

J. W. Bliss,
Lifting Jack.

N^o 10,663.

Patented Mar. 21, 1854.

Fig. 2.

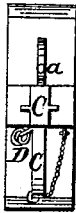


Fig. 6.

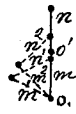


Fig. 1.

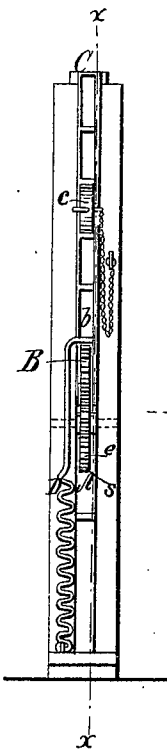


Fig. 4.

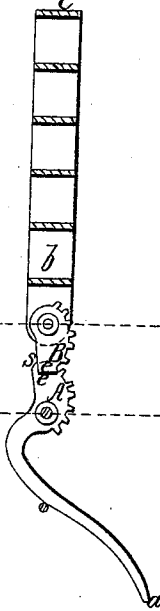


Fig. 3.

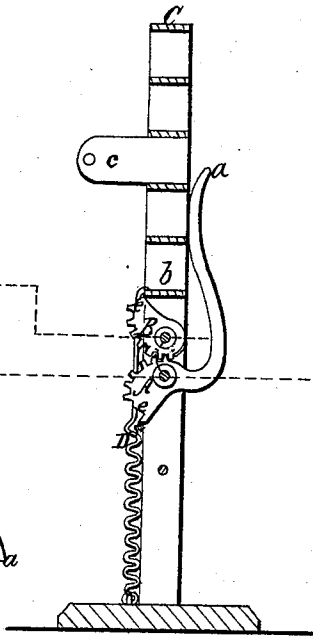
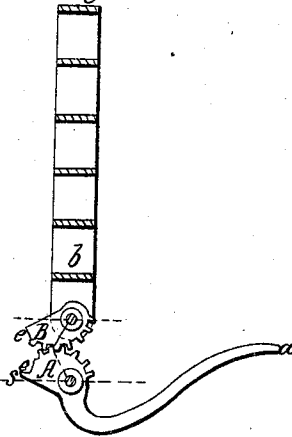


Fig. 5.



UNITED STATES PATENT OFFICE.

JERMY W. BLISS, OF HARTFORD, CONNECTICUT.

LIFTING-JACK.

Specification of Letters Patent No. 10,663, dated March 21, 1854.

To all whom it may concern:

Be it known that I, JERMY W. BLISS, of the city and county of Hartford, in the State of Connecticut, have invented a certain new and useful Improvement in Lifting or Forcing Jacks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, which forms part of this specification, and in which—

Figure 1 represents a front or face elevation of my improved jack; Fig. 2, a top view or plan; Fig. 3, a side sectional elevation taken through the line $x x$ in Fig. 1, and representing the working parts of the jack in the position they occupy when down or before commencing to lift; Fig. 4, a similar view of the lifting portions of the jack when set or raised, and Fig. 5 a like view of the said parts during the act of raising; Fig. 6 is a diagram of elbow jointed levels for elevating the lifting frame in contrast to the arrangements I employ for that purpose.

The jack represented in the accompanying drawing consists of two toothed cams (A and B), the one of which (B) is pivoted to the bottom of the lifting frame or slide (C), while the other cam (A) is provided with journals that take their bearings in the side pieces or cheeks of the frame of the jack. These cams gear into one another and the lower one is furnished with an operating handle or lever (a) that, as it is worked downward causes the lower cam (A) to turn and similarly operate and raise the upper cam and with it the lifting frame (C).

The lifting frame (C) is provided with feathers or guides which fit in slots in the jack frame and serve to preserve the lifting frame vertical as it rises. Cells or bar seats (b), one above the other, are made in the lifting frame; these cells serve to carry the lifting bar (c) and are of the same length, or thereabout, as the stroke of the jack. The outer or extreme ends of the cams are flattened (as at e) and the lower cam is made with an extreme or finishing tooth or lip (g). This construction of the cams serves to give a set or stop to the cams from moving either way when the jack is raised to its top stroke (as in Fig. 4), and, when occupying this position, the arrangement of the cams resembles an elbow jointed lever motion at its dead point or when in line as represented in Fig. 6 by the perpendicular rods (m and n) which connect the fixed and rising ful-

cra (o and o') of those rods; but, when operating or in motion, the action of the cams is greatly superior, for the purpose proposed, than an elevating jointed lever motion, as in commencing to lift (as in Fig. 3), the effective or working angle of the cams—where they strain or gear into each other—is but slight or largely obtuse as compared with that of the elbow jointed levers, as may be seen by reference to Fig. 6 in which the rods or levers (m and n) would—to produce the same length of stroke—be required to occupy the position represented by the lines m' and n' ; and, in like manner, when the jack is at half stroke, or thereabout (as in Fig. 5), a similar gain as regards the working angle is obtained by the cams as compared with the elbow jointed levers which would then occupy the position represented by the lines m^2 and n^2 . But, in addition to the specified advantage of obtaining a more effective working angle, and the consequent closer approximation to uniformity of speed or power throughout the stroke, all liability of the cams to bend, as in elbow jointed levers, is avoided, and that injurious strain which is thrown upon the connecting joints of the said levers, when thus operating, is by the toothed gear of the cams (A and B) divided over several and constantly varying surfaces, whereby increased durability and security against breakage is obtained.

As a carriage jack, this construction and arrangement of the toothed cams and lifting frame affords great facility and security of operation, as, by inserting the lifting bar (c) in one of the lower cells or recesses (b) so as to bear under the axle of the smaller pair of wheels of the carriage, and working down the handle or lever (a) from its position represented in Fig. 3 to the position it occupies in Fig. 4, the carriage is at once lifted by but a slight variation in the power exerted throughout the stroke and without requiring any troublesome or doubtful separate contrivance to lock the jack when raised as it becomes self-setting, and in that respect is even more secure than a screw of the necessary pitch to insure the same power or speed while it has the same facility of lowering as is claimed by the ordinary rack and pinion jack, for, by only slightly elevating the working lever or handle so as to relieve the flattened or smooth extremities of the cams, the lifting frame (c) may then

be run down by its own weight, or a spring (*d*) may be arranged to insure its inward motion and this arrangement of a spring is advisable when the jack is designed to force downward, at an inclination from the perpendicular, or horizontally, as under some circumstances of using the jack it is required to do. The spring (*D*) also serves to insure the cams remaining in their proper relative positions to one another by keeping them constantly in gear, which otherwise, by the sticking of the lifting frame in its descent might not be the case and the cams be caused to slip a tooth or more by the swinging of the pivoted cam (*B*) backward so that upon again attempting to lift, the jack would fall short of its proper stroke and fail to set itself when raised by reason of the cams being improperly in gear and the flattened portions or extremities (*e*) of them failing to meet so as to form a set.

In the further use of the device as a carriage jack, after the front wheels of the carriage have been cleaned, etc., the lifting bar (*c*) is next inserted in one of the higher cells or recesses (*b*) of the lifting frame so as to bring it to bear under the axle of the after or larger wheels, and the same operation of raising, setting and lowering performed as before, and thus great expedition and security is insured in raising and setting the carriage at its lift.

When the jack is required to lift beyond its single or ordinary stroke, the bar (*c*) is first inserted in the bottom cell (*b*) and a lift taken for the full stroke of the jack, when the body being raised is packed up from below to the elevation the jack has by this one operation raised it; the lifting frame is then lowered and the bar (*c*) inserted in the next recess above, when another lift is taken, and so on in succession till the body is raised the full length of the lifting frame. The length of the cells (*b*) being equal to the stroke of the jack they serve as seats in succession for the lifting bar to act or bear against or under the body during each succeeding lift without involving the necessity of introducing intermediate packing between the lifting bar and the body or packing up the jack from beneath; and the several cells or seats serve generally to enlarge the convenience of the jack by giving to the lifting bar several elevations from which to act, whether for carriage lifting or other purposes. Thus, it will be seen, the combination of the geared cams and cellular lifting frame, constructed and arranged as de-

scribed, forms a simple, convenient and powerful jack the speed or power of which may be increased, according to the purpose it is designed to apply it, without, as is customary with the rack and pinion jack, increasing friction and labor of fitting by multiplying the number of parts, as the stroke of the lifting frame compared with the movement of the operating lever or handle is dependent upon the shape and pitch of the cams, while the self-setting arrangement of the cams avoids the usual loss of time, and trouble, in locking the jack, when raised, by separate devices for that purpose; and all tendency on the part of the jack to fly from its set is obviated by reason of the broad bearing surface which is given to the cams at their flattened extremities (*e*) and the division of the resistance or pressure on either side of the axes of the cams as well as in a direct line with their centers, as represented in the drawing. The gearing of the cams (*A* and *B*) together causes the sliding portion of the lifting frame to produce but little friction and gives a free and easy action to the frame, both in ascending and descending, and occasions but little wear by dividing the lifting pressure over several teeth or surfaces at a time.

For some purposes, it is obvious, the cellular construction of the lifting frame may be dispensed with and the sliding or lifting frame be made solid and caused to act direct under the body to be raised, but in a general way I prefer interposing a lifting bar and constructing the lifting frame with cells, or their equivalents, arranged as described for the purposes specified.

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

The combination of the toothed cams (*A* and *B*) with the lifting frame or slide (*C*) arranged and operating together as and for the purposes set forth, when the said cams are so constructed at their finishing extremities (*e*) as to form a bearing surface on either side of the centers of the axes of the cams whereby the jack is made self setting and is restrained from flying from its set as specified.

In testimony whereof, I have hereunto subscribed my name.

JERMY W. BLISS.

Witnesses:

SAMUEL F. JONES,
JOSEPH McDONALD.