

No. 827,364.

PATENTED JULY 31, 1906.

J. HARRIS.  
FENCE MAKING MACHINE.

APPLICATION FILED OCT. 15, 1904.

3 SHEETS—SHEET 1.

Fig. 1

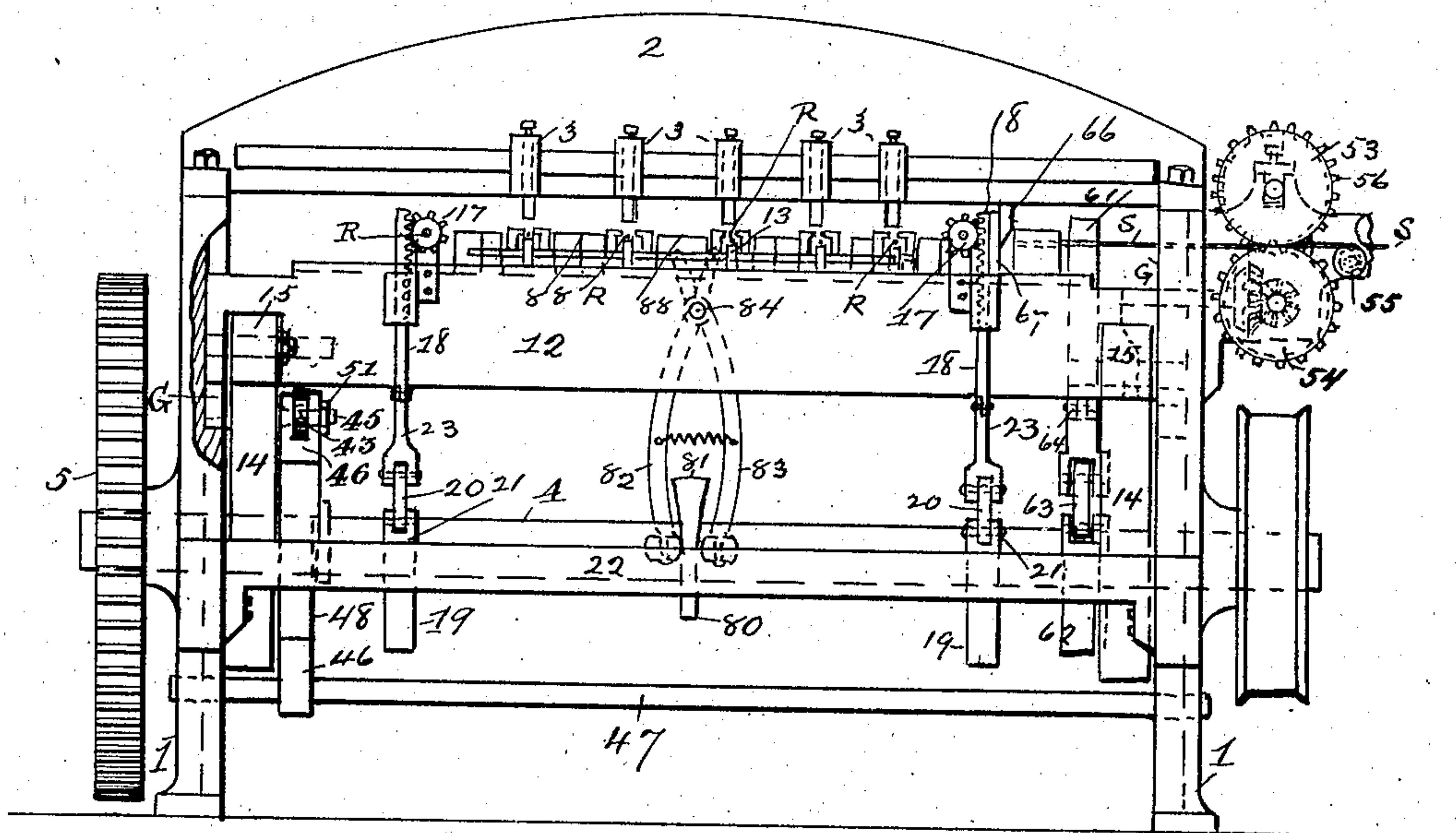


Fig. 4.

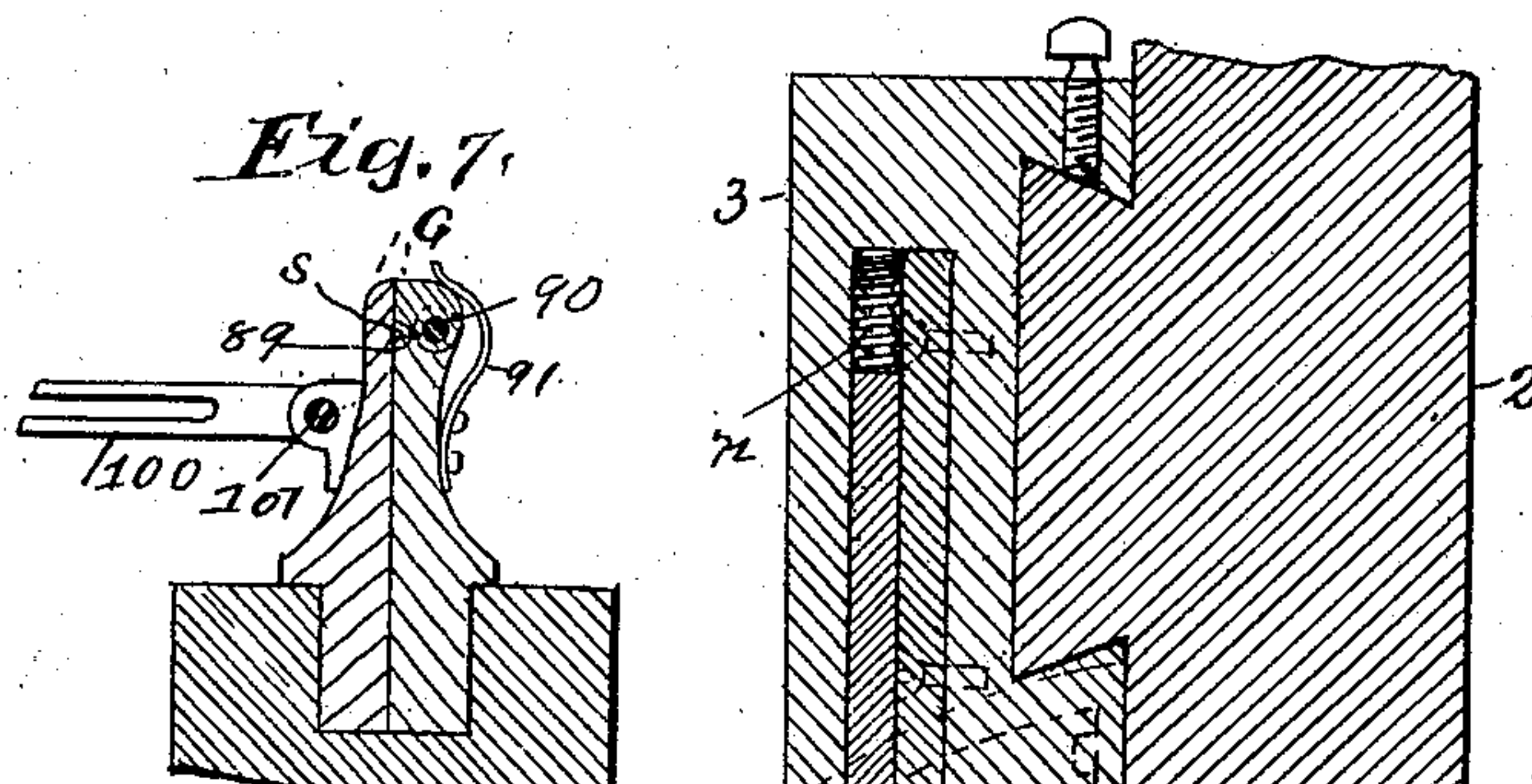


Fig. 7.

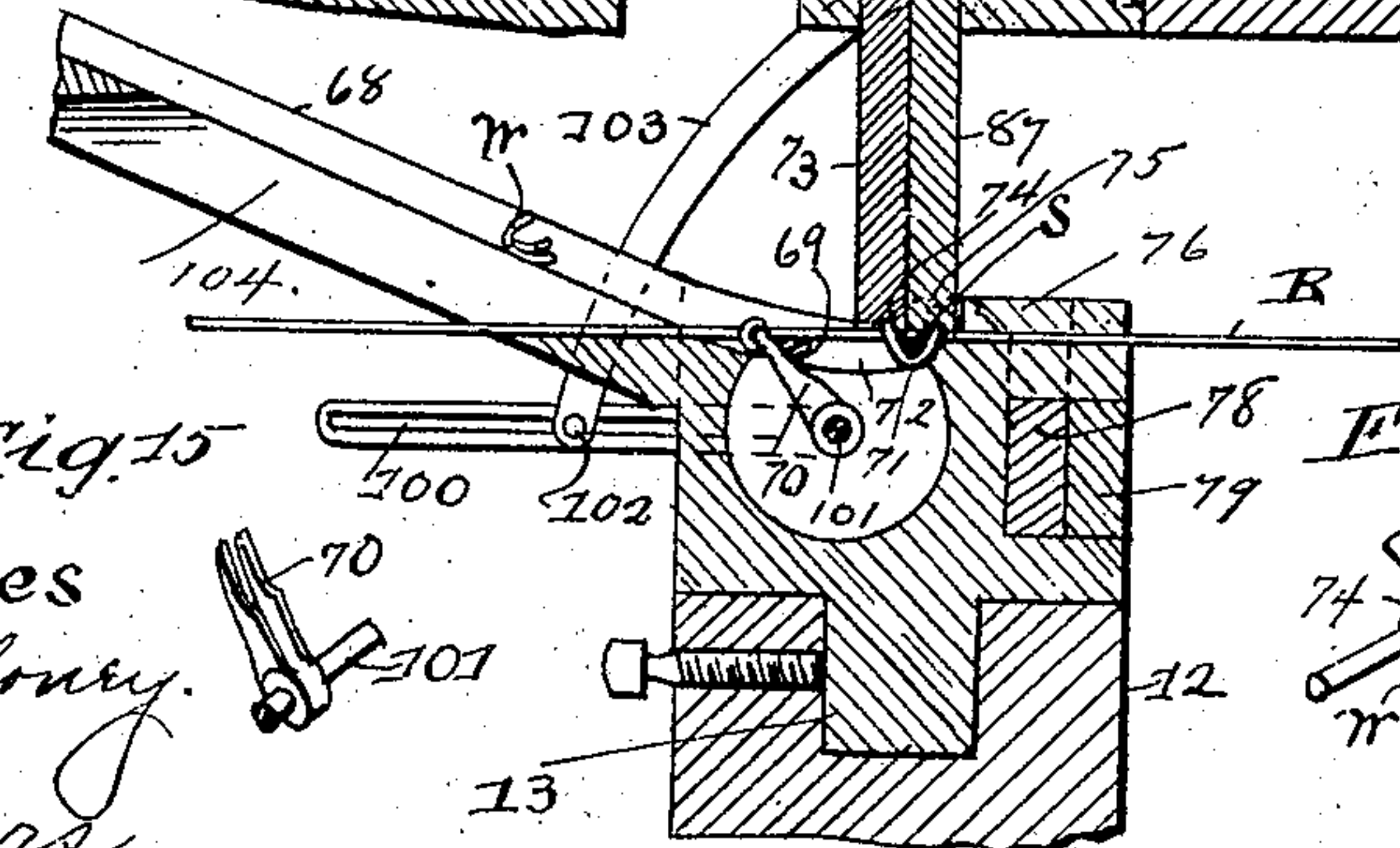
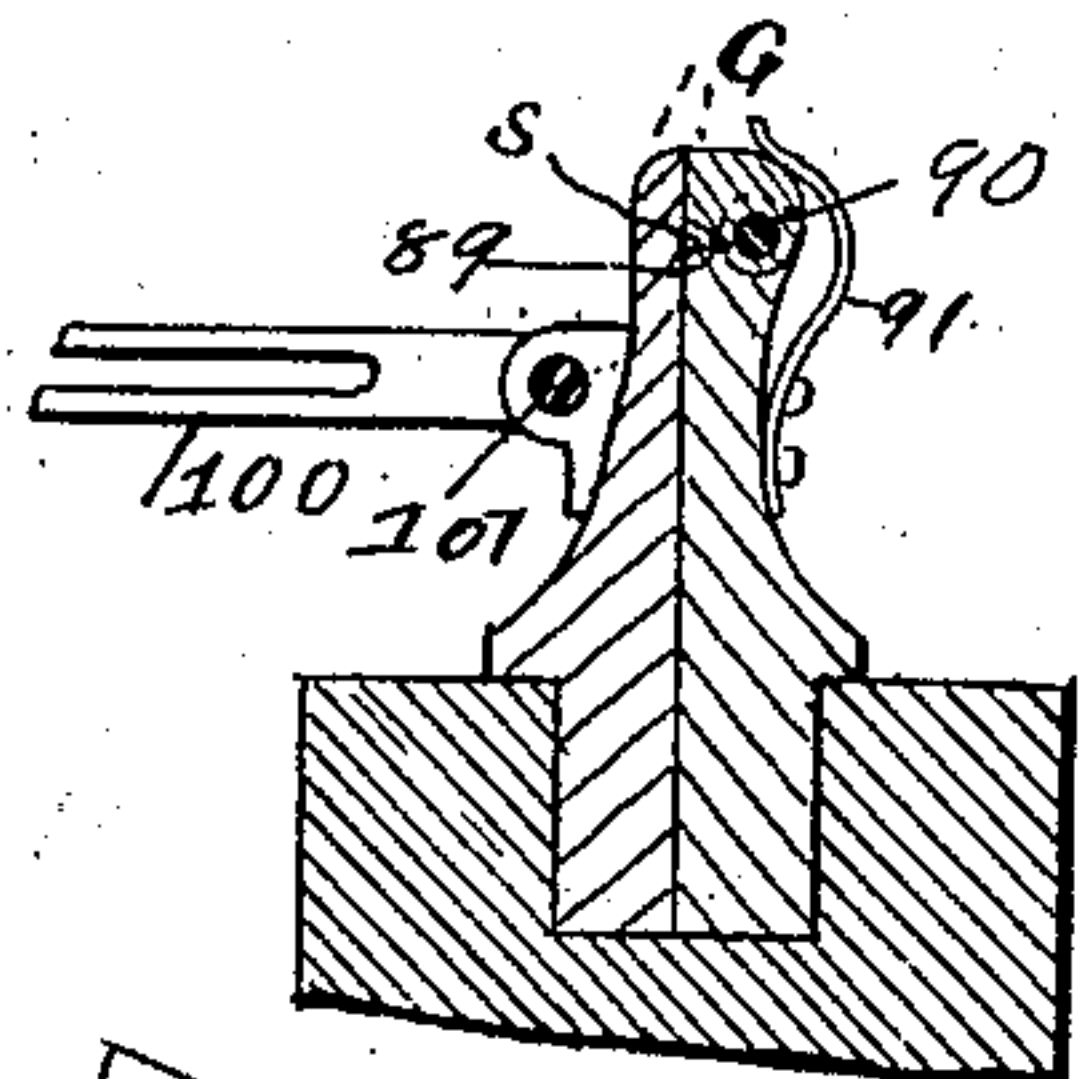


Fig. 15

Fig. 12

Fig. 13

Witnesses  
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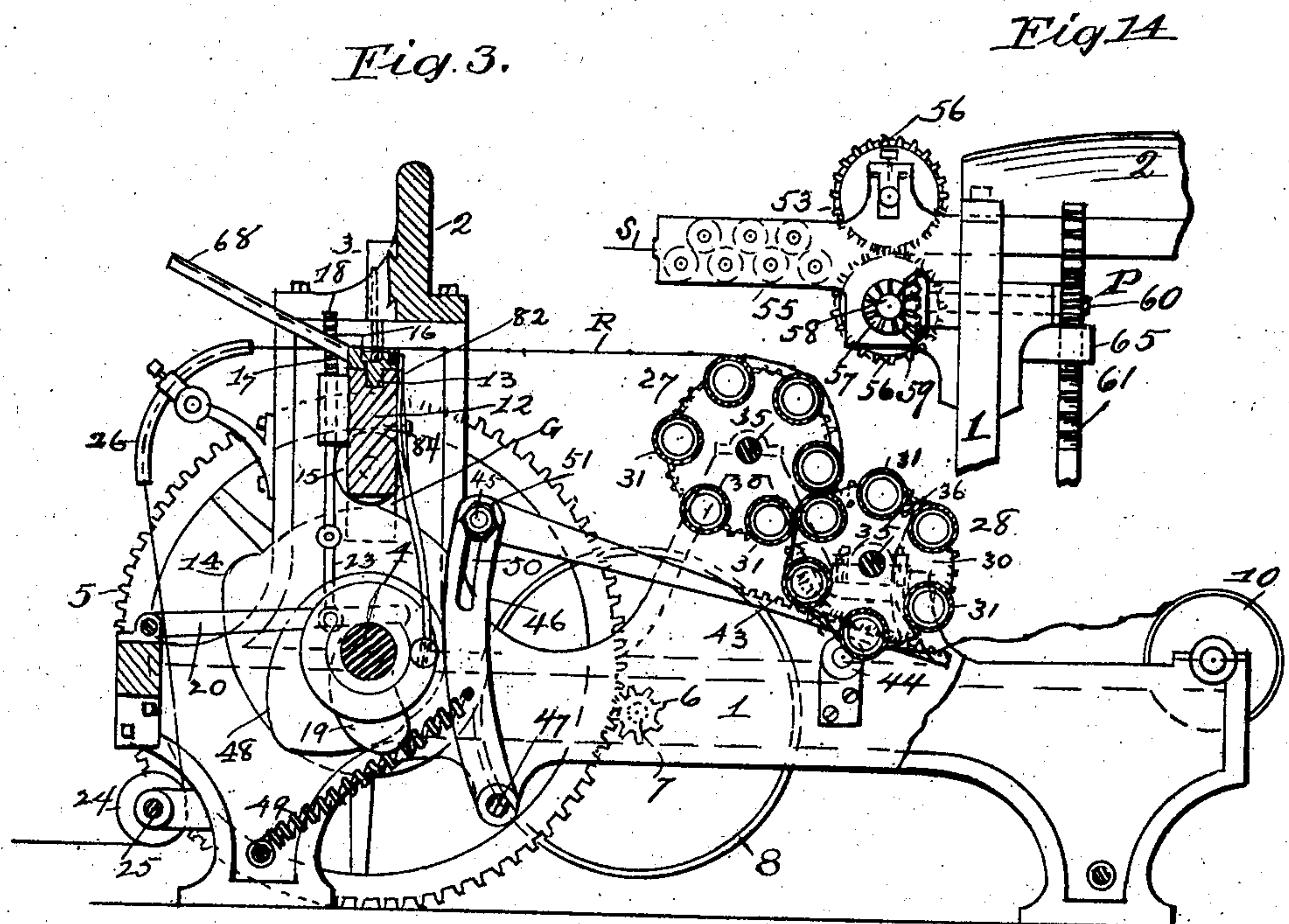
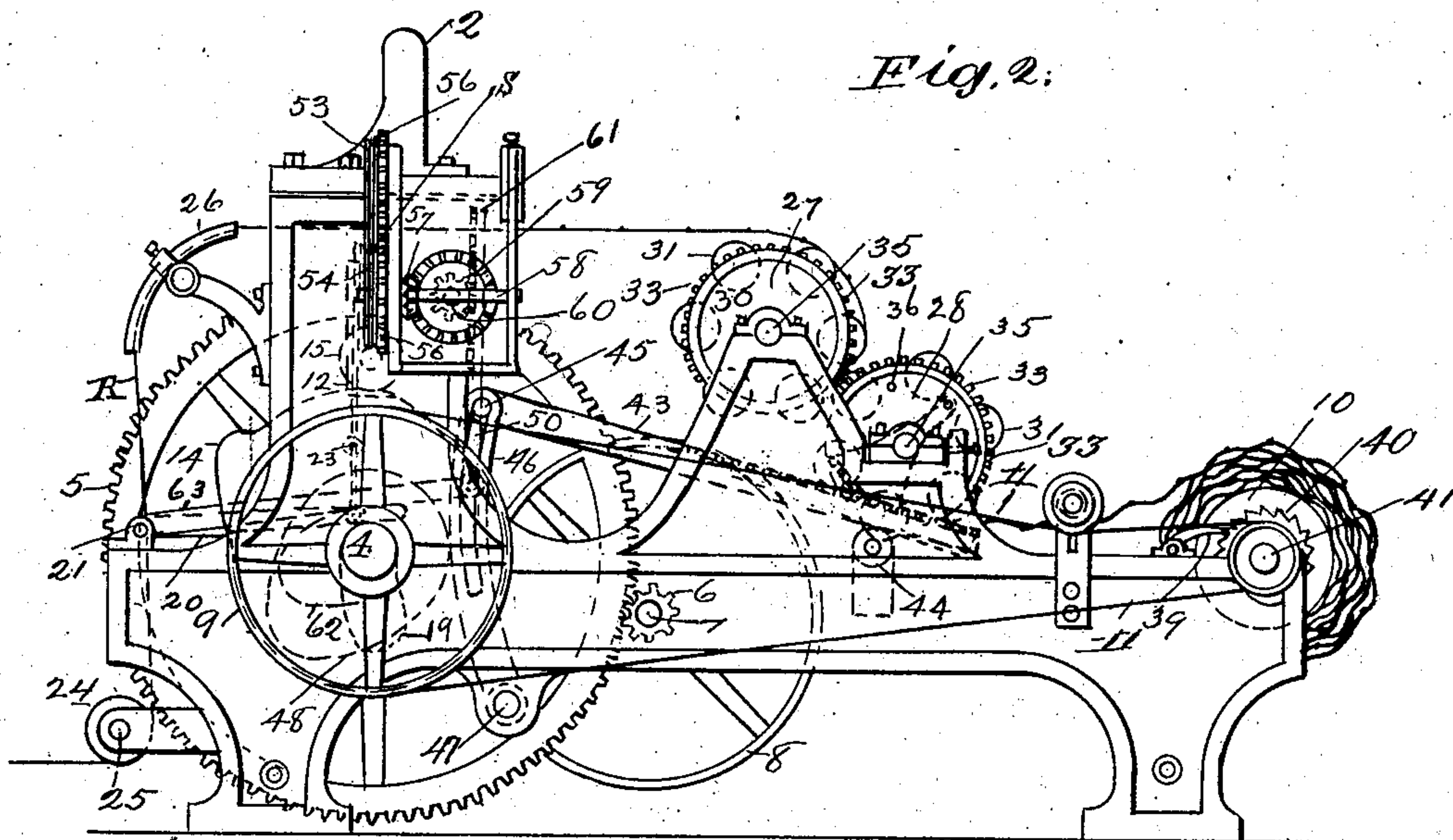
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3 SHEETS—SHEET 2.



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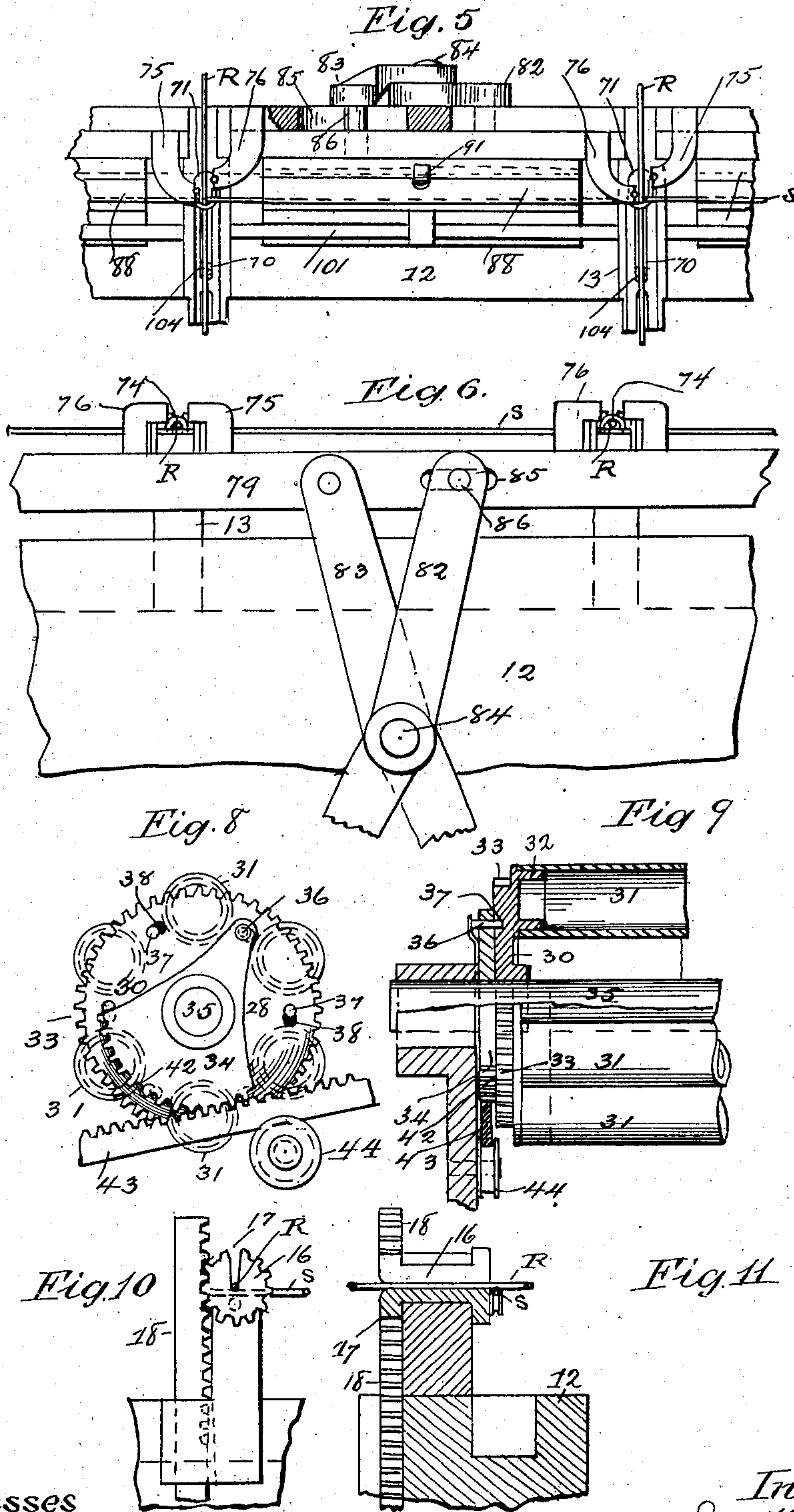


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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

JONATHAN HARRIS, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE BUCKEYE FENCE MACHINE COMPANY, OF ASHTABULA, OHIO, A CORPORATION.

## FENCE-MAKING MACHINE.

No. 827,364.

Specification of Letters Patent.

Patented July 31, 1906.

Application filed October 15, 1904. Serial No. 228,526.

*To all whom it may concern:*

Be it known that I, JONATHAN HARRIS, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Automatic Fence-Making Machinery, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

The objects of the invention are to provide automatic mechanism for attaching wire staples of the form described to the crossing-points of the running and stay wires of a wire fence; and the invention consists in the mechanism for feeding the running-wires spaced to the desired height of the fence and feeding the stay-wires at regular intervals transversely across the running-wires in the various guides for the running and stay wires, in the forming-dies in which the clamps are tightly secured to the wire crossings, means for winding the extremities of the stay-wires about the outer running-wires, mechanism for operating the various reciprocating portions of the dies, means for crimping the running-wires as soon as the fence has been completed, and in the combination and arrangement of the parts to operate automatically in unison with predetermined regular sequence and in the construction of various details, as hereinafter described, shown in the accompanying drawings, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of the complete machine from the end into which the running-wires are fed, showing the driving-shaft and bars upon which the dies are mounted. Fig. 2 is a side elevation of the machine, showing the feed device for the stay-wires, the combined feed and crimping device for the running-wires, and the reel upon which the finished fence is wound. Fig. 3 is a longitudinal section of the machine, showing the driving-shaft and the various cams thereon from which the various automatic movements are derived. Fig. 4 is a transverse section through the upper and lower die-bars and dies thereon, showing the detail construction of the dies and staple-feeding device. Fig. 5 is a plan view of a portion of the lower or movable die-

bar, showing the oppositely-reciprocating dies which bend the staples over the running-wires and their attachments. Fig. 6 is a side elevation thereof, showing the operating-bars for these dies. Fig. 7 is a transverse view of the lower die-bar and stay-wire guides thereon. Fig. 8 is an end elevation of one of the feed and crimping rolls for the line-wires, showing the segment and rack by means of which they are rotated. Fig. 9 is a longitudinal sectional view of the driven extremity of one of the feed-rolls. Fig. 10 is a face view of one of the winders by means of which the ends of the stay-wire are wrapped upon the outer running-wires. Fig. 11 is a longitudinal section through the winder. Fig. 12 is a view of one of the staples. Fig. 13 is a view showing the completed clamp for the wire crossing. Fig. 14 is a view of the feeding mechanism for the stay-wire, and Fig. 15 is a perspective view of the finger which feeds the staples to the dies.

In the figures, 1 1 are side frames for the machine, and 2 is a solid bar connecting them rigidly at the top, upon which the upper die-blocks 3 are mounted.

4 is the main shaft upon which are mounted the various cams which actuate the various moving parts of the machine, all movements being derived therefrom. 5 is the main gear upon this shaft.

6 is the driving-pinion, 7 its shaft, and 8 a band-wheel upon the same shaft.

9 is a band-wheel upon the main shaft.

10 is the reel upon which the finished fence is wound, and 11 the belt connecting them.

12 is a bar upon which the lower die-blocks 13 are mounted. This bar reciprocates vertically between the frames 1 in guides G therein and is moved by means of the cams 14 upon the main shaft, which engage rollers 15 upon the bar. Upon this bar are mounted also the winders 16, which wrap the ends of the stay-wires upon the outer running-wires. Gears 17 upon these winders engage racks 18, which are elevated by the cams 19 on the main shaft by means of the intervening levers 20, pivoted at 21 on the bar 22, connecting the side frames 1. Each rack is provided with a stem, which is jointed at 23 to permit free movement.

The running-wires R are fed over pulleys 24 on a shaft 25 at the base of the machine



and through friction-tubes 26 between the upper and lower die-blocks, where the staples are attached, to the rolls 27 and 28, which feed the fence forward and crimp or wave the running-wires, and thence to the reel 10, on which the completed fence is wound.

The friction-tubes 26 provide sufficient tension to keep the wires taut, and the crimping and feeding rollers are constructed as follows:

Each roll is provided with two heads 30, connecting which at regular intervals are placed the cylinders 31, which may be made of gas-pipe or steel tubing. The cylinders in one roll intermesh with the cylinders in the other roll and as the fence is pressed between them crimp the running-wires as well as exert a strong pull upon the fence.

When the cylinders are tubes, they can be secured in any suitable manner to the heads, as by means of the cast annular flanges 32 upon the heads, which are inserted in the tubes. (See Fig. 9.) Each head is provided with the spur-gear 33 upon its edge, which gears engage so that the rolls shall move in unison.

The rolls are rotated by means of the segment 34, mounted freely upon the shaft 35 of the lower roll and provided with the spring-pressed pin 36, which engages the pin-hole 37 when moved in one direction, but is permitted to slide and escape from the hole when moved in the other direction by means of the incline 38. A pawl 39 and ratchet 40 upon the reel-shaft 41 prevent the fence from pulling back, whatever the tension may be.

The segment 34 is provided with a segmental gear 42 and is oscillated by means of the rack 43, which rests upon a roller 44 to support it in contact with the segment. The rack is pivotally connected at 45 with the rock-arm 46, mounted upon a shaft 47 in the side frames. A cam 48 upon the main shaft moves the rack forward to rotate the rolls, and a spring 49 returns the arm. The arm is slotted at 50 to give adjustment to the throw of the rack, so as to afford change of movement to accommodate the spacing of the stay-wires, and a nut 51 upon the pivot-pin secures it where required.

The bearing of the lower roll is made adjustable by means of the set-screws 52, so that the bearing can be set up as closely as is necessary.

The stay-wire S is fed into the machine under the running-wires by means of the grooved rollers 53 and 54, having first passed through a set of straighteners 55.

The lower roller is seen in the drawings to be the driving-roller, and the rollers are geared together at 56, so as to move in exact unison. A miter-wheel 57 on the shaft 58 of the lower roll is driven by means of the miter-gear 59 on a shaft 60 at right angles to the roller-shaft, and a spur-gear P on this shaft

is engaged by the rack 61, which is vertically reciprocated by means of the cam 62 upon the main shaft and the arm 63, pivoted upon the frame. The rack is jointed at 64 to give freedom of movement and moves through a guide 65.

After entering the machine the stay-wire is fed across the dies under the running-wires, through grooves prepared for it in the upper surface of the dies, and through guides which insure its entering the dies correctly and is then cut off by means of the cutters 66 and 67, one upon the upper and one upon the lower die-bar. As soon as the wires are in position, as seen in Fig. 4, the staples W are fed to the dies by means of grooved conduits 68, in which they slide and straddle over the running-wires. A slight rise 69 in the bottom of the conduit stops them until the vibrating fingers 70 engage them and carry them forward until their forward ends pass under the stay-wire, and an upward curve 71 in the lower die in continuation of the groove 72 in the top of the die elevates the free ends of the staple, so that they stand above the running-wire ready to be wrapped thereover. As the lower dies ascend the upper die 73 comes first into contact with loop 74 of the staple and rigidly holds it in position. A spring *n* permits this die to rise farther while still retaining hold upon the staple. At this point it is necessary that the vertically-elevated ends of the staple should be bent inward from either side over the running-wire. This operation is accomplished by means of the horizontally-moving dies 75 and 76, which are secured to the bars 78 and 79, which move in grooves in the die-blocks and which pass one another, as seen in Fig. 5, the ends of the staples being bent on different planes, so that they can be bent over the running-wire without interfering. The bars 78 and 79 are reciprocated in opposite directions by means of the cam 80 upon the main shaft, which is wider at 81 than elsewhere, both sides being alike. The levers 82 and 83, pivoted at 84 upon the lower die-bar, engage the sliding bars 78 and 79 and crossing at a common pivotal part engage different sides of the cam 80, so that they move in opposite directions, while a slot 85 in the outer bar permits the pin 86, attached to the lever 83, to enter the inner bar. As soon as the ends of the staples have been bent horizontally over the running-wires it is necessary to further wrap them vertically downward. Hence as the lower dies rise the staple comes into contact with the upper stationary die 87, which completes the operation, and the staple is firmly attached to both wires, forming a joint, as seen in Fig. 13.

The guides G, affixed to the lower bar, are seen to be provided with longitudinal openings 89, through which the stay-wire is fed, and as soon as the staples are attached to the



wire crossings the lower die-bar drops, and the upper portions of the guides being hinged at 90 they lift up and the wires come out without difficulty. Springs 91 return them.

5 The finger 70, which feeds the staples to the dies, is oscillated by means of the slotted arm 100 upon the common shaft 101 and a pin 102 in an arm 103, attached to the upper bar 2.

10 It will be seen that when the lower bar 12 descends the slotted arm will be drawn upward at its outer end, thus moving the finger 70 forward and carrying the staple with it, and a slot 104 in the bottom of the conduit 68  
15 admits the passage of the finger.

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

1. In an automatic machine for making  
20 wire fence by attaching wire staples to the wire crossings of the running and stay wires in combination, a stationary upper bar, a vertically-reciprocating lower bar, die-blocks on said bars between which the running and  
25 stay wires are located, dies in said blocks adapted to compress said staples about the wire crossings, means for operating the lower die-bar and dies, and a feed and crimping device for the running-wires consisting of  
30 rolls between which the completed fence passes, each roll comprising a head at either end and spaced cylinders, the cylinders of one roll engaging between the cylinders of the other roll, and means for operating the  
35 rolls, substantially as described.

2. In a machine for attaching a staple such as described to the wire crossings of a wire fence, the combination with a stationary upper bar and vertically-movable lower bar, of  
40 die-blocks on said bars, between which the running and stay wires are located, a recess in each lower die-block having an upwardly-curved extremity in which the staple rests, the loop of the staple resting upon the run-  
45 ning-wire, a compressible upper die adapted to engage said loop, horizontally-moving dies to bend the staple extremities over the running-wire, and a fixed upper die adapted to press the bent-over staple extremities  
50 down over the running-wire, substantially as described.

3. In dies for the purpose described, a movable lower die over which the running and stay wires cross provided with a groove hav-  
55 ing an upwardly-turned extremity in which the staple rests, the loop of said staple resting upon the running-wire, a compressible upper die adapted to engage and hold firmly the said loop upon the running-wire, a horizon-  
60 tally-moving die upon either side of said staple adapted to bend the staple extremities over the running-wire, an upper fixed die adapted to further bend the staple extremities about the running-wire, and means for  
65 moving said horizontally-moving dies to en-

gage the staple extremities from opposite sides, before the action of the fixed upper die, substantially as described.

4. In a machine for making wire fence of the character described, the combination 70 with a main shaft, and frame of stationary and movable die-bars, die-blocks on said bars between which the running and stay wires pass, grooves on the upper surface of the lower die-blocks having upwardly-turned ex- 75 tremities to elevate the forward ends of the staples above the running-wires, the loops of the staples resting upon the running-wires, spring-pressed dies upon the upper die-blocks adapted to engage said loops and hold the 80 staples firmly upon the running-wires, horizontally-moving dies adapted to bend the elevated extremities of the staples over the running-wires, fixed dies in the upper die- 85 blocks adapted to vertically compress the staple extremities about the line-wires, horizontally-moving bars in the lower die-blocks to which the horizontally-moving dies are se- 90 cured, rocking levers pivotally secured to said horizontally-moving bars and to the lower die-bar, and cams upon the main shaft, adapted to raise said lower die-bar and to op- 95 erate said rocking levers in opposite directions, substantially as described.

5. In a machine for the purpose described, 95 means for attaching a staple to wire crossings consisting of a movable die provided with a groove in its upper surface across which the wires lie, the loop of the staple resting upon the upper wire, an upturned extremity to 100 said groove against which the upturned sides of the staple are supported, the said staple sides passing under the other wire, having their free extremities elevated above the up- 105 per wire on either side thereof, oppositely-moving dies engaging said extremities to bend them horizontally over said upper wire, a spring-pressed die adapted to engage said loop of the staple and hold it upon the upper 110 wire, a fixed die adapted to compress the staple extremities vertically upon the upper wire, its action following the action of the horizontally-moving dies, and means for op- 115 erating said dies in sequence.

6. In a wire feeding and crimping device 115 for a wire-fence-making machine, the combination with the frame, of roll-shafts mounted thereon, rolls upon said shafts, each roll comprising heads upon its shafts, and intermedi- 120 ate connecting-cylinders, the cylinders of one roll intermeshing with those of the other roll, gears connecting the rolls and means for operating the rolls consisting of a shaft in the machine, a cam on said shaft, a rock-arm, a rack pivoted to said rock-arm at one end, a 125 geared segment on one of the roll-shafts engaging said rack, and a ratchet device for said segment and roll, substantially as described.

7. In a wire feeding and crimping device 130



for a wire-fence-making machine, the combination with the frame of the machine, of roll-shafts and rolls mounted thereon, each roll comprising heads upon the shafts and intermediate spaced cylinders, gears connecting said rolls, and means for rotating said rolls at predetermined intervals consisting of a gear-segment on one of the roll-shafts having a projection, a series of holes annularly arranged on the gear on said roll, a spring-pin in said projection adapted to engage said holes when the arm is moving in one direction but not to engage in the other direction, a rack engaging said geared segment, a support for the outer end thereof, and means for reciprocating said rack consisting of a rock-arm on the frame to which said rack is adjustably pivoted at one end, a main shaft on the frame, and a cam on said shaft engaging said rock-arm, substantially as described.

8. In a staple-feed device for a wire-fence-making machine, the combination with a stationary die-bar and a movable die-bar, of a grooved lower die upon which the wires cross, an inclined grooved conduit for the staples through which the staple is fed so as to lie with its loop upon the upper wire and its free ends under the lower wire, and an oscillating finger mounted upon a transverse shaft passing through said die underneath the groove, a slot through which said finger passes to engage the said loop, and means for oscillating said finger to feed the staple as the lower die descends, substantially as set forth.

In testimony whereof I hereunto set my hand this 9th day of July, 1904.

JONATHAN HARRIS.

Witnesses:

WM. M. MONROE,  
GEO. S. COLE.