(No Model.)

E. D. MACKINTOSH.

BORING AND TURNING MILL.

No. 440,319.. Patented Nov. 11, 1890.

Fig. 1.

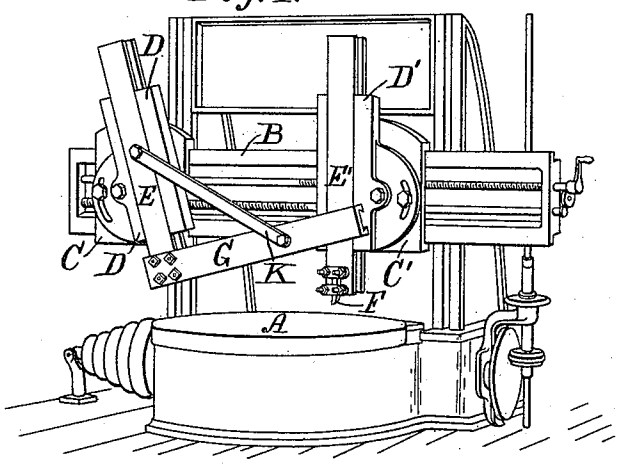


Fig. 2.

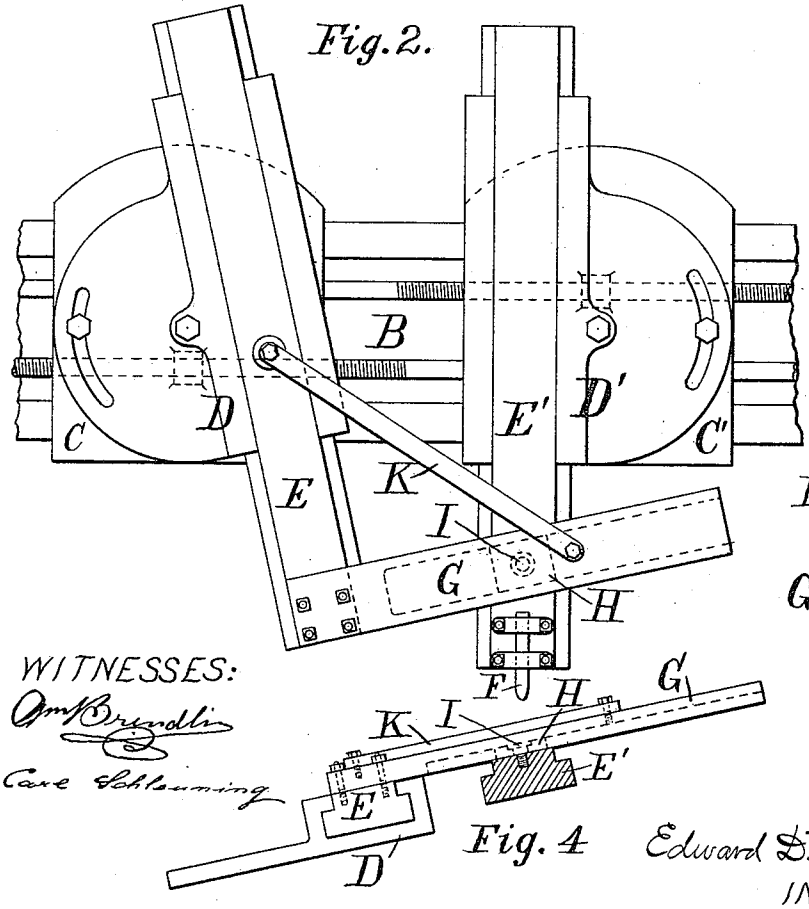
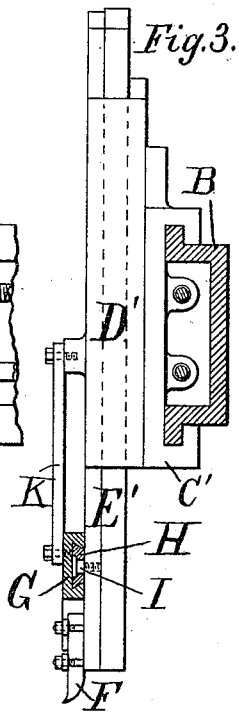


Fig. 3.



WITNESSES:

Chas. Schlaeming

Fig. 4

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UNITED STATES PATENT OFFICE.

EDWARD D. MACKINTOSH, OF BROOKLYN, NEW YORK.

BORING AND TURNING MILL.

SPECIFICATION forming part of Letters Patent No. 440,319, dated November 11, 1890.

Application filed July 24, 1890. Serial No. 359,761. (No model.)

To all whom it may concern:

Be it known that I, EDWARD D. MACKINTOSH, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Boring and Turning Mills, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 is a perspective view of a boring and turning mill with my invention applied to it. Fig. 2 is an enlarged front view, of a part of the same. Fig. 3 is a side view, partly in section, of the parts shown in Fig. 2. Fig. 4 is a bottom view of some of the parts shown in Fig. 2.

Like letters of reference indicate the same parts in the several views.

The form of machine known as a "boring and turning mill," and to which my invention has reference, consists, essentially, of the following parts:

A rotatable horizontal table A, to which is fastened the work to be turned or bored, a horizontal beam B over the table, two slides C and C′, movable longitudinally on the beam, two guideways D and D′, pivoted to the slides C and C′ in such a way as to be capable of being turned in a plane common to both and perpendicular to the surface of the table, and of being temporarily fastened to the slides C and C′ after being so turned, and two tool-bars E and E′, movable longitudinally in the guideways D and D′, and provided with means for holding tools, such as at F. Means are also ordinarily provided for temporarily fixing either or both of the slides C and C′ to the beam B, for moving them longitudinally thereon, for temporarily fixing either tool-bar in its guideway, and for moving the tool-bars longitudinally in their guideways. As such means are well known and form no part of my invention, I do not show or describe them.

The object of pivoting and temporarily fastening the guideways D and D′ to the slides C and C′ is to enable the guideways D and D′ to be set to guide the tool-bars E and E′ obliquely to the surface of the table, so as to enable conical work to be "turned" as the tool-bars and tools are moved toward or from the table; but it has been found that when the altitude of the cone is very small as compared with its base that it becomes impracticable to incline the tool-bars sufficiently.

My invention has for its object the turning of such cones of comparatively small altitude; and it consists of a guide G fastened to one tool-bar E and engaging with the other tool-bar E′ in such a manner that as the latter is moved toward or from the former it will be simultaneously moved toward or from the table A. I prefer to construct the guide G in the form of a channeled bar to fasten it to the tool-bar E at right angles to the latter, and by such means as may be provided for fastening the tools to fit a block H to the channel in the guide G, and to attach the block H loosely to the tool-bar E′ by means of a pivot-screw I. It is evident, however, that the block H might be dispensed with and the pivot I might engage directly with a narrower channel in the guide G; or the guide G might be made in the form of a plain bar and arranged to engage with a channel in the block H. A brace K may be employed to secure additional strength.

Such being the construction of my invention, the operation is as follows: The tool-bar E and guideway D are set obliquely to the table and temporarily fixed with relation to the slide C, the slide C being, also, temporarily fixed to the beam B, all by the ordinary means provided on boring and turning mills as usually constructed. The guide G, attached to the bar E, thus becomes a fixture inclined to the table A. The slide C′ is then moved longitudinally on the beam B, carrying with it the guideway D′ and the tool-bar E′. The latter is allowed to move freely in its guideway D′, as, together with its attached block H, it is raised or lowered by the block H traversing the inclined fixed guide G. Supposing the parts to be set as shown in Fig. 1, the table A to be revolving, and the slide C′, with the guideway D′ and tool-bar E′, to be moving inward toward the center of the table A, it is evident that the tool-bar E′ would be forced to move downward simultaneously with its inward motion, and that if the tool F were operating on a piece of work fastened to the table A that a conical depression would be formed in the work. The reverse of this shape could be formed by in-

clining the tool-bar E and guide G in the opposite direction.

In order to operate on work of different heights above the table or to set the tool to proper depth of cut, it is only necessary to loosen the tool-bar E in its guideway D, adjust it to the proper height, and secure it again, all by the means provided on boring and turning mills as usually constructed.

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

1. In combination, a revolving table, two bars movable in guideways in directions either perpendicular or oblique to the surface of the table, one or both of the said guideways movable in a direction parallel with the surface of the table, and a guide fixed to one of the bars and engaging with the other, substantially as described, and for the purpose specified.

2. In combination, a revolving table, two bars movable in guideways in directions either perpendicular or oblique to the surface of the table, a guide fixed to one of the bars and engaging with the other, and two guideways pivoted to two slides so as to turn in a plane common to both and perpendicular to the surface of the table, one or both of the slides movable in a direction parallel with the surface of the table, substantially as described, and for the purpose specified.

3. In combination, a revolving table, two bars movable in guideways in directions either perpendicular or oblique to the surface of the table, a guide fixed to one of the bars and engaging with the other, two guideways pivoted to two slides so as to turn in a plane common to both and perpendicular to the surface of the table, one or both of the slides movable in a direction parallel with the surface of the table, and a beam supporting and guiding the two slides, substantially as described, and for the purpose specified.

EDWARD D. MACKINTOSH.

Witnesses:

WM. BRENDLIN,

CARL SCHLEUNING.