

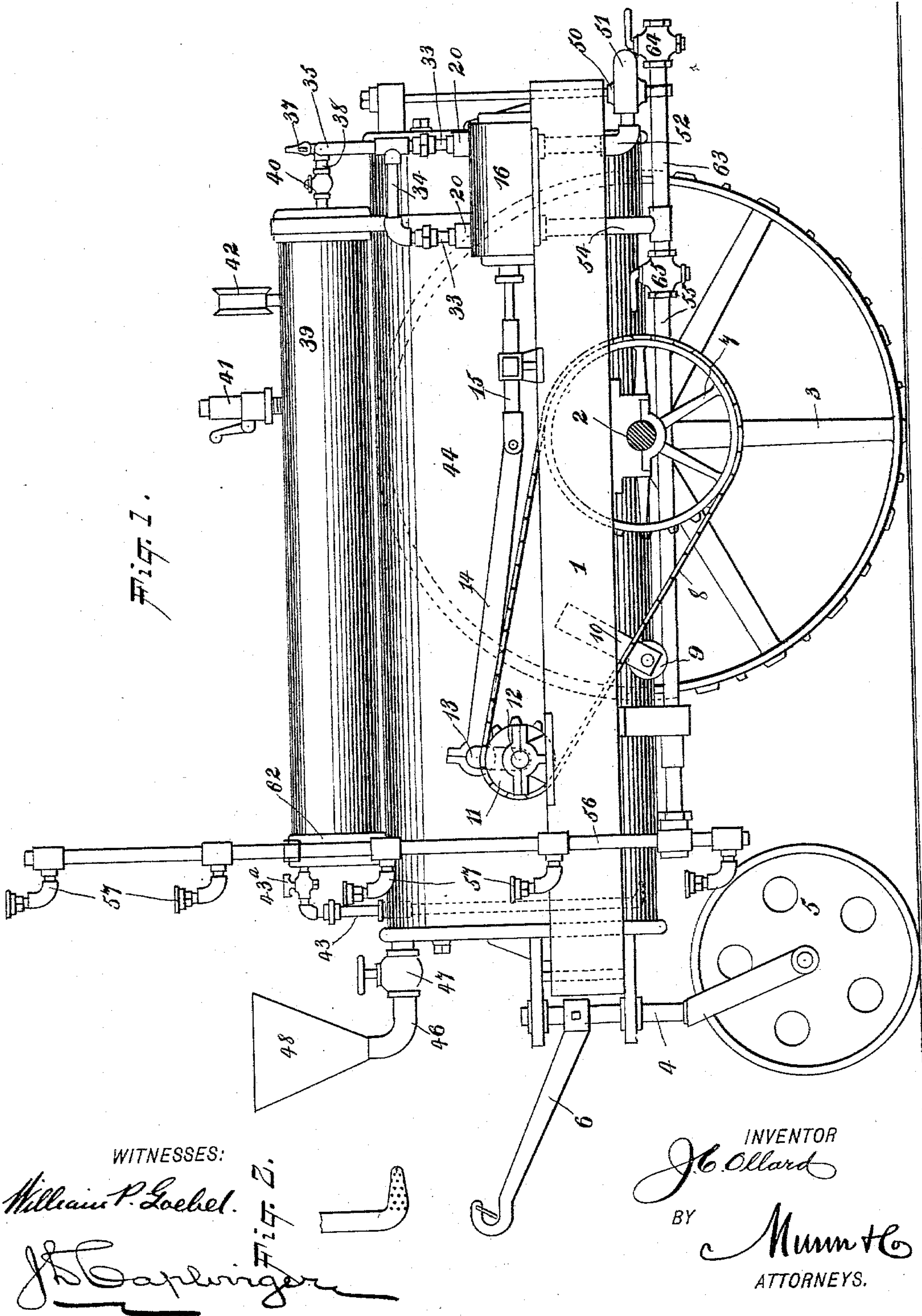
(No Model.)

2 Sheets—Sheet 1.

J. C. OLLARD.
SPRAYING APPARATUS.

No. 569,883.

Patented Oct. 20, 1896.



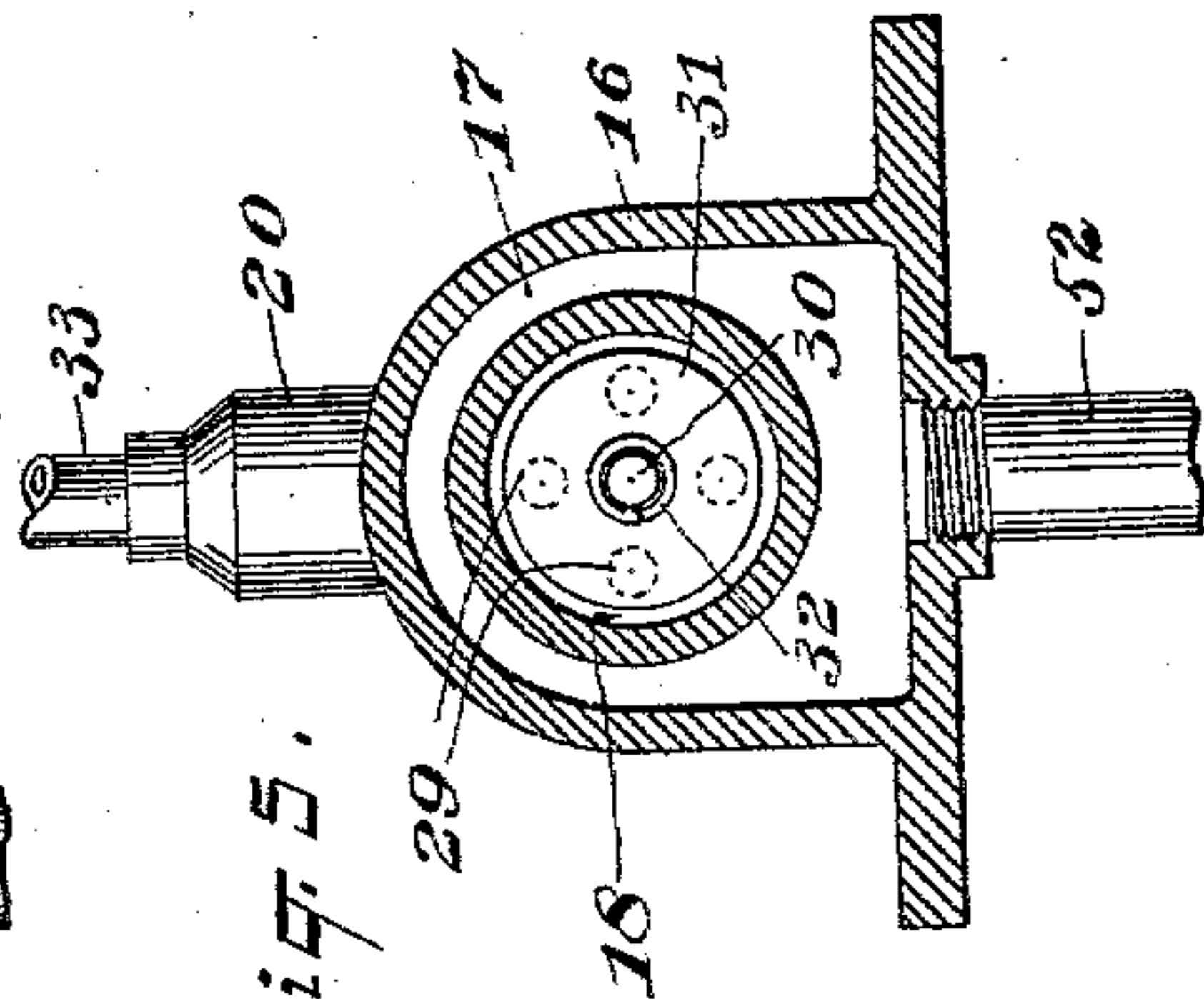
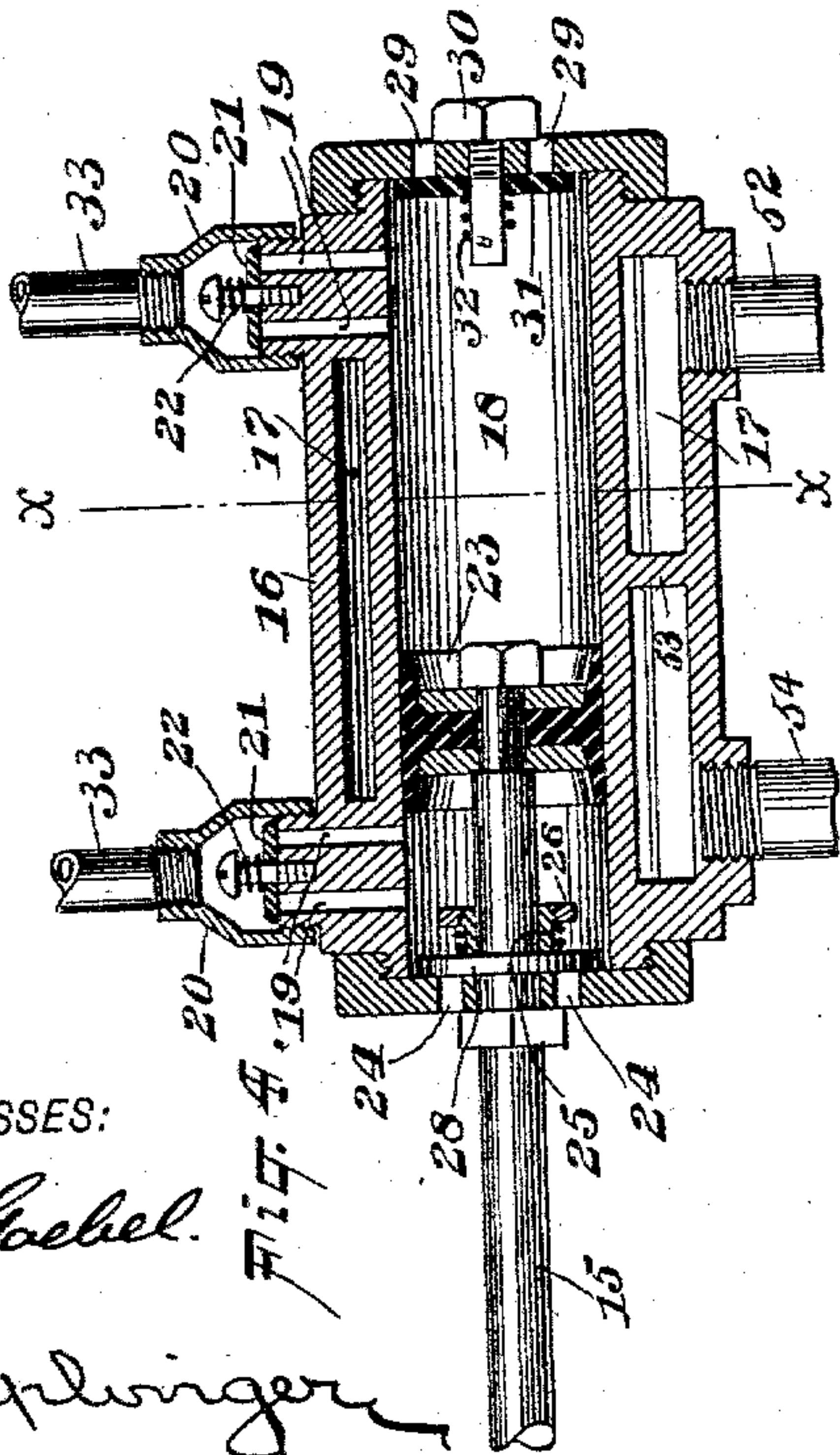
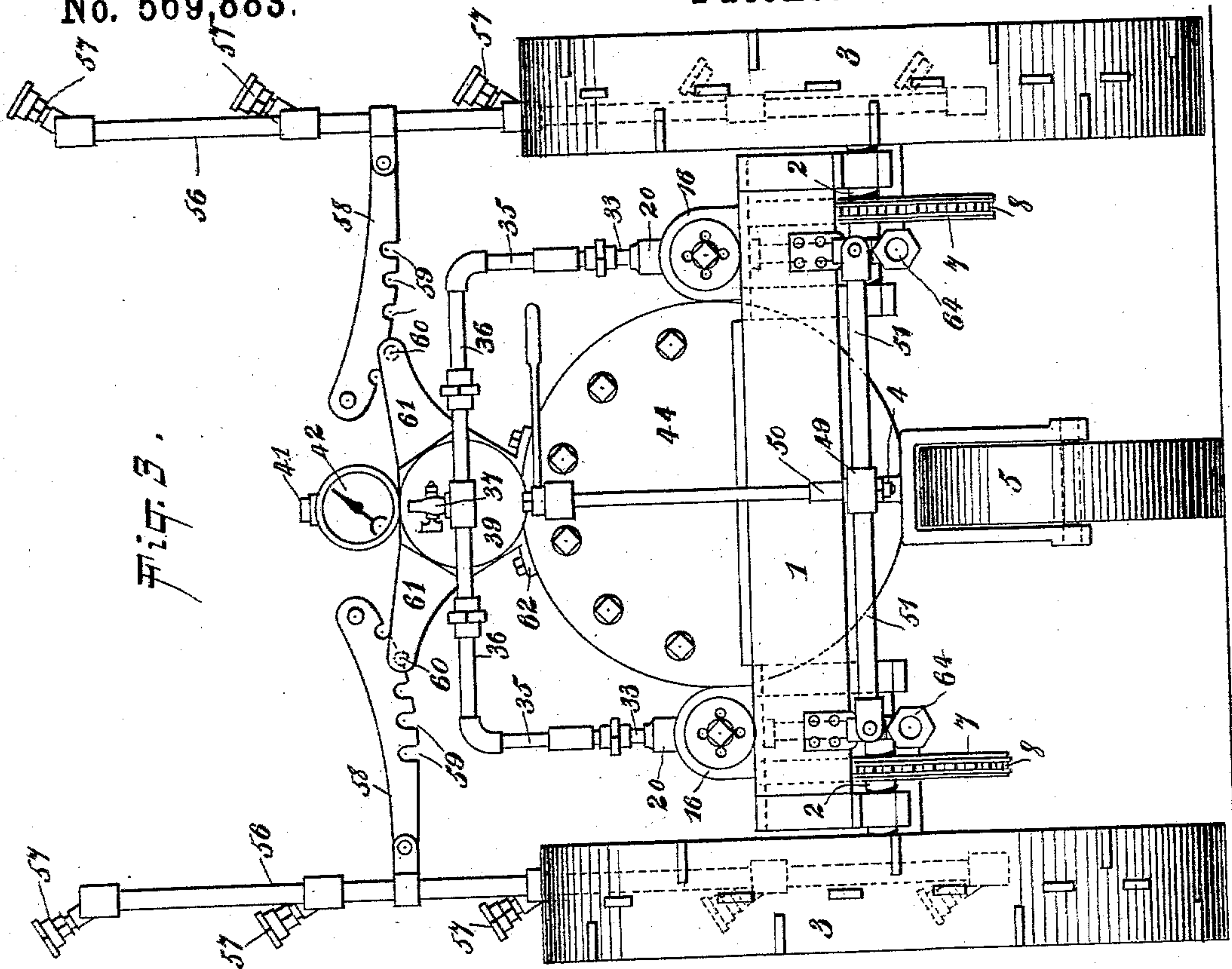
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WITNESSES:

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J. C. Ollard.

INVENTOR

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UNITED STATES PATENT OFFICE.

JAMES C. OLLARD, OF TACOMA, WASHINGTON, ASSIGNOR TO HIMSELF AND
WILLIAM J. OLLARD, OF SAME PLACE.

SPRAYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 569,883, dated October 20, 1896.

Application filed July 18, 1895. Serial No. 556,420. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. OLLARD, of Tacoma, in the county of Pierce and State of Washington, have invented a new and Improved Spraying Apparatus, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in spraying apparatus or machines such as are employed for spraying fruit-trees, vines, &c., with water or insecticide solutions; and the object of the invention is to provide a machine or apparatus of this character of a simple, effective, and inexpensive construction adapted to be drawn by horses and provided with means actuated by the movement of the machine itself for effecting the spraying.

The invention consists in the particular construction and arrangement of parts as hereinafter fully described, and pointed out in the claims.

In order that the improvements may be the better understood, I have shown in the accompanying drawings, forming a part of this specification, a spraying-machine constructed in accordance with my invention, in which drawings similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the spraying machine or apparatus. Fig. 2 is an enlarged fragmentary view showing the nipple at the end of the air-pipe leading from the air-reservoir to the liquid-reservoir. Fig. 3 is a rear end elevation of the spraying machine or apparatus. Fig. 4 is a fragmentary sectional view drawn to an enlarged scale and showing the construction of the air-pumping devices employed in carrying out the invention; and Fig. 5 is a vertical section taken at right angles to Fig. 4 in the plane indicated by the line *xx* in said figure and showing the construction of the said pumping device.

In the drawings, 1 represents the frame of the machine, which may be of any preferred or usual construction, having two short independent axles 2 2, journaled at its opposite sides and provided with ground-wheels 3 3, one of said ground-wheels being secured to each axle, as clearly seen in the drawings. At the central part of the front portion of the frame 1 is journaled an upright or vertical

shaft 4, the lower end of which is bifurcated and carries between its forks a ground-wheel 5, whereby the front end of the frame is supported, and said shaft 4 is connected at its upper end to a draft-bar 6 of suitable form, as clearly shown in Fig. 1.

The axles 2 at opposite sides of the frame are alined with each other, and each of said axles is provided with a sprocket-wheel 7, over which passes a link or chain belt 8, engaged by an idler 9, mounted on a bracket 10, adjustably secured to the frame, as clearly seen, so that said link belt may be adjusted conveniently to the required tension, and the respective link or chain belts 8 also pass over smaller sprocket-wheels 11, mounted on short shafts 12, journaled at opposite sides of frame 1 in front of and parallel to the respective axles 2, and each short shaft 12 is provided with a crank 13, to which is coupled one end of a connecting-rod 14, the rear end of which is connected to the piston-rod 15 of an air-compressing pump, there being one of said pumps at each side of frame 1 and in the rear of the respective axles 2. The said air-compressing pumps each comprise a cylinder or pump-barrel 16, formed with double walls, whereby a space or chamber 17 is formed surrounding the pump, as clearly seen in Figs. 4 and 5, the inner chamber or barrel proper, 18, of the pump being provided at opposite ends with ports 19, which extend through nipples formed exteriorly on the cylinder 16 and threaded to receive valve-casings 20, with which the said ports 19 communicate, said casings 20 being provided with valves 21, provided with springs 22, and adapted to close said ports 19 against the entry of air into the cylinder therethrough.

The piston-rod 15 extends through a central aperture formed in the end of each cylinder 16, and inside said cylinder a piston 23 of any preferred and suitable construction is arranged to play. The forward head of the cylinder 16 is provided with a series of ports 24, grouped around the central opening, through which the piston-rod passes, and inside the bore 18 of said cylinder the said forward head is provided with a tubular extension 25, having a screw-threaded inner end to receive a nut or enlargement 26, screwed

thereon and serving to retain a spiral spring 27, coiled on said extension 25 and bearing against an inlet-valve 28, arranged to close the ports 24 in the cylinder-head, as clearly shown in Fig. 4. The rear head of the cylinder 16 is also provided with a circular series of ports 29, grouped about a central screw 30, the tip of which extends into the cylinder and forms a guide whereon is carried an inlet-valve 31, arranged to close the ports 29, and normally held in its closed position by means of a spring 33, coiled on said screw 30. The valves 28 and 31 are both arranged to open inwardly to admit air to the cylinder of the air-compressing pump, and it will be evident that when the piston 23 is moved toward one end of the cylinder the air-inlet valve at that end of the cylinder will be closed and the air-outlet valve 21 at that end will be opened, and simultaneously the air-inlet valve at the other end of the cylinder will be opened and the corresponding air-outlet valve 21 will be closed.

Each valve-casing 20 at each side of the machine is provided with an outlet-pipe 33, extending above the cylinder 16, and the said pipes 33 at each side of the machine are connected together at their upper ends by a pipe 34 and connect with an air-pipe 35, which extends up vertically to about the center of the air-tank of the machine, and the pipes 35 at each side of the machine are connected together by means of a horizontal air-pipe 36, having a relief-valve 37 at its central portion, where it connects with an air-pipe 38, extending into the central part of the rear head of the cylindrical air tank or reservoir 39, and is provided with an automatic check-valve 40, the said compressed-air tank or reservoir 39 being also provided with a relief or safety valve 41 and with a pressure-gage 42, as clearly seen in the drawings.

The compressed-air tank or reservoir 39 is provided at its front end with an air-outlet pipe 43, controlled by a stop-cock 43^a, which extends through the upper part of the liquid tank or reservoir 44 at the front end thereof and extends almost to the bottom thereof, as seen in dotted lines in Fig. 1, being provided with a bent end 45, (see Fig. 2,) provided with a series of fine perforations adapted to admit the air in the form of fine jets below the liquid-level of the solution or water in said reservoir 44, so as to insure the thorough mixing or agitation of the same, as will be readily understood. The tank or reservoir 44 is also of general cylindrical form, being made of suitable strength and dimensions to adapt it for the purpose, and said tank 44 is located immediately beneath the compressed-air tank or reservoir 39, being at the center of the frame 1 of the machine, along which both tanks extend longitudinally, and said liquid tank or reservoir 44 is provided at the upper part of its front end with an inlet-pipe 46, provided with a valve 47, and having an expanded mouth 48, whereby said tank may

be supplied with the liquids and other materials for spraying the plants.

At the base of the rear end of the tank or reservoir 44 is provided a liquid-outlet pipe 49, having a cock 50, and having a small fine brass-wire strainer inserted between said outlet-pipe 49 and stop-cock 50, and connected at its extremity by means of branch pipes 51 with short pipes 52, which connect with the rear ends of the chambers 17, between the walls of the respective cylinders 16 at opposite sides of the machine, said chambers being provided with transverse partitions 53 at their lower parts, where said pipes 52 open thereinto, and the forward ends of said chambers 17 communicate with other pipes, 54, arranged on the opposite sides of partitions 53 to pipes 52, whereby the liquid discharged from the reservoir 44 by way of the outlet-pipe 49 is caused to circulate in the chambers 17 of the air-compressing pumps, so as to absorb the heat generated by the compression of the air in said pumps, whereby the cylinders are kept cool.

The ends of the pipes 54 connect with discharge-pipes 55, which extend longitudinally along the opposite sides of the machine, being held in brackets or hangers on the sides of the frame 1, and in the forward ends of the discharge-pipes 55 are swiveled upwardly-extending spraying-pipes 56, one on each side of the machine, said spraying-pipes being provided with suitably-located spray-nozzles 57, of any preferred construction, and having arms 58, pivotally secured to their inner sides and provided with recesses or notches 59, formed in their under sides to be engaged by studs or pins 60, formed on the end of arms 61, mounted on a bracket 62, which serves as a support for the forward end of the air-compressing tank or reservoir 39.

The rear ends of the discharge-pipes 55 are made to extend beyond the pipes 54 to the rear end of the machine-frame, as seen at 63 in Fig. 1, where they are provided with a stop-cock 64, adapted to be connected to a hand-hose, and said discharge-pipes 55 are provided with cocks 65, located between the pipes 54 and spraying-pipes 56, so that when the hand-hose is used for spraying the supply of liquid may be cut off from one or both of the spraying-pipes 56.

In operation the movement of the ground-wheels is transmitted through the gearing to the crank-shafts and piston-rods 15 of the air-compressing pumps, causing the pistons 23 to reciprocate in the cylinders 16 and force air into the compressed-air reservoir 39, and when a sufficient pressure has been produced in said reservoir the cock 43^a is opened to permit a current of air to be sprayed through the pipe 43 into the liquid tank or reservoir 44, so as to agitate the liquid therein thoroughly. When it is desired to spray the growing plants, trees, &c., the cocks 50 and 65 are opened, so that the liquid is forced from the liquid tank or reservoir 44 under the air-pressure through

the pipes 49 51 52, the chambers 17 of cylinders 16 of the pumping devices through which it circulates, and the pipes 54, 55, and 56 to the spray-nozzles 57, from which it is discharged in the form of spray upon the plants, as will be readily understood from the drawings.

The valve 50 is so arranged and situated that by its manipulation an important economy is effected in the insecticide solution, since by its use the spraying can be instantaneously stopped when the machine passes out of range of the vines or trees and no matter how short may be the space between the vines, &c. This has heretofore been an element of very considerable waste.

The spraying-pipes 56 being provided with adjustable supporting devices, as above set forth, may evidently be set at any desired inclination to one another in order to effect the spraying, and when it is desired to spray the liquid in places which it is not possible to reach by means of the said spraying-pipes hand-hose may be connected to the respective stop-cocks 64 and the spray directed by hand. By this arrangement of the parts it is possible to bring the spraying devices to bear on all parts of the trees, vines, &c., to be sprayed, and that in a convenient manner. This feature of my invention permits the spraying of small plants or fruits by hand, or of affected parts without the necessity of employing the main spraying pipes and nozzles, whereby a further economy is effected in the use of the solution. By means of the hand-hose the spray can be directed at any desired part of a tree or vine, so as to thoroughly spray that part without wasting any of the water or solution.

The construction of the spraying apparatus as above described is extremely simple and convenient and renders the device especially effective for use, since the air is compressed continuously while the machine is in motion, and the pressure thus stored up is employed for forcing or spraying the liquid from its reservoir when the machine is at rest as well as in motion. The relief-valve in the pipe 36 permits one or both of the air-compressing devices to be placed out of service when required.

It will be evident from the above descrip-

tion of my improved spraying-machine that some modification may be made in the construction thereof and in the form and arrangement of the various parts without material departure from the principles of the invention, and for this reason I do not wish to be understood as limiting myself to the precise construction herein set forth.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a spraying apparatus, the combination of a frame, a liquid-tank extending longitudinally along the central part thereof, discharge-pipes extending longitudinally of the frame on opposite sides of the liquid-tank, and connected thereto, means for forcing the liquid from the liquid-tank through the discharge-pipes, spraying-pipes swiveled on said discharge-pipes and arranged to swing laterally of the frame toward and from each other, a bracket mounted on the liquid-tank with its ends extending in opposite directions from the sides thereof, and notched arms pivotally connected to the spraying-pipes and having their notches arranged to engage the projecting ends of said bracket, substantially as set forth.

2. In a spraying apparatus, the combination of a frame, a liquid-tank extending longitudinally along the central part thereof, discharge-pipes extending on the frame at opposite sides of said liquid-tank and connected thereto, a bracket held on the upper part of the liquid-tank, an air-tank supported by said bracket and also extending longitudinally of the frame above the liquid-tank arms on said bracket projecting on opposite sides of the air-tank, a connection between the air and liquid tanks, spraying-pipes swiveled on the discharge-pipes and arranged to swing laterally of the frame, and arms pivotally connected at their outer ends to the spraying-pipes and having their inner ends adapted for adjustable connection to the projecting arms of the bracket on the liquid-tank, substantially as set forth.

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Witnesses:

F. S. BLATTNER,
F. A. HUFFER.