(No Model.)

T. LEA.

BORING-TOOL.

No. 421,176. Patented Feb. 11, 1890.

Fig. 1.

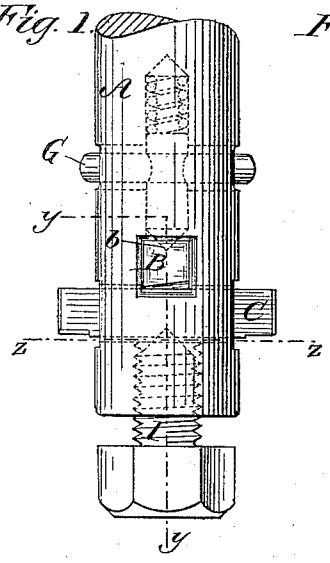


Fig. 2.

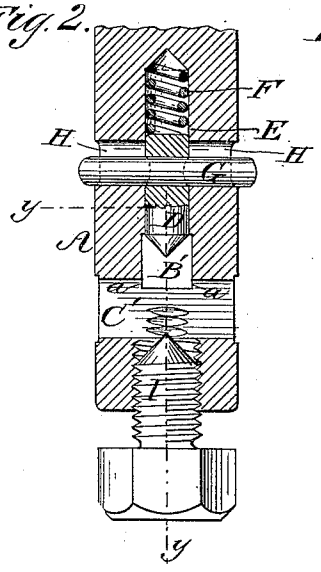


Fig. 3.

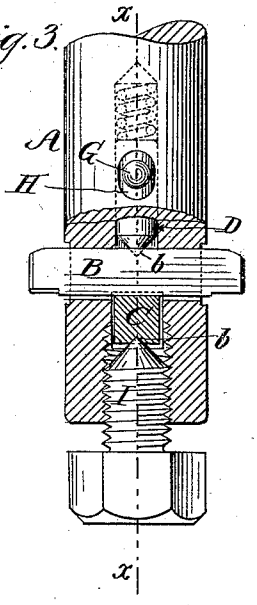


Fig. 4.

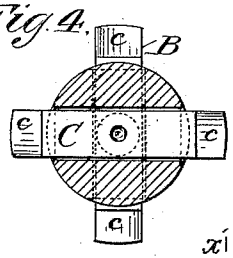


Fig. 9.

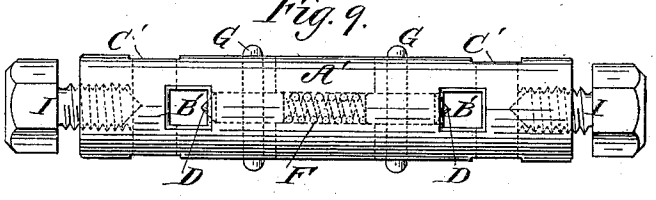


Fig. 6.

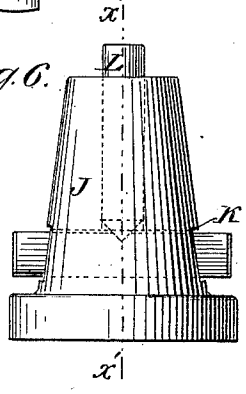


Fig. 7.

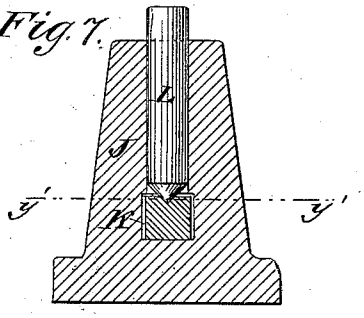
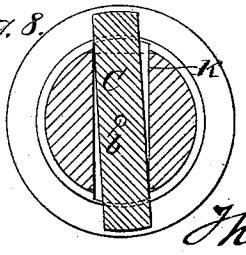


Fig. 5.



Fig. 8.



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UNITED STATES PATENT OFFICE.

THOMAS LEA, OF PLAINFIELD, NEW JERSEY.

BORING-TOOL.

SPECIFICATION forming part of Letters Patent No. 421,176, dated February 11, 1890.

Application filed November 9, 1889. Serial No. 329,779. (No model.)

To all whom it may concern:

Be it known that I, THOMAS LEA, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Boring-Tools, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the boring-bar with the cutters placed therein; Fig. 2, a sectional elevation on the line *x x*, Fig. 3, of the boring-bar with the cutters removed; Fig. 3, a side elevation, partly in section, on the line *y y* of Figs. 1 and 2, of the bar and cutters; Fig. 4, a cross-section of the same on the line *z z*, Fig. 1; and Fig. 5, a detail view showing one of the cutters, partly in section. Fig. 6 is a side elevation of the centering device used herein in preparing the cutters for the boring-bar; Fig. 7, a sectional elevation *x' x'* of Fig. 6, and Fig. 8 a horizontal section *y' y'* of Figs. 6 and 7. Fig. 9 is a side elevation on a reduced scale, showing the implement for holding the cutters in grinding.

My invention relates to metal-boring tools in which the cutters are secured at right angles to one another intersecting the axis of the tool, presenting four cutting-edges.

The object of the invention is to so construct the holding device for the cutters that they may be accurately centered and maintain their center without requiring to be halved or intersected together by mortises cut in the adjacent faces of the tools themselves, as heretofore practiced. The use of self-hardening Mushet steel is thereby attained, thus avoiding the cutters being tempered too much or not enough after the making up into the shape formerly required.

By the practice of my invention a plain bar of Mushet steel is indented by means of a center punch upon one side at its middle, this indentation being the sole means necessary to secure the proper centering of the tool in the boring-bar, and the steel requiring no further working than ordinary grinding.

In the drawings, A represents the boring-bar, the shank of which is omitted, being of any suitable length adapted for attachment to a turret-head of a chucking-machine.

B and C are the cutters inserted, respectively, in the mortises B' C' of the boring-bar.

D is a depressible center consisting of a pointed plunger lengthwise movable in the bore E against a backing spring F. The center D is capable of a limited movement having a cross-pin G intersecting it, and projecting through slots H in each side of the boring-bar, which cross-pin prevents the center from dropping out. This pin may, however, be inserted stationary in the boring-bar A, while a slot is provided in the center or plunger D. Other modifications are also obvious; but I prefer the construction illustrated, whereas the cross-pin can be utilized to push the center back against the spring.

I is a set-screw center-threaded into the end of the boring-bar A, facing the center D at the opposite side of the mortises B' C'. The mortises slightly intersect, as shown at *a*—that is to say, the mortise B' is made with its lower side below the upper side of the mortise C', so that direct contact is insured between the adjacent plain surfaces of the cutters when they are inserted.

In preparing the cutters the blank piece of steel is inserted in a stand J, Figs. 6, 7, 8, passing through the central mortise K. The blank is then set by the hand so that opposite sides touch diametrically-opposite corners of the mortise in the stand. A steel center-punch L, movable in the vertical axis of the stand, is then struck to indent the central depression *b*, Fig. 5, which occurs at the true center due to the diametric adjustment of the bar. The mortise K being of maximum size, the same implement may be used for centering various-sized tools B or C. The tools or cutters having been ground with the desired cutting-edges *c*, the cutter B is first inserted in its mortise, the center D being retracted until it engages with the indentation *b*. The cutter C is next inserted in slot C' and the set-screw I tightened up with its point in the indentation *b* of said cutter C until both cutters B C are tightened up against each other and the upper side of B

is firmly clamped against the upper side of slot B′. Then the center point D, pressed out by the spring, and the center point of the set-screw I prevent any end motion of either of the cutters.

The holder for grinding the cutters in Fig. 9 consists of a bar A′, similar to the boring-bar A, with the exception of being double-ended. The corresponding parts thereon are indicated by similar reference-letters, a single spring F acting upon both centers D. Four cutters can be thereby secured and ground at once.

By the device herein employed for grinding, the cutters are rendered self-centering in the boring-bar, and by the use of the centers as means of adjustment in both grinding and boring bars different cutters are rendered interchangeable without resorting to gages when once they have been ground.

I claim as my invention—

1. The combination, with a boring-bar having diametric mortises, of cutters consisting of bars having plain adjacent surfaces and indented centrally at their opposite surfaces and of centers axial to the boring-bar capable of advancement upon the said indented surfaces of the cutters.

2. The combination, with a boring-bar having diametric mortises, of centers axial to the boring-bar facing one another at opposite sides of the mortises, one of said centers being provided with an advancing spring, the other with an advancing screw for the purposes set forth.

3. The combination, with the diametrically-mortised boring-bar, of the axial screw center, and axial movable center located therein, as described, the latter having an advancing spring and a cross-pin, (or lateral projections,) and of the longitudinal slots in the sides of the boring-bar through which said cross-pin extends to limit the movement of the movable center.

4. The combination, with the boring-bar and longitudinal clamping devices therein, of cutters consisting of bars having plain adjacent surfaces and diametric cutter-receiving mortises in the boring-bar crossing at angles and partly intersecting in the manner described, whereby contact is insured between the said adjacent surfaces of the cutters.

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