

May 23, 1939.

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2,159,593

CYLINDER HEAD PULLER

Filed April 18, 1938

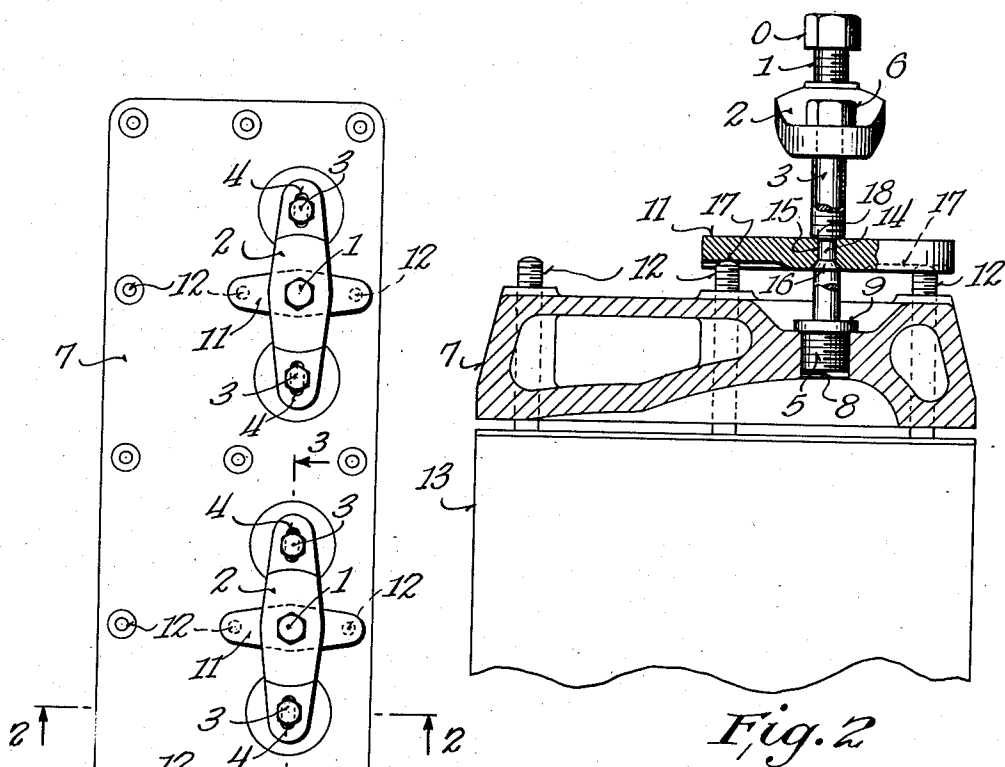


Fig. 1

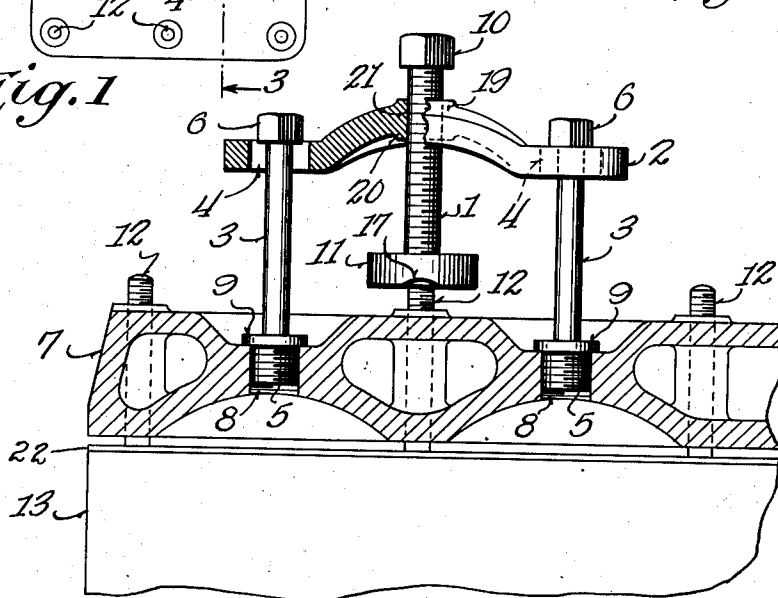


Fig. 3

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2,159,593

CYLINDER HEAD PULLER

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Application April 18, 1938, Serial No. 202,622

1 Claim. (Cl. 29—84)

This invention relates to a device in the nature of a hand tool for removing cylinder heads or other removable covers or caps from all types of internal combustion engines.

5 The general purpose and object of my invention is to provide a device of unusual merit because of its simplicity in attaching for use and the ease in removing the head, plate or cover without damaging the element being removed or the engine block or the screw threaded studs which serve to secure the head or element to the block.

10 In accordance with my invention, I provide a device in the form of a single unit having no removable parts and equipped with bolt-like members which attach the device to the cylinder head through the selected spark plug openings in the head, and a power applying screw which co-operates with a pressure plate which engages certain of the aforementioned studs so that the downward pressure of the screw when turned by a wrench will be exerted on the studs and raise the head from the block overcoming any sticking or binding of the head with respect to the block or the studs.

25 Also, in accordance with my invention, the pressure plate has a length to span at least a pair of the studs so that the downward pressure of the screw will be distributed as much as possible over the cylinder head to avoid warping or pulling the head out of shape when freeing it from the block by the power of the screw.

30 A further object of my invention is to provide a swiveled or equivalent connection between the lower end of the power screw and the pressure plate so that the plate may be adjusted to engage the studs on opposite sides of the screw to more evenly distribute the application of the pressure thereof.

40 A further object of my invention is to provide the plate with centering grooves on its under side for the studs to hold the plate against displacement with respect to the studs when forced against the same by the screw.

45 The invention consists further in the features hereinafter described and claimed.

In the accompanying drawing—

50 Fig. 1 is a view in plan of a cylinder head showing two of my improved puller devices attached thereto for removing the head; and

Figs. 2 and 3 are transverse and longitudinal sectional views with parts in elevation taken on lines 2—2 and 3—3, respectively, of Fig. 1, to show details of construction with respect to the

puller device and its manner of attachment to the cylinder head.

As shown in the drawing, the device of my invention has a power applying screw 1, and a mounting 2 for the screw. This mounting, in the embodiment shown, is in the form of a cross-bar having means adjacent its opposite ends for attaching the device to the element to be removed. The means referred to may take the form of bolts 3, 3 one at each end of the cross-bar, and extending through elongated slots 4, 4 therein as shown.

The bolts 3 extend below the cross-bar and have screw threaded portions 5, 5 at their lower ends and heads 6, 6 at their upper ends. The heads 6 connect the bolts to the cross-bar 2, while the screw threaded portions 5 enable the bolts to be connected to the cylinder head shown at 7. The length of the cross-bar 2 is such that the bolts are positioned for connection with a pair of the spark plug openings 8, 8 in the cylinder head when connecting the device to the head. The slots 4 in the cross-bar allow for lateral adjustment of the bolts for alining them with the spark plug openings, and also permit rotation of the bolts on turning them to screw their lower ends 5 into and out of the similarly threaded spark plug openings.

The heads 6 are non-circular for the purpose just referred to, a wrench being used to turn the bolts. The bolts are enlarged as at 9, 9 above their screw threaded portions 5 to provide seating shoulders to be tightened against the head 7 at the spark plug openings 8 and to keep the bolts from sliding out of the cross-bar at their threaded ends. The heads 6 serve the same purpose at the upper ends of the bolts, and, thus, the bolts remain connected with the cross-bar at all times. The heads 6 also transmit the lifting force of the power screw 1 to the cross-bar when the power screw is turned to remove a cylinder head.

40 The power screw 1 extends through the cross-bar 2 between the bolts 3 and has a head 10 at its upper end and a floating plate 11 at its lower end. The plate 11 has a swiveled or equivalent connection with the power screw so that the plate may be turned with respect to the screw and for adjusting the plate to engage the selected studs 12, 12 which serve to secure the cylinder head 7 to its engine block 13. The swiveled connection shown comprises a reduced cylindrical portion 14 at the lower end of the power screw, which portion extends through a bore 15 in the plate 11, the lower end of the portion 14 being headed as at 16 to connect the plate to the screw.

55 The plate 11 is long enough to span and engage

a pair of the cylinder block studs 12, 12 adjacent the point of connection of the device to the cylinder head. The under side of the plate 11 is grooved as at 17, 17 to center the plate with respect to the engaged studs 12. The power screw 1 has a shoulder 18 at its cylindrical end 14 so that the downward pressure of the screw in the use of the device may be applied directly to the plate 11.

The cross-bar 2 may be arched between its ends as at 19 for strength and also to provide convenient hand holds for removing the cylinder head from the block. The cross-bar may be bossed, as at 19, 20, at its screw threaded opening 21 through which the screw 1 extends and has threaded connection as shown in Fig. 3. The power screw 1 is preferably arranged centrally of the cross-bar so as to distribute its lifting pressure equally on the studs 3.

In preparing a cylinder head for removal, the spark plugs are removed from the spark plug openings in the head and the nuts which clamp the head on the engine block are removed from the studs 12. All other connections with the head are, of course, released, and my improved pulling device is connected to the head by its bolts 3. The latter are screwed and tightened into the selected pair of spark plug openings 8. The floating plate 11 is adjusted to span and engage the upper ends of the pair of cylinder block studs 12 adjacent the spark plug holes. In most cylinder block constructions, there is a pair of block studs 12 between each two adjacent spark plug holes, one stud being near the center line of the block and the other adjacent the margin of the block as shown in Fig. 1. The plate 11 is positioned to engage these studs, whereupon the power screw 1 is turned by a wrench engaged with its head 10 to force the plate 11 downwardly against the upper ends of the studs. The force applied is exerted on the stationary cylinder block 13 through the studs, and the bolts 3 connecting the cross-bar 2 to the removable cylinder head 7 transmit the lifting action of the screw 1 on the cross-bar to the head 7. The downward pressure of the screw is continued until the joint at the head gasket 22 is broken and the head 7 is lifted free of the block as shown in full lines in Figs. 2 and 3. The head 7 is now free for complete removal from the block, the operator grasping the cross-bar between the bolts and lifting the head off of the studs 12.

Considerable power is available by means of the power screw 1 enabling the most aggravated case of freezing or sticking of a cylinder head with respect to its block or the studs being readily and easily overcome.

It is preferable to use two pullers for removing a cylinder head as shown in Fig. 1. One device is connected with the cylinder head adjacent one end in the spark plug openings at such end of the head, and the second device is connected with the cylinder head in the spark plug openings

adjacent the opposite end of the head. The power screws 1 of the two devices are turned in sequence, a few turns at a time so as to apply a more or less even lifting force over the entire cylinder head. This avoids warping or pulling the head out of shape or binding it against its studs 12. Moreover, with four points of contact with the studs, the strains on all four spark plug openings is equalized. When the head is free or loose, the operator grasps the cross-bars of the two devices with both hands and completely lifts the head off of the studs.

The device disclosed is simple in construction and operation. There are no loose parts and an ordinary wrench may be used, thus avoiding the need of special tools. The downward pressure of the screw is taken by the studs, which enables the application of considerable force as the studs are well adapted to stand the strain being relatively large and well anchored in the engine block. With the cross-bar 2 and the pressure plate 11 disposed in crossing relation when in use, the downward pressure of the screw may be exerted on the studs which are on opposite sides of the cross-bar and the lifting force of the screw on the head may be exerted on opposite sides of the plate. This provides for an equal distribution of the strains and stress on the block and the head and the latter is lifted or loosened from the block without warping or binding against its studs. The pulling device is rugged and strong and has all power needed to free the head from the block in the most aggravated case of sticking or binding as may be encountered.

The details of construction and arrangement of parts may be variously changed and modified without departing from the spirit and scope of my invention, except as pointed out in the annexed claim.

I claim as my invention:

A device for removing a cylinder head or the like from an engine block comprising, a cross-member, a power applying screw extending through and having screw threaded connection with said cross-member, bolt-like elements carried by the cross-member on opposite sides of the screw, said bolts having headed upper ends for connection with the cross-member and threaded lower ends for connecting the cross-member to a pair of the spark plug openings in the head, and a pressure plate in the space between the bolts, said plate having a swiveled connection with the lower end of the screw so that the plate in the use of the device may be extended in crossing relation to the cross-member to span and engage the head securing studs of the block between and on opposite sides of said spark plug openings, said cross-member having openings through which the bolts extend, said openings being fashioned to revolvably and adjustably mount the bolts in the cross-member.

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