

No. 803,649.

PATENTED NOV. 7, 1905.

W. E. WILLIAMS.
MACHINE FOR CUTTING AND STICKING MATCH SPLINTS.

APPLICATION FILED MAY 12, 1899.

5 SHEETS—SHEET 1.

Fig. 1.

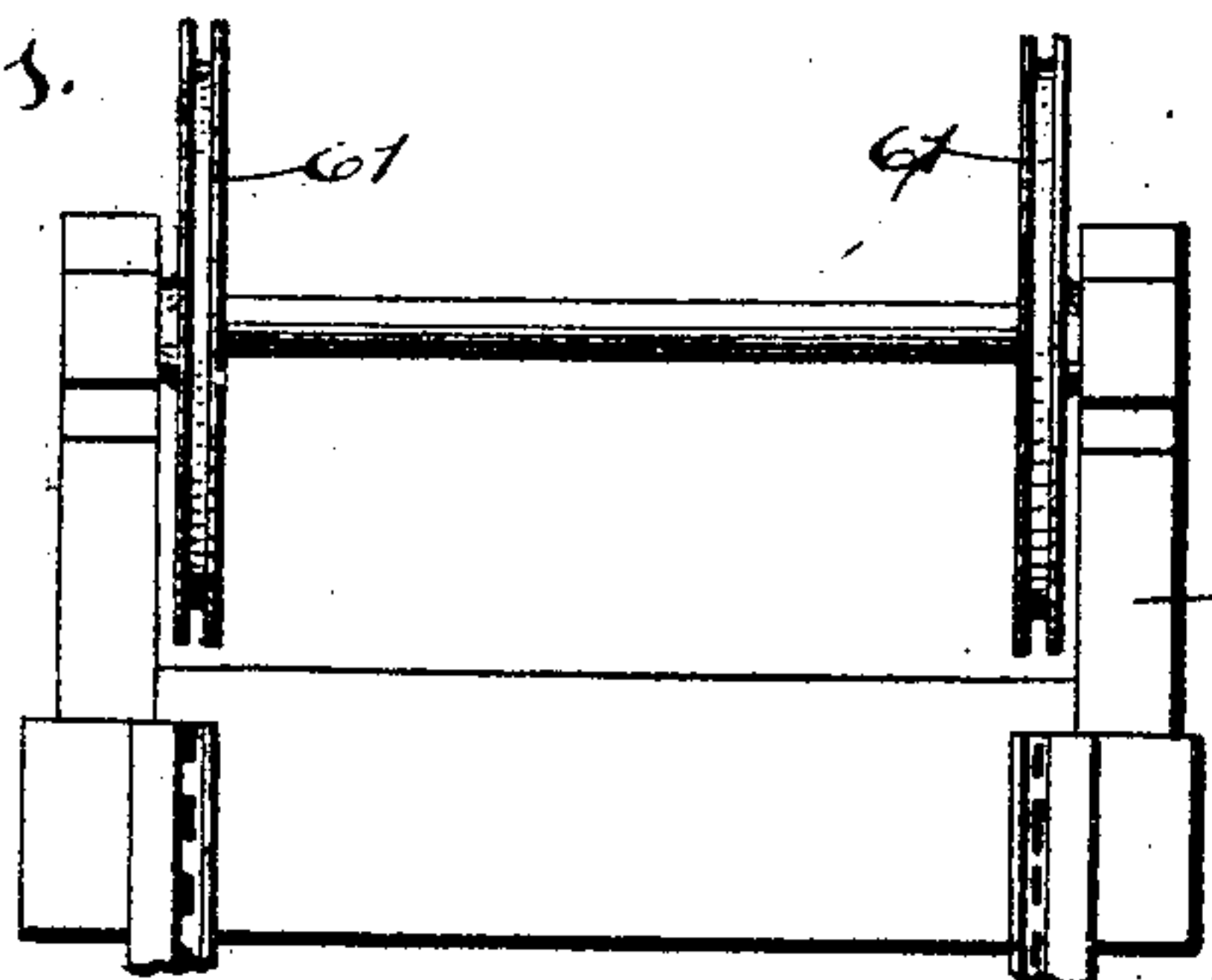


Fig. 2.

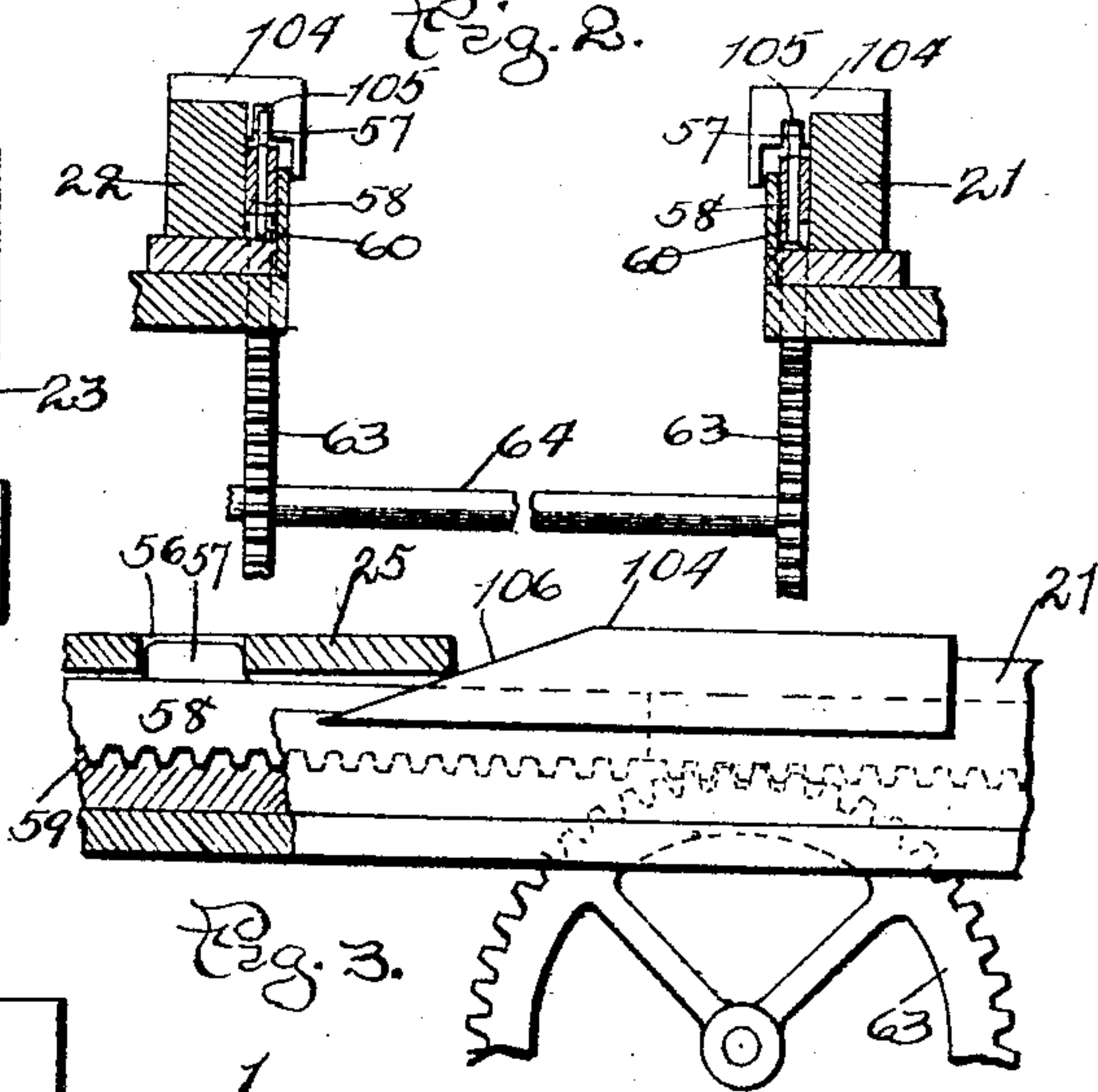


Fig. 3.

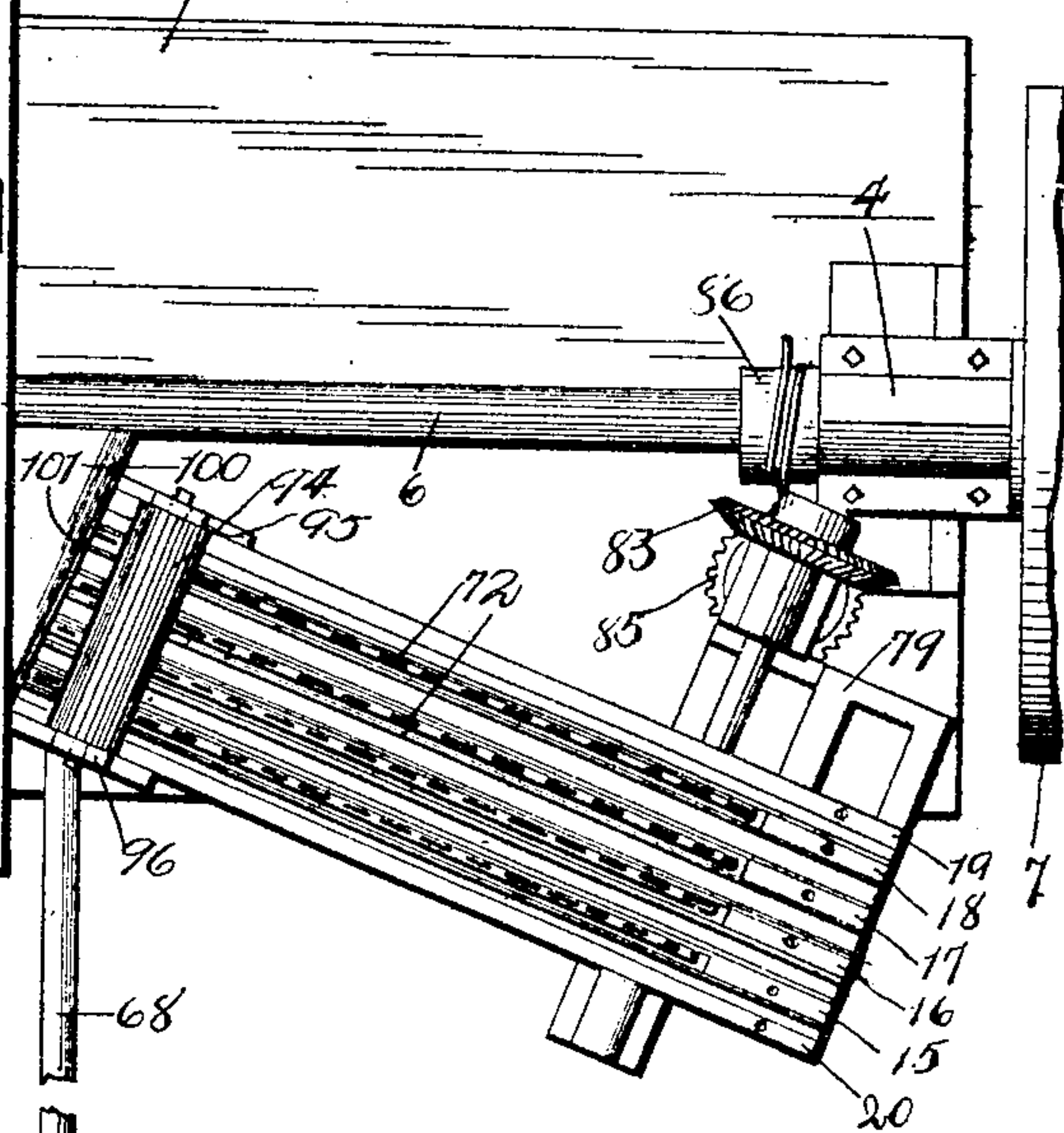
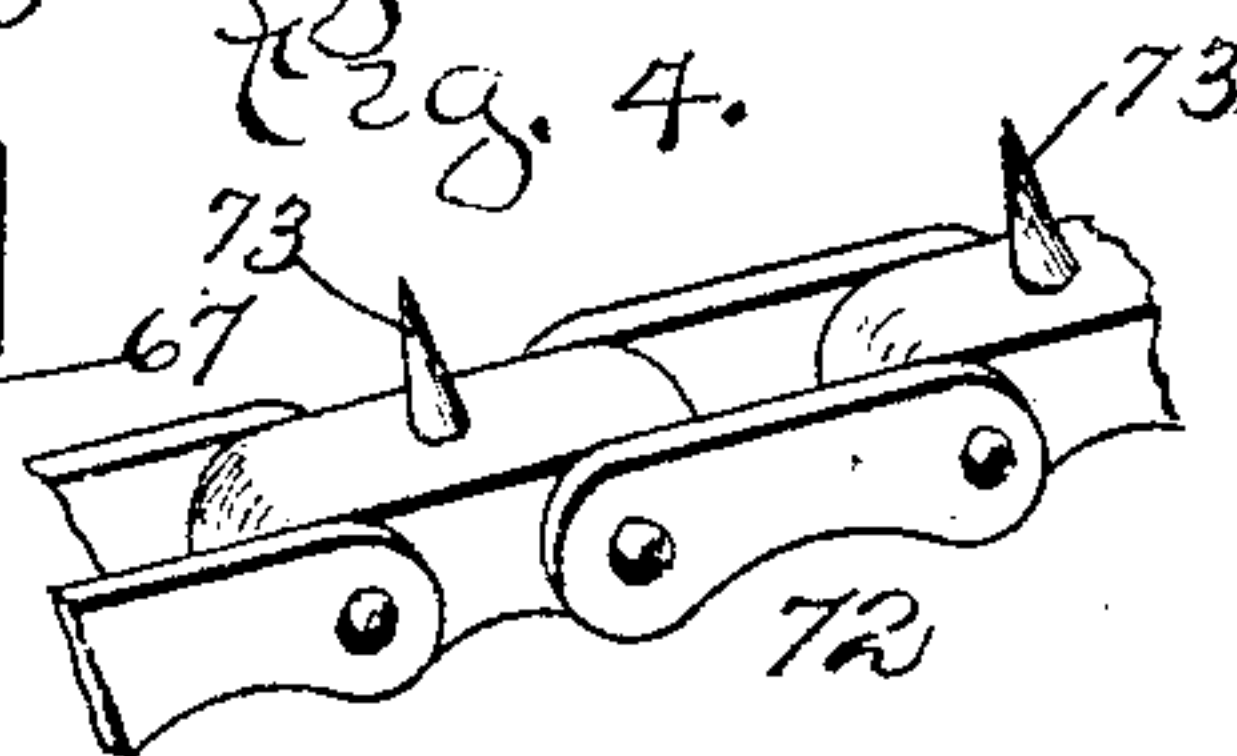


Fig. 4.



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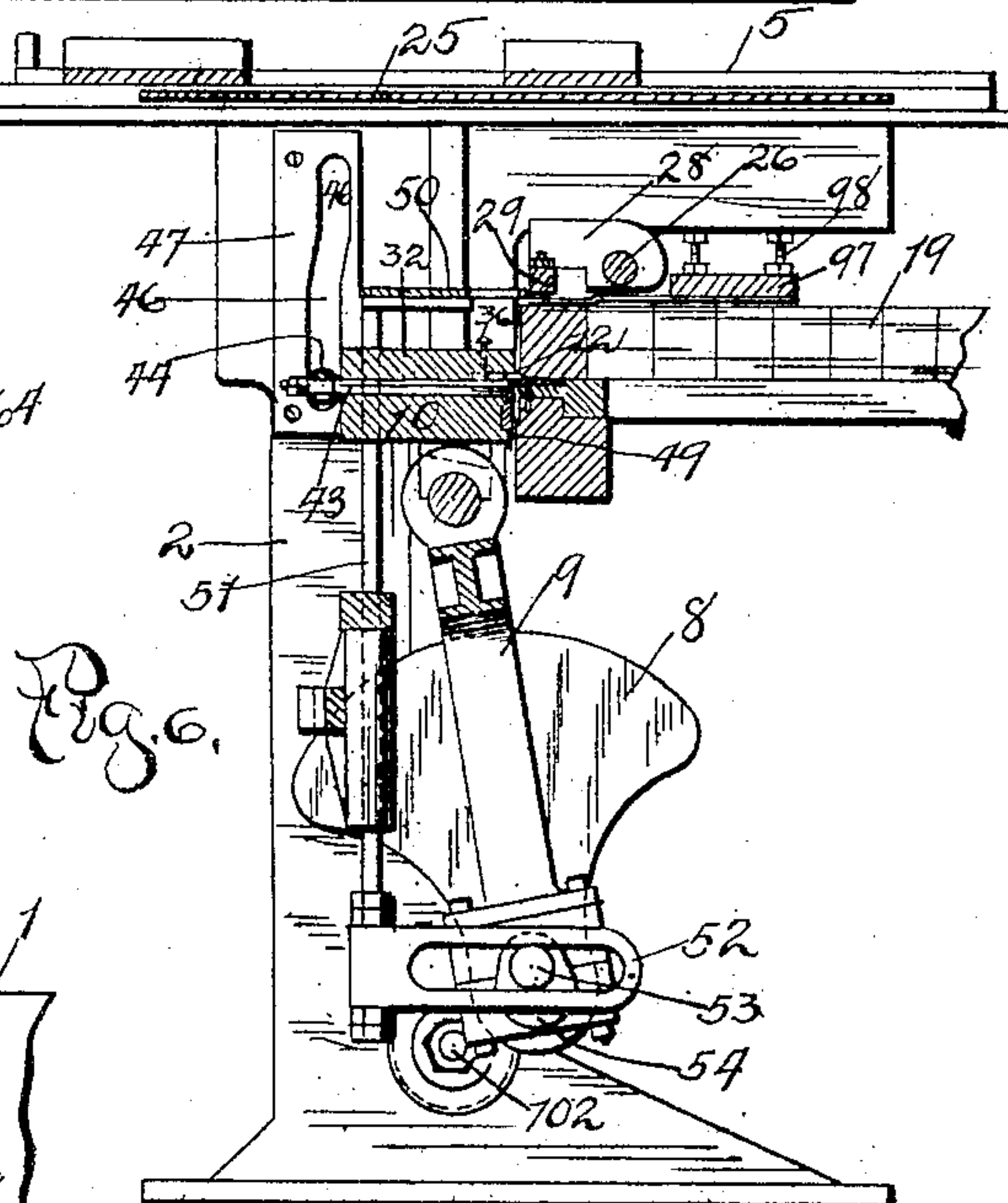
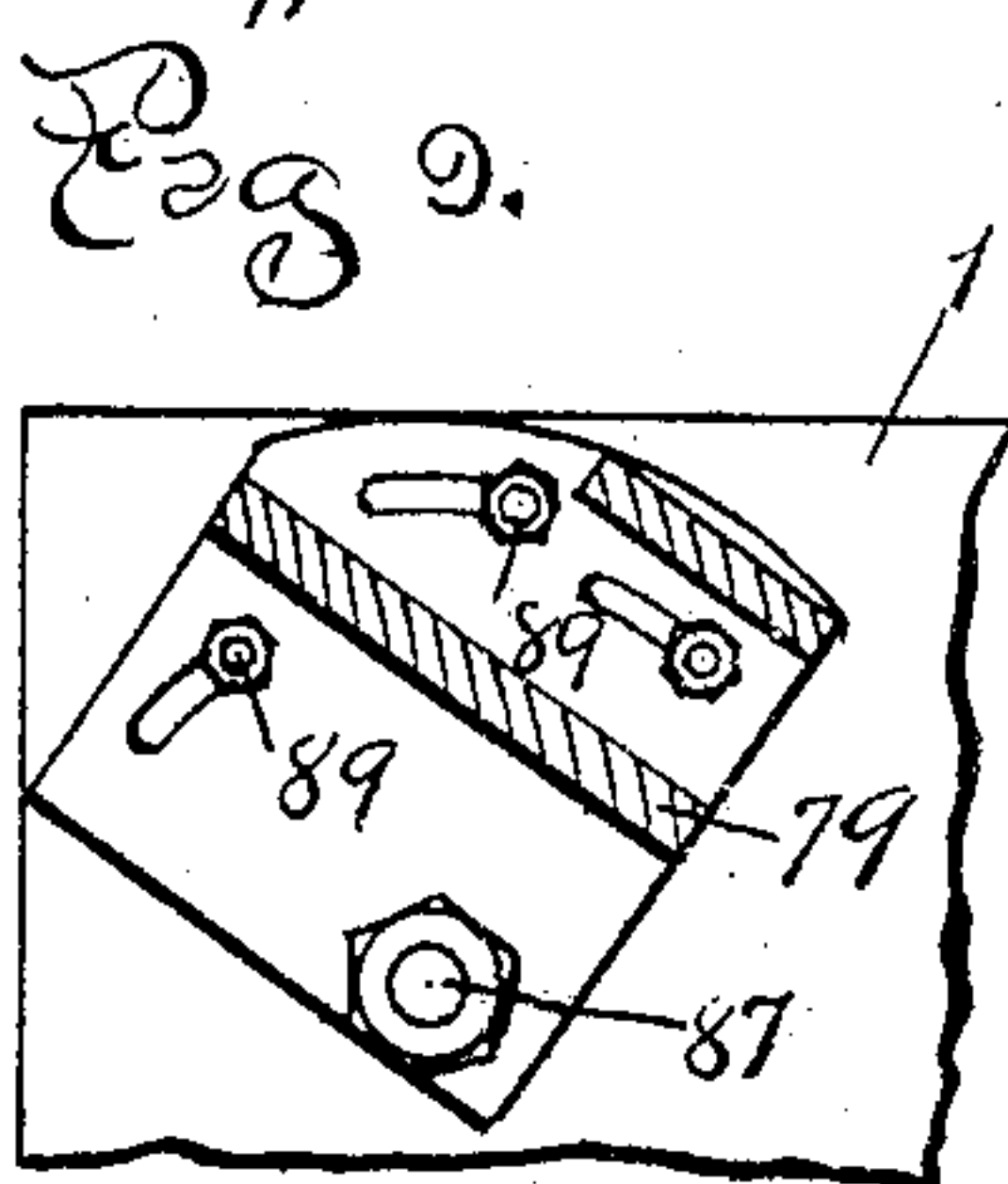
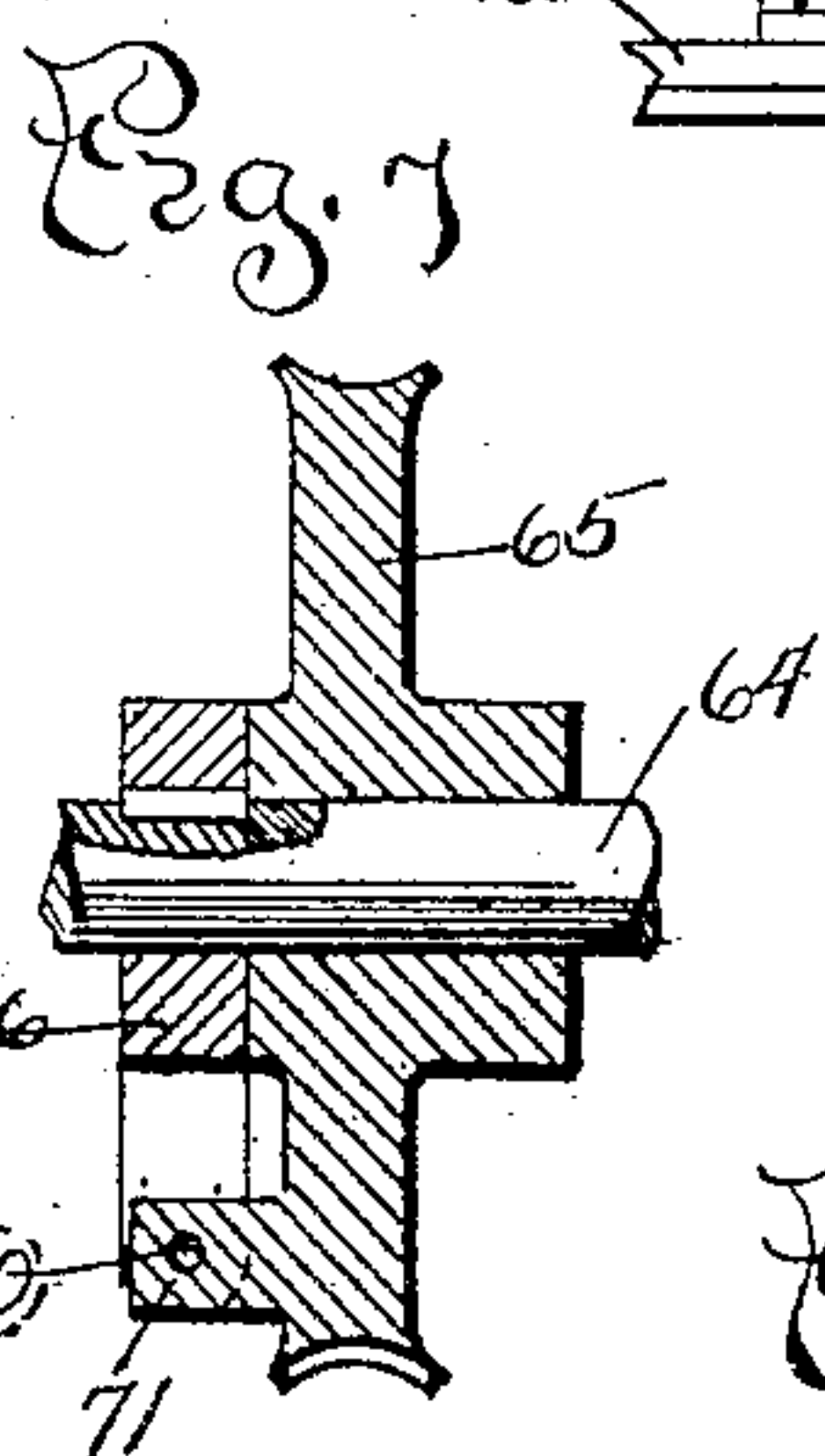
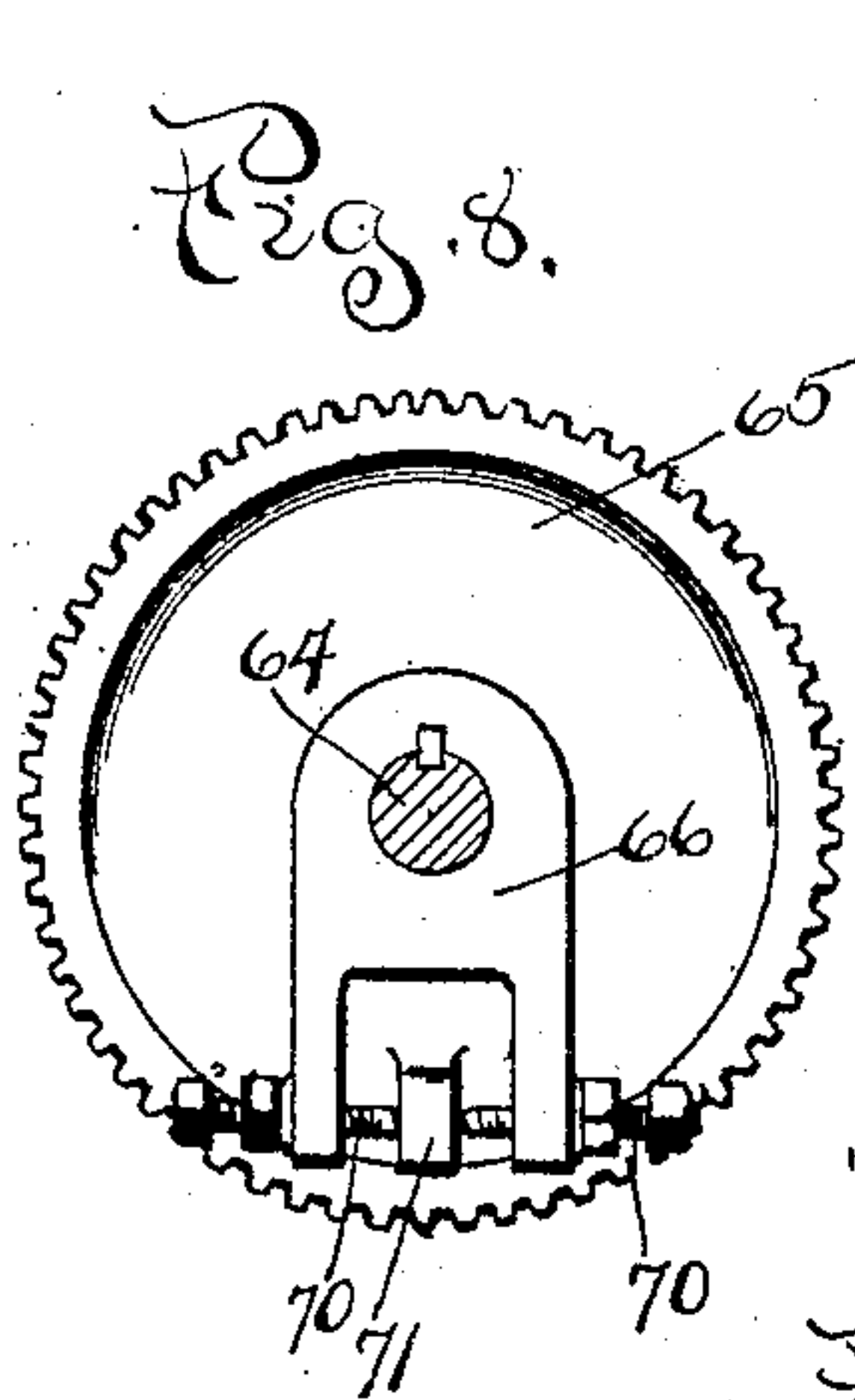
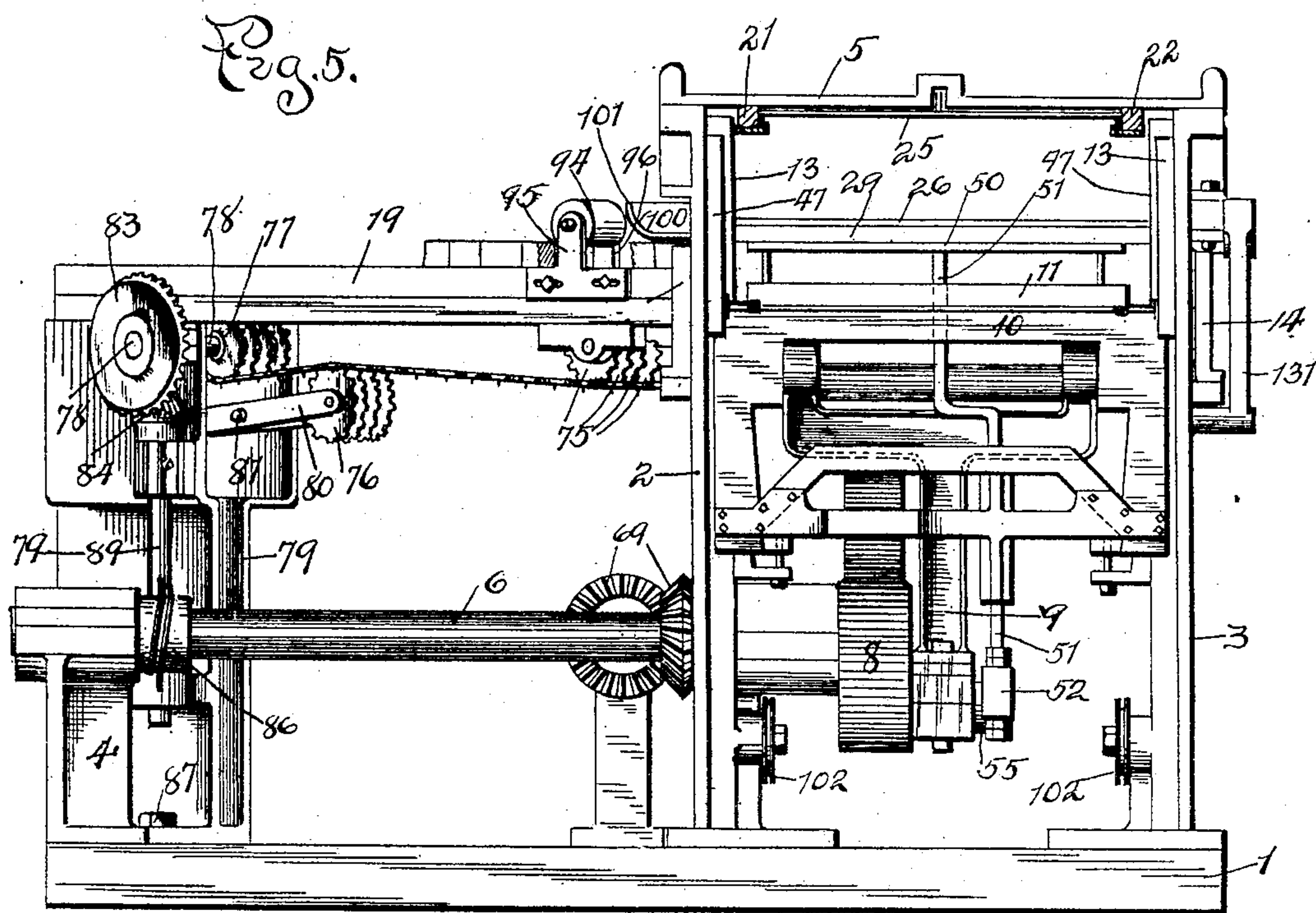
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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

Fig. 10.

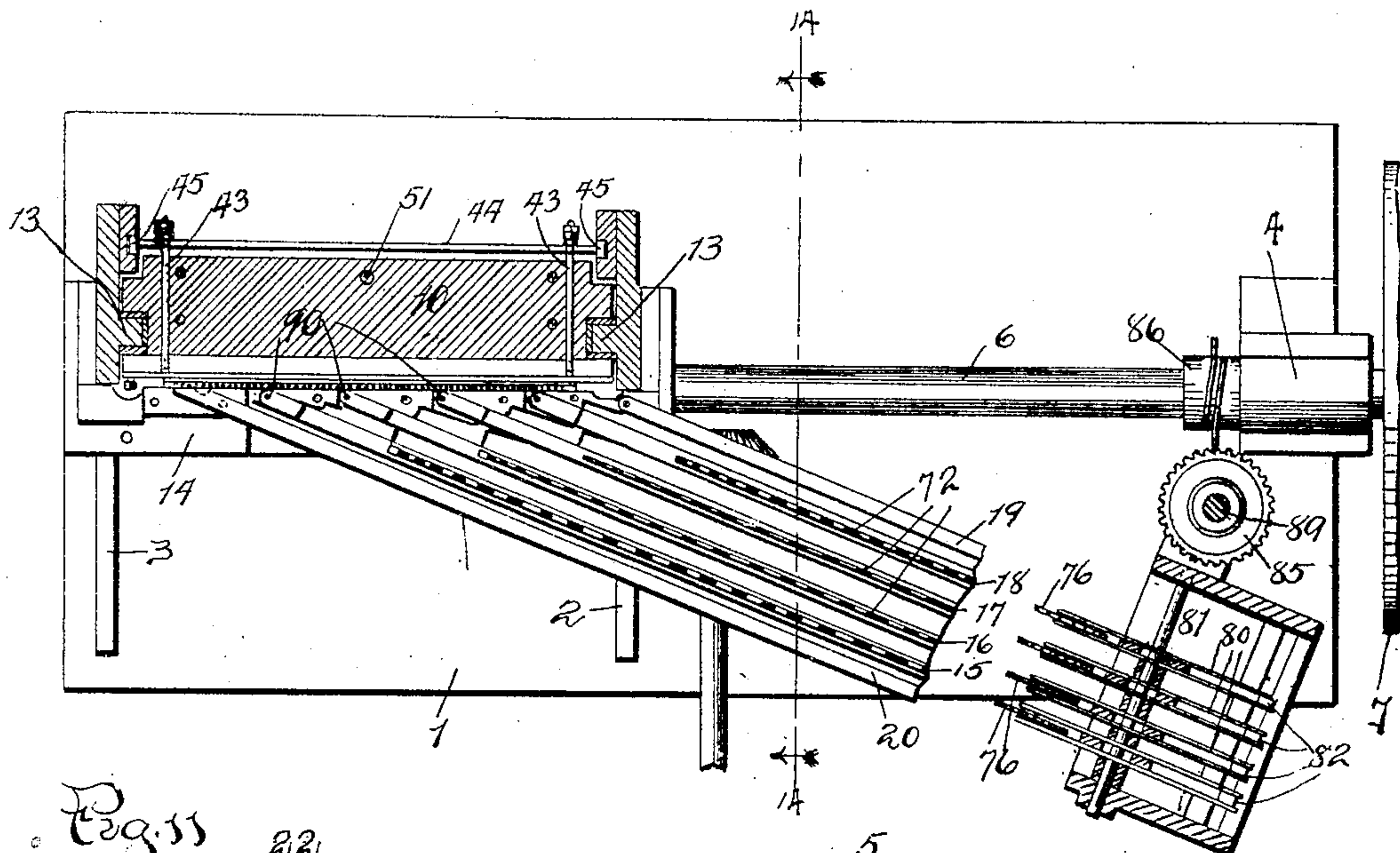


Fig. 11.

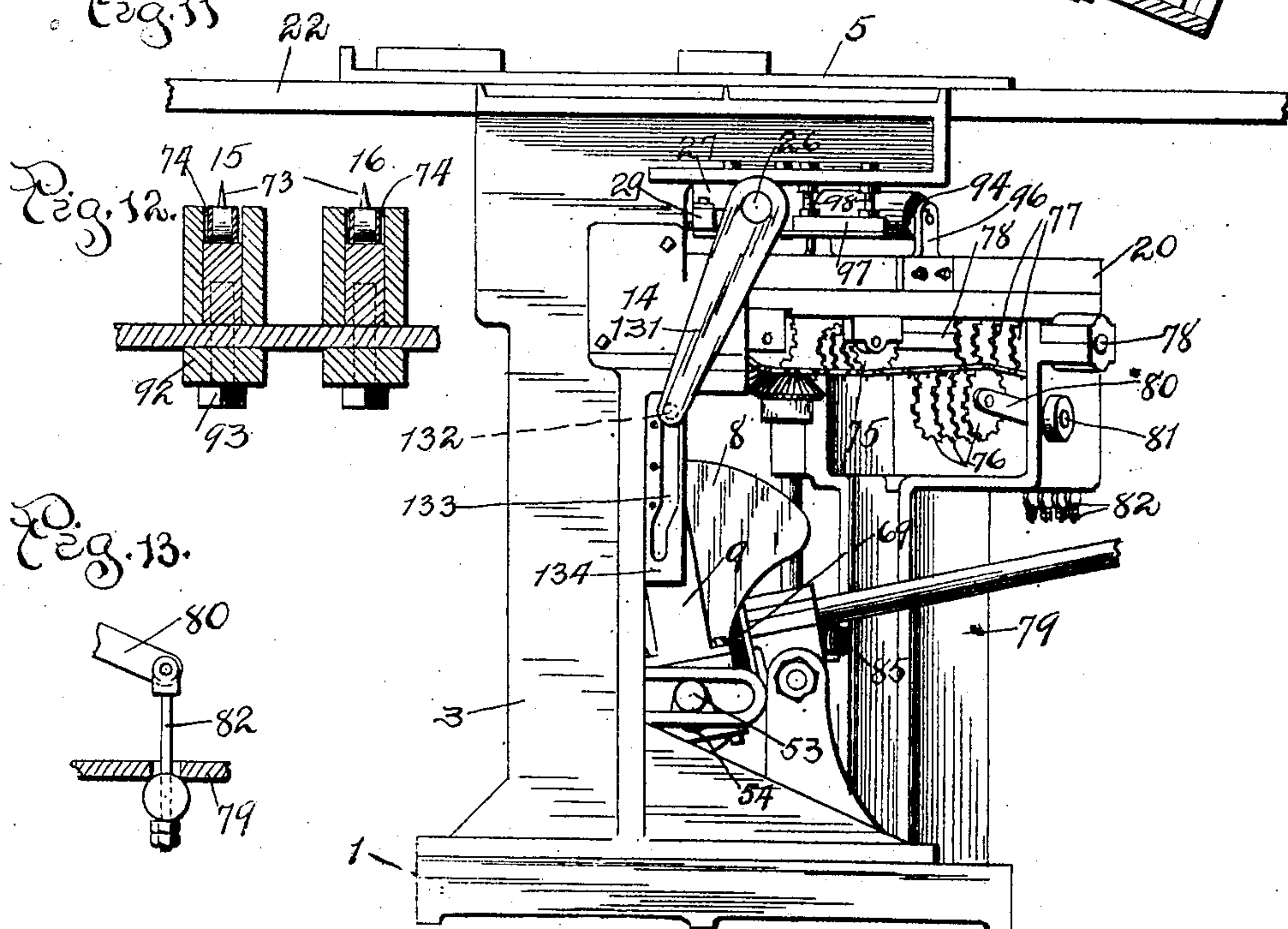


Fig. 12.

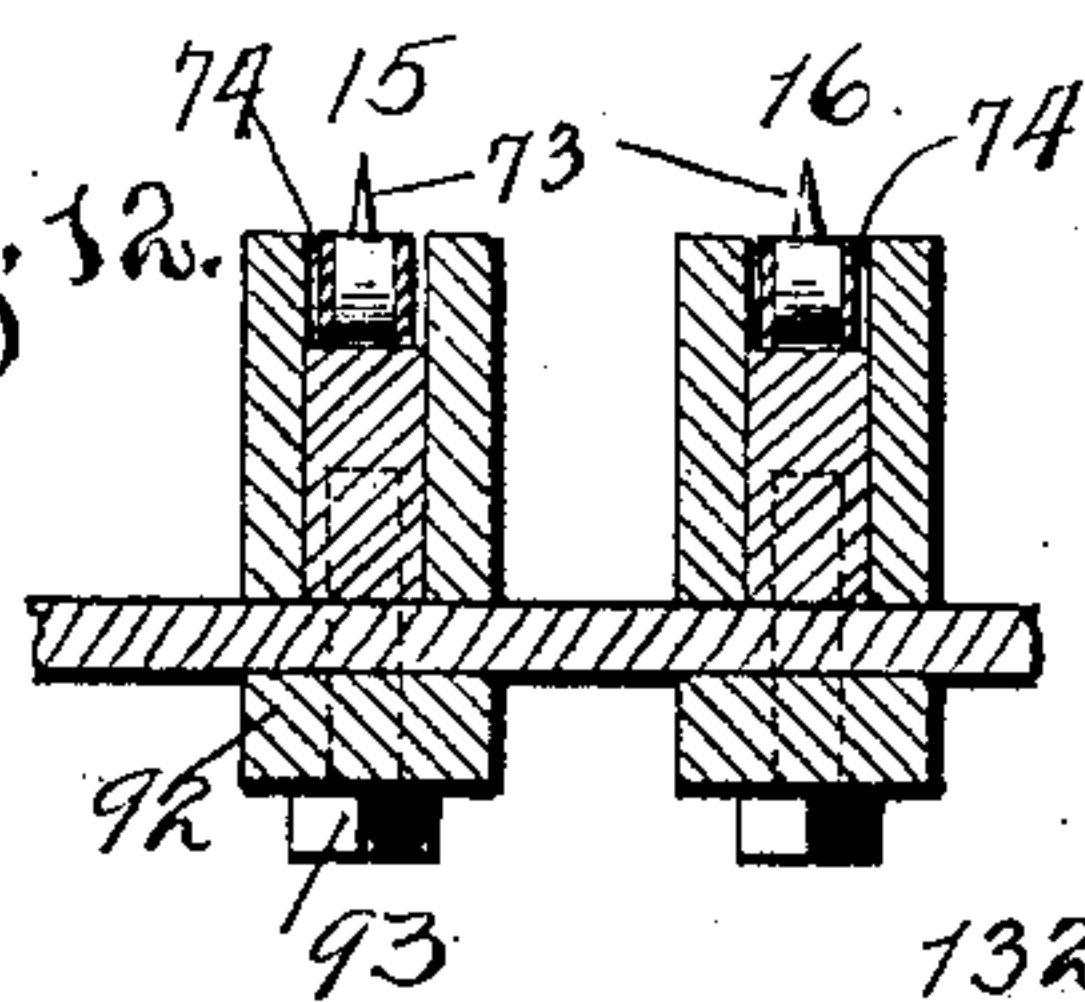
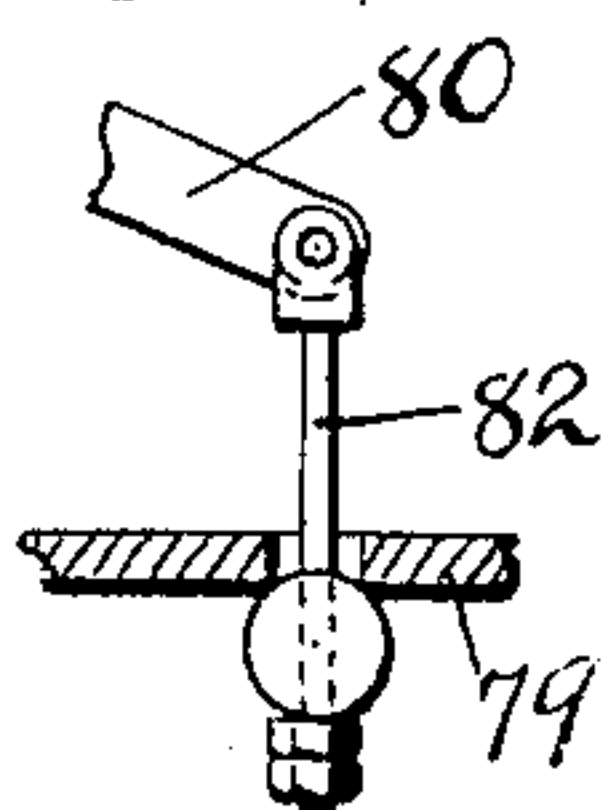


Fig. 13.



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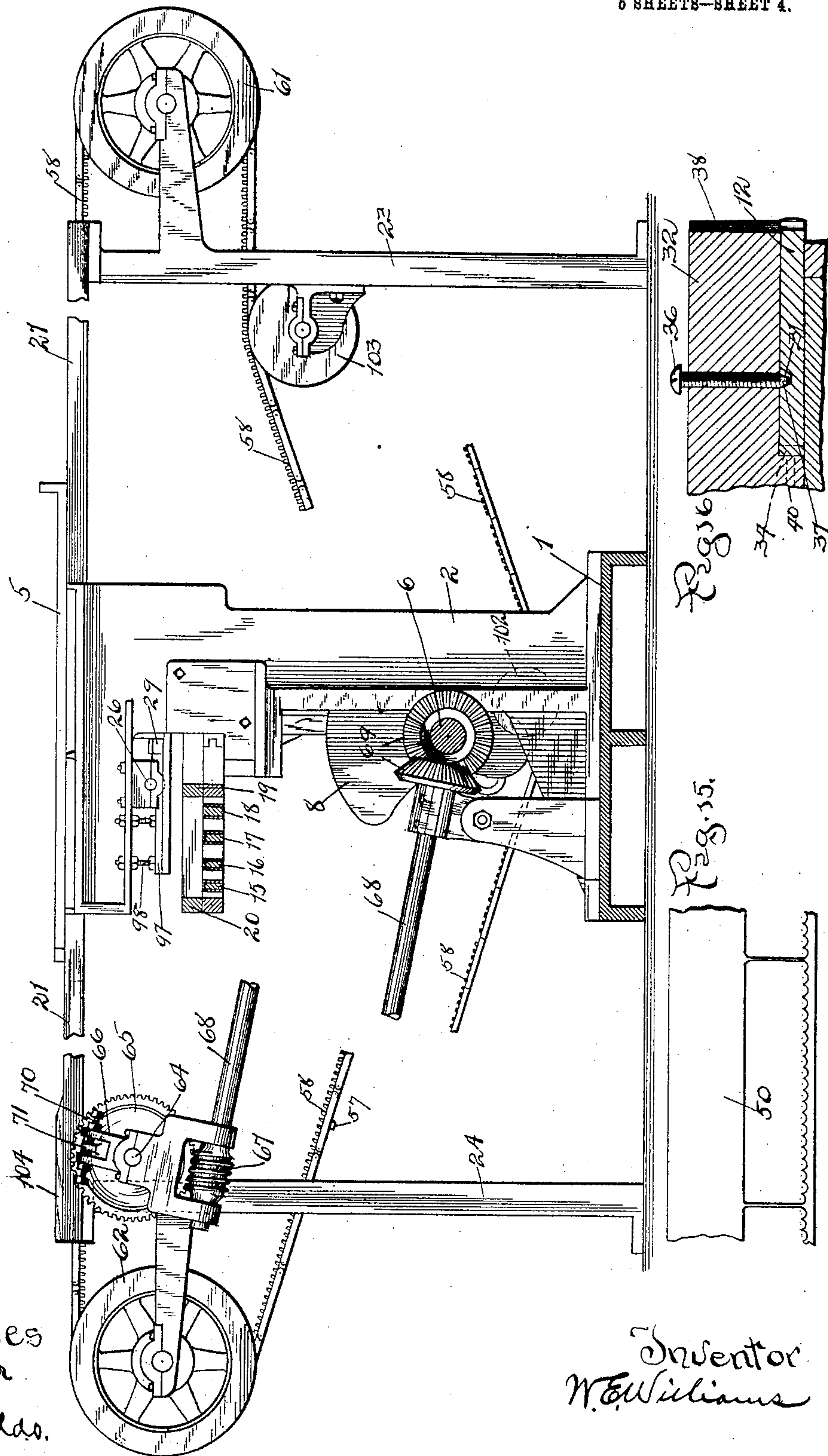
W. E. WILLIAMS.

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5 SHEETS—SHEET 4.

Fig. 14.



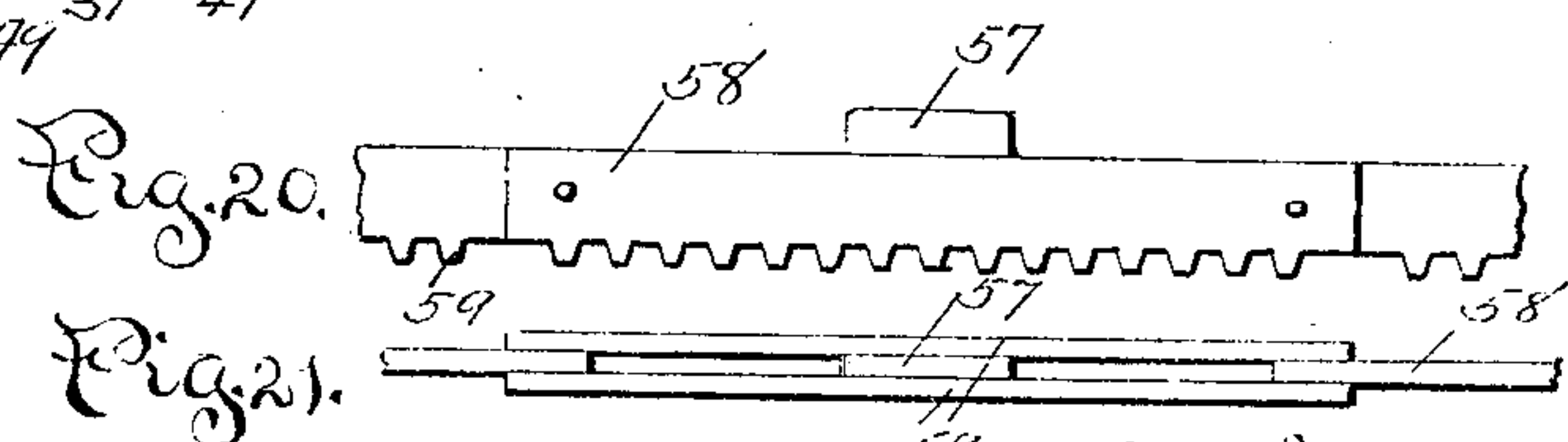
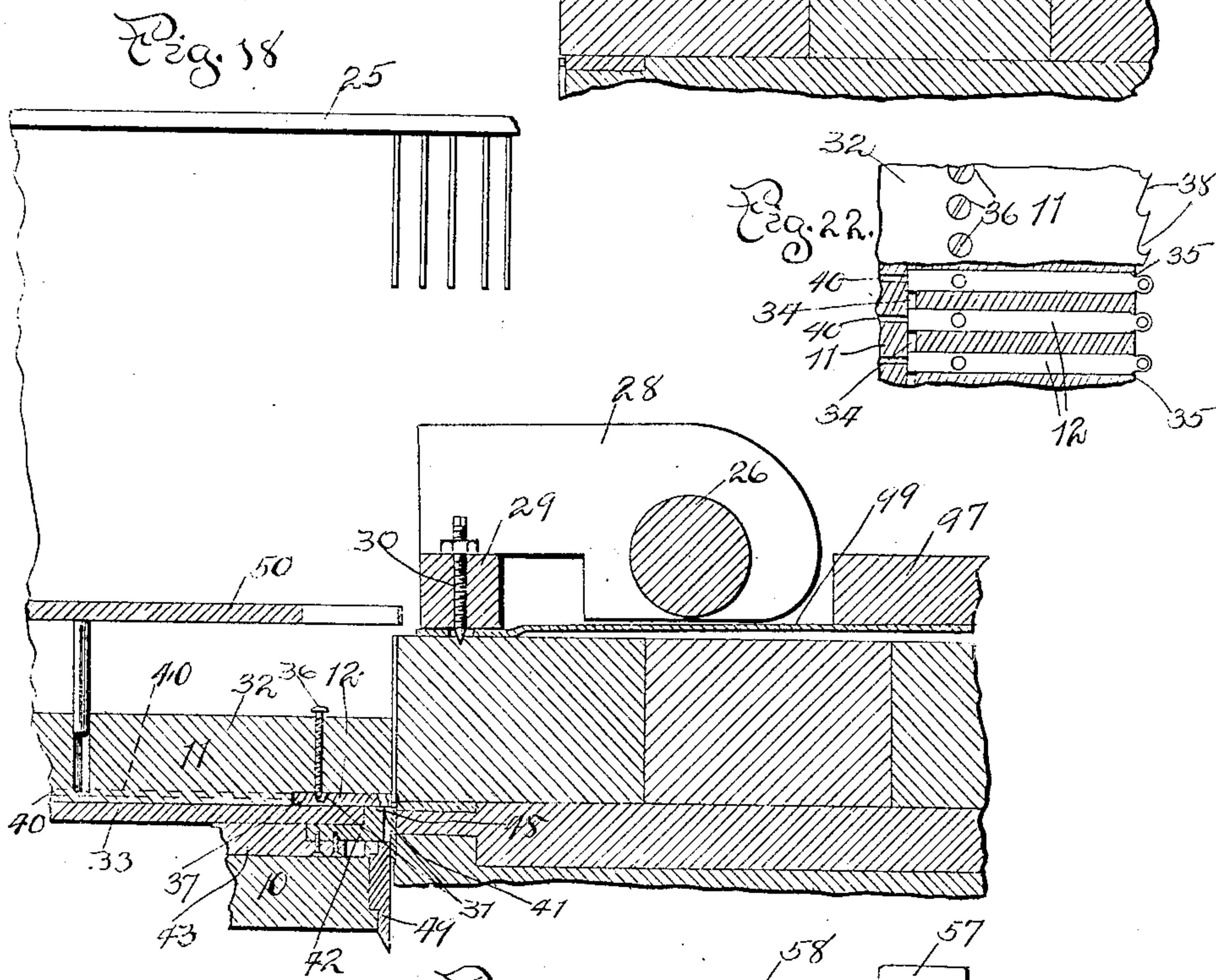
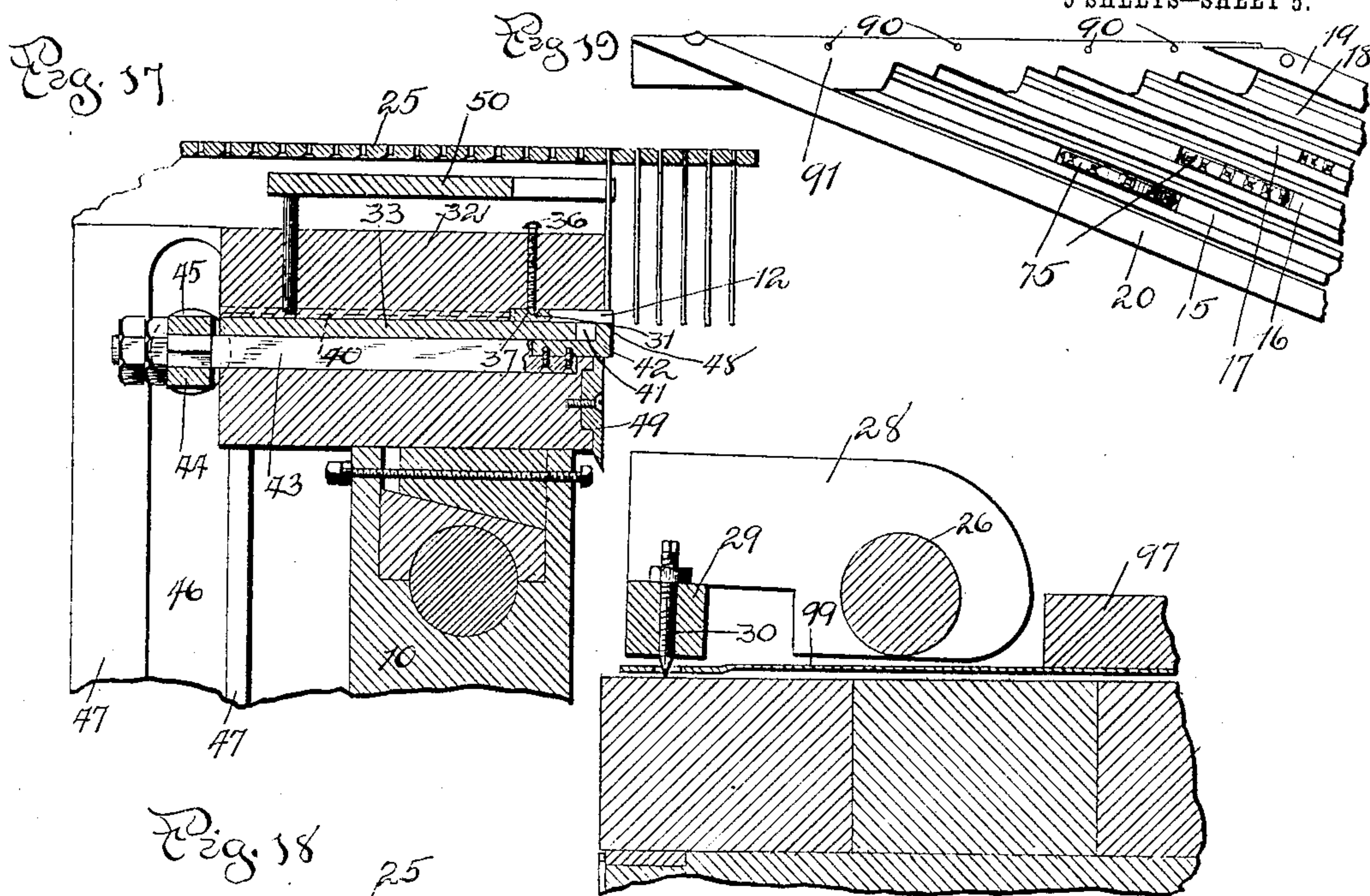
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APPLICATION FILED MAY 12, 1899.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

WILLIAM ERASTUS WILLIAMS, OF EVERGREEN PARK, ILLINOIS, ASSIGNOR,
BY MESNE ASSIGNMENTS, TO DIAMOND MATCH COMPANY, A CORPORATION OF ILLINOIS.

MACHINE FOR CUTTING AND STICKING MATCH-SPLINTS.

No. 803,649.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed May 12, 1899. Serial No. 716,543.

To all whom it may concern:

Be it known that I, WILLIAM ERASTUS WILLIAMS, a citizen of the United States of America, and a resident of Evergreen Park, county of Cook, State of Illinois, have invented certain new and useful Improvements in Machines for Cutting and Sticking Match-Splints, of which the following is a specification.

My invention relates to that class of machines wherein a block of wood is placed into the machine and the machine automatically cuts match-sticks and sticks them into metallic plates which hold them for dipping; and the object of my invention is to provide a machine having general merits, as will be more fully described herein; and the invention consists of the novel construction of the parts and devices and the combinations thereof, as will be more fully set forth herein.

Reference will be had to the accompanying drawings, in which—

Figure 1 is a plan view of the machine. Fig. 2 is a transverse detail sectional view across the driving mechanism of the chain that feeds the plates. Fig. 3 is a side detail showing the parts that are shown in Fig. 2. Fig. 4 is a perspective view of a portion of the chain which feeds the match-blocks. Fig. 5 is an end elevation of the machine. Fig. 6 is a vertical sectional elevation of a portion of the machine. Figs. 7 and 8 are details showing the adjustment for the gearing which drives the plate-feed chain. Fig. 9 is a plan sectional detail of the post which supports the outer end of the feed-trough. Fig. 10 is a plan sectional view taken through the cross-head. Fig. 11 is a side elevation of the machine. Fig. 12 is an end sectional detail of the bottom parts of the feed-trough. Fig. 13 is a detail showing the adjustment of the levers which carry the idlers that tighten the chains that feed the match-blocks. Fig. 14 is a cross-section of a portion of the feeding mechanism on line 14 14 of Fig. 10. Fig. 15 is a plan detail of the plate which supports the match-sticks at the instant of their sticking. Fig. 16 is a detail showing the fastening of the cutters into the cutter-heads. Fig. 17 is a vertical sectional elevation showing a portion of the cross-head at the sticking of the splints. Fig. 18 is a similar view to that of Fig. 17, showing the parts in position at the moment of the completion of the cutting

of the match-sticks. Fig. 19 is a plan detail showing the landing of the bars which form the feed-trough into the head-block into which they are fastened. Figs. 20 and 21 are details of the chain which feeds the plates through the machine. Fig. 22 is a plan detail showing the means for holding the cutters in the cutter-head.

In the drawings, 1 designates the bed-plate casting of the machine, from which there arises the side posts 2 and 3 and the box-stand 4. Joining the side posts 2 and 3 there is the top casting 5, mounted in a bearing in the post 2, and in the box-stand 4 there is the main shaft 6, which is driven by fly-wheel belt-pulley 7, to which the power is applied to the machine, and at the other end of the shaft 6 there is a crank-plate 8, connected by a pitman 9 to a cross-head 10, upon which is mounted the cutters that cut the matches. The crank-plate 8 has the form shown in the drawings to provide the customary counterbalance. Upon the top of the cross-head 10 there is fixed the cutter-head block 11, which carries the cutters 12. The cross-head 11 is mounted in suitable guideways 13 in the posts 2 and 3. Connecting the posts 2 and 3 there is a feed-trough head-block 14, which supports the inner end of the bars 15, 16, 17, 18, 19, and 20, which form the walls of the feed-trough for the match-blocks. To the under side of plate 5 there are fixed the plate-guideways 21 and 22, which are supported at their outer ends upon their end frames 23 and 24, which direct the passage of the match-plates 25 through the machine. In machines of this class the shape of the match-stick and the size of it is affected by the arrangement of the size of the cutters in relation to their distance apart and to the angle at which the match-blocks are fed to the line of the cutters and at the rate that the match-blocks are fed. When a machine is once made, the spacing between the cutters, and hence the spacing between the holes in the match-plate, are fixed and cannot be changed only as new cutter-heads and new plates are supplied to the machine, and it is desirable to be able to have a machine that may be readily adjusted to cut different sized and shaped sticks without the necessity of having to provide new cutter-heads and new plates. To bring about this result, I provide my feed-trough made in such a manner that the angle

that it presents the blocks to the line of the cutters may be adjusted to meet the requirements of the case, and then by a variation in the adjustment of the amount of feed of the blocks to each stroke of the cutter-head and the adjustment of the angle to the feed-trough I am able to produce almost any desired size and shape match-stick that can be made by a machine of this class.

In machines of this class the method of feeding the match-plates through the machine has been done by an intermittent movement, which provides for the plate going to rest at the period of time when the matches are being stuck into the plate. This period of rest is seriously objectionable, for there is quite a mass of iron in the plates, which must be started and stopped rapidly, making a jerky motion and causing severe vibration upon the parts which act upon them. To overcome these obstacles and to add greater efficiency to the machinery, I provide a continuous moving feed for the match-plates and provide means for accurately registering the holes in the plates to receive the match-sticks at the proper instant, when the cutter-head delivers them.

The cutters 12 are made of a short block of steel a little deeper than wide, in one end of which there is made the cutter, and the other end of the block is finished off squarely, and in the top side there is made a countersunk hole 31. The square end and the countersunk hole are made in all the cutters at an exact distance from the cutter on the end of the bar.

The cutter-head block 11 is made of the upper piece 32 and the lower member 33. Across the lower face of the block 32 there is shaped out a groove 34, Fig. 22, at an exact distance from the center line of the cutters as they are held in the block, and extended from the front face of the block 32 back to the groove 34 there are cut at proper distances apart the recesses or cavities 35, in which are held the cutters. Extending down from the top of the block 32 there are screws 36, which have conical points 37 and engage the countersunk cavities 31 in the top surface of the cutter. The distance from this conical hole 31 in the knife back to the square end of the knife is slightly greater than the distance from the center of the screw 36 back to the back side of the groove 34. Hence when the cutter is placed in its slot 35 in the block 32 and the screw 36 screwed down upon it the conical point 37 of the screw engages the back edge of the countersunk cavity 31 and forces the cutter back solidly against the back wall of the groove 34, and at the same time the cutter 12 is held down rigidly upon the plate 33. The plate 33 is secured firmly by screws to the block 32, and when they are finished they act as one plate and are made in parts only to permit the cavities 35 and the groove 34 to be cut to accurate dimen-

sions. In the forward edge of the block 32 there is a series of hooks or guideways 38, which serve to sustain the match-splint in an upright position. The block 32 and its lower member 33 are securely fastened to the cross-head 10 by means of screws passing down into the top member of the cross-head 10. In the rear of the cavities 35 in the block 32 there are cut some small grooves 40, which permit the entry of a small rod to force out the cutter 12 when desired after the screw 36 is released. Thus an old cutter may be taken out and a new one inserted with the least trouble or labor of any method of fastening known to me.

Underneath the plate 33 in a recess 41 in the cutter-head 10 there is placed the abutment-block or backer-bar 42, which is connected at each end by rods 43 passing back through grooves in the top face of the cross-head and connected to cross-rod 44, on which are carried cam-rollers 45, which are engaged by cam-track 46 in cam-blocks 47, fixed to the posts 2 and 3, and the shape of these cam-tracks 46 is such that the block 42 passes out underneath the cutters just after the cutters have lifted above the match-blocks in the feed-troughs, and the block 42 thus dams off the match-stick at the instant of the sticking of the stick into the plate 25. The block 42 is made with an upward-extending portion 48 to permit the main body of the block to pass under the plate 33 and yet permit the portion 48 to come closely in contact with the under edge of the cutters.

Beneath the block 42 and fixed to the cross-head there is a knife 49, which on the descent of the cross-head shaves off from the blocks held in the feed-trough all the surplus wood that projects beyond the normal cutting-line of the cutters.

Mounted above the block 32 there is a plate 50, which is connected by the rod 51 to a slotted block 52, working over a pin 53, carried by a block 54 upon the main wrist-pin 55 of the crank-plate 8. The position of the pin 53 with that of the wrist-pin 55 is such that the stroke of the block 52, and hence the plate 50, is considerably less than the stroke of the cross-head and the cutter-holding block 32, and the adjustment of the rod 51 is such that the position of the plate 50 in relation to the block 32 at the upward limit of the stroke of both members is as is shown in Fig. 17, while the lower position is as is shown in Fig. 18. Hence in Fig. 18, the position at the final severing of the splint by the cutter from the block, the plate 50 is in a position above and clear of the match-block held in the feed-trough; but as the cross-head arises carrying, in the cutters the severed match-splints, the plate 50 does not rise as rapidly, and hence the top ends of the match-sticks are entered into the cavities of the plate 50 before the match-stick has cleared the match-block from which it was

severed sufficiently to permit it to fall out of position to enter the holes in plate 50. By the time the cutter-head with the match-sticks has arisen to the position of sticking the sticks plate 50 has descended sufficiently in relation to the block 32 to permit the match-sticks to protrude sufficiently to properly enter the holes in the match-plate 25. Then on the descent of the cross-head the plate 50 pulls down off the ends of the match-sticks and serves to pull out or displace any broken or improperly-shaped sticks from the mass of sticks carried off by the match-plates, which is a desideratum.

It is to be understood, of course, that the upper ends of the sticks project sufficiently far above the plate 50 to permit sufficient spring or movement of such ends in the direction of movement of the continuously-traveling carrier-plate during the insertion of the sticks into the latter.

The match-plates 25 are provided with notches 56, Fig. 3, which are engaged by projections 57 of chains 58, which are provided with rack-teeth 59 on their lower edges, and the chains 58 run in grooves 60 in the bars 21 and 22, and they pass over wheels 61 and 62, mounted in bearings in the end frames 23 and 24. The chains 58, and hence the plates 25, are driven by the gear-wheels 63, mounted upon a shaft 64, driven by a worm-wheel 65, engaged by a worm 67 on the shaft 68, driven by a set of miter-gears 69 from the main shaft 6 of the machine, and hence the chain travels continuously at a uniform rate of speed; but the gearing is so proportioned that for each stroke of the cross-head the match-plates travel one spacing of holes forward. The worm-wheel 65 is not fixed to the shaft 64; but upon shaft 64, adjacent to wheel 65, there is fixed a block 66, which is provided with the screws 70, engaging a projection 71 of wheel 65, and hence by the adjustment of screws 70 the position of the worm-wheel 65 may be moved slightly in either direction, and as it moves it varies the position of the chain and the plates connected thereto in relation to the position of the cross-head as controlled by the crank fixed to the main shaft. Hence an exactness of the adjustment of the position of the holes in the plates as carried by the chain 58 may be had over the center line of the cutters at the instant that the cutter-head is at the upward limit of its stroke in the function of sticking the matches.

The stroke of the cutter-head is so great as compared with the little distance of travel from hole to hole of the match-plate that the amount of travel of the match-plate which takes place during the time that the cutter-head carrying the match-sticks travels forward the short distance which is required to stick the matches is so small that it does not affect the sticking of the splints, the upper ends of the latter springing or moving suffi-

ciently in the direction of motion of the match-plate, as above mentioned. These proportions of course must be considered in the designing of the machine to produce the desired result, for if the stroke of the cross-head were sufficiently short and the travel from hole to hole of the match-plate sufficiently great this variation might prevent the practical operation of the machine; but with the machine designed, as I have discovered, a continuous movement of the plates may be secured without injury to the efficiency in the sticking of the match-sticks.

To feed the match-blocks, I provide chains 72, in the top surface of which there are fixed sharp pins 73, which engage the match-blocks and carry them along. The chains 72 run in grooves 74 in the bottom bars 15, 16, 17, and 18 of the feed-trough. They pass over sprockets 75, journaled in the forward end of the bars, and then down and return under the bars and pass over the tightener-sprockets 76 and over the driving-sprockets 77 back up into the grooves 74 of the bars. The sprockets 77 are mounted by feathers upon a shaft 78, mounted in a stand 79, which is adjustably fixed to the bed-plate 1, and the idle sprockets 76 are mounted in bars 80, which are pivoted on the rod 81 in stand 79 and are adjusted upward in tightening the chains by means of some screw-threaded links 82, passing through a slot in a flange of the stand 79. Shaft 78 is driven by a beveled gear 83, driven by a pinion 84 on a shaft 89, journaled in stand 79 and carrying a worm-wheel 85, engaged by a worm 86 or main shaft 6 of the machine.

The worm 86 is so constructed that it drives the wheel 85 during a portion only of its revolution and then holds the wheel 85 at rest during the balance of its revolution. This is accomplished by the thread being straight on the part of its circumference where it is desired that the wheel should rest and is inclined on that part of the circumference which acts to move the wheel 85. Thus the movement of the worm-wheel 85 is positive at all times, and there is no opportunity for a backlash or lost motion, which is the case where a ratchet-and-pawl movement is used.

The stand 79 is fixed onto the bed-plate 1 by means of a pivot or screw 87, (see Fig. 9,) which is directly under the center of the shaft 89, and also by some screws 88, passing through slotted holes in the stand 79 and threaded into the bed-plate 1. By this arrangement the stand 79 may be swung about on the bed-plate upon the screw 87 as an axis and not disturb the adjustment of the worm-wheel and worm 85 and 86.

The feed-trough bars 15, 16, 17, and 18 are pivoted at 90 into the feed-trough head-block 14. The top of this block 14 is made in a peculiar manner, as will be noticed by Fig. 10. The offsets therein are provided to permit

the pivoting of the feed-trough bars and at the same time to furnish a shoulder underneath the bars to receive the solid thrust of the match-blocks when the sticks are cut, and covering the ends of the bars over the pivots 90 there is a plate 91. (Shown on a larger scale in Fig. 19.) Bars 15, 16, 17, and 18, 19, and 20 are supported at their other ends by the stand 79 and are adjustably held thereon by means of clamping-plates 92 and screws 93.

The side walls of the feed-trough are made by the bars 19 and 20, which project up higher than bars 15, 16, 17, and 18, and they are pivoted on the feed-trough head-block at a plane higher up than are the bars 15, 16, 17, and 18. They are also fastened to the stand 79 by means of clamping plates and screws in a similar manner to the bars 15, 16, 17, and 18. The distance between the bars 15, 16, 17, and 18 is such that the sides of the bars touch each other when the angle of the feed-trough is at the position of adjustment giving the least angle with the line of the cutters in the cutter-head, and in the position of the greatest adjustment the distance between the bars is not so great as to be objectionable with the width of lumber ordinarily required for match-blocks. Thus by the adjustment of the stand 79 about the center line of the shaft 89 as a pivot and by springing the bars 15, 16, 17, and 18 about their pivots 90 in the feed-trough head-block 14 the angle of the feed-trough may be adjusted to any angle within the limits of the dimensions of the parts, and the chains 72 may be made tight at any position by adjusting the tightener sprockets or rollers 76. The match-blocks are placed in the feed-trough by the operator and lightly pressed down upon the pins of the chain, and as the chain carries the blocks forward they pass underneath a roll 94, mounted upon brackets 95 and 96 upon the side bars 19 and 20 of the feed-trough, and as the blocks pass underneath this roll they are forced down home upon the pins and in contact with the top surface or side bars of the bars 15, 16, 17, and 18.

Fixed across the inner end of the feed-trough and supported from the frame there is a bar 97, fixed to the frame by the studs 98 and supporting on its lower face a series of spring-plates 99. These plates are narrow, which permits of independent action of each plate upon the different portions of the blocks as they enter to the cutters; but one of the plates 100 is located near the roller 94 and is curved at its edge, as is shown by 101, to guide the match-blocks underneath it as they come from the roll 94. The purpose of the plates 99 is to produce a gentle spring-pressure to hold the blocks downward at all times as they approach the cutters.

Mounted across the top of the trough and right adjacent to the line upon which the cut-

ters act upon the blocks there is supported a bar 29, carried by arms 27 and 28, fixed upon a shaft 26, carried in suitable bearings in the frame-pieces 2 and 3, and this shaft 26 and bar 29 are oscillated by the arm 131, carrying the roller 132, engaged by a cam-slot 133 in a plate 134, fixed to the cross-head 10 and vibrated therewith, and fixed in the bar 29 there is a series of wedge-pointed screws 30, which project through the bar and engage the top of the match-blocks in the feed-trough at the period of time that the cutters act upon the block, and this engagement is produced by the cam-slot and the lever just mentioned. Thus the blocks are held very firmly during the time that the cutters act upon them.

The chains 58 on passing the wheel 61 pass down and underneath the sheave-wheels 102, journaled on frame-pieces 2 and 3, thence up and over the tightener-rollers 103, adjustably secured by screws to the frame-piece 23, and thence the chain passing to and around the sheave 62 up to the guideways 21 and 22. Thus the chains 58 may be kept taut, taking out all of the slack of the joints, which is necessary to produce an exact registration of all the holes of the match-plates that the chain carries through the machine.

The gear-wheels 63 engage the chains 58 tangentially only, and hence unless prevented the chains might under strain lift up out of engagement with the gears. To prevent this, I provide some blocks 104, which are fastened to the bars 21 and 22 and press down upon the top surface of the chains 58 and hold them into engagement with the gear-wheels 63. A slot 105 is provided in the blocks 104 to allow the free passage of the projections 57 of the chain.

Blocks 104 are tapered at one end, as shown by 106, and this tapered projection extends outside the main body of the chain and below the line upon which the plates ride, as shown by Fig. 3. The purpose of this inclined projection 106 is to strip or lift up the plates off from this projection 56 of the chain when the plates have arrived at a point over the gears 63, for if this incline were not provided or other means in its place provided the match-plates when they arrived at the blocks 104 might clog and cause a stripping of the rack or gear teeth.

What I claim is—

1. In a match-machine, the combination with means for cutting a row of match-splints, of means for feeding material from which the match-splints are to be cut to said means for cutting match-splints, and means permitting the varying of the angle at which such feeding takes place, substantially as and for the purpose described.

2. In a match-machine, the combination with a cutter for cutting a row of match-splints, of a trough through which blocks may be fed to such cutter, and means permitting

varying of the angle at which such feeding takes place, substantially as and for the purpose described.

3. In combination with splint-cutting mechanism, a feed-table over which the material for the splints is fed to the cutting mechanism, that is movable to change the angle of the line of feed of the splint material with reference to the cutting mechanism, and a guideway for the splint material whose width is adjustable.

4. In a match-machine, the combination with a cutter for cutting a row of match-splints, of a feed-trough therefor, such feed-trough having sides that are pivoted, substantially as and for the purpose described.

5. In a match-machine, the combination with a cutter, of a feed-trough therefor, comprising a plate adjacent such cutter, and bars forming sides for the feed-trough, said bars being pivoted to such plate, substantially as and for the purpose described.

6. In a match-machine, the combination with a cutter, of a feed-trough therefor, comprising a plate adjacent such head, and bars forming the sides and bottom of said trough, such bars being pivoted to said plate, substantially as and for the purpose described.

7. In a match-machine, the combination with a cutter, a feed-trough, and a feed mechanism therefor, both the feed-trough and the feed mechanism being adjustable to vary their angles to the cutter-head, substantially as and for the purpose described.

8. In a match-machine, the combination with a cutter, of a feed-trough therefor, comprising a plate adjacent such cutter, bars forming the sides and bottom of said trough, such bars being pivoted to said plate, and separate means for feeding carried by two or more of said bars, substantially as and for the purpose described.

9. In a match-machine, the combination with a cutter, of a feed-trough therefor, comprising angularly-adjustable bars forming the bottom of such trough, and feed-chains movable in grooves in the tops of said bars, substantially as and for the purpose described.

10. In a match-machine, the combination with a cutter, of a feed-trough, comprising a plate, and a series of adjustable bars pivoted to such plate, a series of feed-chains mounted to travel on said bars, and a driving-shaft for such feed-chains and adjustable to correspond to the adjustments of said bars, substantially as and for the purpose described.

11. In a match-machine, the combination with a cutter, of a feed-trough therefor comprising a stationary plate adjacent such cutter, and bars forming the sides and bottom of said trough, such bars being pivoted to said plate, feed-chains carried by such bars, a shaft extending transversely of such bars, and drive-wheels for said feed-chains, such drive-wheels being movable along said shaft, such shaft being adjustable around an axis that is

perpendicular to said trough, substantially as and for the purpose described.

12. In a match-machine, the combination with a cutter, of a feed-trough therefor, comprising a stationary plate adjacent such cutter, and bars forming the sides and bottom of said trough, such bars being pivoted to said plate, feed-chains carried by such bars, a shaft extending transversely of such bars, and drive-wheels for said feed-chains, such drive-wheels being movable along said shaft, such shaft being adjustable around an axis that is perpendicular to said trough, and separate means for adjusting the tension of each of such chains, substantially as and for the purpose described.

13. In a match-machine, the combination with a cutter-head, of cutters mounted in recesses in the lower side of such head, a plate covering said cutters and recesses, a backer, movable on the lower side of such plate, said backer having an upwardly-extending shoulder to engage the lower sides of such cutters, and a support for the lower side of said backer, substantially as and for the purpose described.

14. In a match-machine, the combination with a cutter-head, adapted to cut splints, of a guide for the rearward side of the splints, and means for reciprocating such guide longitudinally of the splints and independently of said cutter-head, substantially as and for the purpose described.

15. In a match-machine, the combination with a cutter-head, adapted to cut splints, of a laterally-immovable guide for the splints, such guide being adapted to support the splints on the side opposite to the cutter-head, and means for causing said guide to move with the splints, substantially as and for the purpose described.

16. In a match-machine, the combination with a cutter-head adapted to cut splints, of a laterally-immovable guide for the splints, such guide being adapted to support the splints on the side opposite to the cutter-head, and means for reciprocating said guide longitudinally of the splints and independently of the cutter-head, substantially as and for the purpose described.

17. In a match-machine, the combination with a cutter-head adapted to cut splints, such head being provided with a guideway above the cutters for guiding the splints on the side toward such head, of a laterally-immovable guide for the opposite side of the splints, and means for causing said guide to move with the splints, substantially as and for the purpose described.

18. In a match-machine, the combination with a cutter-head adapted to cut splints, such head being provided with a guideway above the cutters for guiding the splints on the side toward such head, of a laterally-immovable guide for the opposite side of the splints, and means for reciprocating said last-mentioned

guide independently of such cutter-head, substantially as and for the purpose described.

19. In a match-machine, the combination with a cutter-head adapted to cut splints, such
5 head being provided with a guideway above the cutters for guiding the splints on the side toward such head, of a laterally-immovable guide for the opposite side of the splints, and means for reciprocating said last-mentioned
10 guide independently of such cutter-head, through a distance less than the reciprocation of said cutter-head, substantially as and for the purpose described.

20. In a match-machine, the combination
15 with a cutter-head adapted to cut splints, such head being provided with a guideway above the cutters for guiding the splints on the side toward such head, of a laterally-immovable guide for the opposite side of the splints, and
20 means for reciprocating said last-mentioned guide independently of such cutter-head, through a distance less than the reciprocation of said cutter-head, and so timed that such guide engages the splints before they are en-
25 tirely lifted above the block from which they are cut, substantially as and for the purpose described.

21. In a match-machine, the combination of

a continuously-moving splint-carrier, and splint cutting and inserting means having a
30 movement only to and from the carrier, said cutting and inserting means including a row of cutters within which one end of a row of splints cut thereby, is held during the inser-
35 tion of the opposite end of the row in the traveling carrier, such latter end during its insertion moving with and in the same direc-
tion as the carrier.

22. In a match-machine, the combination of a continuously-moving carrier for splints hav-
40 ing rows of rigid-walled splint-receiving holes, and splint cutting and inserting means moving in a direction only toward and from the carrier, said cutting and inserting means
45 including a row of cutters within which one end of a row of splints cut thereby, is held during the insertion of the opposite end of the row in the traveling carrier, such latter end
50 during its insertion moving with and in the same direction as the carrier.

Signed by me at Chicago this 8th day of May, 1899.

WILLIAM ERASTUS WILLIAMS.

Witnesses:

GRACE E. FERN,
GEO. E. WALDO.