

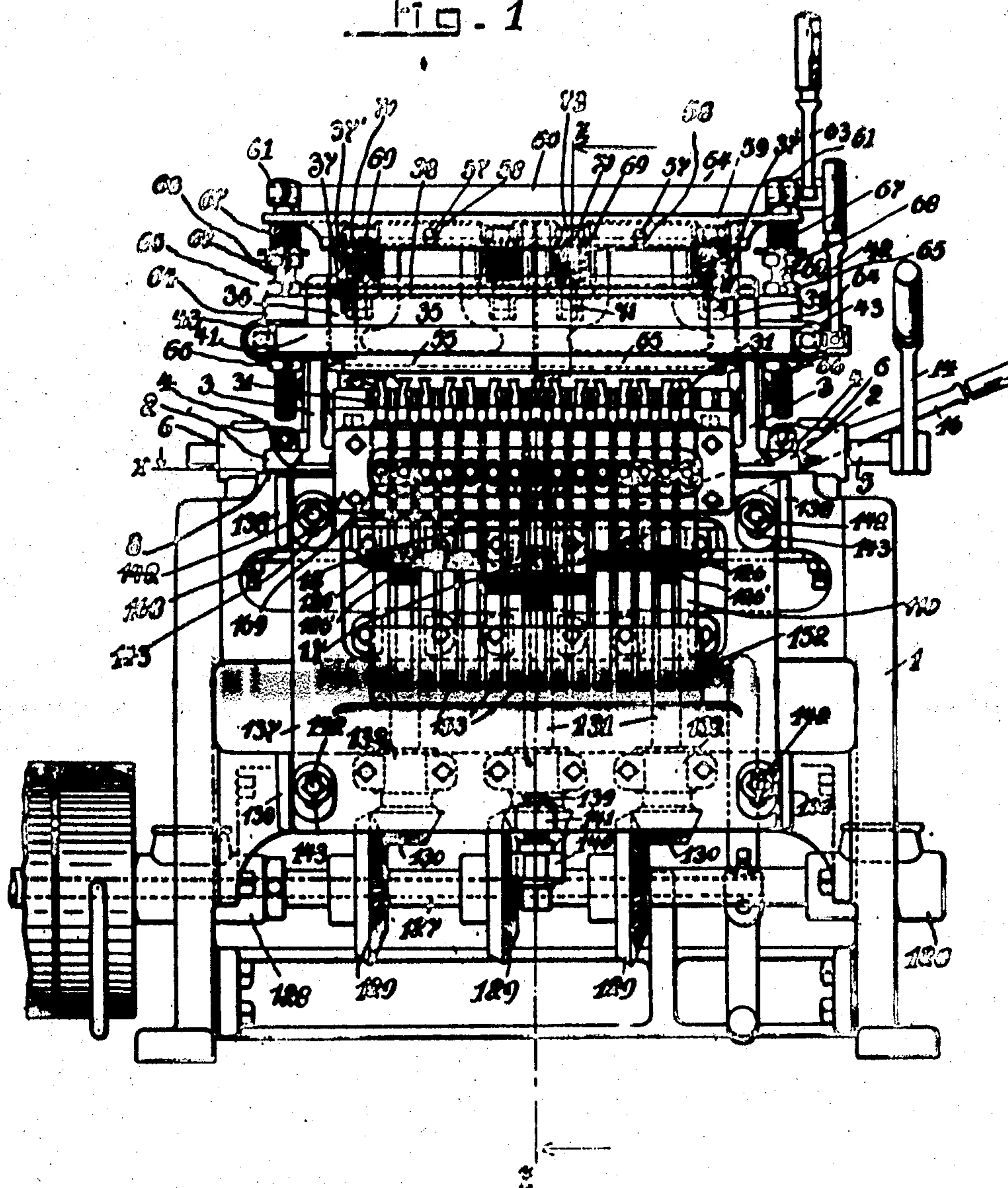
E. R. THOMAS & P. A. SOLEM.  
DOVETAILING MACHINE.  
APPLICATION FILED OCT. 16, 1909.

246,811.

Patented Jan. 13, 1911

6 SHEETS-SHEET 1

FIG. 1



Witnesses:  
C. H. Kottmann.

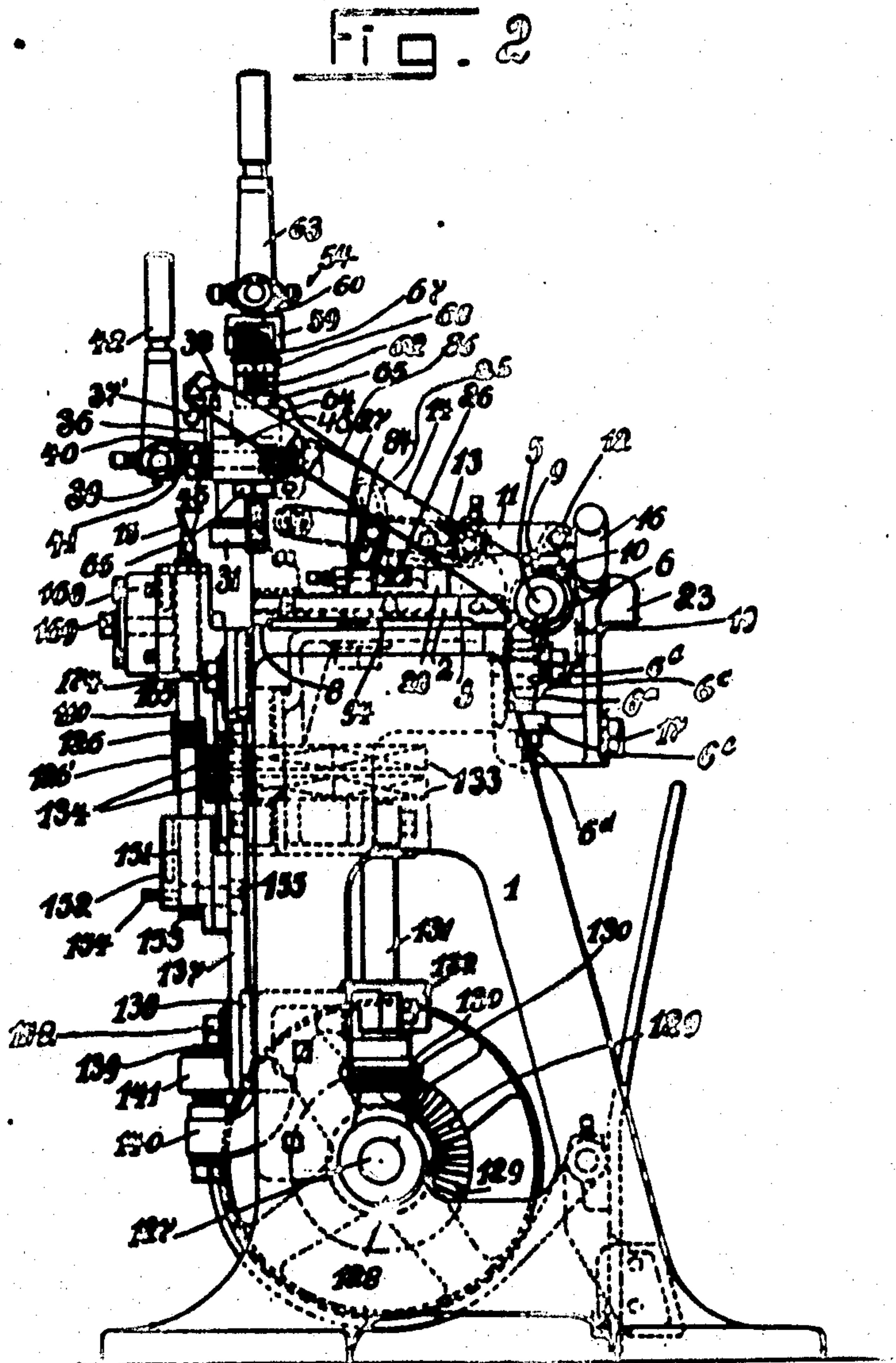
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J. R. THOMAS & P. A. SOLEM.  
DOVETAILING MACHINE.  
APPLICATION FILED OCT. 15, 1909.

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6 SHEETS—SHEET 2.



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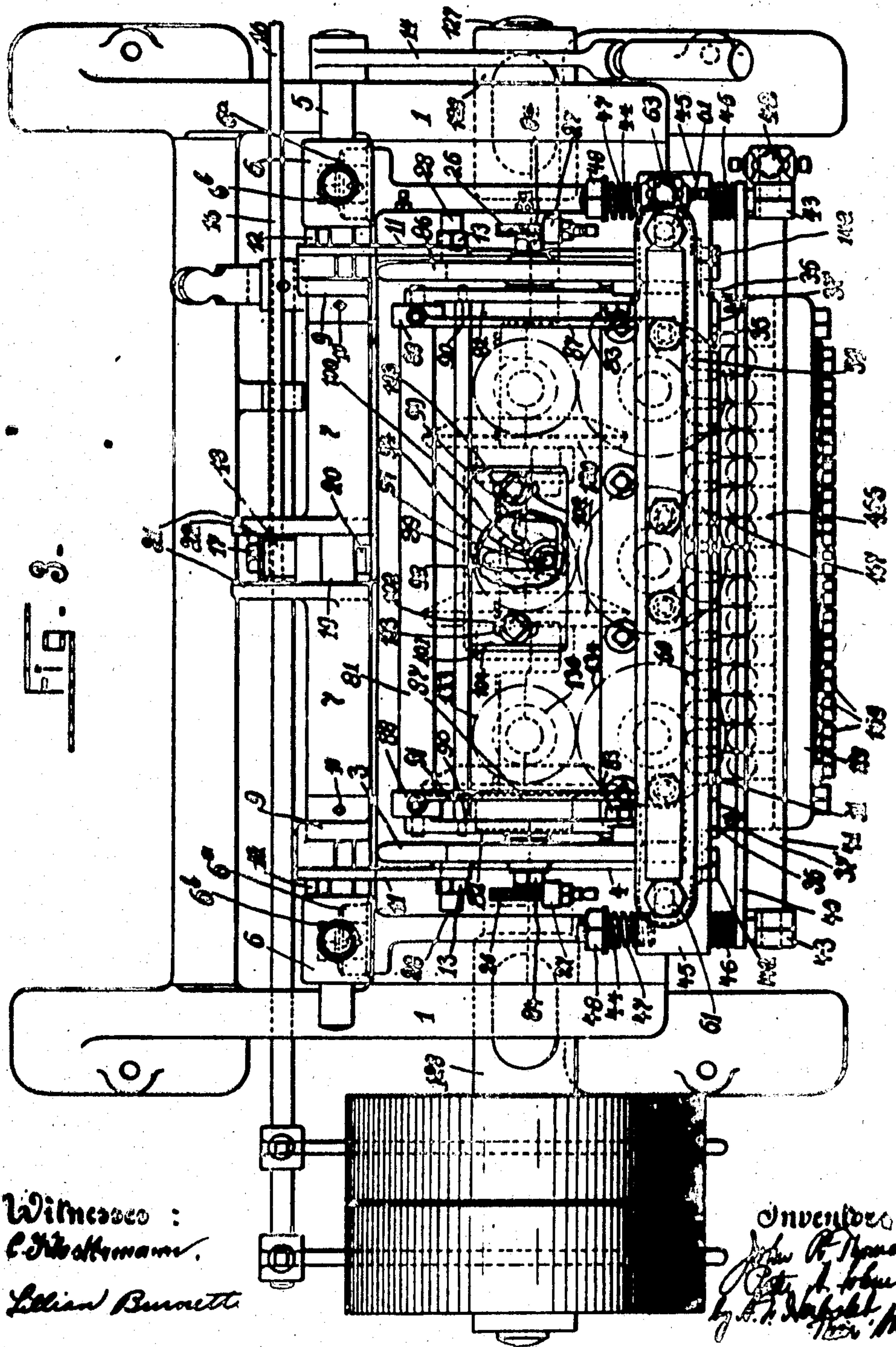
DOVETAILING MACHINE.

APPLICATION FILED OCT. 15, 1909.

946,811.

Patented Jan. 18, 1910.

6 SHEETS—SHEET 3.



Witnesses:  
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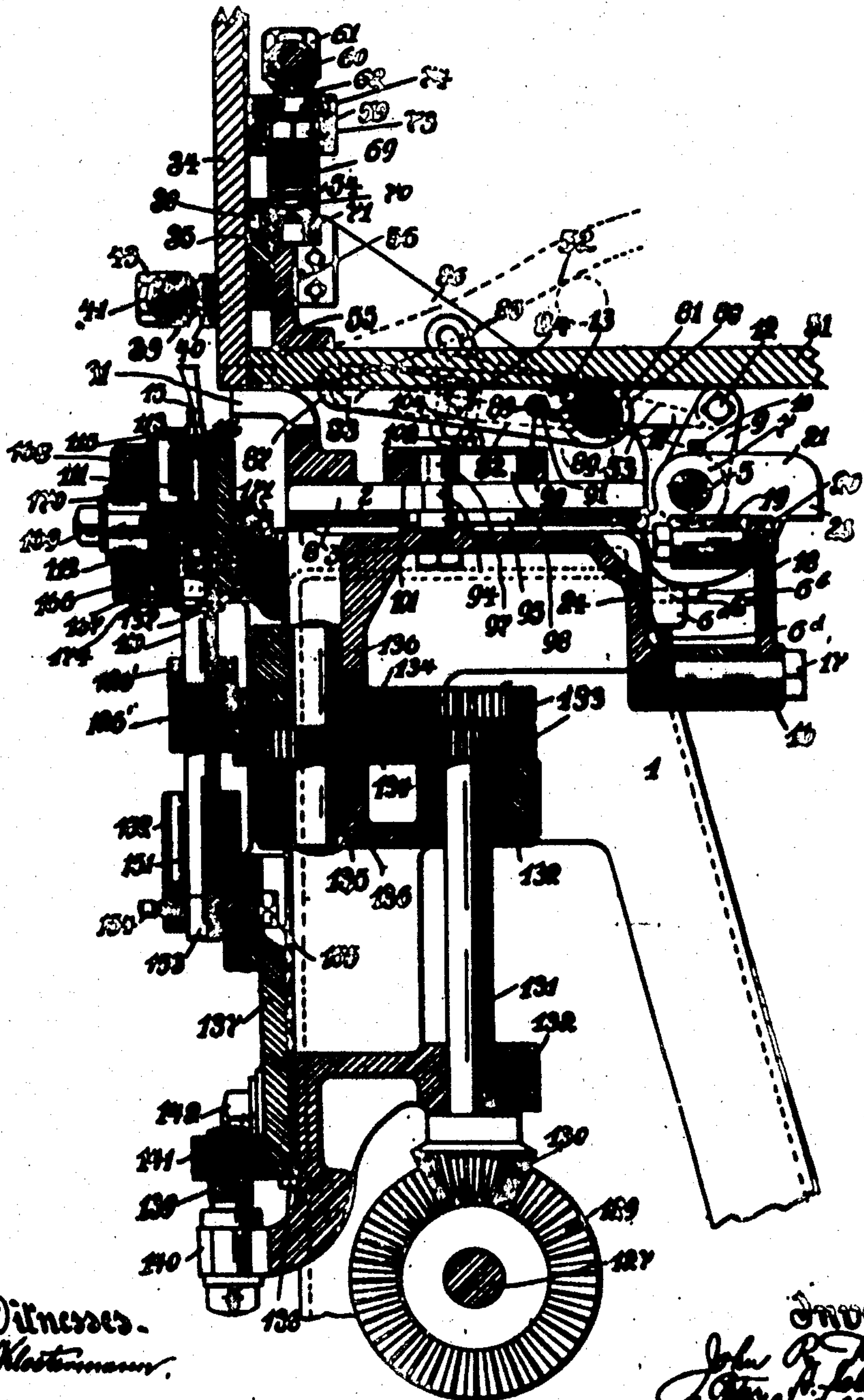
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J. R. THOMAS & P. A. SOLEM.  
DOVETAILING MACHINE.  
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6 SHEETS—SHEET 4.

FIG. 4.



Witnesses.  
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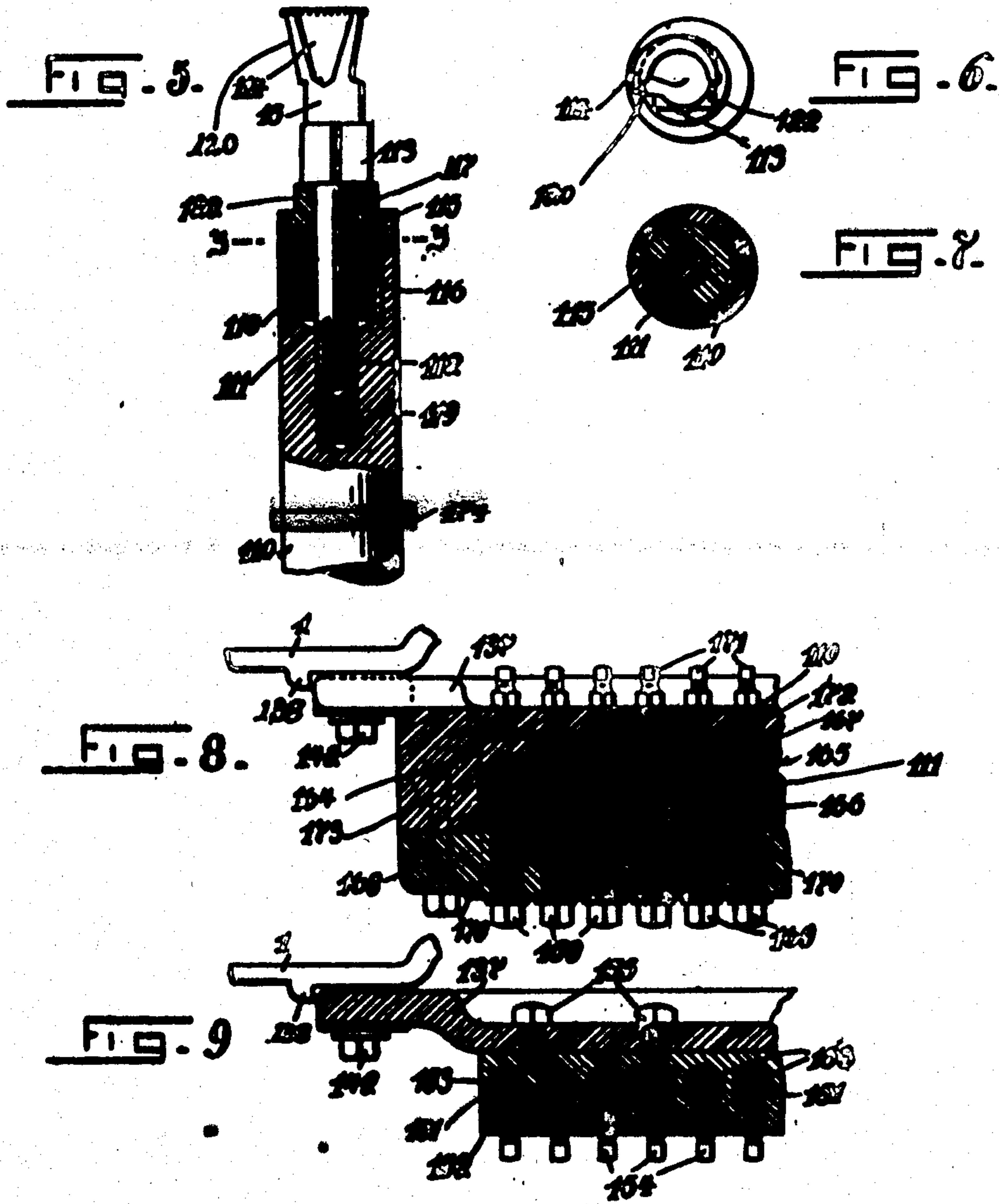
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J. R. THOMAS & P. A. SOLEM.  
DOVERTAILING MACHINE.  
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE

JOHN R. THOMAS AND PETER A. SOLEM, OF CINCINNATI, OHIO, ASSIGNORS TO J. A. FAY & DEAN COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF WEST VIRGINIA.

## DOVETAILING-MACHINE.

843,811.

Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed October 15, 1909. Serial No. 522,992.

*To all whom it may concern:*

Be it known that we, JOHN R. THOMAS and PETER A. SOLEM, citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have jointly invented certain new and useful Improvements in Dovetailing-Machines, of which the following is a specification.

Our invention relates to dovetailing machines, especially of that character of dovetailing machines known as gang dovetailing machines, in which a plurality of dovetail-cutters are simultaneously employed for simultaneously cutting a number of dovetails, although certain of the improvements hereinafter mentioned are also applicable in dovetailing machines employing but a single dovetail-cutter.

It is the object of our invention to provide new and improved means for adjustably mounting the dovetail-cutter or cutters whereby wear of the same may be compensated for; to provide a dovetailing machine with new and improved means whereby the spindles may be adjusted, to provide new and improved means whereby the dovetail-cutters may be collectively and independently adjusted; to provide new and improved means for supporting and moving the stock and to provide new and improved means for guiding and supporting curved stock.

The further objects of our invention, and the character and scope of our invention will be readily understood from the following description and claims and from the drawings, in which latter:

Figure 1 is a front elevation of our improved device. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view of the same, partly broken away. Fig. 4 is a vertical cross-section of the same on the irregular line *x-x* of Fig. 1. Fig. 5 is a detail partly in side elevation and partly in axial section showing the manner of mounting the dovetail-cutter. Fig. 6 is a plan view of the same. Fig. 7 is a cross-section of the same on the line *y-y* of Fig. 5. Fig. 8 is a detail in horizontal section on the line *x* of Fig. 1 illustrating the manner of mounting the upper bearings for the dovetail spindles; and, Fig. 9 is a detail in horizontal section on the line *u* of Fig. 1 showing the lower bearings of said spindles.

1 represents the frame on which a saddle

2 is mounted for sliding sidewardly. A table or stock-support 3 is mounted on the saddle 2 in guideways 4 for sliding back and forth. For accomplishing the sliding of the saddle and table we provide a rock-shaft 5 journaled in bearings 6 on the frame and slidable lengthwise in said journals, the saddle 2 having bearings 7 received about said rock-shaft for supporting said saddle at its rear, the saddle having a sliding support 8 between its front end and the frame. The bearings 6 are on bearing-blocks 6<sup>a</sup> adjustably secured to the frame by bolts 6<sup>b</sup> passing through slots 6<sup>c</sup> in the bearing-blocks into the frame, positioning bolts 6<sup>d</sup> threaded in lugs 6<sup>e</sup> of the frame being received against the bearing-blocks. Crank-arms 9 are secured to the rock-shaft, as by bolts 10, and are connected with the table by means of links 11 articulated to the crank-arms by bolts 12 and to the table by bolts 13. An operating arm 14 is secured to the rock-shaft 5 and acts as a lever for rocking the same and causing forward and backward movement of the table for bringing the stock supported by the table into and out of range of the dovetail-cutters 15.

For causing sidewise movement of the table we provide an operating lever 16 pivoted to the frame on a stud 17, the lever 16 being shown in the form of a bell-crank lever having an upward extension 18 on which a roller 19 is journaled on a pin 20, the roller being received between the walls 21 of a slot 22 at the rear of the saddle 2. The said walls are provided with rearward extensions 23 which form stops received against the rear wall 24 in the top of the frame when the table is tilted.

The construction stated permits the saddle 2 together with the parts superposed thereon, to be raised about the rock-shaft 5 as a pivot, for exposing the mechanism between said saddle and frame and for removing the saddle with the parts superposed thereon out of contiguity with the dovetail-cutters.

For limiting the longitudinal movement of the table we provide the saddle with bolts 25 arranged to be adjustably positioned in lugs 27 and to be impinged by studs 28 secured to the table, thus limiting the movement of the stock supported by the table with relation to the dovetail-cutters and controlling the length of dovetails cut therein. Our construction permits exceptionally good



control of the table in its various movements for the reason that the operation of one of the operating levers by one hand takes place under control of the other hand operating the other operating lever for retarding or aiding the operation, as may be desired.

In cutting the stock, for instance for drawers or the like, it is desirable to cut the side-piece and the front or back simultaneously for the respective corners thereof. The fronts of the drawers are sometimes straight and sometimes are provided with outward or inward curves, known as swell fronts, used for instance in dressers, chiffonniers the like. We have provided convenient means whereby straight as well as swell fronts may be supported and guided irrespective of the curvature or direction of curvature of the same.

81 is a comb secured to the saddle. The side-piece of the stock is represented at 34, the end of which rests upon the comb against a back 35 at the front of the table, against which it is laterally positioned by side-gages 36 adjustably secured against the back as by bolts 37 and nuts 37', the heads of the bolts being received in an undercut slot 38 in the back. The side-piece is clamped in place against the back by a clamp 39 comprising a plate 40 arranged to contact the side-piece by means of an eccentric roller 41 operated by a handle 42 and journaled in bearings 43 at one end of screw-rods 44 slidable in bearings 45 at the respective ends of the table, springs 46 of lighter tension and greater extension being received about said screw-rods 44 between the bearings 45 and plate 40, and springs 47 of greater tension and less extension being received between the bearings 45 and nuts 48 on said screw-rods, the springs 46 causing retraction of the plate 40 and the springs 47 permitting the bearings 48 of the eccentric roller to yield upon excessive pressure being brought to bear against the side-piece.

A straight front is shown at 51, an outwardly curved swell front is indicated in dotted lines at 52, and an inwardly curved swell front is indicated in dotted lines at 53 in Fig. 4. The fronts are arranged to be held in place by clamps 54, which may comprise one or more clamp-plates 55 loosely mounted in guide-ways 56 of the table and normally supported on pins 57 slidable in slots 58 of a yoke 59 against which an eccentric roller 60, journaled in bearings 61 on screw-rods 62, is adapted to bear and be operated by a handle 63. The screw-rods 62 are adjustable in bearings 64 of the table by positioning-nuts 65 66, springs 67 being received about the screw-rods 62 and positioned by nuts 68 for supporting the yoke 59. Springs 69 provide yielding pressure means for the clamp-plates 55. They surround pins 70 received in recesses 71 in said clamp-

plates and have nuts 72 at their upper ends which abut against the yoke, the threaded ends of said pins being received in recesses 74 in said yoke.

The forward end of the front or back of the drawer rests upon the comb 31 which forms a resting ledge for the said forward end. A rear support 80 is provided and is arranged to be placed at suitable elevation with its upper edge in horizontal plane with the resting surface of the comb for straight fronts or above or below said horizontal plane for swell fronts, depending on the curvature of the latter. This rear support preferably comprises a rounded bar 81 shown as a roll having connection with side arms 82 pivoted on bolts 83 located adjacent to the comb, clamp-bolts 84 being received through arc-slots 85 in the side uprights 86 of the table for clamping the same in adjusted positions. Side-gages 87 are provided with hubs 88 and are received about the roll 81 while a rod 89 of substantially less diameter than the roll is received in bearings 90 in the side arms, the said gages being provided with apertures 91 through which the rod passes. The side-gages are supported by the roll and the rod and extend forwardly to a point closely adjacent the comb, there being free space between said comb and the rod and roll for permitting swell fronts to be received above or below the horizontal plane of the comb. The forward ends of the side-gages are free and the mode of support of the same upon the roll and rod insure that the said forward ends shall be at all times within the horizontal plane of the supporting face of the comb, the said free ends maintaining a position in line with the pivotal axes of the side arms 82 irrespective of the extent of adjustment of the supporting-roll.

The comb is provided with teeth arranged to be received between the dovetail-cutters 15 when the table is moved forwardly for making the dovetail cut.

In order to round off the front ends of the tenons of the dovetails in the fronts to correspond with the rounded rear walls of the dovetail-grooves in the sides, we provide means for moving the saddle and table for effecting a circular movement of the forward ends of the fronts with relation to the cutters. For guiding the parts in this movement we provide a pin 94 secured to the frame and passing through an opening 95 in the saddle. The pin may have a roller 97 thereon, the roller being received in a straight slot 98 having a curved slot 99 merging therewith for forming a tongue 100 between said slots which is guided around the roller 97, the slots and the tongue being on the table, the walls of the slot limiting the movement of the table. In effecting this movement the lever 14 is depressed for force-



ing the table and the straight slot 98 forwardly, during which movement the lever 16 aids in controlling the lateral position of the saddle. The lever 14 is then raised for backing the table, the rounded end of the tongue 100 being caused to follow about the roller 97 by the upward pressure exerted on the lever 16, the upward pressure on the lever 14 being changed to a downward pressure as soon as the upward pressure on the lever 16 is initiated, for causing lateral movement of the table, whereby the rounded end of the tongue 100 is caused to move about the roller 97, the pressure on the lever 14 being changed to a downward pressure for causing the rear wall of the curved slot 99 to travel upon the roller. During the movement stated, the rock-shaft 5 is caused to rock during the longitudinal movement of the table and to move axially during lateral movement of the saddle, both movements being controlled by the respective hands of the operator. The slots 98 99 may be formed in a slot-block 101 secured to the table by bolts 102 passing through slots 103. A cover-plate 104 may be provided above said slot-block.

The dovetail-cutters are mounted at the upper ends of spindles 110 in novel manner hereinafter described. When a large number of spindles are employed we prefer to arrange them in series or nests for convenience in driving the same, the present exemplification showing the spindles in nests of five.

Each of the dovetail-cutters is provided with a shank 111 having a threaded end 112 and a suitable turning-seat 113 at the base of the cutting wing 114 thereof, the said seat being shown polygonal in cross-section for receiving a wrench. 115 is a collar having external threads 116 and an internal smooth bore 117, the shank 111 of the dovetail-cutter being received in the bore 117, the threads 112 116 being concentric with said shank. The spindle is provided with a plurality of eccentric bores of different diameters, in similar axial planes shown respectively at 118 119 for receiving respectively the externally threaded collar 115 and the threaded end of the shank 111. The cutting edge 120 of the dovetail-cutter is thus positioned eccentric to the rotary axis of the spindle, the amount of this eccentricity being determined by the radial position of the cutting-edge with relation to the spindle. The cutting edge 120 of the dovetail-cutter is also eccentric to the shank 111, being preferably at the highest point of eccentricity with relation thereto. As the cutter wears, the edge of the cutter-wing is ground away for causing said cutting edge to recede about the wing of said cutter.

Our improved construction permits a wide range of adjustment of the circle of swing of

the cutting edge 120 for permitting adjustment of the diameter of cut made by the dovetail-cutter, and, when a plurality of dovetail-cutters is simultaneously employed, permitting adjustment of said cutters so that the same shall have a uniform diameter of swing at their cutting edges and thereby permitting uniform dovetails to be cut by all of the cutters irrespective of whether all of said cutters are new or whether some are new and others are worn. It is also desirable that the dovetail-cutters shall be positioned at uniform height. This is accomplished by the adjustment of the collar 115 which has a polygonal portion 122 for the reception of a suitable wrench. The construction is such that the collar may be raised or lowered for positioning the same to such height, so that when the cutters are seated upon the collars they may be all of uniform height or be of relatively such heights that they will all have circles of swing at their cutting edges which are of equal diameters in the same horizontal plane. The cutters may be thus adjusted to height and diameter of cut and at the same time locked in position in such manner that the force or cutting blows exerted upon the cutter will tend to tighten the cutter rather than to loosen the same.

It will be noted from Fig. 1 that the cutters have their cutting edges extending alternately toward the right and left. The threads between the nut and shank and the respective spindles alternate correspondingly. The spindles are driven alternately toward the right and left by pinions 126, the pinions of the respective nests of spindles meshing with each other. One of the pinions of each nest of spindles is preferably an elongated pinion, as shown at 126', for permitting simultaneous adjustment of all the spindles in the manner to be presently described. 127 is a drive-shaft journaled in bearings 128 in the frame and driven in suitable manner. Bevel-gears 129 are secured to the drive-shaft and mesh with bevel-pinions 130 on upright shaft 131 journaled in bearings 132 in the frame, and have pinions 133 at their upper ends. The pinions 133 mesh with transmitting gears 134 on stud-shafts 135 mounted in bearings 136 in the frame. The transmitting gears 134 respectively mesh with the elongated pinions 126'. The spindles are collectively journaled in an apron 137 slidable vertically in guide-ways 138 of the frame. The adjustment of the same is accomplished by a screw-rod 139 held against end-wise movement in a bracket 140, secured to the frame and received in a threaded lug 141 of the apron for adjusting the apron vertically. The apron is secured in place by bolts 142 received through slots 143 in the apron and into the frame for securing the apron in adjusted positions. The construction permits the main drive-gears to



be mounted in the frame, the adjustment of the apron affecting only the spindle-pinions, the elongated pinion 126' of each nest of the latter forming the receiving gear throughout the various adjustments of the apron.

The lower ends of the spindles are journaled in bearings 151, shown as bores in a bearing-piece 152 secured to the apron, and rest upon step-blocks 153 adjustably secured in said bores by set-screws 154. The bearing-piece is secured to the apron preferably by means of bolts 155 received through the rear of the apron and threaded into the bearing-piece.

The upper ends of the spindles are journaled in bearings 165 comprising the separated half-blocks 166 167 located in a recess 164 in the apron. The forward ones of the half-blocks are arranged to be clamped to a cross-girt 168 by means of bolts 169 received through slots 170 and threaded into said half-blocks. The rear half-blocks 167 are forced forwardly toward the forward half-blocks 166 by means of set-bolts 171 passing through threaded apertures 172 in the rear wall of the apron and abutting against the rear half-blocks with sufficient force for causing a snug journal-fit between the half-blocks and the upper journals of the spindles. There is a space 173 between the respective front and rear half-blocks for permitting the taking up of wear between said journals and said half-blocks. The half-blocks are arranged side by side and fill the recess 164 from end to end.

The spindles are provided with collars 174 adapted to bear against the lower ends of said half-blocks for preventing upward movement of the spindles, it being understood that the force of the cutting action of the dovetail-cutters tends to cause a raising of the spindles. If it is desired to adjust any of the spindles vertically the bolts 169 are loosened and the spindle shifted vertically to proper position, thereby positioning the dovetail-cutter longitudinally, and when adjusted, the bolt is again tightened. The set-screw 154 of the spindle to be adjusted is also loosened for permitting shifting of its step-block 153, the step-block being pushed manually into engagement with the lower end of the spindle in the adjusted position of the same and the set-screw 154 tightened.

By the construction stated independent adjustment of the respective dovetail-cutters may be obtained both for diameter of the circle of cut and longitudinal positioning of the dovetail-cutter, independent longitudinal positioning of the respective spindles may also be obtained, and the spindles and dovetail-cutters may be collectively adjusted to position, whereby proper depths and circles of cuts and positions of cuts of all the dovetail-cutters may be obtained irrespective of the wear to which any of the

dovetail cutters may have been subjected, for obtaining uniform dovetails throughout in the product.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a dovetailing machine, the combination of a table, a saddle and a main frame superposed one upon the other, said saddle and table constituting movable parts, a longitudinally movable rock-shaft on said frame having operative connection with said movable parts, and a pair of operating levers for longitudinally and rockably moving said shaft, substantially as described.

2. In a dovetailing machine, the combination of a table, a saddle and a main frame superposed one upon the other, said saddle and table constituting movable parts, a shaft on said frame about the axis of which the said movable parts are arranged to swing, an operating lever having connection with said shaft for moving said movable parts in a given direction, and a second operating lever having connection with the other of said movable parts for moving the same at substantial right angles to said given direction, for the purpose specified.

3. In a dovetailing machine, the combination of a frame, a dovetailing-spindle journaled thereon, a saddle, a table, said saddle and table constituting movable parts, a shaft about the axis of which said movable parts are arranged to swing toward and from said spindle, an operating lever having operative connection with said shaft for moving one of said movable parts in a given direction, a second operating lever having operative connection with the other of said movable parts for moving the same in a direction at substantial right angles to said given direction, and said movable parts and frame having a stop between them for limiting the swinging movement of said movable parts, for the purpose specified.

4. In a dovetailing machine, the combination of a frame, a dovetail-spindle journaled at the front thereof, a rock-shaft in said frame, a saddle, bearings therefor about said rock-shaft, a table mounted on said saddle, said rock-shaft having operative connection with said table for moving the same on said saddle toward and from said spindle, and an operating lever having operative connection with said saddle for moving the same and said rock-shaft longitudinally, for the purpose specified.

5. In a gang dovetailing machine, the combination of a frame, a gang of dovetail-spindles journaled at the front thereof, a longitudinally movable rock-shaft journaled at the rear thereof, a saddle journaled about and movable longitudinally with said rock-shaft and slidable laterally on said frame, a table slidable back and forth on said saddle,



said rock-shaft having operative connection with said table, an operating arm for said rock-shaft for moving said table back and forth, and an operating lever having operative connection with said saddle for moving said saddle and rock-shaft laterally, for the purpose specified.

6. In a gang dovetailing machine, the combination of a frame, a gang of dovetail-spindles at the front thereof, a longitudinally movable rock-shaft journaled at the rear of said frame, connecting arms secured to said rock-shaft, a saddle, bearings therefor longitudinally positioned about said rock-shaft, a table having slidable connection with said saddle, links between said connecting arms and table, an operating arm secured to said rock-shaft for rocking the same and an operating lever moving said rock-shaft axially, for the purpose specified.

7. In a gang dovetailing machine, the combination of a table, a saddle and a frame superposed one upon the other, a gang of dovetail-spindles at the front of said frame, a longitudinally movable shaft journaled at the rear of said frame and having operative connection with said saddle and table, said table and saddle having swinging movement about the axis of said rock-shaft toward and from said dovetail-spindles, and a pair of operating levers having operative connection with said rock-shaft for rocking and moving the same longitudinally, there being guiding faces between said table and frame for limiting said movements, for the purpose specified.

8. In a gang dovetailing machine, the combination of a frame, a gang of dovetail-spindles journaled at the front thereof, a longitudinally slidable rock-shaft journaled at the rear of said frame, a saddle having bearing about said rock-shaft and slidable support on said frame, a table slidable on said saddle toward and from said spindles, said rock shaft having operative connection with said table for sliding the same, a pair of operating levers having operative connection with said longitudinally slidable rock-shaft for controlling the longitudinal and rockable movements of the same, and said frame and table having adjustable guiding parts therebetween for limiting said movements, for the purpose specified.

9. In a gang dovetailing machine, the combination of a frame, a gang of dovetail-spindles journaled at the front thereof, a longitudinally movable rock-shaft journaled in said frame, a saddle having bearing about the axis of said rock-shaft for supporting said saddle at the rear thereof and permitting swinging movement of said saddle toward and from said spindles, the front of said saddle being supported on said frame, a table slidable back and forth on said saddle, said rock-shaft having operative con-

nection with said table, a pair of operating levers for controlling the rockable and longitudinal movements of said rock-shaft and thereby controlling the positions of said table with relation to said spindles, and an adjustable cam-plate and guide-piece therefor between said frame and table for limiting said movements of said table, substantially as described.

10. In a gang dovetailing machine, the combination of a main frame, an apron vertically adjustable thereon, a gang of dovetail-spindles journaled in said apron, pinions on said spindle meshing with each other, one of said pinions being an elongated pinion, and driving mechanism mounted on said frame comprising a gear meshing with said elongated pinion throughout the adjustments of said apron for permitting maintenance of driving connection between said gearing on said frame and said spindle-pinions by adjustment solely of said spindle-pinions, substantially as described.

11. In a gang dovetailing machine, the combination of a main frame, an apron, means for adjusting said apron with relation to said main frame, a gang of dovetail-spindles, dovetail-cutters thereon, a bearing block on said apron having a plurality of bores therein serving as bearings for the lower ends of said respective spindles, step-blocks in said respective bores secured therein by lateral pressure thereupon, and bearings for the upper ends of said spindles comprising a pair of half-blocks for each of said spindles, one of which is adjustable longitudinally on said apron, securing means for securing the same in adjusted positions to said apron, and clamping means acting on the other of said respective half-blocks for regulating the journal pressure at the upper ends of said spindles, and constructed and arranged for adjusting said dovetail-cutters to height relatively to each other, substantially as described.

12. In a dovetailing machine, the combination of a main frame, an apron adjustable thereon, a gang of dovetail-spindles having journals at their lower and upper ends, dovetail-cutters therefor, bearings for the lower journals of said spindles, step-blocks for said spindles adjustable therein, bearings for the upper journals of said spindles, each of which comprises a pair of half-blocks, means for adjustably securing one of each of said pairs of half-blocks longitudinally on said apron, means for adjusting the distance between the respective half-blocks of said pairs of half-blocks, said spindles provided with collars bearing against said half-blocks for limiting the upward movements of said spindles, and constructed and arranged for independently and collectively adjusting said dovetail-cutters to height, and meshing gears on said



spindles for driving the same, substantially as described.

13. In a dovetailing machine, the combination of a main frame, an apron thereon, a gang of dovetail-spindles having journals at their lower and upper ends, dovetail-cutters therefor, bearings for the lower journals of said spindles, step-blocks for said spindles adjustable therein, bearings for the upper journals of said spindles, each of which comprises a pair of half-blocks, means for adjustably securing one of each of said pairs of half-blocks longitudinally on said apron, means for adjusting the distance between the respective half-blocks of said pairs of half-blocks, said spindles provided with collars bearing against said half-blocks for limiting the upward movement of said spindles, and constructed and arranged for adjusting said dovetail-cutters to height relatively to each other, meshing gears on said spindles for driving the same, one of said gears being an elongated gear, driving gearing on said frame meshing with said elongated gear, and means for adjusting said apron for collectively adjusting said spindles longitudinally under maintenance of driving connection between the gearing on said frame and said spindle-gears through said elongated gear by adjustment solely of said spindle-gears, substantially as described.

14. In a dovetailing machine, the combination of a main frame, an apron thereon, a gang of dovetail-spindles provided with collars, a bearing for the upper end of each of said spindles comprising front and rear half-blocks, a vertical recess in said apron in which said half-blocks are received, said recess having a front wall provided with a slot for each of said front half-blocks, bolts received through said slots into said front half-blocks for positioning the same longitudinally, bolts received through the rear wall of said recess for adjusting the journal-fits of said half-blocks about said spindles, and lower bearings for said spindles comprising adjustable step-blocks for supporting said spindles with the collars thereof against said half-blocks, substantially as described.

15. In a dovetailing machine, the combination of a rotating part provided with a plurality of eccentric bores of different diameters in similar axial planes, said bores being internally threaded, a dovetail-cutter provided with a threaded shank received in the smaller one of said bores, and an externally threaded collar received in the larger one of said bores, said dovetail-cutter provided with a shoulder for limiting the axial movement of said cutter by the axial position of said collar, for the purpose described.

16. In a dovetailing machine, the combination of a rotating part, a dovetail-cutter provided with a threaded shank, a limiting-piece

therefor provided with external threads, said latter threads and the threads of said shank being concentric with relation to each other and located eccentrically to the rotary axis of said rotating part, substantially as described.

17. In a gang dovetailing machine, the combination of a plurality of rotating parts each having a plurality of eccentric threaded bores of different diameters in similar axial planes, dovetail-cutters provided with threaded shanks fitting said bores of like diameter and provided with shoulders, an positioning-pieces threaded into said eccentric bores of greater diameter for limiting the inward movements of said shoulders, the said dovetail-cutters being provided with cutting edges eccentric to the longitudinal axes of said shanks and said rotating part and constructed and arranged for the purpose specified.

18. In a dovetailing machine, the combination of a dovetail-spindle, a table, means for moving said table toward and from said spindle and laterally thereof, a comb on said table for supporting stock at its front end, rear-support for the stock comprising arms pivoted to said table adjacent to said comb, a rounded bar secured to the swinging ends of said arms, a rod supported adjacent to and movable with said rounded bar, and a side-gage for the stock adjustable laterally of said rounded bar and rod and having an unsupported-end located adjacent to the pivotal axes of said swinging arms throughout the swinging movements of the same.

19. In a dovetailing machine, the combination of a frame, a dovetail-spindle, a stock supporting table adjustable toward and from and laterally of said spindle, a comb on said table for supporting the forward end of stock adjacent to said spindle, a rear support for said stock comprising arms pivoted to said table adjacent to said comb, a rounded bar and a rod between the swinging ends of said arms, side-gages having bearings on said rounded bar and rod and having unsupported forward ends adjacent to said comb, means for positioning said gages laterally, and means for positioning said swinging arms with relation to said table, the forward ends of said side-gages being unsupported and adjacent to the pivotal axes of said swinging arms throughout the swinging movements of the latter, substantially as described.

In testimony whereof, we have signed our names hereto in the presence of two subscribing witnesses.

JOHN R. THOMAS.  
PETER A. SOLEM.

Witnesses.

HARPER G. ROSS,  
RICHARD D. COAN.