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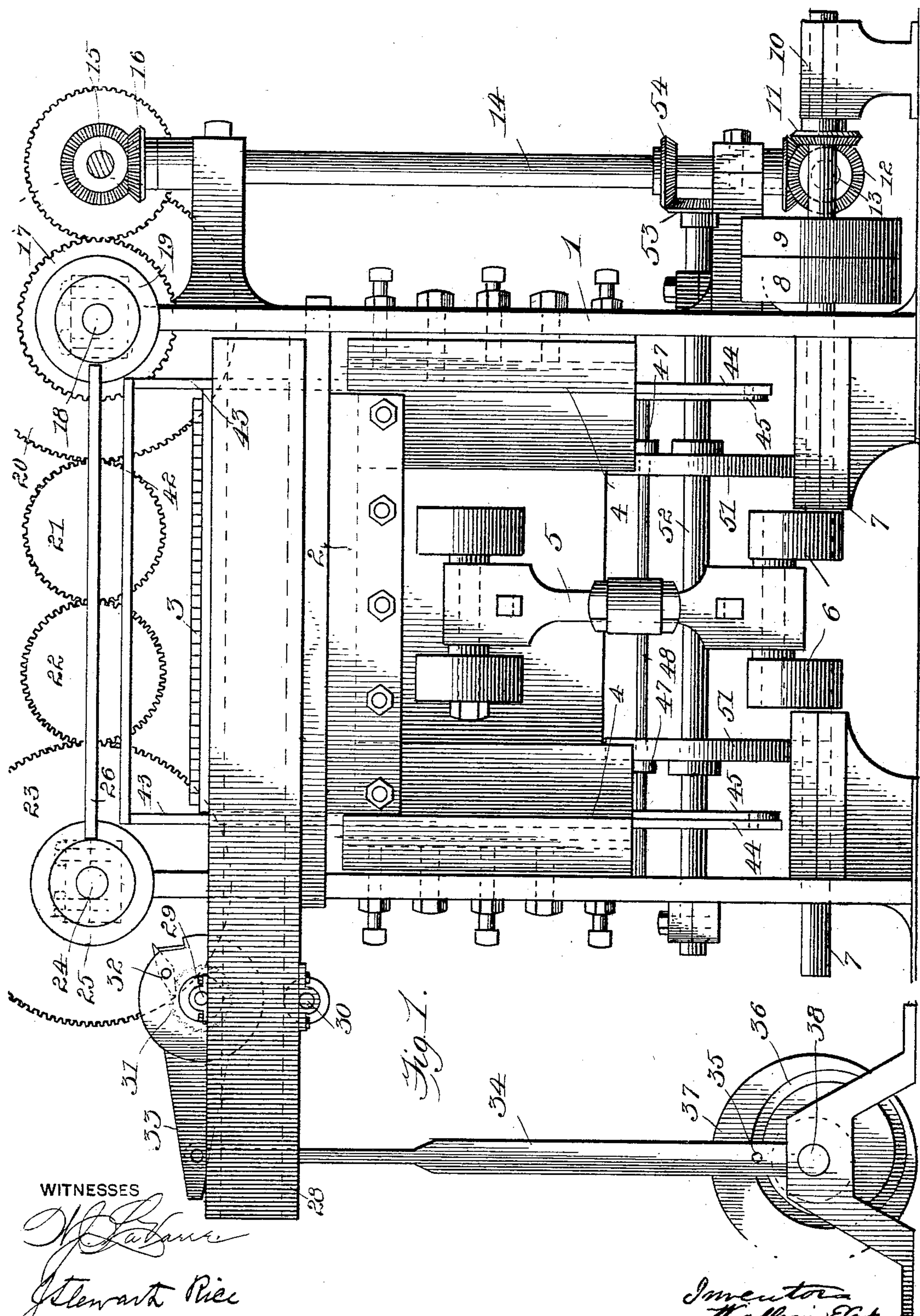
Patented Feb. 28, 1899.

W. E. COOK.
MATCH MACHINE.

(Application filed June 1, 1898.)

(No Model.)

7 Sheets—Sheet 1.



WITNESSES

WITNESSES
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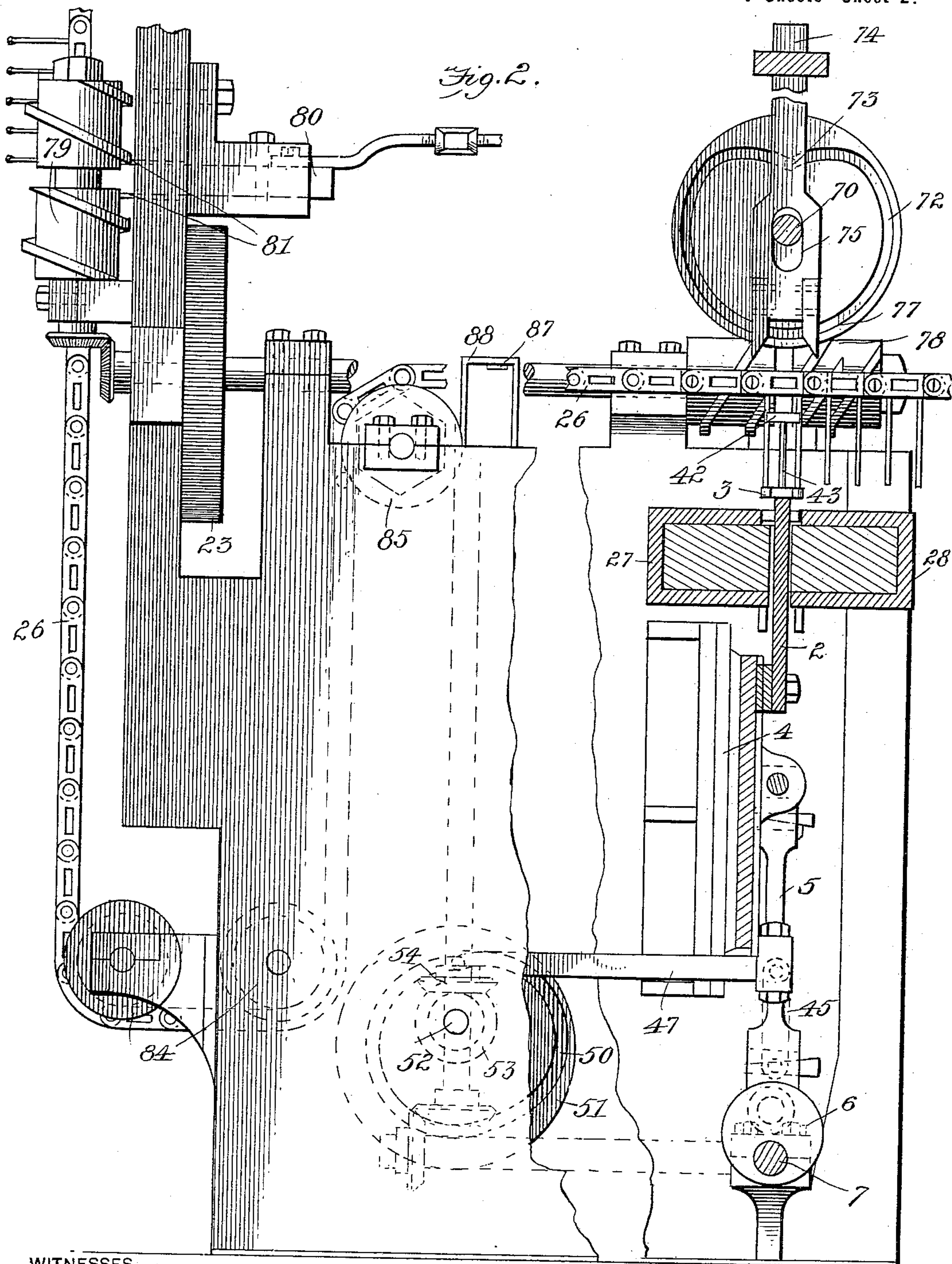
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7 Sheets—Sheet 2.



WITNESSES

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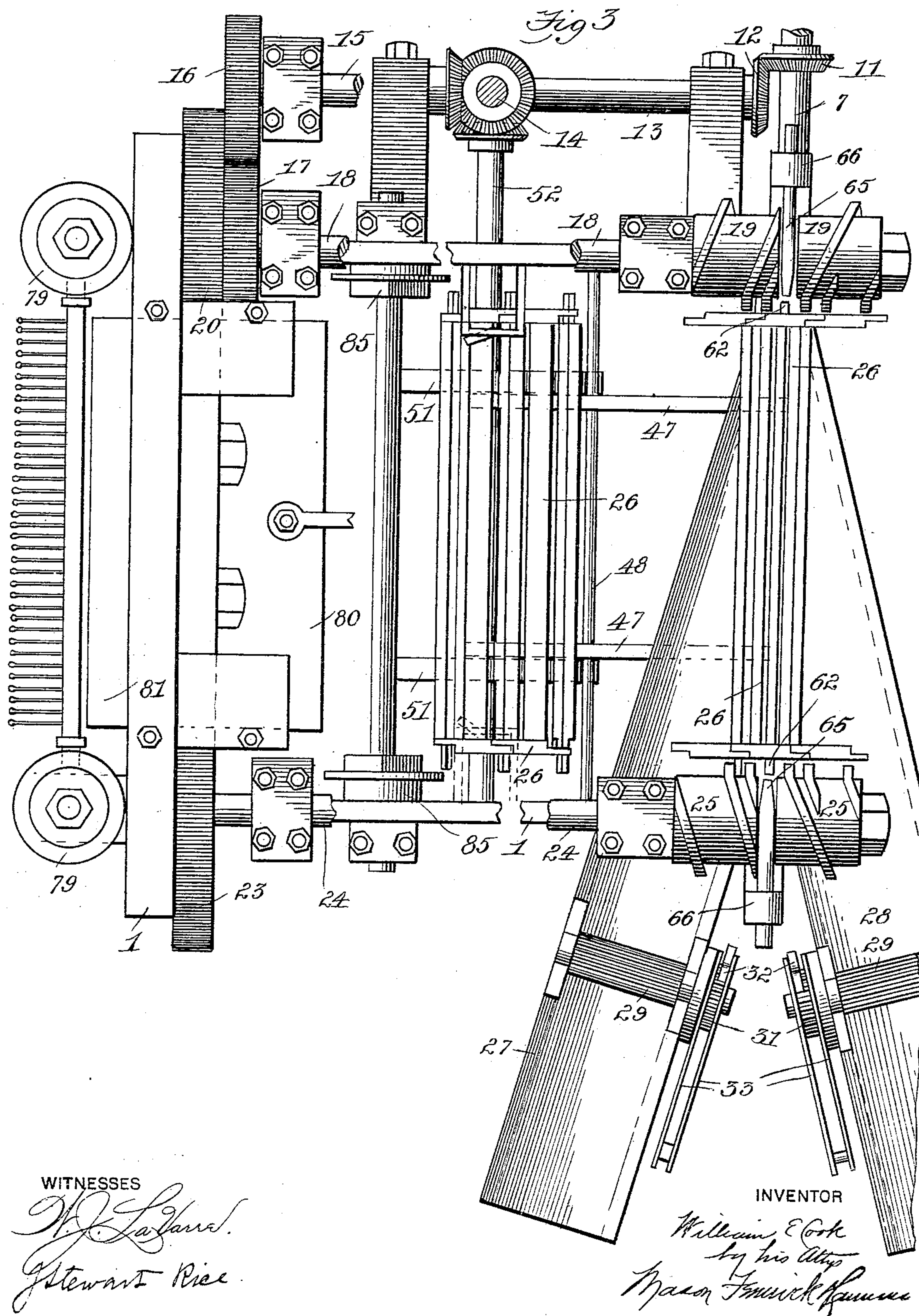
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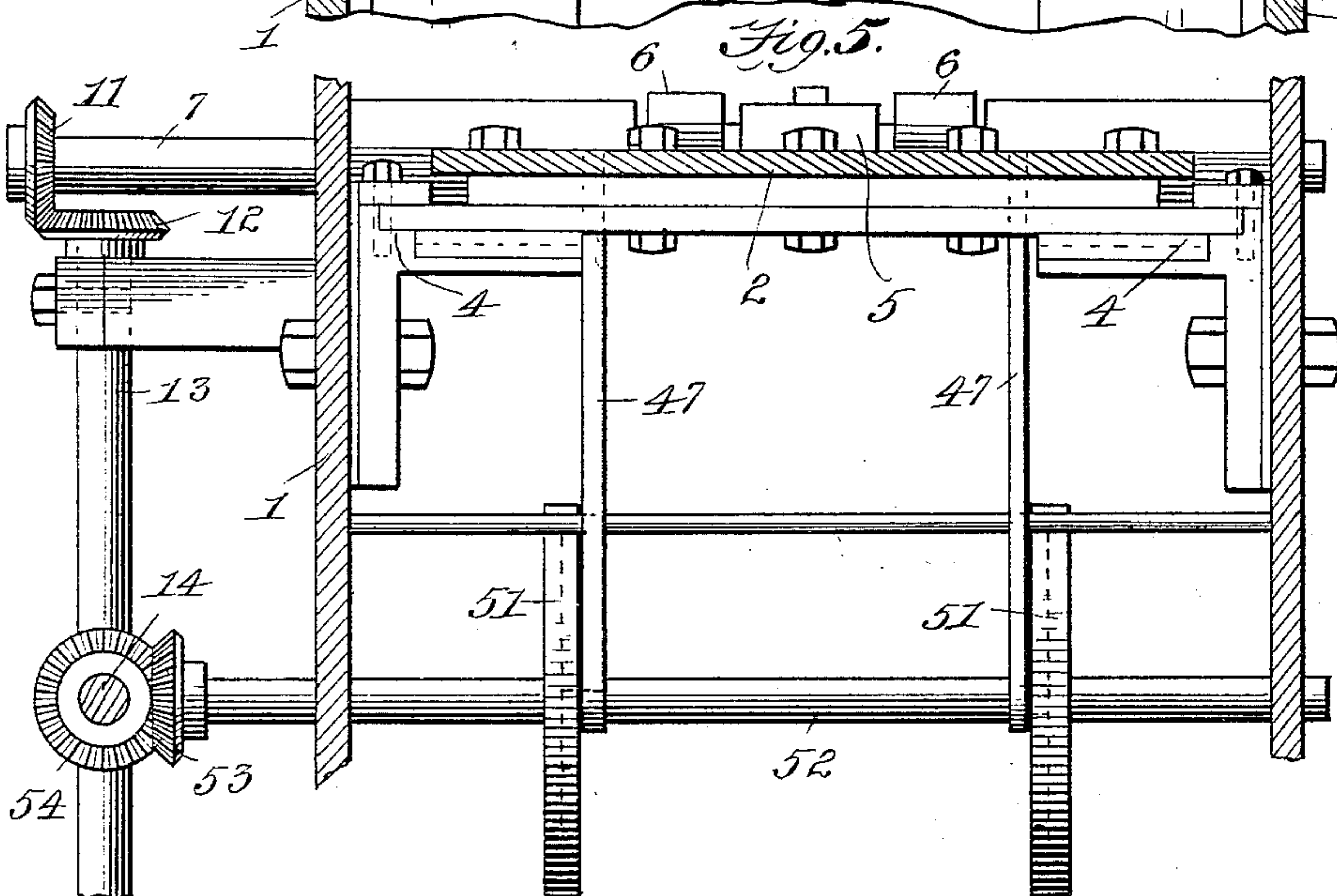
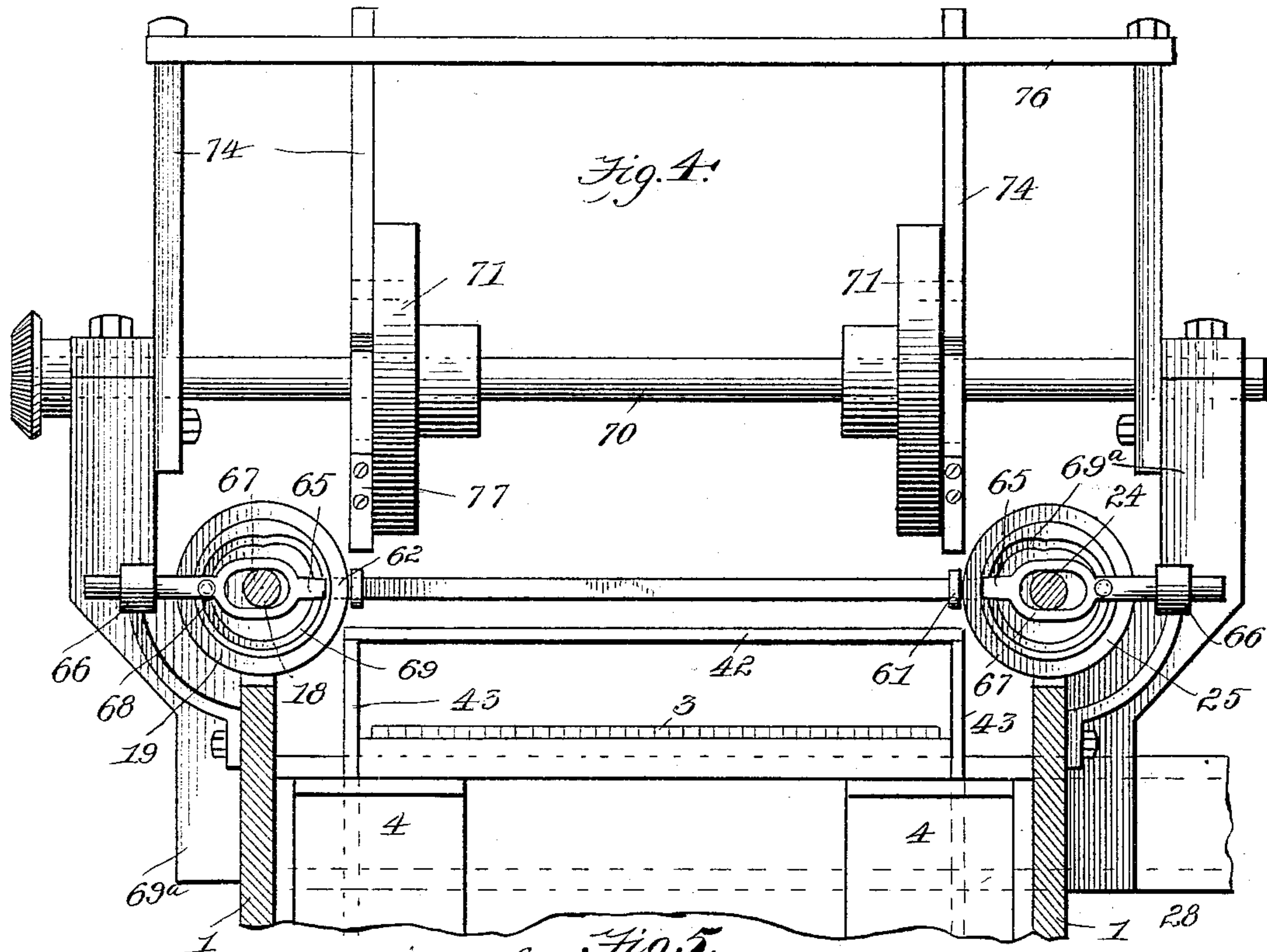
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(No Model.)

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WITNESSES

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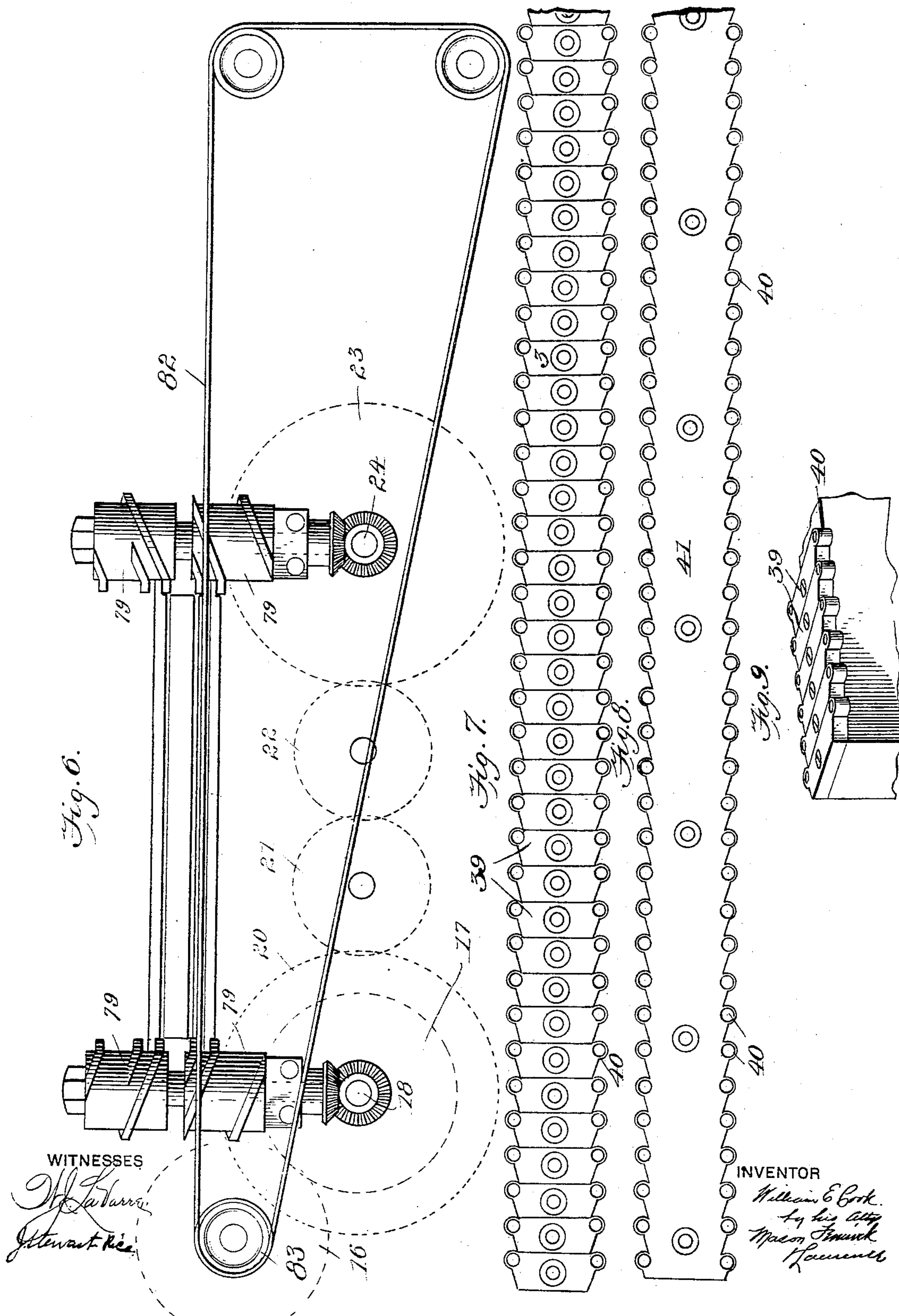
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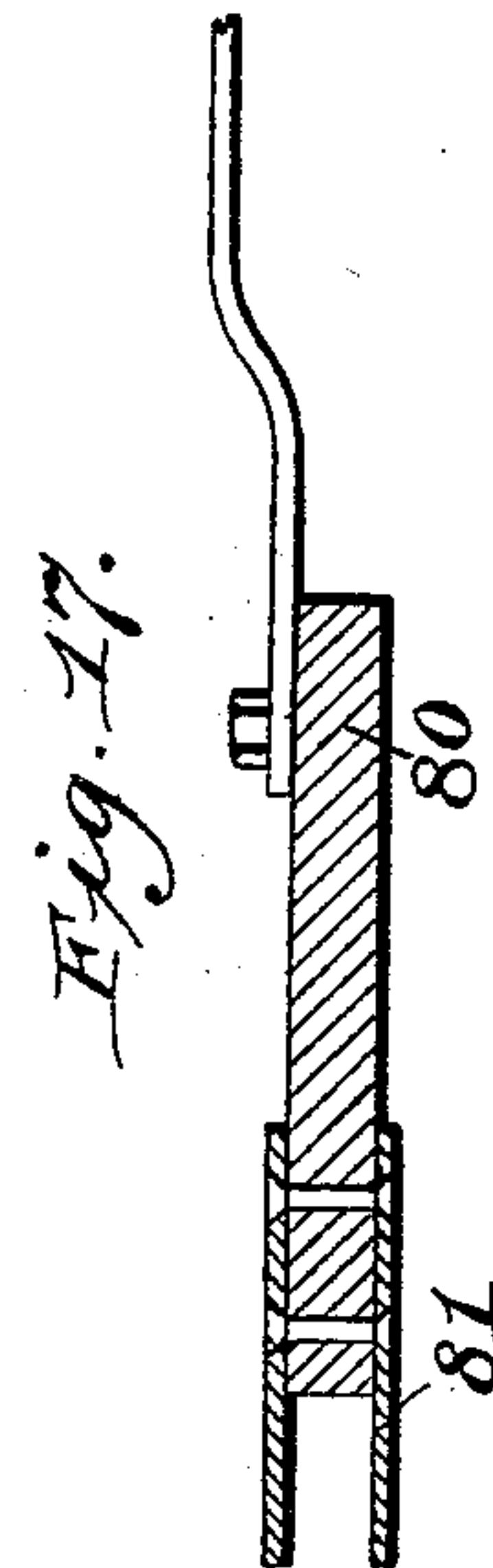
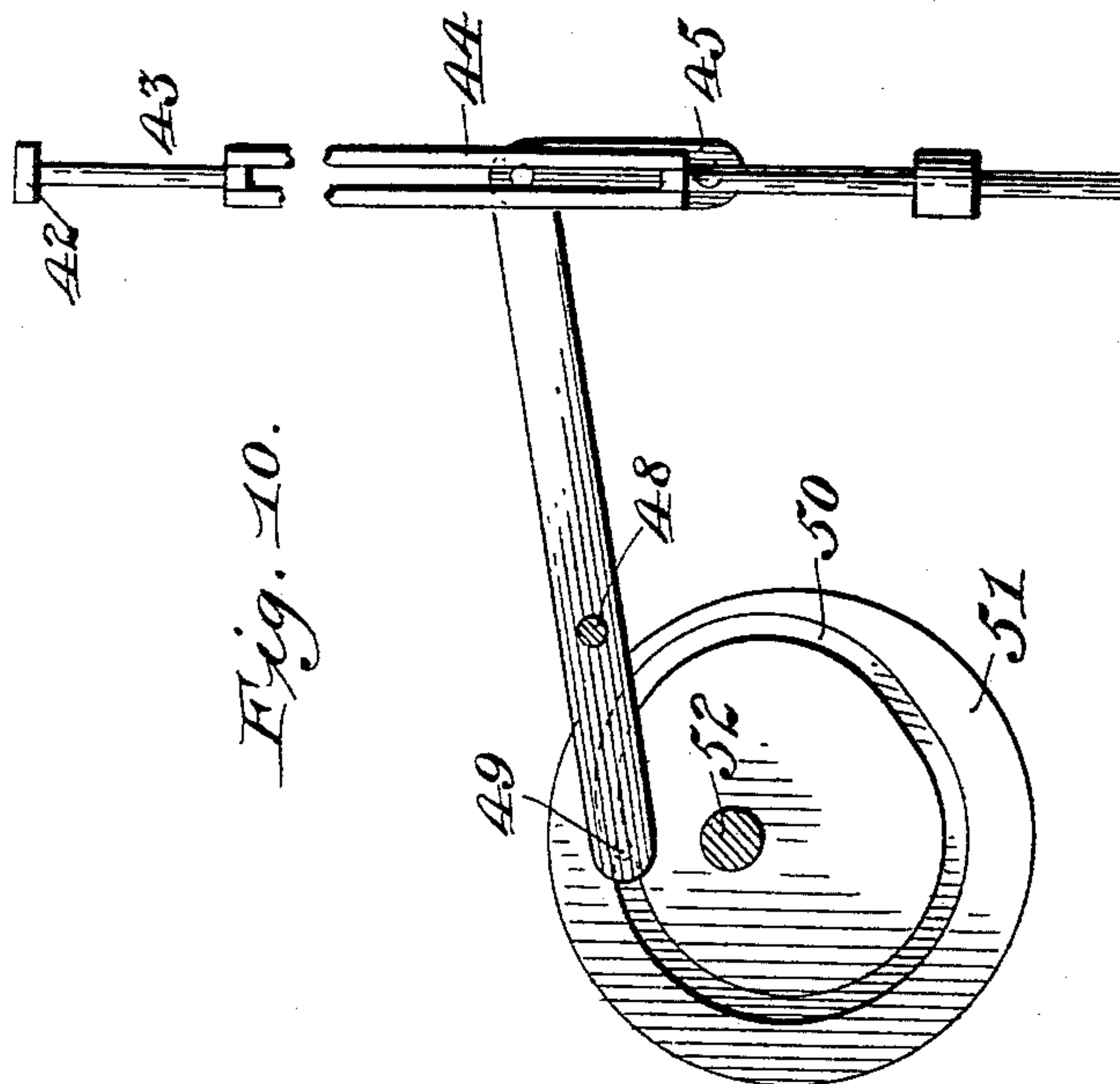
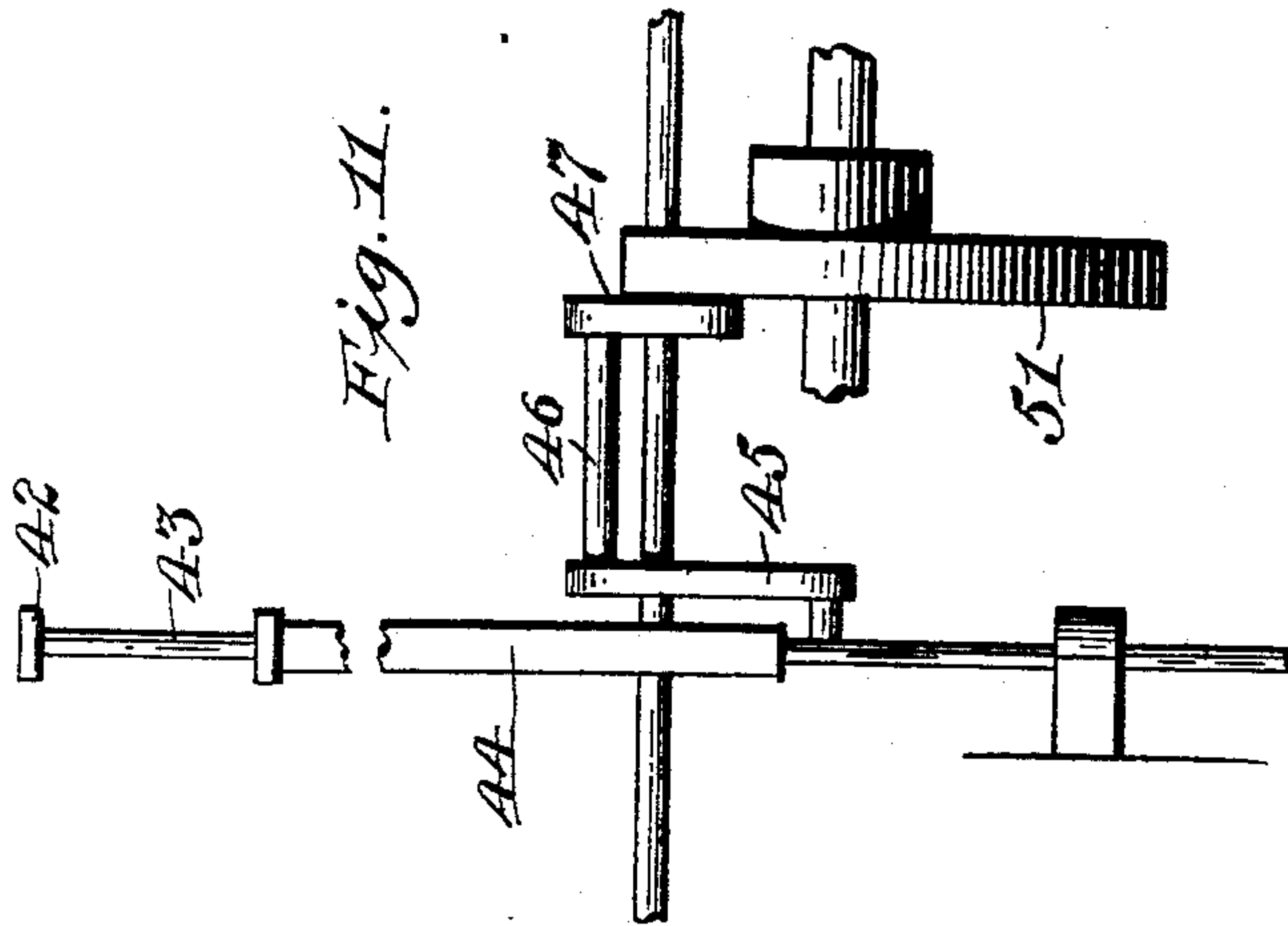
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(Application filed June 1, 1898.)

(No Model.)

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WITNESSES

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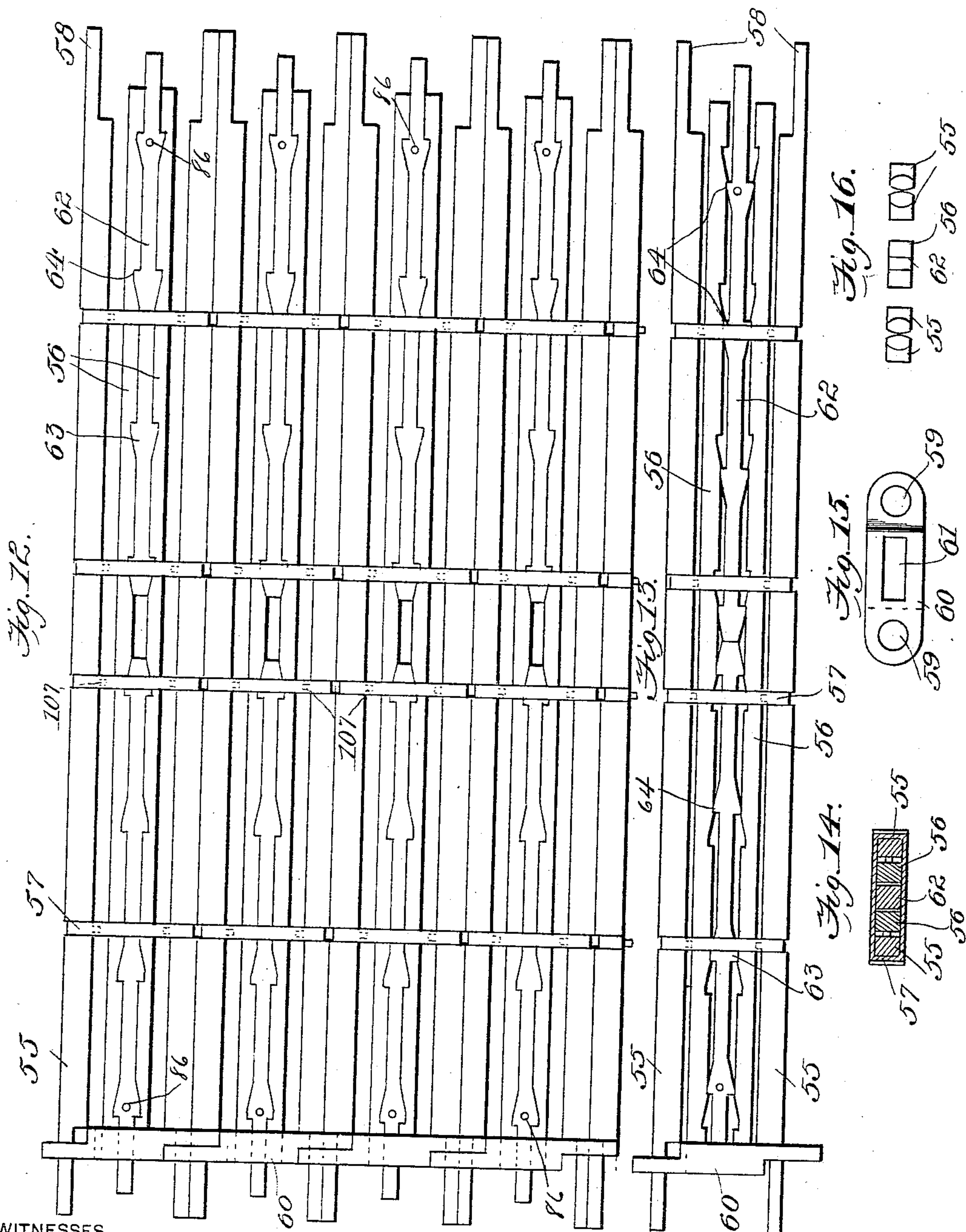
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W. E. COOK.
MATCH MACHINE.

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(No Model.)

7 Sheets—Sheet 7.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM E. COOK, OF OGDENSBURG, NEW YORK.

MATCH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 620,539, dated February 28, 1899.

Application filed June 1, 1898. Serial No. 682,269. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. COOK, a subject of the Queen of Great Britain, residing at Ogdensburg, in the county of St. Lawrence and State of New York, have invented certain new and useful Improvements in Match-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in match-making machines; and it consists in a machine in which is combined with a carrier-chain a cutter-head, cutters secured to the said head and overhanging opposite sides thereof, so as to be capable of cutting two rows of splints, one row upon each side of the cutter-head, and placing them into the sections of a carrier-chain, which follow one another, the travel of said chain being in a plane across that in which the cutter-head moves and from one cutter-line toward the other.

It also consists in a machine in which is combined with a cutter-head cutters, which are secured thereto and overhang opposite sides, so as to be capable of cutting parallel rows of splints, one row upon each side of the cutter, and placing them into the sections of a carrier-chain, the travel of said chain being at right angles to the movement of the cutters and from one cutter-line toward the other.

It also consists, in a match-machine having a cutter-head, of a double cutter centrally supported thereon and having cutting edges projecting beyond each side of the said cutter-head whereby it is capable of cutting a row of splints on each side of the cutter-head simultaneously, substantially as described.

My invention further consists in certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents an end elevation of a match-machine constructed in accordance with my invention, the cutter-head and the means for operating the same being shown therein. Fig. 2 represents a side elevation of the said match-machine, parts being broken away in order

to show the machine upon a large scale. Fig. 3 represents a top plan view of the match-machine, the central parts of the frame being broken away. Fig. 4 represents a detail sectional view through a portion of the match-machine, the means for centering and holding the conveyer for receiving the match-splints being shown in side elevation. Fig. 5 represents a detail horizontal section through the frame of the machine, showing the manner of operating the cams for holding the chain in proper position. Fig. 6 represents a detail elevation of the discharge end of the machine, illustrating the belt or conveyer for receiving the discharged matches. Fig. 7 represents a top plan view of my improved cutter. Fig. 8 represents a cutter made in one piece. Fig. 9 represents a detail perspective view of a portion of the cutter-head, showing the cutters mounted thereon. Figs. 10 and 11 are detail sections and elevations illustrating the construction of the splint-guide used upon my match-machine. Fig. 12 is a top plan view of a portion of my conveyer-chain, showing the central expanding portion in its closed position. Fig. 13 represents a detail plan view of one section of the chain, the central portion being expanded for gripping the splint. Fig. 14 represents a transverse vertical section through a portion of the chain, showing one of the binding-loops used thereon. Fig. 15 represents a detail side elevation of one of the links for connecting the sections of the chains. Fig. 16 represents an end view of a section of the chain. Fig. 17 represents a detail sectional view through the plunger for ejecting the matches from the carrier-chain at the rear end of the machine.

My invention comprises improvements in match-machines which employ reciprocating cutters for cutting match-splints from blocks of wood, the said cutters carrying the match-splints to a conveyer-chain, by which they may be carried to the usual heating and paraffining mechanisms, by which they are prepared to receive their heads of igniting composition, which may be applied in any usual and well-known manner. The carriers then, after passing through the usual drying-frame, return the completed matches to the rear end of the splint-cutting machine, where they are

ejected and removed for packing and distribution. I have conceived the idea of mounting cutters upon a reciprocating cutter-head in such a manner that they will be capable of cutting two rows of splints at a time, one row being cut upon each side of the cutter-head. Upon the return stroke of the cutter-head the splints are deposited in a suitable conveyer for the purpose of being supported while subjected to the usual dipping and drying processes. The construction of the conveyer is such that the splints are forcibly drawn from the dies before the latter again come in contact with the blocks. This form of cutter practically doubles the efficiency of a machine of this character, it being able to produce twice the usual number of completed splints at each revolution of the main operating parts.

In carrying out the various improvements and novel features of my invention I mount upon one end of a frame 1 a cutter-head, as 2, carrying cutters, as 3, upon its upper end. The cutter-head 2 is adapted to reciprocate in suitable guides, as 4, mounted upon the frame 1. The cutter-head is connected by means of a pitman 5 with a crank, as 6, formed upon a shaft 7, which is mounted in the lower part of the frame 1. The shaft 7 extends to one side of the frame 1 and may be connected with any suitable source of power by any well-known means. As shown in the drawings, I preferably employ fast and loose pulleys, as 8 and 9, respectively, which may be connected by means of a belt with the power machinery. One end of the shaft 7 may be supported in an exterior bearing, as 10, and carries outside of the frame 1 a bevel-gear, as 11, which meshes with a corresponding bevel-gear, as 12, upon a horizontal shaft 13, mounted in suitable bearings upon the side of the machine. The shaft 13 is also connected by means of bevel-gearing with a vertical shaft, as 14, which extends upwardly to a point near the top of the frame. The shaft 14 is also connected near its upper end with a horizontal short shaft, as 15, by bevel-gearing, the said shaft 15 carrying upon its rear end a gear-wheel, as 16. The gear-wheel 16 meshes with a corresponding gear-wheel 17, mounted upon another horizontal shaft, as 18, mounted in suitable bearings upon the top of the frame 1. The forward end of the shaft 18 carries a pair of chain-operating cams, as 19 19, and upon its rear end a large gear-wheel 20. Intermediate gears, as 21 22, are interposed between the said gear-wheel 20 and a similar gear-wheel 23, carried by a shaft 24, similar to the shaft 18. Cams 25 25 are also mounted upon the front end of the shaft 24, the said cams being arranged opposite the cams 19 and adapted to cooperate with the same in feeding the splint-carrier in the match-machine.

A carrier-chain for receiving and carrying match-splints, as 26, is adapted to travel through the machine and is preferably constructed as will be hereinafter more fully de-

scribed. Although hereinafter I describe a special form of conveyer or carrier chain for receiving and carrying the match-splints, yet I do not wish to be understood as limiting myself to this specific construction, as it will be apparent that many forms may be used with equal success without departing from the spirit of my invention, which is to cut a row of splints upon each side of a cutter-head simultaneously and upon the return stroke of the cutter-head deposit them in a carrier, which firmly holds the splints, so that upon the forward motion of the dies the splints are withdrawn therefrom before the said dies again come in contact with the blocks. In order to cut the splints and carry them to the said chain, the cutters 3 are secured to the upper edge of the cutter-head 2, which receives a reciprocating movement through the mechanism heretofore described. Feed-troughs, as 27 and 28, are mounted upon the frame 1 and extend upon either side of the cutter-head 2, the said troughs being preferably arranged upon angles to the line of cut. Blocks of wood are fed forward in the said troughs by means of feed-rollers, as 29 and 30. The upper feed-roller 29 is provided exteriorly of the trough with a ratchet-wheel, as 31, which is adapted to be engaged by means of a dog or pawl, as 32, carried between the arms 33, which are pivoted upon the shaft of the said roller 29. The arms 33 are connected to a pitman, as 34, the lower end of which carries an antifriction-wheel, as 35, adapted to travel in a cam-path, as 36, formed in the face of a disk, as 37, which is mounted near the base of the frame 1. The shaft 38, which carries the disks 37, may be connected with the working parts of the match-machine or any other suitable source of power for operating the same in conjunction with the movement of the match-machine. The cam-path 36 is so formed that the blocks of wood will be fed forward between each downward stroke of the cutter, but will remain stationary while the cutters are passing through the said blocks of wood. The cutter 3 is preferably composed of a series of cutter-blocks, as 39, which are provided upon their opposite ends with hollow cylindrical cutting portions, as 40, which are adapted to overhang each side of the cutter-head 2. The cutter-blocks 39 may be secured to the upper edge of the cutter-head 2 in any suitable manner, as by screws, as shown in Fig. 9 of the drawings. The cutter-blocks are arranged side by side along the upper edge of the cutter-head 2, forming one continuous row of cutting edges upon each side of the cutter-head. While I prefer to form the cutters in this manner, yet it will be apparent that the cutters could all be formed upon a single piece, as 41, (shown in Fig. 8 of the drawings,) without departing in the least from the spirit of my invention. As will be clearly seen from Fig. 2 of the drawings, when the cutter descends the overhanging cutting edges upon each side of the cutter-

head will engage the blocks of wood in the feed troughs and cut two rows of splints simultaneously. Upon the cutter ascending again it will carry the splints upwardly and insert them into the carrier-chain, which is adapted to grip and hold the same, as will be hereinafter fully described. In using a cutter of this construction I find it very desirable to employ a guide mechanism for assisting in guiding the splints into the carrier-chain. For this purpose a guide-bar, as 42, is mounted in the frame 1 above the cutter 3 and is carried by means of vertical rods, as 43 43, which extend downwardly through guides 44, secured to the frame 1. The lower ends of the rods 43 are each pivotally secured to a link, as 45, which connects them with a pin or rod, as 46, carried by one end of a lever 47. Each lever 47 is fulcrumed, as at 48, in the frame 1 and carries at its other end an antifriction-roller 49, adapted to travel in the cam-path 50, formed in the face of a disk, as 51. The disks 51 are mounted upon a cross-shaft 52, which finds suitable bearings in the frame 1 and carries at one end a bevel-gearing 53, which meshes with a bevel-gearing 54, secured to the shaft 14, thus receiving its motive power from the gearing of the machine. The cam-path 50 is so constructed that when the cutter 3 descends the guide 42 will descend at the same speed until the said guide has descended a short distance between the blocks of wood and the splints being cut, when it will remain stationary until the cutter has completed its downward stroke. Upon the cutter beginning to rise the cam-path 50 will so actuate the guide 42 that it will also rise at the same speed as the cutter and continue to so rise until within a short distance of the carrier-chain, as will be seen in Fig. 2 of the drawings. The cam-path at this point being concentric again with the shaft 52, the guide will be held stationary until the splints have been gripped in the carrier-chain, when the antifriction-roller 49 will engage a sharp angle in the cam-path 50, which will quickly retract the guide 42, so that it will clear the match-splints and permit the same to be fed forward by the carrier-chain. By means of this guide the splints can be held the proper distance apart and be guided accurately into the spaces in the carrier-chain, which receive them. The peculiar manner of cutting the match-splints and the way of feeding the blocks, so as to cut two rows at a time, necessitates the construction of a carrier-chain to correspond and receive the said splints as they are presented by the cutter. I preferably construct a carrier-chain which is composed of suitable slats held together by links and intermediate spreading portions interposed between the said slats, which may be expanded to grip the splints in the carrier. As shown in Figs. 12 and 13 of the drawings, the carrier consists, preferably, of sections formed of outside slats 55 and interior expanding slats 56 56. These slats are adapted to be held in place by means

of links, as 57, which are preferably countersunk in the said slats, so as to offer no obstruction to the movement of the chain. The ends of the outer slats are provided with journal extensions, as 58 58, which engage apertures 59, formed in connecting-links 60. The connecting-links 60 connect the sections of the chain together, so as to form an endless chain. As shown in Fig. 16, the outer slats 55 are beveled on their outer edges, so that the flexibility of the carrier-chain may not be hindered in any way. The links are preferably provided with offset portions at each end, whereby each link fits into the end of the next adjoining link, as will be clearly seen in Figs. 12 and 13 of the drawings. The links 60 are also provided with a central slot, as 61, through which the ends of wedge-bars, as 62, extend, the said wedge-bars being formed with a series of wedges 63, adapted to engage corresponding notches formed upon the inner faces of the inner slats 56, said wedges 63 having short faces 64. It will be seen that when the wedge-bars 62 are in their outer positions, as shown in Fig. 12 of the drawings, the wedges 63 will fit in the notches formed in the inner bars 56, and the bars 56 will therefore be permitted to come close together and form wide spaces between themselves and the outer slats 55. When the cutter rises with the two rows of match-splints, the upper ends of the splints will be carried into the spaces between the inner and outer slats. When the wedge-pieces are then forced in by any suitable means, the inclined surfaces of the wedges will force the inner slats apart, so as to keep the upper ends of the splints between them and the outer slats, as clearly seen in Fig. 13 of the drawings. The wedges are preferably forced sufficiently far to bring the short faces 64 into engagement with the inner faces of the slats 56, so that the said slats cannot accidentally come together again. This idea of providing a carrier-chain with sections having an expanding center portion for gripping the match-splints forms an important feature of my invention and can be made to operate perfectly in conjunction with the cutter to receive the match-splints therefrom. One great advantage in the use of this kind of a chain may be noted in that it prevents the necessity of the cutters having to force the match-splints into the carrier-chain. In a chain of this character it is necessary to provide a means for expanding the central portion of the chain at the proper time to clamp the match-splints when they are brought up by the cutter. I have devised a simple means of accomplishing this object, which is illustrated in detail in Fig. 4 of the drawings, in which plungers, as 65, are mounted in the frame 1, their outer ends being guided in bearings 66, while their inner ends are provided with guide loops or slots, as 67, which surround the cam-shafts 18 and 24. Antifriction-rollers, as 68, are secured to the plungers 65, which are adapted to engage cam-

paths, as 69, formed in the face of one of the cams 19 and 25. The cam-paths are so timed with respect to the movement of the cutter that when the splints have been brought up
 5 between the open slats of the carrier the plungers 65 will be forced forward against the ends of the wedge-bars 62, so as to force them inwardly and cause their wedges to spread apart or expand the inner slats against the
 10 ends of the match-splints. The plungers are immediately retracted by the shape of the cam-paths 69, so that the chain can be fed forward. It will be noted that two wedge-bars 62 are employed between each set of in-
 15 ner slats 56 and that the wedges upon the said bars are arranged so that when the bars are forced toward each other they will operate to spread the central slats. The cams 19 and 25 are provided with flanges hav-
 20 ing inclined portions and straight portions, as clearly seen in Fig. 3 of the drawings, and are so constructed that the flanges engage three sections of the carrier-chain at a time, the central section being held stationary
 25 at the time of receiving the match-splints. It is advisable, I find, to center the slat which is receiving its charge of matches exactly over the cutter, and for this purpose I form a frame, as 69, upon the upper part of the
 30 frame 1, the said frame 69 carrying a cross-shaft 70, which extends from one side of the machine to the other. Cam-disks, as 71, are mounted upon the said shaft 70 and provided upon their outer faces with cam-paths, as 72,
 35 which engage antifriction-rollers 73, secured to vertical bolts 74. The bolts 74 are each provided with a guide-slot, as 75, which surrounds a shaft 70, and the upper end of each of the bolts passes through a guiding-opening
 40 formed in a cross-bar, as 76. The bolts 74 thence have a vertical movement and are each provided with downwardly-extending projections, as 77, mounted upon each side of their lower ends and beveled on their inner
 45 faces, as at 78. These beveled faces are adapted to fit upon each side of a section of the carrier-chain when the bolts 74 descend. By this construction when the chain pauses to receive the charge of splints the cam-path
 50 72 actuates the bolts 74, so as to force them downwardly, the projections 77 embracing the inner slats 56 of the chain-section which is to receive the splints and centering the same perfectly over the cutter. The projec-
 55 tions 77 also perform the important function of drawing the inner slats 56 snugly against the wedge-bars 62, so as to insure wide receiving-spaces between the inner and outer slats. Upon the splints being gripped by the
 60 chain the bolts 74 are raised and the chain permitted to pass onward. The shaft 70 is preferably connected by means of suitable gearing with the vertical shaft 14 in order to receive its actuating power.

65 After the chain receives its charge of match-splints it carries them on through the usual mechanism for heating, paraffining, and head-

ing the same, after which they are dried, the splint-carrier returning to the rear end of the cutting-machine, where it descends vertically
 70 between the actuating-cams 79 79, mounted upon the rear end of the machine 1. Here the sections of the chain are again given an intermittent movement by the flanges of the cam 79. A platen, as 80, is mounted in suitable
 75 bearings in the frame opposite these cams and may be connected with the other mechanism of the machine for receiving a reciprocating movement. The said platen is provided with a pair of projecting plates, as 81, 80
 which are so spaced as to coincide with the two rows of match-splints in the carrier. When each carrier is momentarily held stationary by the cam 79, the platen 80 is moved forward,
 85 the plates 81 engaging the ends of the matches and ejecting them from the said carrier when the platen is retracted. The matches are preferably ejected upon a moving apron, as 82, which travels about suitable pulleys, one
 90 of said pulleys being connected with a gear-wheel, as 83, which meshes with the gear-wheel 20 and receives movement therefrom. As the matches are ejected upon the apron it carries them to one side, where they may be
 95 collected or packed in boxes by any suitable or well-known means. The chain, emptied of its splints, then passes downwardly and about rollers or pulleys, as 84, thence upwardly again into the frame 1 and over pulleys
 100 85, which brings the chain again upon a plane with the feeding-cams 19 and 25. Before passing to the cutter it is necessary to open the slats in the carrier again, and for this purpose the wedge-bars 62 are provided with
 105 studs, as 86, which engage guides, as 87, mounted upon a frame 88, secured to the main frame 1. The guides 87 are set at an angle, so that as the studs 86 impinge upon them and travel along the sides of the guide
 110 the wedge-bars will be retracted and the slats permitted to open again. The sections of the chain are thus made ready to receive a new charge of match-splints from the cutter.

I find it desirable to interpose stops between the slats of the carrier-chains. As seen
 115 in Figs. 12 and 13, short studs or stops, as 107, are secured to the slats, so as to limit the outer movement of the expanding portions of the chain. I find that this is very useful
 120 when the cutter is not working well from any cause, as where the blocks of wood are not fed evenly, so that one or two or a few matches, for instance, would be inserted in the chain instead of the full row. The inner slats would
 125 be caused to bend or expand unevenly and perhaps drop the splints. By the use of these studs or stops 107 the chain will grip one splint with as even a pressure as if the whole row of splints were inserted in the chain.

130 It will be evident upon considering the description of this machine that I am enabled to produce a match-splint-cutting machine which embodies a decided advance in the art and one which is capable of practically double

the capacity of the ordinary machines in use, because of the arrangement of the cutters, so as to cut upon opposite sides of the cutter-head. A carrier-chain also constructed in accordance with my invention is capable of the best results, especially as match-splints do not have to be forced between the slats of the carrier, and yet the said splints are firmly clamped therein and carried through the various processes usual to such machines.

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

1. In a match-machine, the combination with a carrier-chain, of a cutter-head, cutters secured to said head and overhanging opposite sides thereof so as to be capable of cutting two rows of splints, one row upon each side of the cutter-head and placing them into the sections of the said carrier-chain, which follow one another the travel of such chain being in a plane across that in which the cutter-head moves and from one cutter-line toward the other, substantially as described.

2. In a match-machine, the combination with a cutter-head, of cutters secured thereon, and overhanging opposite sides so as to be capable of cutting parallel rows of splints, one row upon each side of the cutter and placing them into the sections of a carrier-chain, which follow one another the travel of such chain being in a plane at a right angle to the movement of the cutters and from one cutter-line toward the other, substantially as described.

3. In a match-machine, the combination with a cutter-head, of a double cutter centrally supported thereon and having cutting edges projecting beyond each side of the said cutter-head, whereby it is capable of cutting a row of splints on each side of the cutter-head, simultaneously, substantially as described.

4. In a match-machine, the combination with a cutter-head, of a cutter made up of a series of dies placed side by side, each die being centrally supported upon the said cutter-head, and having its cutting edges projecting beyond each side of the said cutter-head, whereby it is capable of cutting splints upon each side of the cutter-head simultaneously, substantially as described.

5. In a match-machine, the combination with a reciprocating cutter-head, of a cutter mounted thereon adapted to cut upon each side of the said cutter-head, feed-troughs leading to opposite sides of the cutter and arranged upon the same side of the machine, whereby an attendant can easily reach and supply both troughs, and means for reciprocating the cutter-head, substantially as described.

6. In a match-machine, the combination with a reciprocating cutter-head, of a cutter adapted to cut two rows of splints mounted thereon, a carrier-chain for receiving the said splints, and a guide adapted to pass between

the rows of splints for guiding them gradually into the carrier-chain, substantially as described.

7. In a match-machine, the combination with a reciprocating cutter-head, of a carrier-chain adapted to receive the said splints, means for feeding the carrier-chain forward, and bolts having slat-embracing portions for centering and clamping each section of the carrier-chain immediately over the cutter to receive its charge of match-splints, substantially as described.

8. In a match-machine, the combination with a reciprocating cutter adapted to cut two rows of match-splints, of a guide adapted to engage the splints for directing them to a carrier-chain, cams connected with the operating mechanism of the machine, and means connecting the said cams with the said guide whereby the guide will be caused to operate in conjunction with the cutter upon the splints, substantially as described.

9. In a match-machine, the combination with a reciprocating cutter-head, of a cutter adapted to cut splints upon the opposite sides of the said cutter-head, a guide adapted to be interposed between the said splints comprising a guide-bar, supporting-rods, levers connected with said rods, and disks having cam-paths formed in their faces for engaging the said levers, whereby the movement of the splint-guide is regulated according to the movement of the cutter, substantially as described.

10. In a match-machine, the combination with a reciprocating cutter-head, of a cutter mounted thereon, a guide adapted to cooperate with the cutter for directing the match-splints, rods carrying the said guide, levers connecting the said rods, disks connected with the operating mechanism of the machine having cam-paths formed in their faces, and levers connecting the said cam-paths with the guide-supporting rods, the shape of the said cam-paths being such that the guide will be caused to accommodate itself to the movement of the cutter and will be quickly withdrawn from between the match-splints, to permit of the chain being fed forward, substantially as described.

11. In a match-machine, the combination with a reciprocating cutter, of a carrier-chain comprising sections formed of slats and wedge-bars adapted to receive splints therefrom, means for centering each section of the carrier-chain over the cutter, comprising reciprocating bolts and beveled projections on the said bolts adapted to engage the inner slats to draw them against the wedge-bars so as to form wide receiving-openings for the splints, substantially as described.

12. In a match-machine, the combination with a reciprocating cutter, of a carrier-chain for receiving splints therefrom, composed of sections formed of slats and wedge-bars, a centering and slat-opening mechanism adapted to hold each section of the carrier-chain over

the cutter, comprising reciprocating bolts having beveled projections for engaging the slats, said bolts being guided upon the frame of the machine, disks for operating said bolts, said disks having cam-paths formed in their faces, and antifriction-rollers formed in said bolts for engaging the said cam-paths, substantially as described.

13. In a match-making machine, the combination with a reciprocating cutter, of a carrier-chain for receiving splints therefrom, means for centering each section of the carrier-chain over the cutter comprising reciprocating bolts, means for reciprocating said bolts in conjunction with the movement of the cutter, and beveled projections mounted upon the said bolts adapted to embrace each section of the chain between them successively as the bolts are lowered, substantially as described.

14. In a match-making machine, the combination with a cutter, of a match-splint carrier adapted to receive splints from the said cutter, said carrier comprising sections of slats, intermediate slats in each section, and means for expanding the same for gripping the splints in the carrier-chain, substantially as described.

15. In a match-making machine, the combination with a cutter, of a carrier-chain for receiving splints therefrom, the said carrier-chain comprising sections formed of exterior and interior slats, links for binding the said slats to form sections, and links for connecting the sections to form a continuous chain, and wedge-bars interposed between the interior slats, the construction being such that when the wedge-bars are forced inwardly, they will expand the inner slats against the ends of the match-splints, substantially as described.

16. In a match-machine, the combination with a cutter, of a carrier-chain adapted to receive splints from the same, the said chain comprising sections formed of outside and inside slats, wedge-bars interposed between the inner slats having beveled faces formed thereon, corresponding beveled faces being formed upon the inner slats, the construction being such that when the wedge-bars are forced inwardly, the wedge-faces will cause the inner slats to separate and grip the match-splints between them and the outer slats, substantially as described.

17. In a match-machine, the combination with a cutter, of a match-splint carrier for receiving the splints therefrom, comprising sections formed of outer and inner slats, wedge-bars interposed between the inner slats having wedges formed thereon, the said wedges having beveled faces and flat faces, the inner slats being provided with corresponding notches formed in their inner faces, the construction being such that when the wedge-bars are forced inwardly, the outer bars will be separated by the beveled faces but will be

held in their open position by the flat faces, substantially as described.

18. In a match-machine, the combination with a cutter, of a match-splint carrier adapted to receive splints therefrom, means for feeding the said carrier forward by an intermittent movement, the said carrier comprising sections formed of fixed slats and inner expanding slats, and means for operating the inner expanding slats, substantially as described.

19. In a match-machine, the combination with a cutter, of a carrier-chain for receiving splints comprising sections formed of fixed slats and expanding slats, cams for feeding the chain, cam-paths formed on the faces of the said cams, and bolts adapted to engage the said cam-paths, the construction being such that the bolts will be intermittently forced inwardly to spread the expanding portion of the chain, substantially as described.

20. In a match-machine, the combination with a cutter, of a carrier for receiving splints therefrom, the said carrier comprising fixed and expanding slats, means for spreading the expanding slats comprising bolts adapted to be moved transversely with respect to the frame of the machine, and feed-cams for feeding the chain forward, the said feeding-cams being provided with cam-paths in their faces, and antifriction-rollers upon the said bolts engaging the said cam-paths, the construction being such that when each carrier-section has received its charge of matches, the bolts will be thrust forward to spread the expanding portion of the chain for gripping the splints, substantially as described.

21. In a match-machine, the combination with a reciprocating cutter, of a carrier-chain adapted to receive splints from the said cutter, said carrier-chain comprising fixed and expanding slats, the said expanding slats being arranged between the fixed slats, the construction being such that two rows of splints may be received in each section of the chain and clamped therein at one operation, substantially as described.

22. In a match-machine, the combination with a cutter, of a carrier-chain mounted thereon adapted to receive splints from the cutter, said carrier-chain comprising fixed slats and intermediate expanding slats, means for expanding the said expanding slats for gripping the splints, and means for releasing the expanding slats after the completed matches have been discharged from the carrier, whereby they are ready for a new charge of splints, substantially as described.

23. In a match-machine, the combination with a reciprocating cutter, of a carrier-chain for receiving splints therefrom, said chain comprising fixed slats and expanding slats, wedge-bars for spreading the expanding slats, means for operating the said wedge-bars to grip the splints, and studs mounted upon the said wedge-bars, and guides mounted in the frame,

the construction being such that when the studs upon the wedge-bars engage the said guides, the wedge-bars will be operated so as to open the chain, substantially as described.

5 24. In a match-machine, the combination with a cutter, of a carrier-chain for receiving splints therefrom, said chain comprising a series of sections formed of exterior and interior slats, the exterior slats being provided
10 with limiting-studs for making even spaces between them, and the inner slats being adapted to expand to grip the splints between them and the outer slats, substantially as described.

15 25. In a match-machine, the combination

with a cutter, of a carrier-chain for receiving splints therefrom, said chain comprising a series of sections formed of exterior and interior slats, the inner slats being adapted to expand to grip the splints between them and the
20 outer slats, and bands for holding the slats together and giving them additional strength, substantially as described.

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

WILLIAM E. COOK.

Witnesses:

A. E. SMITH,

J. E. HERBERT.