

E. A. MATHERS.
SPRINKLING APPARATUS.

APPLICATION FILED JAN. 19, 1907. RENEWED FEB. 18, 1913.

1,068,797.

Patented July 29, 1913.

2 SHEETS-SHEET 1.

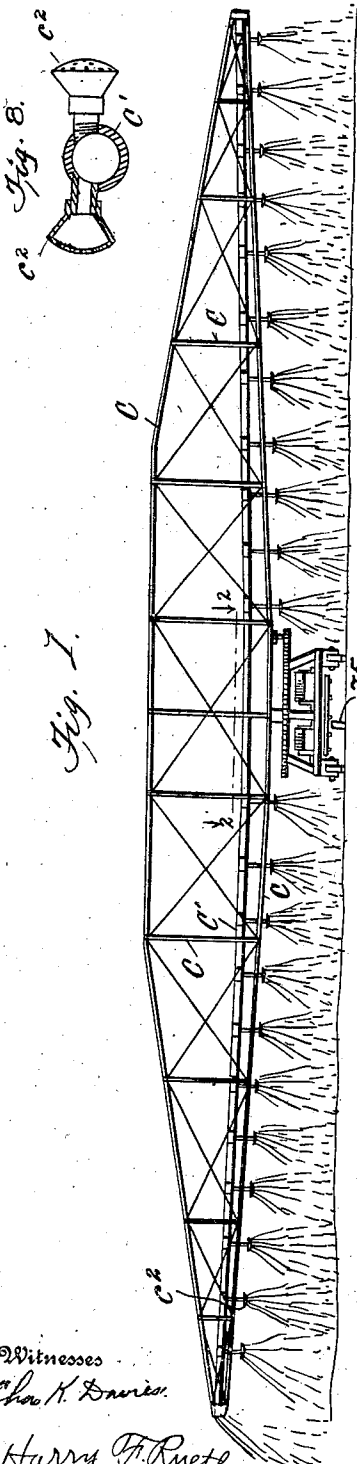


Fig. 1.

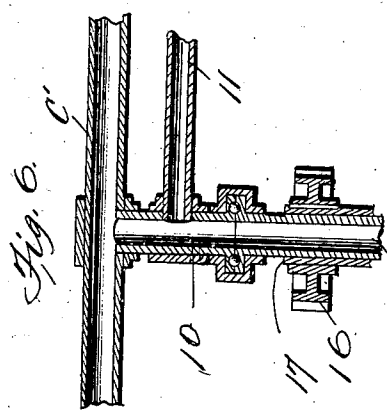


Fig. 6.

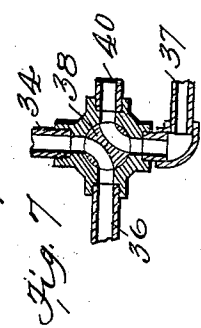


Fig. 7.

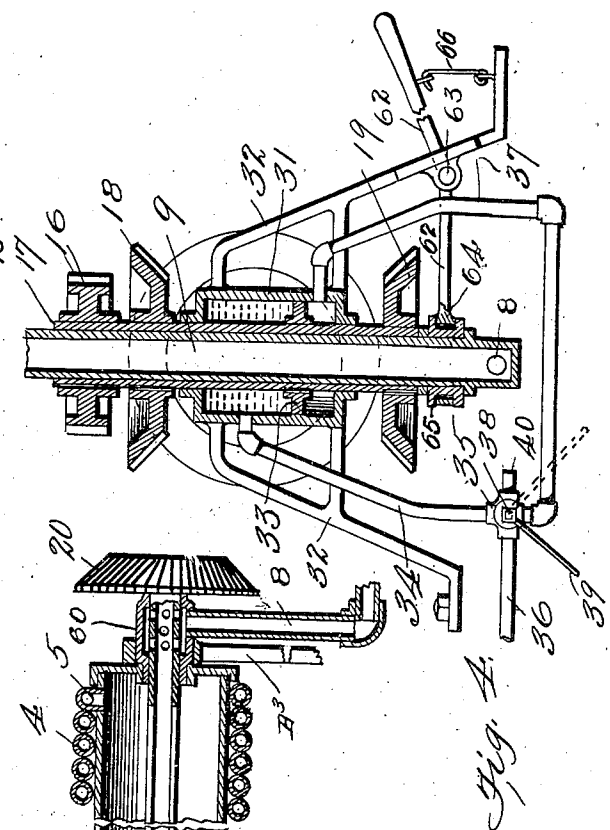


Fig. 4.

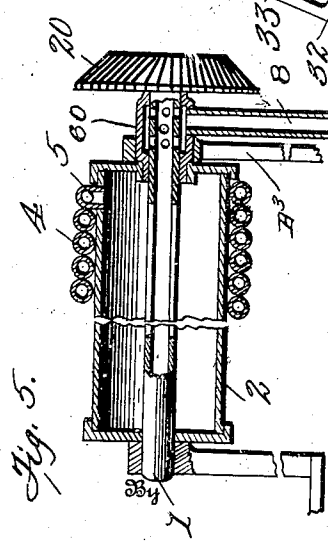


Fig. 5.

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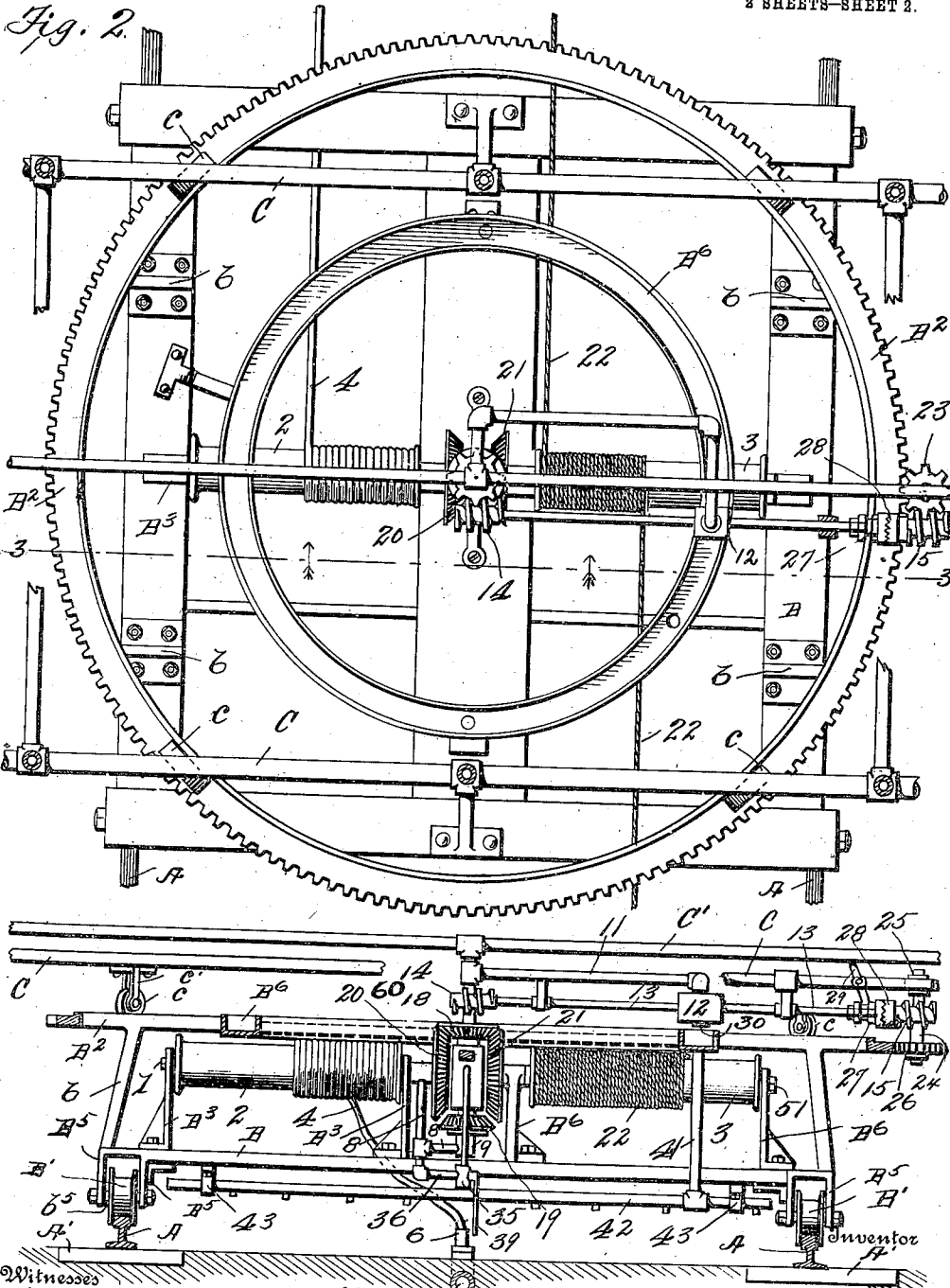
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2 SHEETS-SHEET 2.



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Fig. 3.

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SPRINKLING APPARATUS.

1,068,797.

Specification of Letters Patent.

Patented July 29, 1913.

Application filed January 19, 1907, Serial No. 353,162. Renewed February 18, 1913. Serial No. 749,282.

To all whom it may concern:

Be it known that I, EZRA A. MATHERS, a citizen of the United States, residing at Greensburg, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Sprinkling Apparatus, of which the following is a specification.

My said invention consists in providing a traveling irrigating structure or sprinkler, capable of automatic operation and of covering a wide area, and adapted to sprinkle the ground covered in a thorough and complete manner, resembling natural rain, all as will hereinafter be more fully described and claimed.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a side elevation of a structure embodying my said invention. Fig. 2, a view of the top of the central portion thereof on an enlarged scale as seen when looking downwardly from the dotted line 2—2 in Fig. 1. Fig. 3, a cross section as seen when looking in the direction indicated by the arrows from the dotted line 3—3 in Fig. 2, and Figs. 4, 5, 6, 7, and 8, detail sectional views showing the separate parts of the apparatus, on an enlarged scale, Fig. 8 showing a modified form of the sprinkler head.

In said drawings the portions marked A represent the rails forming the track on which the apparatus is adapted to run, B the frame work of the truck, and C the frame work of the sprinkler carrying arm. The track may be any suitable track for the purpose, preferably composed of old railroad rails A mounted upon bed plates or sleepers A'. The truck frame B is of suitable form to support the various parts of the mechanism preferably composed of iron beams, bars, and plates, secured together in appropriate manner, and has wheels B' mounted on axles b' supported in suitable housings B⁵ formed or secured on said frame, said wheels being adapted to rest and run upon the rails A of the track. The top B² of said frame is circular in form and has gear teeth formed in its outer edge. It is supported from the main frame by posts b and has a top surface adapted to serve as a turn table or track for the frame C. Said frame C is preferably composed of pipes and rods or angles and T-iron, suitably con-

nected to form the support for the sprinkling pipe C', and is of the length desired. It is provided with wheels c mounted on suitable axles supported in brackets c' secured to the underside of said frame C. Said wheels rest and are adapted to travel upon the top B² of the frame B. The sprinkling pipe C' is carried upon said frame C and provided with numerous sprinkling heads c² as shown. Said sprinkling heads c² are preferably of the form shown in Fig. 8, and are by reason of this particular arrangement adapted to discharge the water outward so that it will fall upon the ground by its own weight only and not be driven down by the pressure in the pipe, which would tend to pack the surface. By having the transverse pipes of the head c² jointed to pipe C' near its top, as shown, the sediment, if any, is allowed to pass along to the end of pipe C' and be discharged through larger openings, without any danger of clogging said heads.

A shaft 1 is journaled in suitable bearings on standards B³ mounted on the truck frame B and extends across one side of said truck frame at right angles with its axis. A hollow spool 2 is mounted upon one end of said shaft and carries a hose 4 which is connected at one end to a fitting 5 communicating with the interior of said spool 2, and at its other end is connected with a fitting 6 on a water pipe or main 7, which may be laid underground between the rails of the track, as shown in Fig. 3, or on the top of the ground, as preferred. Said shaft 1 is hollow, and at a point within the cylinder 2 is formed with slots in its sides, and at its outer end, within the bearing box 60 on the top of standards B³, it is formed with perforations. A pipe 8 is connected with said box 60 and leads to the lower end of a hollow vertical shaft 9 which is connected by a ball and socket joint with a short vertical pipe 10 extending down from the center of the sprinkler pipe C'. A branch pipe 11 is also connected with said pipe 10 and leads horizontally to a water-motor 12 which is carried from suitable supports on the frame C. A shaft 13 runs in each direction from said water motor and is driven thereby and has a worm 14 on its inner end and a worm 15 on its outer end. Said worm 14 meshes with a gear 16 mounted on a sleeve 17 surrounding the central shaft 9. Said sleeve 17 also has beveled gears 18 and 19 arranged a distance

apart adapted to mesh alternately with gear wheels 20 and 21 on the shafts 1 and 51. Worm 15 meshes with a gear 23 on a short vertical shaft 24 which is mounted in a bearing 25 on a part of the frame C. On the lower end of said shaft 24 is a gear 26 which meshes with the teeth in the periphery of the ring B². Said worm 15 is preferably mounted loosely on said shaft 13 and connected thereto by means of a clutch 27 which is connected with said shaft 13 by means of a spline and adapted to be slid into and out of engagement with a clutch part 28 on the end of said worm by means of a shifting fork 29 pivoted on the frame C.

Shaft 51 is mounted in line with shaft 1 in bearings in the top of standards B¹ mounted on frame B on the opposite side of its axis from standards B³. Said shaft 51 has a spool 3 mounted thereon around which a cable 22 is wound as shown most plainly in Fig. 2; one end extending in one direction and the other end in the other direction in line with track A, the two ends extending to a point at the opposite ends of the track where they are secured to posts or other stationary devices. A circular trough B¹ is supported from the frame B in substantially the same plane with the circular track or plate B² in position to receive the discharge of the waste pipe 30 of the water-motor 12.

The shafts 1 and 51 are journaled in true line with each other, and their axis at right angles with the axis of the vertical shaft 9. The miter gear wheels 20 and 21 on the adjacent ends of said shafts 1 and 51 are in position to mesh with either the miter gear wheel 18 on the upper end of sleeve 17, or the similar gear wheel 19 on its lower end according to whichever one is thrown into engagement. A cylinder 31 is mounted centrally on the frame B, supported by brackets 32 from said frame, and contains the sleeve 17 which is mounted to have a vertical movement in the cylinder. A piston 33 is mounted rigidly on the sleeve 17, and adapted to move therewith. A branch pipe 34 leads from the upper end of said cylinder 31 above piston 33 to the casing of a three way valve 35 which is connected by a pipe 36 with a downwardly extending branch or pipe 8. Another pipe 37 leads from the lower end of said cylinder 31 at a point below piston 33 to said valve casing 35. Said valve casing 35 is provided with a valve 38, on the stem of which is mounted an operating lever 39. A waste pipe 40 leads from said valve casing.

In operation, the apparatus being in the position shown in the drawings, mounted upon the track, and with the parts connected, and the ends of the cable 22 secured at each end of the track, the water under pressure in the main 7 being turned into the hose

4 soon fills the cylinder 2 with water under the same pressure as in the main 7, which flows through the slots in the central portions of the hollow shaft 1, then through the perforations in its inner end into pipe 8 and through pipe 8 into the vertical hollow shaft 9, and from thence through the branch 10, into the long sprinkling pipe C', carried on the frame C, and also through the pipe 11 to the water motor 12. The pressure of the water flowing through said motor drives shaft 13, through which the worm 14 on its inner end drives the gear 16 and the sleeve 17 carrying the gears 18 and 19; the gear 18 being in mesh with the gears 20 and 21 as shown in Fig. 3, will operate to drive shafts 1 and 51, and revolve the cylinders 2 and 3 thereon. Cylinder 3 being revolved will operate through the cable 22, which is made fast at each end of the track, to pull the car or truck carrying the structure in one direction, the cable being wound upon cylinder 3 in one direction and payed out in the other direction. The gears being of the same size, as well as the cylinders 2 and 3, the hose 4 will be either wound upon cylinder 2 or payed out therefrom with the same speed, as the cable 22. The clutch parts 27 and 28 being in engagement, the worm 15 is driven, which is in engagement with the gear 23, and thus serves to drive the shaft 24 and the gear 26 thereof. Said gear 26 being in mesh with the teeth on the circumference of the circular track B² will serve to turn the frame slowly around upon said track or turn table B², thus giving the entire structure C, with the long sprinkling pipe carried thereby, a rotary movement around the car or truck. The water in the meantime which passes into pipe C is flowing out through the sprinkling heads c² and being distributed like natural rain over the entire surface of the ground. The water flowing through pipe 11 and water motor 12 discharges through the discharge pipe 30 into the circular trough B¹ and passes through pipe 41 downwardly into a horizontal pipe 42 which extends across between the rails A on the under side of frame B², being supported in suitable brackets 43. Said pipe 42 is perforated on its under side and the water thus flows through said perforations and serves to sprinkle the surface between the rails, which may be, and preferably are, a considerable distance apart in order that the structure may be made of sufficient width to afford a wide base for the structure C to travel upon and thus support it in a secure manner. In the meantime the valve 38 being adjusted for the water to flow through branch pipe 34 and 36 into cylinder 31 above piston 33, holds the sleeve 17 downward with the gear 18 in mesh with the gears 20 and 21. When the car reaches the end of the track, lever 39 will strike a

post 75 or other suitable part appropriately set for the purpose, and be swung from the position shown by whole lines in Fig. 4, to the position shown by dotted lines, which will close the port from pipe 36 to pipe 34 and open the port from pipe 36 to port 37, and also open a port from pipe 34, to discharge port 40, thus allowing the water under pressure to flow through pipe 37 to beneath piston 33, and the water above said piston to discharge pipe 40, serving to lift said piston 33 upwardly until gear 18 is freed from the gears 20 and 21, and the gear 19 is thrown into engagement with the lower side thereof, thus starting the shafts 1 and 51 in the reverse direction and changing the direction of the car or truck carrying the sprinkling apparatus. The motion will continue in the reverse direction until the other end of the track is reached, when lever 39 will be thrown back by striking the appropriately arranged post 75 or other suitable part and piston 33 be again shifted to throw gear 18 into mesh with gears 20 and 21 and start the car in the reverse direction again. The car thus operates to travel back and forth without attention as long as may be necessary to furnish the moisture needed for irrigating the soil as may be required. When desired the pressure may be turned off the water main 7 by a suitable valve, and the whole structure will stop. If it is desired to use the apparatus without giving it the rotary motion, clutch parts 27 and 28 are thrown out of engagement, when the frame C may be carried back and forth across the area covered in the same position as shown in Fig. 1. Should it be desired for the car to stand stationary and the structure C to revolve, thus covering only the area within the scope of its length, both gears 18 and 19 may be adjusted out of engagement with the gears 20 and 21 by lifting said sleeve 17, by means of lever 62, which is pivoted on one of the adjacent supports of cylinder 31 on a pivot 63 and has a fork 64 on its inner end which engages in a groove in a collar 65 at the lower end of said sleeve 17. Said lever may be secured by a latch 66 so that said gears will run free and not drive the shafts 1 and 51 with the cylinders thereof.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A sprinkling apparatus comprising a truck adapted to travel upon a track, a transversely extending frame-work mounted to be rotated on said truck, mechanism for rotating said frame work, a sprinkling pipe carried on said frame work, a water main located adjacent to said track, mechanism for operating said truck back and forth upon said track, a device connecting the water main with the truck-operating mechanism

and the transversely extending frame operating mechanism respectively, whereby both are operated by the water pressure, and means for controlling said mechanisms, all substantially as set forth.

2. In a sprinkling apparatus, the combination, of a truck adapted to travel upon a track, a water motor for propelling said truck carried thereon, a sprinkler mounted upon said truck, a hollow cylinder, a hose mounted on said cylinder with one end connecting with its interior and the other end adapted to be attached to a water main adjacent to the track, a pipe leading from said cylinder to the sprinkler and water motor, and gearing for revolving said cylinder as the truck moves toward and from the point of attachment to reel up and pay out said hose, substantially as set forth.

3. In a sprinkling apparatus, the combination, of a truck comprising a frame mounted on wheels, a long transverse-frame carried on said truck, a sprinkling pipe mounted on said frame, a hose for connecting the sprinkler with the water main, a reel for carrying said hose consisting of a hollow cylinder mounted in suitable bearings on the truck frame, means for propelling said truck comprising a shaft mounted in suitable bearings on said truck frame, a drum on said shaft, a cable mounted on said drum, the opposite ends of said cable being made fast at opposite ends of the track respectively, means for revolving said drum and thus drawing the truck back and forth, and means for reeling up and paying out said hose as the truck travels back and forth toward and from the point of attachment with the water main, substantially as set forth.

4. In a sprinkling apparatus, the combination, of a truck, a sprinkler mounted thereon, a central vertical hollow shaft connected with said sprinkler, a horizontal hollow shaft mounted in suitable bearings on the truck frame, a pipe leading from said horizontal shaft to the central vertical shaft, a cylinder mounted on said horizontal shaft, a hose attached at one end to communicate with said cylinder and at its other end attached to a water main, a second shaft mounted in line with and on the opposite side of the truck frame from said first horizontal shaft, a cable drum carried by said second shaft, gear wheels on the adjacent ends of said horizontal shafts, a sleeve mounted on said central vertical shaft to have a limited sliding movement, gear wheels mounted thereon adapted to engage with the gear wheels on said horizontal shafts, and means for shifting said sleeve vertically to throw one or the other of its gear wheels into mesh with the gear wheels on said horizontal shafts, a water motor, a pipe leading from the vertical shaft to said water motor, a third hori-

zontal shaft connected to be driven by said water motor, and a gear between said third horizontal shaft and a gear on said sleeve, whereby said sleeve is driven by said water motor and motion imparted to the two horizontal shafts of the truck frame carrying the hose and cable respectively, substantially as set forth.

5. In a sprinkling apparatus, the combination, of a truck, a sprinkler carried thereby comprising a pipe, a central vertical hollow shaft mounted on said truck frame and communicating at its upper end with said sprinkler pipe, a hose cylinder and a cable cylinder mounted on each side respectively of said vertical shaft and having gear wheels on their adjacent ends, a sliding sleeve mounted on said central vertical shaft and carrying a gear above and a gear below the edges of the gears of said horizontal shafts a distance apart somewhat greater than the diameter of said gears, a hollow cylinder surrounding said sleeve, a piston mounted on said sleeve within said cylinder, a pipe leading from each side of said piston to a pipe leading to the water supply, a valve casing connected to said pipes containing a valve arranged to connect either pipe with the water supply pipe and the other pipes with the waste pipe, said valve, and means at each end of the track for throwing said valve from one position to the other, whereby the water pressure is utilized to drive said apparatus back and forth, substantially as set forth.

6. In a sprinkling apparatus, the combination, of a truck, a sprinkler mounted thereon comprising a sprinkling pipe, a vertical hollow shaft mounted on said truck the upper end of which communicates with said sprinkler pipe, a hollow horizontal shaft on said truck, a hollow cylinder mounted thereon, a hose connected at one end with said

hollow cylinder and at the other end to the water main, said hollow shaft being formed with openings within said cylinder and at its inner end being perforated within the bearing box, said bearing box, a pipe running from said box to the vertical hollow shaft, a sleeve mounted on said vertical hollow shaft carrying a gear wheel at its upper end, a water motor carried by the sprinkler frame, a pipe leading from said vertical hollow shaft to said water motor, a horizontal shaft driven by said water motor and geared at one end to the gear on the upper end of said sleeve, other gear wheels on said sleeve adapted to engage with gear wheels on the shaft supporting the hose cylinder and a cable cylinder, said cable cylinder mounted on a horizontal shaft in line with the hose cylinder shaft on the opposite side of the truck frame, a cable mounted around said cylinder and attached at each end to fixed holding devices at opposite ends of the track, a cylinder surrounding the sleeve on the central shaft, a piston on said sleeve within the cylinder, a pipe leading from the cylinder on each side of said piston respectively to the water supply pipe, and means for connecting said water supply pipe with either side of said piston, whereby the hose and cable cylinders may be driven in either direction and reversed at each end of the track to traverse the truck back and forth, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Greensburg, Pa., this 27th day of December, A. D. nineteen hundred and six.

EZRA A. MATHERS. [L. s.]

Witnesses:

W. F. WEGLEY,
EDW. P. DORAN.