Oct. 14, 1952 R. G. KNUDSEN 2,613,983

SLEEVE PULLING DEVICE

Filed Sept. 23, 1947

Fig. 2.

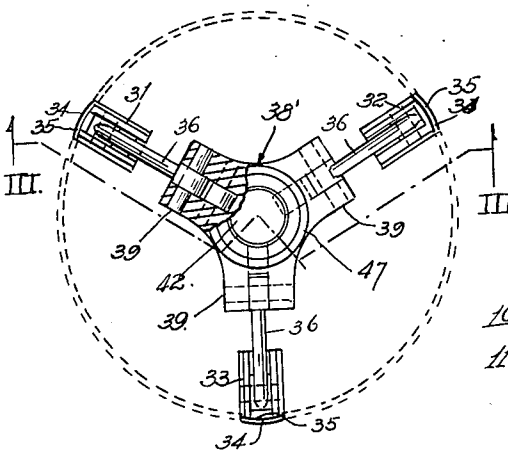


Fig. 1.

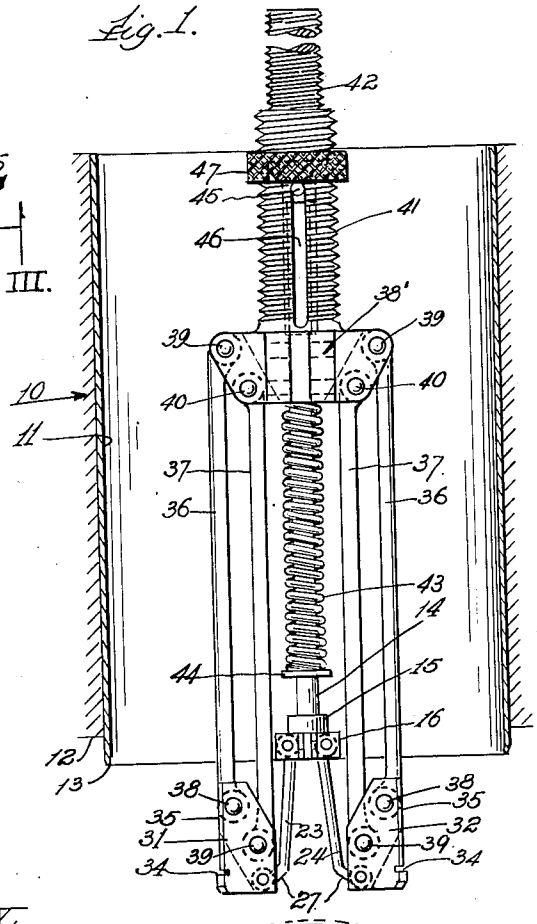


Fig. 3.

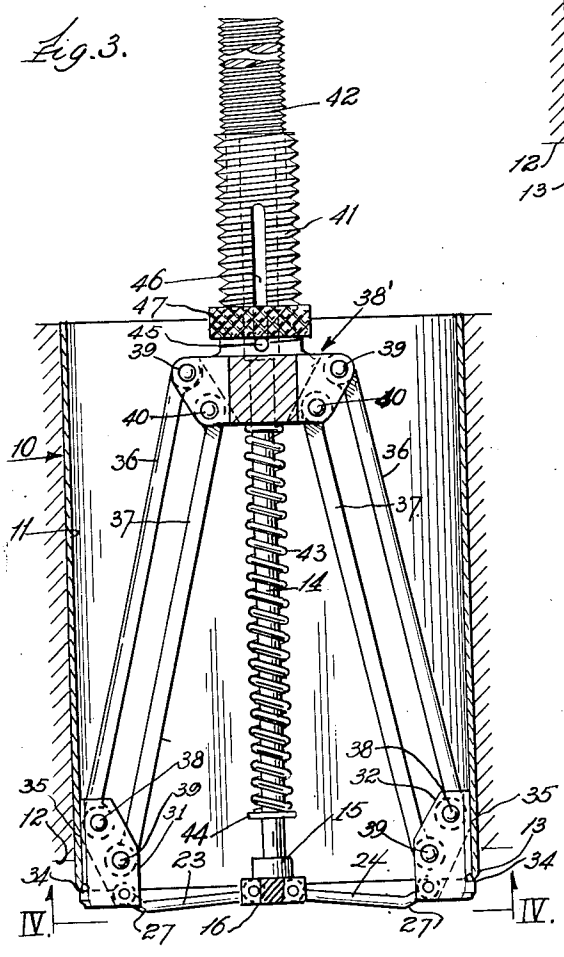
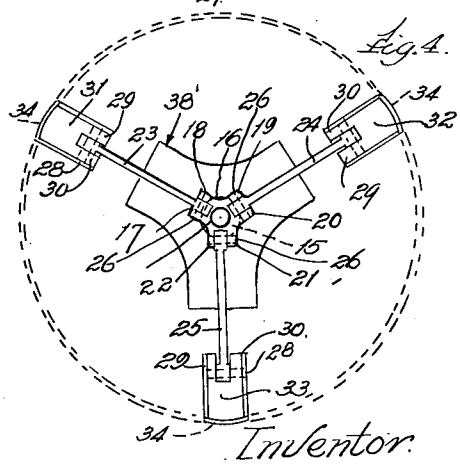


Fig. 4.



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SLEEVE PULLING DEVICE

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3 Claims. (Cl. 294—97)

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This invention relates to pullers and more particularly to cylinder sleeve pullers, although certain features thereof may be employed with equal advantage for other purposes.

It contemplates more especially the provision of improved pullers having remotely adjustable engaging jaws to enable their retraction and expansion relative to the rim of sleeves to effect engagement therewith.

Sleeve pullers are becoming increasingly popular owing to the fact that many internal combustion engines now resort to cylinder sleeves as a liner rather than bore precision cylinders directly in the engine block. In rebuilding engines having cylinder sleeve liners, it is only necessary to remove the cylinder sleeves that are press-fitted, in the cylinder bores, and this is readily accomplished with a power puller that is effective in engaging the inner or lower peripheral edge of the sleeve prior to exerting a power or mechanical pull thereon.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is to provide an improved cylinder sleeve puller having adjustable jaws that are link actuated for remote adjustment.

Still another object is to provide a sleeve puller having jaw adjusting expedients effective through multiple links to enable jaw retraction and expansion from an accessible position.

A further object is to provide an improved puller tool having adjustable jaws mounted on parallel links that are spring impelled to normally assume an extreme retracted position.

A still further object is to provide a puller tool with adjustable jaws mounted on parallel links that are spring impelled to assume an extreme retracted position with accessible screw adjustment means for spreading the jaws against the normal urge of the spring.

Still a further object is to provide parallel jaw mounts for a sleeve puller to enable the adjustment thereof from an actuator mount for retracting or spreading the jaws for removing cylinder sleeves from their press-fitted engine bores.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawing:

Figure 1 is a front sectional view in elevation of a cylinder bore, sleeve, and pulling tool embodying features of the present invention, the jaws being shown in their fully retracted position.

Figure 2 is a plan view of the device shown in Figure 1, parts thereof being shown in section to clarify the showing.

Figure 3 is a front sectional view in elevation

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taken substantially along line III—III of Figure 2 of a cylinder bore, sleeve, and pulling tool shown in Figure 1 with the jaws in an expanded adjusted position engaging the lower rim of a sleeve.

Figure 4 is a bottom plan view taken substantially along line IV—IV in Figure 3.

The structure selected for illustration is not intended to serve as a limitation upon the scope or teachings of the invention, but is merely illustrative thereof. There may be considerable variations and adaptations of all or part of the teachings depending upon the dictates of commercial practice.

The present embodiment comprises a cylinder or engine block 10 having a somewhat larger cylinder sleeve 11 that is press-fitted therein to terminate somewhat below the engine block 12 to present a downwardly tapered lower peripheral sleeve edge 13 which is engageable to effect the removal of the sleeve 11 as will appear more fully hereinafter.

In order to remove the sleeve 11 from the bore 10, a sleeve puller is provided which, in this instance, embodies a central rod 14 terminating downwardly in a collar 15 having a tripod type bracket 16 formed integral therewith. The tripod type bracket 16 has, in this instance, three angularly and equidistantly disposed ears that are radially slotted to provide furcations 17—18, 19—20, and 21—22 to pivotally receive links 23—24—25 therebetween. Suitable pins 26 extend through the spaced furcations 17—18, 19—20, and 21—22 to pivotally connect the links 23—24—25 thereto.

The links 23—24—25 terminate in downwardly and outwardly offset portions 27 which terminate pivotally in eyes or closed loops to receive pins 28 provided through furcations 29—30 provided in a plurality of jaws 31—32—33, in this instance three. The jaws 31—32—33 have projecting lips 34 which extend outwardly beyond the vertical jaw edges 35 of the jaws 31—32—33 to engage the lower peripheral edge or rim 13 of the sleeve 11. In this position, the vertical jaw edges 35 engage the interior cylinder wall of the sleeve 11 when the jaws 31—32—33 have been expanded to the limit of the interior diameter of the sleeve 11. The jaws 31—32—33 each have parallel links 36—37 of equal length pivotally extended therefrom as at 38—39, respectively, to project upwardly for corresponding pivotable connection with an upper triangular bracket 38' by means of pins 39—40.

The bracket 38' has a tubular threaded shank 41 formed integral therewith to extend upwardly therefrom. The threaded tubular shank 41 terminates in a solid threaded shank 42 to which any suitable actuator or power puller may be attached to exert an upward force relative to the engine block 10, in the process of removing

the sleeve 11 from the cylinder bore 10. The rod 14 is slidably guided in the tubular shank 41 to adjust the jaws 31—32—33 as will appear more fully hereinafter.

In order to adjust the jaws 31—32—33 upwardly and outwardly, the axial rod 14 has a tension coil spring 43 disposed thereover between the upper triangular bracket 38 and a collar 44 fitted to the rod 14 proximate to the lower end 15 thereof. The spring 43 is anchored to the collar 44 and serves to impel the shaft 14 upwardly relative to the upper triangular bracket 38 to retract the jaws 31—32—33 inwardly as shown in Figure 1. This will serve to displace the rod 14 upwardly which is provided with a transverse pin 45 that projects through a vertical slot 46 provided in the threaded shank 41. A knurled nut 47 threadably engages the shank 41 to displace the transverse pin 45 downwardly and thus spread the jaws 31—32—33 outwardly against the urge of the tension spring 43. The knurled nut 47 retains the jaws 31—32—33 in their adjusted expanded position against retraction.

As a result, the spread of the jaws 31—32—33 can be adjusted from above the engine block 12 for initial collapsing thereof to facilitate their insertions downwardly through the cylinder sleeve 11 and thereafter effect the spread of the jaws 31—32—33 so that their vertical edges 35 thereof engage the internal wall of the cylinder sleeve 11 with the jaw lips 34 projecting below the lower peripheral sleeve edge 13. The jaw lips 34 effect upper engagement with the lower sleeve edge 13 responsive to effecting an upward pull on the shank 42 for upper displacement with the sleeve 11. Any suitable mechanical or hydraulic actuator may be utilized for this purpose to operate relative to the engine block 12 to displace the shank 42 upwardly together with the jaws 31—32—33 and the sleeve 11 in the process of pulling the latter from the cylinder bore 10.

While I have illustrated and described a preferred embodiment of this invention, it must be understood that the invention is capable of considerable variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

I claim:

1. A grapple comprising an elongated shank, a first yoke on said shank, a plurality of pairs of levers of equal length spaced around said yoke and individually pivoted to said yoke at one end, a jaw for each pair of levers, means pivoting the other end of each lever of a pair to its jaw so that said levers of a pair will be positioned in parallel relation and in a plane including the axis of said shank and extending radially thereof, a second yoke on said shank, links each pivoted to said second yoke and one of said jaws, and means for relatively moving said yokes for moving said jaws toward or away from said shank.

2. A grapple comprising an elongated shank, a first yoke on said shank, a plurality of pairs of levers of equal length spaced around said yoke and individually pivoted to said yoke at one end, a jaw for each pair of levers, means pivoting the other end of each lever of a pair to its jaw so that said levers of a pair will be positioned in parallel relation and in a plane including the axis of said shank and extending radially thereof, a second yoke on said shank, links each pivoted to said second yoke and one of said jaws, and threaded collar means on said shank for relatively moving said yokes for moving said jaws toward or away from said shank.

3. A grapple comprising an elongated shank, a first yoke on said shank, a plurality of pairs of levers of equal length spaced around said yoke and individually pivoted to said yoke at one end, a jaw for each pair of levers, means pivoting the other end of each lever of a pair to its jaw so that said levers of a pair will be positioned in parallel relation and in a plane including the axis of said shank and extending radially thereof, a second yoke on said shank, links each pivoted to said second yoke and one of said jaws, spring means for urging one of said yokes in one direction along said shank to relatively collapse said jaws to their minimum spread, and threaded collar means on said shank for relatively moving said yokes against the urge of said spring means for moving said jaws away from said shank.

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