

No. 844,488.

PATENTED FEB. 19, 1907.

W. L. WEBER.
HYDRAULIC ELEVATOR.
APPLICATION FILED OCT. 5, 1906.

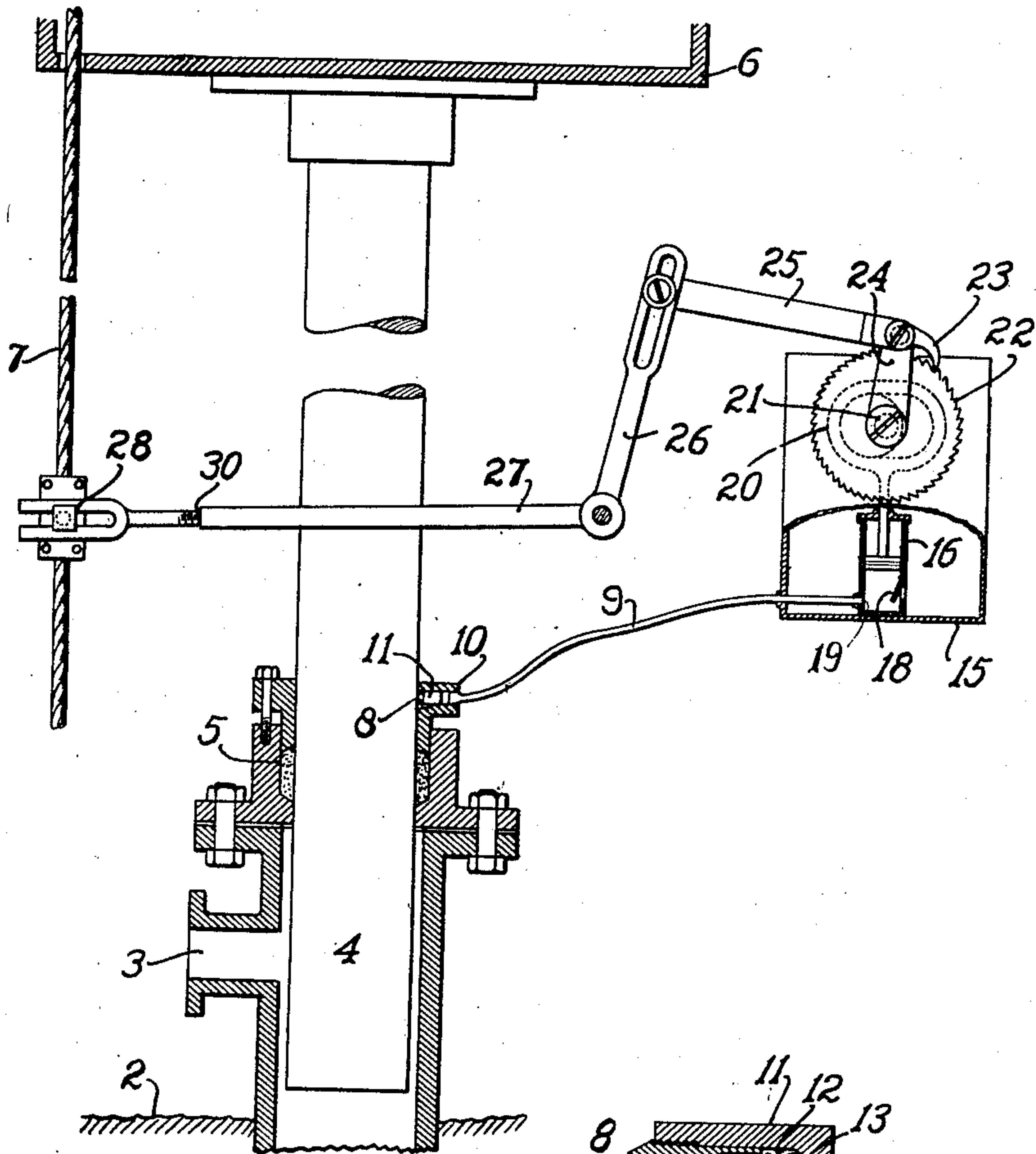


FIG. 1.

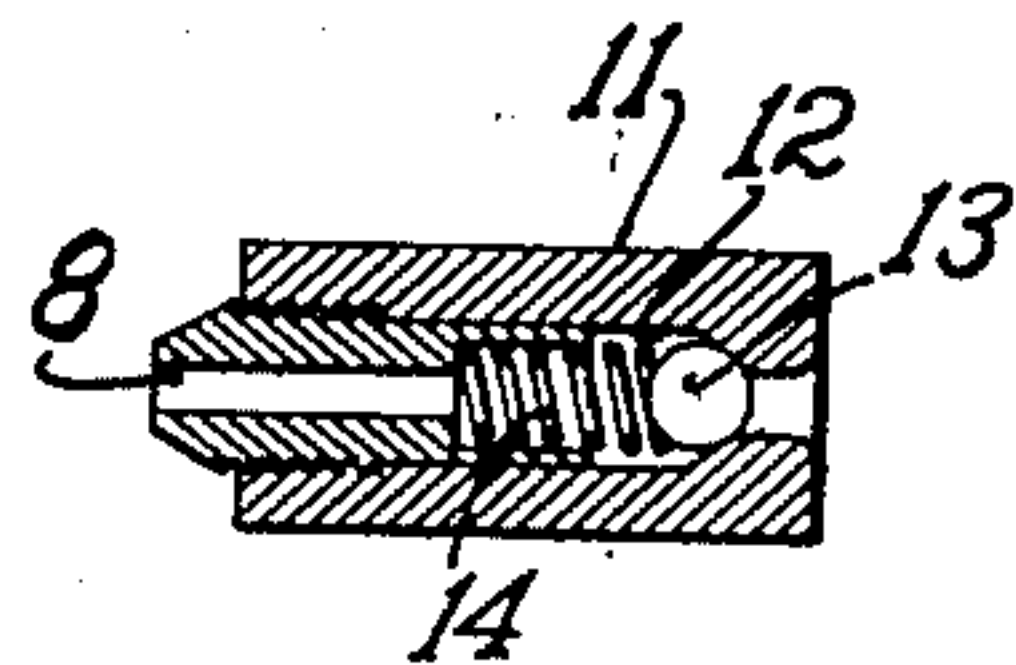


FIG. 2.

WITNESSES

A. T. Palmer
Jerome C. Smith

INVENTOR
WILLIAM L. WEBER
BY HIS ATTORNEY

Everett Kent

UNITED STATES PATENT OFFICE.

WILLIAM L. WEBER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO GREENE, TWEED AND COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

HYDRAULIC ELEVATOR.

No. 844,488.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed October 5, 1906. Serial No. 337,598.

To all whom it may concern:

Be it known that I, WILLIAM L. WEBER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Hydraulic Elevators, of which the following is a specification.

This invention relates to hydraulic elevators.

In particular, it relates to that type of elevator in which the car is supported upon a long piston or plunger which travels in a cylinder sunk in the earth, the plunger being forced upward and out of the cylinder to carry the car to any desired height by forcing water into the cylinder and the car being lowered to any desired level by allowing water to flow through the outlet from the cylinder until the plunger sinks to the desired level. In elevators of this type the water is forced in under considerable pressure, and the packing for the plunger at the mouth of the cylinder is correspondingly tight, and difficulty is experienced in keeping the plunger suitably lubricated for its passage through the packing.

The common method hitherto has been to cause oil to be smeared over the exterior of the plunger by a workman by hand or with the aid of an oil-can and when this has been rubbed away by the packing or carried off by the water to repeat the operation. Another method recently devised has provided a reservoir for oil surrounding the plunger, from which the oil is spread upon the surface of the plunger by direct contact therewith, the plunger passing in and out through a bath of oil thus arranged or through a reservoir filled with absorbent material holding oil, the absorbent oil-carrying material bearing directly against the plunger. Both of these methods provide for the constant deposit of oil on the plunger-surface, and I have found in experience that no method known to me prior to the present invention has been effective to deliver the oil economically and without waste to various parts of the plunger surface. For example, it is sufficient if there be occasionally a deposit of a little at the bottom, a little at the top, and other small deposits at various isolated points between, whence it is spread gradually by contact with the packing.

The present invention aims to facilitate

the economical operation of elevators of the type described by providing means for making occasional deposits of a small body of oil at varying places upon the surface throughout the length of the plunger, and to this end a device is provided having a delivery at a fixed location for making such deposits upon the plunger non-synchronously with the movement of the plunger to and fro, with the result that the deposits thus made occur sometimes at one end of the plunger and sometimes at varying points which happen at the moment of deposit to be opposite the point of discharge. This discharge-point is preferably located in the gland-head of the cylinder-packing, just above said packing; and the invention also comprises means to so govern the discharges that although deposited upon the plunger outside of the cylinder-packing no deposit shall be thus made except upon a portion of the plunger which is certain to pass through the packing, and thus assure the use and distribution of the oil so deposited, thus guarding against making deposits uneconomically in a location where they could not be utilized conveniently, if at all.

Other features of the invention will be understood from the description of construction and arrangement hereinafter given.

The accompanying drawings show one embodiment of the invention.

In the drawings, Figure 1 represents a side elevation of a plunger-elevator, showing the arrangement and application of the invention partly in diagram. Fig. 2 represents a detail in section, much enlarged.

Referring to the drawings, 1 represents a cylinder set in the earth 2 and having an opening 3, through which water may enter or be expelled. A plunger 4 passes through a packing 5 at the top of the cylinder and carries at its top a car 6, which may be guided in ways, as is customary, which are not represented in the drawings, as they are not necessary to a proper understanding of the invention. The movement of the elevator is controlled in any suitable way, the means here represented being a shipper-rope 7, which passes up through the car, where it may be grasped by the operator, and passes down to the valve-operating mechanism for controlling the flow of water through the opening 3. Any sort of mechanism for this

purpose may be used, and this also forms no part of the present invention and is not shown in the drawings. An oil-pipe 9 is provided to conduct a supply of oil to a point 5 which is most conveniently located above the packing 5, the pipe terminating in a hole drilled through the gland 10, which holds the packing in place. A plug 11 is inserted in the inner end of said hole, containing a recess 12, in which is a ball 13 and a spring 14, which normally presses the ball against the end of the passage communicating with the supply-pipe 9, thus serving as a valve to maintain the discharge from said pipe closed 15 except when overcome by pressure of oil within the pipe. When the pressure of the spring is thus overcome, oil escapes from the pipe, passes through the recess and a hole 8 in the plug, and is delivered therefrom upon 20 the adjacent surface of the plunger 4. A reservoir 15, containing a suitable supply of oil, is provided at a convenient nearby location and is connected with a small pump comprising a cylinder 16, in which a piston 25 reciprocates, the cylinder having an inlet-valve 18 from the reservoir and a discharge 19, communicating with the pipe 9. The piston is caused to reciprocate by its connection with an eccentric 20 on a shaft 21, which 30 also carries a toothed pinion 22. A pawl 23, mounted on an arm 24, pivoted on shaft 21, has a reciprocating motion in position to engage the teeth of the pinion and to rotate the pinion when moving in one direction, but to slip freely over the teeth and not rotate the 35 pinion when the pawl is moving in the opposite direction. This pawl-carrying arm 24 projects radially a convenient distance and connects, by means of a rod 25, with one 40 arm 26 of a bell-crank, the other arm of which, 27, is connected with the shipper-rope 7. The last-named connection consists of a pin attached by the clamp 28 to the shipper-rope and riding in a slot in the arm 27.

45 As the shipper-rope and the clamp thereon have a vertical travel, as here represented, the pivot of the bell-crank will be horizontal, giving the point of attachment between the arm 26 and the radial arm 24 a horizontal 50 movement to the right or to the left, as represented in the drawings, movement to the right corresponding to the active movement of the pawl in engagement with the ratchet on the pinion and movement to the left corresponding to the inactive movement of the 55 pawl and corresponding also to the downward movement of the shipper-rope, which in common practice is the movement for starting the car upward or for stopping the 60 car after a downward movement thereof. This arrangement constitutes one feature of the invention, the purpose and effect of which is to cause all deposits of oil on the plunger-surface to be made at points where 65 the same will be efficiently utilized for re-

lieving friction between the plunger and its packing 5.

In operation each time the shipper-rope is pulled downward the pawl is retracted to the left, and each time the shipper-rope is pulled 70 upward the pawl is pushed forward to the right, thus actively rotating the toothed pinion to an extent corresponding to the motion. This rotation of the pinion rotates to a corresponding extent the shaft 21 and 75 advances action of the attached piston in its cylinder to a corresponding extent. During a portion of the time while the piston is being raised it is drawing oil into its cylinder through the inlet-valve, but during the re- 80 maining portion of its motion it is forcing oil out from the cylinder, and owing to the automatic closing of the inlet-valve this oil is forced through outlet 19 into pipe 9, and if that pipe be full, as it is in practice, a cor- 85 responding amount is forced out at the delivery end of said pipe past the valve there located and is deposited upon whatever part of the surface of the plunger happens at that moment to be opposite the point of delivery. 90 The deposit is thus made at varying points of location between the extreme limits of travel of the plunger—as, for example, if the shipper-rope be moved to stop the car at the fifth floor of a building or at the sixth floor 95 the deposit will be made upon a different part of the plunger from that if the shipper-rope be moved to stop the car at the second or the eighth floor—and it will be observed that this deposit is independent of the travel 100 of the plunger, or non-synchronous therewith, depending wholly upon the movement of the shipper-rope or other equivalent means employed for stopping or starting the car. As there is in practice always a certain posi- 105 tion which is the lowest position of the car, there is a certain depth which is the limit to which the plunger enters its cylinder, and as the delivery-point of oil shown in the drawings is outside the cylinder-packing it is evi- 110 dent that any oil deposited when the car is in its lowest position, as by movement of the shipper-rope to stop the car in said position, would be deposited outside the packing and would not be conveyed by the plunger to the 115 packing and would thus never serve to lubricate the passage of the plunger through the packing. By the feature of the invention previously described this uneconomical deposit of oil is avoided—namely, by arrang- 120 ing the inactive movement of the pawl synchronously with the motion of the shipper-rope for stopping downward motion of the car, which is in the same direction as the motion for starting upward motion of the car. 125

The arm 27 of the bell-crank is preferably made adjustable in length, one portion screwing within the other, as indicated at 30, and the other arm 26 has a long slot at one point, in which the pivot-pin for its connec- 130

tion to the rod 25 may be clamped; but it will be obvious that many variations in detail may be made within the scope of the invention, including the substitution of some other form of oil-pump from that here shown or the connection of the pump to some other part of the control mechanism for starting or stopping the elevator-car. The maintenance of the pipe 9 with a spring-closed delivery-nozzle permits a limited quantity of oil to be delivered directly on the surface where it is needed at various parts of the long elevator-plunger, thus giving all parts occasional fresh lubrication, but without spreading oil thickly over all parts or continuously applying same and without the labor of administering this occasional deposit by hand. The amount deposited may be regulated by regulating the travel of the pawl per stroke or by the use of any other suitable mechanical device, a number of which are known in the art.

I claim—

1. A hydraulic elevator, comprising a cylinder, a plunger, and a packing between them, in combination with control means to start and stop the plunger, and an oil-reservoir having a discharge upon the surface of the plunger controlled and operated by said plunger-control means.

2. A hydraulic elevator, comprising a cylinder, a plunger, and a packing between them, in combination with control mechanism moving in one direction to start the plun-

ger upward and in the opposite direction to start it downward, and an oil-reservoir having a discharge for lubricating the parts controlled and operated by movements of the plunger-controller in direction to start the car downward, but not operated by movements to start the car upward.

3. A hydraulic elevator, comprising a cylinder, a plunger, and a packing between them, in combination with control means to start and stop the plunger, an oil-reservoir, a pump connected therewith, and connections from the pump to said plunger-controlling means, whereby movement of the latter operates the pump, there being a discharge therefrom upon the surface of the plunger.

4. A hydraulic elevator, comprising a cylinder, a plunger, and a packing between them, in combination with a shipper-rope and mechanism for controlling motion of the plunger; a pawl-carrying lever actuated by the shipper-rope; said pawl; a pinion engaged thereby; an oil-pump actuated by the pinion, there being a discharge from the oil-pump upon the plunger-surface outside of said packing.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM L. WEBER.

Witnesses:

M. E. MURPHY,
EVERETT E. KENT.