(No Model.)

F. STANSBURY.

BORING BAR DEVICE FOR LATHES.

No. 603,293. Patented May 3, 1898.

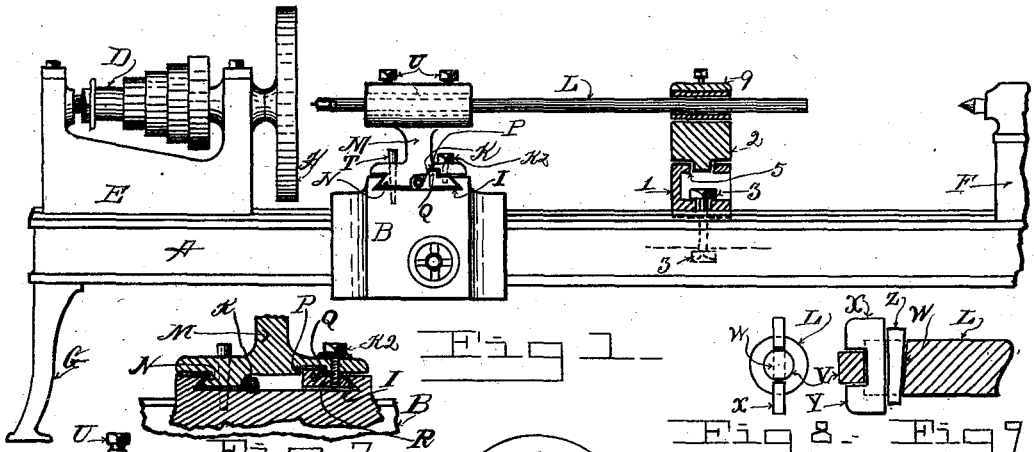

Fig 1.

Fig 7.

Fig 8.

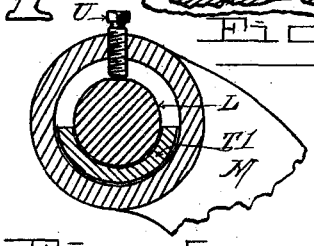

Fig 5.

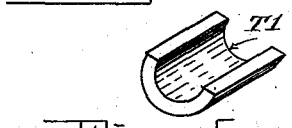

Fig 6.

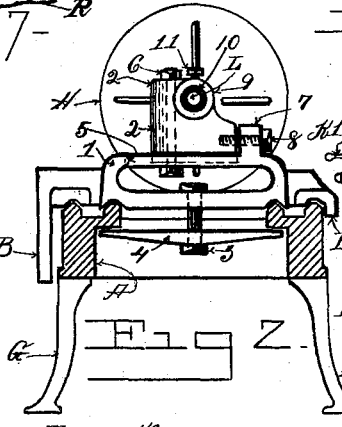

Fig 2.

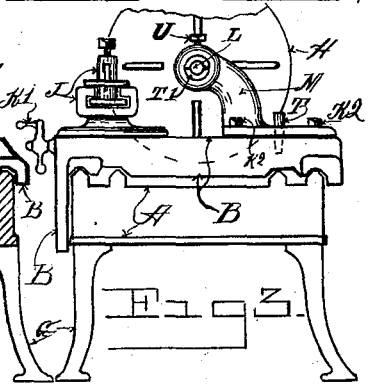

Fig 3.

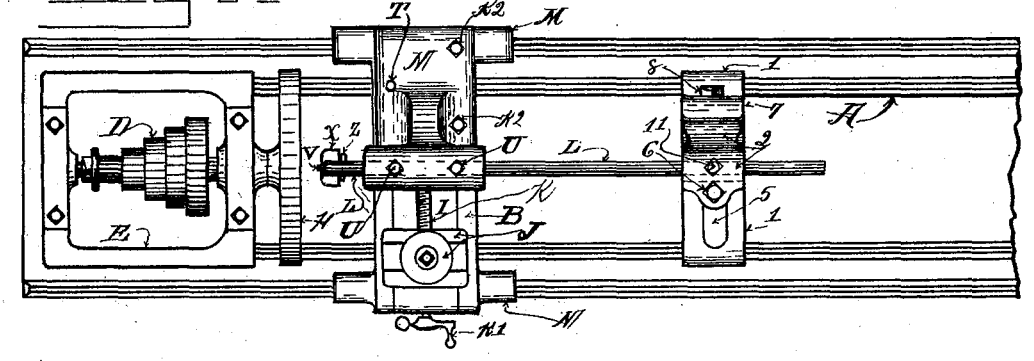

Fig 4.

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UNITED STATES PATENT OFFICE.

FREMONT STANSBURY, OF DENVER, COLORADO.

BORING-BAR DEVICE FOR LATHES.

SPECIFICATION forming part of Letters Patent No. 603,293, dated May 3, 1898.

Application filed December 21, 1897. Serial No. 662,931. (No model.)

To all whom it may concern:

Be it known that I, FREMONT STANSBURY, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Boring-Bar Devices for Lathes; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in boring-bars for lathes; and the objects of my invention are, first, to provide a boring-bar that can be rigidly supported in axial alinement with any lathe's centers and that can be fed by the lathe-carriage into and through any work that can be attached to a lathe in which it is desired to bore a hole; second, to provide a boring-bar in which interchangeable cutters are used and in which the cutters project beyond the feeding-in end of the bar and are thus capable of cutting their way into a much smaller cored casting than in boring-bars where the cutters are positioned wholly intermediate of their ends, and, third, to provide a simple and cheap boring-bar. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of such portions of a lathe as are necessary to illustrate the application of my improved boring-bar to it. Fig. 2 is an end elevation of a section of the lathe-bed, showing a side elevation of the fixed support of the bar. Fig. 3 is an end elevation of the lathe, showing a side elevation of the boring-bar and its main support and also of the tool-post and the lathe-carriage. Fig. 4 is a plan view of Fig. 1. Fig. 5 is a fragment in section of the sleeve portion of the main support of the boring-bar and of the boring-bar and its seat-bushing. Fig. 6 is a perspective view of the boring-bar's seat-bushing. Fig. 7 is a section through the lathe's carriage and the base of the main supporting-bracket of the boring-bar. Fig. 8 is an end elevation of the cutter-holding end of the boring-bar, and Fig. 9 is a side elevation in section of the cutting end of the boring-bar.

Similar letters and figures of reference refer to similar parts throughout the several views.

Referring to Fig. 1, A designates the bed of a lathe.

B is the lathe-carriage; D, the driving-cone; E, the head-stock; F, the tail-stock; G, a supporting-leg, and H a face-plate secured to the spindle of the head-stock and cone.

The carriage B of all engine-lathes is provided with a dovetailed guideway I, which extends across it transversely to the bed of the lathe. In this guideway is slidably mounted the tool-post J (shown in Figs. 3 and 4) and arranged to be fed across the bed by a screw K and handle K′. These parts are common to all engine-lathes and are all that is necessary to illustrate the application of my improved boring-bar to a lathe.

My boring-bar comprises a round bar of steel L, which is provided in various sizes, ranging when used for ordinary machine-shop work from one inch to four inches in diameter and from four to eight feet long. My invention contemplates the interchangeable use of a number of boring-bars of several diameters—such as one inch, one and one-half inches, two inches, two and one-half inches, or larger, if desired—with one set of supporting-brackets.

The boring-bar is supported adjacent to its cutting end by a bracket M, which is provided with a projecting dovetailed portion N, adapted to fit into the guideway in the carriage and fit against its beveled side. This projection is narrow enough to extend between the carriage feed-screw K, which is located in the center of the guideway, and the adjacent side of the guideway, while the body of the base of the bracket rests on the top of the carriage. In the bottom of the base a keyway P is cut parallel to the beveled projection, and in this keyway is seated an upward-projecting key Q, which forms an integral part of a gib R. This gib R has its outward-facing edge beveled to fit and match the bevel in the adjacent side of the guideway of the carriage. This gib is located so that with the projection N the base of the bracket fits snugly, but slidably, the dovetailed guideway in the carriage. Two or more cap-screws K^2 are screwed through the base into the gib, and when it is desired to secure the bracket in any particular place in the carriage transversely of the lathe's bed they are tightened and draw the gib up the beveled side of the

guideway and force the projection M against its adjacent side walls and rigidly clamp the bracket to the carriage. I preferably arrange these screws and the gib on the tail-stock side of the bracket, and on the opposite side I place a dowel-pin T, extending it through the base of the bracket into the carriage. I use this dowel-pin only to lock the bracket rigidly in a fixed position that will bring the center of the sleeve end of the bracket in exact alinement with the lathe's centers, and in constructing the boring-bar the brackets are first fitted to the dovetail guideway of the carriage in a position to bring the sleeve portion concentric with the centers of the lathe. The sleeve is then bored out about a half-inch larger than the diameter of the largest boring-bar to be used. Thus if the largest size of bar is three inches the sleeve is bored out about three and one-half, and as it is bored out in its fixed position and pinned there with the dowel-pin it is always when in that position in axial alinement with the centers of the lathe. I then make several boring-bars by turning up several sizes of bars in sizes suitable for light, medium, and heavy work, a bar of one-inch diameter, one of two, and one of three inches diameter would be suitable for the general run of work. In order to fit these bars centrally in the bracket, I turn a sleeve for each bar that will fit tightly the bore of the bracket and also bore it out concentric to its periphery to fit one of the boring-bars. I then cut this sleeve diametrically into two halves, and each half is just a little less than a full one-half and forms a semicircular seat-bushing T′ for the bar, and consequently it can be inserted into the bracket's bore and removed quickly from it with the hand of the operator, whereas if it were a full sleeve it would require considerable time to insert and remove it from the bracket, and it would also require considerable time to insert and remove the boring-bar in it, but with a little less than one-half of a sleeve both the sleeve or seat bushing and bar are quickly and easily removed or inserted in the bracket. I form a flat place on the bar and thread two set-screws U through the center of the top of the sleeve portion of the bracket into its bore in a position to be screwed down onto the bar and clamp it and its seat-bushing T′ tightly to the bracket. This arrangement enables me to very quickly loosen and free the bar, so that it can be entirely removed from the bracket or its position changed relative to the face-plate or work thereon. The dowel-pin serves to key the bracket in exact alinement with the centers of the lathe, and it is used in this position for boring out pulleys, gears, &c., interchangeable cutters of various sizes being used, as shown in Figs. 8 and 9.

In order to enable a cutter to extend in front of the end of the boring-bar, I provide the extreme end of the bar with a projecting knob V, somewhat smaller in diameter than the boring-bar, but larger in diameter than the slot W, in which the cutters are placed. The slot W is then cut so that one end extends through the bar close to the end of the bar and is made a trifle wider than the full width of the cutter. The cutters X are made with a center portion considerably narrower than the width through the cutting ends, and this center portion is a trifle wider than the diameter of the bar. This allows the cutter after it has been passed through the slot to be pushed toward the end of the bar until the center portion bears against the adjacent end of the slot, and the ends rest on the knob, in which position the cutting edges Y of the cutter project beyond the body of the boring-bar. The cutter is then keyed tightly to the bar by driving a key Z in the slot behind it. The cutting ends of the cutters, while they slide over the opposite sides of the bar when moved forward after being passed through it, fit it very snugly, and the cutter is then held concentric to the axis of the bar and will cut evenly on both sides when fed into the core of a casting. These cutters are made in various sizes for each of the bars, and changes can be easily and quickly made from one size to another.

The boring-bar is fed into the work by feeding the carriage toward the work by hand or automatically with the feed-screw, as is common to all lathes. I can also bore out large cylinders and the inside of the rim of large pulleys, &c., by removing the dowel-pin and loosening the gib-screws and moving the bracket toward the apron of the lathe until it is in alinement with the work, using a cutter in the bar suitable for this kind of work, and where work, such as piston-rings, requires both to be bored out and turned on the outside I can do both at one feed movement of the carriage by putting a turning-tool in the regular tool-post and setting and adjusting it to cut at the same time the bar is boring the work out. When long-hubbed pulleys, gears, sleeves, and cylinders are to be bored out, a long stiff rigid bar is necessary that is in exact alinement and that will feed easily forward.

In order to rigidly support the boring-bars for long work where the cutter and bar are extending forward some two or more feet from the carriage and its supporting-bracket, I use a fixed support, which comprises a bed-plate 1 and a movable block 2. The bed-plate consists of a rectangular-shaped casting open at one side, which is grooved to rest on the ways of the lathe and on the inner ways when a lathe is provided with them. This casting extends several inches above the ways and is clamped to them by a bolt 3 and cross-bar 4, that extends under the ways. The bed-plate extends above the ways several inches and has a planed top surface, in the center of which a slot 5 is formed. The block 2 sits on the bed-plate and is provided with a downward-projecting key portion that fits into said slot. The block is clamped to the bed-plate by a

bolt 6, that extends through the block and through the slot in the bed-plate and bears at its head portion against the under side of the top of the bed-plate. Upon the back end of the bed-plate a large lug 7 is cast, against which the block is clamped by a cap-screw 8. The block is provided with a sleeve portion 9, which is bored out large enough to receive a sleeve 10 with a sliding fit that will fit snugly, but slidably, the largest boring-bar that can be used with the main bracket-support, and the block is fitted on the bed-plate and against the lug to stand in exact alinement with the lathe's centers when clamped by the screw S against the lug. A sleeve is provided for each size of bar, that will fit slidably both bar and block and is held in the block by a set-screw 11. When the main support is moved from its normal position toward the front of the lathe to bore out large work, the rear support can be also moved in alinement with it by loosening the bolt and cap-screw and sliding it on the top of the bed-plate and securing it in a position to allow the bar to slide freely through it. The rear support is always used with the bar and main bracket, as it is indispensable in all holes where accuracy is desired, as it holds the bar rigidly in alinement with the lathe's centers and prevents its springing or working out of alinement. The half-sleeve enables the operator to quickly substitute one size of bar for another and to rapidly move the bar in the main support laterally, and the dowel-pin and gib enable the operator to instantly change the main support in exact alinement with the lathe's cutters.

My improved boring-bar is ample in construction and very rigid. It can be applied to any size, and will finish holes with two cutters and cuts, and is a great time-saver over the ordinary methods of boring in use.

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

1. In a boring-bar for lathes the combination with the lathe-carriage of a bracket slidably dovetailed to the guideway of the carriage, means for clamping the bracket to the carriage at any desired part of the guideway, a sleeve portion to said bracket, a bore through said sleeve portion adapted to support a suitable boring-bar, in axial alinement with the lathe's centers, and a dowel-pin positioned in said bracket and extending into said carriage and arranged and adapted to key said brackets to said carriage in a position to bring its boring-bar-supporting bore in exact alinement with the lathe's centers, substantially as described.

2. In a boring-bar for lathes, the combination with the lathe-carriage of the bracket fitted slidably to the slideway of said carriage to move transversely of the lathe's bed, means including a gib-key for securing said bracket at any desired part of the slideway, a bore through the upper end of said bracket in exact axial alinement with the lathe's centers, a boring-bar of smaller diameter than said bore, a suitable cutter in said bore, a semicircular sleeve fitting accurately said bore and supporting said bar and of a thickness to bring the axis of said bar in axial alinement with the centers of the lathe, and means including a bevel-pin for positively, accurately and quickly shifting and locking said bracket and bar in exact alinement with the center of the lathe, substantially as described.

3. In a boring-bar for lathes, the combination with the slideway of the lathe's carriage of the bracket, the downwardly-projecting integral guideway-rib, the loose opposing gib adapted to fit the opposite side of the slideway of said carriage, the tightening set-screws, the dowel-pin, the bore in the upper end of said bracket, the semicircular sleeve fitting said bore and the boring-bar having a double-ended cutter in its end arranged and adapted with its cutting edges extending beyond and clear of the body of said boring-bar, substantially as described.

4. In a lathe boring-bar, the combination of the cutter-bar having a cutter arranged with its cutting-lips extending forward beyond the body of the bar, a bracket adapted to be shiftably clamped to the transverse slideway of the lathe's carriage a bore through said bracket in exact horizontal alinement with the centers of the lathe, and of larger diameter than the said cutter-bar, a semicircular-shaped sleeve or seat-support fitting accurately said bore and said bar, and a taper-key for locking said bracket in exact alinement with the lathe's centers, with a rear rest for said bar comprising a bed-plate adapted to be clamped to the bed of the lathe, a slot or guideway in said bed-plate, a block arranged to slide transversely of the lathe's bed on said bed-plate and fitted to said guideway a bore in said block larger than said cutter-bar, a sleeve operatively fitting said bar and said bore, a lug and screw on said bed-plate for defining the center position of said bore and means for clamping said block to said bed-plate, substantially as described.

5. The combination of the boring-bar having a transverse slot therethrough adjacent to its end, the cutter fitting in said slot and projecting beyond the body of the bar, the wedge for securing said cutter in place, the bracket, means for securing the bracket shiftably to the lathe's carriage, the semicircular seat-supports arranged and adapted to fit said bracket and various sizes of boring-bars with the rear support comprising the bed-plate, the adjustable block and the interchangeable sleeves, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREMONT STANSBURY.

Witnesses:
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JO. A. FOWLER.