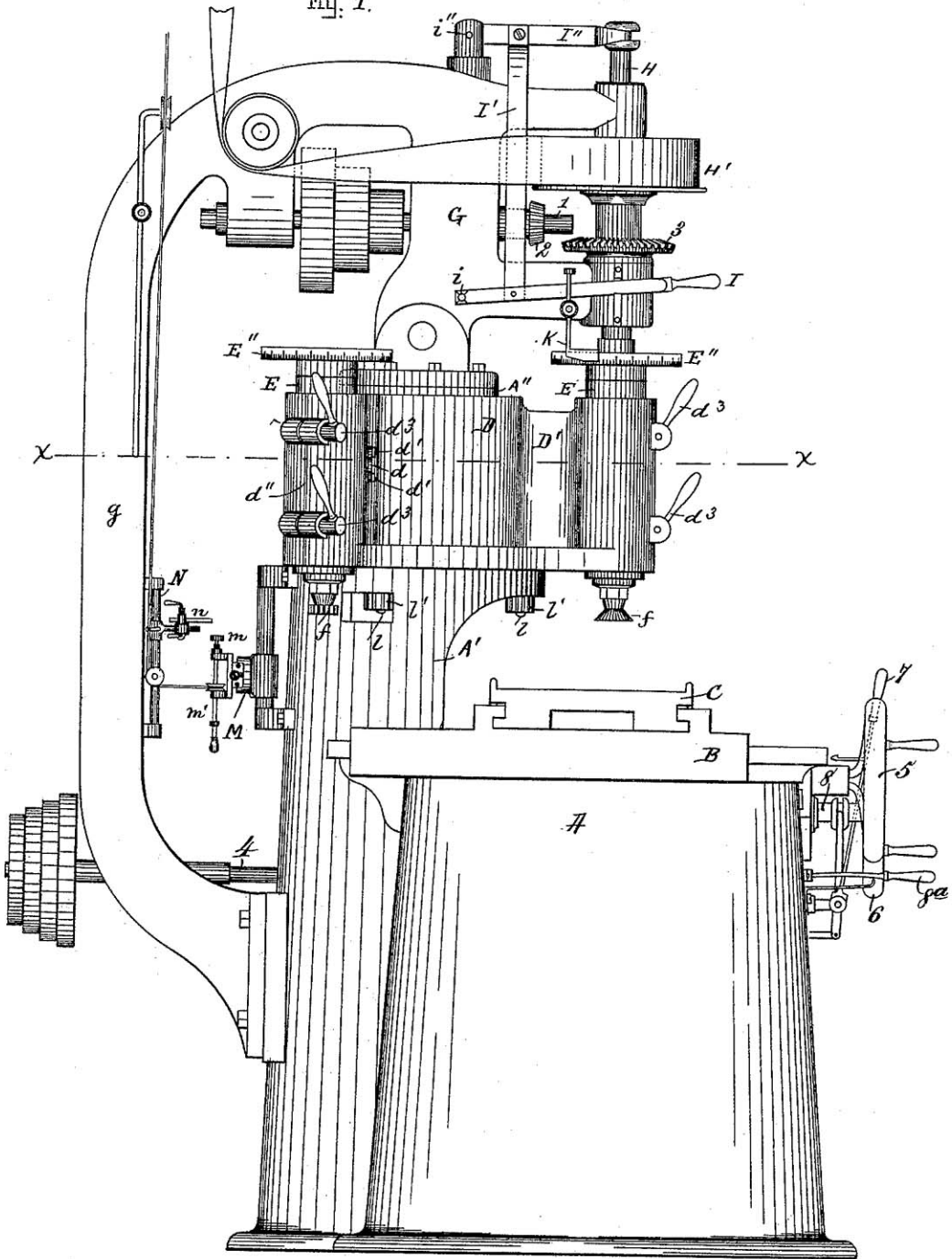


E. RIVETT. MILLING MACHINE.

No. 487,160.

Patented Nov. 29, 1892.

Fig. 1.



Witnesses.

Lauritz W. Möller,
Alice A. Perkins

Inventor

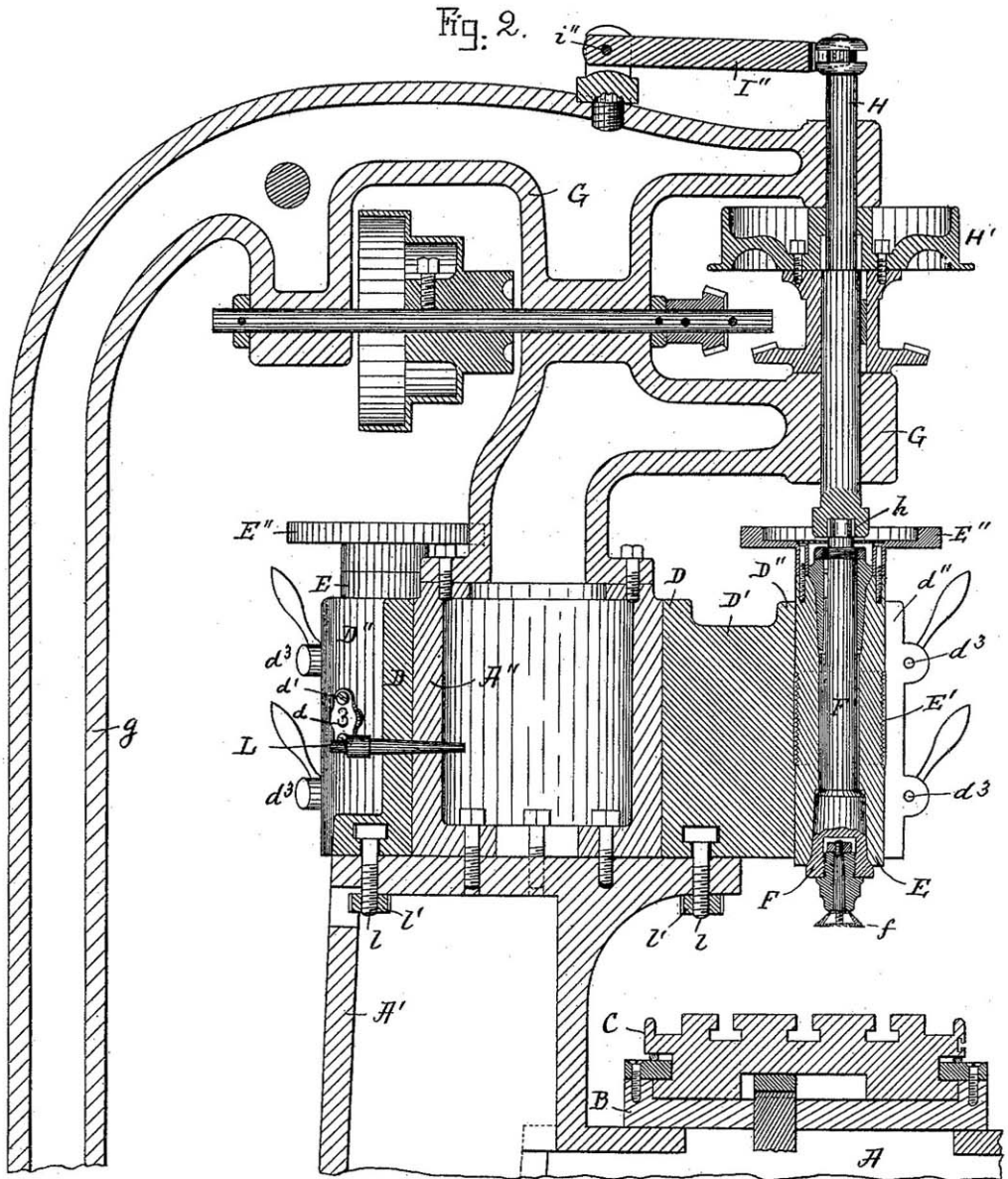
Edward Rivett

by Alban Andrus his atty.

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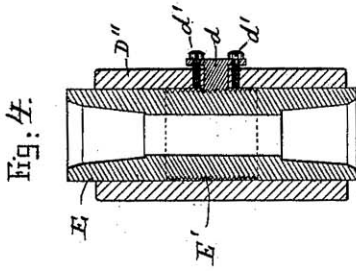


Fig. 4.

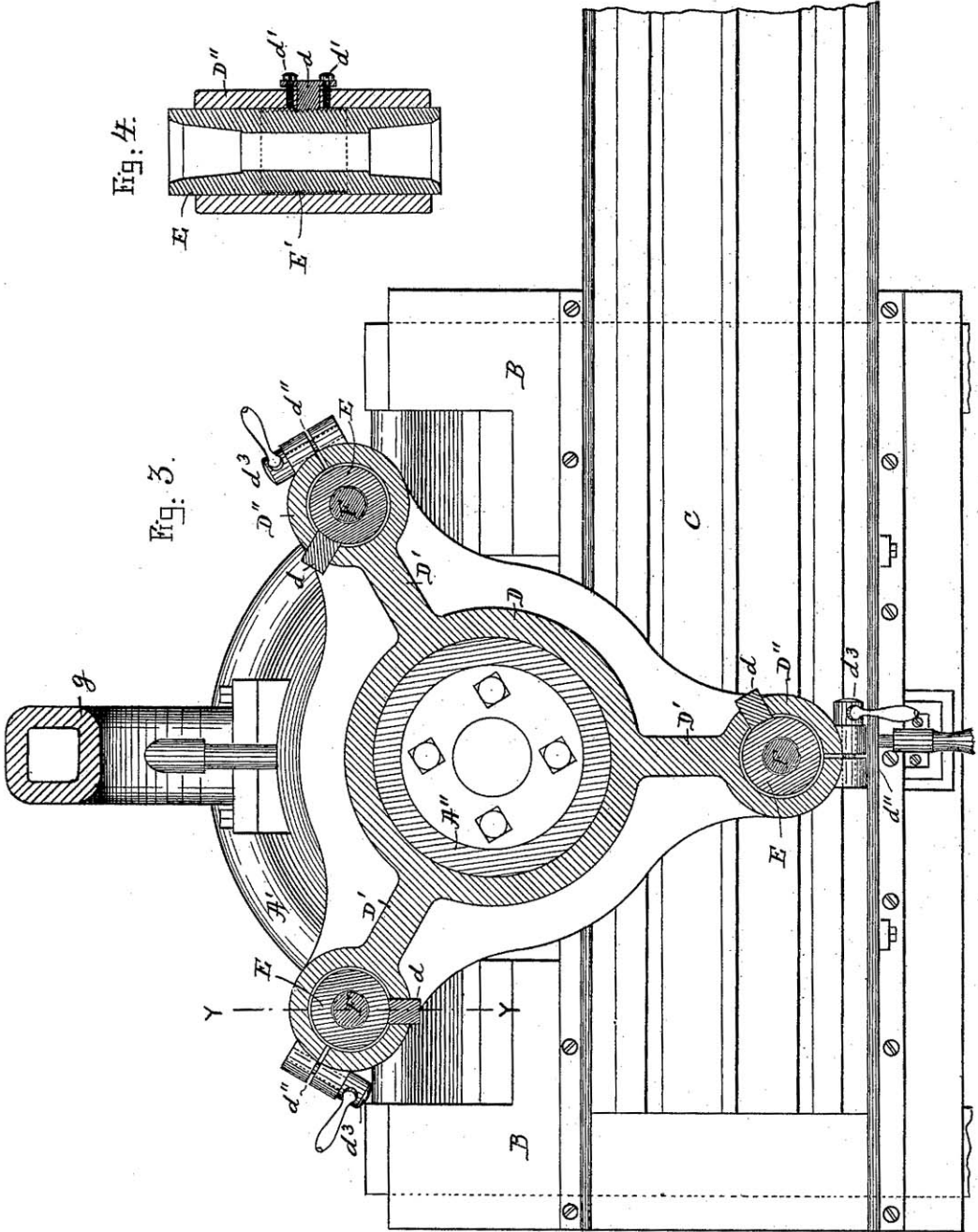


Fig. 3.

Witnesses.

Lainity, W. Möller,
Alice A. Perkins.

Inventor

Edward Rivett
by *Alvan Andrieu*
his atty.

UNITED STATES PATENT OFFICE.

EDWARD RIVETT, OF BOSTON, MASSACHUSETTS.

MILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 487,160, dated November 29, 1892.

Application filed December 14, 1891. Serial No. 414,925. (No model.)

To all whom it may concern:

Be it known that I, EDWARD RIVETT, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Milling-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in milling-machines; and it consists in the construction and arrangement of parts, as will hereinafter be more fully described, reference being had to the accompanying drawings, wherein—

Figure 1 represents a side elevation of the improved milling-machine, and Fig. 2 represents a central vertical section of the same. Fig. 3 represents a longitudinal section on the line $x x$, shown in Fig. 1; and Fig. 4 represents a longitudinal section of one of the spindle-quills and its bearing on the line $Y Y$, shown in Fig. 3.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

In the drawings, A is the bed, having ways on which is horizontally adjustable the carrier B, having guides in which is adjustable the work-table C, the latter having its line of motion at a right angle to the line of motion of the carrier B, as is common in shaping and milling machines. The said work-table and carrier may be moved automatically or by hand, as may be desired, according to the nature of the work that is to be performed.

In one piece with or secured to bed A is made a standard A' , to the upper end of which is secured a cylindrical post or bearing A'' , as fully shown in Figs. 1, 2, and 3, and on said post A'' is loosely journaled a revolving turret D, preferably supported on the top of the standard A' and having two or more radial arms $D' D' D'$, terminating as quill-bearings $D'' D'' D''$, as fully shown in the drawings. Within each of the bearings D'' is located a cylindrical quill E, having upon a portion of its surface an exterior screw-thread E' , adapted to mesh or engage with a screw-threaded block or nut d , which is preferably adjustably secured to the bearing D'' by means of screws $d' d'$, as shown in the drawings. To the quill E is secured, prefer-

ably at its upper end, a graduated index hand-wheel E'' , by the turning of which said quill E may be vertically adjustable in its bearing for the purpose of properly adjusting the milling-tool to the article that is being milled or shaped.

Each bearing D'' is slitted longitudinally at one place, as shown at d'' in Figs. 1, 2, and 3, and provided with clamp-screws $d^3 d^3$, by means of which the quill E can be rigidly secured within its bearing D'' after being vertically adjusted therein.

Within each quill E is suitably journaled the tool-carrying spindle F, to the lower end of which is detachably secured in a suitable manner the milling-tool or toothed cutter f , as fully shown in Fig. 2.

G is the head of the machine, preferably secured to the upper end of the post or turret bearing A'' , which head is provided with a downwardly-projecting extension g , secured to the standard A' , as shown in Figs. 1, 2, and 3.

In vertical bearings in the head G is journaled the longitudinally-adjustable driving-shaft H, on which is splined the pulley H' , to which a rotary motion is imparted by belt-power or other equivalent means. The lower end of the driving-shaft H has a flat or polygonal recess h , adapted to fit the correspondingly-shaped upper end of the tool-carrying spindle F when the said shaft H is lowered, as shown in Figs. 1 and 2, for the purpose of imparting a rotary motion to that one of the tool-carrying spindles which for the time being is located centrally below and in a line with the driving-shaft.

Any suitable mechanism may be employed for lowering and raising the driving-shaft so as to couple it to or uncouple it from the tool-carrying spindle, and for this purpose I have shown in Fig. 1 a hand-lever I, pivoted at i to the head G and connected by means of a link I' to a lever I'' , one end of which is pivoted at i'' to the head G and having its forward end suitably connected to the upper end of the driving-shaft H. The lever I may be locked in its extreme positions by any suitable or well-known means and need not be in detail described or shown.

K is a vertically-adjustable index-pointer secured to the head G and having its lower

end adapted to lie in contact with the graduated scale on the periphery of the hand-wheel E'', so as to regulate and indicate with the greatest accuracy the vertical adjustment of the quill E, its tool-carrying spindle, and milling-tool thereto secured.

For the purpose of holding any one of the bearings D'' in position below the driving-shaft after the turret has been turned around its axis to the desired position I employ any suitable centering and locking device. In the drawings, Fig. 2, I have shown for this purpose a tapering pin L going through perforations in the turret D and post or bearing A'', and for the purpose of still further securing the turret in position after it has been adjusted and centered I have shown in Fig. 2 screw-bolts ll, the heads of which are received in a groove in the said turret, such screw-bolts going through perforations in the standard A', and provided with fastening-nuts ll'', which when tightened will cause the turret to be firmly and rigidly secured in place on the standard A'.

It is very desirable in a machine of this kind that means should be provided for the purpose of sharpening the teeth of the milling-tool without the need of detaching the latter from its tool-carrying spindle, and for this purpose I mount in a suitable manner on the frame of the machine a tool-grinder M, provided with a grinding-tool m, attached to a spindle m', journaled in bearings and rotated by belt or cord power suitably applied to it. In connection with such grinding device I employ a tool-holder N, secured to the frame of the machine and provided with an adjustable index-finger n, adapted to hold the milling-tool stationary while it is being ground and sharpened. By having milling-tools of different shapes arranged upon the respective tool-carrying spindles I am enabled to rapidly change one tool from another, as the nature of the work requires, simply by releasing the revolving turret and swinging it around its axis sufficiently to bring another tool-spindle in position below the driving-shaft and locking and securing the said turret firmly in such new position, after which the driving-shaft is connected to the tool-spindle below it. The advantage of being able to grind the tools without removing them from their spindles is of great advantage and convenience in machines of this kind.

In Fig. 1 the numeral 1 indicates a shaft driven by a belt and having a pinion 2, adapted to mesh in a bevel-gear 3 on the spindle-driving shaft H whenever it is desired to decrease the speed of the latter and increase the power thereon. The numeral 4 indicates the rotary driving-shaft for imparting a forward-and-back motion to the work-table C, as usual in planing or milling machines. The

carriage B is adapted to be moved by hand in the lateral direction through the medium of a crank or hand wheel 5, and likewise the work-table C can be moved laterally by hand by a similar crank or hand wheel 6, as usual in planing or milling machines. The shipping-lever 7 is connected with a spindle 8 for the purpose of adapting the feed to be changed from hand to automatic, as usual in planing or milling machines. A shipping-lever 8^a is provided for reversing the movement of the work-table C, as usual. I do not deem it essential to further illustrate or describe these features, as they constitute no part of my invention.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. In a milling-machine, the combination, with a bed, a work-table, and a standard, of a revolving turret journaled on the standard and having radial arms provided with vertical bearings adapted to overhang the work-table, a screw-threaded nut in each bearing, an externally-threaded quill located in each bearing and vertically adjustable by rotating it in engagement with the nut in the bearing, a tool-carrying spindle moving vertically with each quill, adapted to freely revolve therein independent of any rotation of the quill and having its upper end provided with an angular portion, a rotating vertically-movable driving-shaft having an angular portion at its lower end to directly engage the upper end of each tool-carrying spindle, and hand-lever mechanism for raising and lowering the driving-shaft, substantially as described.

2. In a milling-machine, the combination, with a bed, a work-table, and a standard, of a revolving turret journaled on the standard and having radial arms provided with vertical bearings adapted to overhang the work-table, a screw-threaded nut in each bearing, an externally-threaded quill located in each bearing and vertically adjustable by rotating it in engagement with the nut in the bearing, a graduated hand-wheel secured to the upper end of each quill, a tool-carrying spindle moving vertically with each quill and adapted to freely revolve therein independent of any rotation of the quill, a vertically-adjustable index-point mounted on the frame of the machine, and means for revolving a spindle in a quill while the latter and the turret stand stationary, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 12th day of December, A. D. 1891.

EDWARD RIVETT.

Witnesses:

ALBAN ANDRÉN,
ALICE A. PERKINS.