

No. 612,119.

Patented Oct. 11, 1898.

J. H. PICKETT.  
CORNER LOCKING MACHINE.

(Application filed June 10, 1895.)

(No Model.)

4 Sheets—Sheet 1.

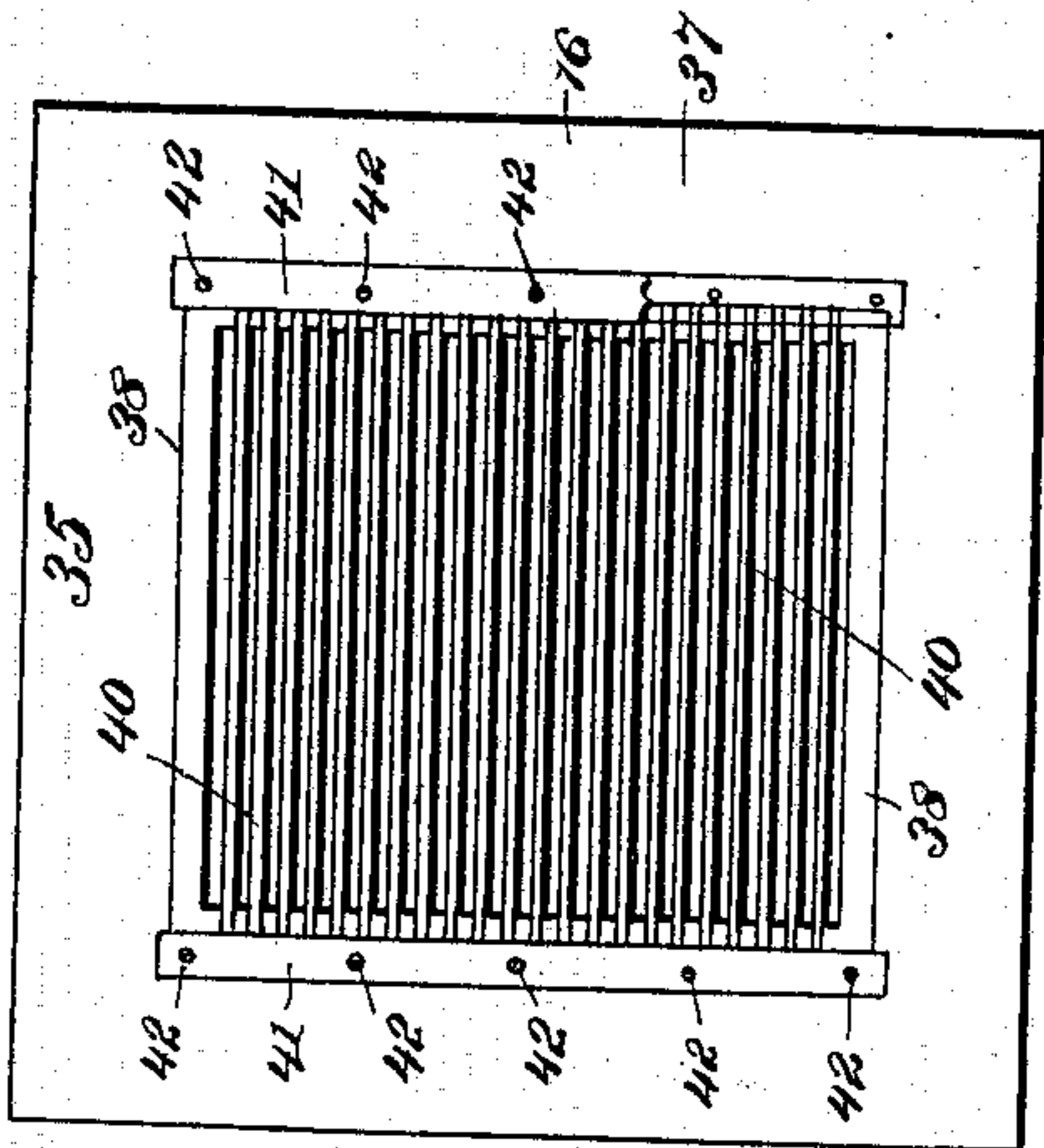
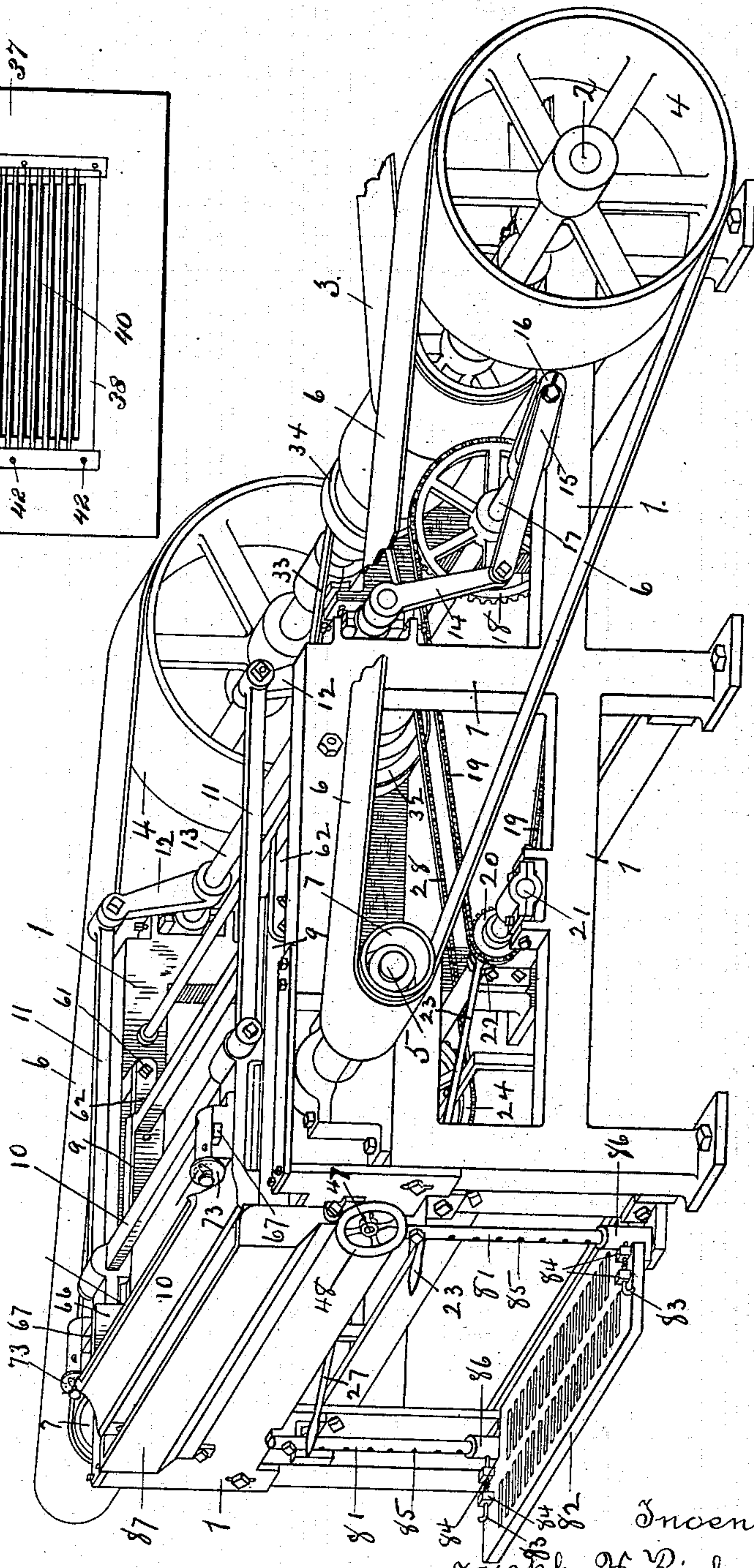


Fig. 15,

Fig. 2



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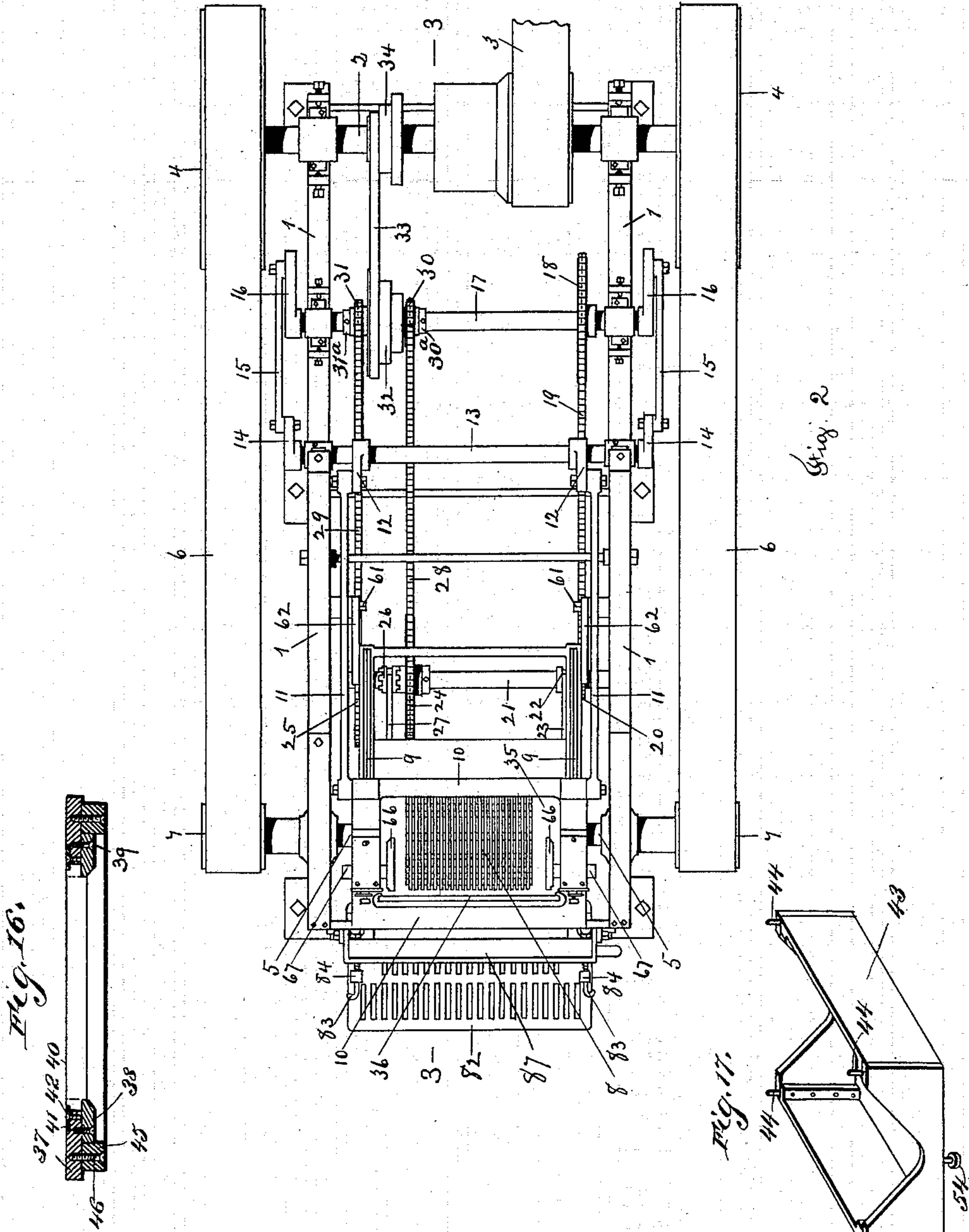
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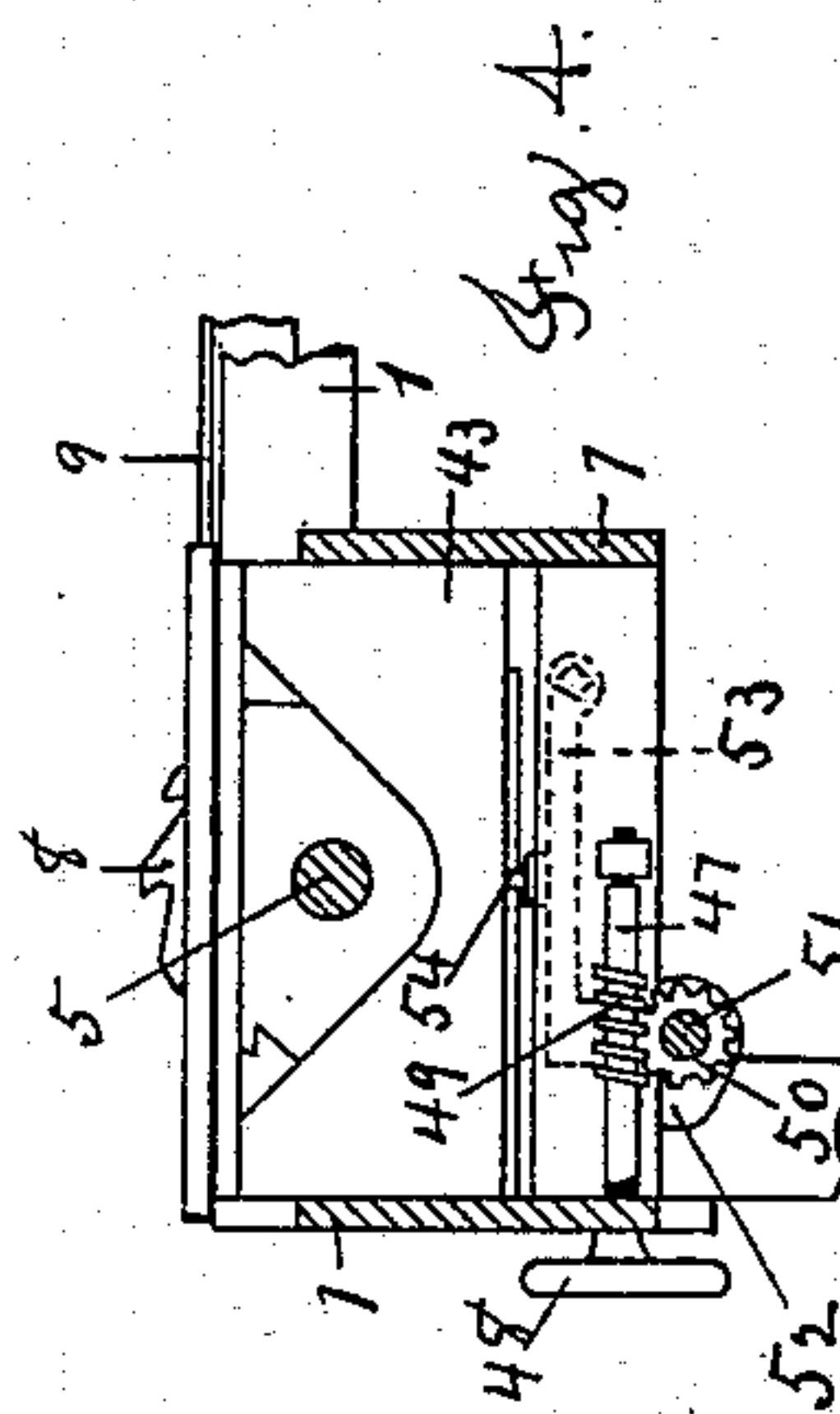
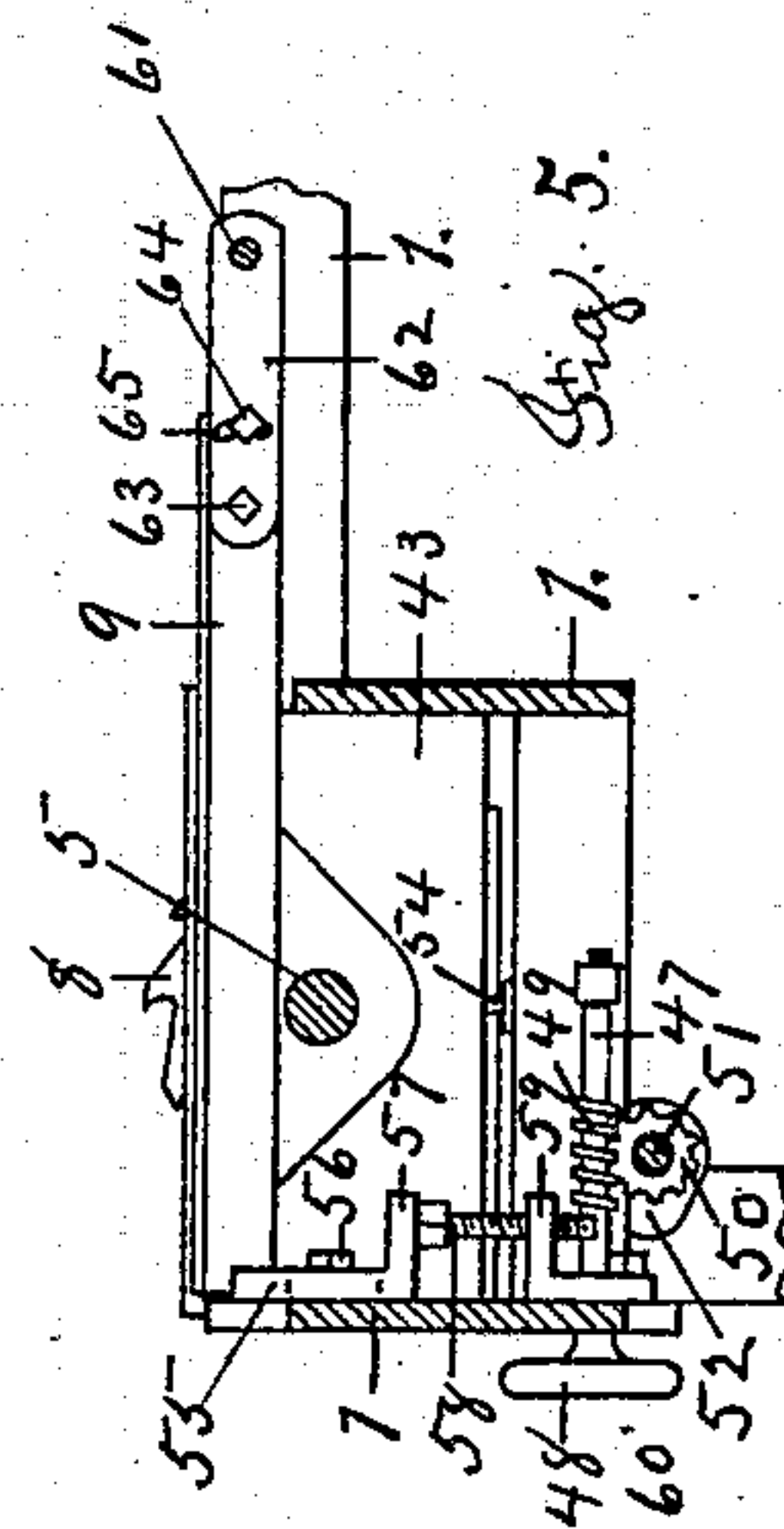
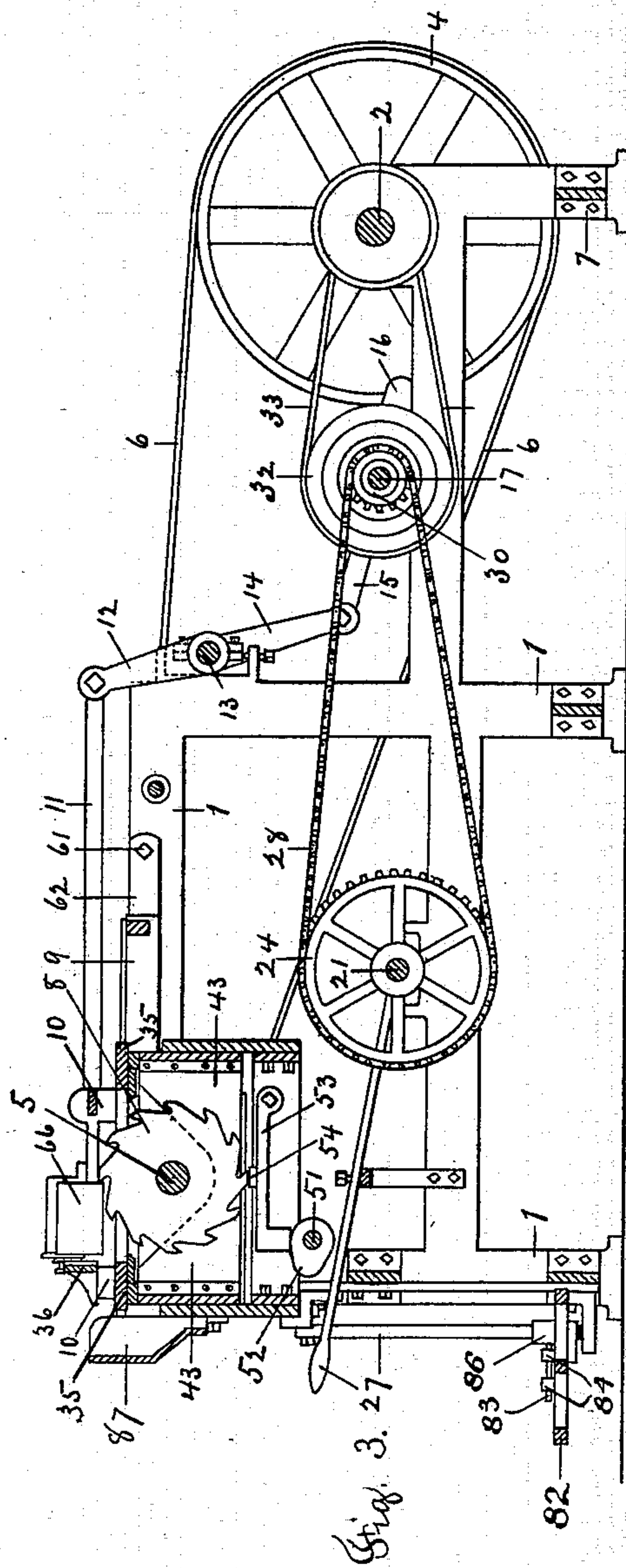
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4 Sheets—Sheet 3.



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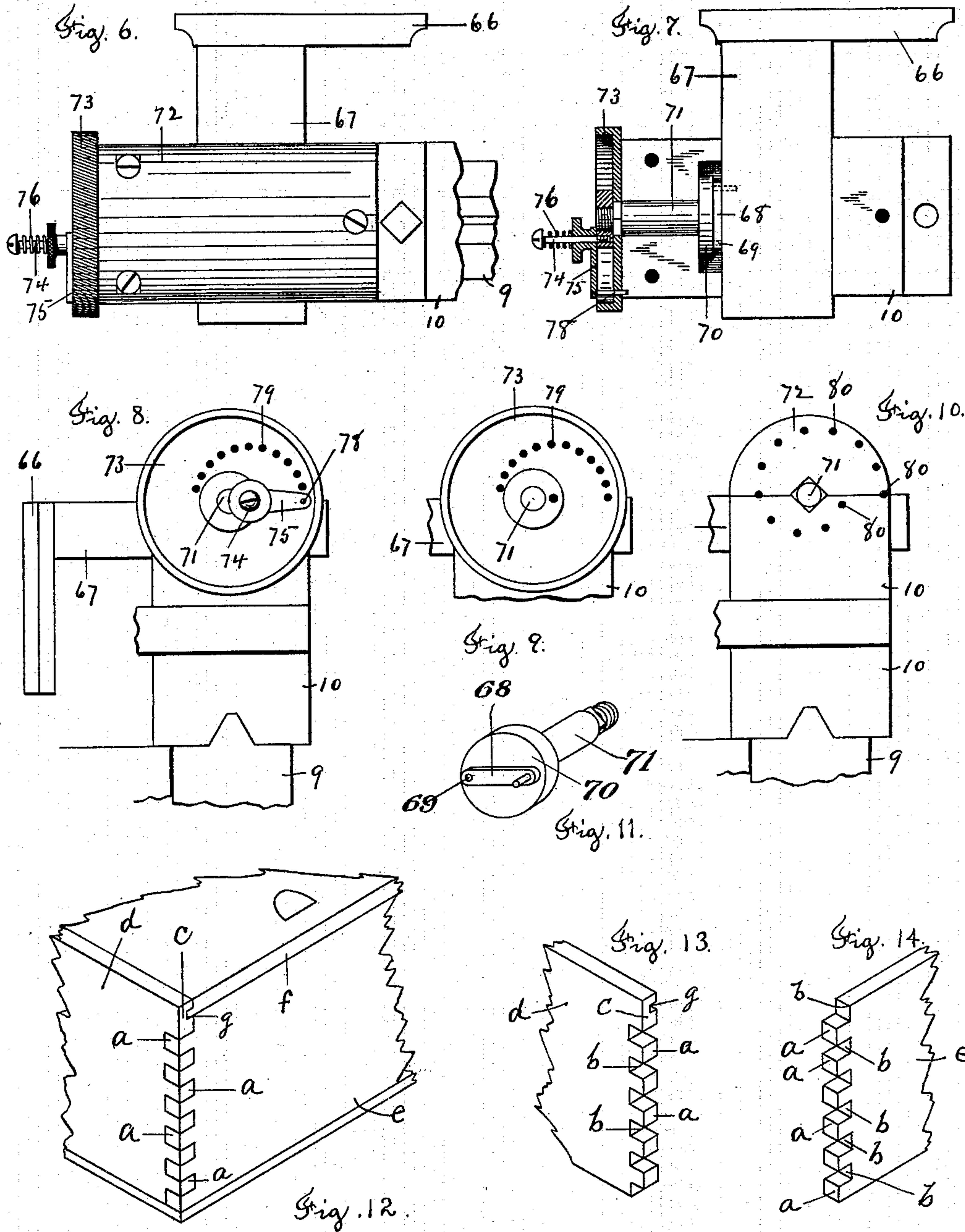
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4 Sheets—Sheet 4.



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# UNITED STATES PATENT OFFICE.

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## CORNER-LOCKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 612,119, dated October 11, 1898.

Application filed June 10, 1895. Serial No. 552,359. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH H. PICKETT, a citizen of the United States, residing at Baldwinville, in the town of Templeton, county of Worcester, and State of Massachusetts, have invented a new and useful Improvement in Corner-Locking Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the same, in which—

Figure 1 represents a perspective view of a corner-locking machine embodying my invention. Fig. 2 is a top view of the same. Fig. 3 is a sectional view on line 3 3, Fig. 2. Fig. 4 represents an end view of the table by which the work is supported and also an end view of the sliding frame upon which the table is mounted, with the mechanism for raising the same, the supporting-framework being shown in sectional view. Fig. 5 represents the same view as shown in Fig. 4, but shows in addition thereto one of the rails of the track upon which the reciprocating carriage moves, together with the device for raising and lowering the same. Fig. 6 represents a top view of one of the side gages, with the connected mechanism for adjusting the same. Fig. 7 represents the same view as shown in Fig. 6 with the cap removed and the hand-wheel shown in central sectional view. Fig. 8 represents an end view of one of the side gages and connected actuating mechanism which is shown in top view in Fig. 6. Fig. 9 is an end view of the hand-wheel with the indicator-arm removed. Fig. 10 is an end view of the framework by which one of the side gages and its mechanism are supported, the view being similar to that shown in Fig. 8, but with the hand-wheel removed. Fig. 11 is a detached view of the crank-shaft by which the side gage is moved. Fig. 12 represents in perspective view a box having its corners locked, illustrating the work performed by the machine. Fig. 13 represents a portion of one of the ends of the box. Fig. 14 represents a portion of one of the sides of the box. Fig. 15 represents a top view of the work-supporting table. Fig. 16 is a sectional view of the work-supporting table on line 16 16, Fig. 15; and Fig. 17 is a perspective view of the rectangular frame

upon which the work-supporting table is mounted.

Similar letters and figures refer to similar parts in the different views.

My invention relates to that class of machinery which is employed in forming a series of teeth upon the edges of the pieces which form the ends and sides of a wooden box and by which they are locked together, as represented in Figs. 12, 13, and 14; and it consists in the construction and arrangement of parts, as hereinafter described, and specifically pointed out in the annexed claims.

Referring to the accompanying drawings, 1 denotes the framework of the machine, and 2 the driving-shaft, receiving its motion from a line-shaft or a counter-shaft through a driving-belt 3. The driving-shaft 2 carries belt-pulleys 4 4, which drive the saw-arbor 5 by means of belts 6 6 and pulleys 7 7. The saws 8 consist of a gang or series of saws carried upon the arbor 5, with the space between adjacent saws equal to the thickness of the teeth *a* of the box end, as represented in Figs. 13 and 14, each of the saws being of equal thickness, with the spaces *b* between the teeth formed on the box end, as shown in Figs. 13 and 14.

The machine is provided with a horizontal track consisting of rails 9 9, upon which the carriage 10 is moved back and forth by means of actuating mechanism consisting of links 11 11, pivoted to the carriage and to the radial arms 12 12, which are carried upon a rocking shaft 13. The shaft 13 is provided with radial arms 14 14, which are connected by links 15 15 with the crank-arms 16 16, carried upon the rotating shaft 17. Attached to the shaft 17 is a sprocket-wheel 18, connected by a chain 19 with a sprocket-wheel 20, running loose upon the shaft 21, but capable of being connected with the shaft 21 by means of a sliding clutch 22, having a spline connection with the shaft 21 and operated by a lever-handle 23 in the usual manner. Turning loosely upon the shaft 21 are the sprocket-wheels 24 and 25, each of which are capable of being connected with the shaft 21 by means of a sliding clutch 26, placed between the sprocket-wheels and having a spline connection



tion with the shaft 21. The clutch 26 is moved to the right or left by means of a lever-handle 27 in order to connect either one of the sprocket-wheels 24 and 25 with the shaft 21. The sprockets 24 and 25 are driven by chain belts 28 and 29 from the sprocket-wheels 30 and 31, which are attached to the hubs of a cone-pulley 32, said cone-pulley 32 and its attached sprocket-wheels 30 and 31 running loosely upon the crank-shaft 17, between collars 30<sup>a</sup> and 31<sup>a</sup>, which are attached to the shaft 17, and being driven by a belt 33 from a cone-pulley 34, attached to the driving-shaft 2. The two sprocket-wheels 30 and 31 are of different sizes, so the sprocket-wheels 24 and 25 are driven at different rates of speed, and consequently the shaft 21 will be driven at different rates of speed, as it is connected with the sprocket 24 or the sprocket 25, thereby causing the reciprocating carriage 10 to move with a slower or faster speed corresponding with the speed of the sprockets 24 and 25. When it is desired to stop the motion of the carriage, the sliding clutch 22 is disengaged from the sprocket-wheel 20. The cone-pulleys 32 and 34 are provided with three steps, each allowing three changes in the speed of the sprocket-wheels 30 and 31, and the clutch 26 allows two changes of speed to be effected instantly by the movement of the lever-handle 27, permitting the carriage 10 to be reciprocated at a speed corresponding with the speed of the attendant to feed the work to the mechanism.

Held within the frame of the machine is a table 35. (Shown detached from the machine and in top and sectional views in Figs. 15 and 16.) The work is supported upon the table 35, with the end upon which the teeth are to be cut resting upon the upper surface of the table, with the rear side of the work resting against the vertical side of a pusher-plate 36, carried by the carriage 10. The table 35 consists of an outer rectangular frame 37 and an inner frame 38, attached to the frame 37 by screws 39. The inner frame 38 is mortised to receive the ends of the bars 40, which are held in place by the thin plates 41, attached to the frame 37 by screws 42.

The bars 40 pass between the saws 8, which project through the spaces between the bars 40 and above the upper surface of the table, a distance equal to the depth of the teeth *a*, so that as the work, with its lower end resting upon the upper surface of the table 10, is pushed across the table by the pusher-plate 36 and carried over the revolving saws 8 each of the saws will cut one of the spaces *b* and form the teeth *a* equal in thickness to the spaces between the saws, the depth of the cut corresponding to the height which the saws project above the upper surface of the table.

The table 35 is supported on a rectangular lifting-frame 43. (Represented in perspective view in Fig. 17.) The lifting-frame 43 is capable of sliding vertically in the framework of the machine, and the table 35, which rests

upon its upper edge, is held in place by dowelpins 44, projecting from the corners of the lifting-frame and entering holes in a rectangular frame 45, which is attached by screws 46 to the under side of the table-frame 37, allowing the table 35 to be removed from the lifting-frame. The vertical adjustment of the lifting-frame 43 and table 35 supported thereon is accomplished by means of a shaft 47, Fig. 4, provided with a hand-wheel 48, by which the shaft is turned, and a worm 49, engaging the worm-gear 50 on a shaft 51, extending across the machine and carrying a pair of cams, one of which is shown at 52, Fig. 3, a similar cam being placed upon the opposite end of the shaft 51, but not shown in the drawings. Levers 53, one of which is shown in Fig. 3, are pivoted at one end to the fixed framework of the machine, with their free ends resting upon the peripheries of the cams 52. Bearing upon the levers 53 are adjusting-screws 54, held in the lower edge of the ends of the lifting-frame 43, so the rotation of the cams 52 will raise the free ends of the levers 53 and raise the lifting-frame 43 and table 35.

The adjusting-screw 54, lever 53, and cam 52, (shown in Fig. 3,) are duplicated at the opposite end of the lifting-frame, but not shown, causing the lifting-frame to be raised simultaneously at each end.

It is desirable to vary the position of the pushing-plate relatively to the surfaces of the table to suit the length of the box end or box side and cause the pushing force to be applied to the work in the proper plane, so the action of the hooked teeth of the saws will hold the work firmly against the angle between the table and the pushing-plate, and this adjustment is secured as follows:

The rails 9 9, which form the track for the reciprocating carriage 10, are provided with means for their vertical adjustment. Those connected with one of the rails are shown in Fig. 5, and those connected with the other rail are a duplicate. The forward end of the rail 9 rests upon a plate 55, held against the rigid frame of the machine by means of a bolt 56, which passes through a slot in the plate 55, so as to allow a sliding motion of the plate 55 on the bolt 56. The lower end of the plate 55 is provided with a flange 57, which rests upon the upper end of an adjusting-screw 58, which is held in the horizontal arm of an angle-plate 59, attached by a bolt 60 to the framework of the machine. By raising the adjusting-screw 58 the plate 55 and the forward end of the rail 9 are raised, the rail turning upon the bolt 61, held in the frame of the machine. Raising the plate 55 imparts an angular movement to the rail 9 upon the bolt 61 as a pivot, and in order to allow the rear end of the rail 9 to be correspondingly raised in order to maintain its upper surface in a horizontal plane the rear end of the rail is pivoted to one end of the link 62 by a bolt 63, and the opposite end of the link is pivoted to the frame by the bolt



61. The rear end of the rail 9 overlaps the end of the link and carries the tightening-bolt 64, which passes through a slot 65 in the link, the slot 65 being curved concentrically with the center of the bolt 63. When the front end of the rail has been raised, the upper surface is leveled by loosening the bolt 64, thereby allowing the rear end of the rail to be correspondingly raised and held in position by tightening the bolt 64.

The work to be cut is placed with its end resting upon the table 35 and with its side against the pushing-plate 36, and its position with reference to the cutting-saws is determined by means of the adjustable gage-plates 66 66, against which the edges of the work are placed as it is pushed across the table 35 and over the revolving saws. The gage-plates 66 are provided on both sides of the machine in order to allow the work to be cut at one end while held against the gage-plate upon one side of the machine and then by turning the work end for end cutting the opposite end by holding it against the gage-plate upon the opposite side of the machine.

The gage-plates 66 and their connected adjusting mechanism are duplicated upon opposite sides of the machine, and therefore a description of that upon one side will suffice for a description of the other. The gage-plate 66 presents a vertical wall to the edge of the work and is provided with a horizontal bar 67, sliding in ways on the carriage 10, and connected by a link 68 with a crank-pin 69, carried in a disk 70, which is attached to a spindle 71, journaled in bearing on the carriage 10, the spindle 71 and horizontal bar 67 being held in position by a cap 72. Attached to the spindle 71 is a hand-wheel 73, by which the spindle is rotated in order to slide the bar 67 and connected gage 66 to the right or left.

A spindle 74 is screwed into the end of the spindle 71 eccentrically to its axis, and an arm 75, capable of sliding longitudinally on the spindle 74, is held against the side of the hand-wheel by means of a spiral spring 76, interposed between the arm 75 and the head 77 of the spindle 74. The free end of the arm 7 carries a locking-pin 78, adapted to pass through one of a series of holes 79 in the hand-wheel and enter one of a series of holes 80, formed in the framework of the carriage, the holes 79 in the hand-wheel being arranged in a circle concentric with the spindle 74, upon which the arm 75 turns, and the holes in the carriage being arranged in a spiral, so that when the locking-pin is inserted in the hole in the hand-wheel farthest from the center of the hand-wheel the hand-wheel can be rotated, so as to bring the locking-pin in alignment with the hole in the carriage farthest from the center of the spindle 71, each of the holes in the hand-wheel being brought over a corresponding hole in the carriage by the rotation of the hand-wheel, allowing the locking-pin 78 to extend through the hand-

wheel into the carriage and lock the hand-wheel and spindle 74, thereby holding the side gage 66 in the desired fixed position. The saws 8 have their teeth hook-shaped or with the front or cutting edge of each tooth cut under, so that as the teeth of the saws engage the work they will draw the work downward upon the surface of the table 35 and also press it rearward against the pushing-plate 36, thereby obviating the necessity of clamping the work upon the carriage as it is moved across the table and against the saws.

At the front of the machine are vertical guide-rods 81 81, attached at their upper and lower ends to the framework of the machine.

Sliding upon the guide-rods 81 is a foot-plate 82, upon which the operator stands, which is adjustably attached to the guide-rods 81 by means of the spring-actuated bolts 83 83, held in the lugs 84 on the foot-plate 82 and entering holes 85 in the guide-rods 81.

The foot-plate 82 is provided with sleeves 86, which inclose and slide upon the rods 81, allowing the foot-plate to be vertically adjusted, so as to bring the operator at the proper height to permit the work to be conveniently fed to the machine. Bolted to the frame of the machine is a guard 87, which prevents the sawdust from being thrown forward against the operator and conducts it downward beneath the saws. In Figs. 13 and 14 I have shown a portion of the piece *d*, forming one of the sides of a wooden box, and a portion of the piece *e*, forming one of the ends of the box, and in Fig. 12 I have shown a perspective view of one corner of the completed box, showing the pieces *d* and *e* united by the interlocking of the teeth *a* and with the cover *f* in position with its edge held in the groove *g*. The first space *b* next the edge is formed at different distances from the edge, that upon the upper edge of the piece *e*, Fig. 14, being formed flush with the edge, while that next the lower edge of the piece *e*, Fig. 14, is removed from the edge the thickness of one of the teeth *a*, and sufficient space is left upon the upper edge of piece *d*, Fig. 13, to receive the groove *g*, and the position of the piece to be cut relatively to the end saw in the gang of saws is determined by varying the position of the side gages 66. The pieces *d* and *e*, as represented in Figs. 13 and 14, are of the proper thickness to have the side and end of the box; but in the operation of the machine I prefer to form the teeth upon the end of a block of the proper length and width for a box end or side, but several times the thickness, and resawing the block after the teeth are cut.

The operation of my improved locking-machine is as follows: The foot-plate 82 is adjusted vertically upon the guide-rods 81, so as to support the operator at the proper elevation to allow the work to be conveniently fed to the machine. The blocks to be cut are then placed in front of the pusher-plate 36,



with its ends resting upon the table 35 and with the right-hand edge of the block against the side gage 36 upon the right-hand side of the machine. The block is placed in this position when the carriage 10 is at the extreme limit of its movement toward the front of the machine, and at its next return movement the block is carried by the pusher-plate 36 across the table 35 and over the revolving saws 8. The block is then lifted by the operator and placed with its opposite end upon the table 35 and against the pusher-plate 36 when at the limit of its forward movement and with the left-hand edge of the block resting against the left-hand gage 66, when the next reciprocating movement of the carriage 10 will again carry the block across the table, forming the teeth in the opposite end of the block, the two side gages 66 having been previously adjusted, so as to cause the first space cut in the block to be formed at the proper distance from the edge of the block. After the block has been moved the second time across the table 35 it is removed and a succeeding block placed in position with its edge against the right-hand side gage 66 and the operation repeated. The carriage 10 is reciprocated by the continuous rotation of the crank-shaft 17, and the insertion and removal of the blocks to be cut are timed to correspond with the reciprocating motion of the carriage, and the movement of the carriage can be varied in speed by the shifting of the belt 33 upon the cone-pulleys 32 and 34 and can also be instantaneously changed by the operator by means of the hand-lever 27 and sliding clutch 26, allowing the operator to connect the shaft 21 with either of the sprocket-wheels 24 or 25, running at different rates of speed. The speed at which the carriage can be reciprocated will be determined by the skill and agility of the operator and also by the size of the blocks to be cut and the character of the material; but the adjustment of speed provided in the machine permits the carriage 10 to be reciprocated at the highest rate of speed at which the operator is capable of properly feeding the work.

It has been customary heretofore in machines of this class to provide means for clamping the work down as it passed over the cutting-saws; but such clamping mechanism has been rendered unnecessary in my machine by placing the work in the angle formed by the horizontal table 35 and the vertical plane of the pusher-plate 36 and by forming the teeth of the saws hook-shaped, as described, and revolving the saws toward the pusher-plate, so the pull of the teeth upon the work will be forward toward the pusher-plate and downward toward the table.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a corner-locking machine the combination with a gang of cutting-saws, a horizontal table, a lifting-frame capable of sliding

vertically in the framework of the machine and supporting said table, levers pivoted at one end and bearing midway their length against said lifting-frame and at opposite ends thereof, cams acting against the free ends of said levers to raise said lifting-frame, and means for actuating said cams. 70

2. In a corner-locking machine, the combination with a gang of cutting-saws, of a work-supporting table, a lifting-frame supporting said table, levers pivoted at one end and having said lifting-frame supported midway their length, cams supporting the free ends of said levers, a shaft carrying said cams and having a worm-gear and a shaft provided with a worm engaging said worm-gear and having a hand-wheel, substantially as described. 75 80

3. In a corner-locking machine, the combination with a gang of cutting-saws, of a table upon which the work is supported, means for vertically adjusting said table with reference to said saws, a reciprocating carriage, a pushing-plate held by said carriage, horizontal rails forming a track for said carriage, and means for vertically adjusting said rails independently of said table, whereby the relative position of the pushing-plate to said table is determined, substantially as described. 85 90

4. In a corner-locking machine, the combination with a gang of cutting-saws, of a reciprocating carriage, a pushing-plate held by said carriage, rails 9, 9, forming a track for said carriage, plates attached to the framework and supporting one end of said rails, an adjusting-screw by which said plate is raised, for the purpose of raising said rails, substantially as described. 95 100

5. In a corner-locking machine, the combination with a gang of saws, of a reciprocating carriage, a pushing-plate held by said carriage, rails 9, 9, links 62 pivoted at one end to the frame of the machine and having their opposite ends adjustably attached to one end of said rails, and means for raising the opposite ends of said rails, substantially as described. 105 110

6. In a corner-locking machine, the combination with a reciprocating carriage, of a shaft 17, means for operatively connecting said shaft 17 with said carriage, shaft 21 operatively connected with said shaft 17, sprocket-wheels running loosely on said shaft 21, clutching mechanism by which either of said sprockets are operatively connected with said shaft 21, sprocket-wheels 30 and 31, carried upon the hubs of an intervening cone-pulley 32, loosely mounted on the shaft 17, cone-pulley 32, a driving-shaft, a cone-pulley 34 carried by said driving-shaft and having a belt connection with said cone-pulley 32, whereby the speed of said carriage is changed, substantially as described. 115 120 125

7. In a corner-locking machine, the combination with a gang of cutting-saws and a reciprocating carriage carrying a push-plate, of an adjustable gage-plate 66, having a bar 130



67 sliding in ways in said carriage, a rotating spindle 71 operatively connected with said bars 67 to move said gage-plate, a hand-wheel carried by said spindle and means for locking  
5 said spindle against rotation, and holding said gage-plate in its desired position, substantially as described.

8. In a corner-locking machine, the combination with a gang of cutting-saws and a reciprocating carriage carrying a push-plate,  
10 of an adjustable gage-plate 66 having a bar 67 sliding in ways in said carriage, a spindle 71 operatively connected with said bar to move said gage-plate, a hand-wheel 73, carried on  
15 said spindle, a spindle 74 held in the end of the spindle 71 and eccentrically thereto, an arm 75 capable of turning on said spindle 74, a locking-pin 78, held by the free end of said arm said hand-wheel 73 having a series of  
20 holes 79, arranged concentrically to said spindle 74 to receive said locking-pin 78 and said carriage having a series of holes 80 concentric with said spindle 71, to receive said locking-

pin 78, and hold said hand-wheel 73 from rotation, substantially as described. 25

9. In a corner-locking machine, the combination with a reciprocating carriage carrying a push-plate having a series of holes 80, of a gage-plate 66 having a bar 67 sliding in ways  
30 in said carriage, a spindle 74 operatively connected with said bar, a hand-wheel 73 carried on said spindle and provided with a series of holes 79, a spindle 74 held in the end of said spindle 71 and concentrically thereto, an arm  
35 75 capable of sliding and turning on said spindle 74, a locking-pin 78 held in the free end of said arm and a spring 76 held on said spindle 74, and acting against said arm to hold said locking-pin in one of the holes in said hand-wheel, substantially as described.

Dated this 6th day of June, 1895.

JOSEPH H. PICKETT.

Witnesses:

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