ATTACHMENTS FOR FLUID PRESSURE CYLINDER AND PISTON

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Fig. 1

Fig. 2

Fig. 3

Fig. 4

William E. Stoneberg

INVENTOR.

Merchants, Merchants & Trade

ATTORNEYS
This invention relates to improvements in lifting mechanisms. More particularly, this invention relates to new and very useful means for readily adapting a fluid pressure cylinder for use as a hydraulic jack.

It is an object of this invention to provide a base and a head each adapted to be readily connected with and detached from a fluid pressure cylinder of the type conventionally used in connection with agricultural equipment so as to provide a tilt-resistant all-purpose lifting jack.

It is another object of this invention to provide a superior hydraulic jack operable from the power lift of a tractor.

It is a further object of this invention to provide for such a lifting jack of the type described a removable base and head therefor adapted to so position the fluid pressure cylinder that tilting of the jack assembly is prevented, thereby providing a lifting jack that can be safely utilized in doing a variety of odd tasks including lifting implements, jacking up buildings, removing stumps, and the like.

Other and further objects of this invention will become apparent to those skilled in the art from a reading of the present specification taken together with the drawings, in which:

FIG. 1 is a view in side elevation of an embodiment of the jack assembly of this invention;

FIG. 2 is a view in side elevation as seen from right to right of FIG. 1;

FIG. 3 is a view in vertical section as seen from the line 2-2 of FIG. 2;

FIG. 4 is a view in vertical section as seen from the line 4-4 of FIG. 2.

Referring to the drawings, there is seen an embodiment of a fluid actuated jack assembly of this invention, herein referred to generally by the numeral 10, which is composed of a fluid pressure cylinder 12 (including a piston equipped plunger rod 14), a base 16 and a head 18.

Fluid pressure cylinder 12 is of the type conventionally used in connection with agricultural equipment. It is composed of a tubular portion 20 within which piston equipped plunger rod 14 moves. The bottom of tubular portion 20 is closed by a cap 22 whose end face 21 is bifurcated. Such bifurcation is achieved by a pair of spaced, parallel, lengthwise-extending, depending tongues 24, sometimes referred to herein as lugs positioned generally equidistant from the axis of tubular portion 20 on end face 21. Aligned apertures 26 (pair) extend one through each tongue 24 in a direction generally normal to the axis of tubular portion 20. The top of tubular portion 20 is closed by a cap 32 through which extends plunger rod 14. The upper or exposed end of piston equipped plunger rod 14 is formed to provide a bifurcated or generally U-shaped element 34, sometimes referred to herein as a mounting element which has a base 36 and a pair of spaced, parallel, upstanding tongues 38, each so positioned as to be generally equidistant from the extended axis of plunger rod 14. Aligned apertures 40 (pair) extend one through each tongue 38 in a direction generally normal to the axis of plunger rod 14. Hydraulic fluid under pressure is introduced into the lower end of fluid pressure cylinder 12 through flexible conduit 28. As piston equipped plunger rod 14 rises, hydraulic fluid in the upper portion of fluid pressure cylinder 12 is exhausted through flexible conduit 30. Piston equipped plunger rod 14 is lowered conveniently by simply reversing this procedure, i.e., hydraulic fluid under pressure is introduced through flexible conduit 30 while fluid in the lower end of cylinder 12 is exhausted through flexible conduit 28.

The base 16 is composed of a plate 42, generally square in shape, to the top face of which, along a hypothetical center-line, is fastened the bottom edge of a flange or leaf 44, sometimes referred to herein as a wall element. Flange 44 is braced in an upright position by means of two pairs of braces 46, each one of which is formed in the shape of an equilateral triangle. One member of a pair of braces 46 is positioned on a side of flange 44 so that one side thereof opposes a side of the other member of such pair on the opposite side of flange 44. Positioned in the top mid-region of the side of flange 44 along a hypothetical center-line is an aperture 48.

In the top edge of flange or leaf 44 is mounted a pair of adjustable stop screws 50. In the embodiment shown, each stop screw 50 comprises a bolt having a head portion 52 and a threaded shank portion 54. Each stop screw 50 screws into a threaded bore 56 in the top edge of flange or leaf 44. Bore 56 (paired) are approximately parallel to one another. The distance between bores 56 is not greater than the distance across the end face 21 of cap 22, and the distance of each bore 56 from aperture 48 is approximately equal.

Here, when the fluid pressure cylinder 12 is mounted on the base 16, opposed faces of tongues 24 slip over the top edge of leaf 44 and loosely engage each face of leaf 44.

The cylinder 12 is positioned so that apertures 26 in tongues 24 align with aperture 48 in leaf 44. Then a cross pin 58 is slipped through the aligned apertures. Conveniently, cross pin 58 is equipped with a stop bar 60 which pierces an end region of pin 58. Stop screws 50 are then adjusted so as to butt up against the end face 21 of bottom cap 22. Usually, fluid pressure cylinder 12 is positioned by means of stop screws 50 so that the axis of fluid pressure cylinder 12 is perpendicular to the base plate 42. The resulting assembly of fluid pressure cylinder 12 and base 16 is locked against tilting movement of the fluid pressure cylinder 12 relative to the base 16 about the axis of cross pin 58.

The head 18 is composed of a plate 62, generally rectangular in shape, to the bottom face of which, along a hypothetical center-line, is fastened the top edge of a flange or leaf 64. Flange 64 has an aperture 66 positioned in the bottom mid-region of its side along a hypothetical center-line.

In the bottom edge of flange or leaf 64 is mounted a pair of adjustable stop screws 68. In the embodiment shown, each stop screw 68 comprises a bolt having a head portion 70 and a threaded shank portion 72. Each stop screw 68 screws into a threaded bore 74 (pair) in the bottom edge of flange or leaf 64. The bores 74 are so positioned that the respective distance of each from aperture 66 is approximately equal and the distance between bores 74 along the bottom edge 76 of flange 64 is not greater than the width across the inside of base 36 of U-shaped element 34. The bores 74 are so positioned in flange 64 as to make the stop screws upwardly diverging. The angle each bore makes with respect to the hypothetical center-line passing through flange 64 is approximately equal. Such an arrangement generally aids in stabilizing head 18 on piston rod 14 in the assembled jack mechanism 10.

When the head 18 is mounted on the piston rod 14, opposed faces of tongues 38 of U-shaped element 34 slip over the top edge of flange or leaf 64 and loosely engage each face of leaf 64. The cylinder 12 is positioned so that apertures 40 in tongues 38 align with aperture 66 in leaf 64. Then, a cross pin 78 is slipped through the
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aligned apertures. Conveniently, cross pin 78 is equipped with a stop bar 80 which pierces an end region of pin 78. Stop screws 68 are then adjusted so as to butt up against the inside of base 36 of U-shaped element 34. Usually, the head plate 62 is positioned by means of stop screws 68 so that the axis of fluid pressure cylinder 12 is perpendicular to the head plate 62. When desired, the stop screws may be adjusted to dispose the head at an oblique angle relative to the piston rod 14. The resulting assembly of fluid pressure cylinder 12 and head 18 is locked against tilting movement of the fluid pressure cylinder 12 relative to the head 18 about the axis of cross pin 78.

Any conventional materials of construction can be used in manufacturing the head and base elements; although, it is preferred that metals be employed. Conveniently, the various components of the respective base 16 and head 18 can be welded together.

It will be appreciated that, while the above description has been made by reference to a particular type of fluid cylinder, any fluid pressure cylinder of the type conventionally found around a farm and which has bifurcated ends can be used for the lifting mechanism of this invention. As, similarly, while the foregoing description has been made in reference to a particular respective head and base construction, it will be appreciated that any conventional head or base structure can be used so long as it has the adjustable stop screws positioned therein to stabilize and prevent tilting of the fluid pressure cylinder with respect to the head and base.

In summary, the lifting assembly of the present invention comprises a generally upstanding fluid pressure cylinder including a piston equipped plunger rod, said cylinder having a bifurcated mounting element at its lower end, and said plunger rod having a bifurcated mounting element at its upper end means for introducing fluid under pressure into the lower end of said cylinder; a base having a generally upstanding leaf adapted to be received in a bifurcated end of said cylinder, the upper edge of the said leaf having mounted therein a pair of adjustable stop means, each adapted to abut against such bifurcated cylinder end; and a head having a generally depending leaf adapted to be received in the other bifurcated end of said cylinder, the lower edge of said leaf having a pair of adjustable stop means mounted therein, each adapted to abut against such bifurcated cylinder end. The opposite bifurcated mounting elements of the fluid pressure cylinder and the piston rod, respectively, and the respective base and head members have aligned apertures extending therethrough in directions generally normal to the axis of the fluid pressure cylinder for cross pins to slidable extend therethrough.

I claim:

1. A jack comprising
   (a) a generally upstanding fluid pressure cylinder having a piston positioned therein for reciprocal movements, said piston having a plunger rod projecting through the upper end of said cylinder,
   (b) a pair of spaced, parallel, projecting tongues mounted on the bottom end of said cylinder,
   (c) a first pair of crosswise-extending aligned apertures, one through the side of each such tongue,
   (d) a U-shaped element whose base is centrally mounted on the exposed end of said plunger rod,
   (e) a second pair of crosswise-extending aligned apertures, one through each side of said U-shaped member,
   (f) a base having a bottom plate and an upstanding leaf, said upstanding leaf being adapted to extend between said pair of tongues and having an aperture aligned with the aperture in each tongue,
   (g) a head having a top plate and a depending leaf, said depending leaf being adapted to extend between the sides of said U-shaped element and having an aperture aligned with the aperture in each such side,
   (h) a bottom pin and a top pin, each slidable extending through such respective aligned apertures,
   (i) a pair of adjustable stop screws positioned in said upstanding leaf and adapted to so engage the bottom end of said cylinder as to prevent tilting movements of said cylinder on the axis of said bottom pin,
   (j) a pair of adjustable stop screws positioned in said depending leaf and adapted to so engage said U-shaped member as to prevent tilting movements of said cylinder on the axis of said top pin,
   (k) means for introducing and removing fluid into and from, respectively, said cylinder so as to produce reciprocatory movements of said plunger rod.

2. A jack comprising:
   (a) a fluid pressure cylinder having a lower mounting element at its lower end and including a pair of laterally spaced generally parallel depending lugs and a piston equipped plunger rod projecting upwardly from the upper end of said cylinder, said plunger rod having a mounting element at its upper end, including a pair of laterally spaced, generally parallel, upwardly extending lugs,
   (b) a base, including a plate and an upstanding wall element, said wall element being received at its upper portion in said lower mounting element, a pair of laterally spaced adjustable stop screws mounted in the upper portion of said wall element abutting said lower mounting element intermediate said depending lugs, and
   (c) a head, having a depending flange received in said upper mounting element of said plunger rod, the lower edge of said flange having mounted therein a pair of laterally spaced adjustable stop screws abutting said mounting element of said plunger rod intermediate said outwardly extending lugs.

3. The jack of claim 2 wherein the upstanding wall element of said base and the lower mounting element of said cylinder have alignable apertures extending therethrough, the depending flange of said head and the mounting element of said upwardly projecting plunger rod having alignable apertures extending therethrough; and in further combination with cross pins slidable extending through respective aligned apertures.

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