June 12, 1951 B. H. KOOKEN 2,556,428

SPRINKLER SYSTEM

Filed March 11, 1948 4 Sheets-Sheet 1

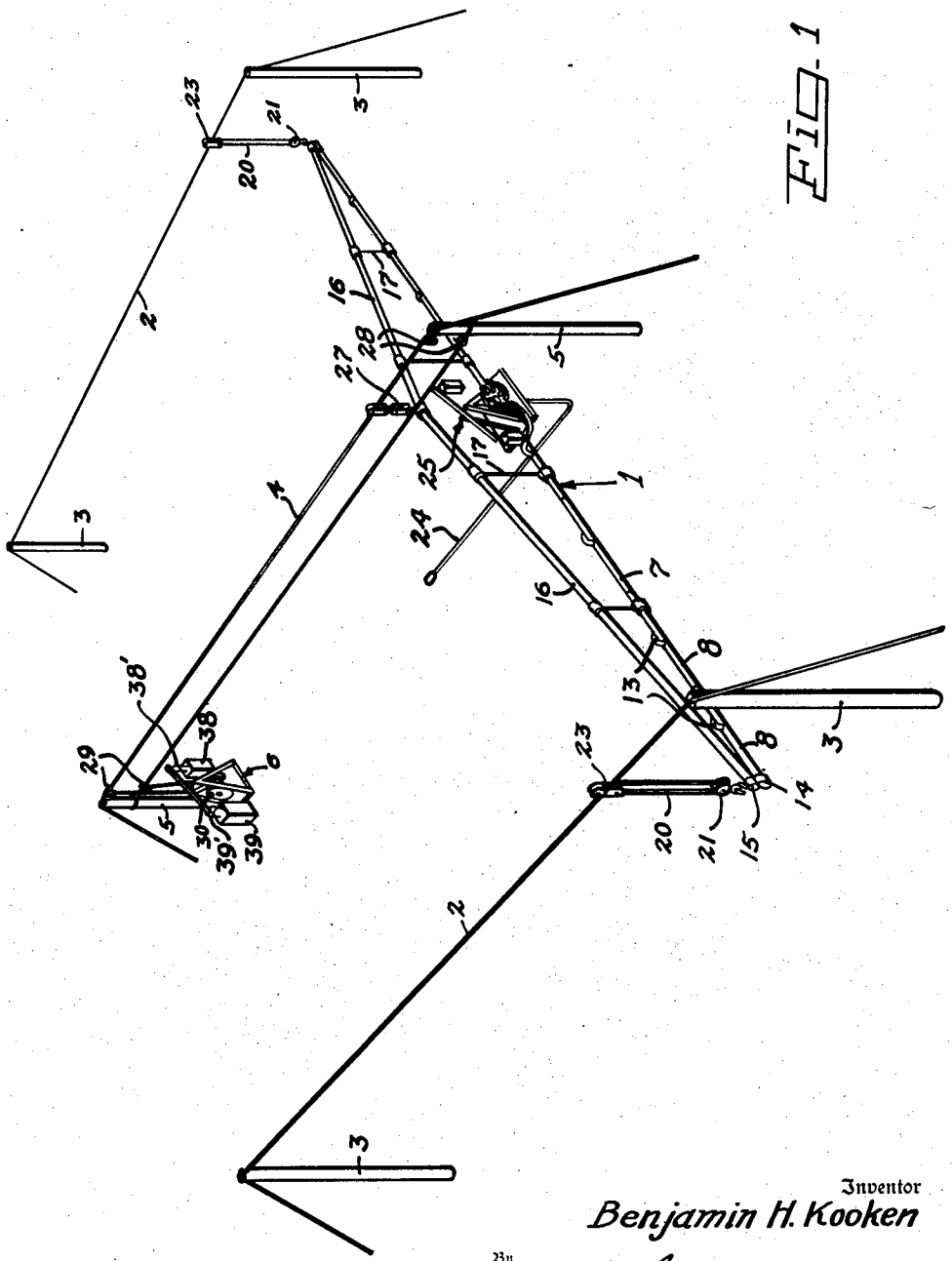


FIG. 1

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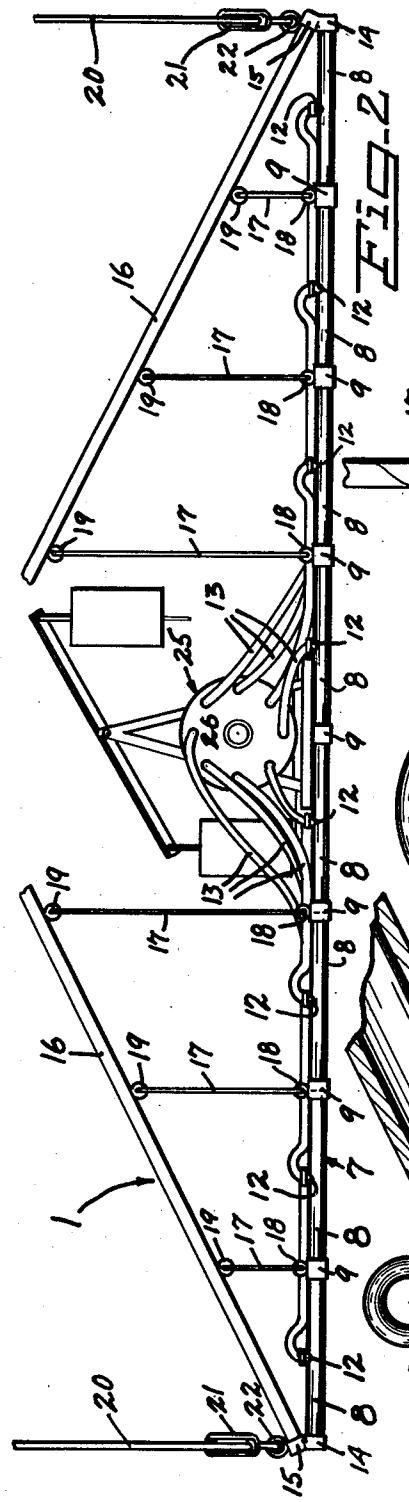


FIG. 2

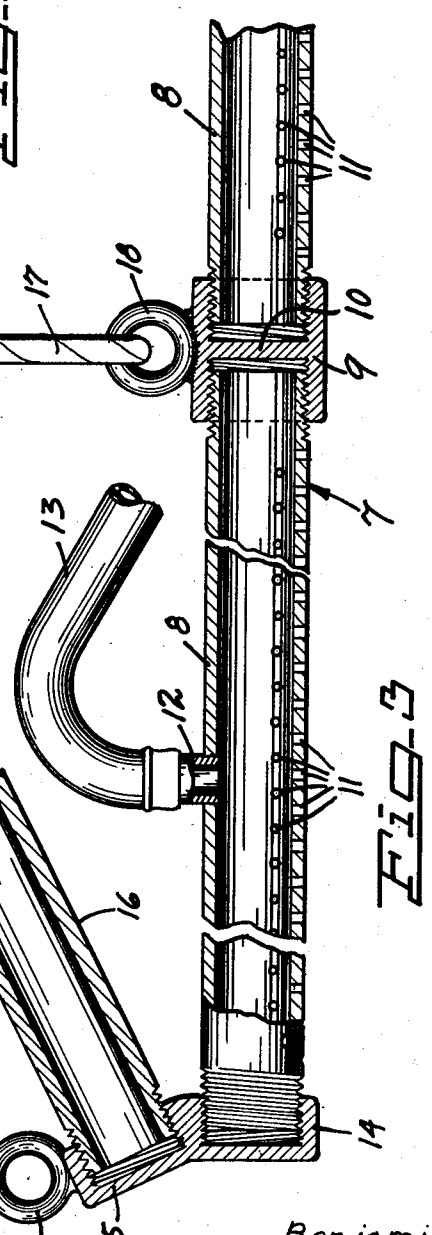


FIG. 3

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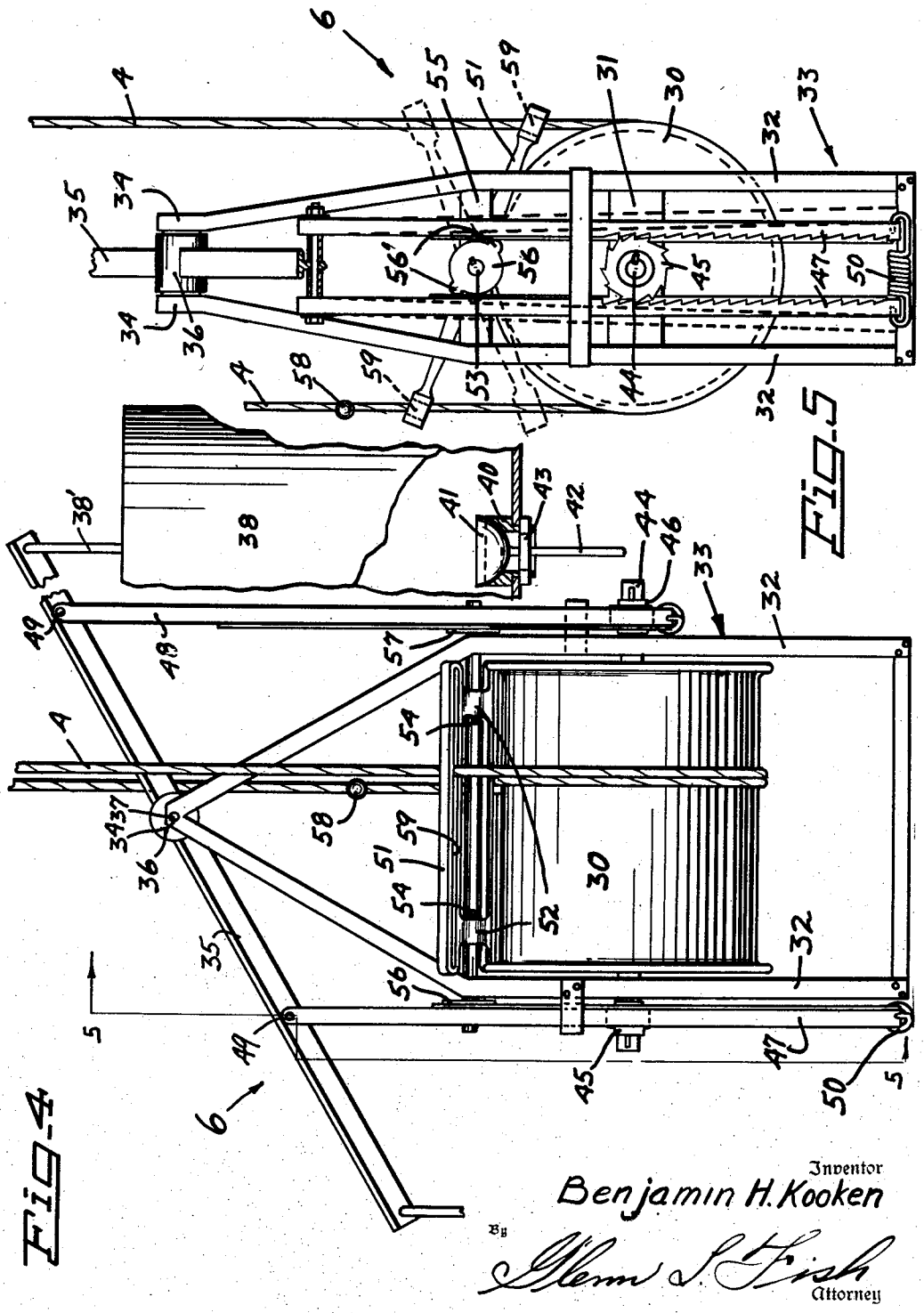


FIG. 4

FIG. 5

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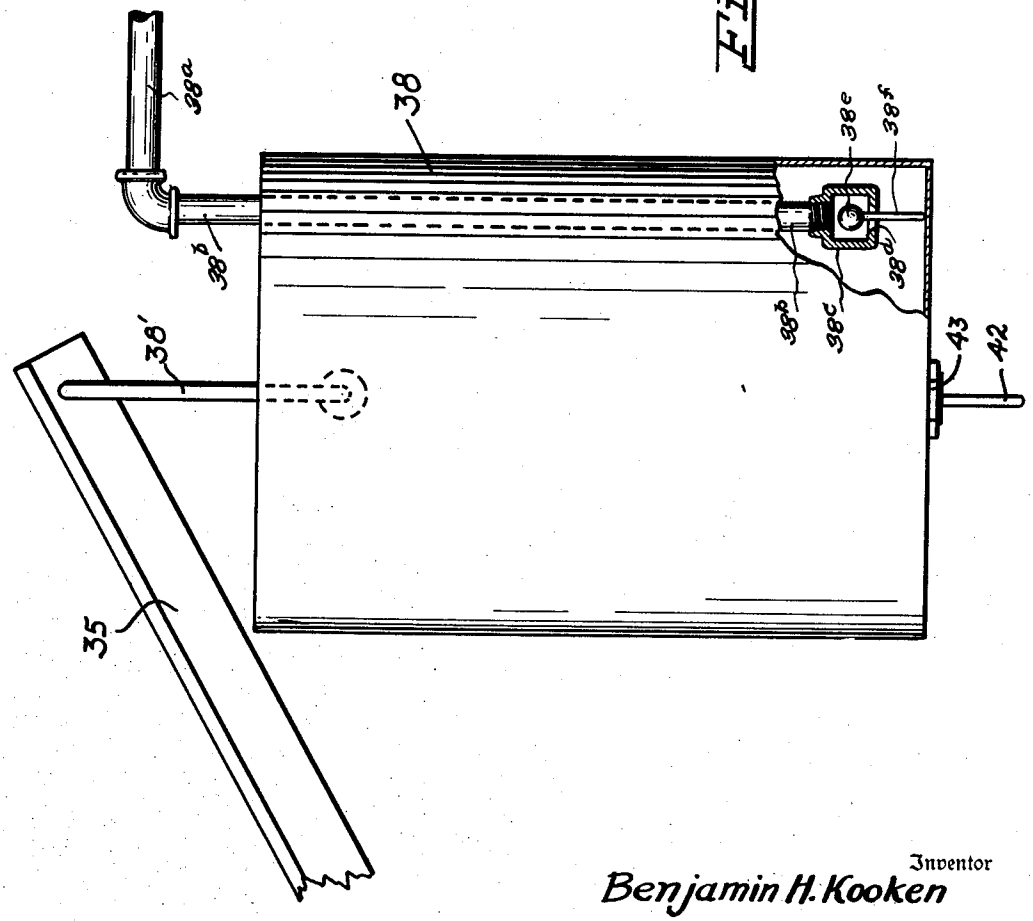
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SPRINKLER SYSTEM

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FIG. 6



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UNITED STATES PATENT OFFICE

2,556,428

SPRINKLER SYSTEM

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Application March 11, 1948, Serial No. 14,191

4 Claims. (Cl. 299—55)

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This invention relates to a sprinkler and it is one object of the invention to provide a sprinkler which may be erected over a lawn or field berry patch, garden, or the like and serve to water the same, the sprinkler being so constructed that it may be moved along overhead supporting cables or equivalent supporting means and water discharged onto growing vegetation. It will thus be seen that a lawn, garden, or the like may be thoroughly watered and in a very effective manner.

Another object of the invention is to provide a sprinkler which is slung beneath overhead cables and connected with a power cable to which movement is imparted in step by step movements and the sprinkler thus caused to have intermittent movements and allow all portions of the lawn or garden to be thoroughly watered as the sprinkler travels from one side or end of the lawn or garden to the other.

Another object of the invention is to provide a sprinkler wherein the power cable is an endless cable having upper and lower flights, the lower flight being engaged about a drum which is intermittently rotated to advance the sprinkler across the lawn or garden, provision being made for reversing the direction in which the drum rotates so that the sprinkler will be automatically moved back and forth along the supporting cables during operation of the sprinkler.

Another object of the invention is to provide a sprinkler which may be very easily set up in a position for use and economically operated.

This invention is illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective view of the improved sprinkler.

Fig. 2 is a side elevation upon an enlarged scale of the water distributor of the sprinkler.

Fig. 3 is a view upon an enlarged scale showing portion of the water distributor in longitudinal section.

Fig. 4 is a view upon an enlarged scale showing the operating means for the power cable in side elevation.

Fig. 5 is a view taken vertically along the line 5—5 of Figure 4.

Fig. 6 is a view upon an enlarged scale of bucket constituting an element of the invention and the means for filling the bucket with water.

The improved sprinkler constituting the subject matter of this invention is intended for use in connection with a large lawn, berry patch, garden, or the like and consists briefly of a water distributor 1 suspended from overhead cables

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2 carried by posts 3, an endless power cable 4 extending between posts 5 and connected with the water distributor, and a power plant 6 by means of which movement is imparted to the power cable for advancing the water distributor across a lawn, field, or garden to be watered.

The distributor 1 has an elongated nozzle 7 consisting of a plurality of pipe sections 8 having threaded end portions screwed into couplings 9 which are blocked by partitions 10 so that water will be prevented from flowing one pipe section to another. Each pipe section has its lower portion formed with outlet perforations 11 and midway its length carries an upstanding neck 12 so that hose pipes 13 may be connected with the pipe sections 8. End ones of the pipe sections are screwed into terminal caps 14 carrying auxiliary caps 15 and serving as couplings for connecting the elongated sprinkler head or nozzle 7 with a bracing bar 16 which may be of tubular formation, as shown in Figure 3, or solid. Bracing cables 17 extend vertically between the nozzle 7 and the angle braces 16 and have their lower ends connected with eyes 18 rising from the couplings 10 and their upper ends connected with eyes 19 depending from the bracing bar. Since the bracing bar or strut 16 is angled longitudinally and is connected with the nozzle at points spaced from each other longitudinally thereof the elongated nozzle will be supported in such a manner that it can not sag. Block and tackles 20 have the pulleys 21 at their lower ends connected with eyes 22 rising from the caps or couplings 15 and the pulleys 23 at their upper ends mounted upon the cables or overhead tracks 2. Since wheels of the upper pulleys rest upon the cables 2 they may roll along these cables and the distributor be moved back and forth across a lawn or field and the lawn or field watered for the full distance between the posts 3 at opposite sides or ends of the field.

A supply of water is obtained through a hose pipe 24 which is connected with apparatus 25 from which the hose pipes lead. The hose pipes 13 are arranged in a circular path about a disk 26 constituting an element of the apparatus 25 and water is successively delivered to these hose pipes by rotation of the disk in step by step movements water will be successively discharged from the pipe sections 8 and the lawn or field watered in successive areas between the ends of the nozzle. The mechanism for successively delivering water to the hose pipes 13 constitutes the subject matter of my copending application filed October 7, 1946, Ser. No. 701,700 and as its construction and

operation are fully set forth in the said copending application it is not necessary to illustrate and describe it in detail.

Midway its length the bracing bar 16 is connected with the power cable 4 by a block and tackle 27, and since this block and tackle is firmly secured to the upper flight of the cable movement of the cable will cause the nozzle to be moved across the field. One of the posts 5 carries pulleys 28 with which the endless cable 4 is engaged and the other post carries pulleys 29 about which flights of the cable are trained. End portions of the cable extend vertically from the pulleys 29 and their lower portions are wound about a drum 30 in such a manner that when the drum is rotated one flight of the cable will be wound upon the drum and the other flight unwound therefrom. It will thus be seen that by rotating the drum the flight of the cable to which the nozzle is connected will be moved longitudinally and the nozzle moved across the lawn or field first in one direction and then in an opposite direction.

The drum 30 is rotatably mounted between cross bars 31 carried by corner posts 32 of a frame 33, and upon referring to Figure 4 it will be seen that pairs of corner posts are brought together in vertical spaced relation to the drum to form bearings 34. A rocker 35 extends longitudinally of the drum with a hub block 36 at its center located between the bearings 34 and this hub block is provided with a pivot rod or shaft 37 which is mounted through the bearings and thereby mounts the rocker bar for tilting movement. Buckets 38 and 39 are suspended from opposite ends of the rocker bar by their bales 38′ and 39′ and when the bucket 38 is filled with a sufficient quantity of water to outweigh the bucket 39 its weight will cause the end of the rocker bar to which it is attached to be moved downwardly and the other end of the bar to be moved upwardly. Therefore tilting movement may be imparted to the rocker bar first in one direction and then in the opposite direction. Water with which the bucket is filled is delivered through a pipe 38*a* having a depending vertically disposed end portion 38*b* which enters the bucket through the open top thereof as the bucket moves upwardly towards its raised position. A valve casing 38*c* is mounted at the lower end of the end portion 38*b* of the pipe and is formed with an outlet surrounded by a valve seat 38*d* upon which normally rests a valve ball 38*e* serving to prevent flow of water from the pipe. A stem 38*f* projects downwardly from the valve ball through the outlet of the casing 38*c* and when the lower end of this stem is encountered by the bottom of the upwardly moving bucket, the valve ball will be shifted upwardly to its opened position so that water may flow from the pipe and fill the bucket until the weight of the water moves the bucket downwardly and the valve is allowed to again resume its closed position. The bucket 39 may be filled with a quantity of heavy material of predetermined weight or a suitable weight may be used instead of a bucket. The bucket 38 has its bottom formed with an outlet opening about which is mounted a nipple 40 constituting a valve seat for engagement by an upwardly opening valve 41 having a stem 42 which passes through a guide 43 and is of such length that it projects downwardly from the bucket. The weight of the valve causes it to normally remain closed and the bucket may be filled with water flowing into it from the pipe 38*a* and when the weight of

the water in the bucket 38 overcomes the weight of the bucket or weight 39 the rocker bar will be tilted about its pivot in one direction. As the bucket approaches the ground the lower end of the valve stem will engage the ground and the valve 41 will be shifted upwardly to an opened position so that water may flow from the bucket and eventually reduce the weight of the bucket 38 sufficiently to allow the bucket or weight 39 to tilt the rocker shaft in the opposite direction and return it to its original position. As the bucket 38 moves upwardly the valve 41 will be closed by gravity and the bucket may then be refilled. It will thus be seen that the rocker bar may be alternately rocked in opposite directions and that since water must flow out of the bucket 38 through a relatively small outlet and the bucket then refilled intermittent rocking movements will take place.

The shaft 44 of the drum 30 has its ends projecting from the cross bars 31 at opposite sides of the frame 33 and these protruding ends of the shaft carry ratchet wheels 45 and 46, the teeth of the ratchet 45 being cut in an opposite direction from the teeth of the ratchet 46. The ratchet wheel 45 is disposed between rack bars 47 and the ratchet wheel 46 is disposed between similar rack bars 48. The rack bars extend vertically and have their upper ends connected with end portions of the rocker bar 35 by pins or rods 49 with which the rack bars are loosely connected and springs 50 are provided for drawing lower ends of companion rack bars towards each other and thus yieldably hold the rack bars 47 in engagement with the racket wheel 45 and the rack bars 48 in engagement with the ratchet wheel 46. The teeth of the companion rack bars extend in opposite directions, as shown in Figure 5, and from an inspection of this view it will be seen that as a pair of rack bars move downwardly the teeth of one bar will impart rotary movement to the drum and the other rack bar impart rotary motion to the drum as the rack bars move upwardly. The bucket 38 comes to a stop at the lower end of its vertical movement while water is flowing from its outlet and also comes to a stop at the upper end of its movement while it is being refilled with sufficient water to overcome the weight of the bucket 39 and therefore rotary movement will be intermittently imparted to the drum and the cable will be intermittently moved. It will thus be seen that the distributor 1 will be intermittently moved across the lawn or field and sufficient time allowed for discharge of water from the nozzle upon a strip of the lawn or field before the distributor is moved into position for watering another strip.

Over the drum is disposed a rocker arm or pedal 51 which carries depending sleeves 52 through which a shaft 53 is passed, keys 54 being driven into the sleeves so that the shaft will be rotated when the treadle is tilted. End portions of the shaft 53 are rotatably mounted through cross bars 55 carried by the corner posts 32 of the frame 33 in upwardly spaced relation to the cross bars 31 and upon protruding ends of the shaft 53 are mounted cam-disks 56 and 57 which are disposed respectively between the rack bars 47 and the rack bars 48. The cam-disks are so mounted upon the shaft that the lugs or points 56′ of the disk 56 extend diagonally, as shown, when the corresponding lugs or points of the disk 57 extend horizontally. Therefore by rocking the treadle from the position shown by full lines in Figure 5 towards the position indicated by dotted lines the

rack bars **47** may be swung out of engagement with the ratchet wheel **45** and the rack bars **48** allowed to be moved into engagement with the ratchet wheel **46** by pull of the spring connecting their lower ends. Tilting or rocking of the treadle or rocker bar **51** is accomplished by stops **58** carried by the cable **4**. One of these stops is shown in Figures 4 and 5 but it will be understood that two are provided, one upon each flight of the cable. The flights of the cable pass through openings **59** formed through the rocker bar or treadle **51** and the stops so located that as the sprinkler head **1** reaches one end of its movement across a lawn or field the downwardly moving stop will engage the upper surface of the rocker bar and allow one set of rack bars to be drawn into engagement with the companion ratchet wheel while the other set is moved out of engagement with the companion ratchet wheel. The direction in which the drum is rotated will thus be reversed automatically and the sprinkler head caused to reverse its direction of movement across the field or lawn. Therefore as long as the sprinkler is in operation the sprinkler will travel back and forth across a field or lawn and this will be in step by step movements with pauses between such movements of sufficient length to allow the distributor **25** to cause water to be successively discharged from the perforated pipe sections **3** of the nozzle **7**.

Having thus described the invention, what is claimed is:

1. In a sprinkler system, overhead tracks, a sprinkler head suspended from the tracks and movable along the same, supports, an endless cable having flights extending between said supports and a portion extending downwardly adjacent one support, the sprinkler head being connected with one flight of the cable, a frame, a drum rotatably supported in said frame and about which the downwardly extending portion of said cable is wound, ratchet wheels turning with said drum, one ratchet wheel having teeth extending in an opposite direction to the teeth of the other ratchet wheel, a rocker bar pivotally carried by said frame over said drum, rack bars extending downwardly from opposite end portions of said rocker bar and yieldably held in engagement with companion ratchet wheels, means for alternately moving the rack bars out of engagement with their companion ratchet wheels means for imparting rocking movement to said rocker bar for imparting rotation to the drum and thereby moving the cable and shifting the sprinkler head along the tracks in a direction controlled according to which companion ratchet wheels and rack bars are in engagement with each other, and means carried by said cable for actuating the last mentioned means as the sprinkler head reaches ends of the tracks and automatically reversing movement of the drum and the sprinkler head.

2. In a sprinkler system, overhead tracks, a sprinkler head suspended from the tracks and movable along the same, supports, an endless cable having flights extending between said supports and a portion extending downwardly adjacent one support, the sprinkler head being connected with one flight of the cable, a frame, a drum rotatably supported in said frame and about which the downwardly extending portion of said cable is wound, ratchet wheels at opposite ends of said drum, a rocker bar pivotally mounted over said drum, pairs of rack bars extending downwardly from opposite end portions of said rocker

bar, the ratchet wheels having teeth extending in opposite directions and each ratchet wheel being disposed between a pair of companion rack bars, springs yieldably holding the rack bars in engagement with the companion ratchet wheels, means for alternately shifting the pairs of rack bars out of engagement with the companion ratchet wheels and thereby control directional rotation of the drum during movement of the rack bars, and means for automatically effecting movement of the rack bars into and out of engagement with the ratchet wheels as the sprinkler head reaches ends of said tracks and reversing directional travel of the sprinkler head along the tracks.

3. In a sprinkler system, overhead tracks, a sprinkler head suspended from the tracks and movable along the same, supports, an endless cable having flights extending between said supports and a portion extending downwardly adjacent one support, the sprinkler head being connected with one flight of the cable, a frame, a drum rotatably supported in said frame and about which the downwardly extending portion of said cable is wound, ratchet wheels at opposite ends of said drum, a rocker bar pivotally mounted over said drum, pairs of rack bars extending downwardly from opposite end portions of said rocker bar, the ratchet wheels having teeth extending in opposite directions and each ratchet wheel being disposed between a pair of companion rack bars, springs yieldably holding the rack bars in engagement with the companion ratchet wheels, a shaft rotatably mounted over said drum, cams carried by said shaft and disposed between the pairs of rack bars for moving one set of rack bars out of engagement with the companion ratchet wheel and allowing the other pair of rack bars to move into engagement with the companion ratchet wheel when the shaft is turned, a rocker arm carried by said shaft and formed with openings through which flights of said cable pass, and stops carried by the said flights of said cable for engaging and tilting the rocker arm to reverse rotation of the drum as the sprinkler reaches ends of the tracks and thereby reverse movement of the sprinkler head along the tracks.

4. In a sprinkler system, overhead tracks, a sprinkler head suspended from the tracks and movable along the same, supports, an endless cable having flights extending between said supports and a portion extending downwardly adjacent one support, the sprinkler head being connected with one flight of the cable, a frame, a drum rotatably supported in said frame and about which the downwardly extending portion of said cable is wound, ratchet wheels at opposite ends of said drum, a rocker bar pivotally mounted over said drum, pairs of rack bars extending downwardly from opposite end portions of said rocker bar, the ratchet wheels having teeth extending in opposite directions and each ratchet wheel being disposed between a pair of companion rack bars, springs yieldably holding the rack bars in engagement with the companion ratchet wheels, a weight carried by one end of said rocker bar, a receptacle suspended from the other end of the rocker bar and adapted to be filled with water, said receptacle having an outlet in its bottom, an upwardly opening valve for closing the outlet having a stem extending downwardly from the receptacle for engagement with the ground and shifting the valve upwardly to an opened position and allow escape of water to reduce weight of the receptacle and cause return of the

rocker bar to its initial position by action of the weight, a rocker arm pivoted over said drum and having cams associated with it and engaging the pairs of rack bars for alternately moving the rack bars out of operative engagement with the companion ratchet wheels, and means carried by said cable for intermittently engaging opposite ends of the rocker arm and tilting the same to reverse rotation of the drum and thereby reverse movement of the sprinkler head along the tracks as the sprinkler head reaches ends of the tracks.

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