

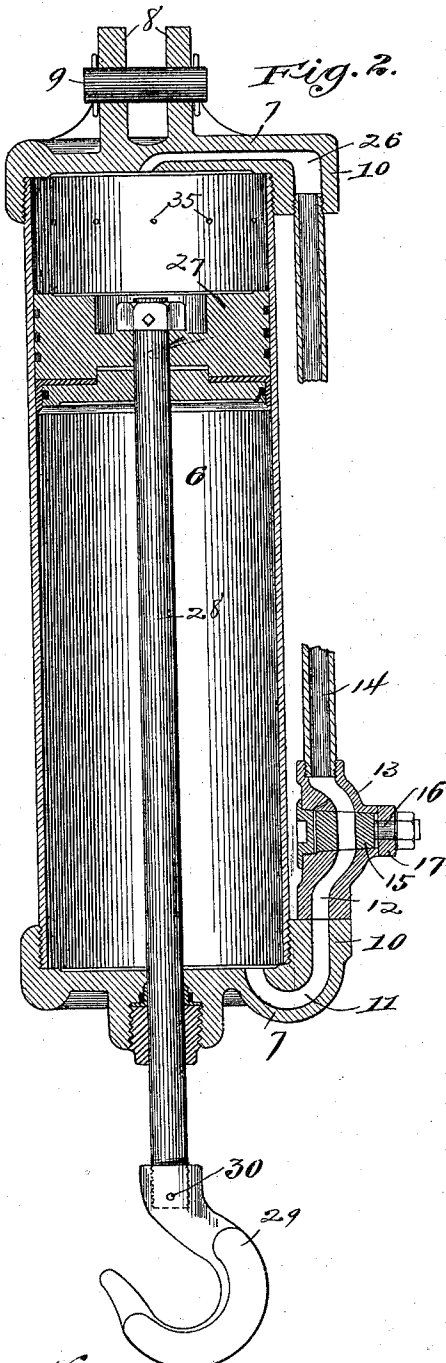
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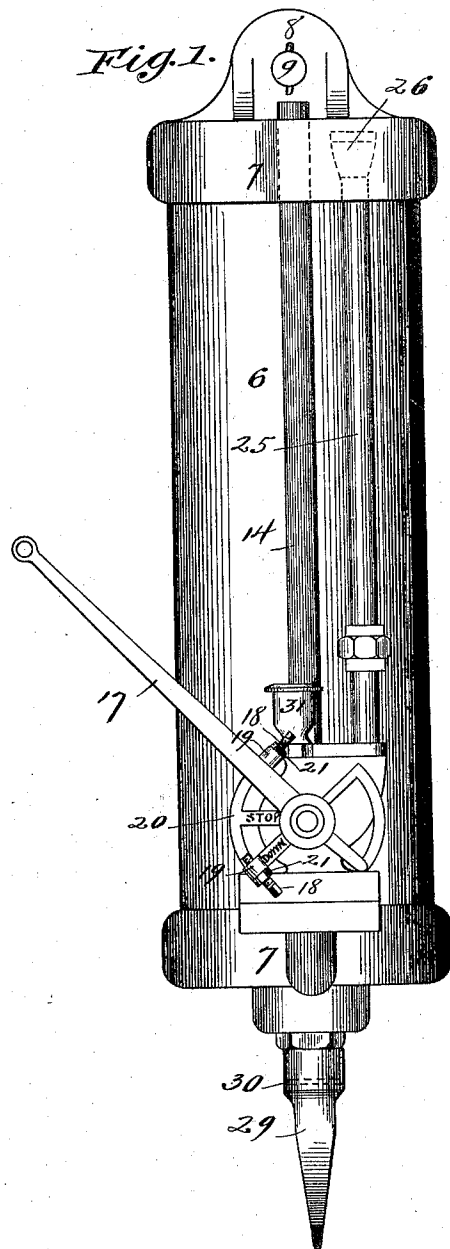
C. WEATHERSON.
AIR HOIST.

No. 577,901.

Patented Mar. 2, 1897.



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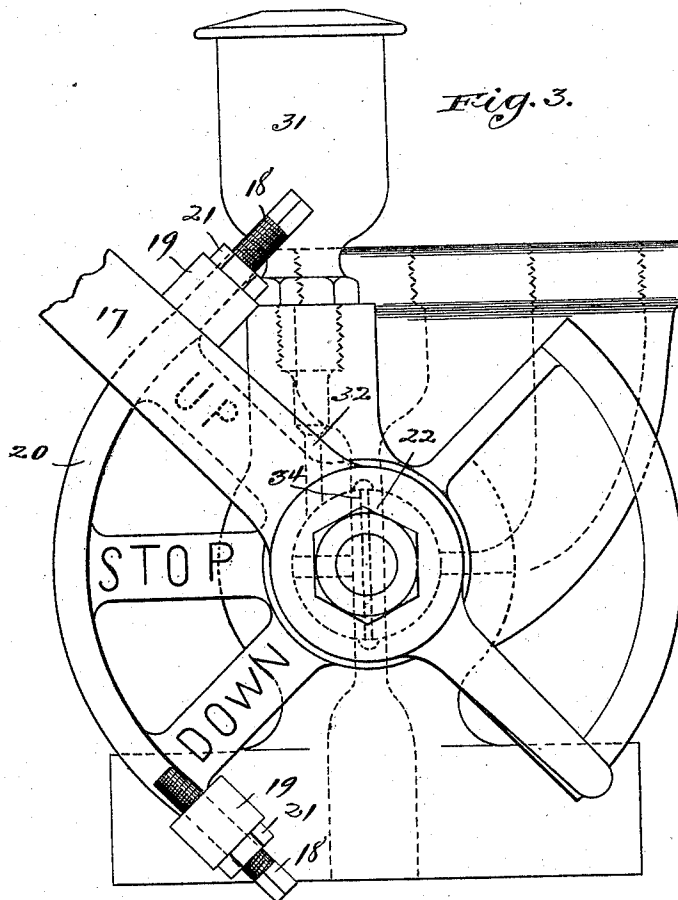
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Fig. 4.

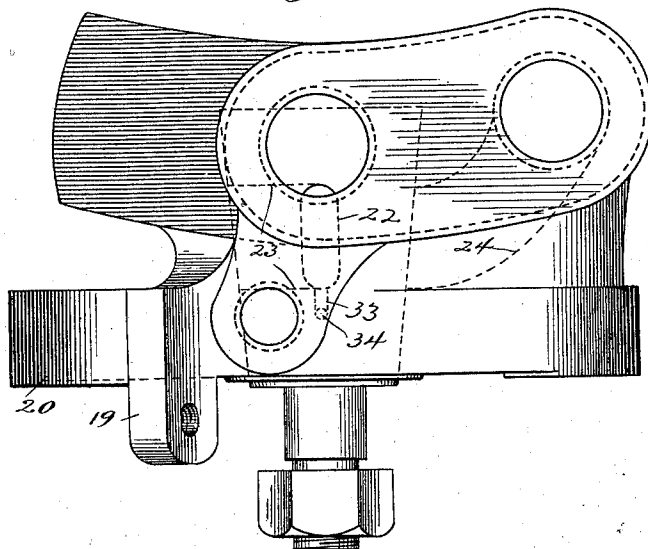
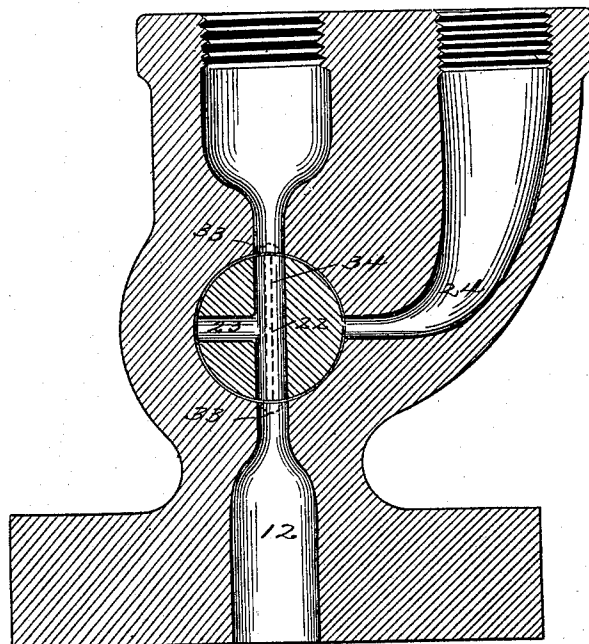


Fig. 5.



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Fig. 4^a

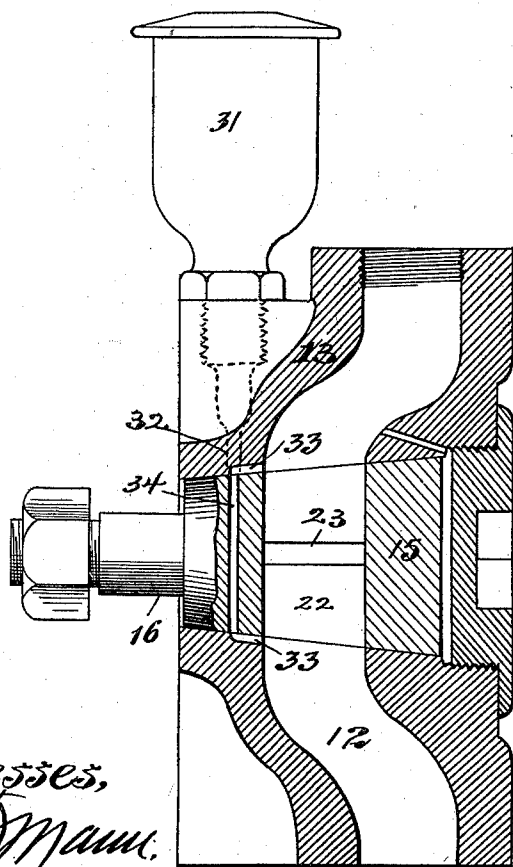
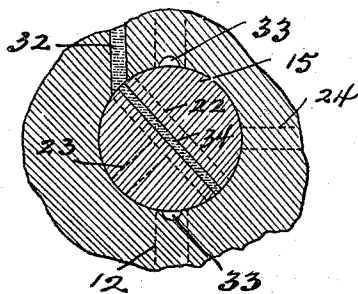


Fig. 5^a

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UNITED STATES PATENT OFFICE.

CHRISTOPHER WEATHERSON, OF CHICAGO, ILLINOIS.

AIR-HOIST.

SPECIFICATION forming part of Letters Patent No. 577,901, dated March 2, 1897.

Application filed April 9, 1894. Serial No. 506,961. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER WEATHERSON, of Chicago, Illinois, have invented certain new and useful Improvements in Air-Hoists, of which the following is a specification.

This invention relates to a hoist in which air under pressure is admitted to a power-cylinder having a reciprocating piston therein and a piston-rod projected beyond the cylinder-head to afford means for attaching the load to be moved. The cylinder is provided with a suitable valve for controlling the admission of compressed air to the bottom of the cylinder and the passage of exhaust-air therefrom; and in my present improvements the exhaust, instead of delivering into the atmosphere, is delivered into the upper end of the cylinder above the piston, and thence escapes through suitable apertures in the cylinder-wall into the atmosphere. By this arrangement there is a constant delivery of air through the escape-apertures instead of an indrawing of air on the downstroke, which incoming current has been found to be exceedingly objectionable because of the fact that it brings in with it particles of sand and other foreign substances which tend to cut the walls of the cylinder and the packing of the piston. A further advantage in delivering the exhaust-air into the upper end of the cylinder and thence into the atmosphere is that a thorough lubrication of the piston is effected, the lubricant carried by the body of the exhaust-air being delivered in the form of a fine spray into the upper end of the cylinder.

Another feature of my improvement is the provision of means for constantly feeding the lubricant, which means consists of the provision of a lubricant-reservoir communicating through a channel with the interior of the valve-casing. The interior of the valve-casing is provided with recesses or oil-chambers, into which the oil will be forced by the pressure of the air seeking to escape through the ports of the valve, and the valve is provided with a transverse duct or channel connecting said chambers, and by the rotation of the valve the oil is carried around its circumference, and a portion of it is also carried on with the air, finding its way into the inte-

rior of the cylinder at its lower end with each charge of air and escaping with the same air by way of the exhaust-passage into the upper portion of the cylinder, as previously described.

Another feature of my improvement relates to the provision of adjustable stops or limiting devices for regulating the throw of the valve-lever, said stops being adapted to be set when it is desired to handle equal loads, such as in ice-houses and like places, and the provision of which renders it practicable to give the valve-lever its full movement, so as to open the valve to admit sufficient pressure to lift such uniform load. Quickness of operation is secured by this arrangement.

Some of the structural details are also novel, and the various features of my invention will be hereinafter described, and more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation showing the valve in end view. Fig. 2 is a sectional elevation through the valve-casing, valve, piston, cylinder, and cylinder-caps, the view being taken at right angles to that shown in Fig. 1, and showing also sectional views through the lower end of the inlet and the upper end of the exhaust-pipe. Fig. 3 is an enlarged detail in elevation of the valve-chamber and oil-reservoir, the exhaust, inlet, and oil passages being shown in dotted lines. Fig. 4 is a plan view of the parts shown in Fig. 3, with the oil-cup, valve-lever, and lever-stop removed. Fig. 5 is a vertical sectional view through the valve-casing and its air-passages, and showing also the oil-chambers in said casing. Fig. 4^a shows a broken sectional detail through the valve-casing and plug, the plug being shown in the "stop" position, wherein oil is admitted to a port therein. Fig. 5^a shows a sectional elevation through the valve-casing and plug, the parts being in the same relative position as shown in Figs. 3 and 5.

In the drawings, 6 represents the cylinder, and 7 the cylinder-caps, which in the construction shown are threaded on the ends of the cylinder, the upper cap being provided with lugs 8, having the transverse pin 9 to receive a hook or other suspending device. In practice it is the custom to suspend these air-hoists from a car traveling on a fixed way.

The cylinder-caps are provided with lateral extensions 10, the lower one of which is channeled, as at 11, said channel leading to the inner surface of the lower cap and the outer
 5 branch thereof extending to the face of the extension and adapted to communicate with a similar channel 12, provided within a valve-casing 13.

14 represents an air-inlet pipe, which, it is
 10 understood, will be connected with some suitable air-compressor, the passage of the air through the conduit thus formed being controlled by means of a plug-valve 15, having connected to its stem 16 a valve-lever 17.
 15 Said valve-lever is moved to open or close the valve, and in order to define the range of its movement I employ the limit-screws 18, which are threaded through bosses 19 on a sector 20. Jam-nuts 21 are preferably provided in order
 20 to set the limit-screws at the proper position.

As shown in Fig. 1, the several rest positions of the valve-lever are indicated by the words "Up," "Stop," and "Down," and it will be understood that the swinging of the
 25 lever over the arc of a circle bounded by the ends of the limit-screws will admit sufficient air through the valve to drive the piston a full stroke. The valve is a three-way valve having a through-port 22 and a lateral port
 30 23. The channel or passage 12 registers with one end of the through-port and the channel with which the pipe 14 communicates registers with the opposite end of the through-port when the valve is turned to a certain
 35 position. The lateral port 23 furnishes means for establishing connection with the exhaust-passage 24, and this exhaust-passage is connected by the pipe 25 with the upper end of the cylinder through a passage 26 in the lat-
 40 eral extension 10 of the upper cap.

27 represents the piston, and 28 the piston-rod. In my present construction I have shown the piston-rod as having its lower end
 45 exteriorly threaded to enter a threaded socket in the shank of a hook 29, a pin 30 preventing the unscrewing of the hook. The object of forming the hook separately from the rod is to obviate destroying the temper of the piston-rod in forging the hook. In order to sustain heavy loads, the rod must be made from
 50 steel. A detachable hook also permits easy access to the lower stuffing-box to renew the packing. The hook may be forged and separately attached without affecting the temper of the rod, and the construction is also more economical.

In order to supply a proper lubricant to the valve-chamber, I employ the valve-cup 31, having a delivery-channel 32 formed in the
 60 valve-casing and terminating at the face of the valve, as clearly shown by the dotted lines in Fig. 3. There are also formed in the casing the small oil-chambers 33, and a passage 34 is formed transversely of the body of the plug,
 65 so as to connect these two channels or oil-chambers. By this means, when the valve is

rotated, the oil is delivered to the entire surface of the valve.

By reference to Fig. 5 it will be seen that the valve-chambers 33 are formed in the wall of
 70 the casing, so as to communicate with or bisect the openings of the air-supply passages, and when air is admitted under pressure it will take up the oil from these chambers and carry it thence into the cylinder beneath the
 75 piston. This position of the parts is clearly shown in Fig. 5. When the valve is turned so that the lateral port 23 registers with one of the supply-passages, one end of the through-port 22 will be connected to the exhaust, de-
 80 pending on the direction in which the valve-lever has been moved. Thus, for example, if the valve-lever is moved from the position marked "Stop" to the position marked "Up" air will be supplied to the lower end of the
 85 cylinder and the piston will be forced up and the exhaust will pass through the ports 35 in the upper end of the cylinder. A movement of the valve-lever from the position marked
 90 "Stop" toward that marked "Down" will establish communication with the exhaust and the air below the piston will pass through the exhaust-passage, through the pipe 25 and piston 26, into the upper end of the cylinder
 95 above the piston and will blow out through the apertures 35, the pressure being sufficient to prevent any incoming current which would cut the cylinder or the piston-packing. The
 100 apertures 35 are so proportioned as to permit a gradual exhaust, the exhaust being sufficiently slow to form an air-cushion against the descent of the piston. The movement of the exhaust-air of course carries with it the
 105 lubricant, and as the air is distributed in something of a spray the inner surface of the cylinder and the upper portion of the piston will be lubricated.

Having thus described my invention, what I claim, and desire to secure by Letters Pat-
 110 ent, is—

1. In an air-hoist, the combination with a power-cylinder, a pipe or passage for supplying air thereto, an oil-reservoir having its delivery at the periphery of the valve and an
 115 oil-channel through the body of the valve whereby the lubricant may be distributed, substantially as described.

2. In an air-hoist, the combination with a power-cylinder, of a pipe or passage supplying air thereto, an oil-reservoir having its delivery at the periphery of the valve, an oil-channel through the body of the valve where-
 120 by the lubricant may be distributed, and a valve-casing having oil-chambers therein to which the air is admitted, substantially as described.
 125

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