(No Model.)

J. BARRETT.

LIFTING JACK.

No. 455,994. Patented July 14, 1891.

Fig. 1.

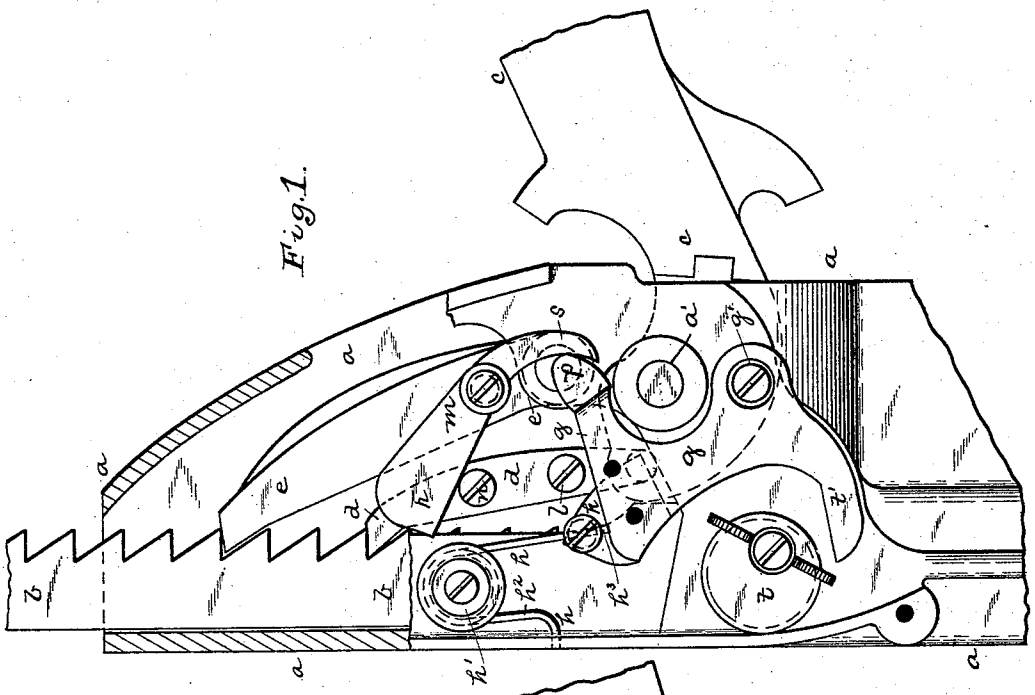
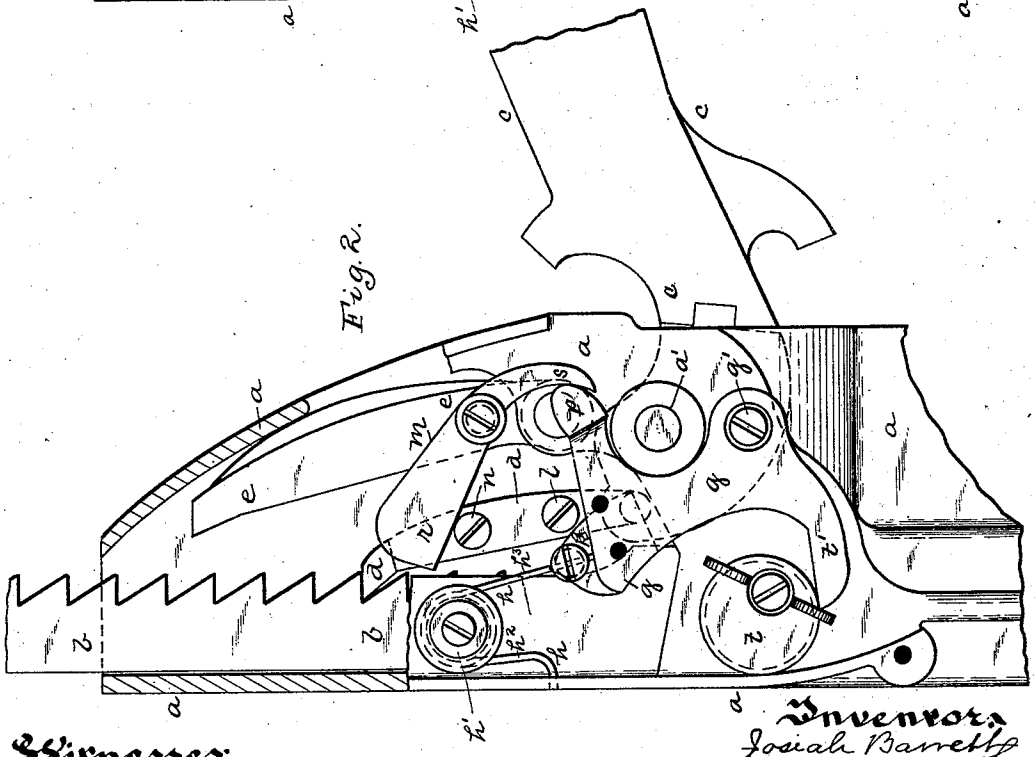


Fig. 2.



Witnesses:
J. N. Cooke
Robt. D. Potter

Inventor:
Josiah Barrett
By James D. Fay
Attorney

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

UNITED STATES PATENT OFFICE.

JOSIAH BARRETT, OF ALLEGHENY, ASSIGNOR TO THE DUFF MANUFACTURING COMPANY, OF PITTSBURG, PENNSYLVANIA.

LIFTING-JACK.

SPECIFICATION forming part of Letters Patent No. 455,994, dated July 14, 1891.

Original application filed February 13, 1891, Serial No. 381,275. Divided and this application filed April 30, 1891. Serial No. 391,066. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH BARRETT, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Lifting-Jacks; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to what might generally be termed "jacks"—that is, to power mechanism in which a step-by-step movement back and forth is obtained—said mechanism being actively operative in one direction to move or raise a load and passively operating in the other direction to control the movements of the load, such as lowering a load lifted by the jack. By such terms it is of course to be understood that the invention includes any device embodying its principle whether the power is exerted in a vertical, horizontal, or other line. My invention relates more particularly to that class of lifting-jacks described in Letters Patent No. 399,470, granted to me March 12, 1889, and its reissue, No. 11,051, dated December 31, 1889, in which jack the operating-lever carries a single pawl to engage with a bar having a toothed face on one side thereof, and a detent is pivoted on the machine-frame to engage with such toothed bar and hold the same during the backward movement of the operating-pawl, while connections are formed between the pawl and detent, so that the one may be alternately lifted from connections with such toothed bar when it is desired to operate the jack in the opposite direction, such as in lowering the load.

The object of the present invention is to simplify the jack described in said patent; and it consists, generally stated, in combining a bar having a toothed face on one side thereof, a frame having the operating or hand lever mounted therein, a pawl carried by the hand-lever and having a finger or projection thereon, a detent mounted on the jack-frame, a yielding tripping-plate mounted on said frame, and a tripping-lever carried by the detent, one end of which engages with the yielding tripping-plate and the other with the projection on the pawl, so that in lowering the jack or imparting an equivalent motion thereto as the pawl is raised said lever will press on the finger thereof and force the pawl into engagement with the toothed bar, and at the same time the pawl will, through said lever, press back the tripping-plate, and as soon as the pawl takes the load, through the tripping-plate and the raising of the pawl operating thereon, said lever will force out the detent, said detent being free to engage with the toothed bar as soon as the lever is freed from the pawl.

It also consists in certain other improvements, as hereinafter more particularly set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figures 1 and 2 are side views, partly broken away, illustrating the operation of the jack.

Like letters of reference indicate like parts in each.

The jack has the body or frame *a* and the toothed bar *b*, the exact construction of the ends of these two parts not being illustrated, as it is not considered of importance, and for the ordinary lifting-jack has been shown in said Letters Patent above referred to. The toothed bar, where it is the movable element and raises the load placed upon it, is mounted in a rectangular or other shaped passage formed in the frame *a*, such passage being open at the back of the frame, so as to permit the movement of the foot of the toothed bar. The frame *a* has the bearing *a'* for the reception of the pintle at the inner end of the operating or hand lever *c*, and pivoted to said operating-lever is the pawl *d*, which engages with the toothed bar *b*, said toothed bar having the teeth formed only on one face thereof, and said pawl *d* acting to lift the bar as the hand-lever is lowered. It is of course desirable in obtaining the lifting action to have the pawl operate as nearly in a line parallel with the lifting-bar as possible; but in the ordinary vertical jack this is not found practicable unless some counter-weight

or spring mechanism is provided for forcing the pawl into engagement with the toothed bar, and it has generally been considered necessary to give such an inclination to the pawl as to cause it to engage with the toothed bar of its own weight, and consequently it has not been considered practicable to obtain the lifting movement in a line as near parallel with the toothed bar as desirable. A further advantage of such a mounting of the pawl is that the downward stroke of the hand-lever imparts a longer or shorter stroke of the lifting-pawl, according to its position with relation thereto and whether the base thereof is drawn back by the movement of the hand-lever.

For reasons hereinafter stated, in the jack forming the subject of this application I am enabled to place the pawl more in line with the toothed bar, and therefore to obtain a better stroke thereon, as I provide the means of obtaining pressure to force it into contact with the toothed bar. Mounted on the jack-frame *a* is the detent *e*, which is arranged outside of the pawl, being pivoted below the upper end of the pawl and extending above the pawl, so as to engage with the toothed bar above the same, the purpose of such detent being to sustain the load which is lifted by the pawl *d*, the detent having, however, no lifting motion.

For the purpose of lowering the jack or forming the backward movement of either the toothed bar or the frame in which the operative parts are mounted, I provide the mechanism forming the subject of the present application for drawing the detent out of engagement with the toothed bar, while the lifting-pawl is operated by the mechanism described in application for patent filed by me February 13, 1891, Serial No. 381,275, of which this application is in part a division.

Mounted upon the machine-frame is the tripping-plate *g*, said tripping-plate being mounted so as to yield and being pressed forward by the spring *h*, secured to the jack-frame, the tripping-plate shown being pivoted to the jack-frame at *g'*. The spring *h* illustrated is coiled around a stud *h'* on the jack-frame, and one arm h^2 thereof engages with the frame, while the other arm engages with a pin or seat h^3 on the tripping-plate. Said tripping-plate *x* has a shoulder *k*, with which a finger or projection *l*, rigid with the pawl *d*, engages, so as to apply pressure to such pawl and draw it out of engagement with the toothed bar as the pawl descends and the finger comes in contact with the shoulder *k* on the yielding tripping-plate, the tripping-plate yielding against the pressure of the spring *h* until the load is taken by the detent *e*, when the pressure of the spring will, through said tripping-plate, draw the pawl out of engagement with the toothed bar.

In order to operate the detent *e*, I mount thereon a projection extending out therefrom, and rigid therewith the tripping-lever *m*, this lever having preferably about the shape shown in the drawings, one arm *r* of which extends over the pin or finger *n* on the pawl *d*, while the other arm *s* extends down to the yielding tripping-plate and engages with the shoulder *p* thereon. As a result of such construction, when the pawl *d* is being raised, so as to take a new hold upon the toothed bar and lower it into another notch, the pin or finger *n* will force upwardly and backwardly the upper arm *r* of the lever *m*. As the load is carried by the detent *e*, however, such pressure on the lever has no effect on the detent *e*, the lever *m* simply swinging on its pivotal point on the detent, its lower arm *s* pressing back the yielding tripping-plate *g* and so compressing the spring *h* thereof. This is continued as the lifting-pawl is raised and until the lifting-pawl itself engages with the toothed bar and relieves the detent of the load. In such case as soon as the detent is released the further upward movement of the upper end pawl, acting upon the upper end or arm *r* of the lever *m*, together with the pressure of the tripping-plate *g* upon the lower arm *s* of the lever *m*, will, through said lever, draw the detent out from the toothed bar, so that as the pawl is lowered the detent will be held free from the toothed bar a sufficient distance to permit the detent to pass one tooth of the bar, when it will receive and hold the load until the toothed bar is withdrawn by the finger *l* pressing upon the shoulder *k* of the yielding tripping-plate and is raised so as to pass one of the teeth and again engage with the toothed bar. A very simple mechanism is thus provided for the operation of the detent, so as to enable it to work alternately with the pawl to lower the load. At the same time, by means of the lever *m*, which always presses upon the pin or finger *n* of the pawl *d*, a sufficient pressure to throw such pawl into engagement with the toothed bar in operating the mechanism in one direction or the other is obtained, the inclined lower face of the arm *r* of the lever *m* always bearing upon the pin *n*, and so exerting a pressure to force the pawl inwardly, this pressure being increased, however, in the operation of lowering the jack, as the lever *m* will then bear upon the shoulder *p* of the yielding tripping-plate while the pin or finger *n* is traveling along the under surface of the arm *r* of said lever and acting to compress the spring or force back the tripping-plate, and as soon as the finger *l* is freed from the shoulder *k* of the tripping-plate said lever *m* will force the pawl *d* forward into engagement with the toothed bar. As the result of this construction I am enabled to pivot the pawl *d* more on a line with the toothed bar and to obtain a greater lifting action thereof by the exertion of the same power upon the hand or operating lever.

An exceedingly simple form of jack mechanism is thus provided, and one which requires practically few parts. It can be changed so as to operate in one direction or the other

simply by holding back the yielding tripping-plate, which may be accomplished in any desired way, that shown in the drawings being by means of a cam t pressing against an arm t' of the tripping-plate.

As above referred to, in the term "jack" I include any mechanism in which either main element—that is, the toothed bar or the frame carrying the operative mechanism—has a step-by-step movement which is actively operative in one direction to move or raise a load and is passively operative in the opposite direction either to lower the load or to control its movement whether the same acts vertically, horizontally, curvilinear, or in other direction.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a jack, the combination of a bar having teeth on one face thereof, a frame having the operating-lever pivoted therein, a pawl pivoted to said lever and carrying a projection or finger rigid therewith, a detent mounted on the frame and having a tripping-lever pivoted thereto and having one arm engaging with the finger of the pawl, and a yielding tripping-plate engaging with the other arm of the tripping-lever, substantially as and for the purposes set forth.

2. In a jack, the combination of a bar having teeth on one face thereof, a frame having the operating-lever mounted therein, a pawl d, pivoted to said lever and carrying the fingers l n, rigid therewith, the detent e, mounted in the jack-frame, the tripping-lever m, mounted on said detent and having the arm r, engaging with said finger n on the pawl, and having the arm s, and the yielding tripping-plate having the shoulders k and p, engaging, respectively, with said finger l and said arm s of the tripping-lever, substantially as and for the purposes set forth.

3. In a jack, the combination of a bar having teeth on one face thereof, a frame having an operating-lever mounted therein, a pawl pivoted to said lever and carrying a projection or finger, a yielding tripping-plate mounted on said frame and having a shoulder engaging with said pawl-finger, and a spring supported by the jack-frame and pressing against said tripping-plate, substantially as and for the purposes set forth.

In testimony whereof I, the said JOSIAH BARRETT, have hereunto set my hand.

JOSIAH BARRETT.

Witnesses:
ROBT. D. TOTTEN,
JAMES I. KAY.