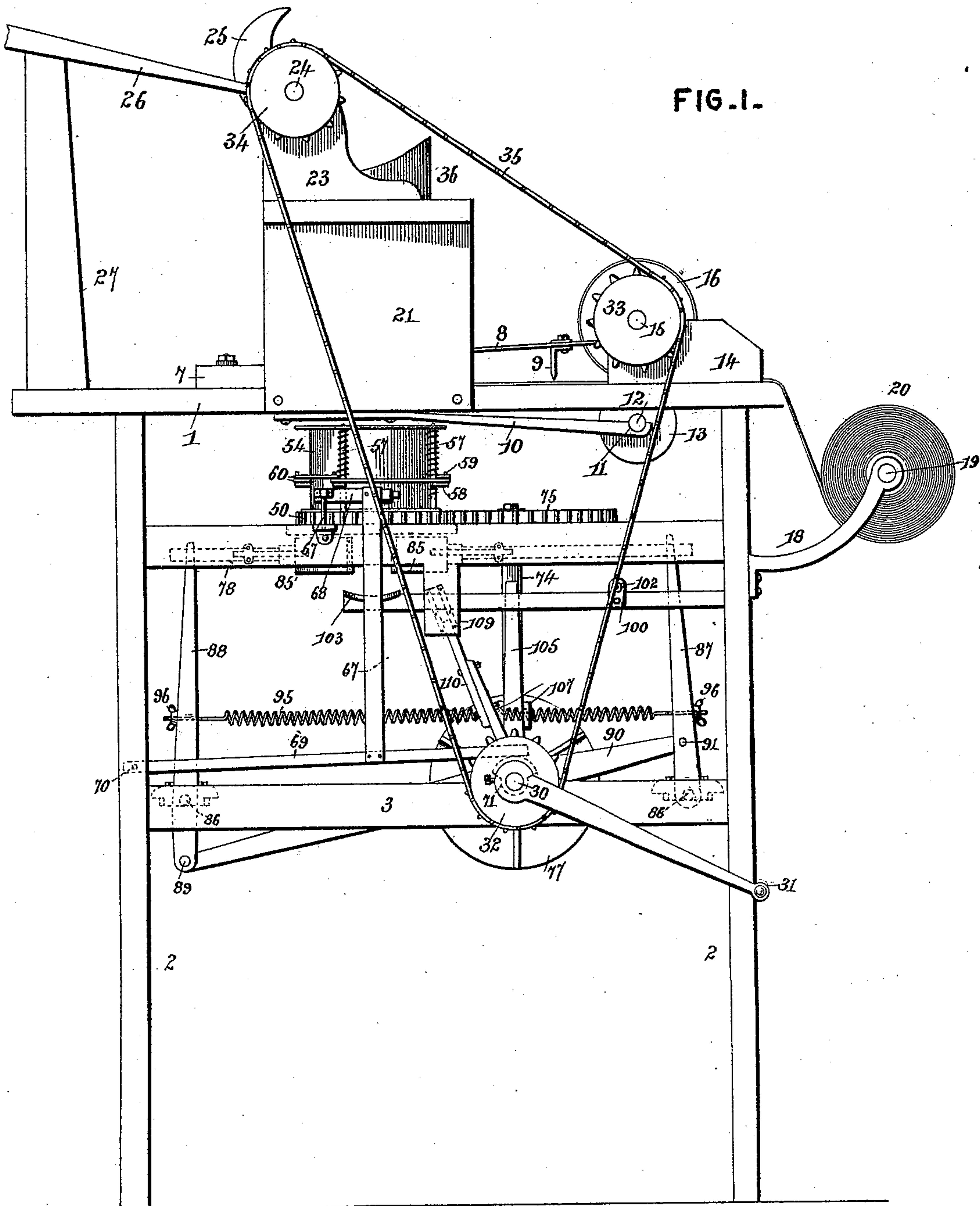


4 Sheets—Sheet 1.

No. 516,638.

Patented Mar. 13, 1894.



Inventor

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W. S. Duvall.

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(No Model.)

4 Sheets—Sheet 2.

T. E. NININGER.
FRUIT WRAPPING MACHINE.

No. 516,638.

Patented Mar. 13, 1894.

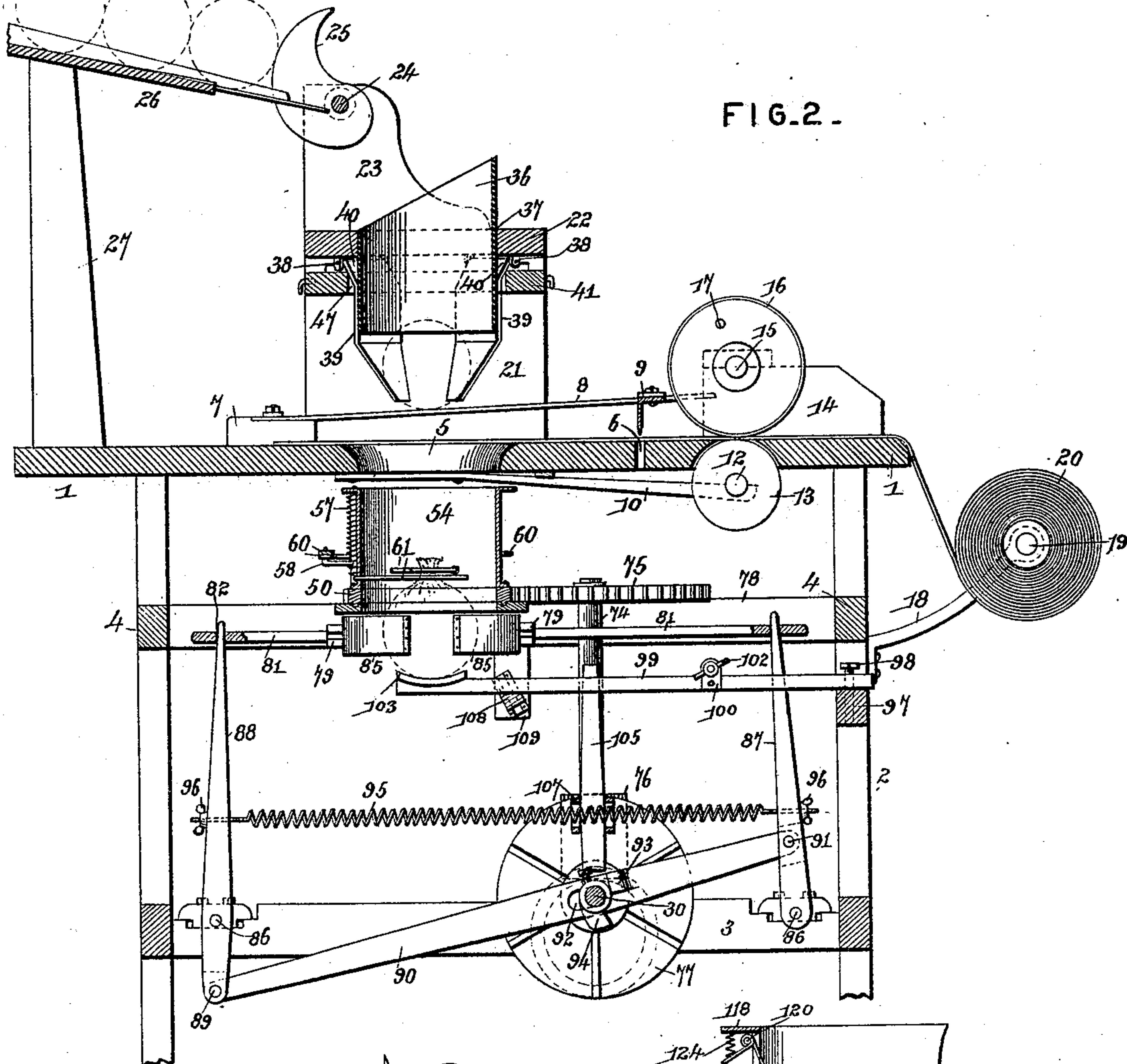
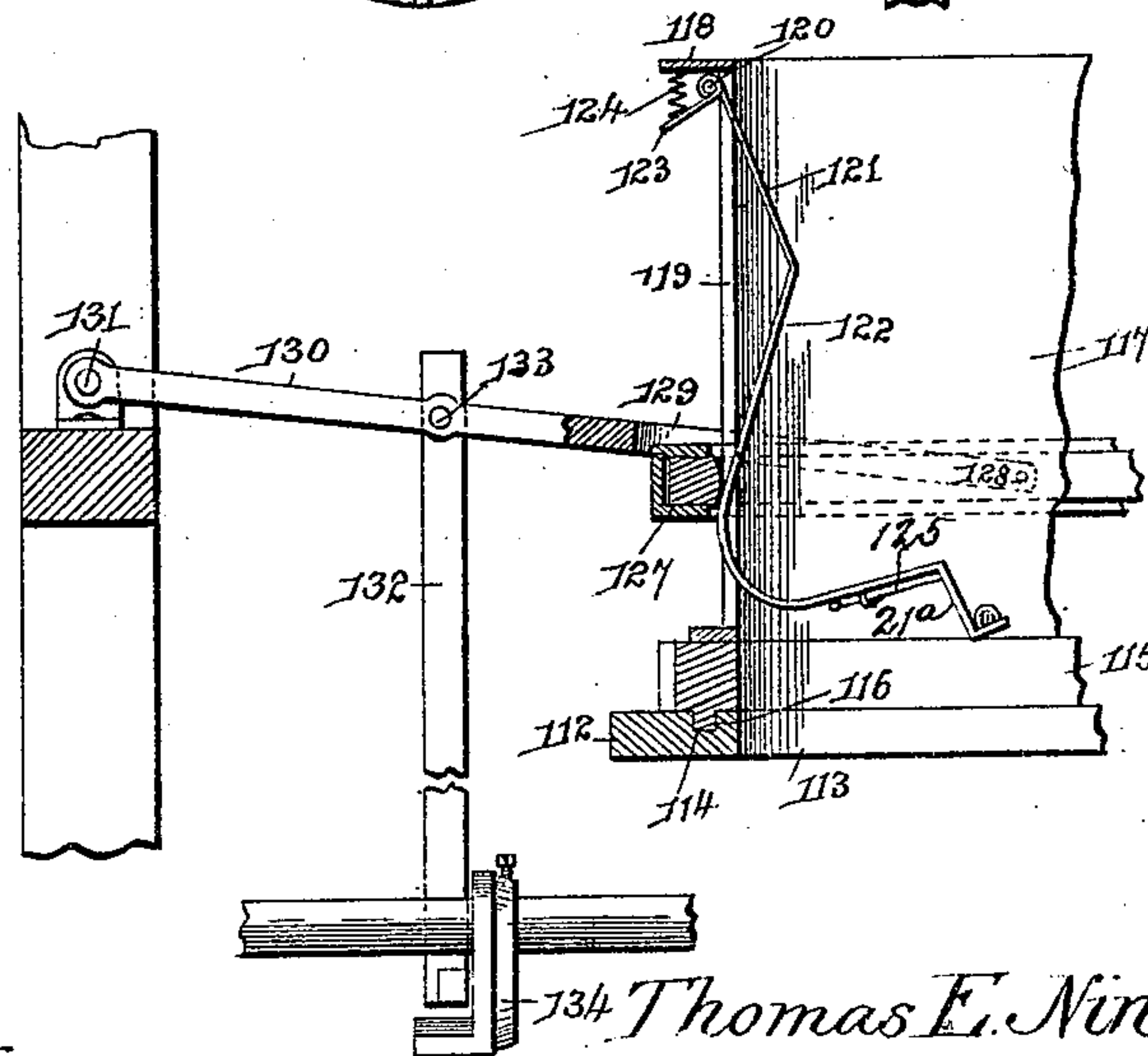


FIG. 8.



Witnesses

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(No Model.)

4 Sheets—Sheet 3.

T. E. NININGER.
FRUIT WRAPPING MACHINE.

No. 516,638.

Patented Mar. 13, 1894.

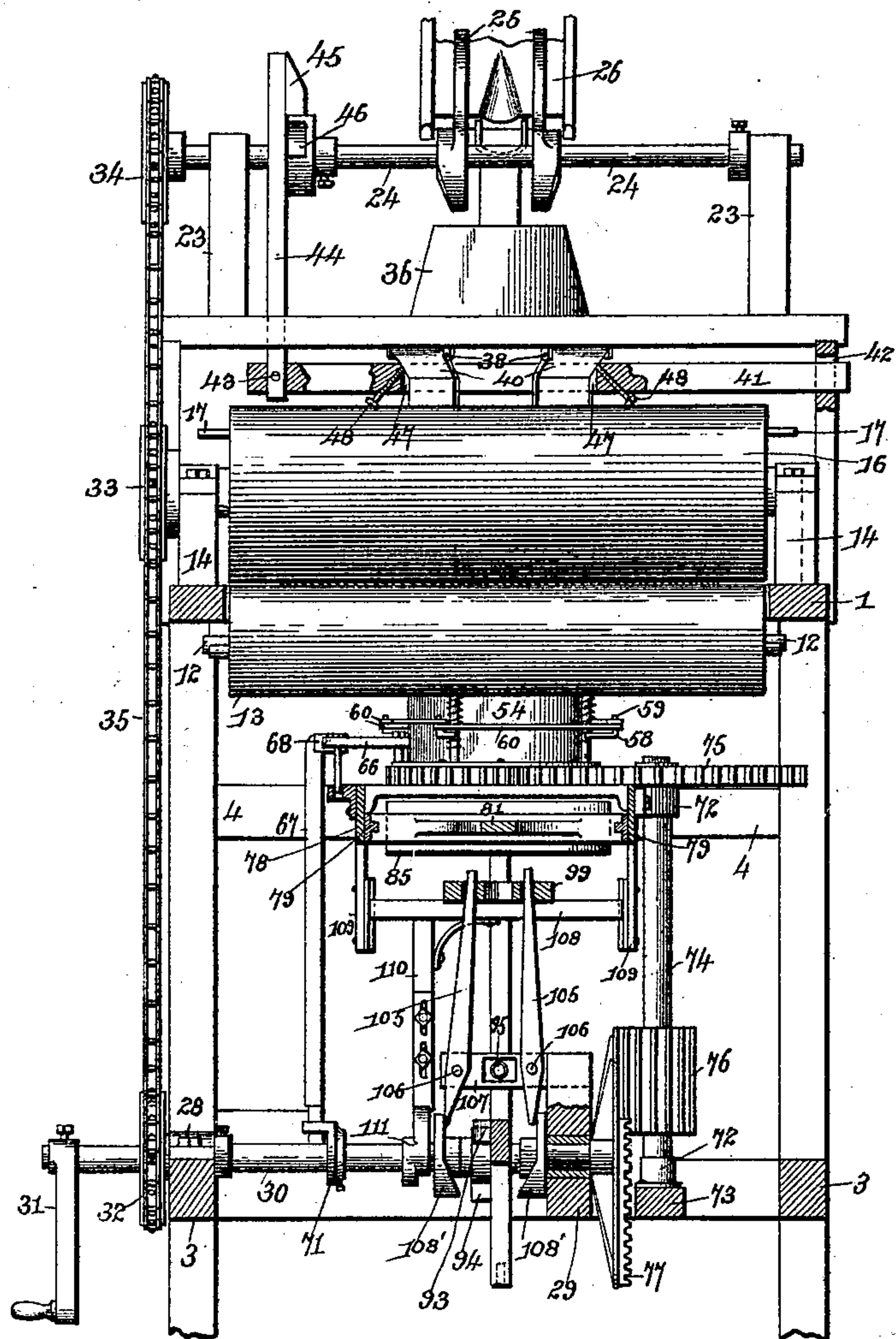
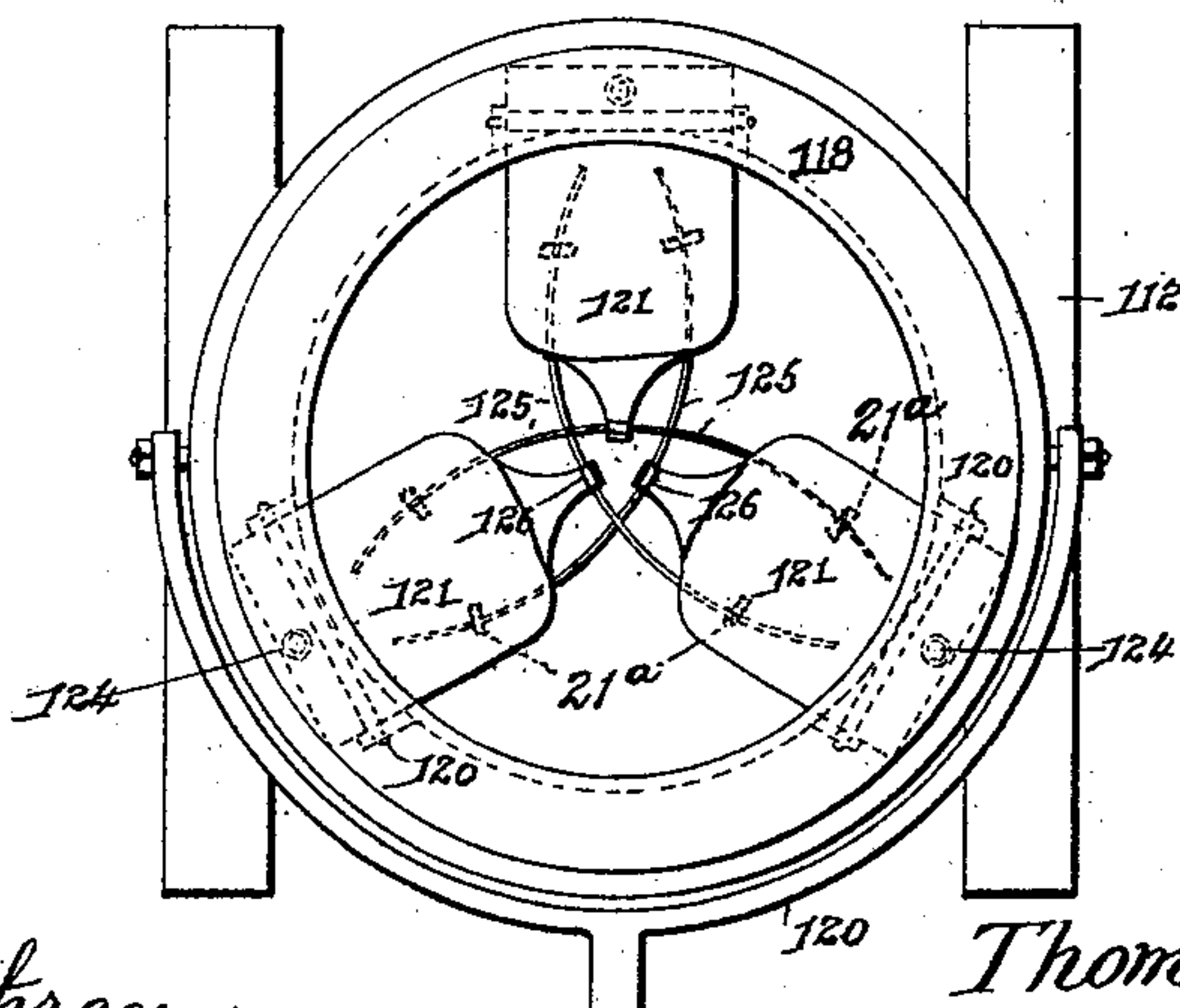


FIG. 3.

FIG. 9.



Witnesses

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(No Model.)

4 Sheets—Sheet 4.

T. E. NININGER.
FRUIT WRAPPING MACHINE.

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Patented Mar. 13, 1894.

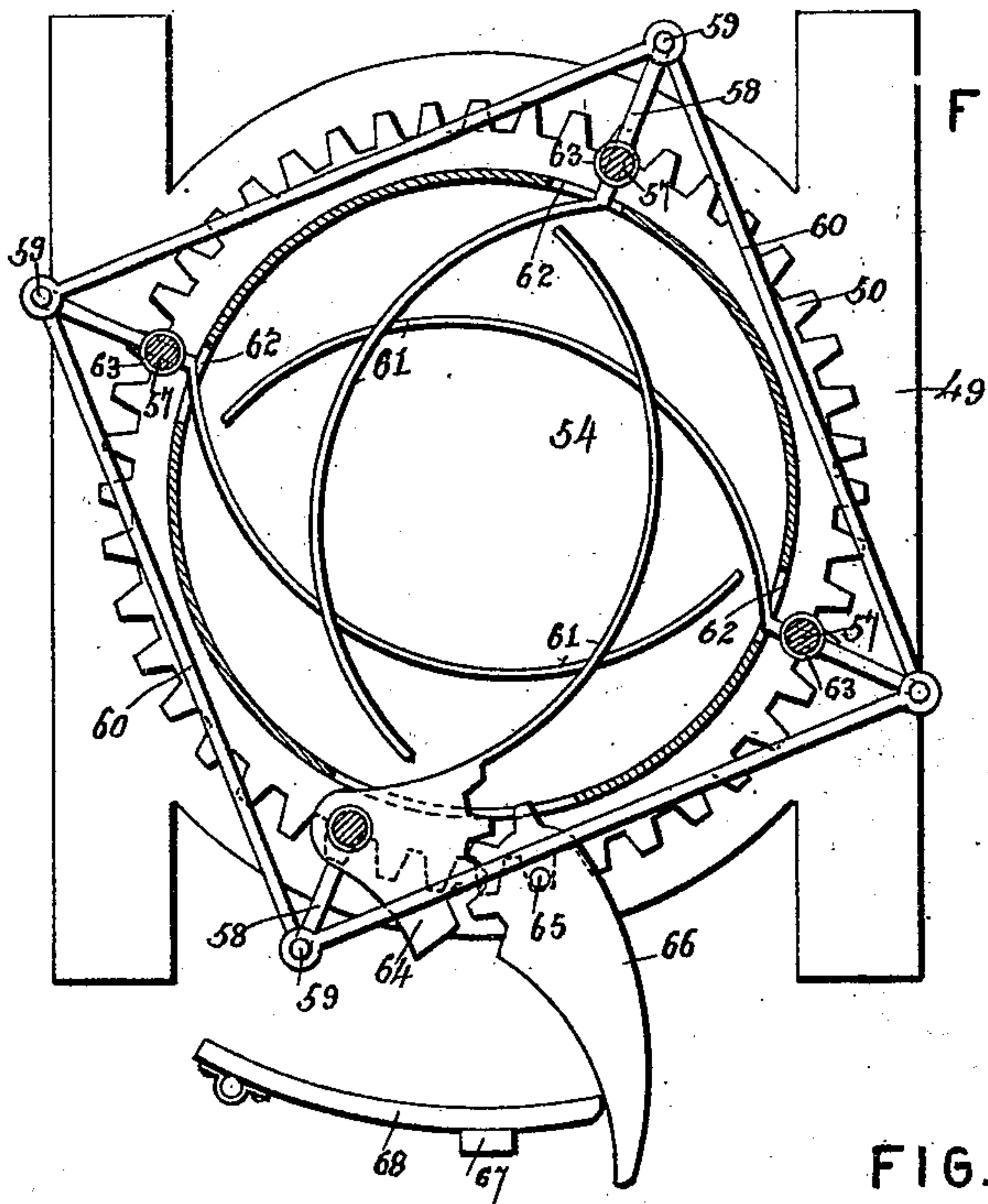


FIG. 4.

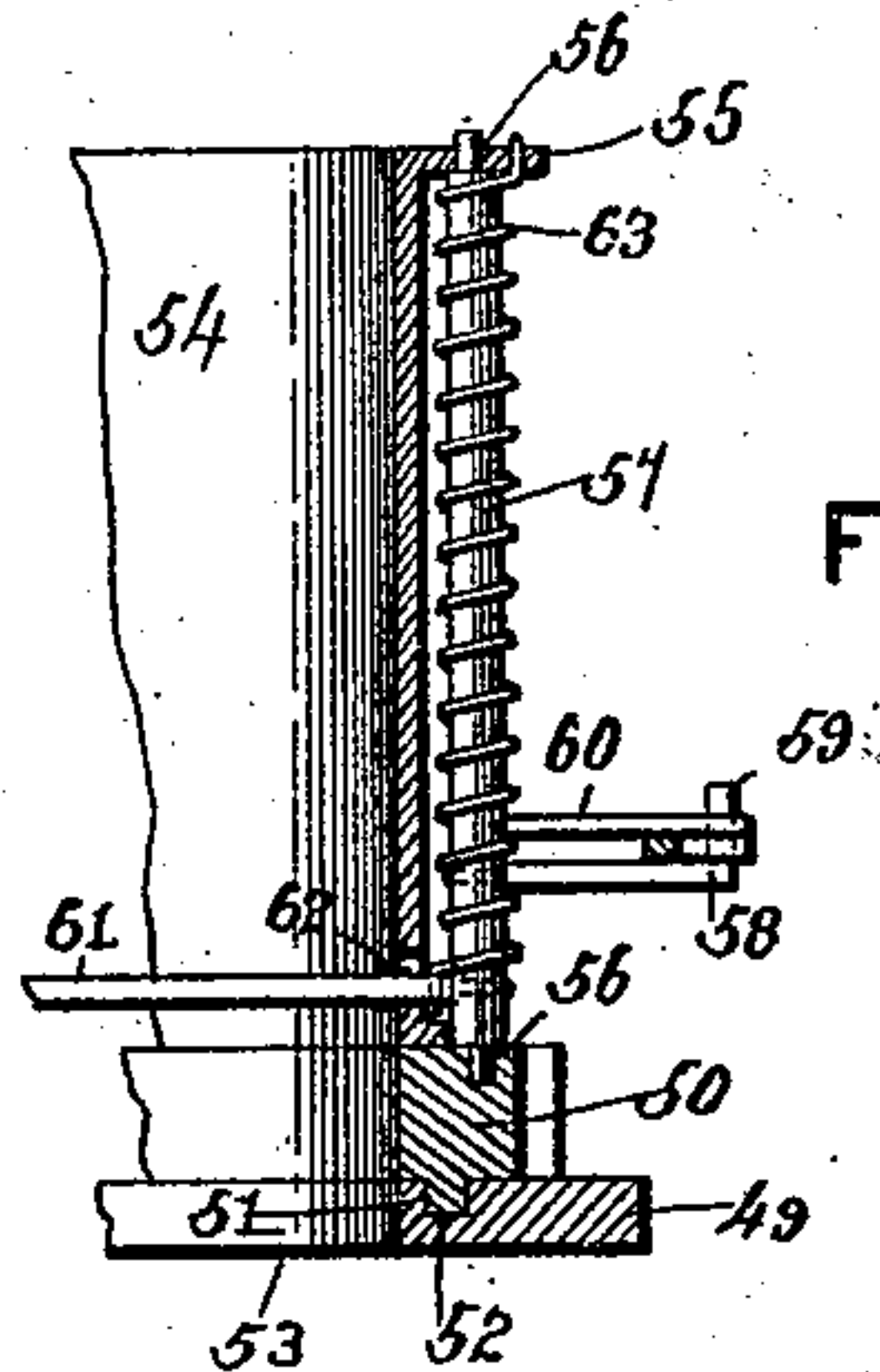


FIG. 5.

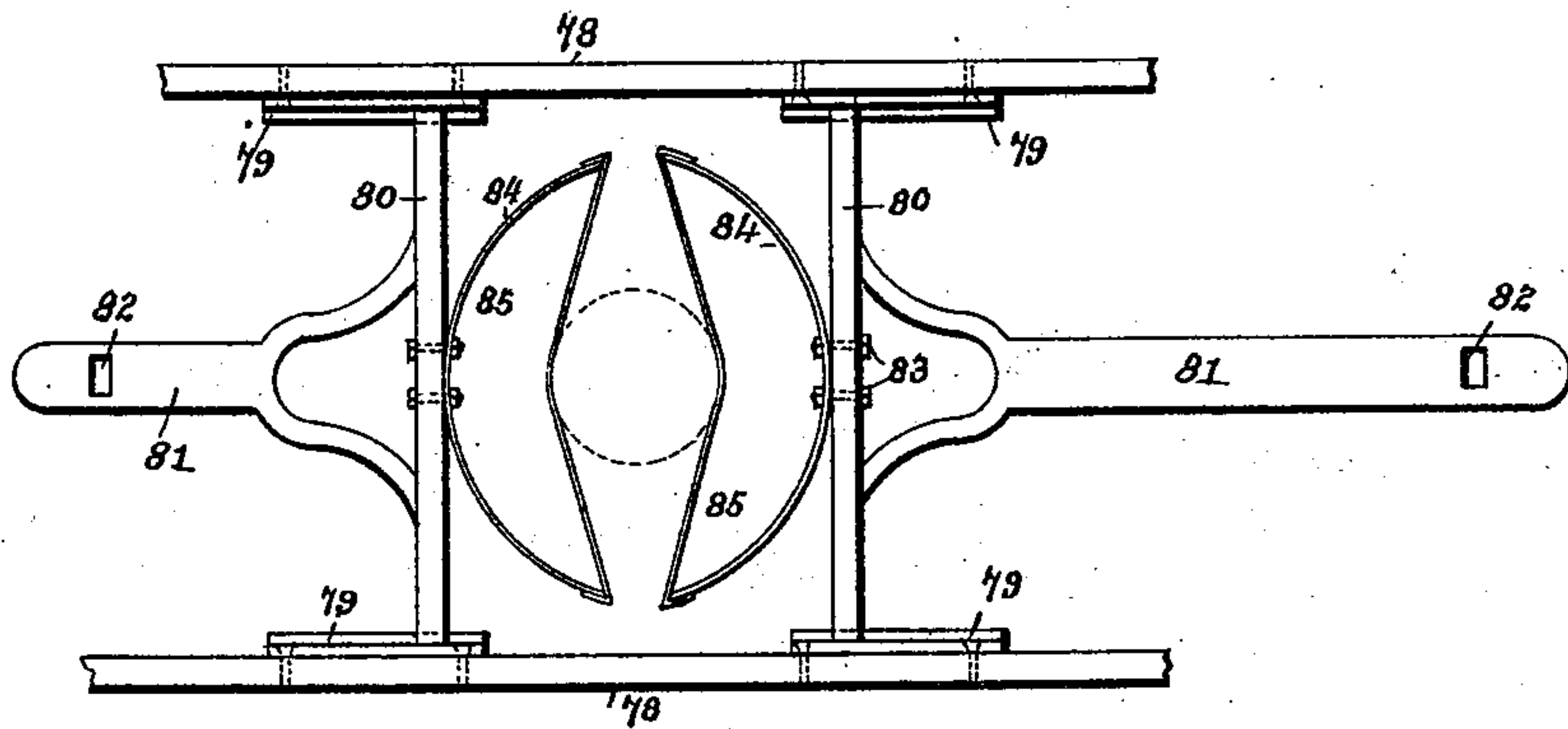


FIG. 6.

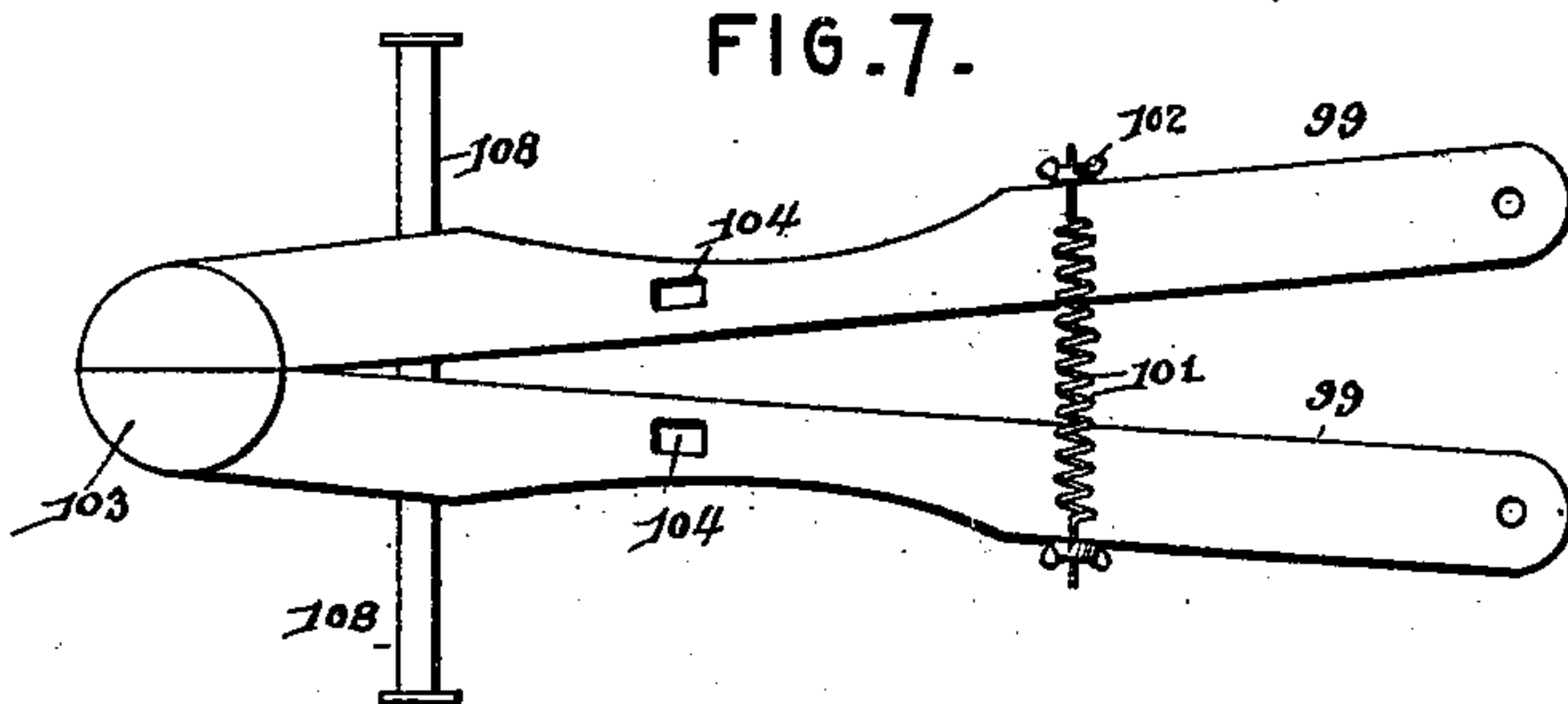


FIG. 7.

Witnesses

Inventor

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By his Attorneys,

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UNITED STATES PATENT OFFICE.

THOMAS E. NININGER, OF INTER LACHEN, FLORIDA.

FRUIT-WRAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 516,638, dated March 13, 1894.

Application filed March 31, 1893. Serial No. 468,452. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. NININGER, a citizen of the United States, residing at Inter Lachen, in the county of Putnam and State of Florida, have invented a new and useful Fruit-Wrapping Machine, of which the following is a specification.

My invention relates to that class of machines employed for wrapping fruit and more especially oranges; and the objects in view are to provide a machine of cheap and economic construction, which is adapted to rapidly and securely apply and twist wrappers upon oranges and subsequently deliver the same.

With these main objects in view the invention consists in certain features of construction hereinafter specified and particularly pointed out in the claims.

Referring to the drawings:—Figure 1 is a side elevation of an orange-wrapping machine constructed in accordance with my invention. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a transverse vertical sectional view. Fig. 4 is a horizontal section of the twisting mechanism. Fig. 5 is a vertical longitudinal sectional view through the twisting-cylinder and its support. Fig. 6 is a top plan view of the orange-holders located below the twisting mechanism. Fig. 7 is a top plan view of the orange-supports located below the holders. Fig. 8 is a vertical longitudinal sectional view of a modified construction of twisting mechanism. Fig. 9 is a similar view of a further modification.

Like numerals of reference indicate like parts in all the figures of the drawings.

In practice I employ a suitable frame or table 1, and support the same at its four corners by legs 2, the legs being connected near their lower ends by opposite side-bars 3 and above the same just below the table with similar side bars 4. The table is provided with a circular opening 5 which is flared toward the upper side of the table and immediately in front of the same with a transverse opening or slot 6. A cross-strip 7 is secured upon the table in rear of the opening 5, and from the same extend resilient rods or strips 8 which are located at opposite sides of the opening 5 and have bolted thereto immediately above the slot 6 a depending knife or

cutter 9. A pair of resilient bars 10 are bolted to the under side of the table at each side of the opening 5, extend forward to points in front of the slot 6, are provided with bearings 11, and have journaled therein the axial trunnions 12 of a lower yielding paper feed-roll 13. The table has its under side concaved, and the bottom of the concavity is slotted so as to permit of the periphery of the roll projecting slightly above the surface of the table. Bearing standards 14 are supported upon the table in front of the slot 6 and journaled therein is a shaft 15 which supports a feed-roll 16. The feed-roll 16 is provided at one end with pins or tappets 17, which, when the feed-roll revolves, is brought into contact with the spring-strips 8 which project into the path of said tappets and consequently said spring strips are elevated, and being subsequently liberated, spring back or vibrate so that the knife 9 carried thereby is shot through the slot 6. A pair of bracket-standards 18 are bolted to the front faces of the two front posts 2, and a reel-shaft 19 supports a roll 20 of paper, the leading end of which passes up over the front end of the table between the feed-rolls 13 and 16 and over the opening 5 in the table, so that as will be obvious, at each revolution of the feed-rolls 13 and 16 the paper is severed by the knife 9 into square sheets.

A pair of standards 21 rise from the table at opposite sides of the opening 5 and support an intermediate cross-piece 22, above which, at their rear ends, the standards are extended as at 23 and receive a cross-shaft 24. Upon this cross-shaft a crescent-shaped separator-finger 25 is mounted and adapted to revolve with the shaft, and leading to the separator is an inclined chute 26 down which the fruit travels, the said chute being supported by a standard 27 and slotted longitudinally for the passage of the crescent-shaped separator finger, all as is common in this and analogous classes of machines.

In suitable bearings 28 on one of the lower side-bars 3 and an intermediate parallel bar 29, there is journaled a transverse power-shaft 30, one end of which projects beyond the side-bar and is there provided with a hand-crank 31 by which it may be operated, or it may be provided with any other device for transmit-

ting motion, as for instance, an ordinary pulley adapted to receive a belt leading from any suitable motor. A sprocket-wheel 32 is mounted on the shaft immediately at the inner side of the crank 31; a similar sprocket-wheel 33 is mounted on one of the extended ends or axial trunnions 15 of the roll 16; and a third sprocket-wheel 34, is mounted upon one end of the transverse shaft 24, these three sprocket-wheels being connected through the medium of a sprocket-chain 35 which transmits motion from the lower sprocket-wheel 32 of the power-shaft to the two upper sprocket-wheels.

15 A revolving cylinder 36 is located in a circular opening 37 formed in the cross-piece 22 and depends from said cross-piece, the lower end of the cylinder being above and in line with the opening 5 in the table. At intervals around the cylinder there are hinged as at 38 depending fingers 39 whose lower ends are inwardly bent or converged and which near their upper ends are outwardly inclined or flared as indicated at 40.

25 A lever 41 is located under the cross-piece 22 and takes at one end in an opening 42 with which one of the vertical standards 21 is provided. The opposite end of the lever has pivoted thereto as at 43 a vertical rod 44 which projects up through the cross-piece 22 and above the shaft 24 at which point it is provided with an abutting shoulder 45, and below which upon the shaft 24 a cam 46 is located so that as the shaft 24 revolves the rod 44 is raised as is also its lever 41 through the medium of a cam 46 successively contacting with the said shoulder. The lever 41 has an opening 47 wherein it fits somewhat loosely upon the annular series of depending fingers 39 at their intermediate portions, and when the lever is raised the said fingers are clamped or moved inward toward each other and the center of the cylinder 36 by reason of the lever acting upon the upper flared or inclined ends of said fingers, and on the other hand, when the lever is lowered the fingers are liberated and fall by gravity to a spread or separated position, consequently releasing an orange that may be supported thereby within the cylinder and permitting it to drop through the opening 5 upon the sheet of paper over the opening carrying the paper therewith and causing the same to be crimped about the orange. The separation of these fingers may be regulated through the medium of a series of inclined set-screws 48 passed through the lower edge of the opening 47 and bearing at their inner ends against the fingers.

Supported upon a suitable base 49 located upon the side-bars 4 and below the opening 5 in the table is a toothed ring 50, the said ring having upon its under side a rib 51 which takes into an annular groove or seat 52 formed in the upper side of the base, the said base having a circular opening 53 which corresponds with the bore of the ring. Supported upon this ring 50 is a cylinder 54, and the

same has its upper end provided with a horizontal flange 55 which is provided with bearing perforations 56 vertically aligning with the corresponding bearing openings 56 formed in the ring 50. In each of these is mounted a vertical oscillating shaft 57 whose ends are reduced to enter the bearings. Rock-arms 58 project from the shafts and have their outer ends provided with pins 59, the series of pins being connected through the medium of a series of rods 60 whose ends are loosely journaled upon the pins so that when one shaft is oscillated a similar movement takes place upon the part of all the shafts of the series. Each shaft is provided with an inwardly-extending curved twisting-finger 61, the said fingers crossing each other within the cylinder 54, to which they gain access through perforations 62 formed in the cylinder. Coiled springs 63 are twisted about the shafts and have their upper ends let into the flange 55 and their lower ends engaged with the fingers 61, so that there is a constant tendency upon the part of the springs to retain the shaft in such position that the fingers are open, as shown in Fig. 4. One of the shafts is provided with a toothed segment 64, and pivoted upon the ring 50 at the side of the segment by means of a vertical pin or stud 65 is a segmental lever 66. A vertical rod 67 is located at one side of the cylinder 54, and the same is provided at its upper end with a transverse head 68 (see Figs. 1 and 4). This rod is secured at its lower end to a lever 69 that is pivoted as at 70 to one of the rear legs 2 that support the table, the said lever extending beyond the rod 67 and overlying a cam 71 that is mounted upon and rotates with the power-shaft 30. It will be seen that at intervals the lever will be caused to rise by the contact therewith of the cam, and will thus elevate the head 68 of the rod 67 into the path of the outer or tail-end of the segmental lever 66. This segmental lever being revolved in a manner hereinafter described with the cylinder, it will be seen will thus be caused to contact with the said head, and in order to pass by the same will be swung upon its pivot, thus actuating the segmental head or gear 64 of one of the vertical rock-shafts 57 of the cylinder, which, as before stated, causes a similar movement upon the part of the rock-shafts and opens or separates the curved twisting-fingers so that they release the wrapping paper in a manner hereinafter apparent. This raising and lowering of the bar 68 is necessary for the reason that, as before stated, when the bar is raised the twisting-arms 61 are opened, and when lowered the twisting arms are closed by the springs 63. Inasmuch as the wrapper of each orange is given several twists it follows that the arm 68 must be out of the path of the lever 66 a greater length of time than it is in the path, that is to say, when the bar 68 is elevated it momentarily opens the twisting-arms or fingers 61, permitting the introduction of the orange and

its wrapper. Immediately thereafter the bar being lowered the grasping-arms or fingers are released and grasp the wrapper, firmly holding the same while the twisting cylinder is rapidly rotated through the mechanism hereinafter described.

Journalled in vertically opposite bearings 72 formed at the side of the base 49 and a bottom cross-strip 73, respectively, is a vertical shaft 74 which at its upper end carries a large spur-gear 75 and at its lower end a small but elongated pinion 76. This pinion is engaged by the teeth of an eccentric gear 77 by which the speed of the shaft 74 mounted at the inner end of the power-shaft 30 and by which the speed of the gear 75 and the parts operated thereby is regulated and timed so as to be increased or diminished in accordance with the necessities or operations of the different parts of the machine. For instance, the rotation of the cylinder 54 is slow until the twisting-fingers have grasped the wrapping-paper, when that portion of the teeth of the gear 77 farthest from the shaft or center of the gear is in mesh with the pinion 76 which causes the said cylinder to be rapidly rotated and the twist of the paper made quickly.

In a pair of longitudinal ways 78, best shown in Fig. 6, there are mounted pairs of opposite sliding shoes 79, the same being connected by cross-bars 80. Each cross bar is connected to a yoke-bar 81, and the outer ends of these yoke-bars have mortise-openings 82 formed therein. The centers of the cross-bars 80 have secured thereto by bolts 83 the centers of bowed spring-metal strips 84, the ends of which are connected by transverse strips 85 of fabric or other frictional material. This constitutes the holding-mechanism or device, and I will now proceed to describe how they are at intervals brought together to clamp upon an orange during the twisting operation and subsequently separated.

In cross-shafts 86 supported upon the lower side-bars 3 near the front and rear ends thereof there is loosely mounted a front and a rear lever 87 and 88, respectively, the front lever being fulcrumed at its lower end to the front shaft 86 and the rear lever being fulcrumed between its ends upon the rear shaft 86. The lower end of the rear lever 88 has pivoted thereto as at 89 a connecting-bar 90 which is pivoted as at 91 to the lever 87 at a point above its fulcrum, so that a motion upon the part of one lever will cause a contrary motion upon the part of the other lever. The connecting-bar 90 is slotted as at 92, and through the slot passes the power-shaft 30 of the machine. Immediately at one side of the shaft an abutting shoulder 93 is formed upon the connecting-bar, and located upon the shaft at one side of the bar is a cam 94, which as the shaft revolves is brought into contact with the abutting-shoulder 93, causing a thrust or reciprocation of the connecting-bar and consequently opposite movements upon the parts of the levers 87 and 88. The upper ends

of the levers 87 and 88 pass loosely through the mortises 82 in the yoke-bars 81, so that it will be seen that said yoke-bars move away from each other at each revolution of the shaft 30. An inward movement is caused by a coiled spring 95, whose ends are threaded and pass through perforations in the levers 87 and 88 above their fulcrums and are there provided with thumb-nuts 96 by which the tension of the spring may be increased.

Upon a front cross-bar 97, which connects the two front legs of the machine, there is pivoted at opposite sides of the center of said bar by means of pins 98, a pair of arms 99, said arms being located in a horizontal plane below the yoke-bars 81 of the holding-mechanism. A pair of ears 100 extends above and from the outer sides of the arms 99, and a coiled spring 101 (best shown in Fig. 7 of the drawings) has its terminals passed through the pins and threaded, and to the same are applied thumb-nuts 102. It will be seen that through the medium of the spring 101 the bars are converged toward their front ends, at which point they meet, the same being vertically below the center of the cylinder 54 and centrally between the holding-devices of the machine. Each arm carries one-half of a circular plate or support 103 for the orange, and when the arms are brought together the halves meet and constitute the whole support. The arms are provided with mortise-openings 104 at points in front of their spring 101, and through these mortise openings pass the upper ends of a pair of loose vertical levers 105 (best shown in Fig. 3), which levers are near their lower ends, as indicated at 106, pivoted on a cross-piece 107. The lower ends of the levers 106 are beveled, as shown, and are operated upon by a pair of twin cams 108 mounted upon the power-shaft 30 at each side of the center of the machine. The projecting surfaces of these two cams are coincident, so that they simultaneously act upon or compress the lower ends of the levers and spread the upper ends thereof causing the said upper ends to spread against the tension of the spring 101, the orange-supporting arms 99, and thus any orange supported by the arms will be permitted to fall. Immediately after the cams have continued their revolution so that their projecting portions are away from the levers the spring that connects the levers will cause a contraction of the arms and the same will again form a support for any subsequent orange that may be deposited thereon. The arms 99 at their inner free ends are supported upon a cross-strip or rest-bar 108 (seen in Figs. 2 and 7), whose ends take into inclined ways 109 that depend from the ways 78. A rod consisting of two adjustable sections slotted and bolted together and indicated as 110 is connected to the rest-bar and depends therefrom, the lower end of the rod being in the path of the cam 111 on the shaft 30 which causes a downward movement of the bars 99 at the same time they are sepa-

rated, so that the fruit is always discharged in the same direction. This rod may be adjusted for different sizes of oranges in a manner apparent that is to say, the orange-supporting arms 99 may be raised and lowered, in that as will be obvious large oranges will require that the arms be lowered so as to bring their wrappers at the proper point, while small oranges will require the arms to be raised in order that the twisting-fingers may grasp their wrappers.

This completes the construction of the preferred form of machine, and although the operation will be readily understood as the same has been outlined in connection with the description of the parts, yet I deem it best to repeat the same in order that it may be thoroughly appreciated: Motion being imparted to the power-shaft, in this instance through the medium of the crank-handle, it will be seen that the eccentric gear 70 will give to the shaft 74 a fast and a slow rotation, alternately, and this shaft through the medium of the spur-gear 75 will impart a similar fast and slow rotation to the cylinder 54. The rotations of the power-shaft will cause rotations upon the parts of the cams 71, 111, 105, and 94, and the rotations of the sprocket 32 will cause a similar movement upon the parts of the shafts 24 and the paper feed-rolls. The oranges are fed by hand or otherwise into the chute 26 above the machine, and as the shaft 24 revolves the separating-finger 25 permits one orange at a time to drop into the cylinder 36. Here the orange is held immediately over the center of the opening 5 over which the web of paper extends. The paper is severed by the knife 9, immediately after which the cam 46 of the shaft 24 leaves the rod 44 so as not to affect or influence it, and permits the latter to fall and release the fingers 39, whereby the orange is discharged and falling through the opening 5 carries the sheet of paper therewith. The opening 5 serves to crimp the paper. At the time that the orange falls through the opening 5, the cam 71 has elevated the rod 67 and advanced the head of the same into the path of the moving segmental lever 66, causing the twisting fingers to open to allow the passage of the orange and wrapper therebetween. In the passage of the orange and wrapper between the fingers the head 68 is lowered, which liberates the lever 56 and permits the fingers to be snapped together grasping the upper edge of the wrapper. The orange continuing its course passes through the twisting-fingers and falls upon the supporting-disk 103, immediately after which, by a proper timing of the mechanism, the holding devices 85 advance and grip the orange at its center, firmly holding the same, yet in such a yielding manner as to avoid any possibility of bruising the fruit. Immediately thereafter the cylinder is given a rapid twist which causes said edges to become twisted over the fruit. The twisting-arms now release their hold and the le-

vers 105 are spread in the manner heretofore described at their upper ends thus causing a separation upon the part of the arms 99, and the fruit is dropped into any waiting receptacle the succeeding orange taking its place.

Referring to Figs. 8 and 9, it will be seen that I have illustrated therein a slight modification of the machine more especially that part termed the twisting-mechanism. In this modification I employ the base 112, which has an annular opening 113 surrounded by an annular groove or seat 114 in which is mounted the toothed ring 115 whose lower edge has a rib 116 which takes into the seat. Fast upon the ring and rising therefrom is a cylinder 117 the same having its upper end provided with a flange 118 and at intervals with openings 119 vertically disposed. Hinged to the flange 118 above each of the openings 119, as indicated at 120, is an irregular curved or shaped finger 121, said finger having an inclined portion 122 intermediate of its point of pivot, and its lower end and beyond its point of pivot provided with a tail or extension 123 interposed between which and the flange 118 is a contracting spring 124. This spring, it will be observed, serves to draw the outer tail-portion or extension upward and consequently the lower end outward. A series of three of these fingers is employed, and each is connected to the other by a bowed wire 125, said wires crossing at points around the center of the cylinder and being connected at their center-portions pivotally with the fingers, as at 126, the opposite ends or terminals of each bowed wire being loosely connected by staples 21^a to those fingers which lie at each side of the one to which it is loosely connected or pivoted at 26. A ring 127, encircles the cylinder, and at diametrically opposite points is pivoted as at 128 to the terminals of a yoke 129 located at the inner end of a lever 130, said lever being pivoted as at 131 to a convenient portion of the frame. A rod 132 is pivoted as at 133 at its upper end to the lever 130 and depends into the path of a cam 134 which is the equivalent of the cam 71 on the shaft 30 as mentioned in the former construction. The operation of this modification in conjunction with the remainder of the machine is simply this:—The normal position of the fingers 22 is spread, which spreading is caused by the contraction of the spring 124. At intervals the rod 132 is depressed by the cam 134 and the downward movement of the rod causes a similar movement upon the part of the lever 130 and its ring 127, thus causing the lower ends of the fingers to move inward toward each other and grasp the paper or wrapper. Of course when the fingers move outward they cause the wires to release the crimped edge of the wrapper and thus hold the same during the rotations of the cylinder, causing a consequent twisting of the wrapper.

Various changes in the details of the construction of my invention will readily suggest

themselves to those skilled in this class of machines, and I therefore do not limit the same to the details herein shown and described and their arrangement, but hold that
 5 I may vary the construction to any degree and extent within the knowledge of the skilled mechanic.

Having described my invention, what I claim is—

10 1. In a machine of the class described, the combination with a table having a circular opening, feed-mechanism arranged over the opening, and twisting and holding mechanism below the same, of a block arranged in
 15 rear of the opening, resilient bars extending from the block at opposite sides of the opening, a knife connecting the bars and arranged above a slot in the table, a paper reel-supporting shaft at the front of the table, a pair
 20 of feed-rolls in advance of the knife, and tappets carried by the feed-rolls and adapted to strike and elevate the resilient bars, substantially as specified.

2. In a machine of the class described, the
 25 combination with a table having a circular opening and a knife and a roll-slot, feed devices and twisting devices above and below the opening, a block in rear of the opening, resilient bars extending forwardly from
 30 the block at the sides of the opening and knife-slot, a knife connected to the bars above the knife-slot, a pair of yielding bars below the table, a lower roll carried by the yielding bars and extending through the roll-slot, op-
 35 posite standards upon the table, a roll-carrying shaft supported by the standards, tappets extending from the ends of the upper rolls and adapted to contact with the resilient bars, and a reel-support in front of the rolls, sub-
 40 stantially as specified.

3. In a machine of the class described, the combination with a table and wrapper twisting and orange holding and supporting mechanisms, of a cylinder supported over the table
 45 and over an opening therein, feed-devices above the cylinder, and means for operating the same, pivoted fingers having upper inclined ends extending below and tending toward the center of the cylinder, a lever hav-
 50 ing an opening encircling the fingers, a rod connected to the free end of the lever, a shaft above the lever, and a cam carried by the shaft for operating the rod for raising the lever, substantially as specified.

4. In a machine of the class described, the
 55 combination with the framework and the wrapper twisting and orange holding and supporting mechanisms, of a superimposed cylinder, an inclined feed arranged over the cyl-
 60 inder, pivoted fingers arranged around the cylinder, a finger-operating device encircling the fingers, and means for vertically reciprocating said device, substantially as specified.

5. In a machine of the class described, the
 65 combination with a separable fruit-supporting device, a fruit-holding device arranged thereover, and means for simultaneously

opening and closing the holding device, and for separating and bringing together the supporting device, of a superimposed twisting
 70 mechanism, and means for operating said mechanism, substantially as specified.

6. In a machine of the class described, the combination with a fruit-supporting device, an upper fruit holding device, and means for
 75 simultaneously opening and closing the same, of a superimposed opening and closing twisting mechanism, and means for rotating the same at a greater speed during the closing of the twisting mechanism, substantially as
 80 specified.

7. In a machine of the class described, the combination with fruit-supporting and holding devices, of a superimposed cylinder having
 85 openings, means for revolving the cylinder, twisting-arms extending inwardly through the wall of and pivoted to the cylinder and crossing each other, at their inner ends and means for closing and unclosing said arms
 90 upon the wrapper of the fruit during the revolution of the cylinder, substantially as specified.

8. In a machine of the class described the combination with fruit-supporting and hold-
 95 ing devices, of a superimposed cylinder, wrapper-twisting arms extending from the wall of the cylinder, means for opening and closing the same upon the wrapper, and means for rotating the cylinder rapidly when the
 100 arms are in their twisting position or closed upon the wrapper and slowly when they are not in their twisting position, substantially as specified.

9. In a machine of the class described, the combination with a fruit-holder, of a super-
 105 imposed twisting cylinder having surrounding teeth, wrapper clamping arms extending from the cylinder, means for closing and unclosing the same upon the wrapper, a vertical shaft, a spur-gear and elongated pinion
 110 carried by the shaft, said spur-gear engaging the teeth of the cylinder, a transverse shaft, and an eccentric gear carried by said transverse shaft and engaging the pinion, substan-
 115 tially as specified.

10. In a machine of the class described, the combination with the fruit-holding devices, of a superimposed base having an annular
 120 opening, a toothed cylinder mounted to revolve thereon, vertical shafts arranged around the cylinder, opposite openings therein, springs for moving the shafts in one direction, arms extending outward from the shafts, connecting-rods between the arms, wrapper-
 125 twisting fingers extending inward from the shafts and crossing each other, a segmental gear mounted upon one of the shafts, a segmental lever mounted upon the cylinder and moving therewith, and a stop arranged out of the plane of the lever, and means for rais-
 130 ing and lowering said stop at intervals and for rotating the cylinder, substantially as specified.

11. In a machine of the class described, the

combination with the fruit-holding devices, of a superimposed base having a circular opening, a toothed cylinder mounted to revolve thereon, vertical shafts arranged around the cylinder, opposite openings therein, springs for moving the shafts in one direction, arms extending outward from the shafts, connecting-rods between the arms, wrapper-twisting fingers extending inward from the shafts and crossing each other, a segmental gear mounted upon one of the shafts, a segmental lever mounted upon the cylinder and moving therewith, a shaft located below the lever, a cam arranged upon the shaft, a lower lever pivoted to the framework and overlapping the cam, a rod supported by the lower lever, and a stop or head arranged upon the upper end of the rod and adapted to be projected into the path of the segmental lever, and means for rotating the cylinder, substantially as specified.

12. In a machine of the class described, the combination with the upper twisting mechanism, of opposite ways, cross-bars arranged in the ways, means for opening and closing the cross-bars, bowed strips connected at their centers to the cross-bars, and webs of fabric connecting the terminals of the bowed strips, substantially as specified.

13. In a machine of the class described, the combination with the twisting devices, of opposite ways, cross-bars arranged therein, yoke-bars having mortises connected to the cross-bars, fruit-clamping devices carried by the cross-bars, of a lower power-shaft, and opposite front and rear shafts, levers mounted upon the front and rear shafts, one of said levers being connected at its end to said shafts and the other between its ends to the remaining shaft, and each of said levers having their upper ends passed through the mortises in the yoke-bars, a connecting-bar between the lower free end of one lever and the upper

free end of the other and slotted to receive the power-shaft, a cam on said power-shaft, and a shoulder on the bar in the path of the cam, and a coiled spring connecting the upper ends of the two levers, substantially as specified.

14. In a machine of the class described, the combination with twisting and holding devices, of a pair of separable arms pivotally supported below said devices, and at their inner front ends carrying concaved half-disks, and means for opening and closing said arms so as to bring them together and spread the disks, substantially as specified.

15. In a machine of the class described, the combination with twisting and holding devices, of a pair of pivoted levers converged at their free ends beneath said devices and there provided with half-disks forming a fruit-support, a coiled spring connecting the arms in front of their pivots, a pair of levers pivoted between their ends below the supporting-levers and at their upper ends engaging mortise-openings in said supporting levers, a transverse shaft, and a pair of cams arranged at opposite sides of the lower ends of the levers and adapted to spread the same at their upper ends, substantially as specified.

16. In a machine of the class described, the combination with the holding and twisting devices, of the pivoted supporting arms terminating in half-disks, means for opening and closing said arms, inclined ways at the sides of the same, and a cross-bar or rest arranged in the ways and under the supporting-arms, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

THOMAS E. NININGER.

Witnesses:

LOTT ALLEN,
Mrs. C. A. BRUSH.