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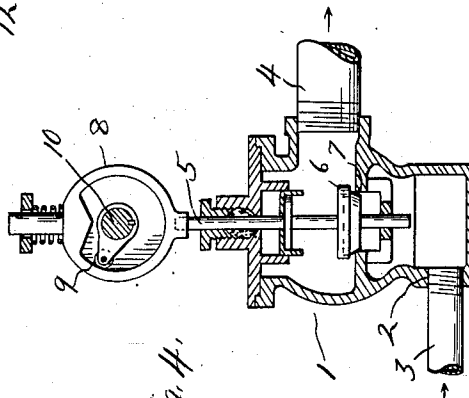
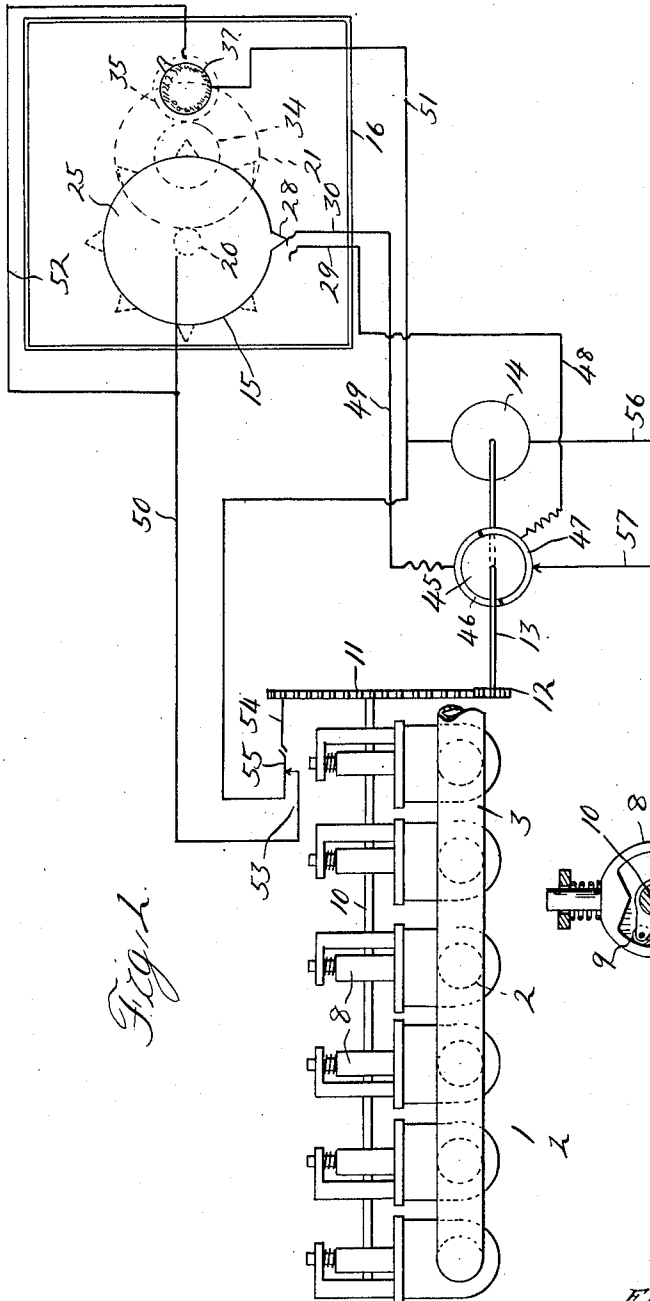
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AUTOMATIC CONTROL FOR IRRIGATING SYSTEMS

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2 Sheets-Sheet 1



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AUTOMATIC CONTROL FOR IRRIGATING SYSTEMS

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This invention relates generally to irrigating systems and refers more particularly to automatic control mechanism for such systems.

5 A primary object of the invention is the provision of a time controlled mechanism for automatically controlling the operation of a set of valves whereby certain sections of land may be irrigated for a specified length of
10 time, said mechanism also being adapted to both turn each valve on and off at a predetermined time.

With these and other objects in view, the invention resides in the novel features of construction and combination and arrangement
15 of parts as more fully hereinafter set forth.

In the drawings:

Figure 1 is a diagrammatic view of my invention;

20 Figure 2 is a plan view of the timing mechanism;

Figure 3 is a front elevation thereof;

Figure 4 is a detail view of one of the valves.

25 In the accompanying drawings, the numeral 1 designates a battery of valves for controlling the flow of water to the different sections of a garden or a piece of land which is to be irrigated. These valves may be of
30 any suitable type and in the present instance I have provided a set of valves such as that indicated in Figure 4 of the drawings wherein 2 indicates the inlet communicating with the main supply pipe 3, and 4 the outlet leading
35 from the valve. Each valve is provided with a reciprocating rod 5 upon which is mounted the valve plate 6 arranged to engage the seat 7. To the upper end of the rod 5 is secured a cam follower 8 which is engaged by the cam 9 keyed to the cam shaft 10.
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As will be noted the cam shaft extends longitudinally of the valves, having at spaced intervals the cams 9 for operating the valves. The cams are so arranged on the cam shaft
45 that the rotation thereof will consecutively open and close each valve.

To one end of the cam shaft is secured the large gear wheel 11 meshing with the pinion 12 mounted on the motor shaft 13. 14 designated diagrammatically a motor for rotat-

ing the shaft 13 and pinion 12 while 15 indicates an adjustable timing device for controlling the operation of the motor. The whole arrangement is such that by setting the timing device, the first valve may be
55 opened for a specified length of time and then closed while the next succeeding valve is being opened for a definite period of time and so on until all of the valves have been operated.
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Referring now to Figures 2 and 3 there is disclosed in detail the adjustable timing device 15. This mechanism comprises a frame 16 within which is suitably mounted a clock 17 having a shaft 18 projecting therefrom
65 which is adapted to make one revolution every two hours. Suitably connected to this shaft and axially aligned therewith is a shaft 19 carrying a pinion 20 meshing with a gear 21 and having a ratio of 12 to 1 therewith so
70 that the gear 21 makes one complete revolution every twenty four hours.

Preferably a sleeve 22 is mounted on the shaft 19 and is provided with an annular ring 23 integrally connected thereto and suitably keyed to the shaft 19. The sleeve 22 is adapted to carry a suitable contact device 24 consisting of a double set of contact disks 25 and 26 spaced apart by means of the spacing member 27. Each disk is provided with one
75 contact point 28 projecting from the periphery thereof and arranged to engage either one or the other of the contacts 29 or 30 projecting upwardly from the base of the frame 16, once during each revolution of the disk
80 from which it projects.
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As will be noted the end portion of the sleeve 22 is screw threaded for receiving the thumb nut 31 which is screwed upon the shaft 19 after the ring 32 and spacer 33 have been placed thereon. By tightly screwing the thumb nut on the shaft the contact disks are securely clamped against relative movement on the sleeve 22 and when it is desired
90 to change the relative positions of the points 28 it is only necessary to unscrew the nut and unclamp the disks.
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The shaft upon which the gear 21 is journaled also carries the small gear 34 integrally connected to the gear 21 and meshing with
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a gear 35 of equal size thereto, the arrangement being merely for the purpose of offsetting the shaft 36 to clear the contact device 24. As shown this shaft 36 besides carrying the gear 35 also supports the disk 37 and the sleeve 38. The disk 37 is keyed to the shaft 36 to rotate therewith, and is calibrated for the twenty four hours of the day. The sleeve 38 is loosely mounted on the shaft 36 and is provided with an indicator 39 having the return bent portion 40 constituting a pointer for the calibrated surface of the disk. Projecting from the sleeve is a contact arm 41 adapted for engagement with a contact member 42 secured to the frame 16.

Suitably keyed to shaft 36 is a member 43 against which the rear end of the sleeve 38 is adapted to abut, while a thumb nut 44 is provided for securely clamping the sleeve to the shaft for rotation therewith. By loosening this nut 44 the indicator and the contact arm 41 may be set at any position for the twenty four hours and then clamped in position by again tightening the nut.

Referring now to Figure 1 there is diagrammatically disclosed the several circuits connecting the timing device, and the motor. The motor shaft 13 has suitably mounted thereon a rotary switch 45 having the segmental portions 46 and 47 separated from one another, the segmental portion 47 being electrically connected to the contact member 29 and the segmental portion 46 to the contact 30 by means of the conductors 48 and 49 respectively.

Leading from the contact device 24 is a conductor wire 50 connecting the same to the motor, while extending from the contact arm 41 is a wire 51 connecting with the wire 50 as shown. There is also a conductor 52 extending from the contact 42 and connecting the conductor 50 while positioned in the conductor 50 is a switch 53 which is adapted to be opened by the pin 54 engaging the contact arm 55. The pin 54 is mounted on the gear wheel 11 and the arrangement is such that the pin will engage the arm 55 once during each revolution of the gear. It should be stated that one complete revolution of the gear will open and close each valve consecutively and that the pin is so positioned on the gear that the switch will be opened after the last valve of the set has been closed. It should also be stated that the disks 25 and 26 are always arranged so that the contact points on one set alternate with the points on the other set whereby after a point on the set 25 engages the arm 29, one of the points on the other set 26 will engage the arm 30 and the next engagement will be by a point on the set 25 contacting with the arm 29, and so on. The reason for this arrangement will be presently set forth during the description of the operation of the device.

Leading from the motor is the wire 56

leading to the power supply while the wire 57 leads from this supply and has a sliding contact with the switch segmental portions 46 and 47.

In operation, with the switch 53 open, the segmental portion 47 in electrical contact with the source of supply, and the contact arm 41 in engagement with the arm 42 (these last contacts having been previously set to engage each other at a predetermined time) no operation of the motor will take place until one of the points 28 engages the contact arm 29 at which time the current will flow from the source of supply through the segmental position 47, conductor 48 contacts 28 and 29, conductors 50 and 52 to the contact arms 41 and 42 and then through 51 to the motor. The motor shaft will then be rotated and carry with it the switch 45 revolving the segmental portions 46 and 47. Just as soon as the segmental portion 47 becomes disengaged from the sliding contact of the lead 57 the circuit will be broken shutting down the motor. However, the pinion 12 will have been rotated sufficiently to move the gear 11 and open the first valve. At the same time the pin will have become disengaged from the contact arm 55 closing the switch 53.

It should be noted that the contacts 41, 42 and 55 of the switch 53 are in parallel so that either may complete the circuit through the motor when the contact points 28 on the disks 25 and 26 make contact with the arms 29 and 30 respectively. It will therefore be apparent that just as soon as the switch 53 is closed, it will be unnecessary to complete the circuit through conductor 52 and 51 and that these latter conductors are only used in the starting operation of the device.

After the first operation of the motor the positions of the segmental portions will be reversed, with the segmental portion 46 engaging the sliding contact of the lead 57. Therefore the circuit will remain broken until a further rotation of the contact device will bring the point of one of the disks 26 into engagement with the contact arm 30. This will close the circuit through 57, segmental portion 46 conductor 49 arm 30 and conductor 50 to the motor which will again be energized and rotated until the segmental portion 46 moves out of contact with the sliding contact of the lead 57. When this occurs the circuit will again be broken and remain so until closed by one of the contact points 28 of the disks. This operation will be repeated until the gear 11 has completed a revolution at which time each valve will have been opened for a certain period of time and then closed. After the last valve has been closed the pin 54 will engage the arm 55 and open the circuit to the motor through the conductor 50 so that even though the points 28 continue to contact with the arms 29 and 30 the circuit will still be opened, and

the motor will not be energized until the contact 41 again engages the arm 42, whereupon the complete operation just described will again take place.

5 It will of course be understood that the disks 25 and 26 can be rearranged to suit the convenience of the operator so that one valve may be opened for a half hour or more while another valve may only be opened for a minute or so. It will also be apparent that any number of valves may be used as the relative sizes of the gear 11 and pinion 12 may be changed to take care of the number of valves in the set. Likewise any number of disks 25 and 26 may be provided for the efficient operation of the device.

10 In view of the fact that the disk 37 revolves once every twenty-four hours the sleeve 38 may be rotated on the shaft 36 relative to the disk and clamped in any desired position for permitting the contact 41 to engage the arm 42 at any predetermined time. It will therefore be apparent that I have provided an adjustable timing device whereby a set of valves may be automatically opened and closed for a specified length of time, the timing device also being capable of starting the operation of the valves at any predetermined time of the day.

20 30 What I claim as my invention is:—

1. In combination, a series of valves, means for operating said valves including a gear, a motor for rotating said gear, a timing device for controlling the operation of said motor, a switch in the motor circuit having a contact arm, and a pin projecting from said gear for engaging said arm to open the motor circuit once during the rotation of said gear.

40 2. In a device of the character described, a series of valves, means for operating said valves including a motor, a timing device including a clock operated shaft, a switch actuated by said clock shaft for initially closing the motor circuit, means controlled by said shaft for successively opening and closing the motor circuit to actuate said valves, and means for opening the motor circuit after the actuation of the last valve of the series.

50 3. In a device of the character described, a series of valves, means for successively operating said valves including a gear, a motor for rotating said gear, a timing device for successively opening and closing the motor circuit, a switch in said motor circuit adjacent said gear, and means carried by said gear for actuating the switch to open said motor circuit once during the rotation of said gear.

60 4. In a device of the character described, a series of valves, means for successively operating said valves including a gear, a motor for rotating said gear, a timing device including a clock operated shaft, a switch actuated by said clock shaft for initially closing the motor circuit, means controlled by said shaft for successively opening and closing the motor circuit to actuate said valves, and means controlled by said gear for opening the motor circuit after the actuation of the last valve in the series.

In testimony whereof I affix my signature.
ELMER G. MUNZ.

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