H. B. TOBIAS.

COMBINATION SPLIT RIM TOOL AND LONG JACK.

APPLICATION FILED NOV. 22, 1920.

1,406,302.

Patented Feb. 14, 1922.

3 SHEETS—SHEET 1.

Fig. 1.

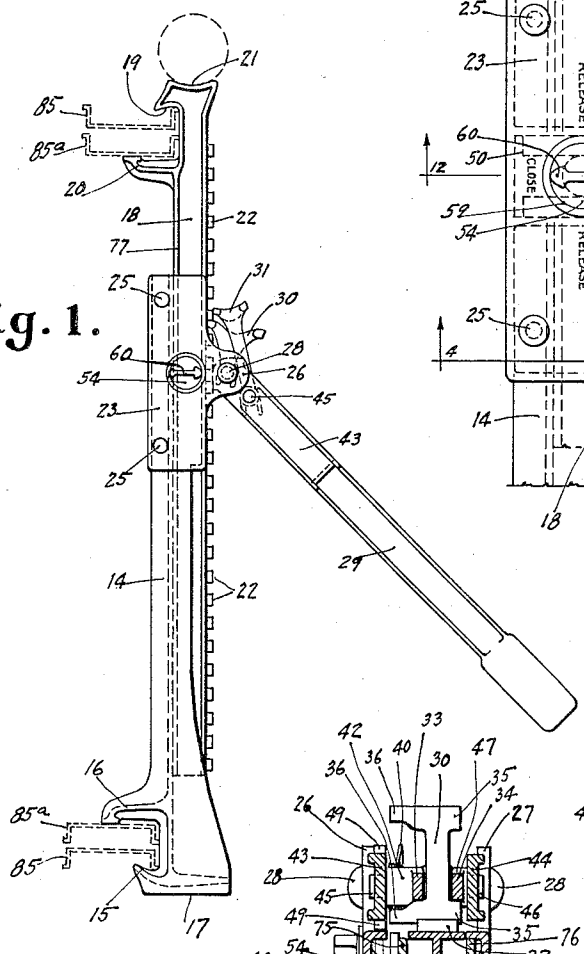


Fig. 2.

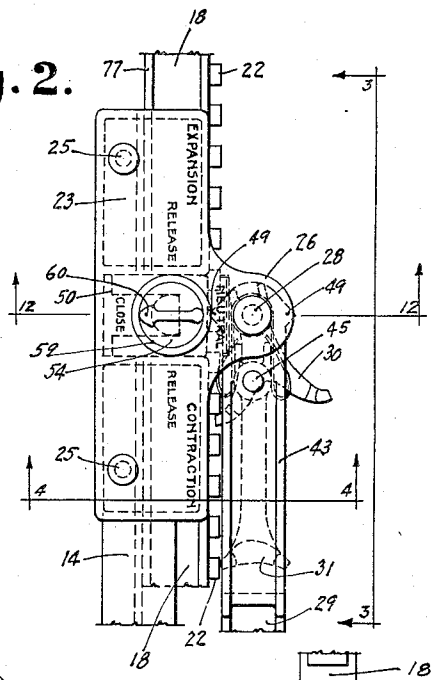


Fig. 4.

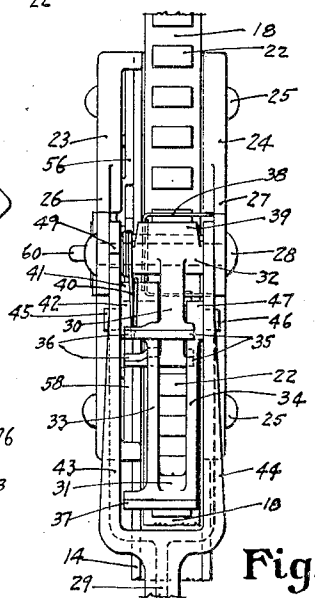


Fig. 3.

Witnesses:

J. E. Moody.

M. W. Trout

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3 SHEETS—SHEET 2.

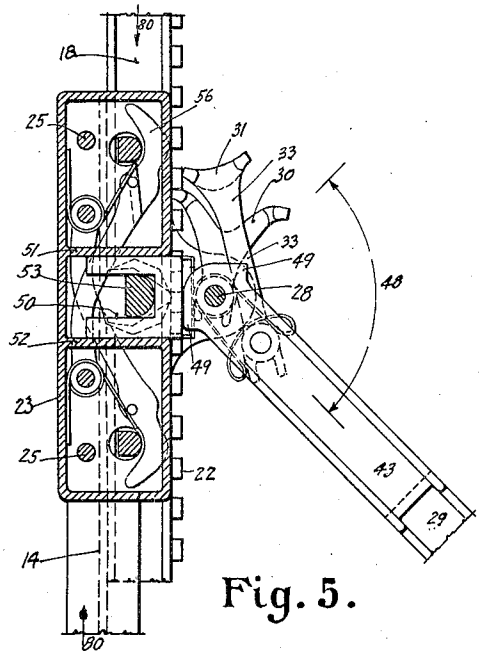


Fig. 5.

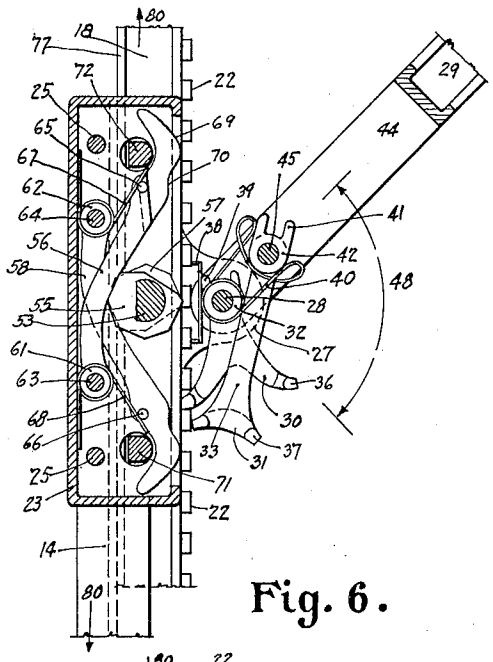


Fig. 6.

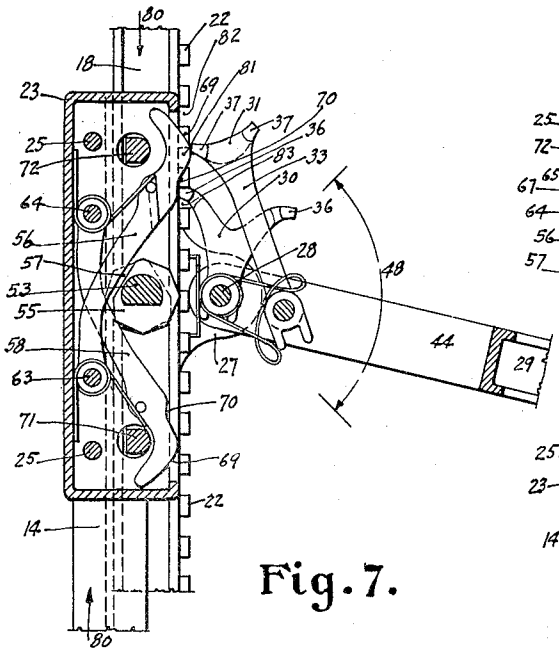


Fig. 7.

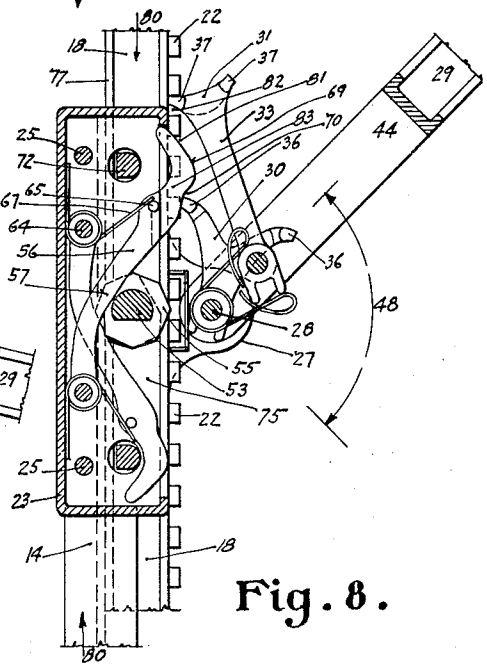


Fig. 8.

Witnesses:

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3 SHEETS—SHEET 3.

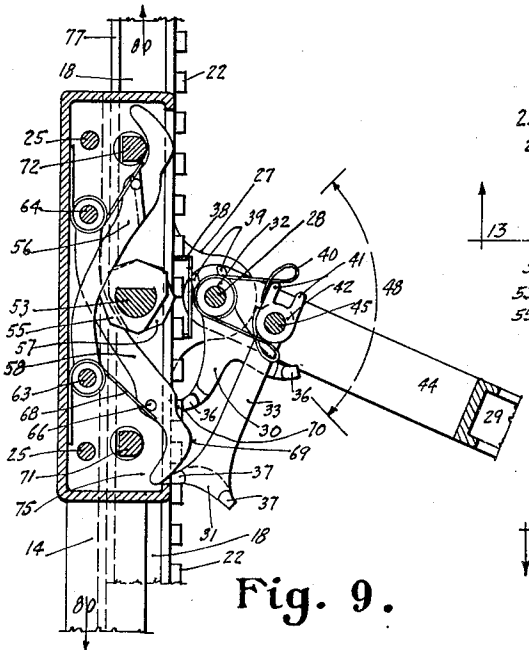


Fig. 9.

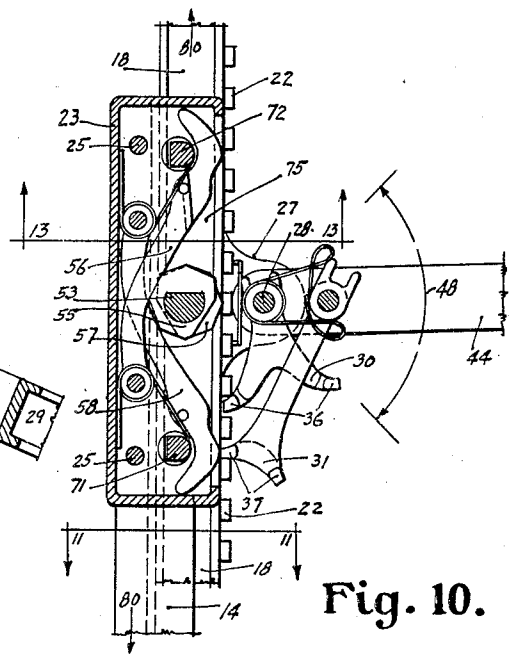


Fig. 10.

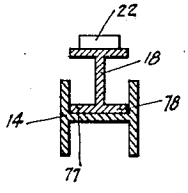


Fig. 11.

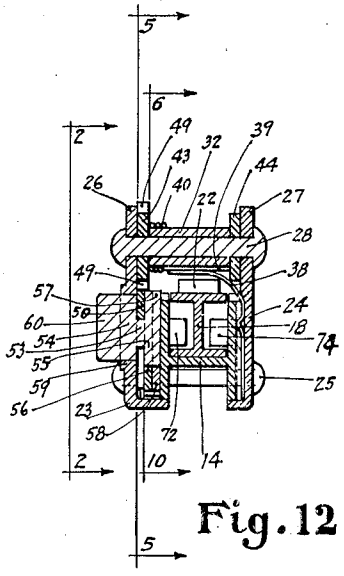


Fig. 12.

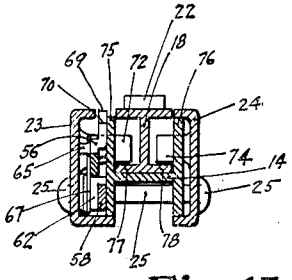


Fig. 13.

Witnesses:

L. E. Moody.

M. W. Trout

Inventor:

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UNITED STATES PATENT OFFICE.

HERRMANN B. TOBIAS, OF PHILADELPHIA, PENNSYLVANIA.

COMBINATION SPLIT-RIM TOOL AND LONG JACK.

1,406,302. Specification of Letters Patent. Patented Feb. 14, 1922.

Application filed November 22, 1920. Serial No. 425,827.

To all whom it may concern:

Be it known that I, HERRMANN B. TOBIAS, a citizen of the United States of America, and a resident of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and Improved Combination Split-Rim Tool and Long Jack, and do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of the specifications, and to the reference numbers marked thereon.

My present invention relates to a tool intended to facilitate the separation of any split rim from the tire it supports and the replacement of same, and also to facilitate the jacking up of an automobile or the extraction of such vehicle out of a roadhole.

The main object of the invention is to provide a tool that is simple to operate and of sufficient strength to perform the aforesaid operations, with the maximum saving of time and labor.

In carrying out my invention I provide two members held in sliding contact, having means at one of their ends for gripping the rim, and means for bearing on the ground and supporting the load, and an operating device with control mechanism for varying the relative position of the two sliding members.

Figure 1 shows the tool in the vertical position as used for jacking up an automobile.

Figure 2 shows the outside view of the control or operating box, taken on line 2—2 of Figure 12, looking in the direction of arrows.

Figure 3 is a top view of the control box taken on line 3—3 of Figure 2, looking in the direction of the arrows.

Figure 4 is a cross section through the control box, taken on line 4—4 of Figure 2 looking in the direction of the arrows.

Figure 5 is a section through the control box taken on line 5—5 of Figure 12 looking in direction of the arrows and showing the tool in position for expansion.

Figure 6 is a section through the control box taken on line 6—10 of Figure 12, looking in the direction of the arrows and showing the tool in position for contraction.

Figure 7 is a section through the control box on line 6—10 of Figure 12 looking in the direction of the arrows and showing the tool in one position for expansion release.

Figure 8 is a section through the control box on line 6—10 of Figure 12 looking in the direction of the arrows, and showing the tool in another position for expansion release.

Figure 9 is a section through control box on line 6—10 of Figure 12, looking in the direction of the arrows, and showing the tool in one position for contraction release.

Figure 10 is a section through control box taken on line 6—10 of Figure 12, looking in the direction of the arrows, and showing the tool in another position for contraction release.

Figure 11 is a cross section of the two sliding members taken on line 11—11 of Figure 10 looking in the direction of the arrows.

Figure 12 is cross section through the control box taken on line 12—12 of Figure 2, looking in the direction of the arrows.

Figure 13 is a cross section through the control box taken on line 13—13 of Figure 10, looking in the direction of the arrows.

This tool, as a combination split rim tool, towing jack and lifting jack, is designed to perform different functions,—the first being the "expansion" which lengthens the tool; the second being the "expansion release" which reduces the length of the tool when under expansive load; the third being the "contraction" which shortens the length of the tool from any chosen extended position, and the fourth being the "contraction release" which lengthens the tool when under contracting load.

A further fuction is to enable the closing of this tool when not in use.

A main frame 14 is provided having at one end a hook 15 intended to grip the edge of a split rim for contraction purposes, and a push lug 16 intended to engage the inner face of a split rim for expansion purposes; also a bearing end 17 for resting the tool on the ground when in a vertical position.

This main frame is for the present purpose shown in the form of an H and so arranged as to receive within it the sliding member 18.

This sliding member 18 is provided at one end with a hook 19 for gripping the edge of a split rim for contraction purposes, and a push lug 20 for engaging the inner surface

of the rim for expansion purposes and is also provided with a saddle 21 at the end to receive the load imposed upon it when used in the vertical position as a jack, or in any other position for pushing purposes.

The sliding member 18 is further provided on top of its H section with integral lugs 22 equally spaced throughout most of its length and intended to be engaged by the operating device as will be hereinafter described.

The control box of this tool is secured to the end of the main member 14, opposite the gripping means 15 and 16 above described, and is formed of two cover plates 23 and 24 held together by the rivets 25 passing through said main frame 14, housing therein the controlling and operating mechanism as hereinafter described.

Integral with the cover plates 23 and 24 are bearing flanges 26 and 27 which support through a rivet 28, the operating handle 29 and the double ratchets 30 and 31.

These two double-ratchets are so arranged and linked, as will be noted, that while the tool is in operation they are free to act independently of one another, and when the action of the tool is to be reversed from the "expansion" as shown in Figure 5 to the "contraction" as shown in Figure 6, the swinging of either one of the double ratchets through the fork of the operating handle, would pull along the other ratchet.

Ratchet 30 is supported by pin 28 through hub 32 with which it is integral and slides freely between the side arms 33 and 34 of the ratchet 31.

Lugs 35 and 36 are provided on the ratchet 30 and serve to engage the side arms 33 and 34 of ratchet 31 when reversion takes place from "contraction" to "expansion" positions.

The lugs 36 are longer than lugs 35 so as to also engage the releasing mechanism.

Similarly lugs 37 are provided integral with ratchet 31 and on the same side with the lugs 36 of ratchet 30, and of such length as to engage the releasing mechanism.

The points of the ratchets are maintained in engagement with the lugs 22 by springs 38 engaging the extensions 39 integral with hub 32 of ratchet 30 and by spring 40 engaging the extensions 41 integral with hub 42 of ratchet 31. These springs, as will be noted, are so arranged that through all cycles of operation they will maintain the points of these ratchets in contact with lugs 22, except at such time as the releasing mechanism prevents it.

The ratchet 31 is supported by forking arms 43 and 44 of the operating lever 29 through the bosses 45 and 46 engaging perforations in said forking arms, said bosses being integral respectively with the hubs 42 and 47 which in turn are a part of the supporting side arms 33 and 34 of ratchet 31.

It will be noted that there is no connection between the hubs 47 and 42, thus allowing a space through which the body of the ratchet 30 can swing when reversion from "expansion" to "contraction" takes place.

The operating arm is limited in its swing through the arc 48, by extensions 49 at the end of forked arm 43, which engages the checking plate 50, sliding between the walls 51 and 52 integral with the control box cover plate 23.

This checking plate is held in this position, as shown in Figure 15, through all the four main operations aforementioned by cam 53, which is integral with control button 54.

This control button supports in addition, two other cams: 55, which acts upon the expansion releasing dog 56 and cam 57 which acts upon the contraction releasing dog 58.

The controlling button is supported in bearing 59 of the cover plate 23 and is held in position by the sliding checking plate 50.

For operating purposes a lug 60 is provided on the outside of the operating button formed like an arrow, the direction of said arrow indicating the desired action of the tool and the releasing mechanism.

It will therefore be understood that when the arrow points as in Figure 2 towards the legend "Closed" it will allow the checking plate 50 to be pushed within the control box and withdraw its obstruction to extensions 49 of the operating handle 29 allowing said handle to be folded for closing the tool as in Figure 2.

This controlling button and the cams integral therewith have four phases of operation: first in the position shown in Figure 2, which allows the tool to be closed; second, when pointed toward the legend "Expansion release" it operates on the releasing mechanism for expansion through the releasing dog 56; third, when pointed toward legend "Neutral" it allows the ratchets to work freely for expansion or contraction, and fourth, when pointing toward legend "Contraction release" it operates on the releasing mechanism for contraction through the releasing dog 58, all as will be noted by its various positions in Figures 5 to 10 inclusive.

The releasing dogs 56 and 58 are supported through the hubs 61 and 62 by bosses 63 and 64 integral with cover plate 23.

The releasing dogs are provided with lugs 65 and 66 to be engaged by springs 67 and 68, which springs are coiled around the hubs 61 and 62 and held in position thereby.

The ends of the releasing dogs opposite to the hubs are provided with an irregular formed edge having a curved surface 69 and a depression 70 intended to be engaged respectively by the lugs 37 and 36 of the ratchets 31 and 30 during the releasing action.

To hold the sliding member 18 in contact with the main frame 14, bearing lugs 71 and 72 are provided integral with the cover plate 23, and lugs 73 and 74 are provided integral with the cover plate 24, all four being of such a length as to penetrate through corresponding perforations in the enlarged flanges, 75 and 76 of the main frame 14 and frictionally engage flanges 77 and 78 of the sliding member 18.

The operation of the jack and rim tool can be easily understood by following through, the positions shown in Figures 2 and 5 to 10 inclusive, assuming the tool is used in the vertical position as a jack, all as follows:

In Figure 2, the tool is in a closed position with the holding ratchet 30 and propelling ratchet 31 folded within the forks 43 and 44 of the operating arm 29, the checking plate 50 being pushed in against the flat end of the cam 53 by the projection 49 in the fork of the operating handle.

To expand the tool the two ratchets are placed as in position shown in Figure 5 and the control button 54 is turned with the arrow pointing towards "Neutral", which acts through the triple four-function cam by pushing the checking plate 50 out to limit the travel of the operating handle.

In this position the cams 55 and 57 bearing against the release dogs 56 and 58 hold them in an inactive position against the expansive energy of the springs 67 and 68 allowing the vertical movements of the operating handle to lift gradually the sliding member 18 in relation to the main frame 14.

In Figure 6 the tool is set for "Contraction" by swinging the ratchets through the fork of the operating handle to the position shown, and maintaining the control button 54 in the same position, pointing toward "Neutral", the arrows 80 showing the direction of the force against which the tool is operating; the releasing mechanism being held in the same position as shown in Figure 5.

Figure 7 shows the tool in position for "Expansion release" in which case the control button 54 is turned with the arrow 60 pointing towards the legend "Release" on the "Expansion" side of control box, which action allows the spring 67 through its expansion to push the release dog 56 outward into active position while the releasing dog 58 is held in the inactive position, the releasing action being as follows:

In Figure 7, the propelling ratchet 31, instead of engaging recess 81 as would be the case for expansion, is forced to slide over same by the edge 69 of the releasing dog and engage the higher recess 82 when the operating handle is moved upward.

When this handle reaches its limit of upward movement as shown in Figure 8, the propelling ratchet 31 assumes the load exerted by the force 80 and allows spring 67 to push the release dog 56 out the necessary distance required to allow recess 70 of the release dog to engage the holding ratchet 30 and lift it out of engagement with the lugs 22 of the sliding member 18 holding it in this position until lug 37, of the ratchet 31, coming down under the action of force 80, bears against the edge 69, of the release dog 56, forcing it within the control box after the recess 83 has passed by, the engaging edge of the holding ratchet 30, allowing said ratchet 30 to assume the load by engaging the recess 81 by the time the operating handle has reached its downward limit of travel. Upon the upward move of the operating handle the releasing operation would be repeated.

The final stages in the sequence of release are shown in Figures 9 and 10, but in the reversed positions for the "Contraction release".

The releasing operation for the "Contraction release" is similar to that for "Expansion release", after the control button 54 has been turned with the arrow 60 pointing toward the "Release" mark on the "Contraction" side of the control box, in which case, the release dog 56 is held inactive while the release dog 58 is forced into active position by the expansion of the spring 68.

The releasing action heretofore described, is possible because springs 67 and 68 have greater expansive force than the action of the springs 38 and 40, upon ratchets 30 and 31.

The releasing dogs 56 and 58 are forced into the control box by the load upon the sliding member 18, locking through the lugs 22, the engagement point of the ratchets 30 and 31 and through said action exerting a greater force upon the release dogs than that of the springs 67 and 68.

The action of the tool in a horizontal position is the same.

Its use as a rim tool is shown in Figure 1, where the rim 85 is shown in its position for contraction at which time the tool is assumed to be in a horizontal position.

After the air is discharged from the tire and the lock of the split rim is released, the hooks 19 and 15 engage the flanges of the rim as shown by dotted lines 85 and with the ratchets in the position shown in Figure 6 the movement of the operating handle 29 through the arc 48 coils the split rim into a smaller circumference and can therefore be easily removed from the tire which it supports.

For the expansion of the rim the position assumed by the tool is as shown in Figure 1, where, the lugs 20 and 16 are bearing against the inner surface of the rim as shown by dotted line 85^a, and with

the ratchet in the position as shown in said figure and also in Figure 5, under which condition the movement of the operating handle 29 through the arc 48 will force the rim, by the expansion of the tool, to its normal circumference and position on the tire, ready for locking.

Used as a jack the base 17 of the main frame 14 rests on the ground while the saddle end 21 engages and supports the load that it is to lift or push.

It will be noted that the construction of this tool and its double action allows it to be built of a length as shown and can therefore be used when a wheel is caught in a deep road depression to lift same out to the road level by placing this tool against the said wheel in an oblique position and expanding it, or it can be used for towing purposes when in a horizontal position with the ratchets in position shown in Figure 6 and the hooks 15 and 19 engaging some towing material such as ropes or chains, etc.

It is evident from the above description that a great force can be exerted by the leverage of the operating handle and the ratchet, changing the relative position of the sliding members in two directions with their accompanying release, thereby serving the purpose of this invention.

Although this tool is illustrated as manufactured of malleable iron it is evident that it is also adapted to be constructed from stamped or wrought metal with slight variations in details of parts, without affecting the purpose of the invention.

I therefore do not wish to be restricted to the exact details of construction or sections shown or described for, as has been indicated, it is obvious that a combination of a split rim tool and long jack with slight modification from the above, but comprising two sliding members held in engagement, their ends equipped to engage a tire rim or chains and further equipped to engage loads for lifting or pushing purposes and the relation of said sliding members to each other controlled through a lever by linked and reversible propelling ratchets so as to act both in an expansive and contractive direction for the purpose of exerting a great pull or push, and their corresponding releases and control will come within the scope of my invention.

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

1. A device of the character described, comprising: two sliding members, provided with means for engaging a split rim, an operating handle holding two linked and reversible double ended ratchets, a control box supporting said operating handle, maintaining the sliding contact of the two members and housing a double release mechanism for said ratchets, and a four stage cam button for controlling the said releasing mechanism.

2. A device of the character described comprising two members, sliding upon each other and provided with hooks, push arms, and rest ends at their outer end for engaging a tire rim, or other resistant body, and operating mechanism, comprising two linked and reversible double ratchets, mounted on a forked lever, and operating upon lugs on one of the sliding members by escapement, so as to vary its relation to the other member and a control box secured to the said other member, supporting said forked lever, housing releasing mechanism for said ratchets and maintaining an engagement between said sliding members, all for propelling said members towards or away from each other and maintaining their position or releasing it under tensile or compressive stresses.

3. A device of the character described, comprising two members in sliding contact with each other, and both provided at one of their extremities with hooks, push lugs and rest saddles, one of said members having lugs actuated by a lever through double ended linked and reversible ratchets intended to work on one of said members in the manner of escapement for the purpose of exerting great force in either direction, as desired, relative to the other member, and means for reversibly releasing the said forcing action and for holding said members in slidable contact.

4. A device of the character described comprising a main member provided at one end with a hook and push lug for engaging a tire rim also a rest saddle for lifting or pushing purposes, and secondary member similarly equipped at one end, sliding within each other and held in slidable contact by a control box provided at the other end of the main member, the relation between said members being varied by the action of two double pointed, linked and reversible ratchets, actuated by an operating lever and by releasing mechanism housed within said control box.

5. A device of the character described, comprising two members, with means at one end of each for engaging a tire rim or other body to be moved, said members being slidable relative to each other, and held in said position by bearing lugs within a control box, secured to the other end of one of said members, lugs equally spaced and integral with the other of said slidable members and actuated by a lever through two linked and reversible ratchets for the purpose of moving said members relative to one another and locking them against, or releasing them from tensile or compressive forces.

6. In a device of the character described, the combination of two members maintained

in slidable contact; a control box mounted on the main one of the two members, housing therein two pivoted and spring actuated release triggers, and a triple-four stage cam button for controlling said triggers; flanges on said control box supporting a forked operating lever; two double pointed, linked and reversible ratchets supported by said lever and operating box, and lugs, upon the secondary member to be engaged by said ratchet for the purpose of varying their relation to each other, when under stress from either longitudinal direction.

7. In a device of the character described, the combination with a main and secondary frame provided with hooks, push lugs and saddles at one of their ends, of two housing plates forming a control box, and secured to the main frame by through bolting; bearing lugs integral with the housing plates and projected through the main frame to engage and hold in slidable contact the secondary member; bearing flanges integral with the housing plates and supporting by a bolt, an operating forked lever, and a double holding ratchet; lugs upon the secondarily member to be engaged by said ratchet; and a double propelling ratchet supported by the operating lever and linked with the holding ratchet, in a manner to allow their free action on the lugs of the sliding members, and to also cause their reversion together through the fork of the lever for the expansion or contraction of the device.

8. In a device of the character described, the combination with a main and secondary frame provided with hooks, push lugs and saddles at one of their ends, of a control box secured to the other end, of the main member; lugs equally spaced and integral with the sliding member; an operating lever supported by flanges on the control box; two double ratchets supported by said lever and control box and linked for united reversing purposes; projections on both ratchet ends of both ratchets for linking purposes, and for engaging the releasing mechanism housed within the control box.

9. In a device of the character described, the combination with a main and secondary frame both provided with hooks, push lugs and saddles at one end of a control box, secured to the main frame; means for holding said members in sliding contact; lugs of equal spacing provided on the sliding member; releasing mechanism and control cam button housed within the control box; an operating forked lever supported by the control box; a pair of linked and reversible double ratchets; extensions on said ratchets for engaging the release mechanism, and springs for maintaining the points of the ratchet in engagement with either the lugs of the sliding members or the release mechanism when the ratchets are in either the neutral position, or in position for the expansion or contraction of the device through all the motion of the operating lever.

10. In a device of the character described, the combination with a main and secondary frame both provided with hooks, push arms and bearing saddles at one end, of an operating lever, supporting a pair of linked and reversible spring actuated double ratchets; a control box supporting said lever; lugs integral with the sliding member to be engaged by the points of said ratchets; projections on the ratchets to engage the releasing mechanism; double releasing mechanism actuated by a triple four stage cam button and housed in the control box; and an indicating and operating flange projected through the control box housing to enable the operation of the release mechanism from the exterior of the said control box.

11. In a device of the character described, the combination with a main and secondary frame both provided with hooks, push arms and bearing saddles at one of their ends, of an operating lever supporting two linked and reversible spring actuated double ratchets having projection thereon for engaging the release mechanism; lugs provided on the sliding member to be engaged by said ratchets; a control box secured to the main frame, supporting said lever and housing the release mechanism; a triple-four stage cam within the control box for actuating the release mechanism and a sliding stop plate within the control box, actuated by one of the triple cam-buttons, and provided to engage projections integral with the operating lever for limiting the swing of said lever during the expansion, contraction and releasing operations, and arranged to release the lever for closing same against the body of the device.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERRMANN B. TOBIAS.

Witnesses:
L. E. Moody,
M. W. Trout.