

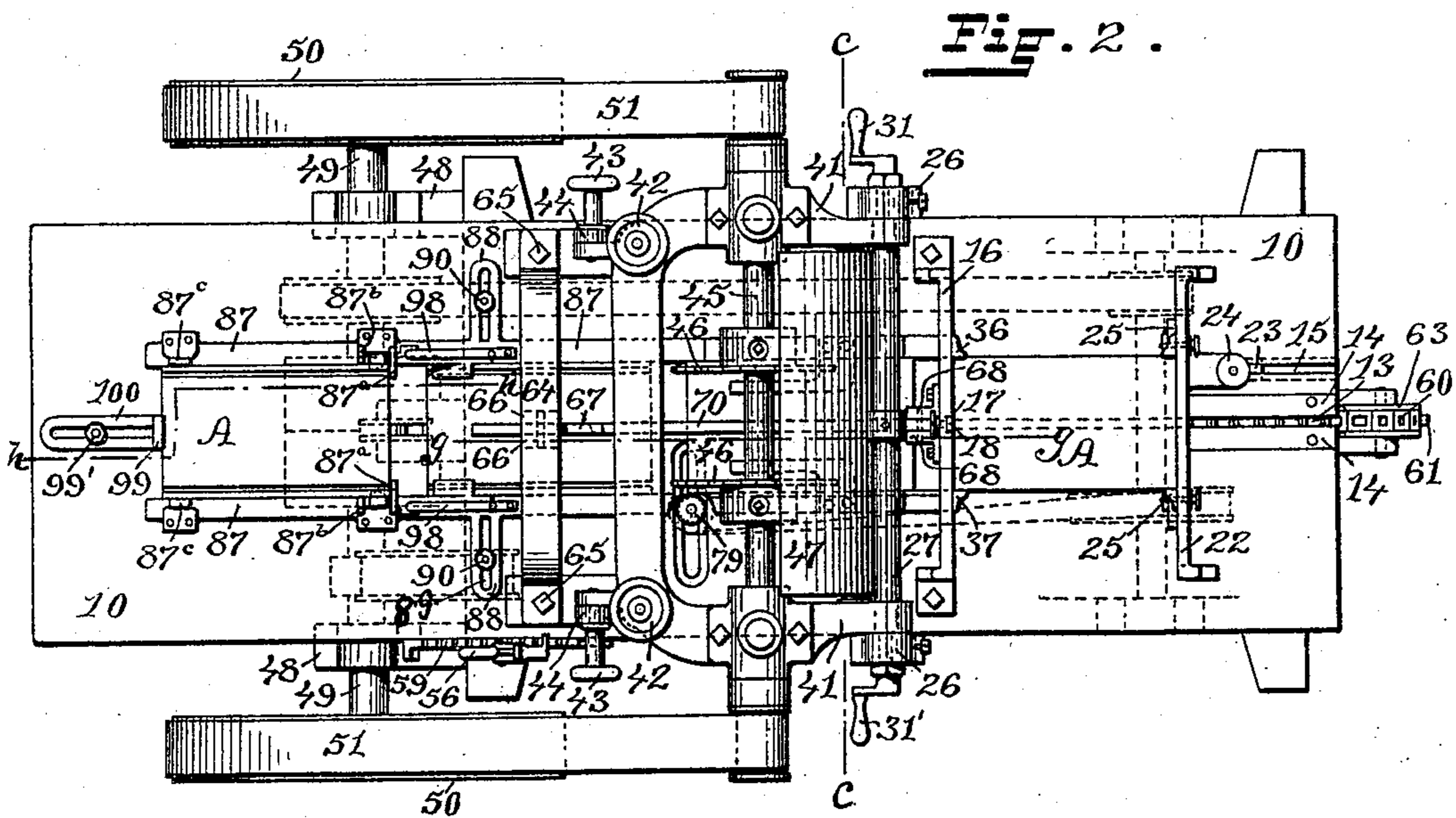
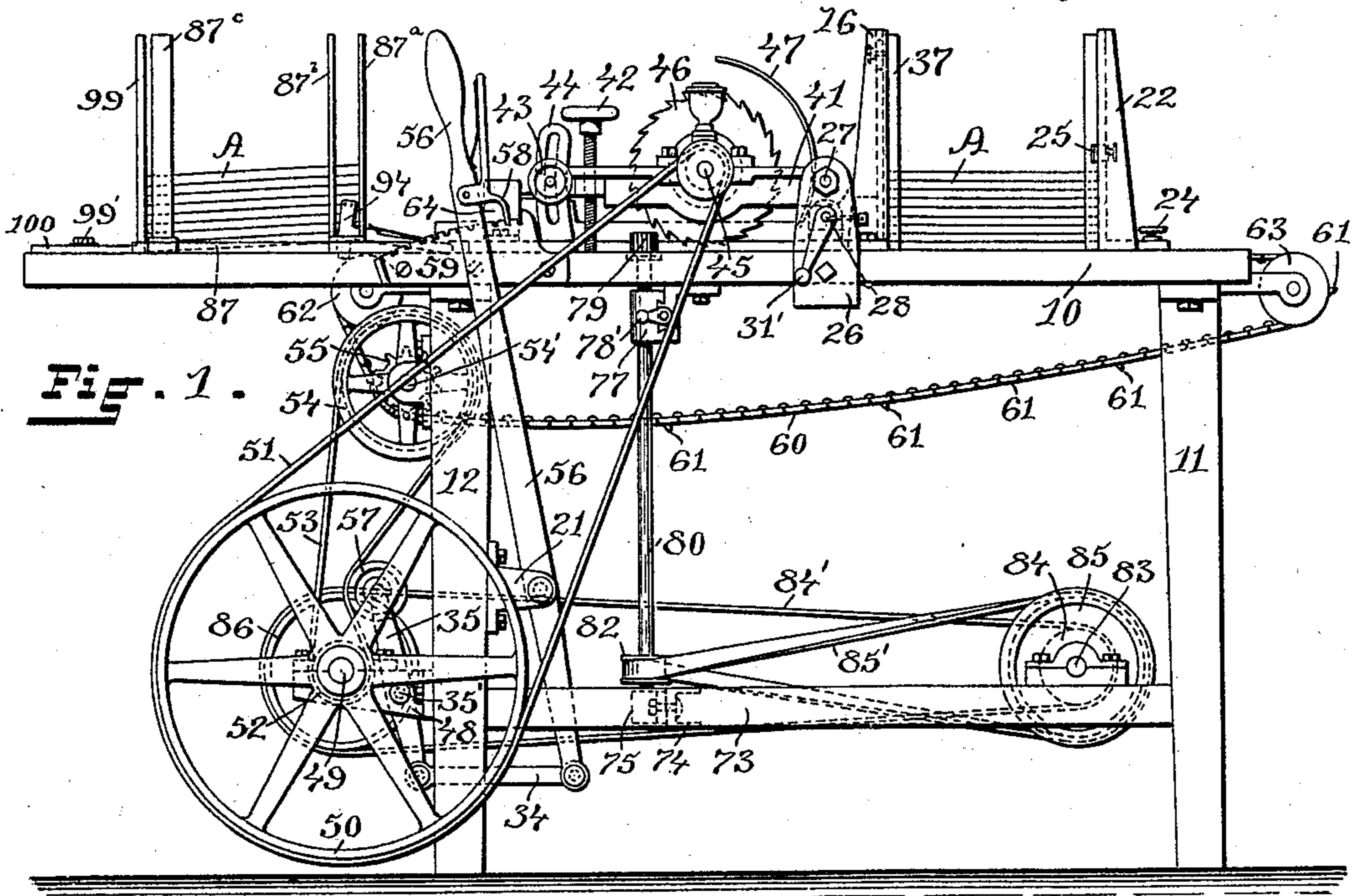
(No Model.)

3 Sheets—Sheet 1.

J. B. CHACE.
GROOVING AND TONGUING MACHINE.

No. 582,388.

Patented May 11, 1897.



WITNESSES:

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Chas. H. Luther.

INVENTOR:

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Attys.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

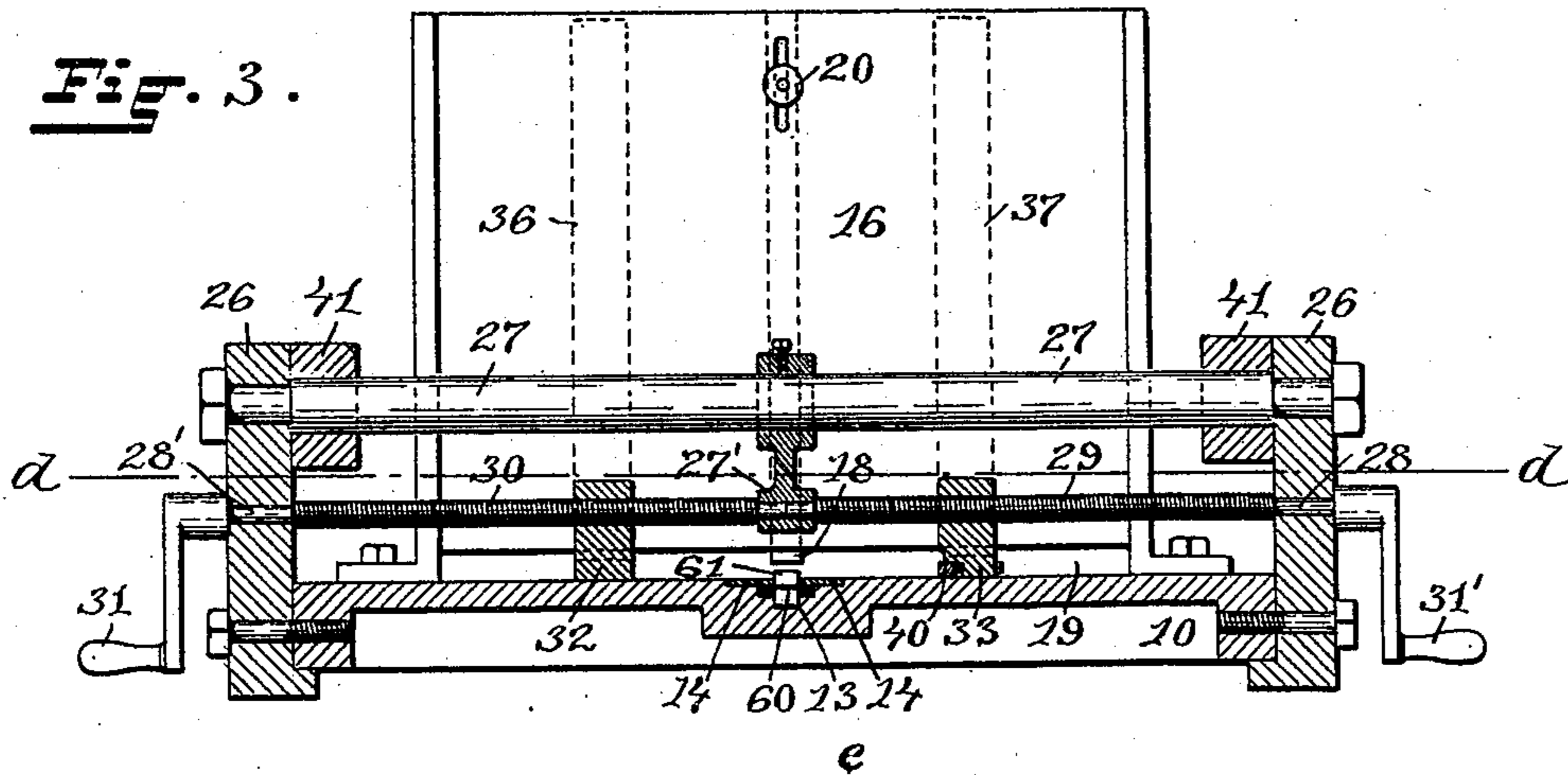


Fig. 4.

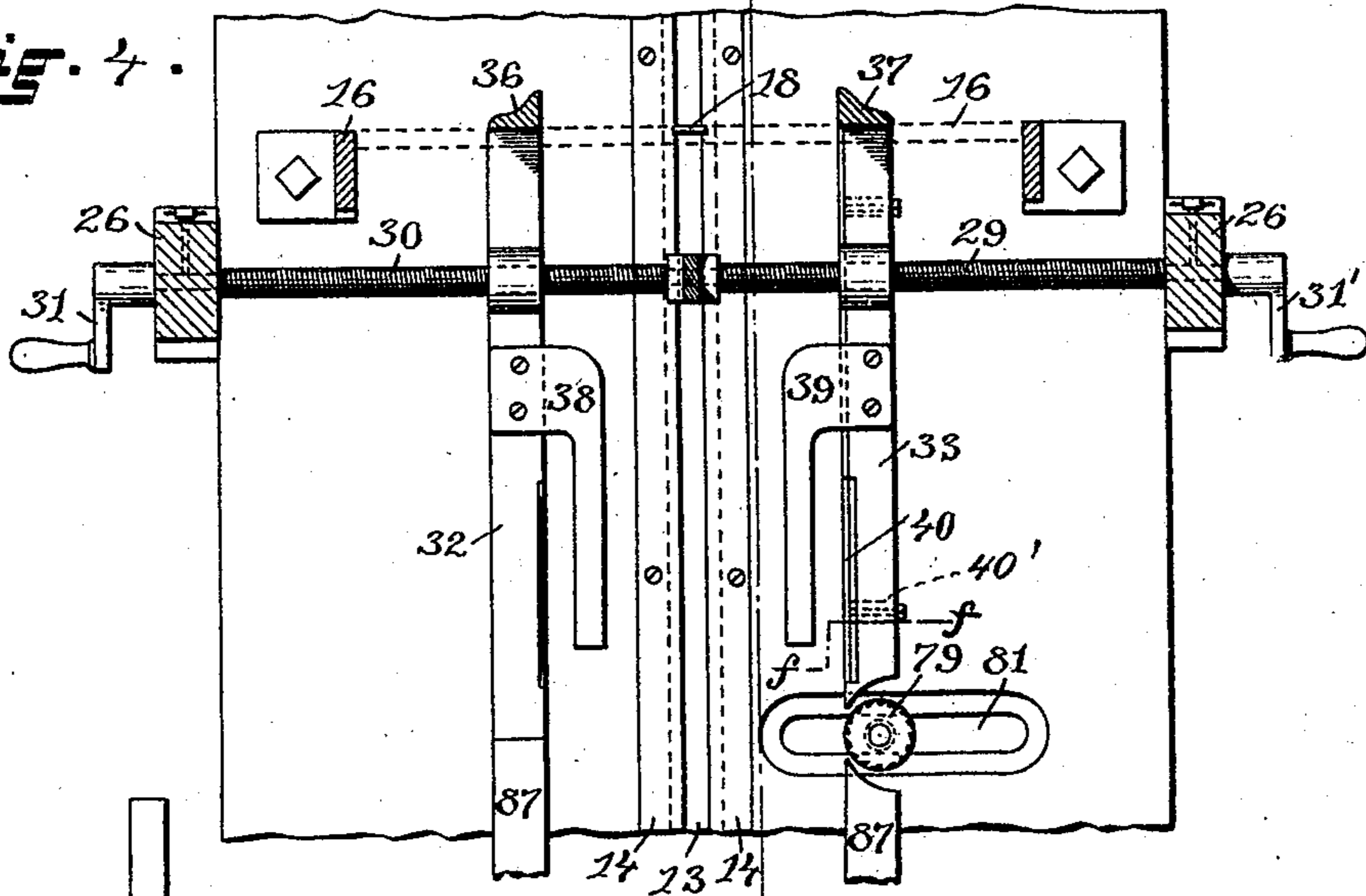


Fig. 5.

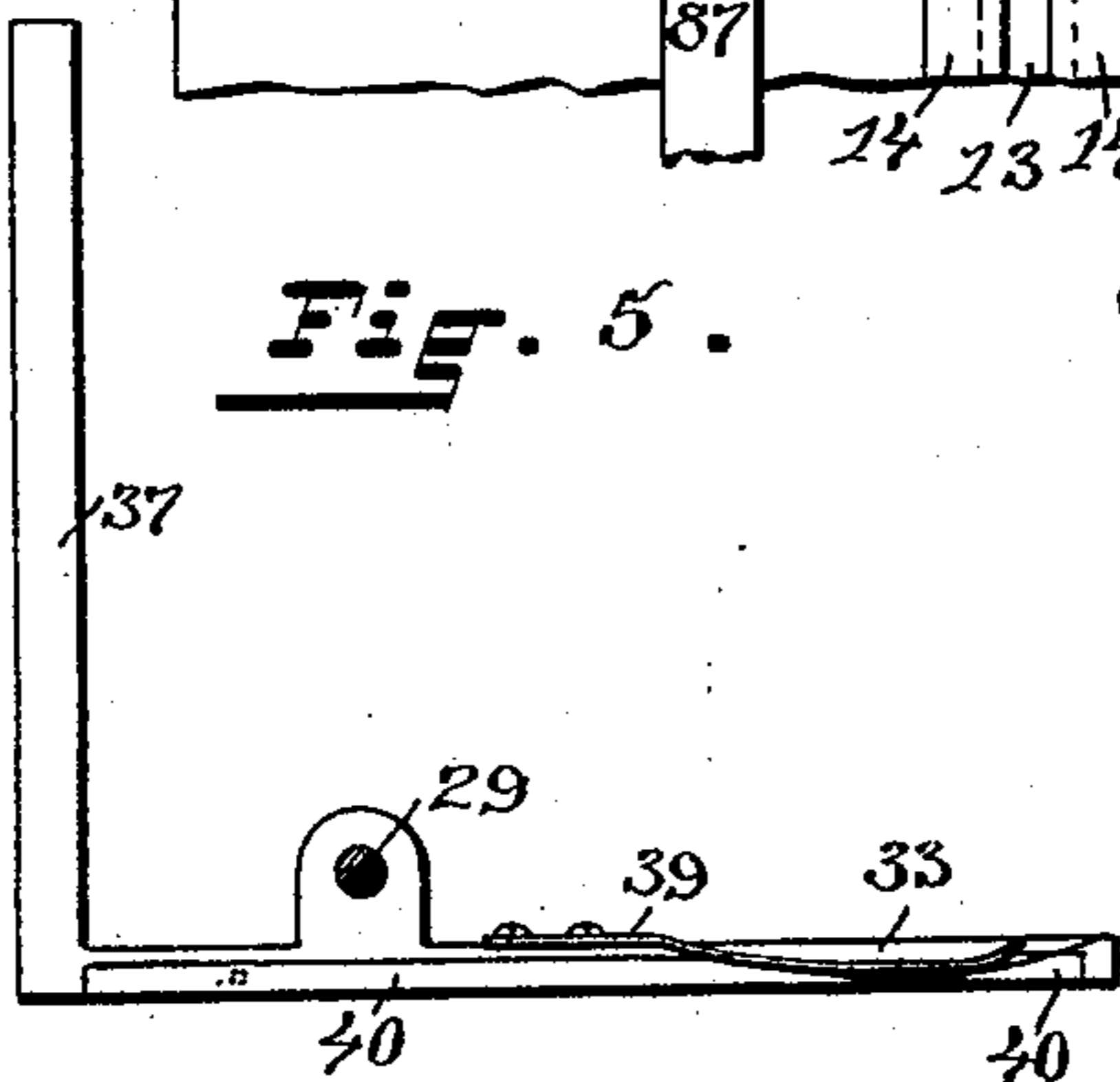
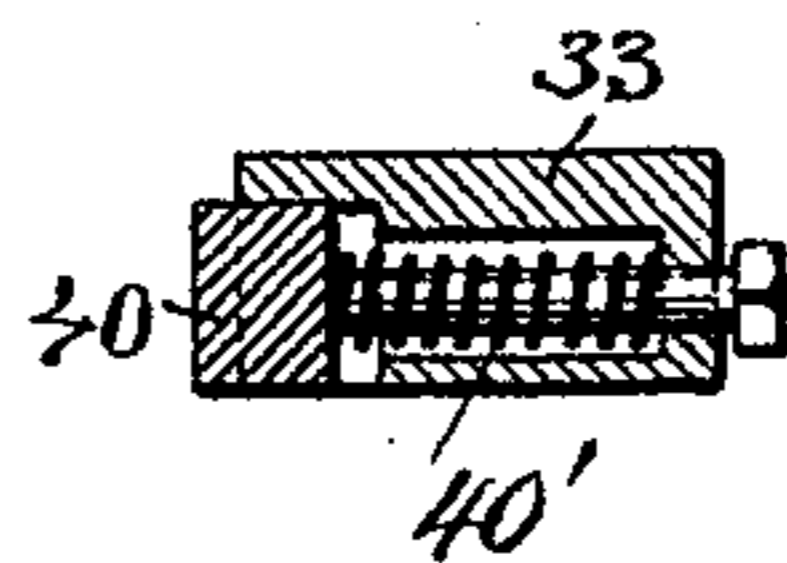


Fig. 6.



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Fig. 7.

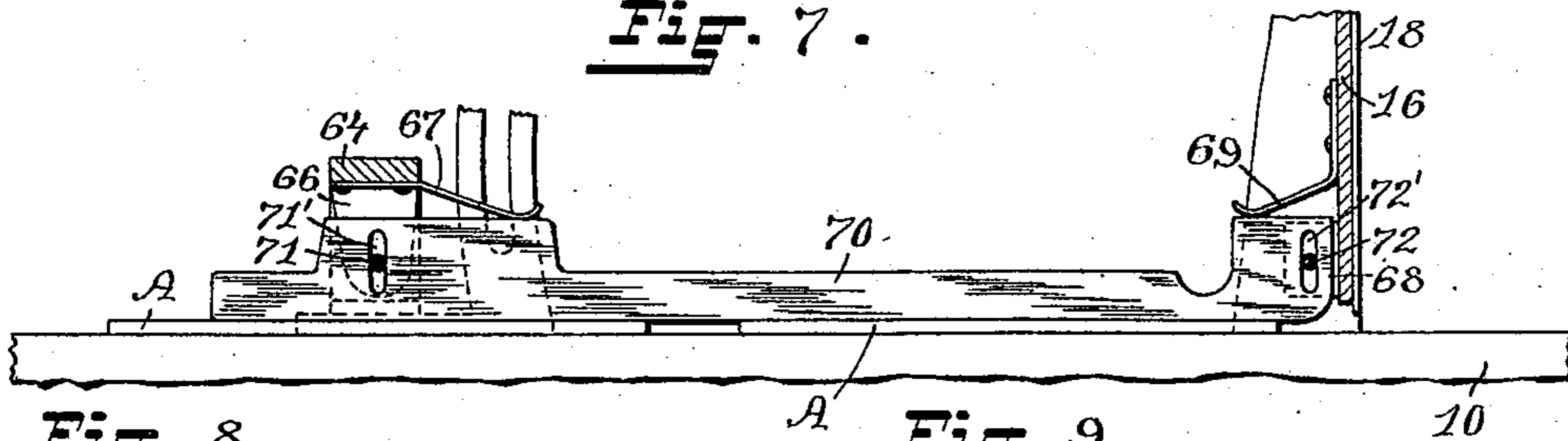


Fig. 8.

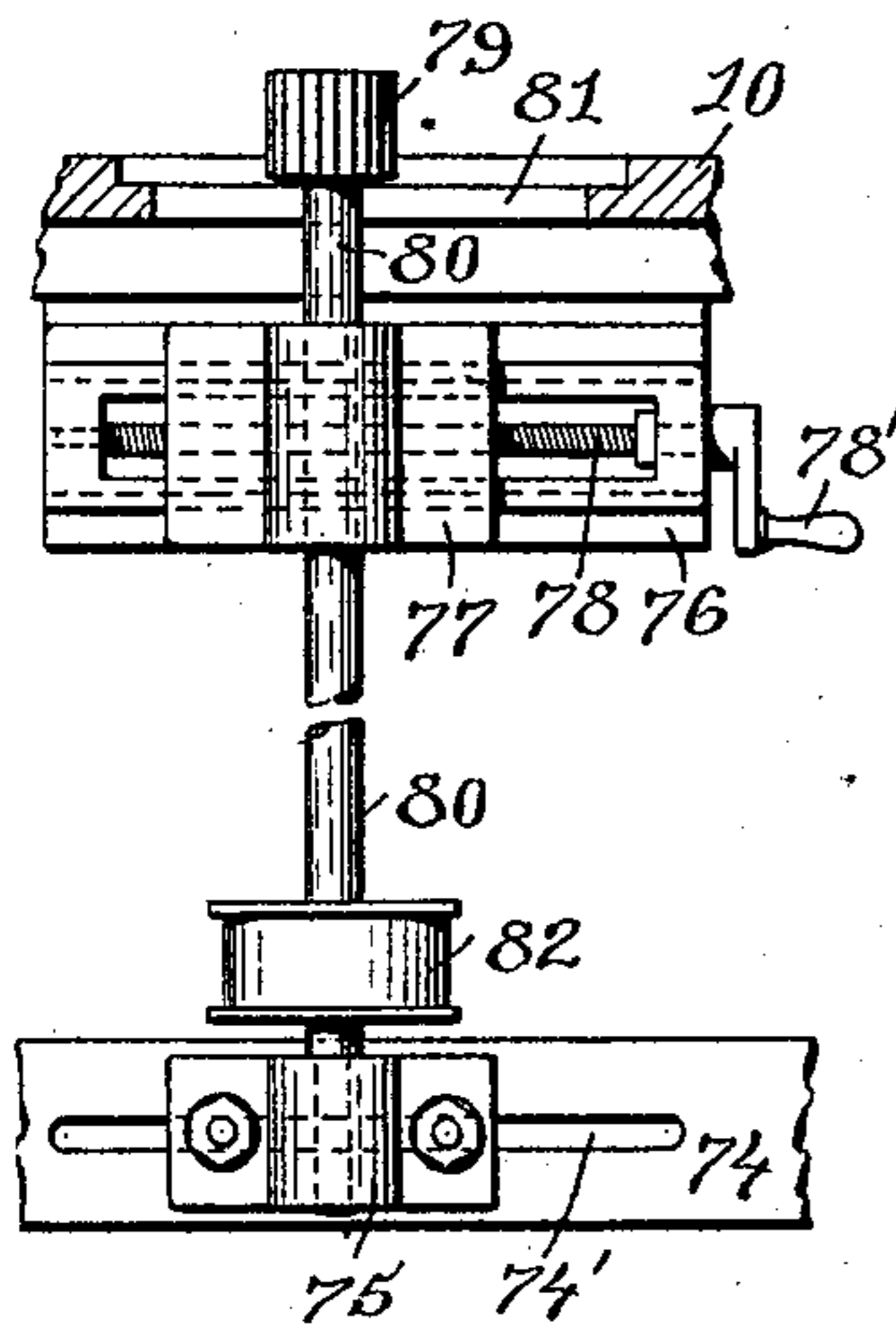


Fig. 9.

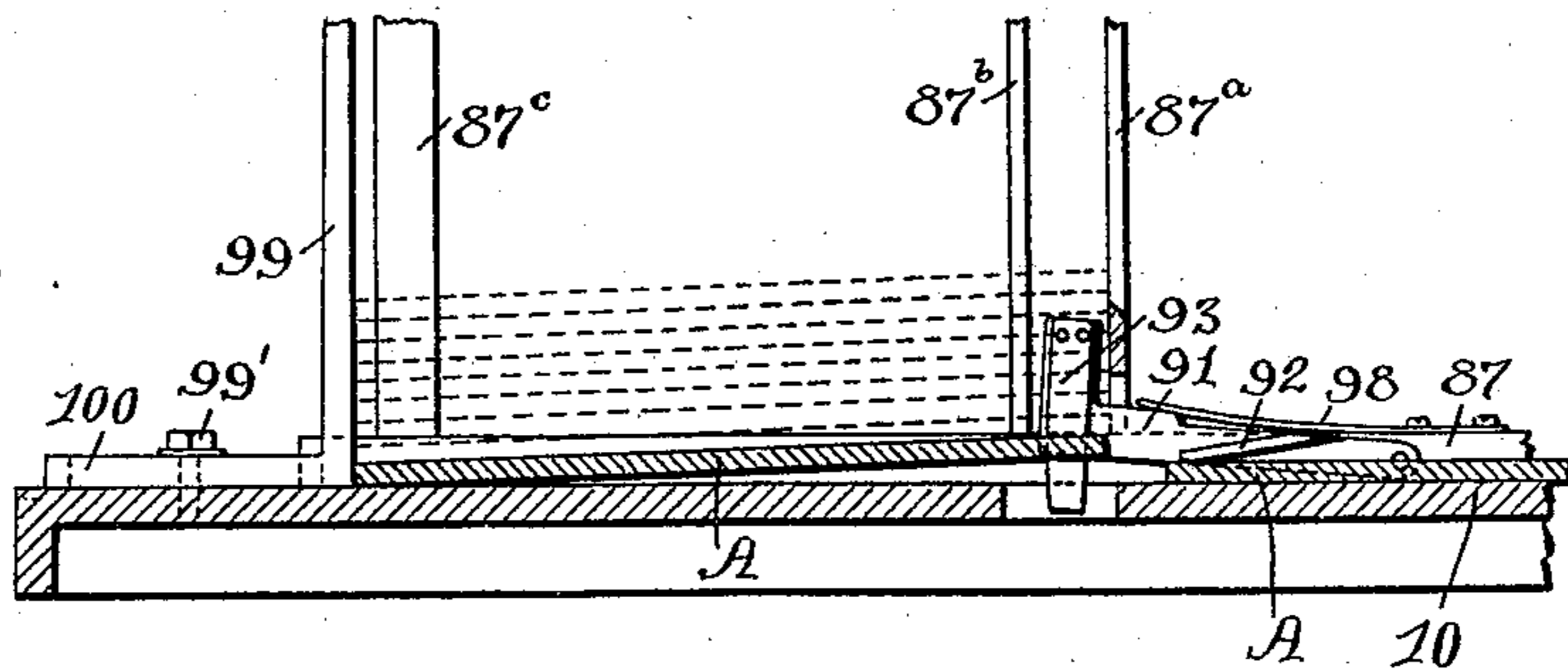


Fig. 10.

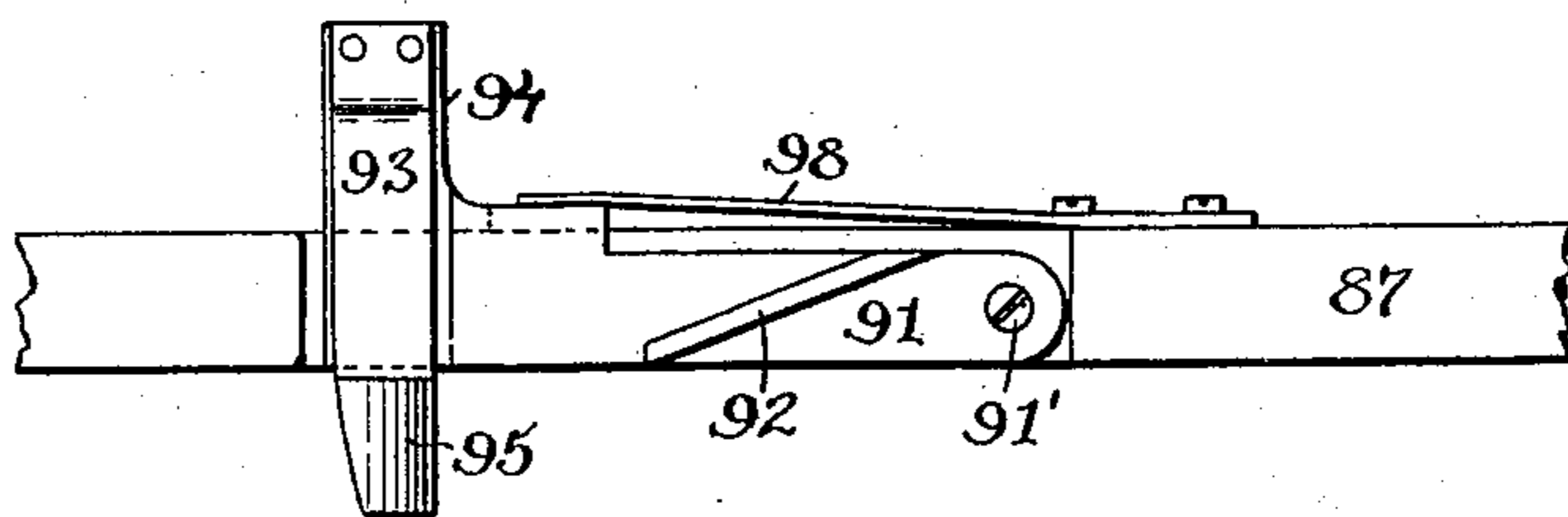


Fig. 11.

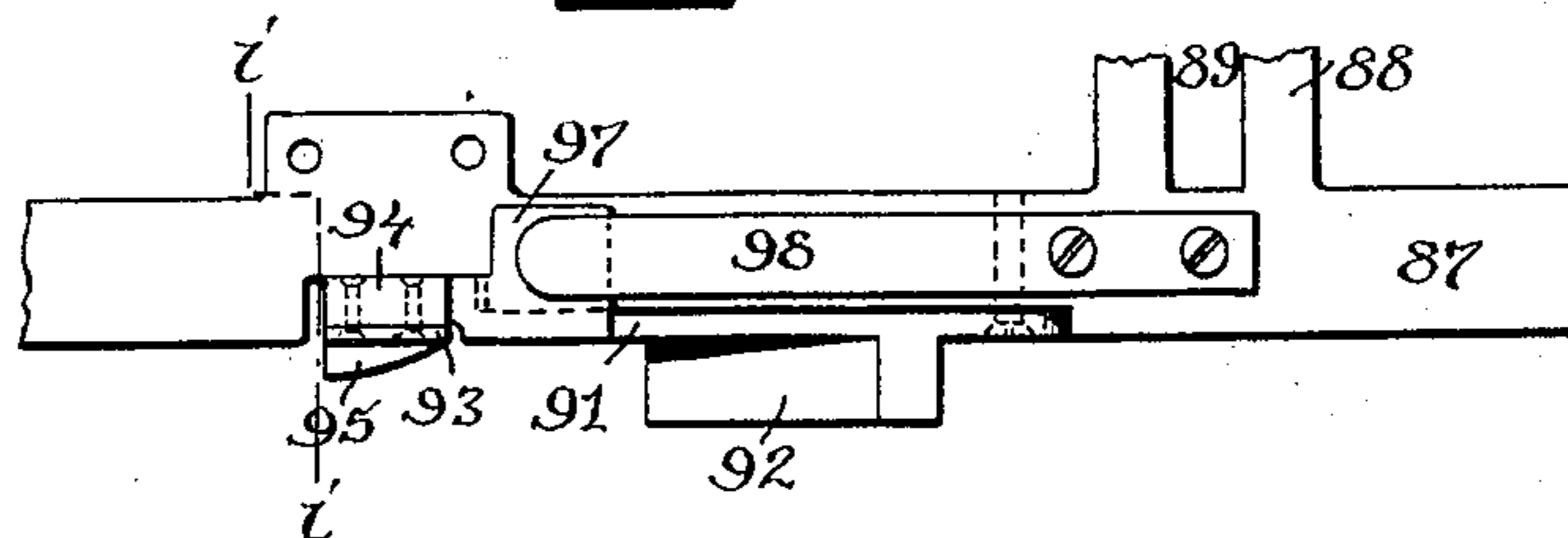


Fig. 12.

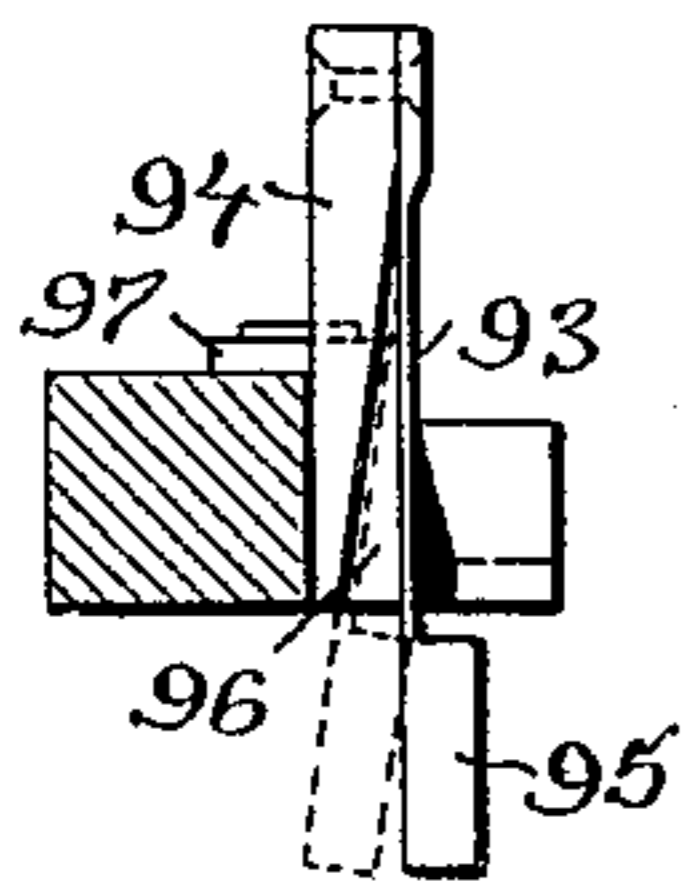
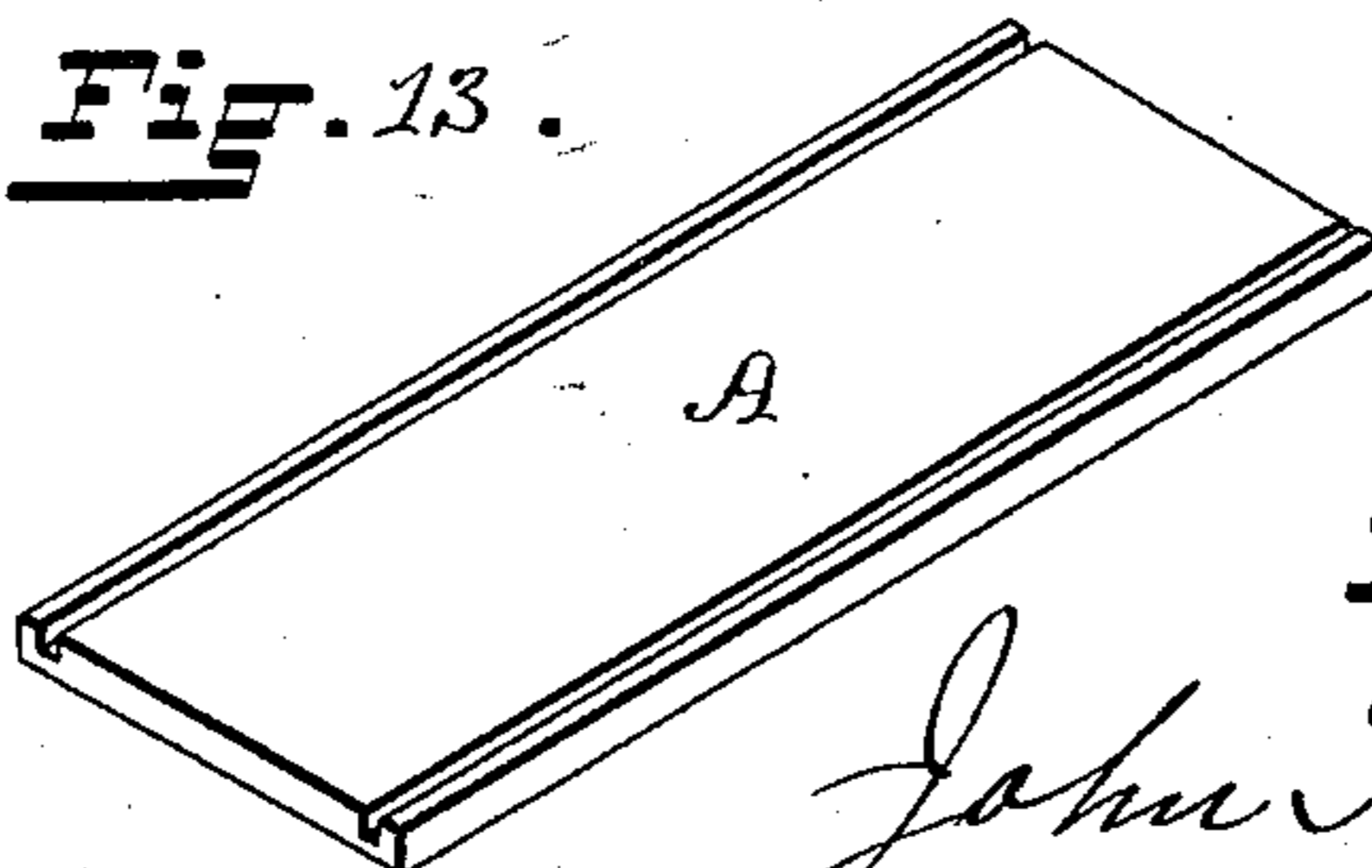


Fig. 13.



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UNITED STATES PATENT OFFICE.

JOHN B. CHACE, OF ORANGE, MASSACHUSETTS.

GROOVING-AND-TONGUING MACHINE.

SPECIFICATION forming part of Letters Patent No. 582,388, dated May 11, 1897.

Application filed February 26, 1896. Serial No. 580,828. (No model.)

To all whom it may concern:

Be it known that I, JOHN BOYDEN CHACE, of Orange, in the county of Franklin and State of Massachusetts, have invented certain new and useful Improvements in Grooving-and-Tonguing Machines; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in machines for cutting parallel grooves in box-boards or for cutting away a rectangular section from the edge or edges thereof to leave a tongue.

The object of the invention is to so construct a machine of this nature that the parallel grooves shall always be the determined distance apart without reference to the distance of either groove from the nearest edge.

Another object is to improve the feed mechanism and the driving devices therefor.

Another object is to more accurately present the boards to the cutting-tools.

Another object is to improve the adjustable supports for the cutting-tools.

Another object is to accurately trim the boards so that the finished boards will all be of the desired size.

Another object is to automatically stack the finished boards into a pile.

The invention consists in such peculiar features of construction and combination of parts as may hereinafter be more fully described, and pointed out in the claims, whereby the objects of the invention are carried into effect.

Figure 1 represents a side elevation of the improved tonguing-and-grooving machine. Fig. 2 represents a plan view of the same. Fig. 3 represents an enlarged vertical sectional view taken on a line *c c*, Fig. 2. Fig. 4 represents an enlarged plan view, partly in section, on line *d d*, Fig. 3, of portion of the machine, showing details of the guides and means for adjusting the same. Fig. 5 represents an elevation of one of said guides, herein termed the "presser-guide," as distinguished from its companion guide, which has no spring presser-plate acting laterally, this view being a partial vertical section taken on a line *e e*, Fig. 4. Fig. 6 represents a cross-sectional

view of the horizontal member of this guide, taken on a line *ff*, Fig. 4, showing the presser-plate and one of the springs acting thereon. Fig. 7 represents an elevation of the central presser-bar with adjacent portions in vertical section on line *g g*, Fig. 2. Fig. 8 represents an elevation of the edge-trimming device, showing the means of adjustment. Fig. 9 represents a sectional view on line *h h*, Fig. 2, through part of the bed, showing one of the stacking devices in position. Fig. 10 represents an elevation of the stacking device. Fig. 11 represents a plan view of the stacking device. Fig. 12 represents a cross-sectional view on line *i i*, Fig. 11, of one of the side pieces with the stacking device. Fig. 13 represents a finished piece of board with the two side grooves.

Similar letters and numerals of reference designate corresponding parts throughout.

In the drawings, 10 indicates a substantial bed-plate mounted on pairs of standards, as 11 and 12, and having the longitudinal groove 13, provided with the guide-plates 14 14, and with the guide-groove 15 parallel with the groove 13. Secured to the bed-plate is the partition 16, having a central vertical groove 17, in which the bolt 18 is adjustable. This bolt is adapted to be so adjusted that its lower end may extend below the edge of the partition 16 into the feed-opening 19, which extends for the width of the partition. When adjusted, the bolt 18 is secured in place by the clamping-nut 20.

The partition 22 is movably supported on the bed-plate, being furnished with a guide-web 23, working in the groove 15, whereby the partition is prevented from swinging, and with the clamp-nut 24 for securing the partition in place when once adjusted. On the inner face of this partition are mounted the vertical guides 25 25, which are laterally adjustable to accommodate different widths of the boards *A A* and may be secured when adjusted.

Adjacent to the ends of the partition 16 are the brackets 26 26, secured to the sides of the bed-plate 10 and carrying the shaft 27, which may be fixed, and the rotatable shafts 28 28', having the screw-threads 29 and 30 and furnished with the handles 31 31', by means of which they may be rotated, the free

ends of the shafts 28 28' being supported in the depending bearing 27', which is secured to and supported by the shaft 27.

The working guides 32 and 33 are provided with screw-threads which are engaged by the screw-threads 29 and 30 of the shafts 28 28'. These guides rest on the surface of the bed-plate and are adjusted laterally by the rotation of said shafts. Their vertical members 36 and 37 may extend upward on the inner surface of the partition 16, being, of course, adjusted at the same time by the same means, so that the forward ends of the boards in the hopper formed by the partitions are guided most accurately as they pass downward to the working guides. To the working guides 32 and 33 are secured the spring presser-plates 38 and 39, which bear on the boards while they are under the action of the cutting-tool, and the guide 33 is provided on its inner side with a lateral-acting presser-plate 40, moved outward by coiled springs, as 40', and having a tendency to press the board under action toward the guide 32.

The bridge-piece 64 is secured at the ends to the bed 10 by the bolts 65 and extends upward and then spans the bed from one side to the other. In the center are two guides 66 66 and the spring 67. Secured to the partition 16 are the guides 68 68 and the spring 69. The central presser-bar 70 extends from the partition 16 back under the frame 41 and the bridge-piece 64 and is held in position by the guides 66 66 and 68 68 and the pins 71 72, which pass through the slots 71' 72' in the presser-bar, allowing of a free upward and downward movement of the presser-bar. The springs 67 69 exert a downward pressure on the presser-bar, which, in connection with the springs 38 39, will keep the boards in a flat condition and prevent buckling.

Journalled on the shaft 27 is a frame 41, having bearings in its ends and supported at its free side by the set-screws 42 42 and by the clamping-screws 43 43, secured in extensions from the frame and in the curved slots of the plates 44 44, mounted on the bed-plate, this portion of the frame 41 being adjustable by the shanks of the clamping-screws 43, moving in the curved slots when said screws are loose to limit the depth of cut. In the bearings of the frame 41 is journalled the shaft 45, having belt-pulleys at its ends, and on this shaft are adjustably secured a series of rotatable cutters, as the saws 46 46, while before the cutters is mounted the curved shield 47. The brackets 48 are secured to the lower portion of the standards 12, and in the brackets is journalled the drive-shaft 49, carrying belt-pulleys 50 50, which are connected by belts 51 51 with the pulleys of the cutter-shaft 45, whereby the cutter-shaft is driven. On the shaft 49 is also mounted a smaller belt-pulley 52, which is connected by the loose belt 53 with the pulley 54, mounted on the shaft 54', which is journalled above the shaft 49 and carries the sprocket 55. It is desired to take

up only so much of the slack in the belt 53 that the pulley 54 and the sprocket 55 will be driven only under normal conditions and that when a sudden interruption occurs to the rotation of the sprocket 55 the belt will slip. This is effected by means of the lever 56, pivoted to the bracket 21 and connected by the link 34 to the arm 35, carrying the roller 57, which bears against the belt 53, the arm being pivoted at 35' to the bracket 48, the upper end of the lever being held in the adjusted position by the holding-pawl 58, engaging in one of the notches of the rack 59, secured to the bed-plate.

The feeding mechanism consists of the chain 60, having the fingers 61 61 located thereon at suitable intervals. This chain is engaged by the teeth of the sprocket 55, by which it is driven, and passes over the chain-pulleys 62 and 63 and through the groove 13 in the bed-plate, its fingers 61 61 moving between the plates 14 14 and extending upward sufficiently to engage the lowest of the pile of boards in the hopper and to carry the board along through the opening 19 between the working guides 32 and 33 to the rotary cutters, which cut grooves in the board, or, when located to act sufficiently near the edge of the same, remove a portion thereof, leaving a tongue on the board as wide as may be desired.

The horizontal supports 73 73 are secured to the standards 11 12 and connected by the cross-bar 74, which is provided with the slot 74'. The adjustable bearing 75 is secured to the cross-bar 74 by means of bolts which pass through the slot 74' and by the loosening of which the bearing can be readily adjusted to the desired position. To the under side of the bed-plate 10 is secured the slide-frame 76, which carries the sliding bearing 77, which is adjusted by revolving the screw-threaded shaft 78 by means of the handle 78'. The cutter-head 79 is mounted on the top of the shaft 80, the lower edge of the cutter-head being below the top surface of the bed-plate 10, a depression being formed in the plate 10 for that purpose. The shaft 80 extends downward from the cutter-head through the slot 81 in the bed-plate 10 through the bearing 77 to the bearing 75 and carries the pulley 82.

The shaft 83 is mounted in suitable bearings on supports 73 and carries two pulleys 84 85, the pulley 84 being connected by the belt 84' to the pulley 86, mounted on the main shaft 49, and the pulley 85 is connected to the pulley 82 by the belt 85', by means of which the cutter-head is operated.

The automatic piling device consists of the adjustable guide-plate 87, provided with the extension 88, having the slot 89, the guide-plate being held in position by the thumb-screw 90, the bolt of which passes through the slot in the extension and is screw-threaded into the bed-plate 10. The guide-plate 87 is provided with the guides 87^a, 87^b, and 87^c for guiding the boards as they are lifted into po-

sition by the lifting device, which consists of the plate 91, pivoted at 91' to the guide-plate 87, and is provided with the cam 92 and the spring-finger 93. The spring-finger 93 is secured at its upper end to the upwardly-extending portion 94 of the plate 91, the lower end being provided with the cam-surfaced projection 95, which upon being pressed inward by the board will enter the recess 96, formed in the end of the plate 91. The plate 91 is also provided with the stop 97, which bears against the top of the guide-plate 87. The spring 98 is secured at one end to the guide-plate 87. The free end of the spring bears on the stop 97 and tends to keep the lifting device in the normal or depressed position shown in Fig. 10.

The stop 99 is secured to the bed-plate 10 by a bolt 99', which passes through a slot in the extension 100 and prevents the boards from sliding off from the pile.

The adjustment of my improved grooving-machine is as follows: The saws are first adjusted on the shaft 45 to give the desired space between the grooves, the saws being lifted or lowered to give the desired depth of groove by reason of the adjustment of the frame 41 by the screws 42 42. When the desired position is obtained, the frame is securely held by the clamping-screws 43 43. The boards, which are of the proper length and width, are then placed upon the bed 10, with one end next to the partition 16. The bolt 18 is lowered, so that the end will be below the partition 16 sufficiently so that only one board can pass under the same at a time. The partition 22 is then secured in position. The working guides 32 33, carrying the vertical members 36 37, are then adjusted by means of the screw-shafts 29 30, and should it be desirable to have the groove nearer to one edge of the board than the other the guides, being adjustable independent of each other, will be so adjusted that the boards will be brought under the saws in the position desired. The guide-plates 87 87 are next moved into position to guide the boards for piling them and are secured in that position by the bolts 90 90. The stop 99 is now moved into position and secured by the bolt 99', and finally the edge-trimmer is adjusted. This adjustment is accomplished by first loosening the bolts of the bearing 75, then revolving the threaded shaft 78, by means of the handle 78', until the sliding bearing 77, and with it the shaft 80, carrying the cutter-head, has been brought into the desired position. The bolts of the bearing 75 are then tightened, thereby holding the bearing in a fixed position.

It frequently happens that there is a slight unevenness in the widths of the boards; hence the necessity of the laterally-acting presser-plate 40 and the edge-trimmer.

The operation of the grooving-machine is as follows: Power having been applied to the shaft 49, the pulleys 50 50 are caused to revolve and drive the saws 46 46 by means of

the belts 51 51, the edge-trimmer being also driven by means of the pulley 86, belt 84', pulley 84, which revolves the shaft 83 and with it the pulley 85, which revolves the pulley 82 by means of the belt 85', and the shaft 80, carrying the cutter-head 79. The boards are now placed in the receptacle formed by the partitions 16 and 22 and the guides 25, 25, 36, and 37. The handle of the lever 56 is now pushed from the operator, causing the roller 57 to take up the slack in the belt 53 and through the pulley 54 and sprocket 55 operate the chain 60, having the fingers 61. One of the fingers coming in contact with the lowest board moves the same along through the opening 19 between the working guides 32 and 33 under the rotary cutters or saws which cut the grooves in the board, then, by the edge-trimmer, to the piling device. The end of the board coming in contact with the cam 92 causes the free end of the plate 91 to be lifted. The board passing along next comes in contact with the projections on the spring, moving the same back into the recesses 96, and the board will pass into position between the guides 87^a 87^b 87^c and stop 99. The spring 98, acting on the stop 97, depresses the lifting-plate into the normal position. The second board coming along will come in contact with cam 92, lifting the free end of the plate 91, and by reason of the top of the projection 95 having been depressed below the bottom of the first board by the spring 98 the board will rest upon the top of the projection 95 and be lifted therewith until the end of the second board has passed under the lifted end of the first board, when it will come in contact with the cam-face of the projection 95, moving it in and allowing the first board to rest on the second, the second sliding under the first to its proper position, and so on until all the boards have been properly grooved, trimmed, and stacked into a pile.

In practice I find it desirable to use two lifting-plates, both being constructed exactly alike with the exception that they are right and left and that they are pivoted to guides located on opposite sides of the machine.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with the bed-plate, and a hopper having a transverse slot at the lower portion of its front, of the brackets 26 26 mounted on the bed-plate, the shafts 28 28' journaled in the brackets and having the screw-threads 29 and 30, handles for rotating the shafts, the guides 32 and 33, working on the screw-threads, extending through the slot in the hopper and having the members 36 and 37 extending upward in the hopper and adjustable laterally with the guides, and the presser-plates 38 and 39 secured to the guides, as described.

2. In a grooving or similar machine, the combination with a bed-plate having a longitudinal slot, a blank-receiving hopper at one

end, a rotary cutting mechanism in line with said hopper, and a feed-chain working through the slot to engage the blanks in the hopper, carry them through the cutter mechanism and
5 deposit them in a receiving-hopper, of the receiving-hopper, a lifting device comprising the plate 91 pivoted to the guide-plate 87 and provided with the projection 94 and the finger 93 secured at its upper end and having the
10 cam-surfaced projection 95, said plate 91 having also the stop 97 and the spring 98, a piling device comprising the guide-plate 87 having the slotted extension 88, the thumb-screw 90 for securing the guide-plate, and means for
15 operating the piling and lifting devices, as described.

3. The combination with the bed-plate 10, the chain 60 and the driving mechanism therefor, the brackets 26 26, the shafts 28 28' having the screw-threads 29 30, the guides 32 33
20 mounted on said shafts, the shaft 27, the cutter-frame pivotally mounted on shaft 27, the cutter-shaft 45 journaled in the frame, of the cutter-head 79 mounted on the shaft 80, means
25 for rotating said shaft, the guides 87 provided

with the pivoted plate 91 having the cam 92 and spring-finger 93.

4. The combination with the bed-plate 10, the chain 60 and the driving mechanism therefor, the brackets 26 26, the shafts 28 28' having the screw-threads 29 30, the guides 32 33
30 mounted on said shafts and provided with the presser-springs 38 39, the spring-pressed bar 70 and guides for the same, the shaft 27, the cutter-frame 41 pivotally mounted on shaft 35
27, and the cutter-shaft 45 provided with the cutters and journaled in the frame, of the cutter-head 79 mounted on the shaft 80, means
35 for revolving said shaft, the guides 87 provided with the springs 98, the plate 91 having
40 the stop 97, the cam 92 and the spring-finger 93, all substantially as herein shown and described.

In witness whereof I have hereunto set my hand.

JOHN B. CHACE.

Witnesses:

J. A. MILLER, Jr.,

M. F. BLIGH.