No. 640,833. Patented Jan. 9, 1900.

J. R. THOMAS.

FEEDING DEVICE FOR WOODWORKING MACHINES.

(Application filed Aug. 28, 1899.)

(No Model.) 3 Sheets—Sheet 1.

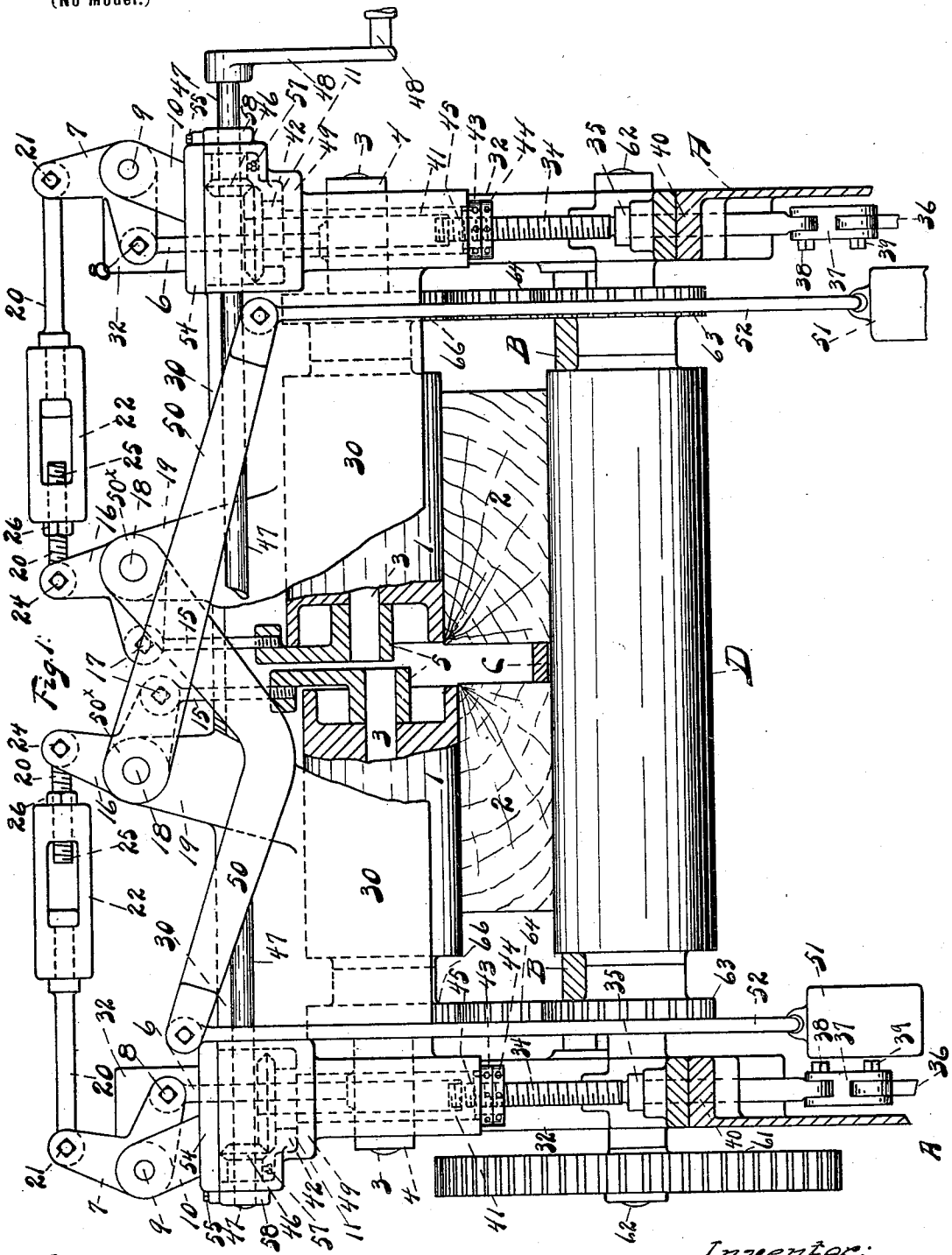


Fig. 1.

Witnesses:
Parke S. Johnson.
Philip W. Tozzer.

Inventor:
John R. Thomas,
by A. P. Verbeck
his Attorney.

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(No Model.) 3 Sheets—Sheet 2.

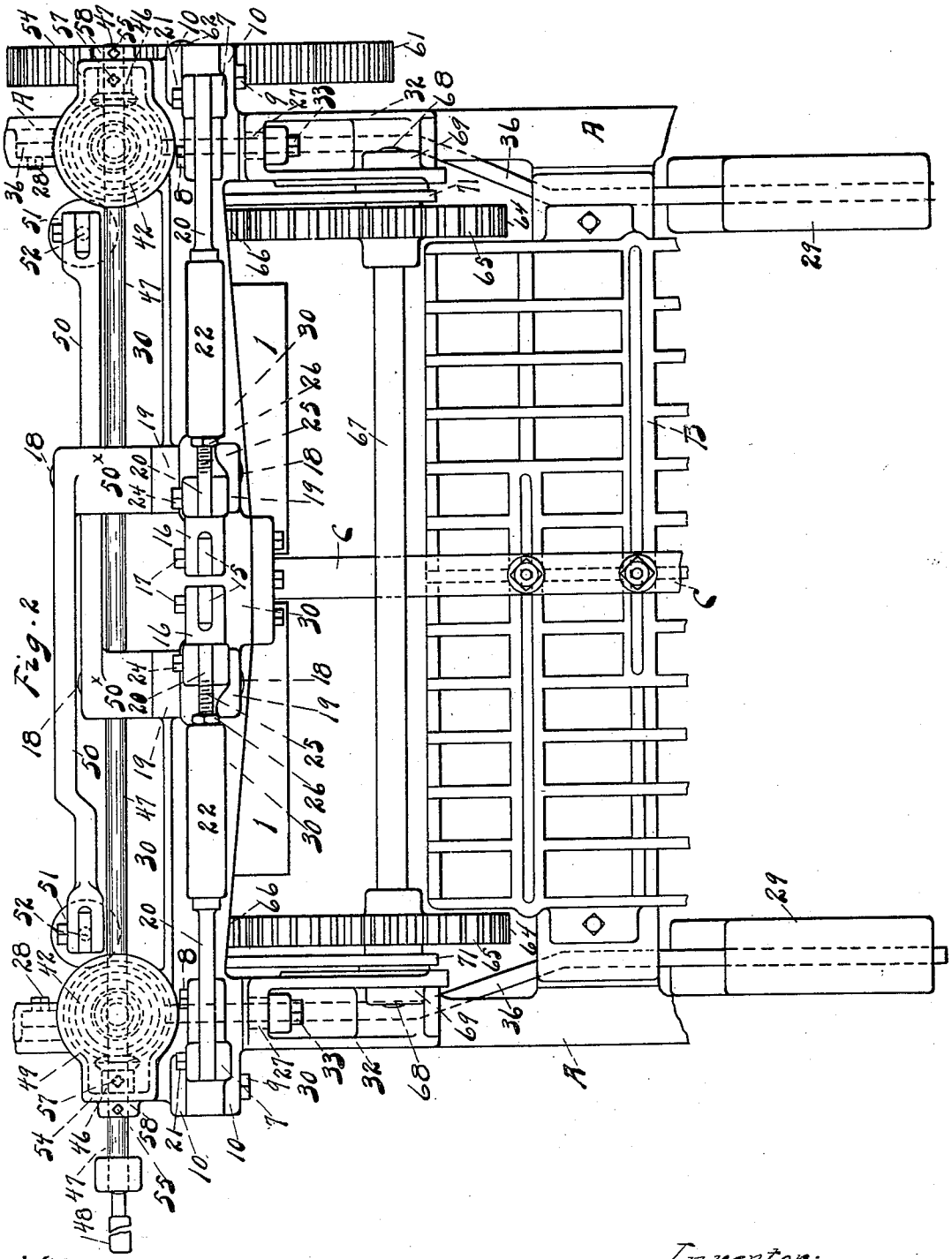


Fig. 2

Witnesses:
Burke S. Johnson.
Philip W. Tozzer.

Inventor:
John R. Thomas.
by F. D. Herbert his Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 3.

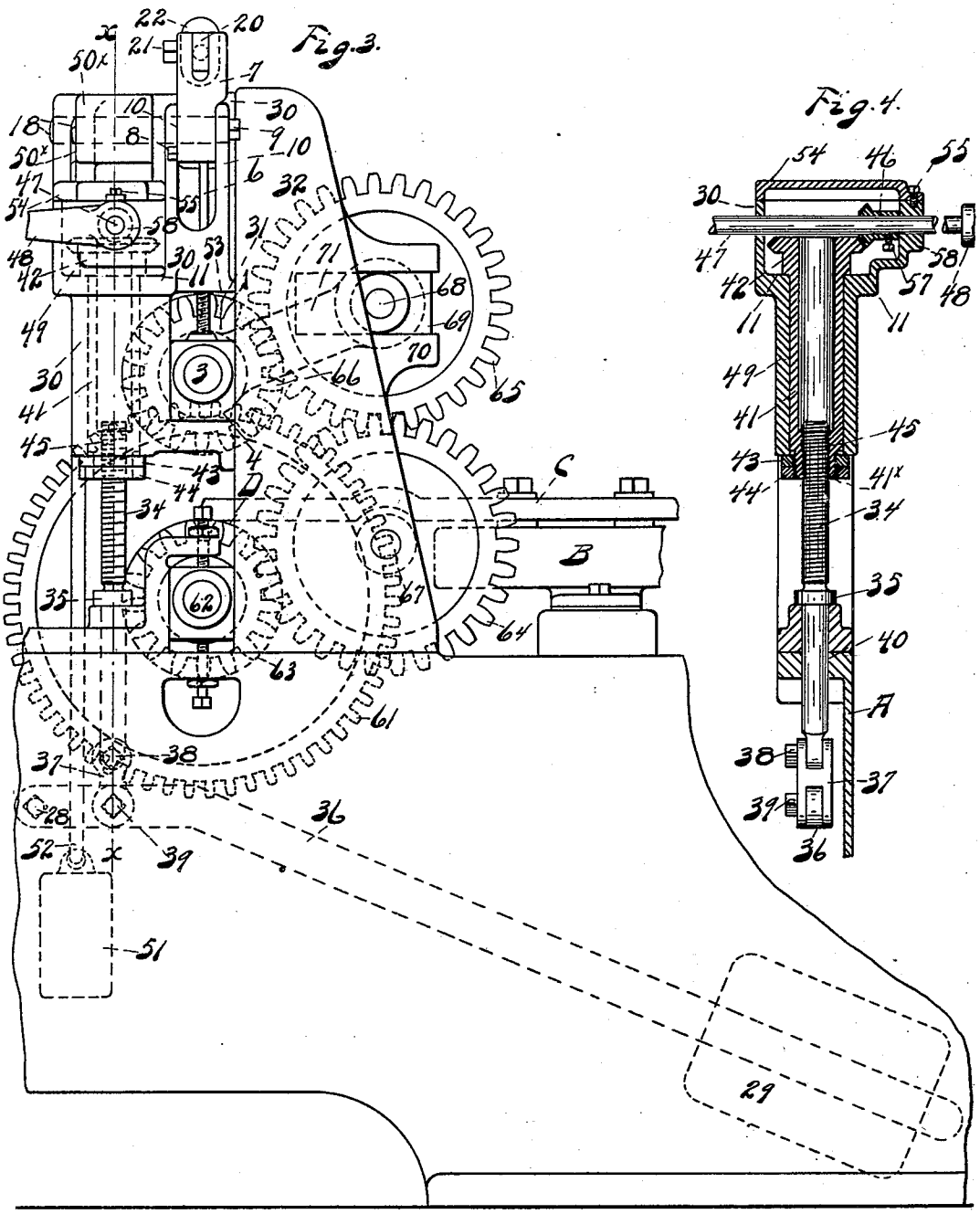


Fig. 4.

Witnesses:
Parke S. Johnson
Philip W. Tozzer.

Inventor:
John R. Thomas
by P. S. Dodge, his Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN R. THOMAS, OF CINCINNATI, OHIO, ASSIGNOR TO THE J. A. FAY & EGAN COMPANY, OF SAME PLACE.

FEEDING DEVICE FOR WOODWORKING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 640,833, dated January 9, 1900.

Application filed August 28, 1899. Serial No. 728,716. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. THOMAS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Feeding Devices for Woodworking-Machines, of which the following is a specification.

My invention relates to feeding devices for woodworking-machines, and has for its object the providing of a device in which the feed-rolls may be adjusted to and maintained in an angling position with reference to the cut by means of an adjusting device capable of effecting the adjustment of the rolls and varying the same instantly while the machine is feeding the stock and in which the rolls are given a parallel lift in the adjusted position; and the invention consists in the parts and in the construction, arrangement, and combinations of parts hereinafter more fully described and claimed.

In the drawings, Figure 1 is a rear elevation of my improved device, looking from the rear toward the feed-in end of a planing-machine frame, on which I have shown the same mounted. The inner ends of the rolls and bearings are shown in section to expose the inner bearings. Fig. 2 is a plan view, and Fig. 3 is an end elevation, of the same. Fig. 4 is a transverse section of one side of the frame and housing on the line $x\ x$ of Fig. 3, showing the bell-mouth shell construction and connected parts.

The feeding devices herein shown and described are adapted to be placed at the feeding-in end of the machine and are so constructed that they may accommodate themselves to the varying thicknesses of stock fed and may also direct the direction of the feed of the stock. I have shown two feeding-rolls 1 1, placed side by side, so that two boards of uneven thickness may be fed simultaneously; but it is obvious that but one of them may be employed.

A represents the frame of the machine, in which suitable wood-cutting agencies may be mounted in any ordinary manner.

B represents the bed of the machine, on which a suitable gage or gages C may be secured at any point desirable in the breadth of the bed and secured thereto in any suitable manner. This gage may extend throughout the length of the machine, guiding the material until it arrives at its feeding-out end.

A suitable feeding roll or rolls D is placed in substantially the plane of the bed of the machine, adjustable in any suitable manner with relation thereto.

Preferably at the feeding-in end of the machine I mount one or more rolls 1 1, which I have shown divided, forming two rolls adapted to rotate side by side, but independently of each other, and each adapted to exert its feeding power independently upon each of two pieces of stock, (shown at 2 2,) each of which pieces of stock may be of uneven thickness or both of relatively different thickness without affecting the feed exerted upon the other. Each of the rolls is mounted upon a shaft 3, having its outer end journaled in a bearing 4 and its inner end in a bearing 5. A link 6 is secured to the outer bearing 4 and pivotally connects with a lever 7 by means of a suitable bolt 8. The lever 7 is secured to a rock-shaft 9, mounted in an ear 10 on the roll-housing hereinafter described. The inner bearing of each roll is secured to a link 15, connecting with a lever 16 by means of a pin 17. The levers are preferably in the shape of bell-cranks. The lever 16 may be secured to a rock-shaft 18, mounted in an ear 19 on the roll-housing. The other ends of the levers 7 and 16 are preferably connected in the following manner: A tie-rod 20, preferably divided, is pivotally secured by means of a pin 21 to the lever 7 at one end and has a turnbuckle 22 turning thereon and connecting the divided ends of the tie-rod. The other end of the tie-rod is connected with the lever 16 by means of a pin 24. The turnbuckle is collared to one end of the divided tie-rod and screw-threaded, as at 25, to the other end. A jam-nut 26 secures the same in position after adjustment.

A suitable roll-housing 30 is provided, which supports the above-mentioned parts. It has a recess 31 at each end, the lower end of which forms a support $31^{\times}$ for normally supporting the outer bearing 4 of the roll 1. The housing preferably spans the machine and may be adjusted vertically on uprights 32 and be se-

cured in place, if desired, by means of bolts 33, passing through slots 27 in the uprights and into the housing. Screw-shafts 34 are supported in the frame of the machine, preferably by means of collars 35, having suitable pressure-levers 36, secured to links 37, connecting with the lower ends of the screw-shafts 34. The links 37 are yoke-shaped at each end. At their top they take over the lower ends of the screw-shafts 34 and at their bottom they take over the levers 36 and are connected thereto, respectively, by bolts 38 and 39. The lever is pivoted to the frame at 28 and also carries a weight 29. The lower end of the screw-shaft 34 is flattened to take into the yoke of link 37, without, however, increasing it in cross-section at any point, so that it may pass freely through a bearing 40 in the frame for the purpose of removal, as hereinafter explained. The screw-shaft is also adapted to slide in the bearing 40 when the housing 30 is raised against the pressure of the lever. Each screw-shaft 34 has an elongated nut 41 taking about the same and meshing therewith and shouldered against endwise movement relatively to the housing, preferably at one end, by means of a bevel-gear 42 and at its other by collars or jam-nuts 43 44, which latter may be turned by a suitable spanner. The thread in the nut for the screw-shaft 34 extends, preferably, only a limited distance, as shown at 45. The bevel-gear 42 may be integral with the elongated nut. The elongated nut, with its bevel-gear, takes into a bell-mouthed shell 49 on the housing. The hub of the bevel-gear 42 rests on the shelf 11, formed on the inside of the upper end of the shank of the shell. The lower part of the nut has a reduced portion $41^{\times}$, screw-threaded to receive the jam-nuts 43 44. The jam-nut 43 takes against the lower edge of the shell, adjustably holding the elongated nut against endwise movement in the shell. The bevel-gear 42 has meshing therewith at each end a bevel-pinion 46, secured to a shaft 47, having a crank 48 for turning the same. When the shaft 47 is rotated, the bevel-pinions operate the bevel-gears on the elongated nuts and raise and lower the housing 30, carrying with it the feeding-rolls 1 1 and connected parts, hereinbefore described. The shaft 47 is adapted to be held in place against endwise movement by the gears 46 shouldering against reverse sides of the bell-mouthed shells at opposite sides of the machine, the bevel-gears 46 being secured to the shaft 47 by bolts 57. The upper end of the bell-mouthed shell has a cover 54, held in place by a bolt 55. The weight exerted through weighted levers 36 normally holds the collars 35 on the screw-shaft 34 against the frame of the machine, and consequently normally holds the housing in its adjusted position.

If it is desired to remove the elongated nut, it is only necessary to remove the cover 54 by unscrewing the bolt 55 and release the bolts 57, when the shaft 47 may be slid endwise through its bearings 58 in the housing and the gears 46, which latter may also be removed when the shaft has been slipped through them. The elongated nut, with its bevel-gear, then lies exposed and can be unscrewed from its shaft and removed after the jam-nuts 43 44 have been unscrewed from its lower end. The screw-shaft 34 can then also be readily removed by releasing the bolt 38 at its lower end and slipping the shaft up through the bearing 40 and then down out of the lower end of the bell-mouthed shell, making all parts easily accessible and readily removable and of simple economical construction. The housing has meanwhile been fastened to its uprights by means of the bolts 33.

Each rock-shaft 18 is adapted to carry a pressure-lever 50, rigidly secured thereto on a hub $50^{\times}$. The pressure-lever carries a weight 51, connected thereto by a suitable link 52, taking into a fork at the end of the lever. The pressure exerted by the weight is transmitted through the lever 16 to the inner end of the roll by means of the link 15 and to the outer end of the roll through the medium of the tie-rod 20 and turnbuckle 22, to the outer lever 7, and links 6, to the outer roll-bearing. This pressure is transmitted to the bearings of the divided roll in such manner that the outer bearing thereof will always normally rest on the support $31^{\times}$ at the lower end of the recesses 31 of the housing 30. Adjustment of the rolls to and from a horizontal plane is effected by means of the turnbuckle 22 in the tie-rod 20. As heretofore explained, the outer bearing 4 of the roll normally rests on the support $31^{\times}$ at the lower end of the recess 31 of the housing 30. When the turnbuckle 22 is turned to lessen the length of the tie-rod, the upper end of the inner bell-crank is brought toward the outer one and the inner bearing of the roll raised, and when the length of the tie-rod is increased by the adjustment of the turnbuckle the upper end of the inner bell-crank is thrown away from the outer and the inner bearing of the roll depressed, the outer bearing being the fixed point from which the adjustments are made by reason of the pressure forcing that bearing against the support $31^{\times}$ at the lower end of the recess 31 in the housing. The adjustment is made by a device located between the levers in a readily-accessible position acting simultaneously against both roll-bearings of the same roll. The depressed end of the roll will naturally exert the greatest pressure on the stock on that side and lead the stock, a gage or gages being provided, which are preferably set in a straight line longitudinally of the machine, the rolls giving the necessary lead to the stock to cause it to hug the gage or gages.

The rock-shafts for the bell-cranks and the pivots between the ends of the bell-cranks and the roll-bearings and extensible tie-rods, respectively, extend in a common direction and are located in substantially a common transverse plane, with the weighting-lever

mounted on one of the rock-shafts in a different transverse plane and operating upon both bearings of the same roll. The extensible tie-rod connects both ends of the same roll for giving each single roll a separate and instant adjustment to angle the roll to a definite and determined angling position, which it maintains with a parallel lift throughout its various elevations to accommodate the stock and without affecting the position or working of any other roll. Two rolls are placed side by side, making a divided feed-roll, with the weight-levers for the rocking bell-cranks crossing each other beyond their pivotal points and each extending to the side of the machine opposite to that in which the roll with which it connects is located. This construction above described allows the angling roll to be used in connection with an opposing roll rotating in a fixed plane with relation to the cutting agencies, between which and the angling roll the stock may be fed. This construction also enables the device to be compactly and strongly built, occupying little space, and enables an angling adjustment of the roll to be instantly made by the manipulation of a single part—namely, the turnbuckle 22—without stopping the feed or danger of contact with the rotating or operating parts of the machine and within easy reach of the operator.

In the practical operation of a woodworking-machine it is found that different kinds of stock require a different angling of the roll to give the proper feed to the stock. Thus for hard woods a greater angling of the rolls is required to cause the stock to hug the gage and keep it in a straight line, whereas in soft woods a less degree of angling will suffice. If, however, the angling is greater than just sufficient to cause the stock to hug the gage, the stock will tend to bind between the roll and the gage, so that it is necessary to combine the highest excellence of product with the highest efficiency and ease in speed of feed that the correct angling of the roll shall be perfectly maintained, and this I do to a nicety in my improved device, in which the angling position of each separate roll may be instantly changed while the stock is being fed by the manipulation of a single part. The conditions requiring a change of angling of the roll are continually changing, making manipulation of the roll frequently necessary and my device especially useful and efficacious.

I have shown and described what is known as a "divided" roll in illustrating my invention. It is obvious that a single roll may also be employed embodying the features of my invention. When a divided roll is used, the lead may be given toward the center or either or both sides of the machine. It is preferably given toward the center, enabling two pieces of stock of different thicknesses to be simultaneously fed against a common gage. In feeding stock through the machine it will exert pressure on the divided feed-roll until the bearing for the outer journal of the same strikes the upper end of the recess 31 in the housing 30, which upper end I have marked 53. A further raising of the roll will cause a lift of the housing itself against the weighted levers 36. By means of my improved device each roll of the divided series may act independently of the others and be adjusted independently in height or in horizontal or angling position and rise independently against the action of the pressure agency in parallel lines.

The lower feed-roll D is operated by a gear 61, mounted on the feed-roll shaft 62. Each roll 1 receives its motion through a train of gears 63, 64, 65, and 66. The gear 63 is secured to the shaft 62. A shaft 67 is journaled in the uprights 32 and carries a gear 64 for each roll 1. The gear 65 is mounted on a stud 68, supported in a sliding bearing 69, sliding in a guideway 70 on each of the uprights 32. The gear 66 is secured to the feed-roll shaft 3. The shaft 3 and the stud 68 are connected by a link 71 to keep the gears 65 and 66 in continual mesh, the bearing 69 sliding in the guideway 70 to allow the various adjustments of the roll 1.

It is obvious that changes may be made in the construction I have preferred to show without departing from the spirit of my invention.

I claim—

1. In a feeding device for woodworking-machines, the combination, with a feed-roll, of a bearing at each end of the same, a separate bell-crank lever for each bearing connecting with the bearings at the ends of the same roll from one arm of the bell-crank levers, and an extensible tie-rod located between and connecting the other arm of the bell-crank levers, and constructed and arranged for varying the distance between the other arms of the levers and for simultaneously acting against the roll-bearing at each end of a single roll and between the roll-bearings for setting the roll to angling position toward either side of its normal plane, substantially as described.

2. In a feeding device for woodworking-machines, the combination with a feed-roll, of a bearing at each end thereof, a separate bell-crank lever for each bearing connecting with the bearings at the ends of the same roll, a rock-shaft for each bell-crank lever, a link connecting one arm of each bell-crank lever with its roll-bearing, with a pivotal connection between the arm and link, an adjustable tie-rod connecting the other arm of the bell-crank levers substantially beyond the roll and practically parallel with its normal axis, with a pivotal connection between the tie-rod and each of the other arms, the pivotal connections of the bell-crank levers constructed and arranged in substantially a common plane with the axis of the roll and rocking in that planet, and constructed and arranged for varying the distance between the said other arms

of the levers and for simultaneously acting against the roll-bearing at each end of a single roll and between the roll-bearings for setting the roll to angling position toward either side of its normal plane, and a pressure-lever secured to the rock-shaft of a bell-crank lever and extending transversely to the rock-shaft at substantially right angles thereto and substantially out of the plane of the rocking of the levers, substantially as described.

3. In a feeding device for woodworking-machines, the combination with a feed-roll, of a bearing at each end of the same, a separate bell-crank lever for each bearing connecting with the bearings at the ends of the same roll from one arm of the bell-crank levers, and an extensible tie-rod located between and connecting the other arm of the bell-crank levers, and constructed and arranged for varying the distance between the said other arms of the bell-crank levers and for simultaneously acting against the roll-bearing at each end of a single roll and between the roll-bearings for setting the roll to angling position toward either side of its normal plane, and a pressure device for the roll, with a housing on which the roll-bearings are mounted, an abutment on the housing against which a roll-bearing takes when yielding to abnormal pressure, and a pressure device for yieldingly holding the housing in normal position, substantially as described.

4. In a feeding device for woodworking-machines, the combination with a feed-roll, of a bearing at each end of the same, a separate bell-crank lever for each bearing connecting with the bearings at the ends of the same roll from one arm of the bell-crank levers, and an extensible tie-rod located between and connecting the other arm of the bell-crank levers, and constructed and arranged for varying the distance between the said other arms of the bell-crank levers and for simultaneously acting against the roll-bearing at each end of a single roll and between the roll-bearings for setting the roll to angling position toward either side of its normal plane, and a pressure device for the roll, with a housing on which the roll-bearings are mounted, an abutment on the housing against which a roll-bearing takes when yielding to abnormal pressure, an adjusting device for the housing, and a pressure device for yieldingly holding the housing in adjusted position, substantially as described.

5. In a feeding device for woodworking-machines, a lower roll, D, a second roll 1 opposed thereto for feeding the stock, ears 10 and 19, bell-cranks 7 and 16 pivoted in the ears, a bearing at each end of the second roll, links 6 and 15 connecting the bearings with one of the arms of the bell-cranks, with a separate tie-rod 20, the parts of same connecting with the other arms of the bell-cranks and located between the last-named arms of the bell-cranks, and a turnbuckle 22 connecting the two divided parts of the extensible tie-rod and arranged to vary the distance between the last-named arms of the bell-crank, and a fixed rest for one of the bearings of the second roll, constructed and arranged for angling the second roll by the adjustment of the turnbuckle acting from one bearing of the roll through the tie-rod to the other bearing of the same roll for setting the roll to angling position toward either side of its normal plane, substantially as described.

6. In a feeding device for woodworking-machines, the combination, with a divided feed-roll, of a bearing at each end of each section thereof, a separate bell-crank lever for each bearing connecting with the bearings at the ends of each section from one arm of the bell-crank levers, and an extensible tie-rod located between and connecting the other arm of the bell-crank levers on each several section, and constructed and arranged for varying the distance between the said other arms of the bell-crank levers of each several section and for simultaneously acting against and between the roll-bearings at the ends of each several section of the divided feed-roll for setting each section of the roll separately to angling position, and a separate weighted lever for each section connecting with a lever of its section and extending longitudinally of the other section of the roll, the levers constructed and arranged to pass each other beyond their connection with the roll-levers, substantially as described.

7. In a feeding device for woodworking-machines, the combination of an adjustable unyielding feed-roll, D, a divided feed-roll, 1, 1, yieldingly rotating in opposition thereto for feeding the stock, a bearing at each end of each section of the divided feed-roll, a separate bell-crank lever connecting with each bearing, a pivot for each bell-crank lever, a separate link connecting each bell-crank lever with its bearing from one of its arms with a pivotal connection between the arm and link, and an extensible tie-rod located between and connecting the other arms of the bell-crank levers on each section of the divided roll respectively, with a pivotal connection between each arm and the tie-rod of its section, and constructed and arranged to vary the distance between those other arms of the levers on each several section, and acting simultaneously against both roll-bearings of each several section for independently setting each section independently to angling position, with the pivotal connections of the bell-crank levers in substantially a common plane with the axis of the divided feed-roll and rocking in that plane, and a separate pressure-lever secured to the inner bell-crank lever of each section of the divided roll, and extending longitudinally of the other section of the divided roll, and constructed and arranged to pass one another between the pivots of the inner bell-crank levers of each section of the divided roll, substantially as described.

8. In a feeding device for woodworking-

machines, the combination of an adjustable unyielding feed-roll, D, a sectional divided feed-roll, 1, 1, yieldingly rotating in opposition thereto for feeding the stock, a bearing at each end of each section of the divided feed-roll, a separate bell-crank lever connecting with each bearing, a pivot for each bell-crank lever, a separate link connecting each bell-crank lever with its bearing from one of its arms with a pivotal connection between the arm and the link, and an extensible tie-rod located between and connecting the other arms of the bell-crank levers on each section of the divided roll respectively, with a pivotal connection between each arm and the tie-rod of its section, and constructed and arranged to vary the distance between those other arms of the levers on each several section, and acting simultaneously against both roll-bearings of each several section for independently setting each section independently to angling position, with the pivotal connections of the bell-crank levers in substantially a common plane with the axis of the divided feed-roll and rocking in that plane, and a separate pressure-lever secured to the inner bell-crank lever of each section of the divided roll and extending longitudinally of the other section of the divided roll, and constructed and arranged to pass one another between the pivots of the inner bell-crank levers of each section of the divided roll, with a housing on which the divided feed-roll is mounted, an abutment on the housing for each section against which a roll-bearing of each section of the divided roll takes when yielding to abnormal pressure, an adjusting device for the housing, and a pressure device for yieldingly holding the housing to adjusted position, substantially as described.

9. In a feeding device for woodworking-machines, the combination of a frame, a housing slidably secured thereto, an adjusting-screw 34 at each end thereof, a collar 35 on each screw for seating the same on the frame, an elongated nut 41 for each screw, a bell-mouthed shell 49 at each end of the housing for receiving one of the elongated nuts, a gear at the upper end of each elongated nut seated in one of the bell-mouthed shells for supporting the gear and the nut, a reduced portion $41^{\times}$ at the lower end of each elongated nut extending beyond the lower end of the bell-mouthed shell, with a collar for holding the nut in position within the shell, with a second gear for each of the gears on the elongated nut and meshing therewith, a transverse shaft on which the same are mounted releasably journaled in the shells, and a removable cap for each shell, constructed and arranged, substantially as described, for releasing the elongated nuts by the removal of the cap and transverse shaft with its gears and the disengagement of the collars and screws from the lower ends of the elongated nuts, substantially as described.

JOHN R. THOMAS.

Witnesses:
PHILLIP W. TOZZER,
PARKE S. JOHNSON.