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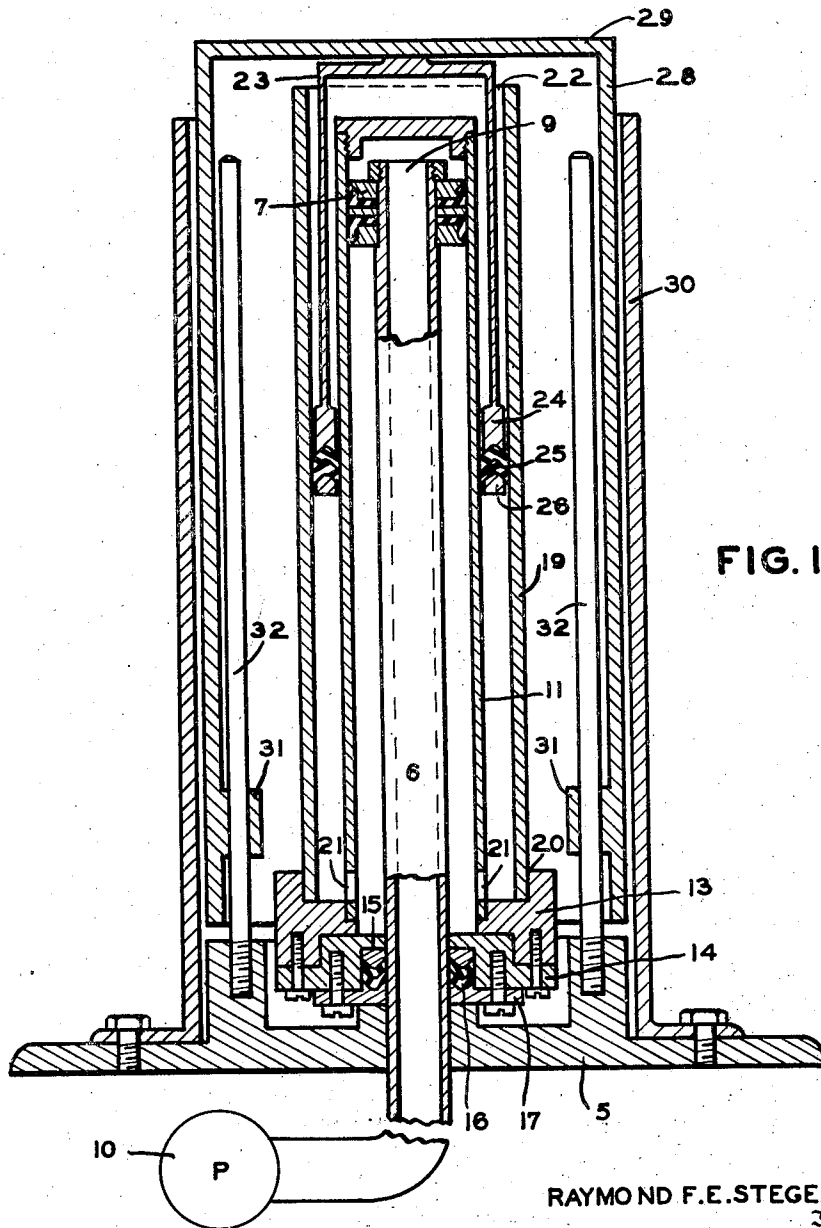
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HYDRAULIC TELESCOPING LIFTING JACK

Filed Aug. 11, 1945

2 Sheets-Sheet 1



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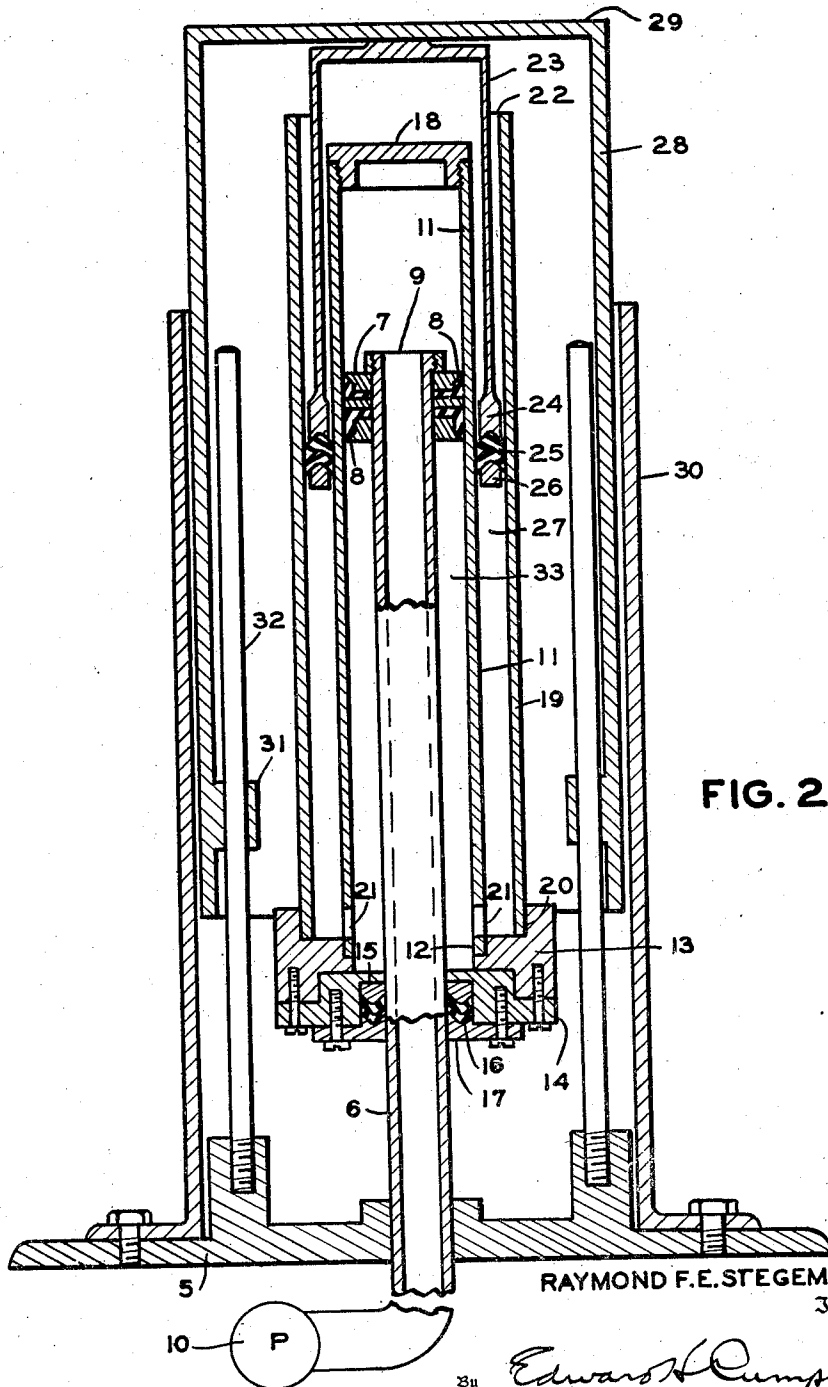
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HYDRAULIC TELESCOPING LIFTING JACK

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6 Claims. (Cl. 121—46)

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This invention relates to lifting jacks and, more particularly, to the fluid pressure or hydraulically operated variety thereof, one object of the invention being to provide an improved lifting jack of the above variety having a concentric and more compact type of construction.

Another object is to provide a lifting jack of the variety described comprising a plurality of concentrically arranged lifting members each operated by fluid pressure.

A further object is to provide such a lifting jack comprising a plurality of concentrically arranged lifting members, one of which is operated by fluid pressure means and actuates a second fluid pressure means for operating another of said lifting members.

Still a further object is to provide a lifting jack of the above nature comprising but few parts adapted to be economically manufactured and assembled and to operate efficiently with a minimum of adjustment or repair.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a central sectional elevation through a lifting jack embodying the present invention and showing the same with the parts in lowered position, and

Fig. 2 is a similar view showing the parts in partially raised position.

The embodiment of the invention herein disclosed by way of illustration comprises a base 5 at the center of which is an upwardly extending hollow standard or piston rod 6 having fixed on its upper end, by any suitable means, a piston 7 provided with packing 8, of any known or suitable variety. The piston rod 6 has an open upper end 9 and communicates at its lower end with any known or suitable means, indicated schematically at 10, for supplying and relieving fluid pressure through the opening in the rod. The means 10, for example, may comprise an oil pressure or another hydraulic system as well understood in the art. While the tubular piston rod 6 is shown in the present instance as extending through the base 5, it may obviously have its end mounted in the base in communication with a conducting passageway cored in the base.

The lifting members comprise an inner cylinder 11 mounted at its lower or inner end 12 in a recess in a head 13. The head is of greater diameter than the cylinder, for a purpose hereinafter de-

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scribed, and comprises a plate 14 which closes the lower end of cylinder 11 and has an opening concentric with the cylinder for slidably receiving the piston rod 6. The plate is recessed as at 15 to form a stuffing box about the rod comprising a suitable packing 16 and a gland 17. The upper end of the cylinder 11 is closed by means of a head, 18.

The lower cylinder head 13 is preferably extended radially and recessed as at 20 to provide a mounting for an outer cylinder 19 concentric with and spaced from the inner cylinder 11 and having its lower end fixed in the recess 20 in the head, the cylinders 11 and 19 and the piston rod 6 being concentrically arranged, as shown. The wall of the inner cylinder 11 is formed adjacent the head 13 with port openings 21 affording continuous communication between the inner and outer cylinders. The outer cylinder 19 has an open upper end, 22.

A second lifting member is provided by a tubular part, 23, extending downwardly through the open upper end 22 of the outer cylinder 19. The lower open end of the part 23 is formed with an enlargement, 24, provided with suitable packing 25 and a gland or follower 26, so as to afford an annular piston head sliding in and closely fitting the annular space 27 between the inner and outer cylinders 11 and 19, as shown.

The upper end of the part 23 supports a lifting member, or sleeve, 28, having a closed upper end 29 providing the lifting step or surface of the jack. The walls of member 28 enclose the upper portion of the above described mechanism and extend down telescopically within a stationary casing 30 fixed on the base 5. Member 28 is preferably guided for movement within casing 30, as by means of lugs 31 formed with openings slidably fitting rod standards 32 fixed in the base. The members 28 and 30 thus effectively enclose, house and protect the working mechanism.

In operation, oil or other fluid pressure is supplied through the hollow standard or piston rod 6 to the inner cylinder 11 above the stationary piston 7. This causes the inner cylinder to move upwardly and carry with it its lower head 13 and the outer cylinder 19 fixed to the same head. As inner cylinder 11 rises, the space 33 between it and the piston rod 6 is reduced, thereby forcing the oil or other fluid with which it is filled outwardly through the port openings 21 into space 27 between the inner and outer cylinders. Such increased pressure in space 27 presses upwardly on the annular head 24, raising its tubular part 23 which bears against and raises in turn the

sleeve member 28 the upper end 29 of which forms the lifting surface of the jack. The parts continue to rise so long as fluid pressure is supplied to the inner cylinder or until its lower head 13 engages the piston 7 and is thus stopped. Release of the fluid pressure in the inner cylinder allows the lifting members to descend until head 13 rests on base 5 as shown in Fig. 1.

The invention thus affords a simple and practical mechanism in which one lifting member is raised by fluid pressure means and actuates in turn a second fluid pressure means which raises a second lifting member, so that movement of one lifting member is added to that of another with cumulative effect. This function is accomplished by a type of construction in which the parts are concentrically nested for telescopic movement relative to one another in an arrangement which is exceedingly compact and requires but few parts.

It will thus be seen that the invention accomplishes its objects and while it has been herein described by reference to the details of a preferred embodiment, it is to be understood that such description is intended in an illustrative, rather than in a limiting sense, as it is contemplated that various modifications in the construction and arrangement of the parts will readily occur to those skilled in the art, within the scope of the appended claims.

I claim:

1. A lifting jack comprising a base, telescoping inner and outer cylinders, means movably supporting said cylinders on said base, said outer cylinder having a connection with said inner cylinder for movement thereby, means movable in said outer cylinder in response to pressure therein, fluid pressure responsive means for moving said inner cylinder, and fluid pressure generating means actuated by said inner cylinder and having a fluid medium communicating with said outer cylinder for moving said pressure responsive means.

2. A lifting jack having a base, concentric inner and outer cylinders, means movably supporting said cylinders on said base, said outer cylinder having a connection with said inner cylinder for movement thereby, means movable in said outer cylinder in response to pressure therein, fluid pressure responsive means for moving said inner cylinder, and fluid pressure generating means actuated by said inner cylinder comprising port means between said cylinders and a fluid medium connecting said cylinders through said port means for actuating said pressure responsive means by the movement of said inner cylinder.

3. A lifting jack having a base, concentric inner and outer cylinders, means movably supporting said cylinders on said base, said outer cylinder having a connection with said inner cylinder for movement thereby, means movable in said outer cylinder in response to pressure therein, a hollow piston rod extending through an end of said inner cylinder and provided therein with a piston, means for supplying fluid under pressure through said rod to one end of said inner cylinder for moving the same, and fluid pressure generating means actuated by said inner cylinder compris-

ing port means between the other end of said inner cylinder and said outer cylinder and a fluid medium connecting said cylinders through said port means for moving said pressure responsive means by the movement of said inner cylinder.

4. A lifting jack comprising a base, a hollow piston rod extending from said base, a head sliding on said rod, concentric inner and outer cylinders each mounted at one end on said head concentric with said rod, said inner cylinder being closed at its opposite end and provided adjacent said base with port means communicating with said outer cylinder, a fluid pressure medium connecting said cylinders through said port means, means movable in said outer cylinder in response to fluid pressure therein, piston means on said rod in said inner cylinder in spaced relation with said base and means for supplying fluid under pressure through said rod to said inner cylinder on the side of said piston opposite said port means, for moving said head and cylinders and thereby moving said pressure responsive means.

5. A lifting jack comprising a base, a hollow piston rod extending from said base, an inner cylinder having its inner end slidably mounted on said rod and closed at its outer end, a piston on said rod in said inner cylinder, an outer cylinder spaced concentrically from said inner cylinder and having a connection therewith for movement thereby, said inner cylinder having a port opening therein below said piston communicating with said outer cylinder, a fluid pressure medium connecting said cylinders through said port opening, lifting means movable in said outer cylinder in response to the pressure therein produced by the movement of said inner cylinder, and means for supplying fluid under pressure through said rod to said inner cylinder above said piston for simultaneously moving said cylinders and said lifting means.

6. A lifting jack comprising a base, a hollow piston rod extending from said base, an inner cylinder closed at its outer end and having its inner end slidably mounted on said rod, a piston on said rod in said inner cylinder, an outer cylinder spaced concentrically from said inner cylinder and having a connection therewith for movement thereby, a member having an annular piston head slidably fitted in the space between said cylinders, said cylinders having a communicating opening between the adjacent inner ends thereof below said piston and piston head, a fluid pressure medium connecting said cylinders through said opening, and means for supplying fluid under pressure through said rod to said inner cylinder above said piston for moving said cylinders and thereby moving said member.

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