

No. 692,126.

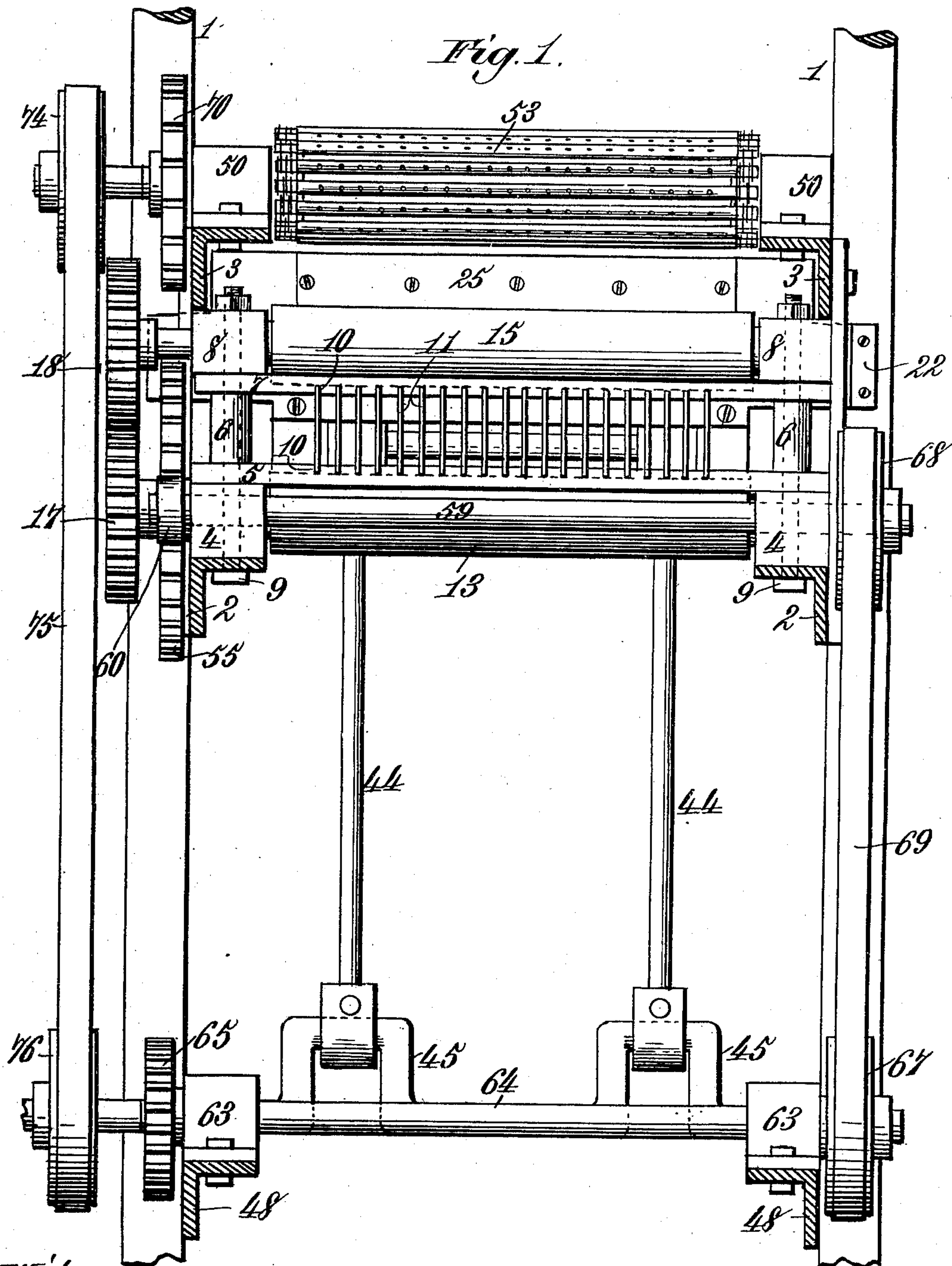
Patented Jan. 28, 1902.

E. H. EISENHART.
MATCH MAKING MACHINE.

(Application filed July 20, 1901.)

(No Model.)

4 Sheets—Sheet 1.



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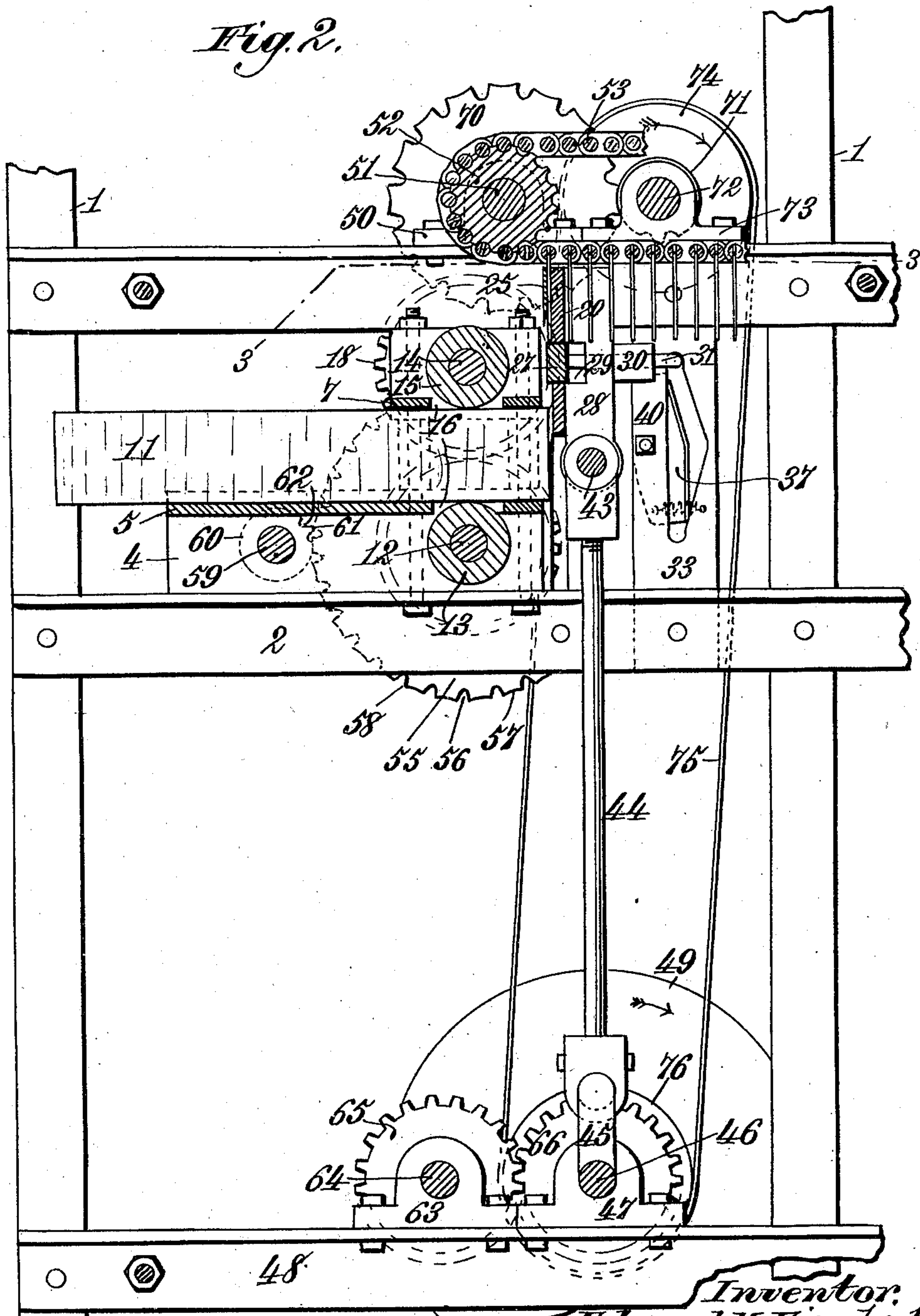
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Fig. 2.



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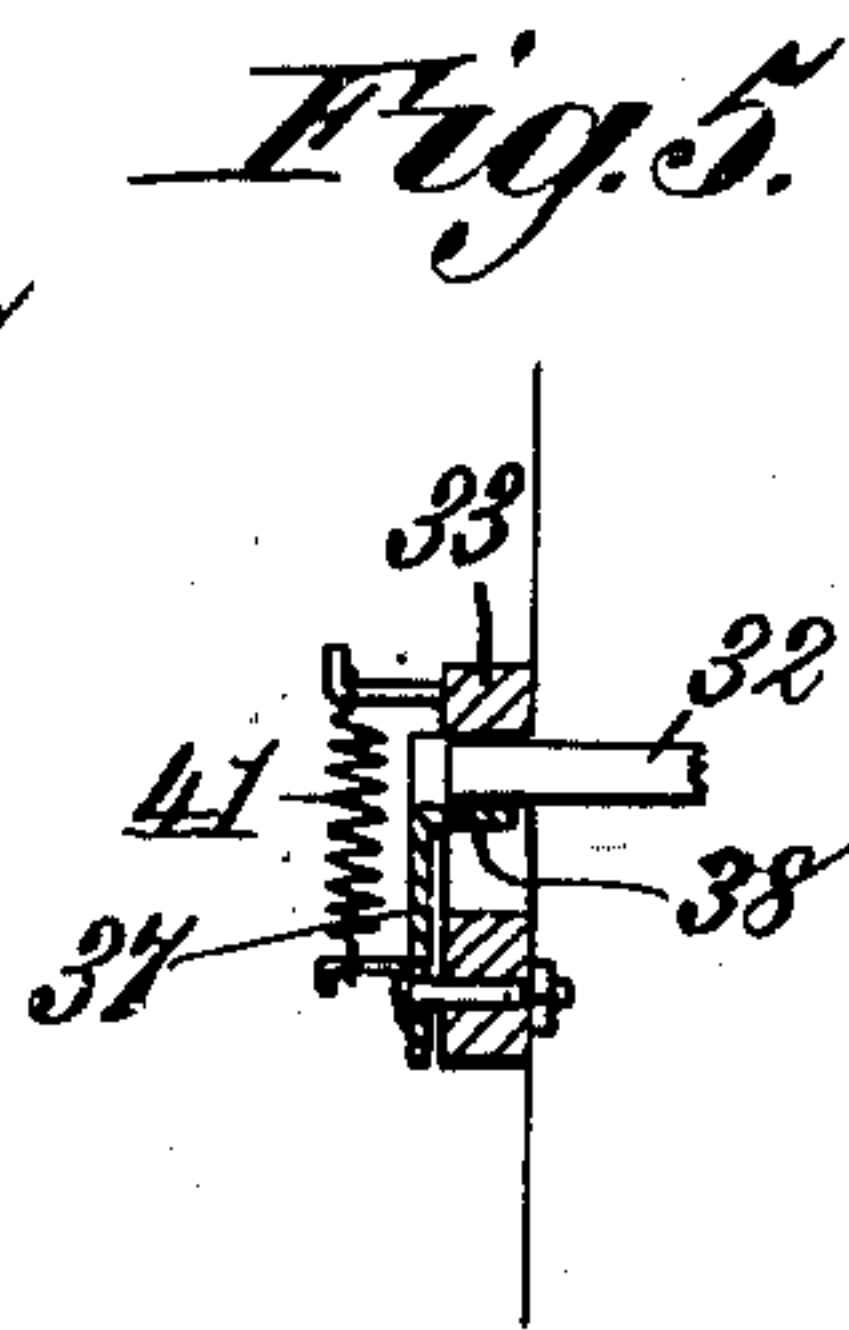
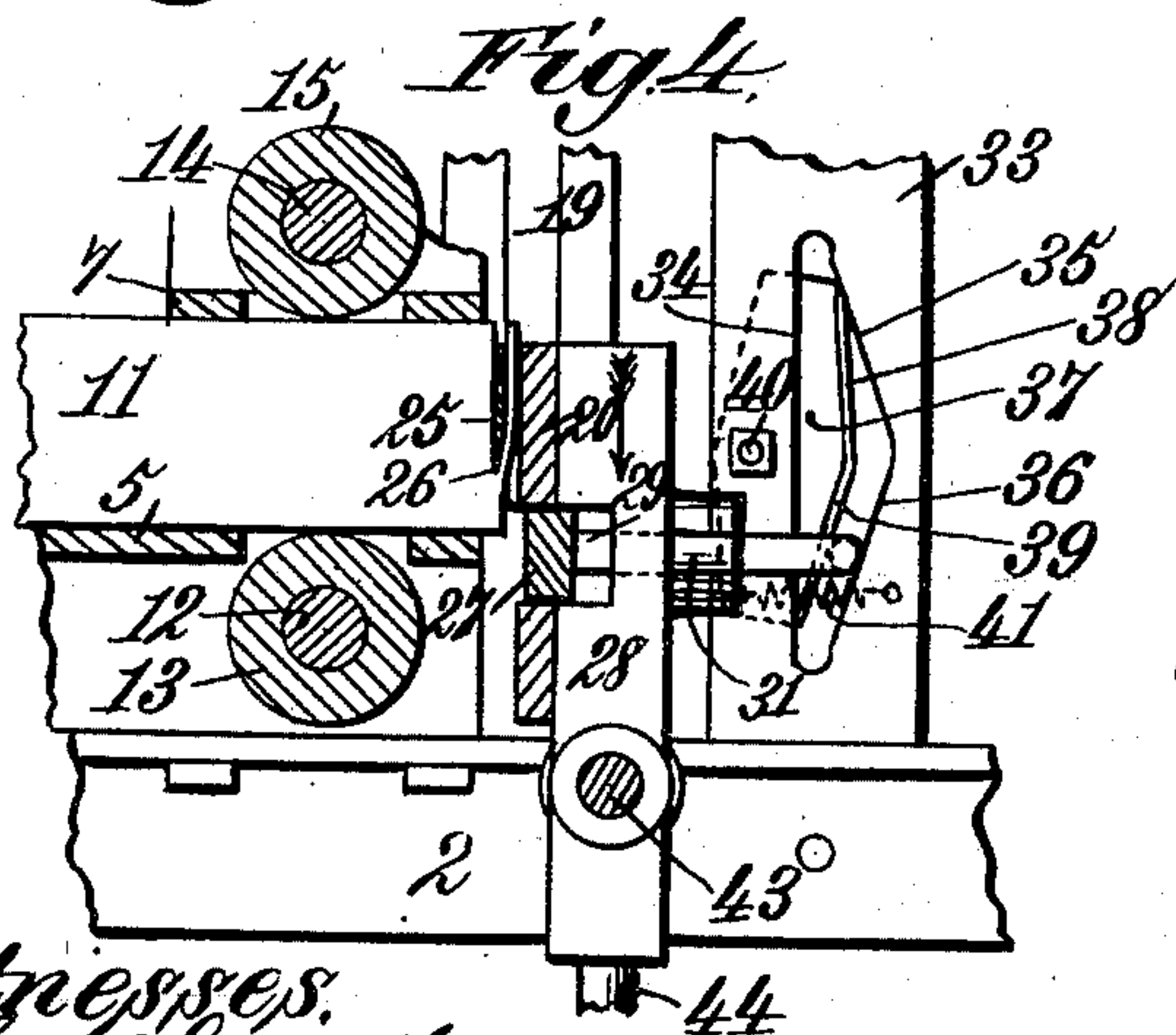
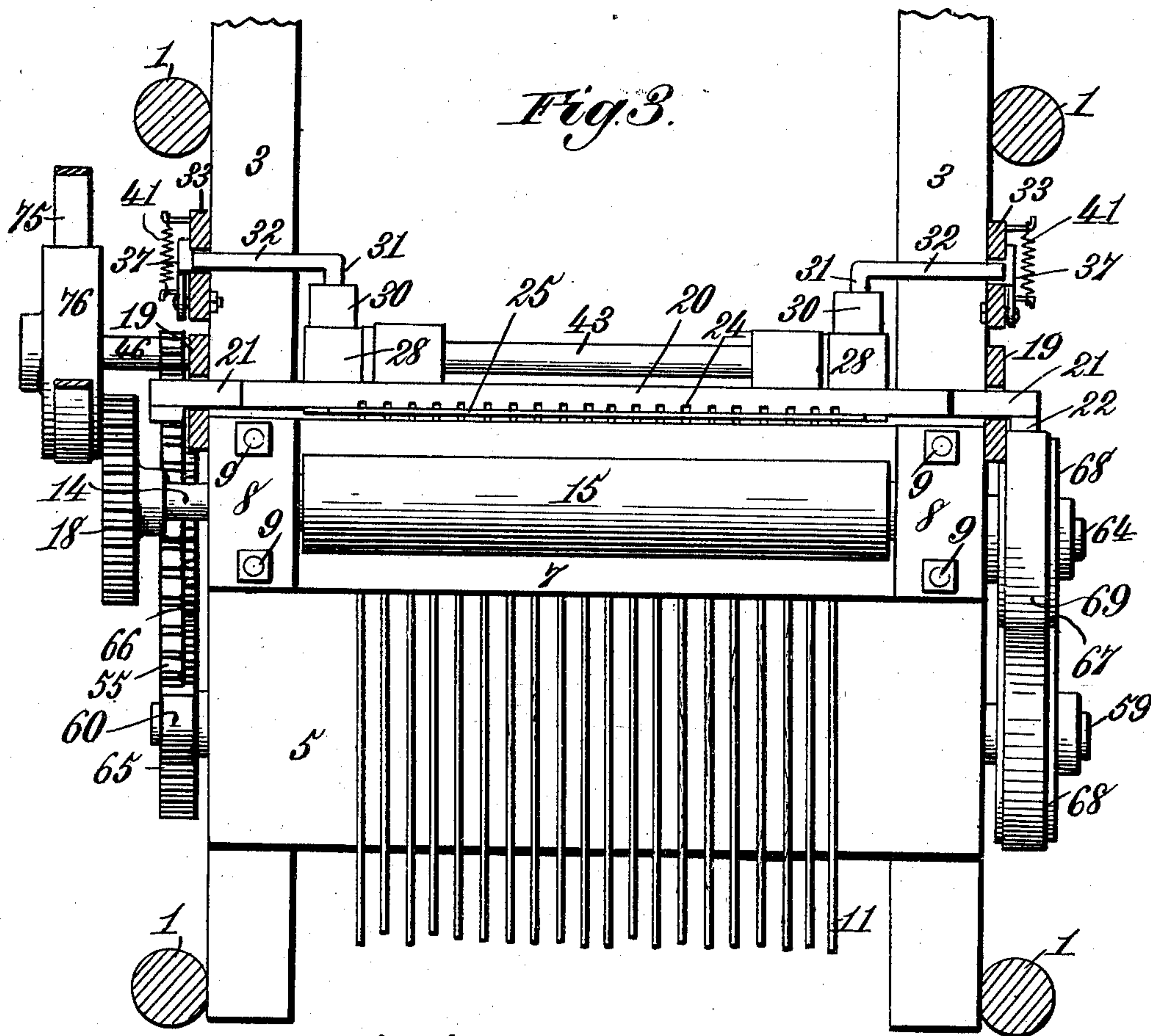
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(No Model.)

4 Sheets—Sheet 3.



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MATCH MAKING MACHINE.

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(No Model.)

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Fig. 6.

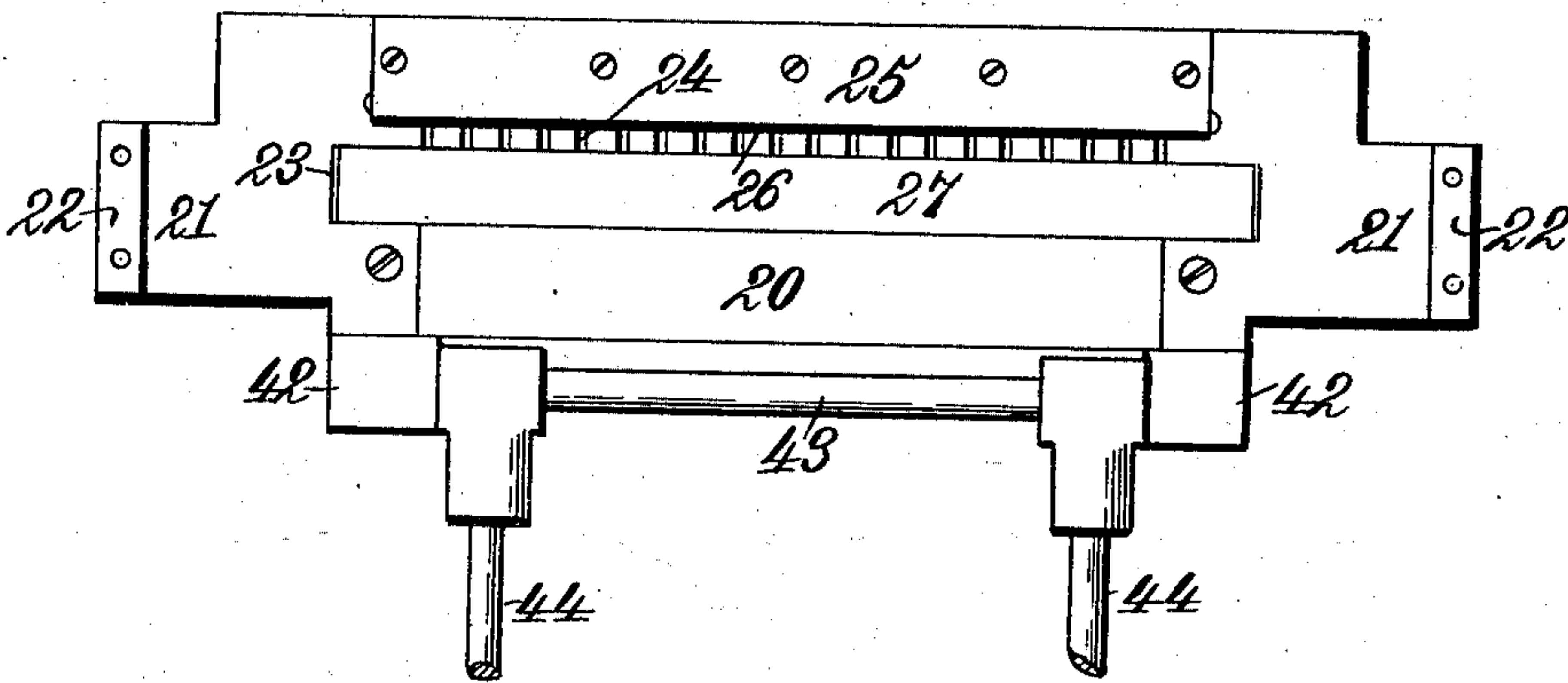


Fig. 7.

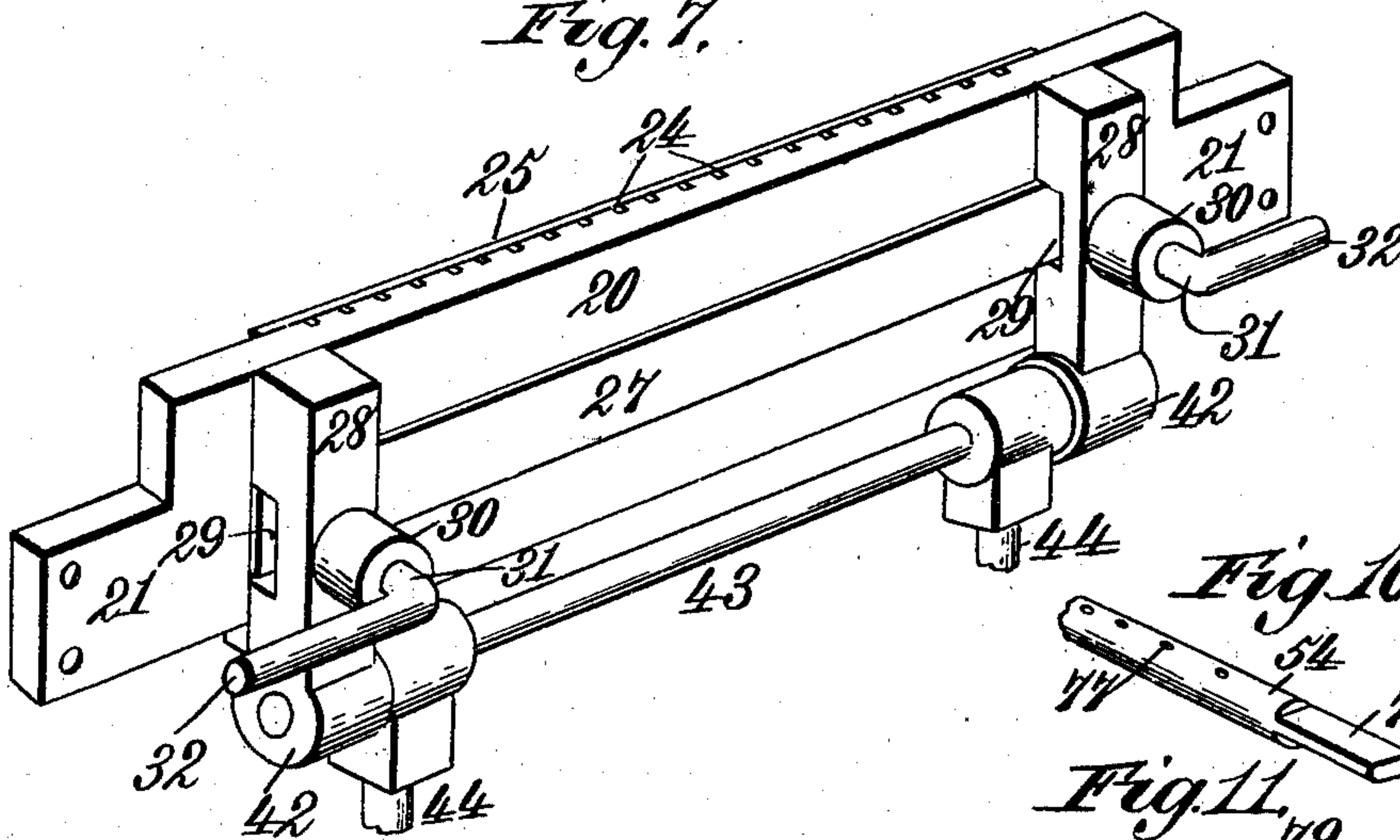


Fig. 10.

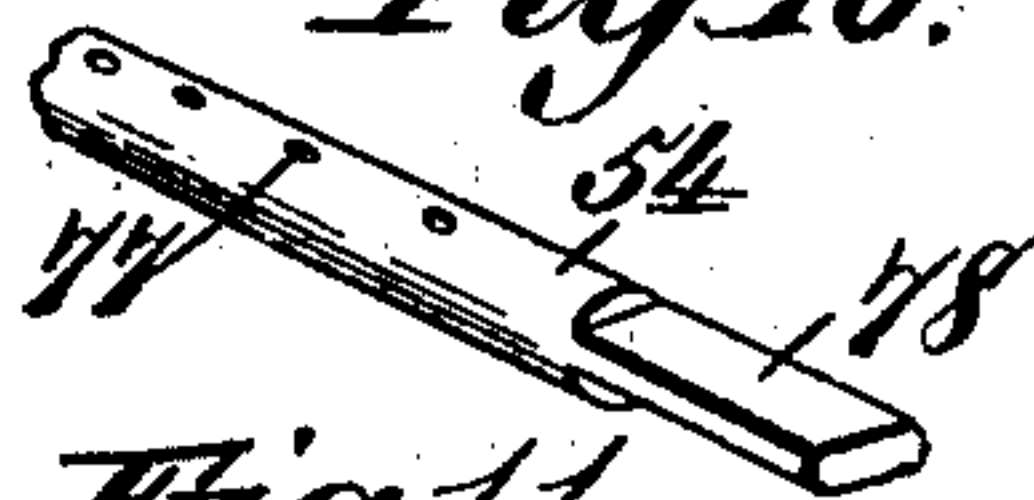


Fig. 11.

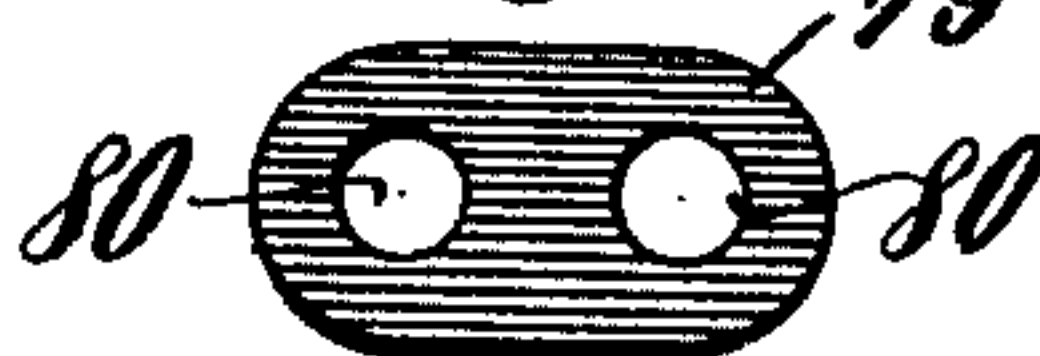


Fig. 12.



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UNITED STATES PATENT OFFICE.

EDWARD H. EISENHART, OF NEW YORK, N. Y.

MATCH-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 692,126, dated January 28, 1902.

Application filed July 20, 1901. Serial No. 69,097. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. EISENHART, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Match-Making Machines, of which the following is a specification.

This invention relates to match-making machines, and particularly to that class of such machines wherein the splints are cut from strips or sheets of veneer and are inserted in an endless carrier, by which they are successively presented to the different parts of a match-making machine to convert the splints into finished matches.

My present invention has for its objects, first, to provide improved mechanism for feeding the veneer strips to the cutting mechanism; second, to provide improved cutting mechanism for slicing off the splints from the veneer strips; third, to provide improved means for feeding the splints to and inserting them in the carrier-bars; fourth, to provide an improved endless carrier for receiving and delivering the splints to the different parts of a match-making machine, and, lastly, to improve and simplify the construction and render more certain and efficient the operation of this class of machines generally.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a view in end elevation of my improved machine. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a horizontal sectional plan view taken on the line 3 3 of Fig. 2. Fig. 4 is a detail sectional view showing the knife in the act of slicing off the splints from the veneer strips. Fig. 5 is a detail sectional view of the switch-cam for controlling the action of the lifter-bar. Fig. 6 is a view in elevation of the knife-carrier. Fig. 7 is a perspective view thereof looking toward the rear side. Fig. 8 is a side view of the carrier. Fig. 9 is a top plan view of one side thereof. Fig. 10 is a perspective view of one end of one of the carrier-bars,

and Figs. 11 and 12 are detail views of two of the carrier-links.

In constructing the machine any frame suitable for the purpose may be provided. In the present instance said frame is shown as consisting of four posts or standards 1 and a similar number of longitudinal side rails consisting of angle-iron beams 2 and 3, two on each side of the frame and bolted one above the other to the standards 1. Resting on the rails 2 are two longitudinal blocks 4, and seated on said blocks is a table or bed-plate 5, that extends from side to side of the frame. Seated on the table above the blocks 4 are spacer-blocks 6, and supported on the upper ends of the latter is an upper table 7, similar to the table 5, before referred to, excepting that it is shorter, as most clearly shown in Fig. 2 of the drawings. Seated on the table 7 above the spacer-blocks are longitudinal blocks 8. Bolts 9 pass vertically through the parts above described and serve to bolt them all tightly together and to the side rails 2. The upper side of the table 5 and the under side of the table 7 are grooved longitudinally, as at 10, the grooves in each table being parallel with one another and formed at uniform distances apart and the grooves of one table registering with the grooves of the other table. The veneer strips 11 are cut of such a width that when stood up on edge they may be readily inserted in the grooves in the two tables and will be held and guided thereby in such position. In practice the height of the veneer strips is such that it is equal to the length of the finished match-splints, and the strips are cut from the stock in such manner that the grain of the wood will be vertical when the strips are in place between the tables. Journaled in the blocks 4 is a shaft 12, on which is fixed a feed-roll 13, and journaled in the blocks 8 is a shaft 14, on which is fixed a similar feed-roll 15. The tables 5 and 7 are transversely slotted, as at 16, opposite the feed-rolls, through which the latter project to frictionally engage the upper and lower edges of the veneer strips to feed the latter forward. Gear-wheels 17 and 18 of equal size are respectively fixed on the shafts 12 and 14 and operate to drive said wheels in opposite directions at equal speed, power be-

ing applied to rotate the shaft 12 intermittently in the manner hereinafter described.

Fixed to the rails 2 and 3 on opposite sides of the machine and in rear of the feed-tables 5 are two vertically-slotted guide-bars 19, in which is adapted to vertically reciprocate a knife-carrier, (most clearly shown in Figs. 6 and 7 of the drawings,) and constructed as follows:

10 The numeral 20 indicates an approximately rectangular plate provided at each end with an extension 21, said extensions projecting through and being freely movable in the vertical slots in the guide-bars 19. Strips 22 are
15 fixed to the outer ends of the extensions 21 and engage the outer sides of the guide-bars to prevent any endwise movement of the knife-carrier. The plate 20 is centrally slotted longitudinally, as at 23, for the purpose
20 presently described, and on its front side is provided with a series of vertical grooves 24, that extend from the upper edge of the plate down to the upper side of the slot 23. The
25 said grooves are equal in number to the veneer strips fed between the two tables and are in alinement or register with the grooves in the latter, and each of the said grooves has a cross-sectional area approximately equal
30 in length than the splint. Fixed by screws or other suitable detachable fastenings to the grooved side of the plate 20 is a knife 25, consisting of a flat steel blade having a lower beveled edge 26, the bevel being formed
35 on the side of the blade adjacent to the plate 20. The lower or cutting edge of the knife does not quite extend to the lower ends of the grooves 24, as best shown in Fig. 6, and the knife covers said grooves, whereby the latter
40 form a series of pockets or cells each adapted to receive a match-splint. Movably fitted in the slot 23 in the knife-carrier is a lifter-bar 27, consisting of a bar rectangular in cross-section and of such size as to loosely fit within
45 the said slot. Formed on the rear side of the knife-carrier are two vertical ribs or flanges 28, which straddle or extend across the ends of the slot 23 and are each provided with a slot or mortise 29, within which the lifter-bar
50 may move. Formed on the rear sides of the said ribs or flanges are hollow bosses 30, through which and the ribs or flanges loosely pass bent arms or levers 31 32, which are fixed in or fastened to the rear side of the lifter-bar.
55 As most clearly shown in Fig. 7, said arms or levers are each bent at a right angle, the ends 32 thereof projecting horizontally in opposite directions and loosely passing through slots formed in two guide-bars 33, secured to the
60 rails 2 and 3 on opposite sides of the frame in rear of the knife-carrier. The slots in said guide-bars are approximately triangular in shape—that is to say, each of said slots has a straight side 34 and two inclined sides 35 and
65 36, the upper and lower ends of the slot being straight or having parallel sides for a short distance, as shown in Fig. 4. Pivoted to the

outer side of each of the guide-bars 33, in proximity to the slot, is a plate 37, provided upon its rear edge with a lateral flange 38 39, 70 that projects into the slot. As shown in Fig. 4, said plate is pivoted midway between its ends, as at 40, to the guide-bar, and the flange 38 39 is angular in shape—that is to say, its two parts 38 and 39 are inclined relatively 75 one to the other in manner similar to the two inclined sides 35 36 of the slot. A coiled spring 41 is attached at one end to the lower end of the plate and at its other end to the guide-bar and operates to draw the lower end 80 of the plate toward the slot. This plate and its angular flange I will herein denominate a “switch-cam” and the slot a “switch-cam slot” for the sake of description. The ends 32 of the angle-arms project between the inclined 85 portions 38 39 of the switch-cams and the sides of the switch-cam slots, as most clearly shown in Figs. 2 and 4. Formed on the lower ends of the ribs or flanges 28 are eyes 42, in which is fixed a rod 43, and journaled on said 90 rod are the upper ends of two pitmen 44, the lower ends of which are journaled on cranks 45 of a crank-shaft 46, mounted in bearings 47, fixed to side rails 48, bolted to the standards 1. The crank-shaft 46 constitutes the 95 power or driving shaft of the machine and is provided with a driving-pulley 49, which may be driven from any suitable source of power. By means of the crank-shaft and pitmen the knife-carrier is reciprocated vertically in close 100 proximity to the rear ends of the tables 5 and 7 and causes the knife to slice off the splints from the veneer strips in the manner presently to be described.

Journaled in bearings 50, bolted to the side 105 rails 3, is a transverse shaft 51, on which is fixed a fluted roll 52. The splint-carrier 53, constructed in the manner hereinafter described and comprising transverse perforated carrier-bars 54, passes around the fluted roll 110 and above the splint-cutting mechanism, so as to receive the ends of the match-splints in a manner common in this class of machines, the fluted roll being given an intermittent rotation to impart a step-by-step movement to 115 the carrier by means hereinafter explained.

The operation of the splint-cutting mechanism is as follows: The veneer strips are inserted in the grooves in the feed-tables and are fed forward by the feed-rolls 13 and 15 120 with a step-by-step movement by mechanism hereinafter described, the veneer strips being fed forward at each operation of the feed mechanism the distance equal to the thickness of a match-splint. Let it be assumed 125 that the knife-carrier is at the limit of its upward movement and that the veneer strips have been fed forward. The latter will then project beneath the knife a distance equal to the thickness of a splint, and the ends 32 of 130 the angle-arms will project through the upper ends of the switch-cam slots. When the angle-arms lie in this position, the springs 41 will hold the upper ends of the switch-cams

against the vertical sides of the slots, as best shown in Fig. 2, and said angle-arms will hold the lifter-bar 27 thrust forward. As the knife-carrier commences to descend the bent ends 5 32 of the angle-arms engage the upper inclined portions 38 of the switch-cams and are drawn rearward by the latter, thereby retracting the lifter-bar and withdrawing it into the slot 23 in the knife-carrier. This operation 10 continues until the bent ends of the angle-arms pass the apices of the switch-cams, or, in other words, until they descend past the points where the inclined faces of said cams meet, whereupon they are thrust forward by 15 the inclined sides 36 of the switch-cam slots and operate to advance the lifter-bar and project it from out the slot 23 in the knife-carrier until the ends of the angle-arms reach the bottoms of the switch-cam slots. In this 20 part of their movement the angle-arms force the lower ends of the switch-cams forward or toward the straight sides of the switch-cam slots and against the tension of the springs 41; but when the angle-arms have reached 25 the lower ends of said slots they will release the switch-cam, whereupon the springs will immediately restore said cams to their former positions, as shown in Fig. 2. During the descent of the knife-carrier the knife en- 30 gages the upper edge of the veneer strips and commences to slice off the splints therefrom. The beveled cutting edge of the knife directs the ends of the splints into the grooves 24 of the knife-carrier, and as the knife continues 35 its descent and slicing-off operation the splints are forced up into said grooves, or, more properly speaking, the grooved knife-carrier and knife are forced down over and about the splints as the latter are sliced from 40 the veneer strips by the knife, so that when the splints have been completely sliced off from the veneer strips they will be contained in the cells or pockets formed by said grooves and knife. Just before the splints have been 45 completely severed from the veneer strips the lifter-bar will have been projected from out the slot 23 in the knife-carrier in the manner before described and will lie beneath the lower ends of the splints. When the knife- 50 carrier ascends, therefore, after the splints have been completely severed, the lifter-bar will engage the lower ends of the splints and will prevent the latter from dropping out of the grooves in the knife-carrier. When the 55 knife-carrier starts to ascend, which operation occurs when the ends of the angle-arms are at the bottoms of the switch-cam grooves, the angle-arms will travel up between the straight or vertical sides of the switch-cam slots and the switch-cam, and hence the lifter- 60 bar will remain beneath the ends of the splints during the entire ascent of the knife-carrier. As the knife-carrier approaches the limit of its upward movement the upper ends 65 of the splints enter the perforations in the carrier-bars of the endless carrier, and during the remainder of the upward movement

of the knife-carrier the lifter-bar operates to force the splints into said perforations. Just before the knife-carrier reaches the limit of 70 its upward movement the ends of the angle-arms pass from behind the upper ends of the switch-cams and the springs 41 immediately restore the said cams to the position shown in Fig. 2 in readiness for the descent of the 75 knife-carrier, as before described. As the knife-carrier descends the splints are retained in the carrier-bars and the knife-carrier is stripped from off the splints. The endless carrier is then fed forward the proper dis- 80 tance to bring another carrier-bar into position to receive the next series of splints, to cut which the knife-carrier again starts to descend. The operation above described is successively repeated with great rapidity, 85 each descent of the knife-carrier slicing off a series of splints from the veneer strips, and on each ascent of the knife-carrier the previously-formed series of splints is inserted in one of the carrier-bars. 90

The means for feeding forward the veneer strips and for actuating the endless carrier will now be described.

Fixed on the shaft 12, on which is mounted the lower feed-roll 13, is a wheel 55, provided 95 on its periphery at equal distances apart with transverse grooves or notches 56. The periphery of said wheel between each two adjacent notches is concave or inwardly curved, as at 57, said notches and concave faces at 100 their points of intersection forming shoulders 58. Journaled in the blocks 4 is a transverse shaft 59, on which is fixed a relatively small wheel 60, having a perfectly-smooth and cir- 105 cular periphery for the greater portion of its circumference, but provided at one point with a radial tooth 61, that projects beyond the periphery. The periphery of the said wheel at the opposite sides of the base of the 110 tooth 61 is notched or recessed, as at 62. The distance between the shafts 12 and 59 and the relative sizes of the wheels 55 and 60 are such that the smooth circular periphery of the wheel 60 will accurately fit and revolve in the 115 concave faces 57 of the wheel 55. It will be obvious, however, that while the wheel 60 may freely revolve when in contact with any one of said faces it will be impossible for the wheel 55 to turn in either direction, and hence the latter will be locked in an immovable po- 120 sition. When, however, the tooth enters one of the notches 56, one of the recesses 62 is brought opposite the shoulder 58 in advance of the tooth, and as the wheel 60 continues to rotate the tooth imparts a rotary movement 125 to the wheel 55 and turns the latter until the tooth moves out of the notch, whereupon the periphery of the wheel 60 again rotates in one of the concave faces of the wheel 55, and the latter is again effectually locked against move- 130 ment. At every complete revolution of the wheel 60 then the wheel 55 is given a fractional part of a revolution, and inasmuch as the wheel 55 is mounted on the same shaft as

the feed-roll 13 and as said feed-roll and the feed-roll 15 are geared to rotate together in the manner before described it follows that at each complete rotation of the wheel 60 the two feed-rolls will be given a partial rotation and will feed the veneer strips forward to be operated on by the knife. Motion is imparted to the wheel 60 by means of the following gearing: Journaled in bearings 63, fixed to the lower side rails 48, is a shaft 64, on which is fixed a gear-wheel 65, the same size as and gearing with a gear-wheel 66, fixed on the crank or driving shaft 46. A pulley 67 is fixed on the shaft 64, and a similar pulley 68 is fixed on the shaft 59 of the toothed wheel 60. Motion is communicated from the pulley 65 to the pulley 68 by a belt 69. The described gearing is so timed and proportioned that the intermittent feed is actuated to feed forward the veneer strips as the knife-carrier approaches the limit of its upward movement.

The construction of the intermittent gearing for imparting a step-by-step movement to the endless carrier 53 is precisely the same as that just above described for giving an intermittent movement to the feed-rolls and need, therefore, be but briefly alluded to. Fixed on the shaft 51 of the fluted carrier-roll is a notched and concave-faced wheel 70, similar in all respects to the wheel 55, before described, and gearing with said wheel is a single-toothed wheel 71, similar to the wheel 60. The notched wheel 70 should be provided with a number of notches exactly corresponding in number to the number of grooves or corrugations in the fluted carrier-roll. The toothed wheel 71 is fixed on a shaft 72, mounted in bearings 73, bolted to the upper side rails 3, and also fixed on the shaft 72 is a pulley 74, that is connected by a belt 75 to a similar pulley 76, fixed on the crank or drive shaft 46. It will be readily understood from what has heretofore been stated that at each complete rotation of the wheel 74 the wheel 70 and with the latter the fluted carrier-roll will be given a partial rotation and the endless carrier will be moved the distance of one carrier-bar. This part of the intermittent gearing is so timed and arranged that as the knife-carrier descends the tooth of the wheel 71 will engage one of the notches of the wheel 70 and will partially rotate the latter and feed forward the carrier.

It only remains to describe the construction of the improved endless carrier, which is as follows: The carrier comprises a series of carrier-bars 54, arranged parallel to one another and each consisting of a rod provided with a number of transverse perforations 77, corresponding in number to the number of splints cut at each stroke of the knife, and provided at its opposite ends with flat journals 78 or journals angular in cross-section, and by the term "angular" I wish to be understood as meaning journals having any shape in cross-section that would prevent them from turning in bearings having a cor-

responding shape. The links serving to flexibly connect the carrier-bars together are of two kinds, respectively illustrated in Figs. 11 and 12, each consisting of a thin flat metallic plate, preferably rounded at its ends, the plate 79 (shown in Fig. 11) being provided at its ends with round apertures 80 of such a size as just to receive the flat journals 78 and permit the latter to freely rotate therein, and the plate 81 (shown in Fig. 12) provided at its ends with apertures 82, corresponding in shape to the journals, whereby the latter are prevented from rotating in said apertures. For the sake of clearness I shall hereinafter designate the links having round apertures as "perforated" links and those having angular apertures as "slotted" links. The carrier-bars are arranged parallel to one another, and the ends of a pair of each kind of links are fitted over the end of each journal—that is to say, the ends of four links will be fitted over each journal, the perforated links alternately with the slotted links, the arrangement being such that of every three certain carrier-bars the journals of the first and second carrier-bars will be connected together by the same slotted links, while the journals of the second and third carrier-bars will be connected together by the same perforated links. This is best illustrated in Figs. 8 and 9, wherein for the sake of more clearly illustrating the arrangement the perforated links are shaded and the slotted links are unshaded. By thus arranging the links the carrier-bars will, in effect, be grouped together in pairs, the carrier-bars of each pair being non-rotatable relative to each other, both having their flat journals inserted in the slots of the same links, and hence are rigidly connected together; but it will be evident that each two pairs of adjacent carrier-bars will be flexibly connected together, as the journals of the adjacent carrier-bars of said pairs are connected together only by two perforated links, in which said journals are free to turn. A carrier is thus provided which is amply flexible to freely turn around the rollers about which it leads, yet will possess a certain stiffness or rigidity found desirable in machines of this class.

Having described the construction and operation of the different parts of the machine separately and in detail, a brief review of the operation of the machine as a whole will be sufficient to thoroughly disclose the entire invention. The veneer strips are placed on edge between the two grooved feed-tables and between the upper and lower feed-rolls. The shaft 46 is then put in motion and operates to reciprocate the knife-carrier and actuate the feed-rolls and the endless carrier. At each complete movement of the knife-carrier, comprising a full down and upstroke, the feed-rolls will feed all the veneer strips forward a distance equal to the thickness of a match-splint and will feed the endless carrier forward a distance equal to the distance

between the longitudinal centers of two adjacent carrier-bars. The veneer strips are fed forward at the moment the knife-carrier has reached the limit of its upward movement, and the carrier is fed forward as the knife-carrier approaches the limit of its downward stroke. It will be noted by referring to Fig. 2 of the drawings, wherein the knife-carrier is shown at the end of its upward movement, that said knife-carrier is of such height that when in its highest position its lower portion will lie in front of the upper portion of the ends of the veneer strips, so that when the strips are fed forward their ends will abut the face of the knife-carrier. This arrangement has a twofold purpose. First, the knife-carrier acts as an abutment to limit the forward feed of the veneer strips. The other and more important purpose will presently appear. Heretofore where the splints have been cut from veneer strips it has been usual to employ a series of knives, one for each splint, which are so arranged that they move transversely across the path of movement of the veneer strip and sever the strips at one stroke simultaneously from end to end. The purpose of thus cutting the splints is owing to the fact that the grain of the wood does not always run straight, or, in other words, does not run in a line at a true right angle to the length of the strips, and hence if it be attempted to start the knife cutting at one edge of the strip and continue the cutting operation through to the other edge the splint would be apt to split off from the strip unevenly. Owing to the fact, however, that in the present instance the ends of the splints have a bearing against the face of the knife-carrier, no such result can take place and the knife operates to slice off the splints from the veneer strips as contradistinguished from splitting them therefrom. By slicing off the splints in this manner one knife only is necessary to simultaneously sever the splints from all the veneer strips. The veneer strips having been fed forward, as described, the knife-carrier commences to descend, and the lifter-bar is at the same time retracted and before it reaches the upper edges of the strips will have been entirely withdrawn into its slot in the knife-carrier. As the knife descends it engages the upper edges of all the strips and simultaneously slices off the splints, commencing at the upper edges of the strips and continuing on down to and through their lower edges. As the knife slices off the splints its beveled edge directs them into the grooves formed in the face of the knife-carrier and packs them therein. Before the splints have been entirely severed from the strips the lifter-bar is projected under the lower edges of the strips by the means hereinbefore described, so that when the splints have been entirely detached and are resting in the grooves in the knife-carrier they are effectually prevented from dropping out of said grooves by the

lifter-bar. When the knife-carrier ascends, the lifter-bar presses against the lower ends of the splints and forces the latter into the perforations in the carrier-bar awaiting their reception. The knife-carrier then descends, leaving the splints in the carrier-bar, and is in readiness to cut another series of splints and insert them in the succeeding carrier-bar.

Having described my invention, what I claim is—

1. In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips in parallel rows, of a vertically-grooved plate arranged to reciprocate in front of the ends of the strips and receive the splints as they are severed therefrom, a knife fixed to the grooved face of said plate and beveled on the side of its cutting edge adjacent to the said plate, and means for reciprocating said knife to simultaneously slice off splints from all the veneer strips, the beveled edge of the knife operating to direct the splints into said grooves, substantially as described.

2. In a match-machine, the combination with means for intermittently feeding forward a plurality of veneer strips in parallel rows, of a plate arranged to reciprocate transversely in front of the ends of the strips in the direction of their width, said plate having its face adjacent to the strips vertically grooved for a suitable distance to receive the splints as they are severed from the strips, a knife fixed to the grooved portion of the face of said plate and beveled on the side of its cutting edge adjacent to the plate to guide the splints into the said grooves, means for reciprocating the knife and plate in one direction to simultaneously slice off splints from all the veneer strips, and in the other direction to move the knife and grooved portion of the plate from in front of the strips and the ungrooved portion of said plate in front thereof, substantially as described.

3. In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely to said strips in the direction of their width, a knife carried by said carrier, means for actuating said knife-carrier to simultaneously slice off splints from the ends of all the strips, a bar carried by the knife-carrier, and means for projecting said bar beneath the forward edges of the strips before the splints are entirely severed, substantially as described.

4. In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife carrier arranged to move transversely in front of said strips, a knife carried by said carrier for simultaneously slicing off splints from the ends of all the strips, said knife-carrier being provided with

receptacles arranged to receive the splints as they are severed from the strips, and said knife being arranged to close one side of each of said receptacles, and means for actuating the knife-carrier, substantially as described.

5 In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips, the face of said knife-carrier being vertically grooved, a knife fixed to the face of the knife-carrier over said grooves and arranged to simultaneously slice off splints from the ends of all the strips, and means for closing the lower ends of the grooves, substantially as described.

6 In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips, the face of said carrier being vertically grooved, a knife fixed to the face of the knife-carrier over said grooves and arranged to simultaneously slice off splints from the ends of all the strips, the lower cutting edge of the knife being beveled on the side next the carrier for directing the severed splints into the grooves, and means for closing the lower ends of the grooves, substantially as described.

7 In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips, the face of said carrier being vertically grooved, a knife fixed to the face of said knife-carrier over said grooves and arranged to simultaneously slice off splints from the ends of all the strips, the lower cutting edge of the knife being beveled on the side next the knife-carrier for directing the severed splints into the grooves, a horizontally-movable bar carried by the knife-carrier, and means for moving said bar under the lower edges of the veneer strips before the splints have been completely severed, substantially as described.

8 In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips, the face of said carrier being vertically grooved, a knife fixed to the grooved face of said knife-carrier and arranged to slice off splints simultaneously from the ends of all the strips, the lower cutting edge of the knife being beveled on the side next the knife-carrier to direct the splints into the grooves as they are severed from the strips, a horizontally-movable bar carried by the knife-carrier, and means for moving said bar under the lower edges of the veneer strips before the splints

have been completely severed, and an endless splint-carrier arranged above the knife-carrier, substantially as described.

9 In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips, the face of said carrier being vertically grooved, a knife fixed to the grooved face of the knife-carrier and arranged to slice off splints simultaneously from the ends of all the strips, a horizontally-movable bar carried by the knife-carrier, means for moving said bar under the lower edges of the strips before the splints have been completely severed, means for maintaining said bar in such position during the ascent of the knife-carrier, and an endless splint-carrier arranged above the knife-carrier, substantially as described.

10 In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips, the face of said carrier being vertically grooved, a knife fixed to the grooved face of the knife-carrier and arranged to slice off splints simultaneously from the ends of all the strips, a horizontally-movable bar carried by the knife-carrier, means for moving said bar under the lower edges of the strips before the strips have been completely severed, means for maintaining the bar in said position during the ascent of the knife-carrier, means for retracting the bar during the descent of the knife-carrier, and an endless splint-carrier arranged above the knife-carrier, substantially as described.

11 In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips, and provided centrally with a horizontal slot, the face of said knife-carrier being vertically grooved from its upper edge to said slot, a knife fixed to the grooved face of the knife-carrier and having its lower cutting edge terminating above the slot, a bar movably arranged in said slot, means for projecting said bar from the slot and under the edges of the strips before the latter are completely severed, means for withdrawing the bar into the slot on the downward stroke of the knife-carrier, and an endless splint-carrier arranged above the knife-carrier, substantially as described.

12 In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips and provided centrally with a horizontal slot, the face

of said knife-carrier being vertically grooved from its upper edge to said slot, a knife fixed to the grooved face of the knife-carrier and having its lower cutting edge terminating above the slot, a bar movably arranged in said slot, means for projecting said bar from the slot and under the edges of the strips before the latter are completely severed, means for maintaining said bar projected during the ascent of the knife-carrier, means for retracting the bar during the descent of the knife-carrier, and an endless splint-carrier arranged above the knife-carrier, substantially as described.

13. In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips and provided centrally with a horizontal slot, the face of said knife-carrier being vertically grooved from its upper edge to said slot, a knife fixed to the grooved face of the knife-carrier and having its lower cutting edge beveled on the side next the knife-carrier and terminating above a bar movably arranged in said slot, means for projecting said bar beneath the lower edges of the strips before the splints have been completely severed, means for retracting the bar during the descent of the knife-carrier, and an endless splint-carrier arranged above the knife-carrier, substantially as described.

14. In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips set up on edge in parallel rows, of a vertically-reciprocating knife-carrier arranged to move transversely in front of said strips and provided centrally with a horizontal slot, the face of said knife-carrier being vertically grooved from its upper edge to said slot, a knife fixed to the grooved face of the knife-carrier and having its lower cutting edge terminating above the slot, a bar movably arranged in said slot, means for projecting said bar beneath the lower edges of the strips before the splints have been completely severed, means for retracting the bar during the descent of the knife-carrier, an endless splint-carrier arranged above the knife-carrier, and means for preventing lateral movement of the knife-carrier, substantially as described.

15. In a match-machine, the combination with a vertically-reciprocating knife-carrier provided centrally with a horizontal slot and provided on its face with a plurality of vertical grooves extending from its upper edge to said slot, of a knife fixed to the grooved face of the knife-carrier and having its lower cutting edge terminating above the slot, a bar movably arranged in said slot, laterally-bent arms attached to the rear side of said bar, and vertical guide-bars fixed on opposite sides of the knife-carrier and provided with slots into which the ends of said arms project,

said slots having inclined sides against which the ends of the arms impinge on the latter part of the downward movement of the knife-carrier, whereby the said bar is projected from without the slot, substantially as and for the purpose specified.

16. In a match-machine, the combination with a vertically-reciprocating knife-carrier provided centrally with a horizontal slot and provided on its face with a plurality of vertical grooves extending from its upper edge to said slot, of a knife fixed to the grooved face of the knife-carrier and having its lower cutting edge terminating above the slot, a bar movably arranged in said slot, laterally-bent arms attached to the rear side of said bar, vertical guide-bars fixed on opposite sides of the knife-carrier and provided with slots into which the ends of said arms project, said slots having inclined sides against which the ends of the arms impinge during the latter part of the descent of the knife-carrier, whereby the bar is projected from without the slot, and cams disposed within said slots and arranged to engage the ends of the said arms and retract the bar during the initial portion of the descent of the knife-carrier, substantially as and for the purpose specified.

17. In a match-machine, the combination with a vertically-reciprocating knife-carrier provided centrally with a horizontal slot and provided on its face with a plurality of vertical grooves extending from its upper edge to said slot, of a knife fixed to the grooved face of the knife-carrier and having its lower cutting edge terminating above the slot, a bar movably arranged in said slot, laterally-bent arms attached to the rear side of said bar, vertical guide-bars fixed on opposite sides of the knife-carrier and provided with slots into which the ends of said arms project, said slots having inclined sides against which the ends of the arms impinge during the latter part of the descent of the knife-carrier and project the bar without the slot, and pivoted switch-cams disposed within said slots and arranged to engage the ends of the said arms and retract the bar during the initial portion of the descent of the knife-carrier, said switch-cams being arranged to oscillate on the upward movement of the knife-carrier to permit the passage of the arms therepast, substantially as described.

18. In a match-machine, the combination with a vertically-reciprocating knife-carrier provided centrally with a horizontal slot and provided on its face with a plurality of vertical grooves extending from its upper edge to said slot, of a knife fixed to the grooved face of the knife-carrier above said slot, a bar movably arranged in said slot, laterally-bent arms attached to the rear side of said bar, vertical guide-bars fixed on opposite sides of the knife-carrier and provided with slots into which the ends of said arms project, said slots having inclined sides against which the ends of the arms impinge during the latter part of

the descent of the knife-carrier and project the bar without the slot, pivoted switch-cams disposed within said slots and arranged to engage the ends of said arms and retract the bar during the initial portion of the descent of the knife-carrier, and a spring arranged to normally hold the switch-cam in position to be engaged by the arms as the knife-carrier descends, said switch-cams being arranged to oscillate on the upward movement of the knife-carrier to permit the passage of the arms therepast, substantially as described.

19. In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips arranged in parallel rows, of a reciprocating knife arranged to move transversely to said strips in the direction of their width, a crank-shaft and pitman for reciprocating the knife, an endless carrier, means moving with the knife for inserting the severed splints in the carrier, and intermittent gearing driven by the crank-shank and constructed to feed forward the carrier with a step-by-step movement, substantially as described.

20. In a match-machine, the combination with means for intermittently feeding forward a plurality of separated veneer strips arranged in parallel rows, of a reciprocating knife arranged to move transversely to said strips in the direction of their width, a crank-shaft and pitman for reciprocating the knife, an endless carrier, means moving with the knife for inserting the severed splints in the carrier, and intermittent gearing driven by the crank-shaft and constructed to feed forward the carrier with a step-by-step movement and to positively lock the carrier against movement while the splints are being cut and inserted, substantially as described.

21. An endless carrier for match-machines consisting of a series of parallel perforated carrier-bars each constructed to receive and hold a plurality of splints and provided at their opposite ends with journals, of links fitted over and connecting said journals, said carrier-bars being rigidly connected together in pairs and said pairs being flexibly connected together, substantially as described.

22. An endless carrier for match-machines consisting of a series of parallel perforated carrier-bars provided at their opposite ends with angular journals, of two series of links fitted over and connecting said journals, the links of one series having circular apertures in their opposite ends in which the journals are free to turn, and the links of the other series having angular apertures corresponding in shape to the journals and in which the latter cannot turn, substantially as described.

23. An endless carrier for match-machines consisting of a series of parallel perforated carrier-bars provided at their opposite ends with angular journals, of two series of links fitted over and connecting said journals, one series of links being perforated at their ends and the other series slotted at their ends to correspond to the shape of the journals, the slotted and perforated links being alternately arranged on the journals and so disposed that the forward ends of the perforated links overlap the rear ends of the slotted links, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWARD H. EISENHART.

Witnesses:

J. W. COULTER,
Mrs. F. COULTER.