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REPLACEMENT CYLINDER FOR HYDRAULIC JACKS

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Fig. 1

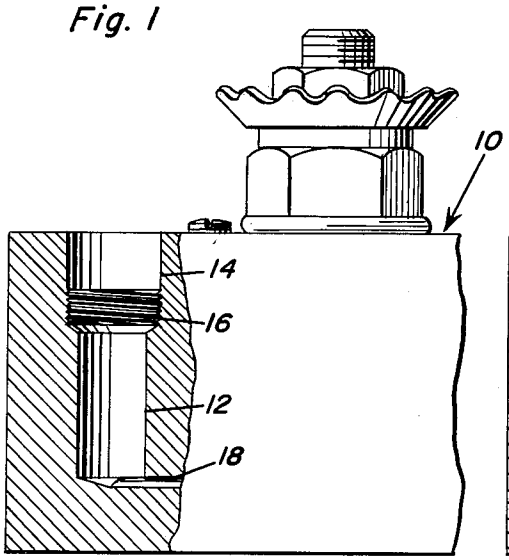


Fig. 2

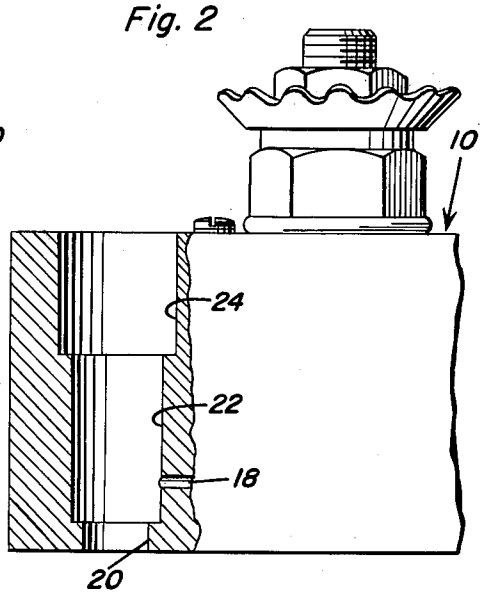


Fig. 3

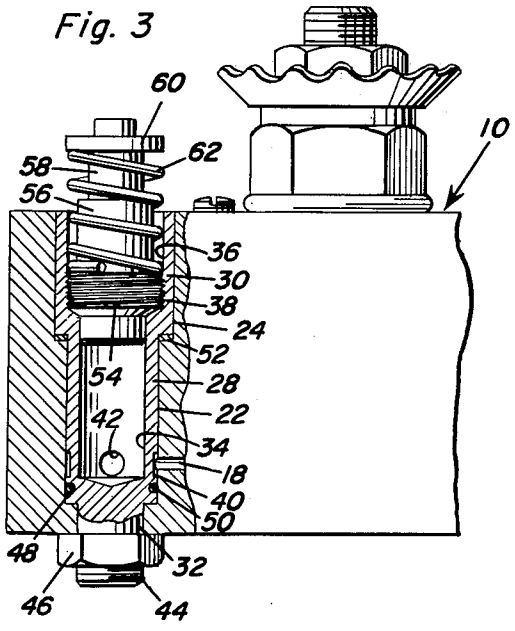
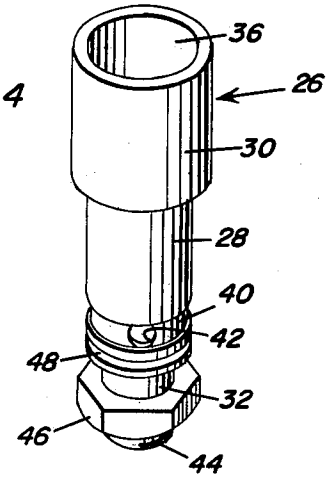


Fig. 4



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REPLACEMENT CYLINDER FOR HYDRAULIC JACKS

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This invention relates to a novel and useful replacement cylinder for hydraulic jacks and more particularly to a replacement cylinder which is adapted to be removably secured within a jack pump body to restore the worm surfaces of the pump body cylinder to its original dimensions and condition.

Many types of hydraulic jacks, and particularly those used for the purpose of raising and lowering motor vehicles to assist in the repair of the latter, are constructed in such a manner as to provide relatively long periods of trouble free operation. However, for various reasons such as the entrance of water or other foreign materials into the fluid passageways of the jack, the cylinder from which the fluid is pumped into the ram of the jack becomes pitted or scarred and thus rendered incapable of efficiently performing its function.

Such hydraulic jacks are initially relatively expensive and it is most desirable to be able to restore the jack to its original efficient condition without necessitating the replacement of the entire hydraulic system of the jack.

Of course, the pump cylinder could be quite readily bored oversize and provided with a similar oversized piston, but this would necessarily change the ratio between the area of the pump piston and the area of the ram piston which in some instances could be undesirable such as when the jack ram is required to move precise distances in response to a given travel of the pump piston. It would also require that hydraulic jack manufacturers maintain a supply of various dimensioned oversized pump pistons which would be economically undesirable.

Although the automotive industry has found it to be advantageous to provide oversized pistons for automobile engines, this would not be the case with the manufacturers of hydraulic jacks since there are different conditions present and a substantially smaller number of a given make of jack being manufactured which would necessarily maintain the cost of oversized hydraulic jack pump pistons relatively high because of the limited number that would be produced.

It is therefore the main object of this invention to provide a means whereby a hydraulic jack pump may have its cylinder replaced with a cylinder of identical internal dimensions.

A further object of this invention is to provide a replaceable pump cylinder for hydraulic jacks that may be installed in the pump body of a hydraulic jack with a minimum amount of alterations to the pump body.

Still another object of this invention, in accordance with the preceding objects, is to provide a replaceable hydraulic jack pump cylinder which may be itself readily replaced should the need arise.

A still further object of this invention is to provide a replaceable cylinder for a hydraulic jack pump which may be removed and/or replaced merely by the removal of one threaded fastener.

A final object to be specifically enumerated herein in accordance with the preceding objects is to provide a replaceable hydraulic jack pump cylinder that will conform to conventional forms of manufacture, be of simple construction, and easy to replace so as to provide a replaceable cylinder that will be economically feasible, long lasting and durable, and easy to replace by unskilled labor.

These together with other objects and advantages which will become subsequently apparent reside in the details

of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational view of a portion of a conventional form of hydraulic jack pump such as that utilized in the Hein-Werner models O, OS, W and WS hydraulic floor jacks, parts of the pump body being broken away and shown in section and the piston and piston guide assembly being removed;

FIGURE 2 is a side elevational view, similar to FIGURE 1, of the pump body but shown in a modified bored and counterbored condition in preparation for the securement of the replaceable cylinder comprising the instant invention therein;

FIGURE 3 is a side elevational view, similar to FIGURE 2, of the pump but with the replaceable cylinder shown secured therein and with the piston and piston guide assembly shown mounted in the replaceable cylinder; and

FIGURE 4 is an enlarged perspective view of the replaceable cylinder.

Referring now more specifically to the drawings, the numeral **10** generally designates a conventional form of hydraulic pump body, as for example that of the Hein-Werner models O, OS, W and WS, having a blind bore **12** formed therein provided with an enlarged outer counterbore **14** which is internally threaded as at **16** adjacent its junction with the bore **12**. A fluid passageway **18** communicates with the inner end portion of the blind bore **12** and serves as a passageway for hydraulic fluid to enter and exit from the blind bore or pump cylinder **12** under the operation of a piston therein.

It is to be understood that the passageway **18** also communicates with a fluid reservoir (not shown) and the hydraulic ram (not shown) of the jack, there being provided suitable check valves (not shown) between the blind bore **12** and the reservoir and the hydraulic ram.

The hydraulic pump shown in FIGURE 1 is typical of the conventional form of hydraulic pump used in certain conventional forms of hydraulic jacks and with attention directed more particularly to FIGURE 2 of the drawings it will be seen that in preparation to receive a removable or replaceable cylinder, the hydraulic pump body is bored as at **20** and provided with first and second counterbores **22** and **24** respectively.

The replaceable pump cylinder comprising the present invention is generally designated by the reference numeral **26** and includes a cylindrical body having an intermediate portion **28** terminating in a diametrically enlarged portion **30** on one end and a diametrically reduced portion **32** on the other end.

Formed in the cylindrical body and extending from the enlarged end portion **30** to a point adjacent the reduced end portion **32** is a blind bore **34** which is provided with an outer counterbore **36** that is internally threaded as at **38**.

The intermediate portion **28** is provided with a peripheral groove **40** which is in alignment with and communicates with passageway **18**. At least one aperture **42** is formed in the intermediate portion **28** of the cylindrical body **26** which communicates the blind bore **34** with the peripheral groove **40** in order to continuously communicate the blind bore **34** with the passageway **18**.

The diametrically reduced end portion **32** is threaded as at **44** and there is provided a threaded fastener **46** for the purpose of removably securing the cylindrical body **26** within the pump body **10**.

The intermediate portion **28** is also provided with an annular groove **48** in which is seated an O-ring **50** for the purpose of providing a fluid seal between the intermediate portion **28** and the first counterbore **22**.

The diametrically enlarged portion 30 is shorter than the second counterbore 24 and there is disposed between the shoulder of the diametrically enlarged end portion 30 and the adjacent shoulder of the pump body 10 an annular fluid seal 52 for the purpose of establishing a fluid seal between the intermediate portion 28 and the second counterbore 24.

Seated in the threaded portion 38 of the enlarged bore 36 is a piston guide 54 having a bore (not shown) formed therethrough for the purpose of guiding the pump piston 56 during its reciprocatory movement in the blind bore 34. The upper portion of the piston 56 is provided with a diametrically reduced end portion 58 to which is secured in any convenient manner a retaining washer 60 between which and the piston guide 54 is disposed a compression spring 62 for the purpose of normally urging the piston 56 toward a position with its lower or inner end in the upper or outer portion of the blind bore 34.

It is to be understood that the counterbores 20 and 24 are of sufficient diameter to enable a cylindrical body 26 to be snugly received therein with a blind bore 34 and enlarged bore 36 formed therein equal in dimensions to the original blind bore 12 and counterbore 14 so as to enable the pump body 10 to be restored to its original operating condition with a piston 56 of the same diameter as the original piston. Further, it is to be noted that once the pump body 10 has been modified by the provision of the bore 20 and counterbores 22 and 24, that the replaceable cylindrical body 26 may itself be readily replaced merely upon the removal of the threaded fastener 46. In this manner, whenever it becomes necessary, the pump cylinder and the piston and guide assemblies may be readily replaced by relatively unskilled labor.

It is to be understood that the replaceable cylinder 76 may also be incorporated in the manufacture of new jacks which would enable the replacement of the original cylinder much faster with great ease. Incorporation of the replaceable cylinder 24 in new jacks would eliminate the need for boring out the pump body when the cylinder is replaced. Further, the enlarged end portion 30 can be made shorter in length to provide a recess for receiving a flexible boot or sectional metal dust shield in the upper end of the counter bore 24 to provide a means for restricting the entrance of foreign material into the hydraulic jack system.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination with a pump body of the type having a body bore formed therethrough having first and second counterbores and with a fluid passage in said body communicating with said first counter bore, a fluid pump comprising a cylindrical body having an intermediate portion with diametrically enlarged and reduced end portions on opposite ends, said cylindrical body having a longitudinal blind bore formed therein and terminating at its inner end adjacent said reduced portion, the outer end of said blind bore including an enlarged counter bore disposed in said enlarged portion, a cylindrical piston guide, means removably securing and seating said piston guide in said enlarged bore adjacent the inner end thereof, the inner surfaces of said guide forming continuations of the non-countered bore portion of said blind bore, a piston slidably disposed in said piston guide and extending into said blind bore, means normally urging said piston outwardly towards a position with the inner end thereof extending slightly into said last-mentioned non-counterbored portion of said blind bore, said intermediate and enlarged portions of said cylindrical body snugly received and seated in said first and second counterbores with said reduced portion snugly received in and extending through said pump body bore, means communicating the inner portion of said blind bore with said fluid passage, and means securing the reduced portion of said cylindrical body through said pump body bore.

2. The combination of claim 1 wherein said communicating means comprises a peripheral groove formed in said intermediate portion registering with said fluid passage, at least one connecting aperture formed in said cylindrical body communicating said groove with said blind bore.

3. The combination of claim 1 wherein said piston guide is threadingly engaged in said counterbore of said cylindrical body.

4. The combination of claim 1 including a fluid seal between said pump body and said cylindrical body intermediate said fluid passage and the remote end of said body bore.

5. The combination of claim 1 including a fluid seal between said pump body and said cylindrical body intermediate said fluid passage and the remote end of said second counter bore.

6. The combination of claim 1 including a fluid seal between said pump body and said cylindrical body intermediate said fluid passage and the remote end of said body bore, a fluid seal between said pump body and said cylindrical body intermediate said fluid passage and the remote end of said second counterbore.

7. The combination of claim 1 wherein said reduced portion is externally threaded, said securing means comprising a threaded fastener.

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