

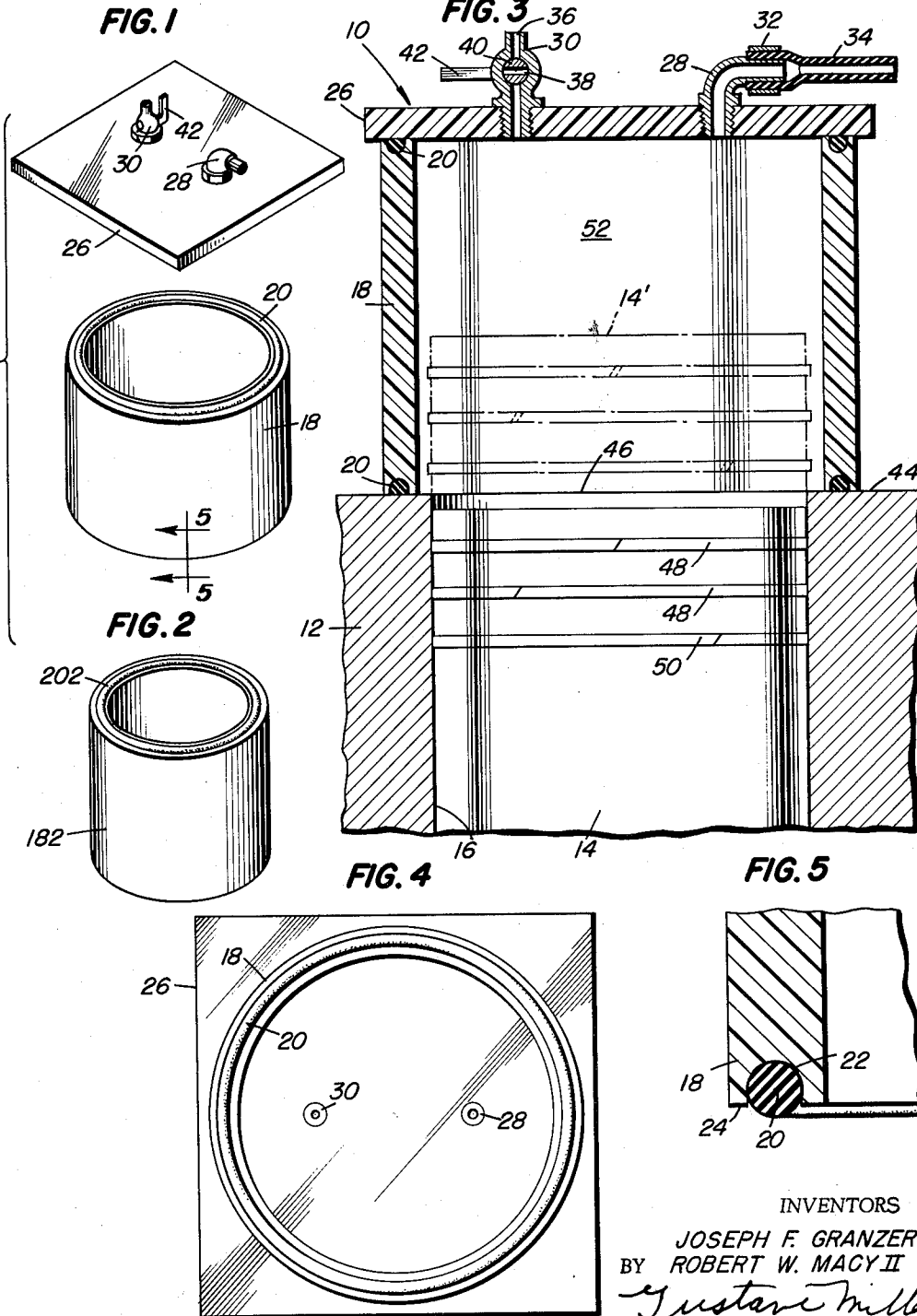
June 16, 1964

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3,137,060

PISTON PULLING DEVICE

Filed Oct. 24, 1962



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3,137,060

PISTON PULLING DEVICE

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Filed Oct. 24, 1962, Ser. No. 232,817

8 Claims. (Cl. 29—200)

This invention relates to a piston pulling device and has for an object to provide an improved device for pulling a piston from a cylinder block, the cylinder block being of any conventional type such as an internal combustion engine, a diesel engine, or any type of block wherein a piston is reciprocable within the cylinder in the block and is difficult to remove therefrom for repair or replacement.

A further object of this invention is to provide a piston pulling device which is extremely simple in construction and operation, is comparatively inexpensive to manufacture and utilizes a novel combination of elements to provide a very satisfactory device for pulling or removing a piston from a cylinder in a block.

Still a further object of this invention is to provide a piston pulling device which utilizes a particular size of sleeve for a particular size of block, but which may be made in a set with several sizes of sleeves for correspondingly cooperating with several sizes of cylinders and pistons therein while the remaining part of the device may be cooperative with any one of the several sizes of sleeves.

Still a further object of this invention is to provide a piston pulling device which will utilize any suitable source of vacuum for creating a vacuum on the top of a piston in a cylinder block with the bottom side of the piston exposed to the atmosphere so that as the vacuum is progressively increased on top of the piston, it will be pulled upwardly out of the cylinder until the bottom-most piston ring is about the plane of the top of the cylinder block, whereupon the device may be removed from the cylinder block and the piston may be readily grasped by the hand or by a suitable tool to completely remove it from the cylinder block.

Still a further object of this invention is to provide a valve vacuum operating device for pulling a piston at least partially out of the cylinder of a cylinder block, which may use any suitable source of vacuum, such as from the intake manifold of a naturally aspirated internal combustion engine or a small vacuum pump which has the power to pull eighteen to twenty inches of vacuum.

Still a further object of this invention is to provide a vacuum-operated piston pulling device wherein the amount of vacuum effective on the piston for pulling it upwardly may be controlled by a suitable valve for progressively increasing the vacuum by progressively reducing a connection from the vacuum to the atmosphere.

With the above and related objects in view, this invention consists in the details of construction and combination of parts as will be more fully understood from the following description, when read in conjunction with the accompanying drawing in which:

FIG. 1 is an exploded perspective view of the piston pulling device of this invention.

FIG. 2 is a perspective view of a smaller size sleeve.

FIG. 3 is a sectional view through the piston pulling device in operative position on a cylinder block.

FIG. 4 is a bottom plan view of the device.

FIG. 5 is a sectional view on line 5—5 of FIG. 1.

There is shown at 10 the piston pulling device of this invention which is to be used in connection with any type of cylinder block 12 where it is desired to remove a piston 14 from a cylinder 16 in the block 12. The piston pulling device of this invention consists of a sleeve 18 having an

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internal diameter somewhat greater than the diameter of the cylinder 16 and of the piston 14. The sleeve 18 is of sufficient gauge that an O-ring 20 can be located in a complementary recess 22 formed in the peripheral end of the top and the bottom thereof, the O-ring 20 normally projecting beyond the peripheral end 24, as seen in FIG. 5, when not assembled in operative position.

A polygonal shaped cover 26, here shown as square, and having a minimum diameter at least slightly greater than the outside diameter of the largest sleeve 18 with which it is to be used, is provided for cooperating with the top end of the sleeve 18 against the O-ring 20 thereon. Obviously, the cover may be of any other regular polygonal shape, such as hexagonal, octagonal, circular, etc.

Symmetrically placed on cover 26 and secured therein by being threaded therethrough is a vacuum nipple 28 and a control valve body 30. The nipple 28 is shown as elbow shaped for convenience and secured on the outer end of the nipple 28 as by a ring band 32 is a vacuum hose 34 whose other end, not shown, is arranged to be secured to any suitable source of vacuum, such as from the intake manifold of a naturally aspirated internal combustion engine or of a small vacuum pump of sufficient strength to create eighteen to twenty inches of vacuum. The valve body 30 has a bore 36 therethrough cooperating with a bore 38 is a rotary valve 40 whose position is controllable by a manual handle 42.

In FIG. 2, there is shown a sleeve 182 having an O-ring 202 mounted in a recess in each end thereof, the sleeve 182 differing from the sleeve 18 only in its diameter being smaller than the sleeve 18. Obviously, any number of sleeves may be included as part of a single set, all differing in a single cover 26 so long as the internal diameter of the particular sleeve used is at least slightly greater than the distance between the threaded openings in the cover 26 through which the elbow nipple 28 and the valve body 30 are threaded. This will make a single kit suitable for a variety of sizes of cylinders and pistons.

In operation, the sleeve of appropriate size with each of the O-rings 20 in place is placed on the cylinder block 12 after the top 44 thereof has been suitably cleaned to provide a plane contacting surface. The cover 26 is similarly placed on the top end of the sleeve 18 with the handle 42 in the open position shown in FIG. 1 and the vacuum hose 34 is connected to the suitable source of vacuum. Then, the handle 42 is manually slowly operated toward the closed position to create a vacuum on the top 46 of the piston 14 until the piston 14 is lifted or pulled to the position wherein its piston rings 48 and 50 are lifted above the top 44 of the cylinder block until the lower-most piston ring 50 is clear of the top 44 of the cylinder block.

The bottom of the cylinder 16 being open to atmosphere, the vacuum created at 52 within the sleeve 18 and cover 26 will thereby be broken whereupon the vacuum through nipple 28 will be disconnected and the rotary valve handle 42 will be moved from the closed or partly closed position, shown in FIG. 3, to the fully opened position, shown in FIG. 1, thereby fully equalizing the pressure at 52 within the device 10 with the atmosphere and permitting both the cover 26 and sleeve 18 to be readily removed from the top 44 of the cylinder block 12, thus leaving the piston 14 now in the position shown in dashed outline at 14' capable of being readily removed, either manually, if necessary, particularly if weighty, by a suitable tool, there now being an ample portion of the piston 14 extending above the cylinder block 12.

Obviously, to keep the cost at a minimum for use with several sizes of cylinders, the sleeve 18 is made separable from the cover 26, the O-ring 20 being sufficient to seal the cover to the sleeve just as the sleeve is sealed to the

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top of the cylinder block as soon as the vacuum is connected through the vacuum nipple 23. However, it is obvious that the cover 26 could be permanently connected to the sleeve 18, but that the O-ring 20 is necessary for temporary sealing of the bottom of the sleeve 18 to the top of the cylinder block. In addition, while the valve body and the vacuum nipple are separately connected through the cover through separate threaded ports therein, these threaded ports might be located through the sleeve 18 and also that a combination single nipple and valve body of conventional constructions could be provided with a rotary valve for connecting the vacuum tube either to the space inside the device or to atmosphere or progressively to both in a regulated degree at the same time, the degree being determined by the rotation of the valve hand by utilizing a suitable conventional rotary type of valve. However, the construction shown is the preferred type of construction and most convenient for operation.

Although this invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. A piston pulling device for removing a piston from a cylinder of a cylinder block comprising a sleeve having a diameter sufficiently larger than the diameter of the cylinder so that one end of the sleeve may rest on the cylinder block about the cylinder from which the piston is to be removed, a cover closing the other end of said sleeve, and means through which a vacuum may be created and may be relieved within the sleeve above the piston, whereby creating the vacuum in the sleeve will lift the piston in the cylinder at least partially into said sleeve,

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and relieving the vacuum will permit the sleeve to be removed from the cylinder block to allow access to the lifted piston extending at least partially above the cylinder block.

2. The device of claim 1, and sealing means at the bottom periphery of said sleeve for cooperating with the cylinder block.

3. The device of claim 2, said sealing means comprising an O-ring partially recessed into an annular recess in the periphery of said sleeve.

4. The device of claim 3, and a similar sealing means at the top end of said sleeve for cooperation with said cover.

5. The device of claim 1, said means comprising a nipple extending to the space within the sleeve.

6. The device of claim 5, and a control valve connected to the space within the sleeve.

7. The device of claim 6, said nipple and said valve being separately connected through said sleeve cover and a vacuum hose connected to said nipple.

8. A pulling device for removing a piston from a cylinder of a cylinder block comprising a sleeve having a diameter of a size to have one end thereof restable on the cylinder block about the cylinder from which the piston is to be removed, both ends of said sleeve being open, a sealing O-ring recessed into the periphery of each end of said sleeve to extend therefrom, a cover plate removably placed over the other end of said sleeve, a vacuum connecting nipple extending through said cover, and a vacuum relief valve extending through said cover.

References Cited in the file of this patent

UNITED STATES PATENTS

35	2,101,996	Gerstenberg	Dec. 14, 1937
	2,799,318	Blucher et al.	July 16, 1957