Feb. 24, 1931. H. W. BOLENS 1,793,462

HYDRAULIC JACK

Filed Oct. 31, 1927

Fig. 4.

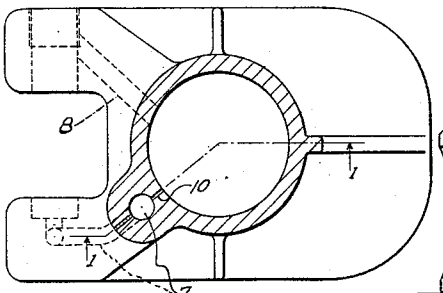


Fig. 1.

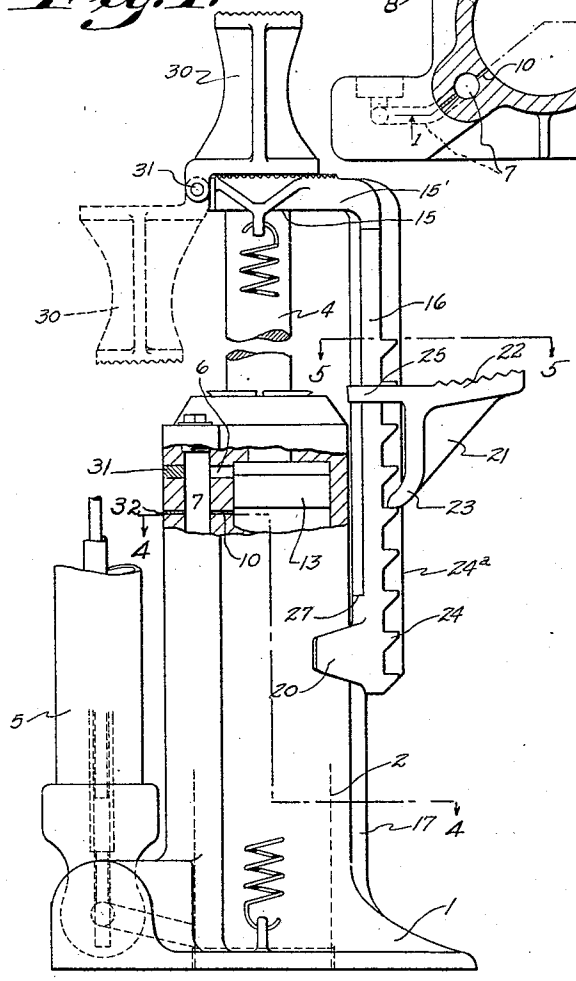


Fig. 2.

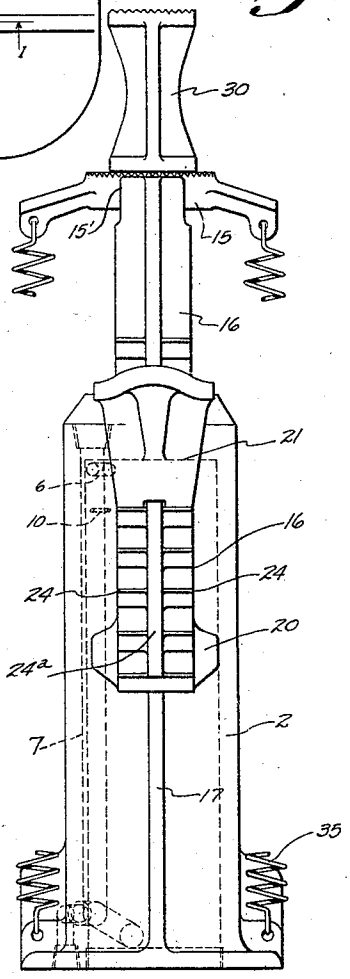


Fig. 3.

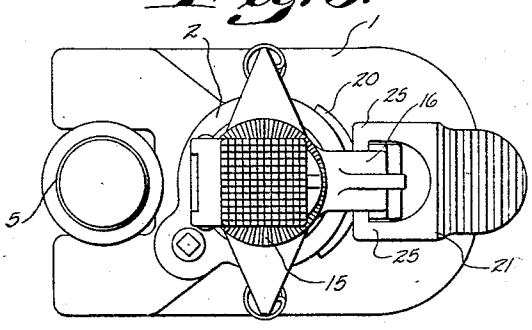
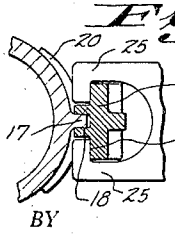


Fig. 5



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UNITED STATES PATENT OFFICE

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HYDRAULIC JACK

Application filed October 31, 1927. Serial No. 229,897.

This invention relates to an improvement in hydraulic jacks of the type especially adapted for use with automobiles or similar vehicles although also adapted for practically universal application.

One object of the invention is to provide a jack of this character which has a novel form of lifting mechanism designed to render the jack effective and conveniently usable over a wide range of heights, the lifting mechanism having this capacity and also coacting with the piston of the hydraulic jack in such a novel and effective manner that the lifting mechanism and the piston and cylinder assembly mutually coact to guide and strengthen each other.

Another object of the invention is to provide a hydraulic jack construction having means for preventing the application of excessive pressures below the piston after the piston has been elevated as far as it may be in the cylinder, this means serving this function without being liable to injure or score the piston.

Another object is to provide lifting mechanism of a hydraulic jack of the type having a lifting lug and wherein the lifting lugs is freely adjustable along its carrier and yet is prevented from falling off of the same even in its lowermost adjustments.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings, forming a part of this specification, and in which:

Figure 1 is a view partly in side elevation and partly in section taken on line 1—1 of Figure 4, showing a hydraulic jack embodying the present invention;

Figure 2 is a view in elevation looking toward the right hand side of Figure 1;

Figure 3 is a plan view of the jack;

Figure 4 is a sectional view taken on line 4—4 of Figure 1; and

Figure 5 is a similar view taken on line 5—5 of Figure 1.

Referring to the drawings, numeral 1 designates the base of the hydraulic jack. Integral with the base is a cylinder 2 in which a piston 3 is fitted. The piston 3 has a piston rod 4 secured thereto and extending upwardly therefrom, the piston rod 4 being a working fit through the usual stuffing box (not shown) provided at the upper end of the cylinder 2. A hand operated pump 5 is provided and is swiveled to the base 1 and connected by valve controlled passages to the opposite ends of the cylinder 2, that is, above and below the piston. The details of the construction of the pump 5 and of the valve controlled means between it and the cylinder 2 form no part of this invention and are well known. For the purposes of the present invention it is sufficient to understand that the pump 5 may be utilized to withdraw the oil or other fluid from the top of the cylinder 2 above the piston 3 through a port 6 and return passages 7 and to force this fluid into the lower end of the cylinder below the piston through the passage 8.

With an arrangement of this character if the pump is operated, after the piston 3 has been elevated as far as it may be, excessive and even destructive pressures may be set up in the cylinders and to avoid this a minute by-pass port 10 is provided between the cylinder and the return passage 7 at a point just below the piston 3 when the piston is in its extreme upper position. Such a venting port 10 provides for the relief of any excessive pressures and does so without interfering with the maintenance of the piston 3 in its uppermost position and without liability of scoring or damaging the piston. Usually these pistons have leather cups or washers which would be damaged if expanded into an opening of any size. The relief port 10 is so small that even the high pressures that exist below the piston are not capable of forcing the washer into the relief port and damaging the same.

To the upper end of the piston rod 4 a head or lifting member 15 is rigidly secured. Integral with the lifting member is a combined guide bar and lifting lug carried 16 which extends down along the outside of the cylinder 2 in parallel relation to the piston

rod 4. The cylinder 2 has an integral strengthening and guiding rib 17 which extends for substantially the full length of the piston and merges into the base thereof. This guide rib 17 is a snug sliding fit in a similarly formed groove or guideway 18 provided in the bar 16 (see Figure 5). With this arrangement the piston 3 and piston rod 4 are constrained to true sliding movement by virtue of the coaction of the guide bar 16 and the rib 17 and the piston and piston rod having a similar action on the guide bar. The guiding action of the guide bar is enhanced by means of curved guiding wings 20 integral with the lower end of the bar and sliding against the outer surface of the cylinder.

The bar 16 has two vertical rows of teeth 24 spaced by an intervening rib 24ª. A lifting lug 21 is adjustably mounted on the bar 16 and includes a body portion 22 adapted to engage the object to be raised, a downwardly and inwardly curved lug 23 notched to clear the rib and to permit its lower end portions to engage the spaced teeth 24 on the bar 16, and hook-like retaining fingers 25 which extend around and engage the bar as shown in Figure 5. The bar 16 is cut away at 16ª to provide ways to receive the hooks 25, these ways terminating short of the lower end of the bar to provide stops 27 which limit the downward movement of the lifting lug and prevent its being dropped off of the bar 16.

To take the lifting lug 21 off of the bar 16, it is raised up along the bar 16 as far as it will go and is then rotated until the body portion 22 is in a substantially vertical plane with the hooks 25 alined with the portion 15′ between the head 15 and the bar 16. At least one (preferably the vertical) dimension of this portion 15′ is less than the distance between the hooks so that by keeping the lug 21 in a substantially vertical plane and rotating it in either direction, it may be slipped laterally off of the portion 15′. The reverse of this operation will effect assembly of the lug 21 and the lift bar 16.

The head 15 is roughened so as to be adapted to engage properly an object or a part of the vehicle. In order to adapt the jack for engaging objects spaced above the ground beyond the range of the head 15, an auxiliary lifting head 30 is provided and has an offset hinged connection 31 with the head 15. This auxiliary head 30 may be operatively positioned as shown in full lines in Figure 1 in which position it is engaged with and firmly supported by the head 15 and is ready for use. Again, the auxiliary head 30 may be swung over to the side as shown in dotted lines in Figure 1 in which position of the head 30 either the head 15 or the lifting lug 21 must be used.

Retractile coil springs 35 may be provided between the head 15 and the base 1 to aid in the lowering of the jack.

From the foregoing it will be seen that the lifting mechanism has a wide range of action and yet is especially adapted for organization with a hydraulic jack. Thus, the lifting head, lifting bar and cylinder are interconnected to guide and strengthen each other and afford adequate strength and rigidity in the support of the lifting head and of the lifting lug. The auxiliary lifting head increases the range of action of the jack and when in use is firmly supported. Finally the cylinder of the jack is relieved of excessive pressures in such a novel manner as to avoid impairing the action of the jack or damage to the piston thereof.

The ports 6 and 7 may be conveniently formed by drilling through the cylinder casting from the exterior. After the drilling operation the portions of the drill holes that lie between the exterior and the return passage 7 are plugged up as indicated at 31 and 32 in Figure 1.

The invention claimed is:

1. A jack including a lifting lug and a carrier for the lifting lug, said carrier having two rows of teeth with an intervening rib thereon and said lifting lug having a depending portion notched to interfit with the rib on said carrier and to permit its lower end to engage the spaced teeth on said carrier.

2. A jack including a lifting lug and a carrier therefor, said carrier having two rows of teeth with an intervening rib on one face thereof and guide ways on an opposite face of the carrier, said guide ways terminating short of the lower end of the carrier and said lifting lug having a depending portion notched to interfit with said rib and to permit its lower end to engage said spaced teeth, said lifting lug also having hooks thereon for engaging said guide ways.

3. A jack including a cylinder, a guiding rib on said cylinder, a lifting lug carrier having a guide way cooperating with said guide rib and having two rows of teeth with an intervening rib thereon, a lifting lug mounted on said carrier and having a portion notched to interfit with the intervening rib on said carrier and to permit its lower end to engage the spaced teeth on the carrier.

In witness whereof, I hereto affix my signature.

HARRY W. BOLENS.