July 17, 1962 J. L. NOLDEN 3,044,747

FLUID-OPERATED JACK

Filed June 29, 1959

Fig. 1

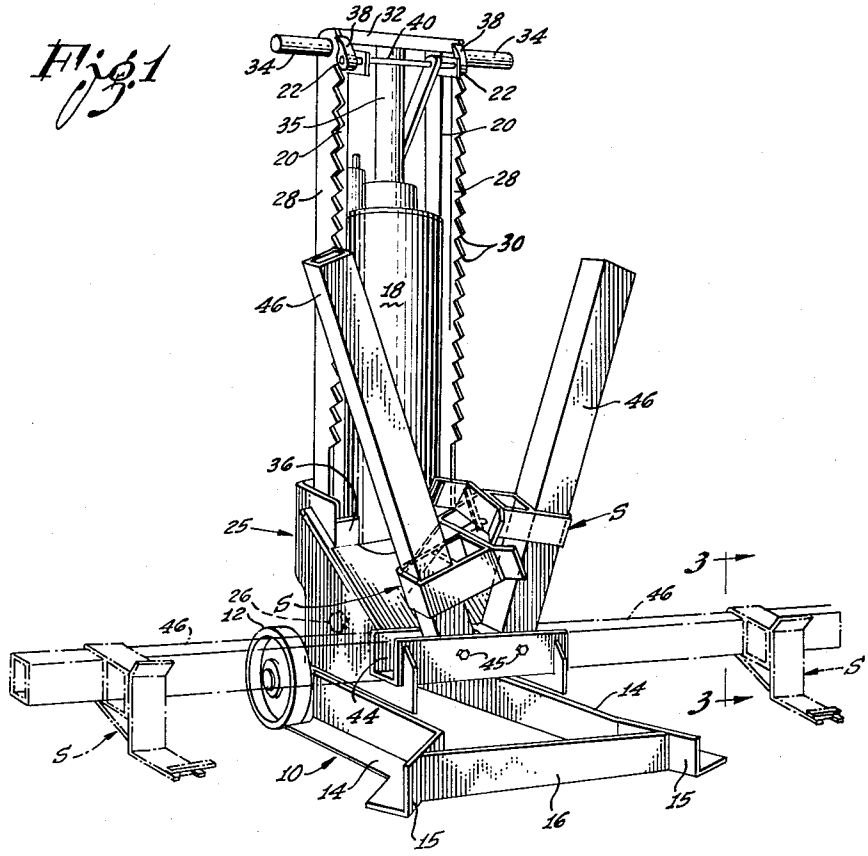


Fig. 2

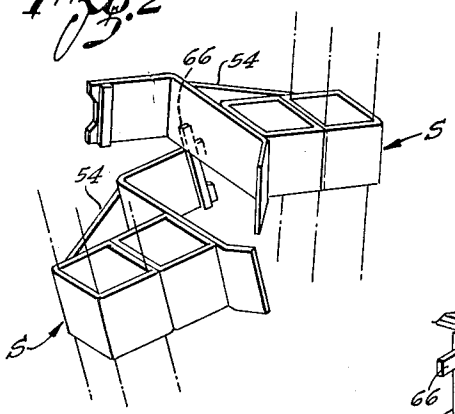


Fig. 3

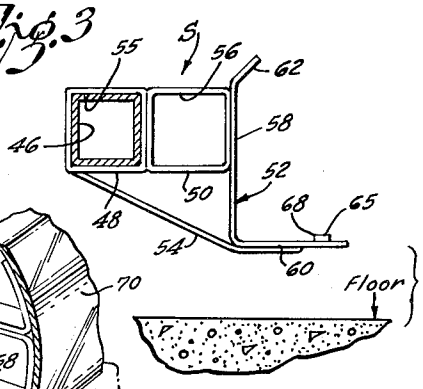
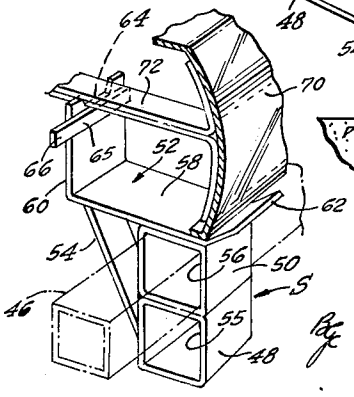


Fig. 4



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FLUID-OPERATED JACK

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This invention relates to a heavy duty fluid-operated jack of the general type disclosed in the Branick Patent No. 2,805,839. Such a jack comprises a base, a carriage adapted for engaging a vehicle, and a power cylinder for lifting the carriage. The present invention is specifically directed to the construction of the means on the carriage of the jack for engaging vehicles that are to be lifted.

The carriage of the jack should engage the front end or rear end of a vehicle at points that are spaced apart laterally for sake of stability and the spacing of these engagement points should be adjustable. For this purpose, the carriage of the Branick disclosure is provided with what is termed a transverse lifting beam. The lifting beam is hollow and two extension members are slidingly mounted inside the hollow beam in side by side relationship. The outer ends of these extension members carry brackets for direct engagement with parts of vehicles.

The present invention is directed to certain needs for improvement on such a prior art jack. One need is for greater adaptability of the jack for different uses and for engagement with widely different vehicles. Merely providing adjustability in the spacing of the brackets is not sufficient because vehicle structures vary in shape as well as in dimensions. In some instances, the vehicle engaging portions of the brackets should be only slightly above the level of the transverse lifting beam on which they are mounted and in other instances they should be substantially higher. In still other instances, where the requirement is to lift a vehicle by a bumper that is close to the floor the vehicle engaging portions of the two brackets must be substantially below the level of the transverse lifting beam on which they are mounted.

Another need is for means to engage a vehicle bumper of relatively thin metal in such manner as to avoid overstressing the material of the bumper. In some instances, the bumper metal is so thin that it will tend to yield by curling if used to lift the end of the vehicle by means of a jack.

Another need is for a heavy duty jack to be contractable in width so that it may be moved through relatively narrow spaces to reach work areas. Contraction in width is also desirable when the jack is idle. The usual fixed transverse lifting beam cannot be contracted to permit the jack to pass through a narrow space.

A further need is for a rugged high strength construction capable of sustaining large loads over a long service life. Extensions that are slidingly mounted side by side inside a hollow transverse lifting beam must be of less than one-half the cross-section of the beam and therefore must be substantially weaker than the beam.

The invention meets these various needs by substituting a pair of foldable arms of noncircular cross-sectional configuration for the fixed lifting beam and by slidingly mounting on these arms saddles or bracket members that may be oriented to different positions to engage vehicles of different configurations. The foldable arms may be of the same cross-section as the fixed lifting beam of the prior art and just as strong and may extend to greater lateral distances when unfolded for use. Since the two saddles are transversely apertured to receive the lifting arms on which they are mounted and slidingly embrace the arms, their attachment to the arms does not weaken the structure of the arms themselves.

In the selected embodiment of the invention, each of the two saddles has two transverse noncircular apertures for use selectively in mounting the saddle on the corresponding lifting arm. The two apertures permit the elevation of the saddle relative to the arm to be varied at one orientation of the saddle. This arrangment provides adjustment of the degree to which an upper vehicle-engaging portion of the saddle extends above the arm at this one orientation of the saddle.

At another orientation of the slidable saddles, vehicle-engaging portions of the saddles extend forward at levels substantially below the level of the arms to hook under low lying parts of vehicles. This arrangement permits the jack to engage a vehicle bumper that is too low for engagement by other jacks of this general type.

The invention further solves the problem of engaging a thin-walled bumper without over-stressing the material of the bumper. For this purpose, each of the two saddles at one of its orientations has two portions to engage different parts of the bumper simultaneously. One portion of the saddle slips or hooks under the lower edge of the bumper. The other portion extends upward to engage one of the two brackets by means of which the bumper is mounted on the vehicle frame. Thus, the load or weight of the vehicle is divided between the bumper and the two bumper brackets to avoid over stressing of the thin metal of the bumper proper.

A further feature of the present embodiment of the invention is that the two saddles may be made of heavy bar stock. Such a construction may consist of two noncircular sleeves dimensioned to slip over the two arms selectively and a bracket member to engage parts of vehicles that are to be lifted. The two sleeves are welded together; the bracket is welded to the outer side of one of the two sleeves and is reinforced by a welded brace extending diagonally from the other sleeve.

The features and advantages of the invention may be understood from the following detailed description considered with the accompanying drawing.

In the drawing, which is to be regarded as merely illustrative:

FIG. 1 is a perspective view of a fluid-operated jack incorporating the presently preferred embodiment of the invention;

FIG. 2 is a fragmentary perspective view showing how the two saddles cooperate to function as latch means for holding the two lifting arms in their upper folded positions;

FIG. 3 is a view partly in side elevation and partly in section showing the construction of one of the saddles, the section being taken along the line 3—3 of FIG. 1; and

FIG. 4 is a fragmentary perspective view showing how one of the saddles is formed with one portion to hook under the lower edge of a bumper and is formed with a second portion to engage the bracket by means of which the bumper is mounted on the vehicle frame.

The drawing illustrates the presently preferred embodiment of the invention. The jack construction includes a base structure **10** provided with a pair of rearward wheels **12** which are raised out of contact with the floor when the jack is in its normal upright position. The base structure **10** comprises a pair of forwardly extending angles **14** having diverging portions **15** at their outer ends interconnected by a cross member **16**.

Fixedly mounted on the base structure **10** is an upright power cylinder **18** and a pair of upright guide members **20** that are on opposite sides of the power cylinder and extend above the power cylinder. The upper ends of the two guide members **20** are formed with corresponding forwardly extending stop projections **22**.

A carriage, generally designated by numeral **25**, is slid-

ingly mounted on the two upright guide members 20 by suitable rollers 26 to move freely up and down. The carriage structure includes a pair of upright ratchet bars 28 having downwardly pointed ratchet teeth 30. The two ratchet bars 28 lie alongside the corresponding upright guide members 20 and are rigidly interconnected at their upper ends by a crosshead 32. The upper ends of the ratchet bars 28 are further provided with laterally extending handles 34 for convenience in maneuvering the jack. When the jack is tilted rearward by means of the handle, the weight is transferred from the base structure 10 to the rearward wheels 12.

The crosshead 32 is connected to the upper end of a piston rod 35 which is connected to a piston (not shown) inside the power cylinder 18 in a well-known manner. The power cylinder 18 may be supplied with hydraulic fluid under pressure for lifting the carriage 25 but preferably compressed air is used. The carriage 25 is provided with suitable stop members 36 which abut the previously mentioned stop projections 22 of the guide members 20 at the upper limit position of the carriage. The provision of these stop members keeps the piston inside the power cylinder from ramming against the cylinder head.

The carriage 25 may be latched at a selected elevated position by means of a pair of pawls 38 which are fixedly mounted on a cross shaft 40 in positions to engage the teeth 30 of the corresponding ratchet bars 28. The cross shaft 40 is journaled at its opposite ends in the two upright guide members 20 and is controlled by a handle 42 that is fixedly mounted on the shaft. As may be seen in FIG. 1, the handle 52 is mounted on the cross shaft 40 at such an angle that the handle gravitationally tends to swing the pawls 48 into engagement with the ratchet teeth 30. The carriage 25 forms a forwardly positioned transversely extending channel 44 that is open at both ends. Pivotally mounted in the channel 44 by means of bolts 45 is a pair of oppositely extending lifting arms 46. Each of the lifting arms 46 is preferably a hollow member of substantially square cross section. The lifting arms 46 are movable between upwardly extending folded positions shown in solid lines in FIG. 1 and horizontal laterally extending positions shown in phantom in FIG. 1, the latter positions being the operative positions for lifting vehicles.

The present invention is specifically directed to the construction of a pair of lifting brackets which may be termed saddles and are generally designated by the letter S in the drawing. The two saddles S are slidingly mounted on the two lifting arms 46, respectively.

In the present embodiment of the invention, each of the saddles S is fabricated from heavy flat bar stock. Thus each saddle S comprises a pair of substantially square sleeves 48 and 50 welded together, a bracket member generally designated 52 welded to the outer side of the sleeve 50 and a diagonal brace 54 that is welded at one end to the bracket 52 and is welded at the other end to the sleeve 48. The sleeve 48 forms a substantially square aperture 55 and the sleeve 50 forms a similar aperture 56, these two apertures being shaped and dimensioned for sliding fit selectively on the lifting arms 46.

The bracket member 52 of each of the two saddles S is of angular construction with a straight portion 58 lying flat against the sleeve 50 and another straight portion in the form of a relatively long flange 60 extending at 90° to the portion 58. The end of the straight portion 58 is formed with a relatively short 45° flange 62. As best shown in FIG. 4, the outer end of the second straight portion 60 of the bracket is formed with a relatively wide notch 64 and a transverse cleat 65 is positioned at the bottom of the notch. The cleat 65 comprises a small metal bar welded in place.

At least one cleat 65 of the two cleats on the two saddles S extends laterally from the saddle to form a latching finger 66. In the construction shown, the latching finger 66 is provided on only one of the two saddles and extends in only one lateral direction from the saddle. If desired, latching fingers may be provided on both saddles and may extend in both directions from each saddle.

If the jack is to be used to raise a car by a bumper and the bumper is relatively close to the floor, the two saddles S may be positioned on the two lifting arms 46 in the manner shown in FIGS. 1 and 3. In this instance, the two saddles S are mounted on the two arms by means of the apertures 55 formed by the sleeves 48 to position the two brackets 52 well forward from the lifting arms. If desired, however, the two saddles may be mounted on the lifting arms by their apertures 56 to position the brackets 52 closer to the lifting arms.

At the positions of the saddles shown in FIGS. 1 and 3, the straight portions 60 of the two saddles extend forward at relatively low elevations close to the floor to permit the straight portions 60 to be moved under the bumper of a car. When the two saddles are thus positioned relative to a bumper, the carriage may be elevated to cause the straight portions 60 of the saddles to lift the vehicle by the bumper. The two cleats 65 provide rearwardly directed shoulders 68 to keep the bumper from sliding off the saddles.

FIG. 4 shows how each of the two saddles S may be placed on the corresponding lifting arm 46 at a different orientation which places the bracket member 52 uppermost. In FIG. 4, the saddle S is mounted on the lifting arm 46 by means of the aperture 56 of the square sleeve 50. If it is desired to position the bracket member 52 at a higher elevation relative to the lifting arm, the saddle may be mounted on the lifting arm by the alternate square aperture 55 formed by the other sleeve 48.

FIG. 4 shows how each of the two saddles in this second orientation may be used to engage a thin-walled bumper 70 that is mounted on a vehicle by a pair of forwardly extending arms 72. At this orientation of each saddle S, the straight portion 58 of the bracket 52 extends under the lower edge of the bumper 70 with the 45° flange 62 keeping the bumper from sliding off the saddle. The other straight portion 60 of the bracket extends upward with the bumper arm 72 securely seated in the notch 64. Thus the weight of the vehicle that is transmitted to each saddle S is imposed in part on the bumper 70 and in part on the bumper arm 72. With only a portion of the weight imposed on the thin wall of the bumper, this arrangement avoids damage to the bumper. In many instances, the omission of the upwardly extending portion 60 for engagement with the corresponding bumper arm 64 would result in over-stressing of the bumper with consequent curling of the lower edge of the bumper.

One of the features of the invention is the manner in which the two saddles S may be interlocked with each other to hold the two lifting arms 46 in their upward folded positions, as shown in FIGS. 1 and 2. As best shown in FIG. 2, the latching finger 66 of one of the two saddles is engaged with the other of the two saddles S so that the two interlocked saddles serve in effect as means to tie the two arms together. Thus it is a simple matter to fold the arms upward from the horizontal positions shown in phantom in FIG. 1 to the upper positions shown in solid lines, and at the same time, to slide the two saddles S into mutual engagement at the positions shown in FIG. 1.

It is to be noted that the cleats 65 have multiple functions. They serve as means to keep a bumper from sliding off the straight portion 68 of a bracket 52 when a saddle is used in the position shown in FIG. 3. When a saddle is used in the manner shown in FIG. 4, the cleats 65 serve as reinforcements for the bottom of the notches 64. Finally, a cleat which forms a latching finger 66 permits the two saddles to be interlocked for interconnecting the folded lifting arms.

My description in specific detail of the selected embodiment of the invention will suggest various changes, sub-

stitutions and other departures from my disclosure within the spirit and scope of the appended claims.

I claim:

1. In a fluid-operated jack having a carriage and a power cylinder to raise the carriage, means on said carriage to engage vehicles for lifting operations, said engaging means comprising: a pair of lifting arms of noncircular cross section extending in opposite lateral directions from the carriage; and a pair of saddles, one slidable along each of said arms, each of said saddles being apertured to receive the corresponding arm for mounting of the saddle on the arm at two different orientations relative to the arm selectively, each of said saddles having a vehicle-engaging portion for positioning above the level of the arm at one of said two orientations, said vehicle-engaging portion having a relatively long flange and a relatively short flange on opposite sides thereof, said relatively long flange being positioned to extend from the arm forwardly of the carriage at a level lower than the arm at the other of said two orientations.

2. In a fluid-operated jack having a carriage and a power cylinder to raise the carriage, means on said carriage to engage vehicles for lifting operations, said engaging means comprising: a pair of lifting arms of noncircular cross section extending in opposite lateral directions from the carriage; and a pair of saddles, one slidable along each of said arms, each of said saddles being apertured to receive the corresponding arm for mounting of the saddle on the arm at two different orientations relative to the arm selectively, each of said saddles having a first vehicle-engaging portion for positioning above the level of the arm at one of said two orientations and having a second vehicle-engaging portion to extend from the arm forwardly of the carriage at a level lower than the arm at the other of said two orientations, each of said saddles having two apertures for selectively receiving the corresponding arm at said first orientation of the saddle relative to the arm to place said first vehicle-engaging portion selectively at two levels above the arm.

3. In a fluid-operated jack having a carriage and a power cylinder to raise the carriage, means on said carriage to engage vehicles for lifting operations, said engaging means comprising: a pair of lifting arms of noncircular cross section extending in opposite lateral directions from the carriage; and a pair of saddles, one slidable along each of said arms, each of said saddles being apertured to receive the corresponding arm for mounting of the saddle on the arm at two different orientations relative to the arm selectively, each of said saddles having a first vehicle-engaging portion for positioning above the level of the arm at one of said two orientations and having a second vehicle-engaging portion to extend from the arm forwardly of the carriage at a level lower than the arm at the other of said two orientations, said second vehicle-engaging portion being shaped to hook under a vehicle part and being provided with a shoulder facing rearwardly of the carriage to prevent the vehicle part from sliding off.

4. In a fluid-operated jack having a carriage and a power cylinder to raise the carriage, means on said carriage to engage vehicles for lifting operations, said engaging means comprising: a pair of lifting arms of noncircular cross section extending in opposite lateral directions from the carriage; and a pair of saddles, one slidable along each of said arms, each of said saddles being apertured to receive the corresponding arm for mounting of the saddle on the arm at two different orientations relative to the arm selectively, each of said saddles having a first vehicle-engaging portion for positioning above the level of the arm at one of said two orientations and having a second vehicle-engaging portion to extend from the arm forwardly of the carriage at a level lower than the arm at the other of said two orientations, said pair of arms being foldable upward towards each other, portions of said two saddles respectively being shaped for releasable interlocking engagement with each other while on the folded arms to hold the arms in their folded position.

5. A combination as set forth in claim 1 in which said relatively long flange of the vehicle-engaging portion of each of said saddles is notched for engagement with a vehicle at said one orientation of the saddle.

6. A fluid-operated jack for lifting a vehicle which has a bumper on a pair of support arms, said jack having a carriage and a power cylinder to raise the carriage, means on said carriage to engage the vehicle, said engaging means comprising: a pair of lifting arms of substantially square cross section extending in opposite lateral directions from the carriage; a pair of saddles for said arms, respectively, each of said saddles being made of bar stock forming two square sleeves positioned side by side, a bracket on the outer side of one of said two sleeves and a brace extending to the bracket diagonally from the other of the two sleeves, said two sleeves being dimensioned to receive the corresponding arm for use selectively for slideably mounting the saddle on the arm, said bracket having two portions substantially perpendicular to each other, one of said portions being shaped and dimensioned to hook under said bumper, the other of said portions being shaped and dimensioned to extend upward into simultaneous engagement with one of said support arms to carry a portion of the weight of the vehicle to prevent excessive stressing of the bumper, said other of the two portions of the bracket being formed with a notch to receive said bumper arm; and a cleat reinforcing said notch and also forming a shoulder to keep a part of a vehicle from sliding off said other portion when the saddle is oriented on the lifting arm for said other portion of the bracket to hook under a part of a vehicle.

7. In a fluid-operated jack having a carriage and a power cylinder to raise the carriage, means on said carriage to engage vehicles for lifting operations, said engaging means comprising: a pair of lifting arms of substantially square cross section extending in opposite lateral directions from the carriage; and a pair of saddles for said arms, respectively, each of said saddles being made of bar stock forming two square sleeves positioned side by side, with a bracket on the outer side of one of said two sleeves and a brace extending to the bracket diagonally from the other of the two sleeves, said two sleeves being dimensioned to receive the corresponding arm for use selectively for slidably mounting the saddle on the arm, said bracket being shaped to hook under a bumper of a vehicle with a transverse cleat on the bracket to keep the bumper from sliding off, said two arms being foldable upward towards each other and the cleat on at least one of the two saddles projecting laterally to engage the other saddle to hold the two arms in their folded positions.

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