(No Model.) 3 Sheets—Sheet 1.

E. S. & W. A. McKINLAY

HOISTING MACHINE.

No. 311,251. Patented Jan. 27, 1885.

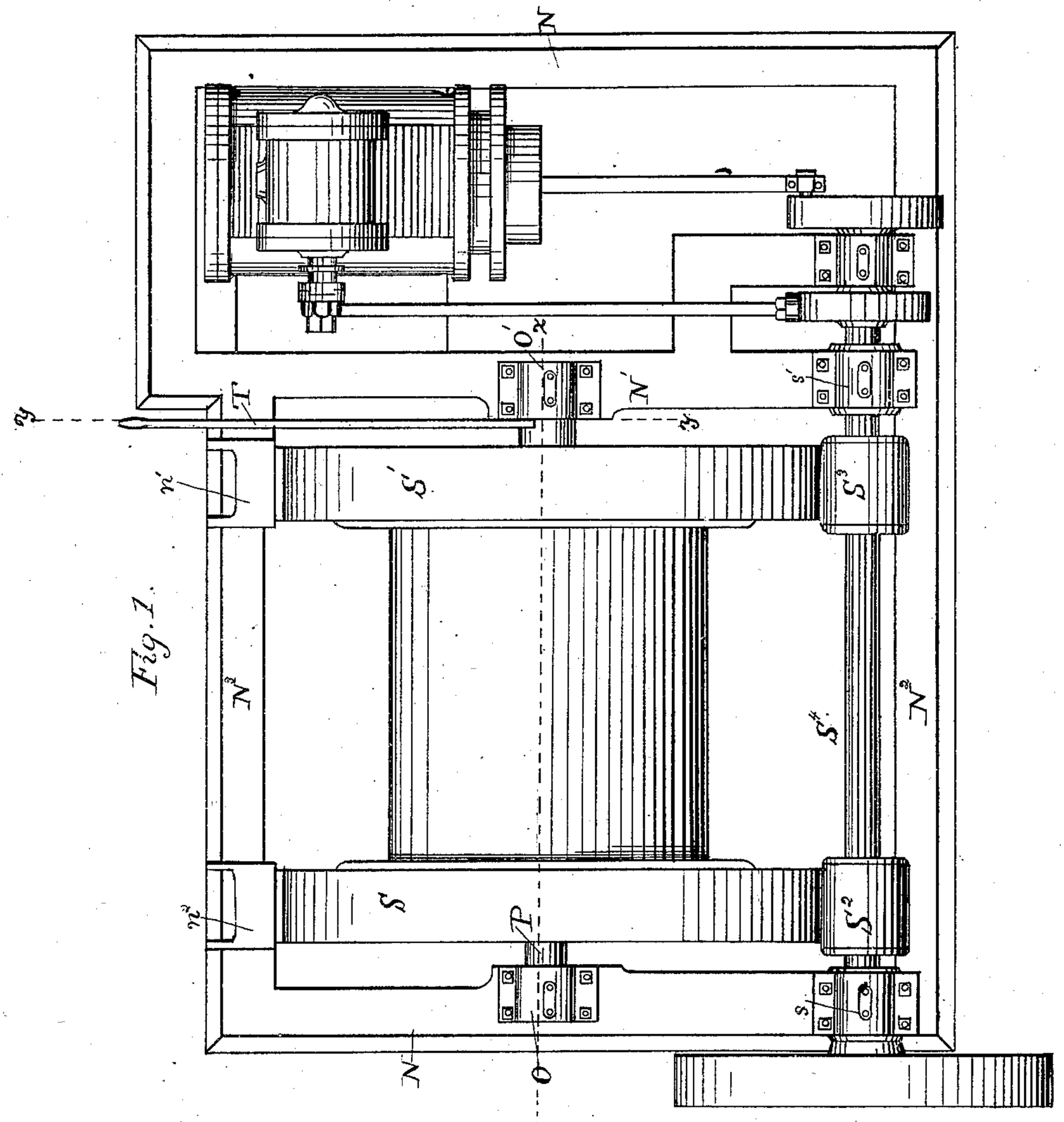

Fig. 1.

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Fig. 4.

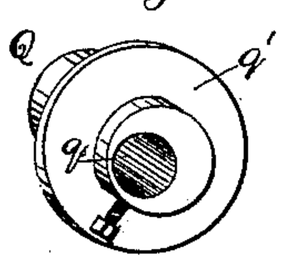


Fig. 3.

Fig. 2.

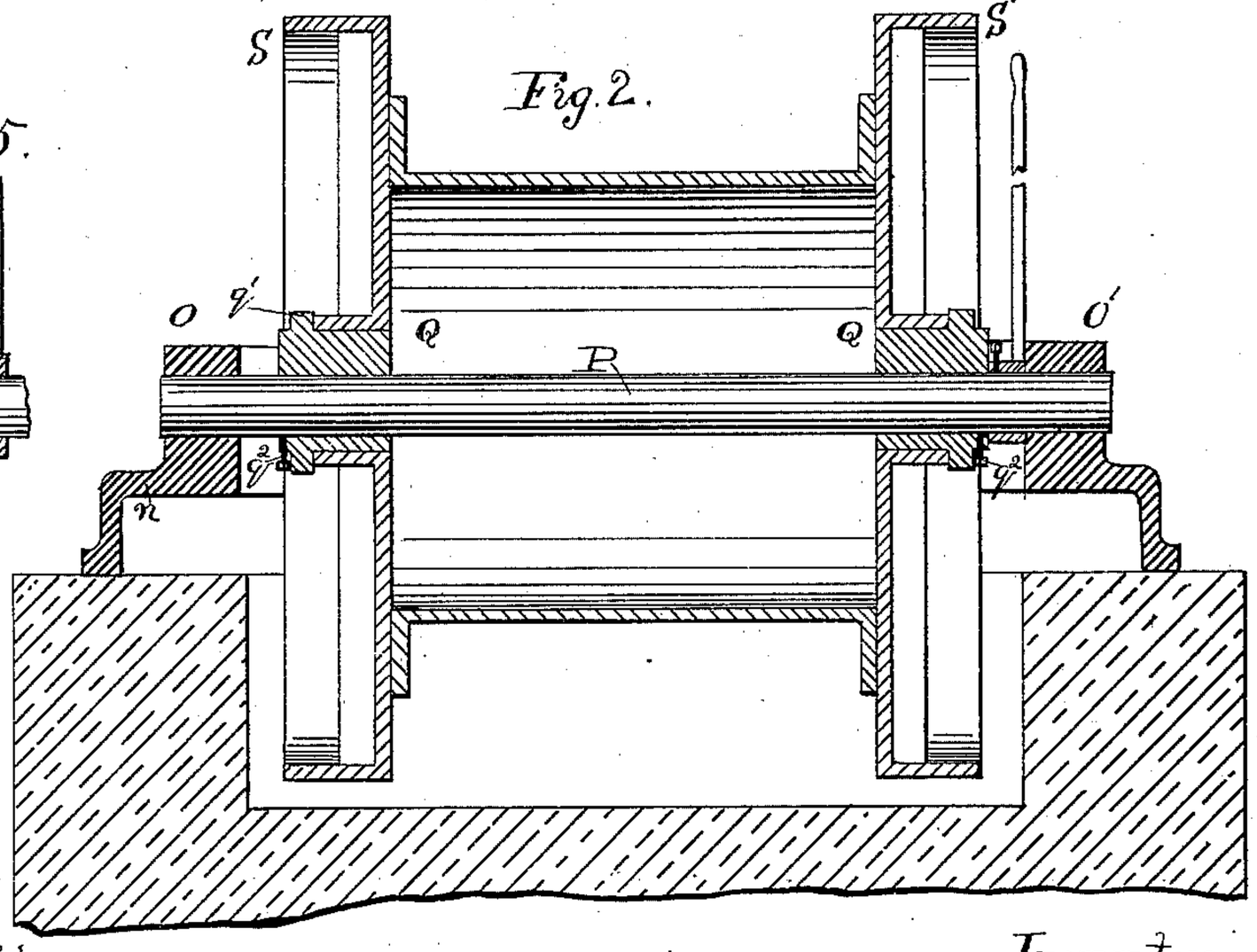
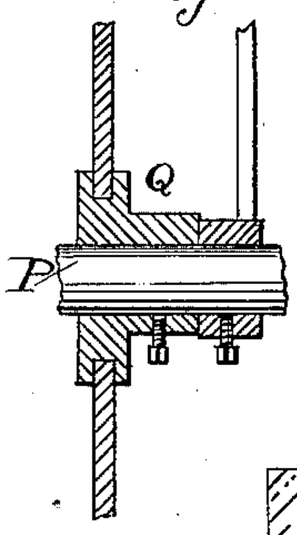


Fig. 5.



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HOISTING MACHINE.

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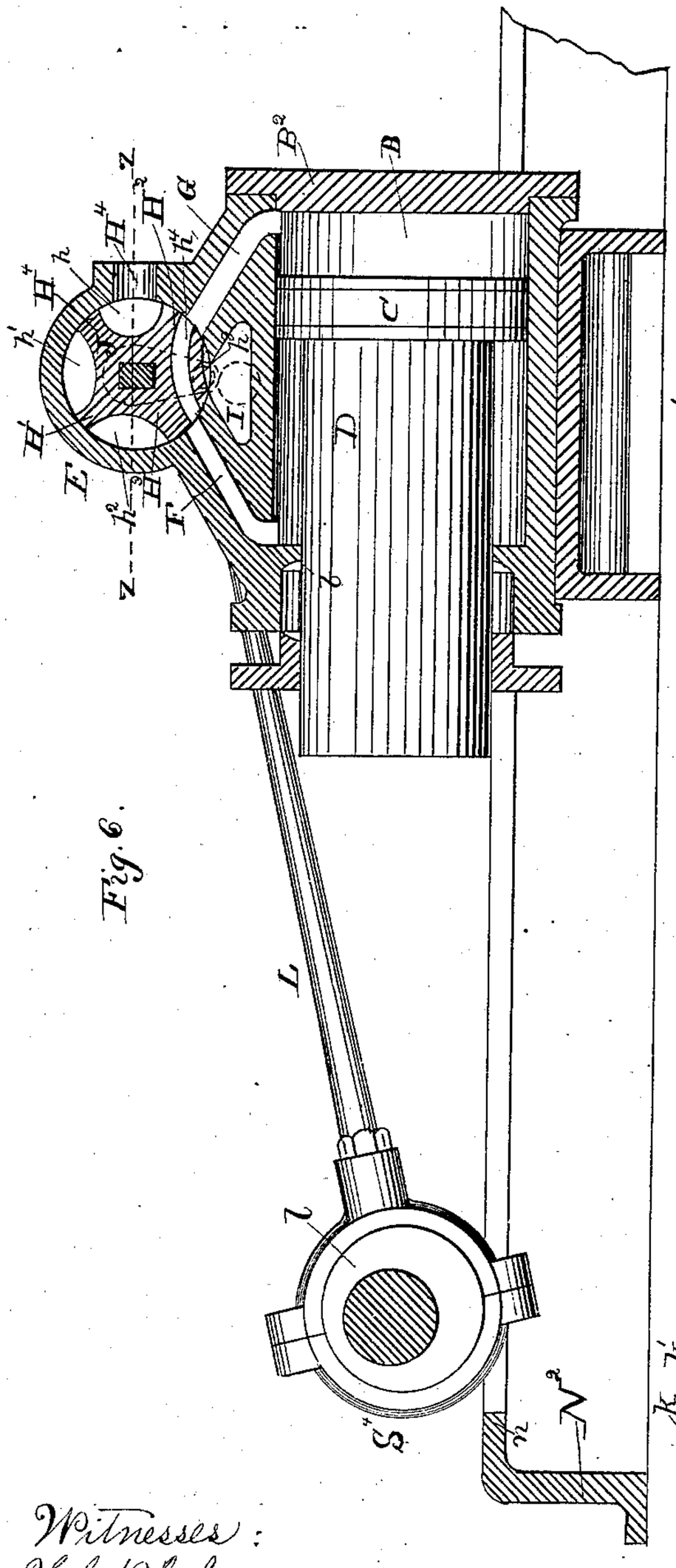

Fig. 6.

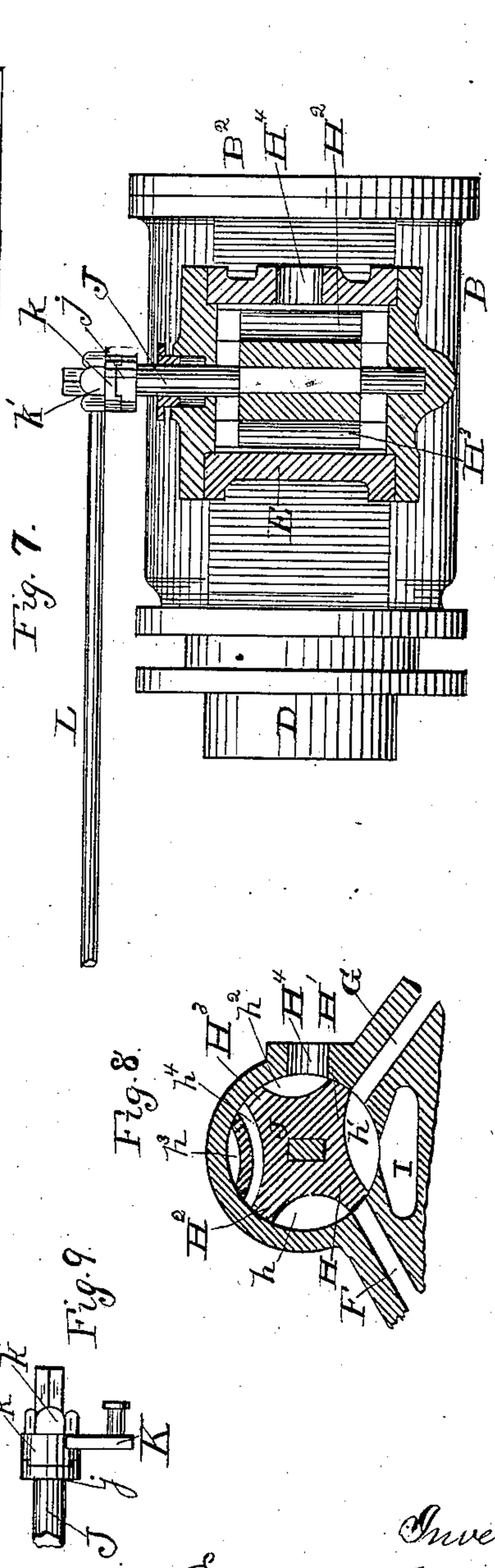

Fig. 7.

Fig. 8.

Fig. 9.

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UNITED STATES PATENT OFFICE.

EDWARD S. McKINLAY AND WILLIAM A. McKINLAY, OF SOUTH PUEBLO, COLORADO.

HOISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 311,251, dated January 27, 1885.

Application filed April 8, 1884. (No model.)

To all whom it may concern:

Be it known that we, EDWARD S. McKINLAY and WILLIAM A. McKINLAY, citizens of the United States, residing at South Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Hoisting Machines and Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a plan view of a hoisting mechanism embodying our improvements. Fig. 2 is a cross-section on line *x x*, Fig. 1. Fig. 3 is a view partly in end elevation, partly in section, the section being taken on line *y y*, Fig. 1. Fig. 4 shows one of the drum-bearings in perspective. Fig. 5 is a sectional view of a modified form of bearing. Fig. 6 is a longitudinal section through the engine. Fig. 7 is a section on the line *z z*, Fig. 6. Fig. 8 shows the valve in its inverted position. Fig. 9 is a view of the valve-crank detached.

The machine shown is mounted upon a metal frame cast with the end pieces, N N′, and the front and rear sills or connecting-pieces, N^2 N^3. The walls of the frame preferably consist of upwardly-extending plates and horizontal flanges *n*, upon which latter the engine and shafts are mounted. On the part N^3 there are cast also upwardly-extending arms or standards n' n^2, which have sockets adapted to receive brake-blocks, to be hereinafter described.

At O O′ bearings are provided for the drum-shaft. This shaft is represented by P. It is straight from end to end, unlike the shafts that have been used in this class heretofore for carrying the drum, they having been commonly provided with eccentric journals at the ends. There are disadvantages incident to the shafts alluded to last above, and these disadvantages we aim to overcome by our improved construction.

Upon the shaft are placed and to it are secured by keys or set-screws bearings Q for the drum, which may be cast in the form of short sleeves having the apertures through them situated eccentrically to the axis of the sleeve, as shown in Figs. 4 and 5. Upon these the drum is mounted, the latter having at the ends suitable hubs or central supports to fit the outer surface of the bearings Q. The bearing-pieces may be cast with flanges or rims to serve as guides or stops for the drum; or other equivalent means for holding the drum in place relative to the bearings may be employed. In Figs. 2, 3, and 4 a bearing-piece is shown having the characteristics above described, the shaft-aperture being shown at *q*, and a flange being shown at *q′*. It will be seen that these bearing-pieces may be readily inserted into the hubs or central supports of the drum and secured to the shaft. If they are secured by means of set-screws, as at q^2, their positions relatively to the driving friction-wheels may be easily adjusted.

S S′ represent the large friction-wheels at the ends of the drum, respectively. They are provided with comparatively broad peripheries, which engage with the driving friction-wheels S^2 S^3. These latter are secured to the power-shaft S^4, which is mounted upon the bed-frame N N′ N^2 at *s s′*. To this shaft S^4 power is imparted from the engine, and when the surfaces of the driving-wheel S^2 S^3 are in engagement with the wheels S S′ the drum will be rotated. The wheels S S′ and the drum are shifted to and from the wheel S^2 S^3 by means of one or more levers, T. The latter has a hub or ring at the inner end, which is secured to the shaft P separately from the eccentric-bearings Q.

By employing separate bearing-pieces, such as those described and shown at Q, for supporting the drum upon the shaft we not only provide for a better adjustment of the drum relatively to the driving-wheels, but also permit the substitution of one bearing for another when worn. When the shaft itself is depended upon to directly support the drum, the whole shaft must be shifted in effecting an adjustment and must be withdrawn and another substituted when impaired by wear.

With the parts above described we have combined an improved form of engine, which we have devised and found to be well adapted for driving a hoisting mechanism. This engine is supported upon the bed-frame above described.

B represents a cylinder having the head B′ with an inwardly-projecting annular flange at *b*, and having the head B^2 secured thereto by bolts in the usual manner.

C represents the piston within the cylinder

B, it having a trunk or hollow cylinder, D, attached thereto in the manner of engines of this general class, said trunk or cylinder projecting forward through the aperture within the flange *b*. The connecting-rod or pitman may be attached to or have its end surrounded by this cylinder D in any of the ordinary ways.

E represents the valve-chest, its interior being hollow and cylindrical. It communicates with the interior of the cylinder B through ports F and G, and through a pipe attached at H^4 it receives steam or compressed air. Within the valve-chest is mounted the rocking valve having the radial arms or plates H H′, and the somewhat thicker arms or plates H^2 H^3, these arms or plates being so formed or arranged as to have three large passage-ways, *h h′* h^2, and the small passage-way h^3, situated substantially parallel with the axis of the valve. h^4 is a cross passage-way or port from the outer end of the arm or plate H^2 to the outer end of the arm or plate H^3.

I is the exhaust port or passage, and with it one or another of the ports or passages above named is adapted to register, according to the movements of the parts.

The valve is secured upon the shaft J, which is mounted in suitable bearings at the ends of the valve-chest. The shaft projects through the valve-chest at one end, and has attached thereto a crank, K, to which is pivoted the valve-rod L, driven by the eccentric *l* on the main shaft S^4. The crank K is connected rigidly with the shaft J of the valve by means of a two-part clutch, one part being carried by the shaft and the other by the crank. As shown, the clutch is formed of plates or disks *j* and *k*, each having teeth or projections adapted to interlock. *k′* is a nut engaging with a thread upon the shaft, and by it the two parts of the clutch can be clamped rigidly together after the crank K has been turned to the proper position.

When the parts are in the position shown in Fig. 6, the steam or compressed air enters the valve-chest through the port H and passes therefrom into the port F, and from this to the forward or trunk side of the piston, where it exerts its pressure until the stroke is completed. In the meantime the exhaust-port I is in communication with the port G, so that the steam or air exhausting from the other side passes through the port I and escapes from the cylinder. As the piston completes its stroke from the pressure on the trunk side the eccentric shifts the valve into the opposite position, so that the escape of steam from the valve-chest is prevented until the port h^4 connects the ports F and G. Thereupon the steam passes from the trunk side of the piston to the opposite side through the ports last mentioned, and the piston is caused to move by reason of the greater area exposed to the steam on the rear side. After the piston has made the reverse stroke the valve is again shifted, so as to admit steam through the port F, when a similar series of operations result. The volume of steam or air which is discharged from the trunk side of the piston to the opposite side by its expansion drives the piston back though no further supply of steam or air is admitted during the return-stroke. When, however, it is desired to increase the efficiency of the engine by admitting live steam or air to cause each stroke of the piston, this can be accomplished by turning the valve only half-way round, as shown in Fig. 8, the turning of the valve and its reclamping being permitted by the devices above described. After the valve has been put into this position it will be seen that the steam or air which passes through the port F to the trunk side of the piston is exhausted therefrom, not to the opposite side of the piston, but directly to the exhaust-port I, and also that the steam or air which passes to the rear side of the piston comes directly from the chest through the port *h′*, and that, therefore, it acts with all the pressure that it has in the boiler, or, in the case of air, in the compressor or reservoir. There are many times when it is desirable to thus increase the efficiency of the engine, and this can readily be accomplished by these devices.

It will be seen that the parts are exceedingly simple in construction, and that the engine is much more compact than many that have been heretofore used, and, further, that the adjustment of parts necessary can be instantly effected.

It will be also seen that the bearings for the drum are formed separately from the lever and from the lever-fastenings; and, therefore, they can be adjusted independently of the lever, and the throw of the drum toward and from the driving-wheels can be regulated without affecting the position of the lever.

We do not in this application claim any of the features shown and described relating to the engine, as we propose to make this the subject-matter of another application.

What we claim is—

1. The combination, with a hoisting-drum, the shaft of uniform diameter from end to end, and the lever, of the bearing-piece for the drum formed separately from the lever and from the lever-fastening devices and secured independently thereof to the shaft, substantially as set forth.

2. The combination, with the drum, the shaft of uniform diameter from end to end, and the lever, of the drum-bearing formed separately from the lever and from the lever-fastening devices, and secured to the shaft adjustably and independently of the lever, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

EDWARD S. McKINLAY.
WILLIAM A. McKINLAY.

Witnesses:
M. V. B. BENSON,
P. C. McKINLAY.