April 10, 1962 J. F. SHEPANSKI 3,028,664

SLEEVE INSTALLING TOOL

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Fig.1

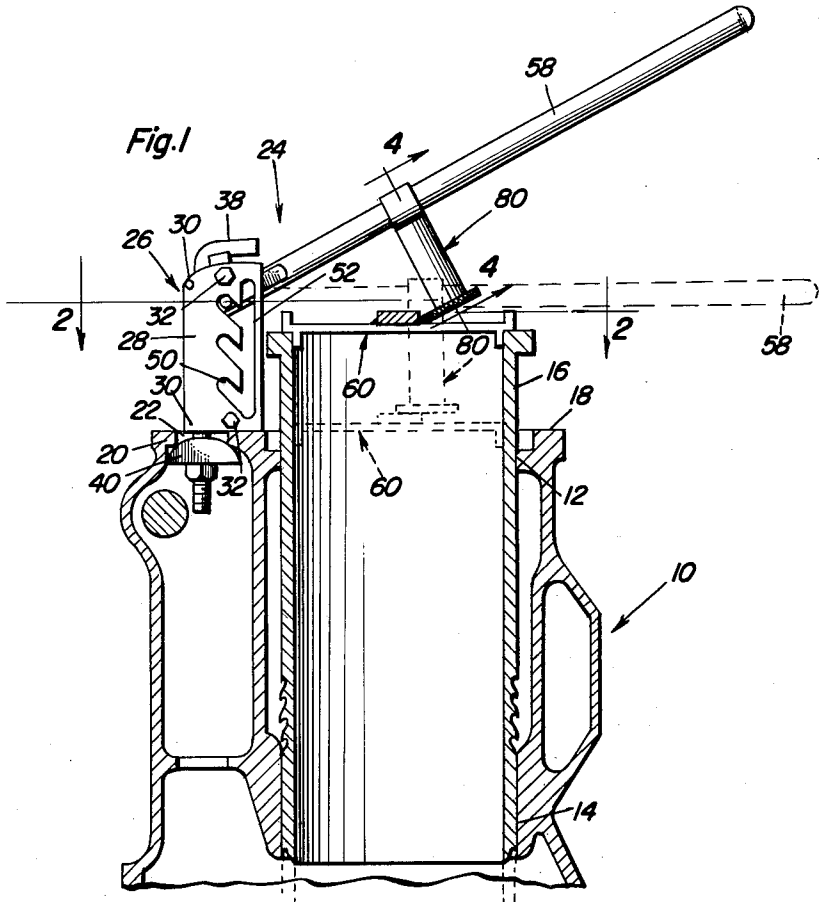


Fig.4

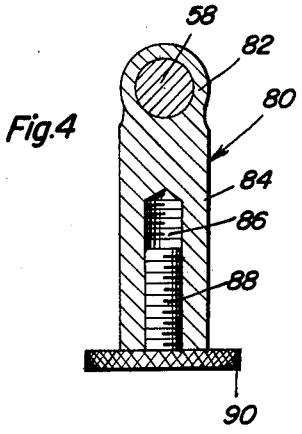
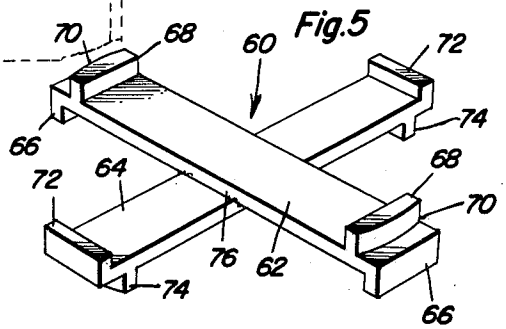


Fig.5



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Fig.2

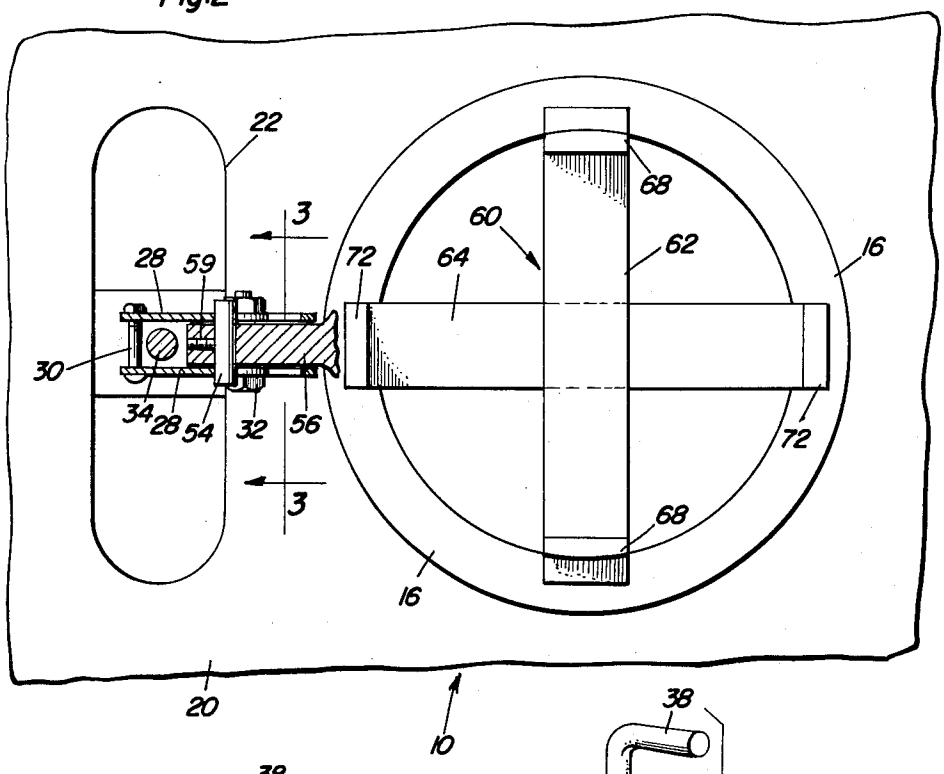
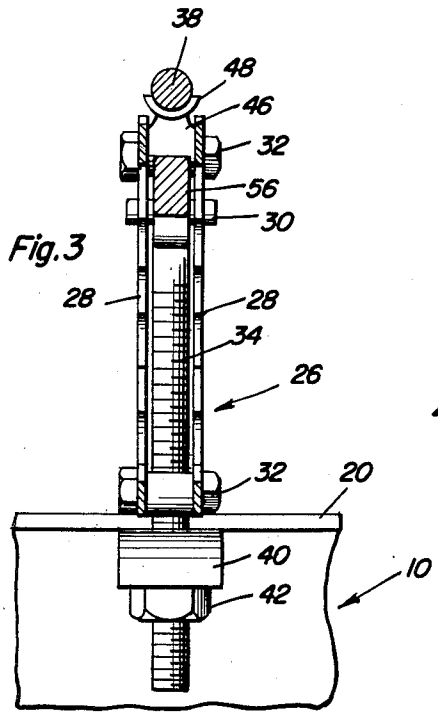


Fig.3



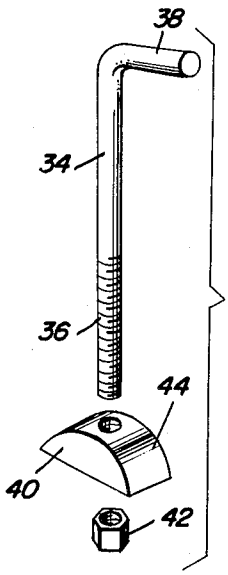


Fig.6

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SLEEVE INSTALLING TOOL

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This invention relates in general to new and useful improvements in tools for use in conjunction with internal combustion engines, and more specifically to an improved sleeve installing tool.

Many types of internal combustion engines, particularly diesel engines, are provided with wet sleeves. During an overhaul, after these sleeves have been worn, it is necessary that they be removed and replaced with new sleeves. The customary practice of replacing new sleeves is to place a block of wood on the top of the sleeve and to drive it in place by means of a hammer. This is undesirable for two reasons. First, by driving on the block of wood, there is the possibility of distorting the sleeve. Secondly, as the wooden block is driven down onto the sleeve, chips of the wooden block fall through the sleeve and down into the internal combustion engine.

It is therefore the primary object of this invention to provide a sleeve installing tool, the sleeve installing tool including a stand which may be anchored relative to the engine block and the stand having pivotally connected thereto a lever arm which is provided with a sleeve engaging fitting so that pressure may be exerted directly on the lever arm to force the sleeve into place in the engine block.

Another object of this invention is to provide a sleeve installing tool which is primarily intended for use in conjunction with an internal combustion engine block which has a push rod opening in the upper surface thereof immediately adjacent the cylinder, the sleeve installing tool including a stand having a fastener which will pass through the push rod opening and engage the interior of the block so as to anchor the stand on the block, the stand having pivotally connected thereto a lever arm which is provided with a sleeve engaging fitting whereby the lever arm may be moved downwardly so as to press the sleeve into place in the cylinder block.

A further object of this invention is to provide a sleeve installing tool for internal combustion engines, the sleeve installing tool including a stand having means for securing the stand on the top of the internal combustion engine block, the stand carrying a pivot pin to which there is secured a lever arm, the stand having a plurality of vertically spaced seats for the pivot pin whereby the pivotal end of the lever arm may be vertically adjusted, and the lever arm being provided with means for engaging a sleeve whereby the lever arm may be used for directly pushing a sleeve into place.

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 sectional view taken through an internal combustion engine and shows a sleeve thereof in the process of being installed utilizing the sleeve installing tool which is the subject of this invention;

FIGURE 2 is an enlarged fragmentary horizontal sectional view taken substantially upon the plane indicated by the section line 2—2 of FIGURE 1 and shows both

the specific details of an adapter for engaging the sleeve being installed and the specific relationship between the lever arm, the lever arm pivot pin and the stand;

FIGURE 3 is an enlarged fragmentary sectional view taken substantially upon the plane indicated by the section line 3—3 of FIGURE 2 and shows the manner in which the stand is removably secured to the block;

FIGURE 4 is an enlarged fragmentary sectional view taken substantially upon the plane indicated by the section line 4—4 of FIGURE 1 and shows the specific details of a fitting carried by the lever arm for engaging the cylinder sleeve adapter;

FIGURE 5 is an enlarged perspective view of the cylinder sleeve adapter; and

FIGURE 6 is an enlarged exploded perspective view showing the details of the fastener for securing the stand to the engine block.

Referring now to the drawings in detail, it will be seen that there is illustrated in FIGURES 1 and 2 a conventional type of engine block which is referred to in general by the reference numeral 10. The engine block 10 is provided with vertically alined surfaces 12 and 14 which form guides for a sleeve 16 and which engage the sleeve 16 in sealing relation so as to form a water-tight seal between the block 10 and the cylinder sleeve 16. The block 10 also includes a top surface 18 which is formed by a top wall portion 20. Opening through the top surface 18 adjacent the sleeve 16 is an elongated push rod opening 22, as is best shown in FIGURE 2.

The sleeve installing tool which is the subject of this invention is referred to in general by the reference numeral 24 and is particularly designed to take advantage of the elongated push rod opening 22 in the top wall 20 of the block 10. The sleeve installing tool 24 includes a stand, which is referred to in general by the reference numeral 26, the stand being seated on the top wall surface 18 in overlying relation to the push rod opening 22. The stand 26 is of an open construction and is formed of a pair of side plates 28 connected together along the rear edges thereof by bolts 30 and adjacent the center thereof by means of bolts 32.

Extending down between the plates 28 is an elongated clamp rod 34 which has a threaded lower portion 36 and an offset upper portion 38. The threaded lower portion 36 passes through a clamp member 40 and has threadedly engaged in the lower end thereof a nut 42. The clamp member 40 has a cam shaped upper surface 44 and is of a rectangular outline in plan.

Carried by the uppermost one of the bolts 32 is a fitting 46 which terminates in an uppermost upwardly opening socket 48. The socket 48 is positioned to receive the offset upper end 38 of the rod 34.

The stand 26 is releasably secured to the block 10 in the position illustrated in FIGURE 1 by placing the clamp member 40 through the push rod opening 22 and then rotating both the rod 34 and the clamp member 40 so that as the clamp member 40 cams under the upper wall 20, the upper portion 38 of the rod 34 will snap into the socket 48. Thus the stand 26 is clamped to the top wall surface 18 of the block 10 in an upstanding position.

Formed in each of the side plates 28 is a plurality of upwardly sloping seats 50. The seats 50 are connected together by means of a vertical guideway 52. Extending between the plates 28 and seated in one of the seats 50 is a pivot pin 54. The pivot pin 54 is releasably secured to a flattened end portion 56 of a lever arm 58 by means of a setscrew 59. The flattened end portion 56 of the lever

arm 58 extends between the plates 28 and is pivotally mounted with respect to the stand 26 by means of the pivot pin 54. Inasmuch as the pivot pin 54 is of a length greater than the spacing between the plates 28, it will be seen that the pivot pin 54 cannot be removed from the stand 26 until it is removed from the lever arm 58.

For a reason to be described in more detail hereinafter, it is desirable under operating conditions to vary the vertical position of the pivot pin 54. This is accomplished by locating the pivot pin 54 in one of the seats 50. The pivot pin 54 may be moved between the seats 50 by sliding it out of its respective seat 50 into the guideway 52 and then into the desired seat 50.

The sleeve installing tool 24 also includes a sleeve adapter which is referred to in general by the reference numeral 60. The sleeve adapter 60 is formed of a pair of crossbars 62 and 64, the crossbar 62 being disposed uppermost when viewed in FIGURE 5. The crossbar 62 is provided at the ends thereof in downturned flanges 66. Secured to the upper surface of the crossbar 62 inwardly of the ends thereof are guide lugs 68. The guide lugs 68 have outer surfaces 70 which are contoured to conform to the inner surface of the sleeve 16.

The crossbar 64 is identical with the crossbar 62, but is inverted relative thereto. The crossbar 64 is provided with upturned ends 72. Secured to the underside of the crossbar 64 adjacent the ends thereof are lugs 74 which correspond to the lugs 68. The crossbars 62 and 64 are secured together as by welding 76.

By making the crossbars 62 and 64 of the adapter 60 identical, it will be readily apparent that the adapter 60 is reversible. Furthermore, the crossbars 62 and 64 aid each other in the centering and engagement of the cylinder sleeve 16.

Slidably carried by the lever arm 58 is a fitting which is referred to in general by the reference numeral 80. The fitting 80 includes a sleeve 82 through which the lever arm 58 passes. Depending from the sleeve 82 is a body member 84 which is provided with an internally threaded bore 86. Threadedly engaged in the bore 86 is a screw portion 88 of a head 90. The head 90 is intended to engage the center of the adapter 60 to transfer a force from the lever arm 58 to the adapter 60. By varying the effective length of the fitting 80, the proper engagement between the fitting 80 and the adapter 60 may be accomplished. Inasmuch as the fitting 80 is slidable along the lever arm 58, it may be alined with the adapter 60 as is necessary.

From the foregoing, it will be readily apparent that there has been devised a very simple sleeve installing tool, which sleeve installing tool is specifically designed whereby it may be secured to the upper surface of blocks of internal combustion engines having push rod openings in the upper surface adjacent the cylinders thereof and when installed on the block, the sleeve installing tool is permanently anchored so that there is no possibility of slippage. Furthermore, the operator of the sleeve installing tool may exert his entire pressure on the lever arm 58, there being no need to apply pressure to the stand 26 to hold it in place. In addition to this, the stand 26 by being provided with numerous vertical adjustments, permits the lever arm 58 to engage the cylinder sleeve at that point where it refuses to enter into the cylinder block 10 by manual pressure. Thus the cylinder installing tool 24 will overcome the normal difficulties encountered by the use of other sleeve installing tools.

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. For use with an engine block having an upper wall including an upwardly opening sleeve opening and an adjacent upwardly opening push rod opening, a sleeve installing tool, said sleeve installing tool comprising a hollow anchor stand having a base adapted to be supported on said upper wall and to overlie a portion of said push rod opening, an upstanding elongated clamp rod extending through said stand and adapted to extend downwardly through said push rod opening, retaining means carried by the lower end of said clamp rod adapted to be engaged with said block through said push rod opening and to prevent withdrawal of said rod from said opening, retaining means carried by said stand and releasingly engaging the upper end of said rod, a pivot pin carried by said stand, a lever arm pivotally connected to said stand by said pivot pin, and sleeve engaging means connected to said lever arm for use in the installation of a cylinder sleeve in said sleeve opening, said stand having a plurality of vertically spaced and communicated seats for said pivot pin whereby said pivot pin may be selectively vertically positioned.

2. The combination of claim 1 wherein said retaining means is adjustable longitudinally of said clamp rod.

3. The combination of claim 1 wherein said sleeve engaging means includes an adapter for seating on the upper end of a cylinder sleeve, and a fitting on said lever arm for engagement with said adapter.

4. The combination of claim 1 wherein said fitting is formed of adjustable telescoped sections whereby the length of said fitting may be varied.

5. The combination of claim 1 wherein said sleeve engaging means includes an adapter for seating on the upper end of a cylinder sleeve and for engagement by said fitting on said lever arm, said adapter including a pair of overlapped and crossed bars adapted to overlie the upper end of the cylinder sleeve, at least one of said bars having depending guide means on opposite ends thereof adapted to engage the inner surface of a cylinder sleeve, said other bar lapped over said one bar and provided with downturned abutment flanges at opposite ends thereof substantially equal in vertical length to the vertical thickness of said one bar and adapted to abut the end surfaces of a cylinder sleeve, said depending guide means being spaced inwardly of the opposite ends of said one bar whereby the lower surfaces of the extreme ends thereof outwardly of said guide means will also abut the end surfaces of a cylinder sleeve.

6. The combination of claim 5 wherein each of said bars are provided with guide means projecting from one side and abutment flanges projecting from the opposite side, said crossed bars being inverted relative to each other whereby said adapter is reversible.

7. A thrust adapter for effecting equal axial thrust to circumferentially spaced points about the end edges of a hollow cylindrical member, said adapter including a pair of overlapped and crossed bars adapted to overlie an end of a cylindrical sleeve, at least one of said bars having guide means on opposite ends thereof projecting laterally to one side of said bar and adapted to engage the inner surfaces of a cylindrical sleeve, said other bar lapped over the other side of said one bar and having laterally directed abutment flanges at opposite ends projecting laterally from said other bar toward said one bar a distance equal to the thickness of said one bar, the free ends of said abutment flanges adapted to abut the end surfaces of a cylinder sleeve, said guide means being spaced inwardly of the opposite ends of said one bar whereby the opposite end portions of the side of said one bar from which said guide means project will overlap and also abut the end surfaces of a cylindrical sleeve.

8. The combination of claim 7 wherein said guide means of each of said crossed bars includes laterally extending lugs having convexed remote surfaces.

9. The combination of claim 7 wherein each of said

bars are provided with guide means projecting from one side and abutment flanges projecting from the opposite side, said crossed bars being inverted relative to each other whereby said adapter is reversible.

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