

No. 702,376.

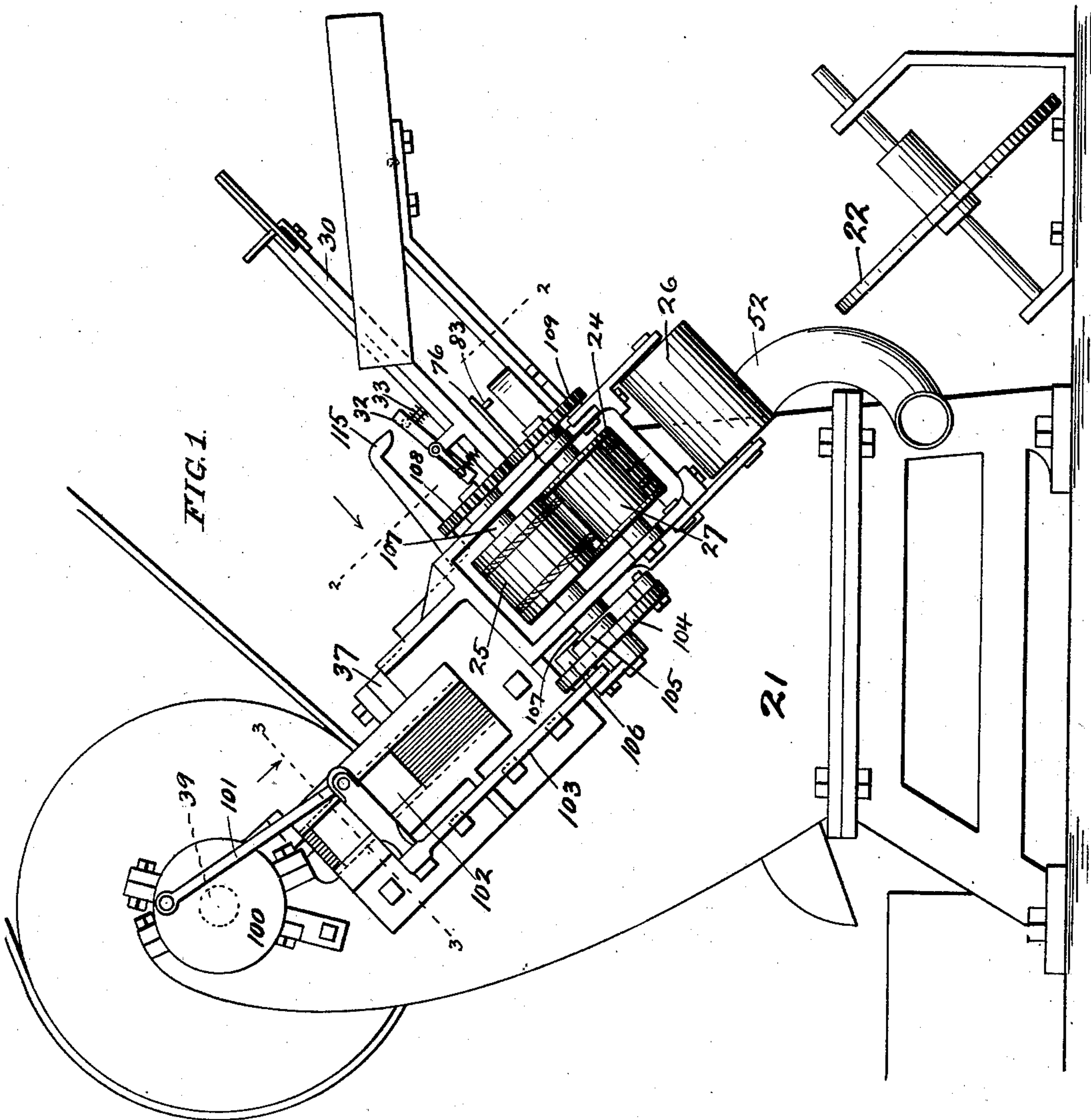
Patented June 10, 1902.

L. A. NORTON.
HEMMED CAP MACHINE.

(Application filed Oct. 22, 1900.)

(No Model.)

9 Sheets—Sheet 1.



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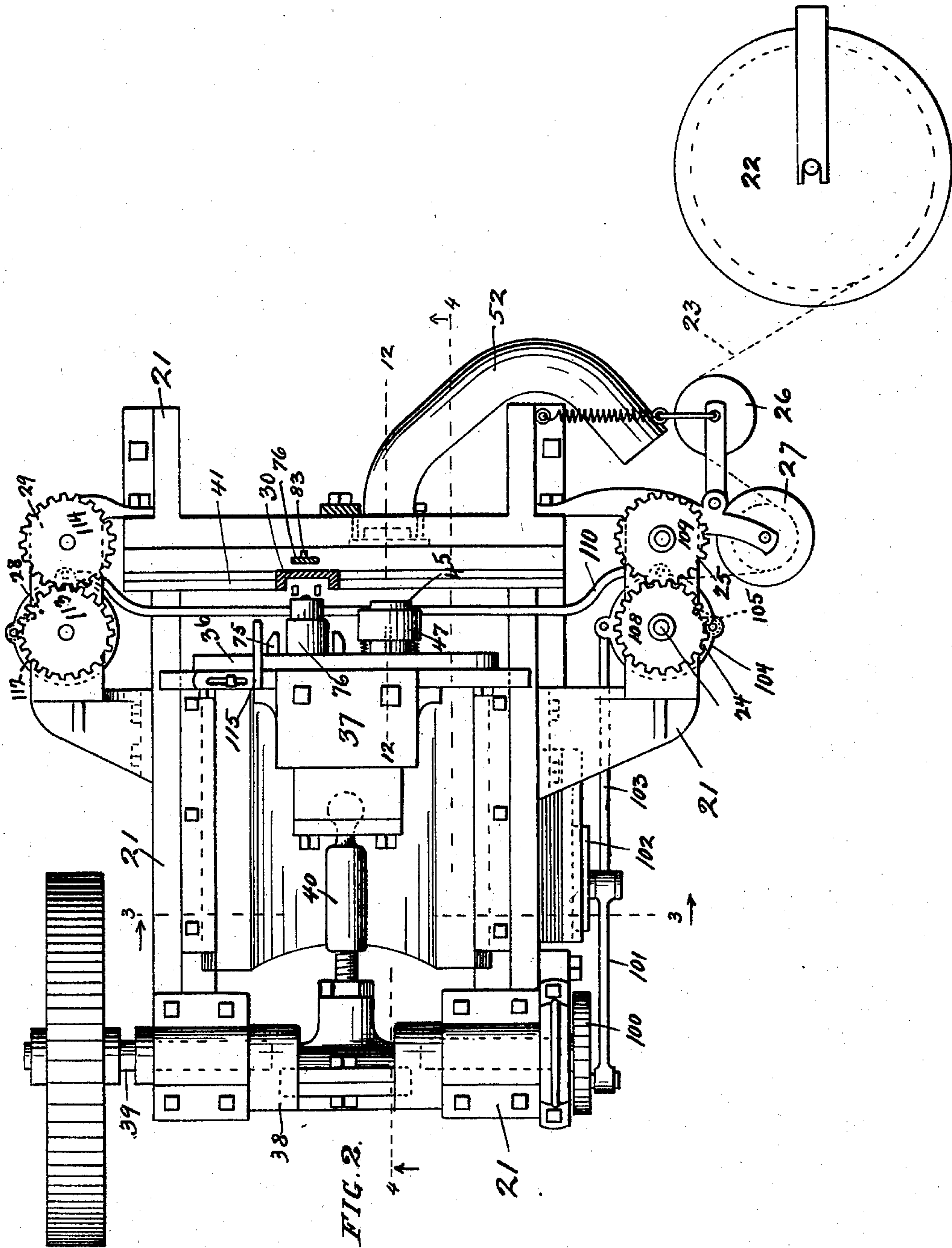
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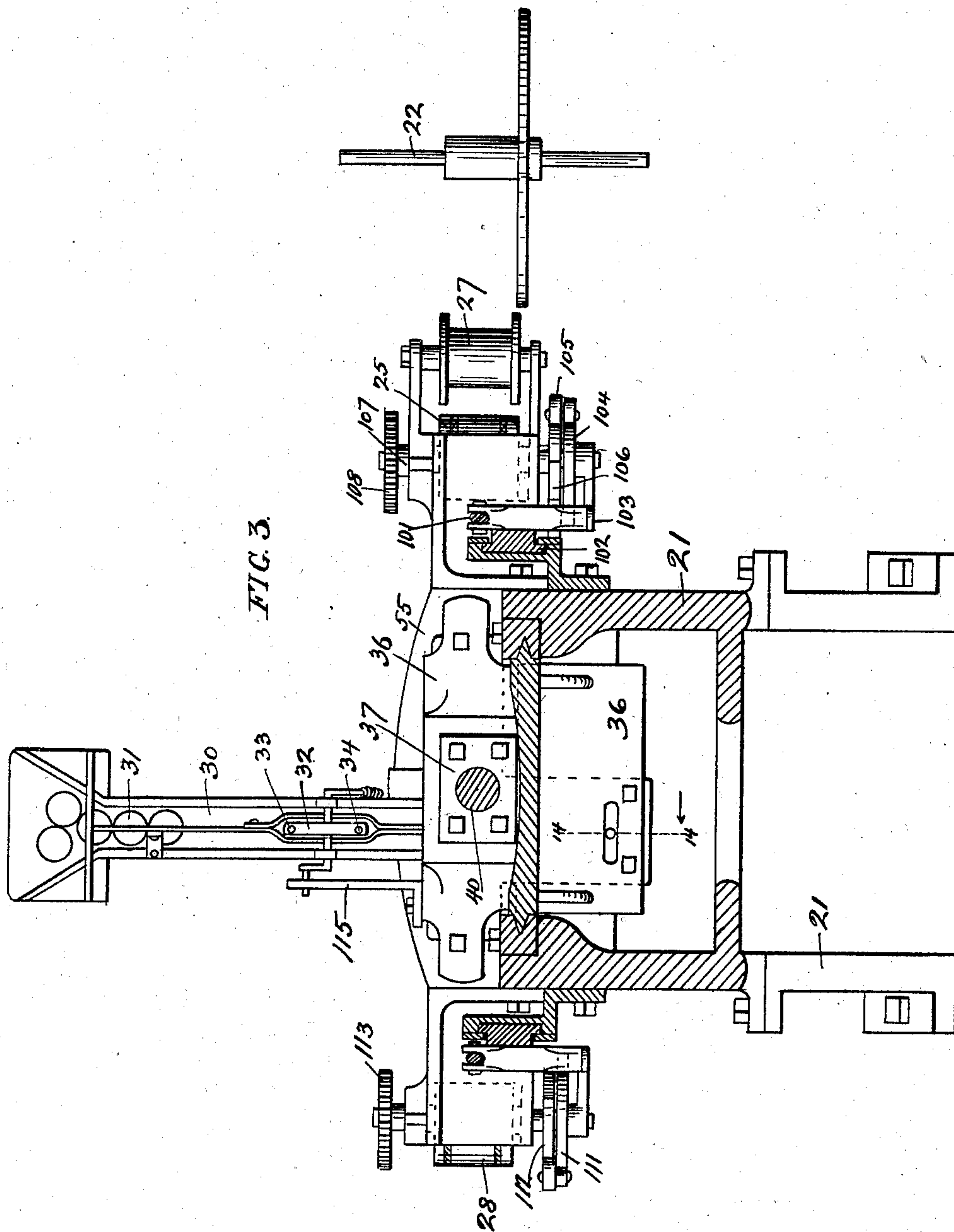
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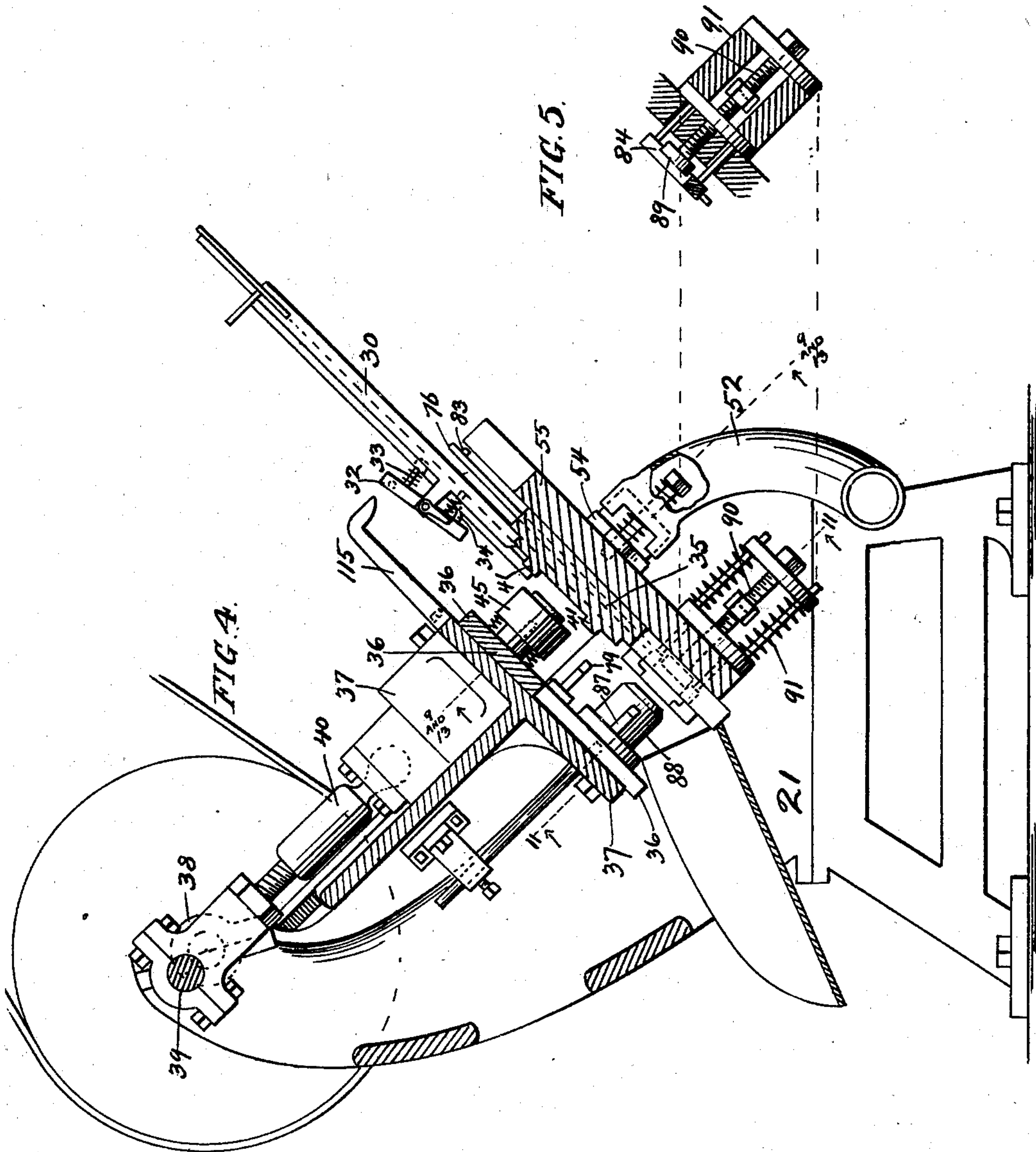
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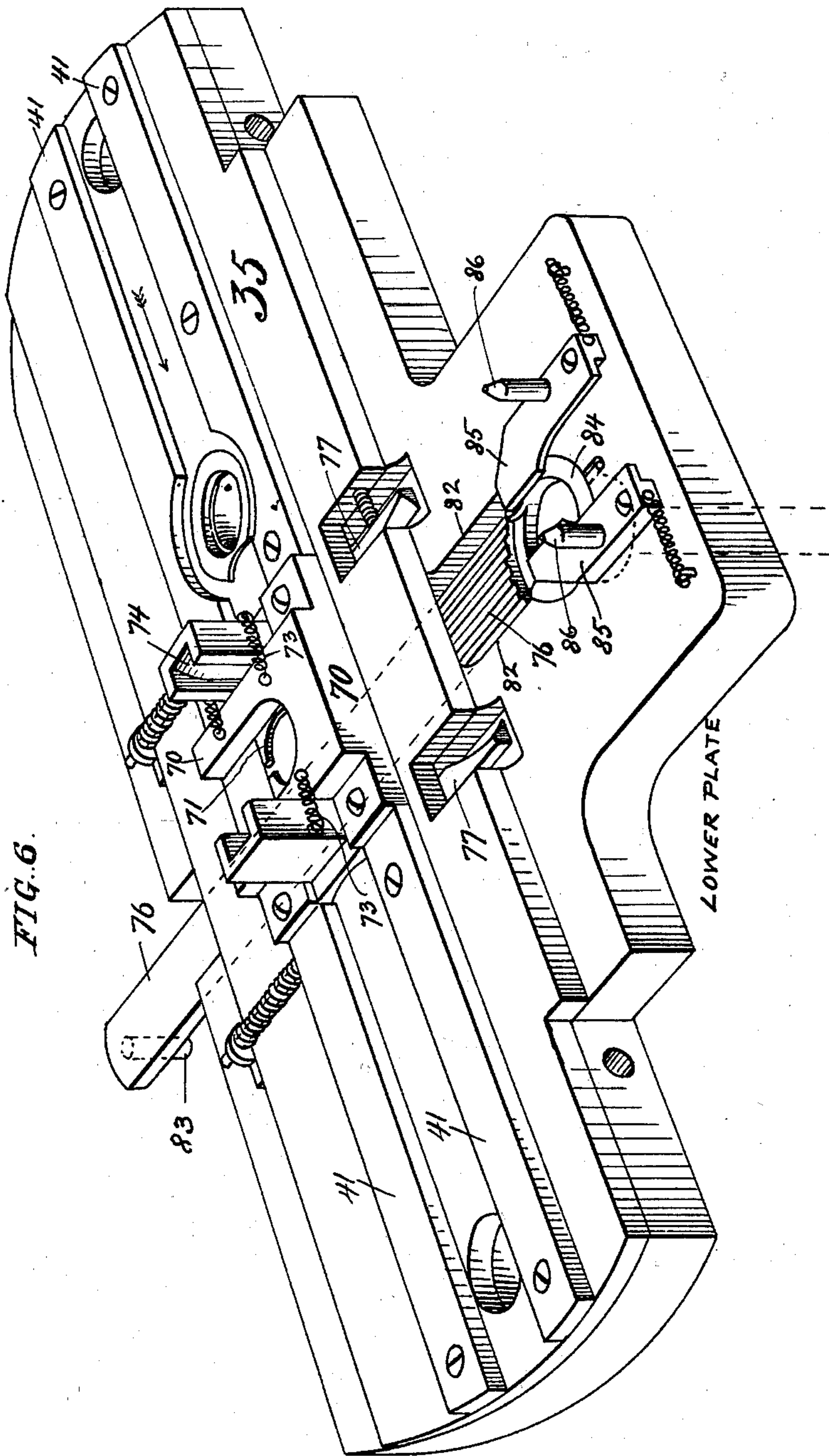
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FIG. 8.

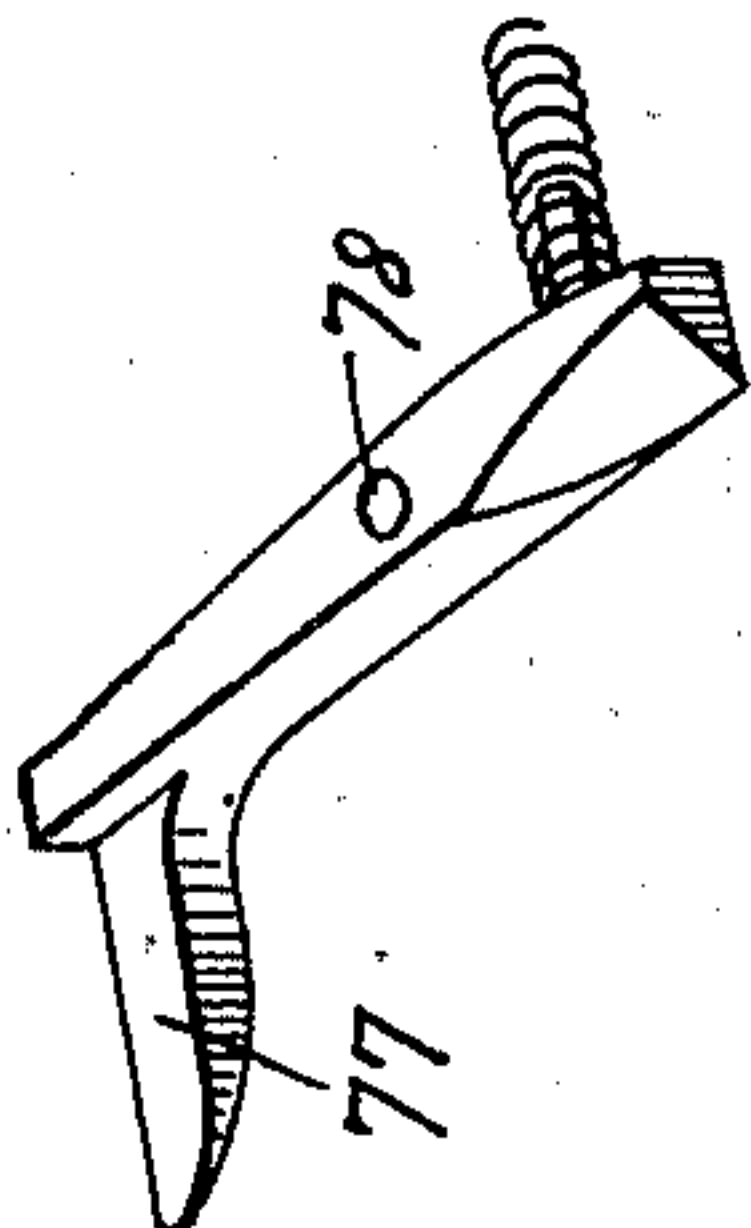
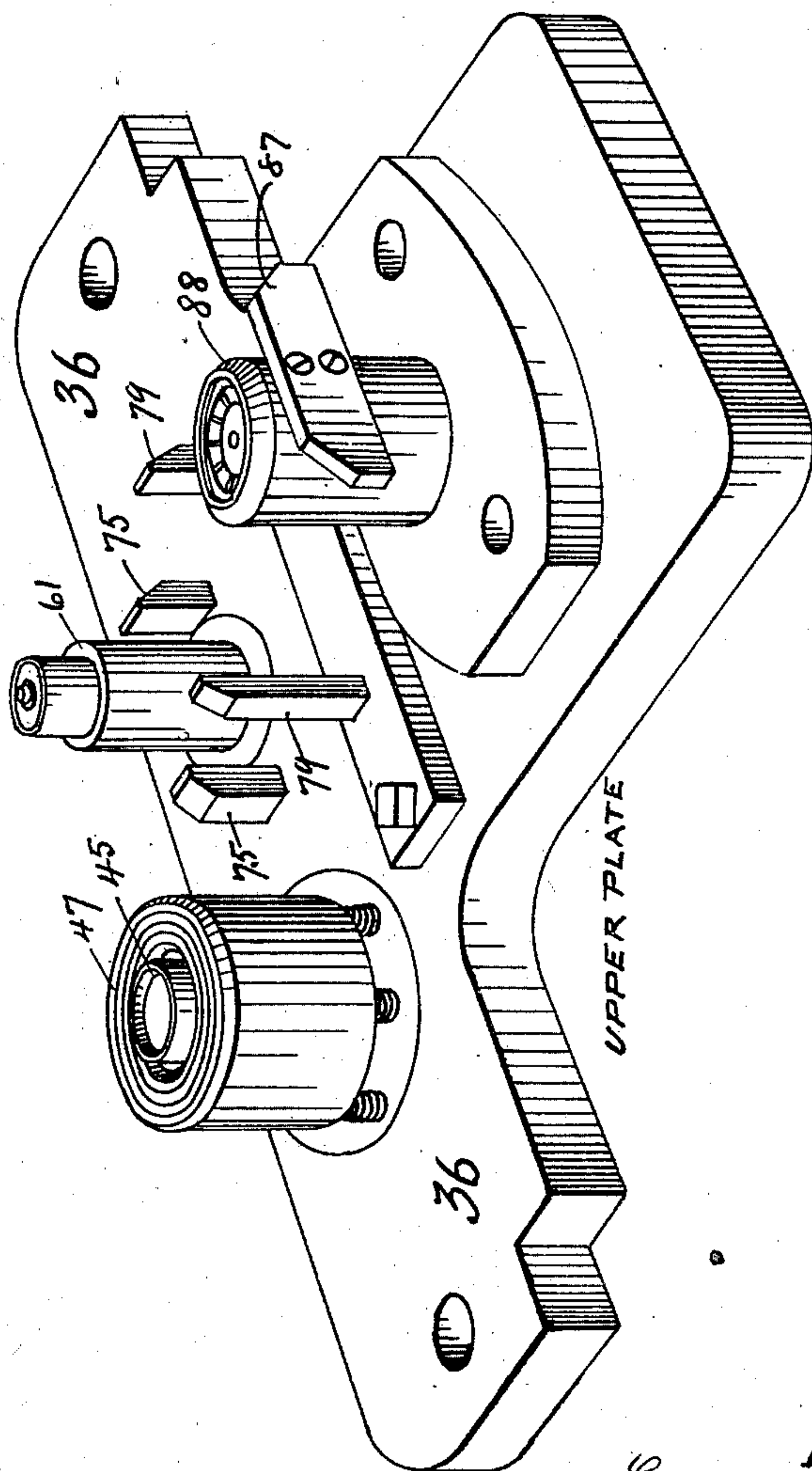


FIG. 7.



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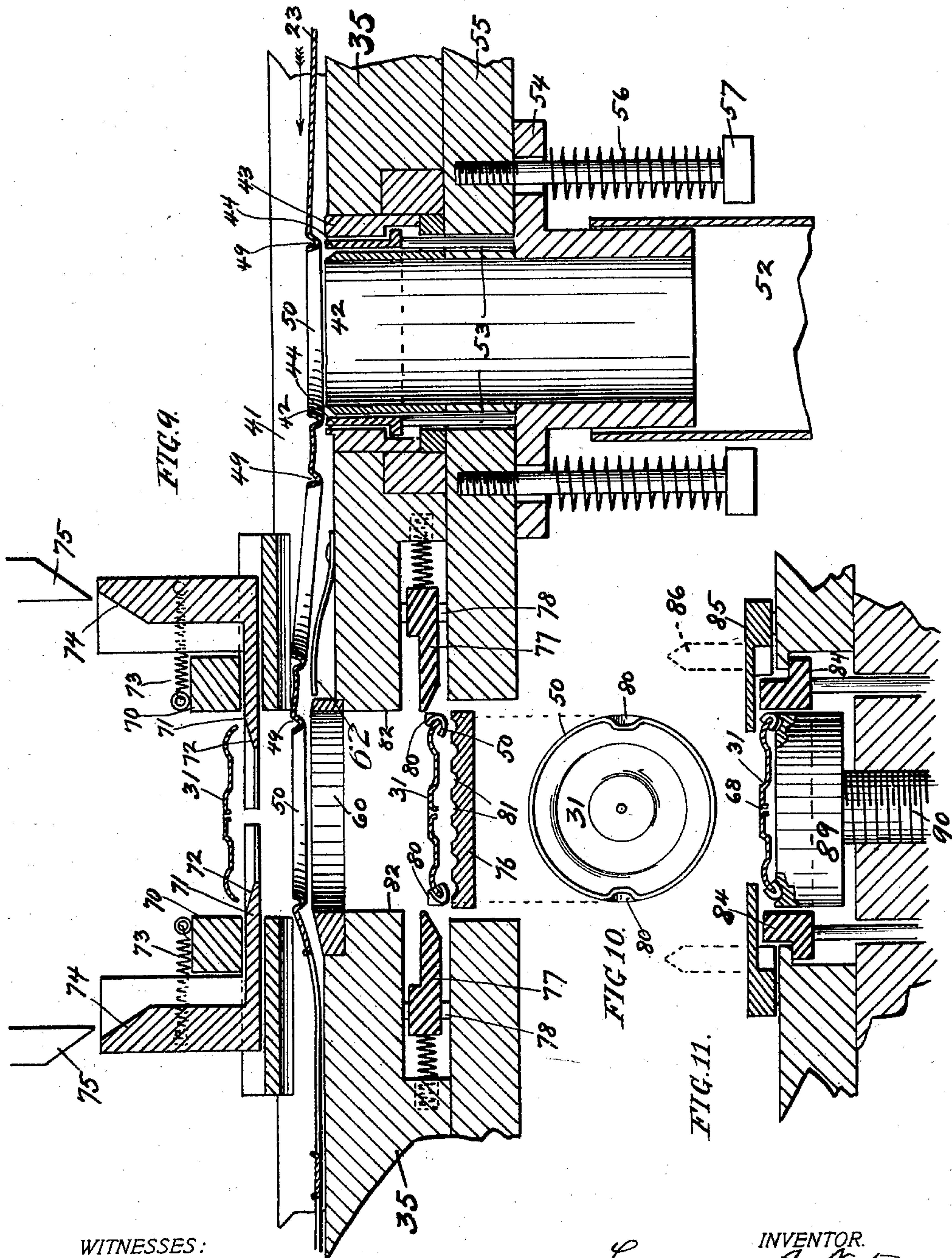
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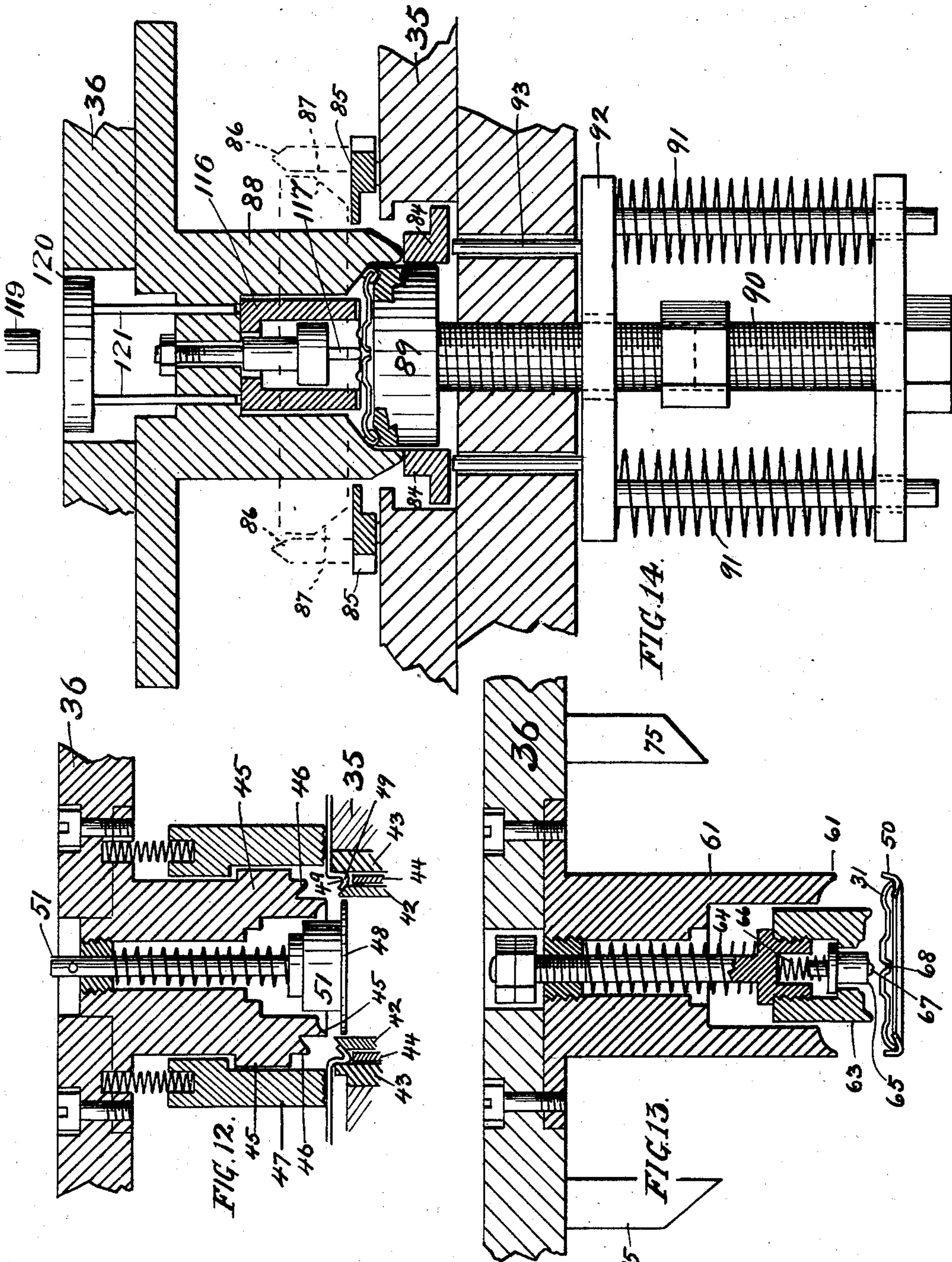
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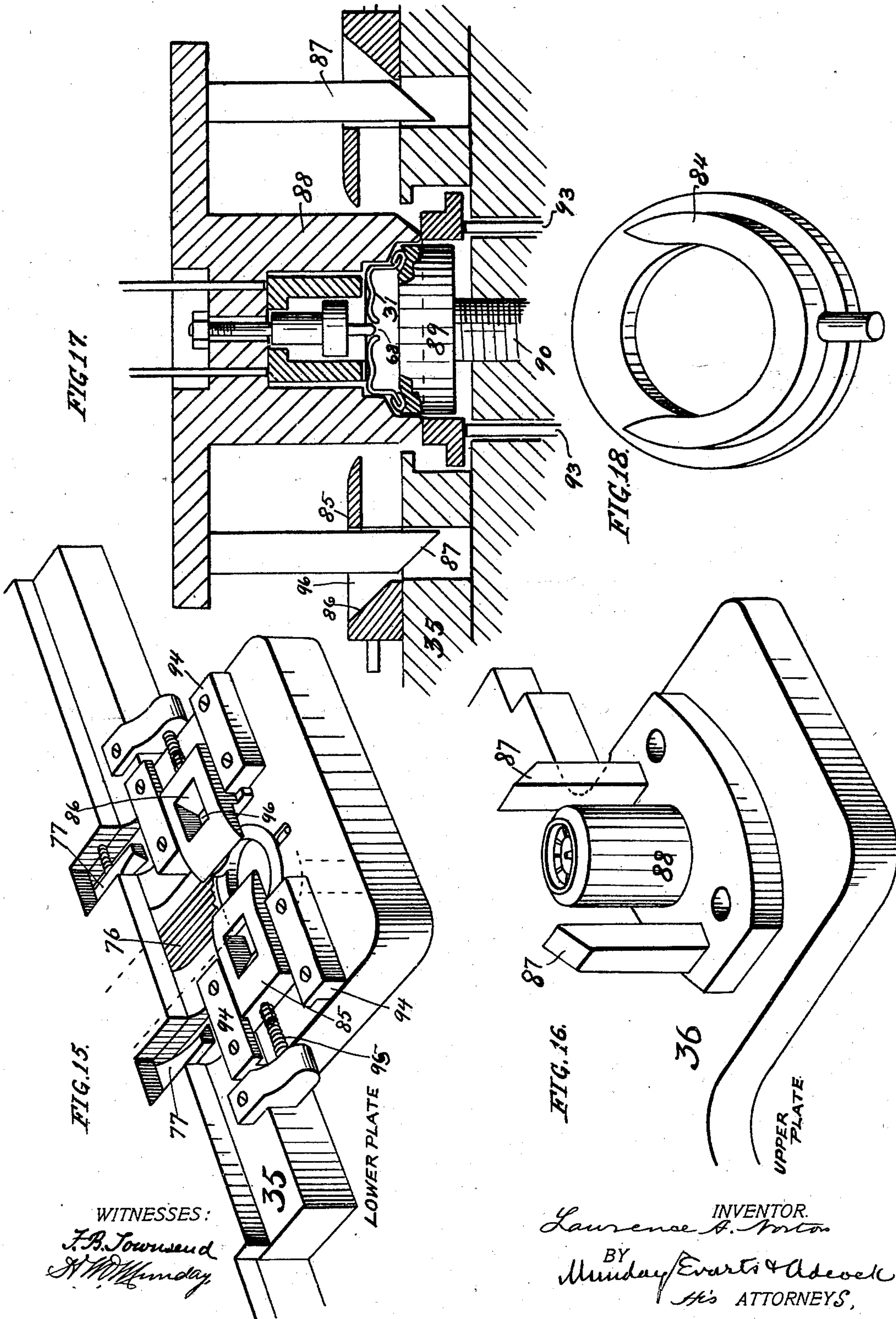
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(Application filed Oct. 22, 1900.)

(No Model.)

9 Sheets—Sheet 9.



UNITED STATES PATENT OFFICE.

LAWRENCE A. NORTON, OF MAYWOOD, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN CAN COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

HEMMED-CAP MACHINE.

SPECIFICATION forming part of Letters Patent No. 702,376, dated June 10, 1902.

Application filed October 22, 1900. Serial No. 33,994. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE A. NORTON, a citizen of the United States, residing in Maywood, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Hemmed-Cap Machines, of which the following is a specification.

My invention relates to machines for manufacturing solder-hemmed caps or disks to prepare them for soldering cans or other vessels.

The object of the invention is to provide a machine of a simple, efficient, and durable construction by means of which sheet-metal caps or disks may be rapidly and cheaply hemmed with rings of solder as said rings are cut from a continuous solder ribbon.

It consists in the novel construction of parts and devices and in the novel combinations of parts and devices herein shown and described, and specified in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a plan or face view looking from the line 2 2 of Fig. 1 in the direction indicated by the arrow. Fig. 3 is a section on line 3 3 of Figs. 1 and 2. Fig. 4 is a section on the broken line 4 4 of Fig. 2. Fig. 5 is a detail sectional view of certain parts shown in Fig. 4 as indicated by the dotted lines connecting Figs. 4 and 5. In Fig. 5, however, rubber springs are employed in place of coil-springs. Fig. 6 is a perspective view of the lower die-plate. Fig. 7 is a perspective view of the upper die-plate. Fig. 8 is a perspective view of one of the dies hereinafter to be described. Fig. 9 is a longitudinal section through the solder-ring cutting and forming dies. Fig. 10 is a detail view showing the sheet-metal cap and solder ring after the solder ring has been cut and operated upon by the connecting or uniting die shown in Figs. 8 and 9. Fig. 11 is a section through the lower hemming-die. Fig. 12 is a section of the first upper and lower cutting and forming dies. Fig. 13 is a section of the second upper cutting-die. Fig. 14 is a section through the hemming-dies. Fig. 15 is a detail perspective of a modification, showing a part of

the upper die-plate and part shown in Fig. 17. Fig. 16 is a detail perspective of a modification, showing the lower die-plate, which coöperates with that shown in Fig. 15. Fig. 17 is a detail section similar to Fig. 14, showing the modified construction illustrated in Figs. 15 and 16; and Fig. 18 is a detail perspective of a part hereinafter to be described.

In said drawings, 21 represents the frame of the machine.

22 is the reel or spool from which a continuous ribbon 23 of sheet-solder is fed to the machine by the feed-rollers 24 25, the ribbon passing over guide-rollers 26 27 and being discharged after the solder rings have been cut therefrom by the discharge feed-rollers 28 29.

30 is the feed-chute or passage down or along which the sheet-metal-can caps or disks 31 are fed one by one, the feed-chute being provided with a vibratory feeder 32, having upper and lower stops 33 34, alternately engaging the caps and permitting the same to pass one by one, as required. The can-cap feed-chute is inclined to permit the caps to feed by gravity, the axes of the ribbon-solder-feed rollers being likewise inclined so that the caps may be delivered in a plane parallel to the solder ribbon.

35 is the lower die-plate, and 36 is the corresponding upper die-plate. The die-plate 36 is secured to a reciprocating cross-head or slide 37, which is reciprocated by a crank 38 on the driving-shaft 39 by the connecting-link 40.

The lower die-plate 35 is furnished with a guide 41, along which the solder ribbon passes, and this die-plate carries an inner cutting-die 42, a holder or clamping-ring 43, and a yielding extractor-ring 44, which operate, in conjunction with the corresponding inner cutter-die 45, former-die 46, and holding or clamping ring 47, to cut the center 48 out of the solder ribbon and form the annular groove or channel 49 in the solder ring 50 to be formed, which annular groove is to receive the rim or edge of the cap 31. The upper inner cutter-die 45 is furnished with a movable spring plunger or die 51 to discharge the disk

or center 48 cut from the ribbon through the hollow lower cutter-die and the discharge tube or passage 52, communicating therewith. The extractor sleeve or ring 44, which reciprocates between the lower cutter-die 42 and the lower holder-ring 43 and serves to free the partially-formed solder ring from the lower die, is operated by pins 53, which are engaged by a movable ring 54, held against the plate 55 of the lower die-plate 35 by springs 56. At the next movement of the feed-rollers 24 25 28 29 the solder ribbon is fed forward and brings the partially cut and formed solder ring into position to register with the second or outer cutter-dies 60 61, which cut the solder ring from the solder ribbon. The lower outer cutter-die 60, which is carried by the lower die-plate 35, is raised somewhat above the surface of the die-plate, and a flat spring-guide 62, secured to the lower die-plate, guides the solder ribbon over the die. The upper outer cutter-ring 61, which is secure to the upper or reciprocating die-plate 36, is provided with a cap-holder and centering-plunger 63, actuated by a spring 64, this spring-plunger being itself preferably provided with a centering-plunger 65, having a spring 66, and which centering-plunger has a point 67 fitting in the center vent-hole opening 68 of the cap to properly center the cap in the annular groove of the partially-formed solder ring, and secured to the lower die-plate just above the lower cutter-die 60 and the path of the solder ribbon is a guide-block 70 for the caps, which forms a continuation of the cap-chute 30 and which is provided with movable bottom plates 71 71, having beveled inner faces 72, upon which the cap 31 rests when the same is directly over the lower outer cutter 60. These movable bottom plates of the cap-guide are preferably held in position to support the cap by springs 73 and are automatically retracted to permit the cap to descend or be pushed down upon the solder ring by the spring plunger or die by integral cams 74 thereon engaging pins or cams 75 on the upper die-plate. As the upper die-plate moves down the bottom plates 71 are thus withdrawn out of the way of the upper outer cutter-die, which cuts the solder ring from the solder ribbon, the solder ring and cap with it being pushed by the further downward movement of the upper die-plate through the lower die 60 onto the guide-plate 76 below, and then the solder-ring-connecting dies or fingers 77 77, which are pivoted at 78 to the lower die-plate, are actuated by the cam-pins 79 on the upper die-plate and caused to move forward and fold a portion of the upper edge of the solder ring over the rim of the cap 31, as indicated at 80 in Figs. 9 and 10, thus connecting, locking, or uniting the cap and solder ring, so that there will be no danger of their being disconnected while being conveyed to the solder ring folding or hemming dies, which are located farther down the guide-plate 76. The guide-plate 76 is preferably provided with lon-

gitudinal grooves or corrugations 81. This guide-plate 76, which forms the bottom of the transverse guide 82 for the combined caps and solder rings in the die-plate 35, is preferably removable, the same being provided with a pin or handle 83 for slipping it in and out in case of the machine becoming clogged or stopped by caps or solder rings imperfectly fed or operated upon.

84 is a movable guide or registry device, forming the lower end of the guide or passage 82 and which serves to guide or register the caps, with attached or connected solder rings, in proper position to be operated upon by the folding-dies. Movable spring guide-plates 85, which overlap or overhang the caps as they slide down into position against the guide 84, prevent the caps from jumping or moving out of position. These guide-plates 85 are furnished with cams or inclined faces or projections 86, which are engaged by cams or inclines 87 on the upper die-plate 36 or folder-die 88, carried thereby, to retract the movable guides 85 out of the way of the folder-die 88 as the same descends to form, fold, or hem the solder ring on the cap in conjunction with the lower folder-die 89. The lower folder-die or anvil 89 is adjustably secured to the lower die-plate by its screw-stem 90, and the guide 84 yields out of the way as the upper folder-die descends, this being permitted by the springs 91, which support said guide 84 to the plate 92 and connecting-pins 93. In the modification illustrated in Figs. 15, 16, and 17 the spring-guides 85 slide in suitable guides 94 on the die-plate 35, being held in position by springs 95 and having openings 96, through which pass the cams 87, which in this modification are in the form of pins. This modified construction is desirable for operating upon certain forms of sheet-metal disks.

The necessary intermittent movement is given to the feed-rollers 24 25 from the driving-shaft through a crank or wheel 100, connected by a pitman 101, slide 102, link 103 with a rocking disk or cam 104, carrying a pawl 105, engaging a ratchet 106 on the shaft 107 of the feed-roller 24. The feed-rollers 24 and 25 are geared together by gears 108 109. The connecting-bar 110 communicates motion to the pawl-carrying disk or arm 111, which actuates the ratchet 112 of the discharge feed-roller 28. The feed-rollers 28 and 29 are geared together by gears 113 and 114.

The reciprocating slide 37 is furnished with an arm 115, which operates the vibrating feeder 32 of the can-cap feed-chute. The upper folding, clenching, hemming die 88 has a cap-centering plunger 116, which itself is furnished with a cap-centering punch 117, the same operating by their own weight to advance against the cap before the die, and thus serving to center the cap in position accurately register with the hemming-dies 88 and 89 before the said dies engage the cap. The plunger 116 also serves as an extractor to force the cap from the upper die when said

die is withdrawn, the plunger being thus operated by a fixed stop 119 on the frame through the disk 120 and pins 121.

The two pairs of feed-rollers 24 25 and 28 29, operated in unison by the bar connecting their pawl arms and disks, serve to keep the solder ribbon straight and under slight tension between them, so that the solder ribbon, notwithstanding its frail character, especially after being operated upon by the first pair of cutting and forming dies, may nevertheless be fed with the accuracy and precision necessary to register with the second pair of cutting-dies and other parts. For this purpose the second pair of feed-rollers 28 29 is made very slightly longer than the first pair 24 25 to compensate for the inevitable stretching of the thin frail solder ribbon and its elongation by pressure of the first pair of feed-rolls, and thus keep the same always properly flat, straight, and under tension, as required.

The operation of the machine is as follows: The solder ribbon is fed intermittently by the solder-feed rolls. At the first stop or period of rest the first pair of cutting and forming dies, as illustrated in Fig. 12, cut out the central disk from the interior of the ring and partially shape it, as illustrated in Fig. 9, at the right-hand side thereof. The next movement of the solder ribbon brings the partially-formed solder ring into registry with the next pair of cutting-dies, as illustrated in Fig. 9, at the left side thereof, and beneath the sheet-metal cap 31, which has been in the meantime fed down into position. The descent of the upper outer cutter-die 61 then retracts the movable bottom plates 71 71, upon which the cap 31 rests, and pushes the cap down into registry with the partially-formed solder ring and cuts the ring from the solder ribbon and forces the cap 31 and solder ring, now assembled, through the lower die 60 and into position for being operated upon by the connecting dies or fingers 77 77, which next operate and connect the solder ring to the disk, as illustrated in Figs. 9 and 10. The united solder ring and caps slide down the guide-plate 76 into position for registration with the folding-dies 88 89, which next operate and firmly clench the solder ring upon the cap 31, as illustrated in Fig. 14.

I claim—

1. In a machine for hemming sheet-metal disks or caps with solder, the combination with a ribbon-solder-feed device, of an inner pair of solder-ring cutting and forming dies, an outer pair of solder-ring cutting and forming dies, a cap or disk feed-chute and feeder, a cap guide-ring, movable bottom plates therefor, solder ring and cap connecting dies or fingers, a transverse guide and cap-registering guide, removable guide-plates therefor, and a pair of folder-dies, substantially as specified.

2. The combination with a ribbon-solder-feed device of a cap-feeder, a pair of inner

solder-ring-cutting dies, a pair of outer solder-ring-cutting dies, and a pair of hemming or folder dies, substantially as specified.

3. The combination with a ribbon-solder-feed device, of solder-ring-cutting dies, a cap feed-chute and feeder, a cap-guide having movable bottom plates, and means for uniting the cap and solder ring, substantially as specified.

4. The combination with a ribbon-solder-feed device, of solder-ring-cutting dies, a cap feed-chute and feeder, a cap-guide having movable bottom plates, cams for retracting said movable bottom plates, and means for uniting the cap and solder ring, substantially as specified.

5. The combination with a ribbon-solder-feed device, of solder-ring-cutting dies, a cap feed-chute and feeder, a cap-guide having movable bottom plates, and hemming or folding dies, substantially as specified.

6. The combination with a ribbon-solder-feed device, of a cap feed-chute and feeder, a lower die-plate, an upper or reciprocating die-plate, a pair of inner ring cutting and forming dies, a pair of outer ring cutting and forming dies, a cap-guide, a block on the lower die-plate, and movable bottom plates for said guide, a pair of folder-dies, substantially as specified.

7. The combination with a ribbon-solder-feed device, of a cap feed-chute and feeder, a lower die-plate, an upper or reciprocating die-plate, a pair of inner ring cutting and forming dies, a pair of outer ring cutting and forming dies, a cap-guide, a block on the lower die-plate, movable bottom plates for said guide, and a pair of solder-ring-connecting dies or fingers below the lower outer cutting-die, substantially as specified.

8. The combination with a ribbon-solder-feed device, of a cap feed-chute and feeder, a lower die-plate, an upper or reciprocating die-plate, a pair of inner ring cutting and forming dies, a pair of outer ring cutting and forming dies, a cap-guide, a block on the lower die-plate, movable bottom plates for said guide, a pair of solder-ring-connecting dies or fingers below the lower outer cutting-die, and a transverse cap-guideway below said lower cutter-die, substantially as specified.

9. The combination with a ribbon-solder-feed device, of a cap feed-chute and feeder, a lower die-plate, an upper or reciprocating die-plate, a pair of inner ring cutting and forming dies, a pair of outer ring cutting and forming dies, a cap-guide, a block on the lower die-plate, movable bottom plates for said guide, a pair of solder-ring-connecting dies or fingers below the lower outer cutting-die, a transverse guideway below said lower cutting-die, and removable guide-plate for said guideway, substantially as specified.

10. The combination with a pair of solder ring-cutter dies, of a cap-guide having movable bottom plates, and means for uniting the cap and solder ring, substantially as specified.

11. The combination with a pair of solder-ring-cutter dies, of a cap-guide having movable bottom plates, and cams for retracting said movable bottom plates, and means for
5 uniting the cap and solder ring, substantially as specified.

12. The combination with a pair of solder-ring-cutter dies, of a cap-guide having movable bottom plates, the upper die having
10 movable cap holding and centering plunger inside the same, substantially as specified.

13. The combination with a pair of solder-ring-cutter dies, of a cap-guide having movable bottom plates, the upper die having
15 movable cap holding and centering plunger inside the same provided with an inside centering-plunger engaging the vent-hole of the cap, substantially as specified.

14. The combination with a pair of solder-
20 ring-cutter dies, a cap feed-chute and feeder, a cap-guide having movable bottom plates, a transverse guideway for the caps, and a pair of hemming or folding dies, substantially as specified.

25 15. The combination with a pair of solder-

ring-cutter dies, a cap feed-chute and feeder, a cap-guide having movable bottom plates, a transverse guideway for the caps, a pair of hemming or folding dies, and a pair of solder-ring connecting or attaching dies or fingers,
30 substantially as specified.

16. The combination with a pair of solder-ring-cutter dies, a cap feed-chute and feeder, a cap-guide having movable bottom plates, a transverse guideway for the dies, a pair of
35 hemming or folding dies, a pair of solder-ring connecting or attaching dies or fingers, and a cap guide or registering device furnished with upper movable guide-plates, substantially as specified.
40

17. The combination with an upper movable die-plate, provided with cam-pins, of a cap-guide ring having movable bottom plates provided with cams or projections engaged by the cam-pins on the upper die-plate, and a
45 lower die-plate substantially as specified.

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