

(No Model.)

6 Sheets—Sheet 1.

J. G. HARDIE, Jr.
PAPER FOLDING MACHINE.

No. 552,366.

Patented Dec. 31, 1895.

Fig. 1.

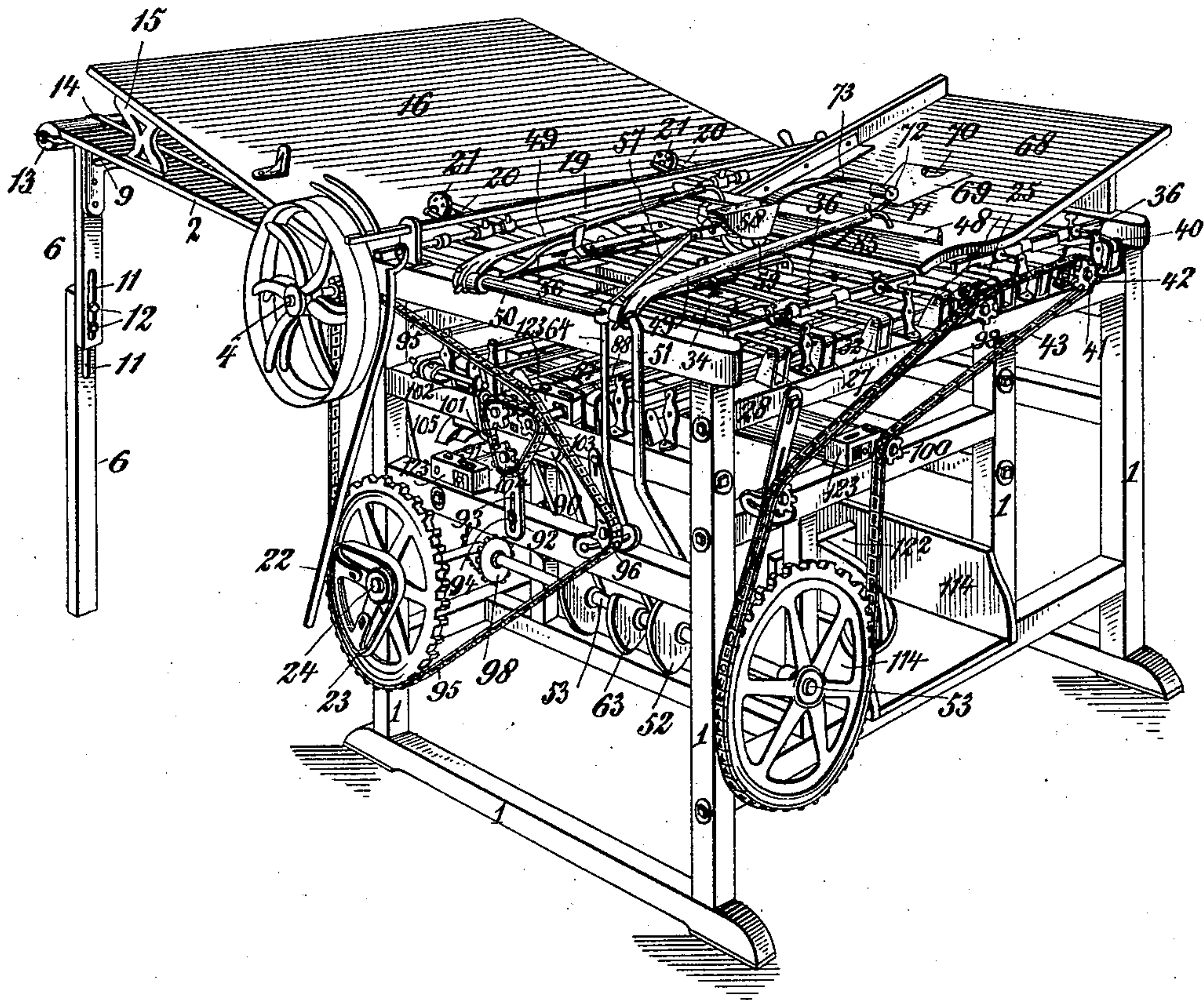
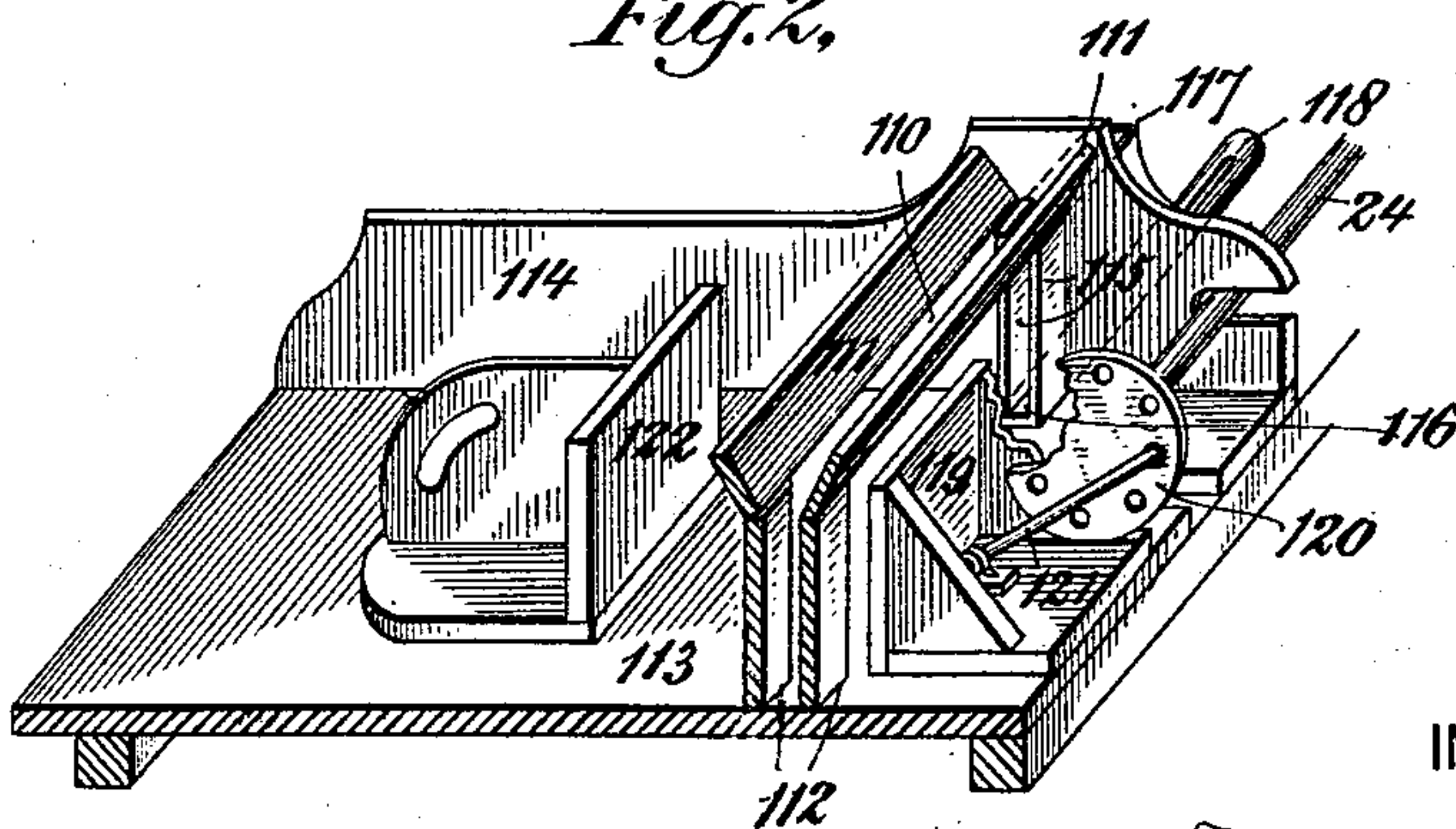


Fig. 2.



WITNESSES:

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(No Model.)

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Fig. 3.

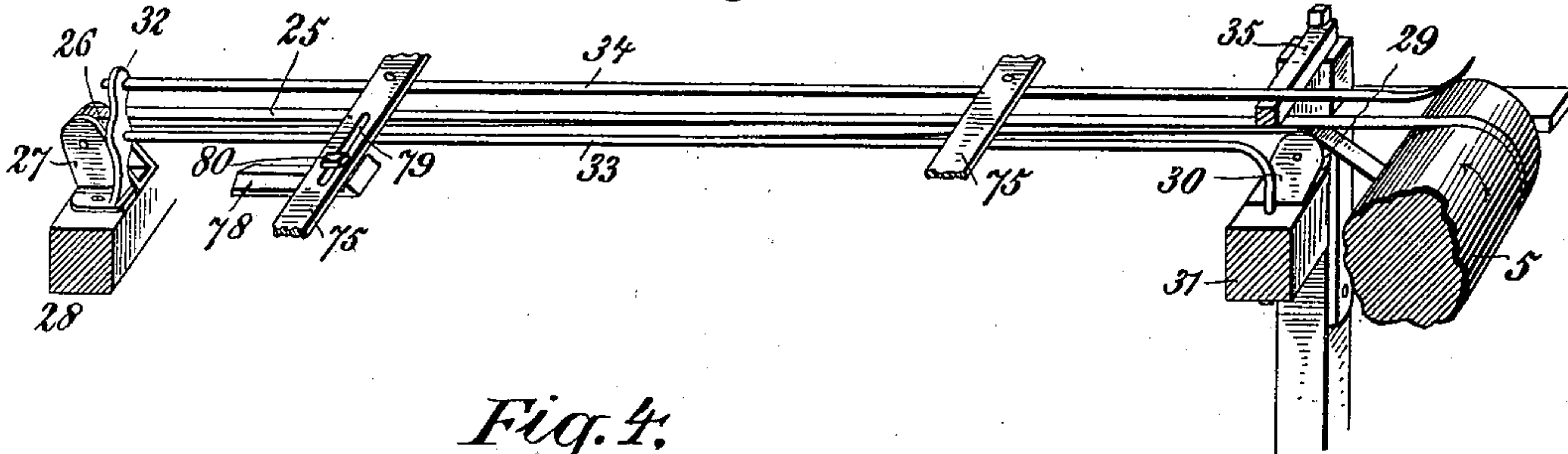


Fig. 4.

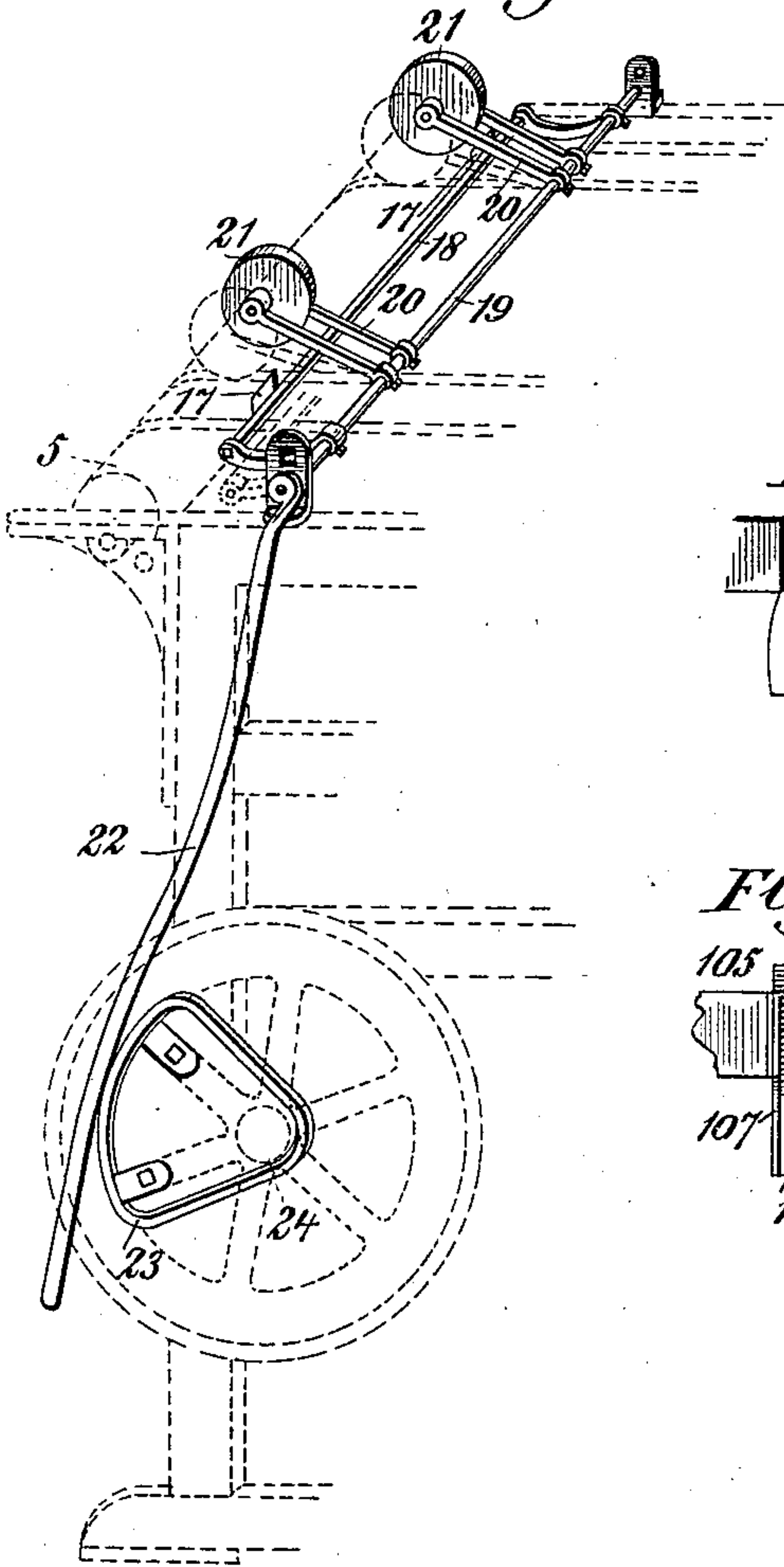


Fig. 5.

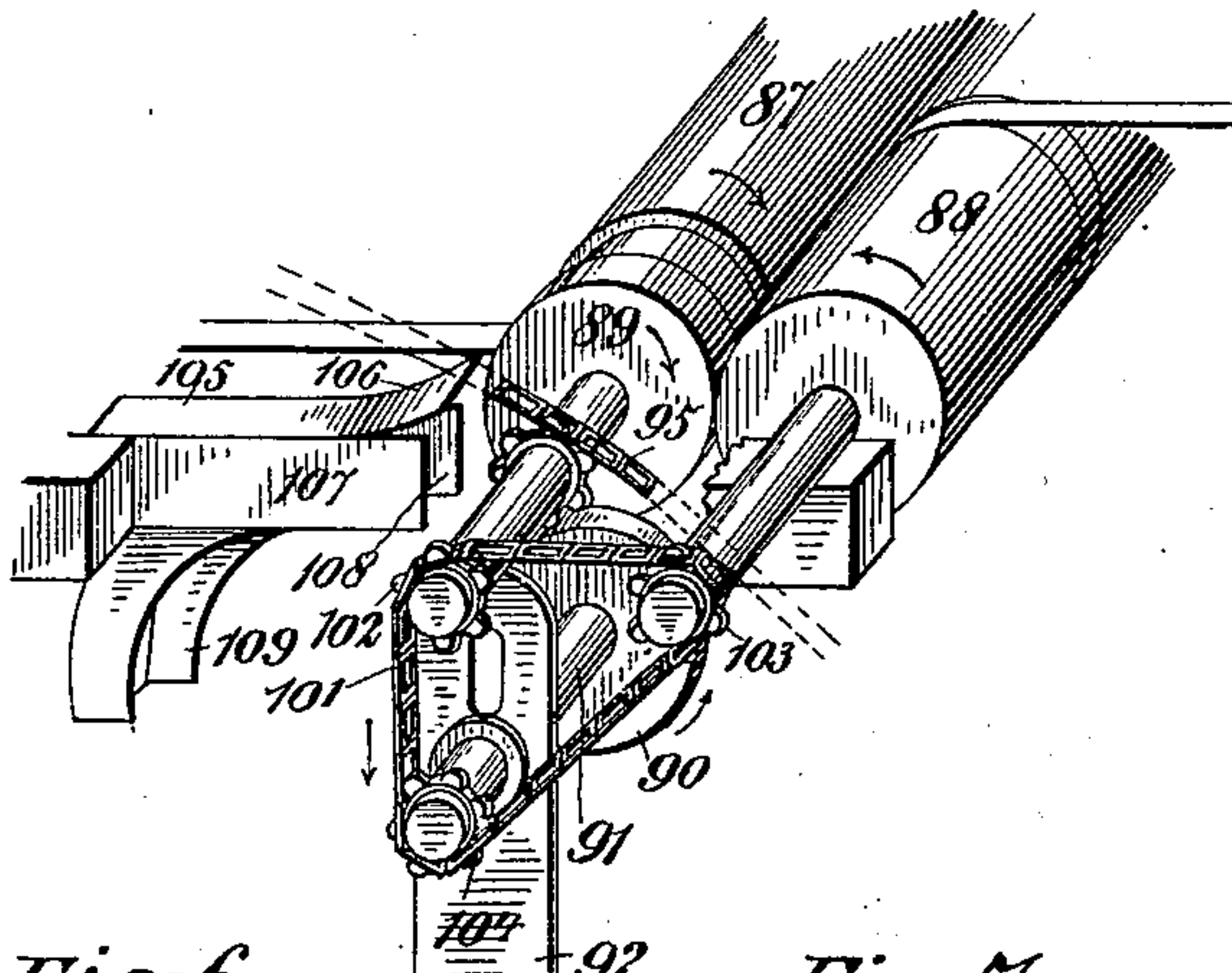


Fig. 6.

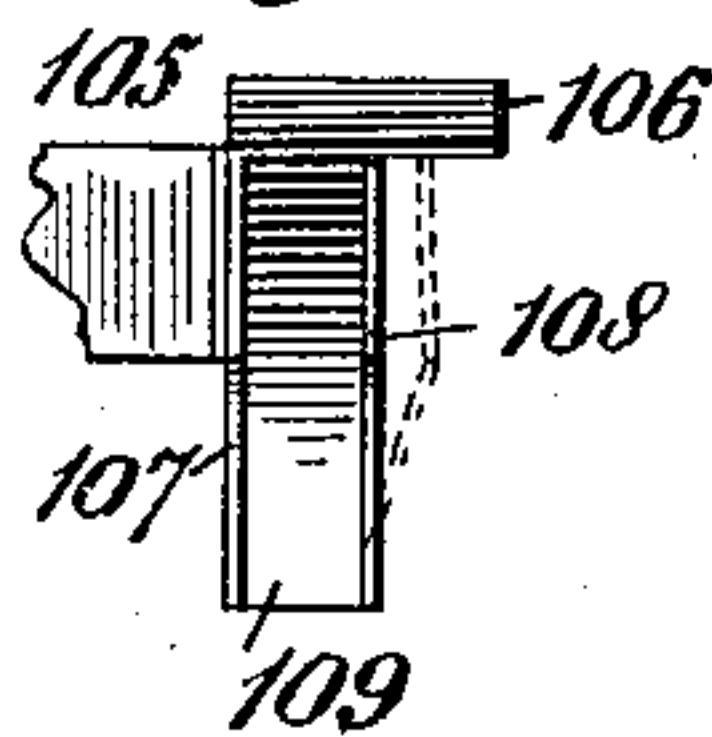


Fig. 7.

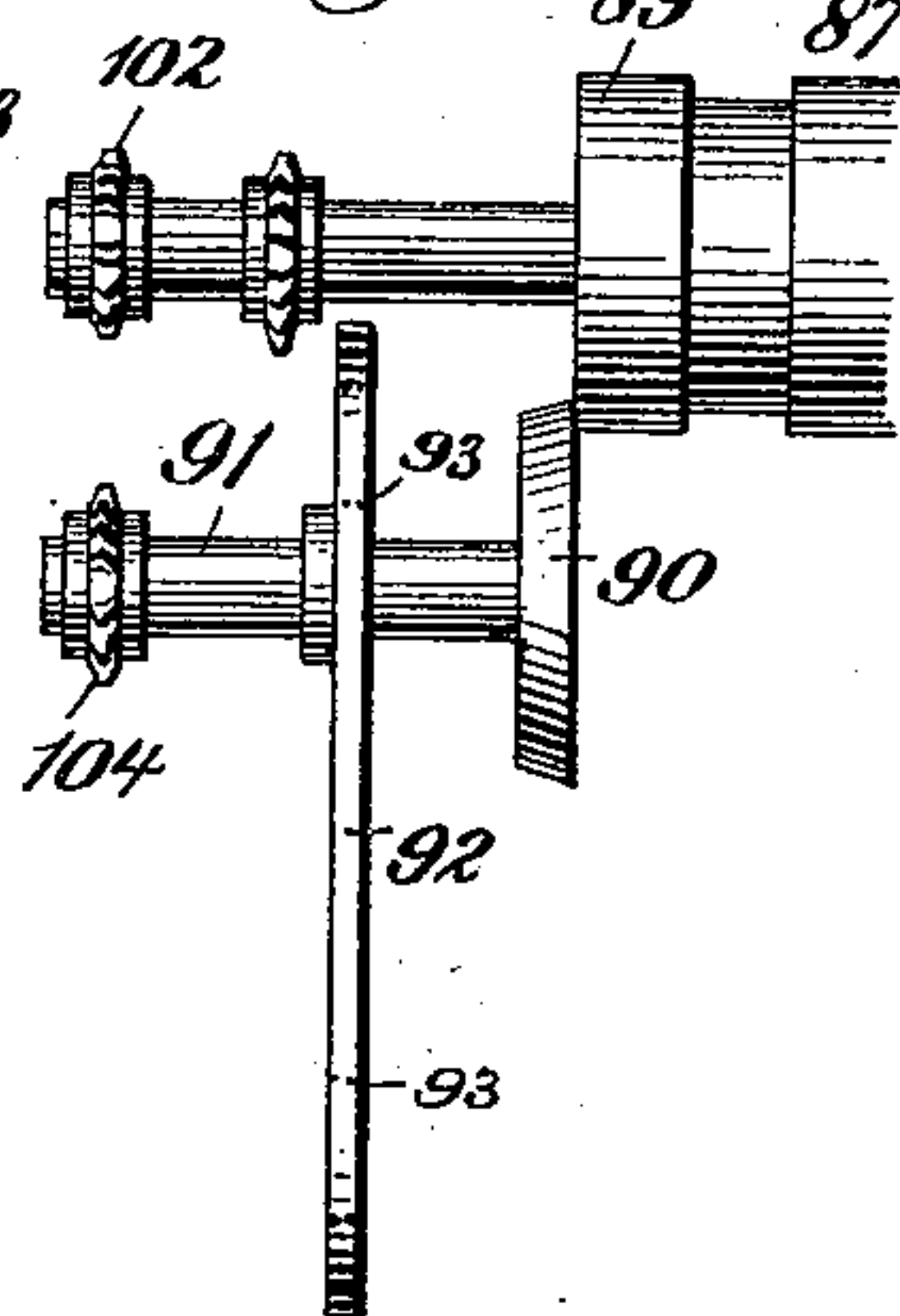
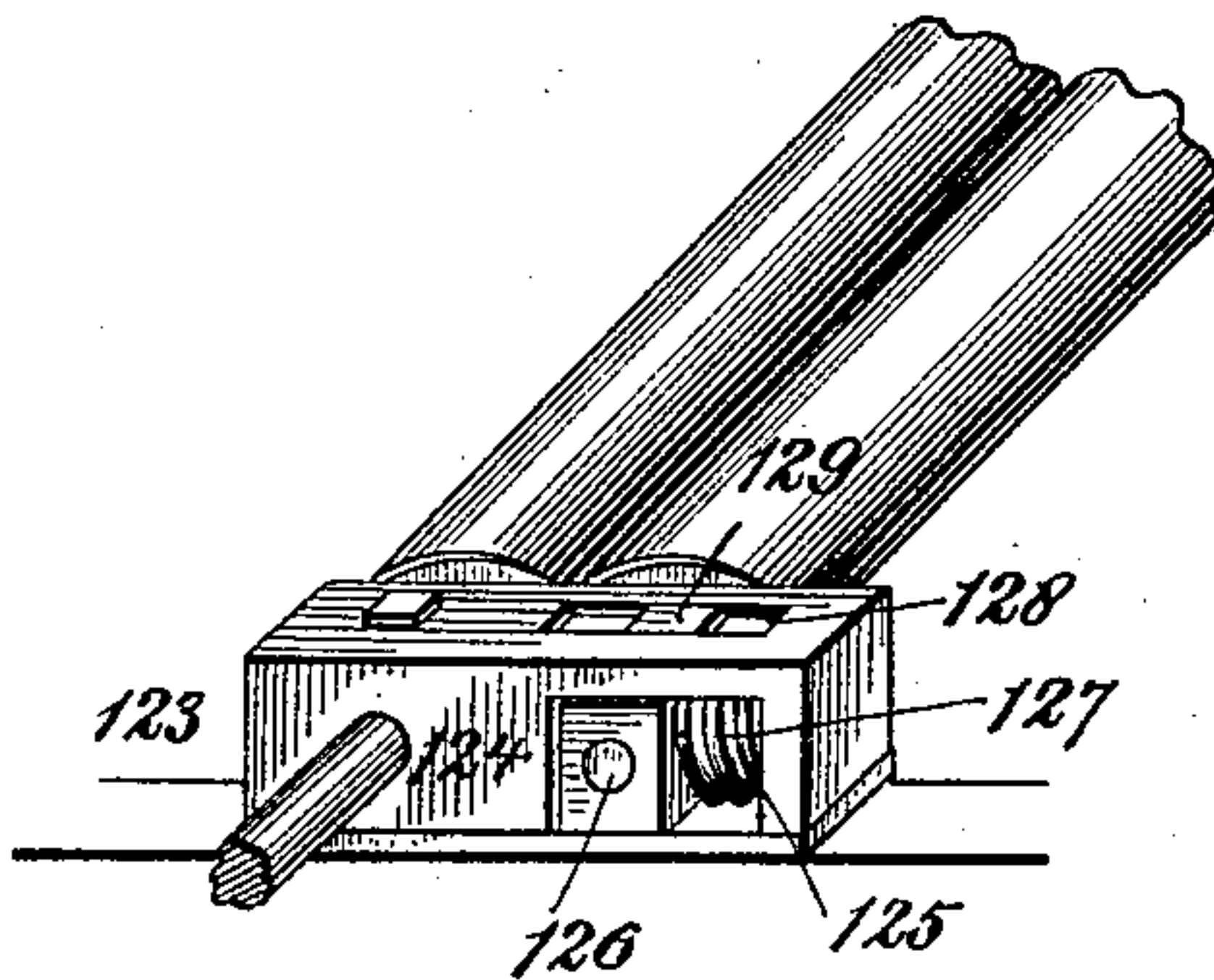


Fig. 8.



WITNESSES:

O. H. Haywood

K. V. Donovan

INVENTOR

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(No Model.)

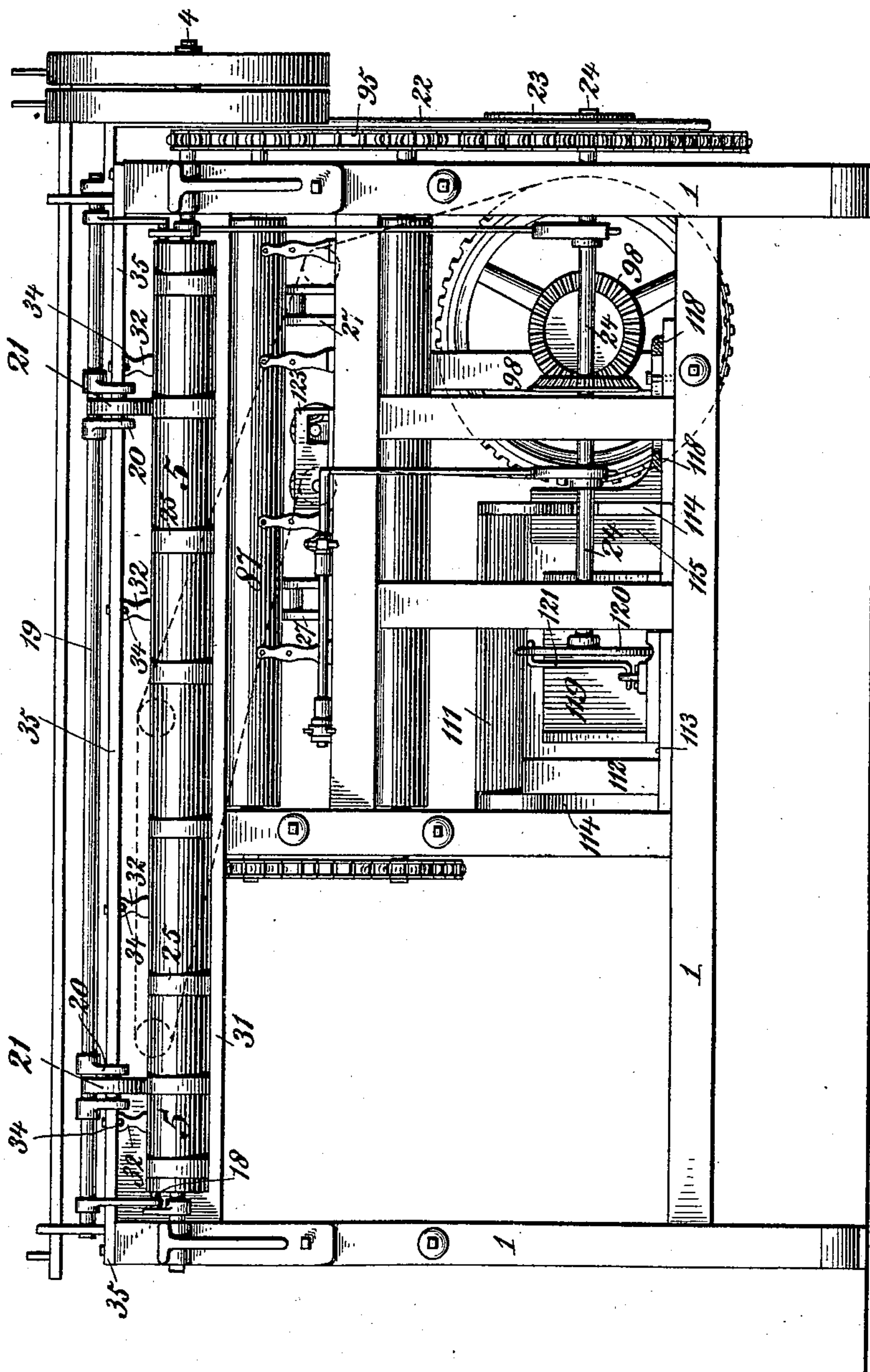
6 Sheets—Sheet 3.

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Fig. 9.



WITNESSES:

W. H. Hayworth

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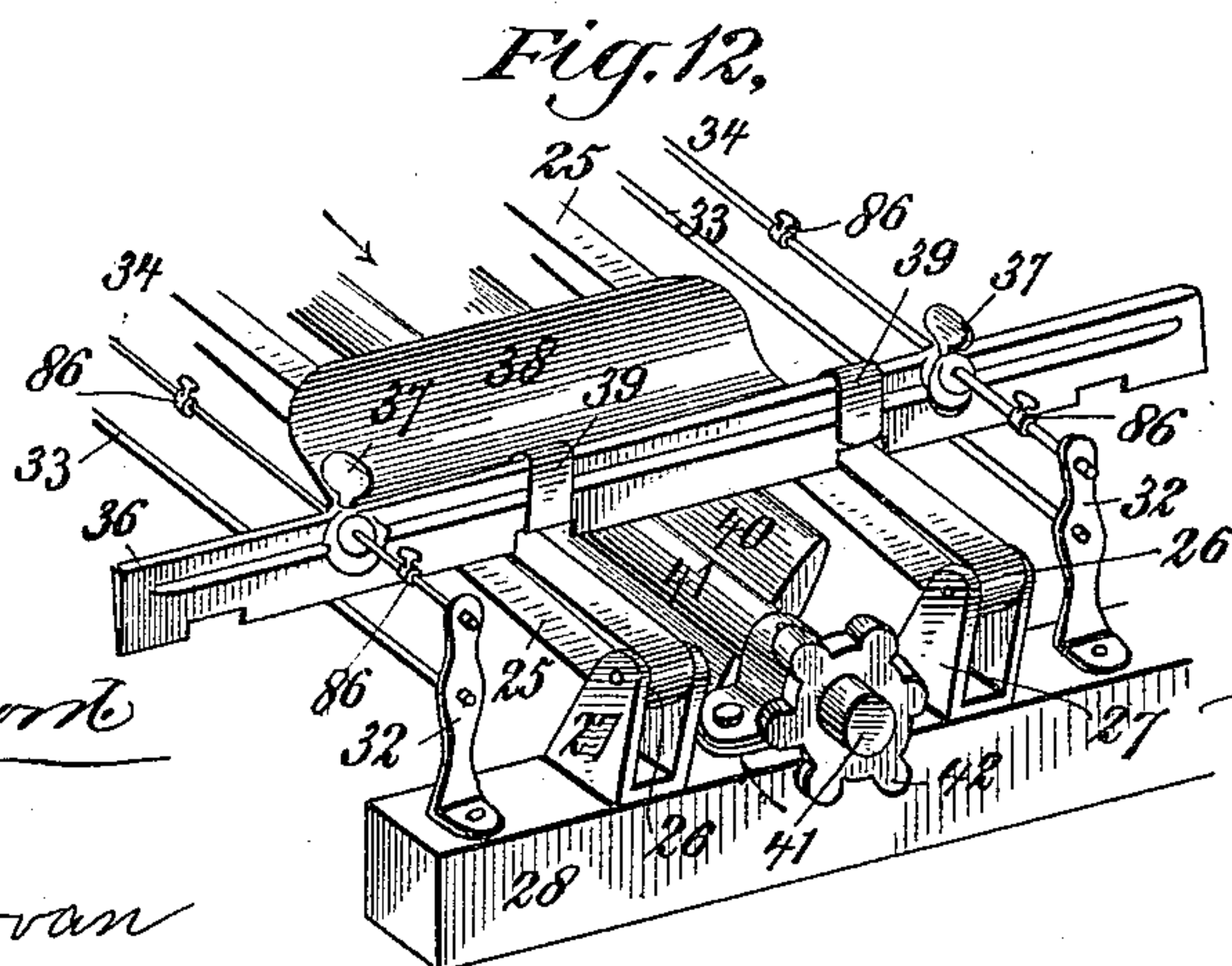
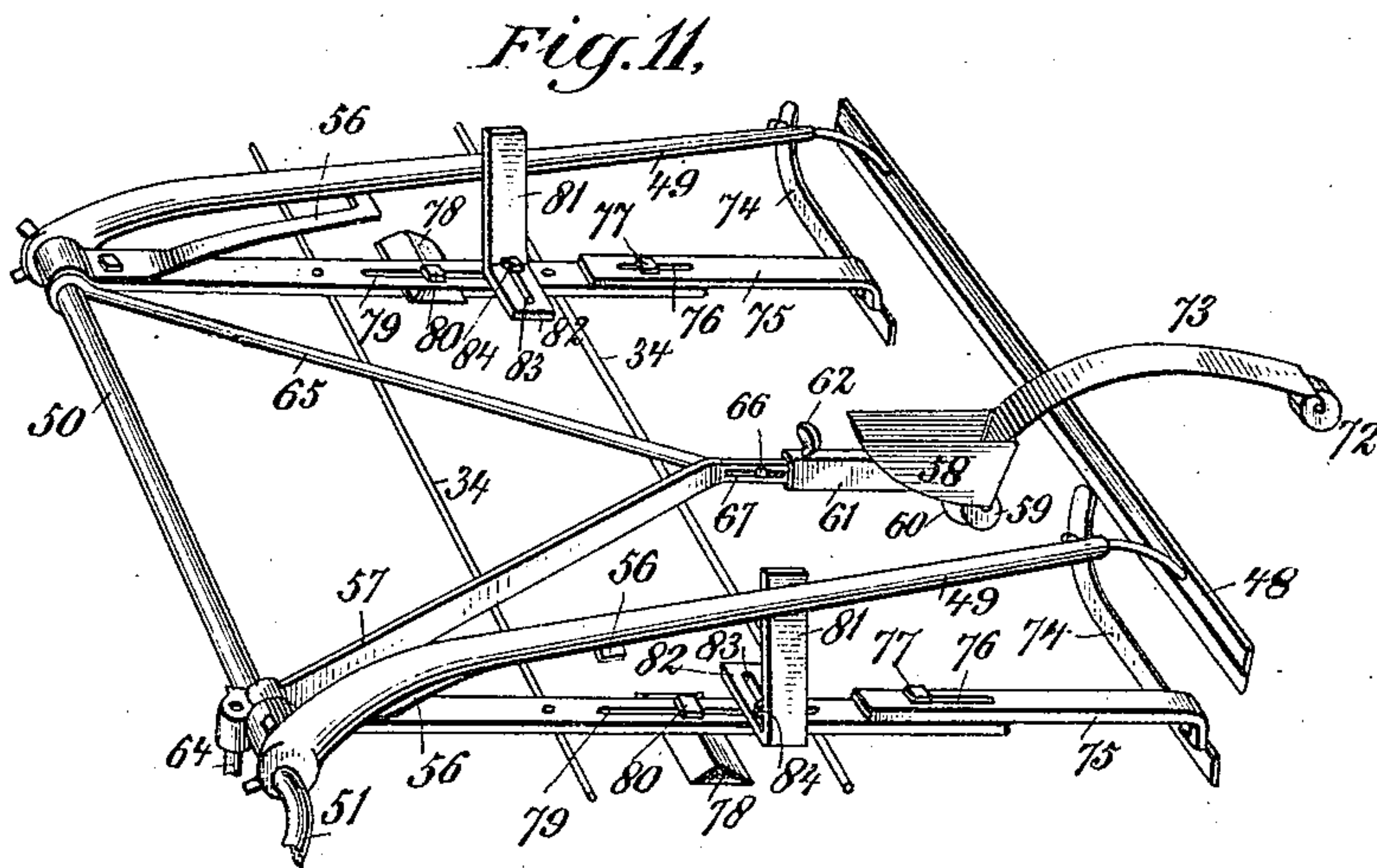
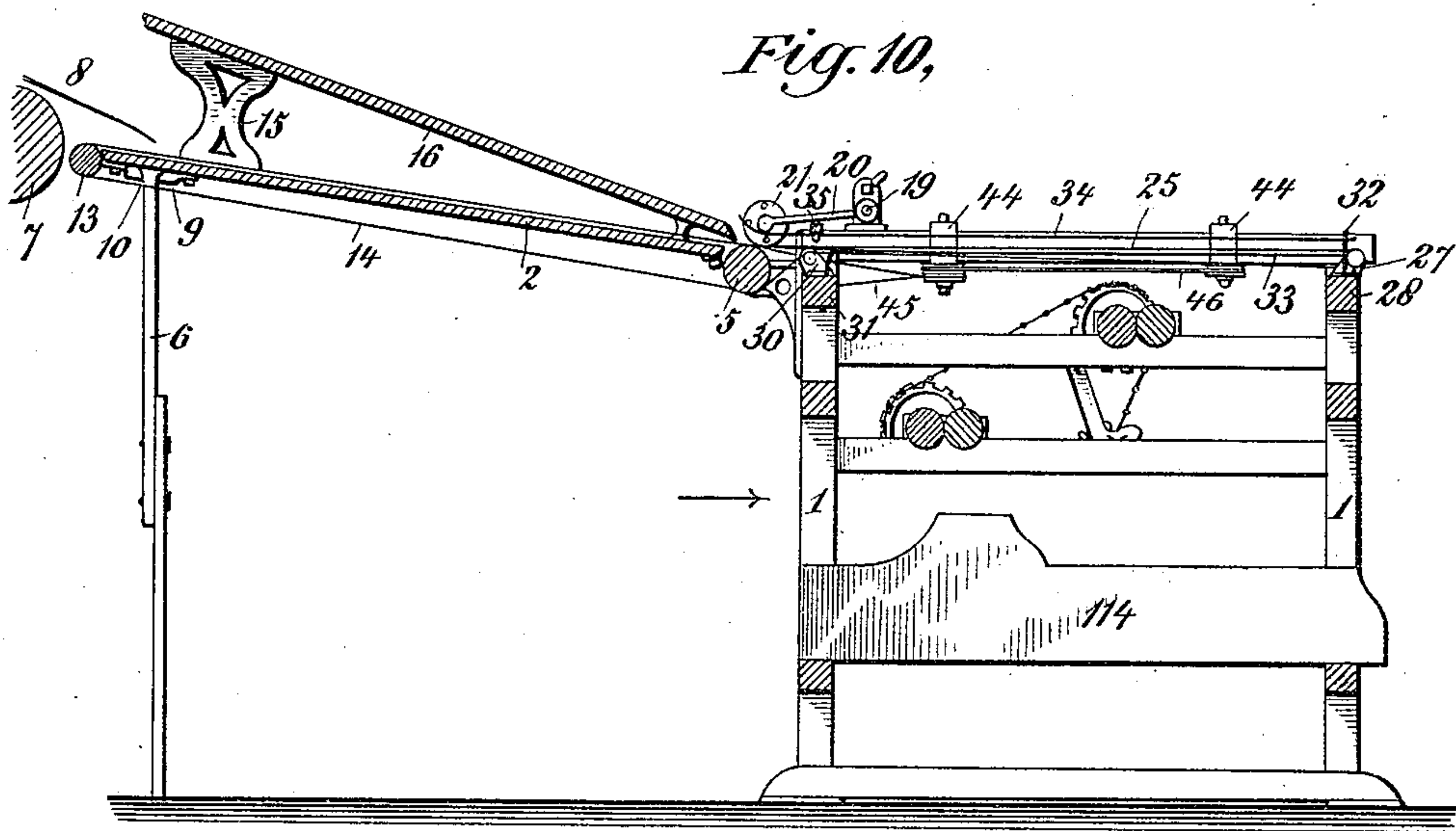
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6 Sheets—Sheet 4.

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Patented Dec. 31, 1895.



WITNESSES:

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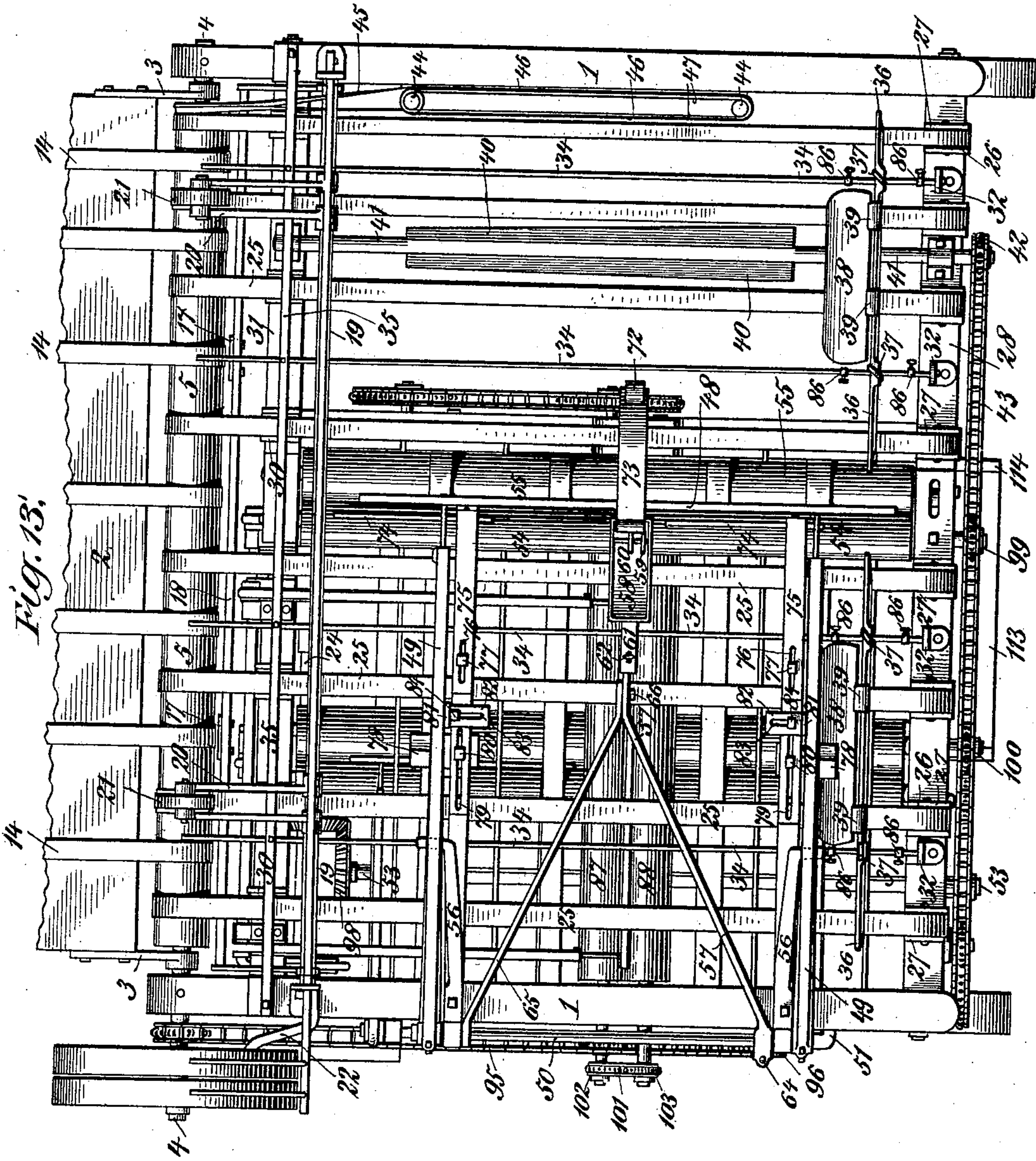
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6 Sheets—Sheet 5.

J. G. HARDIE, Jr.
PAPER FOLDING MACHINE.

No. 552,366.

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(No Model.)

6 Sheets—Sheet 6.

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No. 552,366.

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Fig. 14,

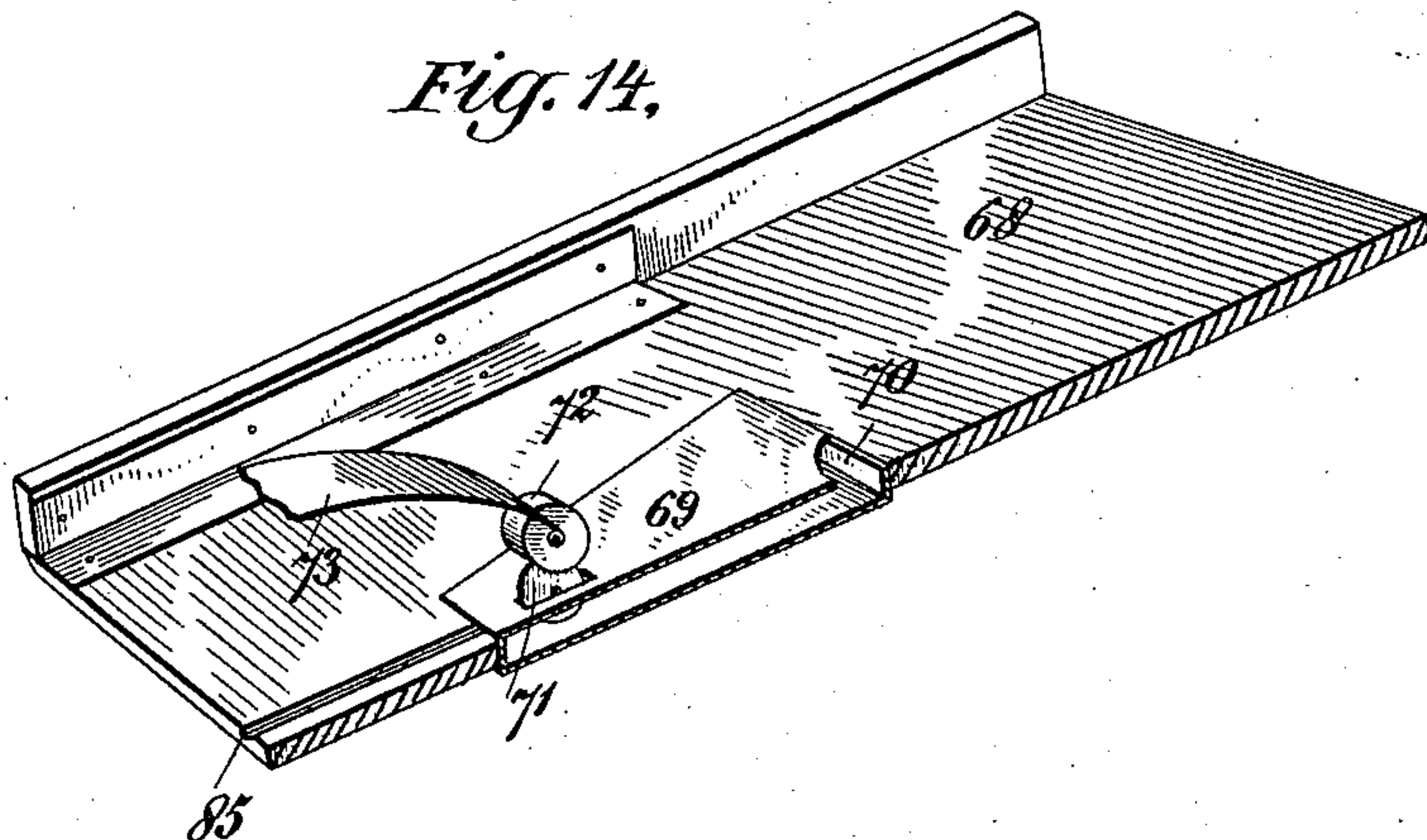


Fig. 15,

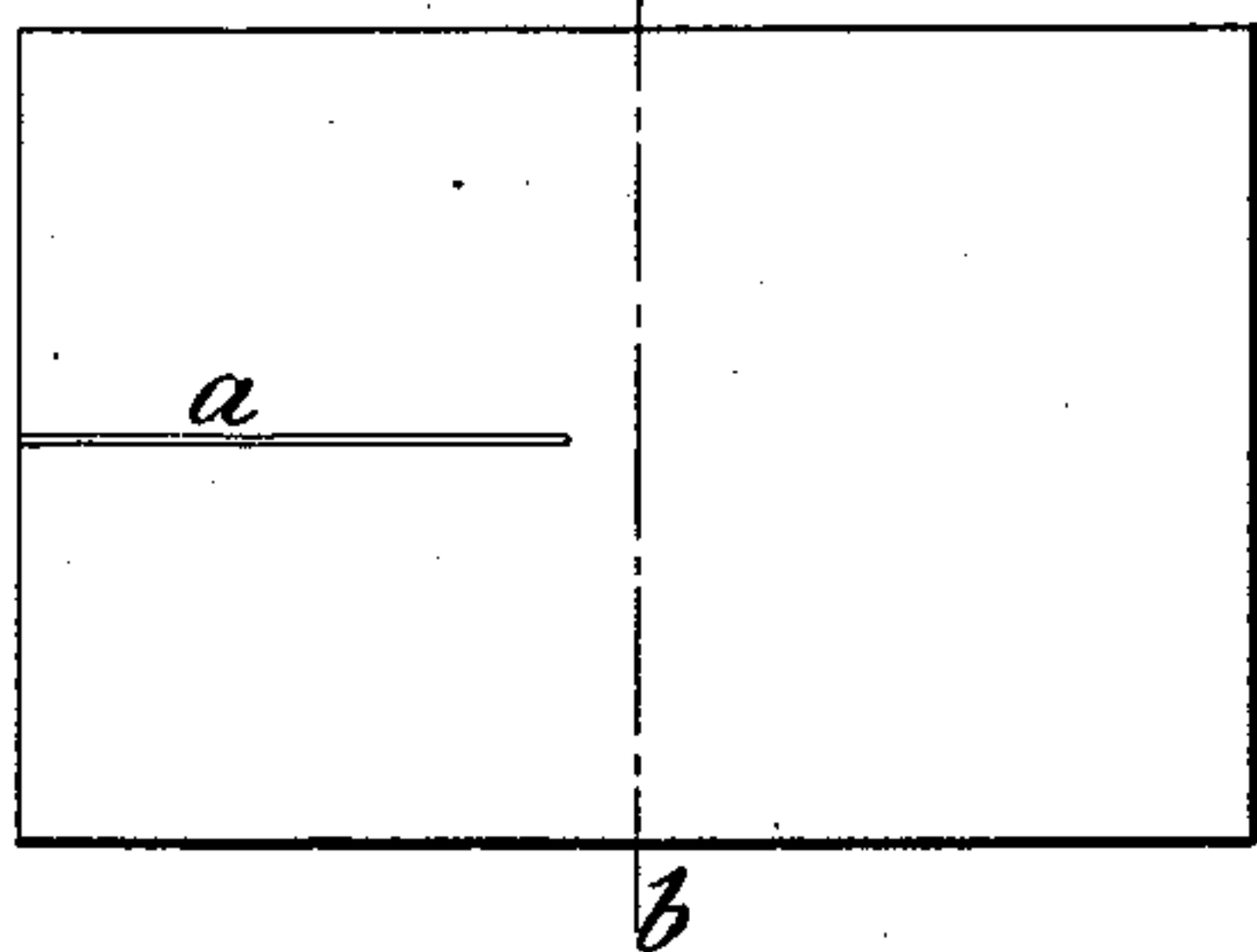


Fig. 16,

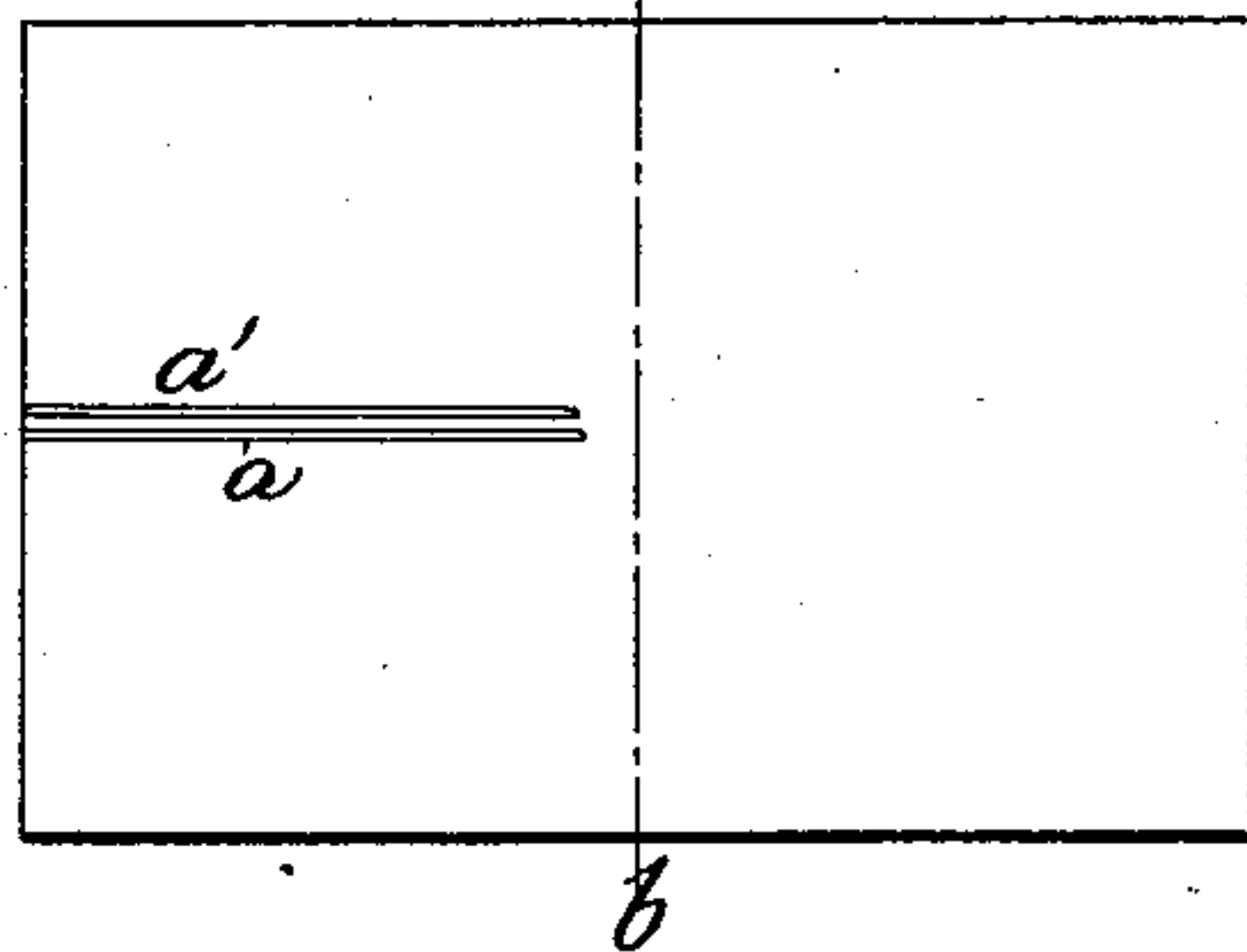


Fig. 17,

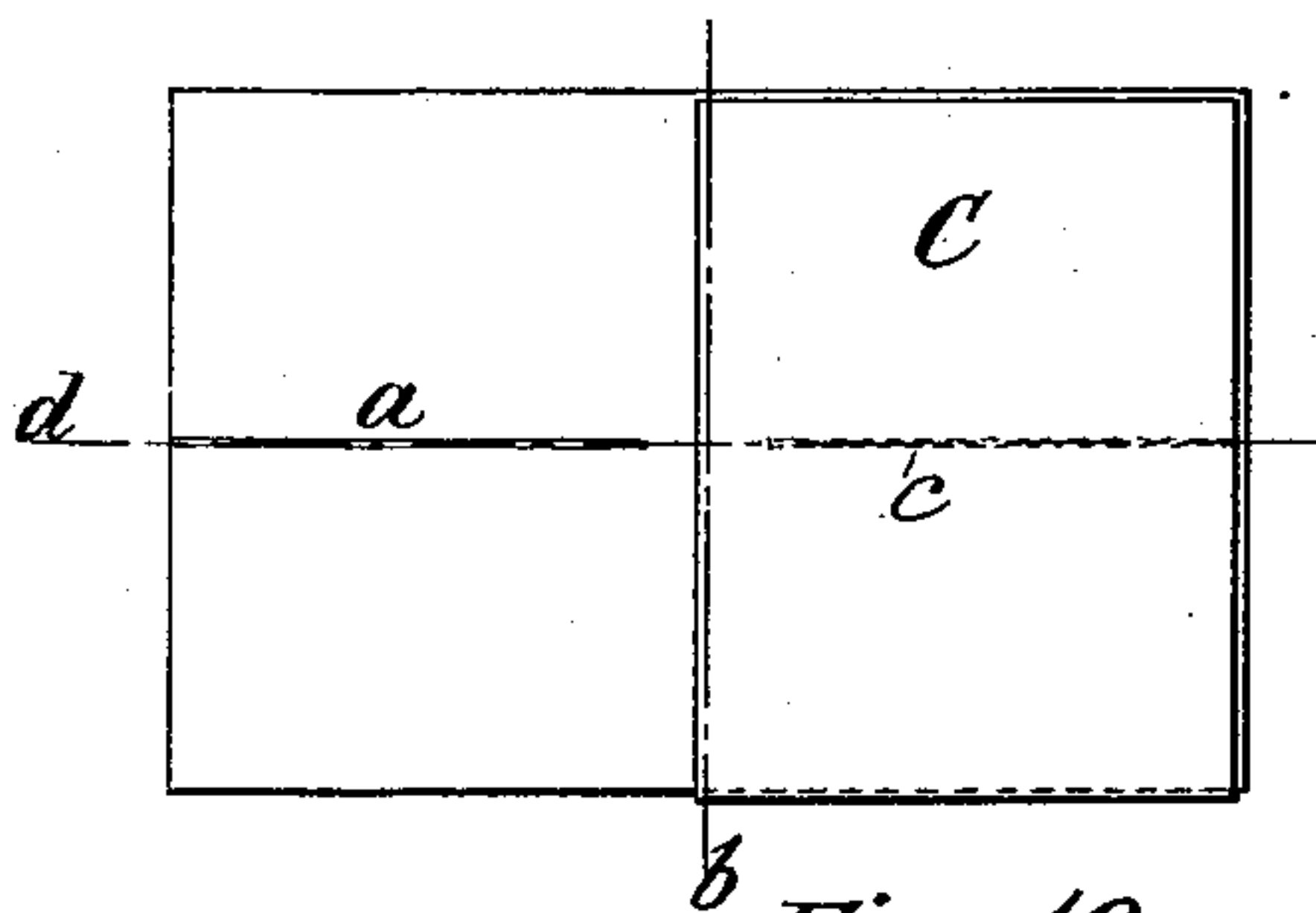


Fig. 18,

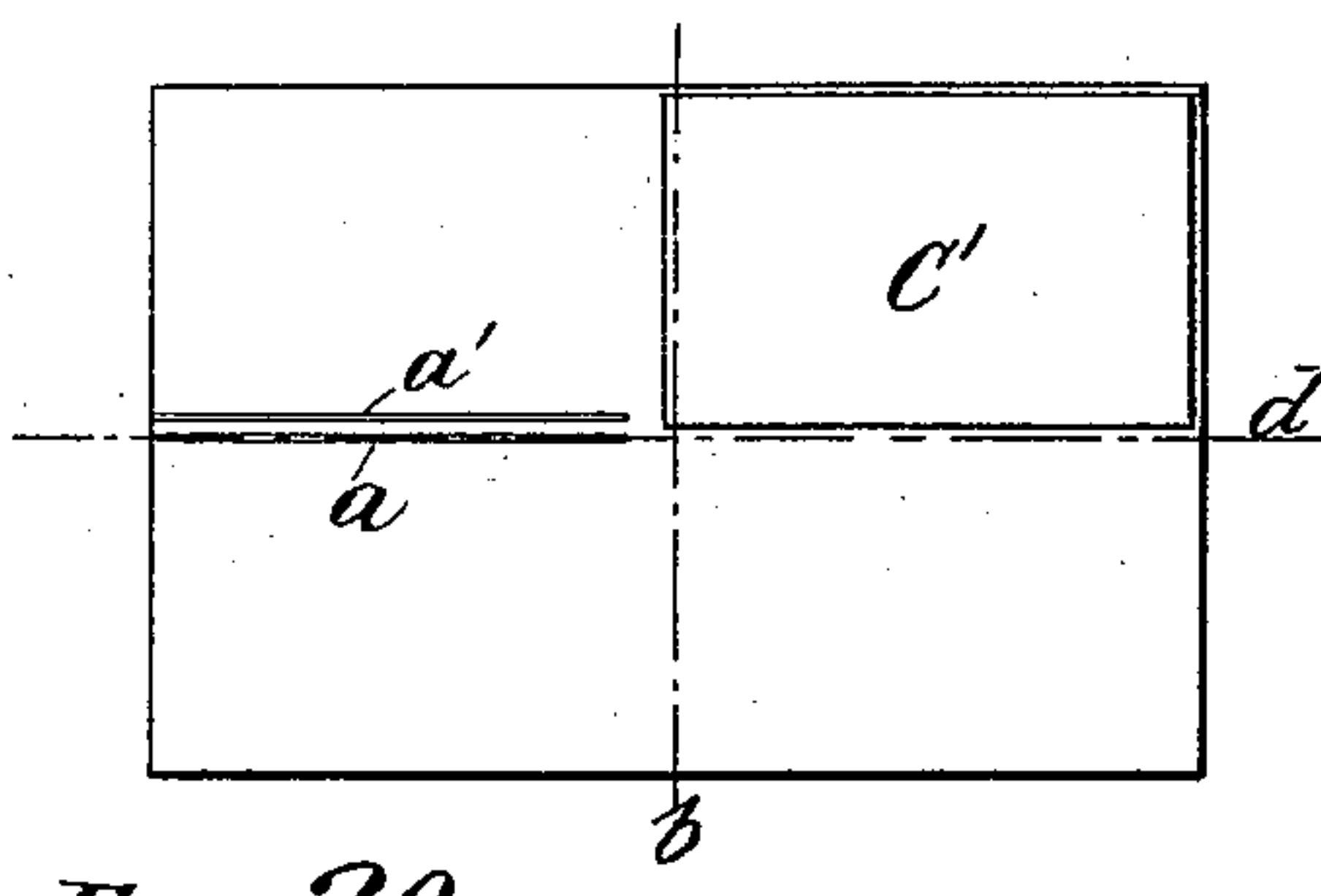


Fig. 19,

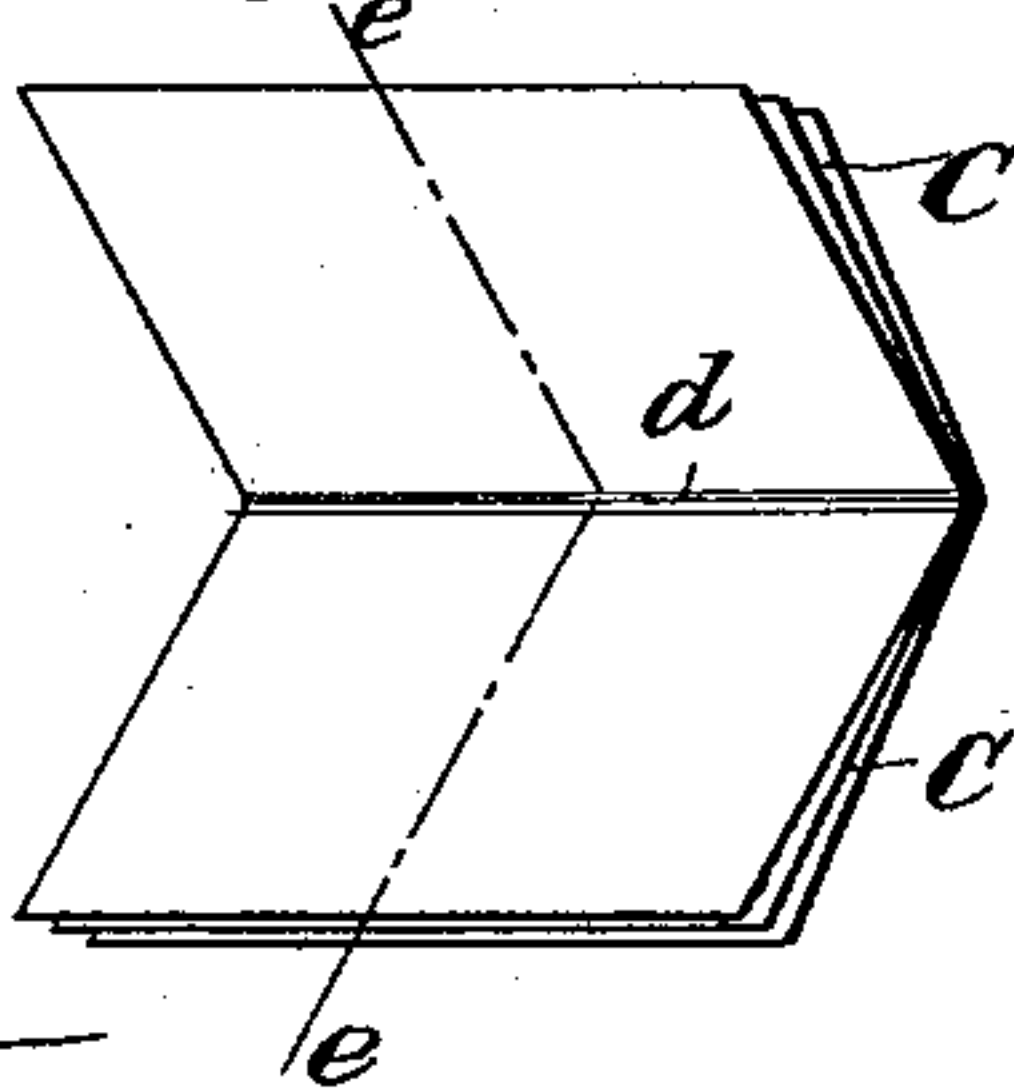
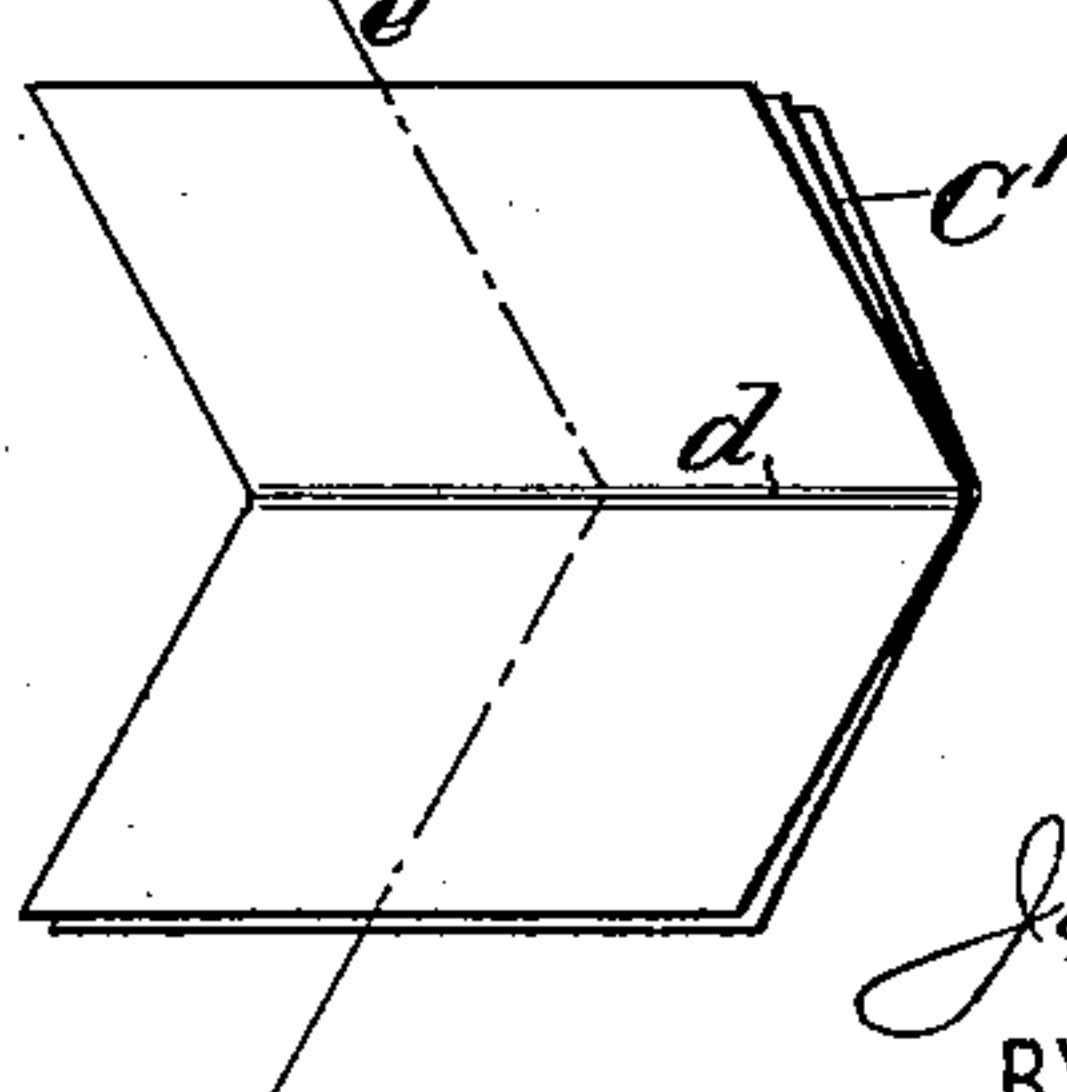


Fig. 20,



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UNITED STATES PATENT OFFICE.

JAMES G. HARDIE, JR., OF CANTON, NEW YORK.

PAPER-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 552,366, dated December 31, 1895.

Application filed August 31, 1892. Serial No. 444,702. (No model.)

To all whom it may concern:

Be it known that I, JAMES G. HARDIE, JR., a citizen of the United States, and a resident of Canton, in the county of St. Lawrence and State of New York, have invented certain new and useful Improvements in Folding-Machines, of which the following is a specification.

My invention relates more especially to that class of folding-machines which is used in country newspaper-offices; but some of my improvements may be used on other classes of folding-machines.

My invention has for its main object to provide a durable, speedy, accurate, and otherwise better and more efficient machine of low cost; and it consists in the various features of construction and combinations of devices hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a perspective view of a folding-machine embodying my improvements. Fig. 2 is a similar view of the packing box or compartment which receives the folded papers and of the means for pushing or advancing the stack. Fig. 3 is a perspective fragmentary view showing more particularly the relative arrangement of carrying-tapes, guide-rods, &c. Fig. 4 is a perspective view to illustrate the means for raising and lowering the gages or stops and the friction-wheels which co-operate with the first feed-roller. Fig. 5 is a perspective view showing more particularly the mode of mounting and driving the trimmers, and showing also the construction of the clippings chute or deflector. Fig. 6 is an end view of the clippings-chute. Fig. 7 is a detailed view illustrating the relative positions of the two cutters and the capability of vertical adjustment of the lower cutter. Fig. 8 is a perspective view showing more particularly the mode of mounting the folding-rollers. Fig. 9 is a front elevation looking in the direction of the arrow at Fig. 10, with the feed boards or tables removed. Fig. 10 is a vertical section omitting the first folding-blade, supplement-board, paste devices and numerous other parts to avoid confusion. Fig. 11 is a perspective view showing more particularly the folding-blade and its connections, the paste-cup and its connections, the supplement stops

or gages and their connections, and the guide-rods, &c. Fig. 12 is a partial perspective view showing the guide-rods, the paper-stops, the paper-holder, the tapes, and the chute-adjuster. Fig. 13 is a top plan view of the machine. Fig. 14 is a perspective view, partly in section, to show the construction of the supplement-board and the pasting devices thereat. Figs. 15, 16, 17, 18, 19 and 20 are diagrams showing the papers with supplement-sheets and the folding-lines and the paste-lines. Fig. 21 is a detailed end view of one of the stop-collars and its rod.

In the various views the same part will be found designated by the same numeral of reference.

The framework of the machine is composed, as usual, of suitable standards or uprights and cross-beams, and this framework throughout is designated generally by the numeral 1.

2 designates a feed board or table, which preferably is hung at its inner end by arms 3 to the shaft 4 of the first or main feed-roller 5. The rear end of said feed board or table is supported by legs 6, one at each side. These legs are adjustable laterally to fit any width of printing-press and vertically to fit any height of printing-press. The delivery end of a printing-press is shown at 7, whereat is also shown a sheet of paper 8 as on its way from the printing-press to the feed-table 2. The legs are adjustable laterally or widthwise of the table preferably by the following means.

On the under side of the table is secured two transverse brackets 9, one at each side, and projecting inwardly toward the center of the board, and each of said brackets is formed with a dovetailed groove or slot, in which is fitted a dovetailed tenon 10 at the upper end of each leg 6. By this construction the legs 6 may be slid toward or from each other, in accordance with the width of the press the folder is to be used in connection with, and without liability of detachment of said legs 6. The table 2 may be swung vertically about its hinge-like support to bring its receiving end to the proper height relatively to the delivery end of the press. The legs 6 are made in two parts and provided with slots 11 and bolts and nuts 12, by

which means the legs may of course be lengthened or shortened and the table adjusted to the required height or position. At the front end of said table is mounted a roller 5 13, around which and the feed-roller 5 passes a series of endless belts or tapes 14, which carry the sheet automatically from the printing-press to the folding-machine proper.

Above the table 2 and supported thereupon by brackets 15 at each side is another feed board or table 16, which is set at the proper inclination to enable a sheet to be fed by hand to the folder at the same point at which the sheet from the printing-press is 15 automatically delivered. By this arrangement two separate sheets may be fed to the folder simultaneously, one sheet directly from the press as the printing is done and the other from a pile of previously-printed sheets.

20 The sheet from the press, as it is carried forward on the tapes, is stopped at the entrance of the folder proper by fingers or abutments 17 secured to the bar 18, which by side arms is connected to a rock-shaft 19, 25 mounted in suitable supports arranged immediately behind the roller 5. The sheet is held at this point for a moment while another sheet is fed by hand from the table 16 down to said stops or abutments, thus bringing one 30 sheet directly on top of the other and the front edges of both sheets into alignment or register at the same locality.

Upon the rock-shaft 19 is secured two brackets 20, in the forward end of each of which is 35 mounted a wheel 21, which wheels at predetermined times are adapted to be dropped upon the paper, and by their friction, in connection with the feed-roller 5, cause the associated sheets to be fed into the folding-machine after 40 the removal or depression of the stops or abutments 17, which occurs simultaneously with the downward movement of the wheels.

The stops 17 and the wheels 21 are thrown into and out of operation by means of a trip-rod 22 secured to near the base of the machine, 45 to be there operated upon by a cam 23 from a shaft 24 suitably mounted in the framework.

Endless tapes 25 carry the associated sheets from the roller 5 and wheels 21 into the folder 50 proper. These tapes pass around the roller 5 at the front side of the machine and around short rollers or spindles 26 at the rear side of the machine. These short rollers are mounted in brackets 27 arranged upon a cross-beam 55 28, and the brackets are preferably made adjustable so that the proper tension may be given the tapes without cutting and resewing them.

The upper surfaces of the long roller 5 and 60 the short rollers 26 are arranged in the same plane, so that the sheets travel perfectly horizontal. The under or returning strands of the tapes 25 pass over guide rolls or idlers 29 in brackets 30 secured on a cross-beam 31. 65 Upon said cross-bar is mounted, at a suitable distance apart, a series of standards 32, to each of which is secured two guide-rods 33

and 34, one directly above the other. The guide-rod 33 at its free end is bent down and through the cross-beam 31, while the upper 70 guide-rod 34 is extended over to the roller 5 and is bent upwardly to insure the passage of the sheets along upon the tapes. The guide-rod 34 may be supported at its bent end by a cross-bar 35. 75

Near the rear of the machine, above the tapes 25, are arranged two stop-bars 36, each of which is mounted upon two of the upper guide-rods 34 and is adjustable thereon for 80 different lengths of sheets by means of set-screws 37. The incoming sheets on the tapes 25 are arrested by these stop-bars, and to prevent any rebound of the sheets which strike said stop-bars, as well as to keep the edges of the sheets from rolling under said 85 stop-bars, the latter are provided with sheet-holders 38, preferably made of thin sheet metal, arranged to hang loosely on said bars and rest their weight very lightly upon the upper plies of the underlying tapes adjacent 90 to said bars. Each sheet-holder is preferably hung upon its bar by means of two hooks 39 cut out of the stock of the sheet-holder and bent upon said stop-bar. The front edge of the sheet-holder is curved or turned up to 95 allow the sheet to pass beneath it. The sheet-holder being mounted upon the cross-bar is of course adjustable with it.

At one side of the machine (preferably at the left-hand side viewed in the direction of 100 the arrow at Fig. 10) is arranged a sheet-adjuster 40, which is mounted upon a shaft 41, provided at one end with a sprocket-wheel 42, which is driven by a chain belt 43. The sheet-adjuster is arranged in the direction of 105 the tapes 25, and a little higher than the same, so that the sheets will contact with it. The sheet-adjuster revolves transversely of the direction of movement of the tapes. The purpose of this sheet-adjuster is to carry the 110 incoming sheet sidewise to a guiding means to bring the line of fold of the sheets directly over the folding-rollers or, in other words, to give the sheet perfect register at its first fold. This sheet-adjuster may consist of several 115 wings or vanes, preferably four, so that it will rapidly hit the sheet from below and move it sidewise while it is traveling lengthwise. The wings or vanes of the sheet-adjuster are preferably made tapering or smaller at the 120 end where the sheet enters upon it, so that they will not obstruct its incoming movement. The sheet-adjuster operates to move the sheet sidewise or laterally before the leading end of the sheet reaches the stops 36, 125 which permanently arrest it.

In connection with the sheet-adjuster is employed a pair of rollers 44, which revolve upon vertical pivots and are driven by a belt 45 from the roller 5, the said belt passing over 130 the roller 5 and around a pulley on that one of the rollers nearest the roller 5.

The rollers 44 are connected together and driven in unison by a belt 46, passing around

pulleys at the lower ends of said rollers. A broad belt or band 47 passes around the rollers 44. The said belt or band is preferably about four inches wide and is arranged so that its face lies and travels in a vertical plane. The revolving sheet-adjuster 40 causes the sheet to move laterally over into contact with the face side of the band 47, and as the said band travels at the same speed as the tapes 25 the sheet will be carried or fed at a uniform speed by both. It will thus be seen that by means of the tapes, the sheet-adjuster, and the belt the sheets are properly advanced or fed straight, so that every sheet will, before the folding takes place, be brought exactly to the same position widthwise. Hence the fold-lines of the various sheets will be uniform and the sheets or papers regularly and evenly folded.

48 designates the first folding-blade, which is connected near its ends to arms or supports 49, which are secured by set-screws upon a rock-shaft 50, having a depending trip-rod 51, which is operated upon by a cam 52 upon a shaft 53 to raise and lower said blade at the proper times and cause it to force or double the sheets into the bight of the first pair of folding-rolls 54 and 55, which are arranged parallel with the first set of tapes 25. The cam is so shaped as to cause the folding-blade to descend slowly and return quickly, and also to allow the machine to be reversed or run backward. Flat springs 56 on the under side of the arms 49 assist the return of the folding-blade.

Upon the rock-shaft 50 is loosely mounted or journaled an arm 57, which carries at its free end a paste-cup 58, the bottom of which is open. On the under side of the paste-cup 58 are two wheels 59 and 60, which supply paste to the sheets. The paste-cup is provided with a tubular or hollow shank 61, to surround the free end of the arm 57 and be adjustable thereon, a set-screw 62 being employed to hold the cup in the desired position. The wheel 59 may be used to leave a trail of paste in the center of the space between two printed pages of the paper, and the wheel 60 to leave a trail of paste between the first-named trail of paste and either one of the printed pages, so that when a one-paged supplement is used the second trail of paste will cause the supplement to adhere to one side of the folding-line, while the central trail of paste will secure together the two pages of the main sheet. The paste-cup is raised and lowered by means of a cam 63 on the shaft 53, which operates the trip-rod 64 that is secured at its upper end to the arm 57.

Upon the rock-shaft 50 is mounted a rod 65, which is inclined toward the obliquely-arranged arm 57, and is connected thereto at near the point where the paste-box is secured. This rod acts as a brace to the main arm, and is connected thereto by means of a bolt 66, the arm 57 being provided with a slot 67. This slotted connection permits of the arm

being moved laterally and of the paste-cup being swung sidewise about one inch, in order that the cup may be set or adjusted so that it will leave the trails of paste exactly at the desired lines on the sheets, the arm 57 and the rod 65 being sufficiently light and resilient to permit of this. This lateral adjustment of the paste-cup 58 is permitted by means of the spring of the arm 57, which is held in its adjusted position by means of the brace-rod 65 and bolt 66, the brace-rod at its rear end resting against the stationary bracket.

68 is a supplement feed-board arranged opposite the folding-blade 48 and over the sheet-adjuster. An opening is formed in the said feed-board for the insertion of a paste-box 69, which fills said opening, a hole being formed in the cover of said box at 70 for the introduction of the paste. Within said paste-box is journaled a small wheel 71, which supplies paste to the sheet passing over it. Directly over said wheel is another wheel or feed-roller 72, mounted on an arm 73, which is preferably secured to the paste-cup 58.

The supplement is fed by hand just as the first fold of the sheet proper is about to be made, and it is fed down so that the front edge of the supplement is about one-half of an inch past the folding-rolls and against stops 74, mounted upon arms 75, which are supported by the guide-rod 34, to which they are attached by screws or otherwise. These arms 75 are made in two parts and are adjustable lengthwise by means of slots and bolts 76 and 77, respectively. By reason of this adjustment the stops 74 may be set at different points, according to the size of the supplement. Upon said arms are mounted two stops 78 for the arms 49 of the folding-blade. When the folding-blade descends the arms strike said stops and limit the entrance of the folding-blade between the folding-rolls to just the desired depth or extent. These stops 78 are adjustable lengthwise of the arms 75 by means of slots and bolts 79 and 80. The nearer the said stops are moved to the fulcrums of said arms the shorter will be the arc of vibration of said arms and of the folding-blade secured thereto. On the upper side of each of the arms 75 is provided an upright 81, against which the arms 49 slide. These uprights are provided for the purpose of preventing any side or lateral tremble or vibration of said arms, and are formed each with a base-plate 82, which is slotted at 83 and adjustably secured by a bolt 84 to the arm 75, said bolt passing through the slots 83 and 79.

The supplement feed-table is formed with a groove or depression 85, over which the pasted portion of the supplement travels, thus preventing the paste from being transferred from the sheet to the table.

The stop-bars 36, which arrest the paper and bring the line of fold directly over the first pair of folding-rolls, are adjustable, as has been said, for different sizes of sheet. In most cases it is desired to fold only two sizes

of sheet, and accordingly the stop-bars are generally adjusted to only either of two positions. To aid in quickly and accurately setting the stop-bars there are placed on each of said guide-rods 34 two collars 86, provided each with a set-screw by which the collars may be held rigidly on said rod at the desired points. If a large-sized sheet is to be folded the stop-bars are pushed back against the rearmost fast collars and fastened by the set-screws 37, and if a smaller-sized sheet is to be folded the stop-bars are pushed up against the forward fast collars, nearer the center of the machine, and again secured. Of course the stop-bars may be adjusted to any intermediate position without reference to the collars 86; but the latter are found convenient to assist in quickly and accurately setting the said stop-bars for either of two sizes of sheet. The bottom of each collar is preferably cut on a slant, or is flattened or so cut away on its under side that there will be nothing to obstruct the incoming sheet.

Beneath the top of the machine of the plane of the first folding-rolls is arranged a second set of tapes, fold-rolls, guide-rods, a folding-blade, &c., similar in construction and operation to those above described, and below these sets of devices are arranged a third set for producing an additional fold in the sheets.

There may be as many sets of carrying, folding, and guiding devices as may be desired, as in prior machines. In order to avoid prolixity of description I refrain from describing in detail the construction and operation of the additional carrying and folding mechanisms, it being understood that they are essentially the same as those above described.

At or in connection with the second set of folding-rolls 87 88 there is employed means for trimming or cutting the sheets.

Upon the shaft of the roller 87 and forming in effect a portion of said roller is secured a cutting-disk 89, and below the same is another cutting-disk 90 mounted upon an arbor 91, the outer end of which is supported in a bearing plate or casting 92, which is vertically adjustable by means of slots 93 and bolts 94 for the purpose of maintaining the two cutting-disks at all times in proper operative relation to each other.

Upon the axle of the roller 87 is a sprocket-wheel, with which engages the main driving belt or chain 95, which also engages a sprocket-wheel on a tension-adjuster 96 on the main frame and a sprocket-wheel on the shaft 24, from which it passes up and engages a sprocket-wheel on the main power-shaft 4, which may be provided with driving-belt pulleys, as shown. As will be seen, the said chain or belt operates to drive the second set of folding-rolls and the shaft 24, and by means of miter-gears 98 the counter-shaft 53 bearing the cams 52 and 63 is driven from said shaft 24. On the rearmost end of said counter-shaft is affixed a sprocket-wheel, around

which the chain or belt 43 runs after passing over the sprocket-wheel 42, which drives the sheet-adjuster, and the sprocket-wheel 99, which drives one of the first pair of folding-rollers after passing over the sprocket-wheel of a tension-adjuster for the chain. The chain 43 also passes over a sprocket-wheel 100 on one of the third set of folding-rolls.

The cutting or trimming disks 89 and 90 are driven by a separate chain belt 101, which passes over a loose sprocket-wheel 102 on the extended shaft of the roller 87, over a sprocket-wheel 103 on the extended shaft of the roller 88, and around a sprocket-wheel 104 on the outer end of the arbor 91. Roller 88 is geared to roller 87 at the opposite end, and hence is driven thereby. The cutting-edges of the disks move toward each other, and as the sheet passes down from the folding-rolls and forward it comes into contact with these said disks and is cut or trimmed.

The lower disk is preferably of larger diameter than the roll, so as to give a slitting tendency to the cut. By thus arranging the parts the proper direction of rotation is given to the lower cutting-disk, as the sprocket-wheel 104 and the sprocket-wheel 103 are fast on their respective arbors, while the sprocket-wheel 102 is loose on its shaft and moves in an opposite direction to that of the folding-roll 87. One advantage in using the third and last wheel 102 is that the chain is kept from doubling or buckling between the other two.

105 designates a chute to guide the clippings from the trimmers down from the machine onto the floor of the room or into a receptacle thereon. The chute is fastened to the inside frame of the machine and directly in front of the cutting-disks and is composed of a top portion 106, two vertical sides 107 and 108, and a curved downwardly-extending portion 109. The top portion is partially detached from the sides 107 and 108 and bent upwardly to avoid liability of the clippings or the sheets climbing above or upon the chute. The side or partition 108 is arranged to register or be in direct alignment with the cutting-disks, so as to separate the clippings from the sheet, the sheet passing on one side of the partition and the clippings on the other. The partially-detached partition 108 may be bent sidewise independently and set relatively to the cutting-disks for different sizes of sheet, the disks being movable on their respective arbors for different sizes of sheet. By this construction the partition may be adjusted laterally to accurately register with the cutting-disks wherever the latter may be set in accordance with the work to be done. The dotted lines at Fig. 6 show the partition 108 as bent laterally.

The folded sheets are delivered to a packing-box at or near the base of the machine, which is preferably made oblong and without ends or top. The sheets or papers drop from the last pair of folding-rollers into a

slot or opening 110, formed by two oppositely - inclined horizontal cross - bars 111, which are supported each at one end upon an upright 112, rising from the bottom or base 113 of the box, and at its other end by a side piece 114, secured to the bottom. The uprights 112 are arranged preferably at about one inch apart and between them the sheets fall and are supported vertically at one side. Opposite said uprights and projecting through an opening in the side piece 114 is a contrivance for supporting the opposite side of the sheet. This contrivance is composed essentially of two upright sides 115, in line with the uprights 112, which are connected together by a bottom piece 116 and an end piece 117. This contrivance is adjustable in the opening in the side 114 for folded sheets of different widths and is preferably provided at its bottom portion with an extension 118, which is slotted to receive a set-screw for holding the contrivance at the desired point.

Between the inner edges of the uprights 112 and 115 is left a comparatively large space or opening in which works a follower 119 arranged to slide on the bottom of the packing-box, and preferably by means of a crank-wheel 120, on a constantly-rotating shaft 24, and a link or pitman 121 connected at one end to said crank-wheel and at the other end to the follower. The crank-wheel is preferably provided with a series of holes for adjusting the position of the pitman.

On leaving the last set of folding-rollers the papers drop vertically through the slot 110 and are held momentarily in an upright position by the uprights 112 and upright members 115 of the adjustable support. The follower then advances and forces the paper forward out of the slot and against an adjustable and movable support 122 resting on the bottom of the box.

Each pair of folding-rollers is preferably mounted as shown at Fig. 8, in which 123 designates a box formed at 124 with a bearing for one of the shafts of the rollers. The said box is extended therefrom and is formed with an opening 125, in which is fitted a sliding box or bearing 126 for the other shaft of the rollers, the opening 125 being long enough to permit said box or bearing to have a slight sliding movement to and from the relatively fixed bearing 124. 127 is a spiral spring bearing at one end against the fixed box 123 and at its other end against the sliding box 126 to press the latter and the roller which it supports toward the other relatively fixed roller. In the upper portion of the box 123 is a longitudinal slot or opening 128, in which is fitted and slides a lug 129, projecting upwardly from the sliding box 126. This lug prevents the said box 126 and its roller from moving endwise, but allows the box and roller to move transversely or toward and away

from its companion roller. By this construction and arrangement the rollers are readily adapted to receive and properly fold and feed papers of any thickness or bulk.

Fig. 15 is a view of a single sheet to be folded twice, making four pages, as it appears fed from the roller 7, Fig. 10, either along the tapes 14 or by hand upon the table 16. There may be two of these, one fed in upon the tapes automatically, as described, and the other thrown in by hand upon the table, in which case they will lie superposed and still appear as in Fig. 15. For simplification of description and illustration, however, I have considered Fig. 15 to be a single sheet. *a* represents the line of paste, and *b* the line of the first fold. Before the first fold is taken, a two-paged supplement-sheet, as C, is fed in from the supplement-table 68 to about the position as shown in Fig. 17. The supplement-sheet during this operation is pasted on the under side by the supplement-pasting roller 71, as shown by the dotted lines *c*, and arrives against the stops 74 just previous to the moment the first folding-blade 48 descends, which will be on the line *b*. The main and supplement sheets are then folded together on this line, the paste-lines *a* and *c* causing them to adhere to each other. The papers are then trimmed along the line *b* by the cutters 89 and 90, and the second fold is taken upon the line *d*. This brings the parts to the positions as shown in Fig. 19. The final transverse fold is afterward taken at the line *e*, the paper then being in a condition for delivery upon the platform 113.

Figs. 16, 18 and 20 are diagrams which illustrate a similar series of operations with the exception that a one-paged supplement C' is used instead of the two-paged supplement C, as just described. *a* and *a'* show the trails of paste made by the paste-rollers 59 and 60, the roller 59 making the paste-line *a* and the roller 60 the line *a'*. The paste *a* upon the main sheet being folded causes the same to stick together, and the paste *a'* causes the supplement-sheet to stick to the main. The one-paged supplement C' may or may not be pasted on the under side by the roller 71, as desired. The balance of the operations are the same as those previously described.

Of course some of my improvements may be used without others, and I do not therefore wish to be considered as limiting myself to the employment in any one machine of all of the various improvements hereinbefore referred to.

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

1. In a folding machine, a hinged feed table provided with carrying bands for automatically delivering a sheet from the printing press, means for adjusting the height of the receiving end of said table, and a hand feed

table mounted upon said hinged table and vertically adjustable therewith so as to maintain the proper relative positions of said feed tables to enable sheets therefrom to be always delivered to the same point or locality.

2. In a folding machine, the combination of a set of carrying tapes, a sheet adjuster having tapering blades or wings, and a vertically-arranged band traveling in the direction of the carrying tapes.

3. In a folding machine, the combination with a set of carrying bands, a transversely-operating set of blades, a pair of vertical rollers, a traveling band, a belt passing around pulleys at the lower end of said rollers, and a belt passing from a pulley on the lower end of one of said rollers, and thence around the main feed roller, around which the set of carrying bands pass.

4. In a folding machine, the combination with a pair of folding rollers, a folding blade, a pair of arms, a pair of springs, a pair of adjustable stops, a trip-rod, and a cam.

5. In a folding machine, the combination of a paste-cup, an arm to which said cup is secured, a trip-rod for vibrating said arm and cup through the action of a cam, and a brace-rod adjustably connected to said arm.

6. In a folding machine, the combination with a paste-cup provided with a tubular or hollow shank, a vibratory arm, upon which the shank of the paste-cup may be adjusted and secured, a trip-rod for said arm, and a brace-rod adjustably connected to said arm.

7. In a folding machine, the combination of a pair of folding rollers, a folding blade, a pair of arms therefor, a rock-shaft to which said arms are secured, a trip rod, a cam for rocking said arms, a paste-cup, an arm to which the latter is secured, mounted loosely upon said rock-shaft, a brace-rod for said arm, also loosely-mounted upon said rock-shaft, a trip-rod, and a cam.

8. In a folding machine, the combination of a pair of folding rollers, a folding blade, a pair of arms connected thereto, means for rocking said arms, and a pair of vertical uprights or guides for preventing lateral vibration or tremble of said arms.

9. In a folding machine, provided with means for supplying a main sheet, the combination of a pair of folding rollers, a supplement feed table, a pair of stops for arresting the supplement sheet, a pair of adjustable arms to which said stops are attached, a folding blade, a pair of arms to which said blade is connected, stops for limiting the descent of said arms, and stops for preventing lateral vibration of said arms, said stops all being adjustably mounted upon the arms carrying the supplement stops.

10. In a folding machine, provided with means for supplying a main sheet, a supplement feed table having an opening fitted with

a paste-box provided with an aperture at its upper side and with a paste-wheel adapted to apply paste to the under sides of the supplements.

11. In a folding machine, provided with means for supplying a main sheet, the combination of a supplement feed table provided with a paste-box and wheel, a vibratory arm provided with a roller, adapted to co-operate with said paste-wheel.

12. In a folding machine, provided with means for supplying a main sheet a supplement feed table provided with a paste-box and wheel and formed with a longitudinal groove or depression.

13. In a folding machine, provided with means for supplying a main sheet, the combination of a supplement feed table, provided with a paste-box and wheel, a pair of adjustable stops for the supplement sheet, a vibratory paste cup provided with a pair of paste-wheels, a pair of folding rollers, and a folding blade.

14. In a folding machine, provided with means for supplying a main sheet, the combination of a supplement feed table provided with a paste box and a paste-wheel, a pair of adjustable stops for the supplement sheet, a vibratory laterally-adjustable paste cup provided with a pair of paste wheels, a pair of folding rollers, and a folding blade.

15. In a folding machine, provided with means for supplying a main sheet the combination of a supplement feed table provided with a paste box and wheel, a pair of adjustable stops for the supplement sheet, a vibratory, longitudinally and laterally adjustable paste-cup provided with a pair of paste wheels, a pair of folding rollers, and a folding blade.

16. In a folding machine, provided with means for supplying a main sheet the combination of a supplement feed table provided with a paste-box and a paste wheel, a vibratory paste-cup provided with an arm having a feed roller to co-operate with the supplement paste-wheel, a pair of folding rollers, and a folding blade.

17. In a folding machine, the combination with a pair of folding rollers, a pair of cutting or trimming disks, one of which is mounted upon the shaft of one of said rollers, and the other of which is mounted independently on a shaft or arbor, a main driving chain, a sprocket-wheel fast on the shaft of the roller bearing one of the cutting disks, an auxiliary driving chain, a sprocket-wheel loosely mounted on the said shaft bearing the fixed sprocket-wheel, a sprocket-wheel fixed upon the shaft of the other folding roller, and a sprocket-wheel fixed upon the independent cutting disk shaft or arbor.

18. In a folding machine, the combination with a pair of folding rollers, of a receiver for

the folded papers consisting essentially of the inclined cross-bars 111, uprights 112, and the laterally-adjustable uprights 115.

19. In a folding machine, the combination
5 with a pair of folding rollers, of a receiver for the folded papers consisting essentially of a pair of oppositely-inclined bars 111, a pair of uprights 112, and the laterally-adjustable supports composed of the uprights 115, and

means for securing the same at any desired locality.

Signed at Canton, in the county of St. Lawrence and State of New York, this 26th day of August, A. D. 1892.

JAMES G. HARDIE, JR.

Witnesses:

CHAS. P. HOWE,
E. E. NEVIN.