May 20, 1941. M. B. LUCKER 2,242,431

JACK

Filed Feb. 1, 1940

FIG. 1.

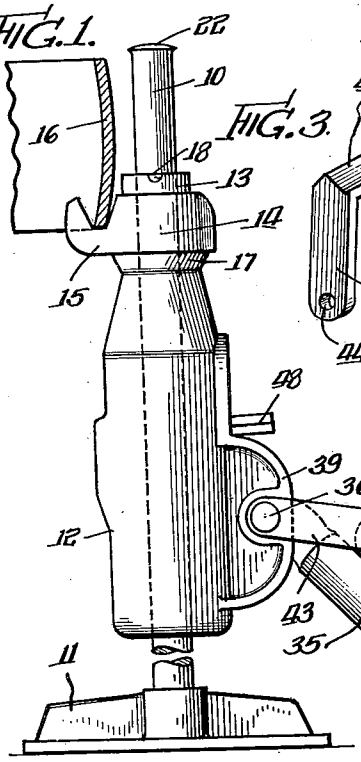


FIG. 3.

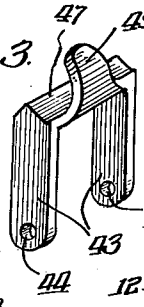


FIG. 2.

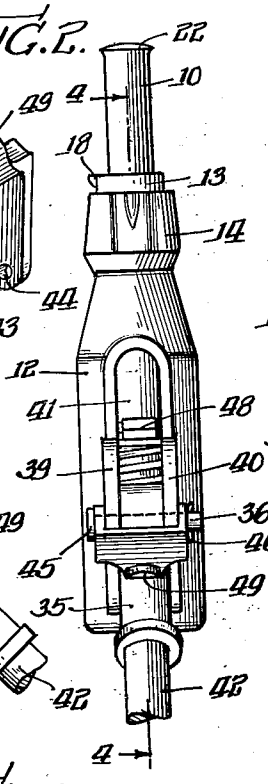


FIG. 6.

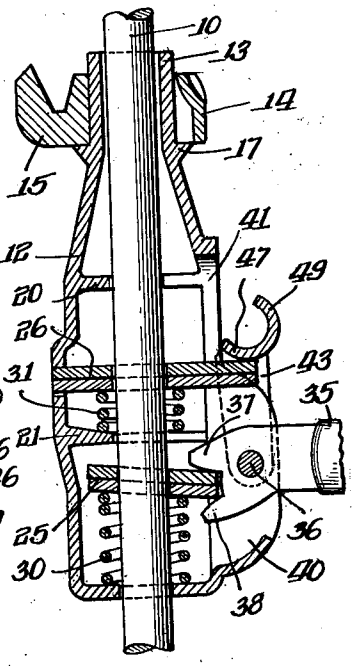


FIG. 4.

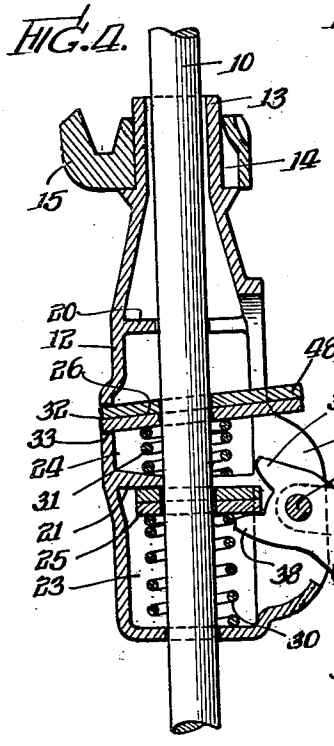


FIG. 5.

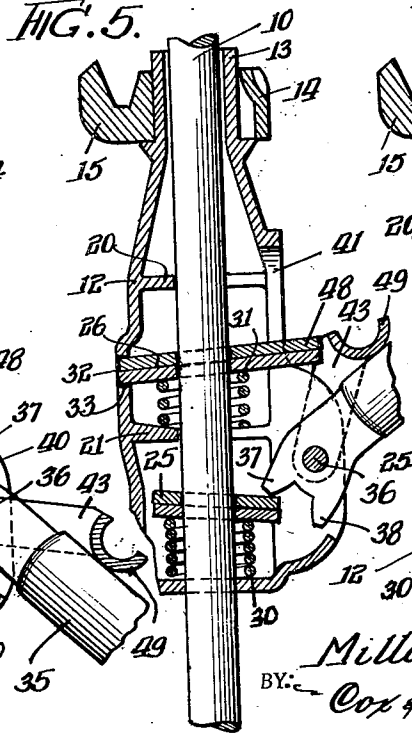
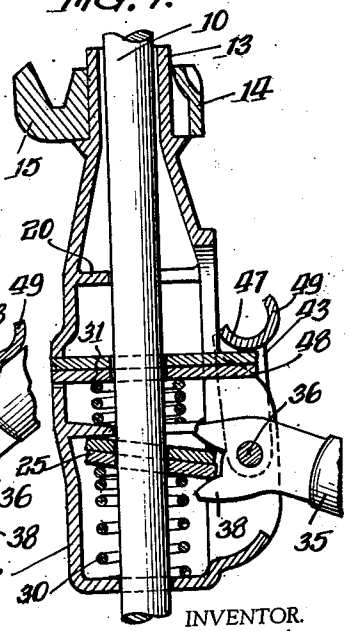


FIG. 7.



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Patented May 20, 1941 2,242,431

UNITED STATES PATENT OFFICE

2,242,431

JACK

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Application February 1, 1940, Serial No. 316,709

6 Claims. (Cl. 254—106)

This invention relates to lifting jacks and particularly to jacks of the friction gripping clamp or cam type.

It is an object of the invention to provide a friction clamp or cam lifting jack of improved construction and operating characteristics, and particularly to provide improved means and methods for effecting the lowering or release movements of the jack load-lifting member.

More specifically, it is an object of the invention to provide, in a friction clamp or cam lifting jack wherein the lowering or release of the load lifting member is controlled by means of the actuating clamp or cam and the jack actuating lever, improved and simplified means for moving the holding clamp or cam into inoperative released position and for maintaining it in such position during the load lowering operations.

Still more specifically, it is an object of the invention to provide improved and simplified means for moving the holding clamp or cam to inoperative position, which means may be mounted upon the main body or housing of the jack without the necessity of special mounting devices or adjuncts, providing a simplified and economical structure. In accordance with the invention, the disabling means for the holding clamp or cam may be manually manipulated to disable the clamp, the means being self-operable when moved into engagement with the clamp to maintain it in disabled or release position.

Various other objects, advantages and features of the invention will appear from the following specification when taken in connection with the accompanying drawing, wherein one preferred embodiment of the invention is set forth for purposes of illustration.

In the drawing, wherein like reference numerals refer to like parts throughout,

Figure 1 is a general side assembly view of a lifting jack constructed in accordance with one preferred and illustrative form of the invention, the disabling means for the holding clamp or cam being shown in inoperative position;

Fig. 2 is a front view of the jack structure shown in Figure 1, particularly illustrating the lifting body and its associated parts;

Fig. 3 is a detail perspective view of the release lever for the holding clamp which constitutes the disabling means therefor; and

Figs. 4, 5, 6, and 7 are side sectional views through the jack structure of Figs. 1 and 2, showing the movements of the parts in various operating positions, and taken along a line such as the line 4—4 of Fig. 2.

Referring more particularly to the drawing, the structure shown is of the general type illustrated in my copending application Serial No. 184,174, filed January 10, 1938, entitled "Automobile jack." The structure comprises an upstanding circular shaft 10, partially broken away in Fig. 1, carried in any suitable manner on a base 11 which is adapted to rest upon the ground or other supporting surface. A main lifting body 12 is mounted for longitudinal sliding movement along the shaft 10, the raising or lowering movements of the lifting body being under the control of friction clamps or cams, later to be described.

The lifting body may conveniently be formed as a one-piece casting provided with a central bore through which the shaft 10 is adapted to project. The upper end of the lifting body is provided with a cylindrical or sleeve portion 13 adapted to support a rotatable load-engaging collar 14. The load-engaging collar is provided with a laterally projecting seat portion 15 adapted to be brought into engagement with the load to be raised, which may for example be the bumper of an automotive vehicle as illustrated by the reference numeral 16. While the lifting jack illustrated is thus of the automobile bumper jack type, it is to be understood that the principles of the present invention may be adapted to lifting jacks and related structures of other types and kinds, and adapted for other purposes. The lower edge of the load-engaging collar is arranged to seat upon an annular bead 17 formed on the lifting body, and the cylindrical body portion 13 is formed at its upper end with a projection 18 adapted to prevent the inadvertent dislodgment of the load-engaging collar in the event that the jack structure is inverted, as when not in use.

Referring more particularly to Fig. 4, it will be seen that the lifting body is provided with a pair of transverse partitions 20 and 21. The partition 20 cooperates with an enlarged head portion 22 formed on the upper end of the shaft 10 whereby to prevent the projection of the lifting body upwardly off of the end of the shaft. The partition 21 separates the lower portion of the lifting body into lower and upper chambers 23 and 24 in which the actuating and holding clamps or cams 25 and 26 are respectively mounted. The clamps may be of various forms clamps are of laminated construction as illustrated in my before-mentioned copending ap-

plication, if desired. However, as shown, the clamps are of laminated construction as illustrated in my copending application Serial No. 195,142, filed March 10, 1938, and entitled, "Jack," patented Dec. 31, 1940, as Patent 2,227,397. The laminated plates constituting the clamps are provided with central openings through which the shaft 10 projects, these openings being provided with oppositely disposed gripping or biting edges adapted to be brought into gripping or locking engagement with the shaft as the plates are canted. The arrangement is such that, when the plates or clamps are in uncanted position, they are free to move longitudinally along the shaft, but when the plates are moved or tilted to canted position they are brought into locking engagement with the shaft.

A compression spring 30 encircling the shaft bears against the lower surface of the actuating clamp 25, and normally holds it in uncanted position, as seen in Fig. 4, in seated engagement against the lifting body barrier wall 21. A compression spring 31 also encircling the shaft 10 bears against the lower surface of the holding clamp 26 and normally urges it counterclockwise as seen in Fig. 4 into gripping engagement with the shaft. One end 32 of the holding clamp is loosely engaged within an opening 33 in the lifting body, the engagement 32—33 thus constituting a pivotal connection between the lifting body and holding clamp whereby the clamp may be moved counterclockwise into gripping engagement with the shaft by the compression spring. The lower end of the compression spring 31 seats against the barrier wall 21, whereas the lower end of the compression spring 30 seats upon the extreme lower surface of the lifting body.

An operating lever 35 is pivotally mounted upon the lifting body, on a pivot pin 36, the inner end of the operating lever being provided with a pair of toothed projections 37 and 38 engageable on opposite sides of the actuating clamp 25. The pivot pin 36 is mounted in a pair of laterally projecting ears 39 and 40, Fig. 2, formed as a part of the lifting body and defining a front lifting body opening 41. The operating lever is also provided with an extension 42, which is preferably in the form of a removable bar adapted to be received within a socket portion on the operating lever. The bar 42 may be of any suitable length to provide the necessary leverage in the operation of the device.

The operating lever controls the movements of the actuating clamp 25 to effect both the raising and lowering of the lifting body along the shaft 10, and means is provided for releasing or disabling the holding clamp during load lowering operations.

In accordance with the invention, this disabling or release means, specifically illustrated in Fig. 3, comprises a release lever 43 in the form of a U-shaped strap or yoke. The two depending leg portions of the yoke-like release member are provided with aligned openings 44 adapted to receive the pivot pin 36, whereby to pivotally mount the release lever upon the pivot pin, the pin being provided with an enlarged head 45 and a cotter pin or the like 46, as best shown in Fig. 2, to retain the lever in position. The connecting cross portion 47 of the release lever is adapted to engage and move the holding clamp into uncanted inoperative position as the release lever is moved from its inoperative position, as illustrated, for example, in Figs. 1 and 4, to its operative position as shown in Figs. 6 and 7. To this end, it will be noted that the cross portion 47 is of cam shape or contour so that as it is manually brought or forced into engagement with the extending end 48 of the holding clamp, it will automatically move the clamp into uncanted inoperative position. It will also be noted, particularly by reference to Figs. 6 and 7, that the shape of the cross portion 47 and the pivotal mounting of the release lever are such that the upward force of the spring 31 upon the holding clamp cannot act to dislodge the release lever when it has been moved into clamp-engaging position. Accordingly, the release lever is self-operable to maintain the clamp in uncanted position after the parts have been manually engaged and the clamp disabled, and the clamp will be restored to normal position only upon the manual movement of the release lever to its inoperative position. To facilitate the manual manipulation of the release lever, the cross portion 47 thereof is provided with an extension or handle portion 49. This handle portion may be conveniently manipulated to move the release lever into engagement with the holding clamp by the operator's thumb with the hand encircling the lifting body 12. The yoke-like release lever may be formed as a casting if desired, but preferably is made as a stamping—for example, of pressed steel or the like.

In the operation of the structure, the shaft 10 is first placed upon the base 11, and the lifting body 12 is then pushed upwardly into engagement with the load, the load-engaging collar 14 first being rotated into proper load-engaging position. The lifting body may be readily moved upwardly into engagement with the load, as the actuating and holding clamps do not inhibit such movement whether in canted or uncanted position. With the load properly engaged, and assuming the release lever 43 to be in its inoperative position as shown in Figs. 1, 4, and 5, the main operating lever 35 may be actuated to effect the step-by-step raising of the lifting body along the shaft 10. More particularly, as the operating lever is moved counterclockwise from its Fig. 4 to its Fig. 5 position, the actuating clamp 25 will first be canted clockwise into gripping engagement with the shaft upon the initial movement of the lever, and thereafter serve as a reaction base upon which the inner end of the lever may be fulcrumed enabling the lever to raise the lifting body by means of the pivot pin 36. Fig. 4 shows the position of the parts prior to movement of the operating lever, and Fig. 5 shows the position of the parts at the end of the operating stroke. During the upward movement of the lifting body, the holding clamp 26 is constantly maintained in counterclockwise gripping position. The canted position of the holding clamp does not prevent the upward movement of the lifting body, but does prevent any retrograde or downward movement, the holding clamp thus serving to retain the lifting body in any position to which it has been raised. As the operating lever 35 is restored from its Fig. 5 to its Fig. 4 position, the actuating clamp is moved upwardly to a new position of engagement upon the shaft by the compression spring 30, and in the event the clamp should tend to stick, the tooth projection 38 on the operating lever positively engages and releases the clamp. The operation may be repeated to effect the step-by-step lifting of the load to the desired amount.

To effect the controlled lowering of the load, the main operating lever 35 is again moved

counterclockwise from its normal position as shown in Figs. 1 and 4, to some intermediate operating position, for example, as illustrated in Fig. 6, sufficiently to cause the actuating clamp 25 to be removed from the barrier wall 21 and to be canted into gripping engagement with the shaft, whereby to assume control of the load. The release lever 43 is then manually moved into engagement with the holding clamp, as also illustrated in Fig. 6, whereby to move the holding clamp into uncanted or inoperative position. This release of the holding clamp does not result in a lowering of the load so long as the operator maintains the main operating lever 35 in a position such as illustrated in Fig. 6, maintaining the actuating clamp in canted engagement with the shaft and thus in load supporting position. The load having been removed from the holding clamp, the clamp may be readily unlocked from the shaft and moved to release position by manual actuation of the release lever. With the release lever maintaining the holding clamp released, the operator then pivots the main operating lever 35 clockwise to a position such as illustrated in Fig. 7 whereby the actuating clamp is brought into immediate juxtaposition with the barrier wall 21.

Any further clockwise or lowering movement of the lever 35 will cause the actuating clamp to become seated against the barrier wall and thereby be uncanted and released from gripping engagement with the shaft, causing the sliding lowering of the lifting body under the weight of the load. However, immediately as the lifting body is lowered, the operating lever 35 will as a result be moved counterclockwise, causing the actuating clamp to be moved from the barrier wall and again brought into gripping engagement with the shaft, unless the outer end of the operating lever is lowered simultaneously as the lifting body slides downwardly. In other words, the lifting body can move downwardly only as rapidly as the outer or lower end of the bar 42 is depressed by the operator. As a result, a wholly controlled lowering of the load is rendered possible, the load being permitted to go down only as fast as the operator depresses the operating lever. The load may be lowered rapidly or slowly as may be desired, but in either event the downward movement will be at all times under the operator's full control and may be stopped immediately and automatically at any time merely by stopping the downward movement of the operating lever. During the entire lowering operation, the holding clamp is held in release or inoperative position by the release member 43. When the lowering has been completed, the release lever may be manually restored to inoperative position, such as illustrated in Figure 1.

It will be seen that the invention thus provides, in a friction clamp or cam lifting jack, for the raising and lowering of the load from a single operating lever, the mechanism providing for the controlled lowering of the load under control of the main operating lever and the actuating clamp. It is further to be noted that the release lever 43, which is provided for moving and holding the holding clamp in disabled position, is not only a simple and readily operable, manually manipulative member, but, in accordance with the invention, it is applied to the structure in such a manner as to avoid the necessity of separate mounting devices or other items of expense. To this end, the release lever is mounted upon the same pivot pin which is also used to support the main operating lever of the jack, and the release lever is so shaped and mounted that it may be moved to its various operating positions without the necessity for any special shaping or appurtenances on the lifting housing 12. The release lever is carried by the projecting ears 39 and 40 of the housing 12, which otherwise support the main operating lever and form the opening through which the projecting end 48 of the holding clamp extends.

This application is a continuation in part of my copending application Serial No. 299,338 filed October 13, 1939, and entitled "Lifting jack." Claims more broadly directed to the features disclosed in both cases are presented in said copending application.

It is obvious that various changes may be made in the specific embodiment of the invention set forth for purposes of illustration, both as to details of structure and as to modes of operation, without departing from the spirit of the invention. Accordingly, the invention is not to be limited to the specific embodiments shown and described, but only as indicated in the following claims.

The invention is hereby claimed as follows:

1. A lifting jack comprising a base, a load-engaging member, means for moving the load-engaging member relative to the base comprising a main body and a pair of friction clamps associated therewith, one of the clamps being an actuating clamp and the other of the clamps being a holding clamp, an operating lever pivotally mounted upon the body for controlling the movements of the actuating clamp, and means for disabling the holding clamp, said disabling means comprising a member engageable with the holding clamp and pivotally mounted upon the body coaxial with the operating lever.

2. A lifting jack comprising a base, an upstanding shaft mounted on the base, a lifting body including a load-engaging member longitudinally movable on the shaft, means for moving the lifting body along the shaft comprising a pair of friction clamps, one of said clamps being an actuating clamp and the other of the clamps being a holding clamp, an operating lever pivotally mounted on the lifting body for controlling the movements of the actuating clamp, and means for disabling the holding clamp, said disabling means comprising a member pivotally mounted upon the lifting body coaxial with the operating lever and engageable with the holding claimp.

3. A lifting jack as defined in claim 1, wherein the disabling member portion which engages the holding clamp is provided with a cam-shaped surface whereby to effect the movement of the holding clamp as the yoke is engaged therewith.

4. A lifting jack comprising a base, a load-engaging member, means for moving the load-engaging member relative to the base comprising a housing and a pair of friction clamps mounted therein, one of said clamps being an actuating clamp and the other of the clamps being a holding clamp, the holding clamp being fulcrumed on the housing for pivotal movement with respect thereto to holding and disabled positions, said housing being provided with a pair of outwardly-extending spaced projections, an operating lever pivotally mounted on said projections adjacent the actuating clamp and engageable with the actuating clamp for controlling the movements thereof, and means for disabling the holding

clamp, said disabling means comprising a member also pivoted on said projections and engageable with the holding clamp.

5. A lifting jack comprising a base, an upstanding shaft mounted on the base, a lifting housing including a load-engaging member longitudinally movable on the shaft, means for moving the housing along the shaft comprising a pair of friction clamps mounted within the housing, one of the clamps being an actuating clamp and the other of the clamps being a holding clamp, the holding clamp being fulcrumed on the housing for pivotal movement with respect thereto to holding and disabled positions, said housing being provided with a pair of spaced projections defining an opening therethrough, an operating lever pivotally mounted on said projections and having a portion extending into engagement with the actuating clamp for controlling the movements of the clamp, and means for disabling the holding clamp, said disabling means comprising a member also mounted on said projections and adapted to engage the holding clamp to effect the movements thereof.

6. A lifting jack as defined in claim 5, wherein the disabling member is coaxially mounted with the operating lever upon said projections.

MILLARD B. LUCKER.

CERTIFICATE OF CORRECTION.

Patent No. 2,242,431. May 20, 1941.

MILLARD B. LUCKER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, second column, line 54, for the words "clamps are of laminated construction" read --and may be of one-piece construction,--; page 3, second column, line 55, claim 2, for "claimp" read --clamp--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of July, A. D. 1941.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.