No. 676,935. Patented June 25, 1901.

D. B. BURT.

ROUTING MACHINE.

(Application filed Aug. 17, 1899.)

(No Model.) 2 Sheets—Sheet 1.

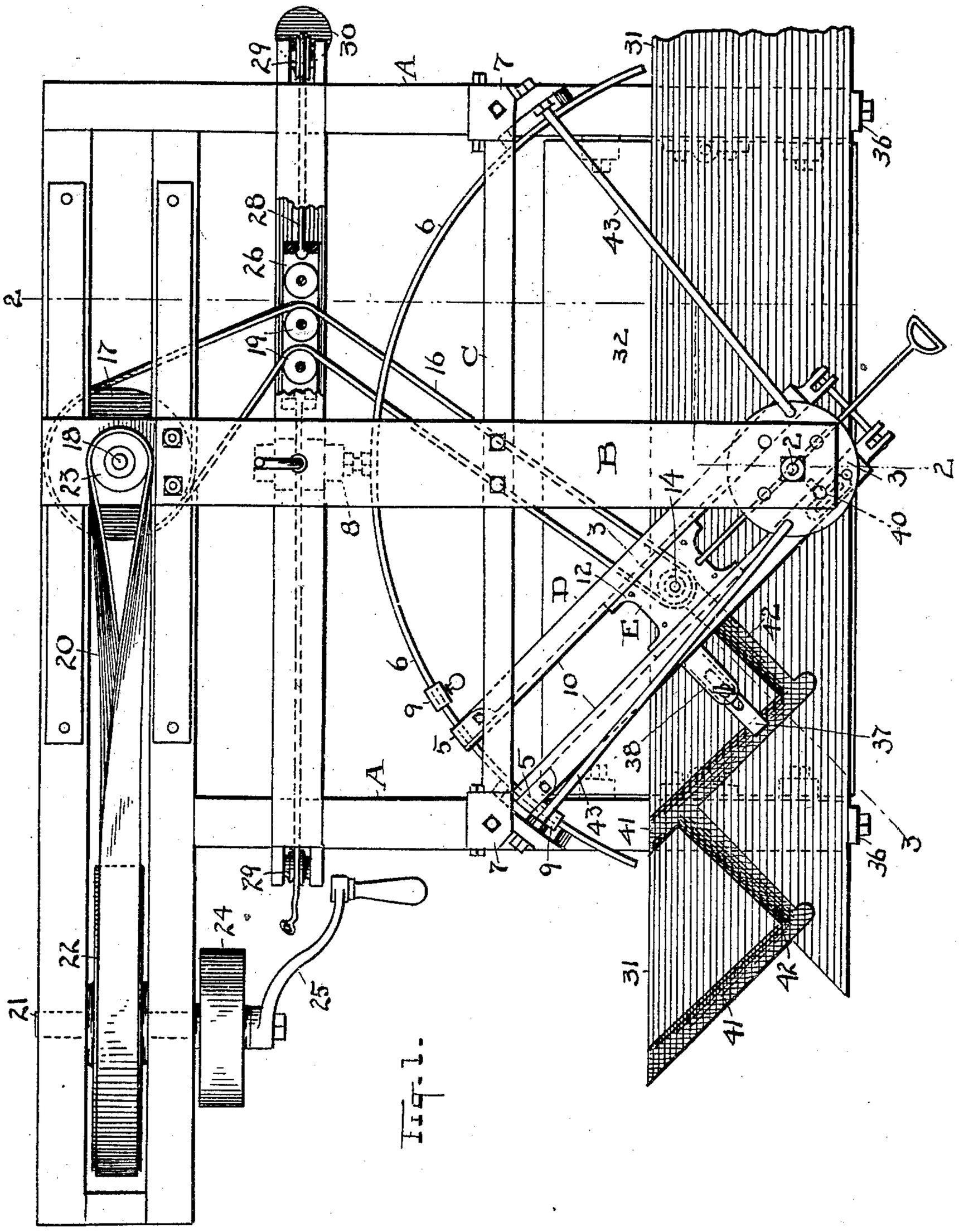

Fig. 1.

Attest
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Fig. 2.

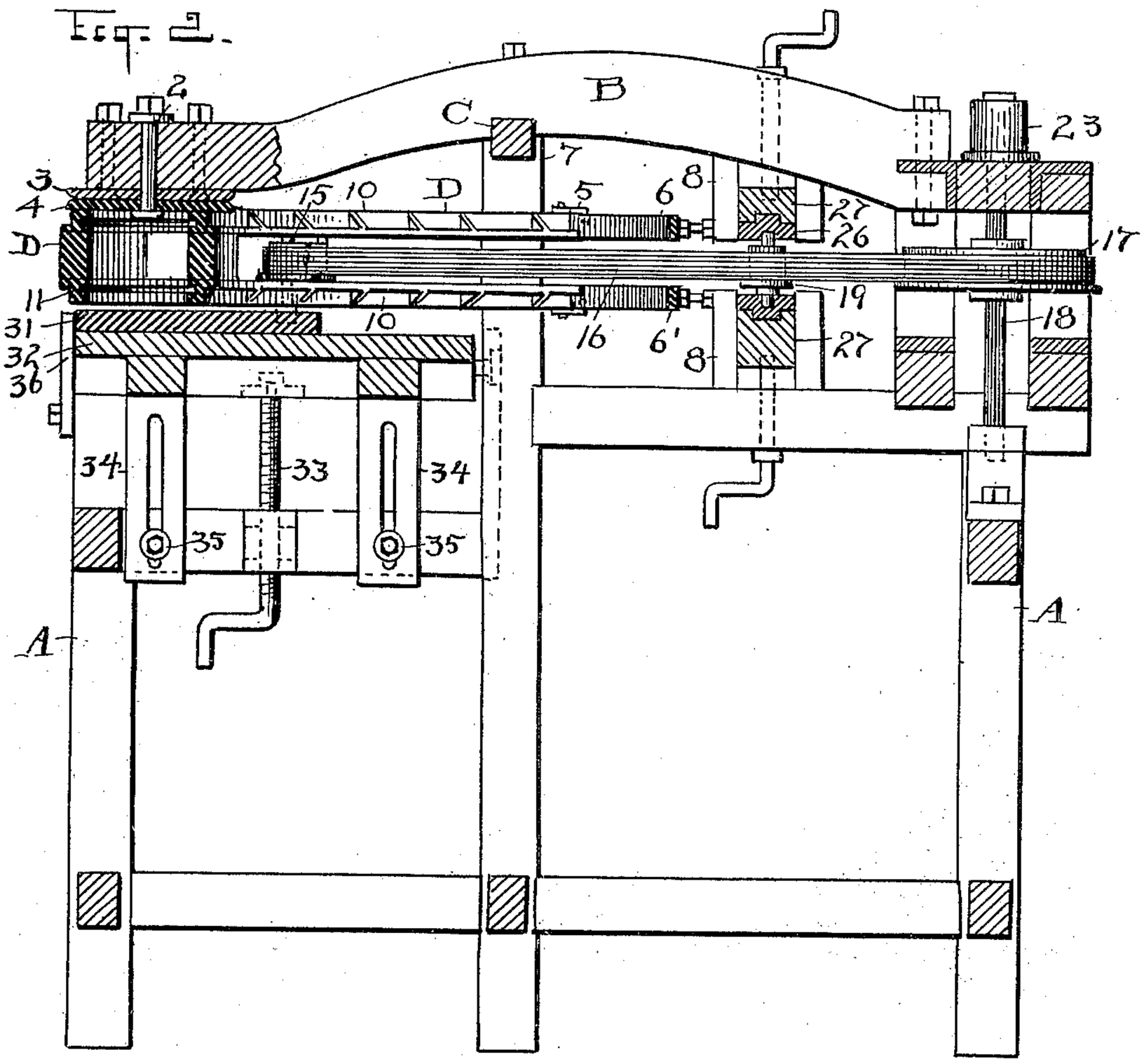


Fig. 3.

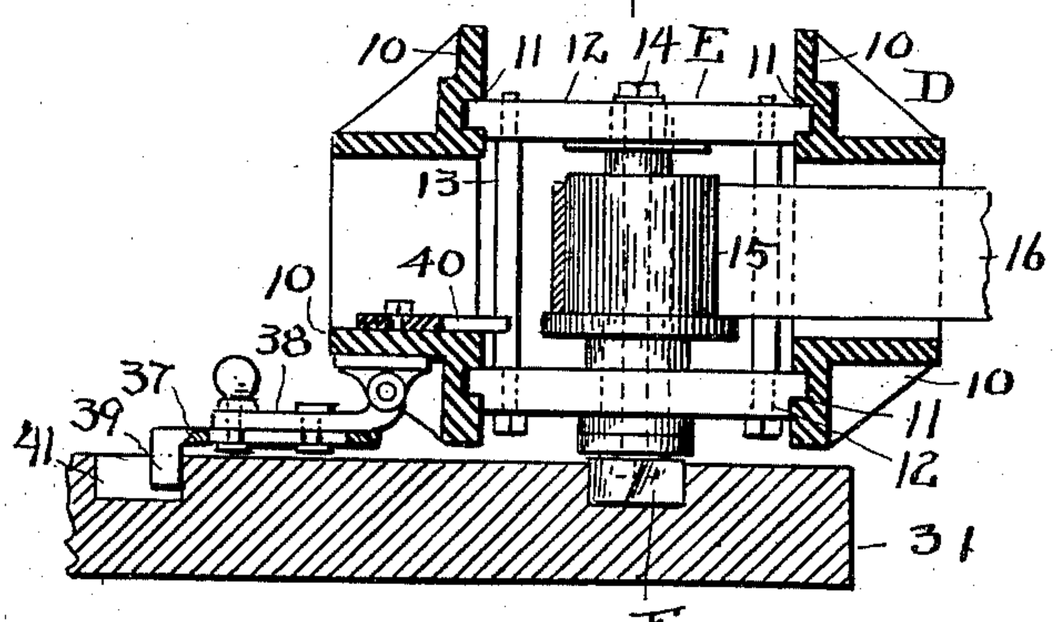
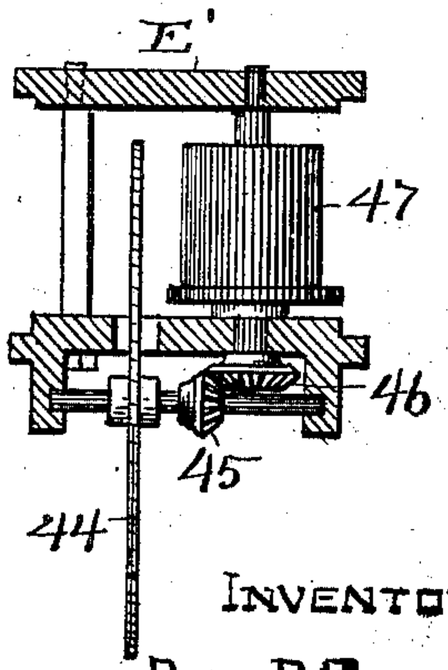


Fig. 4.



Attest

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UNITED STATES PATENT OFFICE.

DAVID B. BURT, OF CLEVELAND, OHIO.

ROUTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 676,935, dated June 25, 1901.

Application filed August 17, 1899. Serial No. 727,516. (No model.)

To all whom it may concern:

Be it known that I, DAVID B. BURT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Routing-Machines; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in routing-machines; and the improvement consists in the novel arrangement and combination of parts substantially as hereinafter described, and more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of my improved machine, showing a string-board in position to be routed or grooved. Fig. 2 is a cross-sectional view taken on line 2 2, Fig 1. Fig. 3 is a cross-section on line 3 3, Fig. 1, of the guide-frame and showing the tool-carrier in end elevation within the same. Fig. 4 is a sectional view of a modified form of carrier and cutting-tool.

The object of my invention is to provide simple and efficient means for routing or grooving the string-boards used in forming or building staircases, and this is especially true of the means for guiding and carrying the tool and adjusting the same to the degree of angle that the string-board requires. It is plain that the riser and tread boards of a stair must always be on vertical and horizontal lines; but as stairs are built on varying degrees of incline the angle as outlined by the edge of the string-board in respect to the vertical and horizontal lines also varies, and it is to this end that the construction hereinafter described becomes a ready and rapid means for laying out stair string-boards of any angle. With the introduction of other forms of cutters or saws I can do other work—such as slotting, mitering, &c.—and I do not wish to limit myself to a routing device alone.

Referring to the drawings, A is a built-up frame or base upon which the various operating parts are mounted and supported. At the top and center of this frame is an overhanging beam or arm B, supported at its center by a cross-bar C and bolted at the rear to the frame A. The front end of this arm B supports a pivoted guiding member D, in which the tool-carrier E is free to be moved back and forth. This guiding member D is pivotally supported by the headed bolt 2, which holds the two plates 3 and 4 fastened to arm B and member D, respectively, in close contact and provides a steady and wide support for guiding member D. In addition to this, member D is also supported at its other end by clips 5, which rest upon the curved band-segment 6, which is equally distant at all points from the pivot-bolt 2. This curved band-segment is formed in two parts 6 and 6′ and is rigidly supported upon the posts 7 at the side and top of the frame A and post 8 in the center. Sufficient space is allowed between segments 6 and 6′ and their supports to allow the ends of member D to pass by without interference when it is desired to swing said member to either extremity of band-segments 6 and 6′. Stop-clips 9 are fastened upon band 6 to set and limit the movement of member D after the desired cutting angle has been determined upon.

Guide member D is formed of four parallel angle-bars 10, rigidly connected together at their ends, but separated the entire distance between the ends. Within the inner vertical faces of these bars 10 and running their entire length are grooves 11, in which the upper and lower plates 12 of the tool-carrier E are free to slide. This carrier E has bolts 13, connecting plates 12, and a vertical shaft 14, with a small pulley 15, is supported centrally between the plates. The rotating routing-tool F is removably but firmly fastened to the lower end of shaft 14 below lower plate 12, where it is free to engage the work. The means to drive the tool is seen in Fig. 1, where an endless belt 16 from pulley 17, supported on the vertical shaft 18 at the rear of frame A, passes to idling pulleys 19 and thence to pulley 15. A belt 20 transmits the power to shaft 18 from the power-shaft 21, through pulleys 22 and 23 on shafts 21 and 18, respectively, and a band-wheel 24 or crank 25 on the power-shaft furnishes means for driving the same.

As the carrier E is moved back and forth within guiding-frame D the distance between pulley 17 and 15 is materially increased or de-

creased, due to the angle of travel of the carrier, and if no take-up means for the belt were provided the belt would become too slack or taut. The take-up means consists of a sliding carriage 26, held between grooved ways 27 and having three loose pulleys or idlers mounted therein, and a cord 28 is attached to each end of this carriage, which passes over a sheave 29 at each side of the frame A. If the guiding-frame D and its tool-carrier be at the left side of beam B, as seen in Fig. 1, a weight 30 is attached to the end of the cord 28 at the right of the machine; but if the said parts are to the left of beam B the weight and carriage 26 would be shifted to the left side of the frame A. This arrangement keeps the belt taut at all times and furnishes the friction necessary to transmit the power to pulley 15.

The work and, as here shown, the string-board 31 rest upon a vertically-adjustable table 32, which is raised or lowered to bring the board into working relation with the tool by means of screw-threaded crank-rods 33, mounted upon frame A. Slotted supporting-guides 34 and bolts 35 secure the table securely in place when the desired elevation has been obtained. One edge of the board abuts against projecting shoulders 36, bolted to the vertical posts of the main frame, and these shoulders keep the board in position and proper alinement while the routing is being done. If desired, suitable clamping mechanism could be utilized to fasten the board temporarily in place upon the table 32.

A gage 37, adjustably held by a thumb-screw to pivoted bracket 38, mounted upon one of the angle-bars 10 of member D, determines the height of each riser, the lip 39 on gage 32 bearing against the side of the groove just previously cut, board 31 being moved to the left after the completion of each groove. It will be readily understood from the description of the foregoing construction that no marking of the board or change of position of the guiding member is necessary after once the angle is determined upon and set, and the cutting of each succeeding groove follows rapidly after the completion of the first, the board merely being moved to the left the distance required and as marked by the gage 37. The length of the groove from the edge of the board where the routing begins could be marked by a line running parallel with the edge of the board; but an adjustable stop 40, fastened to the one of the angle-bars 10, to limit the movement of tool-carrier E, is preferably the simplest and safest way to determine the length of the groove.

The foregoing description, with the position of the parts as seen in the drawings, cover more especially the routing of the tread-board groove 41; but the riser-board groove 42 is made substantially in the same way, the guiding member and accompanying operating parts only being shifted to the right side of beam B and at right angles to that shown.

It will be noticed that the grooves are wider at one end than the other, and this result is obtained by merely shifting the guiding member D along the band-segments 6 against the stop 9, previously set to determine the difference of angle which permits this tapering of the groove.

Stay-rods 43 connect posts 7 and plate 3 at the end of the beam B and brace and steady the same against vibration.

The operation is as follows: The guiding member D for tool-carrier E is shifted to the proper angle desired and set by set-screws and stops 9. The tool-carrier E is shifted to the rear end of member D, and the board to be routed is placed in position on the table 32. The height of the riser being determined upon, the gage 37 is adjusted accordingly, and then power is applied to rotate the tool through its pulley and belt 16. The carrier E is moved by hand to bring the tool against the edge of the board and is carried to the limit of its movement, as fixed by stop 40. The carrier and tool are then returned to their starting-point and the guiding member D shifted, as allowed by stop 9, and the movement of tool-carrier is again repeated, this second routing giving the required taper of the groove. When the tool is withdrawn, the board is moved to the left, gage 37 is dropped into the groove just routed, and the second groove is started. This is repeated until the full number of tread-board grooves have been cut, when the guiding member D and the operating parts are shifted to right angles, as previovsly described, and the riser-board grooves are routed in substantially the same manner as the tread-board grooves.

A scale giving the different degrees of angle could be marked upon band-segments 6 to facilitate the quick and easy adjustment of guide member D.

In Fig. 4 is shown a modified form of cutter 44, which is mounted upon a carrier E′ and which revolves at right angles to that of the routing-tool F. This cutter E′ can be either a rotary saw-blade or of such other form as is common in performing different kinds of work and in this case is mounted upon a horizontal shaft, with a bevel-gear 45 meshing with the bevel-gear 46 on the lower end of the vertical shaft driven by pulley 47.

What I claim is—

1. A routing-machine having an overhanging beam, and a table beneath said beam, a cutting-tool and a sliding carrier for said tool, and a guiding member for said carrier pivotally supported from said beam and above said table, substantially as described.

2. A routing-machine having an overhanging beam, a guiding member pivotally supported from said beam, radial band-segments upon which said member can be shifted to any angle and adjustable stops to fix the

limit of movement of said member, and a cutting-tool and carrier therefor free to slide in said guiding member, substantially as described.

3. In a routing-machine, a cutting-tool and a sliding carrier for said tool, power connections to drive said tool, a guiding member for said carrier pivotally supported at one end and constructed of parallel bars separated their full length to allow the power connections to pass between said bars, curved band-segments at the other end of said bars, and adjustable stops on said segments, substantially as described.

4. A routing-machine having an overhanging beam, and an adjustable table beneath said beam, a cutting-tool and a sliding carrier for said tool, a guiding member for said carrier pivotally supported from said beam and above said table, curved band-segments for said member, adjustable stops on said segments, and means to operate said tool, substantially as described.

5. A routing-machine having a central overhanging beam, an adjustable table beneath said beam, a cutting-tool and a movable tool-carrier, a guiding member for said carrier pivoted at the front end of said beam, curved band-segments and adjustable stops for said guiding member, a driving-pulley located in line and to the rear of said beam, an endless belt connecting said pulley and tool, and a movable carriage having idling pulleys to take up the slack of said belt as the tool-carrier is moved back and forth and when the guiding member is shifted to opposite sides of the beam, substantially as described.

6. A routing-machine having a central overhanging beam, an adjustable table beneath said beam, a guiding member pivoted to said beam, a rotating tool having a pulley and carrier free to slide in said member, radial supporting-segments for said member, a drive-pulley at the rear and in line with said beam, an endless power-transmitting belt connecting the drive and tool pulleys, a grooved way at right angles and at each side of said beam, a sliding carriage in said ways having idle pulleys for said belt, and means to automatically control the movement of said carriage and slack of said belt, substantially as described.

7. In a routing-machine, a cutting-tool and a movable tool-carrier, a pivoted guiding member for said carrier, a supporting-beam for said member, and means to drive said tool, in combination with a bracket pivoted to said guiding member, and a gage adjustably secured to said bracket, substantially as described.

8. In a routing-machine, a base and the central overhanging beam on said base, a guiding member having parallel-grooved angle-bars 10 pivoted at one end to the front of said beam, curved band-segments, 6, 6′ supported by said base upon which the bars 10 rest, a sliding tool-carrier E having a vertical shaft and pulley 15 for said shaft, a removable routing-tool F fastened to the bottom of said shaft, and means to drive said pulley, substantially as described.

9. A routing-machine having an overhanging beam, a guiding member pivotally supported from said beam, curved band-segments upon which said member can be shifted to any angle, adjustable stops to limit the movement of said member, a sliding carrier in said member, a rotating cutting-tool supported by said carrier, a power-transmitting belt for said tool, and means to take up the slack of the belt when the tool-carrier or guiding member is shifted, substantially as described.

10. In a routing-machine, the base A, an overhanging beam B, a pivoted guiding member D, a sliding tool-carrier E, a rotating tool F on said carrier, band-segments 6 and 6′ on said base supporting said member, stops 9 on said segments, a gage 37 on said member, a drive-pulley 17 and power-belt 16, and a slack-take-up carriage 26 having a controlling-weight 30, substantially as described.

Witness my hand to the foregoing specification this 11th day of August, 1899.

DAVID B. BURT.

Witnesses:
H. E. MUDRA,
R. B. MOSER.