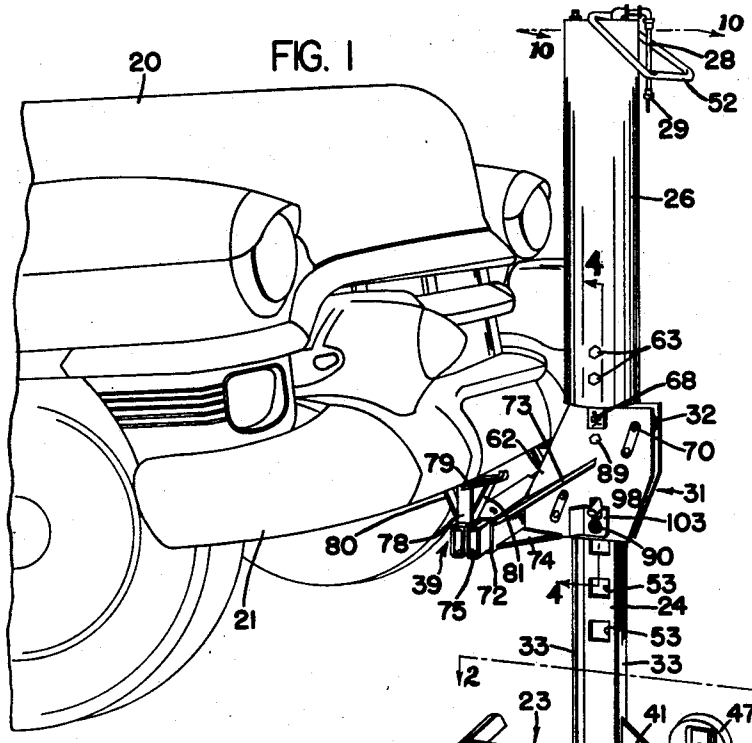
May 17, 1960 P. I. SCHULTZ 2,937,002

PNEUMATIC BUMPER JACK

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FIG. 1



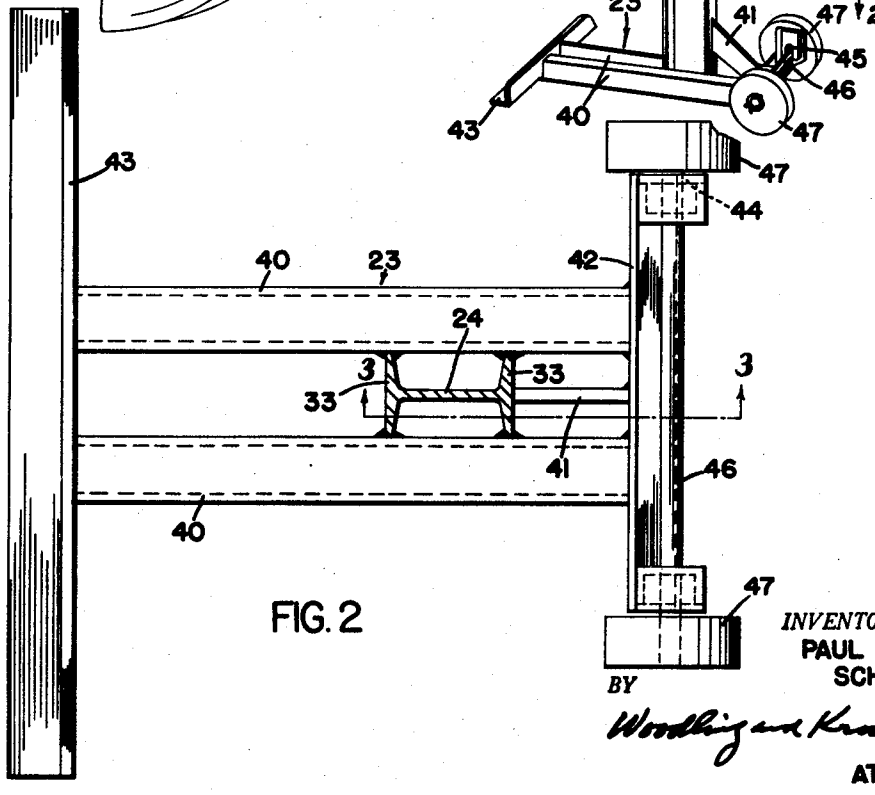


FIG. 2

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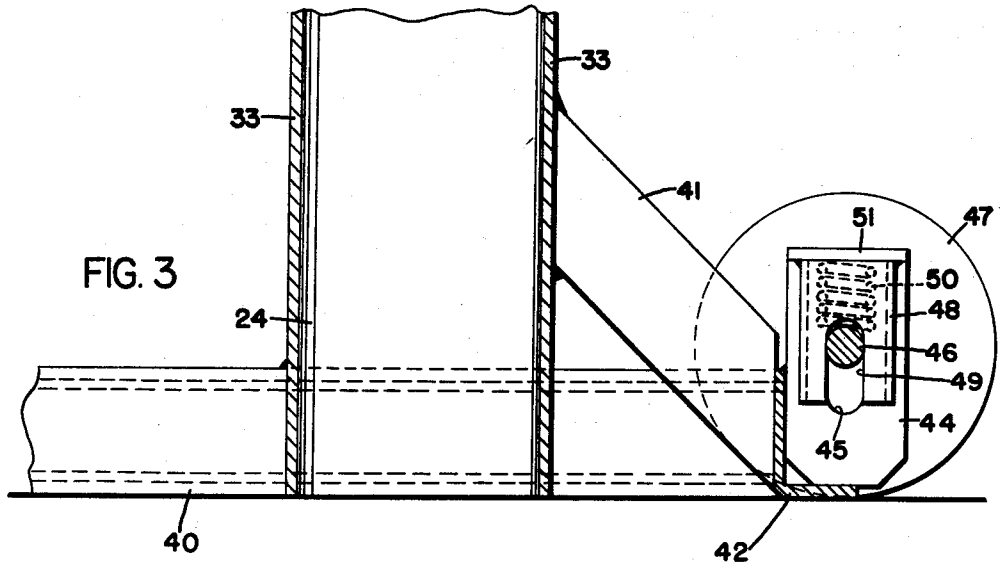


FIG. 3

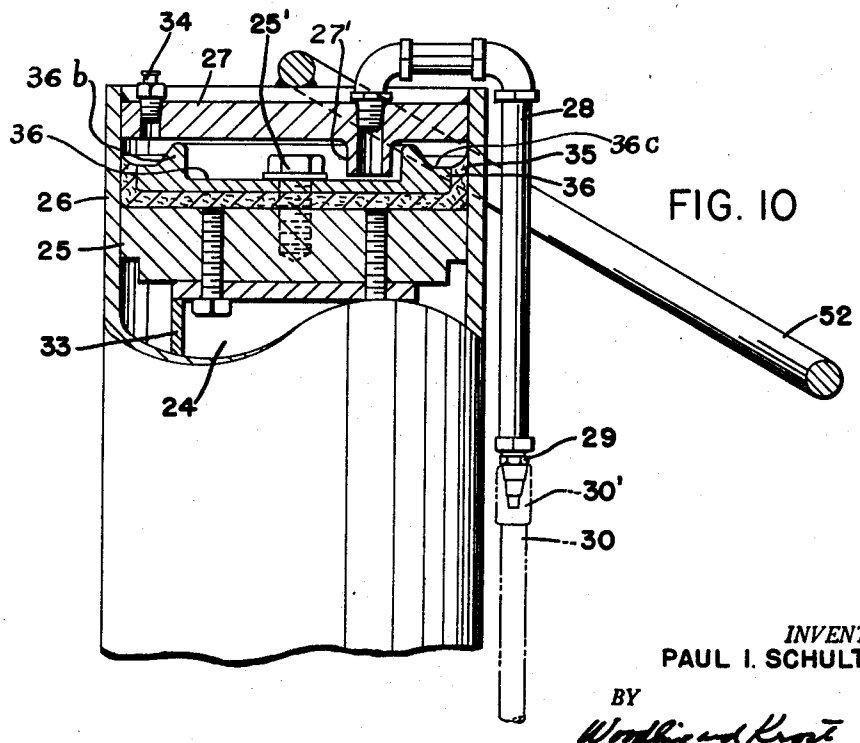


FIG. 10

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FIG. 6

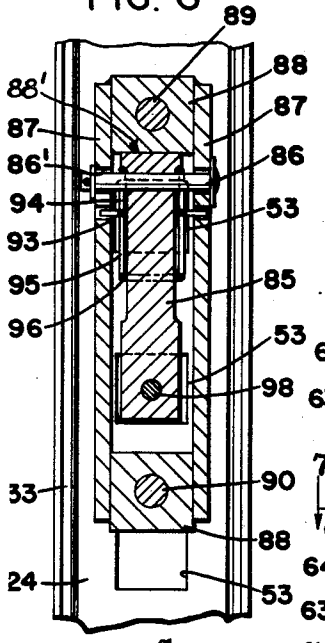


FIG. 4

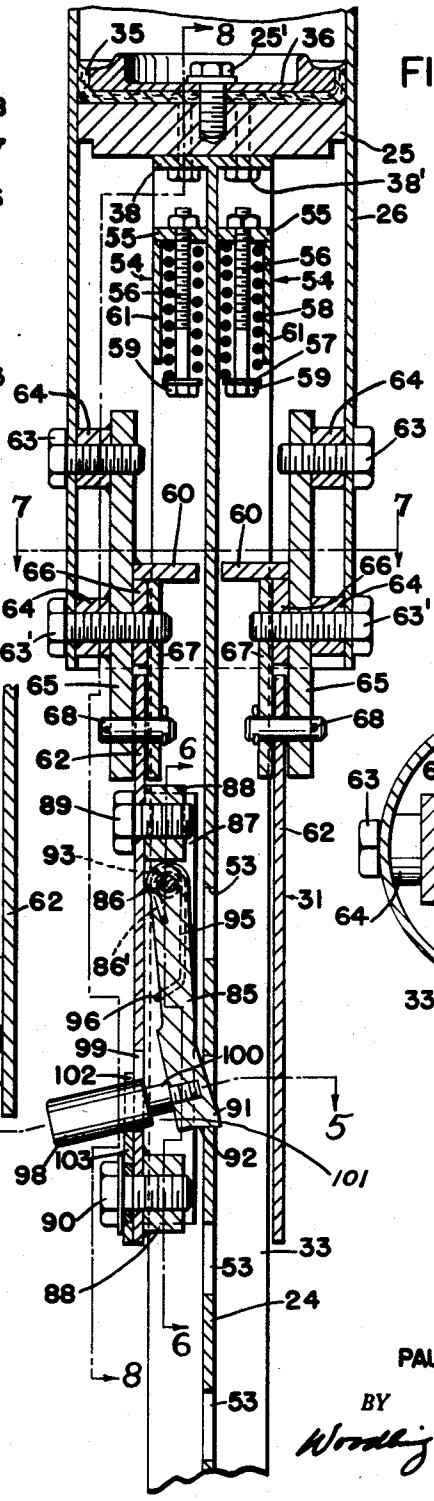
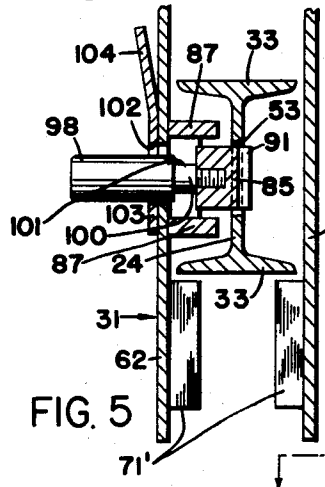


FIG. 5



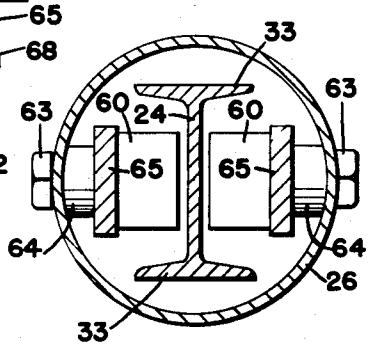


FIG. 7

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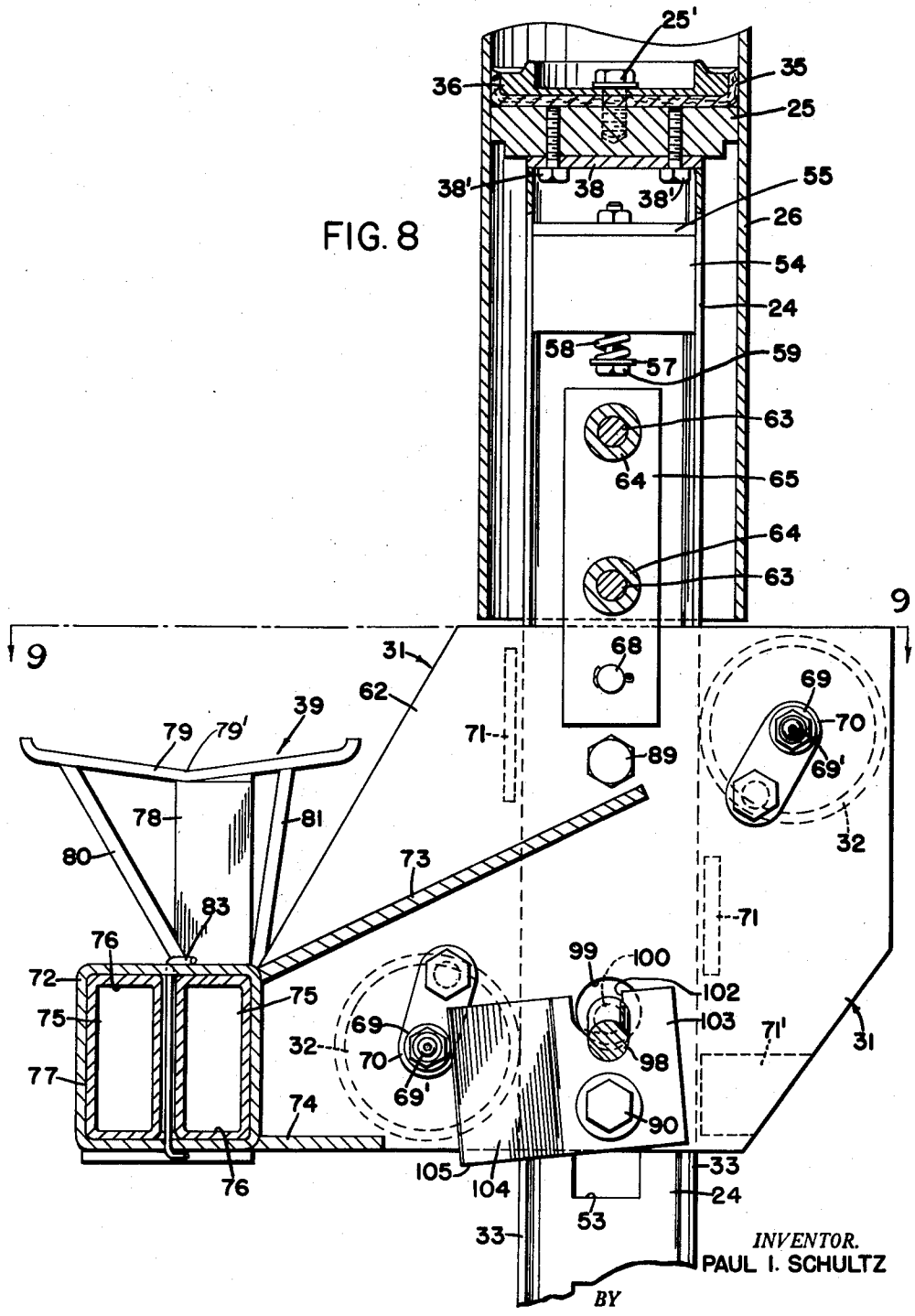
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FIG. 8



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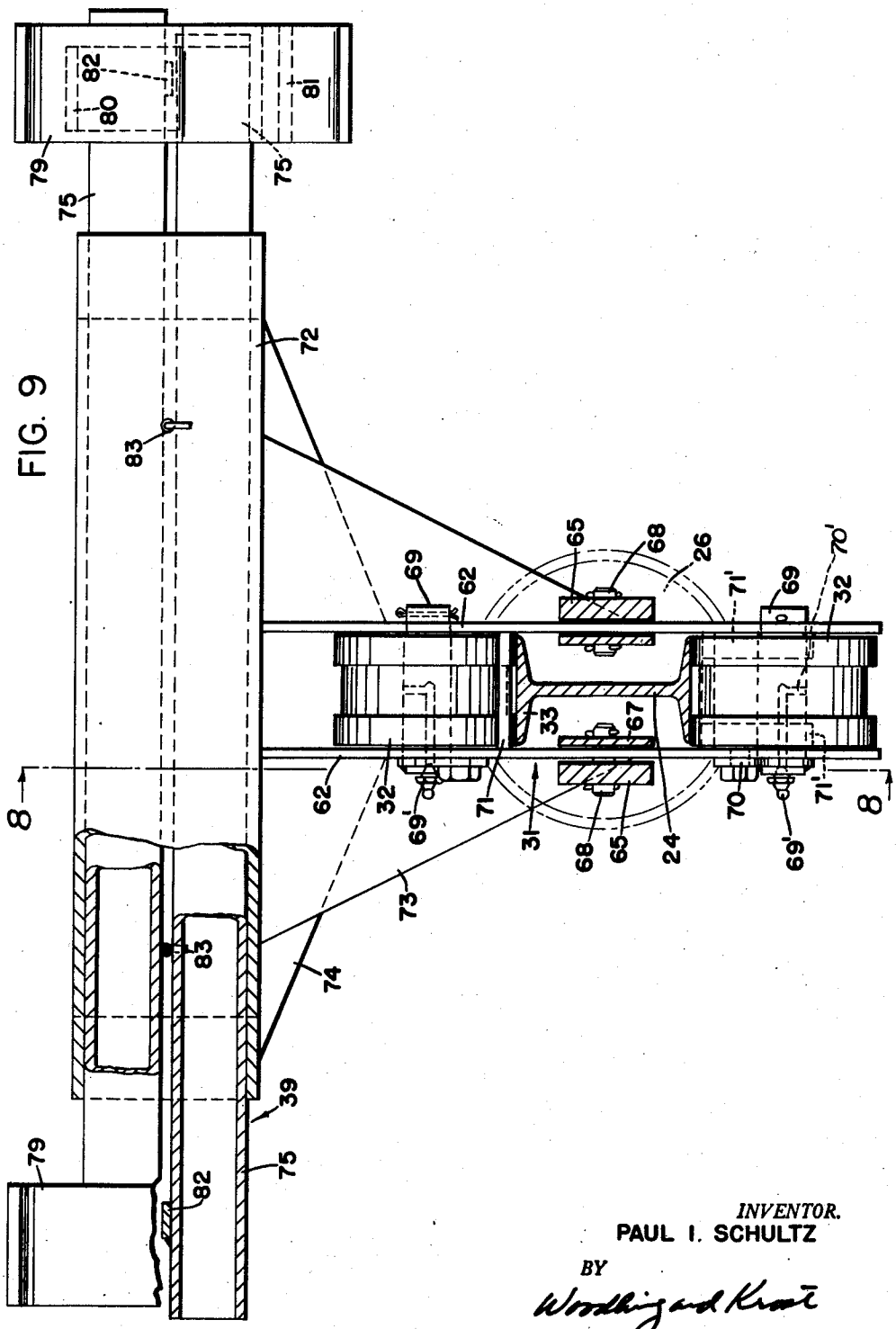
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FIG. 9



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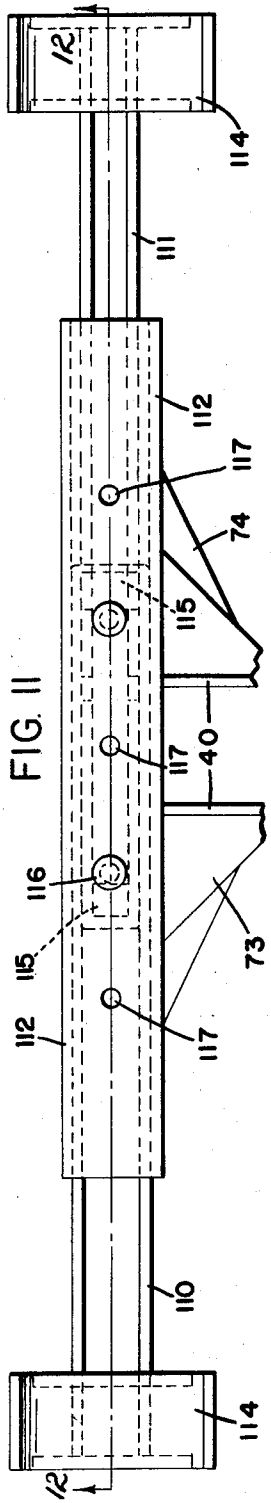


FIG. 11

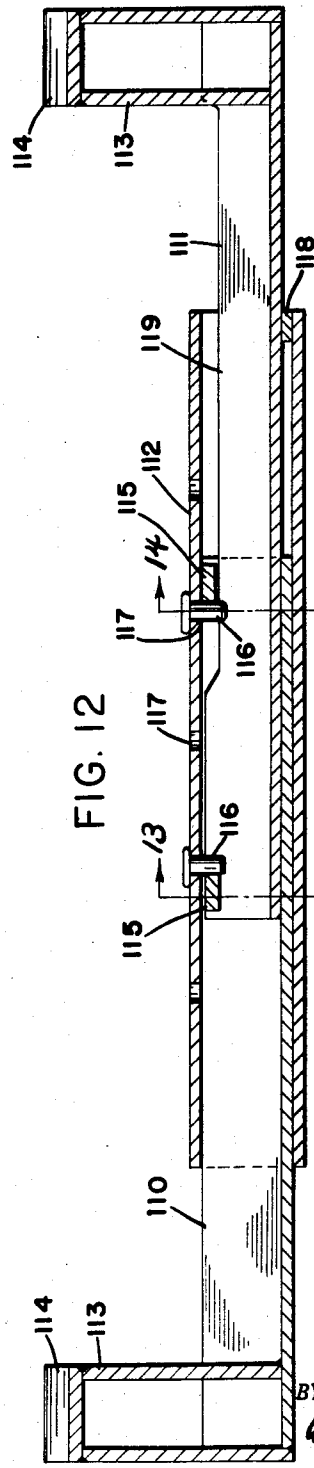


FIG. 12

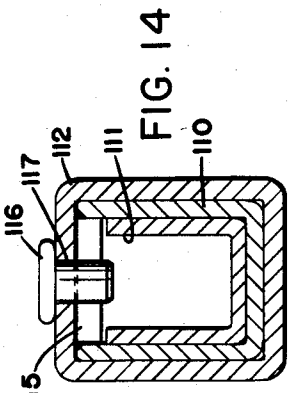


FIG. 14

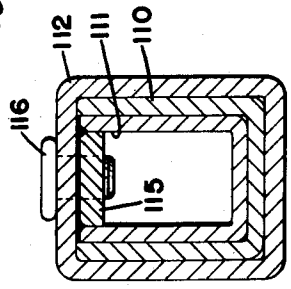


FIG. 13

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FIG. 16

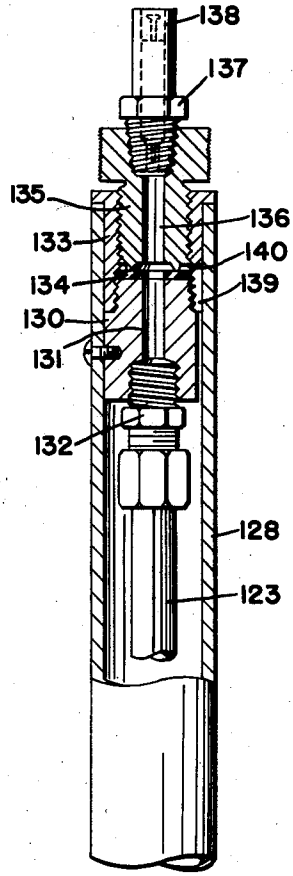


FIG. 15

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United States Patent Office 2,937,002 Patented May 17, 1960

2,937,002

PNEUMATIC BUMPER JACK

Paul I. Schultz, Cleveland, Ohio

Application October 13, 1953, Serial No. 385,844

3 Claims. (Cl. 254—93)

This invention relates to vehicle bumper jacks of the type employed in garages to roll beneath an end of a vehicle to raise and lower the same by air pressure.

An important object of the invention is the provision of positive and sturdy interlock means between relatively movable ground engaging and load bearing elevating members which will reliably lock the load bearing member and vehicle safely in elevated positions and will not endanger operators working beneath the vehicle or subject the vehicle to damage by accidental falling due to failure of air pressure or other causes.

Another important object is the provision of an improved ground engaging carriage for the jack which can be easily wheeled to its place of use and maneuvered into engagement with a vehicle, after which a load imposed thereon will cause the carriage frame to move down into engagement with the ground to relieve the wheel axle of the load and transfer the load entirely to the carriage frame.

Still another important object is to provide a jack with a vertically movable air operated cylinder which bears the load of the vehicle and moves with the load so as not to scratch or mar it during changes in its elevation.

A further object is the provision of a free floating cylinder which has off-center loading, in combination with means to prevent angling of the cylinder in spite of its off-center loading.

A further object is to provide a concealed and protected positive mechanical ratchet mechanism for reliably locking the load engaging element of the jack in elevated positions and which automatically ratchets during elevation of the load engaging element; and which must be manually moved to a non-ratcheting position when the element is to be lowered, at which time a latch comes into play to releasably hold the ratchet mechanism in unlocked and non-ratcheting position during lowering of the jack; and upon bottoming, the latch automatically releases the ratchet to ratcheting operation.

A still further object is to provide a jack with a pair of laterally extensible lifting arms arranged side by side and provided at their opposite ends with bumper engaging crotches which are offset toward the adjacent lifting arm to align the crotches transversely of the jack and square them with the forward edge of the jack base.

Another object is to provide the jack with a strong and sturdy construction properly engineered to distribute the loads imposed upon the jack to parts amply able to sustain such loads.

A further object is to provide the jack with convenient means for attaching an air hose for elevating the jack, venting the jack of air pressure to lower, to relieve it of water of condensation, and to lubricate its moving parts.

Other objects and a fuller understanding of this invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of the jack showing it in use in the elevation of the front end of a vehicle;

Figure 2 is an enlarged transverse section taken on the line 2—2 of Figure 1;

Figure 3 is an enlarged vertical section taken on the line 3—3 of Figure 2, showing the wheels raised and the jack frame bottomed on the ground under a load;

Figure 4 is an enlarged vertical section of the jack taken on the line 4—4 of Figure 1;

Figure 5 is a transverse section taken on the line 5—5 of Figure 4;

Figure 6 is a vertical section taken on the line 6—6 of Figure 4;

Figure 7 is a transverse section taken on the line 7—7 of Figure 4;

Figure 8 is a vertical section taken on the line 8—8 of Figure 4, but with the latch shown in position holding the pawl disengaged from the ratchet;

Figure 9 is a horizontal section taken on the line 9—9 of Figure 8, with parts of the lifting arms broken away to illustrate the construction thereof;

Figure 10 is an enlarged side elevation of the top of the jack cylinder with a section thereof broken away to illustrate the interior construction;

Figure 11 is an enlarged top plan of a modified form of the extensible lifting arms of the jack;

Figure 12 is a longitudinal section of the same;

Figure 13 is a transverse section taken on the line 13—13 of Figure 12;

Figure 14 is a similar section taken on the line 14—14 of Figure 12;

Figure 15 is an enlarged vertical section of a modified form of the jack with a different form of air pressure transmission to the jack; and

Figure 16 is an enlarged vertical section taken on the line 16—16 of Figure 15.

Referring now to the details of the construction of the improved jack, the numeral 20 designates an elevated front end of an automobile having a front bumper 21, under which is engaged the jack of this invention. However, other underparts of the automobile may also be engaged by the jack for elevation as is well understood. It is also to be understood that a jack may be engaged with each front and rear bumper to elevate the entire vehicle and lift all four wheels above the ground to facilitate work beneath the car. When the entire vehicle or either end thereof is so elevated, it is essential that positive safety means be provided to prevent tipping or failure of the jack and accidental falling of the vehicle upon workmen therebeneath. Thus, an extremely stable base frame or carriage is required as well as one which can be easily wheeled to and from its place of use, and also a positive mechanical means other than air pressure is required for locking the jack in elevated positions. It is also essential to provide a jack which requires minimum physical effort, is easily handled and operated by the attendant and one which he knows is safe both to himself while servicing the car and safe in protecting his customer's car against damage by falling.

The jack comprises essentially a stable base frame or carriage 23 to which is secured a stationary vertical piston stem in the form of a post or I-beam 24 having a circular piston head 25 at its upper end to slidably mount an air-operated cylinder 26. This cylinder has a closed upper end 27 with a tapped opening to receive one end of a rigid air pipe 28 which extends laterally and vertically downward along side the cyilnder for a short distance to terminate in an air hose nipple 29 to which the conventional tire inflating air hose 30 with a tire valve chuck 30′ may be connected to admit air up to about two hundred pounds p.s.i. above the top of the stationary piston head 25 to elevate the cylinder 26 relative thereto. This top 27 is also tapped to receive a lubricant fitting 34 disposed in position directly above a groove 36c covering the edge of a

piston head leather or seal 35 to receive lubricant therein from this fitting. This fitting 34 is provided with a valve to retain air pressure within the cylinder, and this valve can be opened by hand or by the pressure of the lubricant to enter lubricant into the groove 36c. The sealing cup or leather 35 is held on the piston head by a plate 36 and screw 25' as shown, and the plate has a central well or depression 36a into which a ported extension 27' of the cylinder top extends when the cylinder is in its lowermost position, as shown in Figure 10. When water of condensation collects in the well or depression 36a and the cylinder 26 is lowered, the extension 27' will be lowered into this depression to reach or dip into the surface of the accumulated water of condensation and the air being exhausted through the pipe 28 will suck this water up through the extension 27' and into air pipe 28 and nipple 29 to discharge it to the atmosphere. The depression 36a is formed in the piston head by an annular flange 36b which together with the cylinder walls and the extended edge of the cup seal 35, provides the annular groove 36c for retaining a quantity of lubricating oil dropped from the fitting 34 separated from the water of condensation to lubricate the seal and the walls of the piston and cylinder.

The upper end of the cylinder 26 is positioned by the piston head 25 and is free to float thereon, while the bottom open end of the cylinder is located by a pair of rollers 32 arranged to engage the opposed flanges 33 of the piston I-beam 24. These rollers are carried by a housing or caboose 31 which in effect, is what may be termed a floating or swiveled extension of the cylinder 26. This caboose is pivotally or swivelly suspended from the cylinder by a pair of pins 68, as will be later described. Since the load of a vehicle is supported by vehicle engaging means 39 on the caboose at one side of the cylinder, the caboose or housing 31 will be caused thereby to tilt or swivel on the pins 68 without tilting or cocking the cylinder from its plane, since the upper back roller 32 is forced against the back side of the piston beam 24 and the front lower roller 32 is forced against the front side of the beam 24. When these rollers thus contact the beam, the caboose and cylinder are precluded against lateral or tilting movement; and thus, there is no side thrust on the cylinder or piston head as would otherwise be caused by the off-center loading of the caboose by the vehicle load which it raises. Thus, there is never any side thrust on the cylinder to cause wear on the piston head or its sealing means 35.

A plate 38 is welded to the top of the I-beam piston 24, and the piston head 25 is secured thereto by screws 38'. The housing or caboose 31 carries vehicle engaging means 39 which of course move up and down with the cylinder to raise and lower the vehicle. It will be apparent that when the chuck 30' of air hose 30 is held on the nipple 29 and air enters the upper end of the cylinder 26, pressure will build up above the piston head 25 to elevate the cylinder and lifting means 39; and when the hose is disconnected, air will exhaust through the pipe 28 to the atmosphere and allow the cylinder to descend with its load. In cases where the nipple 29 is provided with an outwardly closing tire valve, the chuck 30' of the air hose 30 may be detached from the nipple when the cylinder is elevated, and this valve will automatically close to retain air pressure in the cylinder. To lower the cylinder, the valve in the nipple is manually opened.

The base frame carriage 23 is composed of a pair of parallel side box section or channel bars 40 spaced apart the width of the two flanges 33 of the I-beam 24 to be welded or otherwise secured to the bottom thereof. The piston post or beam 24 is arranged perpendicular to the bars near their rear ends, as shown in Figures 1 and 2, and a vertical gusset brace 41 is welded to the rear flange 33 of the piston beam and to the center of a vertical flange of a rear transverse angle bar 42 which is also welded to the rear ends of the side bars 40. A front transverse angle bar 43, considerably longer than bar 42 for lateral stabilization of the jack, has its vertical flange welded to the forward ends of the two side bars 40 at right angles thereto. The horizontal flanges of the front and rear parallel bars 42 and 43 are arranged in the same plane as the bottoms of the side bars 40, whereby the entire frame 23 can rest solidly upon the ground when a load is placed upon the jack. The open angle of the rear bar, as shown in Figure 3, faces rearwardly to have welded therein, at opposite ends, axle bearing plates 44, each of which has an upwardly opening axle receiving slot 45 to receive the ends of an axle 46 carrying wheels 47 at the ends thereof beyond the ends of the rear bar 42. In assembling, after the axle is dropped into the slots 45, a channel element 48, having a downwardly opening slot 49 in its web portion aligned with the slot 45 to receive the axle 46 is dropped over the axle and has its flanges welded to its respective plate 44; thus forming a boxed-in axle bearing having a slot with closed ends in which the axle can move up and down. A spring 50 is confined within each box bearing to bear upon the top of the axle 46 and against a plate 51 welded or otherwise secured to the top edges of the plate 44 and element 48, and these springs have sufficient tension to support the axle 46 near the bottoms of the slots 45 where the peripheries of the wheels 47 will normally be disposed below the frame 23 to engage the ground to raise the rear end of this frame above the ground and thus support the weight of the jack for easy trundling until a load is placed thereon. This arrangement causes the wheels 47 to support the side bars 40 and base frame 23 in a forwardly inclined position, as shown in Figure 15, to rest upon the forward bar 43 with the rear bar 42 elevated above the ground, whereby the jack can be more readily and easily jockeyed into proper engaging and lifting position beneath a bumper. When the jack is to be wheeled to a car, it can be tilted back upon the wheels 47 by placing a foot against the axle 46 and pulling back upon a U-shaped handle or loop 52 having one end welded to the closed top of the cylinder 26 and its other bight end projecting rearwardly of the jack to provide a handle, as shown in Figure 1. Thus, the entire jack is tilted rearwardly to impose its entire weight upon the wheels whereby it can be easily wheeled to the car to be elevated. However, when a load is imposed upon the jack, as when it elevates a car, such load will cause the springs 50 to yield, whereby the rear bar 42 and the entire frame 23 will be forced by the imposed load down upon the ground to form a solid non-skidable contact therewith, as the slotted bearing plates 44 and rear bar 42 move downwardly to take the load off of the axle and wheels 47. Thus, the entire load is shifted onto the base frame 23 causing the entire length of the side bars 40 to rest solidly upon the ground.

The stationary piston post or I-beam 24 has a portion of its web provided with a series of vertically spaced square openings 53 to form ratchet teeth. This beam adjacent its upper end and on opposite sides of its web and between the flanges thereof has a pair of spring stops 54 secured thereto to yieldingly retard the upward travel of the cylinder 26. Each stop includes a top plate 55 having an opening for slidably mounting a plunger or bolt 56 having a lower washer 57 and head 59 against which a spring 58 bears to normally urge the head 59 of the bolt below the lower edge of a plate 61 welded to 55 and the piston beam 24 in the path of movement of a stop 60 carried by the lower open end of the cylinder 26.

The caboose 31 of the cylinder is composed of a pair of vertical parallel side plates 62 arranged to lie across the channels of the I-beam piston 24 in close proximity to the flanges. The lower open end of the cylinder at diametrically opposite points is provided with a pair of openings to receive bolts 63. Each pair of these bolts is threaded into the embossed portions 64 of a hanger plate 65. One of the bolts 63' of each pair is also threaded through a spacer member 66 and inner hanger plate 67. The hanger plates 65 and 67 are spaced apart and depend at each side

of the cylinder to receive therebetween the upper portions of the side plates 62 of the housing 31. A very stout pin 68 extends through all three of these plates on each side of the cylinder to pivotally or swivelly suspend the caboose housing from the cylinder, and cotter pins extend through the ends of these pins to retain them in place. The rollers 32, heretofore mentioned for guiding the cylinder against the piston beam 24 are freely rotatable upon non-rotatable removable shafts 69 which are welded at one end to plates 70 bolted to the side plates 62 to prevent rotation of the shafts 69. A cotter pin may extend through the opposite end of each shaft or pin 69 to hold it in place. Each shaft 69 may have a lubricant passage extending longitudinally thereof and terminating in a lubricant fitting 69' at the end which is welded to plate 70. This longitudinal passage communicates with a lateral port 70' which opens into the periphery of the pin 69 whereby lubricant can lubricate the roller and pin. To afford additional strength for the housing 31, spacer plates or blocks 71 are welded between and to the side plates between the two rollers 32. A pair of blocks 71' are welded to the side plates 62 at the bottom thereof, and these are spaced from one another whereby the brace 41 can pass therebetween to allow the lower edges of the plates 62 to bottom upon the side bars 40 and reach its lowermost position. The blocks 71, in combination with the blocks 71', prevent the housing 31 from turning excessively in a clockwise direction as viewed in Figure 8. This keeps the rollers in near contact to the piston flanges 33 except when the load of a vehicle is applied to the jack, the rollers contact these flanges and the blocks 71 and 71' do not touch the piston beam 24.

As best seen in Figures 1, 8 and 9, the side plates 62 extend farther forwardly then rearwardly of the jack cylinder and provide greater clearance between the vehicle and the cylinder. To the forward vertical edges of these plates is welded a horizontal box-section mounting tube 72, elongated to extend laterally from both sides of the housing 31; and gusset plates 73 and 74, obtained by cutting off the corners of plates 62, are welded to the tube 72 and plates 62 on opposite sides of the housing to add to the sturdiness and lifting power of this housing with its offset front lifting end. Telescopically mounted side by side in the tube 72 to project from opposite ends thereof are a pair of hollow box-section lifting arms 75. The outer end of each arm 75 has an upright arm 78 welded thereto, and to the top of this arm is welded a V-shaped bracket 79 having a crotch to engage the underside of a car bumper or other underpart of a vehicle. An inclined brace 80 is welded to the bracket 79 and to the top of its respective arm 75, while a second inclined brace 81 is secured to the bracket and to a side face of such arm 75.

Viewing Figure 8 will show that the V-shaped brackets 79 are offset with relation to their respective arms 75 so that the crotches 79' of these brackets are located centrally with relation to the mounting tube 72, which houses both arms 75. This arrangement locates the crotches of the brackets 79 square with and in exact alignment transversely of the jack as a whole, so that when the jack is placed under or beneath a bumper, the jack base and front bar 43 will sit square with relation to the car, and the bumper will be located parallel with a line connecting the crotches.

The opposite end of each arm 75 has a spacer and stop shoulder 82 on its inner face adapted to abut a stop pin 83 for each arm 75 dropped through aligned openings in the top and bottom walls of tube 72 to limit the outward sliding extension of the arms 75 and to prevent their detachment from the jack. Preferably, two stop pins 83 are used for abutment with the stops 82 of the two arms 75 and are each positioned near the end of the tube 72 opposite to the end of the arm 75 carrying its bracket 79 whereby the major portion of the arms 75 are always confined within the mounting tube 72 for greater bearing area. The ends of the pins 83 are bent at right angles to permanently hold them assembled with the tube 72. However, only one stop pin 83 may be provided for engagement with the stops 82 of both arms 75, in which event, the single stop pin 83 will be located near the middle of the mounting tube 72, thereby providing for a greater range of extension of the arms 75. By this extensibility of the lifting arms, they are equipped to adapt themselves to whatever shape of bumper or other part they may encounter to balance the load upon the jack. In addition, these arms 75 can be placed under the bumper at the points where the bumper is supported by the car frame and to positions where they will not interfere with trim pieces found on most bumpers to assure the greatest load bearing capacity.

The present jack utilizes a movable load lifting cylinder for several reasons. One of these is that the jack will not scratch or mar the bumper as the cylinder and parts near the car move as a unit with the car as it is raised and lowered; another reason is that the use of packing glands is eliminated; another resides in the fact that a less expensive air conduit can be employed; but the most important reason is that the movable cylinder type of jack provides opportunity for the use of a safer mechanical safety lock to retain the load bearing element in elevated positions to amply support the load at a plurality of points and to conceal and protect the lock inside of the housing structure against accidental unlocking operation. Such a jack provides for the use of a positively acting, sure and safe mechanical pawl and ratchet interlock between the relatively movable piston and cylinder. As stated previously, the ratchet is provided by the square openings 53 in the stationary piston element 24. The safety pawl 85 is concealed and protected against accidental or unauthorized operation by being housed within and carried by the housing or caboose 31, which is in effect an extension of the cylinder. This pawl is suspended for slight vertical movement from a pivot pin 86 extending through slots 86' in a pair of side walls 87, which walls are welded at their ends to a pair of nut elements 88, which are secured to the inner surface of one side plate 62 of the housing 31 by an upper bolt 89 and a lower bolt 90. This disposes the pawl inside of the housing 31 hanging in position to cooperate with the series of openings 53 between the flanges 33 of the I-beam 24. The lower end of this pawl 85 is angled inwardly to provide an inclined surface 91 to cam and slide over the edges of openings 53, when the cylinder is being elevated, and is also provided with a flat free end 92 which is arranged at an acute angle to the surface 91 and is disposed at right angles to the web of the I-beam 24 when the pawl is swung to its innermost locked position to prevent accidental unlocking of the pawl and descent of the cylinder. The pawl is normally urged to such position by gravity and by a double armed one-piece spring 93 which is sprung over the pivot 86 with the laterally extending free ends of its shorter arms 94 anchored into the side walls 87 and with the long arms 95 connected by a bridge portion 96 which is disposed across the outer surface of the pawl to normally urge it inwardly against the web of the I-beam. Therefore, as the cylinder 26 is elevated to lift the load by air pressure, the pawl 85 will ratchet over the openings 53 until the proper elevation of the load is reached, when the flat free end 92 of the pawl will rest in a locked position upon the lower square edge of the nearest opening 53, thereby causing the pawl 85 to move slightly upwardly and move its upper end into abutment with the underside 88' of upper element 88 as shown in Figure 6 to lock and support the cylinder in elevated position. When a load is upon the jack and the bottom edge 92 of the pawl 85 is supported upon the bottom edge of one of the slots 53 to support the load, the pawl cannot be withdrawn from the slot as long as the load remains on the jack, unless the cylinder 26 is first slightly raised by air pressure to allow the bottom edge 92 of the pawl to swing clear of the bottom edge of the slot 53. This will be clear when it is appreciated that this acutely angled edge 92 of the pawl moves in an arc when

the pawl is swung on its pivot 86. This makes it impossible for the jack cylinder to be accidentally lowered and required an intentional act on the part of the operator to lower the jack.

The lower angled end of the pawl has a cylindrical detent or handle portion 98 detachably secured thereto and which extends normal to the inclined outer face of said angled end through an enlarged opening 99 in the left-hand side plate 62 of housing 31 within easy reach of an attendant operating the jack. This handle 98 has considerable weight so that it has a gravitational effect upon the pawl to normally urge it inwardly into ratching engagement with the web of the post 24. The spring 93 augments this action. When the inclined nose of the pawl engages the web between or beyond the ratchet openings 53, the handle 98 will be disposed in a horizontal plane, but when the nose enters one of the openings 53, the handle will be disposed in a downwardly and outwardly inclined locking position shown best in Figure 4.

It will be observed that the detent or handle 98 is provided with a reduced portion 100 next to the pawl 85 thereby providing an annular groove 101 adapted to receive the right-hand edge of a notch 102 provided in the upper edge of a gravity actuated latch plate 103 when the pawl 85 is to be held in an unlocked position. This latch plate is pivoted near its lower edge by the bolt 90 to the side plate 62 below the notch 102 and such distance beyond the vertical center line of the latch as to cause the longer outwardly deflected end 104 to overbalance the other end of the latch and normally urge it to project the right-hand side edge of the notch 102 against the side of handle 98 when the handle is positioned as shown in Figure 4, or into the groove 101 against the reduced portion 100 when the pawl 85 is moved to its outer non-ratcheting position by the handle 98. It will also be observed that when the latch is in a latched position resting against the reduced portion 100 of the detent 98 as shown in Figure 8, the lower edge 105 of the angled end 104 is disposed below the lower edge of the side plate 62 of housing 31. Such latched position of the latch 103 holds the pawl 85 out of ratcheting relation to the ratchet openings 53 and permits lowering of the jack. However, as the jack cylinder approaches its lowermost position to bottom on the base, the angled end 104 of the latch 103 will engage the top edge of the frame member 40 and be automatically swung on its pivot 90 to withdraw the right-hand edge of notch 102 out of the groove 100 in the handle 98, and again permit the pawl 85 to automatically move into ratcheting relation with the web of the piston post 24 ready to provide the essential safety factor for the jack when it is again operated to hoist a car.

When the jack is not being used, it can be wheeled to an out-of-the-way place. When its use is required, an attendant grasps the handle 52, and with his foot acting as a chock against the wheels 47 or the axle, pulls toward himself to tilt the jack back to raise the carriage base frame 23 off of the ground and throw the entire load upon the wheels 47 and springs 50 so that he can easily wheel it to a vehicle requiring service. With the jack cylinder and lifting brackets 79 in their lowermost positions and the forward bar 43 of the base frame 23 resting upon the ground, the springs 50 will raise the rear bar 42 and the rear end of the base frame above the ground. When a vehicle is hoisted by the jack, the added imposed load of the vehicle will cause the springs 50 to be compressed, which will force the base frame 23 down flat upon the ground to assume the entire load. Thus, a most stable non-skidable support is automatically provided by the imposition of the weight of a vehicle upon the jack. Until a load is imposed upon the jack, the springs 50, wheels 47 and axle 46 hold the rear bar 42 elevated from the ground with the front bar 43 resting upon the ground, so that by an operator using his foot to roll or to chock one wheel or the other, he is able by pushing on the handle 52 to slide the front bar 43 along the ground and easily jockey or maneuver the lifting brackets 79 beneath a vehicle bumper or other part.

The laterally extensible lifting arms 75 may be slid longitudinally in the mounting tube 72 to any position found most convenient or secure for the engagement of the brackets 79 with the vehicle or its bumper. In Figures 11 through 14, inclusive, a modified and less expensive form of vehicle engaging and lifting means is illustrated. Here, the two laterally extensible lifting arms 110 and 111 take the form of tubular members or channel bars having U-shaped cross sections. The smaller channel bar 111 is slidably and telescopically mounted within the channel of the larger section bar 110, which in turn is slidably mounted within a mounting tube 112 of square or box-shaped cross section. This mounting tube corresponds to the tube 72 of the device heretofore described and may be connected to the cylinder housing 31 of the jack in the same way the tube 72 is connected therewith. The outer end of each bar 110 and 111 has an upright hollow lifting arm or post 113 welded in the channel thereof and a vehicle engaging V-shaped bracket 114 is welded to the top of each post. One end of the tube 112 has a bearing member 118 for the smaller bar 111 to rest upon to compensate for the difference in size of the bars 110 and 111. In order to limit the longitudinal sliding movement of the bars 110 and 111 in longitudinally outward directions relative to the mounting tube 112, the ends of bars 110 and 111 within the tube 112 each have a stop bar 115 welded therein to bridge and close the channel theerof. One or two removable headed pins 116 dropped into an opening or openings 117 in the top of mounting tube 112 and extending into the channels of the bars 110 and 111, form abutments against which the stop bars 115 engage to limit the longitudinal outward extension of the lifting bars 110 and 111. The innermost bar 111 has portions of its upper edges cut away as at 119 to provide clearance for the stop bar of channel member 110 as shown. If desired, only a single pin 116 may be used at the center of mounting tube 112 to form a stop for engagement with the stop bars 115 of both lifting bars to extend the limits of their longitudinal outward extension. Or, the mounting tube 112 may be provided with a series of apertures 117 arranged lengthwise thereof from one end thereof to the other for the insertion of one or more pins 116 in any selected aperture or apertures. Thus, by placing a pin nearer one end of the mounting tube than the other, the lifting bars can be shifted farther to one side or the other of the transverse center of the mounting tube to provide a laterally offset load bearing arrangement. In these modifications, it will be observed that the lifting device 39 includes a member within a member sliding within a third tube, which provides an extremely inexpensive structure having high resistance to bending stress.

In Figures 15 and 16, a modified form of air induction and exhaust means for the pressure chamber 120 between the cylinder and piston is disclosed. Otherwise, the jack mechanism for this embodiment is the same as the one disclosed hereinbefore; and, therefore, the same numerals are employed to designate previously disclosed parts of the jack mechanism. However, in Figure 15, the interlock mechanism between the piston and cylinder is not illustrated for the sake of brevity. Instead of associating the air induction and exhaust pipe with the movable cylinder as in the previous embodiment, such a pipe 121 is fastened at one end 122 to the stationary piston head 25 and is extended downwardly therefrom in one corner of the I-beam 24 to a point at the bottom thereof, where the pipe or tubing is bent outwardly to extend toward one corner of the base frame 23 and thence vertically as at 123 to a substantial height for convenient reach of the attendant. The center of the piston head has threaded therein a fitting 124 which serves in attaching the cup leather packing 35 to the upper end of the piston

head. This fitting is provided with an axial port which communicates with a lateral passage **125** extending through the head of the fitting, and also with a lateral passage **126** in the piston head **25** terminating in a vertical duct, which communicates with the upper end of the air induction and exhaust pipe **121**. The top of the piston is provided with the same type of well **36***a* to collect water of condensation and groove **36***c* for lubricant, and the port **125** will serve to remove this condensation as the cylinder is lowered. It will be observed that the piston head is provided with a depending internally threaded boss **127** extending downwardly to receive the fitting **122** on the pipe **121**. The other vertical branch **123** of this pipe extends through a side wall and longitudinally through a hollow vertical standard **128** to a point adjacent to the upper end thereof. This standard may be in the form of a piece of pipe or tubing open at both ends; and the lower end thereof is welded, as at **129**, to the corner of the base frame **23**, as illustrated. This standard **128** is of a length to extend about average waist height from the ground.

A fitting **130** is secured within the standard **128** near its upper end by any suitable means and is provided with an axial bore **131**. The lower end of this bore is enlarged and threaded to receive a fitting **132**, which is adapted to clamp the upper flared end of branch pipe **123** therein. The upper end of this fitting is reduced and externally threaded to be threaded into an internally threaded sleeve **133**, which is also fastened within the upper end of standard **128** by any suitable means. A valve seat **134**, in the form of a resilient washer, is positioned upon the top of the fitting **130** to be engaged by the lower end of a valve member **135** having external threads to cooperate with the internal threads of the sleeve **133**. By turning the valve **135** in one direction, the valve **135** is caused to seat upon the valve seat **134** to trap air pressure within the cylinder; and when turned in the opposite direction, raises the valve **135** off of its seat to permit exhausting of the air pressure from the cylinder. This valve member **135** is provided with an axial bore **136** which terminates at its outer end in a tapered female thread to receive a fitting **137** containing the usual tire type outwardly seating inflating valve **138**. From Figure 16, it will be observed that the fitting **130** has its periphery provided with a groove **139** extending longitudinally thereof from top to bottom and which communicates with a lateral passage **140** provided in the fitting **133** above the valve seat **134**. Consequently, when the valve fitting **135** is turned to elevate it off of its seat, air pressure from the cylinder **26** will exhaust therefrom through the pipe **121** and escape downwardly through the standard **128** through the passage **139** and **140**. When the valve **135** is screwed down upon its seat, it will cut off these two passages **139** and **140**, and the valve **138** will retain the pressure within the cylinder. The air pressure exhausting from the cylinder **26** will exhaust through the bottom of the standard **128** into the atmosphere. The fittings **137** and **29** are formed externally to readily receive the conventional chuck on the end of a tire inflating hose, as is well understood.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. An air operated vehicle jack comprising a stationary vertical I-beam having a series of ratchet teeth arranged longitudinally thereof and a piston head at its upper end, a cylinder slidably mounted on said head and having a closed end above said head and an open lower end below said head, a housing forming an extension of said cylinder and pivotally suspended from the lower end of said cylinder, a pair of rollers carried by said housing and adapted to roll on the two flanges of said I-beam to guide said cylinder in its vertical movements, vehicle engaging and lifting arms carried by said housing and extending in cantilever fashion therefrom to swing said housing on its pivotal suspension under a load to force said rollers into engagement with said I-beam when said arms support the load of a vehicle, a ratchet pawl pivotally suspended within said housing and normally biased to ratchet over said ratchet teeth during elevation of said cylinder and housing, said pawl having limited vertical movement relative to said housing, a pawl abutment in said housing above said pawl to be engaged thereby when said pawl engages a ratchet tooth to support a load, said pawl having its lower tooth engaging end angled to rest flush upon the load supporting edge of one of said teeth when in load supporting position and requiring said housing and cylinder to be raised slightly to disengage said pawl from said abutment and to manually disengage said angled end of said pawl from said supporting edge when said cylinder and load is to be lowered.

2. A jack mechanism comprising a base, a stationary piston mounted thereby and including a piston rod having a series of ratchet teeth, a load bearing cylinder element mounted by said piston, a ratchet pawl mounted by said cylinder element and normally biased to engage said teeth, said pawl having a handle portion and a shoulder, a latch pivoted to said cylinder element and having a notch for the reception of said handle portion to enable said pawl to engage said ratchet teeth, and a side of said notch being engageable with said shoulder to retain said pawl in non-ratcheting position relative to said teeth.

3. A lifting mechanism comprising a base, an I-beam extending from said base, said I-beam having first and second spaced faces interconnected by a web, a plurality of vertically spaced openings extending through said web, a piston secured to an upper portion of said I-beam, a cylinder member within which said piston resides and which is movable relative to said piston, a housing, means pivotally mounting said housing to a lower portion of said cylinder, said housing being connected to means for engaging an object to be lifted, a first roller mounted on said housing and engaging said first spaced face of said I-beam, a second roller mounted on said housing and engaging said second spaced face of said I-beam, a locking member carried by said housing and insertable into a selected one of said vertically spaced openings to secure said cylinder at a position relative to said piston.

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