Jan. 21, 1930. R. S. BLITZ 1,744,520

SPRINKLER

Filed June 4, 1928 2 Sheets-Sheet 1

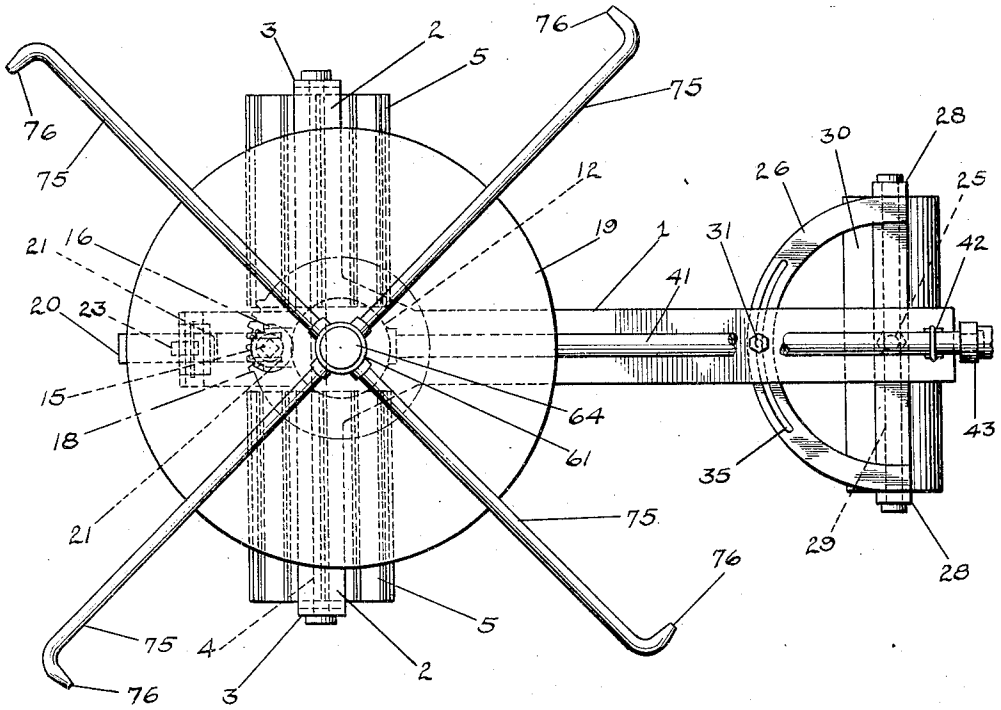


Fig. 1

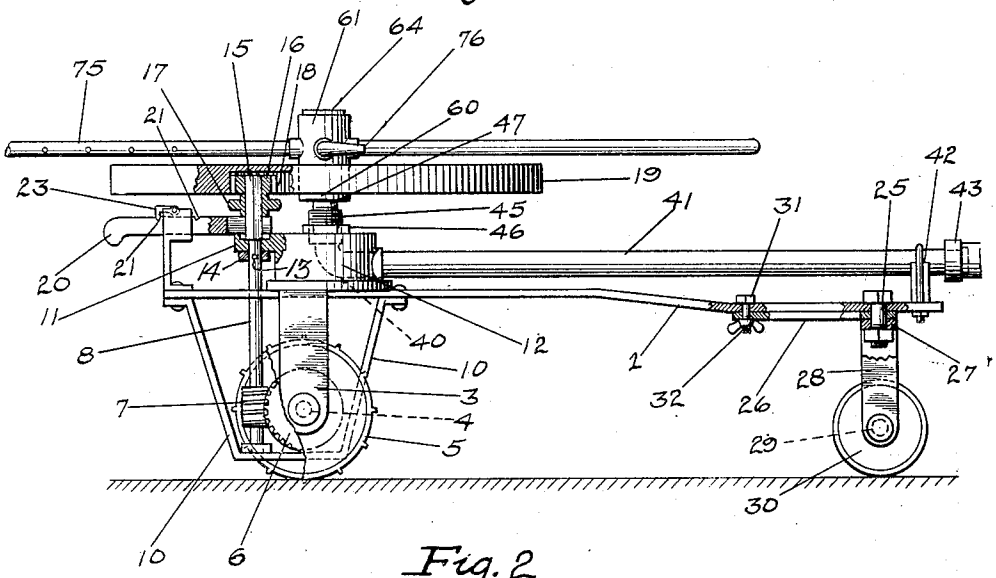


Fig. 2

Inventor
RALPH S. BLITZ
By Peel, Reed & Moore
Attorneys

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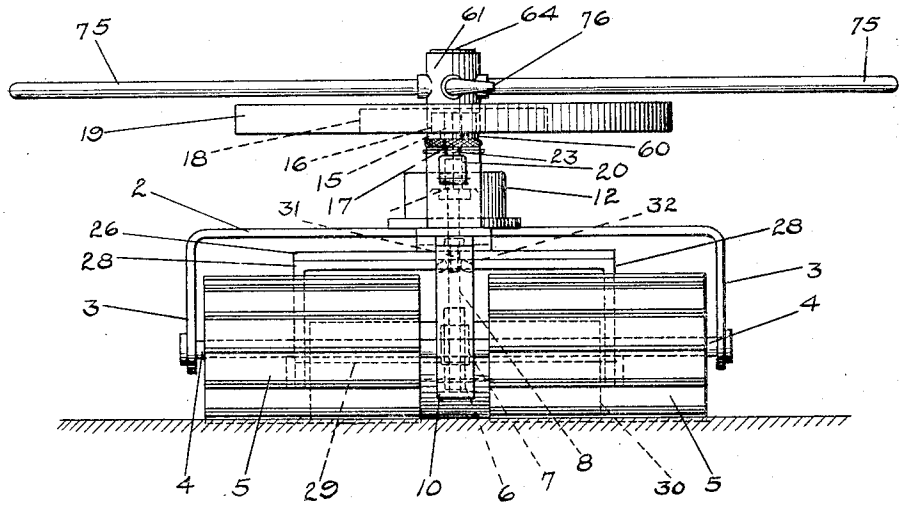


Fig. 3

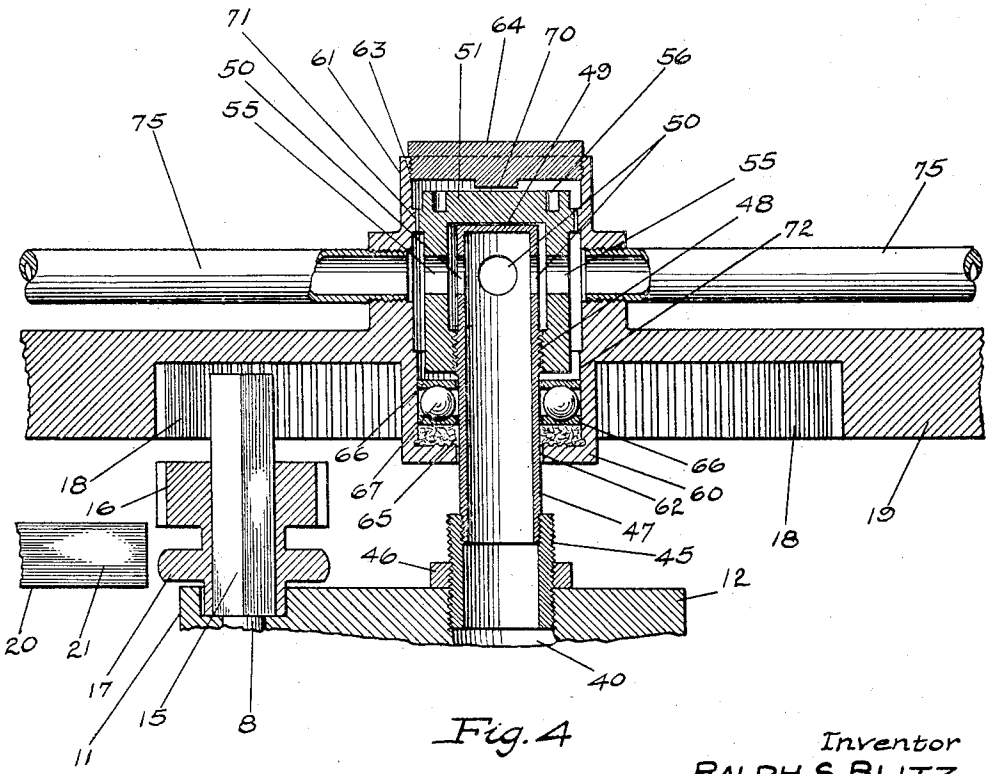


Fig. 4

Inventor
RALPH S. BLITZ
By Paul, Paul & Moore
Attorneys.

Patented Jan. 21, 1930 1,744,520

UNITED STATES PATENT OFFICE

RALPH S. BLITZ, OF RIFLE, COLORADO, ASSIGNOR OF ONE-HALF TO STEINER SALES COMPANY, OF SALT LAKE CITY, UTAH, A CORPORATION OF UTAH

SPRINKLER

Application filed June 4, 1928. Serial No. 282,615.

This invention relates to improvements in lawn sprinklers of the type in which the pressure of the water is utilized for rotating a sprinkler head for water distribution, and for operating mechanism which causes the sprinkler to travel.

General objects of the invention are to provide a simplified construction including driving means, and elements adjustable to make said means operative or inoperative; to provide an improved form of head and an improved construction for the head which may be easily and quickly assembled and which has only a few parts, which can be cheaply manufactured.

Other objects of the invention are to provide a simple driving means for causing the sprinkler to travel; to arrange a sprinkler head and driving means in symmetrical relation adjacent the traction elements; to provide for a few-parts driving mechanism easily attachable; to provide a frame the main portion of which is formed of a single piece of strip metal, and all additional portions of which are formed of strip metal; to provide a block having a water passage with which supply and head-supporting pipes are easily and simply attached, and to have the block form a bearing for a shaft of the driving mechanism; to have a head-supporting pipe and the shaft adjacent one another and symmetrically arranged with reference to the axle which supports the traction means; to provide simple means for disconnecting the drive; to provide a simple head construction including few parts which can be easily assembled; and generally to so simplify the construction, reduce the number of parts and simplify the assembly as to materially reduce production costs.

Advantages and features of the invention will be set forth in the description of the drawings, forming a part of this application, and in said drawings:

Figure 1 is a plan view of the device;

Figure 2 is a side elevation partly in section;

Figure 3 is a front end view; and

Figure 4 is an enlarged vertical section illustrating the construction of the head and related parts.

The main portion of the frame of the machine is composed of an elongated metal strip 1, as a stamping, having at its forward end lateral extensions 2 bent downwardly at 3 to provide bearings having an axle 4 upon which axle is journaled traction wheels 5, in this instance two in number, arranged to be driven by the axle. Centrally of the axle between the traction rollers 5 is a worm gear 6 meshing with a companion worm 7 of a shaft 8 journaled in a frame 10 attached to the bottom of the element 1, and in an extension 11 of a block or casting 12, which casting is attached to the upper side of the frame 1, and extends therebeyond at both sides. It will be noted that the lower end of the shaft 8 has a stepped bearing in the bracket 10, and a pin 13 and washer 14 secure the shaft against translative motion, thus maintaining the lower end of the shaft in its stepped bearing. This provides a simple construction which can be easily assembled. The shaft 8 has an upper squared portion 15 upon which is slidably arranged a gear pinion 16 having a knurled portion 17. The gear meshes with internal gear 18 of a head 19 rotatably mounted in a manner later to be described. The simple arrangement of the shaft and the balanced relation of the block and shaft with reference to the axle are features of the invention. The pinion 16 is held in an upper position and therefore in mesh by means of a slide 20, forked as at 21, the forked portion being interposed between the bottom surface of the pinion 16 and the top surface of the casing 12. The pinion can be considered as splined to the shaft 8. It will be understood that when the element 20 is pulled outwardly from the position shown in Figure 2, that the pinion 16 will drop to the position shown in Figure 4 out of mesh with the gear 18. The element 20 has notches 21 and a catch 23, the arrangement being such that the catch can be put in either notch respectively to secure the element 20 in a position to hold the gear in mesh, or to secure it in its withdrawn position as shown in Figure 4, after release of the gear. The shaft 8 is, therefore, rotatable by rotative motion of the head 19 and motion is transmitted through the gears 7 and 6 to the shaft 4 to operate the trac-

tion rollers or elements 5. A very simple transmission arrangement, with few parts, easily assemblable. This drive arrangement providing means whereby drive can be discontinued at will is a feature of the invention. Attached beneath the frame 1 at the rear, is a frame which is swingable upon a pivot 25, in this instance having the form of a bolt. The frame comprises a horizontally arranged semicircular element 26, and a diametrically arranged cross-element 27 attached rigidly thereto the said cross member 27 having depending arms 28 forming bearings for axle 29 upon which is a guide roller 30. The element 26 is slotted as at 35 and a bolt 31 passes through the element 1 and through the slot and a clamping nut 32 is provided. It will be seen that the slot 35 follows an arc with the axis of the bolt 25 as a center, so that the frame including the members 26 and 28, along with the roller, can be swung. According to the degree of swing either to the right or left of the position shown in Figure 1, the direction and range of travel of the device as a whole over the lawn can be controlled. This is an important feature of the invention.

The block 12 is provided with a passage 40 and with this passage communicates a pipe 41 which extends lengthwise of the element 1 and is suitably secured at its opposite end as at 42 to the frame 1. A hose suitably coupled as at 43 with the pipe 41 supplies water. The element 41 is connected to the block in any suitable manner such as by threading. Screwed into the passage 40 at its upper end, see Figure 4, is a nipple 45 held in position by a lock nut 46. Threaded into the upper end of this nipple is a tubular extension 47 threaded exteriorly at 48. The axis of this extension and of the shaft are symmetrically arranged at opposite sides of the axle 4. The upper end of this extension is closed as at 49 but has perforations or openings 50 as shown. A centering piece 51 has threads engaged with threads 48, and also has openings 55 in opposed relation to the openings 50 so that water can be delivered through the two sets of openings outwardly. Suitable wrench holes 56 are provided at the top of the centering element. The head 19, as before mentioned, is provided with the internal gear 18 and is extended above and below the circular portion 19 respectively as at 60—61 to provide a comparatively elongated cylindrical chamber. The bottom of this chamber has an opening 62, and is threaded interiorly as at 63 adjacent its upper end to receive the closure element 64 which is thus adjustably and removably arranged.

The pipe 47 extends loosely through the opening 62 into the socket. Packing 65 is arranged in the bottom of the chamber around the pipe 47 adjacent its point of entry through the bottom of the chamber. Superposed upon this packing is a ball bearing composed of upper and lower plate elements 66 and ball elements 67 interposed between the plates. The plate elements are loosely arranged and the uppermost plate element lies immediately adjacent the lower face of the cap 51 but is spaced therefrom when there is no water pressure. The whole bearing is arranged to automatically adjust itself and rise when the water is introduced. The cap 64 is provided with a boss 70 of relative small lower surface area, which is adapted to engage the upper surface of the element 51 to limit downward movement of the head. Circular bosses 71 and 72 are provided respectively in upper and lower wall portions of the chamber and provide relatively small surface areas engageable with the surface of the element 51 to center the head. Spray pipes 75 are arranged radially in the head as shown, the outer ends being turned as at 76 to form sprinkler nozzles, and the said pipes being also perforated for the same purpose. The elements 75 are suitably threaded into corresponding radial openings of the head.

It will be understood that when pressure is applied, water flows through the openings 50—55 and outwardly through the element 75. The pressure, under this condition, slightly raises the head so that the boss 70 will not engage the upper surface of the element 51 as it does when pressure ceases. As the head rises, the upper plate of the bearing will engage the bottom of the element 51, and pressure will be applied to packing 65. The spaces between the element 51 and the bore or socket will be filled with water under pressure when the device is operating. The arrangement of the ball bearings as well as the other associated elements of the head are all features of the invention.

In assembly the head is first placed over the pipe 47 with the pipe passing through the opening 62. The packing is then placed, and one of the ball plates introduced, then the balls and then the other ball plate. The element 51 is then screwed into place, and adjusted, a slight space being provided interiorly as shown in Figure 4, between the upper surface of the upper ball plate and the lower surface of the element 51. The closure element 64 is then connected and adjusted to draw the head upwardly, to obtain the proper clearance between the lower surface of element 51 and upper surface of the upper bearing ring. Under pressure, the head will rise slightly as before stated, so that the bearing becomes effective.

I claim as my invention:

1. A device of the class described comprising a frame, an axle journaled thereon, traction rollers upon the axle arranged to be driven thereby, a vertical shaft arranged between the rollers and journaled in the frame and extending thereabove and having a two-

gear drive connection with the axle at a point between the rollers, a water supply pipe extending vertically above the frame, adjacent the shaft, a sprayer head rotatable upon the pipe and having a gear, and radial spray pipes in communication with the pipe, a pinion splined to the shaft to mesh with said head gear and arranged to move from mesh by gravity, and adjustable means for holding the pinion in meshed relation and movable to release the pinion for travel by gravity to unmeshed position.

2. A device of the class described comprising a frame, an axle mounted in the frame, traction rollers upon the axle adapted to be driven thereby, a sprinkler head rotatably mounted upon the frame and having a gear, a shaft rotatable in the frame and having a driving connection with the axle, a pinion splined to the shaft and adapted when in one position to mesh with the head-gear and arranged to drop out of mesh with said gear, and means for holding the pinion in meshing position said means movable to release the pinion.

3. A device of the class described comprising a frame, an axle journaled thereon, traction rolls upon the axle arranged to be driven thereby, a shaft journaled in the frame and extending thereabove and having a gear drive connection with said axle, a water supply pipe extending above the frame, a spray head rotatable upon the pipe and having a gear, and radial spray pipes in communication with the supply pipe, a pinion splined to the shaft to mesh with said head-gear and arranged to move from mesh by gravity, and means for holding the pinion in meshed relation movable to release the pinion for travel by gravity to unmeshed position.

4. A device of the class described comprising a frame, an axle journaled thereon, traction rolls upon the axle arranged to be driven thereby, a shaft journaled in the frame and extending thereabove and having a gear drive connection with said axle, a water supply pipe extending above the frame, a spray head rotatable upon the pipe and having a gear, and radial spray pipes in communication with the supply pipe, a pinion splined to the shaft to mesh with said head-gear and arranged to move from mesh by gravity and means for holding the pinion in meshed relation movable to release the pinion for travel by gravity to unmeshed position, the rotative axes of the head and drive shaft being adjacent the axle and substantially symmetrically respectively arranged at front and rear sides thereof.

5. A device of the class described including a vertically arranged water supply pipe, and a centering cap surrounding and adjustable upon the pipe, a sprinkler head having radial spray tubes and a chamber having an opening in its bottom traversed by said supply pipe, said chamber enclosing the centering cap and a portion of said pipe, an element adjustably and removably arranged to close the upper end of the chamber and capable of engagement with the centering cap to limit downward movement of the head, packing arranged at the bottom of the chamber around the pipe at a point of entry into the chamber, and an anti-friction bearing arranged upon the packing and movable with respect to the walls of the chamber and supply pipe, and engageable with the under surface of the centering cap when water is admitted under pressure, said pipe and centering cap having openings establishing communication between the supply pipe and said spray tubes.

6. A device of the class described including a vertically arranged water supply pipe and a centering cap surrounding and adjustable upon the pipe, a sprinkler head having radial spray tubes and a chamber having an opening in its bottom traversed by said supply pipe, said chamber enclosing the centering cap and a portion of said pipe, and having an annular projection of relatively small surface area engageable with said cap to rotatably center the head, an element adjustably and removably arranged to close the upper end of the chamber and capable only of a small surface engagement with the centering cap to limit downward movement of the head, packing arranged at the bottom of the chamber around the pipe at a point of entry into the chamber and an anti-friction bearing arranged upon the packing and movable with respect to the walls of the chamber and of the supply pipe and engageable with the under surface of the centering cap when water is admitted under pressure, said pipe and centering cap having openings establishing communication between the supply pipe and said spray tubes.

7. A device of the class described comprising a frame, an axle journaled thereon, traction rollers fixed to the axle arranged to be driven thereby, a vertical shaft extending above the frame and having a driving connection with the axle, a water supply pipe extending vertically above the frame immediately adjacent the shaft, a sprayer head rotatable upon and in communication with the pipe and having a gear, a pinion splined to the shaft and in mesh with said head gear and lying between the top of the frame and the gear-carrying portion of the head, said head and gear being detachable by movement in a vertical direction, and means for holding the pinion in meshed relation, said means movable to release the pinion, and said pinion being capable of gravity movement sufficient to unmesh it.

8. A device of the class described comprising a frame, an axle journaled thereon, trac-

tion wheels fixed to the axle, a shaft journaled in the frame and extending thereabove, and having a driving connection with the axle, a water supply pipe also extending above the frame at a point adjacent the shaft, a spraying head rotatable upon the pipe and having a gear, a pinion splined to that portion of the shaft which projects above the frame, and arranged to mesh with the head gear, the rotative axes of head and drive shaft being adjacent the axle and substantially symmetrically respectively arranged at front and rear sides thereof.

9. A device of the class described comprising a frame, an axle journaled thereon, traction wheels fixed to the axle, a shaft journaled in the frame and extending thereabove, and having a driving connection with the axle, a water supply pipe also extending above the frame at a point adjacent the shaft, a spraying head rotatable upon the pipe and having a gear, a pinion splined to that portion of the shaft which projects above the frame, and arranged to mesh with the head gear, the rotative axes of head and drive shaft being adjacent the axle and substantially symmetrically respectively arranged at front and rear sides thereof, and adjustable steering means including a roller, placed at that side of the traction axle oposite the driving shaft.

10. A device of the class described including a vertically arranged water supply pipe, a centering cap surrounding and adjustable upon the pipe, a sprinkler head having radial spray tubes surrounding the centering cap and enclosing a portion of the pipe below the cap, an element adjustably removably arranged to close the upper end of the sprinkler head and capable of engagement with the centering cap to limit downward movement of the head, and a bearing arranged within the head below the centering cap in a manner to limit upward movement of the head, said pipe centering cap having openings establishing communication with the spray tubes.

It witness whereof, I have hereunto set my hand this 23rd day of April, 1928.

RALPH S. BLITZ.