July 16, 1935. W. J. COSTIN 2,008,387

JACK

Filed Sept. 17, 1934

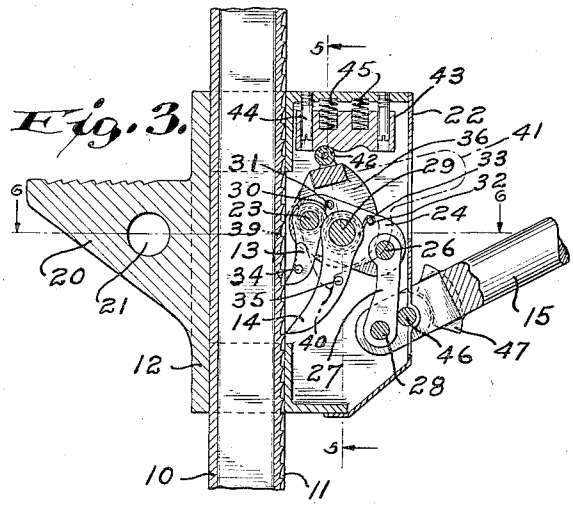


Fig. 3.

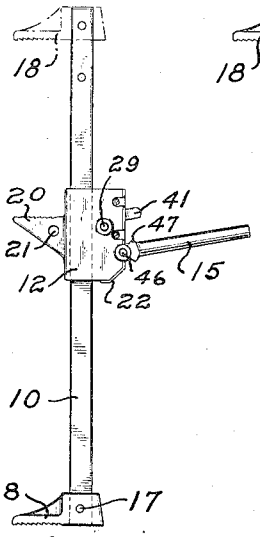


Fig. 1.

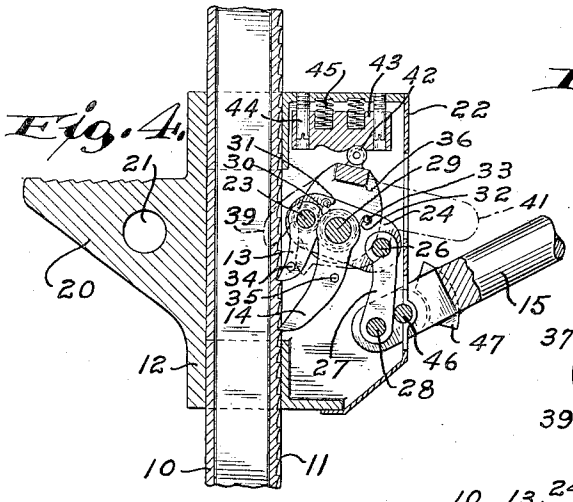


Fig. 4.

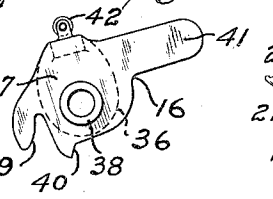


Fig. 7.

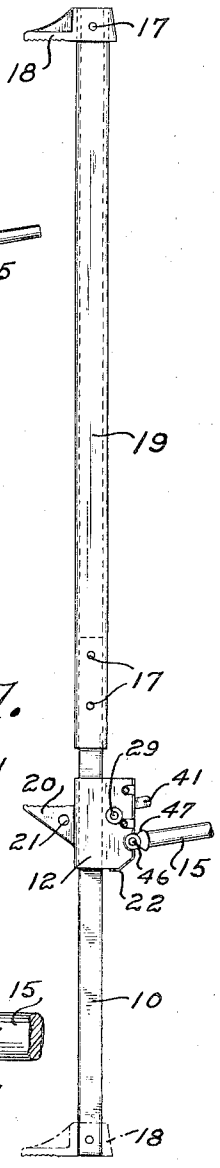


Fig. 2.

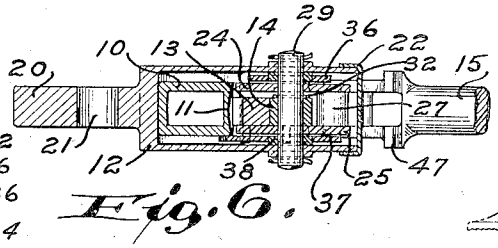


Fig. 6.

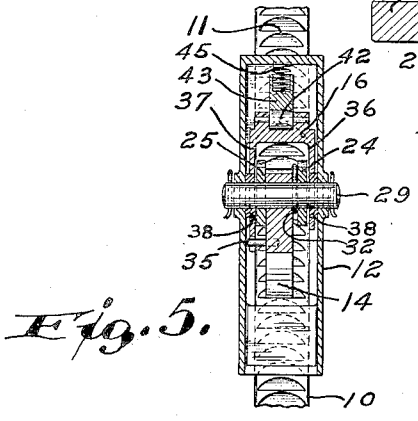


Fig. 5.

INVENTOR.

W. J. Costin

BY

Morsell, Lieber & Morsell

ATTORNEYS.

Patented July 16, 1935 2,008,387

UNITED STATES PATENT OFFICE

2,008,387

JACK

Wesley J. Costin, Milwaukee, Wis.

Application September 17, 1934, Serial No. 744,336

5 Claims. (Cl. 254—111)

The present invention relates in general to improvements in the construction of jacks for lifting, lowering, moving, or distorting objects, and which are especially adapted for use in repairing damaged automobile parts such as frames, bodies, and fenders.

Generally defined, an object of the present invention is to provide an improved jack which is simple and compact in construction, and which is, moreover, highly efficient in operation.

In the art of repairing and straightening automobile frames, bodies, fenders, and other parts, it is frequently necessary to use a powerful jack for spreading or for pulling the parts into desired shape, and it is imperative that such a jack be positively and quickly releasable, even when the same is subjected to heavy loading. It has been found that all of the prior jack mechanisms which have been used commercially for this class of service are decidedly subject to jamming when loaded, thereby making it impossible to reverse and to remove the jack structures whenever desired. The prior commercial jacks of this type are, moreover, deficient in power and are so bulky and complicated in construction as to make their use extremely cumbersome and unreliable.

It is therefore a more specific object of the present invention to provide an improved jack structure which overcomes all of these and other defects of the prior jacks of this general type, and which, besides being durable and powerful, is readily manipulable at all times and will not jam even when subjected to maximum loading.

Another specific object of the invention is to provide a new and useful jack mechanism which is highly flexible in use, and which may be manufactured and sold at minimum cost.

These and other objects and advantages will be apparent from the following specific description.

A clear conception of an embodiment of the several improved features, and of the mode of constructing and of manipulating jacks built in accordance with the present invention, may be had by referring to the drawing accompanying and forming a part of this specification, in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is a side elevation of an assembled jack ready for use in lifting objects or for spreading parts of an object;

Fig. 2 is a similar view of the jack having an extension column associated therewith and equipped with a clamping jaw;

Fig. 3 is an enlarged, vertical section thru the actuating mechanism of the jack, showing the reversing tumbler in lowering position;

Fig. 4 is a similar sectional view of the jack actuating mechanism, showing the reversing tubbler in elevating position;

Fig. 5 is a transverse, vertical section thru the jack taken along the irregular line 5—5 of Fig. 3;

Fig. 6 is a transverse, horizontal section thru the jack taken along the line 6—6 of Fig. 3; and

Fig. 7 is a side elevation of the reversing tumbler alone.

While the invention has been specifically shown herein as being applied to an automobile repair jack of a particular type, it is not intended to thereby limit the scope since some of the novel features may obviously be applicable to other types of jack structures.

Referring to the drawing, the improved jack comprises generally a power-transmitting column 10 which is preferably formed of a rectangular-sectioned tube having a series of teeth 11 milled in one side thereof; a bracket 12 snugly fitting and movable along the column 10; upper and lower pawls 13, 14 respectively, pivotally supported and housed within the bracket 12; a hand lever 15 for actuating the pawls 13, 14; and reversing mechanism including a manually adjustable tumbler 16 carried by the bracket 12 and cooperable with the pawls 13, 14 to control the action thereof.

The column 10 may be of any suitable length and is preferably formed of steel, and the notches or teeth are preferably formed as shown in Figs. 4 and 5, with flat lower surfaces disposed perpendicular to the column 10. The opposite ends of the column 10 may be provided with transverse holes as shown for the reception of pins 17 which are adapted to lock a jaw 18 or an extension tube 19 to the column, as shown in Figs. 1 and 2 respectively, and the jaw 18 is attachable to either end of the column 10, or to an end of the extension tube 19, as shown. The extension tube 19 may be of any desired length and may either be locked to the column 10 by pins 17 as shown in Fig. 2, or it may merely be slipped over the end of the column 10 and caused to rest upon the bracket 12 so that this bracket will cause the tube 19 to telescope upon the column 10.

The bracket 12 may be formed of cast steel or other suitable material and has a movable jaw 20 formed integral therewith and cooperable with the jaw 18 for diverse purposes. As previously indicated, the bracket 12 embraces, but is freely movable along, the column 10 in either direction, except when such movement is restrained by

the upper and lower pawls 13, 14. The movable jaw 20 may also be provided with an opening 21 for the reception of a force-transmitting chain or cable, and the bracket 12 is provided with a removable closure plate 22 for normally concealing and protecting the mechanism housed therein. The gripping surfaces of the jaws 18, 20 are preferably roughened and are disposed substantially parallel to each other, as shown.

The pawls 13, 14, which are cooperable with the notches or teeth 11 of the column 10 within the housing bracket 12, are also formed of steel or other suitable material; and the upper pawl 13 is swingably suspended from a pivot pin 23 carried by the forward ends of a pair of spaced side plates 24, 25. The rear ends of these side plates 24, 25 carry another pivot pin 26 disposed parallel to the front pin 23, and this rear pin 26 is engaged by the upper end of a link 27, the lower end of which is pivotally attached to the adjacent bifurcated end of the hand lever 15 by means of another pin 28. The medial portions of the side plates 24, 25 are swingably mounted upon a main central pivot 29 disposed between and parallel to the pivot pins 23, 26, and this main pivot 29 is carried by the bracket 12 and provides a suspension between the plates 24, 25 for the lower pawl 14, as clearly shown in Figs. 4, 5, and 6. It should be noted that the effective leverage of the jack mechanism may be readily varied by changing the distances between the pivot pins 23, 28 and the pivot 29; and that the pivot 29 is fixed with respect to the bracket 12, whereas the pivot pins 23, 28 are movable relative to this bracket.

The swinging end of the upper pawl 13 is constantly urged toward the teeth 11 of the column 10, by a relatively light coil spring 30 which embraces the pivot pin 23 and has its opposite ends coacting respectively with the pawl 13 and with a projection 31 extending laterally from the side plate 24. The swinging end of the lower pawl 14 is likewise constantly urged toward the column teeth 11 by a similar relatively light coil spring 32 which embraces the main pivot 29 and has its opposite ends coacting respectively with the pawl 14 and with a projection 33 also extending laterally from the side plate 24. The upper pawl 13 is, moreover, provided with a laterally projecting pin 34 disposed beyond but near the opposite side plate 25, and the lower pawl 14 has a similarly located and projecting pin 35, these pins 34, 35 being cooperable with actuating surfaces of the tumbler 16.

The adjustable reversing tumbler 16 may be formed of any suitable material and has U-shaped cross-section providing spaced side walls 36, 37 which are normally disposed adjacent to the outer sides of the plates 24, 25 respectively, but within the housing bracket 12. These side walls 36, 37 of the tumbler 16 are concentrically bored to receive bearing washers 38 which snugly fit the tumbler bores and likewise snugly embrace the main pivot 29 to thus swingably support the tumbler, and the washers 38 are of somewhat greater thickness than the tumbler side walls 36, 37 to thereby insure sufficient clearance between the side plates 24, 25 and the adjacent inner surfaces of the side walls of the bracket 12, so as to permit free swinging of the tumbler 16 at all times. As clearly shown in Figs. 3, 4, and 7, the side wall 37 of the tumbler 16 is provided with abutments 39, 40 which are respectively engageable with the pins 34, 35 of the pawls 13, 14 when the tumbler 16 is oscillated upon the pivot 29, and the tumbler side wall 37 is, moreover, provided with an integral actuating handle 41 which normally projects from within the bracket 12 thru a slot in the closure plate 22 so as to make the tumbler readily manipulable.

The upper cross-member of the tumbler 16, which is oscillatable about the main pivot 29, carries a small roller 42 which is adapted to coact with spaced detents in a latch bar 43 as shown in Figs. 3 and 4. The bar 43 has parallel bores which slidably engage parallel guide rods 44 secured to the upper portion of the bracket 12, and compression springs 45, which are interposed between the top wall of the bracket 12 and coact with sockets in the upper portion of the latch bar 43, serve to constantly urge the bar along the rods 44 and in contact with the roller 42. With this arrangement of elements, when the handle 41 is swung upwardly as in Fig. 3, the forward notch of the bar 43 engages the roller 42 to hold the tumbler 16 in lowering position; whereas when the handle 41 is swung down as in Fig. 4, the rear notch of the bar engages the roller 42 to lock the tumbler in elevating position. The resiliency afforded by the springs 45 obviously causes the tumbler 16 to advance from one extreme to the other, and vice versa, with a snap action.

The hand lever 15 is swingably supported upon the bracket 12 by a pivot 46 which is held in place by the closure plate 22, and this closure plate may normally be held in position by screws. The lever 15, which may be of any desirable length, also has abutments 47 for limiting the swing thereof by coaction with the closure plate 22; and the pivots 29, 46 may be normally held in place by cotter pins as shown, so that when these pivots are withdrawn, the entire jack actuating and reversing mechanisms may be removed from within the bracket 12 upon removal of the closure plate 22.

During normal use of the improved jack, the mechanism may be utilized either as an ordinary elevating and lowering device, as shown in full lines in Fig. 1, or as a clamp with the jaw 18 attached to the upper end of the column 10, as shown in dot-and-dash lines in Fig. 1. If the span is too great, an extension tube 19, such as illustrated in Fig. 2, may be utilized, and this tube 19 may be rigidly attached to the column 10 by pins 17 and have a jaw 18 secured thereto for clamping purposes, as shown in full lines in Fig. 2; or it may be placed telescopically over the end of the column 10 and allowed to rest upon the bracket 12 with the upper jaw 18 reversed, for lifting purposes. The opening 21 also provides means for attaching a chain or cable to the movable element or bracket 12 for any desired purpose, thereby providing extreme flexibility in the operation and use of the jack for diverse purposes. The members or jaws 18 are of identical construction, so that they may be interchangeably applied to either end of the column 10 or to the end of the tube 19 either as shown or in reversed position.

When the mechanism is positioned as illustrated in Fig. 3, with the tumbler roller 42 engaging the notch in the latch bar 43 nearest the column 10, and no load is applied to the bracket 12, the pawls 13, 14 are completely removed from the teeth 11 by the abutments 39, 40 which engage the lateral pawl pins 34, 35 respectively. With the jack thus completely unloaded, the relatively light springs 45 exert sufficient downward pressure upon the latch bar 43 to hold the tum-

bler 16 against movement, and to prevent the pawls 13, 14 from engaging the teeth 11, thus permitting unobstructed sliding of the bracket 12 along the column 10 in either direction.

However, when a load is applied to the element or bracket 12, with the tumbler 16 in lowering position as illustrated in Fig. 3, this application of the load immediately causes the tumbler roller 42 to move away from the element or column 10 to a slight extent sufficient to cause both of the pawls 13, 14 to engage the teeth 11 and to prevent dropping of the bracket 12. If the hand lever 15 is subsequently oscillated, the pawls 13, 14 will be periodically released from the notches 11 to cause the bracket 12, due to its loading, to move downwardly by steps. During such oscillation of the hand lever 15, the tumbler 16 will also oscillate slightly to intermittently release the pawls 13, 14 from the teeth 11 and to permit these pawls to re-engage the teeth. The oscillation of the tumbler 16 is not, however, sufficient to permit the roller 42 to enter the notch of the latch bar 43 which is farthest away from the column 10, but merely permits this roller to swing back and forth within the notch which is nearest the column 10. In this manner gradual restrained lowering movement of the bracket 12 is effected when this bracket is subjected to load, and the action will take place even if the loading is relatively light.

When the mechanism is positioned as illustrated in Fig. 4, with the tumbler roller 42 engaging the notch in the latch bar 43 farthest from the column 10, both pawls 13, 14 engage the teeth 11 since the abutments 39, 40 of the tumbler 16 are then withdrawn from the range of action of the pins 34, 35. With the tumbler 16 in this position, oscillation of the actuating handle 15 will cause the pawls 13, 14 to ride upwardly along the teeth 11 when the bracket 12 is being elevated, and will subsequently cause both pawls to hold the bracket against downward movement when the lever 15 is inactive. When the lever 15 is swung downwardly, the auxiliary pawl 13 is oscillated downwardly and produces lifting of the bracket 12, while the main pawl 14 simultaneously rides along the teeth 11. When the lever 15 is swung upwardly, the auxiliary pawl 13 is moved upwardly along the teeth 11, while the main pawl 14 holds the bracket 12 against downward movement. The tumbler 16 maintains its position during such elevating operation, being locked in elevating position by the latch bar 43.

From the foregoing description it will be apparent that the improved jack will permit effective raising and lowering of a load, and that the element or bracket 12 is freely adjustable along the element or column 10 when the bracket is unloaded. However, when the bracket is loaded, the main pawl 14 is at all times effective to prevent unintentional dropping of the load or release of the pressure; and the auxiliary pawl 13, cooperating with the tumbler 16, will permit raising or lowering of the loaded bracket 12 at the will of the operator. The spacing washers 38 function to prevent jamming of the tumbler 16, at all times, and this tumbler is freely adjustable even when the jack is subjected to the maximum load. The latch bar 43 coacting with the tumbler roller 42 functions to lock the tumbler 16 in elevating position but merely holds the tumbler with a restraining pressure when this tumbler is in lowering position. The power output of the jack mechanism may be readily varied by varying the distances between the main pivot 29 and the pivot pins 23, 26, or by varying the distance between the pivot pins 28 and 46; and the actuating mechanism is readily accessible by merely removing the closure plate 22. The entire mechanism is relatively simple and compact in construction and has proven highly successful in actual commercial operation.

It should be understood that it is not desired to limit the invention to the exact details of construction and to the precise mode of operation herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. A jack comprising, a column, a jaw movable along said column, a main pivot carried by said jaw, a main pawl swingably suspended directly upon said pivot and cooperable with said column, a plate member swingably supported by said pivot, an auxiliary pawl pivotally suspended from said plate member at one side of said main pivot and also cooperable with said column, oscillating means for said plate member coacting therewith at the opposite side of said main pivot, a U-shaped reversing tumbler swingably associated with said main pivot on opposite sides of said main pawl, and a latch bar resiliently mounted on said jaw and cooperable with said tumbler to lock the latter in elevating position.

2. A jack comprising, a column, a jaw movable along said column, a main pivot carried by said jaw, a main pawl swingably suspended directly upon said pivot and cooperable with said column, a plate member swingably supported by said pivot, an auxiliary pawl pivotally suspended from said plate member at one side of said main pivot and also cooperable with said column, oscillating means for said plate member coacting therewith at the opposite side of said main pivot, a U-shaped reversing tumbler swingably associated with said main pivot on opposite sides of said main pawl, and a resiliently supported latch bar carried by said jaw, said bar having a notch for locking said tumbler in elevating position and having another notch for holding the tumbler subject to a resilient restraining pressure when in lowering position.

3. A jack comprising, a column, a jaw movable along said column and having spaced walls, a main pivot carried by said walls, a main pawl swingably suspended directly upon said pivot between said walls and cooperable with said column, a pair of plate members swingably supported by said pivot on opposite sides of said main pawl and between said walls, an auxiliary pawl pivotally suspended from said plate members at one side of said main pivot and also cooperable with said column, oscillating means for said plate members pivotally attached thereto at the opposite side of said main pivot, spacers interposed between said plate members and said walls, a U-shaped reversing tumbler swingable upon said spacers about the axis of said main pivot, and a resiliently supported latch carried by said jaw and cooperable with said tumbler to lock the same in elevating position.

4. A jack comprising, a column, a jaw movable along said column and having spaced walls, a main pivot carried by said walls, a main pawl swingably suspended directly upon said pivot between said walls and cooperable with said column, a pair of plate members swingably supported by said pivot on opposite sides of said main pawl

and between said walls, an auxiliary pawl pivotally suspended from said plate members at one side of said main pivot and also cooperable with said column, oscillating means for said plate members pivotally attached thereto at the opposite side of said main pivot, spacing collars interposed between said plate members and said walls, a U-shaped reversing tumbler having side arms of less thickness than said collars swingably associated with the latter, and a spring pressed latch having positioning notches cooperable with said tumbler.

5. A jack comprising, a column, a jaw movable along said column and having spaced walls, a main pivot carried by said walls, a main pawl swingably suspended directly upon said pivot between said walls and cooperable with said column, a pair of plate members swingably supported by said pivot on opposite sides of said main pawl and between said walls, an auxiliary pawl pivotally suspended from said plate members at one side of said main pivot and also cooperable with said column, oscillating means for said plate members pivotally attached thereto at the opposite side of said main pivot, spacing collars embracing said main pivot between said plate members and said walls, a U-shaped reversing tumbler having side arms of less thickness than said collars swingable upon the latter, and a spring pressed latch carried by said jaw and having one notch cooperable with said tumbler to lock the same in elevating position and another notch for holding the tumbler under a resilient restraining pressure in lowering position.

WESLEY J. COSTIN.