

No. 815,630.

PATENTED MAR. 20, 1906.

C. F. OWEN.
TOOL CARRIER FOR BORING BARS.

APPLICATION FILED DEC. 15, 1902.

3 SHEETS—SHEET 1.

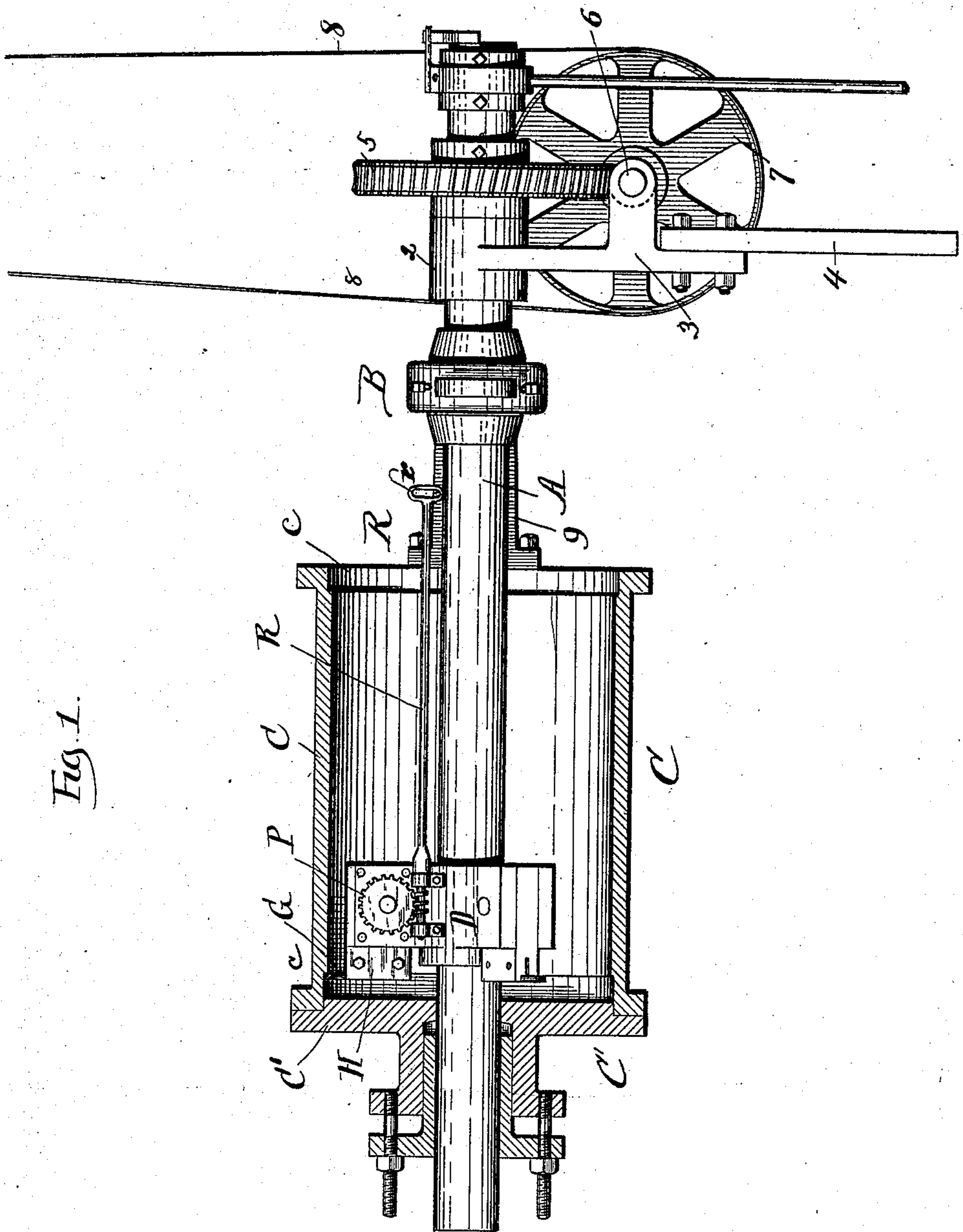


Fig. 1.

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3 SHEETS—SHEET 2.

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UNITED STATES PATENT OFFICE.

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TOOL-CARRIER FOR BORING-BARS.

No. 815,630.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed December 15, 1902. Serial No. 135,209.

To all whom it may concern:

Be it known that I, CHARLES F. OWEN, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Tool-Carriers for Boring-Bars, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The invention has relation more particularly to that class of boring-bars that are designed for boring the cylinders of locomotives or other engines; and the invention consists in the features of novelty hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of this specification.

In boring the cylinders of locomotives and other engines it is found desirable in practice to give to the interior of the cylinders a greater diameter at points immediately adjacent the cylinder-heads than is given to the cylinder throughout the intermediate portions of its length. In boring cylinders one of the cylinder-heads is usually left in position, the boring-bar being centered through the piston-hole therein. Hence it is desirable to provide the tool-carrier or head-stock of the boring-bar with means whereby the tool may be adjusted from a point outside the cylinder in order to shift the cutting-tool to and from the working position when it is to operate upon the enlarged diameter of the cylinder immediately adjacent the head in which the boring-bar is centered.

My present invention affords a simple and effective means whereby the tool may be moved positively to and from the working position while the tool is within the cylinder, and the movement of the tool is effected at substantially right angles to the line of the boring-bar, as by this means the advancement of the tool to its work is most effectively accomplished.

Figure 1 is a view in vertical longitudinal section through a cylinder having applied thereto a boring-bar equipped with my invention. Fig. 2 is an enlarged detailed view of a portion of the boring-bar with the head-stock or tool-carrier in position thereon. Fig. 3 is a view in cross-section on line 3 3 of Fig. 2. Fig. 4 is a view in section on line 4 4 of Fig. 3. Fig. 5 is a side view of one of the wings or arms of the head-stock or carrier,

this view being taken at a point opposite that shown in Fig. 2. Fig. 6 is a view in section on line 6 6 of Fig. 2.

Referring more particularly to Fig. 1 of the drawings, A designates the boring-bar of any suitable or improved construction, the outer end of this boring-bar being sustained by a journal-bearing 2, that is supported by a bracket 3, carried at the top of a floor-brace 4. Upon the boring-bar A is fixed a worm-wheel 5, that is driven from a worm on the shaft 6, to which rotation is imparted by a pulley 7 and belt 8 in the usual manner. The boring-bar A is provided with a binder B for centering the bar, this binder being adapted to engage with posts 9, that will be bolted to the outer end of the cylinder C to be bored. In the drawings, Fig. 1, but a single post 9 is shown, and I have not deemed it necessary to illustrate or to describe in detail the binder B, as these features are old and well understood by those familiar with this class of apparatus, and their details form no part of this invention. The outer end of the boring-bar A is journaled in the head C' of the cylinder, and the interior of the cylinder C is shown as provided at its ends with enlarged annular grooves or channels c, which are found desirable in practice, particularly in the cylinders of steam-engines.

Upon the boring-bar A is mounted in manner free to slide the tool-carrier or head-stock D, that is formed, preferably, with a plurality of wings or arms d, adapted to hold the tools whereby the boring of the cylinder will be effected. The tool-carrier or head-stock D, as shown, is provided with a nut or plate E, (see Fig. 3,) having a threaded opening through which passes the feed-screw A' of the boring-bar. This feed-screw A' is shown as extending in a longitudinal groove a, formed in the bar A, and the nut or plate E is shown as attached to the tool-carrier or head-stock D by a screw e, the plate entering the recess or groove a of the boring-bar. It will be understood, of course, that the screw A' extends to the front end of the boring-bar and is there provided with the usual means (not fully shown) for effecting the automatic feed of the head-stock. When the tool-carrier or head-stock D is provided with a series of arms, as shown, two of these arms may carry tools F, designed to operate only on that part of the cylinder between the annular grooves at its ends, while the third arm may

carry a tool G, adapted not only to act on the body of the cylinder, but also to form the annular grooves at its ends. As shown, the tools F are held by screw-bolts d^3 between the sections of the arms or wings d in the usual manner. As these tools F are used only in boring the main portions of the cylinder they can be adjusted when the tool-carrier or head-stock is outside the cylinder; but as the tool G is used not only in boring the body of the cylinder, but also the enlarged grooves or channels at its ends, provision is made for effecting the adjustment of this finishing-tool G to and from its work, while the tool is adjacent the inner end of the cylinder.

In the preferred form of my invention the tool G is mounted upon a tool-block H, the outer portion of the tool-block H being bifurcated, as clearly shown in Fig. 6, to receive the tool G, that will be securely held in place by the clamping-bolts 10 or in any other convenient manner. The tool-block H is set between the arms d^4 and d^5 of one of the wings of the head-stock or tool-carrier, and preferably a plate or cover d^6 is fastened over the ends of these arms d^4 and d^5 . (See Figs. 2 and 3.) The tool-block H is formed with guide slots or grooves h in its opposite faces, and into these slots or grooves extend guide-pins k , that are fixed in the arms d^4 and d^5 of one of the wings of the tool-carrier or head-stock. The tool-block H is formed with a recess h^2 , adapted to receive an eccentric-block m , through which passes a shaft O, carrying an eccentric o within the block m . On one end of the shaft O is fixed a worm-wheel P, that is engaged by a worm P' upon a shaft p , that is mounted in bearings 13 and 14, secured to the face of one of the arms of the head-stock or tool-carrier. The shaft p is shown as provided with a squared end p' , adapted to be engaged by a wrench R, the end of which extends outside the cylinder and is provided with a suitable handle r , by which it may be manipulated. In one of the arm-sections d^5 and at a point opposite the eccentric-block m (see Fig. 5) there is formed an opening of sufficient size to admit the eccentric-block m . This opening is closed by a plate S, (see Figs. 5 and 6,) that is conveniently held in position by the screws s . As shown, one end of the eccentric-shaft O is journaled in this plate S.

From the foregoing description the operation of my improved apparatus will be seen to be as follows: When the body of the cylinder C has been bored and the tools reach the point adjacent the cylinder-head C' at which the enlarged grooves c is to be formed, (or in an old cylinder is to be rebored,) the attendant will set the wrench R over the ends of the worm-shaft p , and by turning this wrench and the shaft in part revolution to the worm P', the worm-wheel P, and the eccentric-shaft

O as the eccentric-shaft O is thus revolved its eccentric o will cause the eccentric-plate M, and consequently the tool-block H and tool G, to move toward or from the wall of the cylinder C, according to the direction in which the wrench R is turned. In this way the operator can readily advance the tool G to or retract it from its work. As the tool-block and tool are mounted to slide at right angles to the boring-bar, it will be readily seen that the tool is advanced squarely to its work, and by this means the most effective cutting of the groove or channel c in the cylinder is secured. When the groove c adjacent the cylinder-head C' has been cut to the desired depth, the attendant by means of the wrench R may retract the tool G, so that it shall coact with the remaining tools in the boring of the outlying portions of the cylinder.

So far as I am aware this invention presents the first instance of a boring-bar provided with a plurality of tool-carriers, one of which may be adjusted independently of the others, so that in one passage through the cylinder to be bored a "roughing" cut followed by a smooth or finished cut can be had, the independently-adjustable tool being provided with means whereby it can be positively advanced and retracted.

Having thus described my invention, what I claim is new, and desire to secure by Letters Patent, is—

1. The combination with a boring-bar, of a head-stock provided with a plurality of tools, an independently-shiftable tool-block for one of said tools, and manually-controllable means mounted on said head-stock for positively advancing and retracting said tool-block both toward and from the work to enable the tool carried thereby to be shifted back and forth between the tool-bar and the work, independently of the other tools mounted on the head-stock.

2. The combination with a boring-bar, of a head-stock provided with a plurality of radial arms, each of said arms being furnished with a tool, a tool-block mounted on one of said arms and movable at right angles to the tool-bar, and manually-controllable gearing mounted upon the outside of the arm carrying said tool-block, said gearing being connected with the tool-block of one only of said tools, and serving to positively advance and retract the tool-block to which it is connected both toward and from the work, independently of the other tool-blocks.

3. The combination with a boring-bar of a head-stock provided with a plurality of tools and tool-carrying arms, one of said arms being bifurcated, a tool-block mounted in said bifurcated arm and arranged to reciprocate at right angles to the boring-bar, a tool carried by said tool-block and movable independently of the other tools, a shaft extend-

ing through said bifurcated arm and through said block and provided with an eccentric for shifting said block, and gearing at one end of said shaft and on the outside of said arm whereby said tool-block may be advanced and retracted to shift its tool independently of other tools carried by the head-stock.

4. The combination with a boring-bar, of a head-stock or tool-carrier provided with a plurality of tools, a tool-block for one of said tools mounted upon said head-stock and movable independently of the other tools carried by the head-stock and back and forth at right angles to the boring-bar, a shaft extending at right angles to said tool-block provided with means whereby it may shift said tool-block back and forth and gearing at the outer end of said shaft whereby said shaft may be turned.

5. The combination with a boring-bar, of a head-stock or tool-carrier provided with a tool-block mounted thereon, an eccentric for engaging said tool-block whereby it may be advanced and retracted toward and from its work, a shaft for turning said eccentric

and a worm wheel and shaft for operating said eccentric-shaft.

6. The combination with a boring-bar, of a head-stock or tool-carrier provided with a tool-block mounted thereon, suitable means for guiding said tool-block, an eccentric for shifting said tool-block back and forth, a shaft for operating said eccentric, a worm-wheel on said shaft and a worm-shaft engaging said worm-wheel and provided with a polygonal end portion adapted to be engaged by a wrench.

7. The combination with a boring-bar, of a head-stock or tool-carrier having parallel arms, a tool-block mounted between said parallel arms and having an opening provided with an eccentric-block, an eccentric set within said block, a shaft for actuating said eccentric and suitable worm-gearing connected to said eccentric-shaft and whereby said tool-block may be advanced and retracted toward and from its work.

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