Feb. 24, 1953 J. O. STEPHENSON ET AL 2,629,582

HYDRAULIC LIFT MECHANISM

Filed Oct. 15, 1948 4 Sheets-Sheet 1

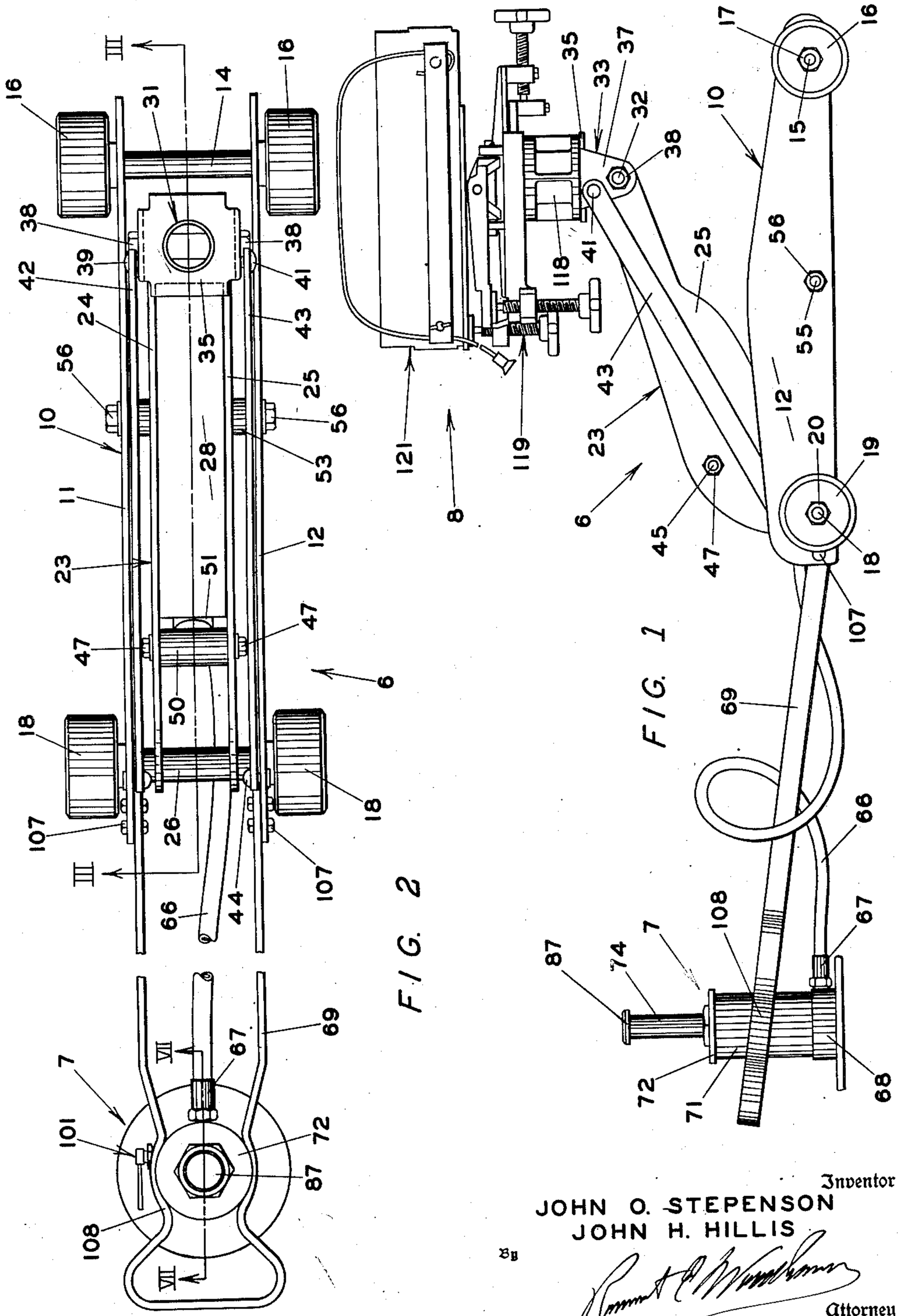

FIG. 2

FIG. 1

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HYDRAULIC LIFT MECHANISM

Filed Oct. 15, 1948 4 Sheets-Sheet 2

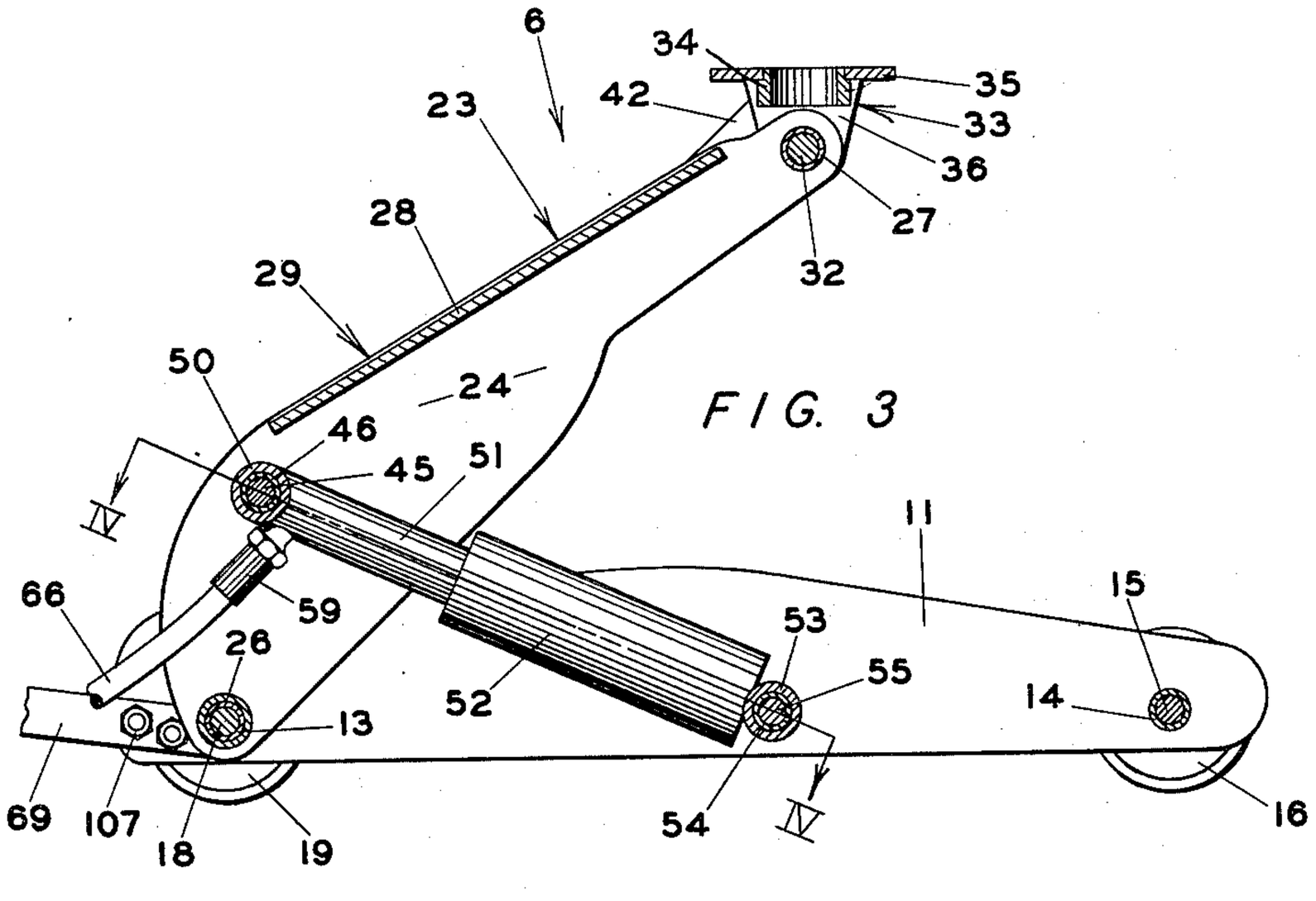

FIG. 3

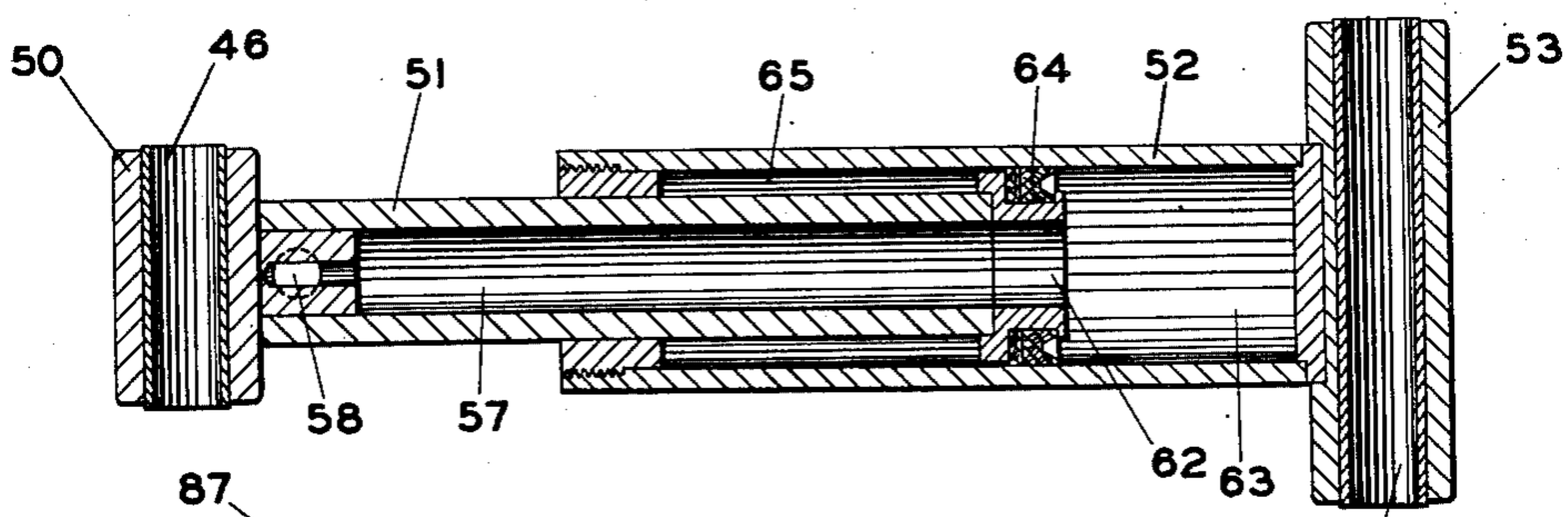

FIG. 4

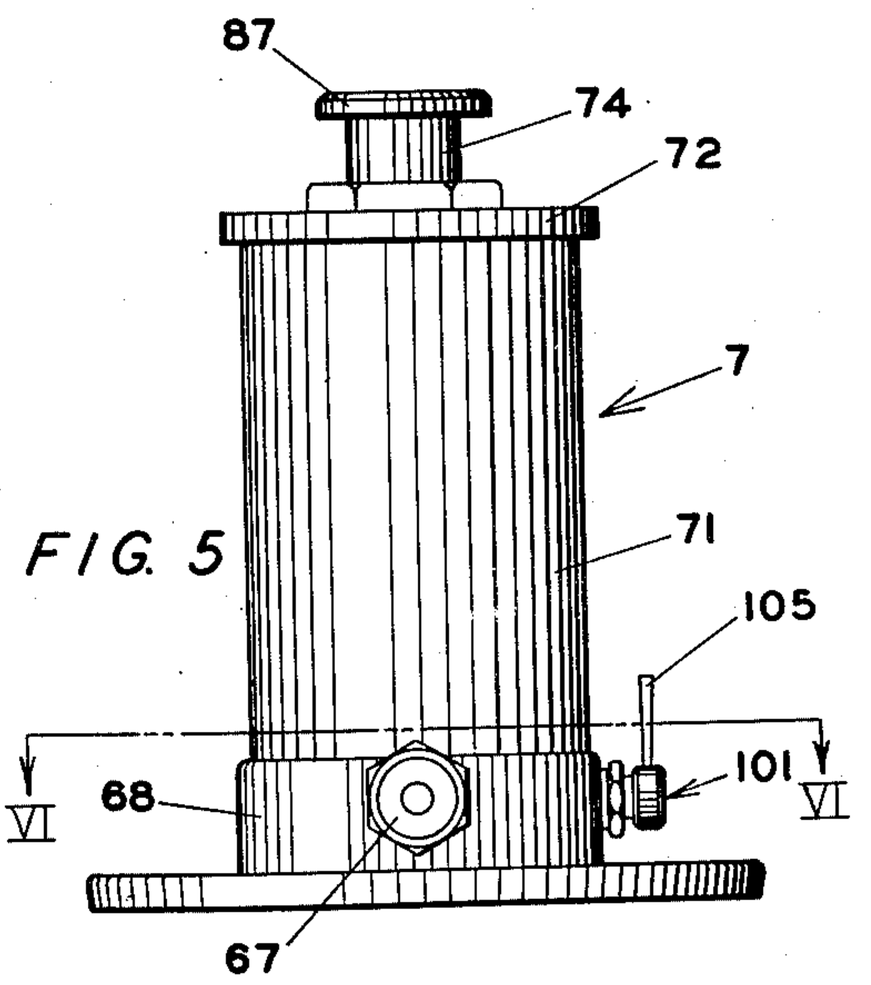

FIG. 5

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HYDRAULIC LIFT MECHANISM

Filed Oct. 15, 1948 4 Sheets-Sheet 3

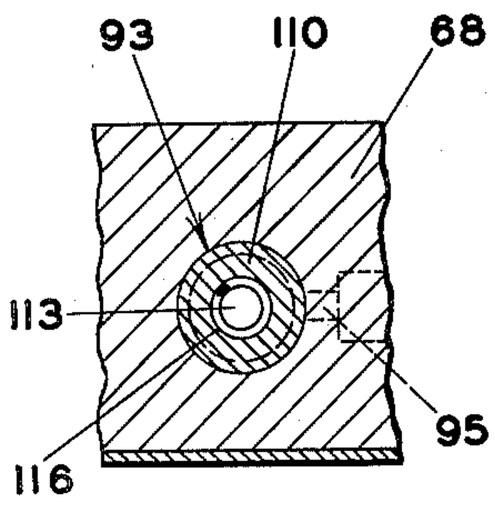

FIG. 9

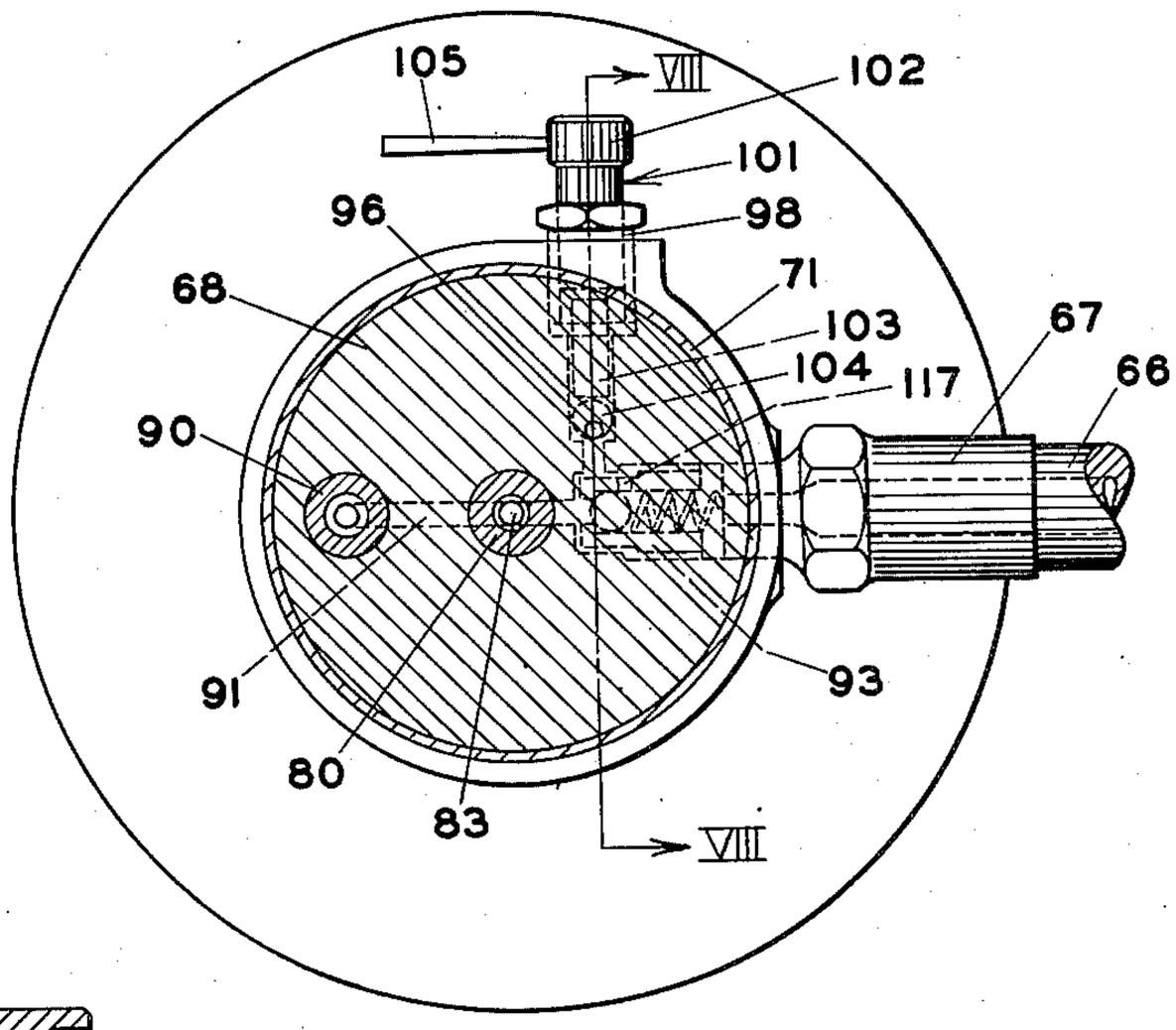

FIG. 6

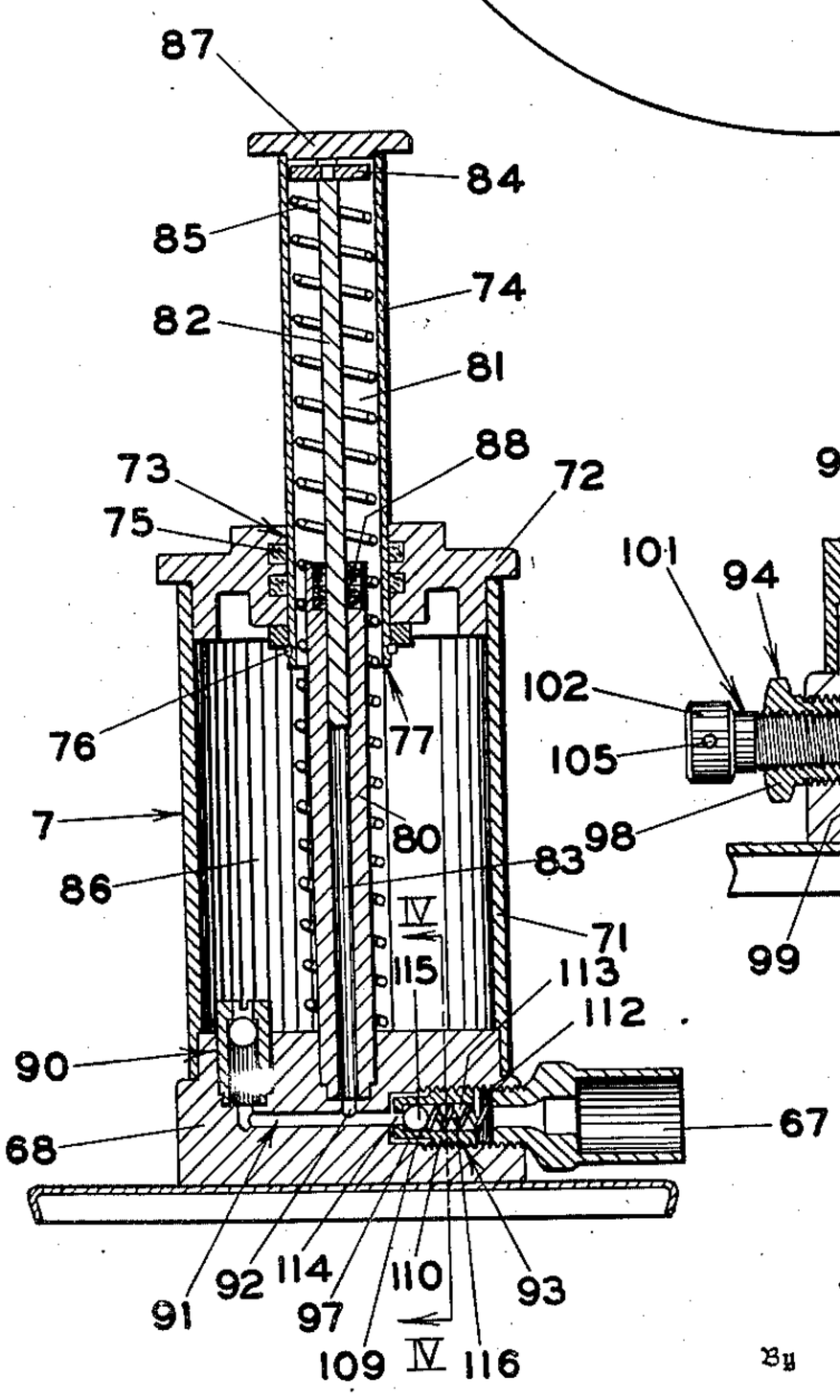

FIG. 7

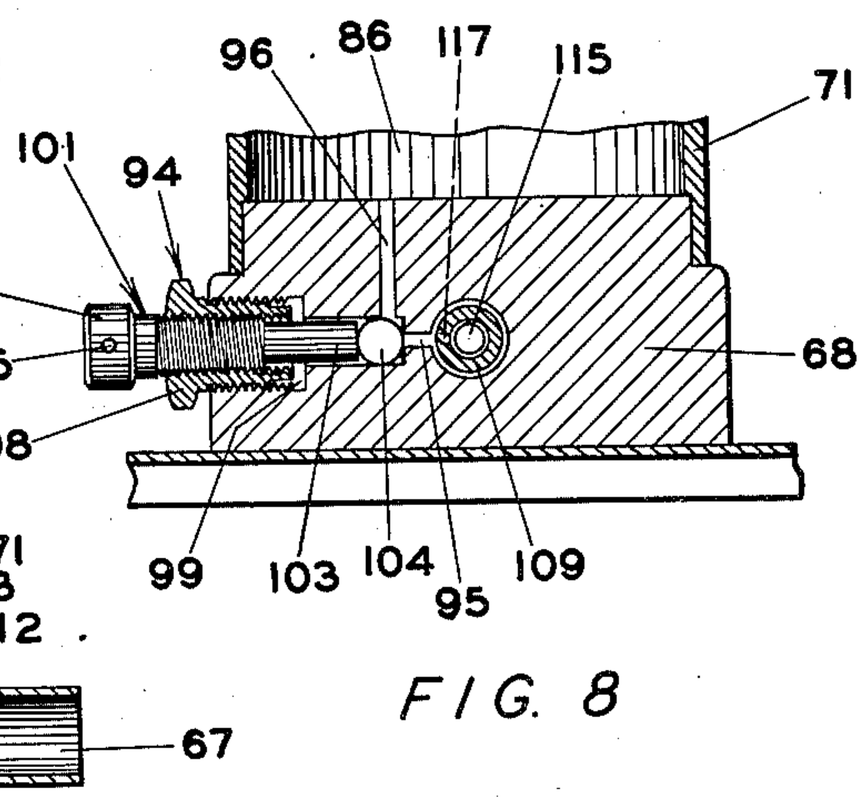

FIG. 8

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HYDRAULIC LIFT MECHANISM

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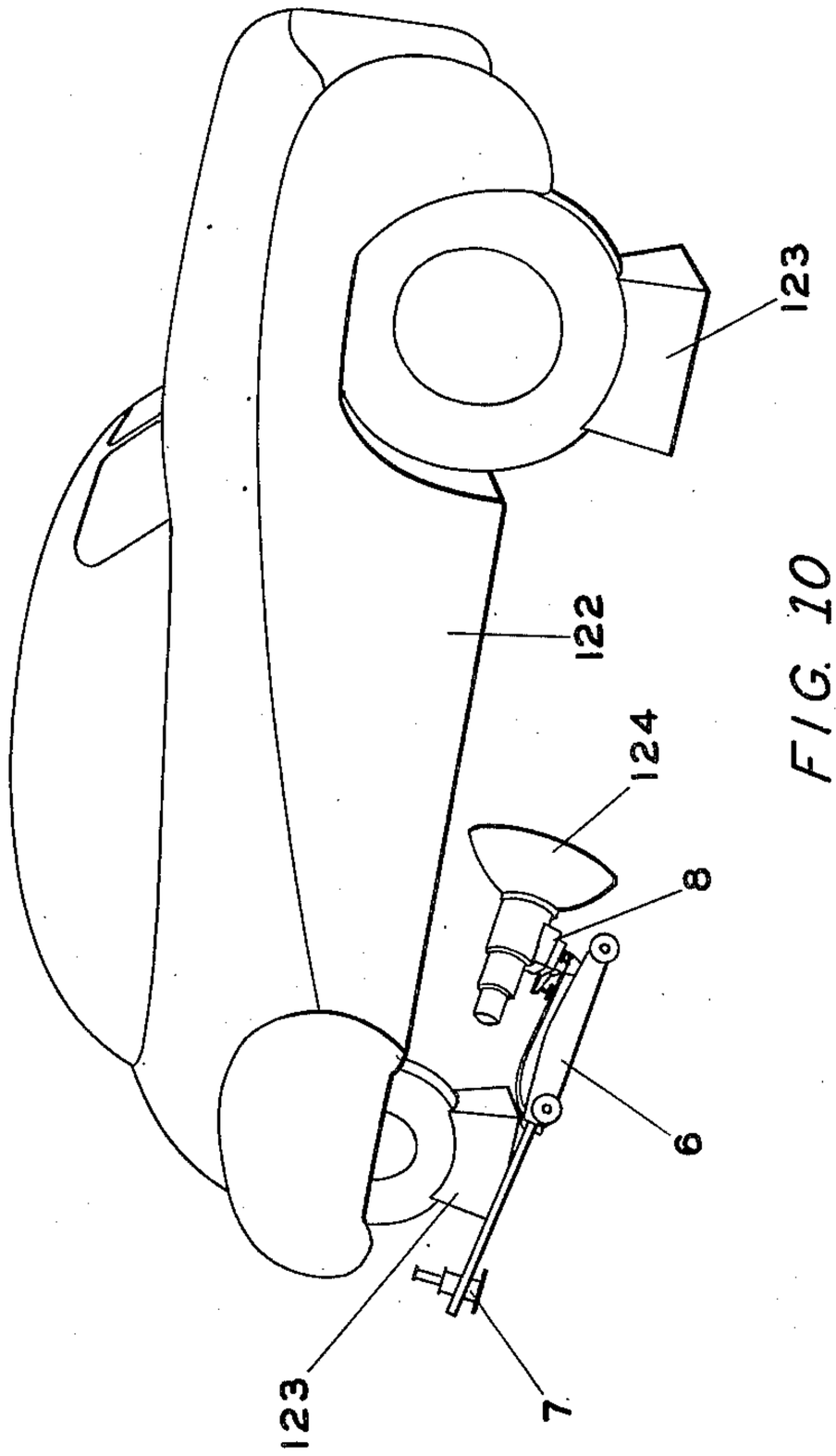

FIG. 10

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UNITED STATES PATENT OFFICE

2,629,582

HYDRAULIC LIFT MECHANISM

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Application October 15, 1948, Serial No. 54,684

5 Claims. (Cl. 254—8)

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This invention relates in general to a hydraulic lift mechanism and more specifically to a type thereof having a foot actuated hydraulic pump and an adjustable gripping device for engaging and supporting parts of a motor vehicle.

It has been observed by persons familiar with the repair of motor vehicles that the removal of certain parts of said vehicles, such as hydraulic, or other heavy, transmissions and heavy differentials, requires expensive, complicated equipment and at least two workmen. Furthermore, in order to use such present types of equipment for removing said parts, it is often necessary to disassemble other portions of the vehicle, which have nothing to do with the part to be removed, in order to gain working access to the said part.

Further, with present equipment it often happens that a workman can, or must, place part or all of his body underneath the part being handled during the adjustment thereof, and since these parts occasionally slip from their supporting means the danger of injury to the workman and to the part is material.

Therefore, the need becomes apparent for a means whereby such cumbersome parts may be easily and safely removed from a vehicle by one workman, and by which he may do so without dismantling other non-associated portions of the vehicle to gain working access to said part.

Accordingly, a principal object of this invention is the provision of a hydraulic lift mechanism having a movable, adjustable gripping means for engaging and supporting certain cumbersome parts, such as hydraulic, or other heavy, transmissions and heavy differentials, of a motor vehicle.

A further object of this invention is the provision of a hydraulic lift mechanism as aforesaid by means of which one workman can easily and safely remove said cumbersome parts from a vehicle without dismantling other portions of said vehicle in order to gain working access to said cumbersome parts and without danger of injury either to the part or to himself.

A further object of this invention is the provision of a means for removing said cumbersome parts more easily and safely than said complicated equipment presently in use, and which means is far less expensive to manufacture and use.

Other objects and purposes of this invention will become apparent to persons familiar with this type of equipment upon referring to the accompanying drawings and upon reading the following specification.

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In meeting those objects and purposes mentioned above as well as others incidental thereto and associated therewith, I have provided a hydraulically actuated lift mechanism comprised of a hydraulic lifting element having a long narrow chassis which is supported at both ends by appropriate wheeled means, and to one end of which is attached a suitable handle. A cantilever lift arm, which is pivotally supported at one of its ends upon said chassis, is provided at its other end with a removable, adjustable gripping means which is automatically held upright throughout all positions of normal operation. Said lift arm is raised by means of a hydraulic cylinder extending between said lift arm and said chassis. A hydraulic pump for actuating said cylinder is connected thereto by a flexible hose and may be removably supported within said handle during transport of the device.

For convenience in description, the lifting device is disclosed in connection with a hydraulic transmission but it will be understood that it may also be used with other heavy parts, including differentials and mechanical transmissions.

For one preferred embodiment of the invention, attention is directed to the drawings in which:

Figure 1 is a side elevation view of the hydraulic lift mechanism and pump to which this invention relates.

Figure 2 is a broken, top plan view of the hydraulic jack and pump.

Figure 3 is a fragmentary, sectional view of Figure 2 without the hydraulic pump.

Figure 4 is a sectional view of the hydraulic cylinder shown in Figure 3 taken along the line IV—IV.

Figure 5 is a side-elevation view of the hydraulic pump with the piston in the depressed or down position.

Figure 6 is a sectional view of Figure 5 taken along the line VI—VI.

Figure 7 is a sectional view of the hydraulic pump in Figure 2 taken along the line VII—VII.

Figure 8 is a sectional view of Figure 6 taken along the line VIII—VIII.

Figure 9 is a sectional view taken on the line IX—IX of Figure 7.

Figure 10 shows a transmission supported upon said lift mechanism, which is being withdrawn from beneath a vehicle.

General construction

The hydraulic lift mechanism shown in Figure 1 is comprised of a hydraulic lifting element 6,

for convenience hereinafter sometimes termed a "jack," a hydraulic pump 7 for operating the lifting element 6, and an adjustable gripping means 8 removably mounted upon said lifting element. The construction of the lifting element, the pump and the gripping means will be disclosed individually hereinafter.

For the purposes of convenience in description, the terms "front" or "forward" will be understood to refer to the leftward end of the lift mechanism as appearing in Figure 1, and "rear" or "rearward" will be understood to refer to the rightward end of the lift mechanism as appearing in Figure 1. The terms "upper" and "lower," or "upwardly" and "downwardly" shall be understood to refer to the lift mechanism or parts thereof when positioned and/or operating in its normal manner of use.

The lifting element

As shown in the Figures 1, 2 and 3, the hydraulic lifting element 6 is comprised of a chassis 10 having a pair of identical chassis side plates 11 and 12 which are preferably made from steel plate of appropriate thickness, and which are substantially longer than wide. Said side plates are held in parallel, spaced relationship with respect to each other by means of a forward tubular member 13 and rearward tubular member 14 (Figs. 2 and 3). The two tubular members communicate at their opposite ends with suitable openings in said side plates 11 and 12 near opposite ends thereof, and are secured thereto by welding, brazing or other suitable means.

The rearward tubular member 14 rotatably supports a rear axle 15 whose opposite ends preferably extend beyond said side plates 11 and 12. A pair of wheels 16 may be attached to said opposite ends in a conventional manner by means of the nuts 17 (Figure 1). In a similar manner the forward tubular member 13 rotatably supports a forward axle 18, to the opposite ends of which a pair of wheels 19 may be attached by means of the nuts 20. The axles 15 and 18 may be of any convenient size and material, but are preferably fabricated from steel shafting.

The lift arm 23 (Figures 2 and 3) is comprised of a pair of substantially identical lift side plates 24 and 25 which are held in parallel, spaced relationship with respect to each other by means of the tubular lift bearing 26, the tubular head bearing 27, and the lift arm brace plate 28. The lift side plates 24 and 25, which are substantially longer than wide and wider at one end than the other, are preferably made from steel plate of appropriate thickness. The brace plate 28, which is substantially longer than wide and is also preferably made from steel plate, is secured along its longitudinal edges perpendicularly to said lift side plates 24 and 25 along corresponding edges thereof. The said brace plate 28 is advantageously of such width that the lift arm 23 is receivable within and between the chassis side plates 11 and 12 of the chassis 10.

The wide ends of the lift side plates 24 and 25 are provided with aligned openings through which the tubular lift bearing 26 is snugly received. The narrow ends of the said side plates also have a pair of aligned openings through which the tubular head bearing 27 is snugly received. The said bearings, which are preferably parallel, extend beyond the outer, or non-adjacent, surfaces of the lift side plates 24 and 25 and are secured thereto by any suitable means such as by welding or brazing.

The lift bearing 26 is rotatably sleeved upon the forward tubular member 13 so that an operating clearance, only, remains between the extremities of said bearing and the inner, or opposed, side walls of the chassis side sheets 11 and 12. Such arrangement positively ensures the centering of the lift arm 23 between the said chassis side plates.

The tubular head bearing 27 rotatably supports a head shaft 32 whose opposite ends extend out of said head bearing, and upon which the lift head 33 is rotatably supported. Said lift head, (Figures 1, 2 and 3) which may be fabricated from steel plate, has a head platform 35 and a pair of parallel, platform support legs 36 and 37 depending from and secured to opposite edges of the platform 35. The support legs 36 and 37 have a pair of aligned openings adjacent to their lower extremities through which the head shaft 32 extends for threaded association with a pair of head shaft nuts 38.

The platform 35 of the lift head 33 is provided with a circular opening 31 approximately at its center into which a cylindrical head bushing 34 is received. The upper edge of said bushing is preferably flush with the top surface of the platform 35 whereas the lower edge of the bushing may extend substantially below said platform.

Another pair of aligned openings are provided in the support legs 36 and 37 so that a pair of coaxial pivot rods 39 and 41 (Figure 2) fixedly supported therein will lie substantially between the head shaft 32 and the platform 35, and parallel therewith. The rods 39 and 41 extend beyond the remote surfaces of the legs 36 and 37, respectively, for pivotal engagement by the upper ends of a pair of head erecting bars 42 and 43, respectively. The lower end of said bar 43, whose upper end is pivotally supported upon the rod 41, is pivotally supported, as by means of a rivet 44, upon the forward end of the chassis side plate 12 adjacent to the lift plate 25. The axis of the said rivet 44 is in the same relative position with respect to the axis of the axle 18 as the axis of the rod 41 is with respect to the axis of the head shaft 32. Therefore, the bar 43, the lift side plate 25, the leg 37 and the chassis side plate 12 combine to create a movable parallelogram whereby the lift head 33 will be continuously held erect throughout all positions of normal operation of the lift arm 23.

The lower end of said bar 42, whose upper end is pivotally supported upon the rod 39, is pivotally supported upon the forward end of the side sheet 11 in the same manner and in the same relative position as the bar 43. The purpose and operation of the bar 42 are the same as those of the bar 43 and therefore will not be described in further detail. Sufficient space is allowed between the side plates 24 and 25, and the side plates 11 and 12, respectively, to prevent interference with the bars 42 and 43, when the lift arm 23 is in its collapsed position and telescoped within the chassis 10.

A piston support shaft 45 is snugly received through and extends beyond suitable, aligned openings in the lift side plates 24 and 25 intermediate the longitudinal extremities thereof. A bushing 46 (Figures 3 and 4) is sleeved upon said shaft 45 between the side plates 24 and 25 so that said lift side plates will bear against the extremities thereof when the piston support shaft nuts 47 (Figure 2) are tightened upon the threaded ends of piston support shaft 45.

The tubular piston bearing 50, which is pref-

erably slightly shorter than the bushing 46 and rotatably supported thereon, is secured to the free end of the hydraulic piston 51 (Figures 3 and 4) by any suitable means such as welding or brazing. The hydraulic cylinder 52, with which said piston 51 is operably associated, is secured at its end remcte from the piston, as by welding or brazing, to a cylinder support bearing 53. The bearing 53 is rotatably supported upon a slightly longer bushing 54 which is in turn supported on a cylinder support shaft 55. A pair of suitable aligned openings are provided in the chassis side plates 11 and 12 through which the said shaft 55 may extend for threaded engagement by the cylinder shaft nuts 56 which, when tightened, bring the chassis side plates 11 and 12 to bear against the opposite extremities of the bushing 54.

The hydraulic piston 51 and cylinder 52 may be of any convenient, conventional type. However, in this particular embodiment of the invention (Figure 4), the piston 51 has a hollow chamber 57 with an inlet opening 58 near the free or outer end thereof into which an appropriate hose connection 59 may be securely fixed. The inner end of the piston 51 is provided with an outlet opening 62, communicating with the cylindrical chamber 63 of the cylinder 52, and a liquid tight seal 64 which positively prevents the passage of hydraulic fluid into that portion 65 of the chamber 63 between the piston 51 and the cylinder 52. Inasmuch as hydraulic seals and means for making hydraulic pistons and cylinders are well known in the art, further description of the construction of the piston and cylinder will be omitted.

A flexible hose 66 (Figures 1 and 2) of any conventional type, such as reinforced rubber, and usually longer than the hereinafter described jack handle 69, may be used between the hose connection 59 on the piston 51 and a similar hose connection fixture 67, secured to the circular pump base 68 of the hydraulic pump 7, which is illustrated in Figures 5 through 9.

The hydraulic pump

The hydraulic pump 7 (Figures 5 and 7) is comprised of a cylindrical casing 71 which is secured at its lower end, by means such as welding, to the pump base 68. A circular casing cap 72 may be threadedly or otherwise secured to the upper end of said cylindrical casing 71, and is provided with a suitable concentric vertical opening 73. A hollow plunger 74 is slidably held within said opening 73 and suitable, conventional packing seals 75 in said opening prevent the passage of hydraulic fluid between the cap 72 and the plunger 74. An appropriate retaining ring 76, which is secured to the inner end 77 of said plunger 74, engages the lower side of the cap 72 when the plunger is moved to its uppermost position thereby preventing the accidental removal of said plunger from the opening 73.

A pressure cylinder 80, which is coaxial with the cylindrical casing 71 and the plunger 74, is seated at its lower end in the pump base 68 in any convenient manner, such as threadedly. The cylinder 80 extends upwardly into the hollow chamber 81 within the plunger 74 and terminates about midway between the upper and lower surfaces of the casing cap 72.

A piston pin 82 is snugly and slidably received within the coaxial opening 83 extending the full length of said pressure cylinder 80. To the upper end of the said pin 82 is affixed a disk 84 against

which the upper extremity of the piston spring 85 bears. The lower end of the spring 85, which is sleeved upon the pressure cylinder 80 and around the piston pin 82 within the hollow chamber 81 of the plunger 74, bears against the base 68. Sufficient clearance is allowed between the outer wall of the pressure cylinder 80 and the inner wall of the hollow plunger 74 to permit smooth reciprocal movement of the plunger 74 over both the pressure cylinder and the spring 85 sleeved thereon.

The piston spring 85 yieldingly urges the piston pin 82 against the top 87 of the plunger and thereby causes both the plunger 74 and the piston pin 82 to remain at rest in an extended position. Any suitable, conventional sealing means 88 is provided within the upper end of the pressure cylinder 80 to prevent the upward escape of hydraulic fluid between the piston pin 82 and the pressure cylinder 80.

The disk 84 is preferably slightly smaller than the inside diameter of the hollow plunger so that said plunger 74 is permitted some lateral movement without effecting the alignment of the piston pin 82 with respect to the pressure cylinder 80.

A conventional, vertical outlet valve, such as the spring loaded, ball and socket valve 90 (Figures 6 and 7), which provides a fluid outlet from the reservoir 86 and is seated in the pump base 68, communicates with one end of a horizontal passageway 91 which passageway passes diametrically through a substantial portion of said base 68. The opening 83 in the pressure cylinder 80 communicates at its lower end with said passageway 91 by means of the vertical canal 92 in the base 68. That end of the passageway 91 remote from said valve 90 opens into a relatively larger, coaxial threaded outlet valve opening 112 in one side of the base 68. A horizontally disposed, spring loaded outlet valve 93, having a valve body 110, is threadedly held within said threaded opening 112. That end portion 109 of said valve body 110 adjacent to the passageway 91 is of less diameter than the internal diameter of the adjacent portion of the threaded opening 112 thereby providing an annular chamber 97 between said body end 109 and the side walls of said opening 112.

The valve body 110 has a cylindrical, coaxial ball chamber 113 which is open at that end of said body remote from said end portion 109 and contains a conventional ball valve 115 backed by a valve spring 116. The closed end of said chamber 113 is provided with a passageway 114 which is coaxial with the ball chamber 113 and communicates with said passageway 91. The ball 115 is normally seated in that end of the passageway 114 opening into the chamber 113 in a conventional manner. That end of the ball spring 116 remote from the ball 115 bears against the inner end of the hose connection 67 which threadedly engages the opening 112. The valve 93 provides an outlet through which hydraulic fluid may flow from the pressure cylinder 80 through the hose connection 677 and the flexible hose 66 to the hydraulic piston 51.

An inlet opening 117 is provided through the side wall of the end portion 109 of the valve body 110 thereby permitting hydraulic fluid to flow freely from the ball chamber 113 to the annular chamber 97. The hydraulic fluid is, however, prevented from passing from the said annular chamber 97 between the inner end of the valve body 110 and the base 68 directly to the passageways 91 and 114, thereby preventing bypassing of the outlet valve 93. Thus, when the pis-

ton pin **82** is raised with the fluid reservoir **86** full of a hydraulic fluid, the reservoir outlet valve **90** is opened and the base outlet valve **92** is held closed. When the piston pin **82** is depressed, the base valve **93** is opened and the reservoir valve **90** is held closed.

A cylindrical return valve opening **99**, (Figure 8) containing a fluid return valve **94**, is preferably positioned in the pump base **68** so that its axis extends horizontally toward the inner end of the ball chamber **113** and is substantially perpendicular to the axis thereof. A horizontal return passageway **95** connects the annular chamber **97** with the return valve opening **99**, and a vertical return passageway **96** connects said return valve opening **99** with said fluid reservoir **86**.

The inlet valve **94** may be comprised of an internally and externally threaded sleeve **98** threadedly secured within said return valve valve opening **99**. A partially threaded valve pin **101**, which is threadedly held within the sleeve **98** has an outer end **102** extending through the sleeve **98** and beyond the base **68**. The inner end **103** of the pin **101** engages a ball valve **104**, which ball may be caused to seal the entrance of the horizontal return pasage **95** into the valve opening **99** by appropriate rotation of the pin **101**. A bar **105** secured to the outer end **102** of the pin **101** facilitates rotation of the pin **101** for the purpose of opening or closing the return passage **95**.

A substantially U-shaped hande **69** (Figures 1, 2 and 3) may be rigidly secured at its adjacent extremities to the forward ends of the chassis side plates **11** and **12** by any suitable means such as the bolts **107**. However, said handle may also be flexibly or pivotally secured to the chassis **10** without departing from the scope of the invention if suitable stops are provided to limit its pivotal motion. Said handle **69**, which is preferably fabricated from steel bar stock, has a contoured portion **108** remote from said chassis **10** within which the pump **7** may be securely but removably engaged and gripped around its casing **71**. The hande **106** is affixed to the chassis side plates **11** and **12** at such an angle with respect to the horizontal that its contoured portion **108** will hold the pump **7** in operative position when the jack **6** is in operating position.

The adjustable gripping device **8** (Figure 1), which may be of any convenient type, is here comprised in general of a swivel post **118**, a positioning unit **119** and a gripping fixture **121**. The gripping device **8** is mounted upon the platform **35** of the lift head **33** by means of the swivel post **118** which is pivotally and removably supported within the head bushing **34**. Of course, the gripping device may be fixed rigidly to the lifting arm and the swiveling function obtained by replacing the wheels herein shown by swiveled casters. Since a complete description of the construction and operation of the particular device **8** herein illustrated may be found in our copending application entitled "Transmission Gripping Device" and filed concurrently herewith, now Patent No. 2,523,734 further details thereof will be omited and reference made thereto.

Operation

Under normal conditions the hydraulic lift mechanism, to which this invention relates, is pushed or pulled about by means of the handle **69**. While the lift mechanism is in transit the

pump **7** is conveniently held and carried within the contoured portion **108** of the handle **69**.

When the lift mechanism has been properly positioned under the vehicle transmission, or other object to be raised or lowered, the pump **7** may be removed from the handle **69** or may be operated while still held within said handle, depending upon safety and/or convenience in the the particular case. The adjustable gripping device **8** is appropriately adjusted and secured to the object to be supported by the lift mechanism, which mechanism is then ready for operation.

The inlet valve **94** is closed by appropriate rotation of the valve pin **101** so that hydraulic fluid cannot pass from the hose **66** through the return passages **95** and **96** to the fluid reservoir **86**. The pump **7** is now set to raise the lift arm **23** by actuating the plunger **74**. When the plunger **74**, which may be actuated either by hand or by foot, is depressed against the compression of the spring **85**, the piston pin **82** is also moved downwardly thereby displacing hydraulic fluid from the pressure cylinder opening **83** through the canal **92**, the passageway **91**, the outlet valve **93** and the flexible hose **66** into the hollow chamber **57** of the hydraulic piston **51**. The flow of hydraulic fluid into the hollow chambers **57** and **63** of the piston **51** and cylinder **52**, respectively, effects an outward movement of the piston **51** from within the chamber **63** in a conventional manner. Since the cylinder is secured to the body member **10** and the piston is secured to the lift arm **23**, such outward movement of the piston with respect to the cylinder effects an upward or lifting movement of the lift arm **23** (Figure 3). Inasmuch as the operation of a conventional hydraulic piston, such as embodied herein, is well known to the art, further description thereof will be omitted.

When the depressed plunger **74** is released, the spring **85** effects an upward movement of both the piston pin **82** within the opening **83** and the plunger **74** by bearing against the disk **84**. Such upward movement of the pin **82** opens the outlet valve **90** and draws hydraulic fluid out of the reservoir **86** through the valve **90**, the passageway **91**, the vertical canal **92** and into the opening **83** in the pressure cylinder **80**. The horizontal valve **93** is held closed during the upward movement of the piston pin **82** by the back pressure of hydraulic fluid in the hose **66**, the spring **116** and the suction of the piston pin **82**, thereby preventing the return of the hydraulic fluid which recently passed therethrough on its way to the hydraulic piston **51**.

When the plunger **74** is again depressed, the fluid is again forced out of the pressure cylinder opening **83** through the passageway **91**, the horizontal valve **93**, and the hose **66** in the same manner and with the same effects as recited above. This cycle may be repeated, by depressing the plunger **74** and allowing the spring **85** to return the plunger to its extended position, until the lift arm **23** has been raised, by the corresponding extension of the hydraulic piston, to the position desired or required.

The head platform **35** of the lift head **33** is constantly held in a horizontal position during the raising of the lift arm **23** by means of the head erecting bars **42** and **43**, as hereinbefore described.

In order to lower the lift arm **23**, the inlet valve **94** is opened by rotating the pin **101** in a direction opposite to that which closed the said valve, thereby permitting the ball **104** to recede from the opening of the passage **95**. The hy-

draulic fluid is then permitted to flow out of the hydraulic piston through the hose 66, the ball chamber 113, the inlet opening 117, the annular chamber 97, the passage 95, the passage 96, and into the fluid reservoir 86, (Figures 3, 6, 7, 8 and 9). The rate of release is controlled by the amount of rotation of the pin 101.

The upper extremity of the piston pin 82 is held in contact with the top 87 of the hollow plunger 74 by means of the coiled spring 85, but said piston is not secured to said plunger in any way. Thus, the plunger 74 is permitted a reasonable amount of lateral movement, which usually developes in a foot operated implement, without destroying the alignment of the piston pin 82 within the pressure cylinder 80.

By providing a hose 66 of substantial length the pump may be operated at a like distance from the rest of the hydraulic jack 6, thereby increasing the safety of the lift mechanism and enabling its effective use under objects which would otherwise be inaccessible with present types of lift mechanisms.

In one preferred application (Figure 10) of the hydraulic lift mechanism to which this invention relates, the adjustable gripping device 8 may be removed from the lift head 33 so that the pump 7 and jack 6 may be used to raise one side of a vehicle such as a passenger car 122. Blocks 123 may then be placed under the wheels on the raised side of the car and the jack lowered and removed. The device 8 is then placed upon the lift head again and the entire lift mechanism is run under the car to engage and support any heavy part, such as a hydraulic transmission 124, which must be removed from the car for repair or replacement. The lift mechanism holds the transmission, which is selected in this description for illustrative purposes only, firmly in place with respect to the car while said transmission is being disconnected from said car. Then the lift arm 23 is lowered, as hereinbefore described, and the transmission is rolled out from under the car. If, as is sometimes the case, the transmission is too large to be drawn straight out from under the car, the entire lift mechanism can be tilted upon its rear wheels (Figure 10) to accomplish the removal. This is made possible by causing the adapter to actually grip the transmission.

The lift mechanism may also be used to return a new or repaired transmission 124 to its proper position under the car and hold the transmission in place while it is being connected to the car. When the part is properly secured in place, the lift arm is again lowered and the lift mechanism removed. The jack and pump may then be used to lower the car off of the blocks. Thus, the entire job of removing heavy parts, such as said transmission, from a motor vehicle may be accomplished easily and safely by one workman and our hydraulic lift mechanism.

Although the above mentioned drawings and description apply to one particular, preferred embodiment of the invention, it is not my intention, implied or otherwise, to eliminate other variations or modifications which do not depart from the scope of the invention unless specifically stated to the contrary in the hereinafter appended claims.

We claim:

1. In a hydraulic lift mechanism, the combination comprising: a wheeled carriage including a pair of substantially parallel side plates and combined spacer and wheel supporting means extending therebetween; an elongated cantilever

arm pivotally supported at one end upon one of said wheel supporting means between said plates near one end of said carriage; said arm having lift means at its free end a hydraulic cylinder pivotally affixed to said plates at a point spaced from said one end of said carriage and operatively associated with a piston, said piston being pivotally affixed to said cantilever arm intermediate its opposite ends; actuating means including a cylindrical reservoir, a pump cylinder concentrically housed within said reservoir and operable from a reciprocable plunger, said plunger being operable along the axis thereof with a power stroke and a spring urged return stroke, passageway and valve means operatively connecting said pump and reservoir; a substantially U-shaped handle rigidly affixed at each of its free ends to each of said side plates, respectively, said handle having a curved portion remote from said free ends releasably supporting said cylindrical reservoir, said handle being affixed to said side plates at such an angle with respect to a horizontal surface supporting said carriage that said actuating means may contact said surface while being gripped by said curved portion; and means including a flexible hose substantially longer than said handle operatively connecting said pump and said hydraulic cylinder.

2. A hydraulic lift mechanism comprising in combination: a wheeled carriage; an elongated cantilever arm supported at one end upon said carriage and having at the other end thereof, means adapted to receive article engaging means; a hydraulic cylinder and associated piston for raising the free end of said arm with respect to said carriage; actuating means including a cylindrical fluid reservoir and a hydraulic, foot operable pump concentrically housed within said reservoir; a generally U-shaped handle including a pair of spaced resilient members the free ends of which are fixedly supported upon said carriage and having offset portions near to the closed ends of said U-shaped handle for yieldably and releasably supporting said cylindrical reservoir; and a flexible hose connecting said actuating means to said hydraulic cylinder, said hose being longer than said handle.

3. In a hydraulic lift mechanism, the combination comprising: a wheeled carriage including a pair of substantially parallel side plates; an elongated cantilever arm pivotally supported at one end upon said carriage near one end thereof; a hydraulic cylinder pivotally affixed to said plates at a point remote from the point at which said cantilever arm is supported on said carriage, said hydraulic cylinder being operatively associated with a piston and said piston being pivotally fixed to said cantilever arm at a point spaced from its point of fixing to the carriage; actuating means including a reservoir, a pump cylinder within said reservoir and operable from a reciprocable plunger, said plunger being operable along the axis thereof with a power stroke and a spring return stroke, passageway and valve means operatively connecting said pump and said reservoir; a substantially U-shaped handle rigidly affixed at each of its free ends to each of said side plates, respectively, said handle having curved portions remote from said free ends releasably supporting said cylindrical reservoir and said handle being rigidly affixed to said side plates at such an angle with respect to a horizontal surface supporting said carriage that said cylindrical actuating means may contact said surface while being gripped by said curved por-

tions; and means including a flexible hose operatively connecting said pump and said hydraulic cylinder.

4. In a hydraulic lift mechanism, the combination comprising: a wheeled carriage including a pair of substantially parallel side plates; an elongated cantilever arm pivotally supported at one end upon said carriage; a hydraulic cylinder pivotally affixed to said plates at a point spaced from the point at which said cantilever arm is supported on said carriage, said hydraulic cylinder being operatively associated with a piston and said piston being pivotally fixed to said cantilever arm at a point spaced from its point of fixing to the carriage; actuating means including a reservoir, a pump cylinder operable from a reciprocable plunger, passageway and valve means operatively connecting said pump and said reservoir; a substantially U-shaped handle rigidly affixed at each of its free ends to each of said side plates, respectively, said handle having portions remote from said free ends releasably supporting said cylindrical reservoir and said handle being rigidly affixed to said side plates at such an angle with respect to a horizontal surface supporting said carriage that said cylindrical actuating means may contact said surface while being gripped by said curved portions; and means including a flexible hose operatively connecting said pump and said hydraulic cylinder.

5. In a hydraulic lift mechanism, the combination comprising: a wheeled carriage including a pair of substantially parallel side plates; an elongated cantilever arm pivotally supported at one end upon said carriage near one end thereof; a hydraulic cylinder pivotally affixed to said plates at a point remote from the point at which said cantiliver arm is supported on said carriage,

said hydraulic cylinder being operatively associated with a piston and said piston being pivotally fixed to said cantilever arm at a point spaced from its point of fixing to the carriage; actuating means including a reservoir, a pump cylinder within said reservoir and operable from a reciprocable plunger, said plunger being operable along the axis thereof with a power stroke and a spring return stroke, passageway and valve means operatively connecting said pump and said reservoir; a substantially U-shaped handle including a pair of spaced resilient members the free ends of which are rigidly supported upon said carriage, and the parallel arms of which have offset portions near the closed end of said U of said U-shaped handle for yieldingably and releasably supporting said cylindrical reservoir; and means including a flexible hose operatively connecting said pump and said hydraulic cylinder.

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