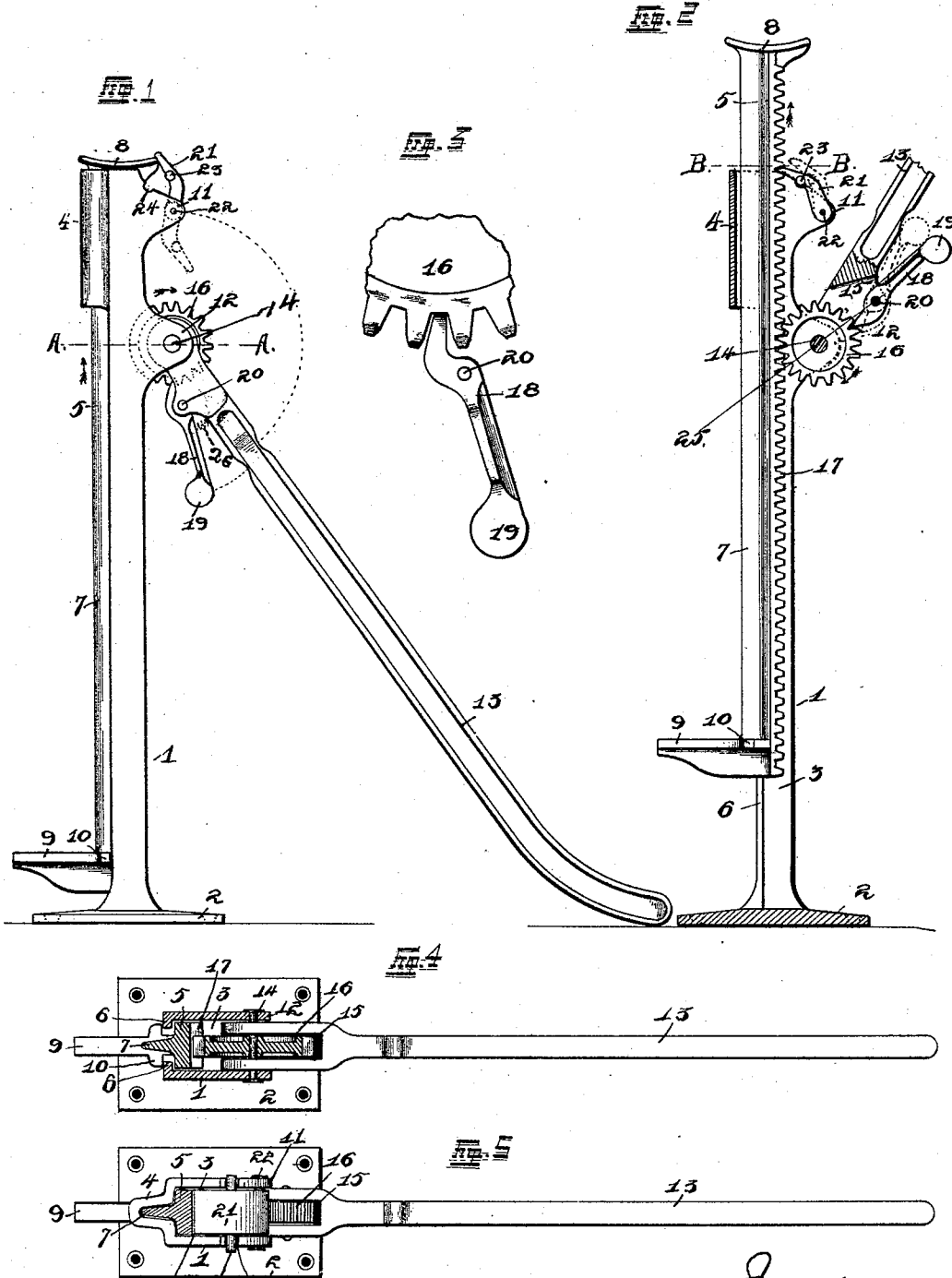


(No Model.)

J. C. HACKETT.
AUTOMATIC LIFTING JACK.

No. 498,546.

Patented May 30, 1893.



Witnesses:
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UNITED STATES PATENT OFFICE.

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AUTOMATIC LIFTING-JACK.

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To all whom it may concern:

Be it known that I, JOHN C. HACKETT, of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Automatic Lifting-Jacks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improved lifting-jack, and it consists in the novel arrangement, construction and combination of parts hereinafter described and claimed.

The object of the invention is to provide an improved lifting-jack which shall be possessed of novel points of adjustment in use, simple in construction and operation, and of low cost considering the advantages it possesses in these respects.

In the drawings, Figure 1 is a side-elevation, with the pivoted-lever down. Fig. 2 is a sectional side-elevation, with the parts in position to make a stroke. Fig. 3 is a detail-view of a portion of the loose-pinion and its weighted-pawl, enlarged. Fig. 4 is a sectional plan-view, the section being taken on line A—A of Fig. 1. Fig. 5 is a similar view to the last, the section being taken on line B—B of Fig. 2.

I desire to preface my description with the statement that my improved jack is preferably made, in entirety, of iron or some other suitable metal, as I have found that such construction can be carried out when the respective parts are fashioned in metal, substantially as herein shown and described, without entailing undue clumsiness or weight, although of course some of the said parts may be made of wood or similar material, if such be desired in carrying out the invention.

1 indicates the vertical stand, standard or frame, of the jack, and 2 the base thereof. The standard and base should be cast in one piece, with said base sufficiently heavy to withstand all strains thrown upon it without breaking, with said standard light and thin, and the entire piece made malleable. The process of producing malleable castings is well understood, and need not be described by me. The standard is formed with a vertical slot 3, which has its rear side and upper end open, and its front side open from a point

adjacent the upper end of the standard to said base. 4 indicates a guiding-strap for the toothed lifting-bar 5, and which strap extends across and closes the portion of said vertical-slot which is adjacent the upper end of said standard. The front side of the slot 3 is narrowed considerably by means of opposite inwardly-projecting guiding-flanges 6 formed upon the front edges of the thin walls of said standard. The lifting-bar 5 is adapted to slide loosely in the slot 3 in the standard. It has a guiding-rib 7 extending longitudinally upon its front face and terminating at points adjacent its ends.

8 represents the lifting-head of the lifting-bar, which is formed upon the upper terminal thereof, and 9 indicates a low-down lifting-foot, which latter is formed upon the lower terminal of said lifting-bar and projects forward a suitable distance through the open narrowed side of the slot 3 and beyond the front face of the standard, to engage beneath objects to be lifted. When the lifting-bar is not in use its normal position is that shown in Fig. 1, with the head 8 in contact with the upper end of the standard. The lifting-bar is loosely retained in proper position in the vertical-slot 3 in the standard by the following means: It is held against forward-movement by its front-face coming in contact with the inwardly-projecting flanges 6 of the standard, and its rearward displacement is prevented by the guiding-lugs 10 on the sides of the low-down foot coming into contact with the front face of said flanges during operation. A loose-pinion or revolvable wheel, hereinafter described, also serves to hold the lifting-bar in proper position in the standard.

11 indicates opposite perforated-ears, located on the rear side of the standard 1, so as to project rearward one on each side of the vertical-slot therein, at a point closely adjacent the upper terminal thereof. 12 indicates additional opposite perforated-ears, located also on the rear side of said standard, at a point some distance below the first-mentioned ears, so as to project in the same direction that they project in.

13 indicates the operating-lever, which has its inner-end loosely pivoted or mounted upon a fixed pin 14 located in the perforations of

the ears 12. The outer end of said lever is free, and may be slightly curved upward. The inner end of said lever is provided with a slot or bifurcation 15, which has vertical sides and extends from said end a proper distance to perform the functions hereinafter described. A toothed-pinion or wheel 16 is loosely-mounted upon the same pin 14 upon which the inner end of the lever 13 is mounted, so as to freely revolve in the slot or bifurcation in said inner end. The teeth of this pinion or wheel mesh with a series of teeth, or a toothed-rack, 17, formed upon or secured to the rear face of the lifting-bar of the jack.

A pawl 18 having a weighted outer end 19, is pivoted also in the slot or bifurcation 15 in the lever 13, by means of a pin 20, so that its free inner end will engage the teeth of said pinion and said weighted end will be located beneath said lever and extend rearward a sufficient distance to be conveniently grasped by the fingers of the operator. The object of thus mounting this pawl is to cause its inner end to normally rest at all times in engagement with the teeth of said pinion, and at same time have the pawl under such control of the operator that the same hand which is used to raise the said lever may operate said pawl. Of course the weighted-end of the pawl may be omitted in some cases, or a spring 26, which is the common substitute for a weight, may be located between said pawl and said lever, as indicated by dotted lines in Fig. 1, so as to normally hold the parts in the above-described relative position.

A holding-dog 21 has one end loosely mounted to turn upon a pin 22 in the space between the ears 11 of the standard so that its opposite end will be free to engage the teeth 17 on the lifting-bar. The relative location of the pin 22, or the pivotal-point, of said dog, and said lifting-bar is such that when said bar is slid upward the free end of said dog will not prevent this upward movement, but when such upward movement is discontinued said dog will automatically act to hold said bar elevated, as hereinafter described. Strong projecting-lugs 23 are located one on each edge or side of the dog 21, so as to engage and rest in suitable open bearings or depressions 24 formed in the upper edge of the ears 11 opposite each other, for a purpose hereinafter mentioned.

The operation is as follows: The jack having been placed in position to raise a weight, such as a large box, safe or loaded wagon, with either its head 8 or its low-down feet 9 beneath such object, and assuming that the lever 13 is in its normal position (shown in Fig. 1), upon elevating the said lever to the position shown in Fig. 2, the following functions will take place: The pinion 16 will remain stationary with the lifting-bar, while the slotted inner end of said lever will turn upon the fixed-pin 14, and the inner end of the pawl 18 will slide over the teeth of said pinion until the upward movement of said

lever is discontinued, when said end of said pawl will be caused to automatically enter the space between two adjacent teeth of said pinion, and thereby prevent a down-stroke of said lever unless the pinion is revolved or moved in the direction indicated by the arrow. Now by depressing the lever to normal position, or to any intermediate position, the pawl will act to practically lock the lever and the pinion together, and make them integral as far as the immediately-following function is concerned—the said pinion will be moved on its supporting-pin or pivot in the direction indicated by the arrow, and as the teeth of the pinion are in engagement with the teeth on the lifting-bar, said bar and its load will be raised a corresponding distance, according to the diameter of the pinion. If it is desired to raise the load higher than it can be elevated by a single stroke of the lever, the above operation should be repeated until the load is satisfactorily elevated. When the handle is at rest, and during the up-stroke of same, the weight of the load is supported very securely by the dog 21 and adjacent parts, as follows, (see Fig. 2:) The free end of said dog engages between two adjacent teeth of the lifting-bar, so that the upper one of said two teeth rests upon the upper surface of said free end, and the load tends to press said free end downward, and does press it downward, until the strong lugs 23 on the sides of edges of said dog securely rest in and engage the depressions 24 formed in the upper edges of the ears 11 of the standard. These lugs bearing thus upon the upper edges of said ears, throw most of the weight upon said edges, and thereby remove in a great measure the strain upon the pivotal-pin 22 of said dog. Were it not for this construction and arrangement the said pin might be torn out of place in the said ears, in case the jack was overloaded and cause grievous accident and looked-for loss. But by reason of such construction there is practically a double bearing formed for the secure support of the holding dog, making the jack doubly safe during use in raising or lowering heavy loads. In this connection I desire also to point out a safeguard in the construction of the pinion, pawl and operating-lever, which is as follows: It will be observed that in bearing down upon the lever, to raise a load, the said pinion, pawl and lever are practically locked together, and move together as one piece of material having the fixed-pin 14 as a center. With this arrangement, and situation, of parts, it is clear that the inner end of said pawl will not press altogether downward upon the face of the tooth which lies beneath it, but will press inward, toward the center of said pinion, so that the strain will take place about on the oblique line 25 shown in Fig. 2, and said inner end of said pawl will contact forcibly with the metal at the base of the teeth of the pinion. (See Fig. 3.) This action will have the effect of removing, in a great meas-

ure, the downward strain upon the said teeth, and prevent their breakage when overloaded. When it is desired to lower a load, the operator should throw the dog 21 back out of the path of the teeth on the lifting-bar, as shown in Fig. 1, when the said bar may pass downward in its standard and the load may be lowered by permitting the outward end of said lever to pass upward a corresponding distance.

In case a single operation of the kind just described is found insufficient to lower the load, the same may be repeated by placing the said dog again into engagement with the teeth of said bar, so as to hold the load, and then grasping the pawl with the hand and disengaging it from the teeth of the pinion to permit the handle or lever to assume its normal position, and soon, alternately detaching and replacing the said dog, and causing the said lever to make the described movements.

Another point of advantage possessed by my improved jack is as follows: Whenever it is desired to drop the lifting-bar to its normal position in the standard, after it has been run out, such action may be quickly accomplished by simply grasping the pawl in the manner above described and thereby withdrawing it from engagement with the teeth of the pinion, when the weight of said bar will cause it to speedily gravitate downward until its head 8 rests upon the standard. Further, I have found that a load may be raised by slight degrees, by determinate degrees: for the reason that the distance from one tooth to another, in the lifting-bar, will afford an accurate guide, both audibly and by sight, in raising a load through slight determinate distances. For instance, suppose the teeth 17 on the lifting-bar are known to be spaced one-half inch apart, and the operator desires to raise a load two inches. He can do so accurately by noting the "click" of the pawl 18 in raising the lever from its normal (or present) position. He will raise said lever until said pawl "clicks" four times. If he desires to be doubly accurate in this matter he may also notice the number of "clicks" made by the dog 21 as the lifting-bar rises, and then in case he finds that they correspond in number to those made by the said pawl during the lifting of the operating-lever he may be certain that he has raised the load the desired distance. This "clicking" action of these parts thus affords a double safeguard against any mistake in raising a load a determinate distance or height, for the reason that even if the operator makes a mistake in counting the number of clicks made by the pawl during the first step of the raising-operation, such mistake will most likely be discovered when he counts the clicks of the dog which follow after.

What I claim is—

1. The improved lifting-jack, constructed with a standard 1, formed with a vertical-slot 3 having its rear side and upper end open and its front side open from a point adjacent the upper end of said standard, a guiding-strap 4 extending across and closing the front portion of said slot which is adjacent said upper end, opposite inwardly-projecting flanges 6 formed upon the front edges of said standard so as to narrow the front side of the slot, the lifting-bar 5 arranged to slide loosely in the vertical-slot in the standard, said bar having a guiding-rib 7 extending along its front-face, a low-down foot having guiding lugs 10 for retaining said bar in said slot, two sets of opposite perforated ears 11 and 12 located on the rear side of said standard so as to project rearward at points adjacent the upper terminal of the standard, a pin 14 located in the perforations of the ears 12, an operating-lever 13 having a bifurcated or slotted end pivoted or mounted on said pin 14, a toothed-pinion 16 loosely mounted upon the same pin upon which said lever is mounted so as to freely revolve in the slot in said lever, the teeth of said pinion meshing with teeth carried by said lifting-bar, a pawl 18 also pivoted in the slot in said lever so that it engages the teeth of said pinion, and a holding-dog 21 mounted in the ears 11 above said ears 12 and arranged to engage the teeth of said lifting-bar, substantially as specified.

2. In a lifting-jack, a toothed lifting-bar in combination with a standard, and a holding-dog 21 mounted to swing upon said standard so that it may engage the teeth on said lifting-bar, and provided with strong lugs 23 which rest upon said standard at a point intermediate of the pivotal-point of said dog and its end which engages said teeth, whereby a double-bearing for said dog is provided, substantially as specified.

3. In a lifting-jack, a toothed lifting-bar, in combination with a standard, opposite ears 11 formed upon said standard and provided with depressions 24 in their upper edges, a holding-dog 21 mounted upon said ears to swing so that it may engage the teeth on said lifting-bar, and strong projecting lugs 23 located one on each edge or side of said holding-dog to rest in said depressions at a point intermediate of the pivotal point of said dog and its end which engages said teeth, substantially as herein specified.

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

JOHN C. HACKETT.

Witnesses:

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JNO. C. HIGDON.