Oct. 27, 1936. J. C. F. MALTHANER 2,059,126

AUTOMATIC WATER DISTRIBUTOR

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FIG. 1.

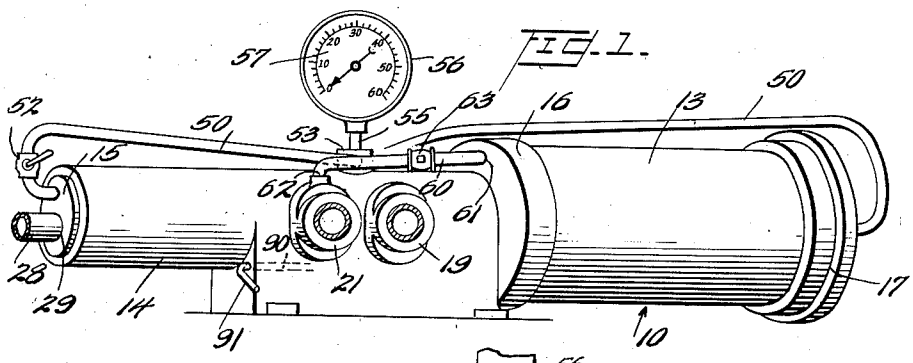


FIG. 5.

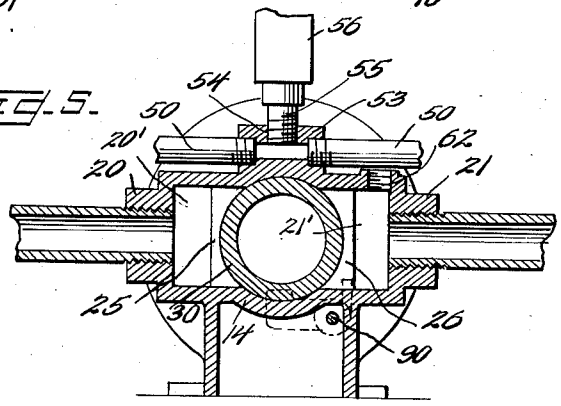


FIG. 6.

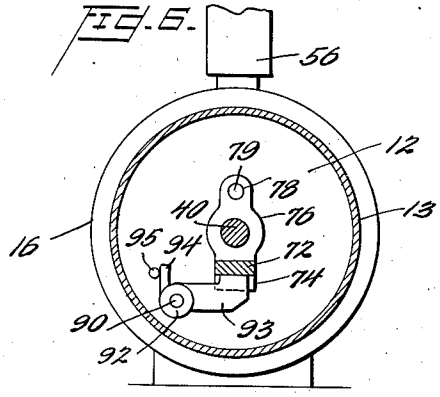


FIG. 7.

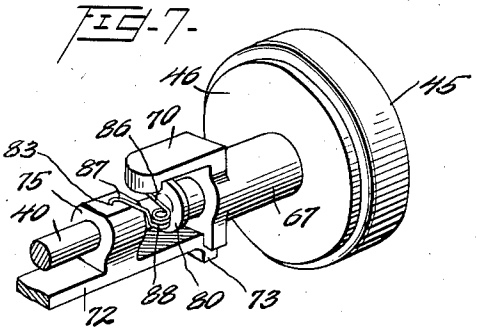


FIG. 8.

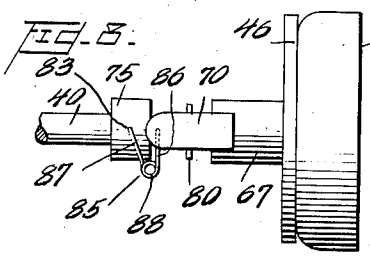
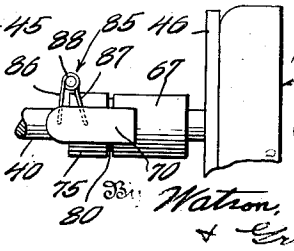


FIG. 9.



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AUTOMATIC WATER DISTRIBUTOR

Filed Nov. 8, 1935 2 Sheets-Sheet 2

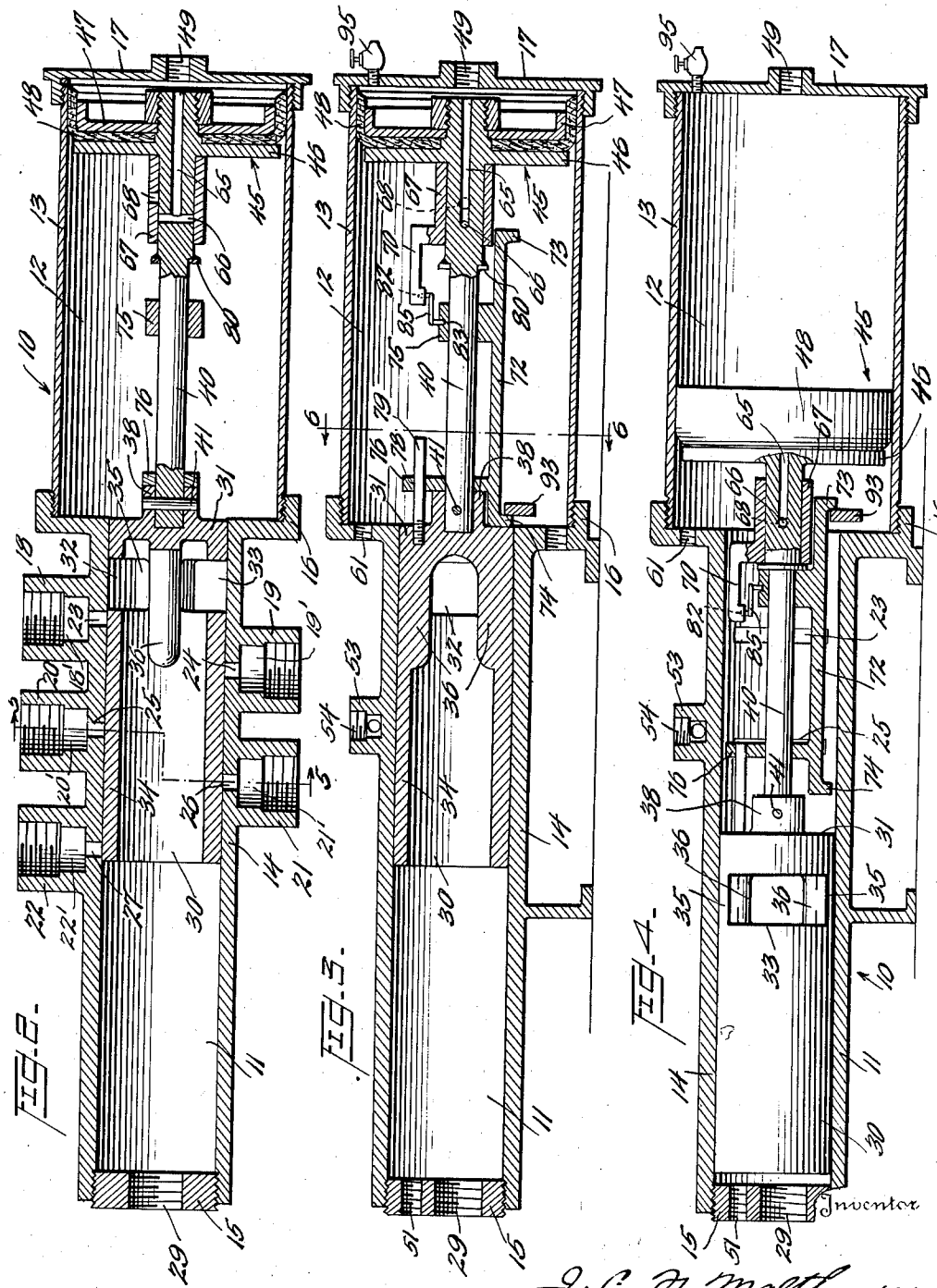


FIG. 2.

FIG. 3.

FIG. 4.

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2,059,126

AUTOMATIC WATER DISTRIBUTOR

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Application November 8, 1935, Serial No. 48,928

16 Claims. (Cl. 137—145)

This invention relates to automatic fluid distributors and more particularly to distributors of this type which are adapted to direct the flow of a fluid from a source under pressure successively through a plurality of conduits, the operation of the distributor for this purpose being controlled by means of the pressure of the fluid received from said source.

The general object of the invention is to provide a novel and improved fluid distributor of this character which is of simple but sturdy construction having a minimum number of parts for performing the desired function; which requires no lubrication nor other maintenance service; and which will operate indefinitely to direct the fluid successively into the several outlet conduits for periods of predetermined duration, as long as fluid under pressure is supplied thereto.

Although my improved fluid distributor is susceptible of many uses,—for example, in factories, chemical plants, refrigeration or heat exchange systems, or in fact in any installation in which a supply of fluid is to be delivered successively to different destinations,—probably its most universal adaptation is in connection with irrigation systems for lawns, gardens, golf courses or the like, where it permits the watering of large areas by the use of pipes or conduits of small diameter and a moderate water supply of the usual domestic pressure.

In systems of this description, a plurality of pipes are generally laid under the ground and are provided at intervals with spray heads at approximately the ground level, each pipe supplying from two or three up to as many as fifteen or twenty heads depending upon the diameter thereof. The pipes which may be of any convenient number are connected to the distributing valve device and are placed successively in communication with a water supply conduit thereby. In this way large areas may be treated in successive sections, where the pressure of the water supply would be quite ineffective if it were called upon to irrigate the entire area at one time.

Certain prior proposals have been made in endeavors to provide effective distributing devices of this character, but they have involved the use of numerous auxiliary pipe connections, valves and the like, and the operating parts have not been of as sturdy and simple construction as in the present case. Furthermore, in previous attempts aimed at the provision of efficient devices of this character, the reversal of the flow controlling member for repeated distributing cycles has had to be effected manually or by means of complicated clock-work mechanism; whereas in the case of the present invention not only is the timed distributing movement of the flow controlling member effected by the pressure of the water supply, but the repetition of the operating cycles is also entirely automatically attained by means of this water pressure.

The advantages of this provision for the automatic repetition of the distributing cycle are considerable. For example, in irrigation systems the distributing device can be allowed to operate all night without attention; it being generally understood that night irrigation is more beneficial to plant life, since plant growth, or cell elongation takes place at night, and the irrigation is consequently at its greatest efficiency during this period. Another advantage of this continuous night operation of these systems is in the resulting lowering of the temperature in the vicinity of residences during hot nights, or in repelling light frosts, especially in the late fall.

In its preferred embodiment my invention contemplates the provision of a casing enclosing two axially aligned cylinders, one being a power cylinder within which the driving piston of the distributing valve member reciprocates, and the other being a valve chamber having an admission opening for the water supply and outlet ports controlled by the valve member providing communication with the several systems of piping which are connected to the casing. A by-pass passageway leads from the valve chamber near the inlet end to one end of the power cylinder to apply the pressure of the water supply to the head of the actuating piston, the degree of pressure and the consequent speed of movement and the duration of the successive watering intervals being governed by a throttling valve in the by-pass passageway. The reversal of the movement of the distributing valve from the distributing phase to the recovery phase of its cycle and vice versa is effected by opening and closing a by-pass passageway leading from one side of the actuating piston to the other. This passageway is controlled by a spring pressed valve or closure which is automatically moved from one position to the other, preferably with a snap action, caused by cooperating tripping members carried by the casing and the reciprocating piston and valve assembly respectively.

It is therefore one of the more particular objects of the invention to provide an automatically operating device of this type which will operate indefinitely through successive cycles of distribu-

tion under the sole influence of the pressure of the water supplied thereto.

Another object is to provide in this connection means for throwing the automatic repeating mechanism into and out of operation at will.

Further objects include novel and improved details of construction of the mechanism referred to as well as of the construction and arrangement of the casing, valve and fluid connections.

Other objects and features of novelty will be apparent from the following specification when read in connection with the accompanying drawings in which one embodiment of my invention is illustrated by way of example.

In the drawings:

Figure 1 is a perspective view of a distributing device embodying the principles of my invention;

Figure 2 is a horizontal central longitudinal sectional view of the device shown in Figure 1;

Figure 3 is a view in vertical central longitudinal section of the device showing the reciprocating piston-distributing valve member in one of its end positions;

Figure 4 is a similar view showing this member in its opposite end position;

Figure 5 is a transverse vertical sectional view taken substantially on the planes indicated by lines 5—5 of Figure 2;

Figure 6 is also a view in transverse vertical section, but taken on line 6—6 of Figure 3 and illustrating the reversing dog or tripper mechanism;

Figure 7 is a fragmentary perspective view of one end portion of the piston and distributing valve member; and

Figures 8 and 9 are fragmentary plan views of this same portion of this member showing the parts in their two respective working positions into which they have been snapped by the spring means which is tripped by the reversing dog.

The distributing device which constitutes the most important feature of my invention is designated generally by the reference numeral 10 in the drawings and comprises a casing which encloses a distributing valve chamber 11 and a power cylinder 12. The portion 14 of the casing which encloses the valve chamber 11 may conveniently be made of an integral casting provided with open ends, one of which is threaded to receive the cap or head 15 and the other end being provided with the enlarged flange portion 16 having a threaded connection with the power cylinder portion of the casing. The casting 14 is provided with a smooth cylindrical bore and a series of laterally disposed bosses threaded for the connection therewith of the distributing pipes or conduits leading to the points of delivery of the fluid. These bosses are preferably disposed in a staggered arrangement and are designated by the reference numerals 18, 19, 20, 21 and 22 numbered in order of their successive reception of the fluid supply. Accumulation chambers 18', 19', 20', 21' and 22' are provided within the respective bosses and are connected with the interior of the casing portion 14 by means of the relatively narrow, vertically elongated slots or ports 23, 24, 25, 26 and 27, the cross sectional areas of which are approximately equal to those of the delivery pipes in order to reduce the flow resistance to a minimum. The cap 15 is provided with an opening 29 threaded for the reception of piping 28 leading from the source of fluid under pressure. The wall 13 of the power cylinder 12 is threaded within the flanged end 16 of the casing portion 14 and is provided at its outer end with the head or cover 17.

The reciprocating distributing valve member 30 is preferably cylindrical and arranged to slide snugly within the chamber 11. The valve member is hollow and open at the receiving end, but is provided with a solid head 31 at its opposite end. Lateral oppositely directed slots 32 and 33 are provided in the wall 34 of the valve member 30 and the webs 35 between these openings 32 and 33 are strengthened by the reinforcing ribs 36. The openings or slots 32 or 33 are adapted to successively register with the ports 23—27 during the movement of the distributing valve member 30 within the chamber 11. By the provision of two oppositely disposed ports in the valve member 30 the pressures are balanced on either side of the member and no binding of the valve member 30 within the chamber 11 can occur. The closed head 31 of the valve member 30 is provided with a boss 38 which is bored to receive an end of the piston rod or stem 40. The stem is secured within the opening as by means of the pin 41. The valve actuating piston indicated generally by the reference numeral 45 comprises the disc 46 formed on the piston rod 40 near its outer end and the flanged disc 47 which is threaded upon the outer end of the rod 40, between which is clamped the cup packing 48 which may be of leather or other suitable material, thus providing a water-tight sliding fit between the piston and the wall 13 of the cylinder 12. It will be noted that the diameters of the piston 45 and power cylinder 13 are greater than those of the valve member 30 and its chamber 11, and that the combined piston and distributing valve member constitutes a differential piston assembly which is reciprocated by the unbalanced pressures on the effective surfaces thereof produced by the means now to be described.

The head 17 of the power cylinder 12 is provided with an opening 49 adapted for the reception of one end of the controlling by-pass tubing 50, the opposite end of which is connected with the threaded opening 51 in the cap 15 of the valve chamber. By this means the fluid flowing into the valve chamber 11 and exerting pressure upon the head 31 of the valve member 30, is tapped and applied to the power cylinder 12 upon the outer side of the piston 45, whereby, due to the greater area of the piston 45, the assembly is caused to move to the left as viewed in Figures 2, 3 and 4 of the drawings. During this movement, the ports 32, 33 of the valve member 30 are brought successively into communication with the outlet ports 23—27.

The speed at which the piston and valve assembly moves, and thus the distribution periods of the various conduits, is governed by the rate of flow of the pressure fluid through the by-pass conduit 50; this rate of flow being regulated by means of the cock 52. Intermediate its length the tubing 50 is divided and threaded into opposite openings in the boss 53 formed on the casing casting 14. The interior of the boss 53 is provided with a threaded opening 54 into which may be inserted the connection 55 with the pressure gauge 56. Thus the rate of movement of the distributing mechanism may be determined by either direct readings on the dial 57 of the pressure gauge or by conversion from the pressures indicated. A relief conduit 60 connects the opening 61 in the flange 16 of the casting 14 with an opening 62 provided in one of the outlet bosses of the valve casing, for example, that

one designated by the numeral 21. A check valve 63 is preferably provided in this conduit 60 permitting flow of fluid out of the power cylinder 12 only, as when the piston 45 is moving toward the left as shown in Figure 4 of the drawings.

So far it has been explained how, by means of a regulatable application of pressure fluid to the piston 45, it will cause the valve member to successively effect communication between the source of fluid supply and the several distributing conduits of the system whereby the duration of the flow through these conduits may be varied within rather wide limits. In certain installations the distributing valve may be moved completely past the five outlet ports in approximately two and one-half minutes, or the travel of the valve may be prolonged to a period of about two and one-half hours, or adjusted to any intermediate timing.

For the purpose of reversing the movement of the piston and distributing valve member so that it may return to the right hand end of the casing and then resume its main distributing movement, the following means are provided. The piston rod or stem 40 is provided with the longitudinally drilled passageway 65 at the inner end of which is formed a transverse communicating passageway 66 opening outwardly upon at least one side of the rod 40. A slidable sleeve valve 67 is mounted upon the stem 40 for limited longitudinal movement thereon. The sleeve valve 67 is provided with the port 68 which is adapted to be brought into and out of registry with the bore 66 during reciprocation of the valve. When the arrangement is set for the left hand distributing travel of the assembly the sleeve is in the position shown in Figures 2, 3 and 8 of the drawings in which the port 68 is out of registry with the bore 66 and consequently no by-passing of pressure fluid is permitted from one side of the piston 45 to the other. The sleeve 67 is provided with the arm 70 to which certain connections are made for alternately reciprocating the sleeve upon the piston rod 40. A double trigger member for actuating the sleeve valve 67 is indicated at 72 and comprises an elongated strip of metal having stop flanges 73 and 74 formed at its opposite ends.

The trigger member 72 is provided with a pair of lugs or riders 75 and 76 which are bored to receive the stem or piston rod 40 so that the member 72 may reciprocate upon this rod. The member 76 is provided with another opening 78 for the reception of the guide post 79 threaded into the head 31 of the valve member 30. This prevents rotation of the trigger member 72 upon the piston rod 40. An annular ring or flange 80 is secured upon the rod 40 between the sleeve 67 and the enlargement or lug 75 of the trigger member 72 and serves as an abutment for limiting the movement of these two elements toward each other and determining their proper positions. The inner portion of the end of the arm 70 carried by the sleeve valve 67 is provided with a recess 82 and the upper surface of the element 75 is provided with a similar recess 83. A substantially V-shaped spring 85 is provided with two arms 86 and 87 having oppositely bent ends which are respectively disposed within the recesses 82 and 83 for operatively connecting the trigger member 72 with the sleeve 67. At its intermediate point the spring is preferably provided with a coiled portion 88, which exerts sufficient force to urge the arms 86, 87 strongly apart.

Passing through perforations in the base of the casing and in the flanged head 16 of the power cylinder is the rotatable shaft 90, best shown in Figures 1, 5 and 6 of the drawings. Upon the outer end of the shaft 90 there is formed a handle 91 and upon the opposite end which projects into the power cylinder there is secured the hub 92 of the tripper or dog 93. The free end of the tripper 93 is adapted in its operative position to be disposed between the stops 73 and 74 of the trigger member 72 and in the path of travel thereof. The tripper 93 is provided with a finger 94 which abuts the stop pin 95 when in operative position.

From the foregoing description of the construction of the device, its operation will be readily understood. The fluid under pressure is received by the valve chamber 11 through the opening 29 and during the operation of the device passes through the hollow valve member 30 and into the several distributing pipes as permitted by the successive registry of the valve ports 32 and 33 with the outlet ports 23—27. A portion of the incoming pressure fluid is tapped off through the conduit 50 and applied at rates graduated by means of the valve 52 to the outer side of the operating piston 45. In Figures 2 and 3 of the drawings the mechanisms are shown in their respective positions prior to the distributing phase of the cycle of movement. The pressure on the right hand side of the piston 45 causes the distributing valve and piston assembly to move toward the left until the stop member 73 carried by the trigger 72 abuts the tripper 93 which is adjusted to lie in its path of movement. After the elements 73 and 93 contact and the trigger is detained, the movement of the piston and valve assembly toward the left is continued until the pivotal point of arm 86 of the spring 85 which is associated with the valve sleeve 67 passes the point of pivotal connection of the arm 87 with the trigger arrangement. During this movement the intermediate portion 88 of the spring rotates toward the center line of the mechanism and as it passes this center, it snaps to its opposite transversely extending position. The two positions of the spring and its associated mechanisms are clearly shown in Figures 3 and 9 of the drawings. This movement of the spring 85 past dead-center causes the trigger member to move quickly toward the right until the rider or sleeve 75 abuts the stop sleeve 80 and similarly the valve closure sleeve 67 is snapped toward the left until it abuts the other side of the stop sleeve 80 and the port 68 in the valve sleeve registers with the by-pass passageway 66. This, of course, opens the by-pass arrangement and permits the pressure fluid to flow through the passage 65, 66 into the power chamber on the left hand side of the piston head 45.

By this time the valve member 30 has moved successively past the distributing ports and has reached the end of its distributing phase. The release of pressure from the right hand side of the piston 45 balances the piston and the pressure of the incoming fluid against the head 31 of the valve member causes the assembly to move relatively quickly toward the right during what may be termed the recovery phase of its cycle, although some of the fluid may be delivered through the outlets as the valve openings are momentarily in registry therewith during this return movement. As it nears the limit of its movement in this direction, the tripper 93 will engage the stop abutment 74 of the trigger 72 and, during continued movement of the assembly toward the

right, will hold the trigger member until the spring 85 is again moved past its dead center, whereupon it will snap from the position shown in Figure 9 to that shown in Figure 8 and will move the sleeve 67 back to its closed position as shown in Figures 2 and 3 whereupon the device is again in condition to proceed with the delivery phase of its cycle of movement. It will be noted that during the delivery or distributing movement, the fluid in the power cylinder upon the left hand side of the piston 45 will be forced through the pipe 60 into the delivery passageway 21 until the closed head 31 has passed port 23 thereby creating additional exit paths for the spent fluid. The check valve 63 will prevent the flow of fluid in the opposite direction into the cylinder at such periods when passageway 21 is under delivery pressure.

It will be understood that the device will operate through successive cycles of movement as described so long as the flow of pressure fluid is permitted and so long as the trigger 93 is in its engaged position as shown, for example, in Figure 6 of the drawings. If it is desired to have the device execute only one delivery movement, the handle 91 is manipulated so that the tripper 93 is swung downwardly out of the path of movement of the abutments 73 and 74 on the trigger 72. Then the assembly will move toward the left and stop without reversing when it reaches its limit of movement. In order to resume operation as an automatically reversing distributor, however, it is necessary to open the drain cock 95 to relieve the pressure on the right hand side of the piston 45 so that the pressure of the incoming fluid against the head 31 of the valve member 30 will restore the arrangement to its original preparatory position. Then the trigger 93 is brought up into operative position and the device is again ready to function automatically.

It will be understood that this automatic fluid distributing device may be employed in a great variety of installations and can be applied to distributing systems for various types of fluid whether liquid or gaseous. When employed in connection with irrigation installations it can be conveniently installed in cellars, outbuildings or the like; or, by removing the pressure gauge and plugging up the opening 54, it may be buried in the ground and permitted to run automatically for indefinite periods governed only by the supply of pressure fluid thereto.

It will be understood that various changes and modifications can be made in the device as illustrated and described herein without departing from the scope of the invention as defined in the following claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In an automatic fluid distributing system, in combination, a source of fluid under pressure, a plurality of conduits leading to points of delivery of said fluid, a distributing device for successively placing said conduits in communication with said source of supply, said device comprising a casing provided with a valve chamber and a power chamber, said chambers being disposed in longitudinal alignment, said valve chamber being provided at its end remote from said power chamber with an inlet port for fluid from said source and a plurality of outlet ports communicating respectively with said conduits, a hollow, sleeve-like distributing valve member disposed for reciprocation in said valve chamber so as to successively uncover said outlet ports, an actuating piston connected to said valve member and disposed within said power chamber, means for supplying said pressure fluid to said power chamber to cause said piston to move said valve member past said ports, and means operated solely by said fluid pressure for causing the piston to repeat its cycle of operation automatically.

2. In an automatic fluid distributing system, in combination, a source of fluid under pressure, a plurality of conduits leading to points of delivery of said fluid, a distributing device for successively placing said conduits in communication with said source of supply, said device comprising a casing provided with a valve chamber and a power chamber, said valve chamber being provided with an inlet port for fluid from said source and a plurality of outlet ports communicating respectively with said conduits, a distributing valve member disposed for reciprocation in said valve chamber so as to successively uncover said outlet ports, an actuating piston connected to said valve member and disposed within said power chamber, means for supplying said pressure fluid to said power chamber to cause said piston to move said valve member past said ports, means for throttling the flow of pressure fluid through said last named means for regulating the period of reciprocation of said valve member and thus the period of flow through the respective conduits, and means also disposed in said power chamber operated solely by said fluid pressure for causing the piston to repeat its cycle of operation automatically.

3. In an automatic fluid distributing system, in combination, a source of fluid under pressure, a plurality of conduits leading to points of delivery of said fluid, a distributing device for successively placing said conduits in communication with said source of supply, said device comprising a casing provided with a valve chamber and a power cylinder, said valve chamber being provided with an inlet port for fluid from said source and a plurality of outlet ports communicating respectively with said conduits, a distributing valve member disposed for reciprocation in said valve chamber so as to successively provide communication with said outlet ports, means in said power cylinder operated solely by the pressure of the fluid from said source for causing said valve member to alternately reciprocate in opposite directions past said outlet ports.

4. In an automatic fluid distributing system, in combination, a source of fluid under pressure, a plurality of conduits leading to points of delivery of said fluid, a distributing device for successively placing said conduits in communication with said source of supply, said device comprising a casing provided with a valve chamber and a power cylinder, said valve chamber being provided with an inlet port for fluid from said source and a plurality of outlet ports communicating respectively with said conduits, a distributing valve member disposed for reciprocation in said valve chamber so as to successively provide communication with said outlet ports, an actuating piston connected to said valve member and disposed within said power cylinder, means disposed in said power cylinder and operated solely by the pressure of the fluid from said source for alternately changing the preponderance of pressure on opposite sides of said piston for causing said valve member to alternately reciprocate in opposite directions past said outlet ports.

5. In an automatic fluid distributing system,

in combination, a source of fluid under pressure, a plurality of conduits leading to points of delivery of said fluid, a distributing device for successively placing said conduits in communication with said source of supply, said device comprising a casing provided with a valve chamber and a power cylinder, said valve chamber being provided with an inlet port for fluid from said source and a plurality of outlet ports communicating respectively with said conduits, a distributing valve member disposed for reciprocation in said valve chamber so as to successively provide communication with said outlet ports, an actuating piston connected to said valve member and disposed within said power cylinder, means for applying the pressure of the fluid from said source to one side of said piston in the power cylinder whereby said distributing valve member may be moved past said ports, a by-pass passageway leading from one side of said piston to the other, valve means controlling said passageway, and means for operating said valve means for alternately changing the preponderance of pressure on opposite sides of said piston for causing said valve member to alternately reciprocate in opposite directions past said outlet ports, said last named means being actuated by the movement of the piston and valve assembly in each direction.

6. In an automatic fluid distributing system, in combination, a source of fluid under pressure, a plurality of conduits leading to points of delivery of said fluid, a distributing device for successively placing said conduits in communication with said source of supply, said device comprising a casing provided with a valve chamber and a power cylinder, said valve chamber being provided with an inlet port for fluid from said source and a plurality of outlet ports communicating respectively with said conduits, a distributing valve member disposed for reciprocation in said valve chamber so as to successively provide communication with said outlet ports, an actuating piston connected to said valve member and disposed within said power cylinder, means for applying the pressure of the fluid from said source to one side of said piston in the power cylinder whereby said distributing valve member may be moved past said ports, a by-pass conduit leading from one side of said piston to the other, a valve controlling the flow through said by-pass passageway for alternately changing the preponderance of pressure on opposite sides of said piston and distributing valve member for causing the latter to reverse its direction of movement, valve actuating means carried by said piston and distributing valve member, and means carried by said casing for operating said valve actuating means near the end of the movement of said member in each direction.

7. In a distributing device of the class described, in combination, a casing enclosing a distributing valve chamber having inlet and outlet ports, a power cylinder disposed adjacent said chamber, a combined distributing valve and actuating piston member disposed for movement within said chamber and cylinder, means for continually urging said member toward one end of said casing, means for applying fluid pressure to one side of said piston to overcome the effect of said last named means and to move the valve past the inlet ports in said valve chamber, a by-pass passageway around said piston, a relief valve controlling said passageway for relieving the fluid pressure upon said piston, means operated by the movement of said piston for actuating said relief valve to relieve the pressure on said piston and permit the reversal of movement of said combined member.

8. In a fluid distributing device of the class described, in combination, a casing provided with two chambers of different diameters one of said chambers being a distributing valve chamber provided with an inlet port for the introduction of fluid under pressure and a plurality of aligned outlet ports, the other of said chambers being a power cylinder provided with an inlet opening at one end for the introduction of a portion of said pressure fluid, and an exhaust port at the other end of said power cylinder, a differential piston and distributing valve member occupying said chambers and reciprocable within said casing to successively place said outlet port in communication with said source of fluid supply, means for applying the pressure fluid to both ends of said differential piston and valve member, whereby it will move in a direction determined by the end of greater diameter, means for equalizing the pressures on opposite sides of the larger end of said differential member, whereby it will move in the reverse direction under the influence of the pressure on the smaller end, and means tripped by said member during its movement for actuating said equalizing means.

9. In a device of the class described, in combination, a distributing valve chamber having inlet and outlet ports, a power cylinder disposed adjacent said valve chamber, a distributing valve member movably disposed in said valve chamber, an actuating piston operatively connected therewith and disposed within said power cylinder, means for admitting pressure fluid to said power cylinder upon one side of said actuating piston to cause it to move in one direction, and means for relieving the pressure upon that side of the piston comprising a movable valve member carried by said piston, a resilient member adapted to urge said valve to either closed or open position depending upon its movement from one side or the other of a dead-center position, and means operated by the movement of the piston for tripping said resilient member.

10. In a device of the class described, in combination, a distributing valve chamber having inlet and outlet ports, a power cylinder disposed adjacent said valve chamber, a distributing valve member movably disposed in said valve chamber, an actuating piston operatively connected therewith and disposed within said power cylinder, means for admitting pressure fluid to said power cylinder upon one side of said actuating piston to cause it to move in one direction, and means for relieving the pressure upon that side of the piston comprising a movable valve member carried by said piston, a spring member adapted to urge said valve to either closed or open position depending upon its movement from one side or the other of a dead-center position, a trigger member connected with said spring and adapted to move it beyond said dead-center position, and a tripper element carried by said casing for actuating said trigger member during movement of said piston.

11. In a device of the class described, in combination, a distributing valve chamber having inlet and outlet ports, a power cylinder disposed adjacent said valve chamber, a distributing valve member movably disposed in said valve chamber, an actuating piston operatively connected therewith and disposed within said power cylinder, means for admitting pressure fluid to said power

cylinder upon one side of said actuating piston to cause it to move in one direction, and means for by-passing said fluid from one side of said piston to the other, a movable valve member carried by said piston and controlling said by-pass, a spring member adapted to urge said valve to either closed or open position depending upon its movement from one side or the other of a dead-center position, and a double trigger member connected with said spring and adapted to move it beyond dead-center position in either direction to open or close said by-pass valve, means operable by movement of said piston in either direction to trip said trigger, whereby said valve is alternately actuated to effect continually repeated reversal of movement of said piston and distributing valve member.

12. In a device of the class described, in combination, a distributing valve chamber having inlet and outlet ports, a power cylinder disposed adjacent said valve chamber, a distributing valve member movably disposed in said valve chamber, an actuating piston operatively connected therewith and disposed within said power cylinder, means for admitting pressure fluid to said power cylinder upon one side of said actuating piston to cause it to move in one direction, a by-pass passageway leading from one side of said piston to the other through the stem thereof and controlled by a sleeve valve member slidable upon said stem, a trigger member also slidable upon said piston stem, a movable spring device connected with said sleeve valve and said piston and adapted to move from one side to the other of a dead-center position for snapping said valve member into open or closed position under the influence of said trigger member, a tripper element carried by said casing and disposed in the path of movement of said trigger in either direction for actuating said trigger to alternately open and close said by-pass valve whereby continually repeated reversal of movement of said piston and distributing valve member is effected.

13. The distributing device as set forth in claim 12 in which said tripper member is movable at will from operative position to prevent reversal of said distributing member.

14. In a distributing device of the class described, in combination, a source of fluid under pressure, a plurality of conduits leading to points of delivery of said fluid, a distributing device for successively placing said conduits in communication with said source of supply, said device comprising a casing provided with aligned substantially cylindrical inter-communicating chambers of different diameters, a differential piston having its piston heads disposed for reciprocation in said respective chambers, one of said chambers being provided with an inlet port for fluid from said source and a plurality of outlet ports communicating respectively with said conduits, a distributing valve member disposed for reciprocation in said chamber so as to successively provide communication with said outlet ports, said valve being connected to said differential piston for reciprocation therewith, means for continually subjecting both ends of said differential piston to the pressure of said fluid while the distributor is in operation, whereby the piston and its attached valve is biased toward one end of the casing, a by-pass passageway around one of the heads of said differential piston, and means for automatically and alternately opening and closing said by-pass passageway for causing the piston and valve member to reverse its direction of movement.

15. In a distributing device of the class described, in combination, a source of fluid under pressure, a plurality of conduits leading to points of delivery of said fluid, a distributing device for successively placing said conduits in communication with said source of supply, said device comprising a casing provided with aligned substantially cylindrical inter-communicating chambers of different diameters, a differential piston having its piston heads disposed for reciprocation in said respective chambers, the smaller of said chambers being provided with an inlet port for fluid from said source and a plurality of outlet ports communicating respectively with said conduits, a distributing valve member disposed for reciprocation in said chamber so as to successively provide communication with said outlet ports, said valve being connected to said differential piston for reciprocation therewith, means for continually subjecting both ends of said differential piston to the pressure of said fluid while the distributor is in operation, whereby the piston and its attached valve is biased toward the end of the casing of smaller diameter, a by-pass passageway around the larger of the heads of said differential piston, and means for automatically and alternately opening and closing said by-pass passageway for causing the piston and valve member to reverse its direction of movement.

16. In a distributing device of the class described, in combination, a source of fluid under pressure, a plurality of conduits leading to points of delivery of said fluid, a distributing device for successively placing said conduits in communication with said source of supply, said device comprising a casing provided with aligned substantially cylindrical inter - communicating chambers of different diameters, inlet ports for fluid from said source of pressure at each end of said casing, a differential piston having its piston heads disposed for reciprocation in said respective chambers, both of said heads being subject to the pressure of said fluid, a plurality of outlet ports in the smaller of said chambers communicating respectively with said conduits, the smaller one of said pistons being provided with a skirt adapted to cover said outlet ports and to successively provide communication with said ports during reciprocation of said differential piston, means for automatically and alternately relieving the pressure of said fluid from one of said piston heads in order to reverse the direction of movement of said piston and thus repeat the cycle of operation of said distributor.

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