the combination of a hollow cylindrical spindle closed at its upper end, provided in its lower portion with an inlet opening for liquid under pressure and means for supporting the spindle in vertical position, of a rotary head having an upwardly extending bore formed therein closed at its upper end constructed and arranged to receive the upper end of the spindle and to permit the head to rotate and to have vertical movement thereon, the spindle being provided with an opening for discharging the liquid into said head and being so constructed as to permit liquid to be delivered under pressure into said bore between the upper end of the spindle and the closed upper end of the bore of the head to effect a lifting of the head, the rotary head having an outlet opening therein arranged to permit escape of liquid so delivered between the upper end of the spindle and the upper end of the bore of the head, said outlet opening being so located that entrance of liquid to its inner end will be contracted by the rotary head in its vertical movement, and said rotary head being provided with liquid discharge means constructed to impart rotation to said head during discharge of liquid.

3. In a sprinkler of the rotary head type the combination of a hollow cylindrical spindle closed at its upper end, provided in its lower portion with an inlet opening for liquid under pressure and means for supporting the spindle in vertical position, of a rotary head having an upwardly extending bore formed therein closed at its upper end constructed and arranged to receive the upper end of the spindle and to permit the head to rotate and to have vertical movement thereon, the spindle being provided with an opening for discharging liquid into said head, the spindle being also provided with another opening arranged to deliver liquid under pressure into said bore between the upper end of the spindle and the closed upper end of the bore of the head to effect a lifting of the head, the rotary head having an outlet opening in its side wall arranged to permit escape of liquid so delivered between the upper end of the spindle and the upper end of the bore of the head, the inner end of said outlet opening being so located as to be opened or closed by the side wall of the spindle as the head rises or falls, the said rotary head being provided with liquid discharge means constructed to impart rotation to said head during discharge of liquid.

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