(No Model.) 4 Sheets—Sheet 1.

H. M. ALBEE.

ROUTING AND WOOD WORKING MACHINE.

No. 408,366. Patented Aug. 6, 1889.

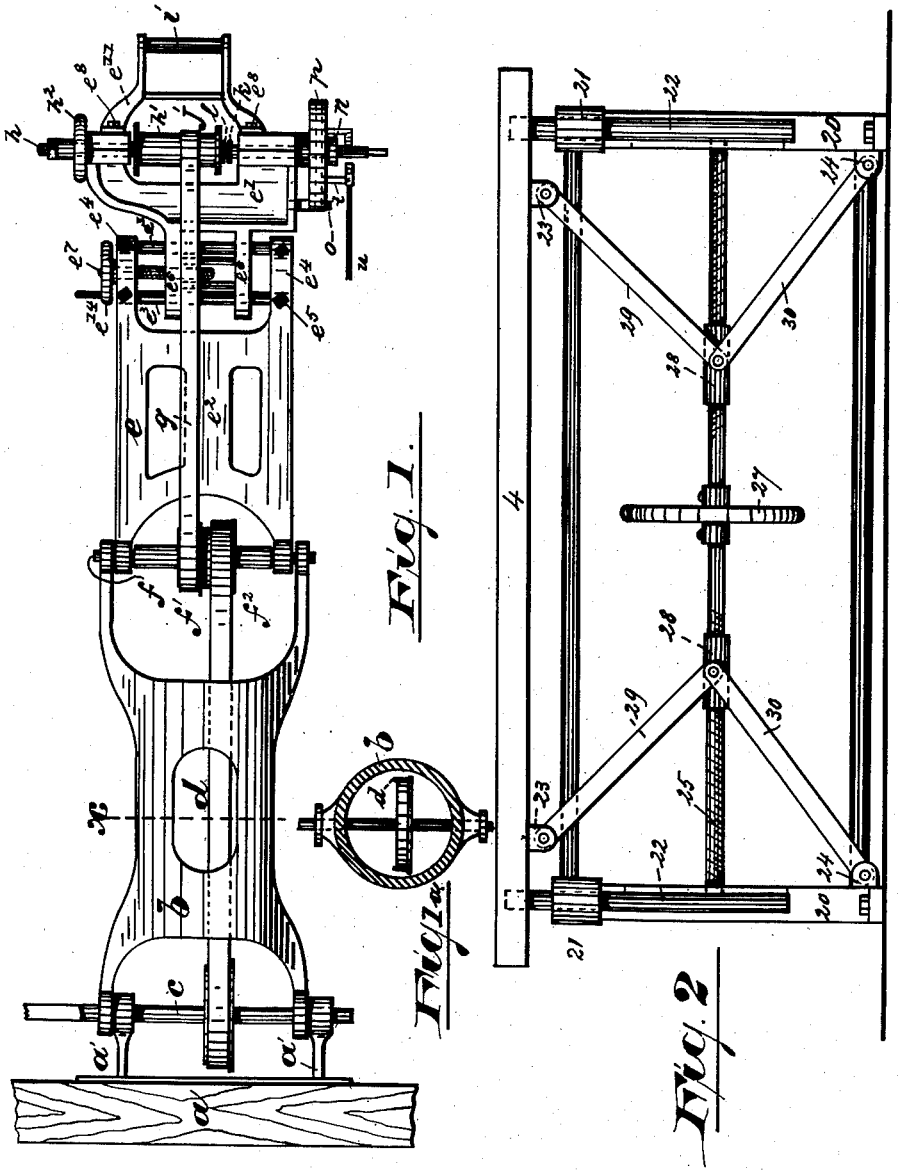

Fig. 1.

Fig. 1a.

Fig. 2.

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E. L. Sherman

Inventor:
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By his Attorneys
Drake & Co.

(No Model.) 4 Sheets—Sheet 2.

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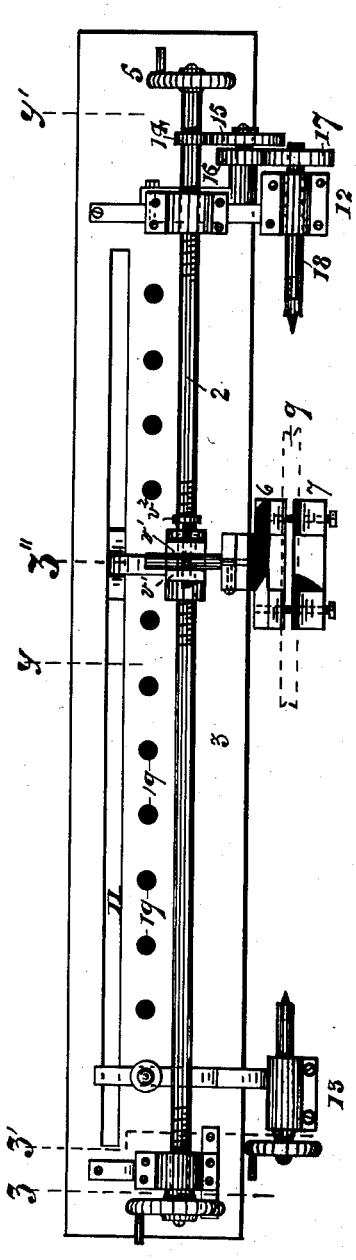

Fig. 3.

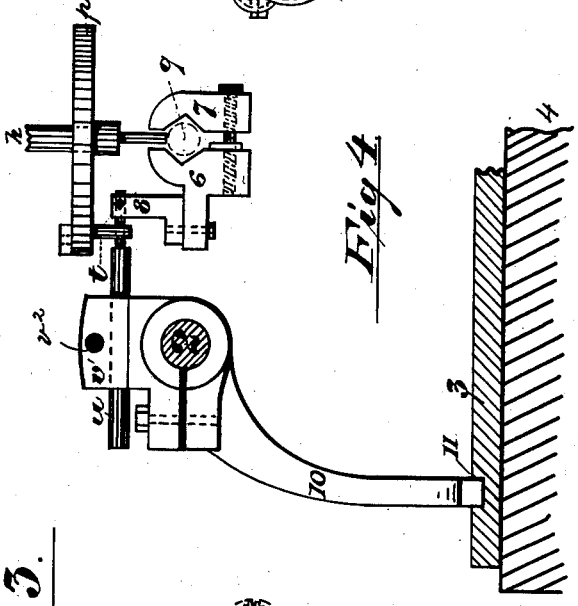

Fig. 4.

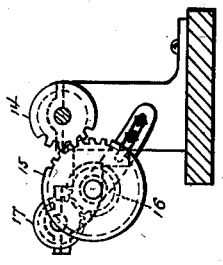

Fig. 5.

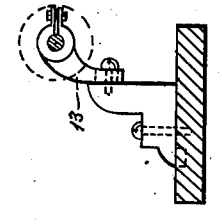

Fig. 7.

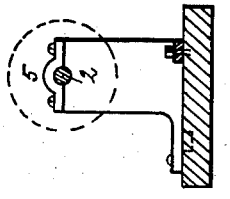

Fig. 6.

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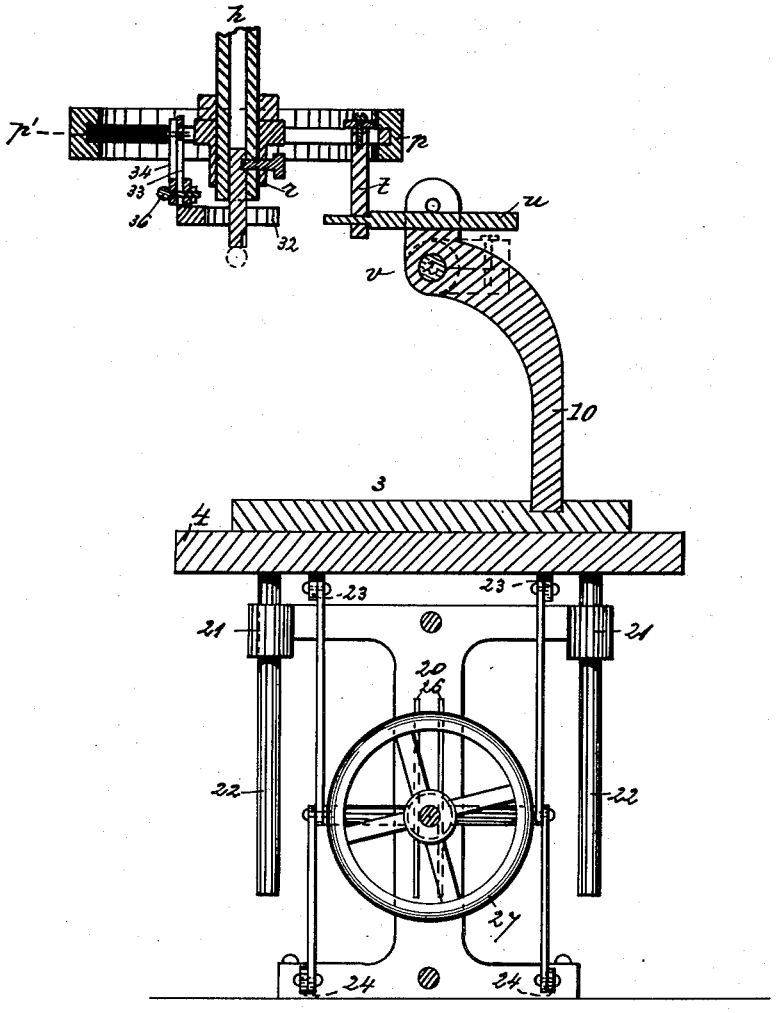

Fig. 8.

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(No Model.) 4 Sheets—Sheet 4.

H. M. ALBEE.

ROUTING AND WOOD WORKING MACHINE.

No. 408,366. Patented Aug. 6, 1889.

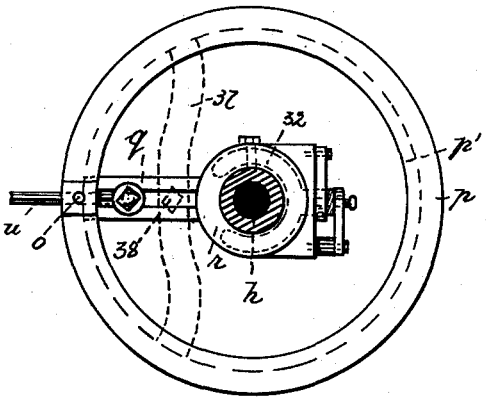

Fig 10.

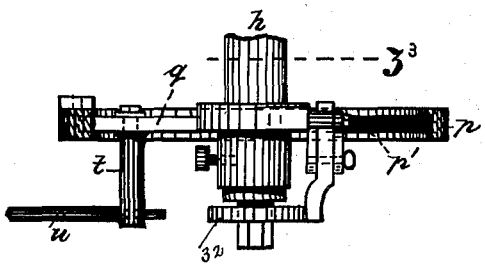

Fig 9.

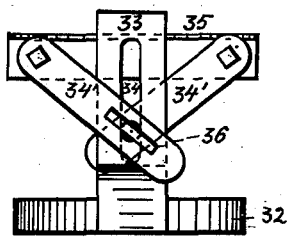

Fig 11.

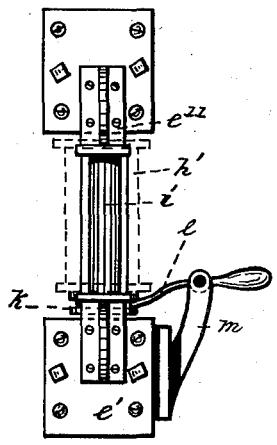

Fig 12.

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UNITED STATES PATENT OFFICE.

HONESTUS M. ALBEE, OF NEWARK, NEW JERSEY.

ROUTING AND WOOD-WORKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 408,366, dated August 6, 1889.

Application filed August 18, 1888. Serial No. 283,138. (No model.)

To all whom it may concern:

Be it known that I, HONESTUS M. ALBEE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Routing and Wood-Working Machines; and I do hereby 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 letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of machines represented by the one shown in my patent dated December 28, 1886, No. 354,997, the general object of my present improvements being to enable a larger variety of work to be accomplished by a single machine, whereby the said machine is rendered of greater value in a general carpenter or wood-working shop.

The more specific objects of the invention are to enable the machine to do spiral and other turning and carving on cylinders, as well as routing and carving on plane surfaces.

The invention consists in the arrangements and combinations of parts, substantially as will be hereinafter set forth, and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, embodied in four sheets, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1, Sheet 1, is an elevation of a routing-tool and its operating mechanism. Fig. 1^a is a section of the same, taken on line x. Fig. 2 is an elevation of a table adapted to receive the wood to be worked upon by the said tool, the said wood being clamped upon said table or bench in any suitable manner by hand-screws or other suitable means when the tool is being employed in connection with routing or carving on a plane surface, and when the tool is to be employed in turning spirals or other figures on a cylindrical rod or post the said table is adapted to receive a lathe. Fig. 3 is a plan of said lathe. Fig. 4 is an enlarged section of the same, taken on line y, said figure also showing the routing or turning tool in combination with the lathe. Fig. 5 is a section of the lathe on line y'. Fig. 6 is a section taken on line z, and Fig. 7 is a section on line z'. Fig. 8 is a section taken vertically through the routing-tool and adjacent parts and through line z^2, Fig. 3. Fig. 9 is a detail elevation of a stiffening or strengthening frame, and Fig. 10 is a section of the same on line z^3. Fig. 11 is a detail elevation of an adjustable gage, and Fig. 12 a detail elevation of the raiser for the routing-tool.

In said drawings, a indicates a vertical post or standard, upon which are secured pivotal bearings a' a' for a laterally-vibrating arm b and a pulley-shaft c, in any suitable manner. Said arm b is made cylindrical, elliptical, or rectangular in form, and is hollow, as in Fig. 1^a, to allow a driving-belt d to pass therethrough and be protected thereby. The cylindrical form of the arm also gives the same great firmness, and greatly limits or reduces vibration when the machine is in operation. Upon the cylindrical arm b is pivoted another arm e, which vibrates on the arm b, thus having a double horizontal motion—one with said arm b and one independent thereof.

The pivot for connecting the arms b and e is preferably the shaft f, on which a cone-pulley f' f^2 is arranged, said pulley serving to receive belts d and g, by which motion is transmitted to the tool-shaft h, arranged at the outer extremity of the vibrating arms.

The arm e is preferably made in two parts, the outer part e' being vertically adjustable on the part e^2. This is accomplished by providing the part e^2 with vertical shafts or rods e^3 e^3, which find bearings in lips or tongues e^4 of said part e^2, and may be removed therefrom by loosening the set-screws e^5, by which said shaft or rods are held in said lips or tongues. The part e' is provided with co-operating lips or tongues e^6, which are arranged on the two said shafts or bars e^3, and are thus prevented from turning pivotally thereon; but space is provided between the lips or tongues e^4 e^4 to allow vertical play for the co-operating tongue e^6. An adjusting-screw e^7, provided with a handle e^{14}, serves to raise or lower the part e', so that the tool carried thereby may be brought into the nicest relation to the work in hand. The outer part e' is subdivided to provide bearings for the tool-shaft h and pulley h', and allow the

ready adjustment or arrangement and removal of the same therein, the sub parts being held together by suitable screws or bolts e^8 in any ordinary or suitable manner. The upper end of the shaft h is provided with an adjusting-wheel h^2, by means of which the shaft may be turned by hand, when the power is off, in adjusting the tool to the work, and said wheel, which works on a threaded shaft, serves to allow of the tool being raised and lowered in its relation to the part e' and to the work. Said wheel also serves as a fly-wheel to give momentum to the tool. Said part e' is provided with a handle i, which may be cast integral with the sub part e'', by means of which the laterally-movable arms and the tool carried thereby may be guided by the hand in the wood-working operation.

In the part e' of the arm e is formed, where the pulley h' is arranged, an opening j of sufficient size to allow of a vertical play to said pulley. Beneath said pulley is arranged on the shaft h a grooved wheel k, with which a forked lever l works, by means of which latter the shaft and the tool thereon may be raised from the work while the tool is in motion for the purpose of examination or adjustment, or to allow the tool to be entered upon the work at any desired point. The said forked lever is fulcrumed on an arm m, Fig. 12, extending laterally from the side of the part e', the said arm being preferably cast integral with said part.

The tool-shaft h for carrying the tool is hollow at its lower extremity to receive the shank of the tool, and is slotted to allow a passage for a set-screw for holding the tool in place in said hollow shaft; also to allow a vertical adjustment for a collar for different thicknesses of forms to be used. A collar n, for limiting the depth of insertion of the tool in the wood or metal, is also held on the shaft, preferably by the same set-screw which holds the tool in place. The slot in the shaft allows the collar to be adjusted vertically to control the depth of the cut. In lieu of the collar an adjustable gage—such as shown in Fig. 11—may be employed.

The device thus described may be employed in connection with the table hereinafter referred to in the operation of ordinary routing or carving plane surfaces; but when the tool is employed in turning spirals I provide additional mechanism, which I will now proceed to describe.

Upon the lower side or edge of the part e' is secured, by a screw o or other suitable means, an annular frame p. Said frame is concentric to the tool-shaft, and on the inner side is grooved, as at p', to receive an arm q, secured on a collar r, fastened to the arm e' around the shaft h, as shown in Fig. 10. Upon said collar r is secured the said arm q, which extends to the groove in said annular frame and works therein, and the said arm q, which is slotted, as indicated in Fig. 10, and receives an adjustable arm t, which in turn receives a rod u, secured upon a feeding-head v, Fig. 8, carried by a screw-shaft 2, arranged upon a frame or bed 3 on the table 4, the said head traveling longitudinally on said screw-shaft 2 when the latter is turned by the hand-wheel 5 or other power-transmitting mechanisms. Upon the same said rod u to which the arm t is connected is secured a holder or clamp for holding the rod of wood to be turned in rigid relation to the tool. Said holder consists of two jaws 6 and 7, one of which carries or has formed or secured thereon an arm 8, adapted to be adjusted on said rod u and be moved toward or from the rod 9 to be turned. Upon the jaw 6 is adjustably secured the jaw 7, which may thus be moved to or away from said jaw 6, so as to allow of the insertion and passage therebetween of rods 9 of various sizes, as shown in Fig. 4. By having both jaws 6 and 7 adjustable in their relations to the rod 9 they can be brought into proper relation to said rod, so that the latter will not be forced out of its proper center.

By the construction of the annular frame, its attachment to the arm e, and its connection with the feeding-head great rigidity is secured, so that there will be no vibration of the arms b and e and tool carried thereby, or of the jaws for holding the rod 9, and as a result the said rod after having been turned will show no irregularities of surfaces occasioned by such vibration, but, on the other hand, will show a very perfect and workmanlike finish without subsequent hand-finishing.

To prevent the feeding-head from turning on the shaft or having a vibration thereon, and to give greater rigidity to the screw-shaft, I have provided the same with a leg 10, which extends downward to the frame or bed 3, and enters a longitudinal groove 11 in said bed and slides longitudinally in said groove as the feeding-head is actuated by the screw. The said leg is provided with longitudinally-projecting feet, which serve to prevent vibration longitudinally. The rod u or carrier for the jaws 6 and 7 is preferably made adjustable on the feeding-head, whereby the said jaws may together be moved backward or forward, as may be desired. To this end the feeding-head is provided with clamping-jaws v' and a set-screw v^2, which serves to hold the rod u in position. In turning larger rods or bars 9 capable of sustaining the pressure of the tool without giving or vibrating to any injurious extent the jaws 6 and 7 may be dispensed with, and the rod be supported alone by the head and the tail stocks 12 and 13. The power which turns the screw-shaft 2 and causes the feeding-head to travel longitudinally thereon also serves to turn the bar or rod 9. This is accomplished by means of a train of cog-wheels 14 15 16 17 of any desired number or size to secure the desired speed which connects the screw-shaft 2 with the shaft 18 of the head-stock. The tail-stock 13 is adjustably secured on the bed-plate 3, so as to be brought nearer to or far-

ther from the head-stock, the bed-plate 3 being suitably prepared by having a series of bolt-holes 19 therein, or otherwise prepared to allow of adjustment.

The table which is employed in connection with the tool to hold the work up to said tool is shown more clearly in Figs. 2 and 8, in which 20 20 are end standards, made of cast metal, and having at the upper edge, at the edges thereof, integral collars or sleeves 21 21, into which vertical steadying-rods 22 of the table 4 or bed 3 are disposed. Beneath said table 4 are formed pivotal bearings 23, and on the standards, near the lower ends thereof, are similar pivotal bearings 24. About midway between the upper and lower ends of the standards, extending from one to the other, as indicated in Fig. 2, is arranged a reversely-threaded screw-shaft 25, which abuts against said standards and slides vertically between stays 26 26. (Shown in Fig. 8.) At the center of said screw-shaft 25 is secured a hand-wheel 27, by means of which the said shaft may be readily turned, and on opposite sides of said hand-wheel are arranged threaded collars 28, which are in engagement with the threads on said screw-shaft, so that when said shaft is turned the said collars will be caused to move longitudinally in opposite directions on said shaft because of the reverse direction of the threads. The collars 28 are connected with the bearings 23 and 24 by rods 29 and 30, and are thus connected, respectively, with the table 4, which I desire to be vertically adjustable to the fixed standards. Thus arranged, the hand-wheel being turned and the collars being moved longitudinally, the rods 29 and 30 are caused to either assume a > shape and to draw the table 4 down or to approach a vertical straight line and thus raise the table. There being four rods 29 30—two at each end of the table—the said rods serve as standards to support the table and hold the same firmly. By this construction the lathe-work supported by the table may be quickly and easily raised to the routing-tool, as will be evident.

In lieu of a simple collar as a gage, I may and prefer to employ the peculiar structure shown in Fig. 11, in which 32 represents the gaging portion, which bears against the wood being routed, and thus limits the depth of the cut, the said gaging portion either entirely encircling the tool or being more of a horseshoe shape, as indicated in outline in Fig. 10. From the portion 32 an arm 33, provided with a slot 34, extends upward between or into engagement with arms 34′, pivoted upon a cross-bar 35, being held therebetween or in said engagement by a clamping-screw 36. By loosening the screw the part 32 may be raised and lowered at will, as will be evident. The cross-bar may be secured to form a part of the collar *r*, as indicated in Fig. 8. To secure increased solidity or evenness of movement, I may brace the arm *q*, by means of which the feeding-head *v* is carried by a cross-bar 37, as indicated in outline in Fig. 10. This is fastened to said arm *q* by a suitable set-screw 38, or equivalent means, and extends at right angles to said arm and enters the groove *p′* in the annular frame.

In operating the device in connection with a bar or rod to be turned irregularly, or so as to form a spiral thread thereon, I first adjust the said bar or rod between the head and tail stocks 12 13, steadying the same by means of the holding-jaws 6 and 7. Power is then applied to the pulleys, so as to actuate the belt *d* and *g* and routing-tool, and the latter is brought into operative relation with the bar 9 by the several means referred to both by raising the table and adjusting the tool-shaft in its bearings. The screw-shaft 2 is then turned either by hand or other power. The bar is turned and at the same time the routing-tool and the holding-jaws are caused to move longitudinally with respect to the bar, thus producing the spiral incision or groove. The space of the groove of course depends on the shape of the cutter employed.

While I have described the parts shown in positive terms, I do not wish to be understood as limiting myself thereto, as various and many changes may be made without departing from the invention.

Having thus described the invention, what I claim as new is—

1. In a routing-machine, the combination, with a routing-tool arranged in bearings formed on vibrating arms, of a lathe, a screw-shaft, and a head *v*, connected with said tool for feeding the routing-tool forward, substantially as and for the purposes set forth.

2. In a routing-machine, the combination, with the routing-tool movable horizontally, as described, of a screw-shaft 2, a head *v*, movable on said shaft and connected with said routing-tool, and means, substantially such as described, for turning the rod or bar worked upon, substantially as and for the purposes set forth.

3. In combination with a lathe, a screw-shaft, a head *v*, and jaws 6 and 7, secured thereto and movable therewith, and a routing-tool having a lateral vibration on arms *b e*, substantially as and for the purposes set forth.

4. The combination, with arms *b e*, pivoted to vibrate horizontally, belts and pulleys arranged on said arms, and a shaft *h*, having its bearings at the outer end of said arms and having a cutting-tool thereon, of a lathe, a screw-shaft, and means adapted to move said cutting-tool longitudinally in connection with said shaft, substantially as and for the purposes set forth.

5. In combination with vibrating arms *b e*, belts and pulleys, and a shaft *h*, arranged on said arms and having a cutting-tool, a slotted bed, head and tail stocks, a screw-shaft, a feeding-head carried by said screw-shaft, a leg 10, for preventing said head from turning on said shaft, and means for connecting said

head with the arm *e*, substantially as and for the purposes set forth.

6. In combination with pivoted arms *b e*, belts and pulleys, and a shaft carrying a routing-tool arranged on said arms, a grooved frame *p*, carrying holding-jaws for steadying the bar to be routed and turned, and a lathe, substantially as and for the purposes set forth.

7. In combination with vibrating arms, pulleys, belts, and shaft carrying a routing-tool, an annular frame secured upon one of said arms, an arm *q*, secured upon said shaft and bearing on said frame, an arm *t*, adjustable on said arm *q*, an arm *u*, head *v*, arm 10, shaft 2, and lathe, all arranged and adapted to operate substantially as and for the purposes set forth.

8. In combination, arms *b e*, belts and pulleys, a shaft carrying a routing-tool, a steadying-frame *p*, secured upon the arm *e*, an arm *q*, secured upon the shaft and engaging said steadying-frame, and a lathe for turning the bar while the same is being routed by the said tool, a screw-shaft, and a head connected with said steadying-frame, substantially as and for the purposes set forth.

9. The improved routing-machine combining therein the cylindrical arm *b*, a belt *d* therein, arm *e*, pulleys and belt *g*, shaft *h*, and routing-tool, all arranged and combined substantially as set forth.

10. In a wood-working machine, the combination, with a vibrating arm *b*, an arm *e*, pivoted on said arm *b* and consisting of parts e' e^2, shafts e^3 e^3, and an adjusting-screw e^7, of belts, pulleys, shaft *h*, and tool, all arranged and combined substantially as and for the purposes set forth.

11. In a wood-working tool, the combination, with arms *b e*, carrying a wood-working tool, of a gage 32, having a slotted arm 33, carried by braces 34 34, and clamping-screw 36, substantially as and for the purposes set forth.

12. In combination with a routing-tool arranged on pivoted arms and actuated by belts and pulleys, a frame secured on one of said arms, a screw-shaft 2, feeding-head *v*, rods *u* and *t*, adjustable in their bearings, and jaws 6 and 7, adjustable in their relation to one another and to said rods, substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of August, 1888.

HONESTUS M. ALBEE.

Witnesses:
HARRY GARDNER,
E. L. SHERMAN.