(No Model.)

D. P. ALLEN.

HYDRAULIC ELEVATOR PLUNGER.

No. 437,880. Patented Oct. 7, 1890.

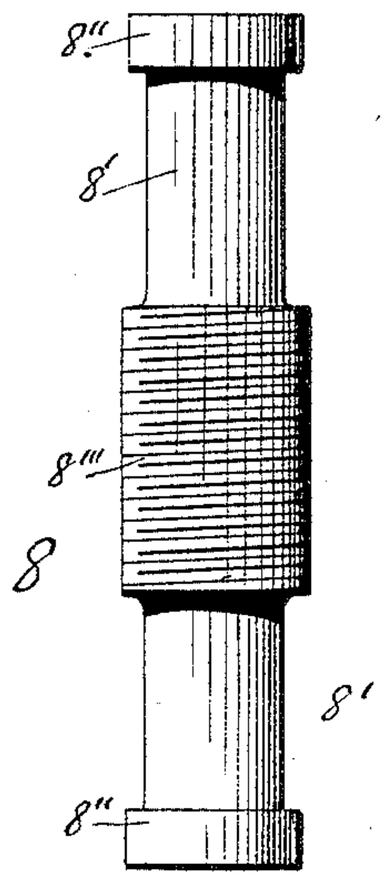

Fig. 2.

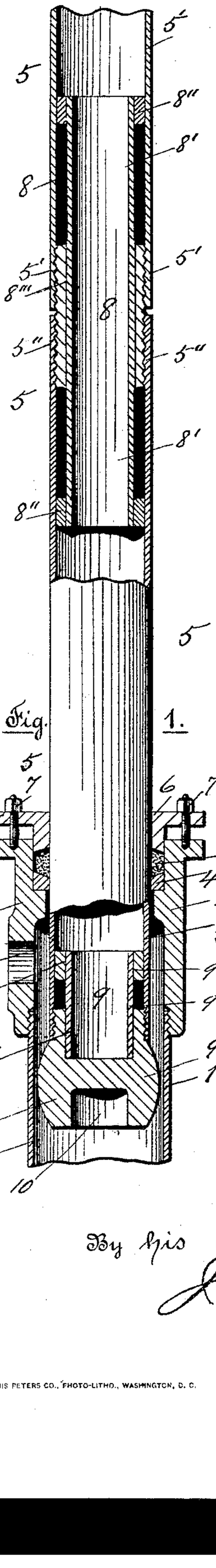

Fig. 1.

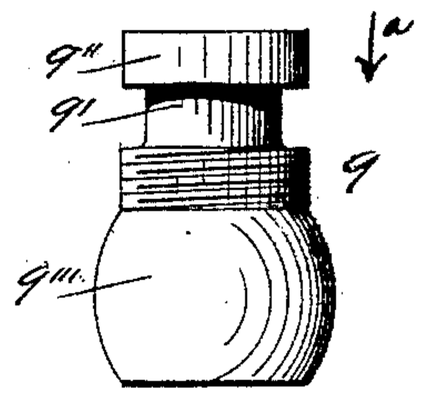

Fig. 3.

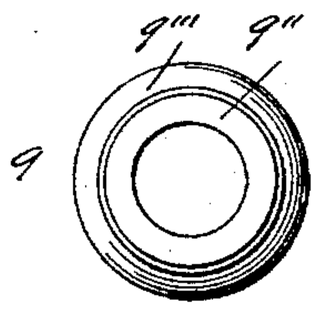

Fig. 4.

Witnesses
Chas. F. Schmelz.
Edmund H. Seymour

Inventor
Dwight P. Allen,
By his Attorney
John C. Dewey.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

DWIGHT P. ALLEN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE WORCESTER ELEVATOR COMPANY, OF SAME PLACE.

HYDRAULIC-ELEVATOR PLUNGER.

SPECIFICATION forming part of Letters Patent No. 437,880, dated October 7, 1890.

Application filed December 9, 1889. Serial No. 333,006. (No model.)

To all whom it may concern:

Be it known that I, DWIGHT P. ALLEN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Hydraulic-Elevator Plungers; and I do hereby declare that the following is a full, clear, and exact description thereof, which, in connection with the drawings making a part of this specification, will enable others skilled in the art to which my invention belongs to make and use the same.

My invention relates to hydraulic-elevator plungers; and the object of my invention is to secure the several sections of the plunger together rigidly and securely and to lessen the weight of the plunger, and to construct the lower end of the plunger in such a manner that it will be prevented from being forced out of the cylinder-head, and will also be prevented from being worn away by friction to cause leakage.

My invention consists more particularly in certain novel features of construction of the couplings for connecting the different tubular sections or lengths of which the elevator-plunger is formed and of the plug secured in the lower end of the plunger, as will be hereinafter fully described.

It will be understood by those skilled in the art that in the construction and operation of hydraulic elevators a hole is bored in the ground and a cylinder or tube sunk therein, within which the plunger, carrying the elevator platform or car upon its upper end, moves up and down. The length of the elevator-plunger depends upon the height above the ground to which it is desired to raise the elevator. In high buildings the elevator-plunger would have to be very long—as long as the height of the building—if it was desired to have the elevator go to the upper story or top of the building.

The expense and labor of making the elevator-plunger in a single length or in one piece would be very great in case of elevators used in high buildings. It is therefore necessary to make the elevator-plunger in several sections or lengths, each being tubular, in order to lessen the weight of the plunger, which has to be raised with the elevator platform or car.

The several sections or lengths of the elevator-plunger must be very rigidly and firmly connected together, and in such a manner as not to weaken or lessen the strength of the tubular sections where they are joined together and where the strain comes and the greatest strength is required. At the same time the sections of the elevator-plunger must be connected together in such a manner as to leave the outer surface of the plunger even and smooth, so as not to interfere with the free movement of the elevator-plunger up and down within the cylinder and through the head thereof as the elevator is raised or lowered.

After the elevator-plunger has passed up out of the cylinder, the weight of the elevator car or platform resting on the top of the plunger tends to throw it out of plumb and to cause it to bend, especially at the points where the several lengths of the plunger are connected together, and it is to prevent this that one feature of my invention is especially designed, and at the same time to add as little as possible to the weight of the whole elevator-plunger, which is a serious consideration in hydraulic elevators used in high buildings.

Referring to the drawings, Figure 1 is a central longitudinal section of a portion of a hydraulic-elevator plunger and the upper part of the cylinder and cylinder-head within which the plunger moves up and down. Fig. 2 shows the coupling for connecting two sections or lengths of the elevator-plunger, detached. Fig. 3 shows the plug secured in the lower end of the elevator-plunger, detached; and Fig. 4 is a top end view of the plug shown in Fig. 3, looking in the direction of arrow *a*, same figure.

In the accompanying drawings, 1 is the upper end of the cylinder or tube within which the elevator-plunger moves up and down.

2 is the cylinder-head, of any ordinary construction, firmly secured upon the upper end of the cylinder 1, in this instance by means of a screw-thread. The head 2 has a hole 3

therein on one side, through which the water passes into and out of the cylinder as the elevator-plunger is raised or lowered therein, all in the usual way. The upper part of the head 2 is cored out to receive a washer 4 and packing 4′, which packing extends around the elevator-plunger 5 and is pressed down and held in place by a collar 6, closely encircling the plunger 5, and which is secured to the top of the cylinder-head 2 by bolts or screws 7. By means of the bolts 7 the pressure on the packing 4, around the plunger 5 may be varied, as desired, and any leaking of water from the cylinder prevented.

The elevator-plunger 5 is made tubular and of the same external and internal diameter throughout its entire length.

I have shown in the drawings the plunger 5, made of two lengths or sections 5′ and 5″, joined together; but it will be understood that the plunger may be made up of any number of lengths or sections, as desired, according to the length of the same. Each of the sections 5′ and 5″ are preferably screw-threaded upon their interior surface at their ends where they come together, and said ends are rigidly and firmly secured together by a coupling 8, extending for a considerable distance within each section 5′ and 5″ of the plunger 5. (See Fig. 1.)

The manner of constructing the coupling 8 and combining it with sections of the elevator-plunger is one of the features of my invention, and therefore I will describe it in detail.

As before stated, lightness and strength are the most important elements in the construction of the hydraulic-elevator plungers, and it is to obtain these that the coupling 8 is especially designed.

The elevator-plunger is subject to great pressure, according to the weight of the elevator car or platform, when it is in its highest position, and is liable to be forced out of a plumb-line between the head of the cylinder and the bottom of the elevator car or platform, especially at the points where the different sections or lengths of the elevator-plunger are joined together, as hereinbefore stated.

For the reasons above stated the coupling 8 must be very strong and at the same time light and combined with the sections of the elevator-plunger which it is to join together in such a manner as to prevent any lateral bending or curving of the plunger at this point under the greatest pressure.

The coupling 8 is made of a wrought iron or steel tube 8′, preferably of the same external and internal diameter and of sufficient length to extend for some distance within the ends of the sections of the plunger which are to be connected together. The tube 8′ is of a less diameter than the internal diameter of the plunger 5, so as to lighten the weight thereof. Upon each end of the tube 8′ is cast a collar 8″, the external diameter of which is a very little less than the internal diameter of the plunger 5, so that the collar 8″ will fit closely within and bear on the interior surface of the section 5′ and 5″ of the plunger 5. Upon the central part of the tube 8′ is cast a collar or thimble 8‴, the exterior surface of which is preferably made screw-threaded and adapted to engage the internal screw-thread in each of the adjoining ends of the sections 5′ and 5″. (See Fig. 1.)

The coupling 8 is combined with the sections 5′ and 5″ of the plunger 5, as shown in Fig. 1 of the drawings, from which it will be seen that the ends of the sections 5′ and 5″ are screwed onto the central screw-threaded collar or thimble 8‴ of the coupling 8 toward each other, so that their ends will nearly meet or butt against each other. The collar 8‴ of coupling 8 may be made without a screw-thread and fit closely within the adjoining end of the sections of the plunger, said sections being secured together by a rod extending within the plunger or otherwise.

The ends of the coupling 8, having the collars 8″ thereon, extend within the sections 5′ and 5″, and the collars 8″ have a bearing on the interior surface of the sections at the extreme ends of the coupling 8, thus obtaining the advantage of the full length of the coupling 8 as a connection between the two sections to hold them rigidly and firmly together and still having an open space extending around the coupling between the end collars 8″ and the central collar 8‴, thus reducing very much the weight of the coupling. It will thus be seen that by making the coupling 8 of wrought iron or steel I produce a very strong connection between the two sections 5′ and 5″ of the plunger 5, and by making the part 8′ tubular and of less diameter than the diameter of the sections of the plunger and combining with said tube the collars 8″ and 8‴, preferably cast thereon, I lessen very much the whole weight of the coupling and cheapen the production thereof without affecting the strength of the same; and, further, by having the coupling 8 extend within the sections of the plunger I leave the outer surface of the plunger even and smooth, requiring no turning or finishing. These advantages will be fully appreciated by those skilled in the art to which my invention belongs.

A plug 9 is provided for the lower open end of the plunger 5, the construction of which corresponds with the construction of the coupling 8 for the purpose of lightness and strength. The plug 9 consists, preferably, of a central tube 9′, of wrought iron or steel, of less diameter than the interior diameter of the plunger 8. Upon the upper end of the tube 9′ may be cast a collar 9″, extending around the tube, of a little less diameter than the internal diameter of the plunger 5, so as to fit closely within the same.

Upon the lower end of the tube 9′ is cast the knob or end 9‴, which is provided with a screw-thread upon its upper exterior part,

adapted to engage a screw-thread in the lower end of the plunger 5 to secure the plug 9 firmly in the lower end of the plunger 5. The end 9''' of the plug 9 is made with curved sides and enlarged, (see Fig. 1,) the object of which is to cause the plug 9 to move freely up and down within the cylinder 1 and to slide freely by any ridges or projections on the interior surface thereof and at the same time to hold the lower end of the plunger in its lower position more steadily within the cylinder 1 and to prevent the plunger from being forced out of the cylinder-head; and, further, the curved sides of the plug 9 present a better wearing-surface and offer less friction to the interior surface of the plunger-cylinder 1 and prevent the end or corners of the plug 9 and plunger wearing away by constant friction with the interior surface of the cylinder as the plunger is raised and lowered, thus preventing the water getting to the inside of the plunger. The advantages of this construction of the plug 9 will be appreciated by those skilled in the art. The lower side of the end 9''' of the plug 9 is preferably cored out, as shown at 10, Fig. 1, in order to make the plug lighter. It will thus be seen that by making the part 9' of the plug 9 tubular and providing it with collar 9'' and end 9''', as described, I make it much lighter than if I made it solid, and at the same time I prevent the end of the plug from being worn away by contact with the interior of the plunger-cylinder.

The manner of combining the sections or lengths of the plunger 5 with the coupling 8 and the plug 9, and the operation of the same will be readily understood by those skilled in the art from the above description, in connection with the drawings, and therefore I will not describe the same here.

I have described my invention as especially adapted for hydraulic-elevator plungers; but the coupling may be used to connect together two or more sections or lengths of pipe for any purpose.

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

1. The combination, with two sections or lengths of a hydraulic-elevator plunger, of a coupling for connecting them together, extending within the adjoining ends of the sections and consisting of a wrought iron or steel tube provided with a collar encircling one or both ends and a central collar or thimble screw-threaded on its exterior surface to engage the screw-thread on the inner surface of the ends of the plunger-sections, substantially as set forth.

2. The combination, with two sections or lengths of tubular pipe, of a coupling for securing together said sections or lengths, adapted to extend within the adjoining ends of the same and consisting of a wrought iron or steel tube provided with a collar or projection on one or both ends, for the purpose stated, and a collar encircling the central portion of said tube, substantially as set forth.

3. The combination, with the lower end of a plunger of a hydraulic elevator, of a plug consisting of a tubular part having a collar thereon encircling one end and extending within the plunger, and an end thereon with enlarged curved sides, for the purpose stated, and provided with a screw-thread to engage the screw-thread on the end of the plunger, substantially as set forth.

4. The combination, with two sections or lengths of a hydraulic-elevator plunger, of a coupling for connecting them together, extending within the adjoining ends of said sections and consisting of a wrought iron or steel tube provided with a collar on one or both ends and a central collar or thimble, for the purpose stated, and a plug extending into the lower end of the plunger and provided with enlarged curved sides, for the purpose stated, substantially as set forth.

DWIGHT P. ALLEN.

Witnesses:
JOHN C. DEWEY,
EDMUND F. SEYMOUR.