Dec. 21, 1926. 1,611,570

A. H. WADELL

MACHINE FOR BORING THE BEARINGS OF CRANK CASES

Filed May 28, 1924 4 Sheets-Sheet 1

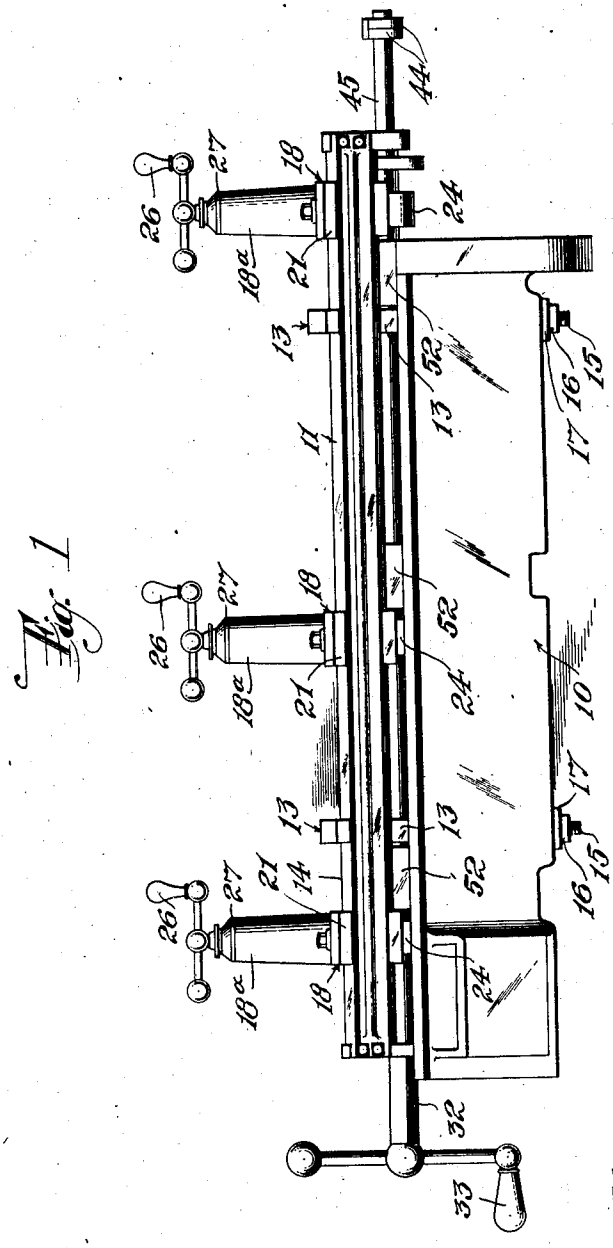


Fig. 1

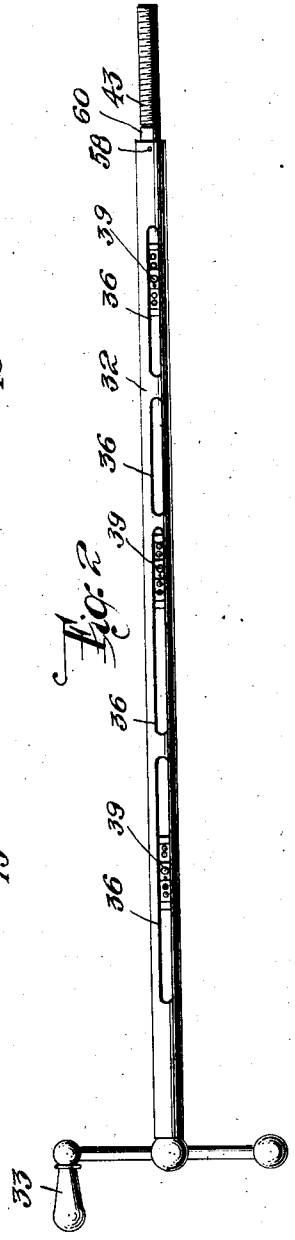


Fig. 2

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Dec. 21, 1926. 1,611,570

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MACHINE FOR BORING THE BEARINGS OF CRANK CASES

Filed May 28, 1924 4 Sheets-Sheet 2

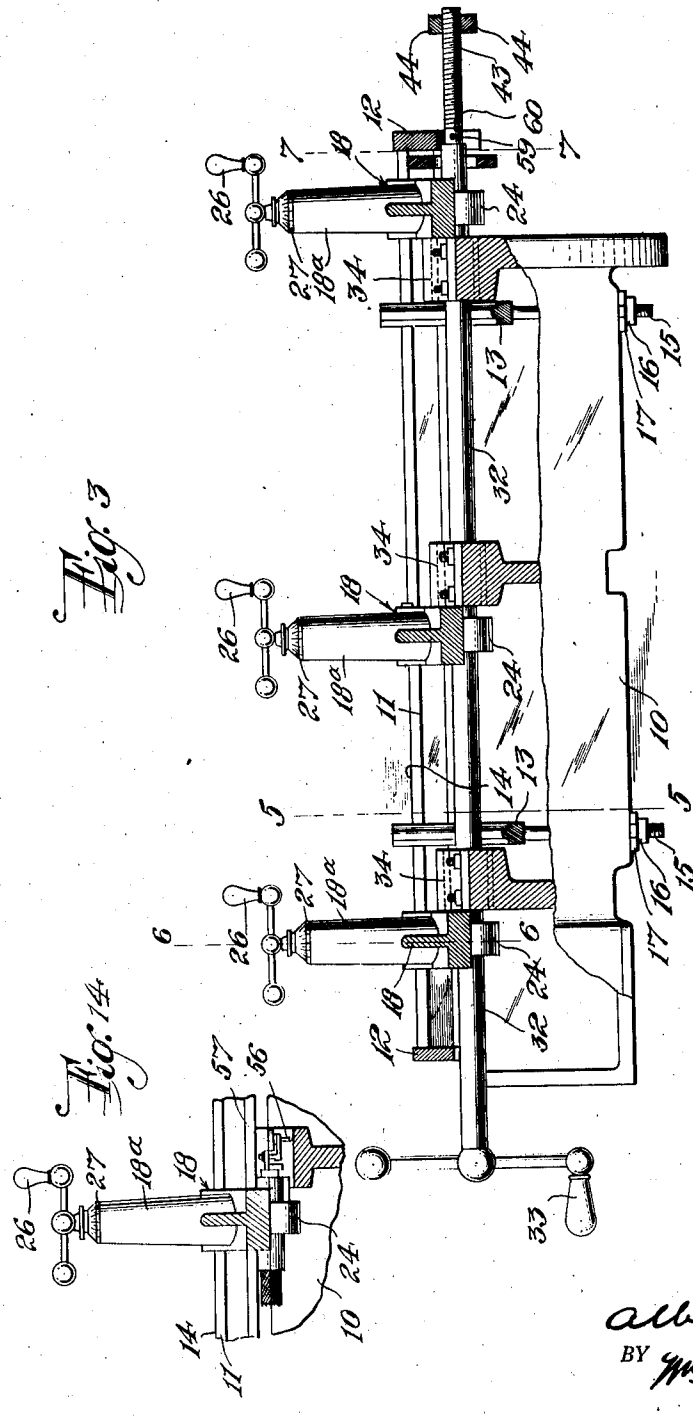


Fig. 3

Fig. 4a

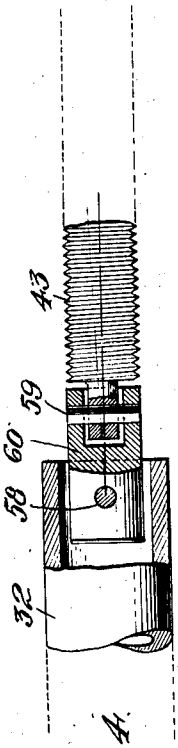


Fig. 4.

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Dec. 21, 1926. 1,611,570

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MACHINE FOR BORING THE BEARINGS OF CRANK CASES

Filed May 28, 1924 4 Sheets-Sheet 3

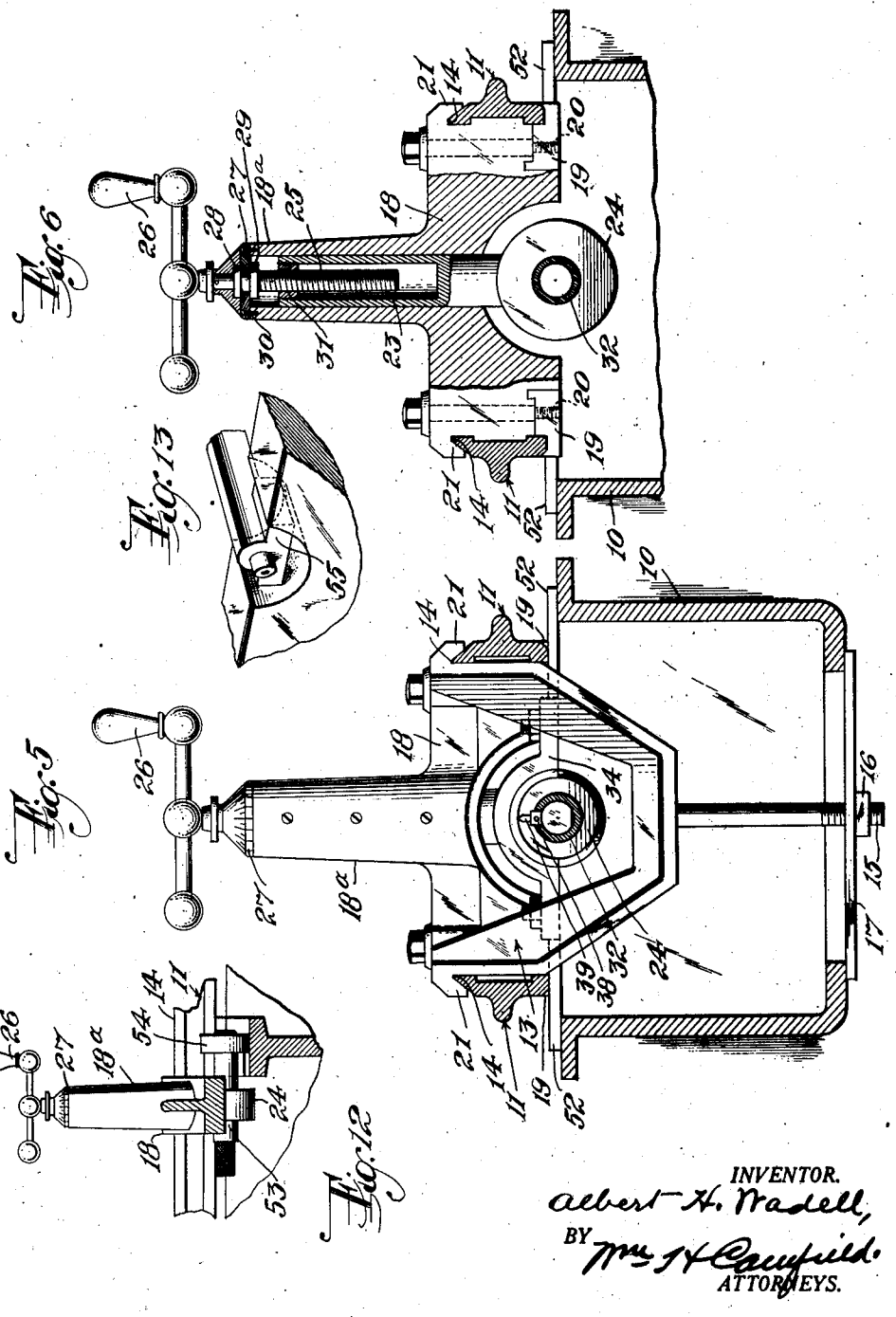


Fig. 6

Fig. 13

Fig. 5

Fig. 12

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Dec. 21, 1926. 1,611,570

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MACHINE FOR BORING THE BEARINGS OF CRANK CASES

Filed May 28, 1924 4 Sheets-Sheet 4

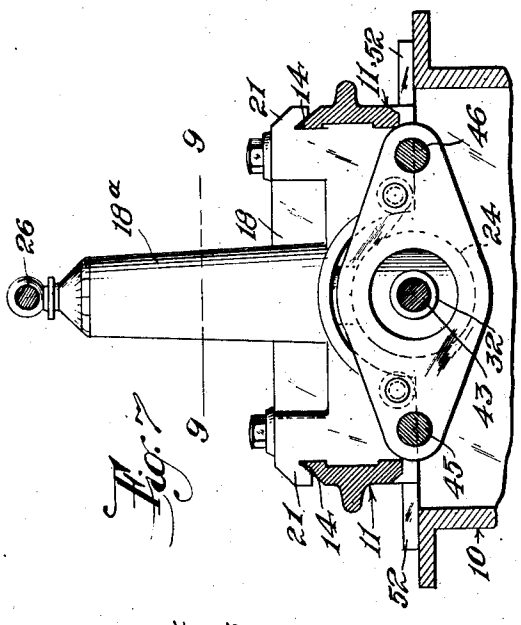


Fig. 7

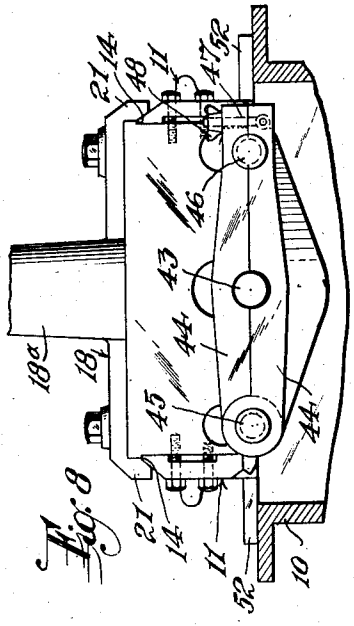


Fig. 8



Fig. 9

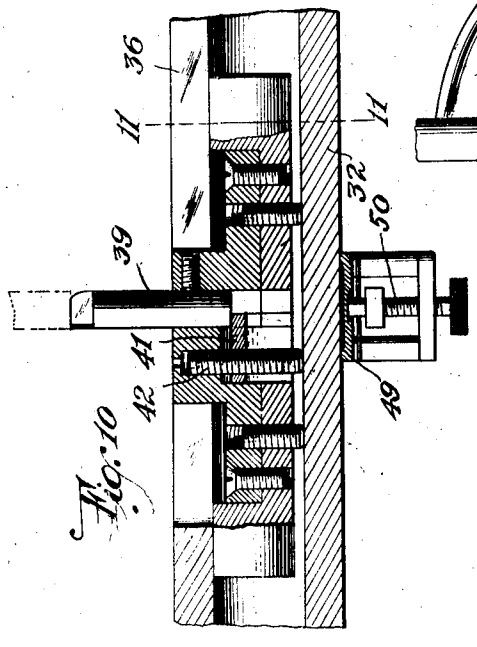


Fig. 10

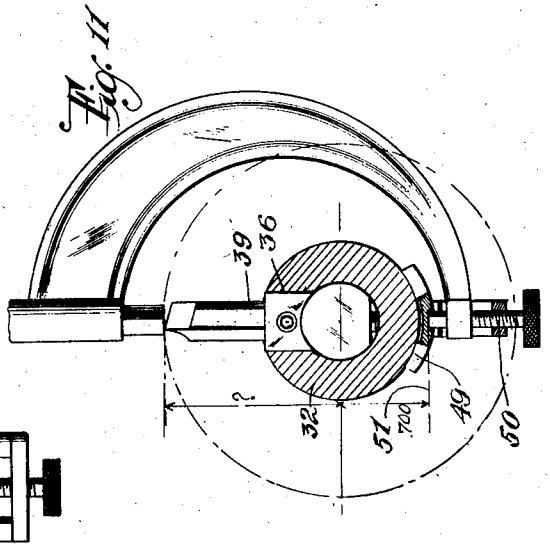


Fig. 11

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Patented Dec. 21, 1926. 1,611,570

UNITED STATES PATENT OFFICE.

ALBERT H. WADELL, OF NEWARK, NEW JERSEY.

MACHINE FOR BORING THE BEARINGS OF CRANK CASES.

Application filed May 28, 1924. Serial No. 716,389.

This invention relates to an improved portable machine for boring the bearings in crank cases of internal combustion engines and is adapted to simultaneously bore all the bearings of the crank case by means of a manually operable mechanism.

The invention is further designed to provide a machine of this kind which is quickly attached or detached from a crank case and in which the boring mechanism can be quickly aligned so that the operation is economical as it can be quickly done. The invention comprising an adjustable supporting means for the boring mechanism and a frame on which all the parts are mounted, the frame being readily attached and detached to and from the crank casing.

The invention is illustrated in the accompanying drawings, in which Figure 1 is a side view of the improved machine mounted on the upper half of a crank case and Figure 2 is a view of the boring bar of the machine detached and with the cutters removed. Figure 3 is a longitudinal section taken through Figure 1 and Figure 4 is a detail view of the preferred form of joint between the boring bar and its screw-threaded extension. Figure 5 is a cross section on an enlarged scale taken on line 5—5 in Figure 3. Figure 6 is a section taken on line 6—6 in Figure 3. Figure 7 is a section taken on line 7—7 in Figure 3. Figure 8 is an end view of the lower portion of the machine showing a part of the crank case in section and Figure 9 is a cross section on line 9—9 in Figure 7. Figure 10 is a longitudinal section on an enlarged scale of the boring bar and tool block therein. Figure 11 is a section on line 11—11 in Figure 10, both Figures 10 and 11 showing a calipering means which can be employed in connection with the machine and Figures 12, 13, and 14 are views showing indicators for assisting in the alignment of the bearings which support the boring bar.

The machine is used on the crank case of an internal combustion engine and in the drawing I show the member 10 of a crank case which has mounted thereon, the frame formed of side rails or slideways 11 and the end pieces 12. The frame is detachably secured in place by clamps and I show the clamps 13 which are forked at the end to engage the upper edges of the rails 11 as at 14 in Figure 5 and to provide clearance at the center for the boring bar. The stem 15 of each clamp is shown secured by a nut 16 screwed up tight against a bar 17 bridging the opening exposed by the removal of a cylinder of the engine.

Slidable on the slideways or side rails 11 are the slides 18 in the desired number the slides being adapted for locking against movement by a suitable lock the form illustrated comprising a block 19 (see Figure 6) which is clamped up tight against bottom edge of its respective side rail by a screw 20 so that the block 19 and the jaw 21 on each side securely hold the slide in place. On the slide is a head 22 in which the stem 23 of the bearing 24 slides. The screw bolt 25 is actuated by a handle 26 and is held against longitudinal movement by the collar 27 between the flanges 28 and 29 of the screw bolt. The collar 27 is made in halves so that it can be inserted between the flanges and is held in place by the screws 30. The screw threaded part of the bolt 25 engages the nut 31 of the stem 23 and moves it up and down when the screw bolt is turned. The bearings 24 are used in the desired number one for each bearing to be bored, and I show three in the illustration.

The bearings support the boring bar 32, which is equipped with a suitable handle 33 and has the required number of tools for finishing the inside of the bearings 34 of the crank case. For each bearing I provide a tool block 35 which is inserted in one of the slots 36 of the tool bar, the slot not being continuous in order to give the bar the required strength but they are extensive enough to make the whole operative length of the bar available so that the tools can be set up to at least four bearings.

The block 35 fits loosely in the bar 32 and is fastened in its adjusted position by the lock screws 37. The member 38 of the block 35 holds the tool or cutter 39 which is adjusted by the screw 40 which moves the foot 41 up or down as the adjusting screw 40 is turned the foot bearing against the bottom of the cutter and forcing it outward when it is to be projected and allowing it to be pushed in when the foot is retreated. The foot 41 is screw-threaded and the hole 42 is not.

On the end of the boring bar 32 is an extension 43 which is screw-threaded and is embraced by the split nut consisting of the two wings 44 pivoted to the post 45 and braced by the post 46 when shut and locked

by a suitable lock as the pivoted bolt 47 and the nut 48.

In order to set the cutter I have devised a gauge 49 which fits under the bar 32 and is secured to one arm of a caliper or micrometer as by a set screw 50 and the distance from the line 51 to the centre of its arc, which is the centre of the bar, being known, the reading on the setting of the cutter will be available for the proper calipering thereof.

When the machine is to be used it is mounted on the crank case as set forth above and if need be suitable blocks or plates 52 are used to establish its proper support intermediate its ends and then clamped in place. The bearings 24 are then properly elevated or depressed and when in place can be verified by an indicator such as the one shown in Figure 12 in which the stem 53 fitting in the bearing 24 has the required size indicator 54 to turn in the bearing to gauge its position so as to line it up with the others. The indicators 54 are interchangeable for different size crank cases. The indicator 55 is another type which is rotatable to gauge the fit all around. In Figure 14 I show another form at 56 with a gauge 57 to show variations, if any, from the concentric position. When properly set by the handles 26, the bearings 24 are fitted with the boring bar 32 and the respective cutters 39 adjusted. When these have been adjusted the members 44 of the nut are swung together and the handle 33 rotated and the boring bar and cutters are advanced when rotated and the bearings are all bored at the same time and in alignment. The joint between the bar 32 and the extension 43 is preferably flexible as the threads on 43 are fine and the stripping thereof is thereby avoided. I show the pins 58 and 59 set at right angles and securing the bar and the extension to the connecting block 60 to provide such flexibilty.

It will be evident that changes can be made in the construction and operation of the parts without departing from the scope of my invention and I have not illustrated many equivalents for the parts described.

I claim:

1. A boring machine for the bearings of crank cases comprising a frame formed of side rails and cross pieces, means for detachably securing the frame to a crank case, a boring bar, bearings for the bar, and heads for the bearings said heads being adjustable longitudinally on the frame, and the bearings being adjustable vertically in the heads.

2. A boring machine for the bearings of crank cases comprising a frame with longitudinal slide-ways thereon, slides on the slideways, means for locking the slides, heads on the slides, bearings adjustable vertically in the heads, a boring bar insertible longitudinally in the bearings, and means for advancing the bar when it is rotated.

3. A boring machine for the bearings of crank cases comprising a frame consisting of side rails and end plates, clamp for securing the frame to the upper member of a crank case, slides movable on the side rails, means for clamping the slides in place, the slides including heads, bearings in the heads, screw bolts for elevating and lowering the bearings, a boring bar fitting in the bearings, cutters in the boring bar, and means for advancing the boring bar when it is rotated.

In testimony that I claim the foregoing, I have hereto set my hand, this 12th day of August, 1923.

ALBERT H. WADELL.