

No. 778,209.

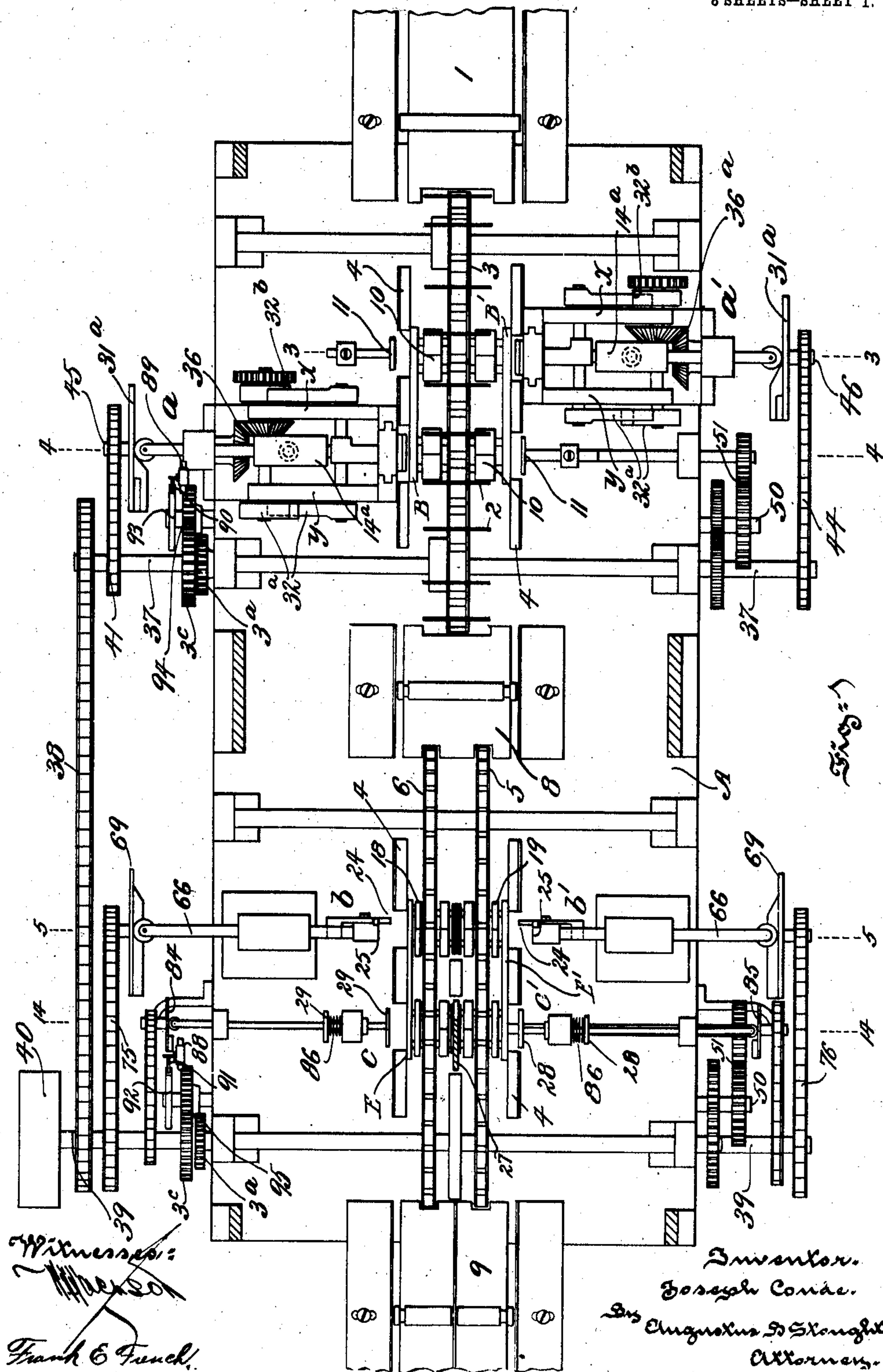
PATENTED DEC. 20, 1904.

J. CONDE.
BOTTLE MAKING MACHINE.

APPLICATION FILED JULY 18, 1904.

NO MODEL.

8 SHEETS—SHEET 1.



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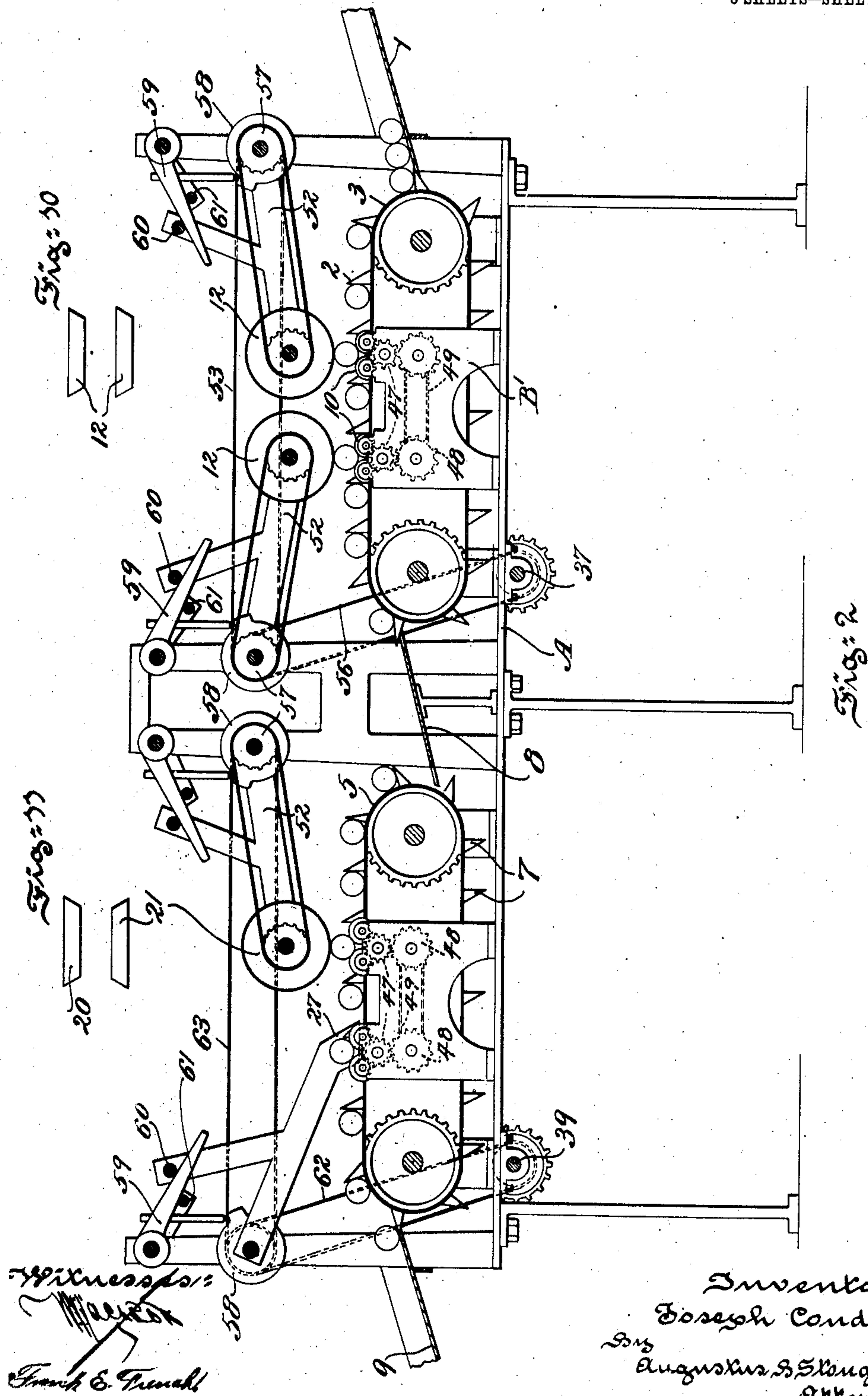
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8 SHEETS—SHEET 2.



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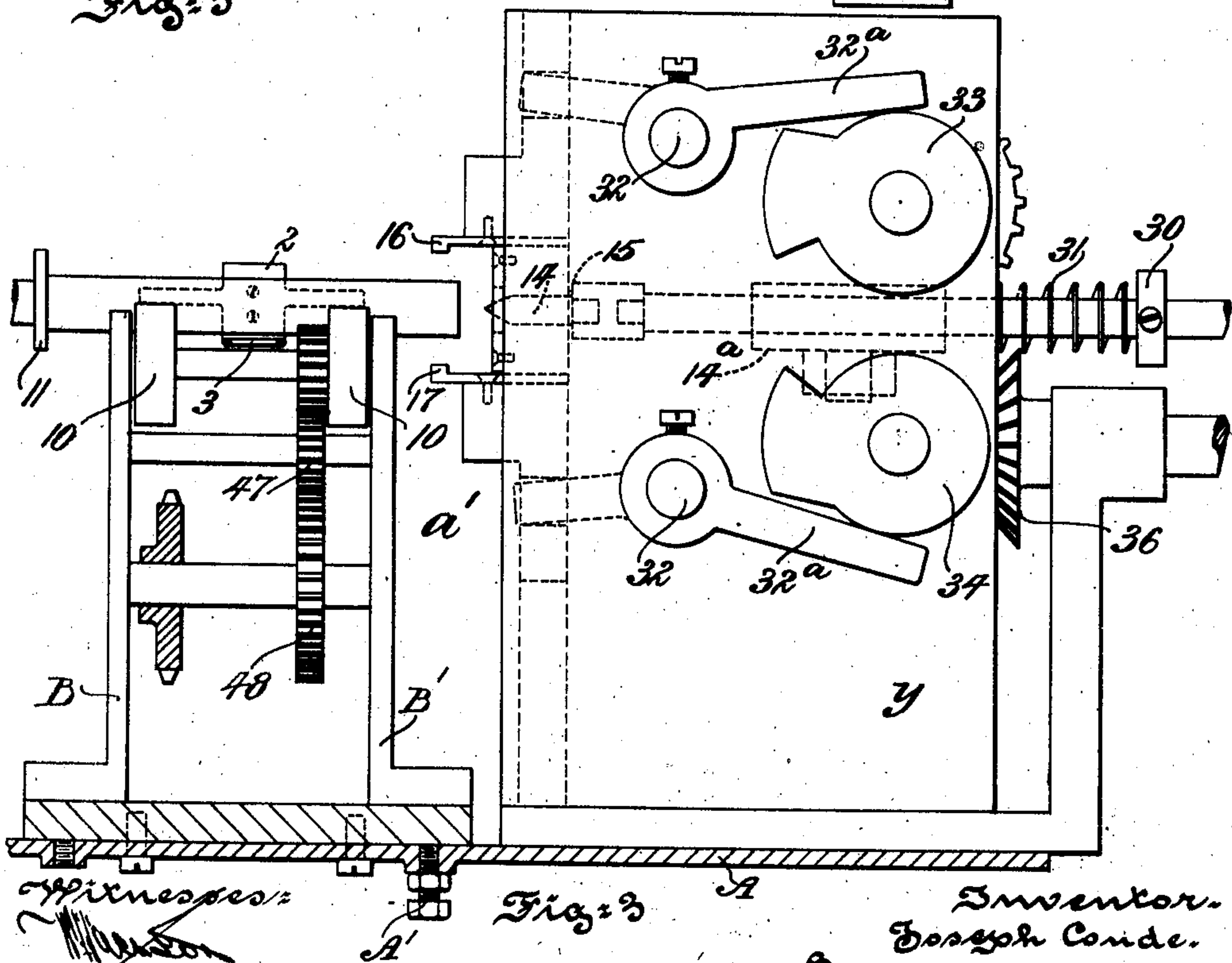
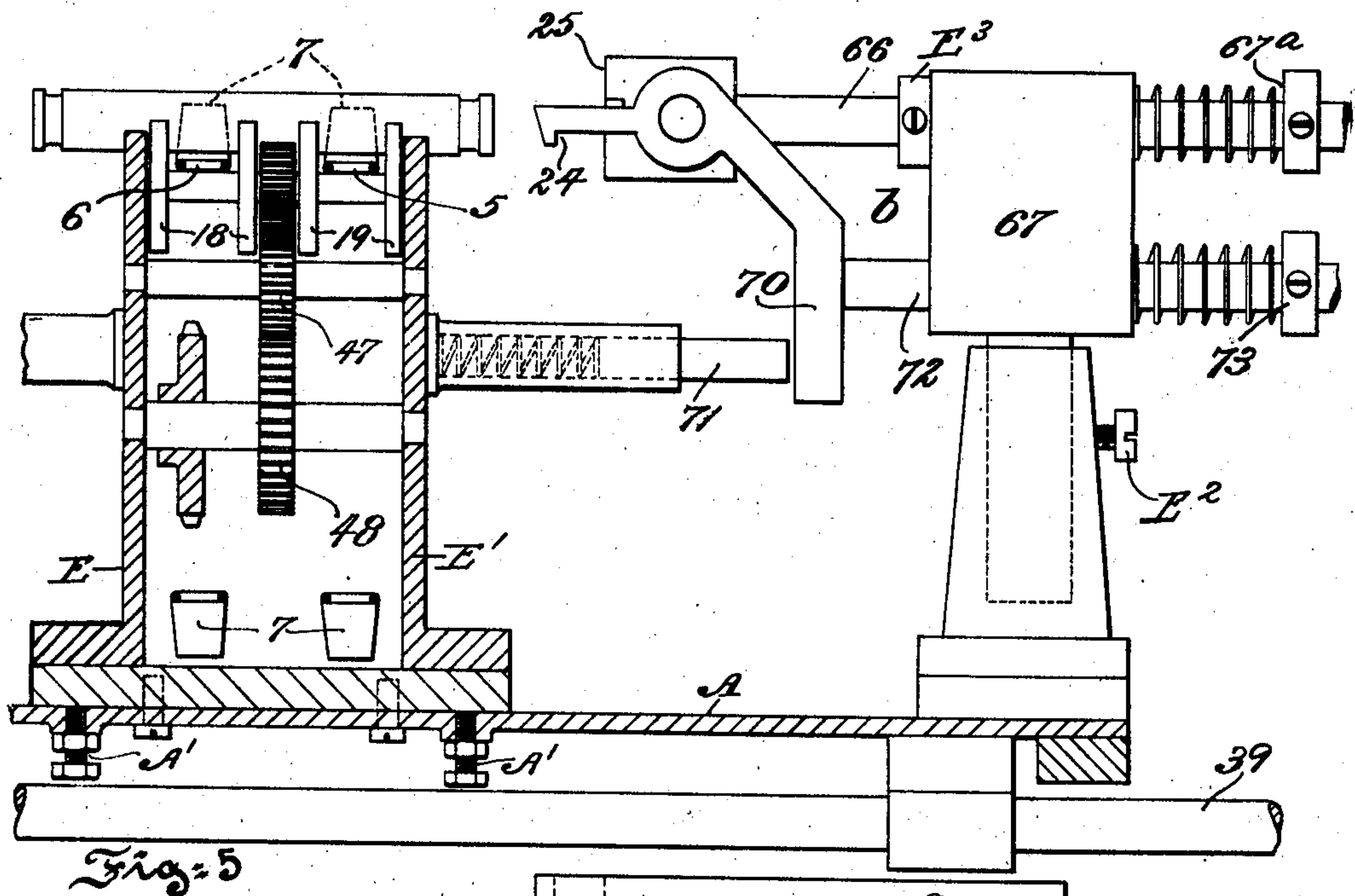
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8 SHEETS—SHEET 3.



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Fig. 3

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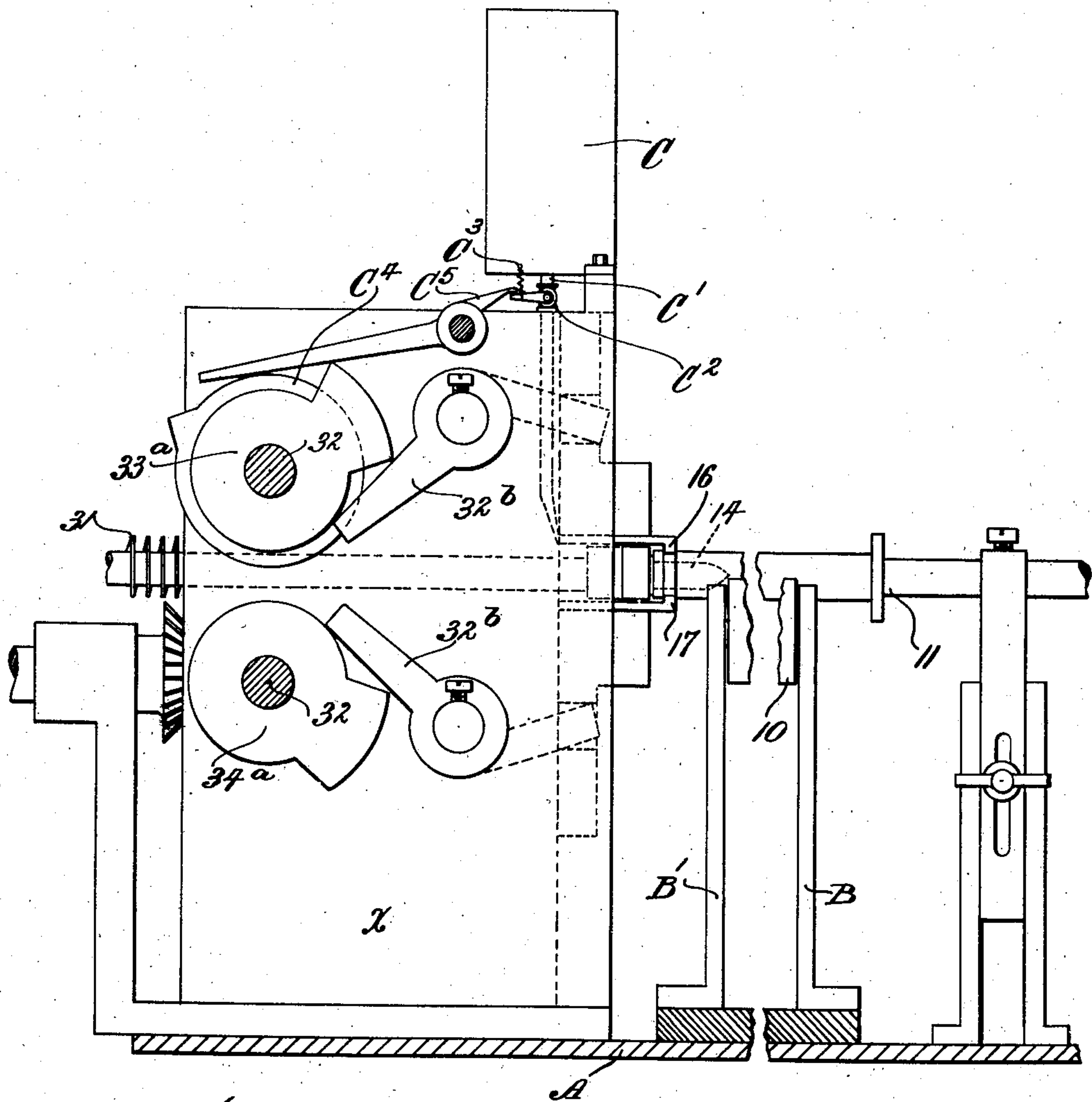
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8 SHEETS—SHEET 4.

Fig. 4



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8 SHEETS—SHEET 5.

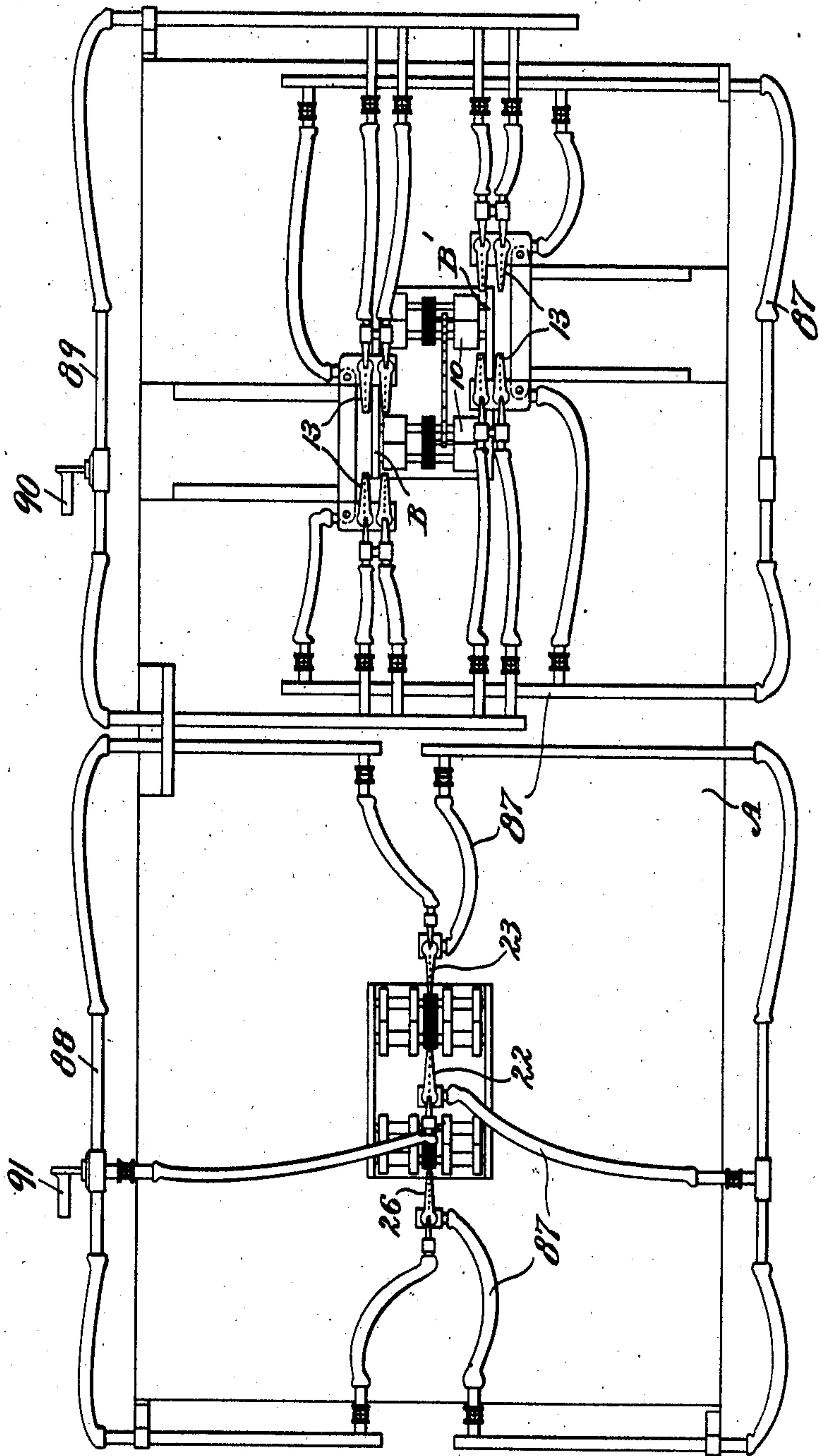


Fig. 6

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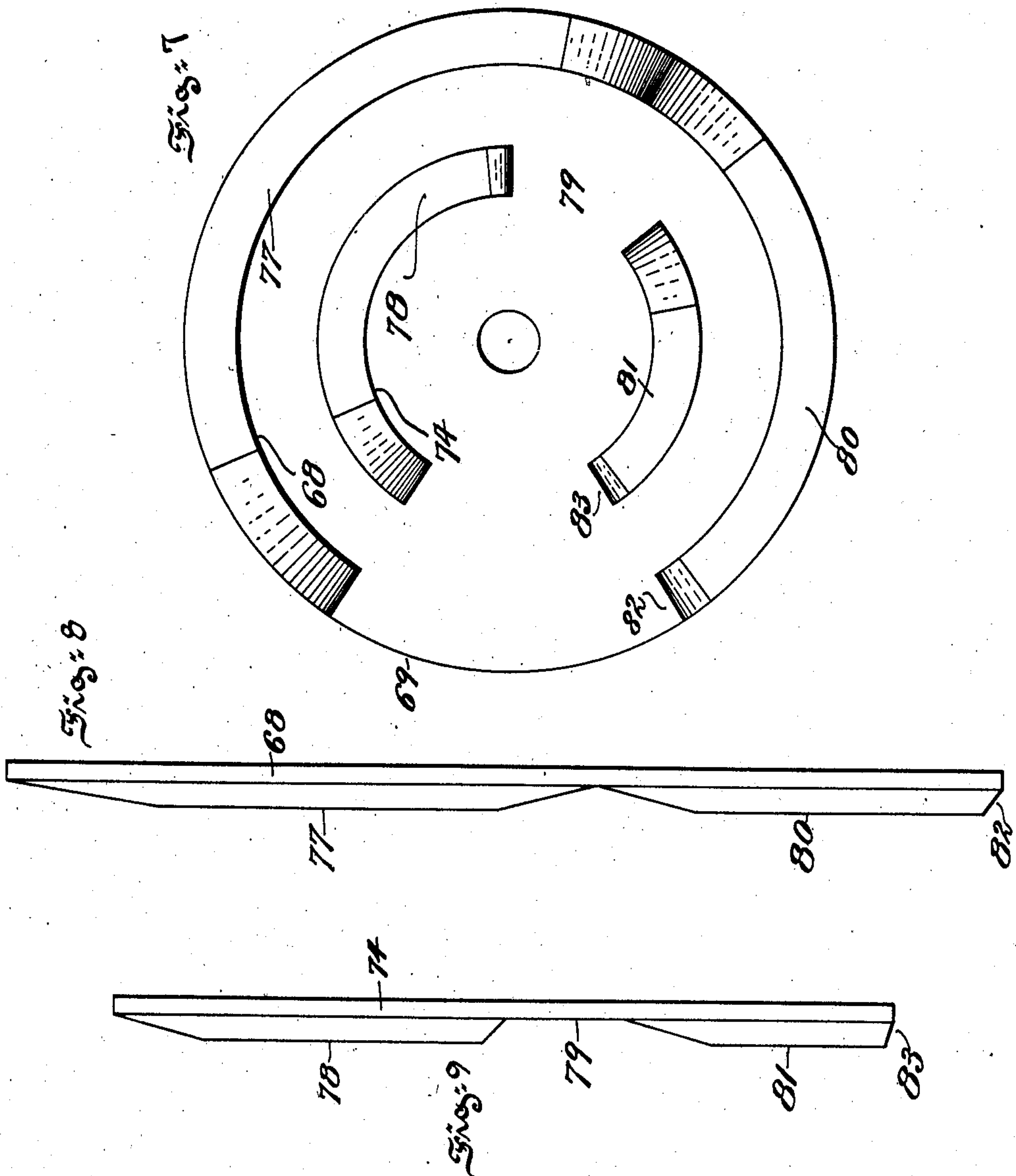
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8 SHEETS—SHEET 6.



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8 SHEETS—SHEET 7.

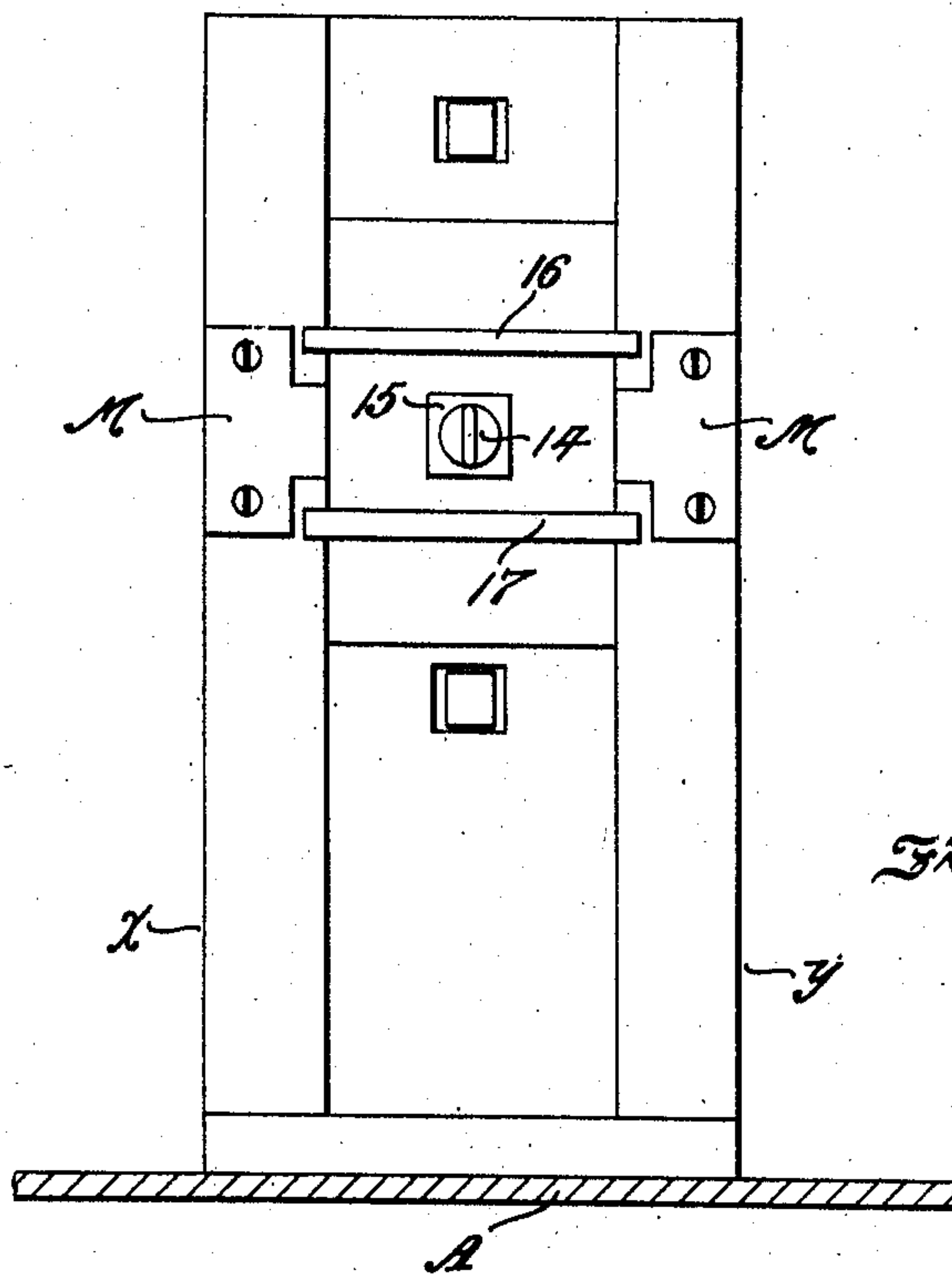


Fig: 15

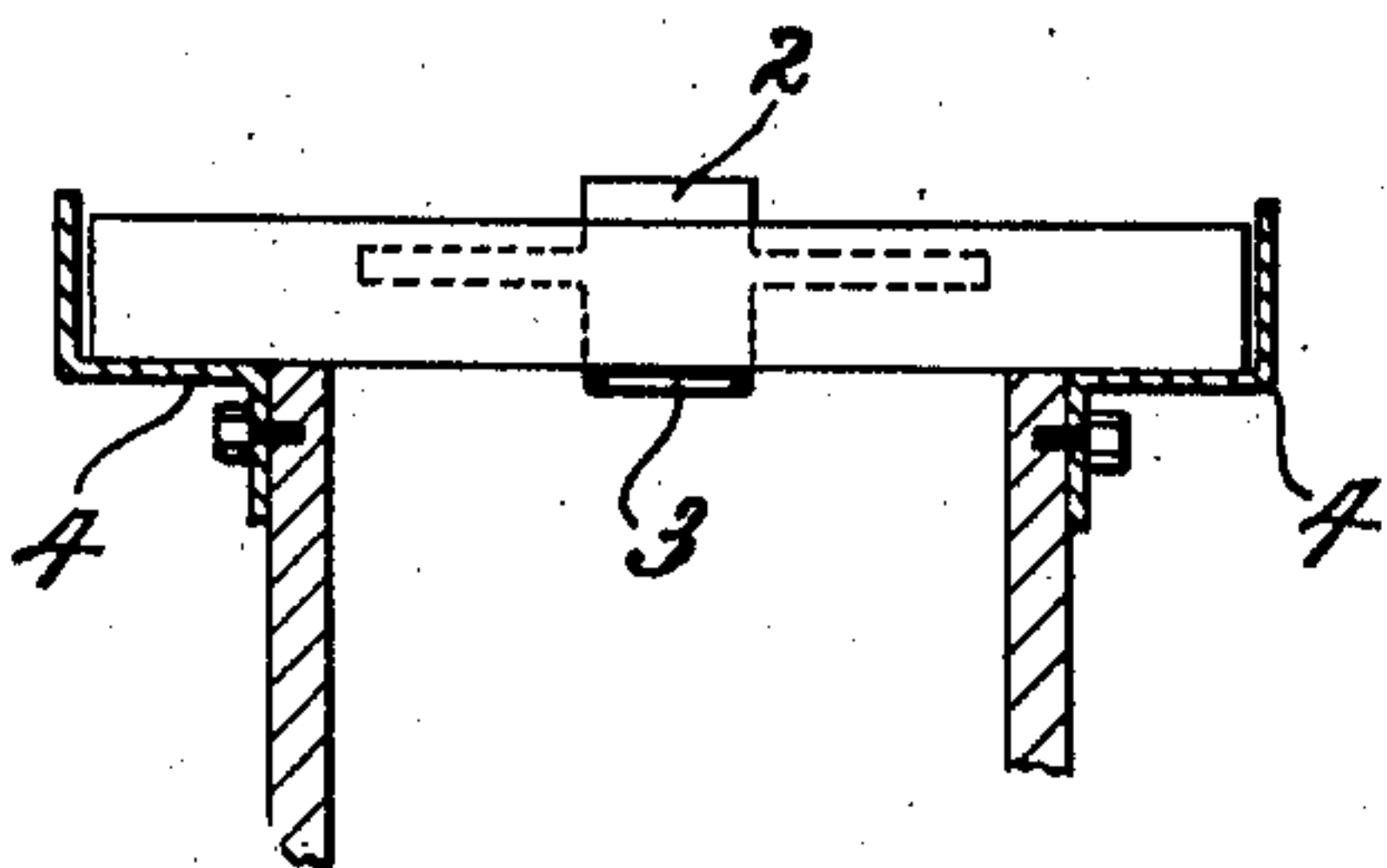


Fig: 13

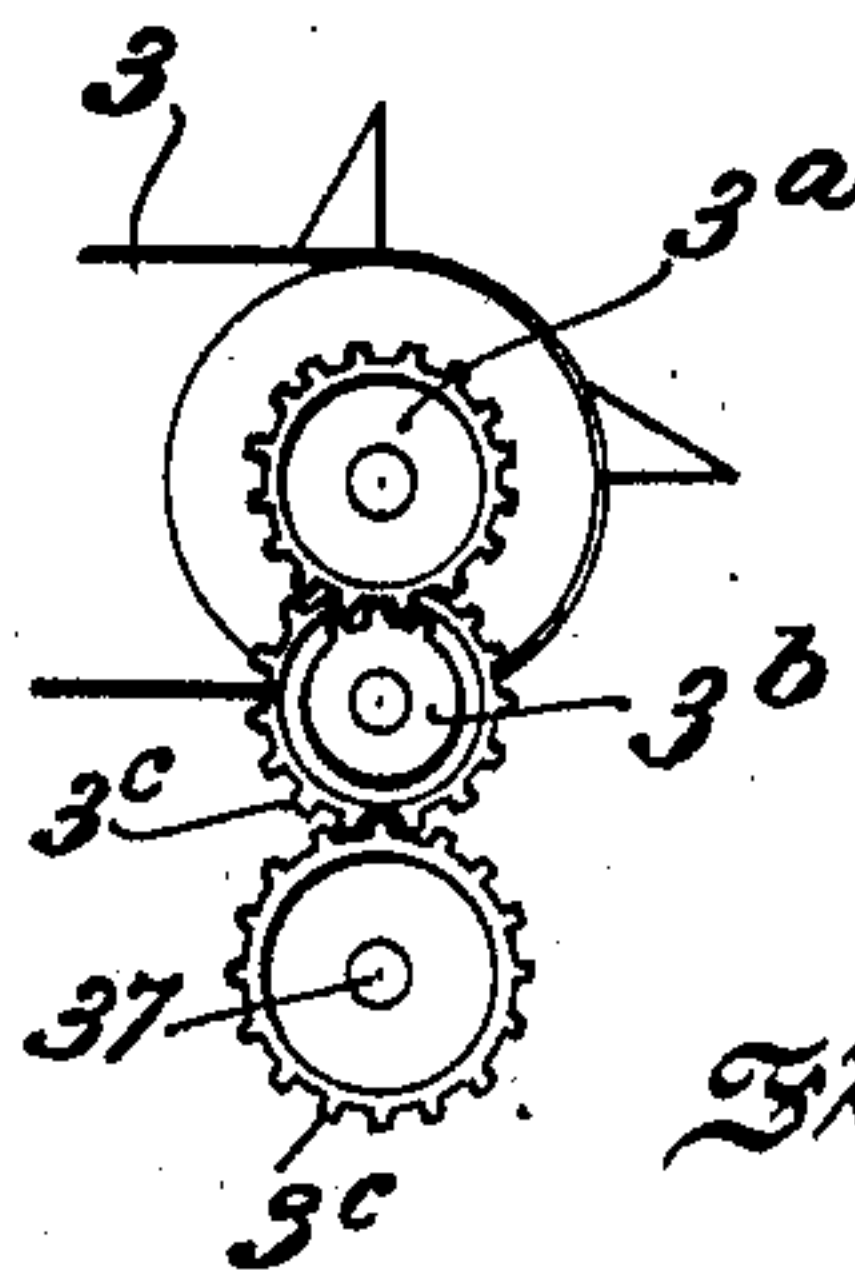


Fig: 12

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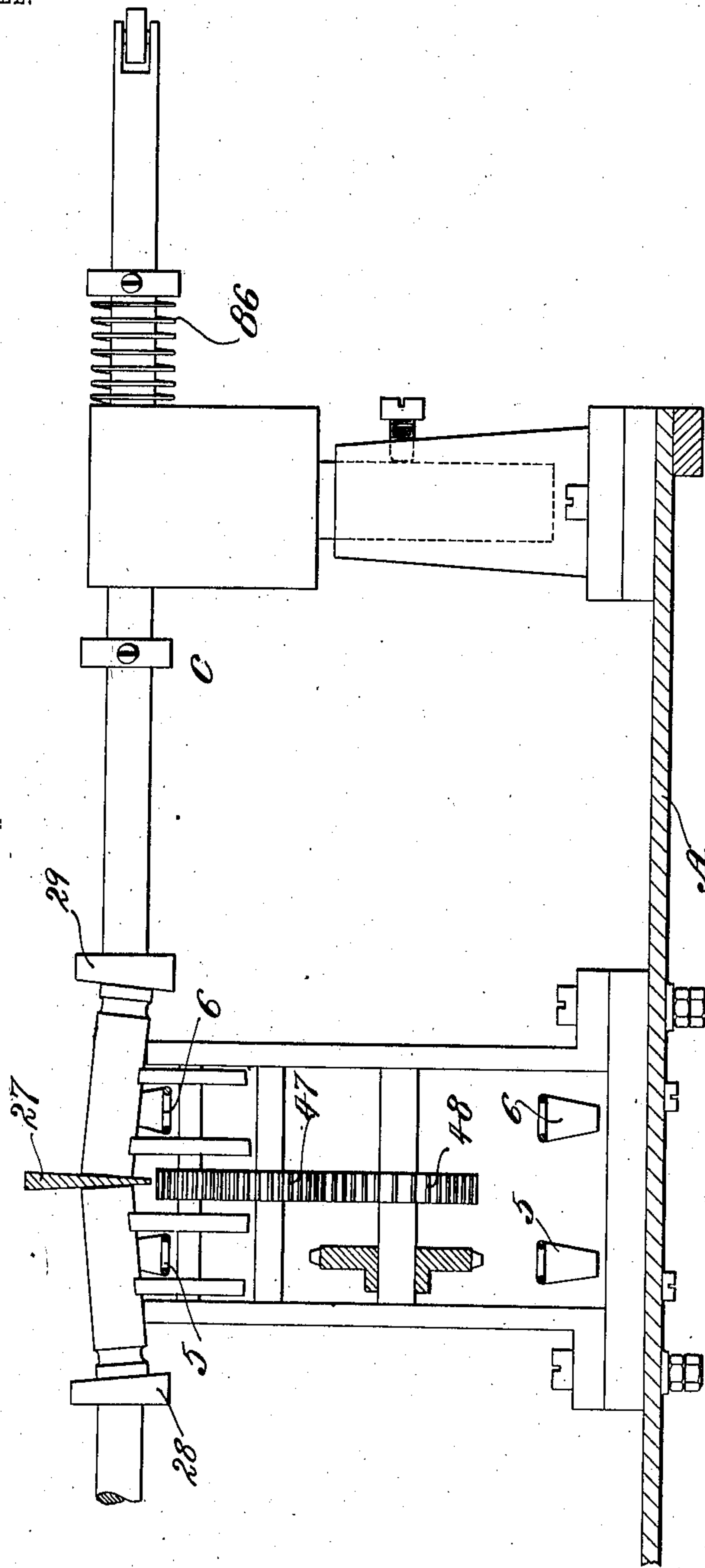
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NO MODEL.

8 SHEETS—SHEET 8.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOSEPH CONDE, OF PHILADELPHIA, PENNSYLVANIA.

BOTTLE-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 778,209, dated December 20, 1904.

Application filed July 18, 1904. Serial No. 217,026.

To all whom it may concern:

Be it known that I, JOSEPH CONDE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Bottle-Making Machine, of which the following is a specification.

The principal object of the present invention is to provide a machine capable of automatically making complete glass bottles or vials and also capable of making parts of the same, so that the articles can be finished either by hand or upon some other machine.

To this and other ends hereinafter set forth the invention comprises the improvements to be presently described and finally claimed.

The nature, characteristic features, and scope of the invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a top or plan view of the machine with parts removed for the sake of clearness. Fig. 2 is a longitudinal sectional view of the machine. Fig. 3 is a transverse sectional view taken on the line 3 3 of Fig. 1 looking toward the right. Fig. 4 is a similar view taken on the line 4 4 of Fig. 1 looking toward the left. Fig. 5 is a similar view taken on the line 5 5 of Fig. 1. Fig. 6 is a top or plan view illustrating the gas and air connections which are omitted from Figs. 1 and 2. Fig. 7 is a face view of a cam. Figs. 8 and 9 are development views of the cam, drawn to a reduced scale. Figs. 10 and 11 are top or plan views of conical rollers. Fig. 12 is a side view showing intermittent carrier-driving mechanism. Fig. 13 is a sectional view illustrating a detail. Fig. 14 is a sectional view taken on the line 14 14 of Fig. 1, and Fig. 15 is an elevational view of the neck-forming jaws.

In making complete bottles or vials tubular blanks of appropriate length for making two bottles or vials are employed. The ends of these blanks are grooved and shaped to form the bottle-necks. The blanks are halved and closed to form the bottoms of the bottles or vials, and if necessary or desirable the bottoms are smoothed and squared. The blanks may

be fed to the machine by the inclined trough 1, having adjustable end guides, which delivers them one at a time to carriers 2, projecting from an endless chain 3. Use may also be made of guides 4, Fig. 13, arranged parallel with the chain and cut away where it is necessary to have access to the ends of the blanks. The carriers 2 may be provided with laterally-extending fingers, as shown in Fig. 3. In this way by the action of the carriers and guides 4 the blanks are carried through the machine, or rather through that portion of the machine which operates upon their ends. There is also a pair of endless belts or aprons 5 and 6, or, at any rate, a divided endless apron or belt. These are provided with carriers 7 and serve to convey the blanks through that part of the machine which operates upon their center portion.

An incline 8, having end guides, is shown for receiving the blanks from the endless-chain apron 3 and delivering them to the divided chain or aprons 5 and 6, or rather to the carriers upon them. The finished articles may be conducted away from the machine by the chute 9, shown as having end and center guides. These chains or carriers are driven by mechanism, to be presently described, with an intermittent motion, so that tubes or blanks are brought to rest in position to be operated upon by the various provisions of the machine, which will be described—that is to say, for example, whenever the aprons stop or pause the necking devices are working upon the necks of some of the blanks, the bottoming devices are working on some of the blanks, and the smoothing or squaring devices are also working on some of the blanks. As the apron 3 moves forward it pauses when a blank is in operative position in respect to the necking mechanism *a* and when another blank is in similar position with respect to the duplicate mechanism *a'*. These two necking mechanisms are duplicates of each other, so that only one, *a'*, of them will be described. As a tube or blank is carried forward by the apron 3 it is delivered upon the supporting-rolls 10, which are positively driven in the same direction by mechanism, to be presently described, and which

are journaled between walls B B' rising from the table A. The apron then pauses and the blank is opposite the abutment 11, Fig. 4, which is adjustably held in a standard rising 5 from the table A of the machine. The positioning-rolls 12, Figs. 2 and 10, then descend, so that their resilient rims bear upon the blank, and their rims are beveled or made in the shape of the frustum of a cone which 10 causes the blank to travel toward the high side or end, and thus positions the blank with one of its ends in contact with the abutment, Fig. 4. The mechanism for operating the positioning-rolls will be presently described.

15 Flames are caused to play upon the end of the rotating blank which is opposite to the abutment, as from the burners 13, Fig. 6. A plug or former 14, Fig. 3, having a shoulder 15, is then projected into the end of the 20 blank by mechanism, to be presently described, whereupon a pair of groove or neck forming jaws 16 and 17 are brought down upon the outside of the blank, and as it rotates they form the grooved neck. The former or 25 plug 14 is inserted farther into the blank, so that its shoulder 15 abuts upon the end and finishes or glazes it. After the neck is formed these jaws are retracted and the former is completely withdrawn, whereupon 30 the carrier 3 resumes its movement and the other end of the blank is made into neck form by the mechanism *a*. The means for operating the neck-forming jaws 16 and 17 will be presently described. The plug 14 35 and jaws 16 and 17 are located between walls *x* and *y* which rise from the table A. The plug-bar works through a guide 14^a, Fig. 3, which is adjustably supported in a socket held between the walls *x* and *y*.

40 The blanks as they leave the carrier 3 are of the general form indicated upon the incline 8 in Fig. 1. The blanks are delivered upon the aprons 5 and 6, and the latter pause opposite the bottoming mechanisms *b* and *b'*, each of 45 which is a duplicate of the other. In this position the blanks rest upon supporting-rolls 18 and 19, Fig. 5, which are positively driven in the same direction and are rotated. The separating-rolls 20 and 21, Fig. 11, are then 50 caused to bear upon the blank, which is also subjected to heat, as from the burners 22 and 23, Fig. 6. The edges of these separating-rolls 20 and 21 are resilient and beveled in opposite directions or cone-shaped, so that 55 they tend to pull the blank apart at its center. The hooks 24, Fig. 5, enter the ends of the blanks and hook into the neck portion and are then pulled back, so as to assist in separating the two parts of the blank. During this op- 60 eration the head 25 contacts with the ends of the blank and keeps it in proper position. Subsequently the hooks 24 disengage the necks and are withdrawn from the interior of the blank. The blank then consists, in effect, of 65 two complete vials, one traveling on the apron

5 and the other on the apron 6. Mechanism for operating the hooks 24 will be presently described.

The divided blank is arrested opposite the bottom-finishing mechanism *c* and *c'*, Fig. 70 14, and is rotated upon supporting-rollers, which taper from the center so as to be smallest at the ends. The bottoms of the blanks are subjected to heat, as from the burner 26, and the wedge-shaped end of the finisher 27 75 comes down between their bottoms, while the pushers 28 and 29 operate upon the necked ends and serve to press the bottoms upon the opposite sides of the finisher 27, thus smoothing and squaring the bottoms. Afterward 80 the finished bottles are delivered upon the chute 9, where two of them are represented diagrammatically. The mechanism for operating the pushers and the finisher will be pres- 85

Mechanism suitable for operating the neck- 85 ing mechanism *a'* will now be described.

The plug-bar is afforded a range of endwise motion and there is upon it an adjustable collar 30 and a spring 31, which tend to shift 90 it toward the right in Fig. 3 and keep it in contact with the face of a cam 31^a, Fig. 1. The face of the cam 31^a is adapted to push the plug 14 forward, permitting it to remain in that position, and then push it still farther 95 forward, and finally permit it to return to its initial position. The neck-forming jaws 16 and 17 are carried by blocks, which are slidably mounted between the walls *x* and *y* and to which they are detachably connected, 100 so that they may be renewed or replaced by others of different sizes. These blocks have slot-and-pin connection with separately-adjustable levers pivoted at 32, each having 105 arms 32^a and operated upon by cams 33 and 34, located outside of the wall *y*, Fig. 3, to close them and each having arms 32^b, operated upon by cams 33^a and 34^a outside of the wall 110 *x*, Fig. 4, to open them. The top blocks are provided with springs which tend to keep the levers in proper engagement with the cams.

M represents stops detachably applied to the walls *x* and *y*, Fig. 15, in range of the jaws 16 and 17 for positioning them, and incidentally keeping them clear of the plug-bar 115 14. The cams 33 and 34 and 33^a and 34^a are geared together and motion is imparted to them by beveled gears 36 and 36^a.

37 is a shaft positively driven by the sprocket-chain 38 from the shaft 39, which in its turn 120 is driven by the pulley 40. The cam 31^a of the mechanism *a* is driven from the shaft 37 by means of the sprocket-chain 41, and the cam 31^a of the mechanism *a'* is driven from the shaft 37 by way of the sprocket-chain 44. 125

45 is a shaft which carries the cam 31^a and drives the beveled gears 36 of the mechanism *a*, and 46 is a shaft which carries the cam 31^a and drives the beveled gears 36^a of the mechanism *a'*. 130

The walls B and B', between which the supporting-rolls are journaled, are adjustable in respect to the table A by means of the adjusting screws or bolts A', Figs. 3 and 4.

5 C, Fig. 4, is a lubricant-receptacle which may be mounted upon the walls x and y , so that its contents may be kept at the proper temperature by the heat of the burners 13. The pipe C' from this receptacle is arranged
10 to convey lubricant to the plug 14, and the supply is made intermittent by the valve C², which is opened and closed by the spring C³, and the cam C⁴, mounted on the shaft which carries the cams 33 and 33^a and arranged to operate
15 upon a pivoted lever C⁵, which in its turn operates upon a projection from the valve-plug.

Mechanism for driving the supporting-rollers 10 will now be described. Each pair of these rolls is driven by a gear-wheel 47, and
20 these gear-wheels 47 mesh with other gear-wheels, 48, mounted on shafts driven by the sprocket-chain 49, and one of these shafts in its turn is driven from the shaft 50, and the shaft 50 is driven from the shaft 37 by the
25 gearing 51. The supporting-rolls for the bottoming mechanism at the left of the machine are similarly geared together and driven from the shaft 39 by the gearing 51.

Mechanism for operating the positioning-rolls 12; Fig. 2, will now be described. These
30 rolls are carried by arms 52, pivoted to shafts which are driven as by a link belt 53, and power is applied to one of these shafts by the link belt 56 from the shaft 37. These shafts
35 carry sprocket-wheels 57, which are geared to the rolls, so as to drive them and also the cams 58. The latter cooperate with arms on bell-cranks 59, which engage pins 60 on the
40 arms 52, so that the cams 58 turn the bell-cranks and lift the arms 52. 61 represents back-stops for the bell-cranks.

Mechanism suitable for imparting an intermittent motion to the feed-apron 3 is fully described and illustrated in Letters Patent No.
45 727,294, granted to me under date of May 5, 1903, and may be described as follows: The sprocket-wheels which carry the feed apron or conveyer 3 are mounted upon shafts of which one is provided with a gear-wheel 3^a, Fig. 12,
50 which is intermittently driven by a gear-wheel 3^b, having only a few teeth. The so-called "broken gear-wheel" 3^b is driven from the shaft 37 by the gearing 3^c. The conveyers 5 and 6 are similarly driven from the shaft 39.

55 The mechanism which operates the separating-rolls 20 and 21 and also the finisher 27 is substantially the same as has been described with reference to the positioning-rolls and need not be described further than to say
60 that the belts 62 and 63 are employed for conveying power.

Mechanism will now be described for operating the hooks 24.

Each hook is pivotally connected with a head
65 25, arranged upon a rod 66, slidable in a block

67, Fig. 5. The rod 66 is provided with a spring and collar 67^a, which serves to hold it up against the cam-face 68 of the cam 69. The hook 24 is provided with a tail 70, which co-
operates with a spring-buffer 71 and with a cam-rod 72, which is held by a spring and collar 73 up against the cam-face 74 of the cam 69. The cams 69 are driven by chains 75 and 76 from the shaft 39. Referring to Figs. 8 and
75 9, the portion 77 of the cam-face 68 pushes the rod 66 and head 25 inward and the portion 78 of the cam 74 likewise pushes the rod 72 inward. The effect of the latter is to hold the hook up against its back-stop 78, so that it enters the bottle-neck, even to the extent
80 of permitting the head 25 to contact with the end of the same, as has been described. At the lower parts of the cams the part 79 permits the rod 72 to be raised toward the right, so that the buffer 71 turns the hook downward
85 away from the stop 78 into engagement with the inside of the bottle-neck. Continuing in the low parts of the cams, both the parts 66 and 72 continue to move toward the right, thus drawing the blank apart at the center, as
90 has been described. Afterward the head 25 and hook 24 are moved inward by the high parts 80 and 81 of the cams, properly positioning the bottle, and finally by the low parts 82 and 83 of the cams the hook in contact with its back-
95 stop 78 is entirely withdrawn from the neck of the bottle. The walls E and E' are adjustable in respect to the table A by means of the set screws or bolts A'. The block 67 is mounted in a socket rising from the table A
100 and made adjustable by means of the set-screw E², and E³ is a collar adjustable on the rod 66.

Mechanism will now be described for operating the pushers 28 and 29, Fig. 14, which
105 are slidable in heads adjustable in standards rising from the table.

84 and 85 are cams mounted upon suitable shafts chained to the main shaft 3 and journaled in suitable bearings rising from the
110 table A. The cams are adapted to operate upon the shanks of the pushers, which are held against the cams by springs 86, Fig. 14.

87 represents gas connections for supplying the various burners, and 88 and 89 are air con-
115 nections for supplying the various burners, as will be seen by reference to Fig. 6. The air connections are provided with air-valves 90 and 91, which are so manipulated that the air is or may be turned off, except when it is de-
120 sired to heat the blanks.

92 and 93 are cams driven from the shafts 37 and 39 by the gearing 94 and 95 and arranged to cooperate with the handles of the air-valves 90 and 91, so as to intermittently
125 turn them on and off at appropriate times.

When the air is turned off the burners 13, the yellow flame deposits fine carbon on the upper jaw 16, and this deposit of carbon serves to polish and finish the grooved neck.
130

The various parts of the machine are adjustable, as has been described and shown, so as to accommodate the machine to operate upon blanks of various sizes appropriate for the production of vials or bottles of different dimensions.

It will be obvious to those skilled in the art to which my invention relates that modifications may be made in details without departing from the spirit thereof. Hence the invention is not limited further than may be required by the prior state of the art; but,

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for making glass bottles the combination of necking mechanism comprising a slidable plug and a pair of jaws movable in respect thereto and mechanism for shifting these parts, supporting-rolls, an abutment opposite said plug, a conveyer for feeding blanks, tapering positioning-rolls, heating devices, and means for actuating said parts, substantially as described.

2. In a machine for making bottles the combination of supporting-rolls, an abutment, a positioning-roll for arranging blanks in contact with the abutment, neck-making mechanism, and devices for operating said parts, substantially as described.

3. In a bottle-making machine the combination of slidable jaws adapted to contact with the outside of the blank, devices for operating said jaws, and means for depositing carbon on said jaws, substantially as described.

4. In a bottle-making machine the combination of neck-forming slidable jaws, cams for operating said jaws, and pivotal arms adjustable in respect to each other and adapted to coöperate with the cams and jaws, substantially as described.

5. In a bottle-making machine the combination of a reciprocating plug-bar, walls on each side of the bar, neck-forming jaws slidable between said walls, means for shifting said parts, and stops applied to said walls in range of the jaws for positioning the latter, substantially as described.

6. The combination of rolls arranged adjacent to each other and adapted to support a blank or tube in rolling contact and between them, means for positively driving said rolls in the same direction, a positioning-roll and means for driving it in the same direction as the first-mentioned rolls, substantially as described.

7. The combination of a conveyer for carrying a series of blanks, a pair of neck-forming mechanisms arranged out of line in respect to each other, and means for intermittently shifting the conveyer to successively present the ends of blanks to the neck-forming mechanisms.

8. In a bottle-making machine the combination of supporting-rollers, hooks adapted

to engage a shoulder at the ends of a blank and to pull the same apart at the center, beveled separating-rolls adapted to contact with the blank so as to pull it apart, and means for operating said parts, substantially as described.

9. In a bottle-making machine the combination of a hook adapted to engage a shoulder at the end of a blank, and means for causing said hook to engage, pull and disengage, substantially as described.

10. In a bottle-making machine the combination of means for rotating a blank, an abutment, and a beveled roller for positioning the blank in respect to the abutment, substantially as described.

11. In a bottle-making machine the combination of a wedge-shaped finisher-bar, oppositely-beveled supporting-rollers, and pushers, substantially as described.

12. In a bottle-making machine the combination of a finisher, rollers arranged in pairs upon opposite sides thereof for supporting blanks, pushers for pressing the bottoms of the blanks against the finisher, and means for operating said parts, substantially as described.

13. In a bottle-making machine the combination of a conveyer, neck-forming mechanisms arranged on opposite sides of said conveyer, conveyers provided with a space between them, bottom-forming mechanism located between said conveyers, means for delivering blanks from the first-mentioned conveyer to the others, and devices for operating said parts, substantially as described.

14. In a bottle-making machine the combination of neck-forming mechanism, bottom-forming mechanism, a conveyer for presenting the ends of blanks to the neck-forming mechanism, conveyers for presenting the ends and centers of blanks to the bottom-forming mechanism, means for delivering blanks from the first-mentioned conveyer to the other, and devices for operating said parts, substantially as described.

15. In a bottle-making machine the combination of slidable rods, a hook pivoted to one of said rods and provided with a tail in range of the other of said rods, a spring-buffer, and means for operating said rods to project, retract and turn the hook, substantially as described.

16. In a bottle-making machine the combination of means for applying heat at or near the center of a blank, devices for rotating the blank, and means for engaging the respective ends of the blank and pulling it apart, substantially as described.

17. A machine for making bottles or vials comprising the combination of a conveyer for presenting the ends of blanks, a trough for feeding blanks to the conveyer, sets of neck-forming mechanism arranged out of alignment with each other and on opposite sides of

the conveyer and each set comprising positively-driven supporting-rollers and heating devices and plugs and jaws and operating mechanism, a pair of endless conveyers having a space between them, means for transferring blanks from the first conveyer to the others, heating devices between the last-mentioned conveyers, hooks and their operating devices on each side of said conveyers, a finisher between said conveyers, pushers on the sides of said conveyers, supporting-rollers, and actuating mechanism, substantially as described.

18. A machine for making bottles comprising the combination of a conveyer, two sets of positively-driven supporting-rollers, abutments on one side of each set of rollers, neck-forming mechanism on the opposite side of each set of rollers, positioning-rollers for each set of supporting-rollers, and means for operating said parts, substantially as described.

19. A machine for making bottles comprising the combination of a conveyer, two sets of positively-driven supporting-rollers, abutments on one side of each set of rollers, neck-

forming mechanism on the opposite side of each set of rollers, positioning-rollers for each set of supporting-rollers, a pair of conveyers having a space between them, means for transferring blanks from the first-mentioned conveyer to said pair of conveyers, two sets of supporting-rollers of which one is beveled and of which both are arranged outside of and between said pair of conveyers, devices for hooking the ends of blanks and pulling them apart, heating means, a finisher between said conveyers, pushers cooperating with the finisher, and means for actuating said parts, substantially as described.

20. In a machine for making bottles, a reciprocating head provided with a pivoted hook between which and the face of the head the bottle-necks are held, substantially as described.

In testimony whereof I have hereunto signed my name in the presence of two witnesses.

JOSEPH CONDE.

Witnesses:

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