(No Model.) 4 Sheets—Sheet 1.

E. M. ROBINSON.

LIFTING JACK.

No. 555,265. Patented Feb. 25, 1896.

Fig. 1.

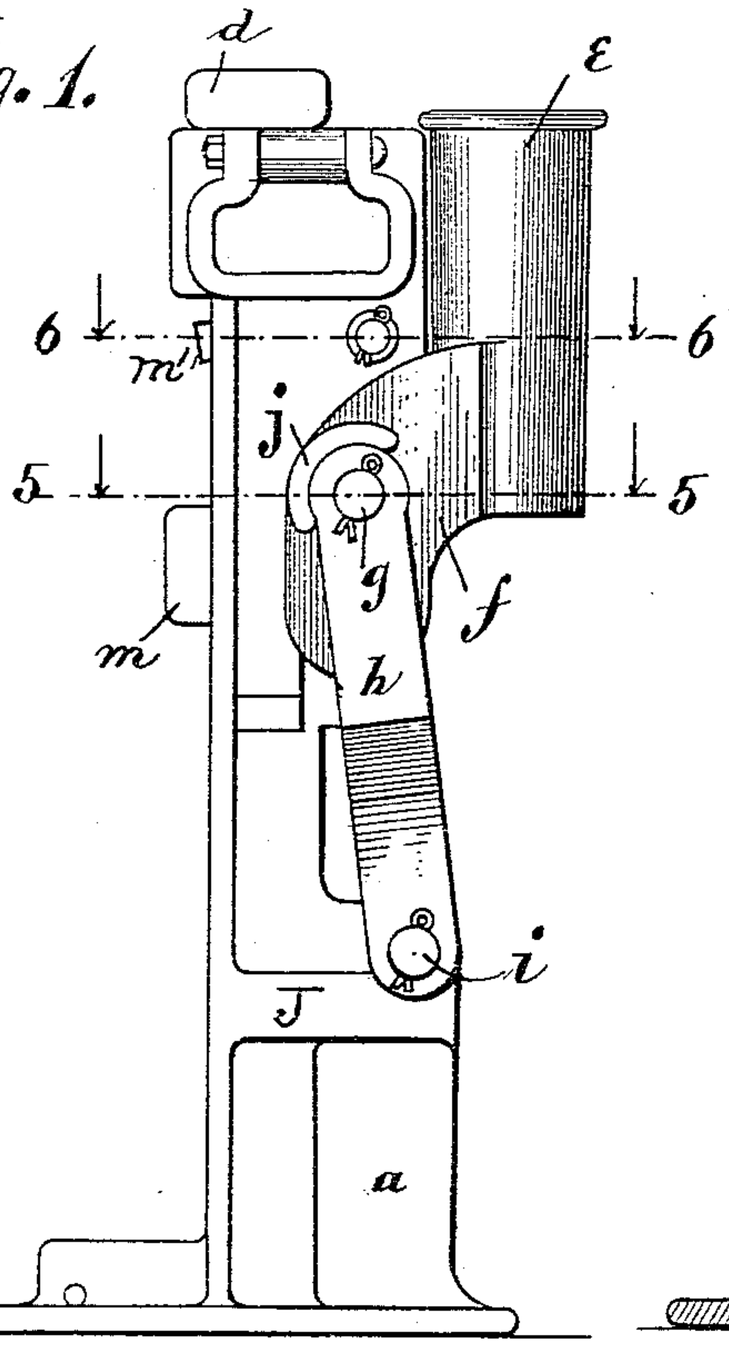
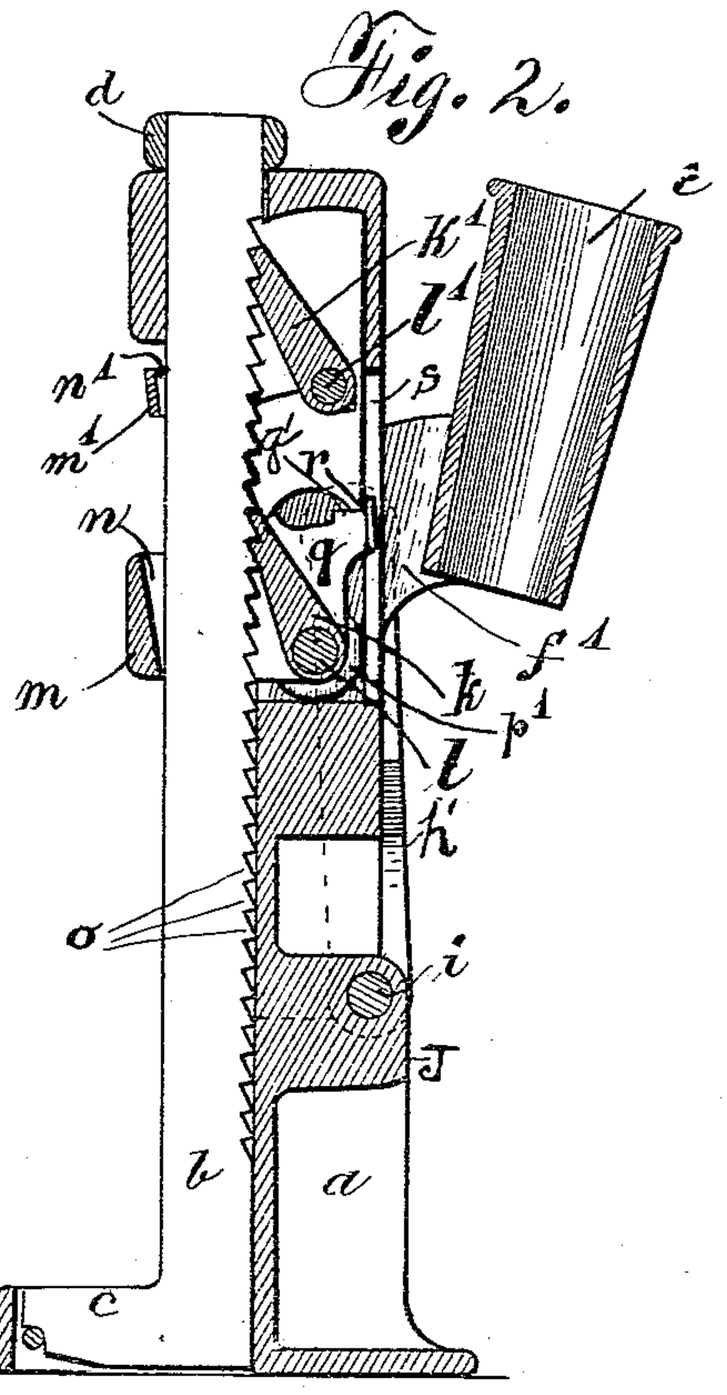


Fig. 2.



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(No Model.) 4 Sheets—Sheet 2.

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Fig. 3.

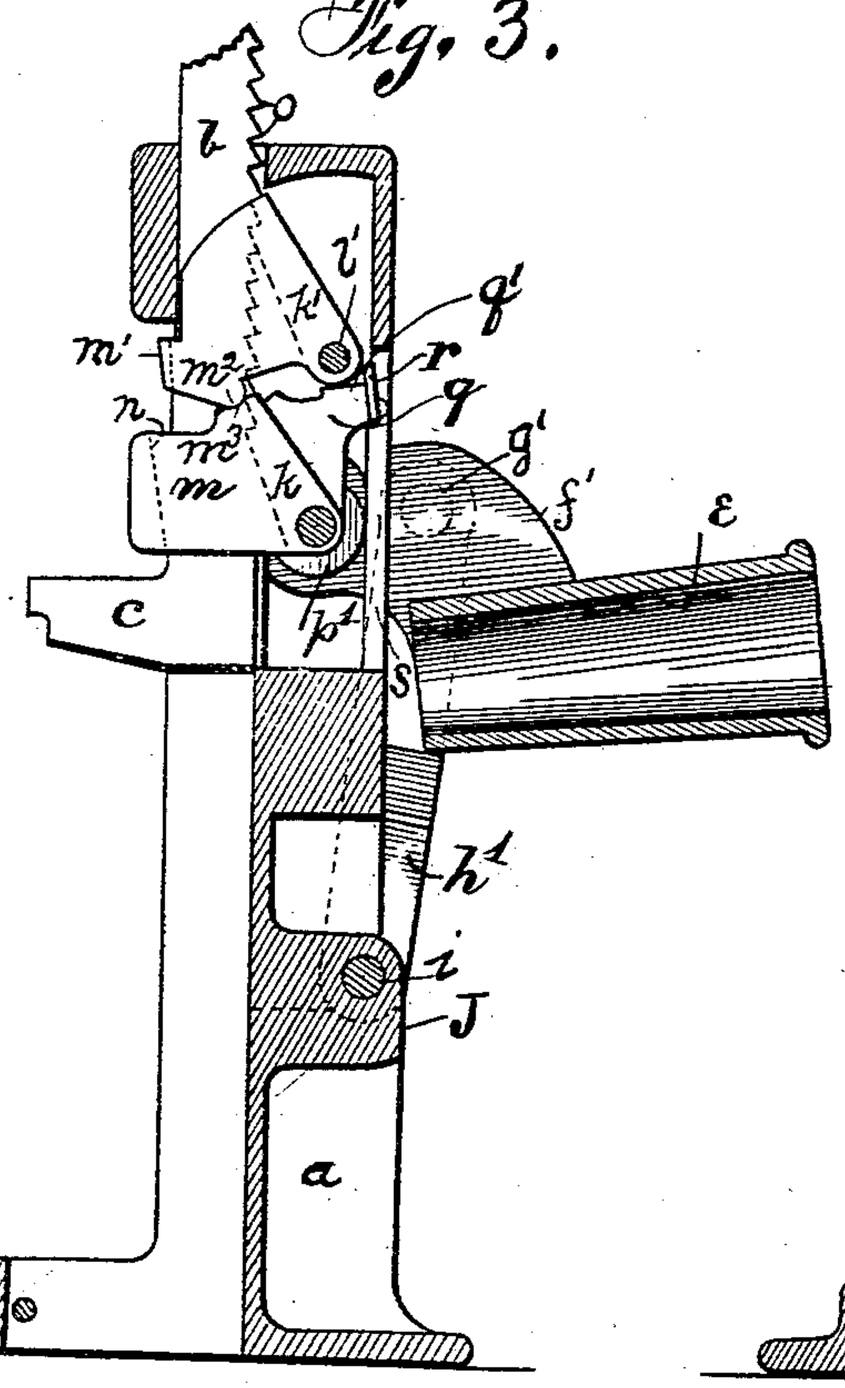

Fig. 4.

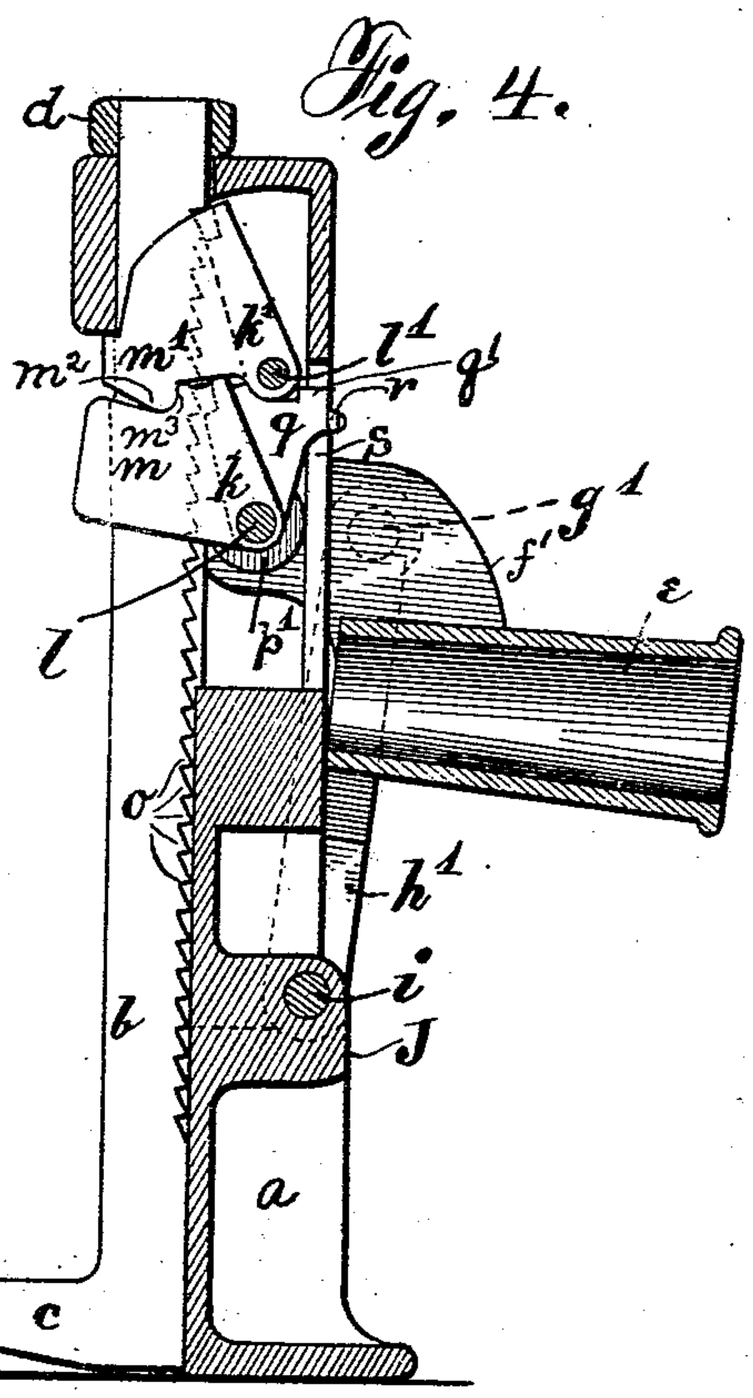

Fig. 5.

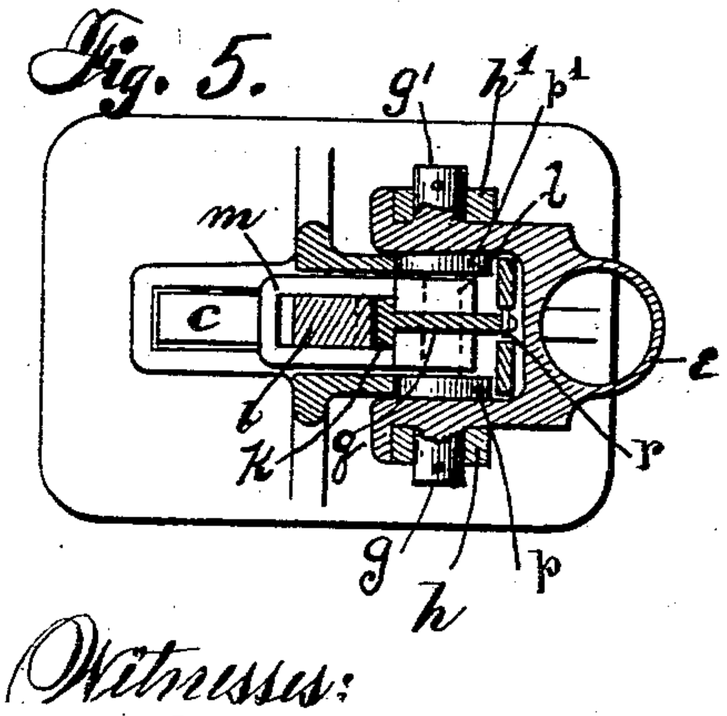

Fig. 6.

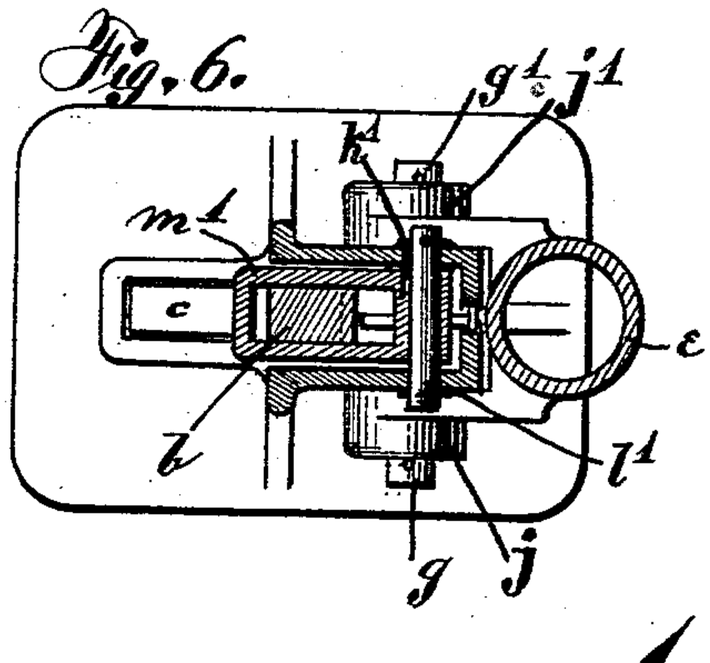

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Fig. 7.

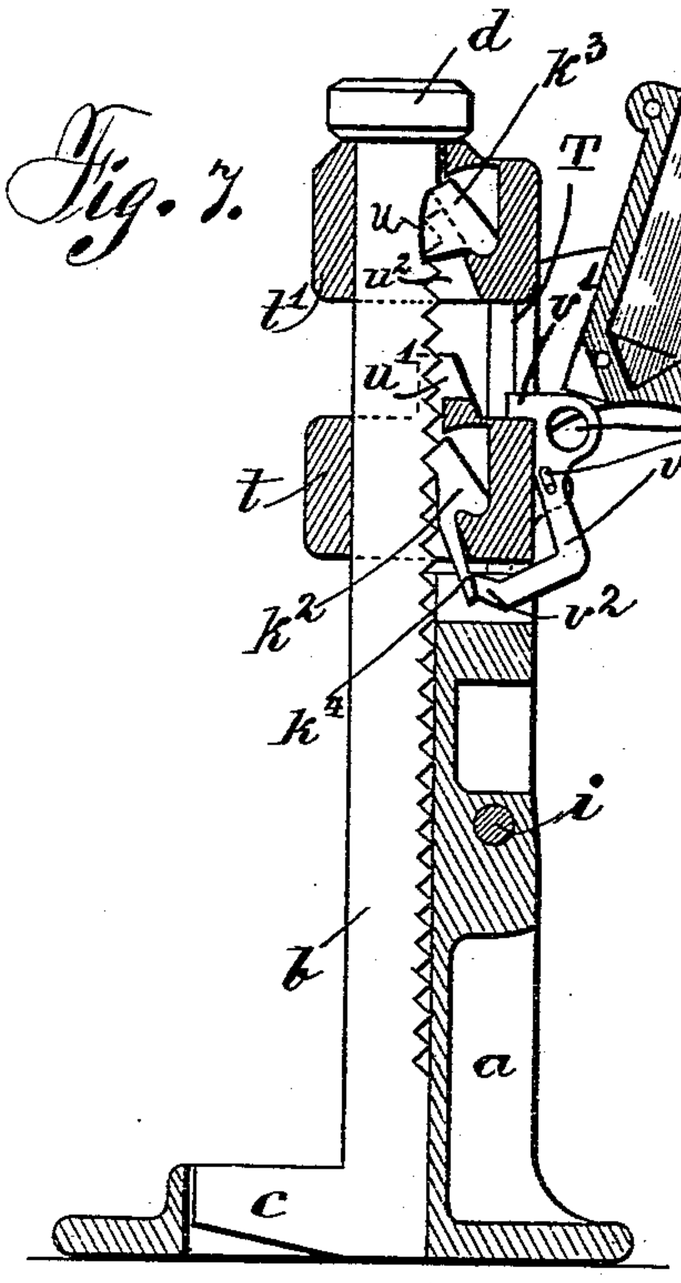


Fig. 8.

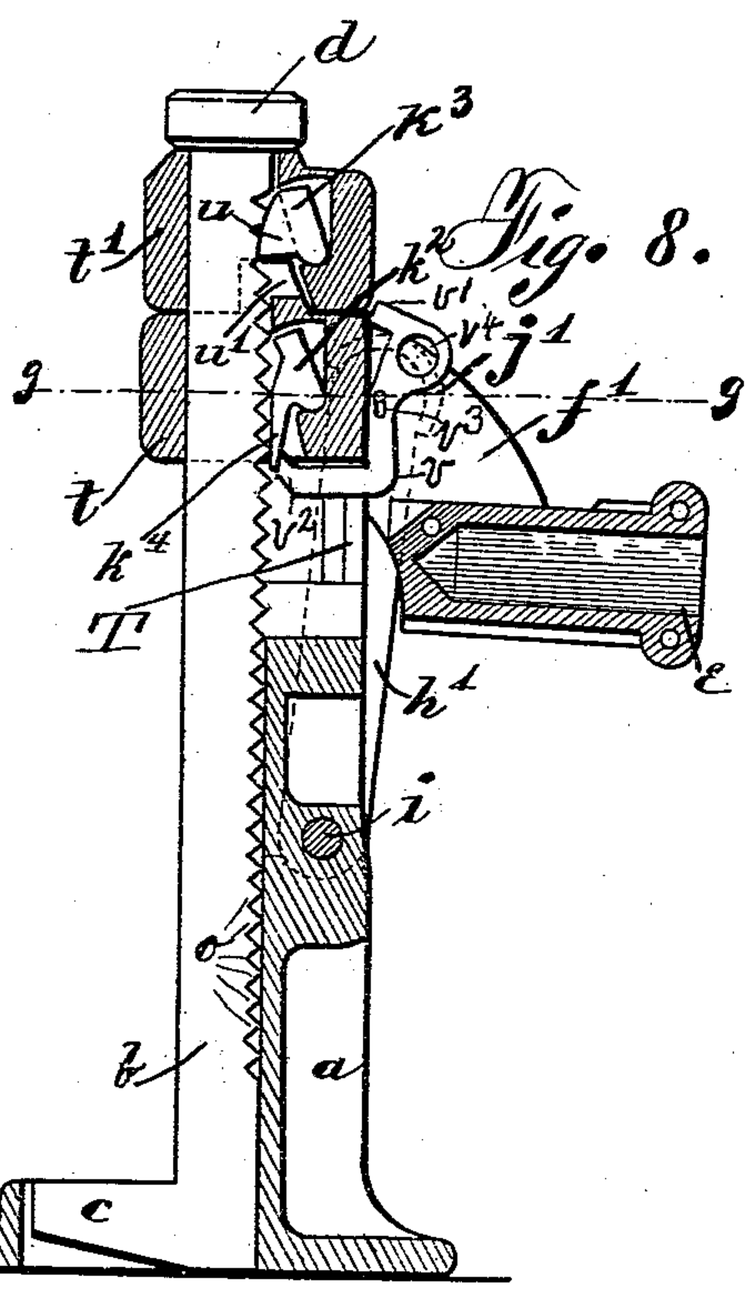
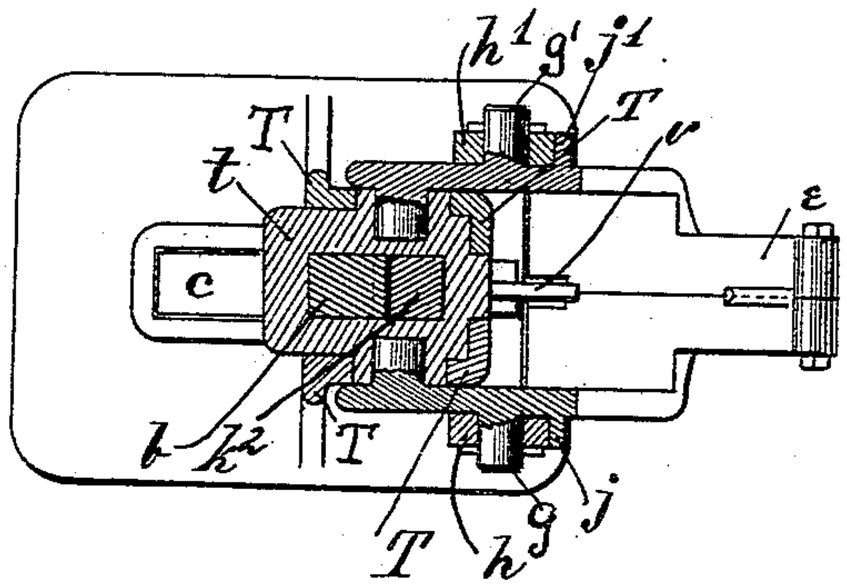


Fig. 9.



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LIFTING JACK.

No. 555,265. Patented Feb. 25, 1896.

Fig. 10.

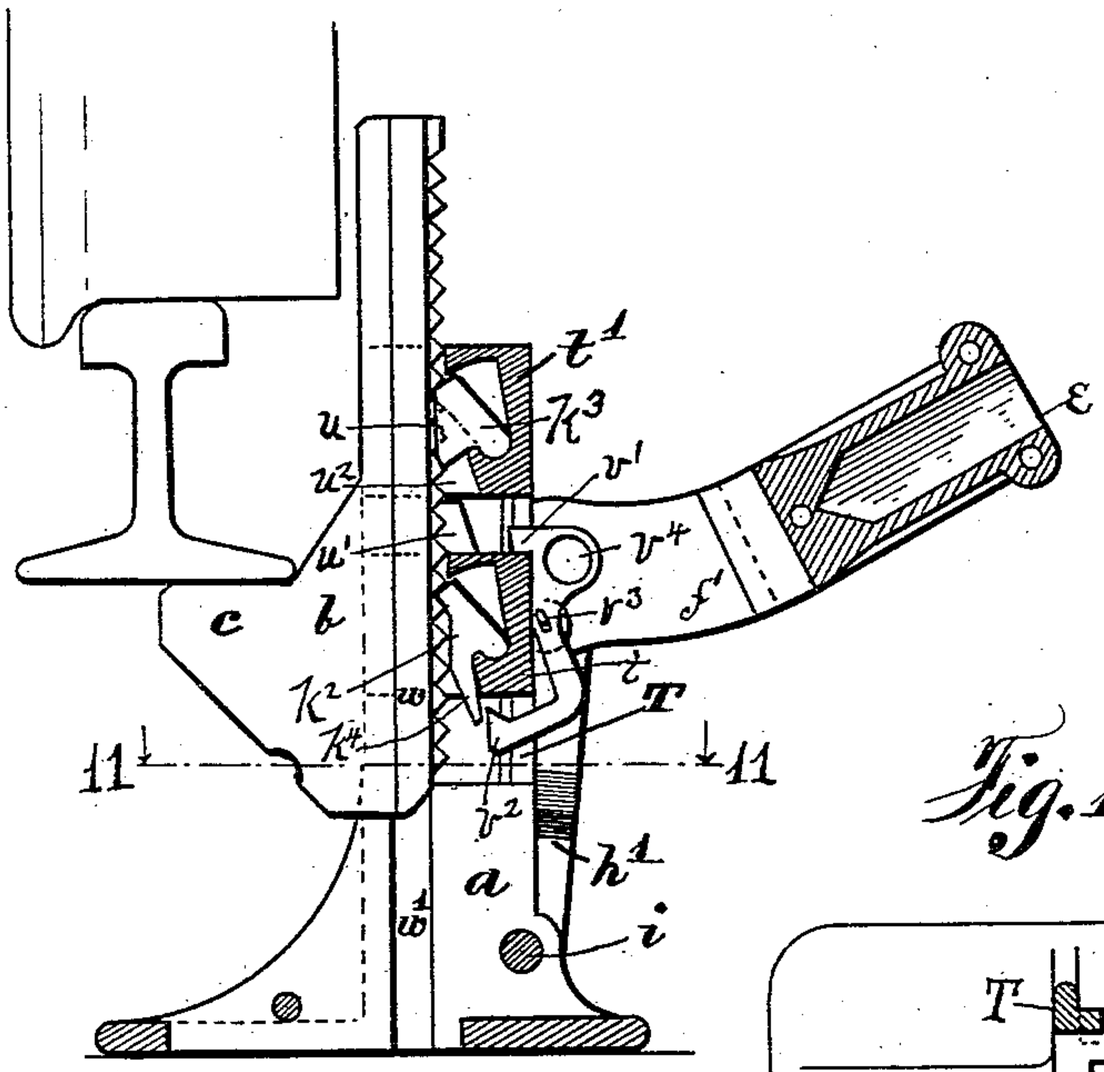


Fig. 11.

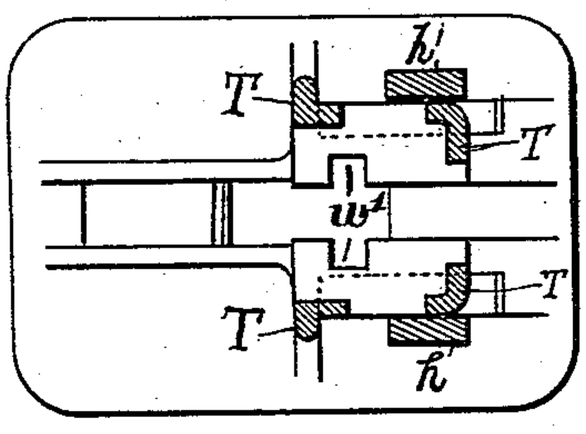


Fig. 12.

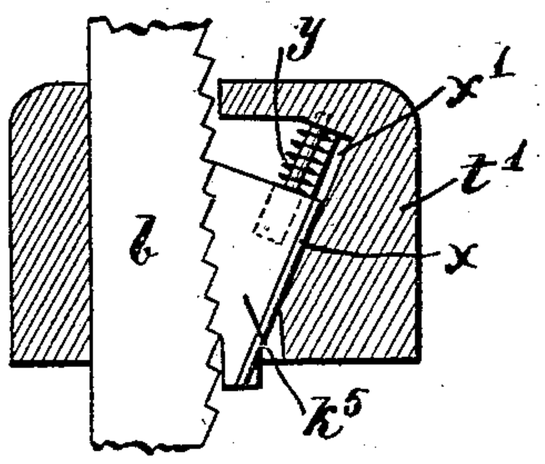
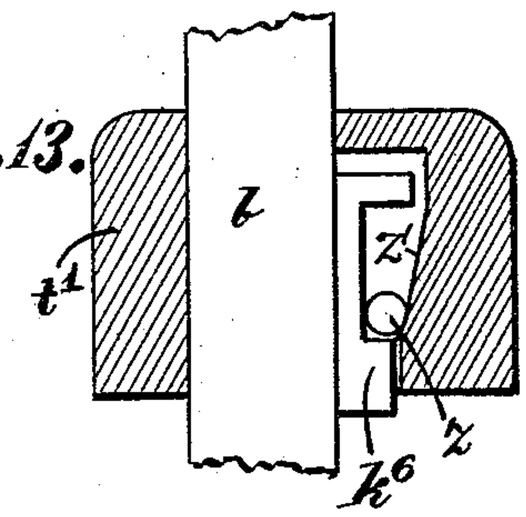


Fig. 13.



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UNITED STATES PATENT OFFICE.

EUGENE M. ROBINSON, OF CHICAGO, ILLINOIS.

LIFTING-JACK.

SPECIFICATION forming part of Letters Patent No. 555,265, dated February 25, 1896.

Application filed August 10, 1895. Serial No. 558,842. (No model.)

To all whom it may concern:

Be it known that I, EUGENE M. ROBINSON, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented a certain new and useful Improvement in Lifting-Jacks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of my invention is to provide a jack suitable for raising the rail of a railway-track or other load, which while being economical in construction will be efficient in service and will operate in such manner that while raising the load it will use to the best advantage the power applied, will securely maintain the load in the elevated position after the lifting power is removed, and may be easily and conveniently tripped and the parts allowed to assume their original positions.

It consists of a lifting-bar slidable longitudinally in a suitable standard, a lever connected with said standard, and two pawls, one operated by the lever and one mounted on the standard, and means whereby after the lifting-pawl has been disengaged the act of raising it to the limit of its permitted movement causes the disengagement of the sustaining-pawl and allows the lifting-bar to descend, there being provided means to prevent this extreme elevation until desired.

It consists also of the combinations more definitely hereinafter pointed out in the claims.

The drawings show approved embodiments of my invention.

Figure 1 is a side elevation of the preferred form of my device before the lever has begun to be depressed. Fig. 2 is a vertical central section of the same, some of the parts being shown in full, however, with the lever at the point where it is just beginning to elevate the lifting-bar. Figs. 3 and 4 are similar views showing, respectively, the position when the lifting-bar has reached its upward limit and the position where it has just been tripped. Figs. 5 and 6 are horizontal sections taken on the lines 5 5 and 6 6, respectively, of Fig. 1. Figs. 7 and 8 are vertical sections of a modified form of my improved jack, Fig. 7 showing the position as the lifting-bar is just beginning to rise, and Fig. 8 the position after it has been tripped. Fig. 9 is a horizontal section on the line 9 9 of Fig. 8. Fig. 10 is a vertical section of a slightly-different embodiment of this modification; and Fig. 11 is a horizontal section of the same, taken on the line 11 11 of Fig. 10, the lifting-bar being omitted, however. Figs. 12 and 13 are enlarged detail views of modified forms of pawls.

Sliding longitudinally in a suitably-shaped standard *a*, preferably made of cast-iron, is the lifting-bar *b*. This bar is provided with a foot *c* and may or may not have a head *d*. The former is adapted for use in raising a rail in a track or other low object, and the latter for raising a load already somewhat elevated, as, for example, a car-body.

e is a socket for a pole of convenient length. The pole, socket, and attached parts constitute the raising-lever. Extending from the socket are two wings *f* and *f'*, which lie outside of the standard on each side thereof. Studs *g* and *g'*, projecting from these wings intermediate of their ends, pass through eyes in the links *h* and *h'*, which are pivoted by the bolt *i*. These links support the raising-lever.

In order to relieve the studs *g* and *g'* of excessive wear rub-lugs *j* and *j'* are provided, as shown, on the wings, while the wear on the bolt *i* is reduced by the webs J on the standard which come under the lower ends of the links. The inner end of the raising-lever is connected with the lower pawl, which operates to raise the lifting-bar *b*.

The form of the pawls and their connection varies in the different modifications shown, and I will therefore describe them serially.

In the form shown in Figs. 1 to 6, inclusive, the lower pawl, *k*, is pivoted directly to the wings of the raising-lever by a bolt *l*, the bosses *p* and *p'* being provided on said wings for strength and to allow the use of a smaller bolt. The walls forming the back of the ways in the standard in which these bosses are shown as working approach each other at their lower extremities or are there cut away sufficiently to allow the insertion of the bosses when the assemblage of the parts is made. Extending from the lower pawl is the rectangular sleeve *m*, which surrounds the lifting-bar. This sleeve is provided so that in lifting

there will be no diagonal thrust on the lifting-pawl, causing friction at the lower end of the pawl or of the bosses against the back of the standard, the sleeve operating to lock the pawl to the lifting-bar, so as to make it virtually a part thereof. The inner side of the front of this sleeve is beveled, as shown at *n*, so that it may be tipped up to release the pawl. The upper pawl, *k'*, is pivoted to the standard by the bolt *l'*. This pawl I have shown also with a sleeve *m'* surrounding the lifting-bar and beveled at *n'* for a purpose similar to that of the lower sleeve, but while of value as giving rigidity to the wings of the pawl which thus form the sides of the sleeve the front of this sleeve is not essential and may be omitted, if desired. There are formed on the back of the lifting-bar notches or teeth *o* into which these pawls take. When the outer end of the raising-lever is depressed, the lower pawl is elevated and carries with it the lifting-bar, the upper pawl clicking idly past each notch or tooth. While the lever is returning for another stroke, the upper pawl holds the lifting-bar in its elevated position. Projecting backward from the lower pawl is the fin *q*, pivoted to which I have shown a latch *r*. This latch consists of a simple bar pivoted near its lower end at a point one side of the line of direction through its center of gravity as it stands vertical. Hence its tendency is to rotate on its pivot and hang downward. It is normally held vertical by the wall *s* of a slot in the back of the standard. When it is desired to trip the lifting-bar, the raising-lever is lifted slightly, thereby relieving the lower pawl of any share of the load, and the lower pawl is then tipped back and disengaged from the lifting-bar by raising the front of the sleeve *m*. As the pawl is thus tipped back, the latch *r* on the fin *q* passes out from the slot in the back of the standard and dropping into a horizontal position behind the wall *s* of the slot prevents the pawl from engaging with the lifting-bar when the elevating pressure is removed from the sleeve. A lug on the fin *q* prevents the latch *r* from falling farther than the horizontal. When the lower pawl is thus disengaged, its sleeve acts as a tappet, and an extreme elevation thereof causes it to strike the upper pawl and shove it out of connection with the lifting-bar, as shown in Fig. 4, whereupon the bar descends to its original position. After the lifting-bar has descended and the lever has been more or less raised the latch *r* is turned up, the pawl drops into its original position, and the jack is ready for another operation.

The latch *r*, while valuable as enabling the lower pawl to be held out of engagement with the lifting-bar irrespective of the position of the lever, may be dispensed with. In such a case the projection m^2 on the lower edge of the sleeve or wings of the upper pawl, co-operating with the projection m^3 on the upper edge of the lower sleeve, becomes the latch, and the lower pawl being tipped back and so held until its sleeve interlocks with the upper sleeve is by this means securely locked out of engagement with the lifting-bar, and is shown in Fig. 4. If the lower pawl is not tipped back until its sleeve is just about to strike the upper sleeve the distance through which it must be held out of engagement with the lifting-bar by external means will be practically inappreciable. On the top of the fin *q* is the projection *q'*, which, if the lower pawl is not tipped out of engagement with the lifting-bar, strikes the upper pawl directly beneath its pivot, when the outer end of the lever is depressed as far as then possible, and thus prevents the lower pawl from being elevated far enough to disengage the upper until after the lower has itself been disengaged.

In the modifications shown in Figs. 7, 8 and 9 the lower pawl, k^2, instead of being pivoted directly by a bolt to the lifting-lever, is socketed in the manner shown to the sliding box *t*, to which latter the raising-lever is connected, and which is guided in its movement by the corner-posts T of the standard. The upper pawl, k^3, is similarly socketed to the box *t'*, which is rigidly secured to the standard. Projecting from the upper pawl, k^3, on each side of the lifting-bar, are the wings *u*. On the top of the sliding box *t* is the tappet, composed of the lugs *u'*, extending upward such distance that when the said box *t* is raised to its maximum height these lugs, passing through the hole u^2 in the upper box and impinging against the wings of the upper pawl, disengage said upper pawl from connection with the lifting-bar.

The upper end, *v'*, of the latch *v* lies normally between the two boxes *t* and *t'* and prevents the lower box, *t*, from rising high enough to trip the upper pawl. This latch is pivoted by means of a bolt and slot at v^3, and its lower end, v^2, lies close to the depending arm k^4 of the lower pawl, k^2. When it is desired to trip the jack, the pressure is taken off the lower pawl by raising the lever a little, and the latch *v* is drawn backward by applying a pull to the finger-hole v^4. The latch at the same time slides slightly downward and assumes the position shown in Fig. 8, the lower end shoving forward the depending arm of the lower pawl and disengaging the pawl from the lifting-bar, and the upper end being out from between the boxes and having its corner against the side of the lower box. The lever is then depressed its full extent, the lugs *u'* disengage the upper pawl and the lifting-bar descends. When the latch has been returned to its original position the jack is again ready for operation.

The modification shown in Figs. 10 and 11 is adapted particularly for raising a rail when there is a car standing upon it. To accommodate this condition, the lifting-bar projects forward from the standard, so that there may be nothing in the way of the wheel, and is held thereto by the ribs *w* sliding in grooves

w' in the standard. The lower box, t, guided by the corner-posts T, also has grooves embracing these ribs. The operation of the jack is the same as that just described with reference to Figs. 7, 8 and 9, and hence will not be repeated.

Figs. 12 and 13 show modifications of pawls adapted for use in forms of jacks similar to those shown in Figs. 7 to 11, inclusive. In Fig. 12 the pawl k^5 instead of oscillating slides upward and is held to the box by the ribs x sliding in grooves x' in the box, the spring y assisting gravity and insuring that the pawl drops downward when desired. The pawl in each box preferably projects below the box, as shown in the drawings, and is tripped by contact from below, the upper pawl by a tappet consisting of the surface of the lower box, and the lower pawl by the lower end of a latch the upper end of which keeps the boxes apart in a similar manner to that already described. The teeth are made with their faces substantially parallel to the back or sliding surface of the pawl, so that, although holding securely, there will be no unnecessary work in tripping. During elevation of the lifting-bar the pawls click past the teeth in the usual manner. In Fig. 13 the arrangement indicated is frictional. The pawl k^6 is held against the lifting-bar by the roller z bearing against the inclined wall z' of the box. The tripping is accomplished in the same manner as that just described with reference to Fig. 12.

It should be noticed that in all the modified forms shown the box carrying the pawl is locked to the lifting-bar during the lifting operation and made virtually a component part thereof, similar to and for the same purpose as the sleeve to which it corresponds in the form first described. I regard this as important, since it saves power otherwise wasted. It will also be observed that from the manner in which the lever is pivoted in my improved jack the effective lever-arm between the pivot of the link and the load varies in the same proportion as the lever-arm between said link-pivot and the operative end of the lever-pole, so that when the pole is well up, where the operator is unable to work to the best advantage, less force acting at right angles to the lever is required, and when the pole is in a substantially horizontal position, where the operator can throw his whole weight upon it, the inner lever-arm requires the most force. Thus the lifting force is substantially constant. This is a great advantage, as if it were otherwise in order that the full stroke of the lever might be used (and thereby save the loss of time consequent upon short strokes) more power would be required to start the lifting than on the lower part of the stroke, and two men, using only a small portion of their combined power on the latter part of the stroke, would be required to operate the jack, while if the force were evenly distributed one man could do it.

Although I have shown and described several forms of my invention, I do not wish to be understood as thereby excluding other equivalents and mechanical modifications not shown, and I do not wish to be construed as limiting myself further than is specified in the claims.

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

1. In a lifting-jack, in combination, a standard, a lifting-bar slidably connected thereto, a raising-lever connected to said standard, a pawl mounted on said standard, a pawl operated by said lever, means whereby an extreme elevation of the inner end of the lever releases the pawl mounted on the standard, and means serving to prevent said extreme elevation unless the pawl connected with the lever is disengaged from the lifting-bar, for the purpose specified.

2. In a lifting-jack, a standard, a lifting-bar slidably connected thereto, a raising-lever connected by a link to said standard, a pawl mounted on said standard, a pawl operated by said lever, a tappet adapted to be raised by the inner end of the lever and which when raised to its maximum height forces the pawl mounted on the standard out of engagement with the lifting-bar, in combination with a latch adapted to hold the pawl operated by the lever out of engagement with the lifting-bar, for the purpose specified.

3. In a lifting-jack, in combination, a standard, a lifting-bar slidably connected thereto, a raising-lever connected by a link to said standard, two pawls, one located higher than the other, the upper pawl being mounted on said standard and the lower carried by said lever, a tappet operated by said lever and rising with said lower pawl and adapted to shove said upper pawl from engagement with the lifting-bar as the inner end of the lever reaches its extreme elevation, and a latch adapted to maintain the lower pawl out of engagement with the lifting-bar, for the purpose specified.

4. In a lifting-jack, in combination, a standard, a lifting-bar slidably connected thereto, a raising-lever connected by a link to said standard, a sustaining-pawl mounted on said standard and adapted to hold the lifting-bar against downward movement, a lifting-pawl carried by the inner end of said raising-lever adapted to raise the lifting-bar on its upstroke, a projection carried with said lifting-pawl which forces the sustaining-pawl out of engagement with said lifting-bar as the lifting-pawl reaches its maximum elevation, and a latch operating to hold the lifting-pawl out of engagement with the raising-bar and adapted to be thrown into action by means exterior to the jack, for the purpose specified.

5. In a lifting-jack, a standard, a lifting-bar slidably connected thereto, said lifting-bar having teeth formed upon it, a raising-lever connected by a link to said standard, a sustaining-pawl pivoted to said standard and

adapted to engage with said teeth and thereby hold the lifting-bar against downward movement, a lifting-pawl pivoted to the inner end of said raising-lever and adapted to engage with the teeth on the lifting-bar and thereby lift said bar upon the upstroke of said inner end of the lever, said lifting-pawl having secured to it a sleeve which surrounds the lifting-bar but with provision for allowing said pawl to be tipped back out of engagement with the lifting-bar, the sleeve being adapted to force the sustaining-pawl out of engagement with the teeth on the bar as the lifting-pawl reaches is maximum height, in combination with a latch adapted to hold the lifting-pawl out of engagement with the teeth after it has been tipped back, for the purpose specified.

6. In a lifting-jack, a standard, a lifting-bar slidably connected thereto, said lifting-bar having teeth formed upon it, a raising-lever connected by a link to said standard, a sustaining-pawl pivoted to said standard and adapted to engage with said teeth and thereby hold the lifting-bar against downward movement, a lifting-pawl pivoted to the inner end of said raising-lever and adapted to engage with the teeth on the lifting-bar and thereby lift said bar upon the upstroke of said inner end of the lever, said sustaining-pawl being located above said lifting-pawl and each of said pawls having secured to it wings, those of the lower pawl continuing in front of the lifting-bar and forming a sleeve, said sleeve being beveled on its front inner surface to allow the lower pawl to be tipped back out of engagement with the lifting-bar and being adapted to impinge against the wings of the sustaining-pawl and tip it backward out of engagement with the teeth on the bar and to so hold it when the lifting-pawl is at its maximum height, in combination with a latch adapted to hold the lifting-pawl out of engagement with the teeth after it has been tipped back, for the purpose specified.

7. In a lifting-jack, in combination, a standard, a lifting-bar slidably connected thereto, a raising-lever connected to said standard, a sustaining-pawl supported by said standard and adapted to hold the lifting-bar against downward movement, a lifting-pawl pivoted to the inner end of said raising-lever and adapted on its upstroke to raise the lifting-bar, a fin q on said lifting-pawl, said fin having a projection q' adapted to come against a stop and limit the upstroke of the lifting-pawl and prevent the disengagement of the sustaining-pawl unless said lifting-pawl is disengaged from the lifting-bar, and a latch r secured to said fin and adapted to lock the lifting-pawl out of engagement with the lifting-bar after it has been disengaged, for the purpose specified.

8. In a lifting-jack, a standard, a lifting-bar slidably connected thereto, said lifting-bar having teeth formed upon it, a raising-lever connected by a link to said standard, a sustaining-pawl mounted on said standard and adapted to engage with said teeth and thereby hold the lifting-bar against downward movement, a lifting-pawl acting as a diagonal strut and operated by the inner end of said raising-lever and carried with a body embracing the lifting-bar, whereby said pawl is adapted to engage with the teeth on the lifting-bar and when so engaged the body embracing said bar becomes securely locked thereto and virtually a part thereof, in combination with means whereby the sustaining-pawl is automatically released by an extreme movement of the lifting-lever, for the purpose specified.

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