

L. ATWOOD.  
ANTIFRICTION DEVICE FOR LOWER ENDS OF PLUNGERS.  
APPLICATION FILED AUG. 10, 1908.

987,666.

Patented Mar. 21, 1911.

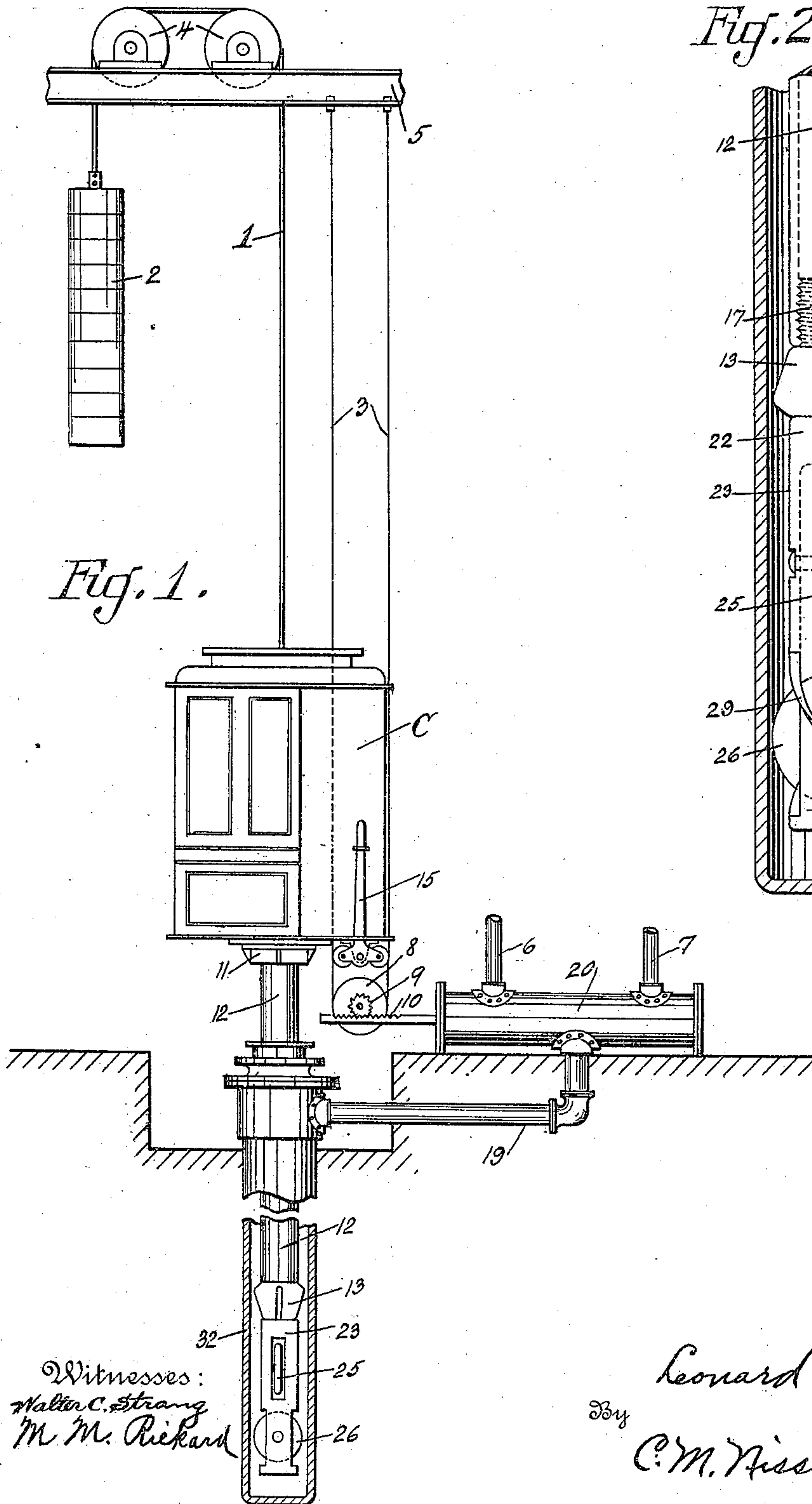
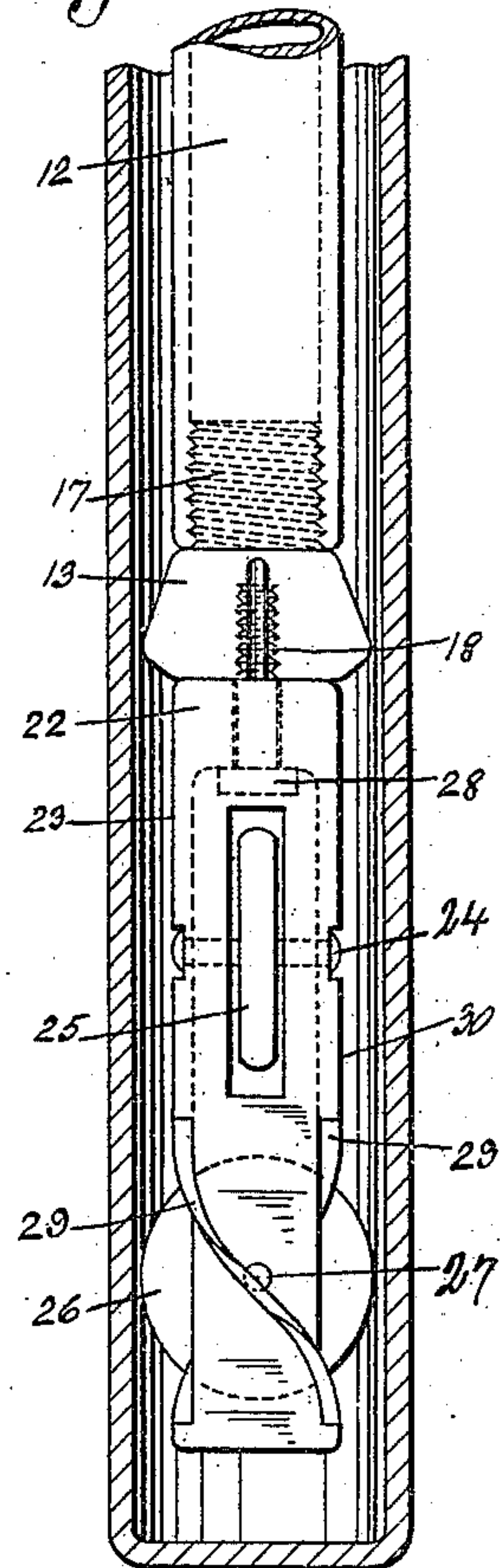


Fig. 1.

Fig. 2.



Witnesses:  
Walter C. Strong  
M. M. Rickard

Inventor:  
Leonard Atwood  
By  
C. M. Nissen Attorney



# UNITED STATES PATENT OFFICE.

LEONARD ATWOOD, OF FARMINGTON FALLS, MAINE, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ANTIFRICTION DEVICE FOR LOWER ENDS OF PLUNGERS.

987,666.

Specification of Letters Patent.

Patented Mar. 21, 1911.

Application filed August 10, 1908. Serial No. 447,841.

*To all whom it may concern:*

Be it known that I, LEONARD ATWOOD, a citizen of the United States, residing at Farmington Falls, in the county of Franklin and State of Maine, have invented a new and useful Improvement in Antifriction Devices for Lower Ends of Plungers, of which the following is a specification.

My invention relates to improvements in plunger elevators, although it may have a general application.

One object of my invention is the provision of means for guiding the lower end of an elevator plunger.

A further object is the provision of means for preventing friction and wear caused by the lower end of the plunger engaging the bore of the cylinder.

Other objects will appear hereinafter, the novel combinations of elements being set forth in the claims forming a part of this specification.

In the accompanying drawings, Figure 1 illustrates in elevation a typical plunger elevator system embodying my invention; Fig. 2 is a detail view of the lower end of the plunger.

Similar characters of reference denote similar parts throughout the various figures.

Referring to Fig. 1, 12 designates a ram or plunger adapted to travel in a cylinder 32 under the action of fluid pressure. C is an elevator car which is connected by a socket plate 11 to the upper part of the plunger 12 and travels therewith. 2 designates the usual counterbalance weight which is suspended by cables 1 leading over suitable guide pulleys 4 supported by the overhead beams 5. These cables are connected to the top of the elevator car C in the usual manner. 20 designates a main valve which effects the operation of the elevator car by admitting or discharging fluid pressure into or out of the plunger cylinder 32 by way of the to-and-from pipe 19. The main valve 20 is controlled from the car by means of a hand lever 15 through the standing ropes 3 which operate to rotate a sheave 8 in one direction or the other, thereby effecting a corresponding movement of the main valve through the rack and pinion connection 10 and 9. This arrangement of standing ropes is illustrated merely to show an operative construction in its simplest form, as in practice many different arrangements of stand-

ing and running rope controllers and other devices are used for connecting the car with the parts to be operated. Furthermore, owing to the high pressures frequently used to operate elevators, the power required to manually operate the main valve is considerable, and for this reason an auxiliary or pilot valve is often used to effect the movement of the main valve. This pilot valve is not illustrated herewith, since it forms no part of the present invention and its construction and operation are well known in the art and hence require no description.

Referring more particularly to Fig. 2, the plunger 12 is constructed after the usual manner of metal tubing which is internally screw-threaded at its lower end. A solid plug 13 has one end 17 screw-threaded to correspond with the screw threads in the end of the plunger 12, and when screwed in position forms a water tight plug for the end of the plunger. Connected to the plug 13 by means of a screw-threaded stud 18 is a tube 23 which is made solid at the end 22 adjacent to the plug 13 and left open at the opposite end. The tube 23 is provided with one or more guide wheels such as 25 and 26, arranged to rotate about their respective supporting pins 24 and 27, and which are preferably arranged at right angles to each other as shown. These guide wheels are somewhat larger in diameter than the plunger 12 and of less diameter than the inside of the plunger cylinder 32.

It is well known that in plunger elevators the lower end of the plunger will frequently strike or drag against the inside of the plunger cylinder. This action tends to wear the lower end of the plunger, as well as the inner surface of the plunger cylinder, and in course of time furrows or holes may be worn entirely through the cylinder. This wear is particularly liable to occur where the cylinder is slightly out of line or where the plunger is crooked. It has been proposed to eliminate this wear by employing metallic brushes or similar means applied to the end of the plunger, but such devices are unsatisfactory since they do not accomplish the desired results, and, furthermore, are expensive to install and maintain, and, owing to their inaccessible position at the lower end of the plunger, it is extremely difficult to effect repairs or to replace worn out parts.



My invention overcomes the above and other undesirable features, since the contact between the plunger and the cylinder takes place at the periphery of the guide wheels, and being a rolling contact, all wear and friction are thus reduced to a minimum.

The tube 23 is arranged to rotate freely upon the end of the plunger. In order to accomplish this, the stud 18 is provided with a head 28 and is arranged to pass loosely through the solid portion 22 of the tube 23, after which it is screwed into the plug and securely pinned against movement. Upon the lower end of the tube 23 one or more vanes 29 are spirally arranged for the purpose of producing a rotation of the tube 23 whenever there is a relative movement between the lower end of the plunger and the surrounding water or other fluid. In this way the tube 23 will be caused to rotate as the plunger travels up and down, and thus the guide wheels 25, 26 will find a new path, thereby making any wear, however small it may be, uniform on the inner surface of the plunger cylinder.

It will thus be seen that in a plunger elevator embodying my invention the lower end of the plunger is kept central within the cylinder and all wear is practically eliminated.

I desire not to be limited to the precise construction and arrangement of parts herein disclosed, since it is obvious that various changes could readily be made by those skilled in the art without departing from the spirit and scope of my invention.

What I claim as new and desire to have protected by Letters Patent of the United States is:—

1. In a plunger elevator, the combination

with a car, of a plunger, a cylinder, a tubular support carried by and rotatable relatively to the plunger, and an anti-friction roller or rollers journaled in said support with their peripheries extending laterally beyond the path of travel of the plunger.

2. In a plunger elevator, the combination with a car, of a cylinder, a plunger, means for lifting and lowering the car and plunger, a support carried by the plunger, an anti-friction roller carried by the support, and means for imparting a movement of the support about a vertical axis when the car is moved.

3. In a plunger elevator, the combination with a car, of a cylinder, a plunger, means for supplying fluid pressure to lift and lower the car, a support swiveled to the plunger, rollers pivoted to the support, and spiral vanes connected to the support.

4. In a plunger elevator, the combination with a car, of a plunger depending from the car, a cylinder in position to receive the plunger, and an anti-friction device carried by the plunger, and means for moving said anti-friction device laterally during the vertical movement of the plunger.

5. In a plunger elevator, the combination of a car, a plunger, a cylinder, a rotatable guide rotatable in a vertical plane to fend the plunger from striking the wall of the cylinder, and means to rotate the guide upon vertical movement of the plunger.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

LEONARD ATWOOD.

Witnesses:

CHAS. M. NISSEN,

JAMES G. BETHELL.