(No Model.)

C. FISHER.

LIFTING JACK.

No. 298,568. Patented May 13, 1884.

Fig. 1.

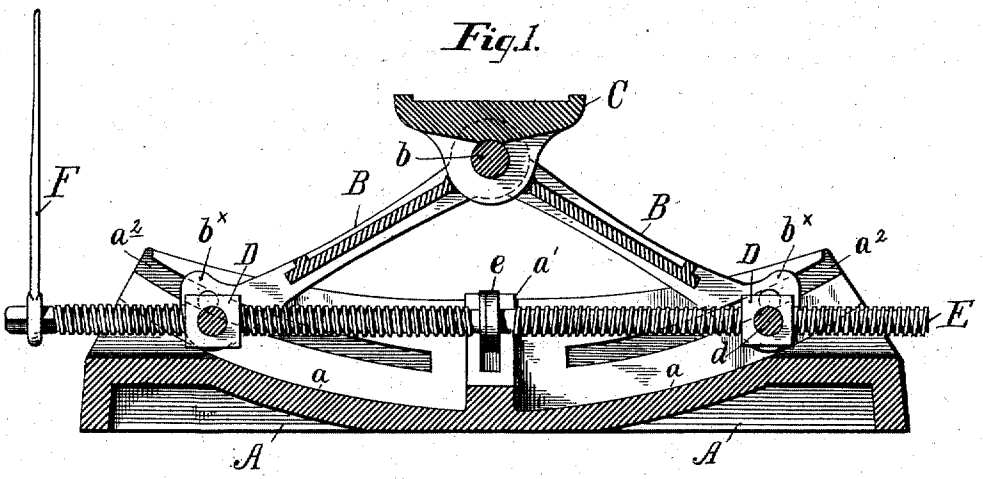


Fig. 2.

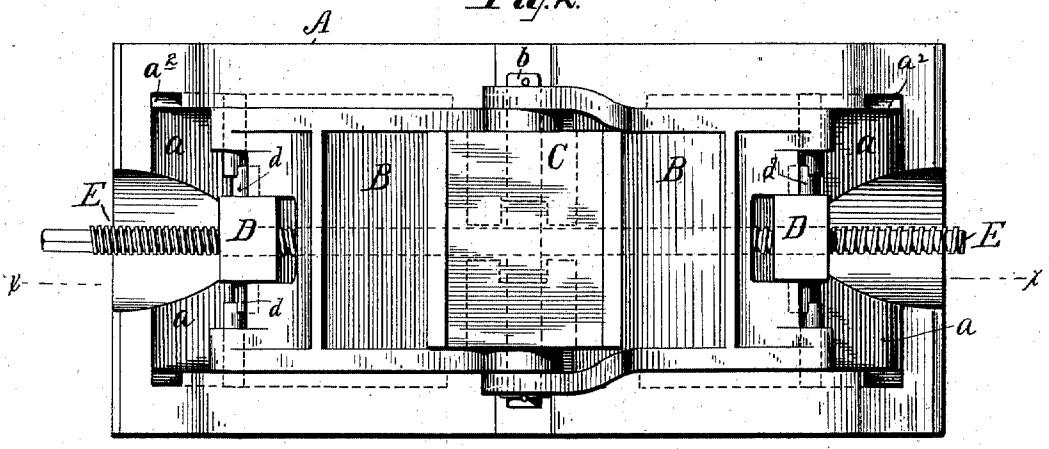


Fig. 5.

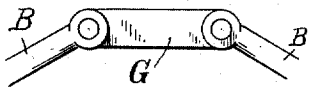


Fig. 3.

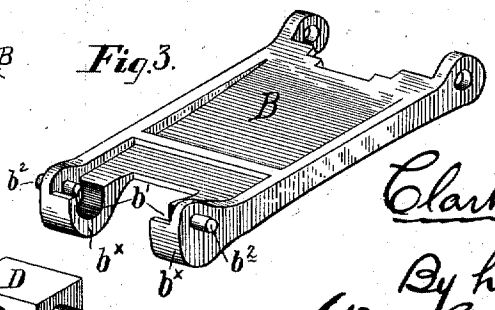
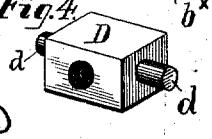


Fig. 4.



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UNITED STATES PATENT OFFICE.

CLARK FISHER, OF TRENTON, NEW JERSEY.

LIFTING-JACK.

SPECIFICATION forming part of Letters Patent No. 298,568, dated May 13, 1884.

Application filed February 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, CLARK FISHER, a citizen of the United States, residing in Trenton, New Jersey, have invented a certain Improvement in Lifting-Jacks, which I entitle a "Duplex Jack," of which the following is a specification.

My invention relates to a class of well-known contrivances employed for hoisting cars, carriages, and other weights, and for retaining them at any elevation. This class is too well known to require further explanatory mention.

The object of my invention is the construction of a mechanically simple yet powerful lifting-jack which can not only be operated with a trifling expenditure of force, but is also adapted to remain fixedly in any predetermined position.

A preferred form of a convenient embodiment of my invention is represented in the accompanying drawings and hereinafter described and claimed.

In the drawings, Figure 1 is a central vertical longitudinal sectional elevation through the entire apparatus, section being supposed upon the dotted line *x x* of Fig. 2. Fig. 2 is a top plan view of the entire apparatus. Fig. 3 is a view in perspective of one of the toggle-bars removed from the machine. Fig. 4 is a similar view of one of the trunnioned nuts, and Fig. 5 is an illustrative detail of another form of apparatus in which the upper extremities of the toggle-bars are connected by a toggle plate or link.

Similar letters of reference indicate corresponding parts.

In the drawings, A is the bed frame or plate of the jack, preferably a cast structure conveniently made in the form represented in the drawings—that is to say, as a laterally-walled structure, between the walls of which are formed two oppositely and preferably equally curved segmental toggle-ways, *a*, which constitute the interior floor of the frame. Centrally within the bed-frame is cast or otherwise formed what I term a "collar-socket," *a'*, which is designed to contain and retain against endwise or axial thrust a collar fixedly applied to the screw-shaft.

B B are two toggle bars or struts, a convenient form of one of which is shown removed from the machine in Fig. 3. These toggle-bars are, in the form of apparatus represented in Figs. 1 and 2, united as to their upper extremities by a toggle-pin, *b*, upon which pin is hung or framed the lifting-head C of the jack. The feet $b^{\times}$ of the toggle-bars rest, respectively, upon the bed-frame in its segmental toggle-ways, as will be clearly understood by reference to the drawings, and these feet are provided with bearings *b'*, or are otherwise conformed to receive the trunnions *d* of the trunnioned nuts D, which latter are respectively mounted upon the respective extremities of the actuating screw-shaft E. The said actuating screw-shaft E is, as to its respective extremities, cut with a right and a left hand thread, and as to its central portion, which is intermediate between its threaded portions, it is provided with a fixed collar, *e*, which is housed within the collar-socket *a'* of the bed-frame, or is otherwise—by means, for instance, of lugs, projections, or kindred contrivances—retained in a fixed position with respect to the bed-plate, so as to prevent the axial movement of said screw-shaft. The screw-shaft, as stated, is equipped with a nut upon each of its respective extremities, which nuts respectively engage the feet of the toggles, preferably to permit the movement of the toggle-bars by means of their trunnions in the manner represented in the drawings. The feet of the toggle-bars are also provided with studs b^2, which are clearly represented in Fig. 3, and which, as to their inner extremities, overhang the trunnions of the nuts and serve to retain said trunnions in their bearings, and as to their outer extremities travel in segmental guideways a^2, correspondent in curvature to the toggle-ways formed in the inner faces of the side walls of the bed-frame, thereby retaining the feet of toggle-bars, to prevent them from lifting out of the bed-frame. The screw-shaft, as to either or both of its extremities, is adapted to be provided with a lever, F, formed either as a simple turning-key or as a ratcheted lever, through the instrumentality of which, or of any equivalent contrivance, rotation in the desired direction is imparted to the screw-shaft.

Such being a description of what I consider

a good form of an inexpensive embodiment of my invention, it will be readily understood that the invention resides simply in the combination of two very old mechanical powers—viz., the toggle-joint and the screw. The primary power which is utilized for the lifting resides, of course, in the toggle-joint, and not in the screw, since it is obvious that the toggle-bars might be brought into their successive positions for raising a load by using instead of the screw any equivalent mechanical contrivance for drawing together the feet of the said toggle-bars; but the screw is evidently the best mechanical contrivance for the purpose, not only from its great power, and from its simplicity and economy of construction, but because at any period of its rest after its rotation the toggle-feet are secured in their then position. This is of manifest advantage when, in the raising of loads, it is desired for the time being to leave the load in a given position between the lowest and highest points of elevation—as, for instance, in the raising of the rails and ties of a railroad, for "lining up" the joints, and where frequent interruptions from passing trains occur.

In jacks as heretofore constructed, so far as my knowledge extends, the load has rested directly upon the screw, rack, or hydraulic piston, as the case may have been, or upon that contrivance which is itself raised and lowered. In my invention, on the contrary, the load always rests directly upon the bed frame or plate, whatever may be the angle which, for the time being, the toggle-bars have assumed, and the only office of the screw-shaft, or of any equivalent contrivance employed for the approximating or separating of the feet of the toggle-bars, is to change the angle of the said toggle-bars. When a more extended bearing-surface than is afforded by the lifting-head of Fig. 1 is desired, the upper extremities of the toggle-bars, instead of being connected by a single toggle-pin, as in Fig. 1, may be connected by a horizontal toggle-plate, G, in the manner represented in Fig. 5. An important feature of the contrivance also resides in the means for preventing the axial thrust of the screw, such means being, in the form of apparatus represented, the collar upon the screw-shaft, and the collar-socket in the bed-frame, although, as already stated, other contrivances operative to the same result may be employed in place of the said collar and socket.

Where the jack is intended for very heavy work, the friction of the toggle-feet due to their sliding, with the entire load upon them, upon the bed-frame will be so great that it will be desirable to interpose small rollers or wheels between these surfaces, and this is conveniently done by extending the trunnions of the nuts entirely through the side faces of their bearings within the toggle-bars, and equipping such prolonged shanks, which then serve as axles, with rollers or wheels. The vital point of my invention, however, resides in the fact that in a jack as constructed by me the whole of the load is transmitted directly to the bed-plate through the toggle-bars or inclined struts, and no part of the vertical load allowed to rest upon the screw-shaft, the only function of which is, as already stated, to change the angular position of the toggle-bars or to retain them in any desired position.

The object of making the toggle-ways of segmental form is to reduce the acuteness of the angle when the toggle is at its lowest point, making less strain upon the screw than if the surface of the bed-frame were in a straight horizontal plane. The vertical movement of the horizontal screw-shaft which this segmental structure of way necessitates is allowed for by excavating the bed-frame at its extremities, and by making the collar-socket of the requisite vertical depth. The screw-shaft can be rotated to a sufficient extent to run the nuts and toggle-feet out of the bed-frame, so that the toggles and shaft can be together removed from the frame.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination, to form a lifting-jack, of two toggle-bars, the upper extremities of which are connected and adapted to carry the load, a bed-frame upon which the feet or lower extremities of said toggle-bars rest and travel, and a right-and-left-handed screw-shaft adapted conveniently, by means of trunnioned nuts, to act against the lower extremities of said toggle-bars and cause their approach upon said bed-frame, substantially as described.

2. The combination, to form a lifting-jack, of two toggle-bars, the upper extremities of which are connected and adapted to carry the load, a bed-frame upon which the feet or lower extremities of said toggle-bars rest and travel, a right-and-left-handed screw-shaft adapted conveniently, by means of trunnioned nuts, to act against the lower extremities of said toggle-bars and cause their approach or recession upon said bed-frame, and means for preventing the axial movement of said screw-shaft, substantially as described.

3. The combination, to form a lifting-jack, of two toggle-bars connected at their upper extremities by a toggle-pin, and as to said upper extremities equipped with a lifting-head, a lifting-head, a bed-plate upon which the lower extremities of said toggle-bars rest and travel, and a right-and-left-handed screw-shaft which is adapted to said toggle-bars in such manner that upon its rotation in one direction it causes the approach of the lower extremities of said toggle-bars, or in the opposite direction their recession, and when not rotated retains said bars fixedly in a given position, substantially as set forth.

4. In a lifting-jack of the class herein recited, the combination of a bed-frame containing or embodying segmental toggle-ways, two

toggle-bars connected as to their upper extremities, adapted as to said upper extremities to sustain the load, and as to their lower extremities adapted to travel in said segmental toggle-ways, and a screw-shaft or kindred device housed in the bed-plate, and adapted to occasion the approach or recession of the lower extremities of said toggle-bars, substantially as set forth.

5. The combination, to form a lifting-jack of the class herein recited, of the bed-frame provided with segmental toggle-ways, the toggle-bars provided as to their upper extremities with a lifting-head, and as to their lower extremities with trunnioned nuts, nuts applied to said toggle-bars and mounted upon a right-and-left-handed screw-shaft, a right-and-left-handed screw-shaft provided with a collar or kindred retaining device housed in the bed-plate, and means for occasioning the rotation of said shaft, substantially as set forth.

6. The bed-frame hereinbefore described, provided with segmental toggle-ways and with the central collar-socket.

7. The bed-frame hereinbefore described, provided with the segmental toggle-ways, the collar-socket, and the guideways.

8. In combination with a bed-plate upon which the feet of the toggle-bars rest and travel, toggle-bars provided with feet which rest and travel upon said bed-plate, and also provided with bearings in said feet, and nuts equipped with trunnions adapted to said toggle-feet, substantially as and for the purpose set forth.

9. In combination with the bed-frame provided with guideways, the toggle-bars provided with studs adapted to said guideways, substantially as set forth.

In testimony whereof I have hereunto signed my name this 8th day of February, A. D. 1884.

CLARK FISHER.

In presence of—
SAMUEL BRACKETT,
CHAS. W. EDWARDS.

Correction in Letters Patent No. 298,568.

It is hereby certified that in Letters Patent No. 298,568, granted May 13, 1884, upon the application of Clark Fisher, of Trenton, New Jersey, for an improvement in "Lifting-Jacks," errors appear in the printed specification requiring correction, as follows: In lines 101 and 112, page 2, the *comma* should be *omitted* after the word "conveniently," and *inserted* after the word "adapted;" and that the specification should be read with these corrections therein to make the Letters Patent conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 20th day of May, A. D. 1884.

[SEAL.]

M. L. JOSLYN,
Acting Secretary of the Interior.

Countersigned:

BENJ. BUTTERWORTH,
Commissioner of Patents.