April 11, 1950 A. A. MILLER 2,503,347

HYDRAULIC JACK

Filed Sept. 12, 1945 3 Sheets-Sheet 1

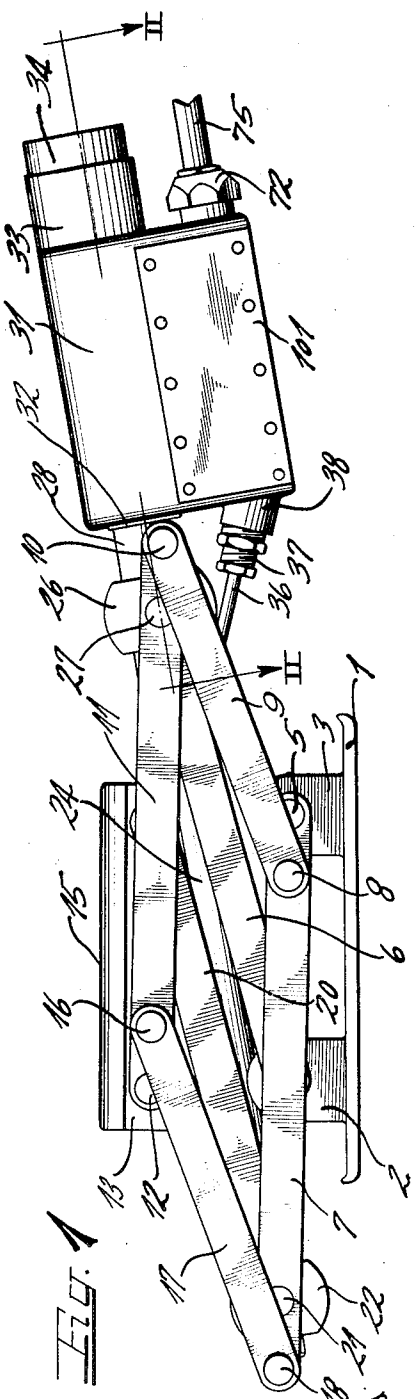


Fig. 1

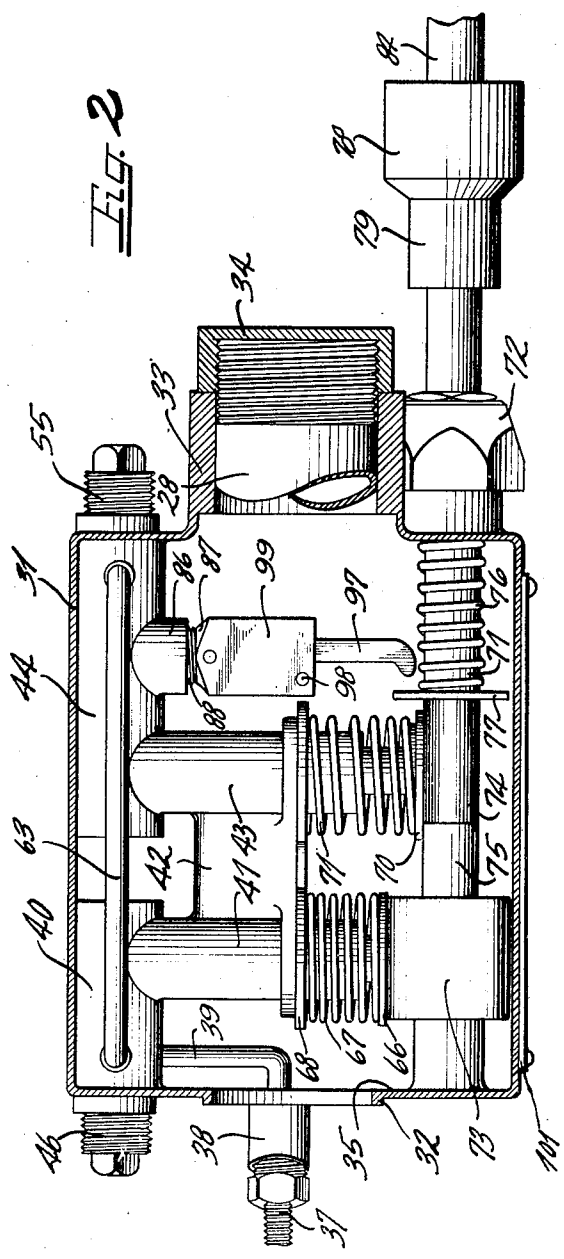


Fig. 2

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Fig. 3

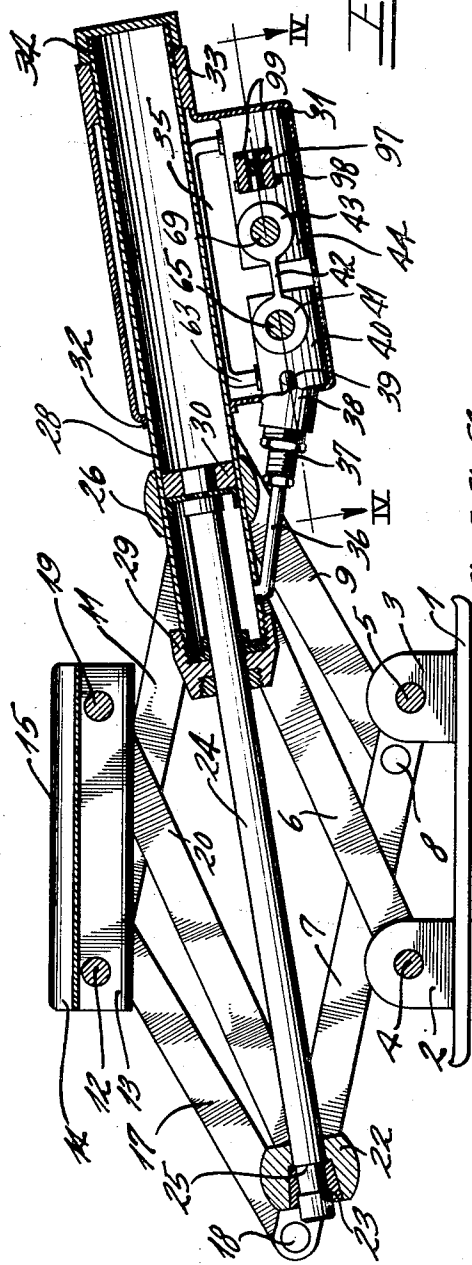
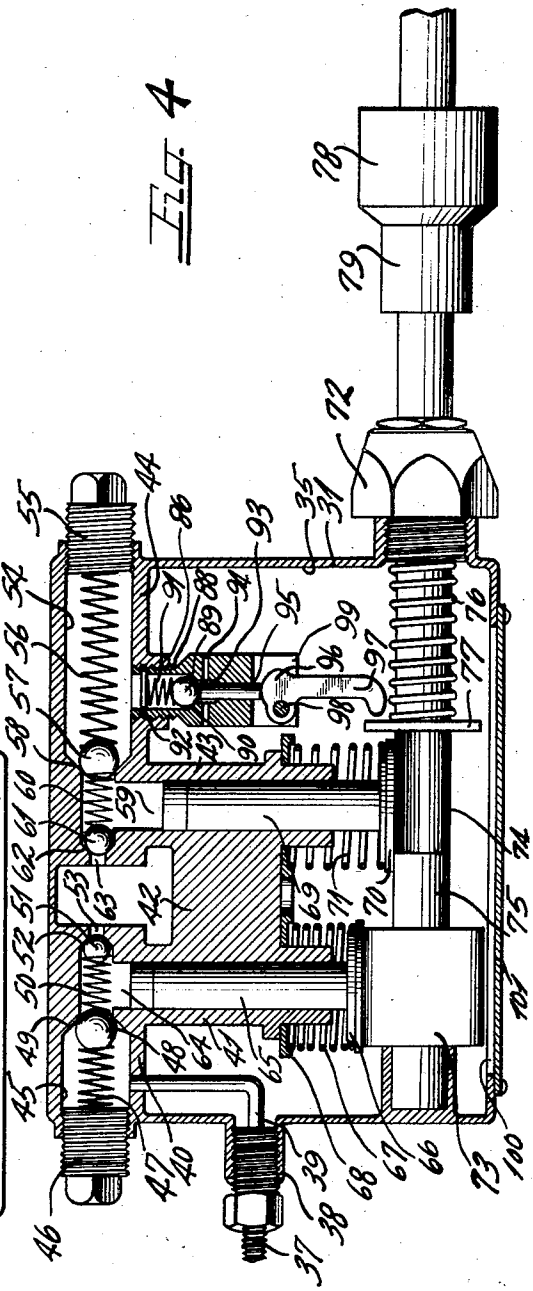


Fig. 4



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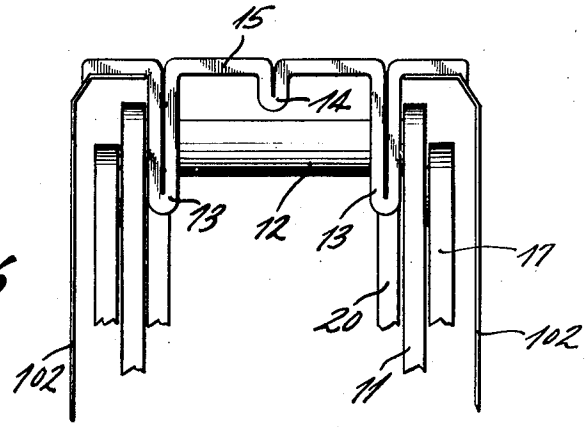


Fig. 6

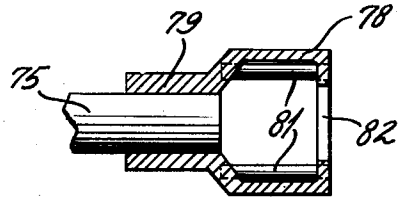


Fig. 8

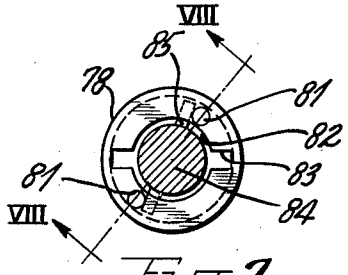


Fig. 7

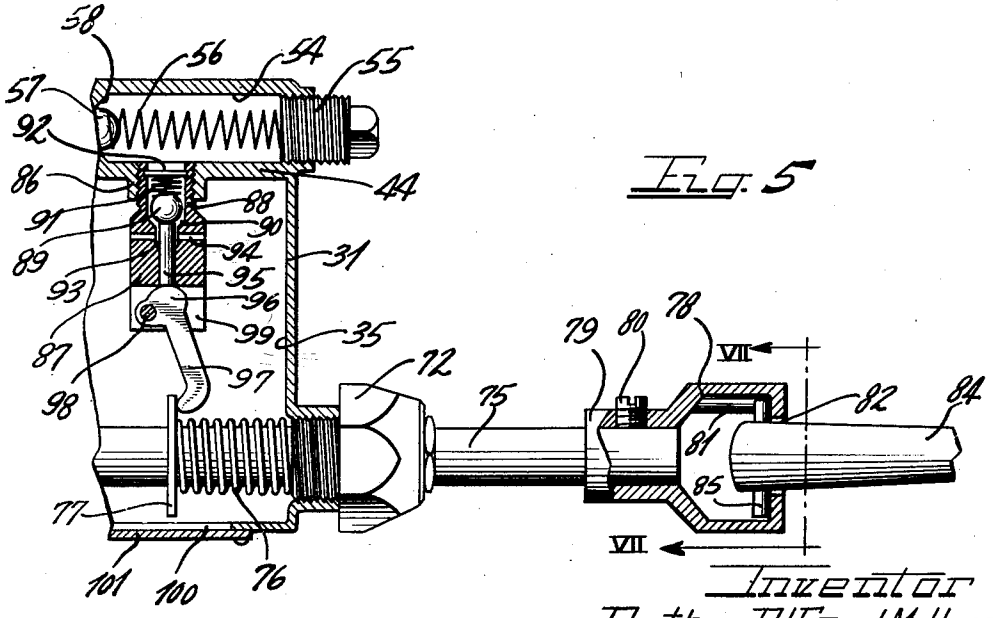


Fig. 5

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Patented Apr. 11, 1950 2,503,347

UNITED STATES PATENT OFFICE

2,503,347

HYDRAULIC JACK

Arthur Alfred Miller, McHenry, Ill., assignor to Miller Products, a copartnership consisting of Arthur Alfred Miller and Lou Charles Casanov

Application September 12, 1945, Serial No. 615,785

6 Claims. (Cl. 254—122)

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The present invention pertains to weight raising devices and more particularly to an improved and efficient type of a hydraulic jack which is adapted to be manually operated and released through the medium of a hydraulic control to effect the raising and lowering of a load supporting head. The jack head is supported by a novel arrangement of pivotally connected lazy tongs links and stabilizing links, having hydraulically actuated operating blocks mounted intermediate the ends of selected upper and lower lazy tongs links to provide pivotal connections for the remaining lazy tongs links and also providing free ends for the attachment of the stabilizing links.

An object of the invention is the provision of a weight lifting device of simple and effective construction, including a hydraulically operated lifting unit involving novelly assembled lazy tongs links and stabilizing links, whereby the objects and features contemplated are obtainable with economy and facility.

It is an object of the invention to provide an improved and simplified form of jack wherein the lazy tongs lifting unit is adapted to be operated by a hydraulic piston mechanism which is conveniently positioned to facilitate convenient operation thereof to effect both raising and lowering of the lifting unit.

Another object of the invention is the provision of a lazy tongs type of jack provided with hydraulic operating means including a manually operable crank connection whereby the hydraulic operating means may be operated to raise the lifting unit and wherein the hydraulic operating means may be conveniently released to effect a gradual and steady lowering of the lifting unit.

It is furthermore an object of this invention to provide a scissors type jack operable by hydraulic means, the lifting and lowering operations of which are effected through the rotation and shifting of a manually operated crank shaft control.

A further object of the invention is the provision of a scissors or lazy tongs type of lifting jack wherein crank operated hydraulic pump mechanisms are operable for raising the jack and wherein lowering of the jack is conveniently effected by the operation of a release means.

It is an important object of this invention to provide a scissors type of lifting jack operable by hydraulic means, the operation of which is governed by the manual rotation and shifting of a control medium, the rotation of which causes raising of the jack while shifting thereof permits retraction and gradual lowering of the jack.

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Another object of the invention is the provision of a hydraulic scissors type of jack mechanism provided with a reinforced lifting head or saddle having side plates for enclosing portions of the lazy tongs members to serve as a shield therefor in either a raised or lowered position of the jack mechanism.

A further feature of the invention is the provision of a hydraulic type of scissors jack wherein a manually operable crank handle is adapted to be removably engaged with a coupling unit for either rotating or shifting a crank mechanism to cause operation of the jack to either raise or lower the same through the control of the direction of flow of a liquid medium.

Another object of the invention is to provide a scissors type of lifting jack operable by hydraulic means wherein the pumping and release of liquid for actuating the jack is governed by a manually operable crank shaft type of control which may be either rotated or shifted to respectively cause raising or lowering of the jack through the control of a fluid medium.

Another object of the invention is the provision of a hydraulic scissors jack wherein piston operated control blocks and stabilizing links are pivotally connected between the ends of upper and lower lazy tongs members to the outer free ends of which the stabilizing links are also connected.

It is an important object of this invention to provide an improved and simplified form of a hydraulic operated scissors jack wherein the operation of lazy tongs mechanisms are stabilized by a novel connection for stabilizing means and a positioning of hydraulically controlled actuating connections intermediate the ends of two oppositely positioned members of the lazy tongs mechanisms, whereby the objects sought are adapted to be realized with economy and facility.

Other and further important objects and features of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

On the drawings:

Figure 1 is a side elevational view of a scissors type hydraulic jack illustrated in collapsed form and embodying the principles of this invention;

Figure 2 is a sectional view of the hydraulic operating mechanism taken on substantially line II—II of Figure 1, with parts shown in elevation and with parts omitted and including a drive coupling for connecting a crank handle with a crank shaft of the hydraulic mechanism;

Figure 3 is a longitudinal central vertical sec-

tion of the scissors jack in a partly raised position, and including a sectional view of the hydraulic control mechanism, with parts shown in elevation;

Figure 4 is an enlarged sectional view of the lower portion of the hydraulic control mechanism taken on line IV—IV of Figure 3 with parts shown in elevation;

Figure 5 is a fragmentary sectional view of the lower right-hand portion of the hydraulic control mechanism with the coupling unit partly shown in section showing the hydraulic crank shaft control pulled outwardly by means of the operating crank handle to open the release valve controlling the discharge of the hydraulic liquid medium out of the piston back into the liquid reservoir to permit lowering of the jack;

Figure 6 is a fragmentary and elevational view of the upper portion of the jack to show the shape of the lifting head or saddle having shields or guard plates secured thereto to partially enclose the toggle mechanism;

Figure 7 is a transverse sectional detail view taken on line VII—VII of Figure 5; and

Figure 8 is a fragmentary longitudinal sectional view taken on line VIII—VIII of Figure 7 with parts shown in elevation and with the operating crank arm removed.

As shown on the drawings:

This invention relates to an improved and efficient type of a hydraulically operated lifting or raising jack adaptable for use in connection with the raising of automobiles, heavy trucks or for use in connection with the lifting or raising of other heavy devices or objects to hold the same in a raised position and act as a temporary support therefor. The improved jack mechanism is of the scissors or lazy tongs type wherein the lazy tongs unit is adapted to be conveniently raised and lowered by a manually operable hydraulic unit which governs the operation of a piston member connected for actuating the lazy tongs to cause either raising or lowering thereof depending upon the flow of the hydraulic medium into or out of the piston cylinder. The jack is furthermore adapted for raising or lowering a load of any selected weight at a speed depending upon the rate of rotation of a manually operable crank handle connected for operating the hydraulic control.

A novel feature of the present hydraulic jack is the mounting of a hydraulic unit in an inclined position to permit a crank handle to be readily attached and disposed in an inclined position so that the outer operating end thereof may be conveniently rotated to facilitate raising of the jack head or cradle and furthermore permitting convenient release of the hydraulic medium to permit gradual lowering of the jack head or cradle without making it necessary for an operator to stoop and crawl into inaccessible places to either position, operate or release the jack.

A novel feature of the present hydraulic jack is contained in the lazy tongs structure which has the operating blocks thereof mounted between the ends of pairs of toggle members to permit projecting ends of said members to be free for the reception of selected ends of equalizing links leaving the opposite ends of said equalizing links free to be pivotally connected intermediate the ends of the respective toggle members to which the operating blocks are secured.

The improved hydraulic scissors type jack herein disclosed comprises a bottom or base plate

1 having two spaced pairs of apertured bearing lugs 2 and 3 integrally formed thereon for respectively supporting bearing shafts 4 and 5, the outer ends of which are reduced in diameter to form suitable supports for the lower ends of members forming parts of a collapsible and expendable type of weight lifting and lowering mechanism of the lazy tongs type.

The load lifting and lowering mechanism is supported on the base plate 1 and is of the scissors type including two oppositely positioned sets of lazy tongs or toggle frame members comprising a pair of lower lazy tongs links or toggle members 6 which have the lower ends thereof pivotally supported on the reduced ends of the base bearing shaft 4. A second pair of lower lazy tongs links or toggle members 7 have the lower ends thereof pivotally supported on the reduced ends of the base bearing shaft 5. The toggle members 6 and 7 on each side of the jack cross one another and project upwardly and outwardly in opposite directions as illustrated in Figure 3.

Pivotally connected by means of a pivot stud 8 to each of the lower toggle members 7, at a point a short distance from the shaft 5, is the lower end of a lower stabilizing link 9, the upper end of which is pivotally engaged on a pivot stud 10 carried in the lower projecting end of an upper lazy tongs link or toggle member 11, two of which are provided. The upper ends of the two lazy tongs links or toggle members 11 are pivotally supported on the reduced ends of an upper shaft 12 which projects through apertures in two spaced looped or U-shaped flanges 13 spaced from an intermediate or middle reinforcing flange 14. The spaced flanges 13 and 14 form an integral part of a jack lifting head or saddle 15. The lifting head 15 is constructed of a sheet metal plate having portions thereof folded upon itself to provide the downwardly projecting flanges 13 and 14 as illustrated in Figure 6.

Each of the upper lazy tongs links or toggle members 11 has a pivot stud 16 supported thereon a short distance inwardly from the upper end thereof. Pivotally supported on the stud 16 is the upper end of an upper stabilizing link 17, the lower end of which is pivotally supported on a pivot stud 18 carried by the upper projecting end of one of the lower lazy tongs links or toggle members 7. It will thus be noted that the lower and upper sets of stabilizing links 9 and 17 are mounted so that one end is pivotally connected intermediate the ends of either one or the other of the toggle members 7 or 11 while the other ends of said stabilizing links are pivotally connected to projecting ends of the respective toggle members 7 or 11 as clearly illustrated in Figure 1.

Also supported in the depending flanges 13 of the jack head 15 is another upper shaft 19, positioned opposite and parallel to the upper shaft 12 on the jack head. Pivotally engaged on the outer reduced ends of the upper shaft 19 are the upper ends of a pair of upper lazy tongs links or toggle members 20 which extend downwardly and cross on the inside of the upper toggle members 11. The lower ends of the two upper toggle members 20 are pivotally engaged on trunnions or gudgeons 21 which are integrally formed on opposite ends of a lower toggle operating block 22. The trunnions 21 of the lower toggle operating block 22 are rotatably engaged in openings provided near the upper ends of the lower toggle members 7 a short distance inwardly from the studs 18 as shown in Figure 1, thereby pro-

viding an arrangement in which the lower ends of the upper stabilizing links 17 are connected to the upper projecting ends of the lower toggle members 7 beyond the point of support for the lower toggle operating block 22.

The lower toggle operating block 22 is recessed to receive a retaining wedge unit 23, which is passaged to register with a transverse opening in the block 22 to receive the outer end of a hydraulically operated piston rod or plunger 24 securely locked therein. The outer end portion of the piston rod 24 is circumferentially grooved at 25 to receive an internal ring forming an integral part of the wedge unit 23, which is of a split construction to facilitate engagement thereof around the grooved end of the piston rod 24 as illustrated in Figure 3.

The scissors or toggle mechanisms for actuating the jack head includes an upper toggle operating block 26 which is formed with integral outwardly projecting end trunnions or gudgeons 27. The trunnions 27 are rotatably engaged in openings provided in the lower portions of the upper toggle members 11 at a short distance inwardly from the studs 10 which are supported in the lower projecting ends of the toggle members 11 to serve as supports for the upper ends of the lower stabilizing links 9 as shown in Figure 1. It will thus be noted that the jack head 15 is adapted to be operated by lazy tongs or the scissors type arranged in two groups or sets on opposite sides of the jack head and including upper and lower sets of stabilizing links connected to projecting ends of the toggle members 7 and 11 and to points between the supporting ends of said toggle members and the points where the supporting trunnions of the lazy tongs operating blocks engage through the toggle members 7 and 11.

The upper toggle operating block 26 is transversely recessed and is welded or otherwise rigidly secured around the exterior of a hydraulic cylinder 28 which is mounted in an inclined position and slidably receives the upper end of the piston rod 24. The piston rod 24 is also supported in an inclined position as illustrated in Figure 3 and projects through suitable packing in a closure cap 29 which is tightly threaded on the lower exteriorly threaded end of the cylinder 28 to insure a tight joint. Rigidly secured on the inner or upper end of the piston rod 24 is a piston 30 which is adapted to be operated by a hydraulic operating fluid, such as oil, water or any other suitable fluid adaptable for use as a liquid medium for actuating the piston and the piston rod to cause operation of the toggle mechanisms to raise the jack head.

The hydraulic cylinder 28 projects longitudinally and centrally through the upper portion of a hydraulic housing or jacket 31 and is tightly sealed in collars 32 and 33 which are integrally formed on opposite ends of the upper central portions of the end walls of the housing 31. The upper end of the cylinder 28 projects through the housing sleeve 33 and is exteriorly threaded to receive a closure cap 34 to seal the upper end of the cylinder.

The hydraulic housing 31 is provided with a chamber 35 which is filled with a hydraulic operating liquid such as oil which forms a jacket around the cylinder 28 where it projects through the housing.

Normally the jack head 15 is in its lowermost position, as illustrated in Figure 1, so that the hydraulic piston rod 24 is in its outermost position with the piston 30 in the lower end of the cylinder 28 so that substantially all of the operating fluid is discharged from the lower side of the piston 30 outwardly through a combination fluid feed and discharge pipe 36, the outer end of which is connected by a pipe coupling 37 which is engaged in a sleeve 38 integrally formed on the lower central portion of one end of the hydraulic housing 31. Tightly connected to the inner end of the pipe coupling 37 is one end of a fluid pipe 39 which is disposed within the fluid chamber 35 and has the second end thereof projecting into a valve housing 40 which is integrally formed or cast in a lower corner of the fluid housing 31 and is disposed at right angles to a fluid pump cylinder 41. The fluid pump cylinder 41 is integrally connected by means of a web 42 to a second pump cylinder 43, one end of which is integrally connected at right angles to a second valve housing 44 which is also integrally formed in one of the corners of the housing 31 in alignment with the valve housing 40 and spaced therefrom as shown in Figure 2.

The valve housing 40 is provided with a liquid receiving chamber 45 which opens through one end of the housing 31 and is closed by a threaded plug 46. Seated against the inner end of the closure plug 46 is one end of a valve control spring 47, the inner end of which seats against a ball valve 48 to normally hold the same seated in a valve seat 49 formed in the valve housing 40. Also seated against the ball valve 48 is one end of a control spring 50 which is disposed within a passage or chamber in the valve housing 40 and communicates with the inner end of the pump chamber within the cylinder 41. The second end of the control spring 50 engages against a second intake ball valve 51 to normally hold the same seated against an auxiliary valve seat 52 to normally close a fluid intake passage or port 53 provided in the inner end of the valve housing 40 as clearly illustrated in Figure 4.

In a similar manner the second valve housing 44, in the housing 31, is provided with a fluid chamber 54, the outer end of which opens through an opening in an end wall of the housing 31 and is closed by means of a threaded closure plug 55. Engaged against the inner end of the closure plug 55 is one end of a main control spring 56 which is disposed in the chamber 54 and has the opposite end thereof engaged against a main ball valve 57 which is adapted to be normally held seated against a main valve seat 58 to close off the chamber 54 from the chamber at the inner end of the chamber 59 of the pump cylinder 43. Disposed within the chambers at the end of the pump chamber 59 is an auxiliary control spring 60 one end of which seats against a main ball valve 57 while the other end seats against an auxiliary ball valve 61 to hold the same against an auxiliary valve seat 62 for controlling a fluid intake passage or port 63 provided in the inner end of the valve housing 44 to permit fluid to be suctioned through the passage 63 to fill the pump chamber 59 to refill the same after the same has been emptied.

To permit the operating fluid to be pumped from the chamber 54 into the chamber 45 and then into the outlet pipe 39, a connecting or transfer pipe 63 is provided with one end of said pipe being connected to the valve housing 44 to communicate with the chamber 54 therein while the other end of said pipe 63 is connected to the valve housing 40 to communicate with the chamber 45 therein.

For the purpose of insuring the steady pumping of a fluid from the fluid chamber 35 of the housing 31, two alternately operating pump mechanisms are provided including the pump cylinders 41 and 43 hereinbefore described. Slidably mounted in the pump chamber 64 of the pump cylinder 41 is a pump piston stem or rod 65 which projects out of one end of the cylinder 41 and has rigidly secured on the projecting end thereof a pump head 66 having engaged around the inner side thereof one end of a coiled spring 67, the inner end of which engages around a portion of the pump cylinder 41 and seats in a recess provided in a plate 68 having openings therein to permit the plate to be engaged around the pump cylinders 41 and 43 as illustrated in Figure 4. Slidably engaged in the chamber 59 of the pump cylinder 43 is a pump piston stem or rod 69, the outer end of which projects from the pump cylinder and has rigidly secured thereon a piston head 70. Engaged around the projecting end of the pump cylinder 43 is a coiled spring 71, one end of which seats against the inner side of the piston head 70 while the other end seats in a recess provided in the plate 68.

The two pump piston units are alternately operable to alternately draw the pumping fluid from the chamber 35 through the intake ports 53 and 63 into the respective pump chambers 64 and 59 when the pump piston rods move outwardly in their respective cylinders by the action of the piston control springs 67 and 71, one of which is compressed when the other is expanded as shown in Figure 4. The piston control springs jointly act to hold the piston heads 66 and 70 in contact with a double cruciform type of crank shaft unit comprising a crank shaft 75 journaled in suitable bearings provided on the housing 31 and extending outwardly from the interior of the housing 31 through a packing unit 72.

Rigidly formed on the crank shaft 75 within the chamber 35 are two spaced diametric double cranks 73 and 74 which form an integral part of the crank shaft 75 and are disposed at right angles with respect to one another so that the crank 73 is positioned to coact with the piston head 66 while the crank 74 coacts with the piston head 70 when the crank shaft is rotated to cause alternate operation of the twin pumps. The crank shaft 75 slidably projects through the packing unit 72 and is normally held in its innermost position by means of a coiled control spring 76 which is coiled around the crank shaft within the chamber 35 of the housing 31 with one end of said spring being engaged against a flat portion of the packing unit 72 while the inner end of said spring seats against a control disk 77 which is rigidly secured on the crank shaft 75 adjacent the crank 74 as illustrated in Figure 4.

The crank shaft 75 which drives the twin pump mechanisms for pumping the hydraulic fluid into the lower end of the hydraulic cylinder 28 to cause operation of the jack is adapted to be manually rotated. For the purpose of rotating the crank shaft 75 the outer projecting end thereof has a coupling head 78 attached thereto by means of a sleeve 79 which is secured to the crank shaft 75 by means of a set screw 80 or other suitable fastening means. Rigidly secured longitudinally within the coupling head 78 are two diametrically opposite and parallel stop pins 81. The coupling head is chambered and has the outer end thereof closed by means of a wall which is provided with a central opening 82 and

with a diametric slot 83 which crosses the opening 82 as clearly illustrated in Figure 7.

For the purpose of rotating the crank shaft 75, a removable crank handle 84 is provided, the outer end of which is shaped with a crank extension and a hand grip (not shown) of the ordinary type to permit rotation of the crank handle 84. The driving or attachment end of the crank handle 84 is provided with a diametrically positioned driving pin 85, as shown in Figure 5, and said pin is adapted to be projected through the diametric slot 83 as the end of the crank handle 84 is projected through the central opening 82 of the coupling head 78.

When the crank handle 84 is rotated, the driving pin 85 will engage behind the pins 81 in the coupling head to cause rotation of the coupling and the crank shaft 75 together with the cranks 73 and 74. The cranks 73 and 74 coact with the respective piston heads 66 and 70 to cause alternate operation of the pump piston rods 65 and 69 whereby the fluid in the chamber 35 of the hydraulic housing 31 is alternately drawn through the ports 53 and 63 to be pumped into the respective chambers 45 and 54 and then through the pipe 39 to enter the hydraulic cylinder 28 below the piston 30 to gradually move the same upwardly in the cylinder 28. The piston 30 draws the piston rod 24 inwardly to cause the toggle operating block 22 to be drawn toward the toggle block 26 thereby causing operation of the toggle members as well as the stabilizing links to gradually and evenly raise the jack head 15 to a desired height.

After the operating piston 30 has been moved upwardly in the hydraulic cylinder 28 by the pumping of the hydraulic fluid into the lower chamber of said cylinder, the raised jack head 15 will stay in its elevated position until the fluid below the piston 30 is released and is permitted to gradually flow outwardly through the pipe 36 and then through the pipe 39 into the chamber 45 of the valve housing 40 and through the connecting pipe 63 into the chamber 54 of the valve housing 44.

In order to permit the hydraulic fluid to escape from the chamber 54 of the valve housing 44, a fluid release mechanism is mounted within the fluid chamber 35 of the housing 31 and is supported in an interiorly threaded sleeve or collar 86 which is integrally formed on the valve housing 44 as clearly illustrated in Figures 2 and 4. The fluid release mechanism includes a valve block 87 having an externally threaded stem 88 integrally formed on one end thereof and threaded into the sleeve 86 to communicate with the chamber 54 in the valve housing 44. A release ball valve 89 is engaged in the valve block 87 and is normally held seated in a closed position against a valve seat 90 by means of a coiled spring 91, one end of which seats against the ball valve 89 while the other end is engaged against a transverse diametric pin 92 in the threaded stem of the valve block 87 as illustrated in Figure 4.

The release valve block 87 is provided with a discharge chamber or passage 93 with which diametrically opposed discharge openings or ports 94 communicate to permit the discharged fluid to pass back into the chamber 35 of the housing 31 as shown in Figure 4. Slidably mounted in a passage provided in the valve block 87 is a discharge valve control pin or stem 95 which projects into the chamber 93 against the ball valve 89. One end of the control pin 95 projects from the block 87 into contact with a cam 96

forming a part of a valve control finger or arm 97 which is pivotally supported on a pivot pin 98. The pin 98 is mounted between a pair of plates 99 secured on opposite sides of the valve block 87 and projecting beyond one end thereof to provide a space for the control cam 96 to rotate in. Rotation of the cam 96 causes operation of the control pin 95 and the release ball valve 89 when the control finger 97 is swung outwardly from the full line position illustrated in Figure 4 by the outward movement of the control disk 77.

Outward movement of the control disk 77 occurs when the crank shaft 75 is slidably moved outwardly against the action of the coiled spring 76 when a pull is manually exerted on the crank handle 84 causing the pins 85 to engage against the end wall of the coupling head 78 to pull the coupling head and the crank shaft 75 from the positions illustrated in Figure 2 into the positions illustrated in Figure 5 in which the spring 76 is compressed and in which the disk 77 swings or rocks the control finger 97 from the position shown in Figure 4 into the operating position shown in Figure 5. The cam 96 thus acts on the control pin 95 and causes the ball valve 88 to move into its open position thereby permitting the fluid which is being forced out of the lower end of the hydraulic cylinder 28 to be discharged through the chamber 93 and the discharge port 94 back into the chamber 35 of the housing 31 for reuse.

When the crank shaft 75 is pulled outwardly to cause opening of the release valve 89, the return of the control fluid back into the chamber 35 permits a gradual even lowering of the jack head 15 from a raised position into a lower position during which time the head raising lazy tongs mechanism and the stabilizing links associated therewith are adapted to be gradually moved back into their normal collapsed positions, as illustrated in Figure 1, to permit the jack mechanism to be removed from beneath an object after being lowered.

For the purpose of gaining admittance to the mechanisms mounted within the hydraulic housing 31, said housing is provided with an opening which is tightly closed by means of a removable closure seal plate 101 secured to the housing by means of screws or other suitable fastening means.

Referring to Figure 6, a protecting guard is provided for the scissors jack, and this guard consists of a pair of side plates or hood sections 102, the upper ends of which are bent over to engage beneath the side margins of the jack head 15 to which the upper flanges of the side plates are rigidly secured. The guard plates 102 serve to protect the lazy tongs mechanisms and also afford a safety means to protect the lazy tongs mechanisms by preventing anything from getting between the members of lazy tongs operating mechanisms to prevent proper operation thereof. The guard plates 102 have been omitted from all of the figures except Figure 6 in order to more clearly disclose the various mechanisms of the scissors jack. It will, of course, be understood that the guard plates may be omitted when not needed or said guard plates may form an integral part of the jack head 15.

The improved hydraulic jack is admirably adapted for raising light or heavy loads, which after being raised may be gradually and uniformly lowered at a constant rate by the release of the fluid control valve unit, the opening of which is controlled by the shifting or slidable movement of the crank shaft 75. When the shaft 75 is rotated by means of the crank handle 84, the fluid pump mechanisms are actuated to cause the fluid to be pumped into the hydraulic cylinder 28 to move the piston head 30 upwardly in said cylinder to actuate the toggle members and the stabilizing links of the lazy tongs unit to cause raising of the jack head 15 to any desired height within the limits for which the jack is designed.

It will thus be noted that an important feature of the hydraulic jack is the provision of a hydraulic control unit comprising a crank shaft which is rotatable for causing pumping of the fluid to cause operation of the piston rod to raise the jack head. The crankshaft is furthermore longitudinally shiftable by exerting an outward pull on the crank shaft against the action of the control spring to cause cam operation of the release ball valve to permit release of the fluid from the hydraulic cylinder and a gradual even lowering of the jack head and the toggle mechanisms supporting the same.

While an improved type of hydraulic control unit is associated with the lazy tongs or scissors jack unit, it will of course be understood that the hydraulically operated piston mechanism may be replaced by an operating screw, the rotation of which may be accomplished by a direct connection thereto of a suitable crank handle or by means of a reduction gear unit and an auxiliary crank handle drive such as the operating drive unit illustrated in my copending application for patent for a "Scissors jack," filed June 21, 1945, U. S. Serial No. 600,763.

Another important feature of the present invention is the provision of a lazy tongs jack unit wherein the toggle members are mounted for raising and lowering the jack head, said toggle members being arranged with the actuating blocks mounted off center or between the ends of selected pairs of the toggle members while the stabilizing links are each mounted with one end connected to a projecting end of one of the toggle members on which the actuating blocks are supported while the other end of the stabilizing link is pivotally connected to another of said block supporting toggle members at a point intermediate the ends thereof.

It will furthermore be understood that various other details of construction may be varied through a wide range without departing from the principles of this invention, and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. A lazy tongs jack device comprising a base, a jack head, a pair of lower lazy tongs members pivotally connected to the base, a pair of upper lazy tongs members pivotally connected to the jack head, an operating block connected to one of the lower lazy tongs members intermediate the ends thereof and pivotally connected to one end of one of the upper lazy tongs members, a second block connected to the second upper lazy tongs member intermediate the ends thereof and to one end of the second lower lazy tongs member, a driven member co-acting with said blocks, driving means for operating the driven member to move the blocks toward one another to actuate the lazy tongs members to raise the jack head, a release mechanism, and an operating means for only shifting the driving means to cause the same to operate the release mechanism to cause

separation of the blocks and gradual lowering of the lower and upper lazy tongs members to lower the jack head.

2. A lazy tongs jack device comprising a base, a jack head, a pair of lower lazy tongs members pivotally connected to the base, a pair of upper lazy tongs members pivotally connected to the jack head, an operating block connected to one of the lower lazy tongs members intermediate the ends thereof and to one end of one of the upper lazy tongs members, an upper stabilizing link connected to one end of the lower lazy tongs members to which the block is connected and having the other end connected to the second of said upper lazy tongs members intermediate the ends thereof, a second operating block connected to the second of said upper lazy tongs members between the ends thereof and to one end of the second of said lower lazy tongs members, a lower stabilizing link having one end connected to one end of the second of said upper lazy tongs members and the other end pivotally connected between the ends of the first of said lower lazy tongs members, a driven member supported by the blocks, a driving means for actuating the driven member to move the blocks toward one another to cause raising of the jack head, and a release mechanism operable by the driving means to cause lowering of the jack head.

3. A lazy tongs jack device comprising a base, a jack head, a pair of lower lazy tongs members pivotally connected to the base, a pair of upper lazy tongs members pivotally connected to the jack head, an operating block connected to one of the lower lazy tongs members intermediate the ends thereof and to one end of one of the upper lazy tongs members, an upper stabilizing link connected to one end of the lower lazy tongs members to which the block is connected and having the other end connected to the second of said upper lazy tongs members intermediate the ends thereof, a second operating block connected to the second of said upper lazy tongs members between the ends thereof and to one end of the second of said lower lazy tongs members, a lower stabilizing link having one end connected to one end of the second of said upper lazy tongs members and the other end pivotally connected between the ends of the first of said lower tongs members, a driven member supported by the blocks, hydraulic means for actuating the driven means to cause the blocks to be moved toward one another to raise the jack head, a shaft member, a control handle device for rotating the shaft member to operate the hydraulic means, and a hydraulic release mechanism operable to cause release of the hydraulic means and lowering of the jack head when the control handle is actuated to shift the shaft member into engagement with the release mechanism.

4. A lazy tongs jack device comprising a jack head. a base, crossed toggle members connecting the head and base, operating blocks connected to opposite pairs of the toggle members between the ends thereof, stabilizing links having one end of each thereof connected to an end of one of the toggle members and the other end connected intermediate the ends of an opposite toggle member, hydraulic means for operating the blocks to cause raising of the jack head, a crank shaft, operating means for rotating the crank shaft to cause operation of the hydraulic means and elevation of the jack head, a hydraulic release mechanism connected with the hydraulic means, and a control carried on the crank shaft

for operating the hydraulic release mechanism to cause lowering of the jack head when the crank shaft is shifted by the operating means.

5. A hydraulic jack mechanism comprising crossed toggle members, a jack head supported thereon, guards carried thereby, a block member supported on two of said toggle members intermediate the ends thereof, a piston rod connected with said block member, a piston on said rod, a hydraulic cylinder enclosing the piston, a second block member on the hydraulic cylinder and connected to two other toggle members intermediate the ends thereof, a fluid housing connected to the hydraulic cylinder, pipe connections between the hydraulic cylinder and the fluid housing a plurality of fluid pump mechanisms in the housing, a fluid intake and outlet valve for each of the pump mechanisms, a fluid release valve unit in the housing, a control shaft rotatably and shiftably mounted in the housing, crank members on the control shaft for alternately operating the pump mechanisms to cause fluid to be pumped into the hydraulic cylinder to operate the piston and piston rod to cause movement of said block members toward one another to raise the jack head, a control disk mounted on the control shaft within the housing, a spring on said control shaft engaging said control disk to hold the control shaft in its innermost position to position the cranks in operating engagement with the pump mechanisms, a coupling unit connected with a projecting end of the control shaft, and a crank handle removably engaged in the coupling unit and adapted to be rotated to cause rotation of the control shaft and the crank members to pump fluid into the hydraulic cylinder to actuate the piston and piston rod to raise the jack head, said crank handle adapted to be pulled to shift the control shaft against the action of the spring to cause the control disk to operate the release valve mechanism to permit return of the fluid from the hydraulic cylinder back into the fluid housing and permit gradual lowering of the jack head.

6. In a scissors type jack including a base, a lifting head, crossed lazy tongs members supporting the head on the base, operating means connected with diagonally opposite upper and lower lazy tongs members intermediate the ends thereof and leaving one projecting end of each of said selected lazy tongs members free, and stabilizing links pivotally connected to the free projecting ends of said selected lazy tongs members and to points intermediate the ends of said selected lazy tongs members.

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