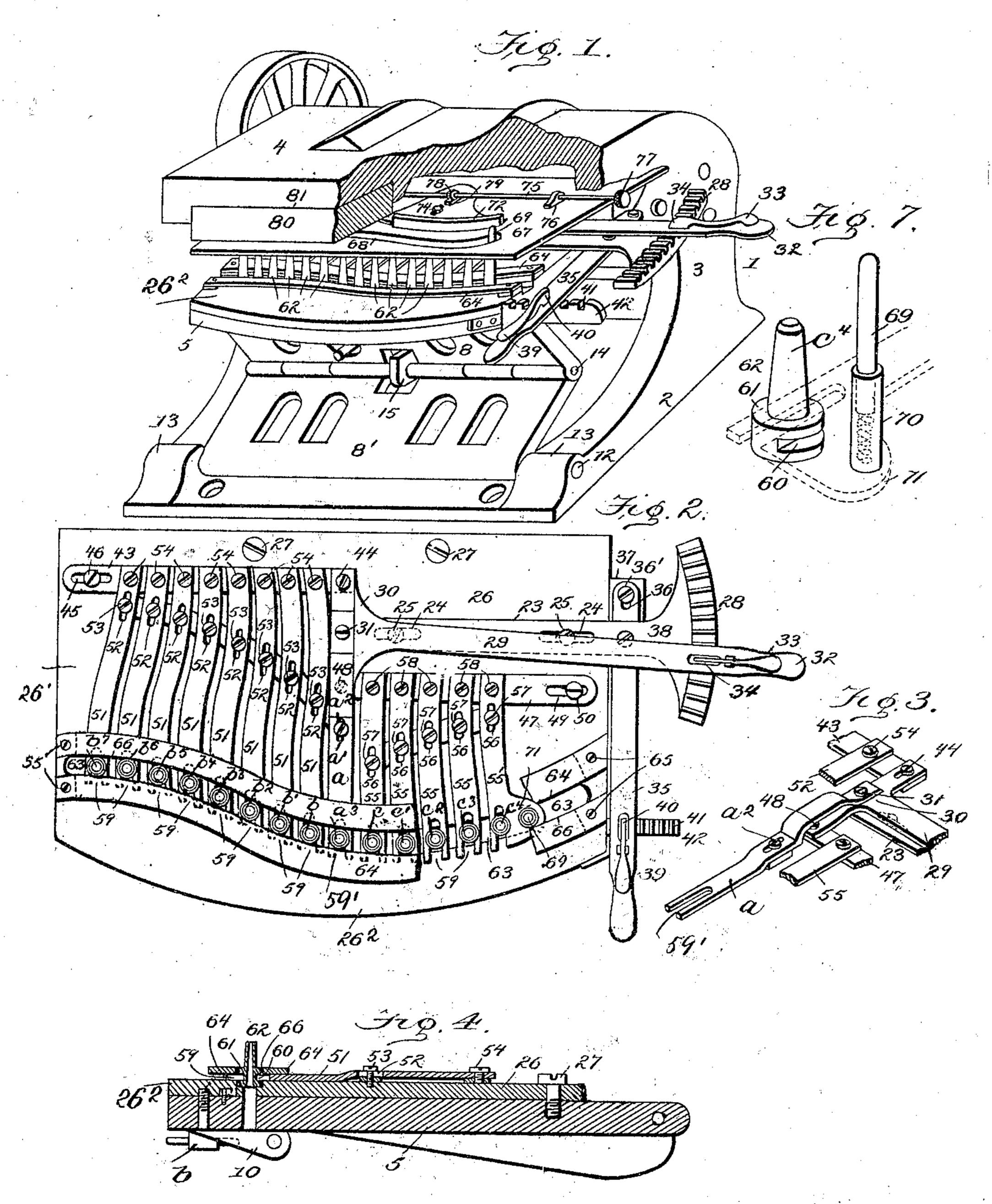
Patented July 3, 1900.

W. W. GREEN. EYELET HOLE MACHINE.

(Application filed Mar. 18, 1897.)

(No Model.)

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WITNESSES

Odwan L. Bradford Theo L. Gatches. INVENTOR

W.W. Green

ATTORNEYS

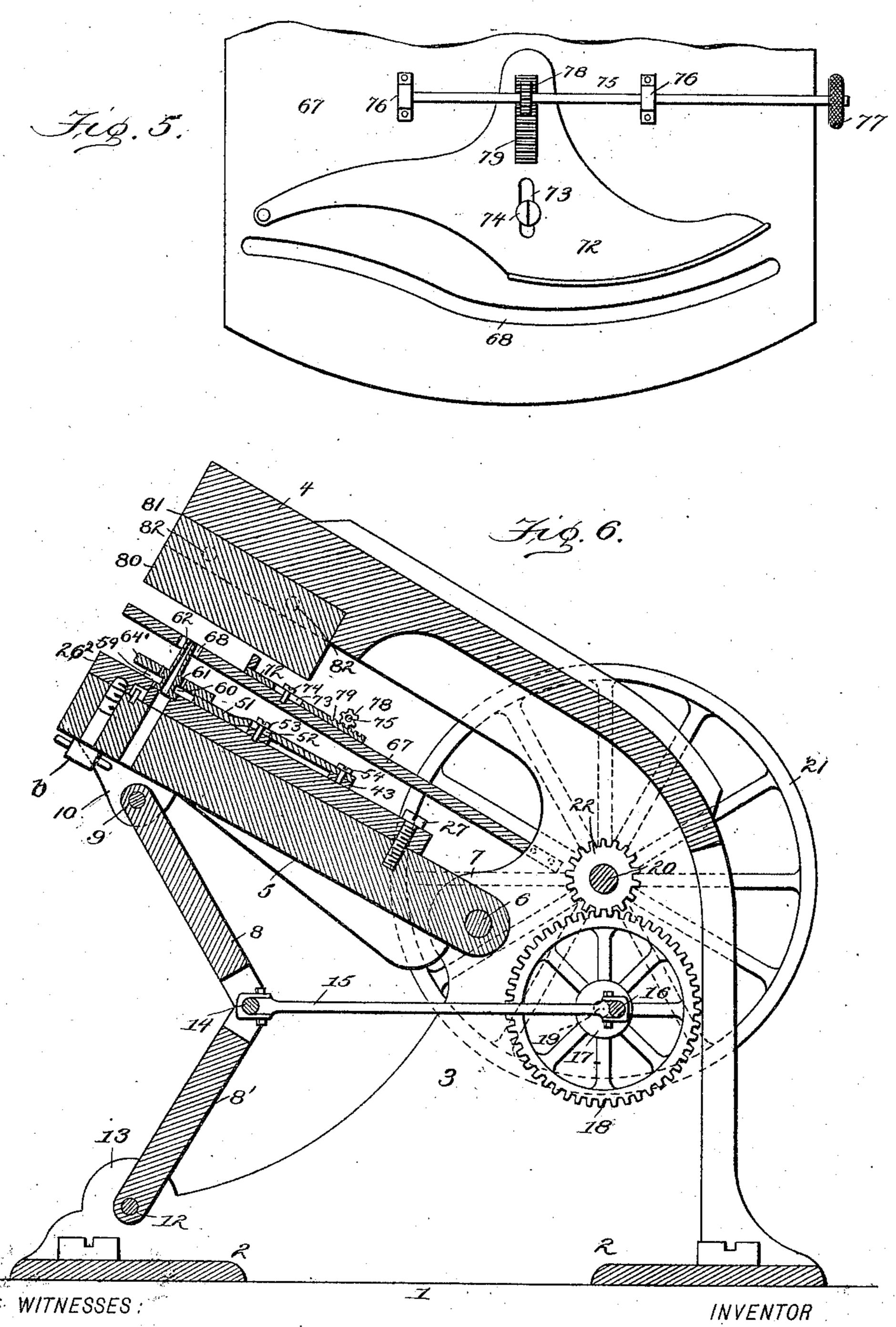
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Theo. L. Satches.

W.W. Green

Markey, ATTORNEYS.

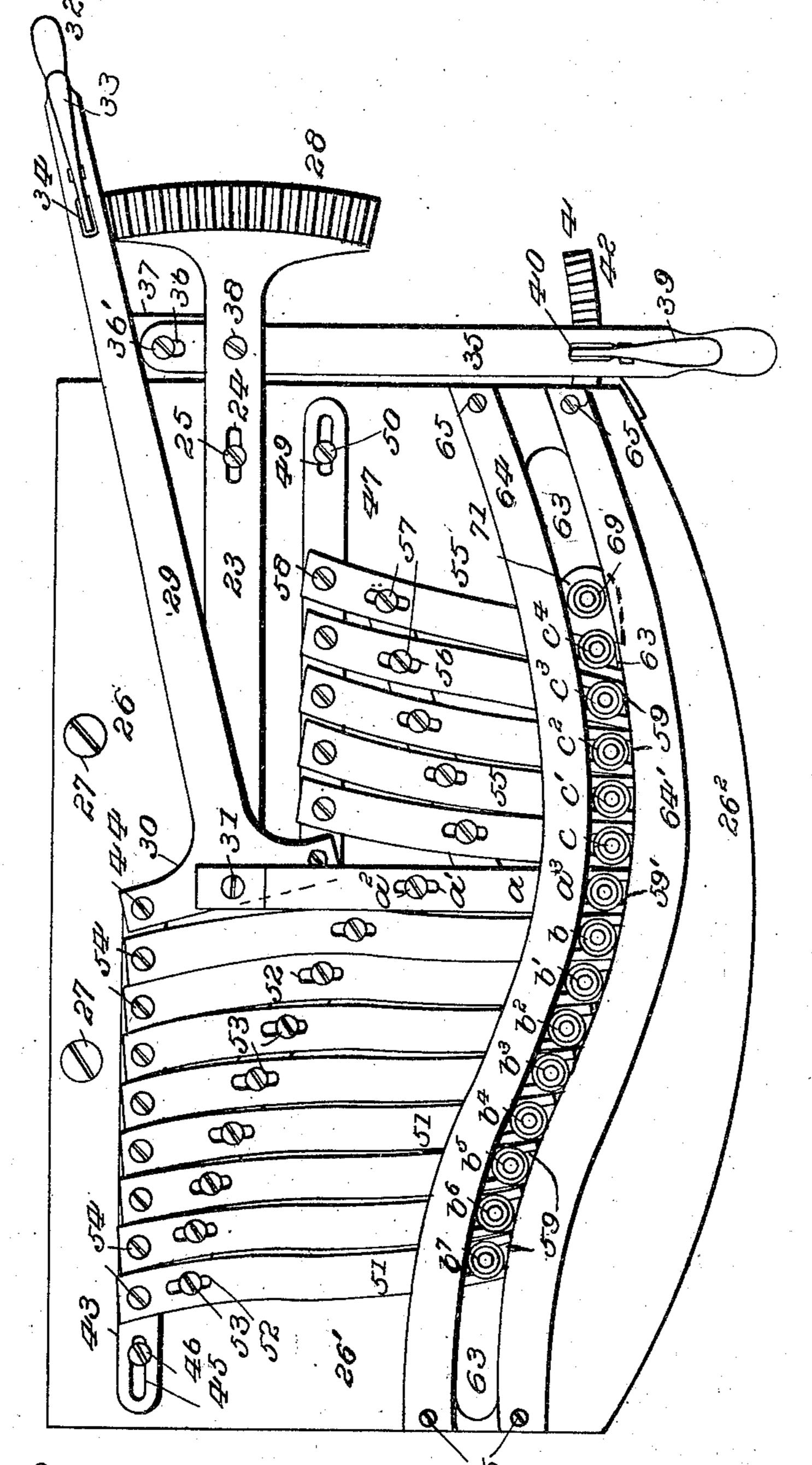
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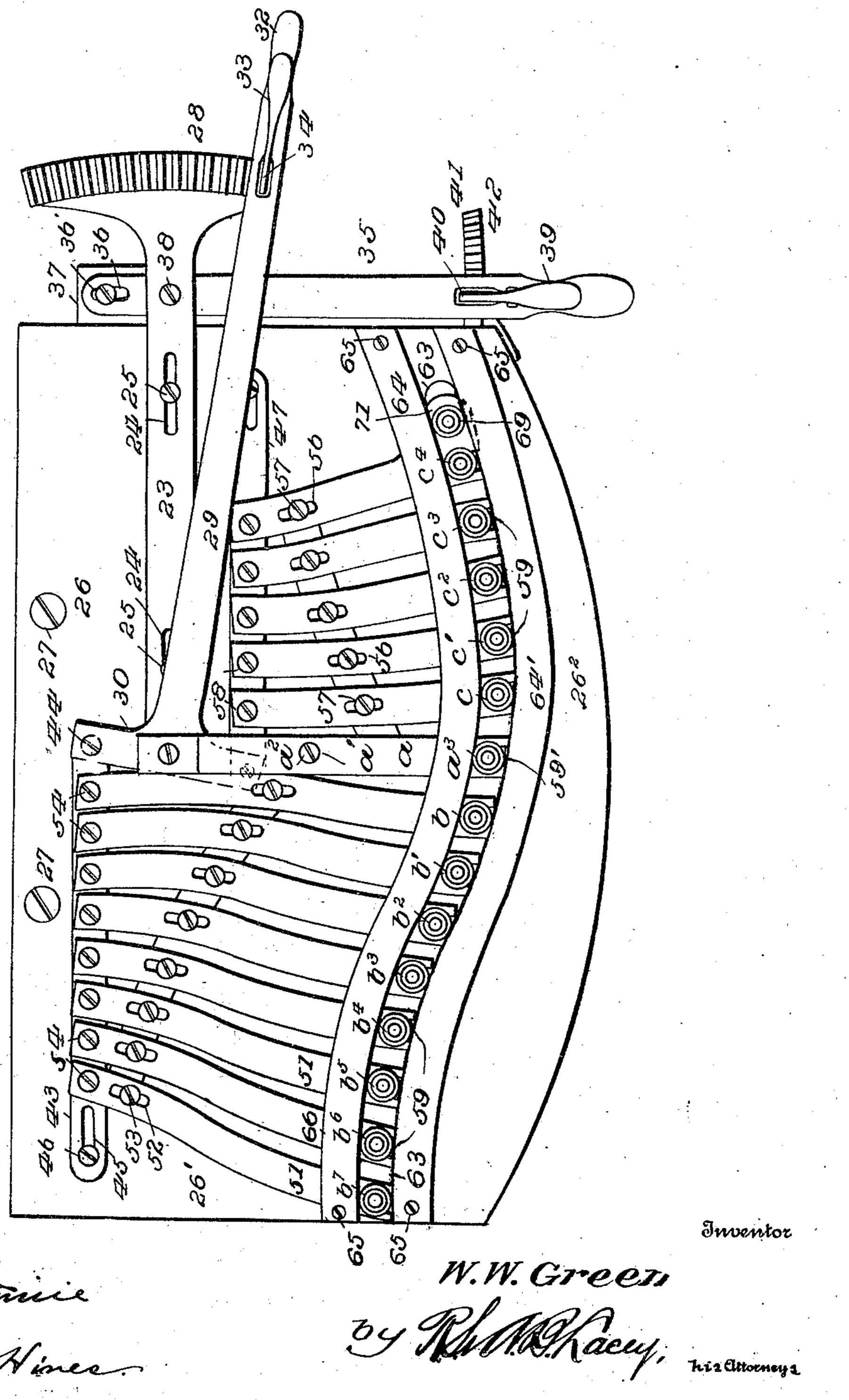
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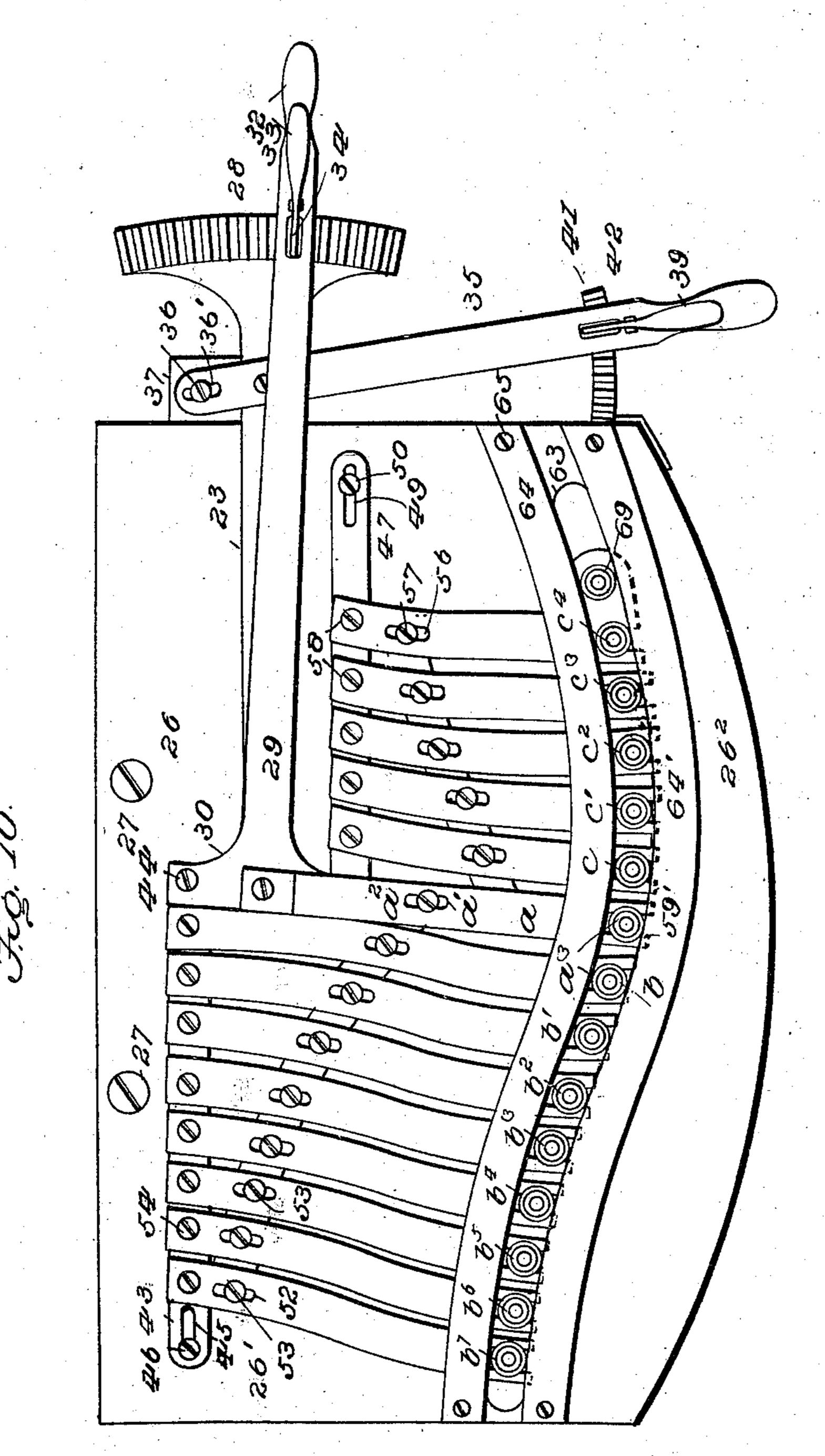
Witnesses

W. W. GREEN. EYELET HOLE MACHINE.

(Application filed Mar. 18, 1897.)

(No Model.)

6 Sheets—Sheet 5



Inventor

Witnesses Prince
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W.W. Green

By Rinds acy, Triz attorneys

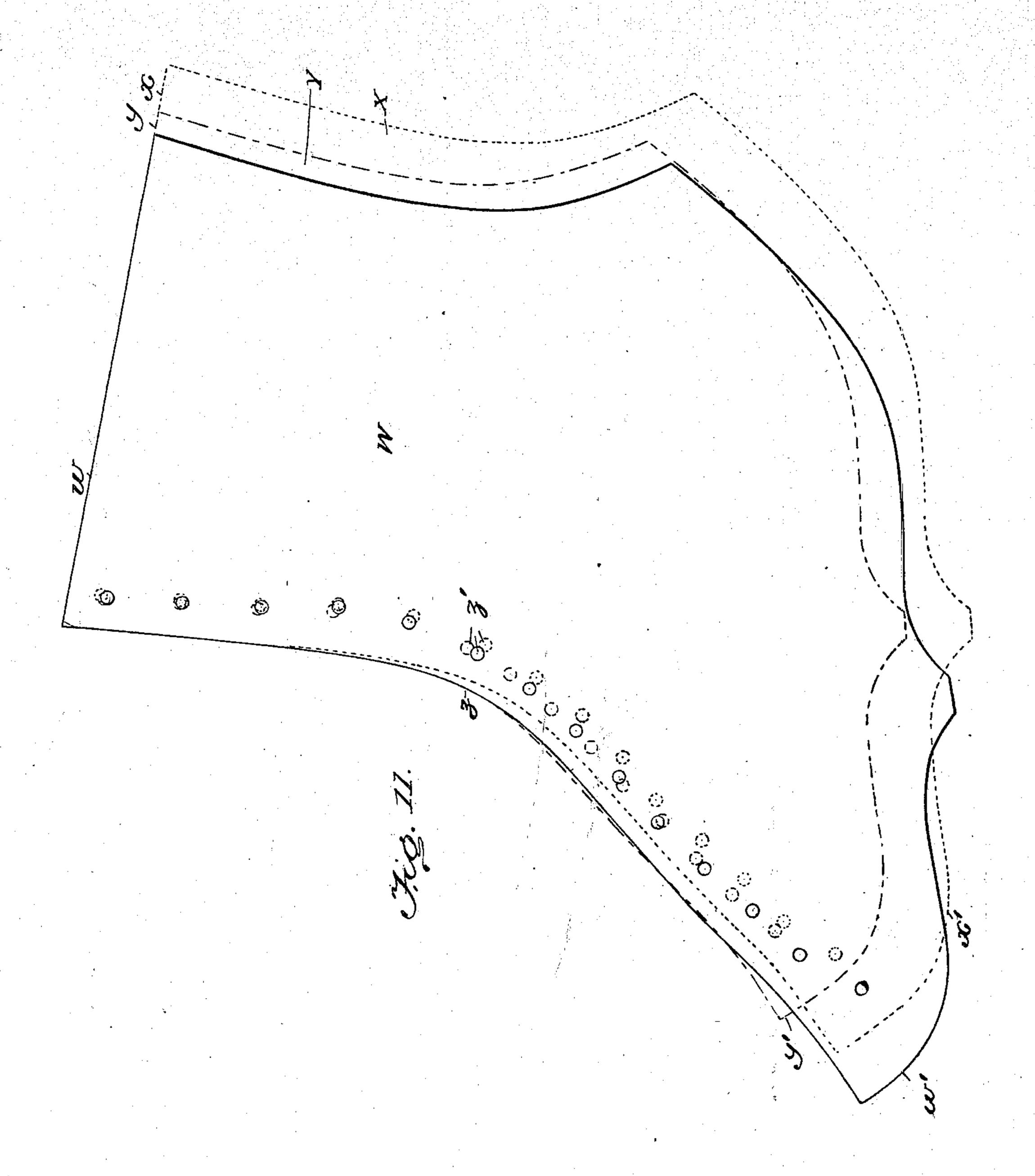
Patented July 3, 1900.

W. W. GREEN. EYELET HOLE MACHINE.

(Application filed Mar. 18, 1897.)

(No Model.)

6 Sheets-Sheet 6.



Inventor

Witnesses

W. W. Green
by Relacy Tris attorneys

UNITED STATES PATENT OFFICE.

WILLIAM W. GREEN, OF FORT DODGE, IOWA, ASSIGNOR OF ONE-HALF TO ROBERT O. GREEN, OF SAME PLACE.

EYELET-HOLE MACHINE.

SPECIFICATION forming part of Letters Patent No. 653,139, dated July 3, 1900. Application filed March 18, 1897. Serial No. 628, 156. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. GREEN, a citizen of the United States, residing at Fort Dodge, in the county of Webster and State of Iowa, have invented certain new and useful Improvements in Machines for Punching Eyelet-Holes in Boot and Shoe Uppers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such 10 as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved machine for punching eyelet-holes in boot and

shoe uppers.

The invention has for its objects to provide novel punch mechanism for simultaneously punching the entire series of eyelet-holes in one-half of an upper at one operation, to provide means for adjusting the junches toward 20 or from each other to operate upon different sizes or lengths of uppers, to further provide means for adjusting the punches to vary their angular line of curvature and adapt them to operate upon different widths of uppers, and, 25 finally, to improve and simplify the construc-

tion and render more efficient the operation of this class of machinery generally.

To these ends the invention consists in the features and in the construction, combination, 30 and arrangement of parts hereinafter more fully described, and set forth in the appended claims, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view of my improved punching-machine, a portion of the frame and die-block being broken away to expose the stripper-plate. Fig. 2 is a top plan view of the pivoted punch-jaw and punch-40 operating mechanism. Fig. 3 is a detailed perspective view of the central punch-lever and connections. Fig. 4 is a longitudinal section of the pivoted punch-jaw on the line of one of the punch-levers. Fig. 5 is a top plan 45 view of the stripper-plate and adjustable gageplate. Fig. 6 is a vertical longitudinal section of the entire machine. Fig. 7 is a detailed perspective view of the end punch C4 and the

spring gage stud and shows in dotted lines the

50 outer end of punch-lever 55'. Figs. 8, 9, and 10

are diagrammatic views showing different adjustments of the punch-levers and punches; and Fig. 11 is a diagrammatic view showing in full and broken lines upper halves of dif-

ferent sizes and widths.

Referring now more particularly to the said drawings, 1 represents the frame of the machine, consisting of the base 2, the side standards 3, and the inclined fixed platen 4. Below this platen is a vertically-tilting support 60 or punch-jaw 5, fulcrumed at its inner end on a transverse shaft 6, mounted in ears 7, formed integrally with the standards 3. The free end of the punch-jaw is mounted to tilt upon two toggle-jointed leaves 88', the said 65 leaf 8 being pivoted at its upper end to a transverse rod 9, fixed in ears 10 on the jaw 5, and the lower end of the leaf 8' on a similar rod 12, fixed in ears 13 on the base 2. At their meeting ends or edges the leaves are 70 jointed by a pintle rod or shaft 14.

The forward end of a connecting-rod 15 is pivoted to the rod or shaft 14, and the rear end of said rod is pivotally connected to a crank-pin 16, carried by the hub 17 of a gear- 73 wheel 18, rigidly mounted on a shaft 19, journaled in the frame 1. A drive-shaft 20, also journaled in the frame, carries a band-wheel 21 and a pinion 22, which meshes with the said gear-wheel 18. The manner in which 80 the punch-jaw is tilted by the mechanism just

described will be readily understood.

The support or tilting jaw carries on its upper face a bed-plate 26, secured thereto by screws 27, and on this plate the punch-carry- 85 ing and adjusting mechanism is mounted. I will first proceed to describe said adjusting mechanism and then the construction, arrangement, and mode of operation of the punch-levers and punches.

On the plate 26 is a transverse arm 23, provided with slots 24 for passage of screws 25, whereby it is secured to and fitted to slide on said plate. The outer end of the arm projects laterally at one side of the jaw and is 95 provided with a curved rack 28. Located above the arm is an adjusting-lever 29, having at its inner end a T or cross head 30, pivoted centrally to the inner end of said arm by a screw 31. The outer end of the lever is 100 formed with a handle 32, carrying a thumblever 33, having a pawl 34, adapted to engage the rack 28.

A second adjusting-lever 35 is arranged at 5 one side of the jaw and substantially at right angles to the lever 29. This lever 35 is provided at its inner end with a slot 36 for passage of a screw 36', which pivots it to a bracket 37, projecting from the jaw 5, and adjacent to thereto the lever is also pivoted to the transverse arm by the screw 38. The free end of said lever projects outwardly at the front of the jaw and carries a thumb-lever 39, having a pawl 40, adapted to engage the notches 41 15 of the rack 42.

Located at the rear end and to the left of the center of the jaw is a sliding plate or bar 43, which is pivoted at its inner end to the outer or rear end of the head 30 by the screw 20 44, and formed at its outer end with a longitudinal slot 45, through which a pivot-screw 46 passes. This bar is adapted to slide transversely of the plate 26 to the extent of the length of the slot 45. A similar sliding plate 25 or bar 47 is located to the right of the center of the jaw in front of and parallel with the transverse arm 23, and is pivoted at its inner . end to the inner or front end of the T-shaped head 30 by a screw 48, and provided at its outer 30 end with a longitudinal slot 49, through which a pivot-screw 50 passes and enters the plate 26. This bar is also adapted to slide transversely of the plate 26 to an extent limited by slot 49.

Two sets or series of curved punch-levers are 35 pivoted to said plates or bars to move simultaneously or in unison. The levers 51 of one set are each provided with a slot 52 for passage of a fulcrum-screw 53, and the inner ends of these levers are pivoted to the sliding bar 43 40 by screws 54. The levers 55 of the other set are provided with similar slots 56 for passage of fulcrum-screws 57 and have their inner ends pivoted to the bar 47 by screws 58.

These screws 53 58 enter the bed-plate 26. 45 Each lever 51 55 is formed at its outer end with an open end slot or bifurcation 59, which receives the collar 61 of a tubular punch 62. The said collar 61 of each punch is preferably formed with a groove or recess 60 to receive

50 the edge of one of the arms of the bifurcation. By this construction independent rotative movement of the punch is prevented, while provision is made for readily and conveniently sliding it out of the slot and disen-

55 gaging it from the punch-lever. A central punch-lever a is arranged between

the two sets of punch-levers 51 55 and is pivoted at its inner end to the transverse arm 23 by the screw 31. This lever is formed 60 with a slot a' for passage of a fulcrum-screw a^2 , which enters the plate 26 and at its outer end with a slot or bifurcation 59', corresponding to the slots 59 of the other levers. The function of this central lever will be herein-65 after described. The pivotal points of the

curved line or in the arc of a circle, beginning with the innermost lever and extending outwardly and rearwardly therefrom. other words, the fulcrum-screws of the sev- 70 eral levers are located at different distances from their outer ends, from the screw of the innermost lever, which is the nearest, to the screw of the outermost lever, which is the farthest, the screw of each lever being ar- 75 ranged a step farther back in regular order or progression. By this construction the outer ends of the levers of both sets, when adjusted toward the central lever a, move closer together or toward each other and when ad- 80 justed in the reverse direction spread apart or move from each other. The extent of throw of each lever may be regulated by changing the position of the fulcrum-screw in its slot.

For convenience in explaining the mode of 85 operation of the punches those punches carried by the levers 51 are designated b b' b2 b3 b4 b5 b6 b7 and those carried by the levers 55 $c c' c^2 c^3 c^4$. In operation the latter-named punches form the eyelet-holes at the upper 90 portion of the upper and the former the eyelet-holes at the lower portion of the upper. The central punch-lever carries a punch a^3 , which forms an intermediate punch-hole from which the others graduate in different sizes 95 and lengths of upper halves, as will appear

more fully hereinafter.

The bed-plate 26 consists of two sections, a rear section 26', secured, as before stated, by the screws 27 to the punch-jaw, and a de-roo tachable front section 262, secured by thumbscrews b, projecting up through the punchjaw and entering threaded orifices in its under side, as shown in Fig. 4. The inner edges of these two sections are spaced apart and ros curved to form between them an angularly or irregularly curved guide-slot 63, in which the base portions of the collars 61 of the punches are adapted to fit and slide, as shown in said figure. This slot is made to conform as 110 nearly as possible to the curvature of the meeting edges of upper halves of different sizes and widths, the different adjustments being secured by moving the punches in said slot.

The punches are supported and guided by guard-plates 64 64', secured, respectively, to the bed-plate sections 26' 262 by screws 65. By releasing the thumb-screws b from engagement with said bed-plate section 262 the lat- 120 ter, together with the guard-plate 64', may be detached to permit of all or only a portion of the number of punches as desired being disengaged from the punch-levers. The machine may thereby be quickly set to work 125 upon the upper halves of low-quarter shoes or to leave an unpunched space at the upper portions of upper halves of ordinary high shoes for the reception of lace-fasteners which do not require eyelet-holes.

The function of the lever 29 is to adjust the levers of each set 51 55 are arranged in a l punches toward or from each other to operate

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upon different lengths or sizes of uppers 2, 21, 3, $3\frac{1}{2}$, 4, &c., and that of the lever 35 to adjust the punches to vary their line of curvature to operate upon different widths of up-5 pers—namely, A, B, C, &c. Fig. 8 shows the punches adjusted close together or toward each other for operating upon small-sized uppers, and Fig. 9 shows the punches spread apart for operating upon uppers of larger size. 10 The proportions of the parts in these figures are somewhat exaggerated in order to clearly disclose the effect of the different movements. The necessity for these different adjustments will be understood by reference to Fig. 11. 15 This figure shows in full lines an upper half of size 7, width A, in short dotted lines an upper half of size 7, width E, and in alternate long and short broken lines an upper half of size 4, width A. The positions of the eyelet-20 holes punched in each upper are also shown. These uppers are represented, respectively, by the reference-letters W.XY. w designate the upper and lower edges or ends of the upper W, xx' the upper and lower ends 25 or edges of upper X, and y y' the corresponding ends or edges of upper Y. The uppers are represented as placed with their upper edges and upper portions of their meeting edges in alinement, and it will be noted that 30 their inner side or meeting edges are of substantially the same shape or contour down to the point z. The lower portions of the uppers from this point, however, vary in line of curvature down to their lower ends w'y'z'. This variation exists to a greater or less extent in the several widths from A to E, and in order to accommodate the punches to operate upon these different widths their angular line of curvature must be varied by adjusting 40 them together or in a body in the curved slot 63. As an example, in a full-sized machine the punch c^4 , carried by lever 55' of set 55, in order to punch width A must be located five-sixteenths of an inch farther to the left, 45 measuring from any certain point, such as the end of the guide-slot, than to punch width E, while at the same time the punch b7, carried by the corresponding lever of set 51, in order to punch width A must be located five-eighths 50 of an inch farther to the left than to punch

The eyelet-hole z' in each upper opposite the point z is formed by the punch a^3 , carried by the central punch-lever a, the eyelet-55 holes below the same or at the lower portion of the upper by the punches b b' b2, &c., and the eyelet-holes above or at the upper portion of the upper by the punches c c' c^2 , &c. It will be seen that this eyelet-hole z' is lo-60 cated at approximately the same distance from the upper edge of the uppers W and Y, although they are of different sizes, but that the remaining punch-holes are spaced farther apart in upper W than in upper Y in order 65 to cover the greater distance between its upper and lower edges. From this it will be understood that the punches carried by the ladjusted to operate upon different widths of

width E.

sets of levers 51 55 are moved toward or from each other and toward or from the punch carried by lever a in adjusting them to oper- 70 ate upon different sizes or lengths of work. When the lever 29 is moved inwardly or toward the rear of plate 26, as shown in Fig. 8, the free ends of the punch-levers 51, through the medium of bar 43, are moved toward the 75 right, and the free ends of levers 55, through the medium of bar 47, are moved toward the left, thus bringing the punches closer together. Upon the said hand-lever 29 being moved outwardly, as shown in Fig. 9, the punch- 80 levers are adjusted in the reverse direction and the punches spread apart. The central punch-lever a, it will be noted, is not connected with the hand-lever 29, and therefore remains stationary when said hand-lever is 85 moved and serves as a fixed point toward or from which all the levers 51 55 are adjusted. To this is due the substantially-coinciding positions of the punch-holes z' in the uppers $\mathbf{W} \mathbf{X} \mathbf{Y}$.

When the lever 35 is moved outwardly or to the right, as shown in Fig. 10, it carries with it the transverse arm 23 and sliding bars 43 47. This movement of the sliding bars to the right causes all of the punch-levers, in- 95 cluding the central lever a, to turn on their fulcrums, the screws 52 57 a^2 , respectively, and the free ends thereof carrying the punches to move toward the left. The position of the punches as a whole in the slot 63 is thereby 100 changed and their line of curvature varied. It will be understood that this variation in the line of curvature is effected by the change in position of the punches b b' b2, &c., carried by the levers 51 at the inwardly and out- 105 wardly curved portion of the slot at the lefthand end, the line of curvature of the remaining punches being substantially the same in all the adjustments for widths. It follows, therefore, that provision is made for adjust- 110 ing those punches which form the punchholes at the lower portions of uppers, which vary in line of curvature in different widths and for maintaining the proper line of curvature of those punches which form the punch- 115 holes at the upper portions of uppers, which upper portions are substantially the same in line of curvature in all widths, as clearly illustrated in Fig. 11. By moving the lever 35 inwardly the parts are adjusted in the re- 120 verse direction.

The distance between the end punches b^7 c^4 remains approximately the same in punching all widths of uppers of a given size. In adjusting the punches by lever 35, however, 125 they move to a slight extent toward or from each other, according to the direction in which they are adjusted, but to a less extent than when adjusted by lever 29.

It will be apparent from the above descrip- 130 tion that the punches when adjusted to operate upon different sizes or lengths of work move toward or from each other, but when

work of a given size change their position as a whole to vary their angular line of curvature in the slot 63.

A stripping-plate 67, which serves as a 5 guide, is fixed to the frame above the punchjaw and is provided near its front end with a sinuous or irregularly-curved slot 68, through which the punch-tubes move. 69 represents a spring gage-pin sliding in a barrel 70, mount-10 ed upon an ear or extension 71, formed on the outer side of the curved lever 55'. This pin projects through the slot 68 in the stripper-plate and forms a gage for the top of the upper to locate the series of eyelet-holes, so 15 that the first eyelet-hole will always be the same distance from the top edge of the upper no matter in what position the punches may be adjusted. On the stripping-plate is a curved gage-plate 72, against which the 20 meeting edge of the upper rests. This gageplate is pivoted at one end and provided with a central slot 73, through which a screw 74 passes and secures it to the stripping-plate. In order to adjust the gage-plate, I provide 25 a shaft 75, journaled in bearings 76 and having at its outer end a milled head 77, by means of which it may be conveniently manipulated. The shaft carries a pinion 78, which engages a rack 79 on the gage-plate. By adjusting 30 the gage-plate the location of the eyelet-holes may be varied relatively to the edge of the

The fixed platen 4 carries a die-block 80, which fits in a recess 81 in its under side and 35 is held by means of set-screws 82. This block may be removed to expose either of its faces or to substitute a new block therefor by re-

leasing said screws 82.

upper.

punched.

In operation the upper is laid upon the 40 stripping-plate with its upper edge abutting against the spring gage-pin 67 and its meeting edge abutting against the gage-plate 72, and then the punch-jaw 5 is tilted to force the punches through the upper and against 45 the die-block. The cuttings drop through the punches and slots in the bed-plate and

punch-jaw to the floor or ground.

From the foregoing description it will be seen that the adjustment of the punches is 50 very sensitive and varied. These punches are simultaneously movable inwardly toward or outwardly from each other to compensate for a difference in sizes of uppers or to place the eyelet-holes closer together or farther 55 apart within the same size. In their movement the punches are guided in a curved slot having a partial contour differing from a continuous or regular arc of a circle and thereby are caused to accommodate upper sections 60 having an irregular curved edge line adjacent to which the said eyelet-holes are to be

Although I have specifically described the construction and relative arrangement of the 65 several elements of my invention, I do not desire to be confined to the same, as such changes or modifications may be made as

clearly fall within the scope of the invention without departing from the spirit thereof.

Having thus fully described my invention, 70° what I claim as new and useful, and desire to

secure by Letters Patent, is-

1. In a machine of the character described, the combination of two sets of pivoted punchlevers 51 55, a central punch-lever a arranged 75 between said two sets, punches carried by said levers, means for moving the free ends of said levers of sets 51 55 to adjust the punches toward or from each other and toward or from said central lever, and further means for mov-80 ing the free ends of all of the levers in the same direction to vary the line of curvature of the punches, as set forth.

2. In a machine of the character described, the combination of a punch-jaw, a bed-plate 85 thereon having a slot and a detachable front section, a series of pivoted punch-levers having bifurcated outer ends arranged above said slot, punches fitted in the slot and bifurcated ends of the levers, and a guard-plate connect- 90 ed with said detachable bed-plate section,

substantially as set forth.

3. In a machine of the character described, the combination of a punch-jaw having a curved guide-slot, a set of punches moving in 95 said slot, means for simultaneously adjusting the punches toward or from each other, and further means for simultaneously adjusting said punches in the same direction to change their position in the guide-slot and thereby roo vary their line of curvature, as set forth.

4. In gang-punches, the combination of the tilting punch-jaw, the sliding bars 43 47 on said jaw, the two sets of punch-levers connected with the bars and carrying punches, 105 and a lever 29 pivotally connecting said sliding bars to simultaneously move the punchlevers and adjust the punches to operate upon different sizes of uppers, substantially as described.

5. In gang-punches, the combination of the tilting punch-jaw, the sliding bars 43 47 on said jaw, the two sets of punch-levers connected with the bars and carrying punches, a lever 29 pivotally connecting said sliding 115 bars to move the punch-levers and adjust the punches to operate upon different sizes of uppers, an arm 23 connected with the said lever 29 and jaw to have limited independent sliding movement, and a pivoted lever 35 con- 120 nected with said arm, whereby the punch-levers may be adjusted to conform to the width of the shoe-upper being operated upon, substantially as described.

6. In gang-punches, the combination of a 125 platen, a tilting punch-jaw provided with a slot, a fixed stripping-plate having a slot in alinement with that in the jaw, a series of punches adjustable in the slot of the jaw, a gage-plate pivoted to the stripping-plate ad- 130 jacent to the slot therein and having a slotand-stop connection therewith and a rack, and a shaft mounted on said stripping-plate and provided with a pinion to engage said

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rack and adjust the gage-plate, substantially as described.

7. In gang-punches, a frame having a platen, a fixed stripping-plate below the platen pro-5 vided with a slot, an adjustable gage-plate on the stripping-plate, a punch-jaw pivoted to tilt below said stripping-plate, mechanism for tilting the jaw, the sliding bars 43 47 on said jaw, the two sets of punch-levers con-10 nected therewith, a sliding arm 23, a lever 29 pivoted to said arm and to the sliding bars, the lever 35 also pivoted to said arm and the jaw, and punches connected with said punchlevers, substantially as described.

8. In gang-punches, the combination with a frame, of the tilting punch-jaw, the sliding bars 43 47 mounted on said jaw, the two sets of punch-levers connected to the bars and carrying punches, a pivoted lever 29 having at - 20 one end a head pivotally connecting said sliding bars to adjust the punch-levers and punches to operate upon different sizes of uppers and provided at its free end with a pawl, an arm 23 connected with the said lever 25 29 and jaw to have limited independent sliding movement and provided at its outer end with a rack with which the pawl on said lever 29 is adapted to engage, and a pivoted lever 35 connected with said arm and pro-30 vided with a pawl to engage a rack 41 on said

9. In gang-punches, the combination of a frame having a platen, a tilting punch-jaw provided with a curved slot 63, a stripping-35 plate interposed between the punch-jaw and platen and provided with a slot in alinement with the slot in the jaw, adjustable bars 43 47 mounted on the punch-jaw, the two sets of punch-levers 51 55 pivoted to said bars, 40 punches connected with said levers, and a spring gage-pin mounted upon the outer punch-lever 55' of the set of punch-levers 55 and projecting through the slot in the said stripping-plate, substantially as described.

frame, substantially as described.

45 10. In gang-punches, the combination with a frame, having a platen, of a tilting punchjaw provided with a curved slot 63, a stripping-plate interposed between the punch-jaw and platen and provided with a slot, a guard-50 plate mounted on the jaw on either side of the slot therein, a pair of sliding bars 43 47 on the jaw, a set of punch-levers pivoted to each bar, each lever having its outer end bifurcated or formed with an open-ended slot, 55 a tubular punch 62 mounted on each of said levers, each punch having a base-collar 61 adapted to fit in said slotted or bifurcated end and formed with a groove 60 to receive one of the arms of the bifurcation, and a gage-60 pin connected with one of said sets of levers, substantially as described.

11. In gang-punches, the combination with a frame having a platen, of a tilting punchjaw, a stripping-plate interposed between the 5 punch-jaw and platen and provided with a slot, an adjustable gage-plate on said stripping-plate, a pair of adjustable bars 43 47 on |

said jaw, two sets of punch-levers 51 55 one set pivotally connected with each bar, a series of detachable punches carried by said le- 70 vers and projecting through the slot in the stripping-plate, a lever 29 pivoted at one end to the adjustable bars 43 47 and carrying at its outer end a pawl, an arm 23 connected with said lever and having a limited inde- 75 pendent sliding movement and provided with a rack with which the pawl on the lever 29 is adapted to engage, and a pivoted lever 35 connected with said arm, substantially as described.

12. In a machine of the character described, the combination of a frame, a movable punchjaw provided with a sinuously-curved transverse guide, a set of punches adapted to traverse the guide, and means for simultaneously 85 adjusting the punches in the same direction along the guide to cause the same to occupy a different portion of said guide and thereby vary their line of curvature.

13. In a machine of the character described, 90 the combination of two sets of pivoted punchlevers 51 55, carrying punches, said levers having two operative adjusting movements one in which the free ends of all the levers are simultaneously moved in one direction to 95 vary the line of curvature of the punches, and the other in which said free ends of the levers are adjusted toward or from each other to vary the distance between the punches, and means operatively connected with the 100 levers for effecting such adjustments.

14. In a machine of the character described, the combination of two sets of pivoted punchlevers 51 55 carrying punches, said levers having two operative adjusting movements-105 one in which the free ends of all the levers are simultaneously moved in one direction to vary the line of curvature of the punches, and the other in which said free ends of the levers are adjusted toward or from each other 110 to vary the distance between the punches, means for moving the levers to accomplish the first adjustment, and further means for moving the levers to accomplish the second adjustment.

15. In a machine of the character described, the combination of two sets of pivoted punchlevers 51 55, carrying punches, said levers having two operative adjusting movements one in which the free ends of all the levers 120 are simultaneously moved in one direction to vary the line of curvature of the punches, and the other in which said free ends of the levers are adjusted toward or from each other to vary the distance between the punches, a 125 central pivoted punch-lever a also carrying a punch and adapted to be moved with the other punch-levers in the first adjustment, but to remain stationary in the second adjustment referred to, and means for operat- 130 ing the levers to effect said adjustments.

16. In a machine of the character described, the combination of a bed-plate having a detachable front section separated therefrom

and forming therewith a guide-slot, a set of pivoted punch-levers, each having its outer end bifurcated or formed with an open-ended slot, a tubular punch carried by each lever, each punch being provided with a base-collar 61 adapted to fit in said slotted or bifurcated end, and formed with a groove 60 to receive one of the arms of the bifurcation, and guard-plates mounted on said bed-plate section at opposite sides of the guide-slot, wherebeath.

opposite sides of the guide-slot, whereby the front bed-plate section and the guard-plate may be detached to permit of the removal of the punches, substantially as described.

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17. In a machine of the character described, the combination of two sliding bars, a set of punch-levers pivoted to each bar, a trans-

verse arm, a pivoted hand-lever pivotally connecting said sliding bars, a central punch-lever arranged between said two sets of punch-levers and connected at its inner end 20 to said transverse arm but independent of said lever, punches carried by said punch-levers, and a second pivoted hand-lever operatively connected with the transverse arm, substantially as described.

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

WILLIAM W. GREEN.

Witnesses:
W. S. KENYON,
ED. SHERMAN.