Nov. 14, 1950 P. E. WALLACE 2,530,138

JACK

Filed Nov. 22, 1946 2 Sheets-Sheet 1

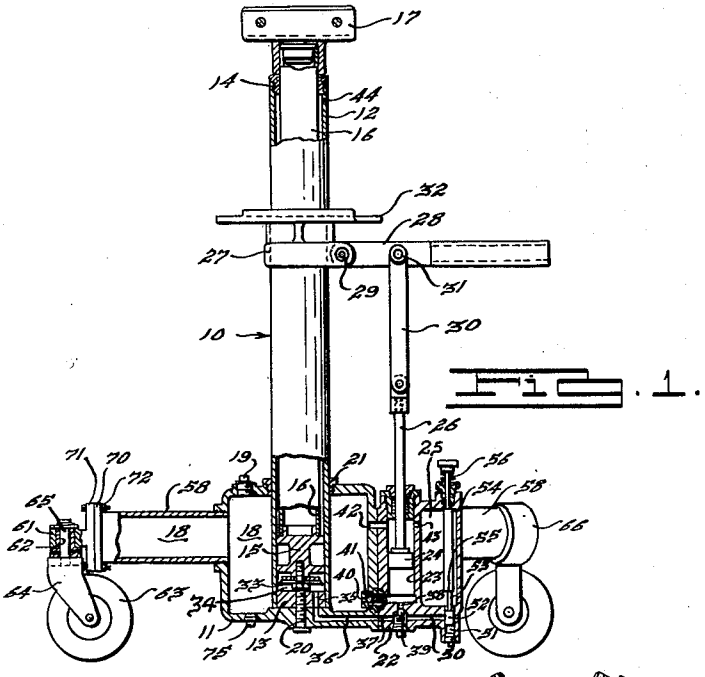


Fig. 1.

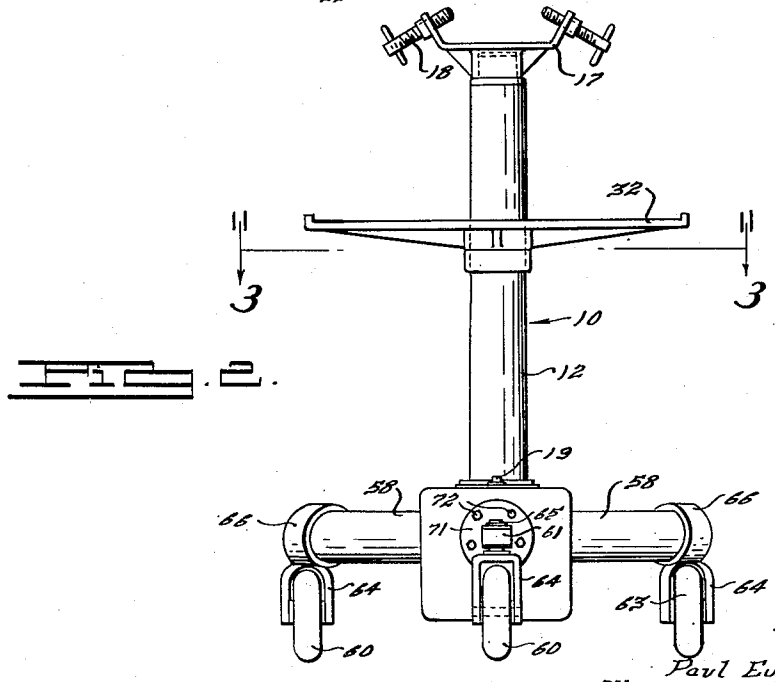


Fig. 2.

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Nov. 14, 1950 P. E. WALLACE 2,530,138

JACK

Filed Nov. 22, 1946 2 Sheets-Sheet 2

Fig. 3.

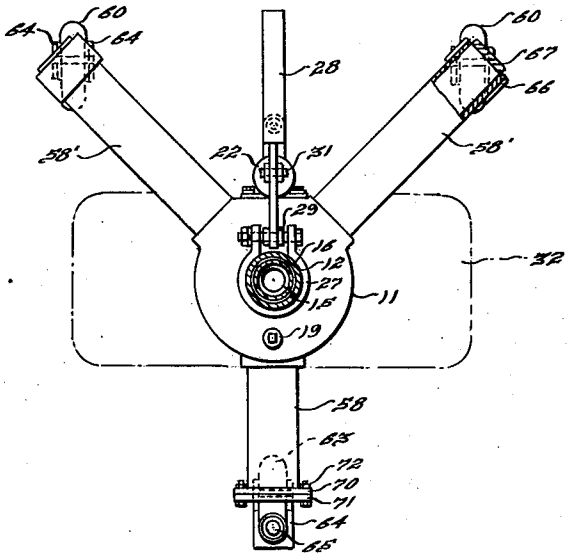


Fig. 5.

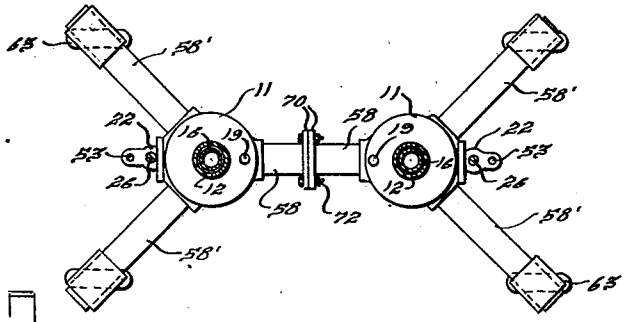
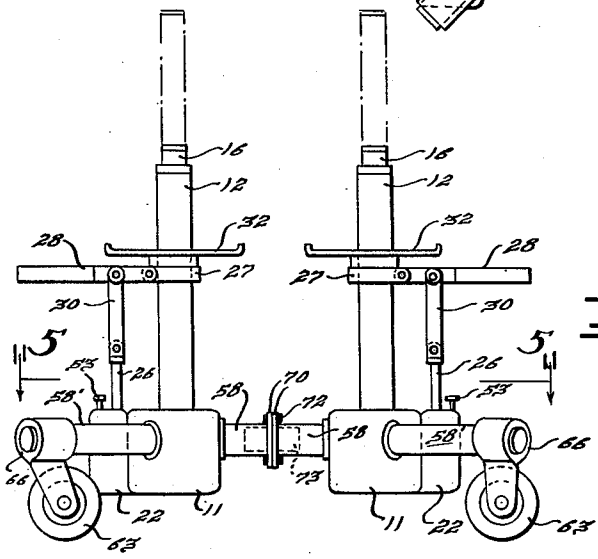


Fig. 4.



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6 Claims. (Cl. 254—89)

1

This invention relates to jacks and more particularly to jacks so constructed that a plurality thereof may be joined to provide a unit having a plurality of lifting heads.

The device to be described herein is particularly adapted for use in motor vehicle repair. In the disassembly of motor vehicle components such as the engine it is desirable to elevate the vehicle and then lower the heavy component rather than raise the heavy component by chain falls etc.

My novel jack is especially adapted for relatively high work and it is particularly adaptable to various loads and various shapes. The assembly of a plurality of jacks into a working unit permits the load carrying capacity of the unit to be increased and permits the lifting heads to be so assembled that they are able to contact the object to be lifted at advantageous points.

It is to be understood that although reference has been made to the use of this jack in the servicing of automobiles that the invention is not so limited and that other applications for the jack can be made.

In the drawings:

Figure 1 is an elevation of the jack which is partly in section.

Figure 2 is a side elevation of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is an elevation of a double unit which consists of the assembly of two of the jacks shown in Figures 1 through 3.

Figure 5 is a section on the line 5—5 of Figure 4.

In Figure 1 an individual jack 10 is illustrated. The jack comprises a housing 11 and stationary tubular column 12. The column 12 is retained in a vertical position and has its lower end sealed by a plug 13 and its upper end sealed by bearing 14. A hydraulic piston 15 is slidably mounted in the column 12 and has a piston rod 16 secured to the upper portion of the piston. The bearing 14 has an opening which the piston rod penetrates. A suitable lifting head 17 provided with clamping screws is secured to the upper end of the piston rod 16.

The housing 11 is hollow and supports a plurality (preferably three) of horizontal legs 58. The legs 58 are hollow and form an oil reservoir 18 in combination with the hollow interior of the housing. A threaded plug 19 in housing 11 provides an inlet by which oil may be added to the reservoir. The column 12 is supported in housing 11 at two points. It contacts the lower

2

portion of the hollow interior and a screw 20 extends upwardly through the bottom of the housing and into the plug 13. A collar 21 is threaded into the top of the housing 11 and is concentric with the column 14.

A supplemental housing 22 is bolted to housing 11. The supplemental housing 22 contains a vertical cylinder 23 in which a piston 24 is slidably mounted. Supplemental housing 22 also contains a chamber 25 which is connected to and forms a part of reservoir 18. Piston 24 is provided with a vertically extending piston rod 26. A collar 27 is rigidly secured to the column 12 and provides a fulcrum for a laterally extending handle 28 which is pivotally mounted on collar 27 at 29. A connecting rod 30 is rotatably connected to an intermediate portion of the handle at 31. Manual operation of the handle reciprocates the piston 24 through the connecting rod 30 and piston rod 26. A tool tray 32 may be mounted on the column 12 if desired. The tray is preferably rotatable relative to the column.

Suitable valving is provided so that reciprocation of the piston 24 by operation of handle 28 will effect an elevation of piston 15, piston rod 16 and lifting head 17. The screw 20 extends through plug 13 and provides an abutment that engages a protrusion on piston 15 illustrated as screw 33 to assure that a pressure chamber 34 is provided below the piston 15. An orifice 35 is aligned with a fluid passage 36 provided in the base of housing 11. A similar passage 37 is provided in the base of supplemental housing 22 and aligned with passage 36. A passage 38 connects the lower portion of cylinder 23 with passage 37. A one way check valve 39 permits fluid to travel from passage 38 to passage 37 but prevents movement of fluid in the opposite direction. An orifice 40 connects chamber 18 with the lower portion of cylinder 23. A one way check valve 41 permits fluid to travel from chamber 18 to cylinder 23 but prevents the return movement thereof. Orifices 42 and 43 are provided in the upper portion of the wall of cylinder 23 and connect the cylinder with the chambers 18 and 25, respectively, so that air pressure in these compartments is equalized. A bleed hole 44 is provided in the upper portion of the column 12 so that air may escape from or enter the column 12 as the piston 15 is moved therein.

In operation, when the handle 28 is raised the piston 24 is raised. The low pressure created below piston 24 by the upward movement thereof causes oil to leave chamber 18 and enter cylinder 23 through orifice 40 past valve 41. As the

handle 28 and piston 24 are lowered valve 41 closes and valve 39 opens permitting oil to travel from cylinder 23, through orifice 38, past valve 39 into passages 37, 36, 35 and into the pressure chamber below piston 15. The entrance of this oil forces piston 15 upward. When the piston 24 has completed its downward stroke and begins to rise the pressure of the piston 15 on the oil below it closes valve 39. The oil trapped below piston 15 by the closed valve 39 supports the piston 15 until the next successive downward motion of piston 24 again raises piston 15.

A valve controlled bleed back to return oil from the chamber below piston 15 to the chamber 18 is provided as a means of lowering the piston 15 and lifting head 17. A passage 50 connected to passage 37 below valve 39 leads to a small cylinder 51. Cylinder 51 is vertically disposed in the base of supplemental housing 22 and the upper end of cylinder 51 opens into chamber 18. A small piston 52 is slidably mounted in cylinder 51. A piston rod 53 extends upwardly from piston 52 and projects through an aligned opening in the upper portion of supplemental housing 22. The piston rod 53 is provided with spaced abutments 54 and 55 which are adapted to engage the upper and lower portions, respectively, of the supplemental housing 22 and limit movement of the piston rod 53. The abutments are so spaced relative to rod 53 and housing 22 that limited movement of the piston 52 is permitted. A spring 56 normally urges the piston 52 and piston rod 53 into their upper position as illustrated in Figure 1. In this position the piston 52 completely blocks the passage 50. When piston rod 53 is manually pushed down against spring 56 the piston 52 exposes the upper portion of cylinder 51 to orifice 50. Oil retained under pressure below piston 15 then flows through passages 35, 36, 50 and cylinder 51 into chambers 25 and 18. The weight of piston 15 and any load supported thereby causes the piston to lower. This motion may be arrested at any time by permitting spring 56 to return valve 52 to its upper position blocking passage 50.

Legs 58 extend laterally from the housing 11. Each individual jack has been illustrated as provided with 3 legs 58 although more legs could be provided if desired. Each leg is supported by a caster 60. Legs 58' in Figure 3 illustrate one means by which a caster 60 may be secured to a leg 58'. Each caster 60 comprises a housing 61 having a vertical opening 62 therein. A wheel 63 and a bifurcated element 64 are adapted to rotatably support said wheel. The bifurcated element 64 has a vertical shaft portion 65 which is rotatably mounted in the opening 62 of housing 61. The construction illustrated on legs 58' of Figure 3 shows a collar 66 which is secured to the housing 61. The collar 66 circumscribes the end portion of leg 58' and is secured thereto as by welding. A suitable plug 67 covers the end of leg 58' so that oil will be retained in the leg. This caster construction is of a permanent nature and does not admit of the removal of the caster.

A second construction of the caster and leg is designed for use on one or more legs to facilitate the joinder of two or more individual jacks. In this construction the end portion of the leg 58 is provided with a vertical flange 70. The housing 61 of the caster is provided with a cooperating vertical plate 71 which has an external contour that is generally similar to the external contour of the flange 70. The flange 70 and vertical plate 71 are provided with aligned openings (not shown) by means of which bolts 72 may be used to secure the plate 71 to the flange 70. Corresponding legs of individual jacks may be joined as illustrated in Figures 4 and 5 by removing the bolts 72 and the casters 60 and placing the flanges 70 of the corresponding legs in contact. The bolts 72 may then be inserted and the flanges 70 of individual jacks bolted together. A section of pipe 73 illustrated in dotted lines in Figure 4 may be inserted during assembly to strengthen the joint if desired. A drain plug 75 may be provided in the bottom of housing 11 if desired so that oil may be drained from the reservoir 18 preparatory to the joinder of individual jacks and so that removal of a caster will not cause a loss of oil. If desired the end of leg 58 may be permanently sealed to prevent the loss of oil although such a construction would not admit of the use of pipe 73.

If one leg of each jack is provided with a removable caster as illustrated in the drawings then two jacks may be joined. If more than one leg of each jack is provided with a removable caster then an unlimited number of jacks may be joined. The joinder of a plurality of jacks permits the total weight of the load to be distributed between the jacks. Individual manipulation of joined jacks permits the lifting heads 17 to be adjusted so that they will engage the particular contour of the object to be lifted or lowered to their best advantage.

I claim:

1. A plurality of independently operable jacks each comprising a lifting head, a base, hydraulic means associated with said bases for elevating said lifting heads, a plurality of wheels associated with and supporting each base, at least one of said wheels on each base being removably mounted on said base, and means associated with said removable wheels for connecting said bases together to form an integral unit having a plurality of lifting heads.

2. A pair of individually operable jacks each comprising a lifting head, a base portion, at least three leg elements secured to each base portion, rotatable means associated with each leg element and supporting said leg element, a second means associated with each base portion for elevating one of said lifting heads, and a third means for selectively connecting a leg element of one of said jacks to a leg element of the other of said jacks, said third means being operable to connect said leg elements upon removal of the rotatable means associated with said connected leg elements.

3. An independently operable jack comprising a lifting head, a base portion, means to elevate said lifting head relative to said base portion, at least three leg elements extending substantially horizontally from said base portion, at least one of said leg elements being provided with a bolt receiving element, a plurality of casters each of which supports one of said leg elements, a plurality of bolts securing one of said casters to one of said leg elements by means of said bolt receiving element, whereby said bolts and said caster may be selectively removed and the bolt receiving element of a similar jack bolted to said element to operably unite said jacks.

4. A pair of independently operable jacks each comprising a lifting head, a base portion, a plurality of leg elements secured to each base portion, rotatable means associated with each leg element and supporting said leg element, a sec-

ond means associated with each base portion for elevating one of said lifting heads, one of the leg elements of each of said jacks being provided with a vertical flange, said flanges being adapted to be selectively coupled together to operably unite said jacks.

5. A pair of independently operable jacks each comprising a lifting head, a base portion, a plurality of leg elements secured to each base portion, rotatable means associated with each leg element and supporting said leg element, a second means associated with each base portion for elevating one of said lifting heads, one of the leg elements of each of said jacks being provided with bolt receiving openings by means of which said leg elements and said jacks may be operably united.

6. A portable hydraulic jack comprising a base operable to support said jack and having a fluid reservoir formed therein, an elevatable column carried by said base, manually operable hydraulic means operatively connected to said reservoir and operable to selectively elevate and lower said column relative to said base, a fixture associated with said base and operable to cooperate with a corresponding fixture on another similar jack

to unite said jacks so that a combined jack having a pair of spaced independently elevatable columns may be obtained by the selective joinder of said jacks, said fixture having an opening extending therethrough so that upon joinder of said jacks the reservoirs thereof are operably connected in fluid flow relationship to provide a common reservoir and means to cover said opening when said jacks are not joined and are operated independently of each other.

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