Sept. 13, 1932. C. B. GLADDING 1,877,477

EXPLOSIVE ENGINE ATTACHMENT TO FACILITATE VALVE GRINDING

Filed June 2, 1928

Fig. 1.

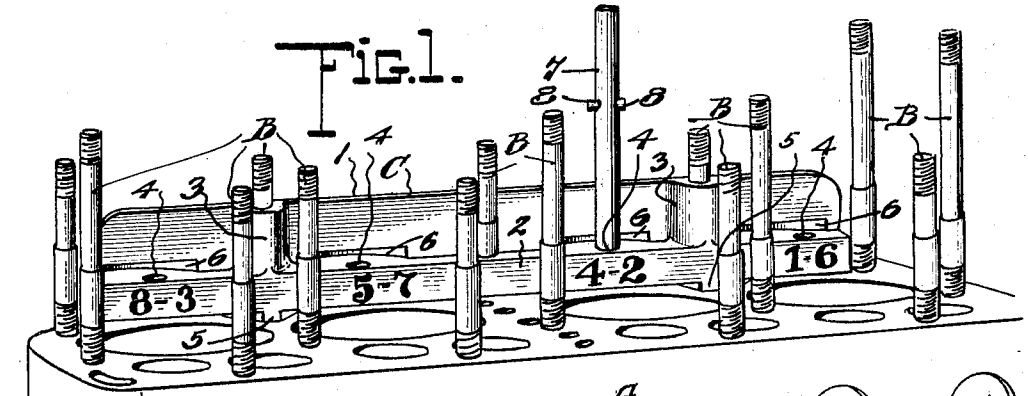


Fig. 2.

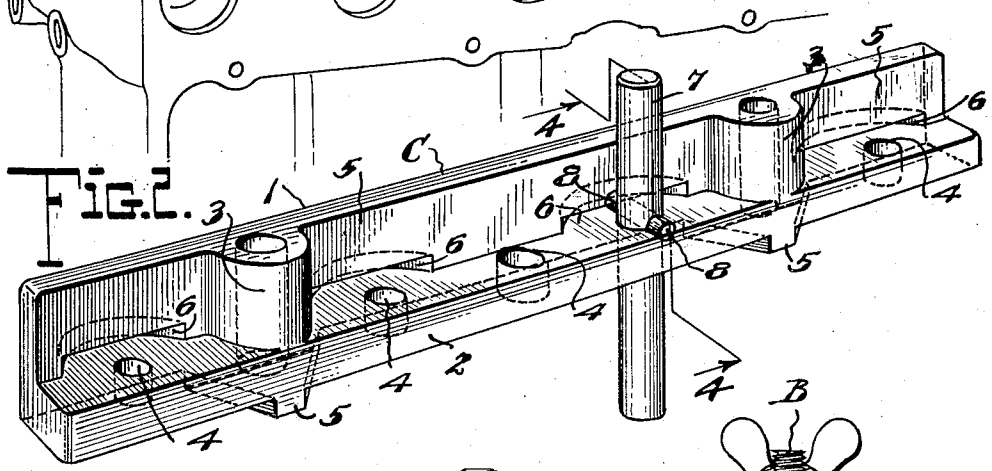


Fig. 3.

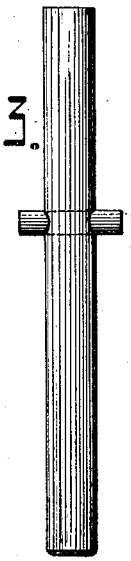


Fig. 4.

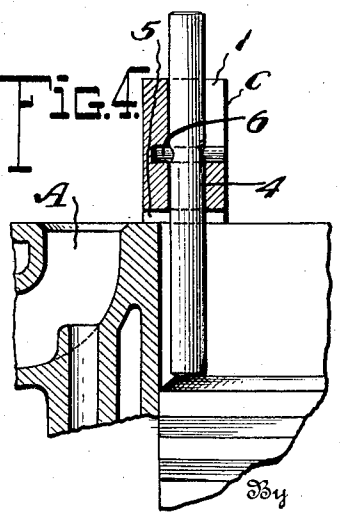
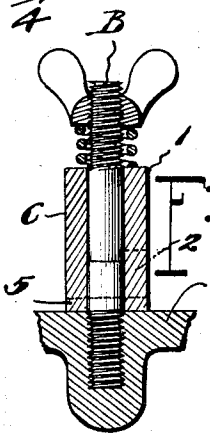


Fig. 5.



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UNITED STATES PATENT OFFICE

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EXPLOSIVE ENGINE ATTACHMENT TO FACILITATE VALVE GRINDING

Application filed June 2, 1928. Serial No. 282,444.

The finishing or adjusting of the valves in certain moderately priced cars of today requires that the piston within the cylinder be properly and accurately positioned with respect to the valves so that the latter may be properly worked on. It is a fact that when a piston in one cylinder is located relative to certain of the valves, that the other pistons are not in suitable position to have operation take place on the other valves. This condition has given rise to considerable difficulty which is encountered when the valves of an internal combustion engine are to be ground, and this invention has for its primary object the provision of a device which may be availed of to accurately position any of the pistons in a motor.

A more particular object in view, is to provide a device of this character which avails of the studs commonly employed to affix the cylinder head to the block. This feature insures the proper positioning of the device on any engine with which it is to be employed.

In carrying out my idea more in detail, I employ an elongated main body member, having vertically extending bores properly located therein to receive stud bolts of a cylinder block when the head is removed. The main body member at its lower portion terminates in a flange in which are formed spaced openings. There being one opening provided for each cylinder of the motor with which the device is designed to be used.

Fashioned in the main body member just above the opening in the flange just described, are grooves which cooperate with projections on a gauge pin for positively holding the latter in position in one of the openings. A gauge pin is inserted in one of the openings just described and a projection thereon is seated in the groove adjacent to the pin. Whereupon, the pin is properly positioned in the cylinder bore to limit upward movement of the piston therein. Upon operation of the crank shaft, the piston abuts against the pin and in this position the pistons are located with respect to certain of the valves so that they may be ground.

It is a noteworthy feature of this invention that when the gauge pin is inserted in one cylinder bore, two valves are always properly adapted to have grinding action take place thereon, but these valves are not necessarily those associated with the particular cylinder opening in which the gauge pin is inserted, because it is essential that the piston be in this position for operations on the intake valves as compared with the exhaust valves. For instance, when the gauge pin is inserted in the cylinder bore at one end of the engine, valves numbers 1 and 6 are adapted to be ground. While locating the pin in the second cylinder bore it will put valves 4 and 2 into condition to have grinding action take place thereon.

It is a highly important object of the invention to provide the device with indicia to indicate which valves are ready to be ground when the gauge pin is located in any one of the cylinder bores. In carrying out this idea more into practical use, the main body member is provided with indicia which are described on the side thereof adjacent to the openings to which the pin is to fit. This indicia indicates the number of the valves which are ready to be ground when the pin is located in that particular opening.

The present invention has to do, of course, not only with the proper setting of the valves of an engine incident to grinding operations, but for their adjustment with required nicety of the relation of the valve stems to the push rods, irrespective of whether grinding of the valves has to be performed. In other words, the invention is designed in its broadest phase for obtaining the proper valve adjustments or spacing of the valve stems regarding the push rods under any conditions, because it is well known that at times valves of explosive engines become noisy through getting out of adjustment and this often happens when the valves are perfectly ground and will seat well without having to be refinished in any way.

To exemplify one particular utility of this invention, I make reference to the present new model A design of Ford engine for the purposes of which my invention is especially adapted. In this particular type of engine, it has been determined empirically that the

cam shaft of the engine is so designed that it is necessary for the piston to be in a position upon its compression stroke a certain distance from the top of the engine block in order that a proper adjustment of certain valve stems and valve push rods may be obtained wherein there will be provided the necessary spacing of the last mentioned parts required for the perfect operation of the valves controlled for the particular piston movement. In the Ford engine the controlling position of the piston is about 2 5/32″ from the top of the engine block and obviously, this is a nicety of adjustment which gives trouble to the engine man in valve adjusting operations. By my invention, the adjusting device which has been briefly outlined as to construction, hereinbefore, when once positioned upon the engine block and arranged with the gauge pin properly disposed to limit the movement of the particular piston so that it may be positioned at its controlling position, enables an operator to quickly adjust the valves associated with the particular piston action so as to space the valve stems of such valves with exactness and certainty relatively to the push rods cooperating therewith and actuated by the cam shaft. The proper spacing is known to be about 13/1000″.

Other features of my device worthy of emphasis are the ease with which it is put into position for use, readily adjustable to cooperate with any cylinder bore, simplicity of construction, and ease of manufacture.

Various other more detailed objects and advantages will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawing, in which

Figure 1 is a view in perspective, bringing out the manner of application of my valve timing device to a cylinder block.

Figure 2 is a detached showing in perspective of the main body member with the gauge pin in position in which a projection thereon engages a groove in the main body member.

Figure 3 is a detached view in side elevation of a gauge pin.

Figure 4 is a sectional view showing of the device bringing out the manner in which the gauge pin projects into a cylinder bore.

Figure 5 is a view in section bringing out one modification in which a wing nut and spring are associated with the connecting bolts.

While a preferred specific embodiment of the invention is herein set forth, it is to be understood that I am not to be limited to the exact constructions illustrated and described, because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

Throughout the various figures of the drawing and the specification, corresponding parts are denoted by like reference characters.

A cylinder block with the head removed is shown in Figure 1 and designated by the reference character A. The head (not shown) is adapted to be fastened to the block through the medium of stud bolts B. I avail of the stud bolts B as a fastening means for properly positioning my valve timing device which is referred to generally as C.

Device C comprises a main body member 1, having a lower flange portion 2, and vertical enlarged portions 3. The enlargements 3, which in this instance are two in number, are provided with bores extending vertically therethrough, and these bores are adapted to receive the stud bolts B when the device is operatively positioned. In the form illustrated I have also shown one of the stud bolts B passing through an opening in the flange 2. This flange is also provided with equidistantly spaced openings 4, there being four of these openings, though it being understood that the number of the openings 4 will vary with the number of cylinders in the engine with which the device is to be employed.

Attention is called to the fact that in the illustrated embodiment, the openings in the enlargements 3 are surrounded on the lower surface of the member 1 with downwardly projecting portions 5, which function to slightly space the flange portion 2 from the cylinder block A.

The member 1 above each of the openings 4, is cut away to provide grooves 6, which deepen gradually to a maximum depth opposite the openings 4.

A gauge pin 7 has diametrically opposing projections 8 extending radially therefrom, and is adapted to pass through one of the openings 4 to project downwardly into one of the cylinder bores in the cylinder block A. The projections 8 are located a suitable distance from the end of the pin 7 so that when one of the projections 8 is fitted in the recesses 6, the pin will constitute a limit for upward movement of the piston of the cylinder in which a pin is located.

The flange 2 on its side is provided with suitable indicia to indicate which valves are in proper condition for grinding when the gauge pin is located in any one of the holes. For instance, referring to Figure 1, when the gauge pin is in the second hole from the end, as illustrated, the side of the flange indicates that the valves 4 and 2 are ready for grinding. If the pin were positioned in the right hand end opening, then valves 1 and 6 would be in condition for grinding.

The operation and use of my valve timing

device is practically self-evident from the foregoing description. Subsequent to the removal of the head from the cylinder block, the main body member 1 is positioned by having certain of the stud bolts B pass through the openings 3. One of them passing through an opening in the flange 2. A gauge pin or piston contact member 7 is now inserted in one of the openings 4 and when one of the projections 8 is opposite the recess 6, associated with the opening 4, the pin is turned, seating the projection in the recess. The main crank shaft of the engine is now turned which causes the piston in the cylinder to move upwardly until it abuts the extremity of the pin 7. When this condition is reached, the valves indicated by the indicia adjacent to the opening in which the pin is fitted, are in proper condition to have grinding operations take place thereon. When these valves have been finished, the pin is inserted in another opening and the operations repeated.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is:—

1. A valve timing device of the class described, comprising, in combination, a main body member formed with means adapting it to be detachably fastened to a cylinder block in position over the cylinders when the head is removed and leaving the valves accessible, and an instrumentality associated with the main body member for limiting movement of one of the pistons in the cylinder block and thereby determining the setting of certain of the valves, said valves being adjustable while the device is in operative position.

2. A valve timing device of the class described, comprising, in combination, a main body member having spaced openings therein, there being one of such openings provided for each cylinder with which the device is to be used, a gauge pin adapted to be fitted in any one of the openings in position to be engaged by a piston in its travel in the cylinder for determining the position of certain valves and means for holding the gauge pin against displacement from the cylinder opening when engaged by the piston, said body member being constructed to allow access to and work upon the valves whose positions are determined by the gauge pin.

3. A valve timing device of the class described, comprising, in combination, a main body member having openings therein adapted to receive the stud bolts of a cylinder block, said main body member also being provided with spaced openings and with grooves adjacent said openings, a gauge pin adapted to fit in one of the openings and having a projection adapted to be seated in the groove adjacent the opening in which the pin is fitted.

4. A valve timing device of the class described for attachment to a cylinder block in the position of the cylinder head, comprising, in combination, an instrumentality suspended in the cylinder for positively limiting the movement of a piston in a cylinder to determine the position of valves, said valves being accessible while the device is in operative position, and means for holding said instrumentality in proper position against displacement from the cylinder.

5. In a valve timing device of the class described, the combination with a main body member having means for detachably connecting it to a cylinder block in the position normally occupied by the cylinder head, of an instrumentality associated with the main body member and adapted to project into any one of the cylinder openings to constitute an abutment for limiting upward movement of a piston in the cylinder to determine proper valve positions, the valves being accessible for grinding when the body member is in position on the block.

6. In a valve timing device for the class described, the combination of a main body member, and an instrumentality for limiting movement of a piston, said body member having indicia means associated therewith for indicating which valves are in proper position to have grinding action take place thereon.

7. In a valve timing device of the class described, the combination of a pin for limiting the movement of a piston so as to properly position another piston for valve grinding operations, and supporting means for the pin, said supporting means having indicia associated therewith for indicating which valves are ready for operations thereon.

8. In mechanism of the class described, the combination with a main body member adapted to be secured to a cylinder block in the place of the cylinder head, of a gauge pin adapted to interlock with the main body member and to extend into a cylinder opening to position any one of the pistons in a cylinder block, said gauge pin and main body member being so interchanged that the limit of movement of each of the pistons is constant the gauge pin being of a fixed length so as to determine the proper settings of valves of related cylinders.

9. A valve timing unit for use in conjunction with an internal combustion engine cylinder block and pistons mounted therein comprising a body member having means for attaching it upon the cylinder block, a pin adapted to be mounted on said member so as to extend into the cylinder opening, means arranged at a predetermined point in the length of said pin and adapted to coact with the body member to suspend the pin in said cylinder opening, said body member having means engageable by said suspending means when the pin is rotated to effect interlock with the body member.

10. A device of the class described, com-

prising a unit adapted for attachment to an internal combustion engine cylinder block having pistons, said unit including a device for positioning certain valves for grinding, said unit having indicia thereon to indicate which valves are properly positioned for grinding and being adapted to remain in position during grinding of the valves.

In testimony whereof I affix my signature.

CHARLES B. GLADDING.