2 Sheets—Sheet 1.

E. O. HOWLAND.

Lifting-Jack.

No. 205,865. Patented July 9, 1878.

Fig. 1.

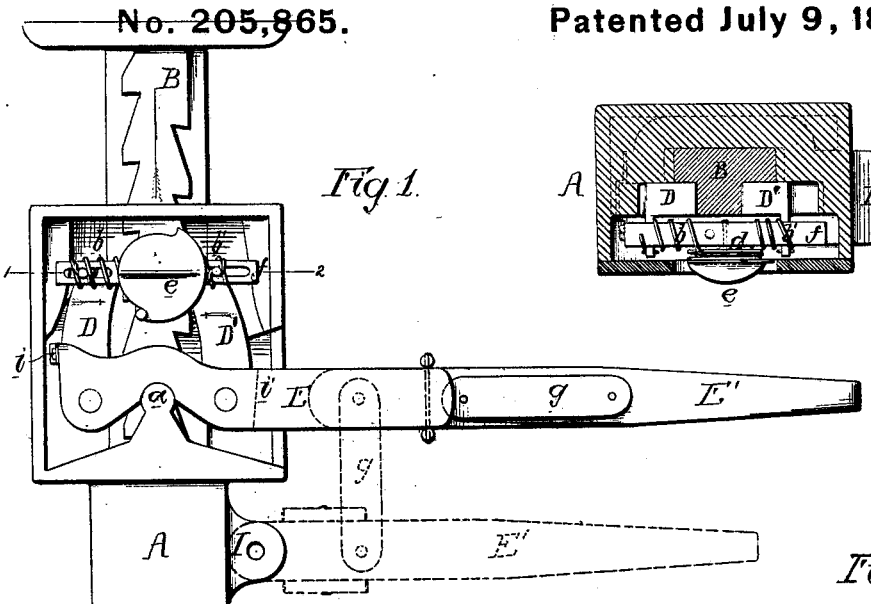


Fig. 2.

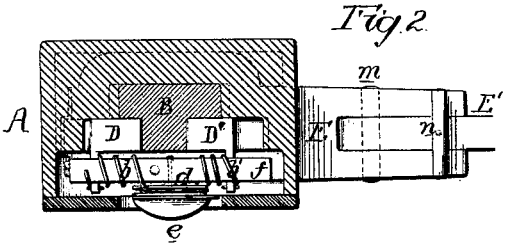


Fig. 3.

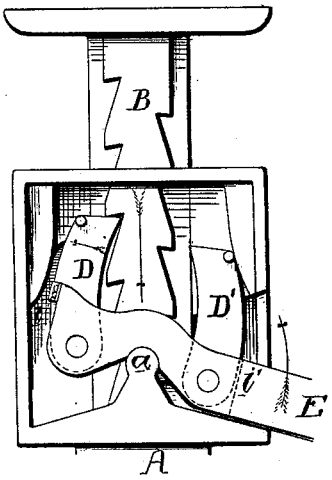


Fig. 7.

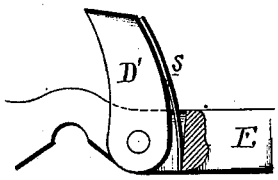


Fig. 4.

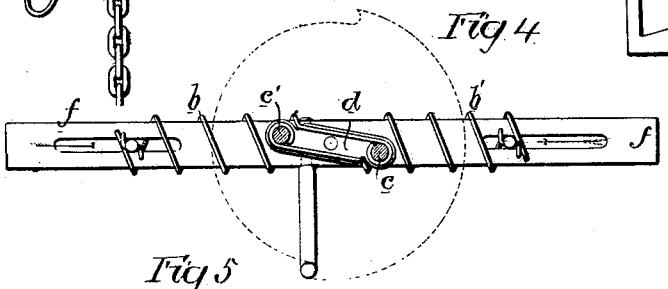


Fig. 5.

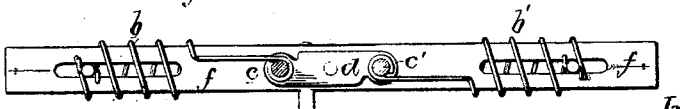
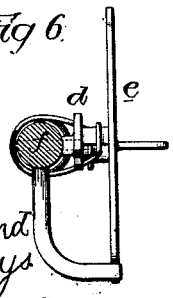


Fig. 6.



Witnesses.
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Harry Smith

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Edgar O. Howland
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2 Sheets—Sheet 2.

E. O. HOWLAND.
Lifting-Jack.

No. 205,865. Patented July 9, 1878.

Fig. 8.

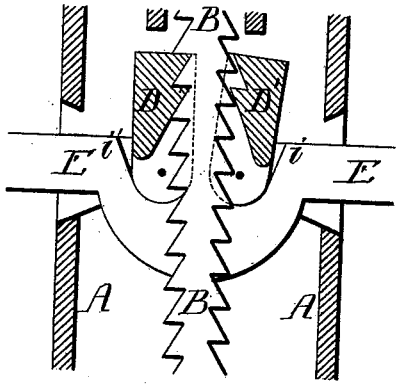


Fig. 9

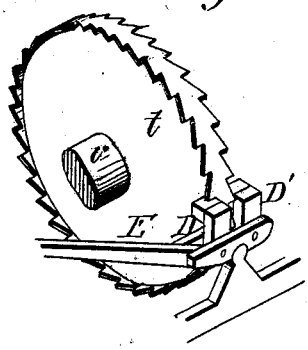
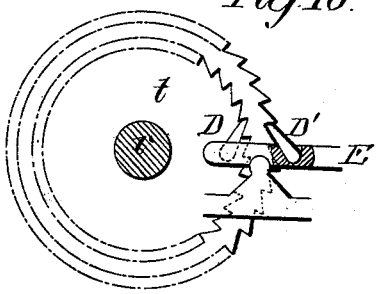


Fig. 10



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Edgar O. Howland
by his Attorneys
Howson & Son

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UNITED STATES PATENT OFFICE.

EDGAR O. HOWLAND, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN LIFTING-JACKS.

Specification forming part of Letters Patent No. **205,865**, dated July 9, 1878; application filed May 31, 1877.

To all whom it may concern:

Be it known that I, EDGAR O. HOWLAND, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Lifting-Jacks, Windlasses, or Capstans, of which the following is a specification:

The objects of my invention are to construct a powerful and compact lifting-jack, windlass, or capstan, to effect either the raising or lowering of the jack, or the winding or unwinding of a rope or chain, by the operation of the same lever, and to improve the general construction and operation of the device. These objects I attain in the manner which I will now proceed to describe.

I have illustrated my invention principally as applied to a lifting-jack, and will describe it mainly in that connection; but it should be understood that its main features are equally applicable to windlasses, capstans, and the like.

In Sheet 1 of the drawings, Figure 1 represents a side view, partly in section, of a lifting-jack with my improvements; Fig. 2, a sectional plan on the line 1 2; Fig. 3, a view of the upper portion of Fig. 1 with the parts in a different position; and Figs. 4, 5, 6, and 7, detached views drawn to an enlarged scale and illustrating portions of the jack.

A is a standard, in which is arranged to slide the guided stem B, and on the latter are formed two sets of ratchet-teeth, to which are adapted pawls D D′ carried by an operating-lever, E.

In the under edge of this lever, at each side of the same and midway between the pawls D D′, is formed a curved recess, to which is adapted a curved lug, *a*, forming part of the adjacent side of the standard of the jack, these lugs thus serving as pivots upon which the lever can be vibrated.

To a pin near the top of the pawl D is connected one end of a spring, *b*, the opposite end of which is attached to a pin, *c*, extending from one end of a pivoted plate, *d*, and connected at the outer end to a disk, *e*, which is provided with means by which it may be readily turned, and which projects through an opening in the cover-plate of the jack, so as to be accessible.

From the opposite end of the plate *d* extends a pin, *c′*, to which is attached one end of a spring, *b′*, connected at its opposite end to a pin on the pawl D′.

The plate *d* is carried by a bar, *f*, supported by the pins which serve to connect the springs to the pawls, the bar *f* being slotted to the extent demanded by the movement of the pins.

On the lever E, adjacent to the rear edges of the pawls, are formed abutments *i i′*, for a purpose rendered apparent hereinafter.

The lever E has an extension, E′, to which it is connected by means of the pin *m* and turn-buckle *n*; and said extension E′ has at each side pivoted strips *g*, as shown in Fig. 1.

By removing the pin *m* and moving the turn-buckle *n* to a position in line with the lever the extension E′ may be removed, and can then be hung to lugs I on the standard A, and connected to the lever E by means of the strips *g*, so as to produce a compound lever for operating the pawls, as shown by dotted lines in Fig. 1.

The opening in the standard A of the jack extends completely through the same, and the lower end of the stem B is provided with an eye, *p*, while to the base of the jack is connected a hook, *q*. By this means the jack is adapted to operate upon objects beneath its foundation or base, a chain connected to the object being first hooked to the eye *p* and the stem B raised to its fullest extent, the hook *q* being then engaged with one of the links of the chain, which it supports, while the stem B is being lowered preparatory to taking a fresh hold on the chain at a lower point.

The mode of operating the above-described jack is as follows: When it is desired to lift the load the disk *e* and plate *d* are adjusted to the position shown in Figs. 1, 2, and 4, the pin *c* of the said plate *d* being then in the position farthest from the pin on the pawl D and the pin *c′* in the position farthest from the pin on the pawl D′. This causes the stretching of the springs *b b′*, the tendency of which is thus to draw the pawls inward and cause them to engage with the teeth of the stem B, so that the operation of the jack is the same as that of an ordinary jack with spring-pawls.

When it is desired to lower the load, however, the disk *e* and plate *d* are turned to the position shown in Fig. 5, the pin *c* being thus thrown

over to the position nearest the pin on the pawl D, and the pin c' to a similar position in respect to the pin on the pawl D′. The springs b b' are thus compressed and caused to push upon the ends of the pawls D D′, and tend to throw them away from the teeth of the ratchet on the stem B.

Suppose the parts to be in the position shown in Fig. 3, the weight of the load being upon the pawl D and the pawl D′ being thrown out by its spring. On elevating the lever E the pawl D and stem B will be lowered and the pawl D′ raised, as shown by the arrow, the abutment i' on the lever pressing upon the rear edge of the pawl D′, so as to overcome the force of the spring b' and force the pawl into gear with the teeth. After the pawl has been caused to engage with the tooth the movement of the lever E in the same direction is continued, so as to slightly lift the stem B, and thus free the pawl D from the pressure of the tooth with which it is engaged, the spring b throwing the pawl away from the teeth as soon as this release is effected.

The lever is now depressed, so as to lower the pawl D′ and stem B, the pawl D rising and being acted upon by the abutment i in the same manner as the pawl D′ was previously acted upon by the abutment i'. This operation is repeated until the load has been lowered to the desired extent.

In order to insure such action of the abutments as will in all cases effect the proper engagement of the pawls with the teeth, a spring, s, may be inserted between the two, as shown in Fig. 7.

In Fig. 8, Sheet 2, I have shown a slightly modified mode of hanging the pawls D D′ to the lever, and the latter to the standard or frame. The lever in this case has a rounded projection adapted to a concave recess in the frame, and the pawls have circular lower ends adapted to circular recesses in the lever. I prefer this mode of constructing the pawls, because it removes the strain from the pivot-pins and transfers it to the body of the lever, the pins merely serving to prevent the pawls from rising out of their proper position.

In applying my invention to a capstan or windlass, I adopt the plan shown in Figs. 9 and 10, in which the pawls D D′ act upon a rack formed around the edge of a disk or flange, t, carried by the central shaft u of the capstan or windlass.

It is not necessary that the exact form of toothed stem B or the exact arrangement of lever and pawls shown should be used in all cases, as the construction and arrangement may be modified in various ways without departing from the main idea—that is, the lever having two pawls adapted to teeth on the same stem. Neither is it necessary that the exact form of springs or shifting devices shown should be used in connection with the pawls. For instance, a plate or bar spring might be substituted for the spiral springs, and a sliding plate or plates might be used in place of the rotating shifting device shown.

I claim as my invention—

1. The combination, in a hoisting-jack, capstan, or windlass, of the following elements, namely: A toothed stem, an operating-lever carrying two pawls adapted to the teeth of the stem, abutments adjacent to the pawls, a spring or springs for acting on said pawls, and a device, substantially as described, whereby the action of the said spring or springs on the pawls may be reversed, all substantially as and for the purpose specified.

2. The combination of the sliding stem B and its eye p with the standard A, open at the bottom and provided with a supporting-hook, as specified.

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

EDGAR O. HOWLAND.

Witnesses:

HERMANN MOESSNER,

HARRY SMITH.