

F. C. THOMPSON.
PUMP.
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1,028,401.

Patented June 4, 1912.

2 SHEETS—SHEET 1.

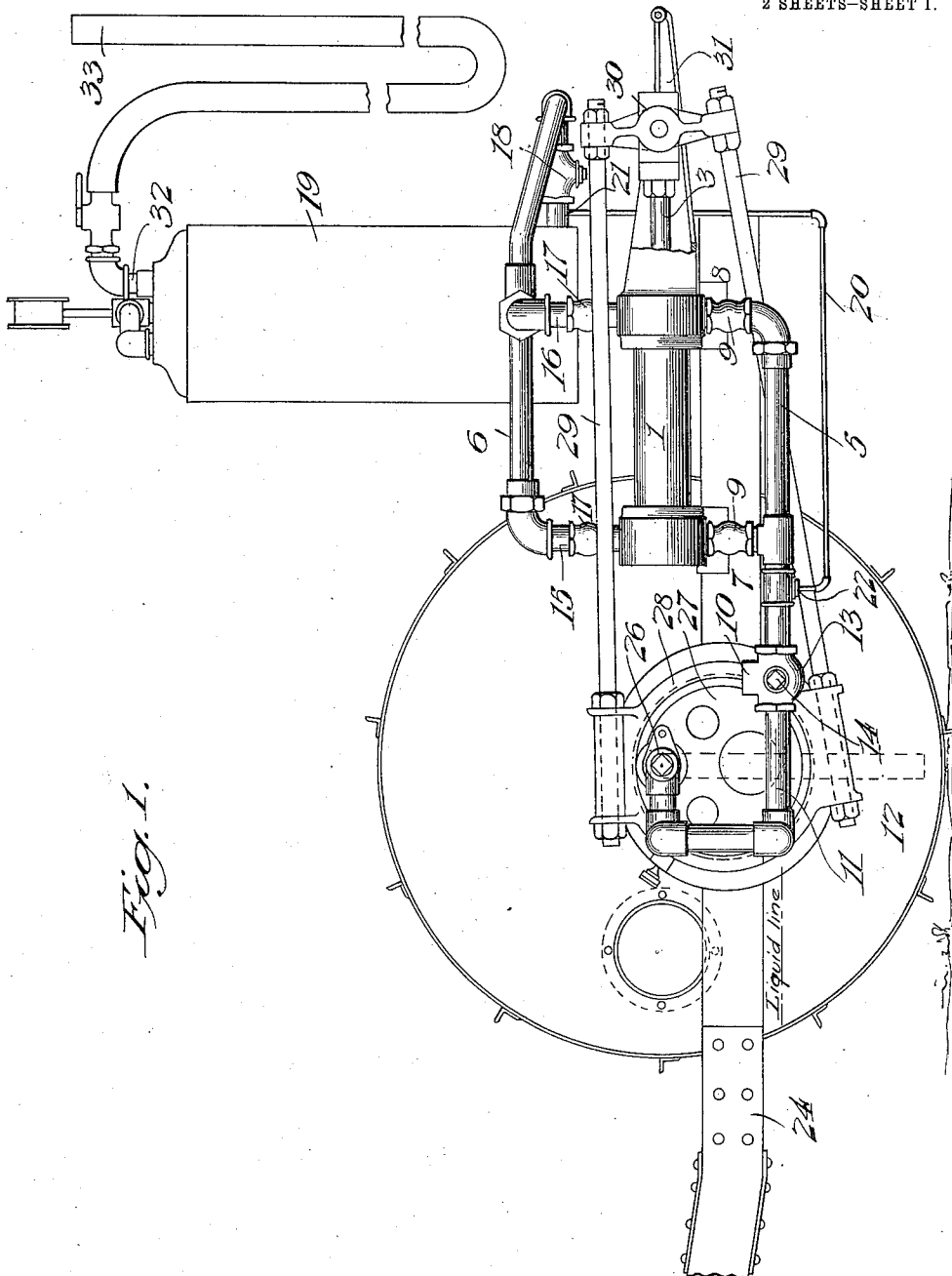


Fig. 1.

WITNESSES

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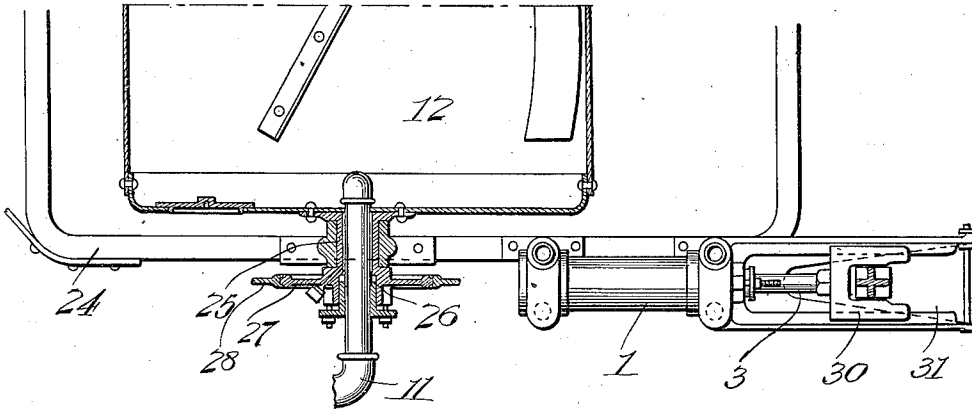


Fig. 2.

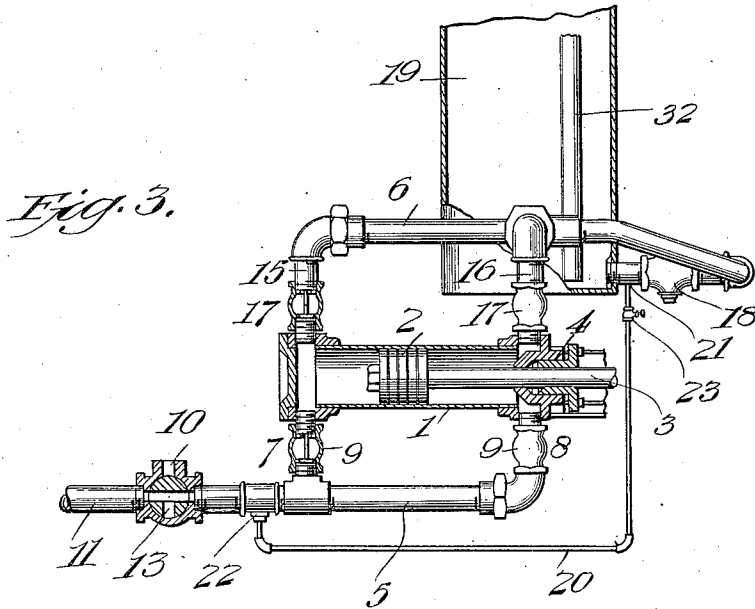


Fig. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

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PUMP.

1,028,401.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRED C. THOMPSON, a citizen of the United States, residing at Granger, in the county of Yakima and State of Washington, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

This invention relates to an improvement in pumps, and more particularly to a novel and practical construction of pump which provides means for pumping both liquid and air.

To this end the invention primarily has in view an improvement in pumps or pumping apparatus which renders it possible to successfully pump and store air under pressure by means of a pump which is ordinarily employed for pumping liquids. In this connection, a special object of the invention is to provide a pump wherein the various elements thereof are so arranged and combined as to admit of the pumping and storing of air under pressure in a suitable container or reservoir, and then, by means of the same instrumentalities, to pump a liquid into the same container or reservoir against the air pressure, thus performing in a reliable and effectual manner the dual function of a liquid pump and an air pump.

A distinctive and practical object of the invention is to provide means whereby a modicum of the liquid in the pressure container or reservoir is automatically fed to and circulated through the pump proper while pumping air, thus keeping the clearance in the pump full of water and the valves water-sealed, with the result of discharging all the air from the pump cylinder at every stroke of the piston.

Another and more general object of the invention is to provide a pump of the character referred to, which possesses special utility in its application to an orchard spraying machine, whereby a quantity of the liquid to be sprayed may readily and conveniently be kept in storage, and at the same time under suitable pressure for immediate expulsion and use under air pressure.

With these and other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

The essential features of the invention are

necessarily susceptible to structural modification without departing from the principle or scope thereof, but a preferred and practical embodiment thereof is shown in the accompanying drawings, in which—

Figure 1 is a side elevation partly in section of a pump constructed in accordance with the present invention, the view illustrating the application of this pump to an orchard spraying machine. Fig. 2 is a detail sectional view showing more plainly the fitting of the suction terminal of the feed pipe to the liquid supply reservoir, which, in the application of the invention shown, is provided for by the rolling tank of the spraying machine. Fig. 3 is a detail sectional view of the pump proper, showing more plainly the valve and pipe arrangement.

Like references designate corresponding parts in the several figures of the drawing.

The invention forming the subject-matter of this application primarily consists of a pump or pumping apparatus comprising in its general organization a working cylinder or barrel 1, a reciprocating piston or plunger 2 operating within the cylinder or barrel, and an improved piping arrangement comprising means for carrying out the operations of pumping and storing air under pressure, and also of pumping liquid into a suitable container or reservoir against the air pressure.

According to the present invention, and in the form of pump illustrated, the pump piston 2 is carried at the inner end of a piston rod 3, working through the combined guide and stuffing box 4, fitted to one end of the cylinder and having suitable operating connections with an actuating means as will be more particularly pointed out. In addition to the usual cylinder and piston, the pump includes as a part of the working elements thereof a feed pipe 5 and a discharge pipe 6, respectively employed for feeding and exhausting the pump cylinder of the liquid or air which is being pumped thereby. The feed pump 5 is branched so as to communicate with both ends of the pump cylinder, this branching simply consisting of pump inlet connections 7 and 8 which are respectively fitted to the opposite end portions of the pump cylinder, and each of which is equipped with a suitable check valve 9 which permits the entry of liquid or air into the pump cylinder, and which close

in a direction to prevent the back flow or return thereof into the feed pipe proper (5).

As hereinbefore pointed out, there are intended to be two sources of supply for the pump; that is to say, a source of supply for the air and a source of supply for the liquid, which are drawn through the feed pipe into the pump cylinder and expelled from the latter into and through the discharge pipe 6. To provide for this the said feed pipe 5 has connected therewith an air-suction terminal 10 which may be in direct communication with the open air, and a water-suction terminal 11. The said water-suction terminal 11 is adapted to have the inlet end thereof in communication with a source of liquid supply, such, for instance, as may be contained within a liquid supply reservoir 12, while the air-suction terminal, being in open communication with the air, provides a supply of air for the pump when the latter is pumping air.

The air-suction terminal 10 may conveniently consist of a valve casing or union having a port at one side which opens into the air and which is respectively coupled to the feed pipe proper 5, and to one end of the water-suction terminal 11 thereof, as may be plainly seen from Figs. 1 and 3 of the drawings, and this valve casing or union accommodates therein a three-way valve 13, having an externally arranged operating head 14, and which valve when turned in one direction closes the air inlet port of the terminal 10 and opens up communication between the terminal 11 and the feed pipe proper 5. Likewise, when the said valve is turned in another position, the water-suction terminal 11 is cut off and communication is opened between the feed pipe proper and the open air. The third position of the valve closes the communication of both of said terminals 10 and 11 with the feed pipe proper 5.

The pump discharge pipe 6 is provided with pump outlet connections 15 and 16, respectively, connected to and in communication with the opposite ends of the pump cylinder and each of which is provided with outwardly opening check valves which permit the outlet of liquid or air and check the back-return thereof. The said pump discharge pipe 6 may be provided with a suitable main cut-off valve 18 which is opened or closed according as the pump is in operation or out of operation, and the said pipe 6 is intended to have its delivery end fitted to and in communication with the container or reservoir for both the liquid or air. This container or reservoir may consist of a storage pressure tank 19.

The important and practical feature of the present invention resides in the employment of a lubricating by-pass pipe 20, one end of which, as at 21, is connected with

the discharge pipe 6 or with the container or reservoir beyond the valved connections thereof, and the other end of which, as at 22, is connected with the feed pipe 5 beyond the valved connections thereof, but also between the latter and both suction terminals 10 and 11. This by-pass pipe 20 is provided with a controlling valve 23 which is intended to be opened sufficiently to allow a modicum of the liquid in the tank 19 to flow to the feed-pipe 5 and be drawn into and through the pump proper, while the latter is pumping air. Means are thus provided for keeping the clearance in the pump full of water and the valves water-sealed, thus insuring a perfect pumping action and making it possible to expel the air on each stroke of the piston. In this way a strong pressure of air can be quickly produced in the pressure tank 19.

The pump or pumping apparatus described is necessarily available for use in connection with any machine or apparatus wherein liquid and air are to be stored in a suitable tank and the expulsion of the liquid from said tank effected by the air pressure, but since this operation is peculiarly useful in connection with an orchard spraying machine, the improved pump is therefore of special utility when associated with such a machine as a part thereof. Hence, there is shown in the drawings this practical application of the invention, that is, to an orchard spraying machine, and, referring more particularly to such application, it will be observed that the pump described may be conveniently and suitably mounted on the carrying frame 24 of the machine. This carrying frame 24 has mounted therein a rolling tank 12 which is designed to contain the spray-liquid which is thoroughly mixed and agitated from the rolling action of the tank. The latter, therefore, constitutes the liquid-supply reservoir previously referred to, and the same includes as a part of the mounting thereof within and upon its carrying frame, a hollow axle 25 fitted at its outer end with a stuffing-box 26, and receiving there-through the inlet end of the water-suction terminal 11 which dips into the liquid in the tank, as indicated by dotted lines in Fig. 1 of the drawings. Also, as shown, the axle 25 of the rolling tank or reservoir 12, carries an eccentric 27 upon which is mounted an eccentric strap 28 having rod connections 29 with a cross-head 30, said cross-head being slidably mounted in the cross-head guide 31 and suitably connected with the outer end of the piston rod 3, thus providing an actuating mechanism for the pump which is controlled and operated by the rolling of the machine over the ground. Also, in the application of the invention shown, the storage pressure tank 19 is

equipped with a suitable discharge pipe 32 having any suitable spray-nozzle equipment 33 connected therewith.

From the foregoing it is thought that the construction, operation and many advantages of the herein described improvement in pumps will be readily apparent without further description.

I claim,—

10 A pump comprising a piston and cylinder, a feed-pipe having valved connection with the cylinder, a discharge pipe having valved

connection with the cylinder, separate water-suction and air-suction terminals for the feed-pipe, and a valved pipe in communication at one end with a source of liquid 15 and at its other end in communication with the feed-pipe.

In testimony whereof I hereunto affix my signature in the presence of two witnesses. 20

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."