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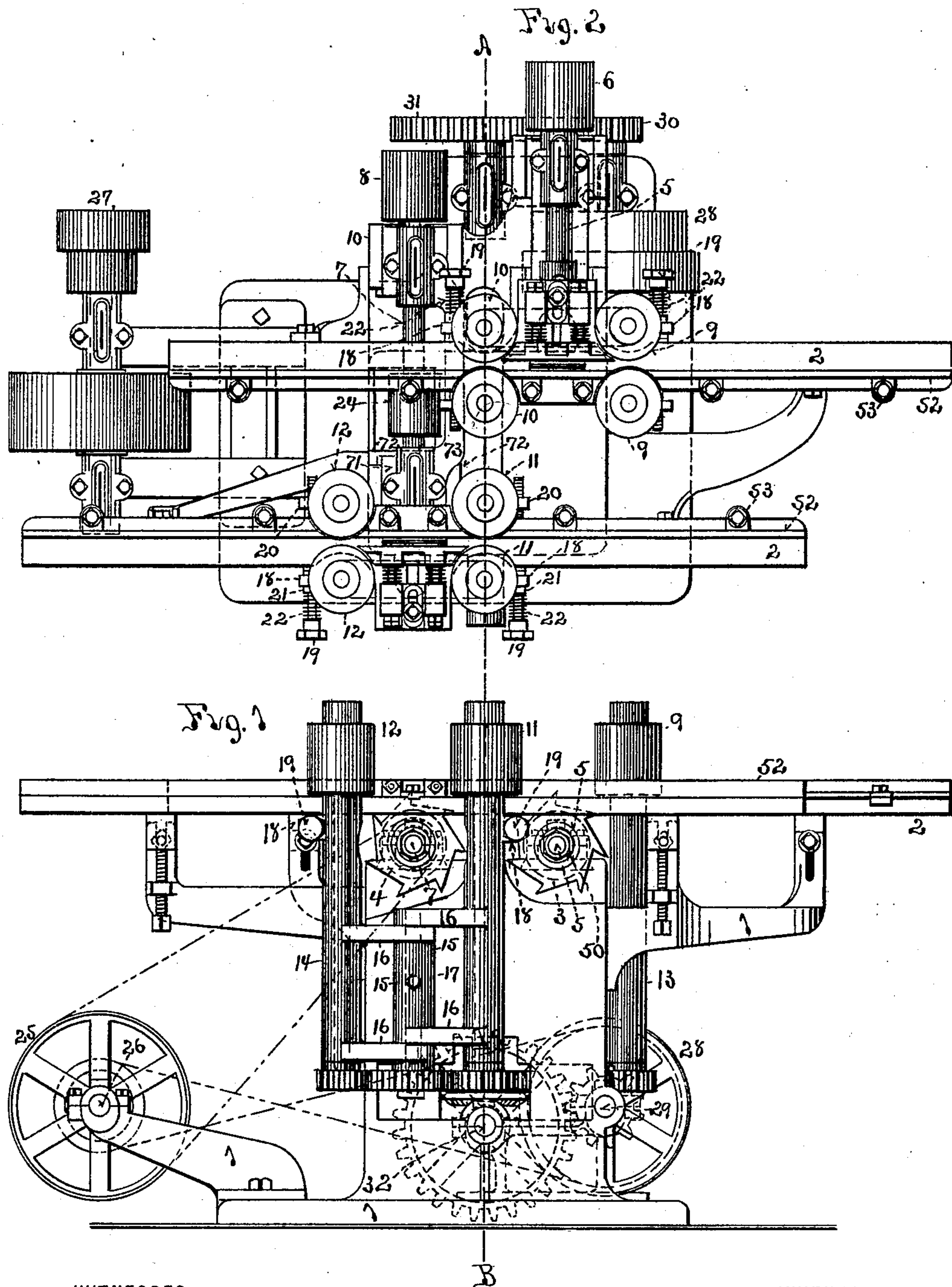
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S. A. WOODS & J. R. THOMAS.

UPRIGHT MATCHING MACHINE.

No. 391,003.

Patented Oct. 9, 1888.



WITNESSES:

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(No Model.)

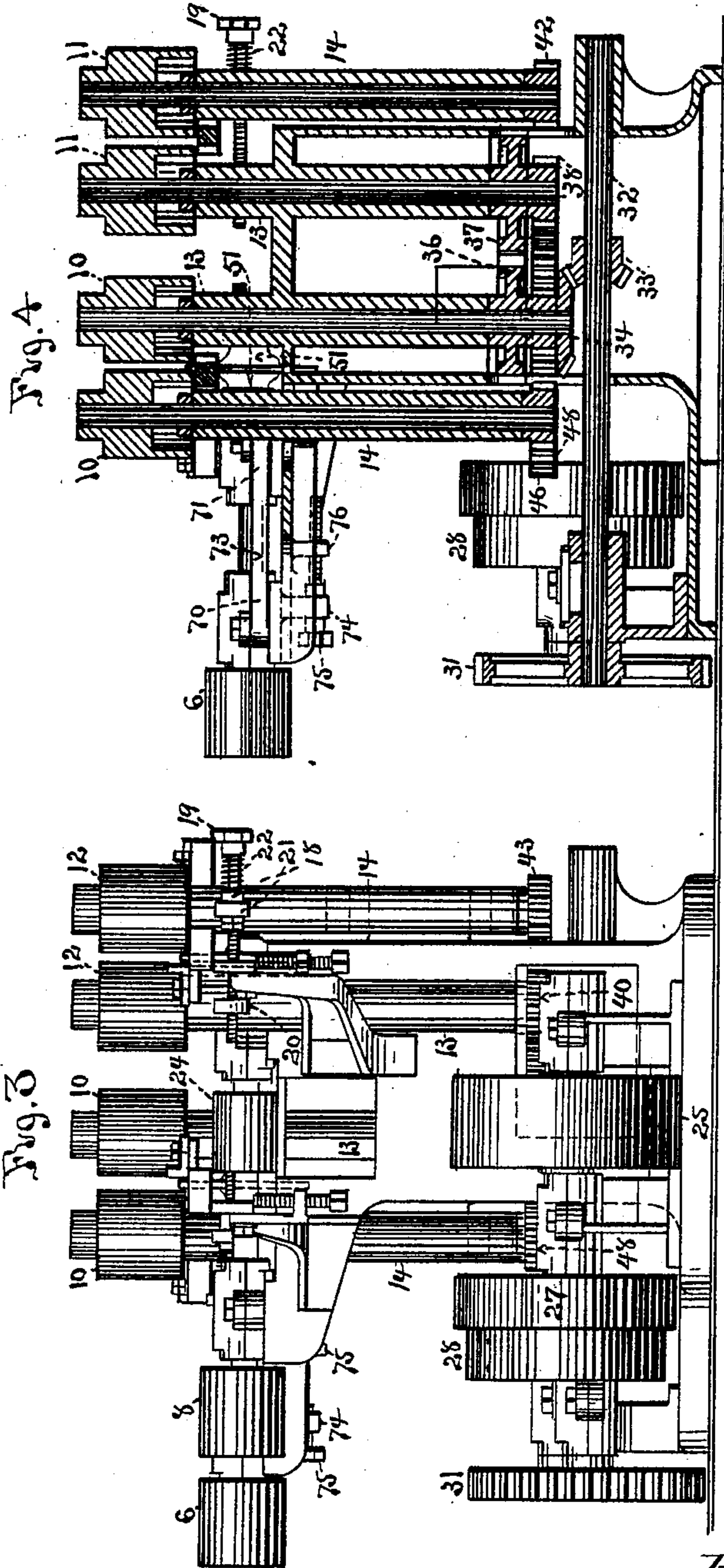
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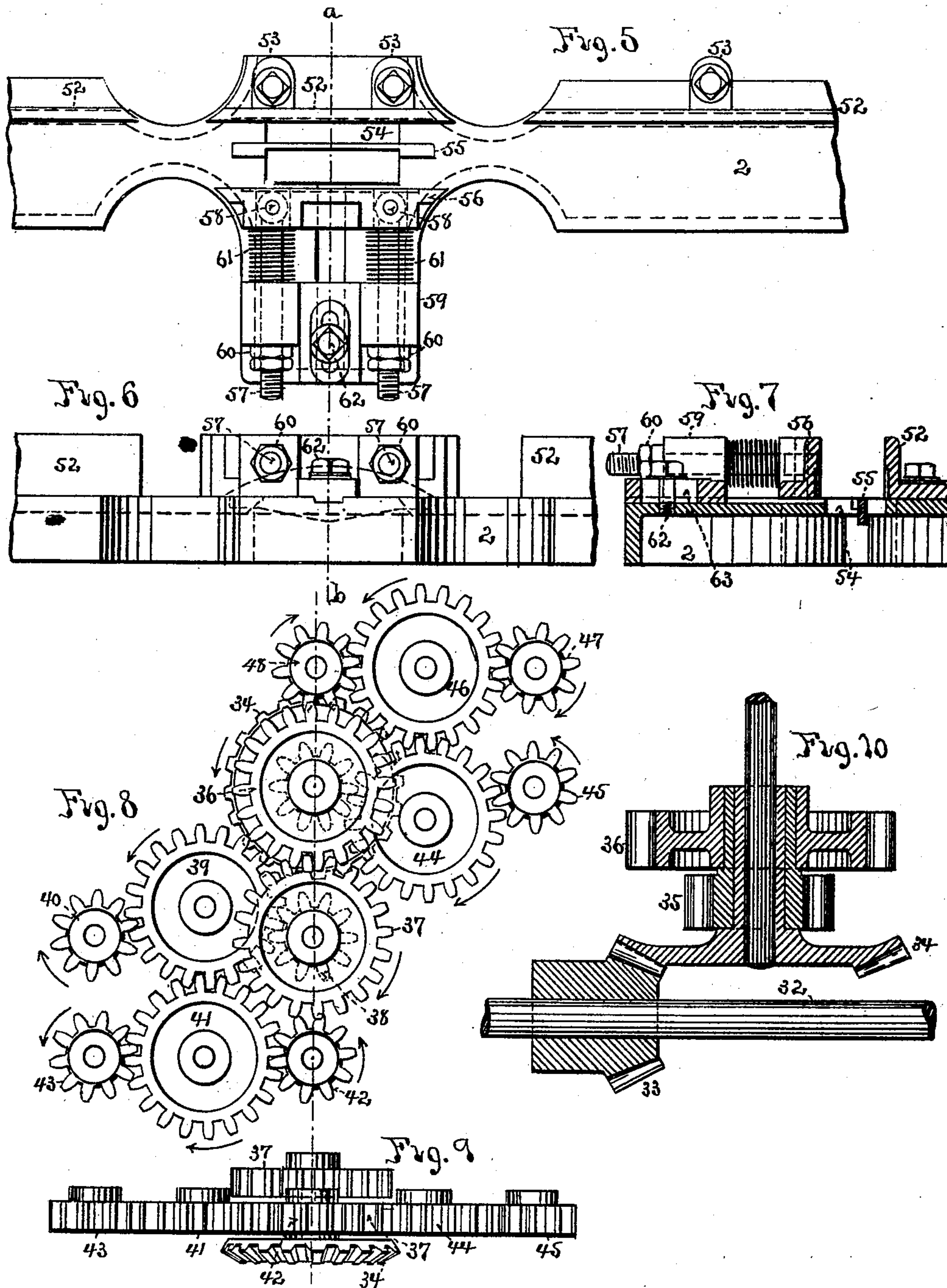
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# UNITED STATES PATENT OFFICE.

SOLOMON A. WOODS AND JOHN R. THOMAS, OF BOSTON, MASSACHUSETTS,  
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## UPRIGHT MATCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 391,003, dated October 9, 1888.

Application filed April 9, 1888. Serial No. 270,075. (No model.)

*To all whom it may concern:*

Be it known that we, SOLOMON A. WOODS and JOHN R. THOMAS, both of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Upright Matching-Machines, of which the following is a specification.

Our improvement relates to machines for tonguing and grooving or dressing the edges of lumber; and it consists in certain new and useful constructions and combinations of the various parts thereof, substantially as hereinafter described and claimed.

The machine to which our improvements are applicable is what is known as an "upright matcher"—i. e., one in which the lumber passes between vertical feed-rolls over a revolving cutter, which tongues, grooves, or reduces the edge of the lumber, such cutter being mounted upon a horizontal spindle.

In the drawings, Figure 1 is a side elevation of an upright matching-machine constructed according to our invention. Fig. 2 is a top plan view of the same. Fig. 3 is an end view of the same. Fig. 4 is a transverse vertical section on the dotted line A B of Figs. 1 and 2. Fig. 5 is an enlarged detail plan view of a portion of the machine-bed and attached parts over one of the tonguing-cutters. Fig. 6 is a side elevation of the same. Fig. 7 is a transverse vertical section of the same on the dotted line a b of Figs. 5 and 6. Figs. 8 and 9 are respectively enlarged plan and edge views of the train of gears used to drive the feed-rollers of the machine. Fig. 10 is an enlarged vertical section of a portion of the same.

The frame 1 of the machine supports the table and operating parts. The bed 2 is mounted on top of the frame and consists of two separate strips or plates—one for each matcher-head—as shown.

It is necessary in these machines to have a cutter-head, 3, for grooving, and another, 4, for tonguing, the edge of the board. Cutter-head 3 is mounted upon the shaft 5, extending transversely across the frame, upon which it is mounted in boxes, and the shaft is provided with the pulley 6, by which it is driven from a counter-shaft. Cutter-head 4 is provided

with the shaft 7, similarly mounted and driven by the pulley 8. This arrangement is adopted in order to place the cutter-heads 3 and 4 out of line with each other transversely in the machine, instead of opposite to each other and on the same shaft, as heretofore.

Upon each side of the cutter-head 3 is located a pair of vertical feed-rolls, 9 and 10, the former on the feed-in and the latter on the feed-out side of the cutter-head. Similar pairs of vertical feed-rolls, 11 and 12, are placed each side of the cutter-head 4. The pair of feed-rolls 10, being the feed-out rolls of cutter-head 3, are placed in line transversely of the table with the pair of feed-in rolls 11 of the cutter-head 4, which arrangement brings the feed-in rolls of the former cutter-head in advance of all others transversely of the table and offsets the location of the feed-rolls of cutter-heads 3 and 4, so to speak. By means of this arrangement the operator, standing upon the side of the machine shown in Fig. 1 and in advance of the feed-rolls 11, is enabled to reach over and take the board as it comes from either feed-out rolls 10 or 12 without stepping away from his position for feeding boards in to either head. He can, therefore, handle the stock faster and with less fatigue. For instance, suppose 3 to be the grooving-cutter and 4 the tonguing. The operator first feeds the short piece of board through the rolls 9 10, and, seizing it as it comes from the latter, turns the other edge downward and feeds it through the rolls 11 12. This grooves one edge and tongues the other ready to be joined to the next board.

In order to arrange the feed-rollers 9 10 and 11 12 as described, it has been found necessary to devise a new train of gearing to drive them and allow one of each pair to yield to varying thicknesses of boards. The shaft of the inside roller of each pair is mounted in a long sleeve, 13, attached to the frame 1 rigidly. Each of these shafts carries a driving-gear at its lower end. The outer feed-roller of each pair is also mounted in a long sleeve, 14, and this sleeve is swung or pivoted to an upright post, 15, Fig. 1, by arms 16 16. The upright post 15 consists of a central rod fixed solidly in the



bottom part of the frame between the sleeves 14 14 and an outer sleeve secured to the central rod by the set-screw 17, between the arms 16 16, after they have been slipped over the central rod, thus securing the whole in place and allowing the sleeves 14 14 to be swung around the post 15 as a pivot. On the side of each sleeve 14, near its upper end, is attached an ear, 18, having a horizontal hole through which the shank of the screw-bolt 19 passes, the shank being somewhat smaller than the hole. The screw end of this bolt is tapped through an ear, 20, fixed to the frame. A collar, 21, is slipped over the shank of the bolt and slides thereon up against the ear 18, and a spiral spring, 22, is placed over the shank of the bolt between its head and this collar, so as to bear upon the latter. This arrangement holds the sleeves 14, carrying the outer feed-rolls 9, 10, 11, and 12, of each pair up against the lumber by the tension of the spiral springs 22, and this tension can be increased or diminished by screwing up or unscrewing the bolts 19.

The lower ends of the feed-roll shafts are provided with gears, by which they are driven, and in order to enable the outer ones to yield, as described, while being driven they are arranged as follows: On shaft 7 is attached the pulley 24, which is belted to pulley 25 on shaft 23. On the outer end of the latter is the double-part pulley 27. This is belted to the double-part pulley 28 on shaft 29. These pulleys are made with double parts in order that the belt may be used either from the larger part of pulley 27 to the smaller part of pulley 28 or vice versa to run the feed-rollers at different speeds. On the outer end of shaft 29 is attached the pinion 30, which gears into the gear-wheel 31 on shaft 32. The latter shaft carries the bevel-wheel 33, which meshes into the bevel-gear 34 on the lower end of the shaft of the inside feed-roll 10. Above this bevel-gear the pinion 35 and larger gear-wheel, 36, are attached to the same shaft.

The gear-wheel 36 drives the feed-rolls of the cutter-head on the side of the machine shown in Fig. 1 as follows: It engages with gear 37 on the lower end of the shaft of the inner feed-roll 11. Below the gear 37 the pinion 38 is attached to the same shaft. It engages with the gear-wheel 39, which drives the pinion 40 on the lower end of the shaft of the inner feed-roll 12. Gear 39 also engages with gear 41, which engages with the pinion 42 on the lower end of the shaft of the outer feed-roll 11, and also engages with the pinion 43 on the lower end of the shaft of the outer feed-roll 12. The axis of gear-wheel 41 is directly beneath the center of the post 15, on which the shafts of the outer feed-rolls 11 and 12 are pivoted, as before described. Whenever, therefore, these feed-rolls yield to different widths of lumber, their centers and those of their shaft-pinions 42 and 43 swing outward in an arc concentric with gear-wheel 41, thus keeping these pinions in mesh with this gear-wheel,

which drives them to the same extent at all times.

Referring now to pinion 35, which drives the feed-rolls of cutter-head 3 on the opposite side of the machine, it engages with gear-wheel 44, which in turn drives the pinion 45 upon the lower end of the shaft of the inner feed-roll 9. Gear-wheel 44 also engages with gear-wheel 46, which drives pinion 47 upon the lower end of the shaft of outer feed-roll 9, and also drives pinion 48 on the lower end of the shaft of outer feed-roll 10. It will be observed that the centers of the pinions 47 and 48 of the outer feed-rolls 9 and 10 swing outward as the feed-rolls yield in arc concentric with their driving-gear 46, they being hung in the same manner as the outer feed rolls 11 and 12, as before described.

The pulleys 6 and 8 of the two cutter-head shafts are offset, as shown in Figs. 2 and 3, so that they may be driven from the same counter-shaft, and the cutter-heads are respectively applied to the other ends of the shafts 5 and 7, carrying these pulleys, which enables the cutter-heads to be removed through the space between the sleeves 13 and 14, carrying the feed-roll shafts, without disturbing the feed-rolls. For this purpose these sleeves are cut away slightly, as shown in Fig. 1, in arcs concentric with the center of the cutter-head spindle, which enables us to introduce a larger cutter-head through this space.

The cutter-heads are held onto the ends of their shafts by nuts 50, clamping them between collars 51, as shown in Figs. 1 and 4, and they can thus be both readily removed and replaced in a manner which would not be practicable if they were placed in line with each other transversely of the machine, as has heretofore been customary. The mandrels of these cutter-heads may also be adjusted independently of each other longitudinally in their boxes, which was not possible when they were both mounted upon the same mandrel.

Each bed-piece 2 carries upon it a vertical guide-strip, 52, which is attached to it by ears 53 (shown in Figs. 5, 6, and 7) and bolts passing down through the said ears into the bed-piece 2. This guide-strip aids in directing the lumber properly between the feed-rolls. The guide-strips are cut away, as shown in Figs. 5 and 6, where the inside feed-rolls revolve, to allow the lumber to bear against the latter. The cutter-heads work through the bed-pieces 2, an aperture, 54, being formed in the bed-pieces for this purpose.

When used with the tonguing-cutters, we supply the bed-piece with a bridge, 55, which divides the aperture 54 longitudinally, the knives of the cutter coming up each side of the bridge through the aperture.

Directly opposite to the guide-strip 52 and the matcher-cutter we attach to the bed-piece 2 an elastic pressure-strip, 56, to hold the lumber accurately against the guide-strip 52 at the point where the tongue or groove is formed in its edge. The guide-strip 56 has attached



to its rear side the bolts 57 by means of pivots 58. These bolts pass through the block 59 and have nuts 60 on their free ends behind the block to limit their forward movement toward the cutter-head. Between the block and the pressure-strip 56 the spiral springs 61 are placed around the bolts, pressing the strip 56 toward the opposite guide-strip, 52, and thus compressing the lumber as it passes over the matcher-cutter. The forward movement of the pressure-strip 56 is limited at pleasure by the nut 60. The block 59 is secured to the bed 2 of the machine by the screw-bolt 62, passing through an elongated slot, 63, in the block, and having its head overlapping the sides of the slot, and being tapped into the bed at its screw-end, as shown. This construction not only allows the pressure-strip 56 to yield directly backward, but allows one end to yield more than the other to the incoming lumber until the board has passed fairly between the entire strip and the guide 52.

Each of the spindles 5 and 7 is made adjustable longitudinally to bring the cutter-head to the proper position with relation to its feed-rollers by similar means. Thus the boxes of the spindles 5 and 7 are secured to plates 70 and 71, which slide on guideways on the cross-girts of the frame 72 72, these plates being connected together by a yoke, 73. From the plate 70 an ear, 74, projects downward, in which the screw 75 is attached through a hole, so as to revolve and carry the ear with it. The thread end of this screw engages with the ear 76, attached to the frame, by passing through a threaded hole in it. When the screw 75 is turned, therefore, it moves the boxes and spindle of the cutter-head longitudinally of the latter to its proper position.

Both of the screws 75 75 project outward upon the same side of the machine, and the adjustment of the cutter-head shafts 5 and 7 can therefore be performed on that same side thereof.

What we claim as new and of our invention is—

1. The combination, in a wood-planing machine adapted to dress the opposite edges of the same board by successive operations, of two cutter-heads, 3 4, mounted on horizontal spindles, and a pair of upright feed-rollers before and behind each head with the feed-in rollers of one cutter-head located nearer to the feed-in end of the machine than the feed-in rollers of the other cutter-head, substantially as described.

2. The combination, in a wood-planing machine adapted to dress the opposite edges of the same board by successive operations, of two cutter-heads, 3 4, mounted out of line with each other lengthwise of the bed on separate horizontal spindles, provided, respectively, with driving-pulleys 6 and 8 on their opposite ends, set out of line with each other longitudinally of the machine and adapted to be driven

by belts from the same counter-shaft, and a pair of upright feed-rollers before and behind each head adapted to present the edge of the board to it, substantially as described.

3. The combination, in a wood-planing machine adapted to dress the opposite edges of the same board by successive operations, of two cutter-heads, 3 4, mounted on the ends of separate horizontal spindles located out of line with each other transversely of the bed by means of clamping-nuts outside of them, and a separate pair of upright feed-rollers before and behind each head having their shafts placed a sufficient distance apart to allow of the cutter-head being withdrawn from its spindle and passing between them, whereby the cutter-heads may be removed and replaced without disturbing the feed-rolls or each other, substantially as described.

4. The combination of the cutter-heads 3 4, mounted upon horizontal spindles, the pairs of feed-rolls 9, 10, 11, and 12, provided with vertical shafts and driving-gears 45 47 34 48 37 40 42 43, attached thereto and driven from the same shaft by trains of gears, the gears 47 and 48, with their shafts and attached feed-rolls 9 10, being hung upon a pivotal support and adapted to swing concentrically outward and inward around their driving-gear 46, and the gears 42 and 43, with their vertical shafts and attached feed-rolls 11 and 12, being hung upon a pivotal support and adapted to swing concentrically outward and inward around their driving-gear 41, substantially as described.

5. The combination, in a wood-planing machine adapted to dress the opposite edges of the same board by successive operations of its cutter-heads, respectively, thereon, of four pairs of vertical feed-rolls, the cutter-heads 3 4, each mounted upon an independent horizontal spindle between two pairs of said rolls and said spindle mounted in boxes adjustable in guideways longitudinally of the spindle, and adjusting-screws 75 75, respectively attached to said spindle-boxes and projecting from the same side of the machine, whereby said cutter-heads may be independently adjusted to their respective feed-rolls, substantially as described.

6. The combination of the vertical pairs of feed-rolls 9 10, having the outer feed-roll of each pair yielding, the cutter-head 3, mounted in a fixed position upon a horizontal spindle, the table 2 and its fixed guide-strip 52 between the fixed rolls of the two pairs and on one side of the cutter-head, and the yielding pressure-block 56, arranged to bear upon the board between the yielding feed-rolls of the two pairs and opposite the cutter-head on its other side and hold it against the guide 52, substantially as described.

7. The combination, with the table 2 and the cutter-head arranged to tongue the edge of the board, of the bridge-strip 55, placed across the opening 54 in the bed through



which the cutter projects and in line with the space between the cutters which form the tongue, substantially as described.

8. The combination of the pairs of vertical  
5 feed-rolls 9 10, the cutter-head 3, the table 2, the guide-strip 52, the pressure-block 56, attached to bolts 57 57, the adjustable block 59, attached to the bed, the nuts 60 60, forming

stops on said bolts, and the springs 61 61, substantially as described.

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