

Nov. 8, 1932.

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WORKHOLDER FOR BORING MACHINES

Filed May 13, 1930

3 Sheets-Sheet 1

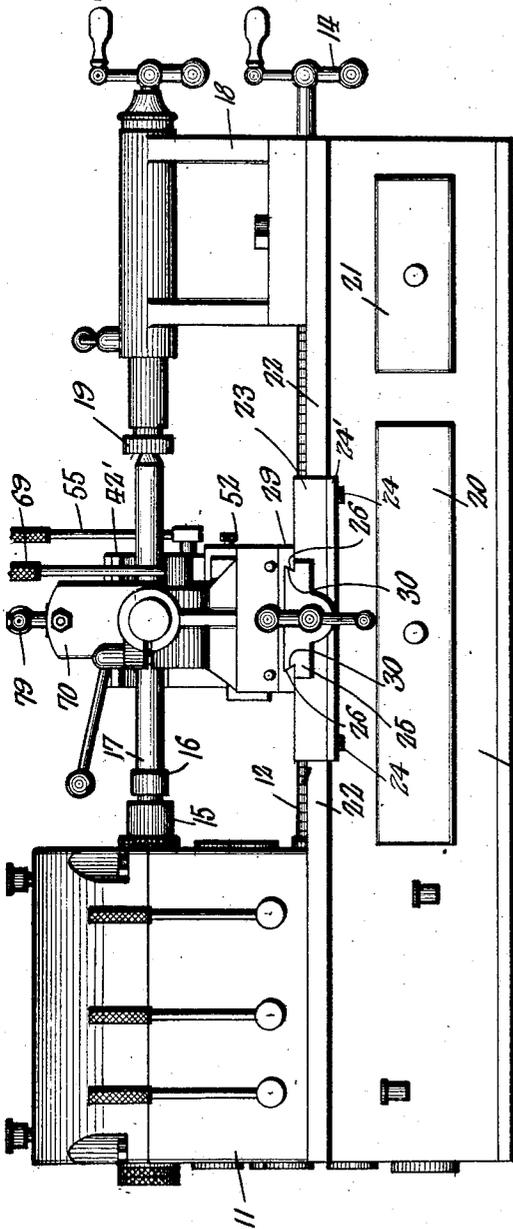


Fig. 1.

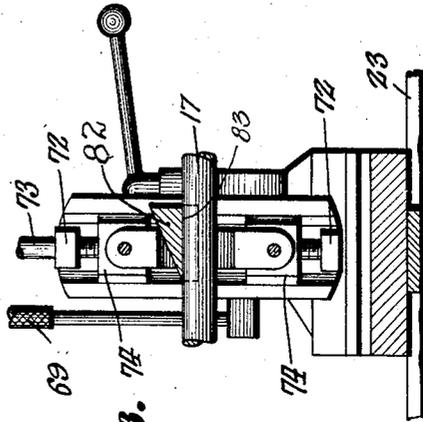


Fig. 2.

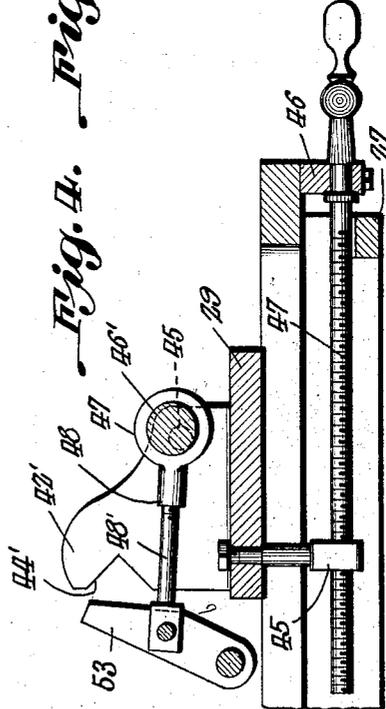


Fig. 3.

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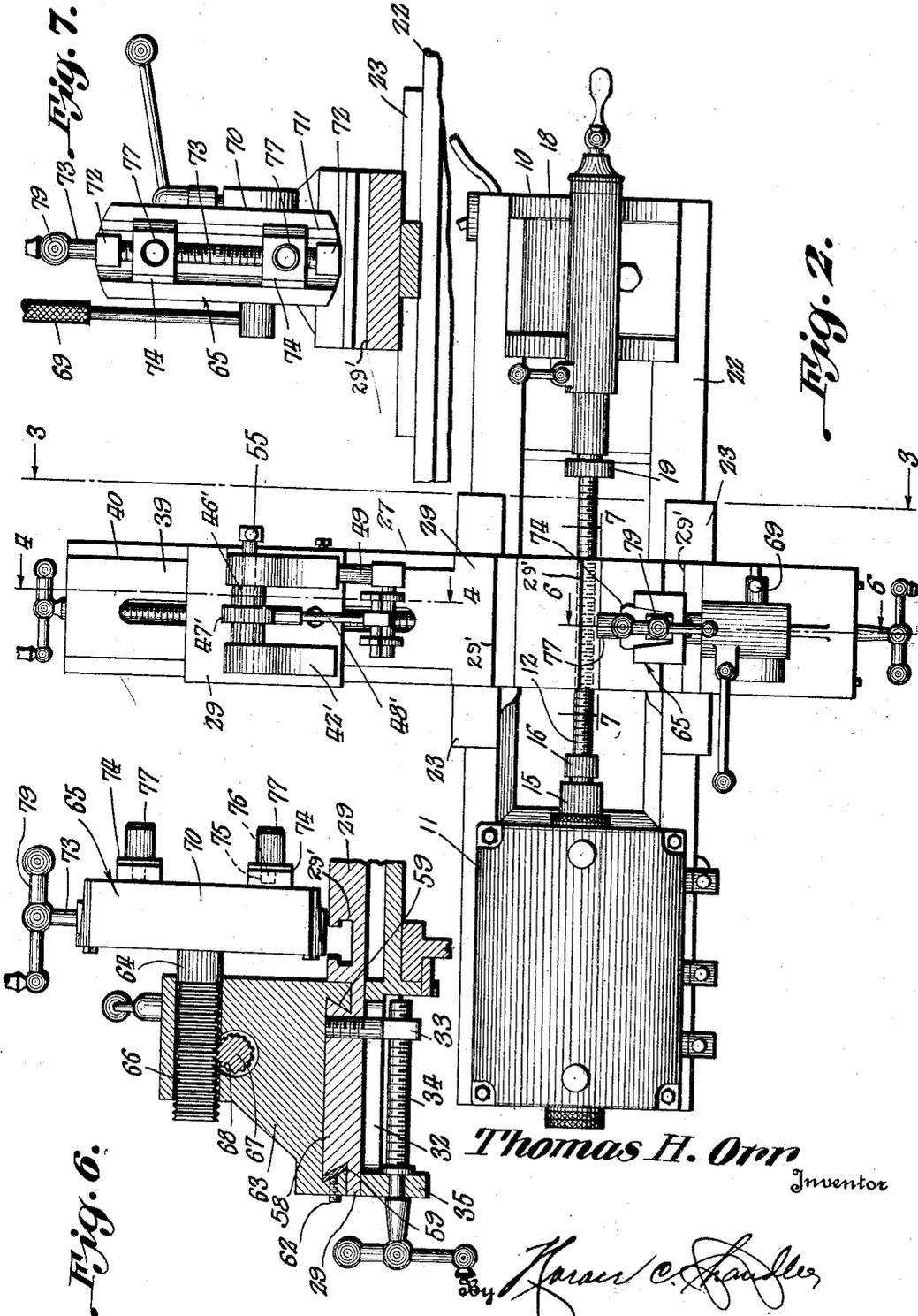
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 3.

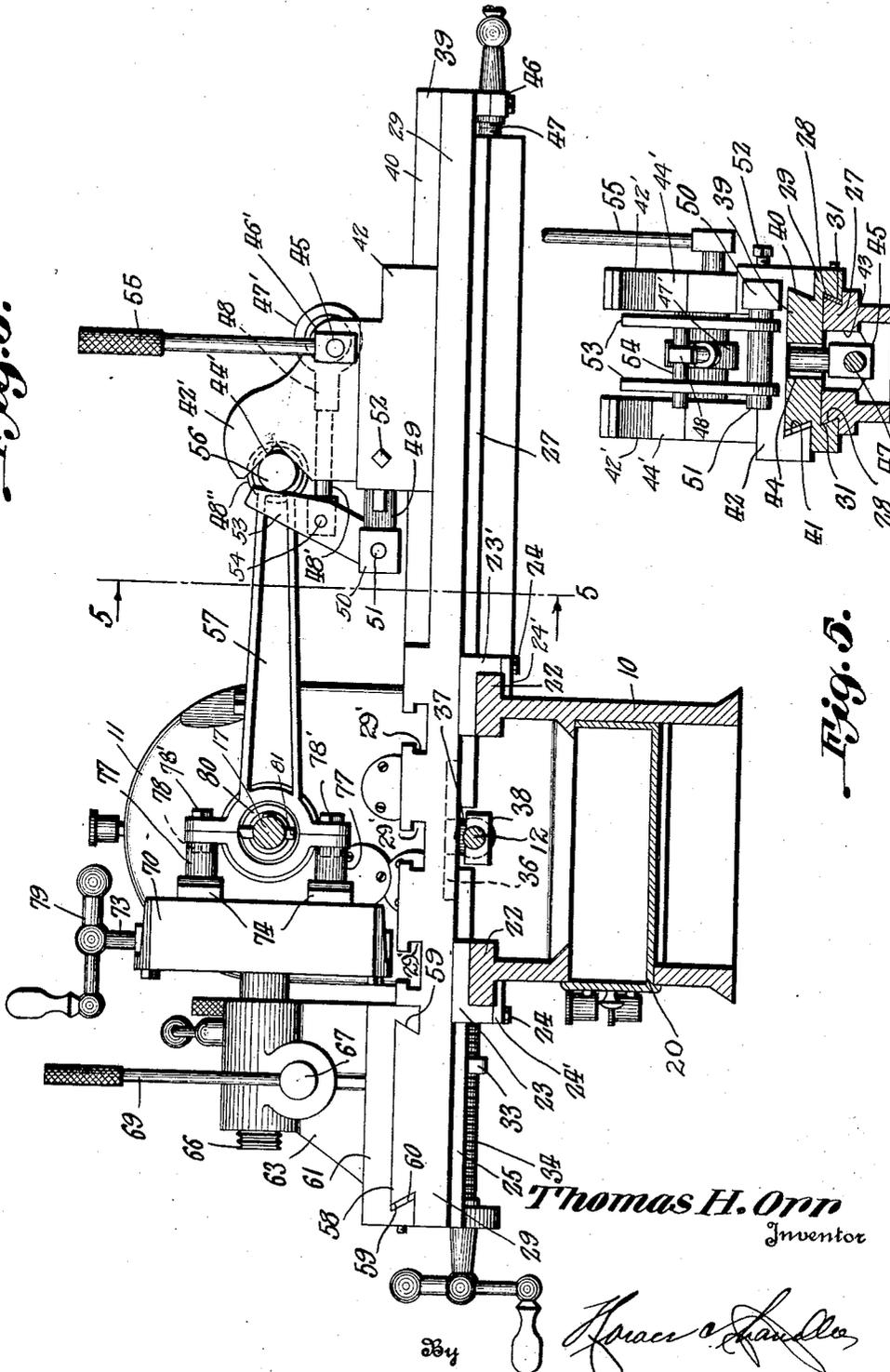


Fig. 5.

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WORKHOLDER FOR BORING MACHINES

Application filed May 13, 1930. Serial No. 452,004.

This invention relates to new and useful improvements in metal working machines.

The principal object of the invention is to provide a novel and improved machine by means of which the connecting-rod of an engine may be properly clamped for operation thereon, by suitable tools associated with the machine.

Another object is to provide novel and improved means for boring out the bearing in the crank-shaft end of a connecting-rod.

Another object is to provide novel and improved means for centering the crank-shaft end of a connecting-rod, whereby the boring tool may properly act upon the bearing in said rod end.

Other objects and advantages will be apparent from the following description when taken in connection with the accompanying drawings.

In the drawings:

Figure 1 is a side elevation of the machine forming the subject matter of the present invention.

Figure 2 is a top plan view of the same, the boring bar being omitted.

Figure 3 is a vertical transverse sectional view on the line 3—3 of Figure 2.

Figure 4 is a sectional view on the line 4—4 of Figure 2.

Figure 5 is a vertical transverse sectional view on the line 5—5 of Figure 3.

Figure 6 is a sectional view on the line 6—6 of Figure 2.

Figure 7 is a vertical transverse sectional view on the line 7—7 of Figure 2.

Figure 8 is a view similar to Figure 7, showing the manner of centering the work, with respect to the boring bar.

Referring particularly to the accompanying drawings, 10 represents an elongated hollow frame or base, in one end of which is formed a casing 11, containing a driving means, not shown, for driving the feed screw shaft 12, extending longitudinally within the base, and having its ends supported, respectively, in the adjacent end wall of the casing 11, and in the other end of the base, one end of said end of the shaft being provided with a handle 14, whereby the shaft may be manu-

ally rotated. Supported in the said end wall of the casing 11, above the shaft 12, is a stub shaft 15, driven by the driving means within the casing, said stub shaft having, in its outer end, a socket 16 for receiving and supporting one end of the boring bar 17. Slidably adjustable, and clamped on the other end of the base 10, is a rest 18, which supports the longitudinally adjustable center 19, said center being adapted to support the other end of said boring bar 17. Removable from the side of the base 10 are the drawers 20 and 21, the former being adapted to receive the chips or shavings from the work, while the latter is adapted to contain tools, cutters, and the like.

The upper longitudinal edges of the sides of the base 10 are formed with the laterally extending horizontal flanges 22, and disposed on said flanges are the angle bars 23—23', the horizontal web of each bar resting on the upper face of a flange, while its vertical web depends into a position where its lower edge is in the plane of the lower face of the flange 22. Removably secured to the said lower edge of the vertical web of each of the angle bars, by means of the screws 24, is a plate 24', which extends beneath the flange 22, whereby to hold the angle bars on the base, but permit longitudinal slidable movement thereof, with respect to the base. Formed on the angle bar 23, and extending horizontally outward therefrom, with its upper face in the plane of the upper face of the said bar, is a table 25, having its longer or side edges beveled, as at 26. On the angle bar 23' is formed a similar, but longer table 27, extending horizontally outward therefrom, said table also having its side edges beveled, as at 28. Disposed transversely of the base is an elongated plate 29, forming a carriage, the lower faces of the end portions of which are formed with the longitudinally extending undercut grooves 30 and 31, respectively, as clearly seen in Figs. 1 and 5 of the drawings, the former groove receiving the table 25, while the latter receives the table 27, whereby said plate or carriage 29 is arranged for sliding movement on said tables, transversely at right angles to the base 10, for a purpose which will appear later herein. The table 25 is formed with a longitudinal

central slot 32, downwardly through which projects the lug 33, carried by the lower face of the carriage 29, and disposed through this lug is the threaded feed shaft or rod 34, the outer end of which is supported in the depending bracket 35, carried by the outer end of the table 25, said outer end of the rod 34 being provided with a handle by means of which the rod may be rotated to cause the carriage to slide transversely of the base, and with respect to said table, as well as the table 27. In the lower face of the intermediate portion of the plate or carriage 29, directly over the screw shaft 12, is a longitudinally extending groove 36, in which is received the lug 37, of the nut 38, carried by the said shaft 12, whereby when said shaft is rotated, the carriage will be moved longitudinally of the base, while at the same time, the groove 36, permits transverse movement of the carriage 29, by reason of the fact that the lug 37 will slide in said groove, during such transverse movement of the carriage.

Formed on the upper face of the end of the carriage which is supported on the table 27, is a longitudinally extending raised portion 39, the longer edges of which are underbeveled, as at 40, and engaged by the beveled side walls of the groove 41, formed in the lower face of the block 42, which is supported on the end of said carriage 29. Formed longitudinally and centrally in the table 27 is a slot 43, and in the end of the carriage 29, thereabove, is a longitudinal slot 44, registering with the slot 43, said slots receiving the depending lug 45, carried by the said block 42. At the outer end of the carriage 29 is a depending apertured lug 46, in which is rotatably held the outer end of the adjusting screw shaft 47, which has threaded through the depending lug 45, a handle being mounted on the outer end of said shaft whereby to rotate the same for the purpose of moving the block 42 longitudinally of the carriage, as will be readily understood. Extending upwardly from the upper face of the block 42 are the parallel members 42', said members having the transverse V-shaped notches in their forward vertical edge faces, shown at 44'. Extending transversely through the lower portions of the members 42' is a shaft 45', on the intermediate portion of which is mounted a cam 46', and engaged around said cam is a strap 47', having an internally threaded stem 48, extending forwardly from between the members 42', and receiving therein the threaded stem D. Slidable into the forward portion of the block 42 is a rod 49, the forward end of which is provided with a head 50, supporting a laterally extending shaft 51. A set screw 52, carried by the side of the said block 42, serves to provide means for holding the rod 49 inwardly or outwardly, with respect to said member. Pivotally supported on the shaft 51 is a pair of upwardly extend-

ing arms 53, through which is disposed a pin 54. Engaged through the outer end of the stem 48' is the before-mentioned pin 54, whereby when the member or stem 48' is moved by the cam 46', the arms 53 will be moved toward and away from the notched faces of the members 42'. On one end of the shaft 45' is a radially extending lever 55, by means of which the shaft is adapted to be rotated, whereby to cause the cam to move the arms 53 toward and away from the notched faces of the members 42'. As seen in Figure 3, the piston end of the connecting rod 57, is disposed transversely of the carriage 29, so that the ends of its pin 56 rest within the notches 44, while the stem of the connecting rod extends in the direction of the base 10, between the arms 53, said arms being drawn into engagement with the end portions of said pin upon rotation of the shaft 45' to hold the pin in said patches. Thus the rod end is tightly clamped between the members 42' and the arms 53.

On the upper face of the other end of the carriage 29 there is formed the transversely extending elevated portion 58, having two of its opposite edges underbeveled, as at 59, said portion 58 being received in the undercut groove 60, in the lower face of the block 61, which is disposed on the said end of the carriage, such block being arranged for transverse slidable adjustment, with respect to the end of the carriage. A screw 62, carried by the block 61, is adapted to engage with the portion 58, to hold the block in adjusted positions, transversely of the carriage 29. On the upper face of the block 61 is a standard 63, through the upper end of which is slidably disposed the stem 64, of the chuck 65. That portion of the stem 64, which slides within the standard is formed with a plurality of parallel circumferential ribs 66, and rotatably supported transversely within said standard, beneath the stem 64, is a rock shaft 67, having thereon the toothed wheel 68, which meshes with the ribs 66. On one end of the rock shaft 67 is a lever 69, by means of which the shaft may be rocked whereby to slide the stem 64 backward and forward through the standard, so as to adjust the chuck toward and away from the boring bar 17.

The chuck 65 comprises a transverse head 70, having in its forward face the longitudinally extending channel 71, the side walls of which converge toward the bottom of the channel. Secured within the ends of the channel are the blocks 72, and disposed longitudinally and centrally within the channel, with its ends rotatably supported in said blocks 72, is an oppositely threaded rod 73. Threaded on each end portion of the rod 73, inwardly of a block 72, is a block 74, the inner portion of which is wedge-shaped to properly fit within the channel, and in the

outer face of each of the blocks 74 is a socket member 75, receiving the stem 76 of a member 77, which has a terminal socket 77', adapted to receive the nut 78 of a bolt 78', of the crank-shaft end of the connecting rod. 5 The upper end of the threaded rod 73 is provided with a handle 79, by means of which said rod may be rotated, whereby to move the blocks 74 toward and away from each other, for the purpose of adjusting said blocks so 10 that their sockets 77 will adapt themselves for connecting rods wherein the bolts are at different distances apart. It will be understood that, after the bolt heads are properly seated within the sockets 77, the operator 15 rotates the screw rod 73, so that they will be moved toward or away from each other, for the purpose of producing a wedging action upon the bolts, and thereby more securely hold said end of the connecting rod. 20

When the connecting rod is thus held in the clamp, at one end of the carriage, and in the chuck 65, at the other end thereof, the bearing eye 80, of the connecting rod should 25 be in proper position to receive the boring bar 17 therethrough, for action of the cutters 81, upon said eye and particularly the bearing therewithin. If, however, the eye 80 is not in proper alinement for action of the cutters 81, that is, it is not properly positioned transversely of the machine, the operator 30 rotates the feed screw 34, which moves the carriage 29 transversely of the base, until it is in proper position. As to the lateral position of the connecting rod, that is its 35 position at right angles to the boring bar, so that the bearing may be properly and squarely bored out, the operator adjusts the block 63 transversely of the end of the carriage 29, 40 (that is, longitudinally of the base 10), he then secures the same in adjusted position by means of the screw 62.

To properly center the bearing, of the connecting rod, with respect to the boring bar 45 17, the operator applies a half conical member 82 to the boring bar, said member having a longitudinal groove 83, which snugly receives a portion of the boring bar, whereby said member may be slipped along the bar 50 so that its point or nose may enter the bearing of the connecting rod. The operator rotates the member 82 on the boring bar, within the bearing, and at the same time makes the proper adjustments of the carriage, and 55 the holders thereon, until the semiconical member can be rotated freely within the bearing. The machine may now be operated to ream out the bearing.

From the foregoing it will be seen that, 60 upon rotating the screw shaft 12, the carriage, together with the connecting rod, will be moved longitudinally of the base, whereby to permit disposing the eye of said rod at one side of the cutters of the boring bar. 65 The shaft 15 is then set in motion to rotate

the boring bar, and due to the fact that the screw shaft 12 is operated by the means which drives the shaft 15, the carriage will be moved longitudinally of the base so that the eye of the connecting rod will be moved over 70 the cutters, to be reamed thereby. When the cutters have passed through the eye, the rotation of the shaft 12 is reversed, so as to drive the carriage back, and thereby permit the cutters return through said bearing 75 eye, it being understood that the cutters are adjusted outwardly so as to further ream the bearing.

It is to be understood that, while I have illustrated the device as particularly adapted 80 for boring out connecting-rod bearings, the machine is adapted for general lathe work, by mounting a tool post in a groove 29', said groove being clearly shown in Figure 6.

What is claimed is: 85

A connecting rod holder for a boring machine comprising a base, means on the base for holding the crank-shaft end of a connecting rod, and means on the base for holding the pin carrying piston end of the connecting rod, said second-named means including a block provided with parallel members having notches for receiving the said pin of the connecting rod, a rod slidably adjustable into and out of the block, a laterally 90 extending shaft carried by said rod, vertical clamping arms pivoted on said shaft, means connecting the arms for unitary movement thereof, a cam shaft carried by said notched members, means for rocking the cam shaft, 100 and a link connected to the cam shaft and said arms connecting means for moving the arms toward and away from said notches.

In testimony whereof, I affix my signature.

THOMAS H. ORR. 105

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