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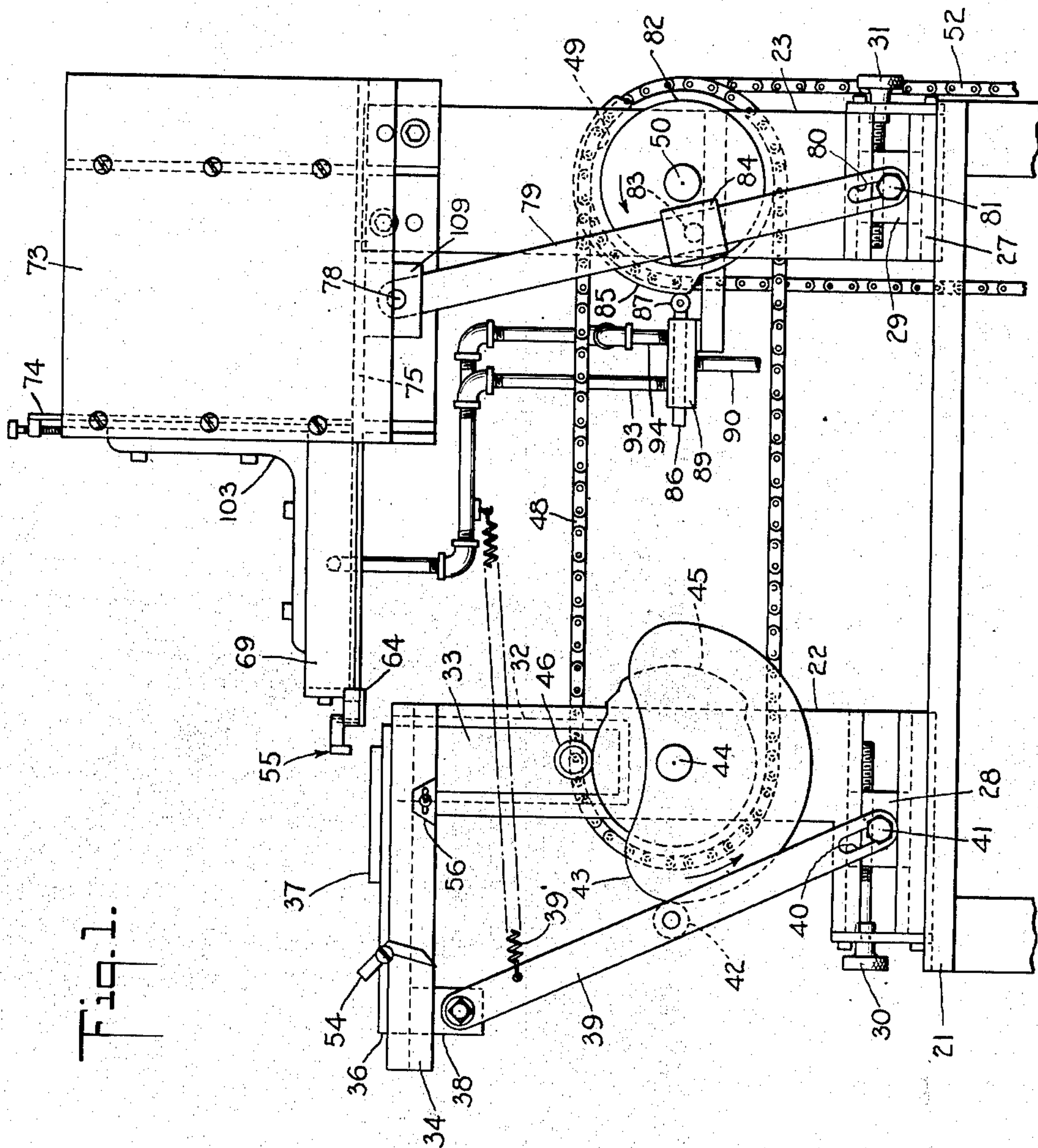
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2,629,296

MACHINE FOR AUTOMATICALLY CARDING CURLERS

Filed Feb. 10, 1948

9 Sheets-Sheet 1



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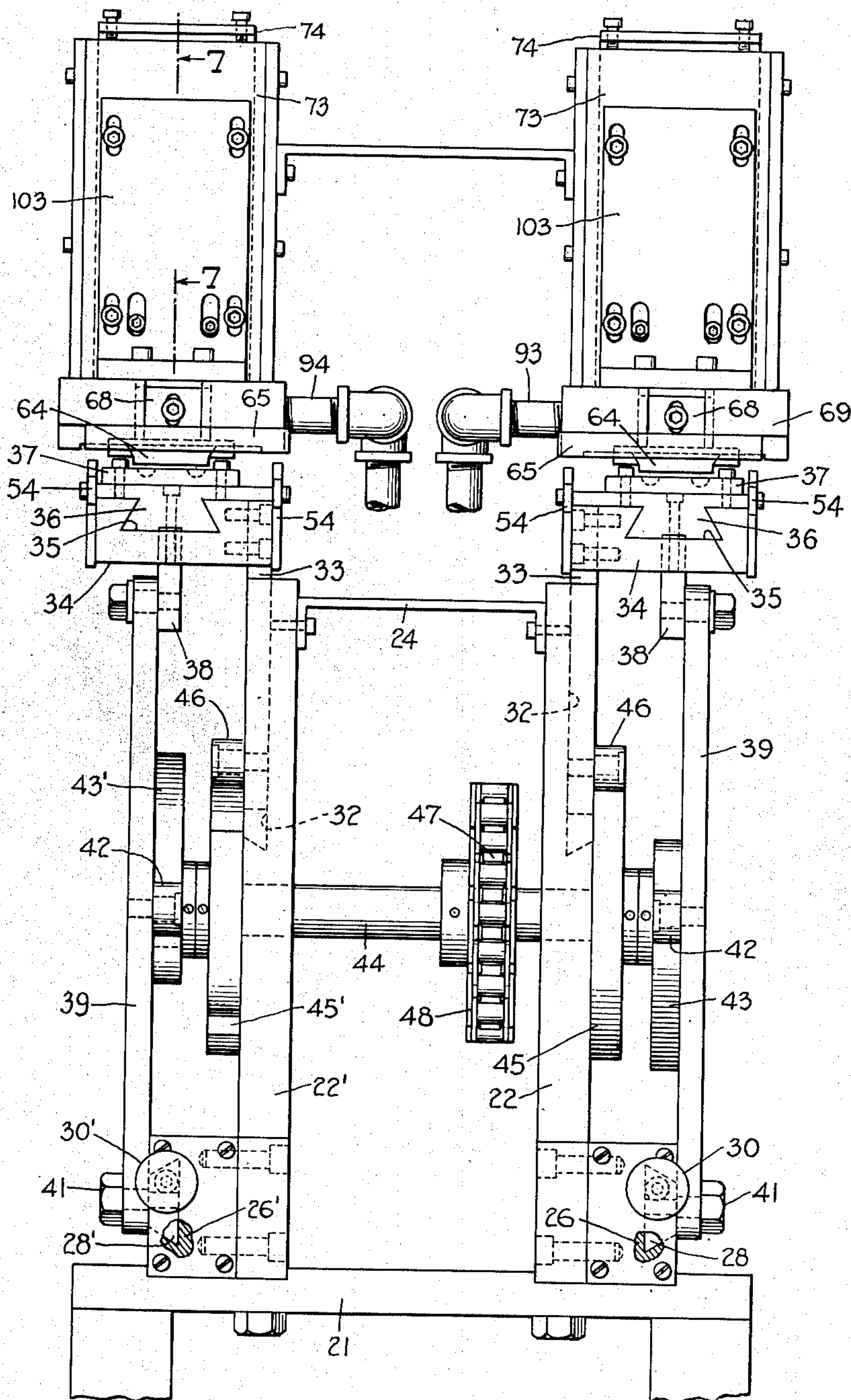


Fig. 2.

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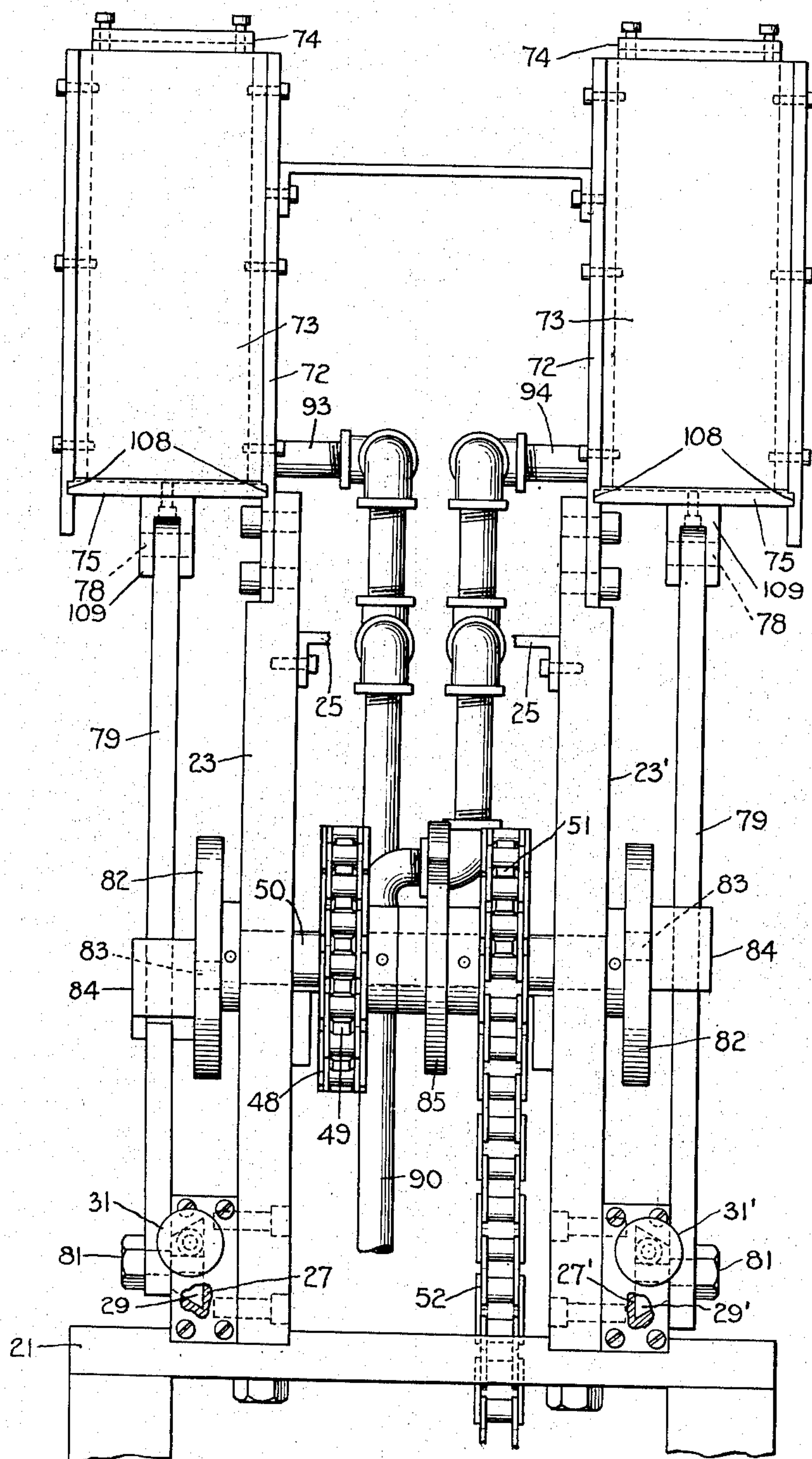


Fig. 3.

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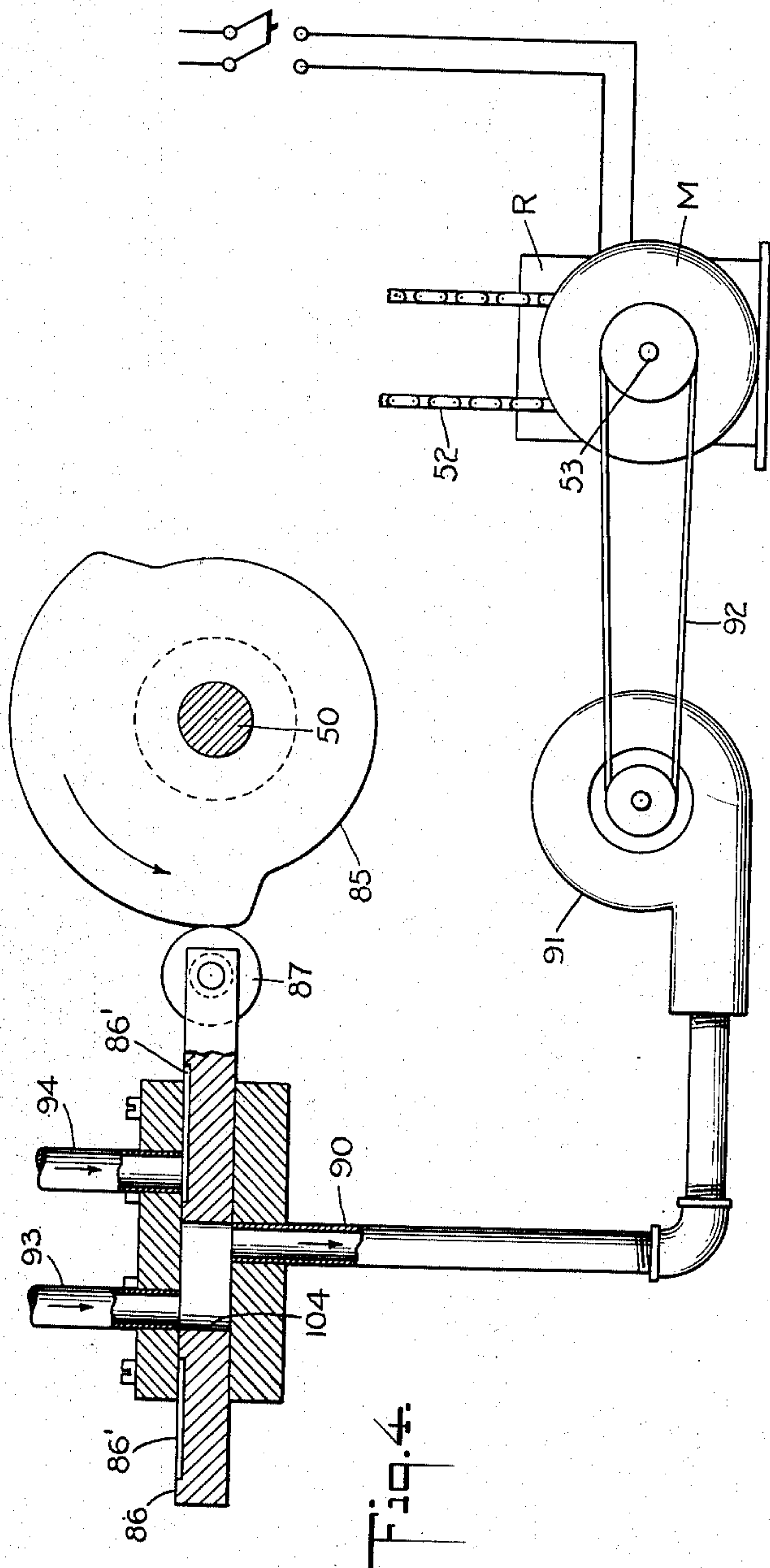
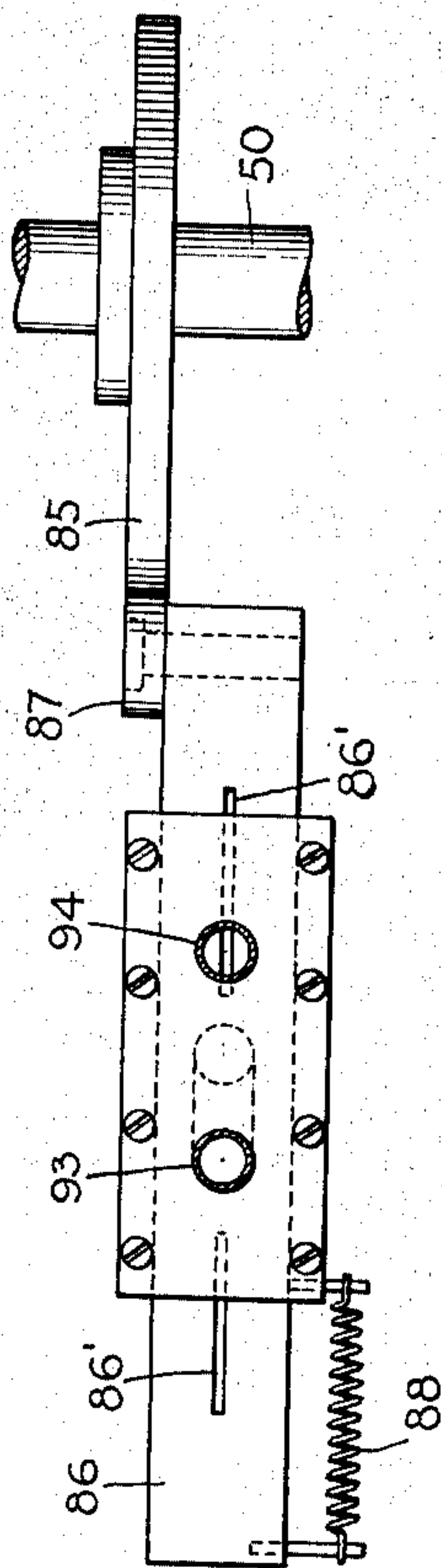


Fig. 4.

Fig. 5.

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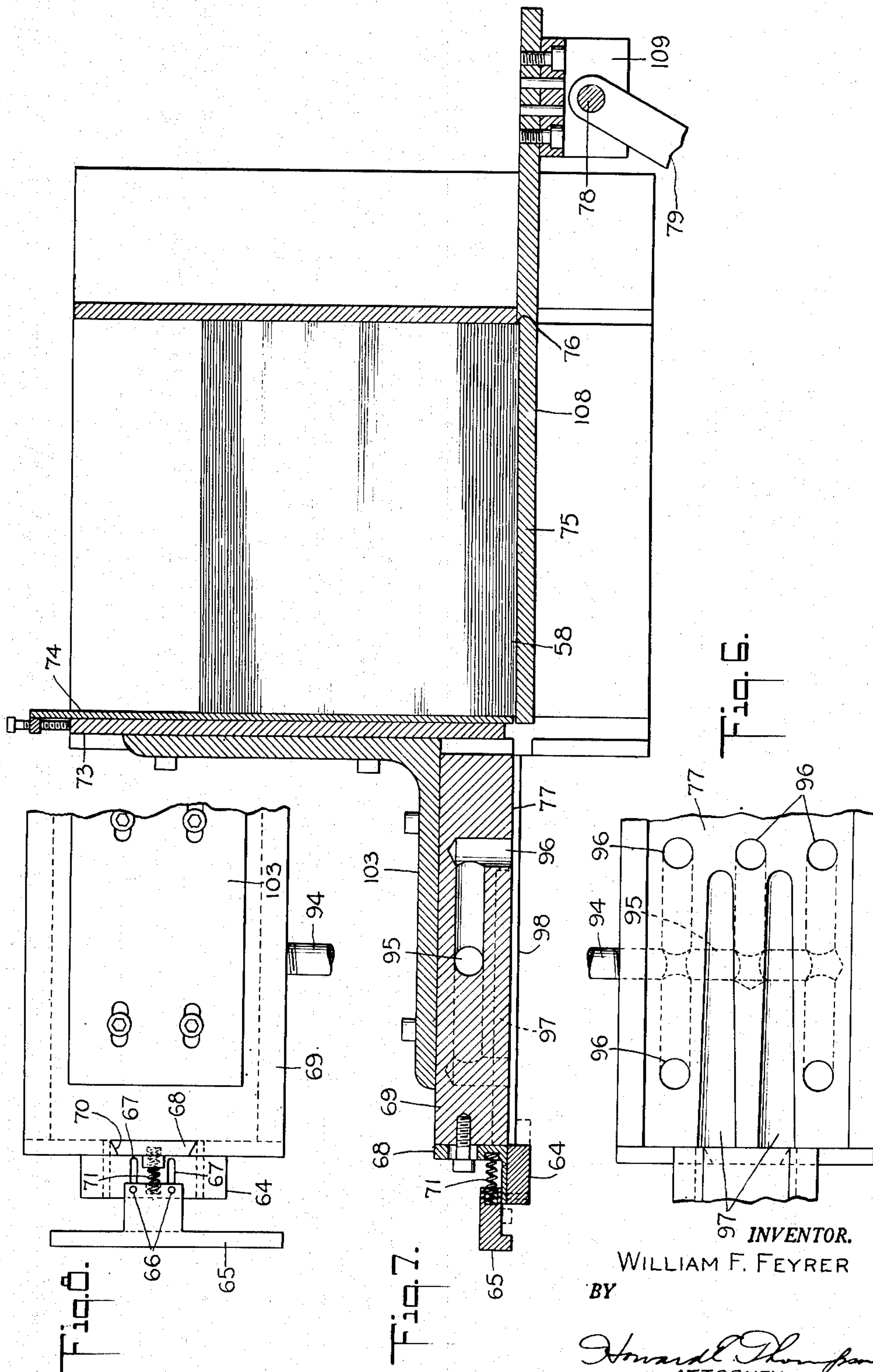
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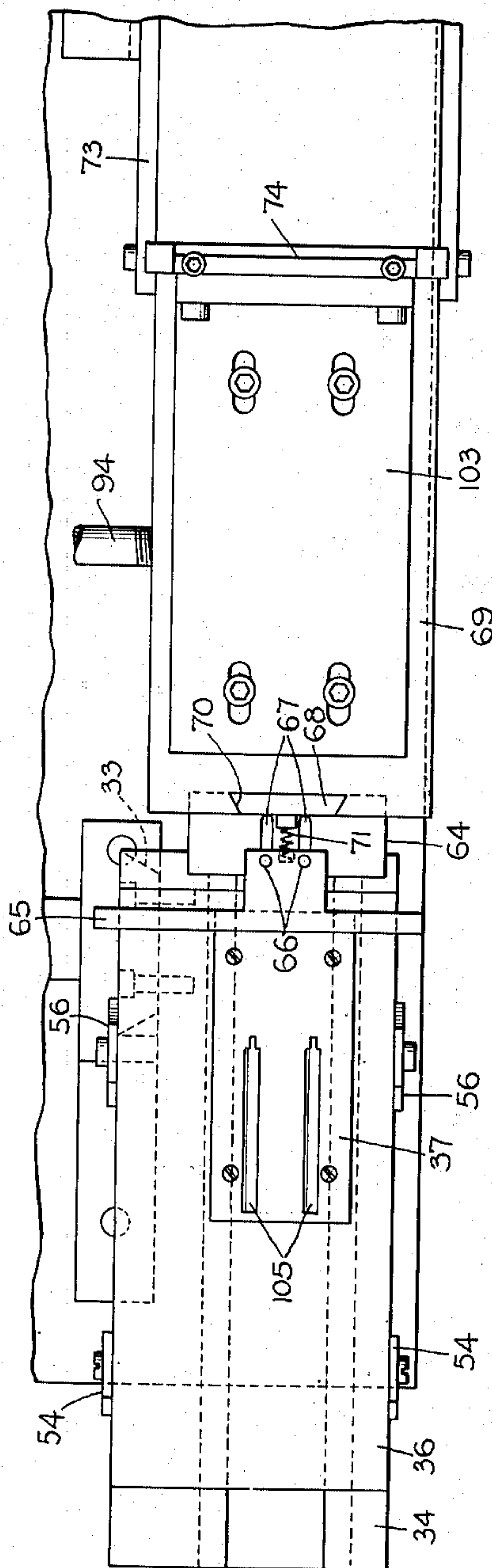
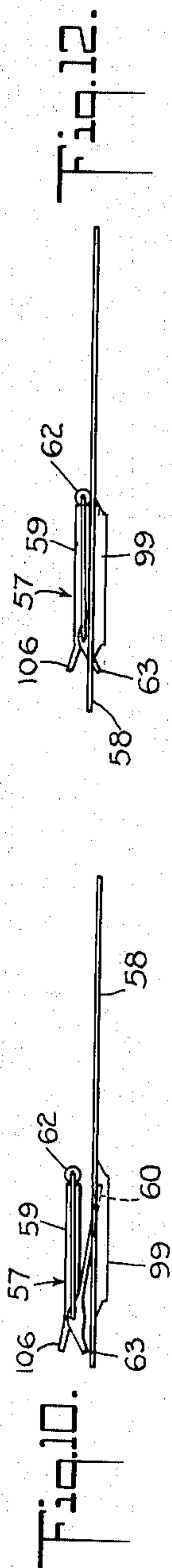
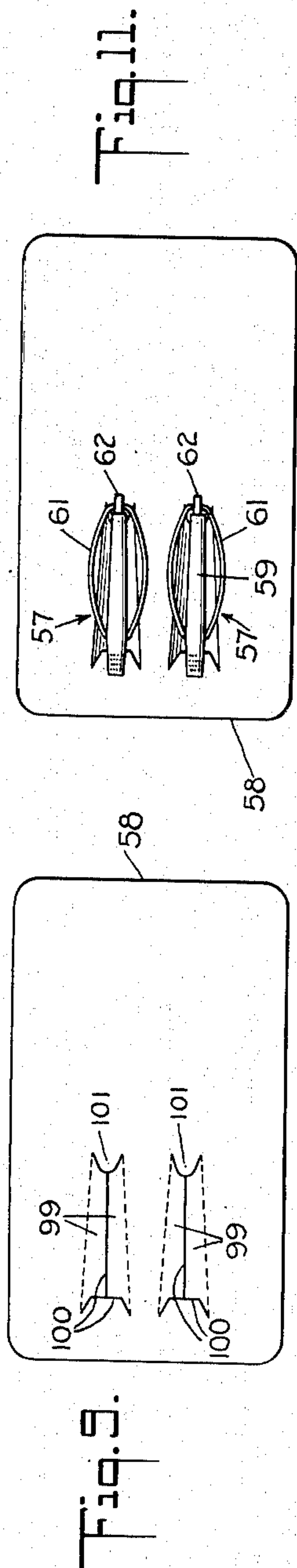


Fig. 13.

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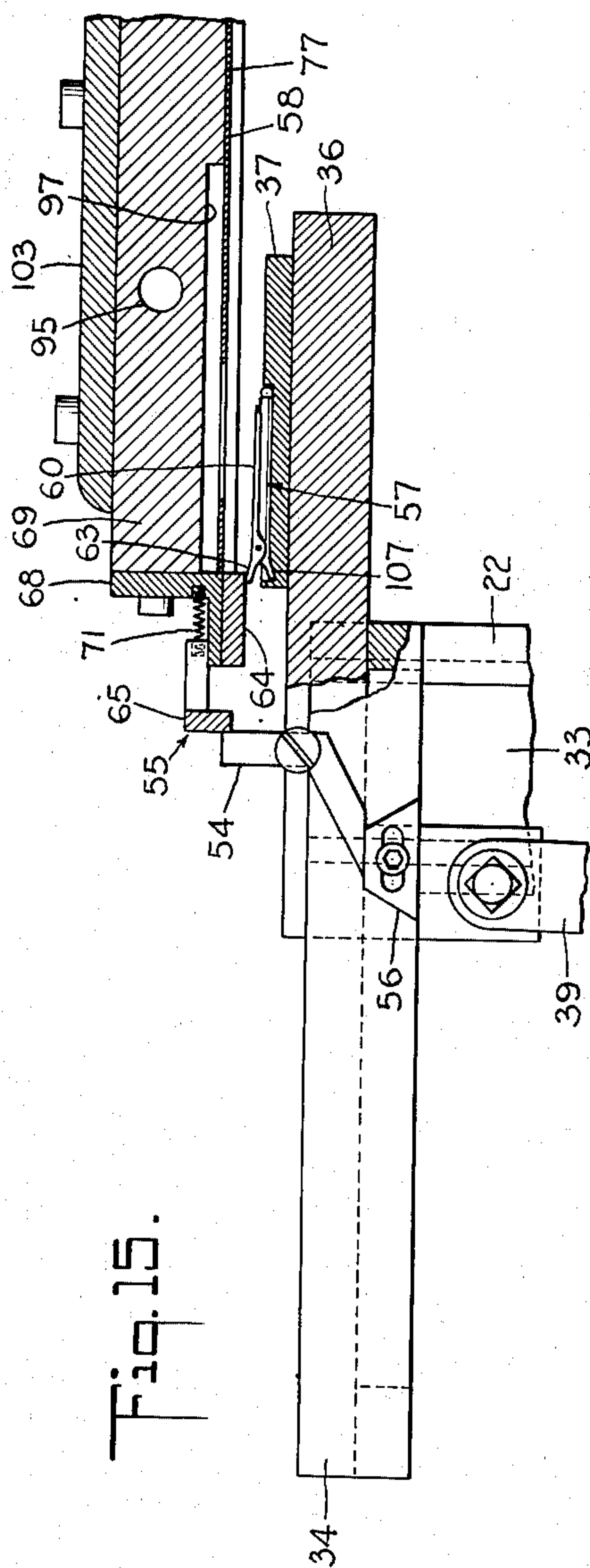
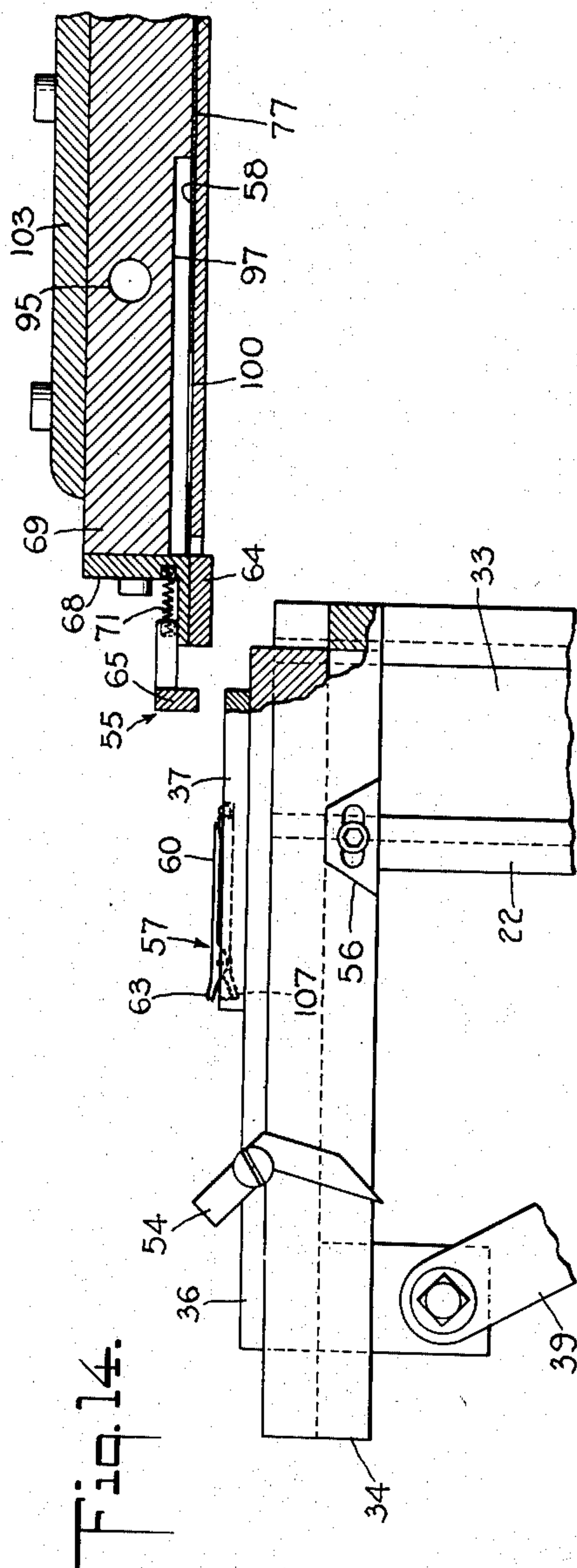
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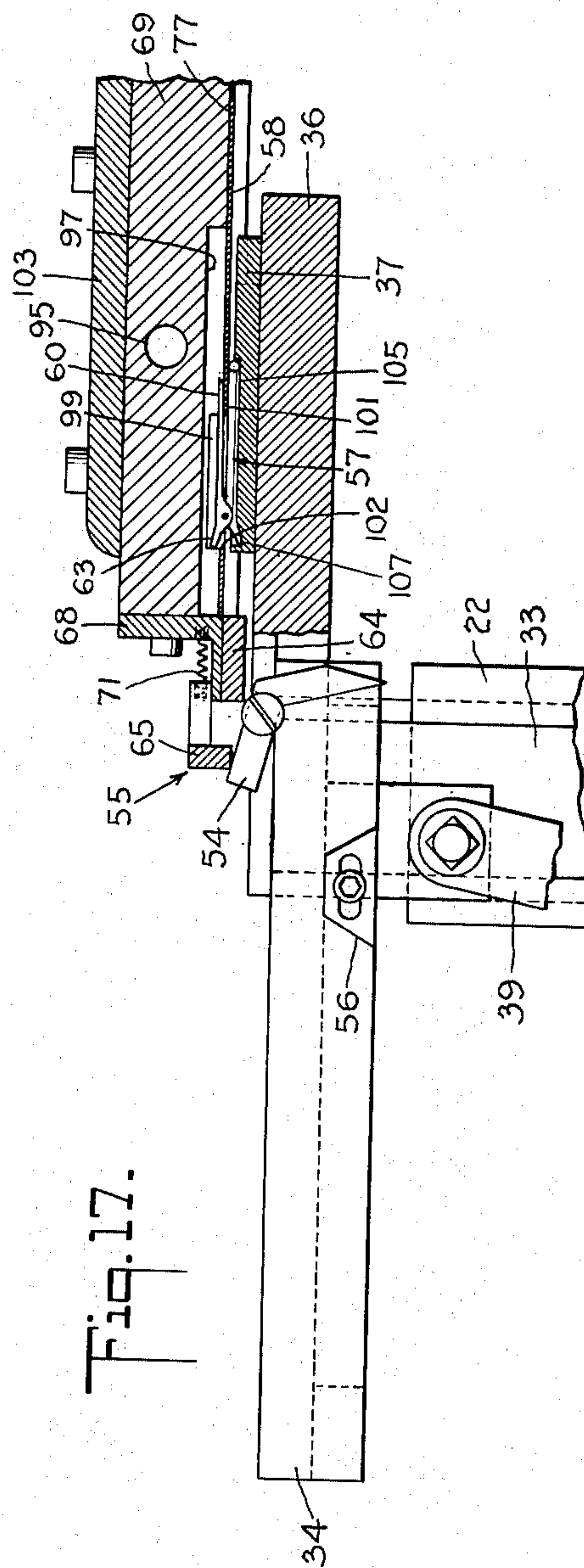
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MACHINE FOR AUTOMATICALLY CARDING CURLERS

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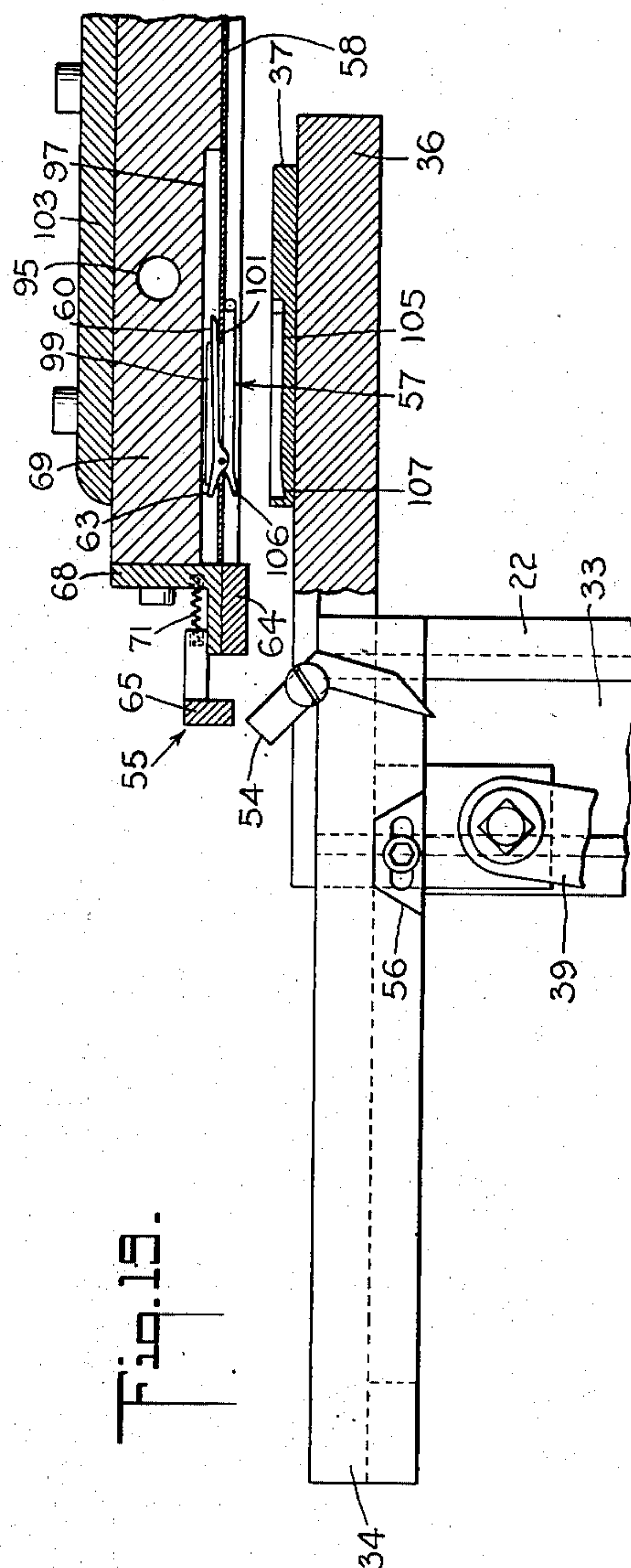
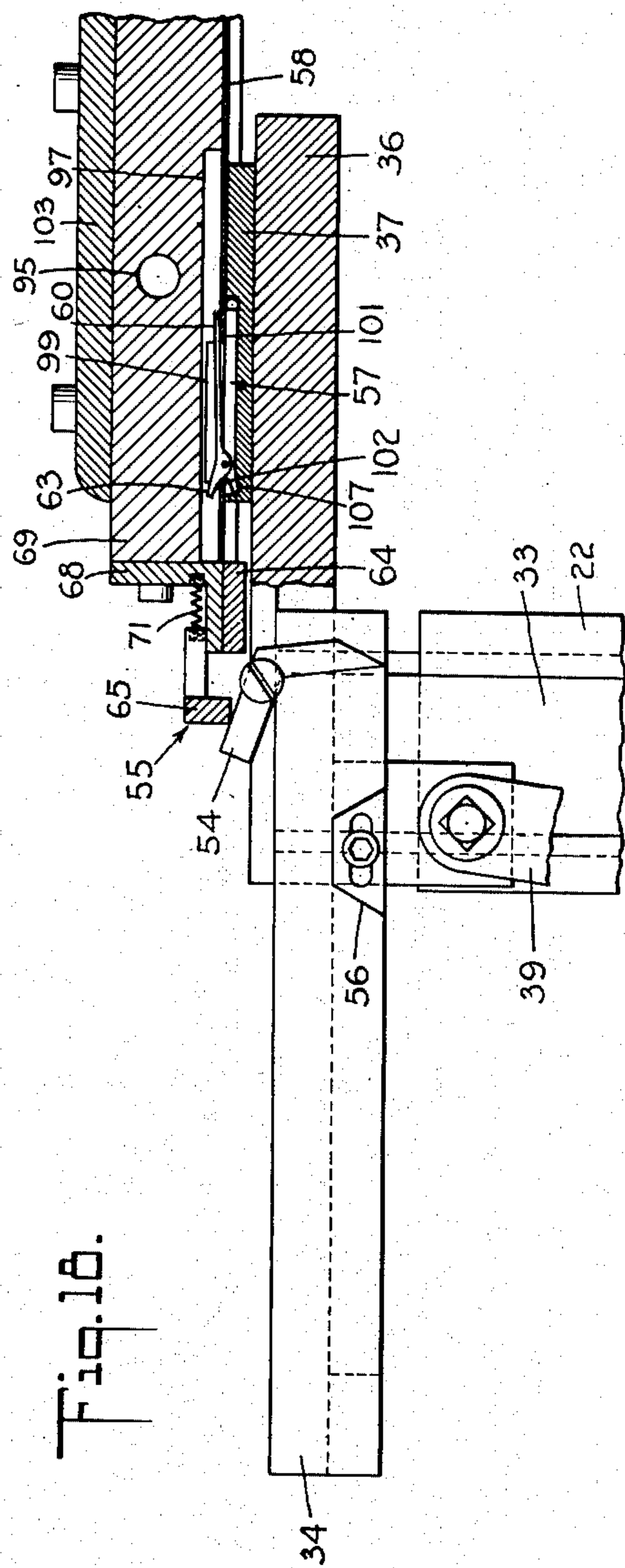
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MACHINE FOR AUTOMATICALLY CARDING CURLERS

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9 Sheets-Sheet 9



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2,629,296

MACHINE FOR AUTOMATICALLY CARDING
CURLERSWilliam F. Feyrer, Englewood, N. J., assignor to
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Application February 10, 1948, Serial No. 7,473

8 Claims. (Cl. 93—1)

1

This invention relates to the packaging or carding of articles of manufacture, such for example, as hair curlers. More particularly, the invention deals with a machine for automatically applying two or more curlers to a card to retain the same against displacement therefrom and to deliver the card assemblages from the machine into a suitable receptacle. More particularly, my invention deals primarily with the automatic delivery of cards and workpieces, such as hair curlers, to what may be termed an assembly station, and in so actuating and manipulating the curlers so as to effect assemblage with cards held in fixed position at said station, and finally in release of the cards for delivery through the machine. Still more particularly, the invention consists in employing what may be termed a dual machine whereby two stacks of cards may be employed and assemblage of workpieces performed on a card from one stack while preparation is being made for assembly on a card of the companion stack.

The novel features of the invention will be best understood from the following description when taken together with the accompanying drawings, in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views; and in which:

Fig. 1 is a side view of one unit of the machine with parts of the construction broken away and showing parts of the machine in the normal position preparatory for delivery of cards and workpieces.

Fig. 2 is a front view of the machine on an enlarged scale, with parts of the construction broken away and showing both units of the machine.

Fig. 3 is a rear view of the machine on an enlarged scale, with parts of the construction broken away and showing both units of the machine.

Figs. 4 and 5 are diagrammatic views showing the drive and suction mechanism of the machine.

Fig. 6 is a bottom plan view of the suction card holding platen of one unit of the machine, with parts of the construction broken away.

Fig. 7 is a sectional view through the hopper, card carrying or delivery and card holder mechanisms of the machine.

Fig. 8 is a fragmentary top view of the suction platen and product control.

Fig. 9 is a top view of one of the card blanks which I employ.

Fig. 10 is a side view of the card shown in Fig.

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9 and indicating the first step in attachment of a product therewith.

Fig. 11 is a view similar to Fig. 9, showing a pair of products attached to a card.

Fig. 12 is a side edge view of the structure as seen in Fig. 11.

Fig. 13 is a plan view of the work supporting platen and slide, card suction platen, product control and a fragment of the card hopper.

Fig. 14 is a diagrammatic sectional view on an enlarged scale of the work and card holder platens, showing the work holder platen preparatory for movement in the direction of the card holder platen.

Fig. 15 is a view similar to Fig. 14, showing the work holder platen in position preparatory for upward movement in the direction of the card holder platen.

Fig. 16 is a view similar to Fig. 15, showing the work holder platen in a partial raised position with the workpiece engaging the card.

Fig. 17 is a view similar to Fig. 16, showing the work holder platen in a further raised and longitudinally fed position establishing the first coupling engagement of the workpiece with the card.

Fig. 18 is a view similar to Fig. 17, showing the work holder platen in a reversely moved position establishing further engagement of the workpiece with the card; and

Fig. 19 shows the work holder platen in a lowered position preparatory for return to the position shown in Fig. 1, and preparatory to release of the card assemblage from the card holder platen.

In Figs. 1 to 3 inclusive, I have shown at 21, part of the upper portion of a table, base or stand, upon which my improved machine is constructed. The machine comprises what may be termed two similar operating units, or a dual machine, the units operating alternately so as to provide for a workpiece loading time while the carding operation is being performed by the companion machine unit. As each unit is of the same construction, one detailed description will be given of one unit and the other unit referred to as and when necessary to clarify the present description.

Each unit of the machine comprises vertical supporting plates 22—22' and 23—23', the plates of these units being joined by cross straps, as at 24 and 25 respectively. Secured to the lower ends of the plates 22—22' are grooved guide blocks 26—26' and 27—27' in which are mounted manually adjustable slidable pivots 28—28' and 29—29', the pivots being adjustable through the medium of screws 30—30' and 31—31'. All of

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said screws have bearing mountings on end plates on the blocks, as clearly shown in Fig. 1 of the drawing. The supporting plates 22—22' have dove-tailed grooves 32 in the upper ends thereof, in which are mounted slides 33. At this point, and from now on, until further mention, references as applied to the structure of one unit will be applied to the companion unit.

To the upper end of the slide is secured a horizontal plate 34 having a dove-tailed socket or recess 35 in the upper surface thereof. Thus, the parts 33—34 form what might be termed an L-shaped table-like member constituting a vertically reciprocating part of the workpiece supporting platen mechanism. Mounted in the groove 34 is a platen supporting slide 36 to which a workpiece supporting platen 37 is secured, at a suitable position. The slide 36 has a downwardly extending arm 38 operating in an elongated slotted portion of the table 34. To the upper end of this arm is pivoted a lever 39 having at its lower end a slidable coupling through the medium of an elongated slot 40, with a pivot pin 41 on the pivot 28—28'.

Substantially centrally of the lever 39 is a roller 42 which is adapted to operate upon a cam 43—43' on a cam shaft 44 supported in the upright frame plates 22—22'. Also secured to this cam shaft are cams 45—45' operating upon rollers 46 on the slides 33. Secured to the shaft 44 between the plates 22—22' is a drive sprocket 47 around which passes a drive chain 48, which also passes around a sprocket 49 on another cam shaft 50 supported in the frame plates 23—23'. Also on the shaft 50 is another sprocket 51 over which passes a drive chain 52, passing around a similar sprocket on the motor or drive shaft 53, shown diagrammatically in Fig. 4 of the drawing.

The cams 43—45 of the dual units are fixed at one hundred and eighty degrees to each other, so that when the workpiece supporting platen 37 of one unit is in the loading position or station, as seen in Fig. 1, the platen of the companion unit will be at the assemblage station in the process of assembling the workpiece with the card. At this time, it will also be well to mention that the operation of the card pick-up and delivery mechanism from the hopper will be similarly operated in the respective units.

Pivoted to side portions of the slides 36 are dogs 54 adapted to actuate product control or operative devices 55, the dogs 54 being maintained in the position shown in Fig. 1 by gravity or otherwise, and these dogs operate in conjunction with adjustable trips 56 at sides of the table 34. The trips 56 are adjusted into such positions as to move and hold the dogs 54 in raised position, as shown in Figs. 15 and 16, in the operation of the control devices 55, supporting the latter in the work engaging position, as seen in Fig. 15 and 16, while assembling workpieces or articles 57 with cards 58. In the construction shown, the workpieces are in the form of hair curler devices, note Fig. 10, comprising an elongated body 59 with which is pivotally mounted a spring actuated jaw or finger 60 movable toward and from the body 59 and normally retained on the body as is well known in the art. The curlers, as shown, have lateral loop portions 61, note Fig. 11, supporting rubber or other rollers 62 at one end of the body 59. The jaw or finger 60 has an operating fingerpiece portion 63 which is adapted to be engaged by the sliding plate 64 of the control device 55 in the

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operation of raising the finger 60 for engagement with the card 58, as later described.

The control device comprises a transversely long bumper plate 65 adapted to be engaged by the dogs 54. The slide 64 is coupled to the bumper plate through a pair of screws 66 operating in elongated apertures 67 in a bracket 68 adjustably supported at one end of the card supporting platen 69, as clearly seen in Figs. 7 and 8 of the drawing. The end wall of the platen 69 has a dove-tailed recess 70 in which the bracket 68 is mounted, as most clearly seen in Fig. 8 of the drawing. A spring 71 is employed to normally support the bumper 65 and plate 64 in the position shown in Figs. 7 and 8.

It will be apparent that after the dog 54 has passed over the trip 56, the dog will be thrown into the position shown in Fig. 17, by return of the bumper 65 and plate 64 to the position shown in said latter figure. In returning the slide 36 from the position shown in Fig. 19, to the position shown in Fig. 1, the dogs 54 will oscillate over the trips 56 and again return to normal position, as seen in Fig. 1.

Supported upon the upper ends of the frame plates 23—23', on extension plates 72, are card storing hoppers 73, note Figs. 3, 7 and 13. The hoppers comprise four vertical wall portions suitably supported for reception of cards of predetermined size and no specific detailed description will be made of the hoppers as this is of no particular importance.

Adjacent the forward wall of the hoppers 73 is a vertically adjustable card feed control plate 74, clearly seen in Fig. 7 of the drawing. This controls the delivery of a single card 58 from the lower end of a stack of cards arranged in the hopper and supported upon a card delivery slide or feed member 75. This feed member has at its rear end portion, a shoulder 76 for picking-up a single card for delivery beneath the control plate 74 and thus onto the lower surface 77 of the card supporting platen 69.

The delivery slide 75 has pivoted to the rear portion thereof, as seen at 78, an operating lever 79. The lower end of this lever is pivoted through the medium of an elongated aperture 80 to a pivot pin 81 on the block 29—29'. Secured to the shaft 50 is a crank disc or wheel 82 having a pin 83 with which is coupled a sliding block 84 arranged upon the lever 79, thus providing a crank drive of the lever 79 in delivery of cards one at a time to the supporting platen 69.

Secured to the shaft 50 centrally thereof is a cam 85 adapted to actuate a sliding air valve 86 through a roller 87 on the valve, engaging the cam with suitable spring means 88 normally maintaining the roller in constant engagement with the cam 85, note Figs. 4 and 5. The valve 86 operates in a valve casing 89 with which is coupled a suction pipe 90 leading to a suction pump 91 driven from the motor through a belt or other drive, as diagrammatically seen at 92 in Fig. 4. On the casing 89 are two control pipes 93 and 94. These pipes extend to the card supporting platen 69 of the respective units, as clearly illustrated in Figs. 1 and 3 of the drawing. The pipes are coupled through inner sides of the platens and open into and communicate with distributing chambers 95 in the platens which open through the surface 77 through five or more ports, as indicated at 96. Note in this connection Fig. 6 of the drawing. The ports 96 are disposed in spaced relation to longitudinally

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arranged workpiece receiving recesses 97 in the surface 77.

The lower surface 77 of the card supporting platen 69 is recessed to provide side guide finders 98 for reception of the card. The workpiece receiving recesses 97 are of sufficient depth to receive not only the fingers 60, but also flexed flange portions 99 of the die cut-out portion 100 of the card, as clearly seen in Fig. 9 of the drawing. In addition to forming the foldable flanges 99, the die cut-outs 100 form, at the ends of the resulting cuts formed in the cards for reception of the curlers, retaining tongue members as at 101 and 102, the first of these tongue members being engaged by the finger or jaw 60 and the latter by the finger-piece 63, when the curlers are assembled with the card, as clearly seen in Figs. 17 and 18. The platen 69 is supported on an L-shaped bracket 103 adjustably supported on the wall of the hopper in setting the platen 69 in proper alignment with the lower end of the hopper or the delivery slide 75. It will be understood that the valve 86 is actuated to expose the pipes 93—94 leading to the pairs of platens 69 to timely create a suction in the passages 96 to suck and hold the card on the platens and to then periodically release or exhaust the suction to allow the cards with the curlers mounted thereon to drop into a suitable receiver, not shown, after the work supporting platen has been returned to the position shown in Fig. 1. The valve 86 has exhaust ports 86' for exhausting the air from each of the pipes 93—94 in operation of the valve, as will be apparent. It will be noted that the port or passage 104 in the valve 86 is such as to expose the suction pipe 90 intermittently to each of the pipes 93—94 as the valve is actuated through the cam 85.

Considering Figs. 13 and 16 to 19 inclusive, it will appear that the work supporting platen 37 has on the upper surface thereof, a pair of workpiece supporting recesses 105, each of which in the present construction is shaped to receive the body 59 of the curler, including the roller 62, and is further shaped to receive a finger portion 106 on the curler body by the offset in the recess 105, as seen at 107, most clearly shown in Fig. 19 of the drawing.

The pairs of curlers may be manually or otherwise placed in the work receiving sockets or recesses 105 when the platen is in the position shown in Fig. 1 of the drawing. This operation being performed while the other workpiece supporting platen of the companion unit is in the loading or carding station beneath the card holding platen for attachment of the workpieces with the card, as shown in Figs. 14 to 19 inclusive. Then when the units are reversed, the other workpiece supporting platen is positioned as in Fig. 1, and the workpieces assembled therewith.

It will appear from a consideration of Fig. 1 of the drawing, that springs 39' are employed for holding the levers 39 or the rollers 42 thereof in constant engagement with the cams 43. It will appear from a consideration of Figs. 3 and 7 of the drawing, that the card carrying or delivery slide 75 operate in grooves 108 in side walls of the hoppers, and further that the levers 79 have their pivots 78 in U-shaped members 109 secured to the card carrying and delivery slides, as clearly seen in Fig. 7 of the drawing.

My improved machine is of simple economical construction and by employing the dual units actuated in the manner described, the machine becomes highly efficient in producing the intend-

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ed carding operation. While I have shown the machine as applied to carding devices of a specific type and kind, it will be understood that the machine is applicable to performance of carding operations of any kind, particularly where it is desirable to pass the device through a perforation or cut-out in the card, and still more particularly, where it is desired to perform two distinct feed motions of the device with respect to the card in providing a double lock or coupling engagement with the card as in the present construction.

Considering the operation of one unit of the machine, it will be apparent that a pair of curlers or other devices are placed in the apertures or recesses 105 when the work-piece supporting platen is in the position shown in Fig. 1. The next operation consists in moving the work holder platen in the direction of the card supporting platen, it being understood in this connection that a card 58 has been delivered to and is supported on the platen with the cut-outs as at 100 in a flat condition.

In Fig. 14 of the drawing the work supporting platen is shown in a position substantially the same as that shown in Fig. 1 and in Fig. 15, the work supporting platen is shown moved into its first stage beneath the card holding platen and the plate 64, the fingerpiece 63 of the workpiece being disposed adjacent the edge of the plate 64 and the dogs 54 are in abutment with the bumper 65 so that in the next operation, the plate 64 will be advanced with the workpiece supporting platen to maintain engagement of the plate 64 with the fingerpiece 63.

The next operation consists in raising the work supporting platen into the position shown in Fig. 16, which operation causes the gripper finger 60 of the workpieces to be raised and moved through the cut-outs 100 in the card 58, thus raising the flanges 99 of the card and these flanges together with the fingers 60 extend into the workpiece receiving apertures or recesses 97 of the card holding platen.

Next, the workpiece supporting platen is moved further to the right as seen in Fig. 17, extending the fingers 60 to a point overlying the card 58 beyond the limits of the flanges 101 and with the fingerpieces 63 at a point to the right of, and clearing the flanges 102 of the card, the fingerpieces 63 being, at this point extended into the recesses or apertures 97, whereupon the workpiece supporting platen is moved slightly to the left, as shown in Fig. 18 to bring the fingerpieces 63 over the flanges 102, establishing the complete locking or coupling engagement of the workpieces with the card. The workpiece supporting platen 37 is then moved downwardly into the position shown in Fig. 19, completely freeing the workpiece supporting platen from the workpieces supported on the card, whereupon the workpiece supporting platen is then returned to the position shown in Fig. 14, and the above operation is again repeated.

Immediately upon return of the workpiece supporting platen to the position shown in Fig. 14, suction is released from the passages 96 of the platen and the card with the two curlers mounted thereon will drop into a suitable receiver in the machine or be guided from the machine to a collecting or packaging station.

Considering Fig. 1 of the drawing, it will appear that the operation of the card delivery slide 75 is slightly retarded with respect to return operation of the workpiece supporting platen to

the position shown in Fig. 1, to give sufficient time for release of the card before advancing a second card to the carding station.

From the foregoing, it will be apparent that in the operation of each unit of the machine, the card is first delivered to the assembly station, held at this station by the suction holding means employed, then the workpieces on the workpiece supporting platen are moved to the position beneath the card holding platen and then the workpiece supporting platen is given a partial raised movement, then a further raised movement while the platen is further advanced. This last operation provides the one coupling engagement of the workpieces with the card, then the workpiece supporting platen is given a partial reverse movement to further lock the workpieces with the card, after which the platen is lowered, leaving the workpieces on the card and then the workpiece supporting platen is returned to its loading station, whereupon suction is broken to the card, releasing the card for delivery into the machine. Immediately after the release of one card, another card is advanced to the card holding platen, and the above operation is repeated.

The control device 55 including the sliding plate 64, which operates upon the article, in moving part thereof into extended position, may be said to comprise an article conditioning means which positions the article for assemblage with the card or holder.

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

1. A carding machine comprising a card delivery station, an article delivery station and an assembly station arranged intermediate the first named stations, means delivering cut cards one at a time to the assembly station, means at the assembly station for supporting a card flatly in the operation of mounting an article thereon, means feeding an article from the article receiving station to a position beneath the card at the assembly position, means in combination with said last named means for engaging an article and moving the same upwardly through the cut of a card supported at the assembly station in mounting the article on the card, means to then remove the article supporting and operating means from the path of the assembly station, means to then release the card with the article thereon for removal from the machine, said assemblage station comprising a card receiving platen, the platen having means for fixedly supporting a card thereon in the assemblage of an article therewith, said first named means comprising a card pick-up and carrier slide reciprocating back and forth with respect to the assembly station, said article feeding means comprising a platen, and means for moving the platen toward and from the card holder platen in two different directions angularly with respect to each other.

2. In carding machines of the character described, a pair of similar carding units, each unit comprising a centrally disposed assembly station, a card delivery mechanism at one end of the assembly station and an article receiving and delivery mechanism at the other end of the assembly station, said card delivery mechanism having means for picking up and delivering cards one at a time to the assembly station, means at the assembly station for holding the card at said station upon removal of said card delivery means, means for actuating the article delivery mechanism to first move an

article beneath the card supported at the assembly station and then in the direction of the card supported at said station in movement of an article through a cut area of the card, means to then move the article in one direction longitudinally of the card to establish coupling engagement therewith, means to then move the article in the opposite direction to establish a secondary coupling therewith, and means to then move the article supporting and operating mechanism out of engagement with the card and article and remote from said assembly station.

3. In carding machines of the character described, a pair of similar carding units, each unit comprising a centrally disposed assembly station, a card delivery mechanism at one end of the assembly station and an article receiving and delivery mechanism at the other end of the assembly station, said card delivery mechanism having means for picking up and delivering cards one at a time to the assembly station, means at the assembly station for holding the card at said station upon removal of said card delivery means, means for actuating the article delivery mechanism to first move an article beneath the card supported at the assembly station and then in the direction of the card supported at said station in movement of an article through a cut area of the card, means to then move the article in one direction longitudinally of the card to establish coupling engagement therewith, means to then move the article in the opposite direction to establish a secondary coupling therewith, means to then move the article supporting and operating mechanism out of engagement with the card and article and remote from said assembly station, and means to then release the card with the article assembled thereon for discharge through the machine.

4. In carding machines of the character described, a pair of similar carding units, each unit comprising a centrally disposed assembly station, a card delivery mechanism at one end of the assembly station and an article receiving and delivery mechanism at the other end of the assembly station, said card delivery mechanism having means for picking up and delivering cards one at a time to the assembly station, means at the assembly station for holding the card at said station upon removal of said card delivery means, means for actuating the article delivery mechanism to first move an article beneath the card supported at the assembly station and then in the direction of the card supported at said station in movement of an article through a cut area of the card, means to then move the article in one direction longitudinally of the card to establish coupling engagement therewith, means to then move the article in the opposite direction to establish a secondary coupling therewith, means to then move the article supporting and operating mechanism out of engagement with the card and article and remote from said assembly station, means to then release the card with the article assembled thereon for discharge through the machine, and means operatively engaging the article in moving part thereof into a different position in the passage of the article through the cut area of the card.

5. In carding machines of the character described, a pair of similar carding units, each unit comprising a centrally disposed assembly station, a card delivery mechanism at one end of the assembly station and an article receiving and delivery mechanism at the other end of the as-

sembly station, said card delivery mechanism having means for picking up and delivering cards one at a time to the assembly station, means at the assembly station for holding the card at said station upon removal of said card delivery means, means for actuating the article delivery mechanism to first move an article beneath the card supported at the assembly station and then in the direction of the card supported at said station in movement of an article through a cut area of the card, means to then move the article in one direction longitudinally of the card to establish coupling engagement therewith, means to then move the article in the opposite direction to establish a secondary coupling therewith, means to then move the article supporting and operating mechanism out of engagement with the card and article and remote from said assembly station, means to then release the card with the article assembled thereon for discharge through the machine, means operatively engaging the article in moving part thereof into a different position in the passage of the article through the cut area of the card, and said last named means being released from the article upon movement of the article into coupling engagement with the card.

6. In carding machines of the character described, a pair of similar carding units, each unit comprising a centrally disposed assembly station, a card delivery mechanism at one end of the assembly station and an article receiving and delivery mechanism at the other end of the assembly station, said card delivery mechanism having means for picking up and delivering cards one at a time to the assembly station, means at the assembly station for holding the card at said station upon removal of said card delivery means, means for actuating the article delivery mechanism to first move an article beneath the card supported at the assembly station and then in the direction of the card supported at said station in movement of an article through a cut area of the card, means to then move the article in one direction longitudinally of the card to establish coupling engagement therewith, means to then move the article in the opposite direction to establish a secondary coupling therewith, means to then move the article supporting and operating mechanism out of engagement with the card and article and remote from said assembly station, means to then release the card with the article assembled thereon for discharge through the machine, means operatively engaging the article in moving part thereof into a different position in the passage of the article through the cut area of the card, said last named means being released from the article upon movement of the article into coupling engagement with the card, and means for actuating the two similar units of the machine in such manner that one unit is per-

forming the assembly operation while the companion unit has its actuating mechanisms in loading position.

7. In carding machines employing card and work assembly units, an assembly station, means for delivering cards one at a time to said station, means at said station for holding a card in fixed flat position in the operation of assembling an article therewith, the card having a cut area for passage of an article therethrough, the holding means of said station having a recess adjacent the cut area of the card for reception of an article in assemblage with the card, means to deliver an article to a position adjacent the cut area of the card, means at said station engaging the article to move part thereof in the direction of the card, means to then move the article toward the card for passage of said part through the cut area of the card, and longitudinally thereof in one direction, means to then move the article relatively to the card in the opposite direction to effect a positive assemblage therewith, and said article engaging means of said station being movable out of engagement with the article in the last named movement of said article relatively to the card.

8. In a machine of the class described, a hopper for supporting a plurality of cards, means at the lower end of the hopper for picking-up and delivering cards one at a time, means at one side of the hopper for receiving and holding a delivered card, means for moving an article into close proximity to a card supported in said holding means, the card having a cut area, means to then move an article through the cut area of the card and longitudinally relatively to the card in two directions in assemblage of an article with the card at said cut area, means to then release the card with the article thereon for discharge from the machine, said article moving and feed means comprising an article supporting platen, and means supporting the platen having movement back and forth in a horizontal direction and up and down in a vertical direction in assemblage of an article with a card.

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