X. KIRSTAETTER.

LIFTING JACK.

APPLICATION FILED JULY 30, 1915.

1,204,162. Patented Nov. 7, 1916.

Fig. 1

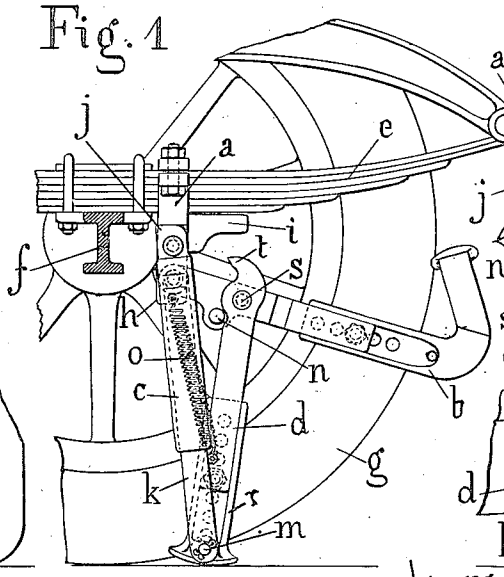


Fig. 2

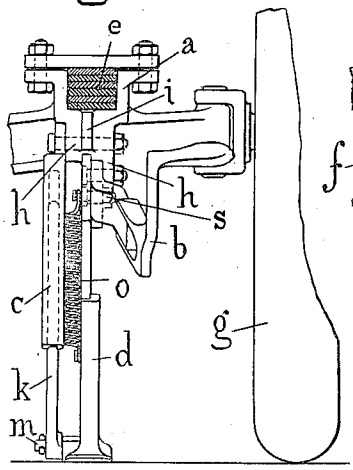


Fig. 3

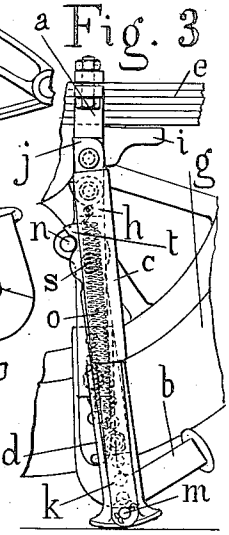


Fig. 5

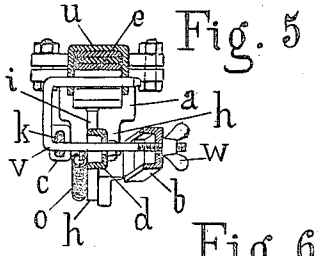


Fig. 4

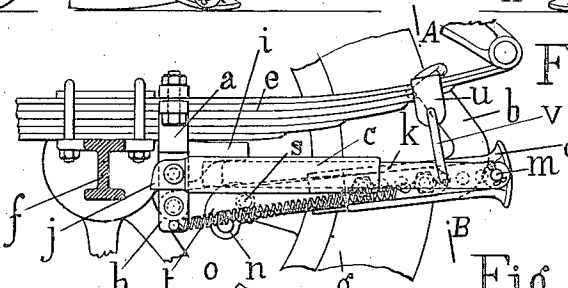


Fig. 6

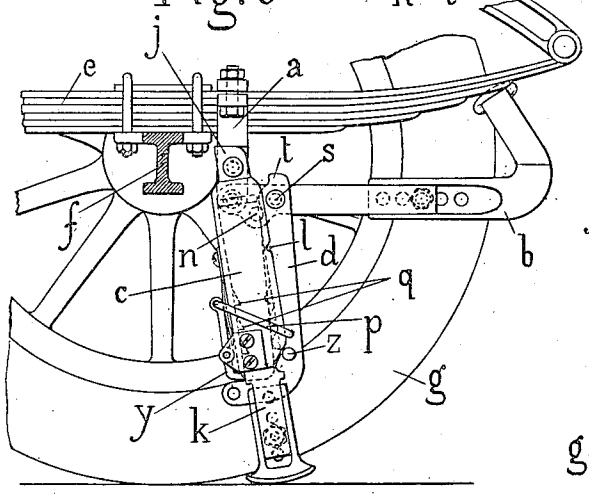
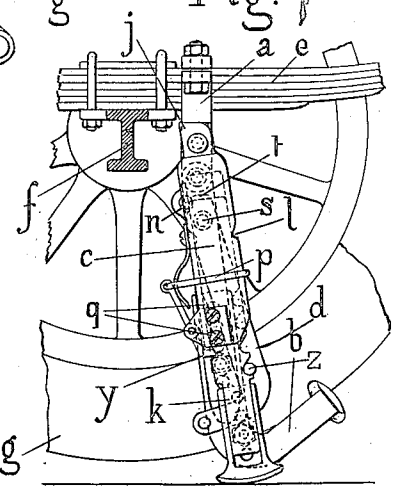


Fig. 7



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UNITED STATES PATENT OFFICE.

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LIFTING-JACK.

1,204,162. Specification of Letters Patent. Patented Nov. 7, 1916.

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To all whom it may concern:

Be it known that I, XAVIER KIRSTAETTER, a citizen of the Swiss Republic, and resident of Spalenvorstadt 15, Basel, Switzerland, have invented certain new and useful Improvements in Lifting-Jacks, of which the following is a specification.

This invention relates to lifting jacks of the type wherein a toggle action is used, a member which is operated by hand or foot power being adapted to effect the lifting until it passes a dead center position and comes against a stop or the like. Such lifting jacks as hitherto known have been arranged with a foot piece to stand on the ground, the jack being intended to be applied below any axle or the like which is to be lifted, adjusted in height if necessary, and then operated for lifting the same by the raising of a rest at the top or side of the jack.

According to the present invention a jack is provided which, instead of standing on the ground and being applied to any vehicle when required, is particularly adapted only for use on a vehicle to which it is attached preferably in a permanent manner.

The object then is to provide a jack which will always be ready for use whenever required, while it can be folded up out of the way when not in use.

The jack according to this invention will usually be mounted adjacent to a wheel of a vehicle such as an automobile, and normally held up out of the way, for instance by a strap or other attachment. When required for use it is released and dropped, whereupon a single movement serves at once to effect the lifting of the adjacent vehicle wheel without any preliminary setting or adjustment.

The jack is simple in construction, and one jack will be attached adjacent each wheel of the vehicle, so that the jacks can be used separately for the respective wheels, or all together when all the wheels are to be raised from the ground.

In the accompanying drawing are shown two examples of construction according to this invention:—Figure 1 shows a side elevation of a lifting jack according to one example of construction, in a position ready for use. Fig. 2 shows a corresponding end elevation. Fig. 3 shows a side elevation of the same lifting jack in the operative position, raising the vehicle wheel. Fig. 4 shows a side elevation of the folded lifting jack suspended from the vehicle spring. Fig. 5 shows a section on the line A—B of Fig. 4. Fig. 6 shows a side elevation of a lifting jack according to a second example of construction, in a position ready for use and Fig. 7 shows a similar view after the operation of the pedal member, to lift the wheel through a fraction of the total lift.

According to the first example of construction the lifting jack comprises a pedal member *b*, which is pivotally mounted on a support *a;* the pedal member is also pivotally connected to a strut or supporting member *d* guided by a bar *c*, the connection between the strut *d* and the pedal member *b* being such that the pedal member is divided into a short lever arm connected to the support *a* and a long lever arm provided with a pedal surface at its end, as shown. Strut *d* has foot piece *r* upon it.

The support *a* is preferably secured to the vehicle spring *e* close beside the frame member *f* which carries the wheels, so that when the jack is used to raise the spring, the frame member *f* and the wheel *g* mounted thereon will also be raised. The support *a* is provided with extensions or lugs *h*, in which the pedal member *b* and the guide bar *c* are hinged; the guide bar *c* is provided at its upper end with a shoulder *j* which, when the lifting jack is in the operative position, rests against the underside of the support *a* and in this manner prevents the guide bar from turning in a direction away from the pedal. The shoulder *j* is also preferably of such a length that when it comes to lie against the underside of the support *a* it causes the jack to take up a somewhat inclined position as in Fig. 3, so that when raising the four wheels of the vehicle, both the front and the rear jacks will be inclined toward the center of the vehicle, thus insuring the safe support of the vehicle on the four lifting jacks.

The guide bar *c* consists of two telescoping parts of which the lower part *k*, sliding in the upper part, is connected to the strut *d* by bolts *m*. A tension spring *o*, having one end connected to one of the lugs *h* of the support *a* and the other end to the strut *d*, serves to retain the latter normally in the raised position, thus also retaining the lower part *k* of the guide bar in its highest position inside the upper part, and the pedal *b* hinged thereto in the raised position, that

is to say in a position ready for use. A projection n provided on the pedal member b is adapted to come to rest against the strut d in order to limit the extent to which the spring o can lift the said strut. Above the connecting bolt s by which the strut d is connected to the pedal lever b, the strut is provided with a nose-piece t which, when the pedal is pulled up toward the vehicle spring e, strikes against a guide projection i of the support a, thus causing the strut d and therewith the guide bar c to be turned up toward the pedal b, so that all these parts will come to lie side by side under the vehicle spring e, in which position the lifting jack can be suspended from the spring e by a suspension device (Figs. 4 and 5).

The suspension device illustrated consists of the member u of band iron, bent around the vehicle spring e, and the bent rod v of which one arm is adapted to engage in the holes provided for the purpose in the member u, when the lifting jack is in the raised position, and of which the other arm is passed through corresponding holes in the guide bar c, strut d and pedal b, the latter being then secured together firmly by a wing nut w screwed on the arm of the rod, so that the whole device is locked firmly in the raised position. This arrangement has the advantage of allowing a certain amount of play to the parts when in the suspended position so that the vehicle spring can carry out its spring operation without being obstructed by the suspended parts of the jack.

When the lifting jack is required for use the suspension device is released and in consequence of the weight of the lifting jack and the action of the spring o, the lifting jack falls into a position ready for use (Figs. 1 and 2). In this position the strut does not touch or only just touches the ground. By depressing the pedal b the strut d is also moved downward, the latter in consequence of its connection to the guide bar c by the bolt m gradually assumes a vertical position, pulling the lower part k of the guide bar out of the upper part so that it comes into a straight line with the short lever arm of the pedal b, and after slight further depression of the lever will pass this point (Fig. 3) whereby the wheel axle and therewith the wheel are raised substantially through a distance equal to the difference between the sum of the length of the short lever arm of the pedal and the length of the strut on the one hand, and the length of the guide bar on the other hand, *i. e.* the difference between the sum of the two sides of the triangle, and the third side formed by these parts. By the movement of the strut d somewhat beyond the straight line position, which movement is limited by the inner side of the nose t at the upper end of the strut coming against the projection n on the pedal b, (Fig. 3) it is made impossible for the lifting jack to be released unintentionally because the weight of the vehicle opposes this, so that the lifting jack remains stationary in this position. It is possible to raise all the four wheels of an automobile if four jacks are provided, one beside each wheel, and to leave the wheels thus raised, which is of special importance when the automobile is stored as it saves the pneumatic tires from standing the load. The application of such jacks to the underside of vehicle springs does not present any difficulties, and when drawn up and suspended under the springs the jacks cause no inconvenience, while they can be brought into a position of use immediately when required; hence the use of lifting jacks according to the present invention offers considerable advantages over the independent lifting jacks which have been generally used up to the present time.

The lifting jack shown in the example of construction according to Figs. 6 and 7 operates on exactly the same principle as the jack hereinbefore described. In this case however the desired lift is not obtained by a single depression of the pedal member but by a plurality of depressions, the lift produced by a single depression of the pedal member being a fraction of the total attainable lift. For this purpose the lower part k which slides in the upper part of the guide bar c carries the foot piece r and is provided with a number of teeth of which the pitch corresponds with the quotient obtained by dividing the total lift by the number of teeth. The strut d pivotally connected to the pedal member by a bolt s is provided with a stud or pin z, adapted to engage between the teeth of the lower part k of the guide bar when the pedal is in the raised position, thus connecting the guide bar c with the strut d. By depressing the pedal the guide bar c is extended a distance equal to the pitch of the teeth or a fraction of the total lift and the vehicle spring and wheel are thus raised through a corresponding distance. A spring actuated pawl y then engages with one of the notches q provided on the other side of the lower part k of the guide bar thus preventing the lower part k from sliding back into the upper part when the pedal is raised. In this manner it is possible to extend the guide bar and press down the foot piece r, thus lifting the wheel through as many stages as there are teeth on the member k by depressing the pedal a number of times. By forcing the strut and the short arm of the pedal somewhat beyond the straight line position, which movement is limited by the inner side of the nose t at the upper end of the support striking against the projection n on the pedal, the

apparatus is locked after the last depression of the pedal so that in this position the pawl *y* is not required. For this reason no notch *q* is provided in the position corresponding with the highest lift or adjacent the highest tooth space so that it is possible to hang the loop *p*, connected to the free end of the double armed pawl *y*, in the notch *l* provided in the guide bar *c*. If the pedal is raised when the pawl *y* is in this position, the wheel *g* will descend and the lower part *k* of the guide bar *c* can slide freely back into the upper part, during which movement the stud *z* of the support when meeting the inclined surface at the lower end of the guide bar *c* is forced out of the tooth space. The lower end of the member *o* is preferably connected to the guide bar *c* by means of a spring having the same function as the spring *o* in Figs. 1 to 4 and also tending to hold the stud *z* in engagement with the teeth in member *k*.

A lifting jack according to this construction which only lifts a fraction of the total lift at each depression of the pedal is particularly suitable for lifting the wheels of heavy vehicles as with the same length of pedal member only a fraction of the total lift is effected at each stroke, or, in other words, the ratio of transmission is considerably higher than according to the first example of construction.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A lifting jack for suspension from a vehicle comprising a guide bar and a pedal member pivotally supported from the vehicle so that they can be turned up out of the way, a strut pivoted to the pedal member, a foot piece, means connecting the strut to the foot piece and means for guiding said foot piece from the guide bar, said connecting and guiding means being such that when the guide bar is dropped to its operative position and the pedal is operated, the vehicle is lifted.

2. A lifting jack for suspension from a vehicle, comprising a guide bar and pedal member pivotally supported from the vehicle, a stop at the upper end of the guide bar, a fixed support on the vehicle, said support coöperating with the stop to limit the movement of the guide bar, a strut pivoted to the pedal member, a foot piece, means connecting the strut to the foot piece, means for guiding said foot piece from the guide bar, a nose on the strut, and a projection on the pedal member, said nose and projection being adapted to limit the movement of the pedal member and strut beyond the straight line position on the operation of the pedal member.

3. A lifting jack for suspension from a vehicle, comprising a guide bar and pedal member pivotally supported from the vehicle, a stop at the upper end of the guide bar, a fixed support on the vehicle, said support coöperating with the stop to limit the movement of the guide bar, a strut pivotally connected to the pedal member, a foot piece, means connecting the strut to the foot piece, means for guiding said foot piece from the guide bar, a nose on the strut, a projection on the pedal member, said nose and projection being adapted to limit the movement of the pedal member and strut beyond the straight line position on the operation of the pedal member, a fixed guide surface on the support, said guide surface being adapted to guide the nose on the strut when the pedal member is pulled upward so that the pedal member, the strut and the guide bar are all brought into an approximately horizontal position.

4. A lifting jack for suspension from a vehicle comprising a guide bar and a pedal member pivotally supported from the vehicle so that they can be turned up out of the way, a strut pivoted to the pedal member, a foot piece, means connecting the strut to the foot piece, and means for guiding said foot piece from the guide bar, said connecting and guiding means being such that when the guide bar is dropped to its operative position and the pedal is operated, the vehicle is lifted, and means for holding the pedal member, the strut, and the guide bar in the raised position when out of use.

5. A lifting jack for suspension from a vehicle comprising a guide bar formed in two parts, one adapted to slide upon the other, one part of said guide bar being pivotally supported on the vehicle, a foot piece attached to the sliding member of the guide bar, a pedal member pivotally supported from said vehicle, a strut pivoted to the pedal member, and means connecting the strut to the sliding member of the guide bar, said means being such that on the depression of the pedal member the sliding member will be moved outwardly from the pivoted member of the guide bar.

XAVIER KIRSTAETTER.

Witnesses:
ARNOLD ZUBER,
ALBERT FISCHER.