March 17, 1936. C. T. ROTTLER 2,034,488

ANCHORING DEVICE FOR CYLINDER BORING MACHINES

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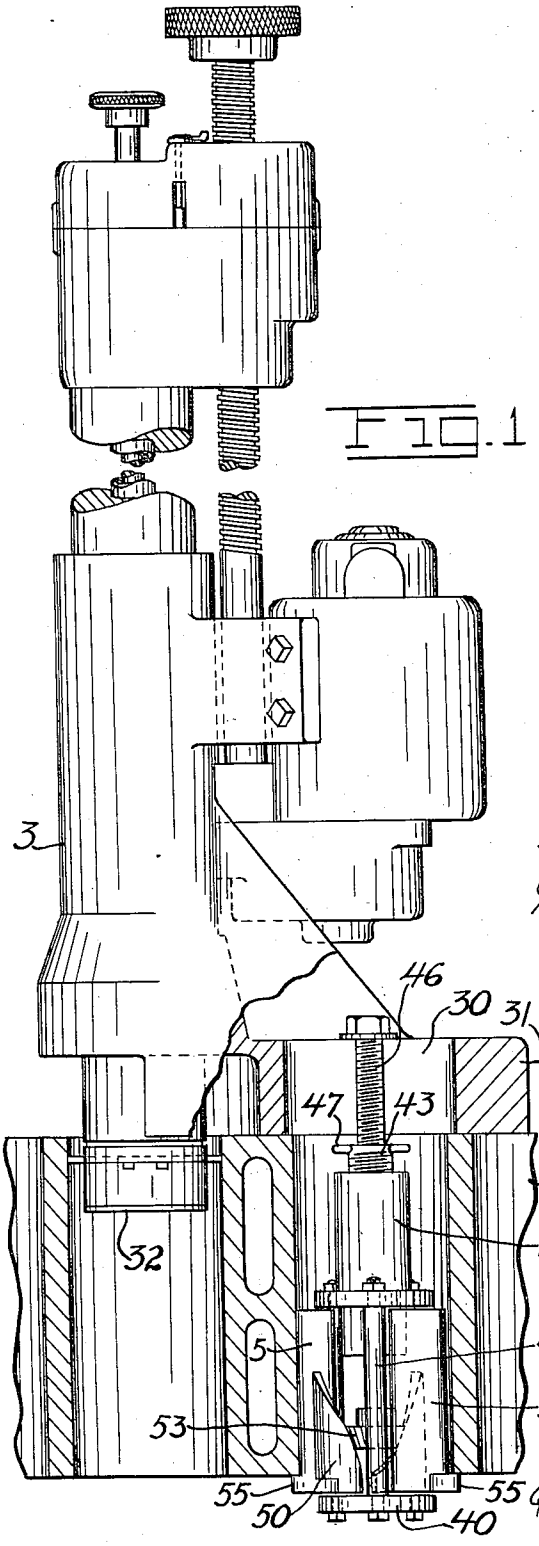


Fig. 1

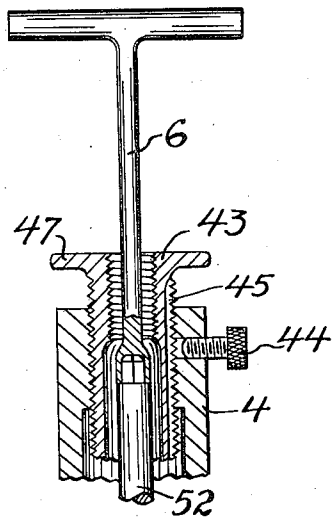


Fig. 4

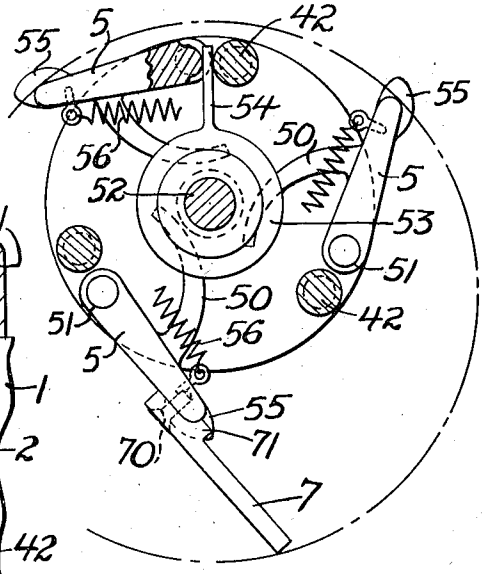


Fig. 5

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FIG. 2

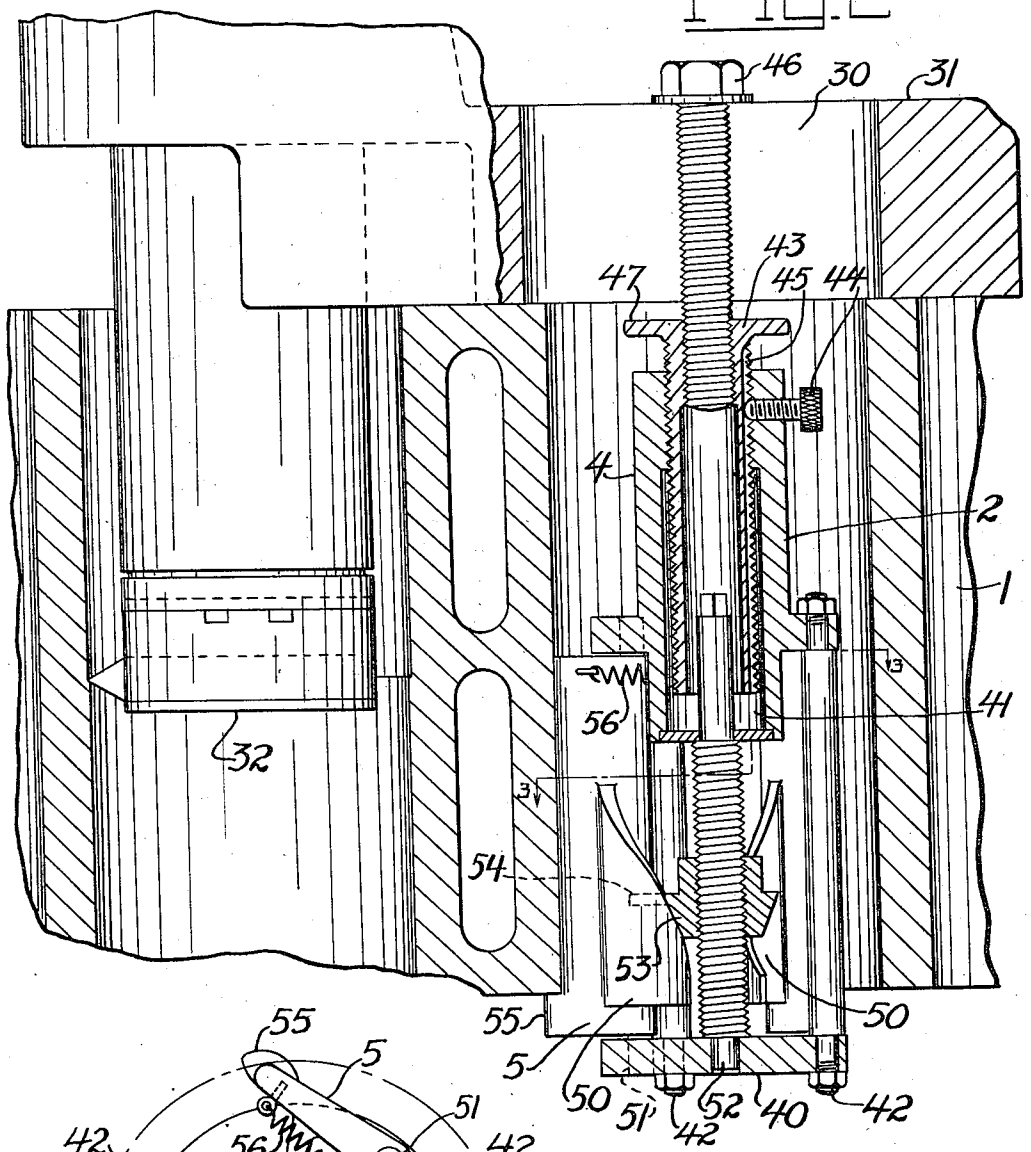
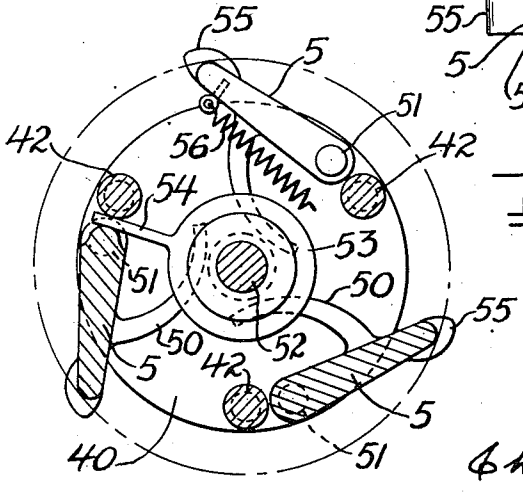


FIG. 3



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ANCHORING DEVICE FOR CYLINDER BORING MACHINES

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Application November 22, 1932, Serial No. 643,859

3 Claims. (Cl. 77—2)

My invention relates to a positioning or hold-down device, and more particularly to a device such as might be used in conjunction with a boring machine for reboring internal combustion engine cylinders, to rigidly maintain such machines in a position aligned with the cylinder to be bored during such operation. Boring machines of this character are disclosed in companion applications, filed herewith. Such a hold-down device may also be used with a valve reseating machine, or other machine which must be held to the cylinder block while performing an operation thereon.

An object of my invention is to provide a positioning device for such machines which may be securely anchored in a cylinder other than the one to be bored, and to which the boring machine may be clamped, or by means of which the boring machine may be clamped to the engine block so that it will not get out of alignment during the boring operation, in spite of the heavy work performed, and the consequent tendency to shift or to jam the machine.

A further object of my invention is to provide such a positioning device which may be easily and quickly secured within a cylinder, and which will preferably but not necessarily, be centrally disposed within the length of the cylinder.

A further object of my invention is to provide a positioning device which may be adjusted to the length of any cylinder, and which may be secured therein independently of and before positioning the boring machine in the boring position.

A further object is to provide such an anchoring means which is readily adaptable to cylinders of widely differing diameters.

A further object is to anchor the device within a cylinder in such a way that by the character of its frictional engagement with the cylinder walls it will resist turning with a clamping screw, directly threaded within it, yet will not scratch nor mar the cylinder wall.

Other objects of my invention will appear in the drawings, specification, and claims which are contained in this application.

My invention comprises the novel device having the characteristics indicated, one form of which is shown in the drawings, and which is to be described in the specification. This preferred form of my invention, and other forms which it may take, and which will operate to provide the objects aforementioned, are defined in the claims appended to the specification.

Figure 1, parts of which are in section, is an assembly view in elevation, showing my positioning device secured in a cylinder to anchor a boring machine which is positioned for a boring operation on the next adjacent cylinder.

Figure 2 is an enlarged sectional elevation of my invention, anchored within a cylinder and secured to the base frame of a boring machine.

Figure 3 is a sectional plan view of my device, taken along the line **3**—**3** of Figure 2.

Figure 4 is a sectional view of the upper portion of my positioning device before the boring machine is placed in position, and serves to illustrate the method of securing the positioning device within the cylinder after the device has been inserted therein.

Figure 5 is a view similar to Figure 3, showing my device adapted for engagement within a cylinder of diameter larger than that for which the device is normally intended.

In the preferred form of my invention illustrated I have shown my device, represented generally at **2**, as being centrally disposed within a cylinder of an engine block **1**. This central or axial position is not essential, but is the normal position which the device would assume in use. With the particular form of securing mechanism shown it will be found convenient to dispose the device in a central position for the various sizes of cylinders, by means of three simultaneously operable centering wings. But two movable positioning means and one stationary means might be used, for instance, in which case the device would be secured at one side of the cylinder axis, though fixed relative thereto. The precise position of the device is immaterial if, during the time the boring machine **3** is being set up, it is securely fixed in the cylinder.

My positioning device comprises two main parts—a supporting member **4**, and a securing and centering means usually consisting of three wings **5** (though more may be used if desired) pivotally supported upon the member **4** at **51**. As a means to swing these wings outward against the cylinder wall, cams **50**, each in the form of a helix of a cylinder whose axis coincides with the pivot axis of the wings, is formed upon each wing. To support the lower ends of the wings I provide a base plate **40**, suitably secured to the supporting member **4**. Bolts **42**, received in the members **4** and **40**, serve as pivots for the wings **5**. These bolts are preferably parallel to the axis of the device as a whole.

A screw **52** is journaled in the supporting member **4** and the base plate **40**. The shank of this screw extends upwardly within the hollow interior **41** of the supporting member, though pref-

erably not so far as to engage the lower end of a clamping screw 46, hereafter referred to. On this screw is threaded a cam operating nut 53 which is prevented from rotating by the engagement of an arm 54 between one of the base plate bolts 42 and a wing pivot 51. Thus, when the screw 52 is rotated, the cam operating nut will be moved longitudinally of the cylinder, and its inclined outer surface will bear on the cams 50 to swing the wings outward against the cylinder wall. Springs 56 serve to draw the wings inward upon upward movement of the cam.

The particular manner in which the wings are operated may be best ascertained in Figures 3 and 4. Figure 3 shows the cams 50 in plan to be an arc of a circle. The cam operating nut 53 simultaneously bears on all of these cams. Figure 4 shows the shank of the screw 52 extending upward within the supporting member 4, though usually it would extend no farther than is shown in Figure 2. The upper end of this shank may have a square head adapted for engagement by a wrench 6 extended down through the top of the cylinder and through the hollow supporting member 4 to engage the shank of the screw 52 and to turn it. As the screw, which has a right hand thread, is turned in the left hand direction the cam operating nut 53 is forced downward against the cam surfaces, to simultaneously swing the wings 5 about their pivots 51 against the cylinder wall, thus to anchor the positioning device in the cylinder by frictional engagement of the wings with the wall.

It may be seen that my positioning device is adjustable in effective diametrical or peripheral extent, whereby it is readily adaptable to cylinders of various diameters. I desire also to make my device adaptable to cylinders of various depths. For this purpose, since the centering wings 5 are always secured in the lower portion of the cylinder, I have made my supporting member 4 adjustable in effective length, so that whatever the depth of the cylinder in which it is disposed, the upper end of the adjustable supporting member may lie slightly below the upper end of the cylinder. The embodiment now preferred by me takes the form of two relatively movable telescoping members.

In the upper portion of the supporting member 4 is received a tubular member 43. The upper end of the supporting member is internally threaded, and the member 43 is externally threaded to screw into the supporting member. As seen in Figure 2, the tubular member 43 may be screwed in or out of the supporting member 4 so as to position its upper end slightly below the top of the cylinder. The members 4 and 43 may then be locked in this adjusted position by engagement of the set screw 44 with the slot 45, which extends longitudinally of the tubular member 43. Lugs 47 on the upper end of the member 43 form a convenient means to grasp the device before it has been secured in the cylinder. It may also be seen from Figure 2 that the tubular member 43 extends over the shank of the screw 52. Figure 4 shows the manner in which the wrench 6 may be inserted within this tubular member 43 to engage the shank of the screw 52.

When the positioning device has been secured in the cylinder in the manner stated, by the frictional engagement of its wings with the cylinder wall, the boring machine 3 may be placed on top of the cylinder block with the cutter head 32 inserted in an adjacent cylinder. A slot 30 formed in the base frame of the boring machine is positioned over the cylinder in which the positioning device is anchored. A bolt 46 is then placed in the slot 30, and extends within the cylinder. The upper end of the tubular member 43 is internally threaded to receive this bolt 46. As the bolt is screwed into the member 43 after the boring machine has been properly positioned, the base frame 31 is drawn securely down against the upper face of the cylinder block. To prevent any upward movement of the positioning device from the thrust exerted by the bolt 46, lugs 55 are formed on the lower end of the centering wings, as may be seen in Figures 2 and 3, these lugs engaging beneath the cylinder block, and preventing upward movement of the device.

After the boring operation has been completed on this cylinder, the bolt 46 may be loosened, and the boring machine swung through 180°, so that the cutter head 32 may be disposed above the adjacent cylinder on the opposite side of that one occupied by the positioning device from the one which has been bored. When in the proper position the bolt 46 may be tightened again to secure the base frame of the boring machine in the new position, and this second cylinder may be bored without the necessity of again setting up the positioning device.

To accommodate the device to cylinders of greater diameter than those for which it is normally intended, I may employ an extension plate 7, of a length approximating the length of a wing 5, which may be secured to such a wing, as shown in Figure 5, by bolts or screws 70. A longitudinal rib 71 may be provided, to engage the edge of the wing, thus to strengthen and steady the extension plate. Now the outer edge of the plate 7 engages the cylinder wall, and, coupled with the engagement of the edges of the other two wings, holds the device in place while the clamping bolt 46 is being engaged therewith. The clamping action obtains between the bolt 46 and the two lugs 55 which still engage beneath the lower edge of the cylinder. When the device is to be used in smaller cylinders, the extension plate may be easily removed.

It may be noted from the illustration of my invention that the wings 5 are formed of plates which are of considerable extent lengthwise of the cylinder. This construction gives sufficient frictional engagement with the cylinder wall to support the anchoring device within the cylinder and to prevent rotation of the anchoring member by the rotational action of the clamping screw 46, directly engaged therewith, while the boring machine is being secured thereto. This frictional engagement is so distributed that no part of the cylinder wall is deformed or scratched, yet rotation of the anchoring member is not possible. The same frictional engagement will hold the threaded hole to be engaged by the bolt 46 in proper alignment for such engagement, and will prevent the anchoring member dropping through the cylinder bore. A mere point or button contact of the centering wings with the cylinder wall could not prevent movement of the positioning device, such as would secure these ends with certainty, and would assuredly score the cylinder wall in resisting turning. I have therefore employed wing members whose outer edges coincide with a generating element of the periphery of a common cylinder of rotation, including the outer edge of each of the wings and the cylindrical surface of the cylinder wall when the wings are in contact therewith. Thus the device, over its entire length,

is substantially fixed relative to the cylinder's axis, and its holding effect is well distributed, so that the effect at any given point need not be excessive.

What I claim as my invention is:

1. A positioning device for a cylinder boring machine or the like, comprising a hollow supporting member disposed within a cylinder and internally threaded at its upper end, means supported thereon to fix said member relative to the cylinder's axis, a tubular member extending within the upper end of said supporting member and externally threaded to engage the internal threads thereof, said tubular member being also internally threaded at its upper end, a bolt threaded in the upper end of said tubular member, said tubular member being adjustable relative to said supporting member for various depths of cylinder to project said bolt above the top of the cylinder wall to engage the boring machine, and locking means to prevent relative rotational movement of the tubular and supporting members after such adjustment.

2. In a positioning device for a cylinder boring machine or the like, a hollow supporting member adapted to be disposed within a cylinder, centering wings having cam surfaces formed thereon supported on said member, a tubular member extending within said supporting member and longitudinally adjustable relative thereto, a screw journaled in said supporting member and extending within an end of said tubular member, and a cam operating nut threaded on said screw for movement only longitudinally thereof, cooperating with said cam surfaces to simultaneously swing said wings outward against the cylinder wall, to support said supporting member by engagement with the cylinder's wall, said screw being adapted for rotation by insertion of a wrench in the opposite end of said tubular member.

3. An anchoring device for a cylinder boring machine or the like, comprising a support body member, a base plate disposed therebelow and spacing bolts interconnecting the two, means for securing such a machine to said body member, a plurality of wing members pivotally mounted between said body member and said base plate on axes extending longitudinally of a cylinder in which the device is operatively disposed, cams on said wing members, a screw carried by said support and operable through the upper end of said support body member, and a nut threaded on said screw and cooperating with said cams to swing said wing members outward into holding engagement with the cylinder wall.

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