

J. M. SEYMOUR.
DEVICE FOR LOWERING OBJECTS.

No. 547,459.

Patented Oct. 8, 1895.

Fig. 1.

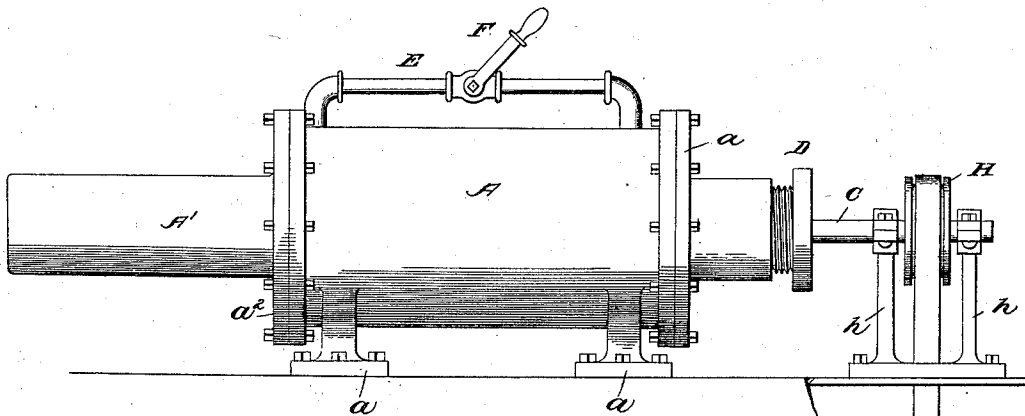


Fig. 3.

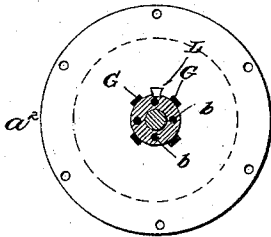
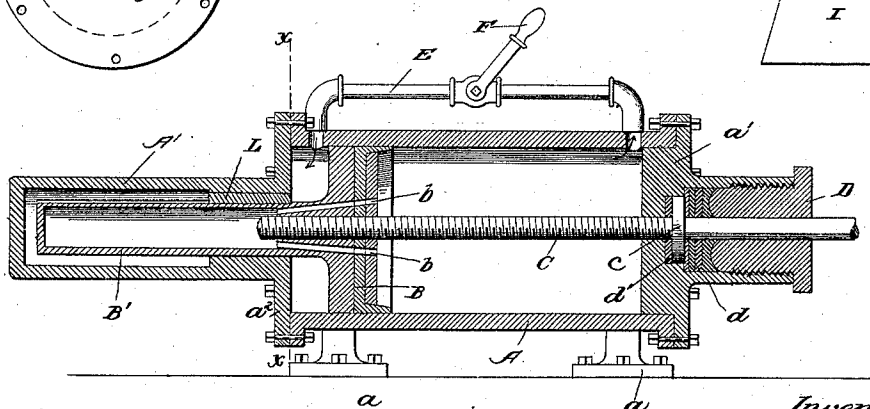


Fig. 2.



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Fig. 4.

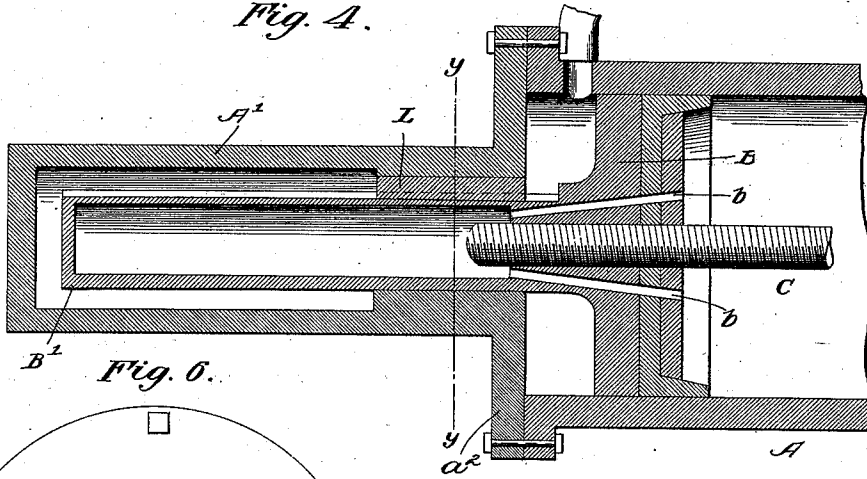


Fig. 6.

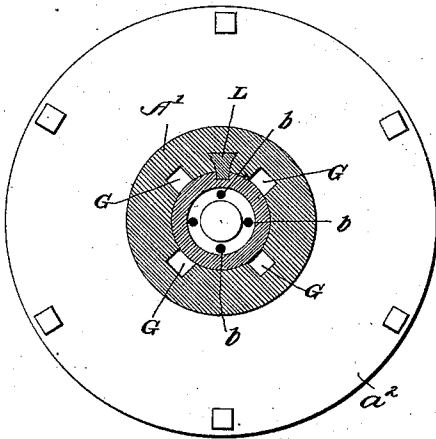


Fig. 7.

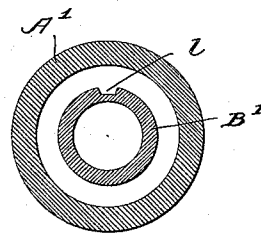
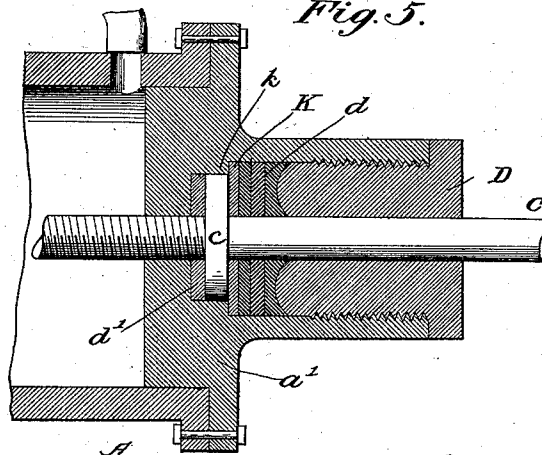


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES M. SEYMOUR, OF NEWARK, NEW JERSEY.

DEVICE FOR LOWERING OBJECTS.

SPECIFICATION forming part of Letters Patent No. 547,459, dated October 8, 1895.

Application filed July 3, 1895. Serial No. 554,856. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. SEYMOUR, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Devices for Lowering Objects; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved mechanism for lowering heavy objects of various kinds. In many of the arts and industries it is necessary to lower objects having more or less weight, being sometimes those that are of immense weight. This lowering is to be done surely and carefully, sometimes rapidly, often slowly, and generally with caution and care.

The object of this invention is to provide a means for this purpose whereby objects of any weight, no matter how great or how small, may be lowered as rapidly or as slowly as may be required with the expenditure of but a trifling amount of power, the whole device being simple, compact, and self-containing; and the invention therefore consists, essentially, in the construction, arrangement, and combination of parts and in numerous details and peculiarities thereof, substantially as will be hereinafter described and claimed.

In the annexed drawings, illustrating my invention, Figure 1 is a side elevation of my improved device for lowering objects. Fig. 2 is a longitudinal section of the same. Fig. 3 is a cross-section on the line xx of Fig. 2. Fig. 4 is an enlarged sectional view of the mechanism shown in the left-hand portion of Fig. 2, the same embracing the piston with its extension and the cylinder-head extension with which the piston extension telescopes. Fig. 5 is an enlarged sectional view of the mechanism shown at the right-hand end of Fig. 2, the same including the packing devices for the screw-shaft at the point where the latter passes through the right-hand head of the cylinder. Fig. 6 is an enlarged cross-sectional view similar to Fig. 3 and taken on the line xx of Fig. 2. Fig. 7 is a cross-sectional view on the line yy of Fig. 4.

Similar letters of reference designate corre-

sponding parts throughout all the different figures of the drawings.

A denotes a cylinder of suitable size and shape and adapted to contain a liquid or fluid—as, for instance, glycerine—which I have selected as suitable liquid for my purpose. The cylinder A is closed at one end by a head a' , attached thereto by means of bolts, as shown, and at the other end it is closed by a head a^2 , likewise attached by bolts, said head a^2 having a hollow cylindrical extension A' , which is closed at its outer end. The cylinder A is preferably mounted on the supports or legs $a a$, although I do not intend to be restricted to such a mounting and reserve the liberty of locating the cylinder wherever it may be needed in the performance of the work of the machine.

Within the cylinder A is the piston B, which is of suitable shape and size. This piston B is engaged by the screw-shaft C, which screws through the center of said piston, a screw-threaded central opening being made therein to receive the screw. In order to prevent leakage and for other purposes to be presently explained, it is necessary that the screw-shaft C shall not pass entirely through the piston, so as to project on the opposite side thereof; but this is ordinarily impossible, in view of the small thickness of a common piston and the considerable length of travel that the latter will have upon the screw, and consequently the piston must be provided with a chamber or receptacle whereby its width at the central point where the screw is located may be increased sufficiently to provide a cavity to receive the screw and yet not interfere with the travel of the piston upon the screw. This screw-receiving receptacle in the piston may be of any form and shape, it being only essential that the piston be provided with some sort of a receptacle wherein the end of the screw which passes through the center of the piston may find room to enter and rotate without projecting into the space upon the other side of said piston. One form of such receptacle I provide in the example of my invention shown in the drawings, where I illustrate a hollow elongated extension B' , which is made integral with the piston B and which is adapted to move telescopically with

the cylinder-head extension A', as is clearly shown in Figs. 2 and 4, said hollow extension B' being closed at its outer end, while its interior communicates with the opposite face of the piston B, and consequently with the interior of the cylinder A, through the ports or passages *b b*, of which there may be any suitable number—as, for instance, four—as shown in Fig. 3. It will therefore be understood that the hollow cylindrical extension B' is an integral part of the piston B, and that it may be made in any form and situated in any manner, provided only that it is adapted to receive the end of the screw-shaft, which screws through the center of the piston and enables said shaft to work, as it were, at all times inside of the piston without projecting entirely through the same, no matter what may be the length of the travel of the piston upon said screw-shaft. The rotation of the shaft C causes the piston B to travel in one direction or the other, according to the direction of rotation of said shaft, it being particularly noted that the shaft C has no endwise movement. Shaft C passes out of cylinder A through one of its heads, as head *a'*. A recess is formed in said head to receive the collar *c* on the shaft C. On one side of this collar *c* in the bottom of the said recess is a rawhide or other washer *d'*. On the other side of the collar *c* is a loose metal collar K, which is seated on a shoulder *k*, (see Fig. 5,) said shoulder being formed by an enlargement of the diameter of the recess within the head *a'* beyond the diameter of that portion of the recess wherein the shaft-collar *c* and the rawhide washer *d'* are situated, all as is clearly shown in the drawings. The object of the collar K is to prevent the packing, consisting of the several washers *d*, which are situated against the metal collar K, from pressing upon the shaft-collar *c* when they are being compressed. Thus the shaft-collar *c* is allowed to revolve freely between the washer *d'* and the metal collar K. The packing *d* may be of any suitable material, as rawhide, or any other convenient substance, and it is held in place by means of the stuffing-box, and is compressed against the metallic collar K by means of the screw-gland D, through which the shaft C passes. The outer part of the shaft C is journaled in the standards or supports *h h* and preferably carries a pulley H between these supports. The pulley H may, however, if desired, be located at any other convenient and suitable point upon the shaft C. Around this pulley H passes a belt *i*, and this is fastened to the weight I, which is to be lowered. It will be understood, of course, that I do not wish to be confined to any particular means for connecting the screw-shaft C to the weight which is to be lowered, and reserve the liberty of carrying out this part of my invention in any desired manner. Although the piston B is designed to travel upon the screw-shaft C in consequence of the rotation of said shaft, yet it must be distinctly understood that the

piston itself is non-rotative. I have already stated that the piston extension B' occupies a position within the cylinder-head extension A'; hence there will be an annular space between the parts A' and B'. On the interior of the part A', which I have said surrounds the part B', is a rib, tongue, groove, lug, or other projection L, which is either integral with the extension A' or is attached thereto by being seated in the groove therein, as shown in Fig. 6, or by being attached in some other suitable manner, and this rib or tongue engages with the groove *l* in the piston extension B', as will be clearly seen by referring to Figs. 4, 6, and 7, being thus a sort of feathered connection between the two telescopic parts A' and B', so that the piston is prevented from rotating, although permitted to have a longitudinal travel. It is manifest, however, that this connection between these two parts may be made at some other point than that shown in the drawings, if desired, or a connection may be made direct between the piston and the cylinder, or some other connection of a different character or involving different specific mechanical means may be employed for the same purpose without departing from my invention. At the point where the piston extension B' enters into the cylinder-head extension A', or, in other words, at the point where the extension B' passes through the cylinder-head *a'*, there is a closed joint, through which the extension B' moves when the piston B reciprocates, and around this joint are a few ports or passages G G—say four of them, for instance—which lead from the interior of cylinder A into the annular space between the extensions A' and B'. (See Figs. 3, 4, and 6.) A pipe, conduit, or channel E of some suitable sort extends from a point in the wall of cylinder A near the head *a'* to a point in the wall near the other head *a'*, and serves to connect the interior parts of cylinder A on the opposite sides of piston B. This pipe E is provided with a valve or cock F to control the passage of fluid through the pipe E, and thus release the pressure.

The operation of my improved mechanism for lowering weights is as follows: The cylinder, cylinder-head extension, piston extension, and the pipes will first be filled with a suitable liquid. I mentioned glycerine as suitable for this purpose because it will not freeze. This quantity of liquid, after the device is once charged therewith, will be kept constant. Hence the interior working parts of the device will be thoroughly submerged within the liquid and will be efficiently lubricated thereby, since all their movements will take place within the liquid. Hence there will be scarcely any friction on the moving parts because of this thorough lubrication. Now if the weight to be lowered be suspended at I it will tend to revolve the shaft C. If the valve F is closed, however, it will be impossible for the shaft C to revolve, as the piston B cannot move, press-

ing as it will against any unyielding mass of liquid in the cylinder. If the valve F be opened more or less so as to release this pressure, which is against the piston, and permit the liquid to pass through the valve, then the piston can move. Therefore when valve F is opened the weight I will descend, the speed of the descent being regulated and governed by the valve F. It is to be noted that all of the pressure is on the right-hand side of the piston and that the function of the valve F is simply to release this pressure by allowing more or less of the mass of liquid on the right hand of the piston to pass through pipe E to the other side of the piston, on which other side there is obviously no pressure, but the space at that point is used simply to receive the liquid which flows out from the advancing side of the piston. With the valve F wide open, the weight will drop quickly. With it open only a little, the descent of the weight may be so gradual as to be imperceptible. The gravity-action of the heavy weight obviously is to rotate the screw, which we have seen is immovable endwise, and this rotation is permitted to take place as rapidly as the opposing fluid in the cylinder against the piston will permit. As the piston moves along on the screw, the end of the latter enters the piston extension or piston-receptacle and displaces a certain amount of fluid therein which must find exit through the ports *b b*. This is essential to the correct operation of the device. Without these ports *b b* the screw could not of course enter the mass of liquid within the extension B' without bursting the wall of said extension, since the shaft must displace a certain amount of fluid. When the screw-shaft withdraws from the extension B', the space which it occupied therein will be filled with liquid through the ports *b*. The device would be absolutely inoperative without the use of the piston-chamber which receives the end of the screw, because without such chamber the screw would then be permitted to enter the liquid on the opposite side of the piston and there would be a leakage through the joint at the center of the piston, which would destroy the effective operation of the latter. It will be noticed that the head *a'* of cylinder A can be held in place with sufficient firmness by a very few bolts, because when the screw-shaft is revolving the collar *c* is exerting a pressure on the head *a'* to hold it on the cylinder. The relative movement of the piston B and the weight I will depend upon the number of threads in the screw C. Suppose that this screw has three threads to the inch and

that the pulley H has a diameter of four inches or a circumference of a foot, then the weight will drop a foot at each revolution of the screw, and for one inch movement of the piston the weight will drop three feet.

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

1. In a device for lowering objects, the combination with a fluid-containing cylinder having one end provided with a hollow extension, of a piston having a hollow extension entering the aforesaid extension and with ports on its face, a screw-shaft passing into the piston, and a valve-provided passage connecting the ends of the cylinder, substantially as described.

2. The combination of the fluid-containing cylinder, the piston having a hollow extension and ports running from the face of the piston into said extension, a screw-shaft engaging said piston and provided with a collar to prevent endwise movement, a pulley on the screw-shaft, and means for releasing the fluid from the advancing face of the piston.

3. The combination of the fluid cylinder having a closed hollow extension at one end, ports leading thereinto from the cylinder, a piston having a closed hollow extension which telescopes with the cylinder extension, ports in the piston leading from the hollow extension to the piston-face, a screw-shaft engaging the piston, a passage connecting the ends of the cylinder, and a valve in said passage, substantially as described.

4. In a device for lowering objects, the combination with the fluid-containing cylinder, of a chamber-provided piston therein, means for preventing the rotation of the piston but permitting its longitudinal movement, a screw-shaft engaging a piston without passing to the other side thereof, and a valve between the ends of the cylinders.

5. In a device for lowering objects, the combination with the fluid-containing cylinder, of a piston therein having a chamber, a screw-shaft engaging the piston without projecting through to the other side thereof, means for controlling the movement of the fluid from one side of the piston to the other, and means for connecting an object to the screw-shaft.

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

JAMES M. SEYMOUR.

Witnesses:

NATHAN F. DENTON, Jr.,
ADELBERT M. HARRIS.