(No Model.) 4 Sheets—Sheet 1.

C. E. VAN NORMAN.

COMBINED LATHE AND MILLING MACHINE.

No. 587,537. Patented Aug. 3, 1897.

Fig. I.

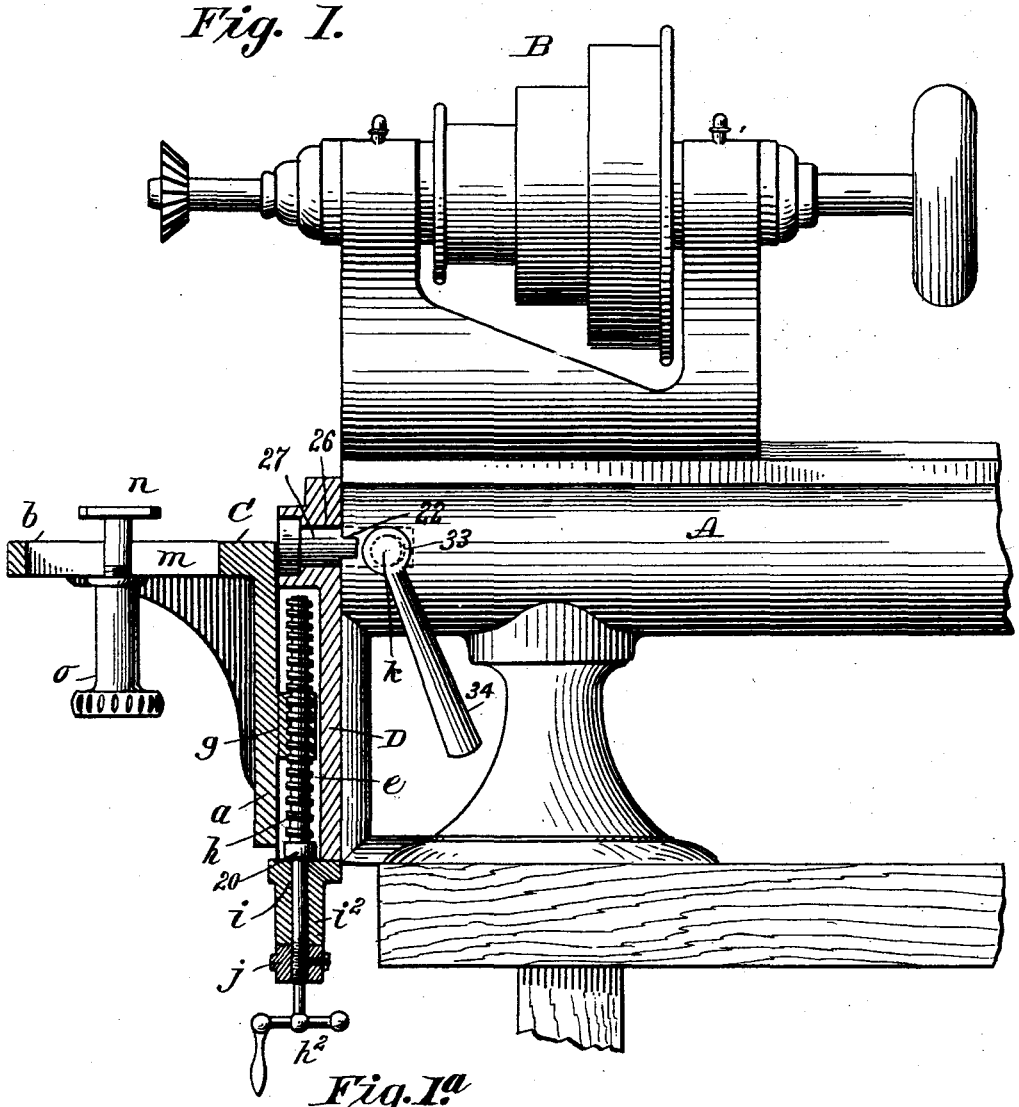
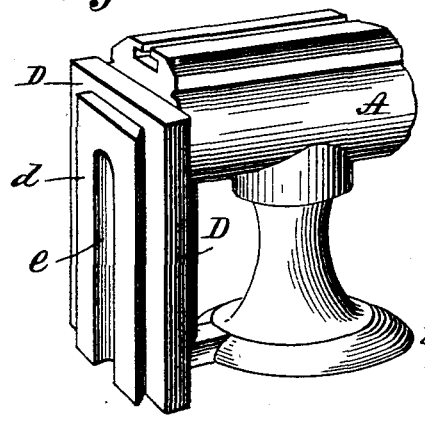


Fig. Ia.



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(No Model.) 4 Sheets—Sheet 2.

C. E. VAN NORMAN.

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Fig. 2.

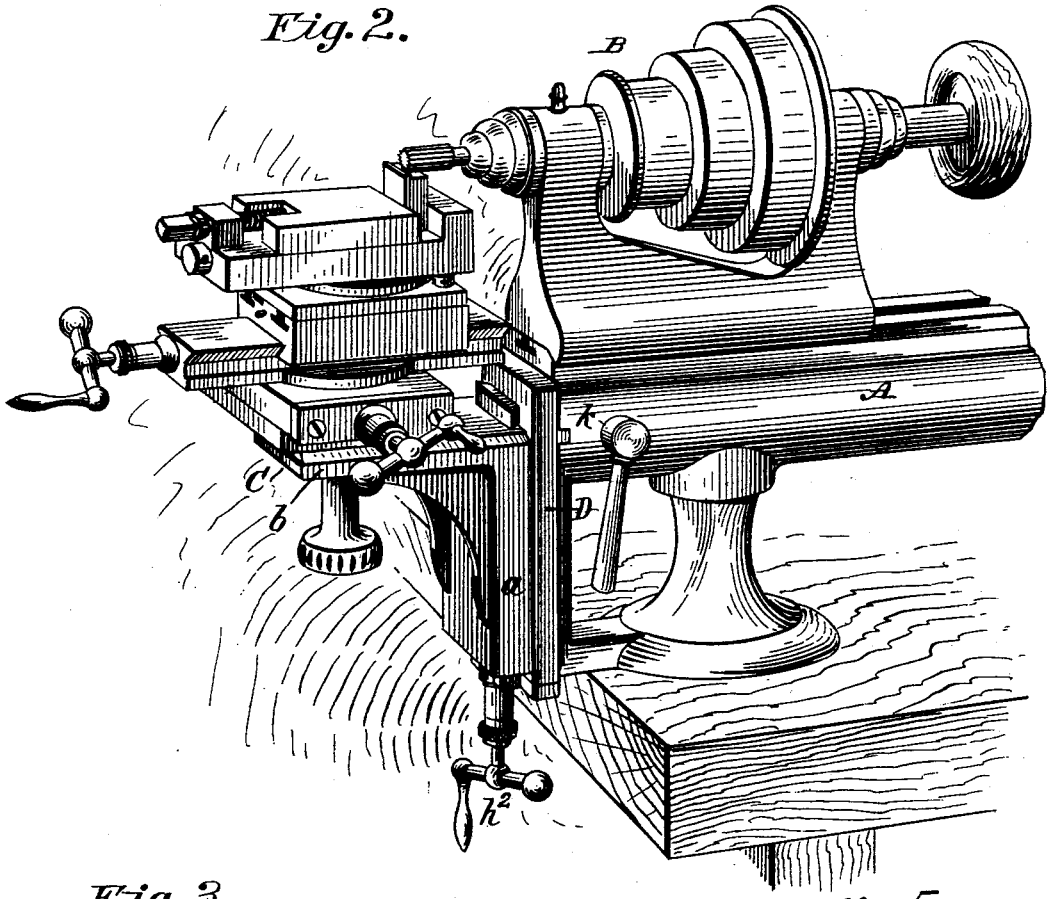


Fig. 3.

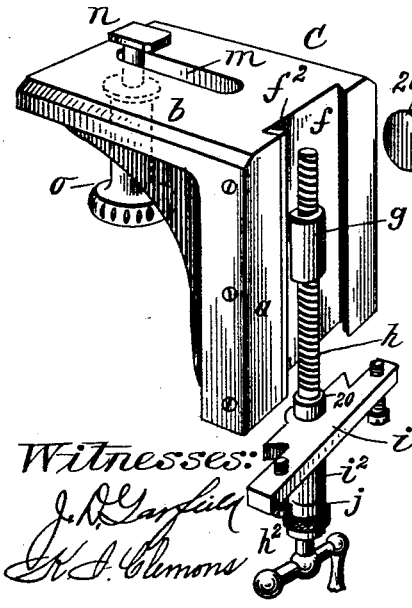


Fig. 4.

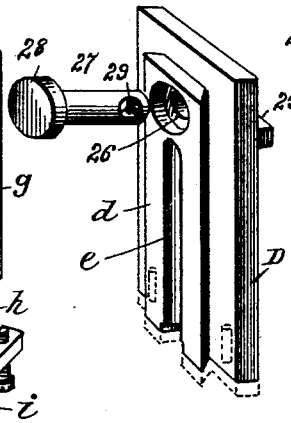
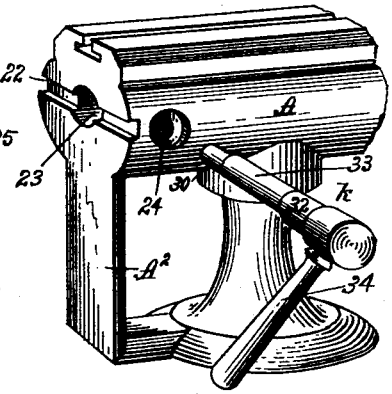


Fig. 5.



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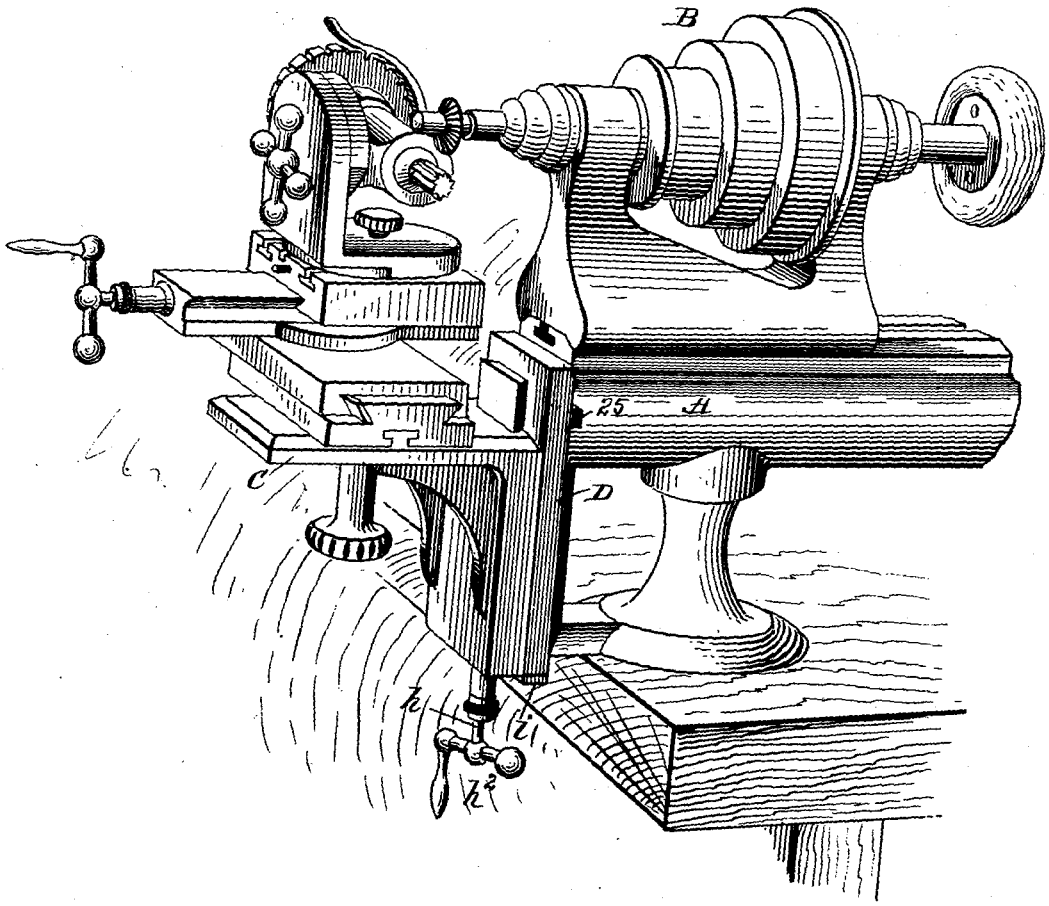
C. E. VAN NORMAN. 4 Sheets—Sheet 3.

COMBINED LATHE AND MILLING MACHINE.

No. 587,537. Patented Aug. 3, 1897.

Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

C. E. VAN NORMAN.

COMBINED LATHE AND MILLING MACHINE.

No. 587,537. Patented Aug. 3, 1897.

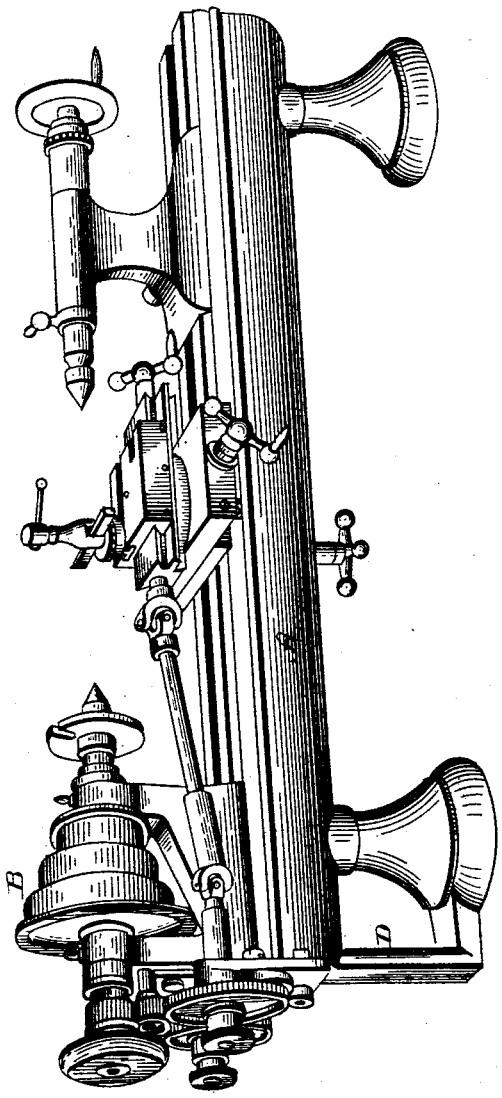

Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES E. VAN NORMAN, OF SPRINGFIELD, MASSACHUSETTS.

COMBINED LATHE AND MILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 587,537, dated August 3, 1897.

Application filed November 13, 1893. Serial No. 490,776. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. VAN NORMAN, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Combined Lathes and Milling-Machines, of which the following is a specification.

The object of this invention is to increase the capabilities and conveniences in use of the ordinary lathe, so that in addition to the work heretofore performed the spindle of the head-stock may be utilized to carry a mill or other rotary cutting tool or part at the outer end of the lathe and head-stock, the work to be operated upon being supported at the end of the lathe-bed and in proper position in proximity to the outer end of the head-stock and to the tool mounted thereat; and the invention embodies the combination, with a lathe having a spindle supported by the head-stock and projected longitudinally beyond the end of the lathe and adapted to carry a rotary cutting-tool, of a bracket or support sustained by the lathe-bed and projected beyond the end of the head-stock and adapted to carry a support or holder for the object to be presented subject to the cutting action of the aforementioned tool; and the invention also consists in certain peculiar details of constructions and combinations of parts, and all substantially as will hereinafter fully appear and be set forth in the claims.

In the drawings, Figure 1 is a side elevation of the lathe-bed and the reversed head-stock and the bracket or support at the end of the lathe-bed, the latter being in central vertical section, showing the elevating device therefor. Fig. 1ª is a perspective view showing a modification in the construction of the slide at the end of the lathe for the auxiliary bracket. Fig. 2 is a perspective view of the parts seen in Fig. 1 with, furthermore, slide-rest and feed devices for the work to be presented to the action of the rotary mill shown mounted on the spindle of the head-stock. Figs. 3, 4, and 5 are representations in perspective of the bracket, the slide-piece on which it is guided, the construction of the end of the lathe-bed for the connection therewith or support thereby of said parts and the bracket-elevating screw. Fig. 6 is a perspective view similar to Fig. 2, but showing on the bracket, in place of the slide-rest formerly shown, an indexed holder for the blank for a gear, mill, or analogous toothed or fluted tool or element to be cut by the tooth-cutting tool which is shown on the head-stock spindle. Fig. 7 is a perspective of my machine used as an ordinary lathe.

In the drawings, A represents the lathe-bed, and B the head-stock, comprising the cone-pulleys and a spindle rotated thereby and adapted, all as usual, to have slide movements in the T or dovetailed slideway of the lathe-bed.

The head-stock in the drawings, Figs. 1, 2, and 6, is shown as reversed from the usual position of head-stocks upon lathes—that is, the working, centering, or supporting end of the spindle is presented outwardly beyond the end of the lathe-bed, the head-stock being turned bodily end for end.

C represents the auxiliary bracket at the end of the lathe-bed under the projected end of the head-stock spindle, and, as shown, it is formed with the vertical part *a* and the horizontal outwardly-extended shelf-like part *b*.

The lathe-bed has formed upon or secured to the end thereof a vertical plate or block D, in conjunction with which the bracket has a slide movement and from which, as its primary support, the bracket is maintained against movement when adjusted in its proper position, either higher or lower, to accord with the work being performed.

The block D, as shown, has on its outer face the dovetailed rib *d*, with the vertical channel or aperture *e* along the middle thereof. The vertical part of the bracket C has the dovetailed way *f* and the gib f^2 for the sliding fit of the bracket upon the aforesaid equipment D at the end of the lathe-bed. The bracket member *a* also has the vertically bored and tapped lug *g*, through which the elevating-screw *h* has its screw-threaded engagement. The screw has a plain portion of its shank or spindle rotatable within a vertical bearing-hole of a bar *i*, which is formed or attached upon the lower end of the part D, the said screw being restrained against any endwise movement by a shoulder 20 above the bar and by a collar *j*, attached upon the

portion of the spindle of the screw which is below the bar or the depending hub i^2, which is provided as a part thereof for proper extent of bearing. The handle-bar h^2 is provided upon the lower end of the screw-spindle for convenience of manipulating it.

In Fig. 1ª the part D is indicated and understood as an integrally-constructed part of the lathe-bed, while in the other views this part D, relative to which the bracket has its support and slide, is shown as a block or plate detachably connected to the end of the lathe-bed, and as a desirable and practical means of attachment between the block D and the lathe-bed end these parts are constructed as follows: The lathe-bed has in its end the horizontal transverse groove 22, the socket 23, extended longitudinally and centrally within the lathe-bed from its end, and the hole 24, formed transversely within the lathe-bed at a short distance from its end and intersecting the said socket 23. The block or plate B has the transverse rib 25 to fit in the aforesaid groove 22, the inner face of the block lying against the face at the end of the lathe-bed proper and the depending continuation A^2 thereof. The block D also has the countersunk hole 26 through its thickness near its upper end to register with the longitudinal socket 23 in the lathe-bed. The pin 27 is provided in this connection, its shank passing through the hole 26 and into the socket 23, the head 28 of the pin being seated in the countersink of the hole 26, and there is a hole 29 transversely through the inner end portion of the pin which when the pin is in place registers with the transverse hole 24, and k represents a shaft or key having portions 30 32, adapted for journal-bearings in suitable portions of the hole 24, and also having the intermediate eccentric portion 33, which fits within the hole 29 of the pin 27, all so that on turning the key by means of the handle-arm 34 the pin is drawn firmly endwise to exert the most effective clamping-bind for holding the block D to the end of the lathe-bed.

The bracket has in the shelf-like member b thereof the slot m, through and below which passes the spindle of a headed or T stud n, the lower extremity of the stud being screw-threaded and receiving thereon the externally-knurled thumb-nut, which has its upper end in bearing against the bottom of the said part b. This provides for the immovable clamping or retention of one or another description of work holder and feed, the base portion of the work-holder being understood as having T-slots therein opening to the bottom thereof.

The spindle of the head-stock need not be specifically referred to either as to its form or construction or the manner of mounting it, immovably or detachably, within the head-stock to be subject to the rotation by means of the cone-pulleys. Suffice it to say that it has a projection beyond the end of the lathe-bed and over the aforedescribed work-supporting bracket and that it carries a rotary metal-cutting mill or tool or in some cases the part to be operated upon.

Now, referring to Fig. 2, it will be perceived that there is mounted upon the bracket a slide-rest and work-holder of a type well known to machinists, in which is held a metallic block presented subject to the milling-tool on the end of the head-stock spindle, it being understood that the work-holder has, by reason of the mechanisms comprised therein, a feed motion to carry the work at right angles to the axis of the rotating cutter.

In Fig. 6 the work-holder comprises an indexed shaft for supporting the cylindrical part from which is to be produced a mill-cutting tool or a gear or ratchet wheel or like toothed or fluted object, the mill-cutter provided on the spindle being adapted for this class of work, and while illustration and mention have been made of two different forms of work-holding devices to be mounted upon the bracket these in themselves constitute no part of this invention, and it will be manifest that they may be replaced by various other forms of holders; and, moreover, in place of a tool being mounted upon the end of the spindle which is projected over the bracket, substantially as shown and described, a piece to be worked upon may be mounted upon the projected rotary spindle and the tool may be mounted upon a suitable slide-rest or holder therefor supported on the bracket.

The lathe may of course be utilized at any time for performing the ordinary lathework by restoring the head-stock to its normal position, as seen in Fig. 7, from which it is shown as reversed in the accompanying illustrations and used in connection with a tool-rest.

The spindle of the head-stock might be projected at the outer end thereof and beyond the end of the lathe-bed, obviating the necessity of reversing the head-stock in the utilization of the novel work-supporting bracket.

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

1. A lathe-bed, a tail-stock applied thereto, and a bracket applied to the outer end of the bed, and carrying a work-holding table, combined with a reversible head-stock that is applied to the end of the lathe-bed, and which is adapted to be reversed upon the bed, and used in connection with the tail-stock, or said bracket, applied to the outer end of the bed and carrying a rotary cutting-tool, substantially as shown.

2. The combination with the lathe-bed having in its vertical end the transverse groove, the longitudinal socket and the transverse hole intersecting said socket, of the block, or plate, having the transverse rib, and the hole through its thickness, the headed pin with the transverse hole in its shank, the key, or shaft, having support-bearings in said trans-

verse hole of the lathe-bed and passed through the said hole in the pin, the bracket, having a vertically-sliding engagement with said plate and a screw rotatably supported by the plate and having a screw-thread engagement with a member of the bracket, substantially as described.

3. The combination with the lathe-bed having in its vertical end the transverse groove, the longitudinal socket, and the transverse hole intersecting said socket, of the block, or plate, having the transverse rib, and the countersunk hole through its thickness, the headed pin with the transverse hole in its shank, the shaft, or key, having support-bearings in said transverse hole of the lathe-bed, and having the eccentric portion to lie within the hole in the said pin, the bracket having a vertically-sliding engagement with said plate and an adjusting-screw therefor, substantially as described.

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Witnesses:
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