

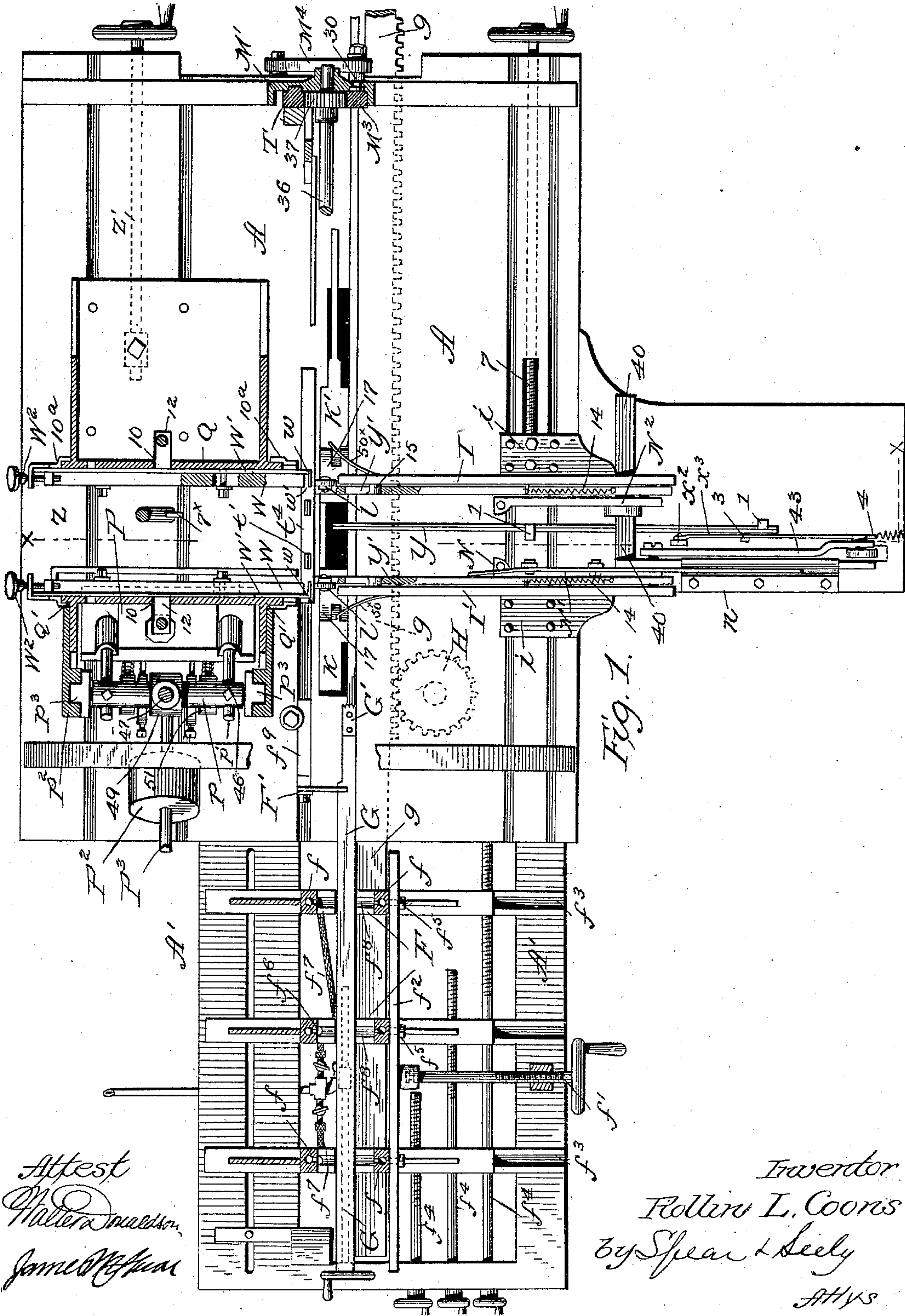
(No Model.)

7 Sheets—Sheet 1.

R. L. COONS.
BOX MAKING MACHINE.

No. 474,545.

Patented May 10, 1892.



Attest
Walter D. Mason
James H. Mason

Inventor
Rollin L. Coons
by Spear & Seely
Attys

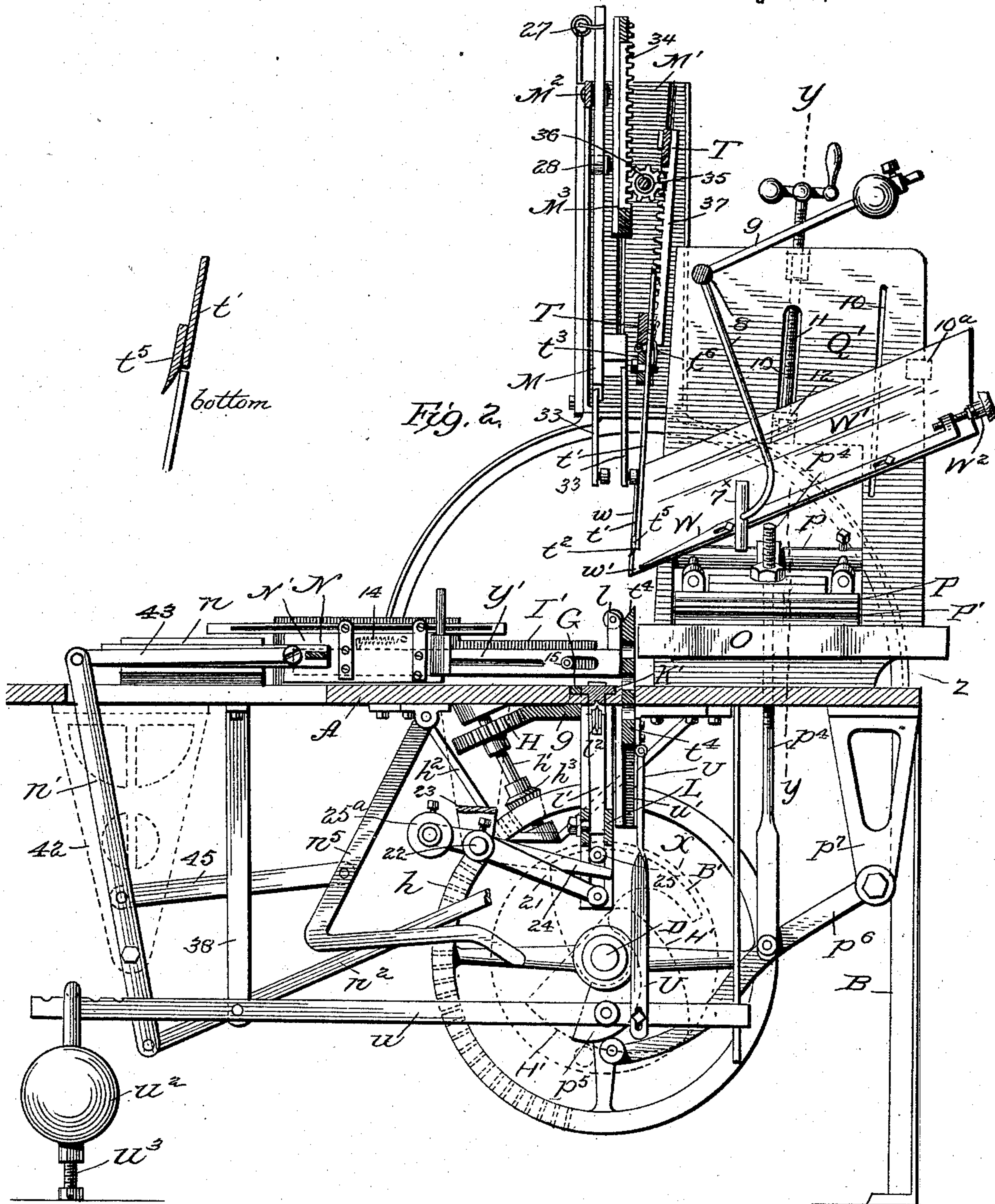
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7 Sheets—Sheet 2.

R. L. COONS.
BOX MAKING MACHINE.

No. 474,545.

Patented May 10, 1892.



Attest
James M. [Signature]
James M. [Signature]

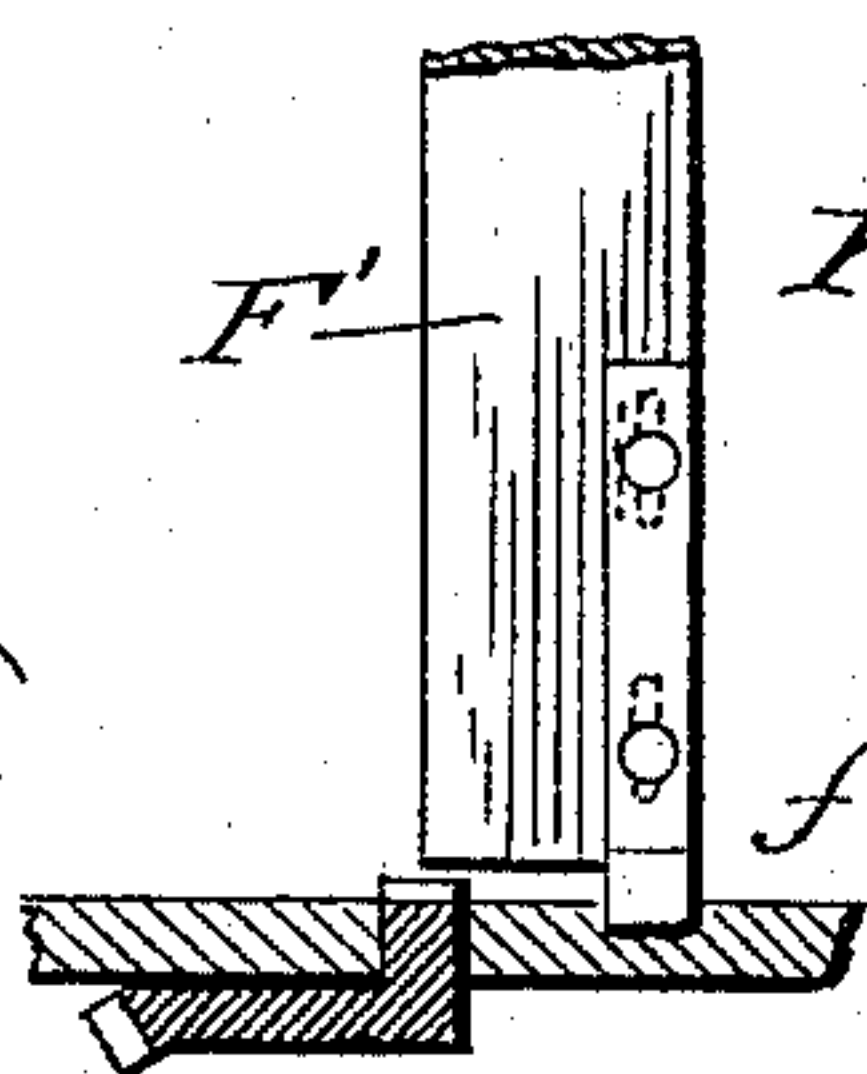


Fig. 2a

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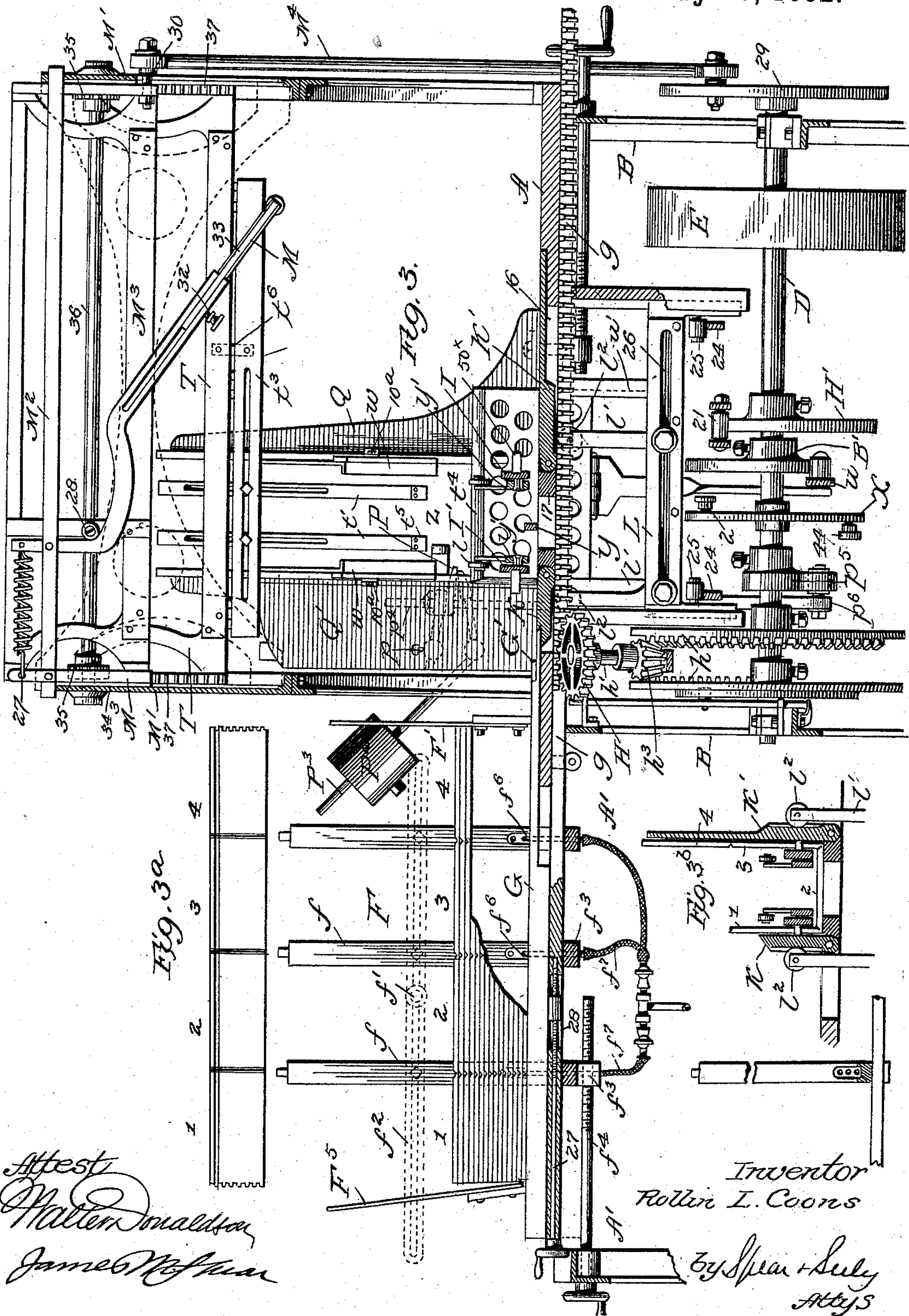
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R. L. COONS.
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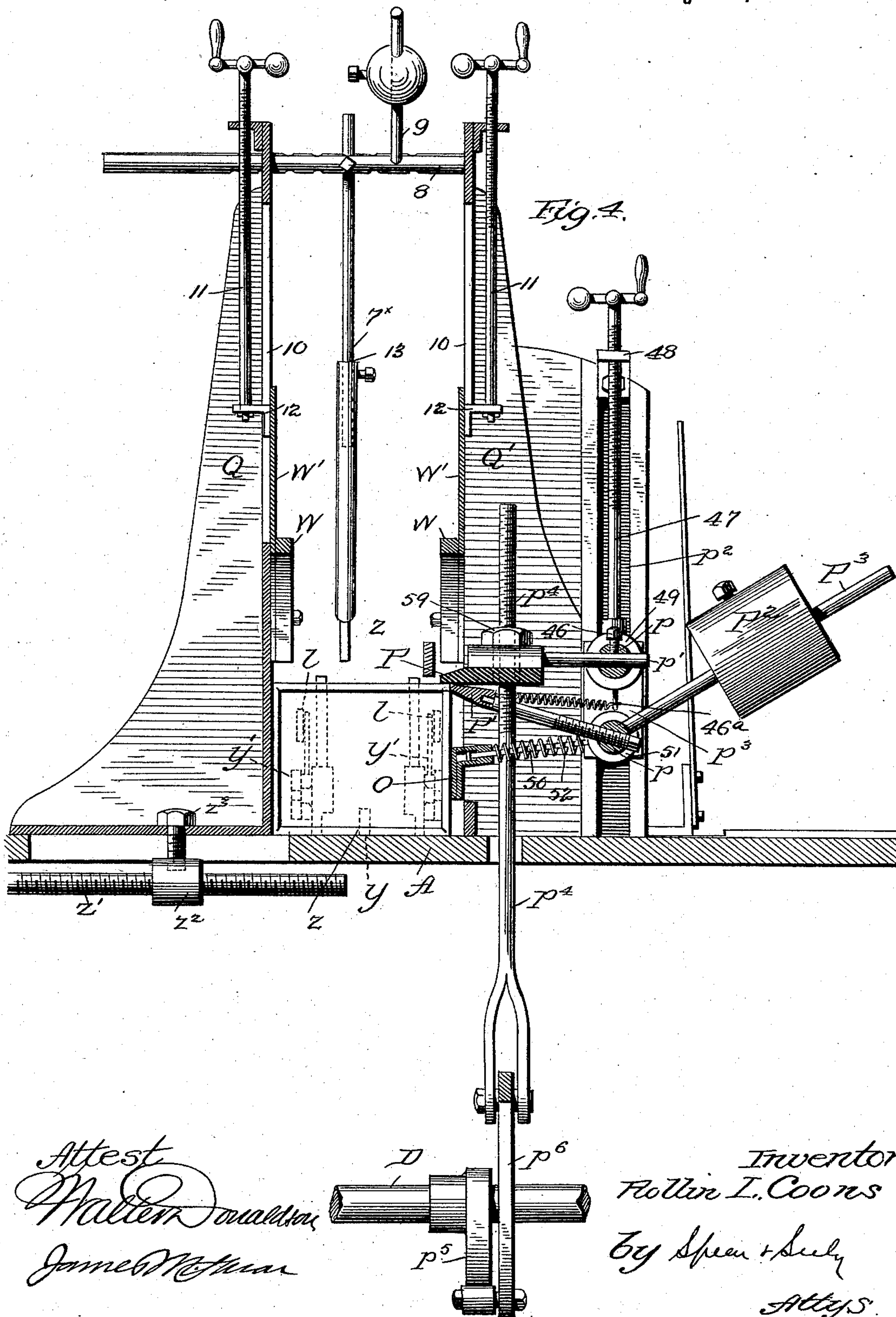
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7 Sheets—Sheet 4.

R. L. COONS.
BOX MAKING MACHINE.

No. 474,545.

Patented May 10, 1892.



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

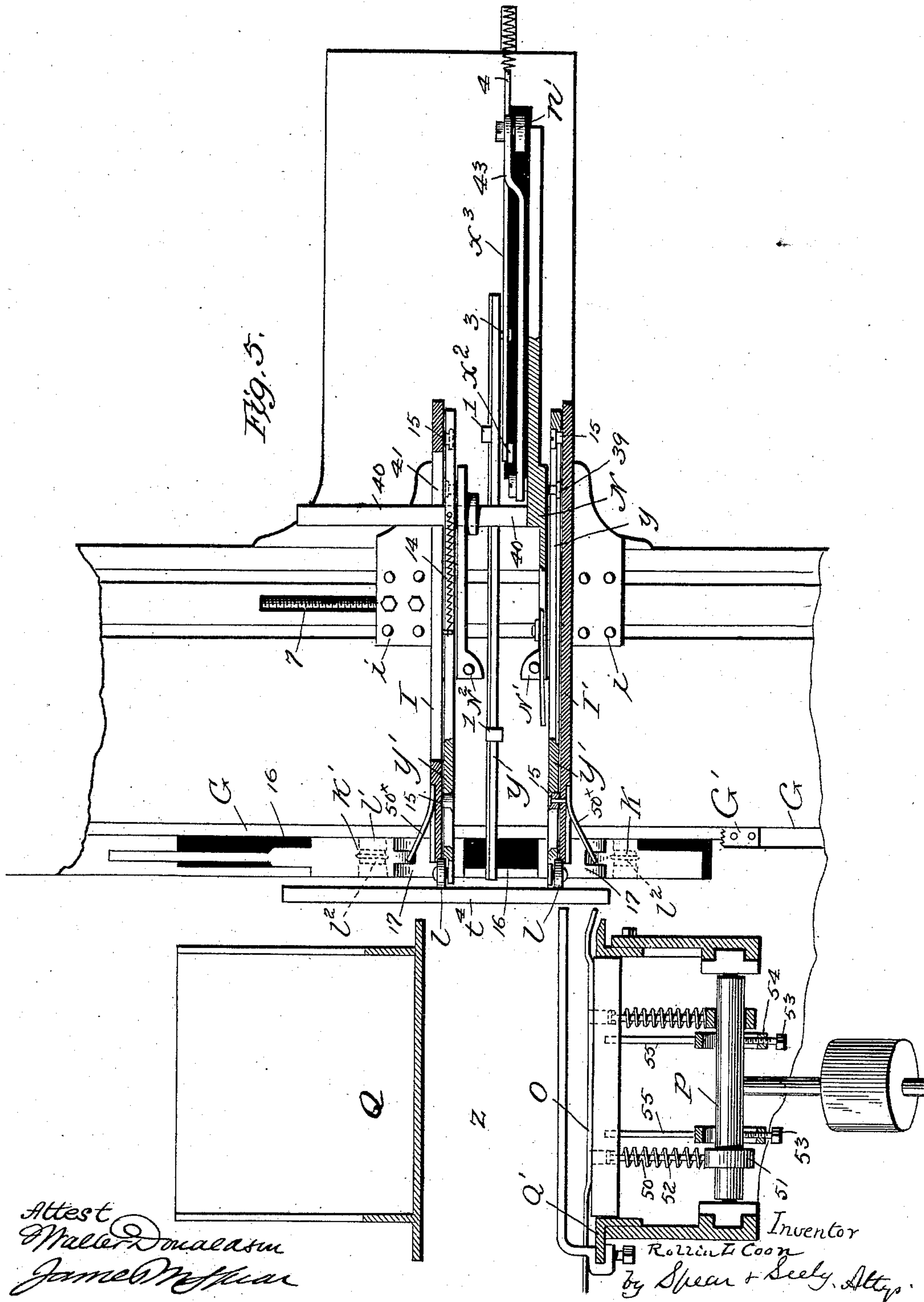
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7 Sheets—Sheet 5.

R. L. COONS.
BOX MAKING MACHINE.

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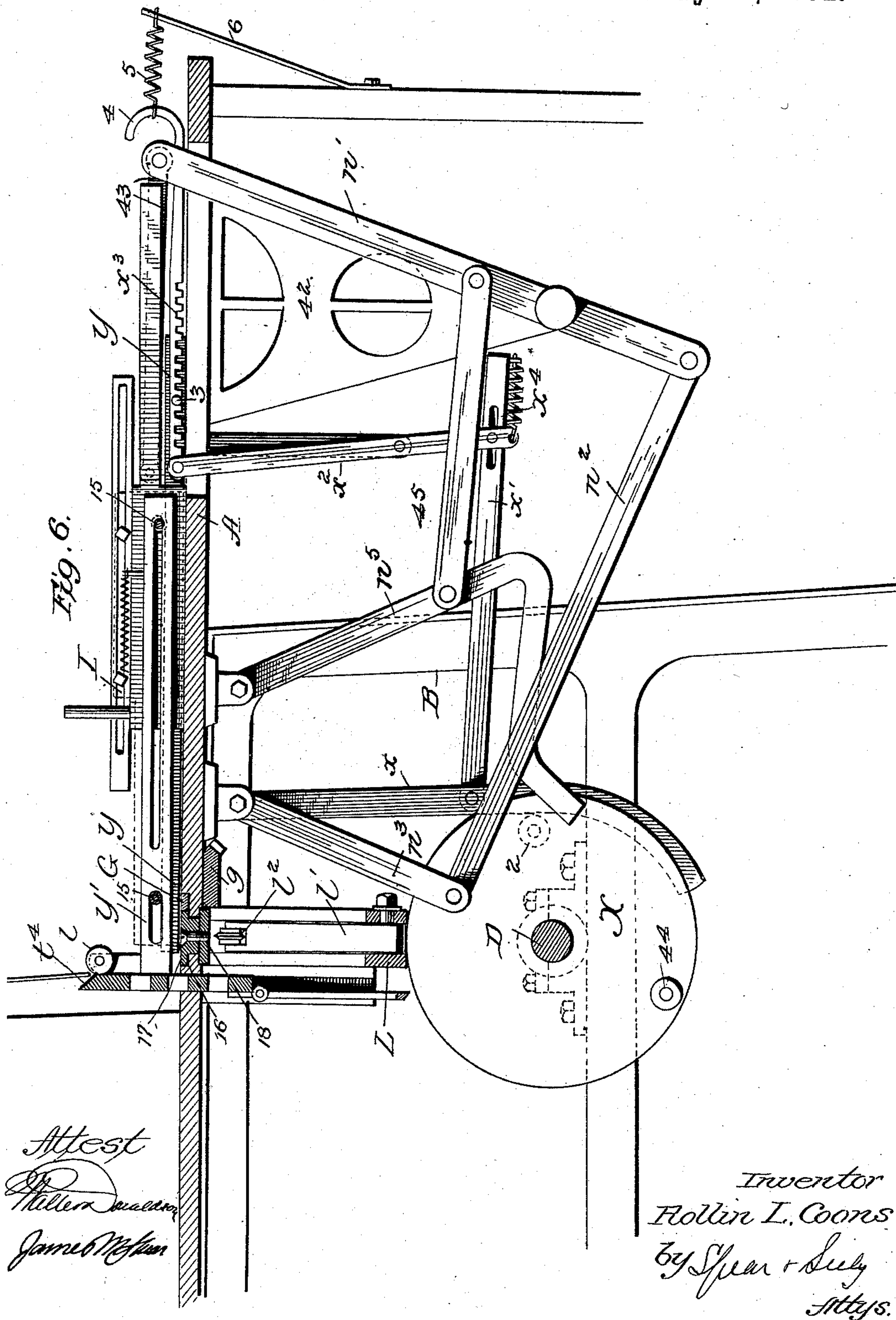
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7 Sheets—Sheet 6.

R. L. COONS.
BOX MAKING MACHINE.

No. 474,545.

Patented May 10, 1892.



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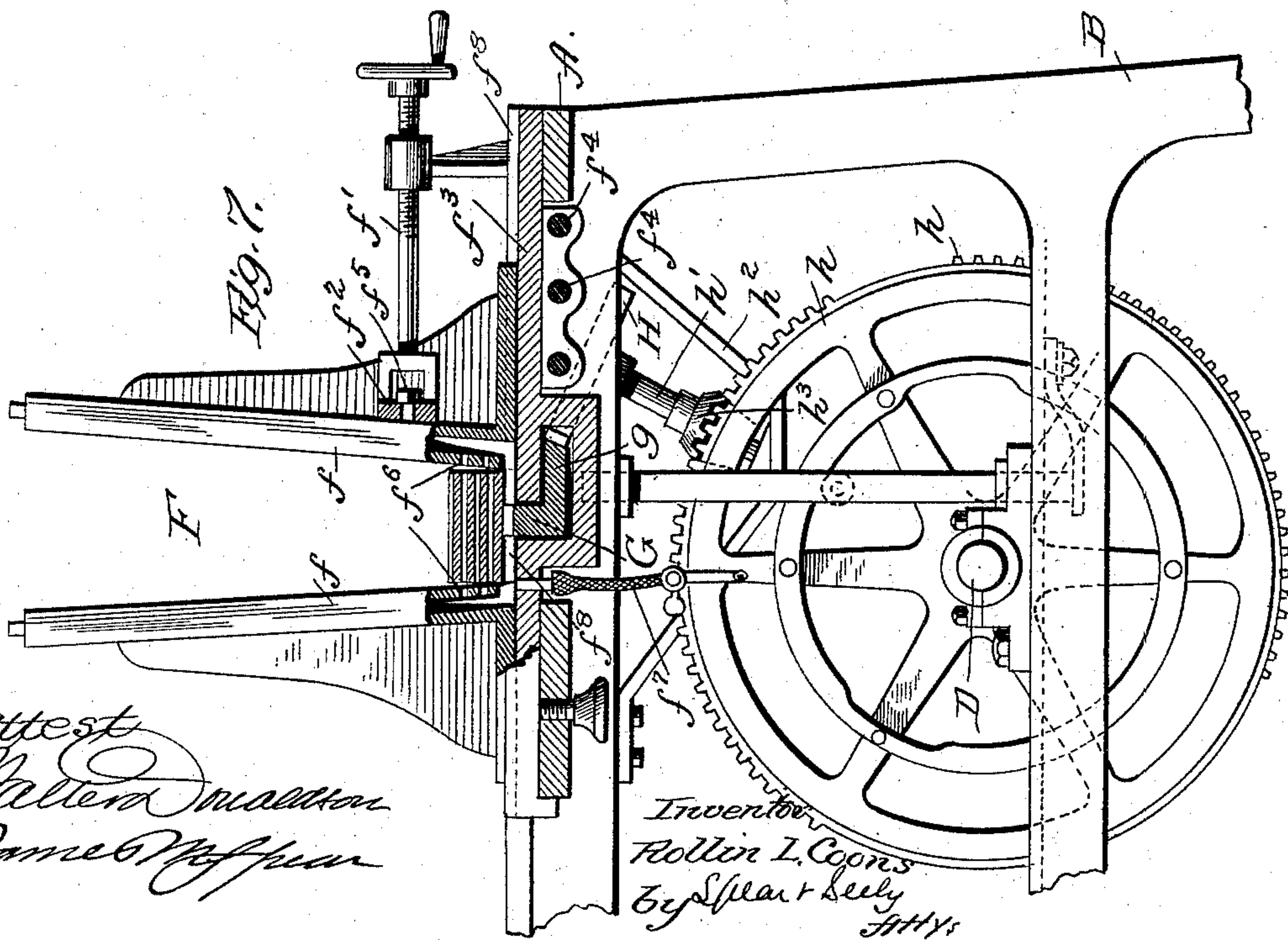
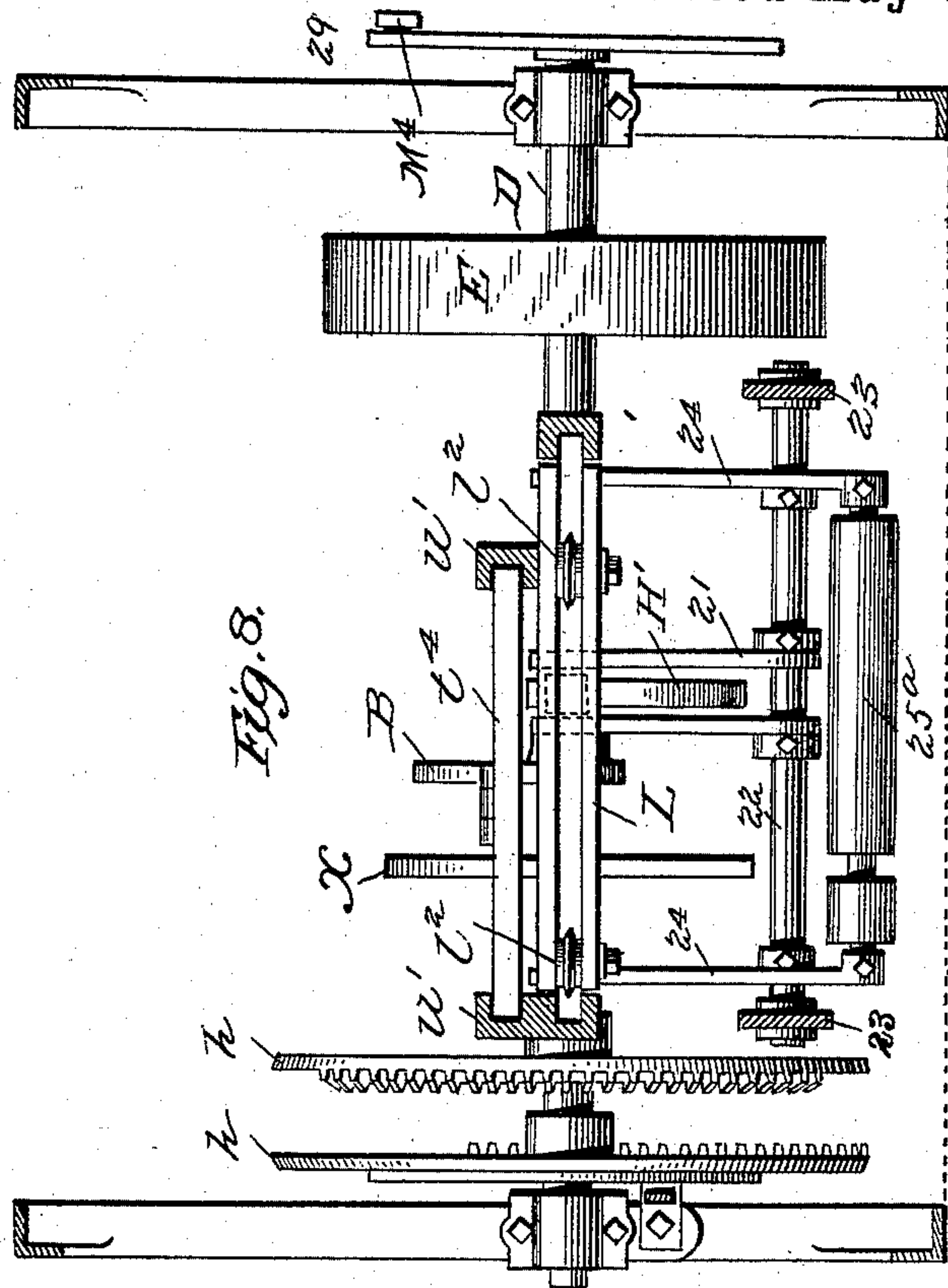
(No Model.)

7 Sheets—Sheet 7.

R. L. COONS.
BOX MAKING MACHINE.

No. 474,545.

Patented May 10, 1892.



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UNITED STATES PATENT OFFICE.

ROLLIN L. COONS, OF HONESDALE, PENNSYLVANIA.

BOX-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 474,545, dated May 10, 1892.

Application filed January 22, 1891. Serial No. 378,737. (No model.)

To all whom it may concern:

Be it known that I, ROLLIN L. COONS, a citizen of the United States of America, residing at Honesdale, in the county of Wayne and State of Pennsylvania, have invented certain new and useful Improvements in Box-Making Machines, of which the following is a specification.

My invention relates to machinery for making wooden boxes, such as cigar-boxes, honey-boxes, and, in fact, any kind of rectangular boxes, no matter for what purpose used. The boxes produced from my machinery are formed from a single piece or strip of wood grooved continuously near one edge and folded around a separate bottom piece, which fits in the groove, the free ends of the strip being then secured together, forming a finished box. For honey-boxes, which are simply bottomless frames, the strips are simply folded and the free ends secured together. The strips from which the box-frames are formed are prepared previous to being placed in the machine by being scored transversely at proper intervals by a suitable saw or cutter, and are then fed in quantities to the machine, which then proceeds automatically to select a strip, to fold it around the bottom piece, to secure the free ends, and to discharge the finished box, a complete box being made at each revolution of the driving-shaft.

It is the object of my invention to render the machine capable of making boxes of various sizes and from strips of various thicknesses by making the operating parts adjustable.

It is a further object of my invention to subject the strips to the action of steam just previous to their being folded, so that they will fold easily and without breaking.

In the accompanying drawings, Figure 1 is a plan view of the machine with the upper cross-heads omitted and parts in section. Fig. 2 is a vertical section on line $x x$ of Fig. 1. Fig. 2^a is a detail of the head of the strip-holder. Fig. 3 is a front view with parts in section. Fig. 3^a is a plan view of a strip to be folded. Fig. 3^b is a detail view of the folding-wings. Fig. 4 is an enlarged section on line $y y$ of Fig. 2, looking from the rear of the machine. Fig. 5 is an enlarged plan view of the presser-arms for the strip and bottom,

the discharge-arms, and the presser-box, with parts in section. Fig. 6 is an enlarged view of the presser-arms, the discharge-arms, and the operating mechanism therefor. Fig. 7 is an end elevation of the strip-holder, the feed-slide, and operating mechanism therefor, with parts in section. Fig. 8 is a plan view of the parts beneath the table.

In the drawings, A is the bed of the machine, B the legs, and D the driving-shaft, having the pulley E secured thereto. The table has an extension A', and on this is located the strip-holder F, of sufficient depth to contain twenty or thirty strips of one-fourth inch thickness. The holder is composed of posts $f f$, arranged in pairs upon grooved cross-bars f^3 , those of each pair diverging upwardly from each other to facilitate placing the strips between and being adjustable toward and from each other by the screw-rod f' , connected to a slotted bar f^2 , which is secured to the front posts, so that when the screw is turned by the hand-wheel the front posts will be adjusted altogether, moving for the purpose in the grooves of the cross-bars. The strips are placed in a pile within the holder, having been previously scored transversely at proper intervals, so that they may be folded into rectangular form, the grooves being V shape to make a neat corner when folded and the ends having interlocking dovetails or tongues and grooves. If the bottom is to be placed in the strip to make a complete box, then the strip is grooved longitudinally near one edge; but if the strip is to be formed into a simple rectangular frame then this groove is omitted.

In Fig. 3 it will be seen that the strips are scored transversely at three places, and the posts of the holder are adjusted opposite these scores, each pair being independently adjustable by a screw-rod f^4 , engaging with the cross-bar f^3 , there being a separate screw-rod and cross-bar for each pair of posts. By this the parts can be adjusted to the scores in different lengths of strips, and in order to permit this adjustment, as also the widening of the holder by the screw f' , before described, the bar f^2 is slotted to receive the bolts f^5 . Each post is hollow and has ports f^6 opposite the scores, and a flexible connection f^7 from a steam-supply leads to each pair of posts, so

that the strips will be thoroughly steamed at the scores when they reach the bottom of the pile, the steam passing through the scores and beneath the lower strip through the grooves f^8 of the cross-bars, in which the bases of the posts slide. This enables the strips to fold easily and prevents breaking. It will be seen that the steam-conduits are thus adjustable, and I do not wish to confine myself to the precise form, the adjustability being the important feature.

The front or head of the holder is formed by a plate F' , carried by a bracket f^9 , adjustable in the table A and to suit different lengths of strips, and also adjustable vertically for different thicknesses. The plate is adjusted so that its lower edge is slightly above the table to permit the passage of one strip at a time beneath. At the other end of the holder there is a similar head F^5 to guide and confine the strips. The feed-slide G extends centrally through the lower part of the holder and the pile of strips rests thereon. It has a shoulder G' , Figs. 1 and 3, which when moved to the extreme left permits the lower strip to fall into position to be fed to the right beneath the head F' into position to be folded, the shoulder engaging with the end of the strip when it moves to the right. The feed-slide has an extension g beneath the table, which has rack-teeth, into which mesh the gear-wheel H on the shaft h' , supported in a bracket h^2 beneath the table. The shaft has a beveled pinion h^3 , into which mesh alternately the segmental gears h on the main shaft and on each side of the pinion, so that a reciprocatory movement is imparted to the feed-slide, the shaft h' and wheel H being turned first one way by one gear h and then the other way by the second gear. These gears are adjustable on the shaft, so that the interval between the end of one movement and the beginning of the other may be varied to suit different conditions in the work, so that a longer or shorter pause may be obtained at the left-hand limit of the feed-slide's stroke to regulate the steaming to the thickness of the strips. The feed-slide is adjustable on the rack-bar g by means of the screw-rod 27, the bar being slotted at 28, Fig. 3. In this way the shoulder may be regulated as to its position in relation to different lengths of strips. The feed-slide pushes the strip to the former, consisting of two plates I I', arranged on edge supported on the table by their base-plates i . The inner ends of these former plates are elevated above the table to permit the strips to pass beneath and the stroke of the slide G insures the correct placing of the strip, so that the scores thereof will be in proper relation to the plates I I' for folding. A guide-plate t^4 moves vertically through the table, and this gages the lateral position of the strip, the edge of which bears thereagainst, being forced and held in position by the yielding presser-rod Y, Figs. 1, 5, and 6. This rod reciprocates longitudinally

and strikes against the edge of the strip, so as to force the same firmly against the guide t^4 , in which position it holds the strip while the bottom is being placed and the strip folded. It is held to the table and guided by clips 1 and is operated from a wheel X on the main shaft, which carries a presser-roller 2. A lever x , pivoted beneath the table, is struck by this roller, and through the bar x' , lever x^2 , and adjustable notched pitman x^3 moves the presser-rod. The notched pitman engages a pin 3 on the presser-rod, and by lifting the hooked end 4 any notch may be engaged, and thus the stroke of the presser-rod is regulated approximately to the width of the strip, while any excess is neutralized by the slot-and-spring connection x^4 between the bar x' and the lever x^2 , the spring yielding after the rod contacts with the strip, thus avoiding jamming and injuring the same. The presser-rod is held normally back by a spring 5, connected thereto and to a standard 6. The former I I' is adjustable for various sizes of boxes by a screw-rod 7, engaging with a projection from the base of the plate i . As before stated, the strips may be folded to make open frames or may be combined with bottoms, and in the latter case the bottoms are placed in position in the longitudinal grooves of the strip immediately after the strip is positioned in front of the guide-plate t^4 and pressed by the rod Y. The bottoms are held by inclined ways W, carried by plates W' , which are supported by standards Q Q' on the table in rear of the guide t^4 . The strips are set on edge upon the ways W and incline backward slightly. The forward bottom bears against the stop-flanges w of the plates W' and is held in this position by the pressure from the bottoms in rear of it and from the feed-arm 7^x , which depends from a shaft 8, journaled in the standards Q Q', and has an arm 9, provided with an adjustable weight. The ways W do not extend all the way forward to the flanges w , but leave an opening w' , Fig. 2, for the downward passage of the bottom to engage the strip. All of these parts are adjustable for different sizes of boxes. The ways W are slotted and held to the plates W' by screws and are adjustable to increase or diminish the size of the opening w' for different thicknesses of material by the screws W^2 , carried by the plates W' . These plates are guided in inclined slots 10 in the standards Q Q', and are adjusted vertically by screw-rods 11, engaging brackets 12 of the plates which project through the slots 10. Clips 10^a on the plates W' embrace the edges of the standards, serving to hold and guide the plates. The feed-arm is also adjustable, as shown in Fig. 4 at 13. The forward bottom is forced down into the groove of the strip by vertically-reciprocating arms $t' t'$, having shoulders t^2 at their lower ends which engage the upper edge of the bottoms. The arms are slotted and are adjustably supported by a slotted plate t^3 , which is hinged to a cross-

head T, operating vertically, as hereinafter described. A spring-plate t^6 holds the plate t^3 in normal position, so that the shoulders t^2 will strike the upper edge of the bottom as said arms move down. When this occurs, the forward bottom of the series is forced down through the opening w' in an inclined position. Its lower edge strikes the upper beveled edge of the guide t^4 , by which it is directed forward, and it is forced down between the front face of the guide and the rear ends of the presser-bars Y' , which have friction-rollers l and are under tension of springs 14, connected to the plates of the former and to the presser-bars. These bars slide within the former and are held to the former-plates $I I'$ by headed screws and rollers 15, projecting into slots in the presser-bars. By the aid of the guide t^4 and the spring presser-bars Y' bottoms are accurately directed to the grooves in the strips. The fingers t^5 on the feed-arms t' overlap the upper edge of the bottom and hold it firmly. The strips and the feed-arms t' incline backwardly, and thus space is left for the operation of the folding-arm M, hereinafter described, and in order to allow the bottom to assume a vertical position as it presses down between the spring presser-bars Y' and the guide the arms t' are carried by the hinged plate t^3 , which is under tension of the spring t^6 , and the arms thus swing forward as the bottom is forced to its place. The spring t^6 is riveted to the plate t^3 and the cross-head T, and consists of a flat strip. The bottom having been properly seated, the strip is folded about it by the wings K K' and the folding-arm M. The wings lie in a slot 16, flush with the table, and are pivoted to blocks 17. One of these blocks is adjustable in the slot, being clamped in any position by the screws and plates 18, Fig. 6. The wings are grooved on their under sides and are operated to fold by a cross-head L, which has standards $l' l''$, carrying rollers $l^2 l^3$, which bear upon the grooved under side of the wings and elevate them as the cross-head rises, the wing K folding the first section 1 of the strip, Fig. 3, and the wing K' raising the sections 3 4, it being longer for this purpose, it being understood that the bottom is seated in the section 2. This action folds the strip up against the former $I I'$. Three sides of the box have thus been formed, and the fourth is formed by the arm M, folding down the last section 4 to engage the upper edge of the first section.

The cross-head L is raised by a cam H' on the shaft, which tilts an arm 21 on a rock-shaft 22, journaled in hangers 23 beneath the table. This rock-shaft has arms 24, which engage rollers 25 on the cross-head, so that the cross-head is raised when the cam lifts the arm 21. A weight 25^a tends to counterbalance the cross-head. The standards $l' l''$ are adjustable in the slot 26 of the cross-head and are changed to suit the adjustment of the wings.

The folding-arm M is pivoted to the cross-brace M^2 , extending between the vertical

standards M' on the table. It is held in normal position off to one side of the former $I I'$, Fig. 3, by a spring 27, and is forced down to fold over the fourth section by a roller 28, carried by a cross-head M^3 , moving vertically in the standards M' , which have ways or grooves to receive the projections on the cross-head. The cross-head is moved by a pitman M^4 , connected thereto by a pin 30, extending through a slot in the standard. The pitman is connected to a face-wheel 29 on the main shaft. When the cross-head moves down, the roller bears on the curved part of the folding-arm and swings it downward over the former, folding the last section of the strip over so that the notched edge thereof will interlock with the upturned edge of the first section, which has been folded by the wing K. The bottom is now seated in the groove of each section which is folded about it, and the box is ready to be tightened by pressure upon the interlocking ends and then discharged, as will be hereinafter described. The wings when raised strike spring 50^x , Fig. 5, which serve to throw the wings back when the cross-head falls.

The folding-arm is adjustable as to length, as at 32, and comprises two extensions 33, which have rollers at their ends. The extensions are sufficiently far apart to pass on each side of the reduced portion of the wing K' in folding over the last section. The cross-head M^3 is provided with rack-bars 34, which mesh with pinions 35 on a shaft 36, extending between the standards M' . These pinions also mesh with racks 37 on the cross-head T, before mentioned, and thus give motion to said cross-head to operate the bottom-feeding arms t' up and down. The cross-heads move in opposite directions, so that the bottom is fed by the downward movement of the cross-head T, while the other cross-head is moving up and retracting the folding-arm M, and vice versa. When the folding-arm is swung down, the feed-arms t' are retracted. Springs 50^x press the wings back into normal position. These springs are of light material and their force is not sufficient to affect the folded condition of the box in any way; but after the folded box is pushed to the rear the springs then act upon the wings to tilt them slightly, when they will fall by their own weight. The strip having been folded about the bottom, as thus far described, the next action is to move the box to the rear, into what is called the "presser-box," which comprises the two standards Q Q' and presser mechanism. In order to allow this, the guide-plate t^4 is moved below the surface of the table, so as to offer no obstruction to the passage of the box to the rear. This is done by a cam B' on the main shaft, which strikes a lever u , pivoted to a hanger 38 beneath the table. The lever is connected to the guide by a rod U, which is hinged to the guide. Suitable ways u' are secured to the table for the guide to move in. The guide is elevated after the cam leaves the roller by a weight u^2 on the end of the lever,

and this has an adjustable stop-screw u^3 , by which the height of the guide above the table may be regulated. While the guide is depressed, the box is moved into the presser-box by the discharge-slide N, which moves between the plates I I' of the former, and consists of a main arm N' and a supplemental arm N². Each arm slides against the inner side of one of the spring presser-bars Y', the said bars having slots y to receive the pins 39 on the discharge-slide. The main arm has a cross-bar 40 formed therewith, which extends loosely through an opening in the arm N² and through a slot 41 in the former-plate I', so that the arm N² will be moved with the arm N', while it may be adjusted laterally with the former-plate I without being disconnected, the cross-bar 40 being long enough for the greatest lateral adjustment. The slide is guided by a bracket n , and is moved by a pitman 43, Figs. 2 and 6, connected to a lever n' , pivoted to a hanger 42 beneath the table. The lower end of this lever is connected by a bar n^2 to the arm n^3 , pivoted between the table and extending into range of a roller 44 on the wheel X, secured to the main shaft. When the roller strikes the arm n^3 , the discharge-slide operated thereby forces the box rearward into the presser-box, where it is pressed upon by a spring O and where it is retained for the final pressure, which securely interlocks the notched ends and completes the box. The slide, after forcing the box into the presser, is returned to normal position positively and quickly by the same roller striking a bent arm n^5 , pivoted beneath the table, which is connected to the lever n' above the pivot by a rod 45. This frees the space for the feeding of a fresh strip and bottom-blank which now takes place, and the folding of which goes on simultaneously with the final pressure of the box just folded.

The pressing mechanism, Figs. 1, 2, and 4, consists of two plates P P', projecting through an opening in the standard Q' and each pivotally supported by its shaft p . The plate P presses the side of the box and is adjustably connected with its shaft by its shank p' and set-screw 46, while the plate P', which presses the end of the box, is adjustable by its screw-threaded shank, which passes through its shank p . The end presser-plate is held up to bear upon the table P by a spring 46^a. Both plates may be thus adjusted laterally toward and from the passage z for different-sized boxes, and they may also be adjusted vertically by a screw-rod 47, which passes through a cross-bar 48 of the standard Q' and is connected to a collar 49 on the upper shaft p . The shafts p are journaled one above the other in sliding boxes p^3 , which move in ways p^2 of the standard Q', and thus by turning the screw the presser mechanism may be moved vertically as a whole for different-sized boxes. The parts being properly adjusted, the box, when pushed back by the slide N, passes its

interlocking ends under the projecting edge of the presser-plate P and in front of the edge of the end presser-plate P', and when the operating-rod p^4 is drawn upon the upper plate is forced down, carrying with it the plate P', both plates describing arcs of circles from their respective centers. The side of the box is forced down by the plate P, and as the shaft of the other plate is in a lower plane the edge describes an outward arc and presses the end of the box, it in effect sliding along the under surface of the upper plate. The rod p^4 is operated from a cam p^5 on the same shaft through a lever p^6 , pivoted in a bracket p^7 beneath the table. A weight P² on an arm P³ of the lower shaft p returns the presser mechanism to normal position after the cam p^5 has acted. The rod p^4 is screw-threaded and adjustably connected to the presser-plate P by a nut 59, and by this the proper adjustment is aided. The plate O, Fig. 5, is held by headed rods 50, connected to collars 51 on the lower shaft p , and springs 52 press the plates outward to bear upon the box. The tension is regulated by screws 53, which pass through elongated collars 54 on the ends of rods 55, connected to the plate O. The collars encircle the shaft p loosely, and the screws bear thereon.

The standard Q of the presser-box is adjustable laterally in the ways formed in the table and is moved by the screw Z', Figs. 1 and 4, which passes through a collar z^2 , held to the base of the standard by a set-screw z^3 . The completed boxes are forced rearwardly and discharged from the machine by the newly-folded boxes, which are pushed rearward in the presser-box by the discharge-slide N.

It will be noticed that all the parts that act directly upon any part of the box are adjustable to suit different sizes and thicknesses, lengths, and widths.

I claim as my invention—

1. In a box-machine and in combination with folding mechanism, a strip-holder consisting of pairs of posts, means for adjusting said pairs, and means for adjusting the posts of each pair, substantially as described.

2. In a box-machine and in combination, folding mechanism, a strip-holder having adjustable posts, and steam-supply pipes leading to the adjustable posts, whereby the strip may be subjected to steam at different points, substantially as described.

3. In a box-machine and in combination, folding mechanism, a strip-feed slide G and means for moving it, consisting of the rack-extension g , the gear-wheel H, the pinion, and the segmental gears meshing alternately with said pinion, substantially as described.

4. In a box-machine and in combination with folding mechanism, a strip-holder, and a steam-supply pipe leading thereto, substantially as described.

5. In a box-machine and in combination, folding mechanism, a strip-feed slide, the segmental gears h , having connections to the feed-

slide for operating it, said gears being adjustable in relation to each other, substantially as described.

6. In combination, in a box-machine, a strip-holder, a table, a former, folding means operating through an opening in the table, the table, a feed-slide to push the strips over the folding means, and a folding-arm, substantially as described.

7. In a machine for making boxes from wooden strips, the combination of an adjustable folding-form, pivoted folding-wings, a folding-arm, and a driving-shaft, and connections between said driving-shaft, folding-wings, and folding-arm, substantially as described.

8. In a machine for making boxes, the combination of a laterally adjustable folding-form, the pivoted folding-wings, one of which is adjustable, the driving-shaft, and connection between said driving-shaft and folding-wings, substantially as described.

9. In combination, the table, the feed-slide operating along the table-surface to force the strip into place, the former above the table-surface to permit the strip to pass beneath, a folding mechanism in the line of movement of the strip, and a guide t^4 at the end of the former and to one side of the folding mechanism, against which the strip bears when moved by the feed-slide, substantially as described.

10. In combination, the table, the former, the feed-slide for moving the strip beneath the former, a guide t^4 for the strip at the end of the former, a presser-rod operating within the former, and the folding-wings operating about the former, substantially as described.

11. In combination, the table, the strip-feed slide and folding mechanism, a guide for the strip, an adjustable presser-rod Y, and a yielding connection x^4 in the operating means, substantially as described.

12. In combination, the table, the strip-feed slide and folding mechanism, a guide t^4 for the strip, a discharge-slide N, and means for retracting the guide, substantially as described.

13. In combination, the table, the strip-feed slide and folding mechanism, a vertically-movable guide, the lever u , connected thereto, the cam for depressing the guide, and the weight having the adjustable stop w^3 , substantially as described.

14. In combination, the table, the strip-feed slide and folding mechanism, the discharge-slide, and means for operating the same, consisting of the lever n' , the arms $n^3 n^5$, connected thereto below and above the pivot, and the cam-wheel X, having a stud, substantially as described.

15. In combination, the former adjustable laterally and the discharge-slide adjustable therewith, substantially as described.

16. In combination, the table, the strip-feed slide and folding mechanism, means for feeding the bottoms to the strips, and a guide t^4 ,

against which the strip bears and which directs the bottom into place, substantially as described.

17. In combination, the table, the strip-holder, feed-slide and folding mechanism, the bottom-feeding means, the guide t^4 , and the spring presser-bars y' to direct and hold the bottoms, substantially as described.

18. The combination of the holder for the box-bottoms, a vertically-moving arm for placing the box-bottoms successively in position, and a folding mechanism for folding the previously-grooved strip around the bottom, substantially as described.

19. The combination of a holder for the box-bottoms, a vertically-moving arm for placing the box-bottoms successively in position, folding mechanism for folding the previously-prepared grooved strip around the bottom, means for placing the folded box under the presser-bar P, and the presser-bar for uniting the free ends of the folded strips and thus completing the box, substantially as described.

20. In combination, the table, the former, the folding-wings K K', one of which is adjustable toward and from the other, and means for operating the folding-wings, consisting of the cross-head L, with operating connections to the main shaft, substantially as described.

21. In combination, the former, the folding-arm M, and the wings, the presser-bar P in rear of the former, having connections to the main shaft, and the discharge-slide N, operating to move the folded box from the former to the presser-bar, substantially as described.

22. In combination, the table, the strip-feed slide, the former having a vertical and a horizontal pressure-surface and folding mechanism, a presser mechanism in rear of the former, and a discharge-slide to move the box from the former to the presser mechanism.

23. In combination, the table, the strip-feed slide, the former, the folding mechanism, and a presser-box consisting of the adjustable standards Q Q', a presser-bar P, and operating mechanism therefor.

24. In combination, the former, the folding mechanism, and an adjustable presser with operating means for pressing the box vertically and laterally.

25. In combination, the table, the strip-feed slide, the former and folding mechanism, a presser-bar P, operating vertically, and a second bar for pressing the box laterally, said bars being arranged to press at the corner of the box, substantially as described.

26. In combination, the table, the strip-feed slide, the former and folding mechanism, a presser mechanism, including the presser-bars P and P', and means for adjusting said bars laterally and vertically, substantially as described.

27. In combination, the former, the folding mechanism, the presser-box and presser mech-

anism, the spring-plate O in the presser-box, and a discharge-slide, substantially as described.

28. In a box-machine, the adjustable former, the folding-wings, one of which is adjustable, and an adjustable folding-arm, substantially as described.

29. In combination, the folding mechanism, with feeding mechanism for the strips and bottoms, the ways W, having an opening w' at their forward ends, and means for adjusting the ways, substantially as described.

30. In combination, the folding mechanism, with feeding mechanism for the strips and bottoms, the ways W, and the vertically-adjustable plates W' , carrying said ways, substantially as described.

31. In a box-machine, the combination of the folding-wings, the upper folding-arm, ways W, forming a chute or holder for the box-bottom blanks, and a sliding cross-head, as T, for feeding the bottom-blanks singly downward, substantially as described.

32. In a machine for making boxes, the combination, with the folding-wings and folding-

arm, of the ways W for the box-bottom blanks, and the cross-head T, having the feed-arms t' t' and the spring t^6 , substantially as described.

33. In combination, the strip-feed slide, the folding-wings, the upper folding-arm, the cross-head M^3 for operating the same, the feed-arms for the bottoms, the cross-head T, and the racks and pinion connection between the cross-heads, substantially as described.

34. A machine for making boxes by folding grooved wooden strips around bottom-blanks, consisting, essentially, of the following elements: a holder for the strips, a pusher for placing the strips separately in position to be folded, mechanism for folding the grooved strips around the bottoms, and pressing devices for uniting the free ends, all substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ROLLIN L. COONS.

Witnesses:

SIDNEY COONS,

C. M. KELLY.