

No. 688,811.

Patented Dec. 17, 1901.

W. W. ABBOTT, Dec'd.

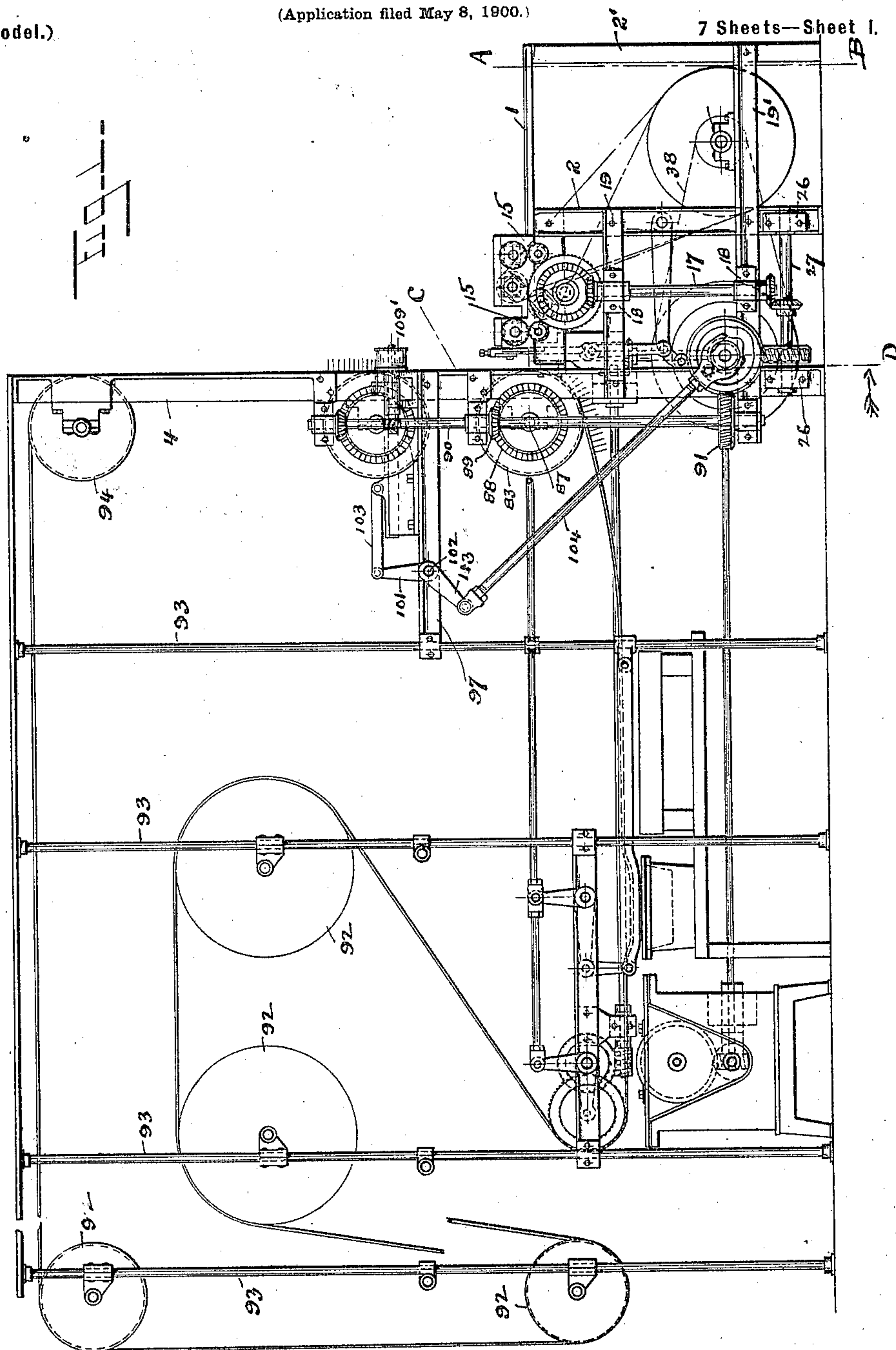
M. S. ABBOTT, Administratrix.

MATCH MACHINE.

(Application filed May 8, 1900.)

(No Model.)

7 Sheets—Sheet 1.



Witnesses.

Edgar Thomas
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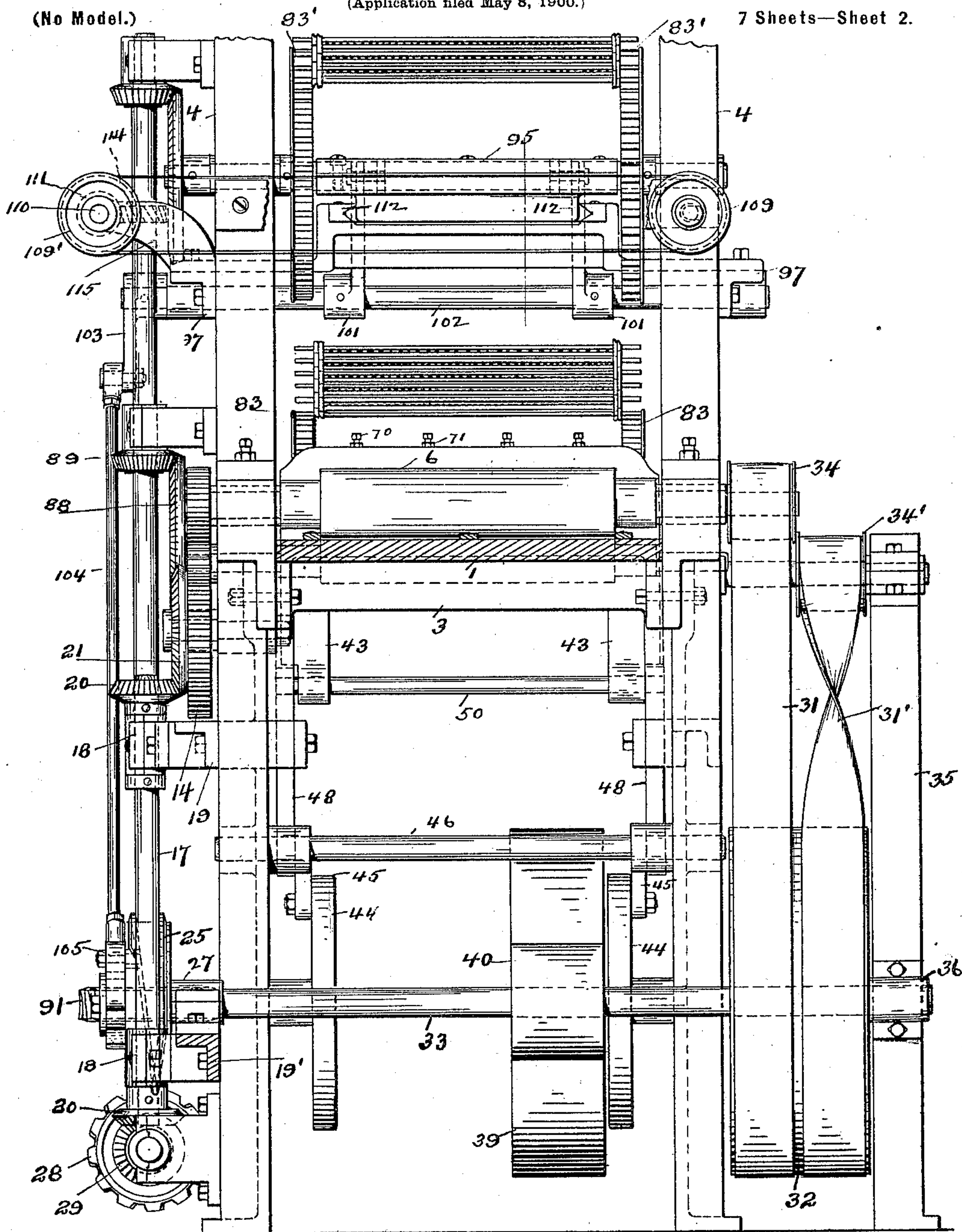
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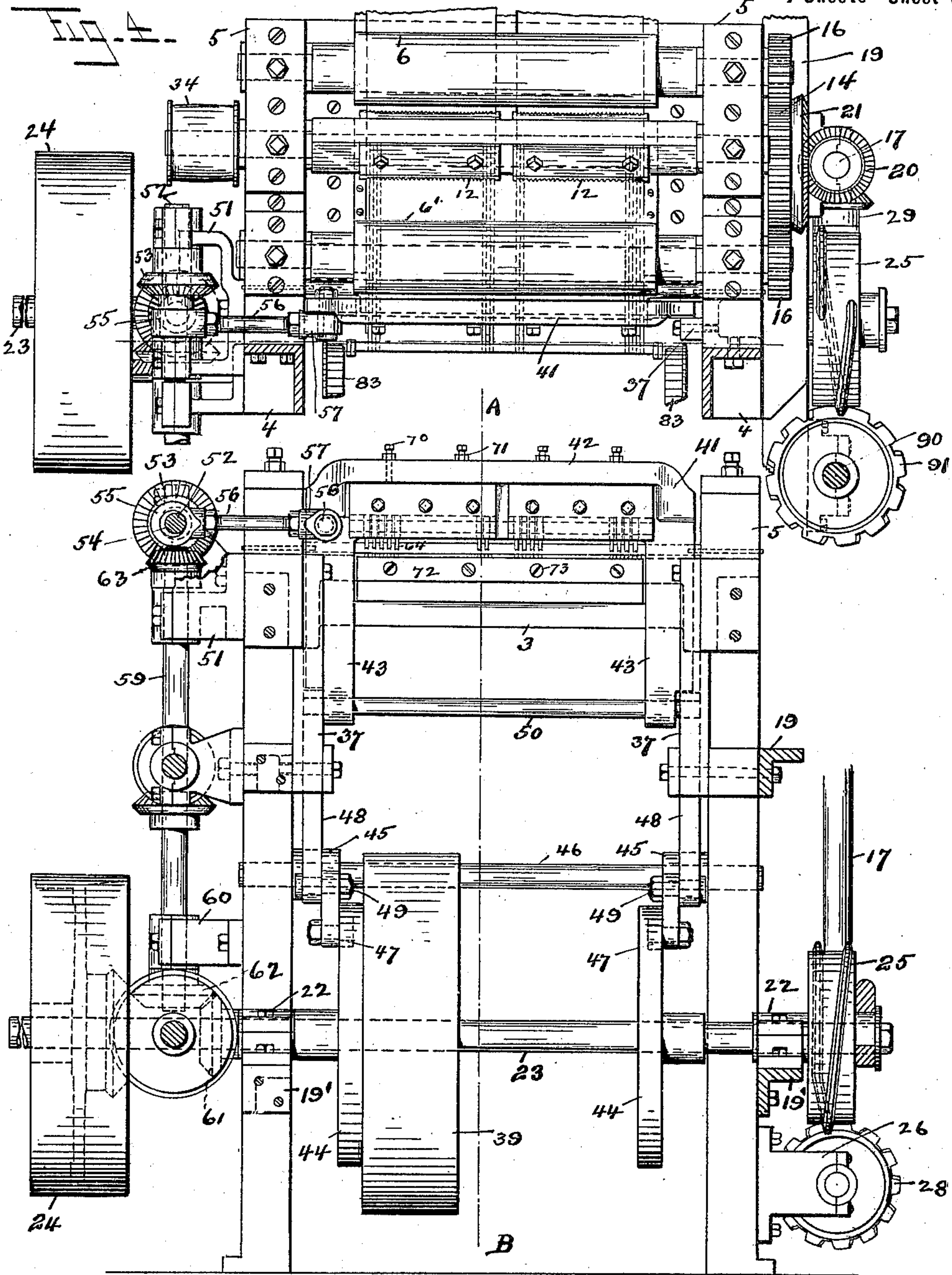
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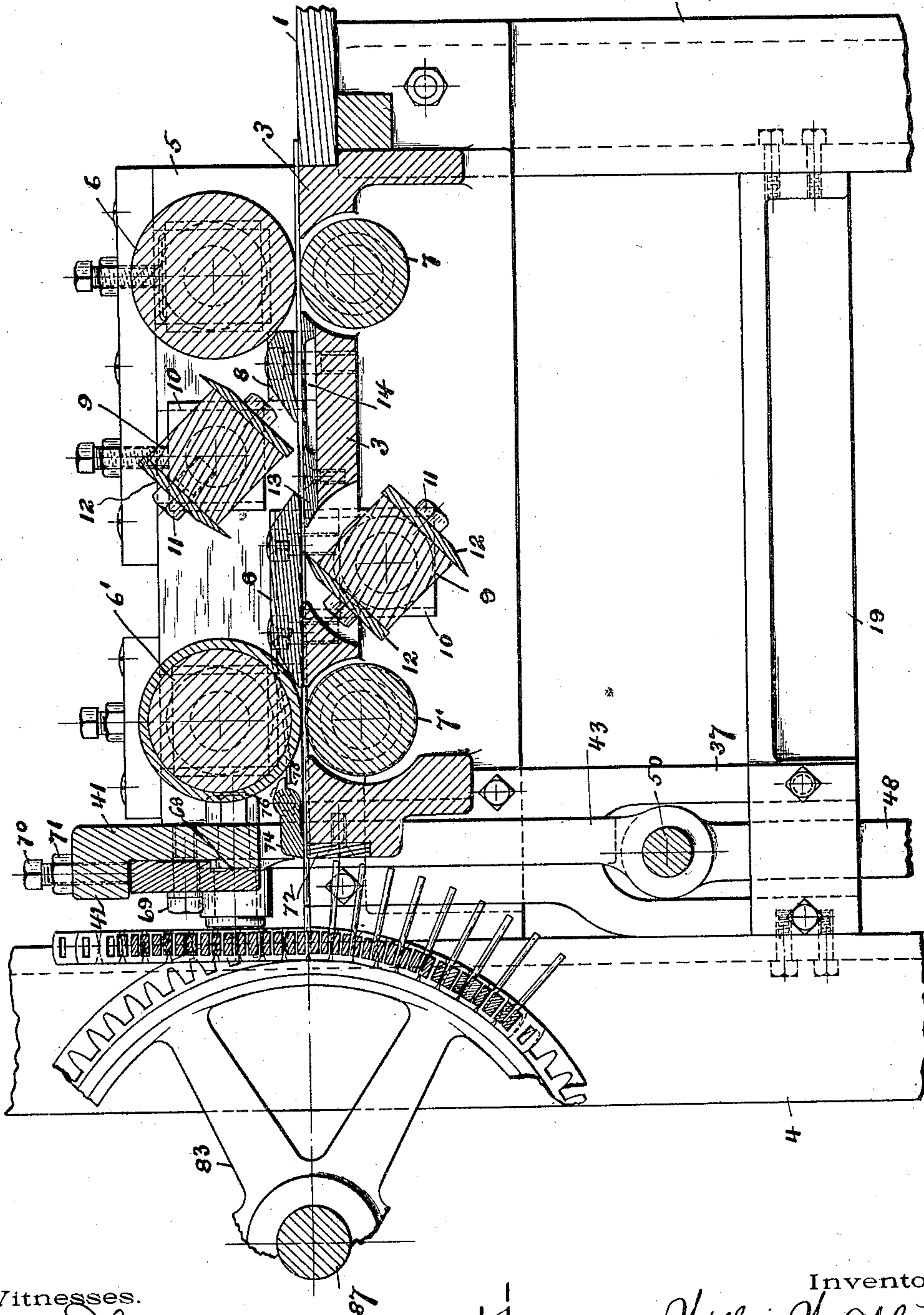
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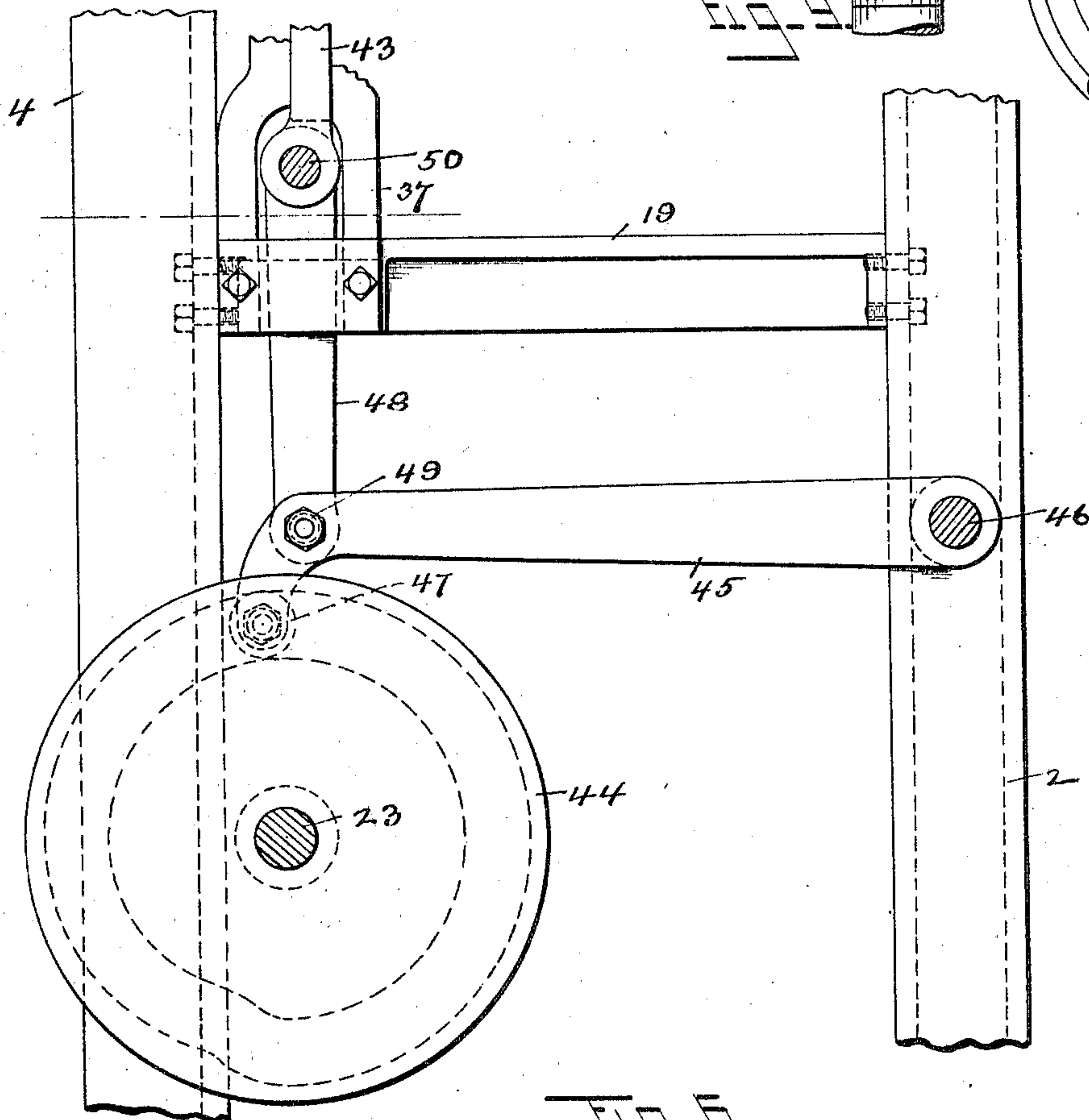
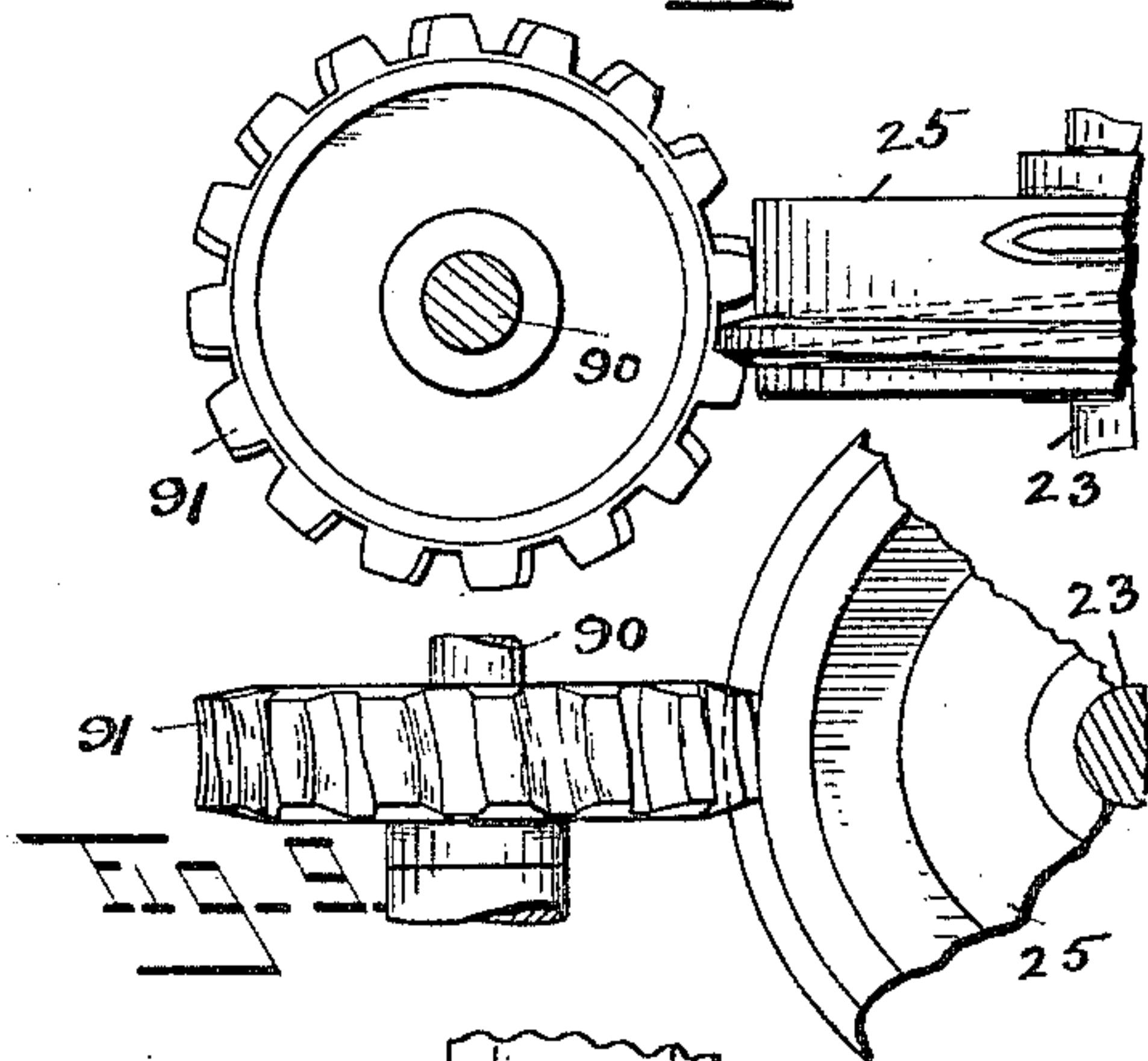
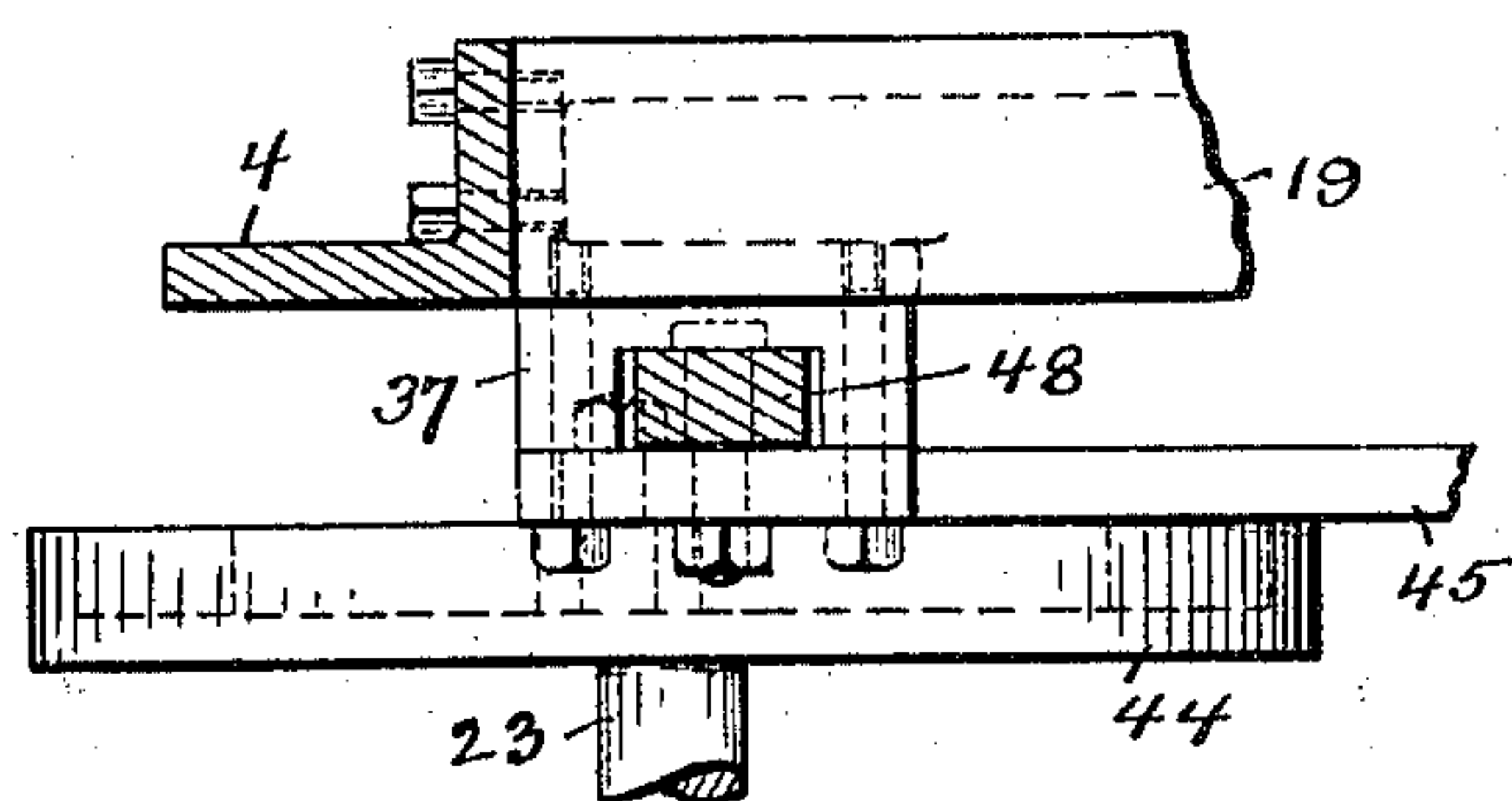
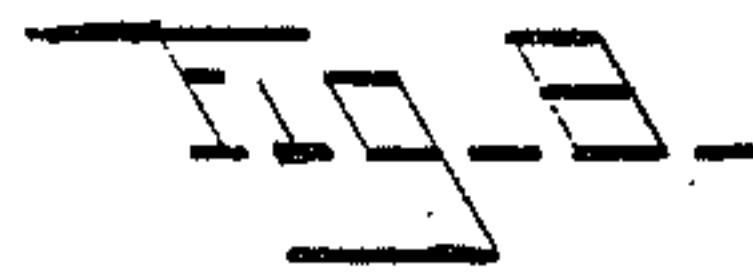
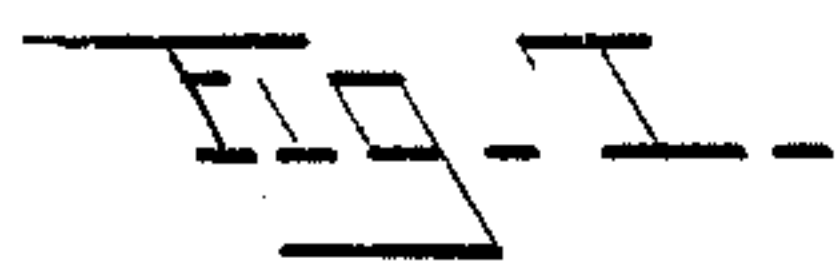
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Witnesses.

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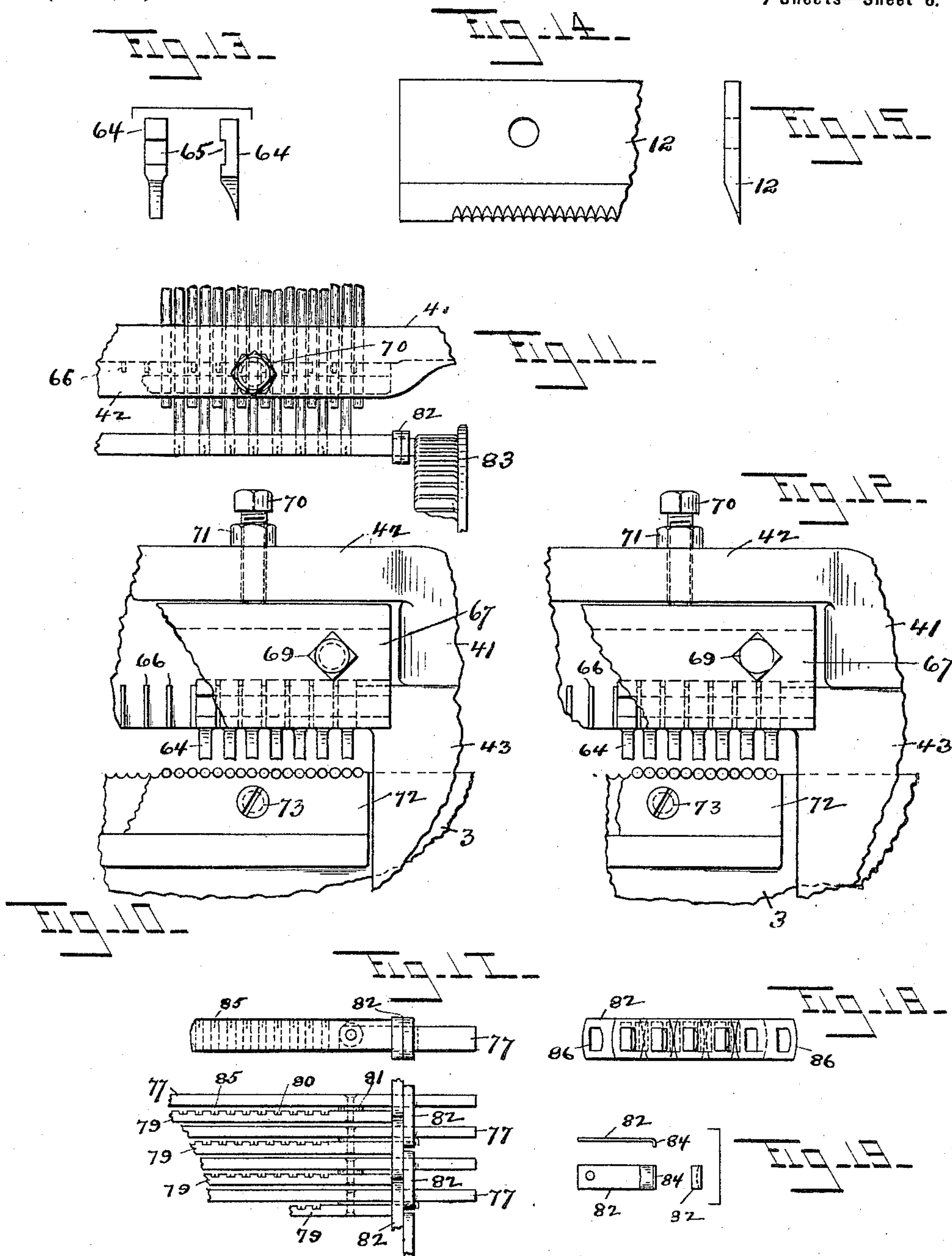
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Witnesses.

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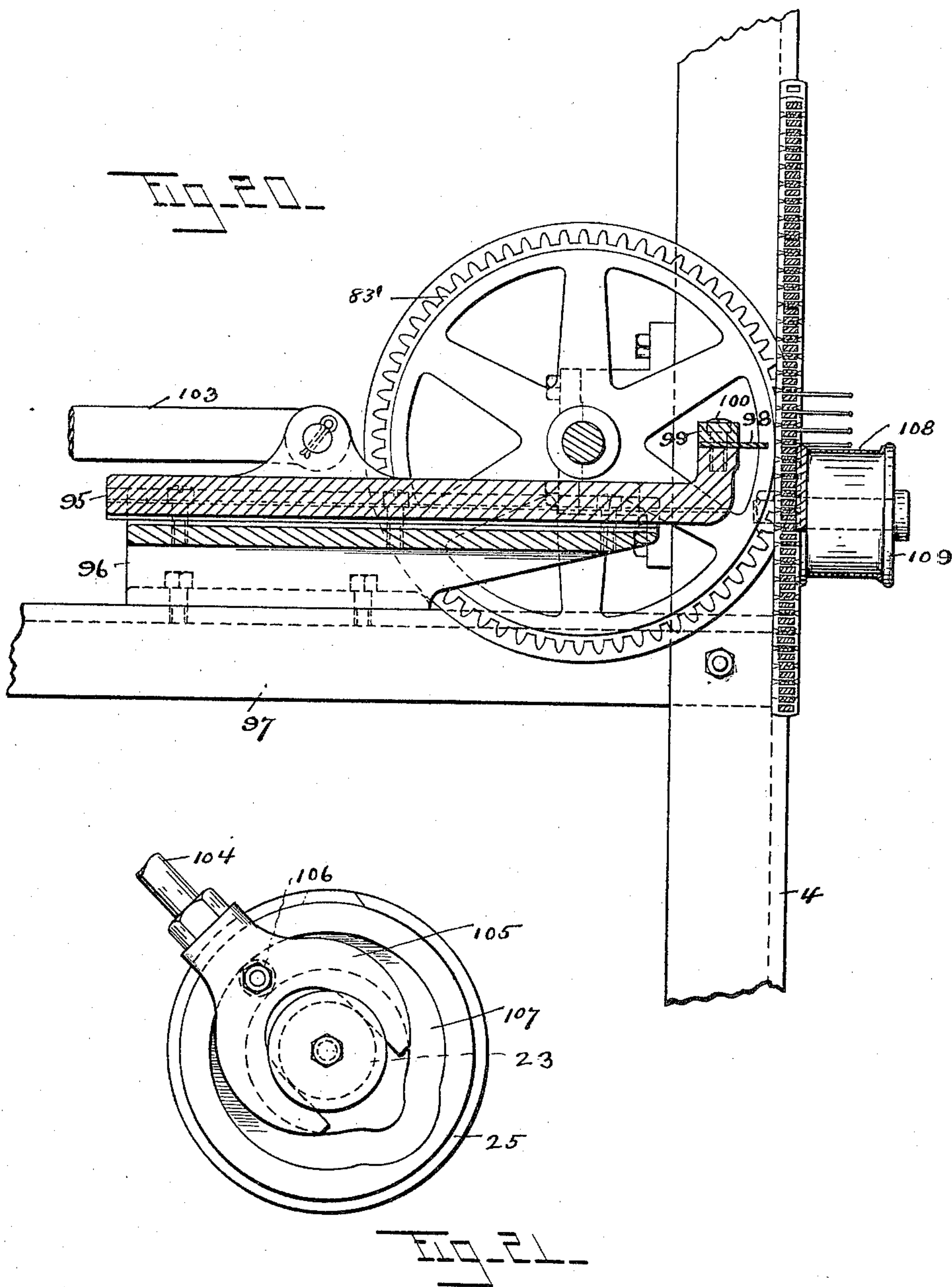
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Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM W. ABBOTT, OF NEW HAVEN, CONNECTICUT; MARY S. ABBOTT
ADMINISTRATRIX OF SAID WILLIAM W. ABBOTT, DECEASED.

MATCH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 688,811, dated December 17, 1901.

Application filed May 8, 1900. Serial No. 15,930. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. ABBOTT, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Match-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in match-machines, and refers more especially to that class of machines in which a veneer is cut into splints, which are inserted into an endless carrier, then cut off into lengths and conveyed by the said carrier through a composition-bath, afterward being forced out of the carrier as a finished match onto a moving belt which conveys them to the boxing machinery.

It is the object of my invention, among other things, to construct a machine of this general character in which only every alternate splint will be severed from the veneer at each stroke of the cutter mechanism, so that the splints enter the carrier with an open space between them the full width of a splint.

It is a further object of my invention to construct the machine with the fewest possible parts so designed as to be economically constructed and readily assembled.

To these and other ends my invention consists in a match-machine having certain details of construction and combination of parts, as will be hereinafter described, and more particularly pointed out in the claims.

In the match-machine herein described a veneer enters a splint-cutting machine between a pair of feeding-rolls, and by means of rotating knives or cutters the veneer is divided lengthwise into a plurality of splints, which pass between another pair of feeding-rolls adjacent to an endless carrier. A vertically-movable cutter separates each alternate splint from the veneer, leaving the other splints projecting in front of the cutter. The feeding-rolls during their next rotation push the projecting splints into one of the bars of the carrier-chain and away from the cutter. Immediately after the cutting operation the carrier-chain is advanced so that the next carrying-bar in the chain is brought into line

with the splints. The cutter-head is moved sidewise before the next downward movement, so that the cutters are in line with those splints that were not cut off at the last previous stroke. By this construction and mode of operation every alternate splint is severed at each stroke of the cutter mechanism, and between every splint in the carrier-chain there is an open space of substantially the same width as that of the splint itself. The splints enter the carrier-chain in a direct line with the veneer, which overcomes the present objectionable method common in the art of feeding all of the splints into the carrier-chain at one and the same time, but separating them, so that every alternate splint enters the chain in a different vertical plane from the one next to it.

Referring to the drawings, in which like numerals designate like parts in the several views, Figure 1 is a side elevation of the machine complete. Fig. 2 is a fragmentary end view thereof with the splint-cutter in section upon line A B of Fig. 1. Fig. 3 is a view of one end of the splint-cutting machine, taken upon line C D in the direction of the arrow of Fig. 1. Fig. 4 is a fragmentary plan view of the splint-cutting machine. Fig. 5 is a fragmentary sectional elevation of the splint-cutting machine, taken upon line A B of Fig. 3. Fig. 6 is a fragmentary elevation of a portion of the splint-cutting-machine frame, showing the mechanism for actuating the cutter-head. Fig. 7 is a fragmentary plan view of the parts shown in Fig. 6. Figs. 8 and 9 are fragmentary views of the intermittent feed worm and gears. Figs. 10, 11, and 12 are fragmentary views of the cutter-head and its adjacent mechanism. Fig. 13 illustrates two views of the cutting-knife. Figs. 14 and 15 are front and side elevations, respectively, of one of the former knives. Figs. 16, 17, and 18 are views of the carrier-chain. Fig. 19 illustrates three views of the carrier-chain, filling-piece, and link-retaining device. Fig. 20 is a longitudinal section of the mechanism for stripping the matches from the chain. Fig. 21 is an elevation of the stripper-cam.

The splint-cutting machine is constructed with a horizontal table 1, supported at either end by standards 2 2', and a roll-table 3, fixed

at one end to the standard 2 and at the other end to the upright 4. Journaled in boxes adjustable vertically in the side frames 5 5 are the upper feed-rolls 6 6', and directly below the same are the lower feed-rolls 7 7', the peripheries of which are substantially flush with the surface of the top of the roll-table. The feed-roll 6' is preferably covered with rubber, so that it may have a yielding and resilient surface. Secured to the upper side of the said roll-table are the guide-bars 8 8, under which the veneer is fed and arranged so as to prevent any vertical or horizontal movement of the veneer during the cutting operation. Between the feed-rolls, both below and above the upper surface of the roll-frame, are the rotating knife-bars 9 9, which are journaled at either end in boxes 10 10, adjustable vertically within the side frames 5. Attached to each of the said knife-bars by screws 11 11 or other like means are the former-knives 12, having a serrated beveled cutting edge, as shown in Fig. 14, the form and shape of the serrations being governed by the shape of the match.

As illustrated, the knives are designed for a round match; but if it is desired to make a match angular in cross-section it is simply necessary to change the form of the serrations. Beneath the upper knife-bar and fastened securely to the top of the roll-table is a plate 13, having a recess 14 cut in the bottom thereof, so as to permit of a slight yielding movement of the upper surface of the table and prevent clogging of the veneer under the guide 8 if, perchance, the veneer should vary slightly in thickness. A rotary motion is imparted to the feed-rolls through the spur-gear 14, which meshes into the pinions 15 15, Fig. 1, fixed to rolls 7 7', which pinions mesh into the pinions 16 16, fixed to rolls 6 6'. The spur-gear 14 is driven from a vertical shaft 17, journaled in boxes 18 18, fixed to the frame-bars 19 19', a bevel-pinion 20 upon said shaft meshing into a bevel-gear 21, made fast to the spur-gear 14. Rotatable in the boxes 22 22, fastened to the frame-bars 19' 19', is the main driving-shaft 23, having upon one end a driving-pulley 24 and upon the other end the worm 25. Journaled at either end in the boxes 26 26, attached to the standards 2 and upright 4, is the shaft 27, to which is fixed a worm-gear 28, which meshes into the worm 25, and a miter-gear 29, which meshes into the miter-gear 30, fastened to the vertical shaft 17. As the main shaft 23 is rotated an intermittent rotary movement is imparted to the shaft 27 through the worm 25 and worm-gear 28, which motion is imparted to the vertical shaft 17 and the feed-rolls through the miter-gears 29 and 30. The knife-bars 9 9 are rotated by the belts 31 31', connecting the pulley 32 upon the cutter-shaft 33 and the pulleys 34 and 34' upon the projecting ends of the said knife-bars. One of the knife-bars 9 is supported and journaled at its outer end in the standard 35, which standard also sup-

ports one end of the shaft 33 in the box 36, the other end of said shaft being journaled in the box 27, fastened to the frame-bar 19'. Shaft 33 is driven by the belt 38, which connects the pulley 39 upon the shaft 23 with the pulley 40. The forming-knives rotate continuously at a high rate of speed, which speed is determined by the relative sizes of the pulleys 39 and 40 and pulley 32 and 34', while the feed-rolls have an intermittent motion and only feed the veneer forward when the carrier-chain is ready to receive it.

Movable vertically in guideways 37, fastened at their lower ends to the frame-bars 19 and at their upper ends to the roll-table 3, is the cutter-head 41, having an integral overhanging backing-lug 42 and downwardly-projecting integral arms 43 43 at either side thereof. The cutter-head is actuated vertically by means of the cutter-cams 44 44, fixed to the driving-shaft 23, cam-levers 45 45, secured at one end to the rod 46 and carrying a cam-roll 47 at its free end, which roll lies in the groove in the cutter-cam, links 48 48, pivotally secured to the cam-levers by the bolts 49 at their lower ends and to the rod 50 at their upper ends, which rod passes through the bottom ends of the arms 43 43 on the cutter-head.

Fixed to the side of the roll-table 3 is a bracket 51, within which is journaled the eccentric-shaft 52, carrying a bevel-gear 53 and an eccentric 54, around which is the eccentric-strap 55. A connection-rod 56 joins the eccentric-strap 55 with the block 57, rotatably fixed to the cutter-head by the bolt 58.

The numeral 59 designates a vertical shaft, which is journaled in the bearing 60 and the bracket 51 and is driven by a miter-gear 61 upon the shaft 23, meshing into a miter-gear 62 upon the lower end of the said vertical shaft. A bevel-pinion 63, keyed to the shaft 59, engages with the bevel-gear 53 and drives the eccentric-shaft 52. As the pinion 63 is only one-half the size of the gear 53, the eccentric-shaft 52 rotates at one-half the speed of the vertical shaft 59.

Rigidly fixed to the cutter-head 37 are a plurality of independent cutters 64, which are provided with a groove 65 and are prevented from lateral movement within the cutter-head by the integral tongues 66, between which the said cutters are inserted. Vertical movement of the cutters is prevented by the plate 67, having a tongue 68, which enters the groove 65 in the cutters, and which plate is securely fastened to the cutter-head by the bolts 69. An adjustment of the knives is acquired by means of the adjusting-screws 70 and check-nuts 71, the screws being threaded in the overhanging head portion 42 of the cutter-head and impinging upon the plate 67. As these cutters are independent of each other, they can be replaced at a small expense and with little difficulty if one of them should become broken or injured in any way and without requiring a complete new set. A hardened plate

72 is fastened, by means of the screws 73, to the edge of the roll-table 3 and provides a lower rigid knife, against which the movable cutters 64 can separate the splints from the veneer. To prevent the forward ends of the splints from springing upward, I have provided a pressure-plate 74, which is pivotally mounted at either end in the side frames 5 and which bears upon the top of the splints, as shown in Fig. 5, and a spring 75, engaging with a lug 76 upon the said pressure-plate, holds the same down with a yielding pressure.

The operation of the splint-cutting device is as follows: A wooden veneer is placed in the machine between the feed-rolls 6 and 7, which rolls feed the said veneer under the guide 8 and over the plate 13, where the forming-knives 12 12, attached to the knife-bar 9, cut the upper portion of said veneer so as to form one-half of the splint. The veneer then passes under the guide 8, and the lower forming-knives 12 12, attached to the knife-bar 9', cut the veneer so as to form the lower half, and complete the splint. The splints are now separate from each other and pass between the rolls 6' and 7' and under the pressure-plate 74. It will be borne in mind that the feed-rolls have an intermittent rotary movement, and hence the veneer is fed forward intermittently; but the forming-rolls rotate continuously. The cam 44 is so timed that immediately upon the stopping of the feed-rolls and the feeding of the splints a downward movement is given to the cutter-head 37, and the cutters 64 sever every alternate splint from the veneer against the plate 72. The first lot of splints cut from the veneer do not enter the carrier-chain, because the front of the veneer is straight and there are no holes in the chain to receive the full width of the veneer; but after the first downward stroke of the cutter-head one half of the splints project in advance of the other half, as shown in Fig. 11, so that at the next movement of the feed-rolls the projecting splints are fed into the chain and are there held until the cutter-head moves downwardly and the cutters sever the splints from the veneer. After each downward movement of the cutter-head the same is shifted or moved crosswise in the guideways 37 37 by means of the eccentric 54 and connection-bar 56, so that the cutter-knives 64 are above those splints that were not severed at the last stroke of the cutter-head. The two extreme lateral positions of the cutter-head in relation to the splints and the adjacent parts is shown in Figs. 10 and 12. These successive operations of feeding and cutting every alternate splint from the veneer at every stroke continues until the veneer has passed through the machine, when a new veneer is inserted and the operations repeated as before.

The carrier-chain is composed of a plurality of carrier-bars 77, to which are secured plates 79, having recesses 80 therein for the reception of the match-splints and which are sepa-

rated from the bar 77 by a filling-piece 81. The carrier-bars 77 are joined by links 82, which abut against the ends of the plates 79, permitting a portion of the bars 77 to project outside thereof, so as to engage with the teeth upon the feed-gears 83, as shown in Figs. 2 and 11. Every alternate filling-piece 81 is elongated and projects through the said links and is provided with a finger 84, which engages with the outer surface of the links 82 and prevents the same from being displaced laterally, as shown in Fig. 16. A knife-point 85 projects upward from the bottom of each of the recesses 80 and is designed to enter the end of the splint and hold it against disengagement from the carrier-bars. The apertures 86 in the links 82, through which the bars 77 pass, are rounded upon one side, as shown in Fig. 18, so as to permit a slight rocking movement upon the bars 77, which enables the chain to pass around the periphery of the carrier-wheels. The recesses 80 in the plates 79 are staggered in relation to each other—that is, the recesses in one plate are opposite the high portion of the next succeeding plate, and vice versa—so as to permit the splints to enter the bars as they are cut off, it being remembered that only every alternate splint is severed from the veneer at each stroke. The particular construction of the mechanism for moving the chain is not material to this invention; but, as illustrated, it consists of a pair of toothed feed-wheels 83 83, mounted upon a shaft 87, rotatably secured to boxes upon the upright 4 and having fixed upon one end a bevel-gear 88, which meshes into a bevel-pinion 89, keyed to vertical shaft 90, upon the lower end of which is a worm-gear 91, meshing into the worm 25. Through the worm 25 and worm-gear 91 an intermittent rotary movement is imparted to the vertical shaft 90, which motion is conveyed to the feed-wheels and carrier-chain through the bevel-pinion 89 and bevel-gear 88, the timing of the movement of the carrier-chain being such as to permit the moving thereof at the same time as the veneer is being advanced by the feed-rolls. After passing around the feed-wheels 83 the carrier-chain passes through the usual composition-bath, &c., common to machines of this character, thence around a plurality of drums 92, which are supported upon uprights 93 93, thence around a drum 94, and through the stripping device back to the feed-wheels 83.

The construction of the composition-bath and drum mechanism is not material to my invention, and I have not therefore shown or described it more in detail. The mechanism for knocking the splints from the carrier-bars consists of a frame 96, secured to the frame-bars 97; a slide 95, movable in ways 112, secured to said frame; a stripper-plate 98, fastened to one end of the said slide by the cap 99 and screws 100; rock-arms 101, fixed to a rock-shaft 102, mounted in the frame-bars 97; links 103, connecting the rock-arms 101

with the slide 95, and a connection-bar 104, joining the rock-arm 113, fixed to the rock-shaft 102, with a yoke 105, which straddles the shaft 23 and carries a roll 106, which is operative within a cam-groove 107 in the face of the worm 25.

When the carrier-chain is at rest, the slide 95 is actuated through the rock-shaft 102 and cam mechanism above described, causing the stripper-plate 98 to enter between the carrier-bar 77 and plate 79, pushing the splints out of the chain onto the transversely-moving belt 108, which passes around pulleys 109 109'. A shaft 110, journaled in a bracket 115, bolted to the frame-bar 97, supports the pulley 109, and fixed to said shaft is a worm 111, which engages with a worm-gear 114 upon the vertical shaft 90. Adjacent to the said stripper mechanism are a pair of chain feed-wheels 83' 83', which are operated and driven in substantially the same manner as hereinbefore described for the feed-wheels 83.

There are many minor changes and alterations that can be made within my invention, and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of my invention.

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

1. In a match-machine, the combination with mechanism for forming splint-strips from a veneer; of mechanism for cutting the splints into lengths; and means for actuating said cutting mechanism whereby the same will sever only a portion of the said splint-strips at each operation thereof, substantially as described.

2. In a match-machine, the combination with mechanism for forming splint-strips from a veneer; of mechanism for cutting the splint-strips into lengths; and means for actuating said cutting mechanism whereby the same will sever only every alternate splint from the splint-strips at each stroke thereof, substantially as described.

3. In a match-machine, the combination with mechanism for cutting a veneer into splint-strips; a cutter mechanism for severing said splint-strips from the said veneer; cutters secured to said cutting mechanism, arranged so as to leave an open space therebetween; and means for actuating said cutting mechanism whereby only a portion of said splints are severed at a single stroke of said cutting mechanism, the unsevered splints lying in the said open spaces between the cutters, substantially as described.

4. In a match-machine having mechanism for forming splint-strips from a veneer, the combination therewith of a vertically-movable cutter-head having cutters fixed thereto; means for actuating said cutter-head vertically and laterally whereby only a portion of

the said splint-strips are severed from said veneer at each stroke thereof, substantially as described.

5. In a match-machine having mechanism attached thereto for forming a plurality of splint-strips from a veneer, the combination therewith of a cutting mechanism having cutters attached thereto; and means for actuating said cutting mechanism whereby one-half of the splint-strips are severed at one stroke thereof; and means for shifting the said cutting mechanism between each cutting stroke, so that the next succeeding stroke will sever the remaining splints from the splint-strips, all constructed and operating substantially as described.

6. In a match-machine having mechanism attached thereto for forming a plurality of splint-strips from a veneer, the combination therewith of a cutter-head having fixed therein a plurality of cutter-knives, which knives are separated by tongues attached to the said cutter-head and whereby an open space is left between said cutters; and means for imparting a vertical and a lateral movement to the said cutting mechanism at substantially one and the same time, substantially as described.

7. In a match-machine of the character described, the combination with a splint-strip-forming machine; of cutting mechanism for severing every alternate splint from said strips at each stroke thereof; an endless carrier-chain; means for feeding the said splints into said carrier-chain, and stripper mechanism for stripping the said splints from the said carrier-chain, substantially as shown and described.

8. In a carrier-chain for match-machines; means for holding the splints in said chain, the said means comprising a carrier-bar; a plate shorter than said bar but attached thereto with an open space therebetween, the said plate having a plurality of recesses therein; and a plurality of knife-points fixed in said recesses and projecting into the same, substantially as described.

9. In a carrier-chain for match-machines; a plurality of carrier-bars; links connecting said bars and adapted to have a slight relative movement thereon, the ends of said bars projecting outward from said links; plates rigidly attached to said bars with an open space therebetween and having a plurality of recesses therein within which the match-splints are adapted to enter and a plurality of knife-points fixed to said plates and entering the said recesses, substantially as described.

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

WILLIAM W. ABBOTT.

Witnesses:

GEORGE E. HALL,
EDWIN M. CLARK.