May 18, 1937. W. J. FIEDLER 2,080,963

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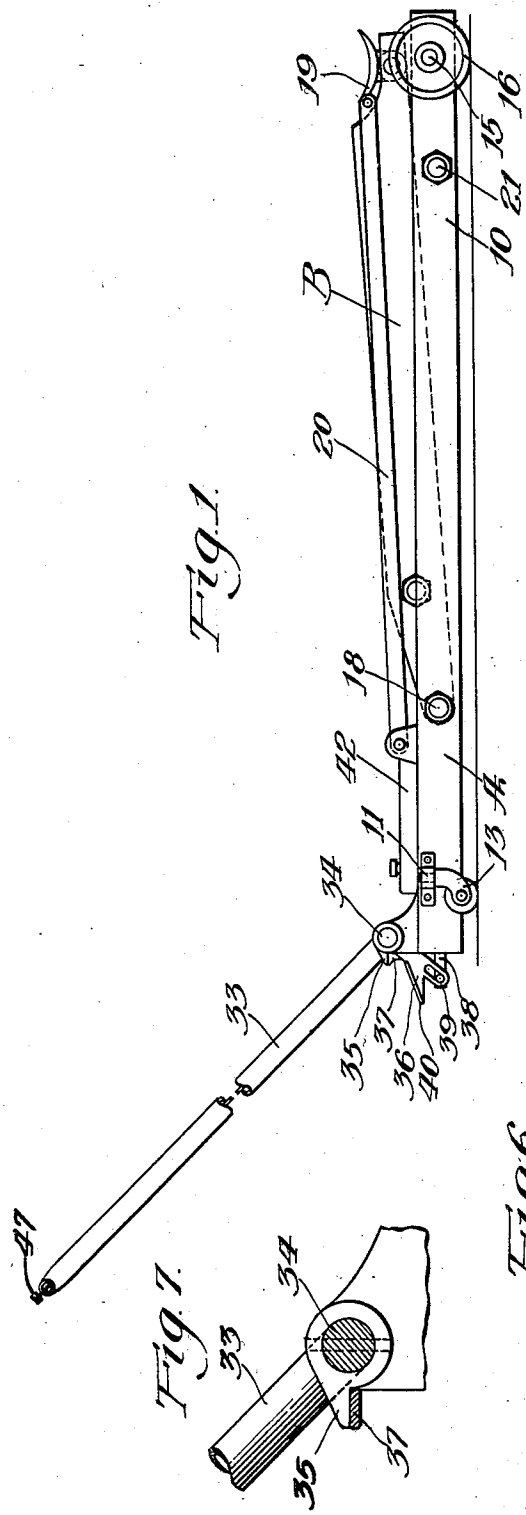


Fig. 1.

Fig. 7.

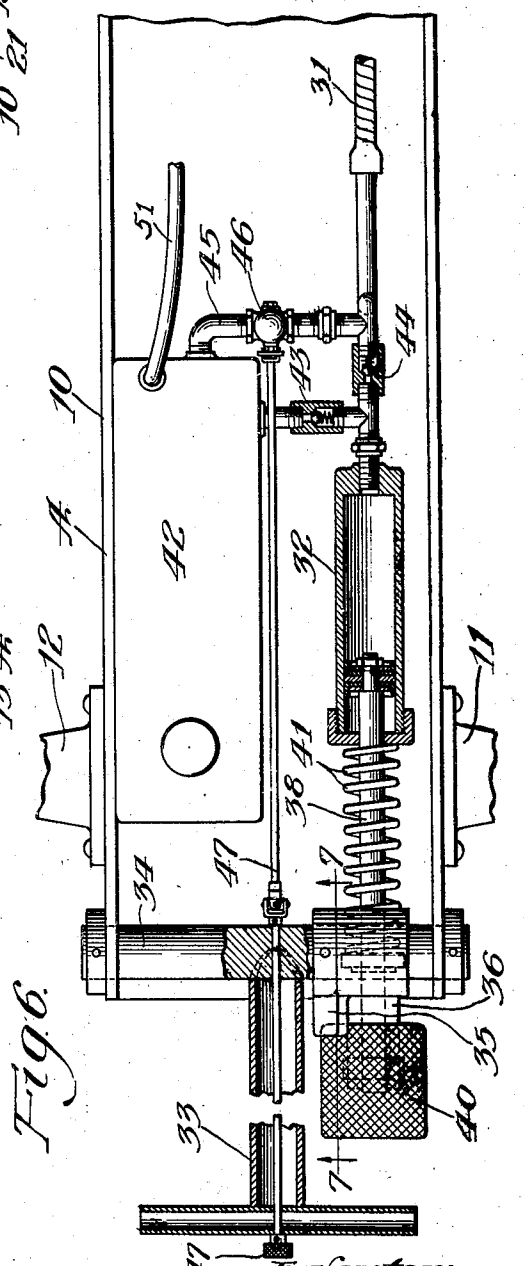


Fig. 6.

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Filed Oct. 23, 1936 3 Sheets-Sheet 2

Fig. 2.

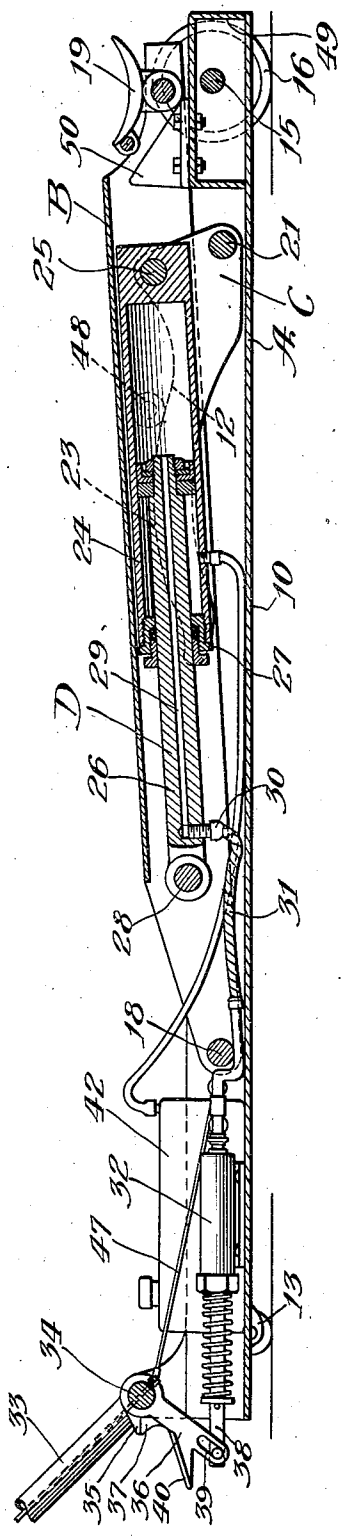
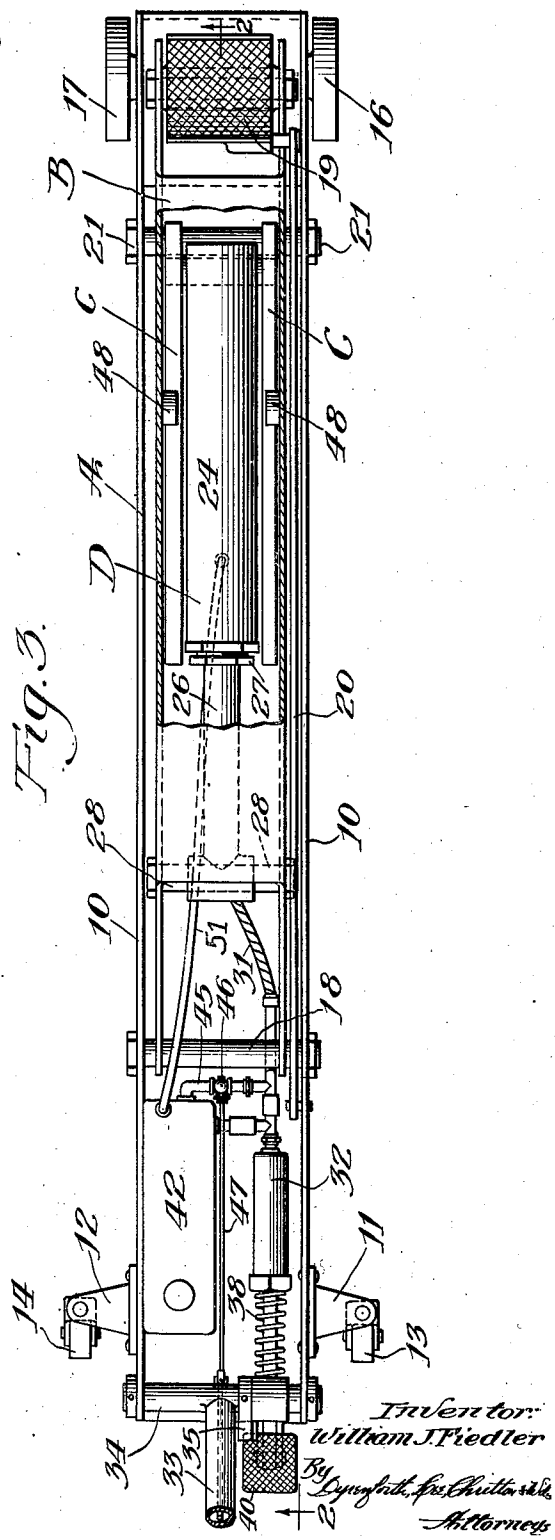


Fig. 3.



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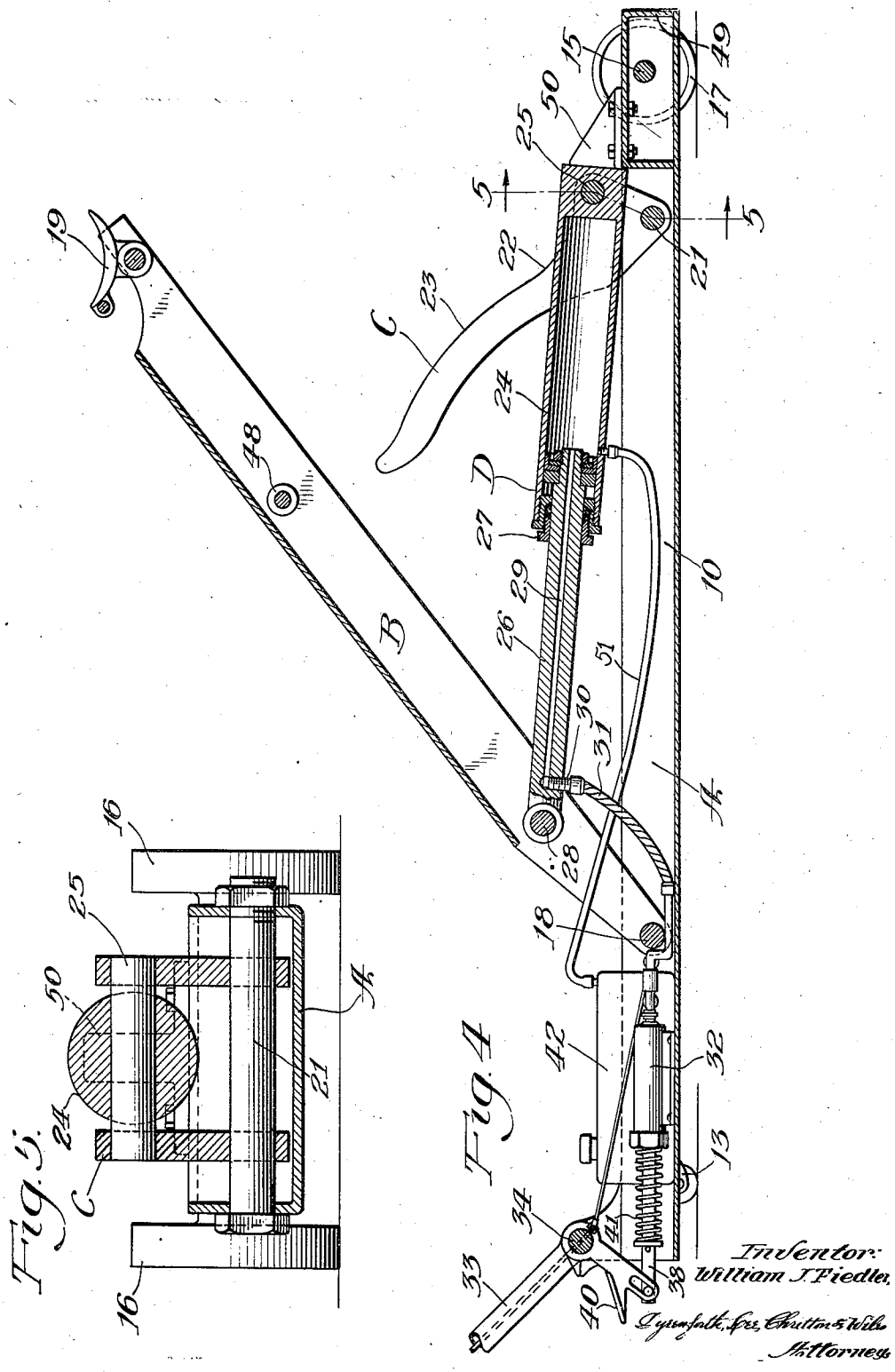


Fig. 4.

Fig. 5.

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Patented May 18, 1937 2,080,963

UNITED STATES PATENT OFFICE

2,080,963

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Application October 23, 1936, Serial No. 107,291

6 Claims. (Cl. 254—2)

This invention relates to a floor jack of the type adapted for lifting an end of an automobile or other motor vehicle. The jack may also be effectively used in lifting other objects, however.

An object of the invention is to provide a jack by which a load may be lifted with ease through any portion of its lifting range, and which is provided with auxiliary lifting mechanism to facilitate operation through the lower portion of the lifting range.

Another object is to provide a jack in which mechanical advantage is gained by utilizing the reaction of a lifting cylinder.

A further object is to provide a jack of simple sturdy construction, and which is convenient to operate. Other objects and advantages will appear as the specification proceeds.

A preferred embodiment of my invention is shown in the accompanying drawings in which—

Fig. 1 is a view in side elevation of the jack showing the lifting member in lower or closed position; Fig. 2, a sectional view taken as indicated at line 2—2 of Fig. 3, showing the lifting member in lower position and the handle broken away; Fig. 3, a plan view of the jack, the handle being broken away and a portion of the lifting member broken away to expose the lifting cylinder; Fig. 4, a sectional view similar to Fig. 2, but showing the lifting member in raised position; Fig. 5, a sectional view taken as indicated at line 5—5 of Fig. 4; Fig. 6, a fragmentary view showing the pump and valve arrangement; and Fig. 7, a detail view of the handle connection.

As illustrated, A designates a frame; B, a lifting member; C, cam members; and D, mechanism for actuating the cam members and the lifting member.

The frame A may be of any well known construction suitable for this type of device. As illustrated, it includes a channel iron 10 which is equipped at the front with the brackets 11 and 12 for holding the casters 13 and 14. In the rear it contains an axle 15 to which is attached the rear wheels 16 and 17. Over axle 15 is the cross frame member 49 to which is attached a stop piece 50 for limiting the rearward movement of the cylinder.

The lifting member B comprises an inverted channel iron which is pivotally attached to the inside of frame A by the pin 18 extending through the forward end of member B and through the sides of channel iron 10. At its rearward end the lifting member B is provided with a pivoted head 19 which is cupped to engage an automobile axle or other object to be raised. The link 20 connects the edge of head 19 with the frame at a point just forward of pin 18, and serves to keep head 19 always in upright position. Suitable rollers 48 are mounted on the inside of member B and are adapted to engage with the cam members later to be described.

The cam members C, of the general shape as illustrated, are pivotally mounted in frame A by the pin 21 which extends transversely through the sides of channel 10 and through the lower rear portion of members C. The upper surfaces of the cam members are concave near the rear portion as indicated at 22. Their surfaces at a more forward portion, however, are convex as indicated at 23.

The means for actuating the lifting member and the cam members comprises a cylinder 24 which at its rearward end is mounted between members C on pin 25 which extends through the upper rear portion of members C. Within cylinder 24 is the plunger head 25 to which is attached the hollow plunger rod 26. Fittings 27 are screwed into cylinder 24 and about rod 26 for preventing the escape of oil from the cylinder. At its forward end rod 26 is pivotally secured to the lifting member B by the pin 28. The passage 29 within rod 26 is open to the interior of cylinder 24, and at the forward portion of plunger 26 a hollow screw 30 connects this passage with the exterior of the plunger. A flexible tube 31 connects hollow screw 30 with oil pumping mechanism shown more clearly in Fig. 6.

For actuating the oil pump 32, I provide the handle 33 which is secured to shaft 34 rotatably mounted in the sides of channel 10. Shaft 34 is equipped with a lug 35 for engaging a treadle arm 36. Arm 36 is provided with a lug 37 which engages with lug 35. At its lower end arm 36 connects with piston 38 of pump 32 at the slotted connection 39. The arm 36 is equipped with a knurled portion 40 for convenience when only the treadle is used to operate the pump. A spring 41 on piston 38 serves to withdraw the piston after the stroke is completed.

Pump 32 operates to force oil from reservoir 42 through suitable passages including valves such as 42 and 44 to passage 29. Another pipe 45 containing release valve 46 connects the passageway 29 with the oil reservoir. Suitable means for controlling release valve 46 such as rod 47 extending to the end of handle 33 is provided.

A flexible tube 51 connects the rear portion of

the cylinder with tank 42. The purpose of this tube is to relieve the pressure behind plunger 26 when the plunger approaches maximum rearward movement. This expedient prevents great pressure being built up or forceful striking of the plunger against the end of the cylinder when the jack attaches highest position.

As shown in Figs. 1 and 2, when the jack is in closed position the plunger 26 is well back in cylinder 24, and lifting member B and cam members C are in lower position. When it is desired to use the jack to raise some object, the operation is as follows:

By either moving handle 33 up and down, or simply operating treadle 36 by foot, the oil pump 32 is actuated. This forces oil from the reservoir 42 through valves 43 and 44, and through tube 31 and passage 29 into cylinder 24. The pressure of oil within cylinder 24 causes the cylinder to be urged rearwardly and plunger 26 urged forwardly, the effect being to expand the distance between pins 18 and 25. But, as clearly shown in Fig. 2, when the jack is closed the pin 18 is almost aligned with plunger 26, and though plunger 26 is urged forwardly it will have only small purchase for raising lifting member B. However, as cylinder 24 is urged rearwardly with equal force, the cam members C will be turned about pivot pin 21 and their surfaces urged upwardly against rollers 48. Backward movement of the cylinder will then cause lifting member B to be raised, the rollers 48 rolling along the cam surfaces of member B.

When the cam members have been so turned that the rollers 48 approach the ends of members C, the lifting member will have been raised to a position where the plunger has gained sufficient purchase to raise the lifting member to still higher positions such as shown in Fig. 4. The stop 50 supports cylinder 24 when the function of the cam members is completed.

From the above it may be seen that the cylinder and plunger are effective for raising the lifting member in two ways; first, by turning the cam members about their pivots to raise the lifting member, and secondly, through direct connection of the plunger with the lifting member. At the lower positions of the jack the lift comes principally through the cam members and at higher positions the lift comes principally through the plunger connection.

When it is desired to release the jack to let down its load, the operator may turn rod 47 to release valve 46 and allow oil to flow back into the reservoir, the decrease in pressure then allowing the lifting member to be lowered to closed position.

This jack has an important advantage in that it can be placed under low objects and is capable of raising heavy loads at relatively low positions. In common jacks of this type now in use a common objection is that they do not have sufficient lifting leverage or purchase either at the lower or higher positions of the lifting member. By using means for effecting the double purchase I have eliminated such an objection. Another important advantage is gained by the use of a single cylinder for producing both of the lifting forces as above set forth.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

I claim:

1. A jack comprising a frame, a lifting member pivotally mounted on said frame, a cam member mounted on said frame and having its cam surface in contact with said lifting member, and a cylinder attached to said cam member and arranged to rock said cam member to raise said lifting member.

2. A jack comprising a frame, a lifting member pivotally mounted on said frame, a cam member mounted in said frame and having its cam surface in contact with said lifting member, a cylinder attached to said cam member, and a plunger associated with said cylinder and having its one end pivotally attached to said lifting member.

3. A jack comprising a frame, a lifting member attached to said frame, a cam member pivotally attached to said frame and having its cam surface in contact with said lifting member, and expansive means for rocking said cam member about its pivot, said means being connected to said lifting member and adapted to urge said lifting member at the point of connection.

4. A jack comprising a frame, a lifting member attached to said frame, a pair of cam members pivotally attached to said frame and having their cam surfaces in contact with said lifting member, and expansive means connected at one end to said cam members and at its other end to said lifting member, said means being so arranged that when expanded its one end urges said lifting member upward and its other end moves said cam members about their pivots to urge said lifting member upward.

5. A jack comprising a frame, a lifting member attached to said frame, a cam member pivotally secured in said frame and having its cam surface in contact with said lifting member, and expansive means in direct connection with said lifting member, said means being also effective for rocking said cam member about its pivot to raise said lifting member, said means being adapted to exert greater turning moment through said cam member when said lifting member is in a lower position and to exert a greater turning moment through its direct connecton with said lifting member when said lifting member is at a higher position.

6. A jack comprising a frame, a lifting member pivotally mounted on said frame, a cam member pivotally mounted on said frame, and in engagement with said lifting member, and means attached to said lifting member for rocking said cam member about its pivot to raise said lifting member.

WILLIAM J. FIEDLER.