

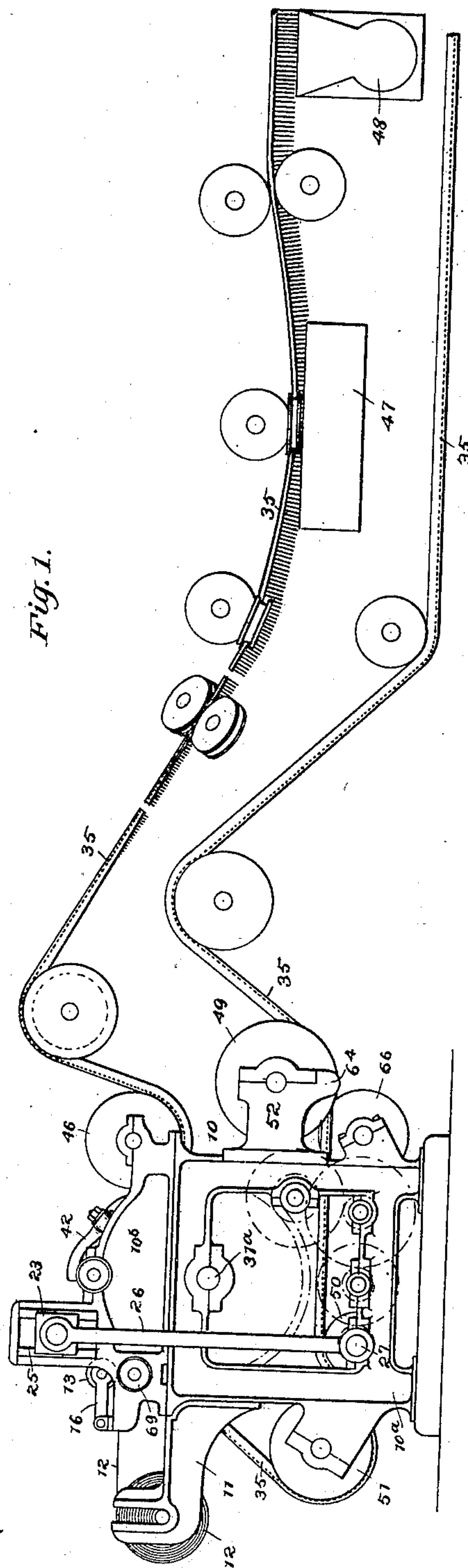
No. 652,475

J. A. E. CRISWELL.  
MATCH MAKING MACHINE.  
(Application filed July 29, 1899.)

Patented June 26, 1900.

(No Model.)

6 Sheets—Sheet 1.



WITNESSES:

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6 Sheets—Sheet 2.

Fig. 3.

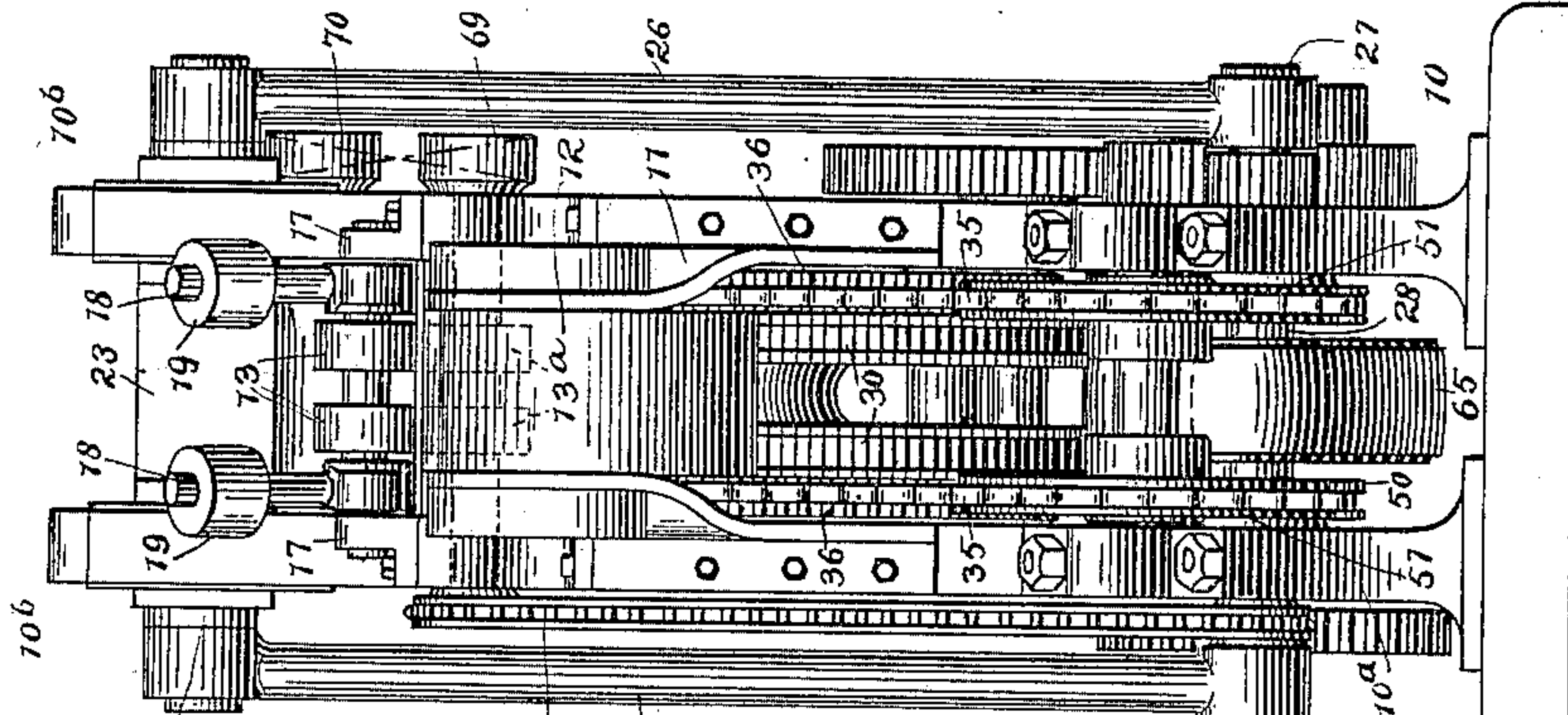
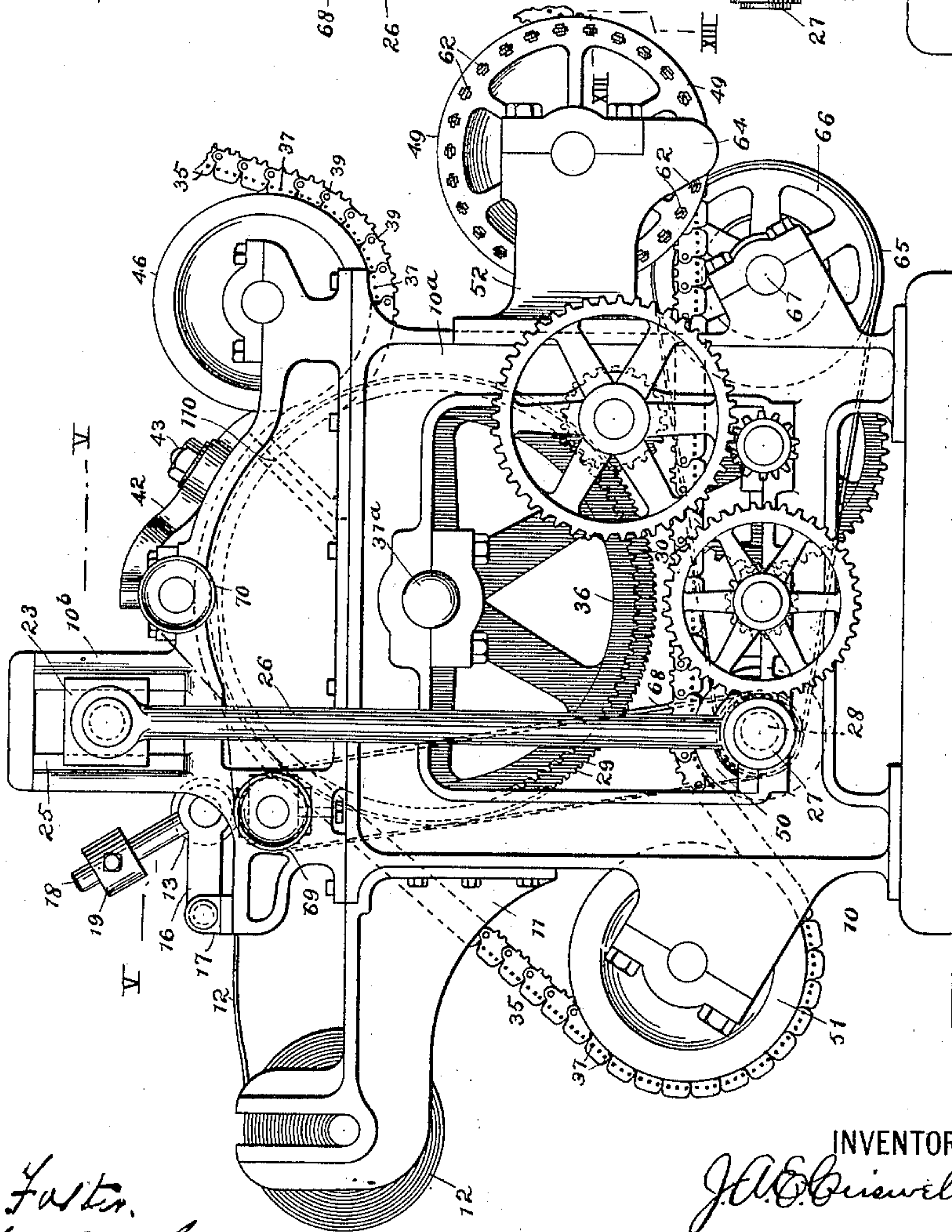


Fig. 2.



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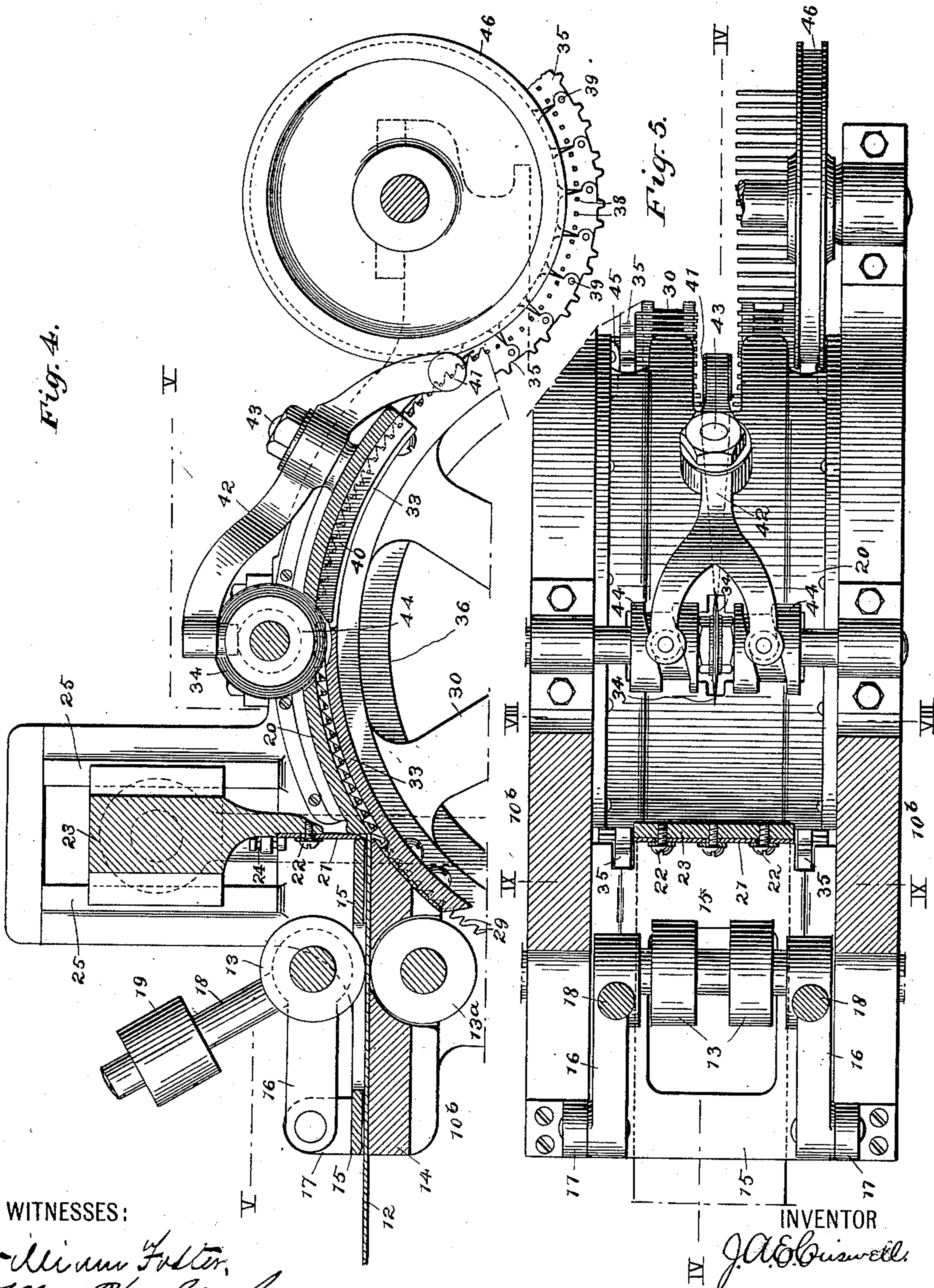
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6 Sheets—Sheet 3.



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6 Sheets—Sheet 4.

Fig. 10.

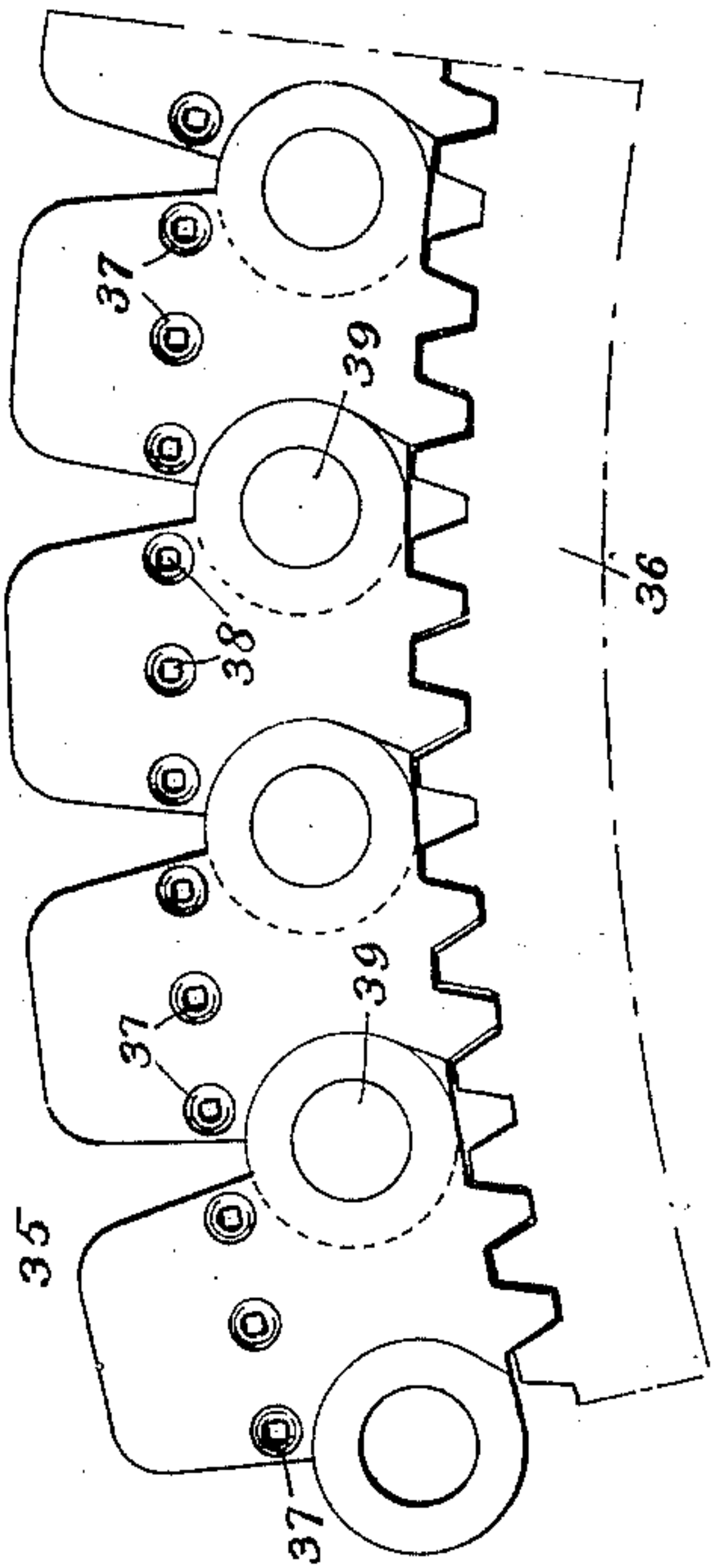


Fig. 11.

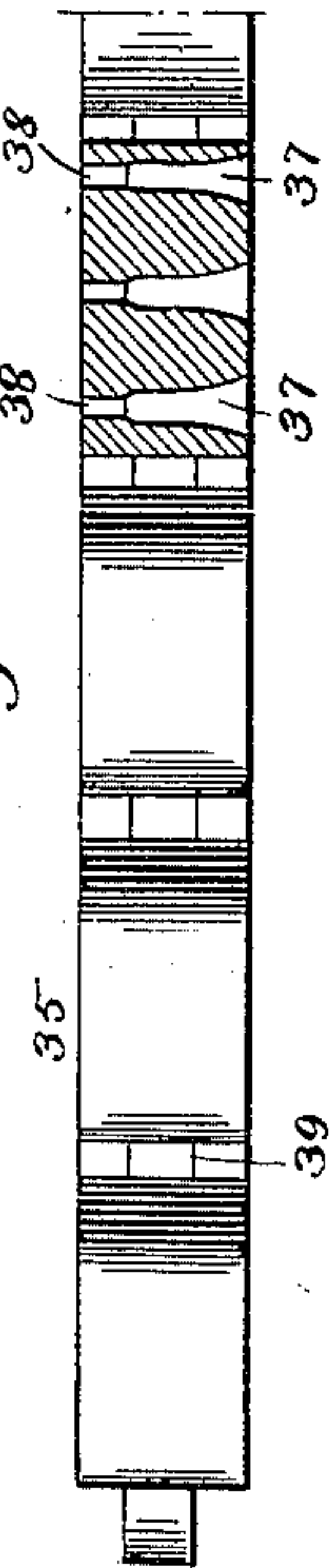


Fig. 12.

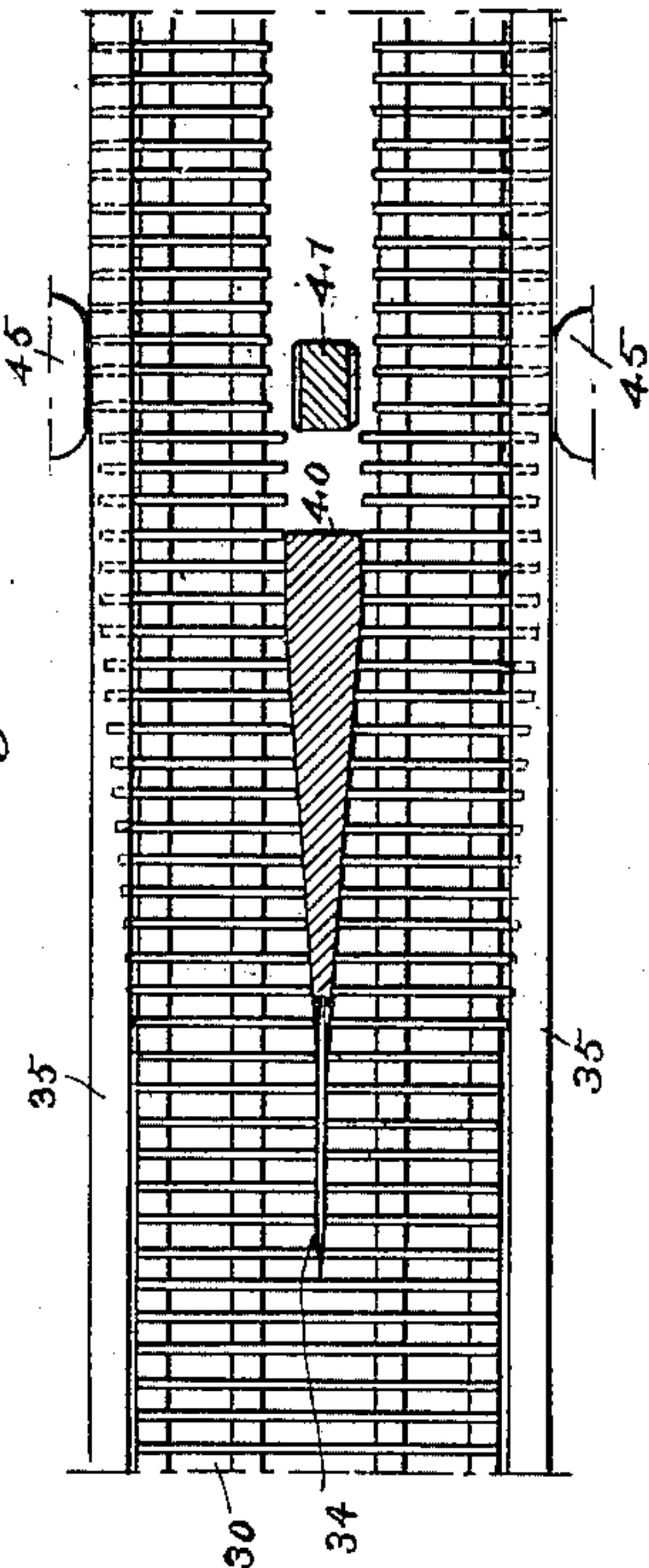


Fig. 7.

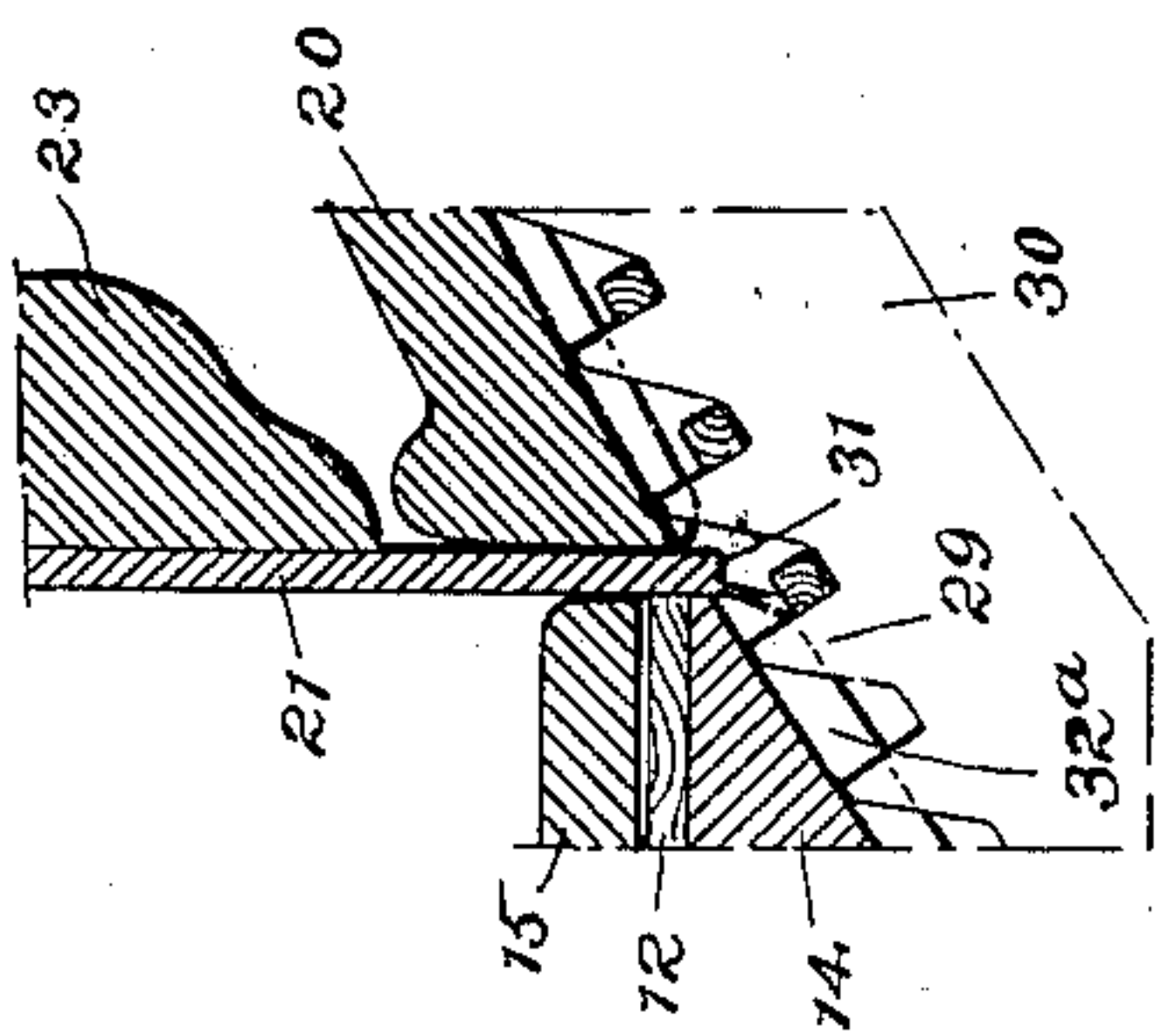


Fig. 8.

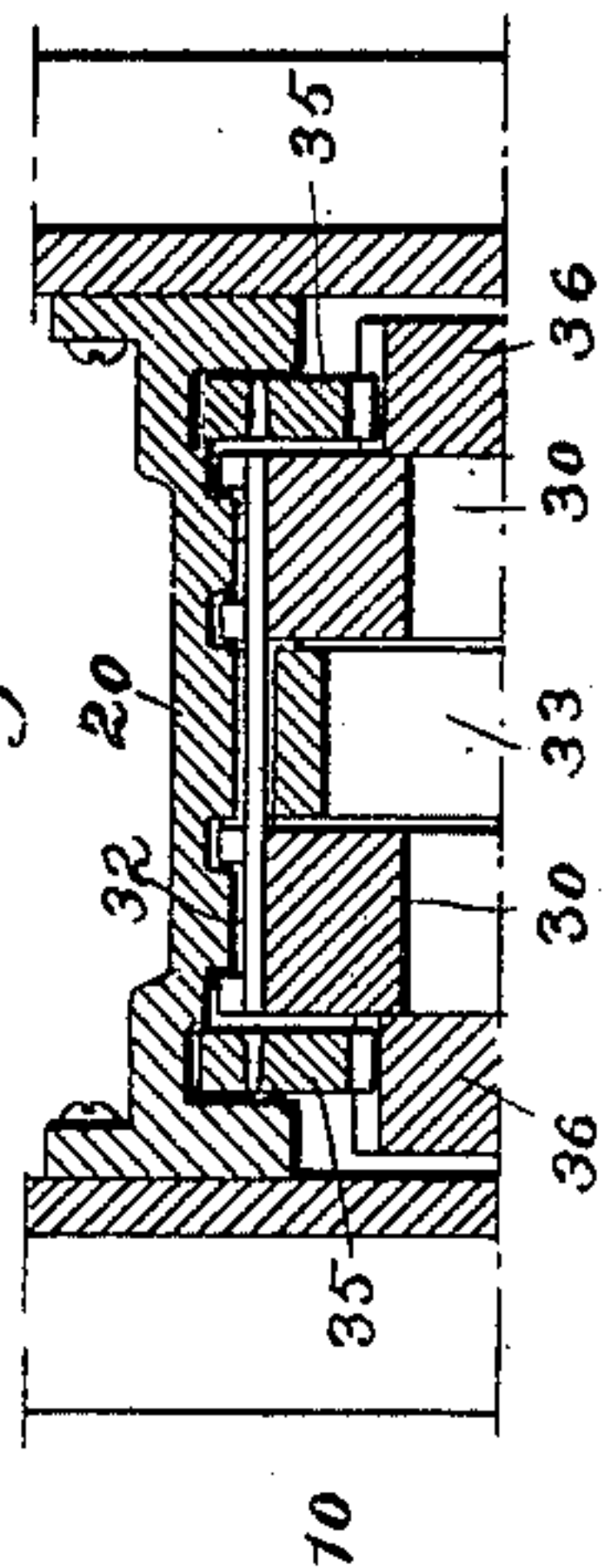
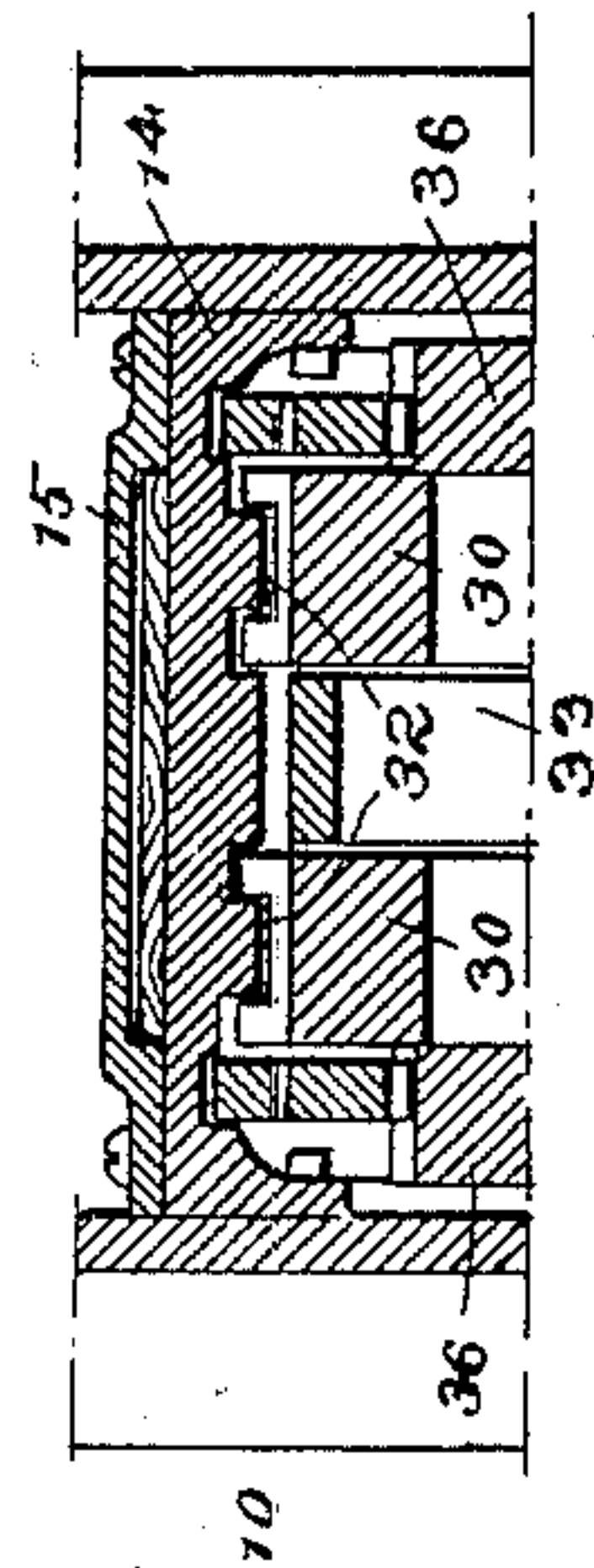


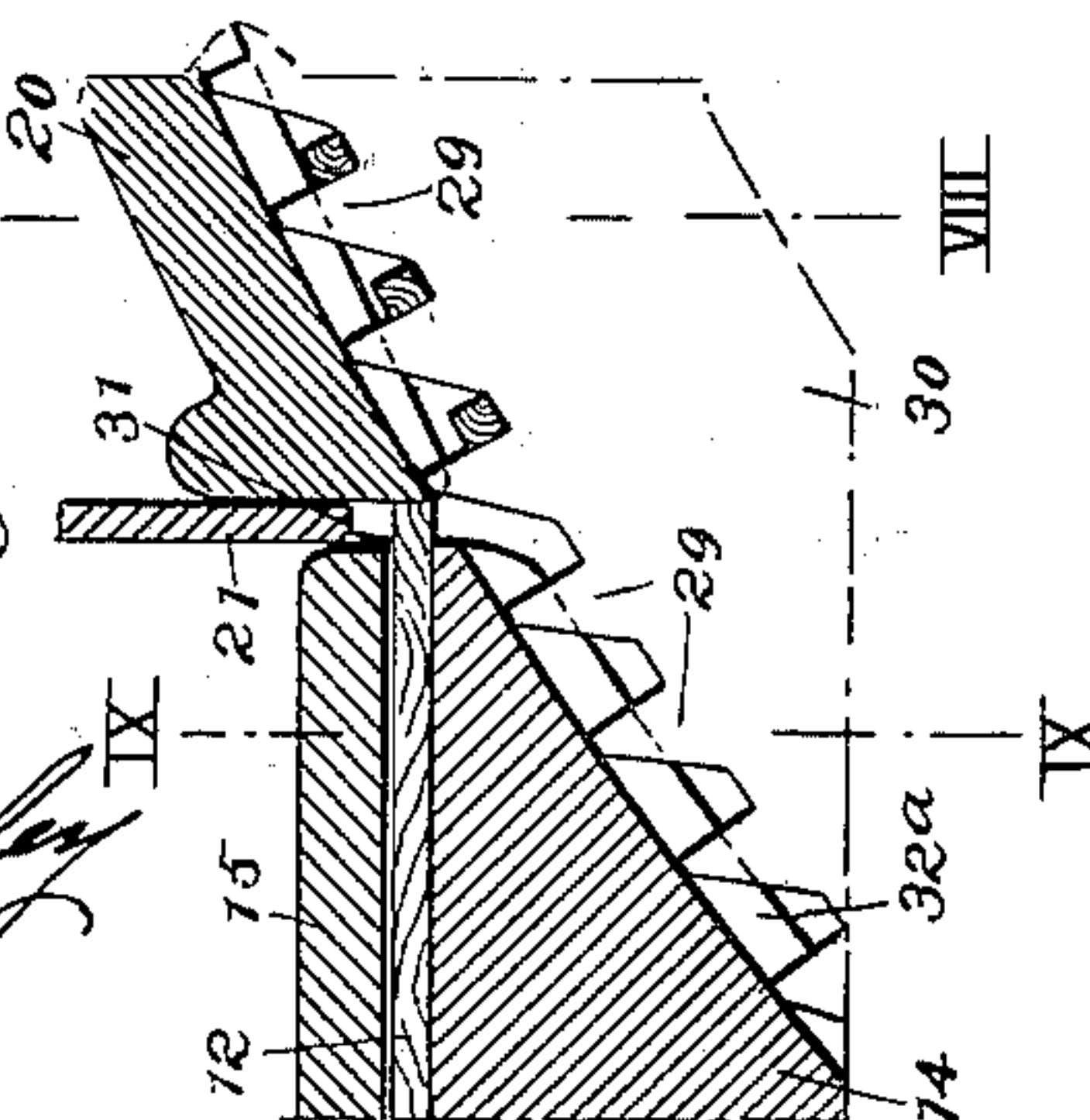
Fig. 9.



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Fig. 6.



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No. 652,475.

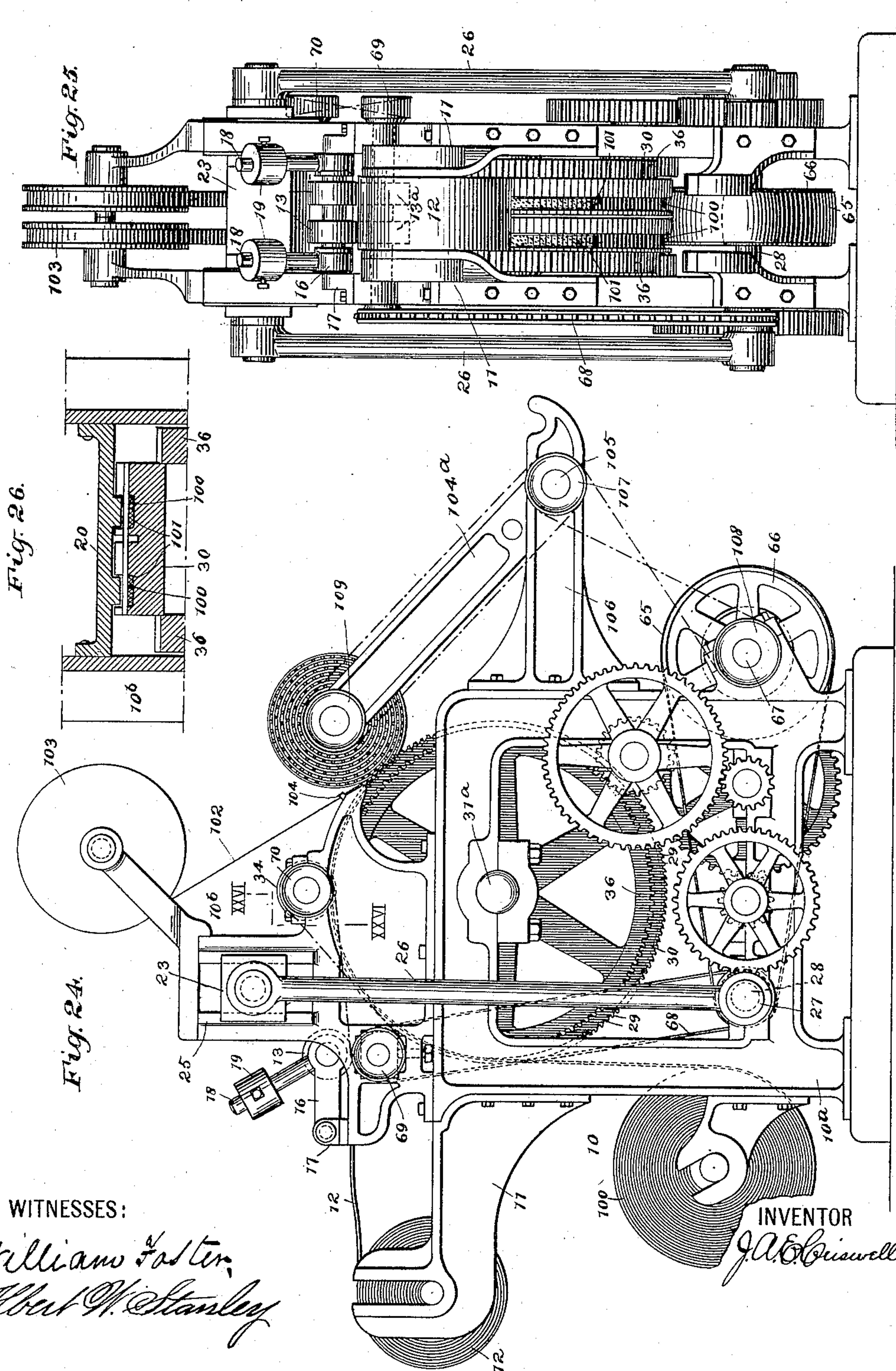
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(No Model.)

6 Sheets—Sheet 6.



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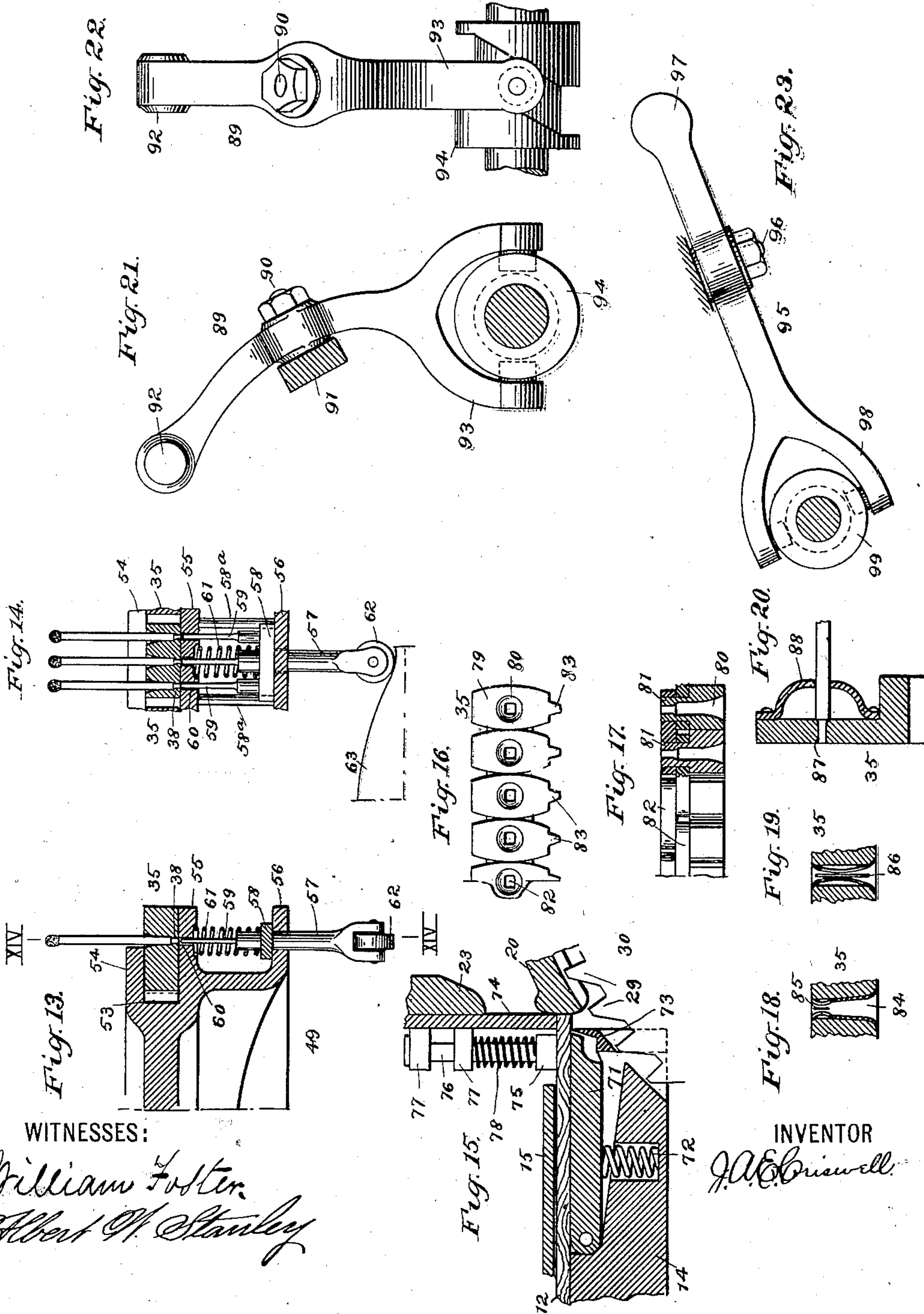
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MATCH MAKING MACHINE.

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6 Sheets—Sheet 5.





# UNITED STATES PATENT OFFICE.

JAMES A. EKin CRISWELL, OF NEW YORK, N. Y.

## MATCH-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 652,475, dated June 26, 1900.

Application filed July 29, 1899. Serial No. 725,472. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES A. EKin CRISWELL, of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Match-Making Machines, of which the following is a full, clear, and exact description.

This invention relates to match-making machines, but more particularly to machines in which the splints are cut from sheets of veneer.

The primary object of the invention is to provide means by which the splints immediately they are cut are forced directly into the carrier in order to be positively held at all times, thus overcoming one of the principal objections incident to many machines of the character as heretofore constructed.

Other objects of the invention are to provide a simple and efficient match-machine which may for the most part with comparatively few changes be employed either as a machine in which the splints may be subjected to the continuous process of drying, dipping, and having the igniting composition placed thereon or in which the splints may be coiled and the coils then removed from the machine to complete the matches, to provide simple and efficient means for transferring the splints from one carrier to another, and to provide simple and efficient means for ejecting the splints from the carrier after the igniting composition has been placed thereon.

The invention will be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and then pointed out in the claims at the end of the description.

In the drawings, wherein similar numerals of reference designate similar parts, Figure 1 is a general side elevation, partly diagrammatic, illustrating the several steps to form the matches. Fig. 2 is a side elevation of the machine proper. Fig. 3 is a front elevation. Fig. 4 is an enlarged fragmentary vertical section taken on the line IV IV of Fig. 5. Fig. 5 is a sectional plan taken on the line V V of Figs. 2 and 4. Fig. 6 is a fragmentary vertical section, on a still larger scale, of the splint cutting and receiving mechanism, the plate beneath the splints being removed. Fig. 7 is a view similar to Fig. 6 ex-

cept that the knife is in a different position. Fig. 8 is a vertical transverse section taken on the line VIII VIII of Figs. 5 and 6. Fig. 9 is a vertical transverse section taken on the line IX IX of Figs. 5 and 6. Fig. 10 is an elevation of a portion of the endless carrier or belt and drive-gear. Fig. 11 is a plan view, partly in section, of the endless carrier. Fig. 12 is a diagrammatic view illustrating the method of transferring the splints from one carrier to the other. Fig. 13 is a fragmentary section, on an enlarged scale, of the ejector-wheel, taken on the line XIII XIII of Fig. 2, illustrating the means for ejecting the splints from the carrier. Fig. 14 is a section, partly in elevation, taken on the line XIV XIV of Fig. 13. Fig. 15 is a fragmentary vertical section of a modified form of cutting mechanism. Fig. 16 is an elevation of a portion of an endless carrier in which there is a link for each splint. Fig. 17 is a plan view, partly in section, of the form shown in Fig. 16. Figs. 18 and 19 show in section yielding bushings, which may be employed with various carriers. Fig. 20 is a modified form of holding device for the splints. Fig. 21 shows how the rocking or oscillatory arm for forcing the splints into the endless carrier may be arranged to be operated from the rear of the toothed carrier. Fig. 22 is a rear elevation of the rocking arm shown in Fig. 21. Fig. 23 shows how the stems carrying the ejecting plungers might be operated in one direction by a rocking arm instead of by the cam shown in Fig. 14. Fig. 24 is a side elevation showing how the machine may be arranged to coil the splints. Fig. 25 is a front elevation of Fig. 24, the coiling-belts being removed; and Fig. 26 is a vertical transverse section taken on the line XXVI XXVI of Fig. 24.

The frame 10 of the machine may be of any desired form or construction. As shown, the frame has a suitable base on which are the side pieces or sections 10<sup>a</sup>, and on the top of these side sections are the sections 10<sup>b</sup>. Projecting from the sections 10<sup>a</sup> are brackets 11, which have slotted forward ends adapted to hold a coil of sheet or strip-like veneer 12. The veneer is unrolled from the coil by suitable feeding mechanism. This mechanism may consist of the usual feed-rolls 13 and 13<sup>a</sup>, between which the veneer passes and is fed



over the table 14 and under a suitable guide-plate 15. The rolls 13<sup>a</sup>—in this case two—are arranged to work in recesses in the table 14, and the upper rolls 13 have their shafts journaled in arms 16, which have one of their ends pivoted to brackets 17, carried by the frame, and on said arms are arranged rods 18, on which the weights 19 may be adjustably held.

The veneer as it is fed from the coil by the feeding mechanism will abut against the forward edge or abutment of the cap-plate 20 beneath the splint-cutting knife 21. This knife is adjustably held by the screws 22 or otherwise to the reciprocating head 23, and above the screws 22 may be located bolts 24, which pass through lugs carried by the head 23 and engage portions of the knife to assist in retaining the latter securely in position. The head 23 moves vertically in guides 25 of the top section 10<sup>b</sup> and are connected on opposite sides of the frame by rods 26 to crank-pins or eccentric portions 27 of the shaft 28 in order to give the desired throw to the head and knife when the shaft 28 is rotated. At each reciprocation of the knife a splint is cut, and immediately it is cut it is forced or delivered directly into splint receiving and holding devices arranged in a carrier or series of carriers, the knife in cutting moving a sufficient distance toward the holding devices to accomplish this. As shown, the splints are forced into peripheral grooves or holding devices formed between the teeth 29 of the wheel or carrier 30, the lower end of the knife being provided with a shoulder or straight portion 31, when desired, to assist in forcing each splint directly it is cut into one of the grooves. The carrier or wheel 30 may be single or may be divided into a series of parallel carriers or divisions, as shown in the drawings, in which case the veneer is of sufficient width to supply splints to each carrier. The carrier 30 has its shaft 31<sup>a</sup> journaled in suitable bearings and is provided with peripheral channels 32, which extend around the same, and on the inner edge of the table are ribs 32<sup>a</sup>, which enter the channels. This permits the inner edge of the table to be strengthened, and, as will be seen, the upper surface of the table where the veneer is cut is brought adjacent to the surface of the carriers, but free of the engaging devices. The veneer is thus fed close to but free of the carrier, and the inner edge of the table, the abutment of the plate 20, and one side of each tooth 29 as they are successively brought in position form a short channel, in which the knife may enter, as best shown in Figs. 6 and 7. By this means each splint is immediately held by the carrier directly it is cut, so that it cannot possibly get away.

The wheel 30 as it revolves carries the splints, which are now held in holding devices or grooves, away from the splint-cutting knife under the cap-plate 20, which latter is secured to the frame and is provided with

ribs adapted to enter the annular channels 32 of the carrier, so as to assist in retaining the splints in position. In the center channel 32 and between the two divisions, which form parallel carriers, is a plate or strip 33, Figs. 4 and 8, which may be secured to the table and to the cap-plate 20 and has its upper surface immediately below the lower surface of the splints to form a lower central support or guide for the splints. As the splints are carried along they come in contact with a rotary cutter 34, having its shaft journaled in the frame 10, and are cut in two between the divisions of the carrier. Instead of the rotary cutter any suitable cutter may be employed.

For the purpose of holding the splints and to convey the same from the divisions or separate parallel carriers to be dipped and the igniting composition placed thereon I provide endless carriers or belts corresponding in number to the divisions of the carrier 30. These second carriers are provided with teeth which mesh with gears 36, carried by the shaft 31<sup>a</sup>, and have splint-holding devices 37, which are adapted to register with the splint-holding devices of the carrier 30. The holding devices or openings 37 of the belt 35 have each a small reduced end 38 to compress and hold one end of each splint, as will be hereinafter described, and the holding devices are arranged in short narrow links, which are pivoted together at 39 to form each belt. A preferably gradually tapering block or plate 40, Figs. 4 and 12, is formed on or attached to the under side of the cap-plate 20. This block has a sharp forward edge which extends nearly to the edge of the cutter 34, and as the carrier travels forward the cut splints are moved laterally or transversely into the holding device 37 of the carriers while still retained in the holding devices of the carrier 30, as shown more clearly in Fig. 12. The splints as they continue to move along will come in the path of movement of the end 41 of the oscillatory or rocking arm 42. The arm 42 is pivoted at 43 to the cap-plate 20 and has its upper end forked and provided with pins or rollers which engage grooved cams 44, carried by the shaft of the cutter 34 on opposite sides of the cutter, so that as the cams rotate with the cutter the end 41 of the arm 42 will be rapidly reciprocated and will force the splints farther into the carriers or belts 35, so as to be rigidly held by the small end 38 of the holding devices 37, which will compress a small section of the splints in the usual manner. A block or projection 45, located on opposite sides of the frame close to the carrier 35, prevents lateral movement of the carriers while the splints are being driven into the holding devices by the arm 42.

The belts or carrier 35, with the splints, pass from the carrier 30 around the wheels or pulleys 46 and then over any desired arrangement of guide pulleys or rollers to give the belts a partial turn and cause the splints to



assume a vertical position. The splints are dried, dipped in the paraffin, as in a tank 47, Fig. 1, and then has the igniting composition applied thereto, as at 48, in the usual or in any preferred manner. These devices have not been gone into in detail, as they are well known and are not claimed as a part of the present invention. The carrier-belts 35 return over suitable guide-pulleys under ejector-wheels 49, over idlers 50, and around pulleys 51 back to the gears 36 in alinement again to receive splints from the carrier 30.

During the passage of the carrier or belts 35 around the wheels 49, which have their shaft journaled in brackets 52 on the frame 10, the finished splints or matches are forced from the carriers into any suitable receptacle provided therefor. The wheels 49 have teeth 53, which mesh with the teeth of the carriers 35, and have flanges 54 and 55, Figs. 13 and 14, between which the carriers travel and are prevented from having lateral movement. An outer flange 56 on each wheel is provided, in which is arranged a series of movable stems 57. These stems each carry a yoke or bar 58, which is guided on rods or pins 58<sup>a</sup>, and each yoke carries a series of plungers 59, corresponding in number in this case to the number of splint-holding devices in each link of the carrier. The ends of the plungers 59 enter openings 60 in the flange 55 and are normally forced in one direction by the springs 61 and in the opposite direction by the rollers 62, carried by the stems 57, which ride over an inclined or cam surface 63, located on the portion 64 of the brackets 52. The ejector-wheels rotate with the carriers 35, and as the stems 57 reach the cam 63 on the brackets 52 the splints opposite the plungers carried by each stem will be ejected from the carriers.

Any suitable form of speeding and driving mechanism may be employed. A train of gears properly timed may lead from a pinion on the shaft 28 to the gears 36, which rotate with the carrier 30. No attempt has been made to show the exact proportions and relative number of teeth of the timing mechanism, as this may be variously arranged to cause the knife to reciprocate once each time a holding device of the carrier 30 is presented to it and the carrier or carriers 35 so timed as to cause their splint-holding devices to register with the devices of the carrier 30. A drive-belt 65 may lead from a pulley on the shaft 28 to a pulley 66 on the shaft 67, and a sprocket-chain 68 connects the shaft 28 with the shaft of the lower feed-roll 13<sup>a</sup>, which latter may also be geared to the upper feed-roll shaft or not, as desired. A belt may connect the pulley 69 on the lower feed-roll shaft with a pulley 70 on the shaft of the rotary cutter 34.

The invention will be readily understood from the foregoing description when taken in connection with the accompanying drawings.

The parts being in the position shown, it will be seen that at each rotation of the shaft

28 a splint will be cut from the veneer 12 and will be forced directly into the grooves in the wheel or carrier 30 and that at each rotation of the shaft 28 the carrier will be moved the distance of one groove, thus successively placing each groove or holding device beneath the knife 21. The splints are divided by the cutter 34, and as soon as cut are given a lateral movement and forced into the carriers 35, as hereinbefore described. The splints are then dried, dipped, and the composition applied in the usual or any preferred manner, and when they reach the wheels 49 they are ejected by the plungers 59, carried by the stems 57.

In Fig. 15 a supporting table or plate 71 is pivoted to the table 14 and is normally forced upward by a spring or springs 72. At the inner edge of the table 14 is a stationary knife 73, secured to the table and grooved to permit the teeth of the carrier 30 to pass. The veneer 12 is fed in substantially the same position as with the movable knife, and above the veneer is a reciprocating plunger or plate 74, which carries a yielding foot 75. This foot may have one or more stems 76 projecting therefrom, which are guided by lugs carried by the plunger, and around each stem is a spring 78. The splints as they are cut are forced directly into the holding grooves or devices of the carrier 30, the table 71 yielding to permit each splint to be cleanly severed and the foot 75 yielding to permit farther travel of the plunger to positively force the splints into the receiving-grooves.

Figs. 16 and 17 merely show how the endless carrier or carriers may be made up of links, in which each link will hold only one splint. The links have the usual holding device 80 and have shanks 81, which are connected together by the straps or links 82.

The endless carriers may be variously formed and may have any suitable number of splint-holding devices in each link. Either of the forms shown may have the holding devices formed with bushings, as in Figs. 18 and 19. In Fig. 18 the bushing 84 is slitted only at one end, as at 85, while in Fig. 19 the bushing is slitted practically its whole length, as at 86.

In Fig. 20 the carrier has each link cut away and has the usual compressing holding devices 87. A guide-plate 88, having apertures therein corresponding in number to holding devices in each link, is secured to each link, so that the aperture will register with the holding devices 87. These plates merely guide and hold, but do not compress the splints.

The oscillatory or rocking arm 89 (shown in Figs. 21 and 22) is substantially the same as the arm 42. The arm is pivoted at 90 to a support 91 and has one end 91 in the path of movement of the splints to drive them into the carriers 35 and its other end forked and spanning a grooved cam 94, by which the arm is rocked.

Fig. 23 shows an arm 95, which is pivoted



at 96 to a suitable support and has one end 97 free and its other end 98 forked and engaged by a cam 99 to oscillate said arm. This arm may be employed to force the stems 57 of the ejecting-wheels in one direction to take the place of the cam 63, already described.

The machine illustrated in Figs. 24 to 26, inclusive, is for coiling the splints and shows how the machine hereinbefore described may be used for the most part for either the continuous process or for coiling the splints. The belts 100—in this case two—are taken from coils in the front of the machine and pass around annular grooves or channels 101 beneath the splints, the latter being fed to the carrier in the same manner as already described. In this machine the carrier may have simply a small central channel intermediate the coiling-belt channels to permit the cutter to divide the splints, and above the splints may be fed tapes 102 from spools 103, suitably supported on the frame. These tapes pass under guides 104 and are wound, together with the belts and splints, into coils in the usual manner. The coiling-shaft may be supported in the usual arms 104<sup>a</sup>, pivoted to a shaft or to studs 105. The shaft 105 is mounted in brackets 106, projecting outwardly from the frame 10. A pulley 107 connects with the pulley 108 to the drive-shaft 67, and a slip-belt connects the pulley 107 or a separate pulley to a pulley 109 on the coiling-shaft.

When the machine is to coil the splints, the mechanism for giving a lateral movement to the splints is dispensed with; but even then the plate 40 might be used, and if the annular channels 32 were made deep enough to receive the coiling-belts 100 the carrier 30 might be used for either machine. The frame, if made for both classes of machines, should have the top sections 10<sup>b</sup>, as well as the cap-plate 20, made in two pieces, as indicated in dotted lines at 110 in Fig. 2, instead of the wheels 46 and 51 and the ejecting-wheels of the machine shown in Figs. 2 and 3. The coiling means could then be readily applied. It will thus be seen that simple and efficient means are provided by which the splints are directly held by the carrier immediately they are cut, so as to be under absolute control, and a simple and efficient machine provided which may be employed for the most part either for the continuous process or for coiling the splints.

While I have described a certain class of machine, it will be understood that some of the features may be used with other machines, and by the word "veneer" it is intended to mean either wood veneer or any sheet or strip-like material from which matches may be made.

The veneer may be fed to the cutting mechanism in separate strips instead of a single strip where parallel carriers are used and each are to be supplied with splints, and these carriers may be independent instead of being united to form a single carrier. The abut-

ting end of the cap-plate 20<sup>1</sup>, against which the end of the veneer rests, may be separate from the cap-plate and may be adjustable and yielding, if desired.

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

1. In a match-machine, the combination with a movable carrier having splint-receiving devices adapted to hold the splints, means for feeding veneer adjacent to the carrier free of the receiving devices, together with splint-cutting mechanism moving in cutting toward the receiving devices a sufficient distance to fully deliver each splint directly it is cut into the receiving devices of the carrier as they are successively brought in position to receive the splints, substantially as and for the purpose described.

2. In a match-machine, the combination with a movable carrier having splint-receiving devices adapted to hold the splints in a plane transverse to the line of travel of the carrier, means for feeding veneer close to and over the devices of the carrier, together with a reciprocating knife moving in cutting toward the receiving devices a sufficient distance to fully force or deliver each splint directly it is cut from the veneer into the receiving devices of the carrier as they are successively brought in position to receive the splints.

3. In a match-machine, the combination with a movable carrier having splint-receiving devices adapted to hold the splints, means for moving the carrier, a table adjacent to the carrier, means for feeding veneer over the table, together with splint-cutting mechanism cutting the splints over the edge of the table and moving in cutting toward the receiving devices a sufficient distance to fully force or deliver each splint directly it is cut into the receiving devices of the carrier as they are successively brought in position to receive the splints.

4. In a match-machine, the combination with a movable carrier having teeth-forming splint-receiving grooves between them, a table adjacent to the carrier, means for feeding veneer over the table close to the carrier free of the splint-receiving grooves, together with a reciprocating knife cutting the veneer over the edge of the table and moving in cutting toward the receiving-grooves a sufficient distance to fully force each splint directly it is cut into the grooves of the carrier as they are successively brought in position to receive the splints, substantially as and for the purpose described.

5. In a match-machine, the combination with a wheel having peripheral splint receiving and holding grooves, means for feeding veneer close to the wheel free of and over the grooves, and a reciprocating knife moving in cutting toward the receiving-grooves a sufficient distance to fully force or deliver each



splint directly it is cut into the grooves of the wheel as they are successively brought in position under the knife.

6. In a match-machine, the combination with a continuously-rotating wheel having peripheral teeth forming splint-holding grooves between them adapted to hold the splints substantially parallel to its axis, a table having one edge close to and above the grooves in the wheel, means for feeding veneer over the table close to the periphery of the wheel free of the grooves, together with a reciprocating knife cutting over the edge of the table and entering the grooves of the wheel as they are successively brought in position so as to positively force each splint as it is cut directly into the splint-receiving grooves, substantially as and for the purpose described.

7. In a match-machine, the combination with a movable carrier having splint-receiving devices adapted to hold the splints transversely of the carrier, means for delivering splints to the carrier, a second carrier having means to hold splints movable with and in the same direction as the first-mentioned carrier, and means for shifting the splints laterally or transversely to the second carrier while held by the first-mentioned carrier.

8. In combination with a movable carrier having splint-receiving devices adapted to hold the splints, cutting mechanism, means for feeding veneer to the cutting mechanism, a second endless carrier having means to hold the splints movable with and in the same direction as the first-mentioned carrier, and means for forcing the splints laterally while held by the first-mentioned carrier so as to be held by the second carrier.

9. In a match-machine, a movable carrier having splint-receiving devices adapted to hold the splints, means for delivering splints to the carrier, a second endless carrier having means to hold splints movable with and in the same direction as the first-mentioned carrier, and means for shifting the splints laterally or transversely so as to be held by the second carrier while held by the first-mentioned carrier.

10. The combination with a movable splint-receiving carrier and means for delivering splints to the carrier, of a second carrier having devices to hold splints, and a movable arm for forcing the splints into the holding devices of the second carrier while held by the first-mentioned carrier, substantially as described.

11. The combination with a movable splint-receiving carrier and means for delivering splints to the carrier, of a second carrier having devices to hold the splints, means for gradually shifting the splints from the first-mentioned carrier into the holding devices of the second carrier while held by the former carrier, and a movable arm for forcing the splints farther into the holding devices of the second carrier.

12. The combination with a movable carrier, having splint-receiving grooves adapted to hold the splints, and means for delivering splints to the carrier, of a second carrier having devices to hold the splints, a stationary tapering plate located in the path of movement of the splints for gradually shifting the latter from the first-mentioned carrier into the holding devices of the second carrier, and a cam-actuated and oscillatory arm striking the ends of the splints for further forcing the latter into the holding devices of the second carrier.

13. In a match-machine, the combination with a carrier having devices to receive and hold splints, a table having one edge adjacent to the carrier, means for feeding veneer over the table close to and free of the carrier, splint-cutting mechanism moving in cutting toward the splint-receiving devices a sufficient distance to fully deliver each splint directly it is cut into the devices of the carrier as they are successively brought in position to receive the splints, and an abutment against which the end of the veneer rests prior to cutting the splints to space the width of the latter, substantially as described.

14. In a match-machine, the combination with a carrier having peripheral teeth forming grooves to receive and hold the splints, of a table having one edge close to and over the grooves in the carrier, means for feeding veneer over the table close to and free of the splint-receiving grooves, an abutment adjacent to the table against which the end of the veneer abuts to limit the width of the splints, the ends of the table, face of abutment and one side of the teeth of the carrier serving to form a short channel for each splint, together with a reciprocating knife moving in cutting toward the receiving-grooves a sufficient distance to fully force or deliver each splint directly it is cut into the grooves of the carrier as said grooves are successively brought in position to receive the splints, substantially as and for the purpose described.

15. The combination with a series of parallel movable carriers having devices adapted to receive and hold the splints, means for feeding veneer close to and free of the carrier of a sufficient width when divided to give splints to each carrier, splint-cutting mechanism moving in cutting toward the receiving-grooves a sufficient distance to fully force or deliver the splints directly into the devices of the carriers as the veneer is cut and the devices are successively brought in position, and means located between the carriers for cutting the splints.

16. The combination with a series of parallel movable carriers having devices adapted to receive and hold the splints, and means for supplying splints to the carriers, of a second series of parallel carriers having splint-holding devices moving with and in the same direction as the first-mentioned carriers, and



means for forcing the splints laterally from the first-mentioned series of carriers to the second series of carriers while held by the first-mentioned carriers.

5 17. In a match-machine, the combination with two parallel movable carriers having grooves therein to receive and hold the splints, and means for feeding veneer adjacent to and free of the grooves, the veneer being of a width  
10 equal to two splints to supply each carrier, a reciprocating knife moving in cutting toward the receiving-grooves a sufficient distance to fully force each splint directly into the receiving-grooves as the veneer is cut, and a cut-  
15 ter dividing the splints between the carriers, substantially as and for the purpose described.

18. In a match-machine, the combination with a pair of parallel movable carriers having grooves therein to receive and hold the  
20 splints, of splint-cutting mechanism, means for feeding veneer to the cutting mechanism, means for cutting the splints between the carriers, a second pair of carriers having splint-  
25 holding devices movable with and in the same direction as the first-mentioned carriers, means for gradually shifting the splints laterally into the holding devices of the second pair of carriers while held by the first-men-  
30 tioned carriers, and means for further forcing the splints into the second pair of carriers.

19. The combination with a series of parallel movable carriers having devices to receive and hold the splints, and means for supplying splints to the carriers, of a second series of endless parallel carriers having splint-  
35 holding devices, moving with and in the same direction as the first-mentioned carriers, means for forcing the splints laterally or transversely from the first-mentioned series  
40 to the second series of carriers while held by the first-mentioned carriers, and means for

ejecting the splints from the second series of carriers.

20. In a match-machine, the combination 45 with a pair of wheels having teeth forming grooves between them to receive the splints and having channels passing around the wheels, means for supplying splints to the grooves, a cap-plate having ribs projecting  
50 into the channels of the wheels over the splints in the grooves, a plate located between the carriers beneath the splints, a pair of endless carriers having splint-holding devices, and means for shifting the splints laterally into  
55 the devices of the endless carriers while held by the grooves of the wheels.

21. In a match-machine, the combination with a carrier having splint-holding devices, of a series of independently-movable stems, 60 a support for the stems moving with and parallel to the carrier, a series of plungers carried by each stem, adapted to register with the splint-holding devices, a spring for each stem normally forcing the latter in one direc-  
65 tion, and means for operating the stems in the opposite direction.

22. In a match-machine, the combination with a carrier having splint-holding devices, of independently-movable stems, a wheel 70 forming a support for the stems and moving with and parallel to the carrier, a bar or yoke carried by each stem, a series of plungers carried by each yoke adapted to register with the splint-holding devices of the carrier, 75 guides for the yoke, a spring normally forcing each stem in one direction, and means for forcing the stems in the opposite direction to eject the splints from the carrier.

JAMES A. EKIN CRISWELL.

Witnesses:

WILLIAM FOSTER,  
ALBERT W. STANLEY.