

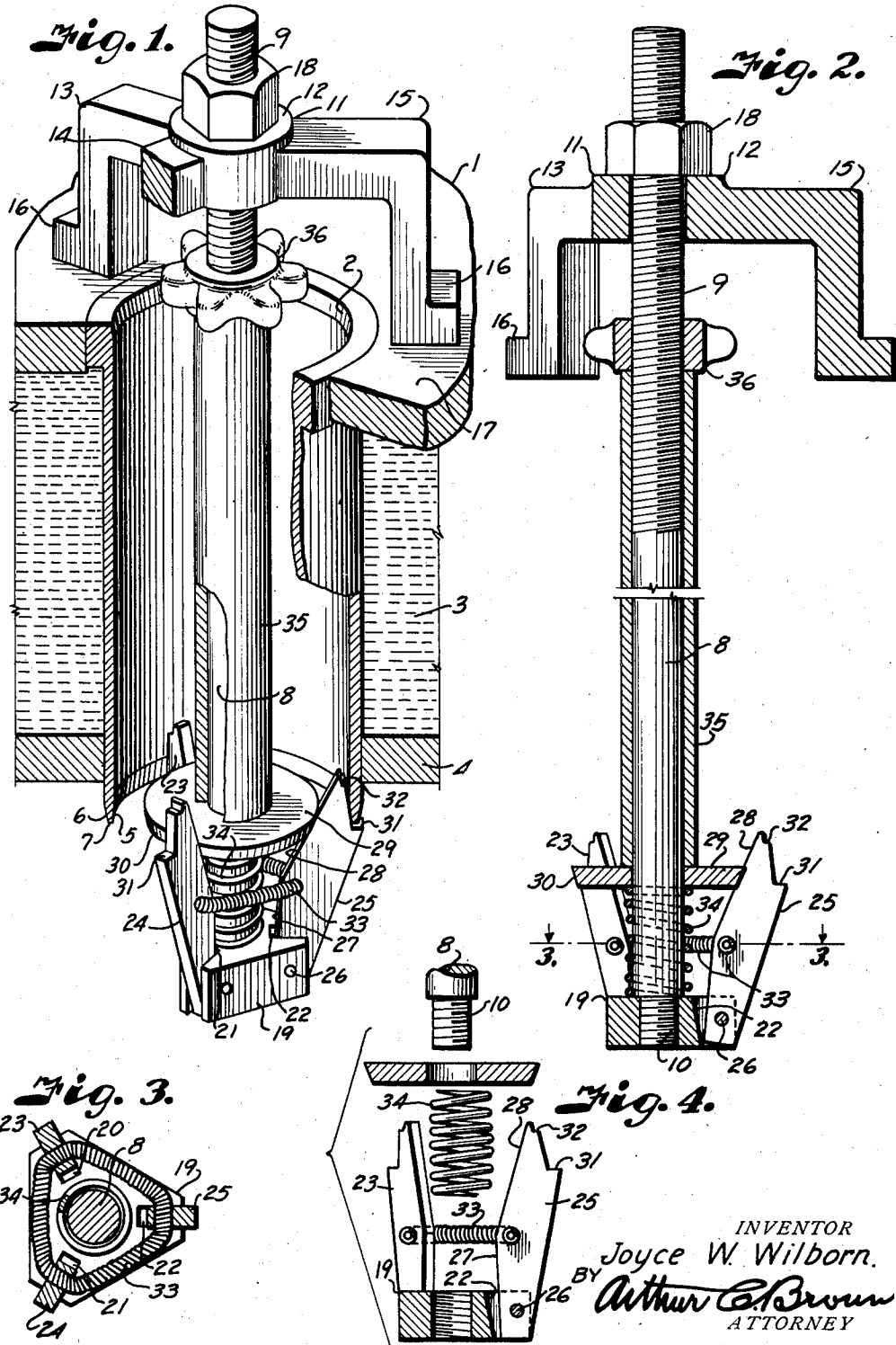
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SLEEVE EXTRACTOR

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SLEEVE EXTRACTOR

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1 Claim. (Cl. 29—88.2)

This invention relates to sleeve extractors and more particularly to devices of that character designed to remove sleeves, such as cylinder sleeves, from supports, such as cylinder blocks, the principal object of the present invention being to provide a convenient, economical and efficient extractor for such purpose.

Other important objects of the present invention are to provide for utilizing a support from which a sleeve is to be extracted as a tensioning base in withdrawing a sleeve therefrom; to provide for inserting the extractor into the sleeve from top to bottom for withdrawing the sleeve upwardly relative to the support; to provide for engaging the lower end of the sleeve in such a manner as to avoid mutilating the inner working surface of the sleeve; to provide for fitting the extractor to sleeves of various sizes; to provide for normally allowing sleeve engaging portions of the extractor to be maintained in contracted unengaged condition relative to a sleeve; to provide for facile repair and replacement of sleeve engaging portions of the extractor; to provide a sleeve extractor capable of employment by a single person; and to provide improved elements and arrangements of them in a sleeve extractor of the character and for the purpose noted.

In accomplishing these and other objects of the present invention, I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawing, wherein:

Fig. 1 is a fragmentary perspective view of a cylinder block and sleeve showing my improved sleeve extractor applied thereto, parts of the block, sleeve and extractor being broken away to more clearly illustrate the construction and arrangement of the several elements.

Fig. 2 is a vertical cross-section through portions of the sleeve extractor particularly illustrating the relation and construction of the sleeve extracting elements embodying my invention.

Fig. 3 is a horizontal cross-section through my improved sleeve extractor on the line 3—3, Fig. 2, particularly illustrating the manner of contracting the sleeve engaging elements of the extractor.

Fig. 4 is a detail vertical cross-section similar to the lower portion of the extractor illustrated in Fig. 2, certain of the elements thereof being shown in disassembled spaced relation to better illustrate their construction.

Referring more in detail to the drawing:

1 designates a cylinder block comprising apertured top and bottom walls in which a cylinder

sleeve 2 is mounted for forming, with the walls of the cylinder block, a water jacket 3 about the cylinder for cooling purposes. The sleeve 2 normally extends below the bottom wall 4 of the cylinder block, and is sometimes provided with tapered inner and outer faces 5 and 6 respectively at the lower end 7 of the sleeve.

Cylinder sleeves of the character noted often become rusted through contact with water in the water jacket about the sleeves, or warped due to unevenness of expansion and contraction as a consequence of extreme heats encountered in engines of which a cylinder block forms a part, or otherwise become in need of repair due to cracking and similar damage. It is, furthermore, sometimes very difficult to remove sleeves from the block, either from the fact of their becoming stuck in the block, or their being difficultly accessible to workers attempting to remove the sleeves from the block.

The present invention has therefore been provided for substantially alleviating the difficulties normally encountered, the invention preferably consisting in a post 8 having a threaded upper end 9 and preferably a reduced and threaded lower end 10. A yoke 11 is preferably mounted on the upper threaded end of the post, and may consist of a substantially cylindrical head 12, from which radial arms 13, 14 and 15 project laterally, the arms being turned downwardly at their outer ends and terminating in foot members 16 bearingly engageable upon the upper surface 17 of the top wall of the cylinder block 1 in spaced relation about an aperture in such wall in which the upper end of a sleeve 2 is mounted. A nut 18 may then be mounted on the upper threaded end of the post for seating engagement on the head 12 of the yoke, which nut is adapted for engagement by a suitable tool or wrench for threading the same downwardly on the post to draw the post upwardly as a result of bearing contact of the foot members of the yoke on the cylinder block.

A head 19, which is preferably of substantially triangular conformation is provided with a threaded aperture for adapting the head to be engaged with the lower reduced end of the post 9, it being apparent that heads of this character may be interchanged, if desired, when in need of repair or when, for example, different sizes of heads are necessary, depending upon the size of the sleeve to be extracted. The ends or corners of the head 19 are preferably provided with notches 20, 21 and 22 which extend vertically throughout the thickness thereof and extend in-

wardly relative to the corners a distance sufficient for receiving the lower ends of fingers 23, 24 and 25, which are provided with apertures alignable with aligned apertures extending through the notched portions of the head, and through which pins 26 may be extended for pivotally mounting the fingers on the head within the notches.

As a matter of practice, the pins 26 are preferably made of a material of predetermined strength relative to the block or sleeve, to the end that they may shear upon excessive strain being applied thereto, and thus avoid serious damage to the block or sleeve, should it be found impracticable to withdraw the sleeve or should, for example, the operator have improperly applied the extractor to the sleeve.

Each of the fingers 23 to 25 preferably consists of a plate like element of polygonal shape and having substantially vertically arranged inner lower edges 27, when the fingers are nested relative to each other, as shown in Fig. 4. Edges 28 of the fingers are arranged in outwardly extending angular relation to the edges 27 thereof to form an inwardly and downwardly tapering space therebetween, in which a ring plate 29 or the like is adapted to lodge.

The ring plate 29 has an inwardly and downwardly tapered periphery 30 for frictionally engaging the edges 28 of the fingers and forcing them outwardly upon extension of the ring plate downwardly toward the lower ends of the fingers. The upper outer ends of each of the fingers are preferably provided with set-backs forming shoulders 31 engageable with the lower end 7 of a sleeve, as shown in Fig. 1, and are further provided with additional set-backs forming secondary shoulders 32 which may be employed for engagement with sleeves or bushings, for example, under different extracting requirements.

The fingers 23 to 25 are normally maintained in contracted relation by a coil spring 33 which is mounted in horizontally aligned apertures in each of the fingers for resiliently urging them toward each other, as shown in Fig. 4.

In order to allow the fingers to normally nest relative to each other, a coil spring 34 is mounted on the post 8 and bears on the upper face of the head 19 between the fingers. The upper end of the spring bears against the lower face of the ring plate 29 and, as a consequence, urges the same upwardly in such a manner that the upper ends of the fingers may pivot inwardly under action of the spring 33.

In order to force the ring plate downwardly against tension of the spring 34 and thus expand or spread the fingers 23 to 25 into engagement with the lower end of a cylinder sleeve, a sleeve 35 is provided which is adapted to be mounted over the post 8 in such a manner as to

provide the lower end of the sleeve 35 with bearing engagement upon the ring plate 29. A star or like wheel 36 is also preferably threadedly engaged with the threaded end 9 of the post above the sleeve 35 and below the yoke 11, the star wheel being threadable up and down the post to allow the spring 34 to raise the sleeve 35 when the star wheel is moved upwardly and to provide for moving the sleeve 35 downwardly when the star wheel is threaded downwardly to depress the ring plate 29 and expand the fingers 23 to 25.

The operation of a sleeve extractor constructed as described is as follows:

The nut 18 and star wheel are threaded upwardly on the threaded end of the post 8 of the extractor a distance sufficient to respectively allow insertion of the fingered end of the extractor through a cylinder sleeve, for example, into a position convenient for engagement of the sleeve by the extractor fingers, the fingers when so positioned normally being in contracted or nested condition. The foot members of the yoke 11 rest on the upper face of the cylinder block and the star wheel is manipulated to thread the same downwardly and act on the sleeve 35 and ring plate 29 to expand the fingers in such a manner that the shoulders 31 and/or 32 of the fingers engage the lower end of the cylinder sleeve.

The nut 18 is then threaded downwardly and, due to the bearing engagement of the yoke on the cylinder block, the head 19 of the extractor must rise and in so doing withdraw the sleeve from the block. As soon as the sleeve has been loosened and raised sufficiently, it may be removed from the block and the extractor removed from the sleeve by reversely manipulating the star wheel 36 to allow disengagement of the fingers of the extractor relative to the sleeve. The operation thus described may then be repeated on other sleeves which need attention.

It is apparent, therefore, that a sleeve extractor that is convenient in operation by even one person, relatively economical, and highly efficient for its intended purpose has been provided by the present invention.

What I claim and desire to secure by Letters Patent is:

In a device of the character described, a post, a head mounted on one end of the post, fingers pivotally mounted on said head supportingly engageable with an end of a sleeve to be moved, a plate mounted on the post and engageable with the fingers for moving the fingers outwardly into engagement with the sleeve, means on the post adapted to move and allow movement of the plate, a spring bearing against said head and plate respectively for normally urging said plate out of engagement with said fingers, and a spring tending to contract the fingers relative to each other.

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