June 10, 1924. 1,497,218

J. P. McBRIDE

JACK

Filed April 11, 1922

Fig. 1.

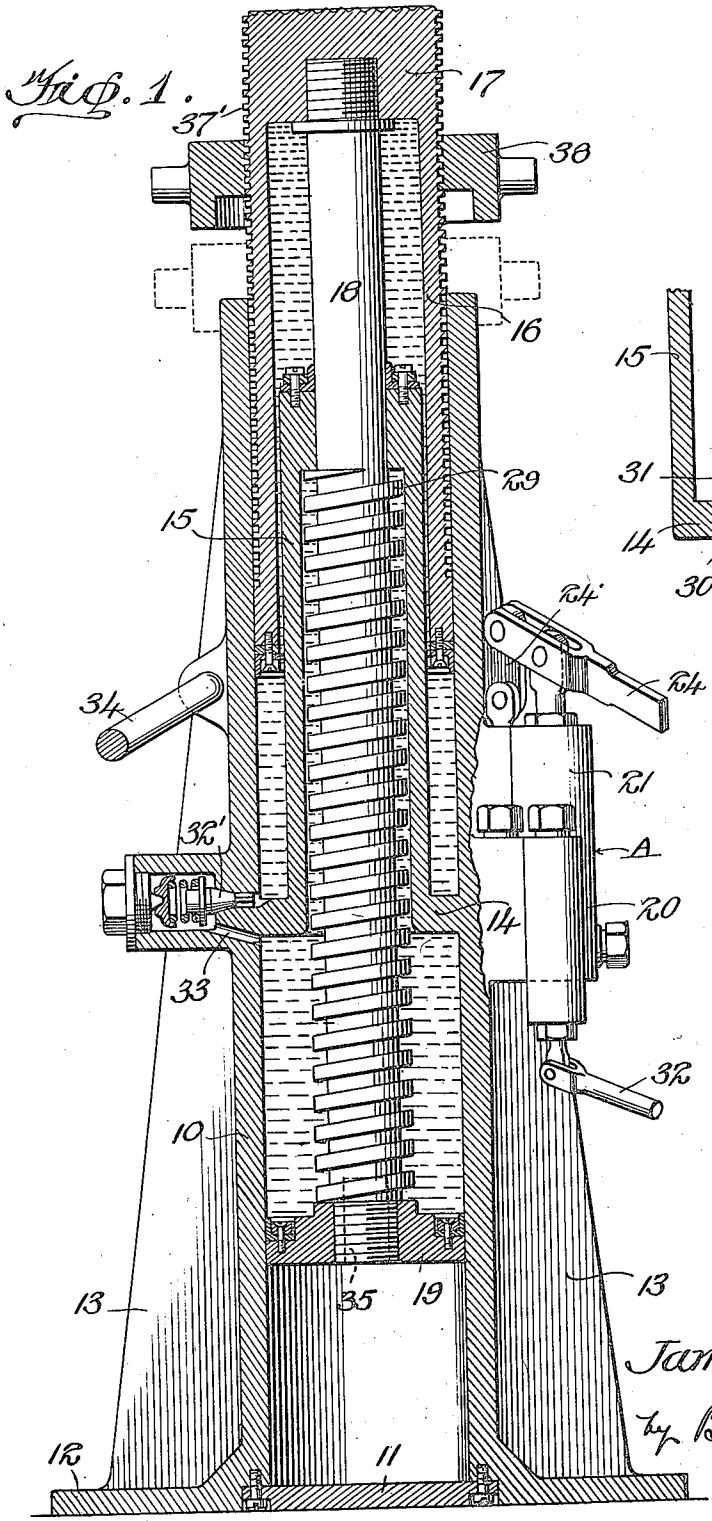


Fig. 2.

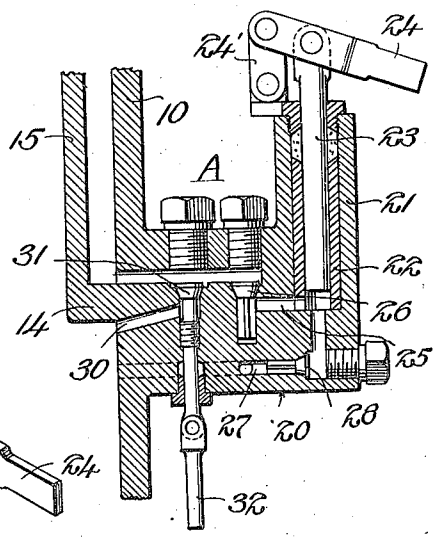
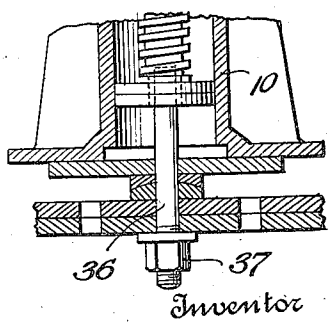


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES P. McBRIDE, OF BALTIMORE, MARYLAND.

JACK.

Application filed April 11, 1922. Serial No. 551,598.

To all whom it may concern:

Be it known that I, JAMES P. McBRIDE, a citizen of the United States, and resident of Baltimore, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Jacks, of which the following is a specification.

My invention relates to jacks and while it is particularly applicable as a whole to those jacks wherein the ram member is projected by fluid pressure, certain features thereof are capable of incorporation with facility and advantage in jacks whose ram members are projected by means other than fluid pressure.

In carrying my invention into practice my purpose broadly has been to provide a hydraulic jack embodying an improved construction whereby all the elements essential to the complete and continued operation of the jack are embodied in a single self-contained unitary mechanism capable of being transported manually from one desired location to another, and which owing to its compactness and relatively light weight can be utilized with facility under conditions which have not heretofore permitted the use of a hydraulic jack for the purposes of lifting or pushing.

It is also the purpose of my present invention to provide a portable hydraulic jack which not only is capable of effecting a push or lift with great power, but which also embodies certain essentials covered by my prior Patents 1,304,895, May 27, 1919; 1,353,600, September 21, 1920, and 1,387,895, August 16, 1921; whereby it is rendered capable of utilization in clamping together overlying plates prior to riveting.

I will describe my invention in the best form known to me at present, but it will be obvious that the same is susceptible to changes in forms and proportions and to desirable additions with the exercise of only ordinary mechanical skill and without departing from the scope thereof as set forth in the appended claims.

In the drawings chosen to illustrate my invention—

Figure 1 is a vertical section of a jack constructed in accordance with my invention, with the ram member shown partly projected and the pump device in elevation;

Figure 2, a detail sectional view showing the pump device and its connections with the interior of the jack cylinder or housing; and

Figure 3, a detail sectional view showing the adaptation of the jack for use in clamping together a pair of plates prior to riveting.

Referring to Figures 1 to 3 my improved jack is shown as comprising a housing or cylinder 10 open at its upper end and having its lower end closed by a removable plate 11 for a purpose that will presently appear. I provide the housing 10 with a supporting base 12 and also with vertical strengthening ribs or webs 13. Disposed within the housing 10 intermediate its upper and lower ends is an abutment 14 provided with a central upwardly directed hollow extension 15 and slidably engaged over this extension is the skirt 16 of a piston 17, the entire piston having a snug sliding fit within the housing as will be obvious. Secured to the piston 17 and slidably extending therethrough and through the interior of the abutment extension 15 is a rod 18 which has threaded on the end thereof remote from the piston 17 a second piston 19 proportioned to slide snugly in the housing 10.

To transfer the liquid contained in the space between the piston 19 and abutment 14 into the space between said abutment and the piston 17 I provide a pump device A which is directly embodied in the housing 10 to thereby maintain the jack a manually portable self contained unitary mechanism. In constructing this pump device I provide the housing at a suitable location between its upper and lower ends with a lateral enlargement 20 which is bored out to form a cylinder chamber 21 having mounted therein a suitable tubular lining 22 and in the bore of this lining a pump piston 23 reciprocates. To effect the reciprocation of the piston 23 I provide a handle 24 pivotally attached to the outer end of the piston and pivotally mounted on a bracket 24′ carried by the enlargement 20. The lower end of the lining bore in which the piston 23 reciprocates is connected with the space between the piston 17 and abutment 14 by a passage 25 having a check valve 26 mounted therein to bar return of the liquid from said space to the bore of the lining 22 as a result of reciprocation of the piston 23. Likewise I connect the lower end of the bore of the lining 22 with the space between the abut-

ment 14 and piston 19 by a passage 27 in which is mounted a check valve 28 barring return of liquid to the space between the abutment 14 and piston 19 as will be obvious.

From the foregoing it will be apparent that when the ram member is fully retracted and the space between the piston 19 and abutment 14 and also the passages 27 and 25 are fully charged with liquid operation of the pump device will transfer the liquid from the space between the abutment and piston 19 into the space between the abutment and piston 17 to thereby project the ram member. Retraction of the ram member is positively and speedily accomplished by a spring 29 encircling the rod 18 and reacting from the abutment against piston 19, the return of the liquid to its initial station being effected by way of passage 25 and a return passage 30 which latter leads through the enlarged portion 20 from the space between abutment 14 and piston 19. This passage 30 is adapted to be placed in communication with the passage 25 between the check valve 26 and the interior of the housing by the operation of a screw valve 31 the stem of which carries an operating handle 32 for convenient manipulation. When the valve 31 is in the position shown in Figure 2 it will be obvious that no liquid can return from the space between abutment 14 and piston 17 to the space between said abutment and piston 19 by way of passage 30. However, when valve 31 is unscrewed or unseated it will be obvious that the liquid is free to so return to its initial station under the retractive influence of the spring 29 on the piston 17.

In order to limit the pressure to be raised to project the ram member I provide a suitable relief valve 32′ in operative communication with the space between the abutment 14 and piston 17. When the pressure in this space exceeds that permitted by the relief valve the latter will be operated to allow sufficient liquid to flow back into the space between the abutment and piston 19 through a passage 33 in the housing to thereby restore the pressure being exerted to project the ram member to the predetermined limit desired. For convenience in manually transporting the jack from one location to another I provide the housing 10 with a suitable handle 34.

In order to render my improved jack capable of use to clamp together overlying plates prior to riveting in the manner described and claimed in my prior patents I provide the lower end of the rod 18 with a threaded recess 35 in which a rod extension 36 is screwed after removing the plate 11. The outer end of this rod extension has a head or nut 37 threaded thereon so that, after said head is removed, the extension can be engaged through perforations of desired plates, when, upon reapplication of the head and projection of the ram member the plates will be clamped tightly together as clearly shown in Figure 3.

In further reference to the operation of my improved jack it will be noted that during the movements of the ram member the spaces between the abutment and piston 17 and between the abutment and piston 19 harmoniously increase and decrease in volume which prevents any possibility of the formation of a vacuum during such movements of the ram member with resulting interference with the proper and desired operation of the jack.

In order to prevent any relaxation of the ram member when projected as a result of slight leakage of the liquid back into the space between the abutment and the piston 19 I thread the outer side of the piston 17 as at 37′ and engage thereon a nut 38 which is adapted to be screwed down into engagement with the upper end of the housing 10 and thereby positively lock the ram member against retraction.

I claim:—

1. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member including spaced pistons operating on opposite sides of the abutment respectively, means for transferring fluid contained in the space between the abutment and one piston into the space between the abutment and the other piston to project the ram member, and means for retracting said member.

2. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member, fluid pressure means reacting from one side of the abutment to project the ram member, and means reacting from the other side of the abutment to retract said ram member.

3. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member, fluid pressure means reacting from one side of the abutment to project the ram member, and means constantly reacting from the other side of the abutment to retract said ram member.

4. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member, spring means constantly reacting from one side of the abutment to retract said ram member, and fluid pressure means reacting from the other side of the abutment to project the ram member against the influence of said spring means.

5. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member including spaced pistons operating on opposite sides of the abutment respectively,

means for transferring fluid contained in the space between the abutment and one piston into the space between the abutment and the other piston to project the ram member, and spring means for retracting said member.

6. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member including spaced pistons operating on opposite sides of the abutment respectively, means for transferring fluid contained in the space between the abutment and one piston into the space between the abutment and the other piston to project the ram member, and spring means constantly tending to retract said member.

7. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member, means constantly tending to retract said ram member, a fluid supply constantly carried by the jack and having an initial station when the ram member is retracted, a pump device also carried by the jack and operable to transfer said fluid supply from its initial station into the space between the abutment and ram member to project the latter, and means operable to permit said fluid to return to its initial station under the influence of the retraction of the ram member.

8. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member including spaced pistons operating on opposite sides of the abutment respectively, a pump device carried by the jack for transferring fluid contained in the space between the abutment and one piston into the space between the abutment and the other piston to project the ram member, and means operable independent of the pump device to effect return of the fluid to its previous station.

9. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member including spaced pistons operating on opposite sides of the abutment respectively, means for transferring fluid contained in the space between the abutment and one piston into the space between the abutment and the other piston to project the ram member, and spring means constantly tending to retract said member.

10. In a fluid operated jack, a cylinder, an abutment fixed within and intermediate the ends of the cylinder, said abutment having a hollow central extension, a projectable and retractible ram member including a piston having a recess slidably receiving the extension of the abutment, a rod secured to said piston and slidably engaged through said abutment, a second piston carried by the rod on the opposite side of the abutment from the first piston, a spring reacting from said abutment against the second piston to retract the ram member, and a pump device carried by the cylinder operable to transfer fluid from the space between the abutment and second piston into the space between the abutment and first piston to project the ram member.

11. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member including spaced pistons operating on opposite sides of the abutment respectively, means for transferring fluid contained in the space between the abutment and one piston into the space between the abutment and the other piston to project the ram member and means for effecting return of the fluid from the last named space to the first named space.

12. In a fluid operated jack, a housing, an abutment fixed with respect to the housing, a projectable and retractible ram member including spaced pistons operating on opposite sides of the abutment respectively, a pump device carried by the jack for transferring fluid contained in the space between the abutment and one piston into the space between the abutment and the other piston to project the ram member, and means operable to effect return of the fluid to its previous station.

13. In a fluid pressure jack, a housing, a projectable and retractible ram member, an abutment fixed with respect to the housing, a fluid pressure supply having an initial station on one side of said abutment when the ram member is retracted, means for pumping fluid from the initial station into the space between the other side of the abutment and ram member to project the latter, and a pressure operated valve normally closing a passage connecting the space between the ram member and abutment with the initial station of the fluid supply.

In testimony whereof I hereunto affix my signature.

JAMES P. McBRIDE.