March 5, 1929. C. W. STEWART ET AL 1,704,374

AUTOMATIC TIME REGULATOR FOR SPRINKLING SYSTEMS

Filed April 20, 1927

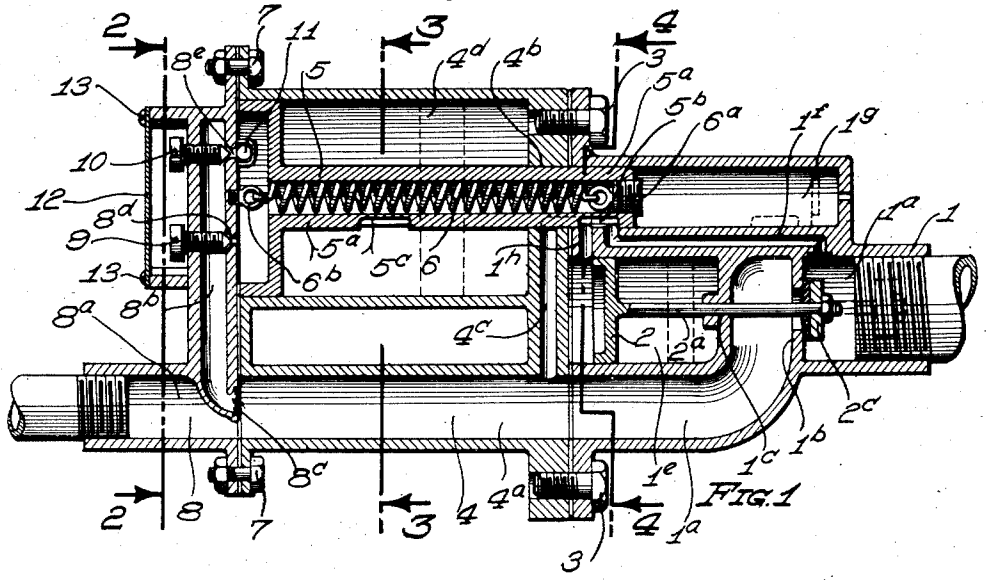

FIG. 1

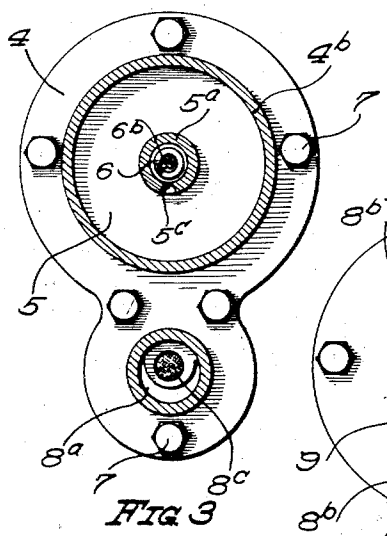

FIG. 3

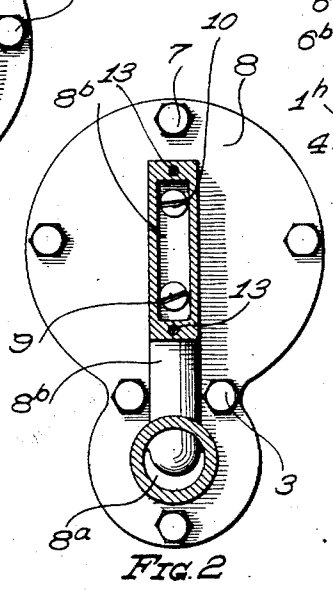

FIG. 2

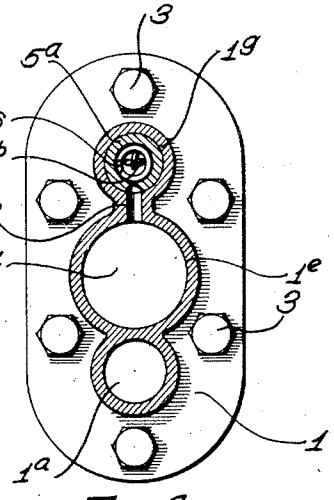

FIG. 4

INVENTOR.
CHARLES W. STEWART
& FRANK R. BAKER
BY A.B. Bowman
ATTORNEY

Patented Mar. 5, 1929. 1,704,374

UNITED STATES PATENT OFFICE.

CHARLES W. STEWART AND FRANK R. BATER, OF SAN DIEGO, CALIFORNIA.

AUTOMATIC TIME REGULATOR FOR SPRINKLING SYSTEMS.

Application filed April 20, 1927. Serial No. 185,139.

Our invention relates to automatic time regulators for sprinkling systems for lawns, parks or the like, and the objects of our invention are: first, to provide a device of this class which automatically causes the sprinkling system to operate at predetermined intervals, and to keep the sprinkling system in operation a predetermined length of time; second, to provide a device of this class which will maintain a uniformity in the time between the duration of sprinkling period even if the water supply should be shut off for a time between active periods; third, to provide a device of this class which will operate with a minimum amount of care and will need little or no adjustment; fourth, to provide a device of this class which has means for regulating the periods of action and inaction, and which are independently adjustable; fifth, to provide a device of this class which is adaptable to and may be easily installed or added to any sprinkling system; sixth, to provide a device of this class which is not only adapted to regulate the period of flow of water, but that of other fluids, and seventh, to provide a device of this class which is economical of construction, efficient in its action, durable, compact, easy to install, and which will not readily deteriorate or get out of order.

With these and other objects in view, as will appear hereinafter, our invention consists of certain noval features of construction, combination and arrangement of parts and portions, as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon, which form a part of this application, in which:

Figure 1 is a longitudinal sectional view of our automatic time regulator for sprinkling systems, with parts and portions shown in elevation to facilitate the illustration; Fig. 2 is a transverse sectional view through 2—2 of Fig. 1; Fig. 3 is another transverse sectional view thereof, through 3—3 of Fig. 1, and Fig. 4 is another transverse sectional view through 4—4 of Fig. 1.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings.

The casing members 1, 4 and 8, plunger member 2, regulator plunger member 5, spring 6, bolts 3 and 7, needle valves 9 and 10, check valve 11, cover plate 12, and screws 13, constitute the principal parts and portions of our regulator.

The casing 1 is shaped as shown and provided with a passage 1^a threaded internally at its rear portion and which is constricted at 1^b, leaving a central opening about one-half the diameter of the passage 1^a. Just forward of the constricted portion 1^b the passage jogs downwardly, thence forwardly to the forward end of the casing parallel with the rear portion of the passage. In the jogged portion of the passage 1^a is a small aperture 1^c, in which is reciprocally mounted the plunger rod 2^a of the plunger 2. The aperture 1^c is in alinement with the axial line of the rear portion of the passage 1^a. The plunger rod 2^a extends through the constricted portion 1^b and at the rear of said constricted portion is provided with a valve 2^c, which closes the opening of the constricted portion when the plunger is in the position shown by the solid lines in Fig. 1 of the drawings. The forward end of the plunger rod 2^a is secured to a plunger 2, which is reciprocally mounted in a cylinder portion 1^e of the casing 1, and which is substantially the same size and in alinement with the rear portion of the passage 1^a. The passage 1^a, as shown in Fig. 1 of the drawings, jogs around the cylinder 1^e. Just behind the constricted portion 1^b is an opening to a small passage 1^f, which extends parallel to the passage 1^a and alongside the cylinder 1^e. The passage 1^f turns abruptly and opens into a hollow cylinder portion 1^g, which receives the plunger portion of the regulator plunger 5, which will be described later. Near the forward end of the cylinder 1^e and at the upper side thereof is a small, upwardly extending passage 1^h, which opens into the hollow cylinder portion 1^g, thereby connecting the cylinder 1^e with the hollow portion 1^g. The two openings of the passages 1^f and 1^g are in alinement with, and separated slightly from, each other. The forward end of the casing 1 is flanged outwardly and is provided with holes, which aline with similar holes in the casing 4 and are secured thereto by means of bolts 3. Between the two casings 1 and 4 is positioned a gasket, which prevents leaking of any fluid from within the regulator. The casing 4 is provided at its lower portion with a passage 4^a, which corresponds to the passage 1^a and is in alinement therewith. Also the casing 4 is provided with a hollow portion 4^b, which

alines with and is a continuation of the hollow portion 1^g. Near the rear edge of the casing 4 is a small vertical passage 4^c, which connects the hollow portion 4^b with the passage 4^a. The opening of the passage 4^c into the hollow portion 4^b is in alinement with the two first mentioned openings 1^a and 1^f in the casing 1 and is spaced a short distance therefrom. The hollow portion 4^b extends a short distance into the casing 1 and then merges into a cylinder portion 4^d, which is considerably larger than the hollow portion and extends to the forward end of the casing 4. Within the cylinder portion 4^d is reciprocally mounted a regulator plunger member 5, which is provided with a hollow plunger rod 5^a, which extends into the hollow portions 4^b and 1^g. On the lower side of the plunger rod 5^a are two slots 5^b and 5^c. The slot 5^b connects the passages 1^f and 1^h when in the position shown by the solid lines in Fig. 1 of the drawings. The slot 5^c connects the passage 1^h with the passage 4^c when the plunger is in the position shown by the dotted lines in Fig. 1 of the drawings. The plunger rod 5^a is hollow from end to end and is provided with a plug 6^a in its rear end to which is secured a spring 6. The spring 6 extends from the plug 6^a through the plunger rod 5^a, and is secured to the casing member 8 by means of an eye bolt 6^b. It will be noted that the hollow portion 1^g is provided with a small hole in its rear end to allow passage of air as the piston rod 5^a moves backwardly and forwardly in the hollow portion 1^g. The casing member 4 is provided with outwardly extending flanges, which are provided with holes through which extend bolts 7, which secure the casing member 8 to the casing member 4. Between the two casings is a gasket, which prevents any leakage of fluid from within the device. The casing member 8 covers the open end of the cylinder portion 4^d of the casing 4 and is provided at its lower end with a passage 8^b, which is a continuance of the passages 4^a and 1^a. On the forward face of the casing 8, which covers the cylinder portion 4^d, is a downwardly extending passage 8^b, which passes across the axial line of the cylinder, and which extends into the passage 8^a where it is preferably curved as shown. Over its lower opening is positioned a filter 8^c. The passage 8^b is provided with two spaced apart holes in which needle valves 9 and 10 are screwably mounted. On the rear portion of the passage 8^b, opposite the aforementioned holes, are apertures 8^d and 8^e, which connect the passage 8^c with the cylinder 4^d and permit the passage of a liquid into the cylinder 4^d. The valve 9 regulates the size of the lower opening 8^d, and the valve 10 regulates the size of the upper opening 8^e. The opening 8^e is further provided with a check valve 11, which only permits the passage of fluid from the passage 8^c into the cylinder 4^d. It will be noted that the opening 8^e is considerably larger than the opening 8^d, thus permitting the cylinder 4^d to fill up more quickly than it will empty. The casing 8 extends forwardly on all sides around the needle valves, and is provided with a cover 12, which is secured to the casing by means of screws 13. The cover 12 protects the needle valve against accidental disarrangement, but permits easy access for adjustment.

The operation of our device is as follows:

The fluid pressure from the main holds the valve 2^c closed, but a portion of the fluid passes through the passage 1^f, through the slots 5^b, through the passage 1^h into the cylinder 1^e. Because of the larger area of the cylinder 1^e and the piston 2, the valve 2^c is lifted from its seat and the water flows through the passage 1^a, then through the passage 4^a, then out through the passage 8^a into the sprinkling system or other desired destination. Part of the fluid is forced up the passage 8^b, through the valves 8^d and 8^e into the cylinder 4^d. As the pressure of the water in the cylinder becomes greater than the force of the spring 6, the plunger moves rearwardly until it assumes the position shown by the dotted lines in Fig. 1 of the drawings. The slots 5^c then connect the passages 1^h and 4^c, which permit the water within the cylinder 1^e to pass out, thereby permitting the valve 2^c to close. The fluid in the regulator cylinder, now lacking the pressure of the main, is forced out through the lower needle valve 8^d, the upper opening 8^c being closed by the check valve 11. When the water has permitted the plunger to regain the position shown by the solid lines in Fig. 1 of the drawings, the passages 1^f and 1^h are again connected and the valve 2^c is again opened. By adjusting the size of the openings 8^d and 8^e by means of the needle valves 9 and 10, the period of action and inaction can be controlled.

It will be noted that this device is not only adapted to regulate the period of flow of water, but also to regulate the period of flow of any fluid desired.

Though we have shown and described a particular construction, combination and arrangement of parts and portions, we do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of our invention, the construction, combination and arrangement substantially as set forth in the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a device of the class described, a casing, a passage extending through said casing, a valve means in said passage, a cyl-

inder, a plunger means reciprocally mounted within said cylinder secured to said valve means, a bypass between said cylinder and said valve, and a second bypass between said cylinder and said passage.

2. In a device of the class described, a casing, a passage extending through said casing, a valve means in said passage, a cylinder, a plunger means reciprocally mounted within said cylinder secured to said valve means, a bypass between said cylinder and said valve, a second bypass between said cylinder and said passage, and pressure actuated means communicating with the opposite side of said passage for automatically and alternately opening and closing said second bypass.

3. In a device of the class described, a casing, a passage extending from end to end of said casing, a valve means near the one end of said passage, a cylinder, a plunger means reciprocally mounted within said cylinder secured to said valve means, a bypass between said cylinder and said valve, a second bypass between said cylinder and said passage, a second cylinder, a plunger within said cylinder, and a plunger rod secured to said plunger, said rod provided with means adapted to alternately open and close said second bypass.

4. In a device of the class described, a casing, a passage extending from end to end of said casing, a valve means near the one end of said passage, a cylinder, a plunger means reciprocally mounted within said cylinder secured to said valve means, a bypass between said cylinder and said valve, a second bypass between said cylinder and said passage, a second cylinder, a plunger within said cylinder, a plunger rod secured to said plunger, said rod provided with means adapted to alternately open and close said bypass, and a second bypass between said first mentioned passage and said second mentioned cylinder.

5. In a device of the class described, a casing, a passage extending from end to end of said casing, a valve means near the one end of said passage, a cylinder, a plunger means reciprocally mounted within said cylinder secured to said valve means, a bypass between said cylinder and said valve, a second bypass between said cylinder and said passage, a second cylinder, a plunger within said cylinder, a plunger rod secured to said plunger, said rod provided with means adapted to alternately open and close said bypass, a second bypass between said first mentioned passage and said second mentioned cylinder, and valve means for regulating the flow of fluid into and out of said second mentioned cylinder.

6. In a device of the class described, a casing, a passage extending from end to end of said casing, a valve means near the one end of said passage, a cylinder, a plunger means reciprocally mounted within said cylinder secured to said valve means, a bypass between said cylinder and said valve, a second bypass between said cylinder and said passage, a second cylinder, a plunger within said cylinder, a plunger rod secured to said plunger, said rod provided with means adapted to alternately open and close said bypass, a second bypass between said first mentioned passage and said second mentioned cylinder, and valve means for regulating the flow of fluid into and out of said second mentioned cylinder, said second mentioned passage extending into said first mentioned passage and provided with a filter screen.

7. In a device of the class described, a casing, a passage extending from end to end of said casing, a valve means near the one end of said passage, a cylinder, a plunger means reciprocally mounted within said cylinder secured to said valve means, a bypass between said cylinder and said valve, a second bypass between said cylinder and said passage, a second cylinder, a plunger within said cylinder, a plunger rod secured to said plunger, said rod provided with means adapted to alternately open and close said bypass, a second bypass between said first mentioned passage and said second mentioned cylinder, valve means for regulating the flow of fluid into and out of said second mentioned cylinder, said second mentioned passage extending into said first mentioned passage and provided with a filter screen, and spring means tending to hold said piston against the pressure of said flow.

8. In a device of the class described, a casing, a passage extending from end to end of said casing, a valve means near the one end of said passage, a cylinder, a plunger means reciprocally mounted within said cylinder secured to said valve means, a bypass between said cylinder and said valve, a second bypass between said cylinder and said passage, a second cylinder, a plunger within said cylinder, a plunger rod secured to said plunger, said rod provided with means adapted to alternately open and close said bypass, a second bypass between said first mentioned passage and said second mentioned cylinder, a plurality of valve regulated openings for controlling the flow of a fluid into and out from said second mentioned cylinder, and a check valve over one of said openings adapted to prevent the passage of fluid from said cylinder, said valve for regulating said opening to said cylinder being independently adjustable.

In testimony whereof, we have hereunto set our hands at San Diego, California, this 6th day of April, 1927.

CHARLES W. STEWART.
FRANK R. BATER.