

No. 703,184.

Patented June 24, 1902.

W. G. CHAPIN.
CARTON MACHINE.

(Application filed Nov. 13, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1

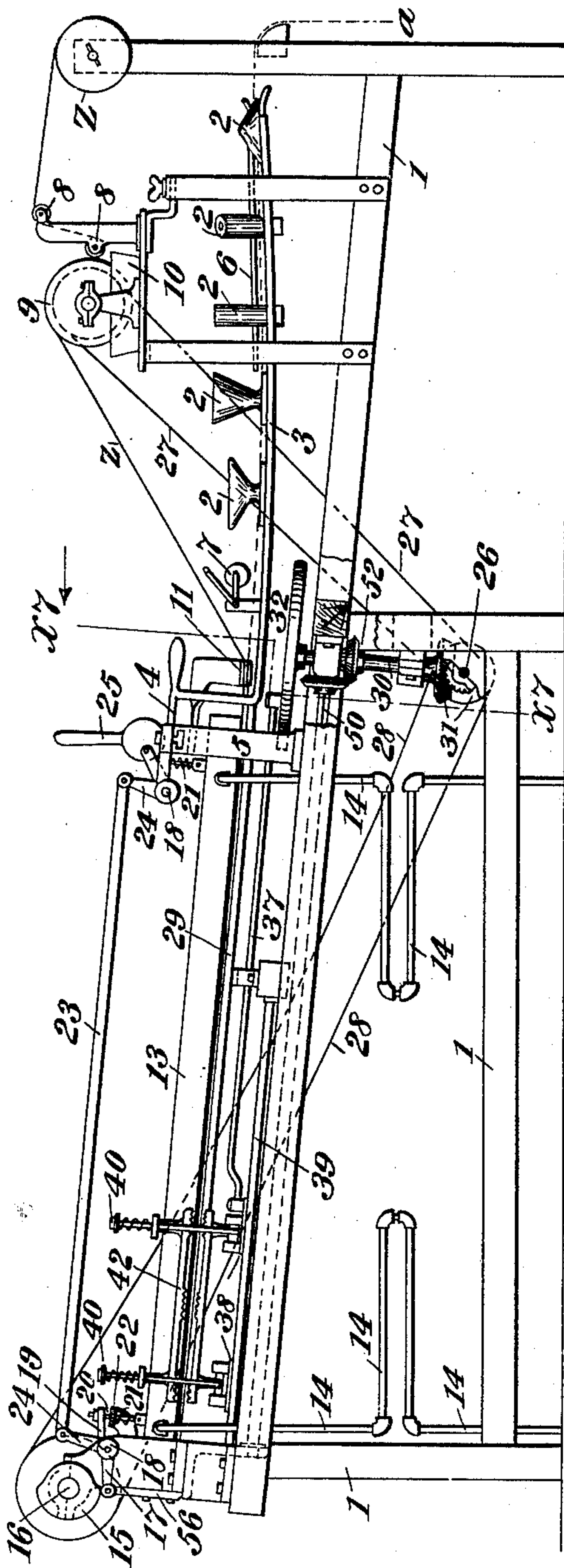
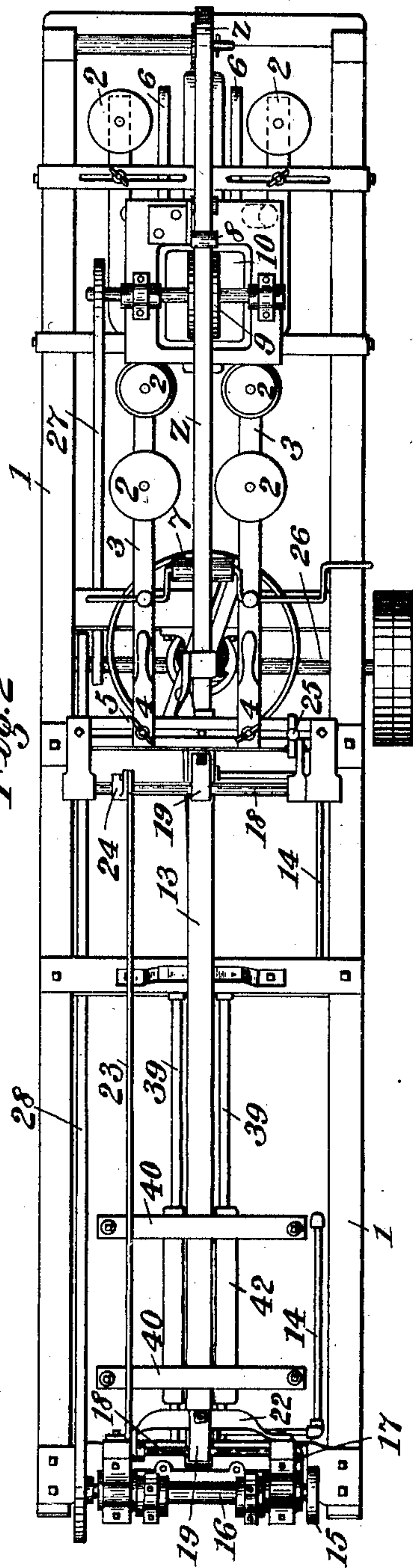


Fig. 2



Witnesses
Bert B. Jones.
Charles W. Hildreth

Inventor:
William G. Chapin
By his Attorney
Henry Connors

No. 703,184.

Patented June 24, 1902.

W. G. CHAPIN.
CARTON MACHINE.

(Application filed Nov. 13, 1901.)

(No Model.)

3 Sheets—Sheet 2.

Fig. 3.

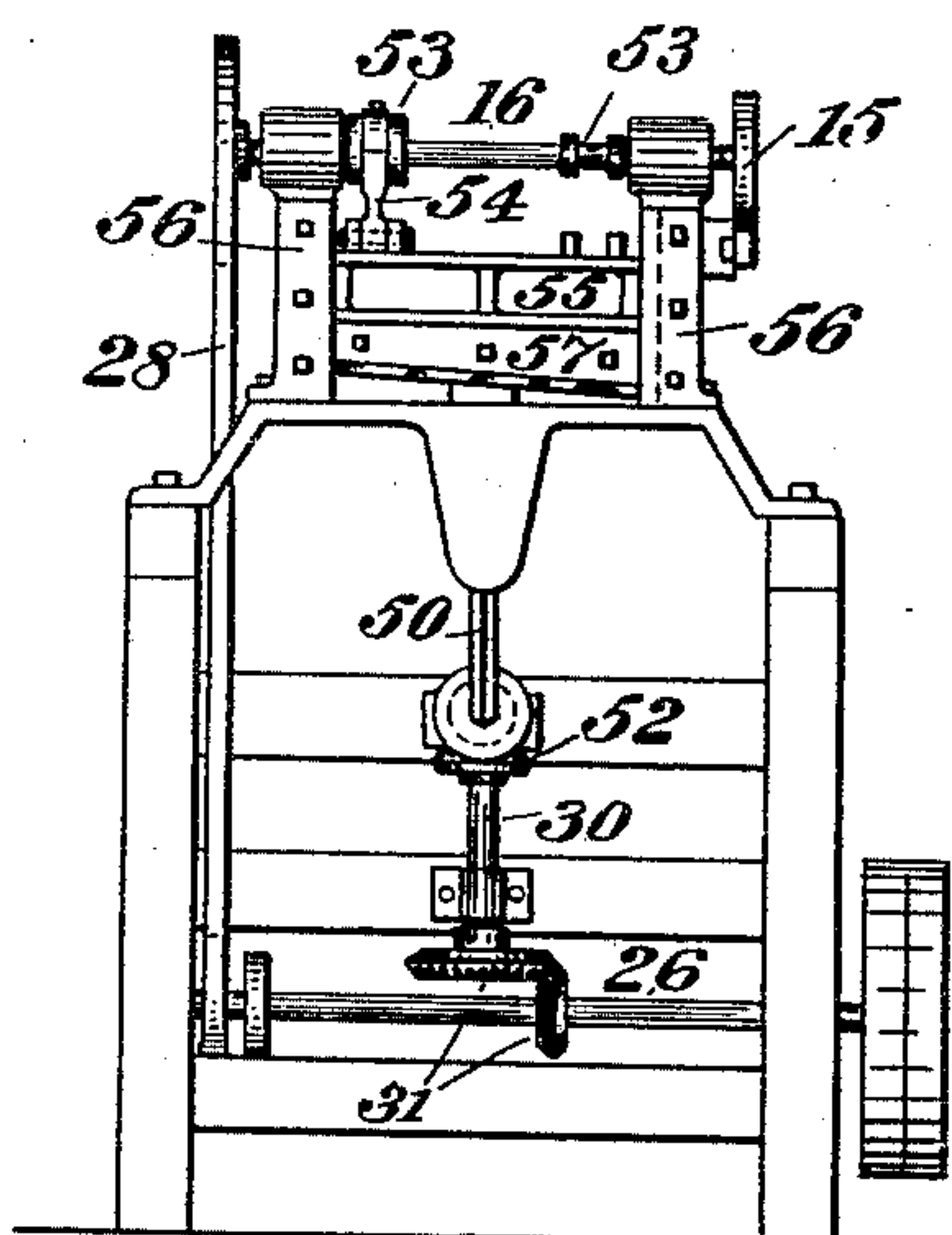


Fig. 4.

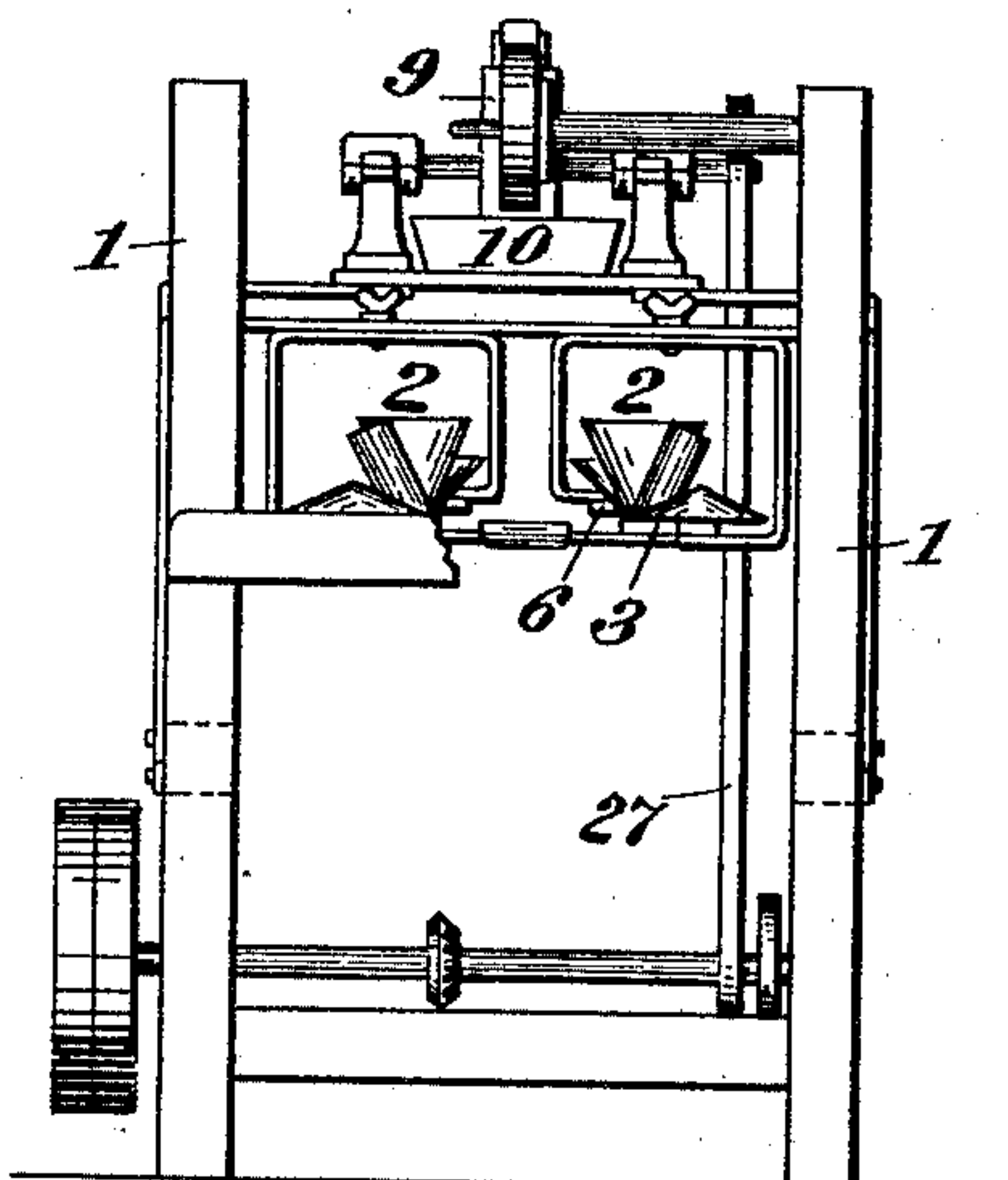


Fig. 5.

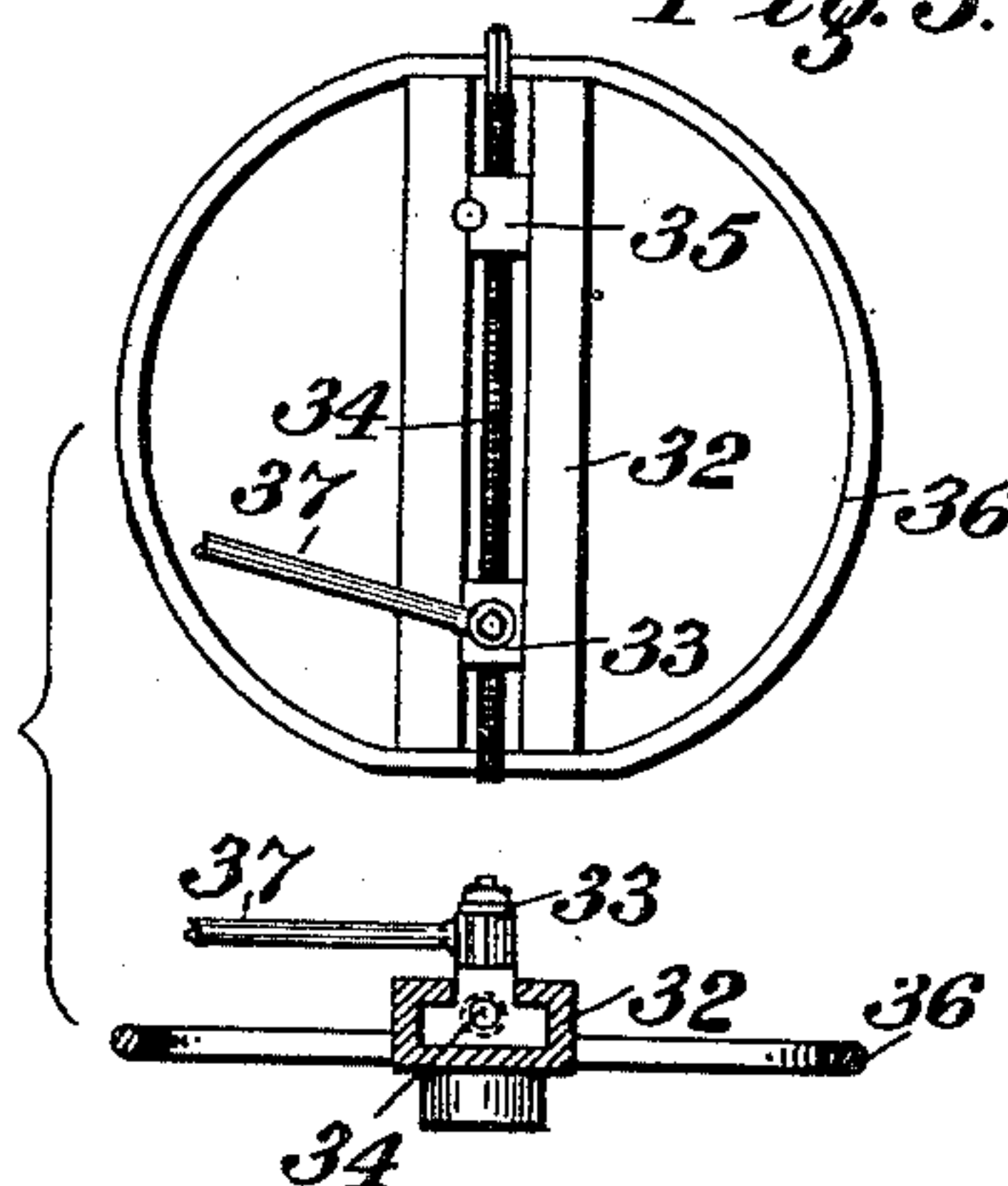


Fig. 6.

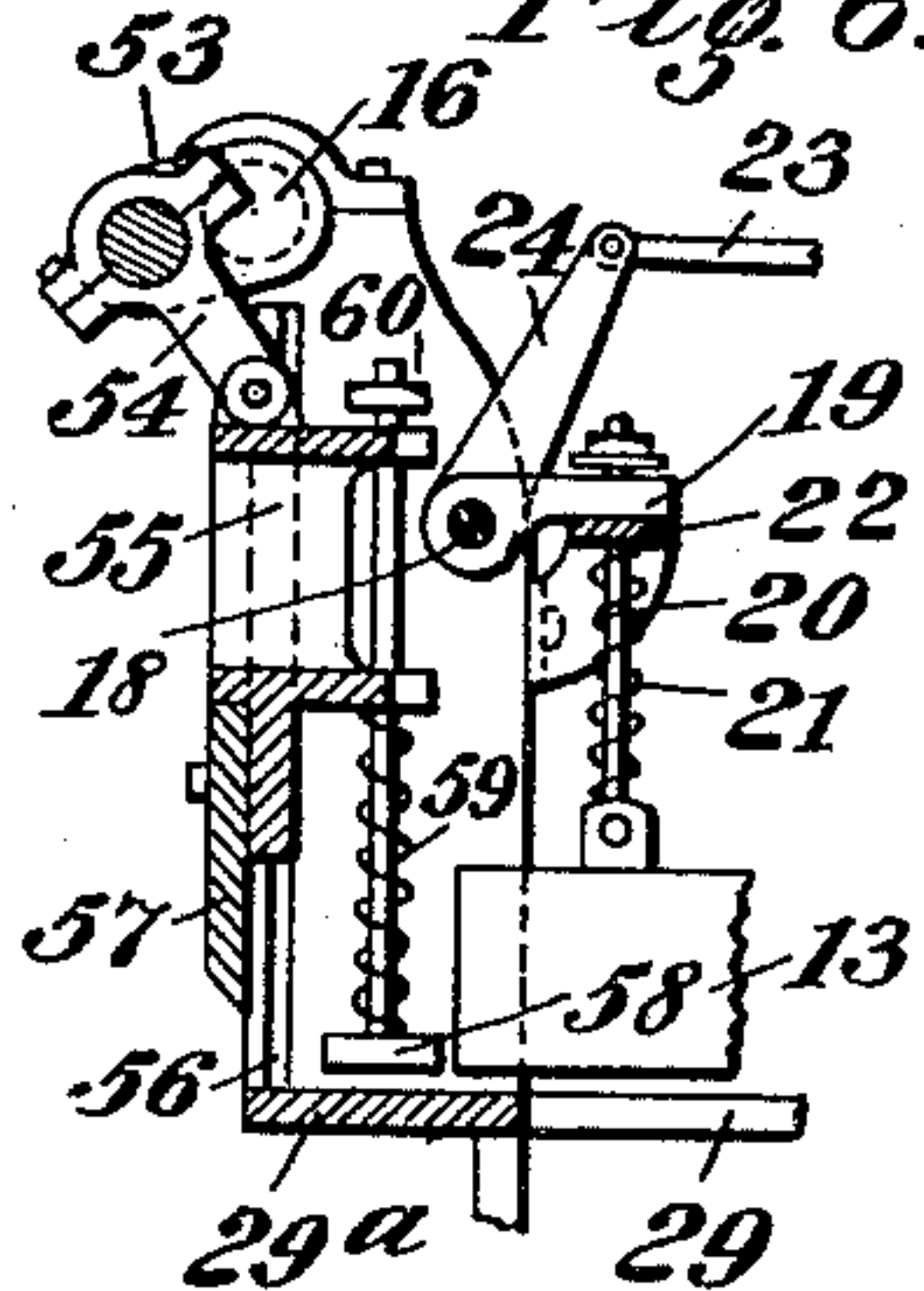


Fig. 7.

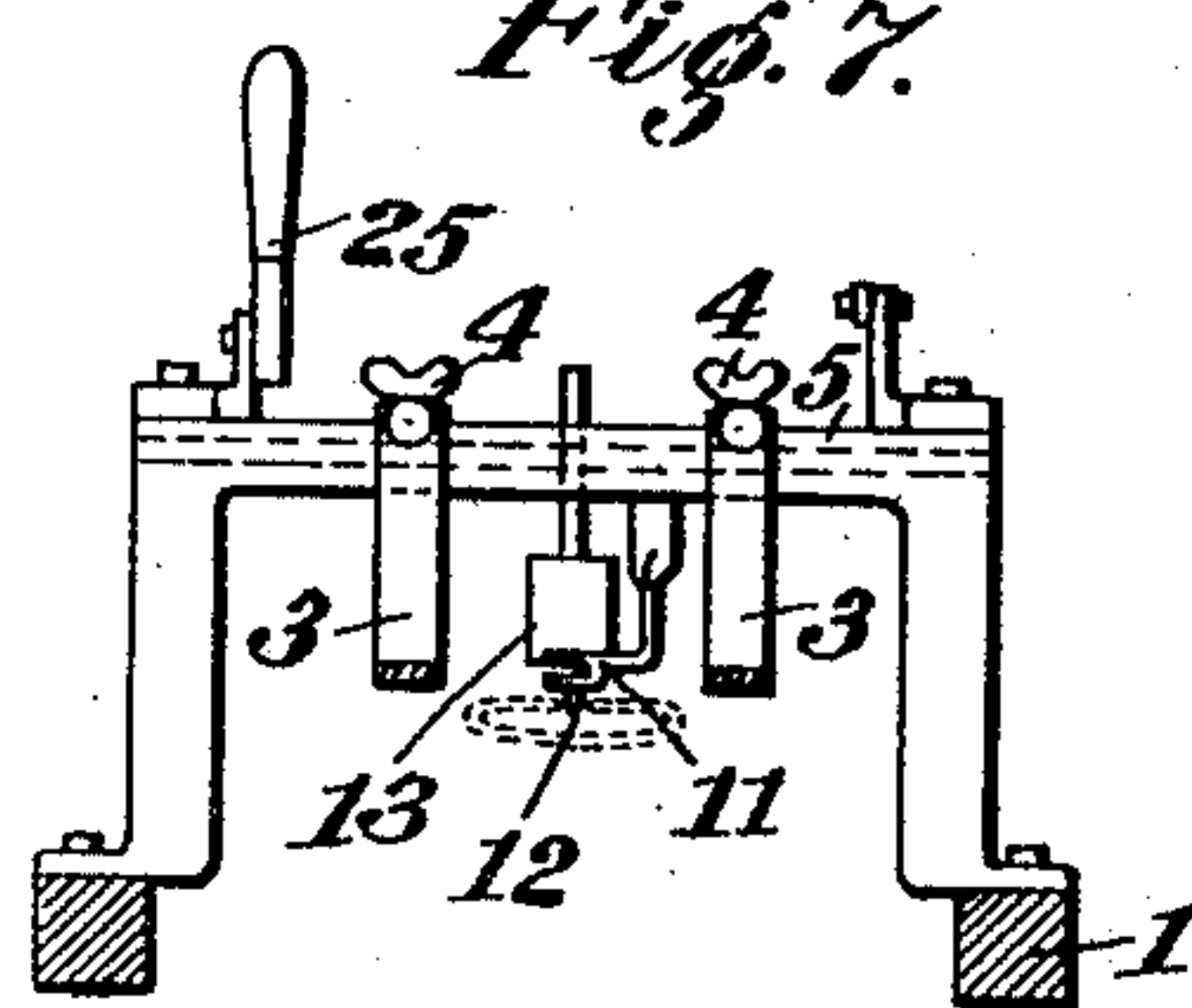


Fig. 15.

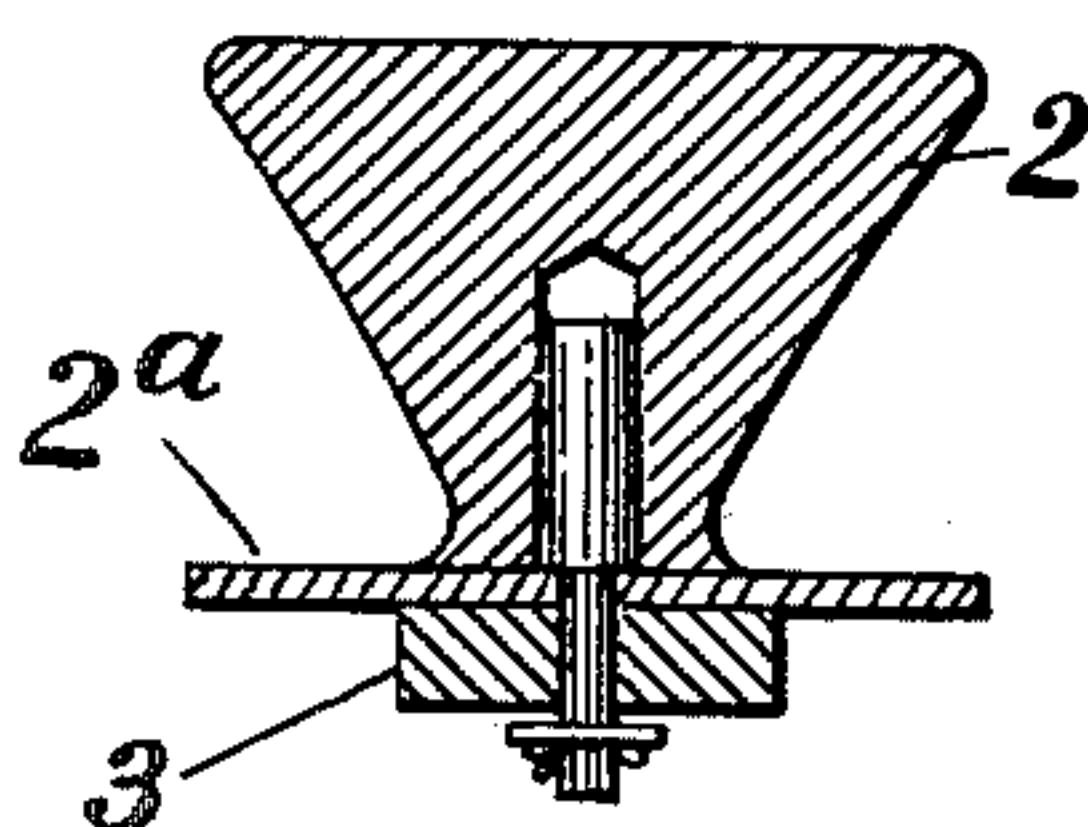
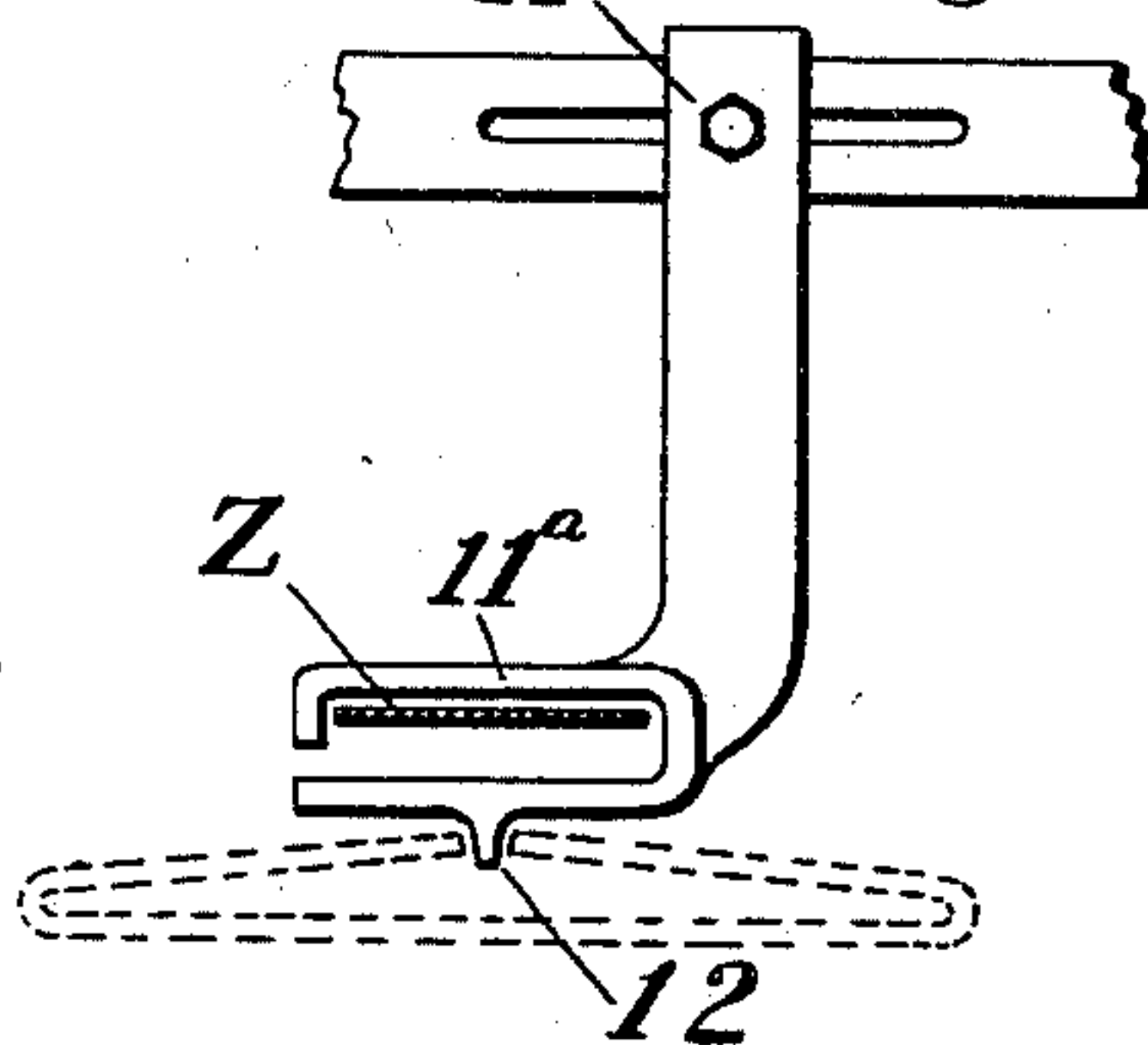


Fig. 16.



Witnesses
Ben B. Jones.
Charles H. Wilderth

Inventor:
William G. Chapin
By his Attorney
Henry C. Cunniff

No. 703,184.

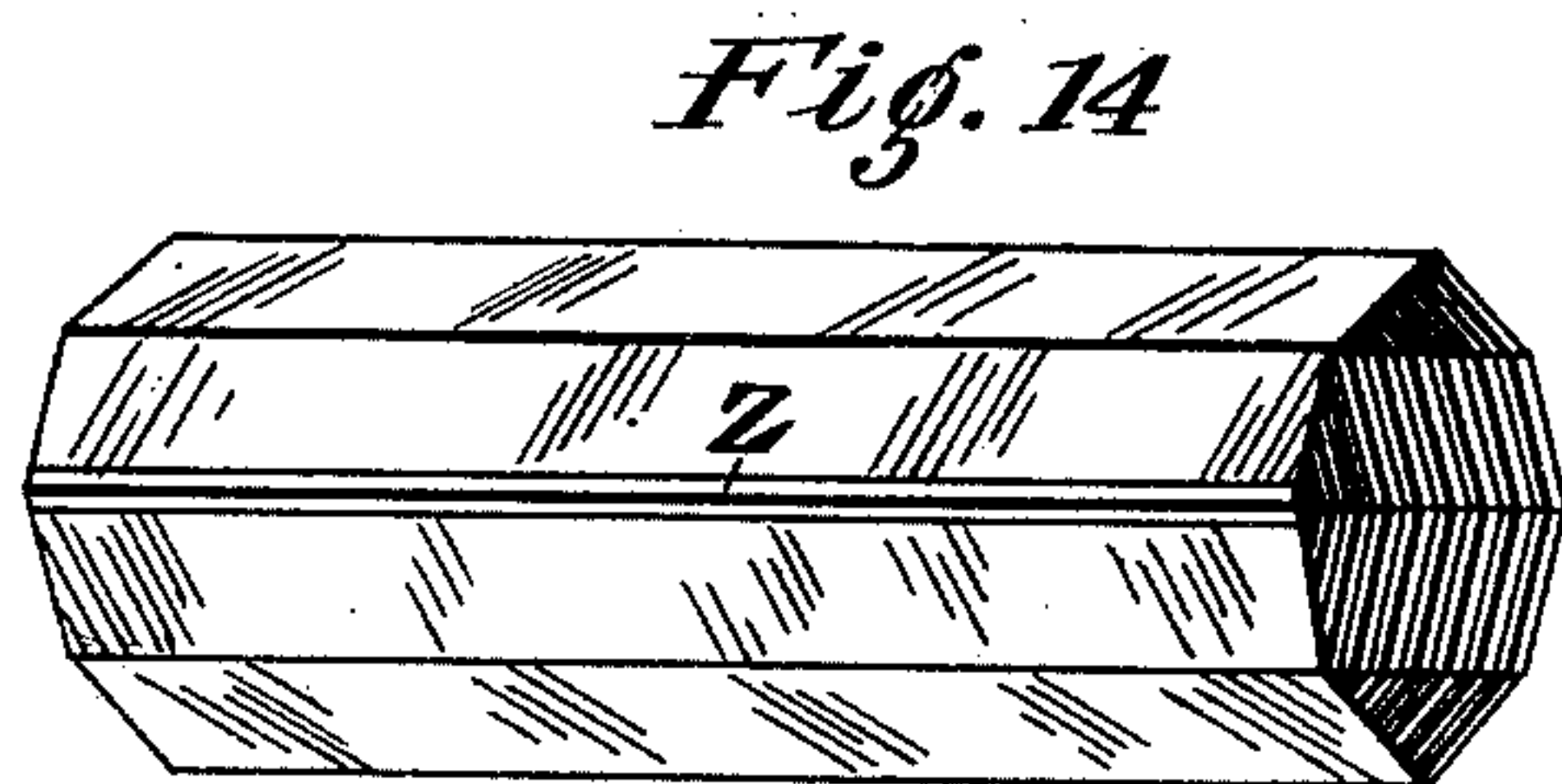
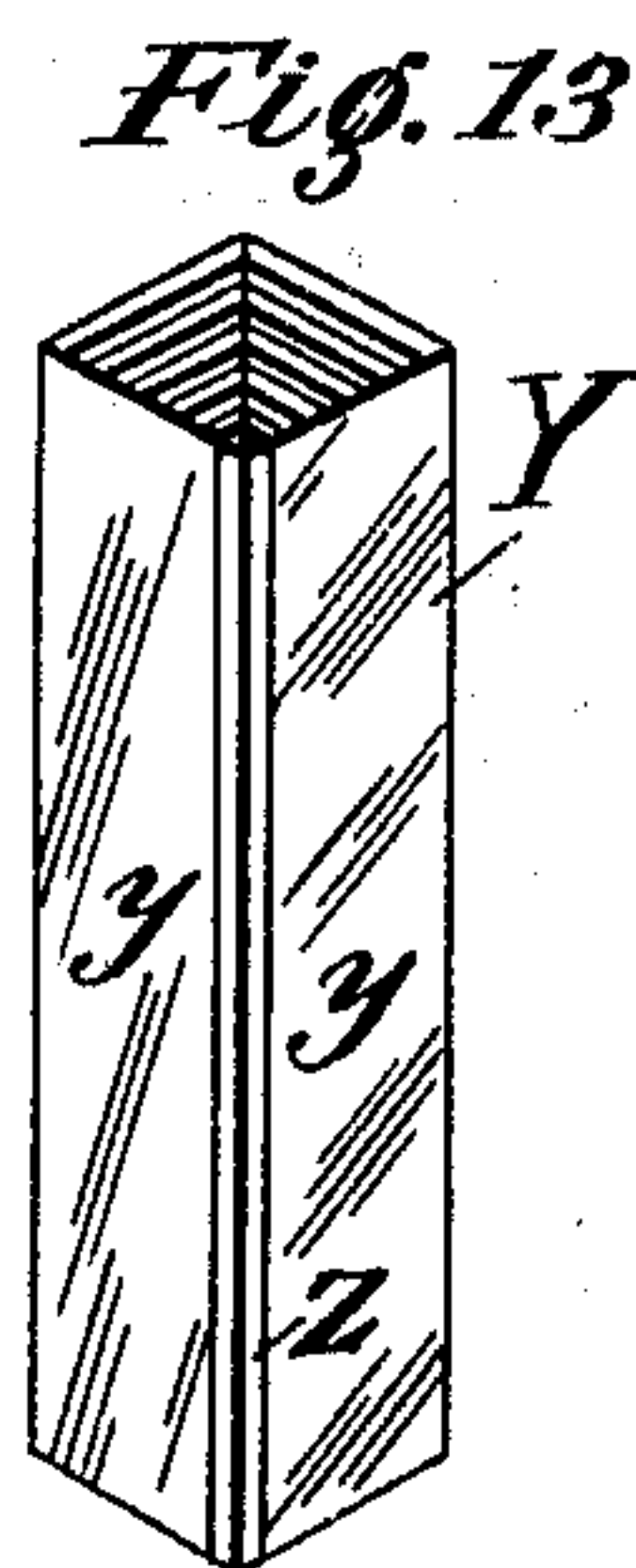
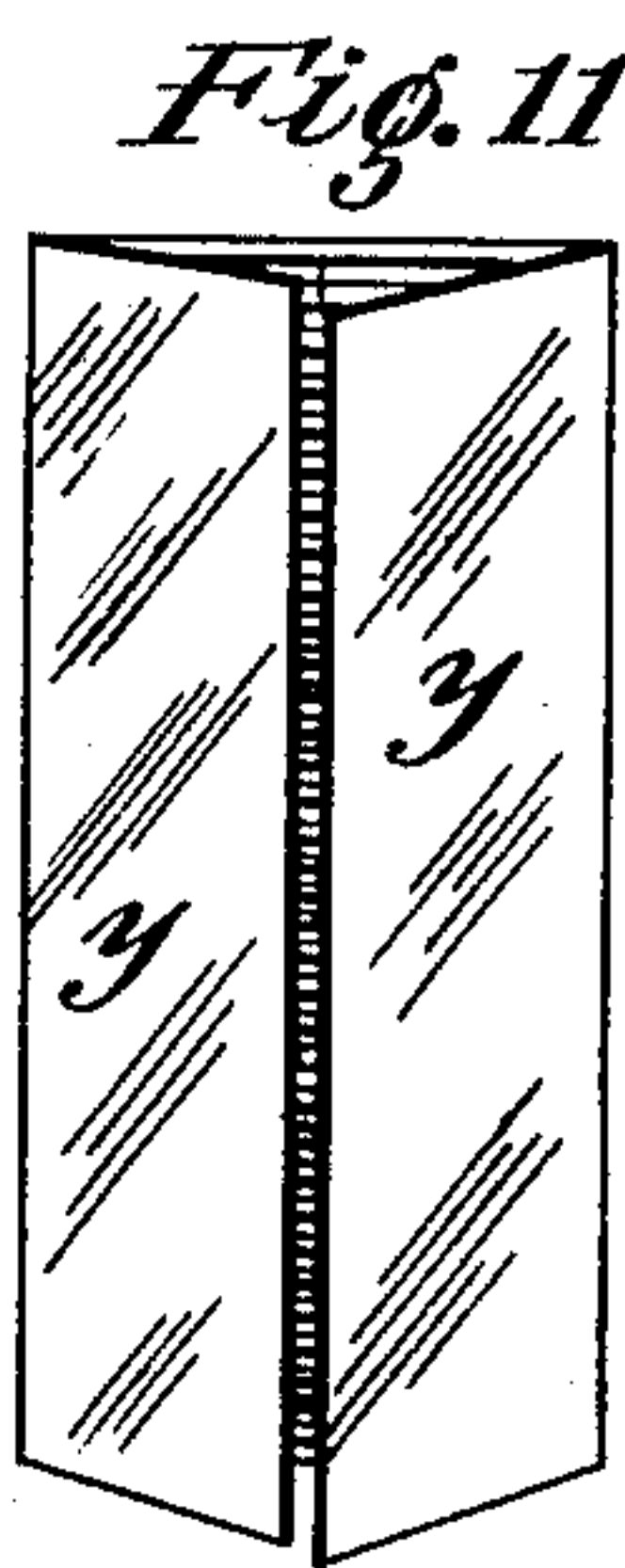
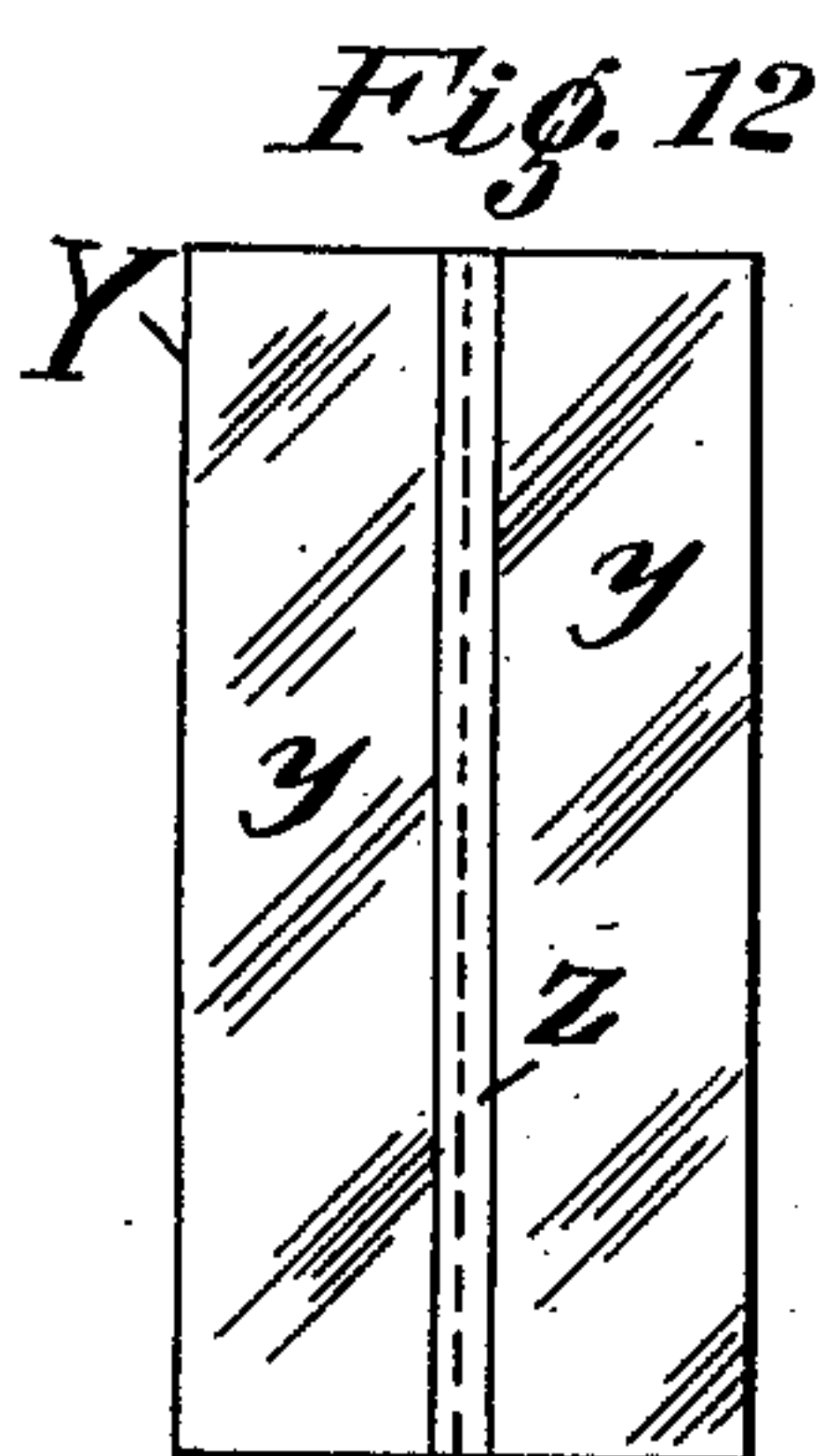
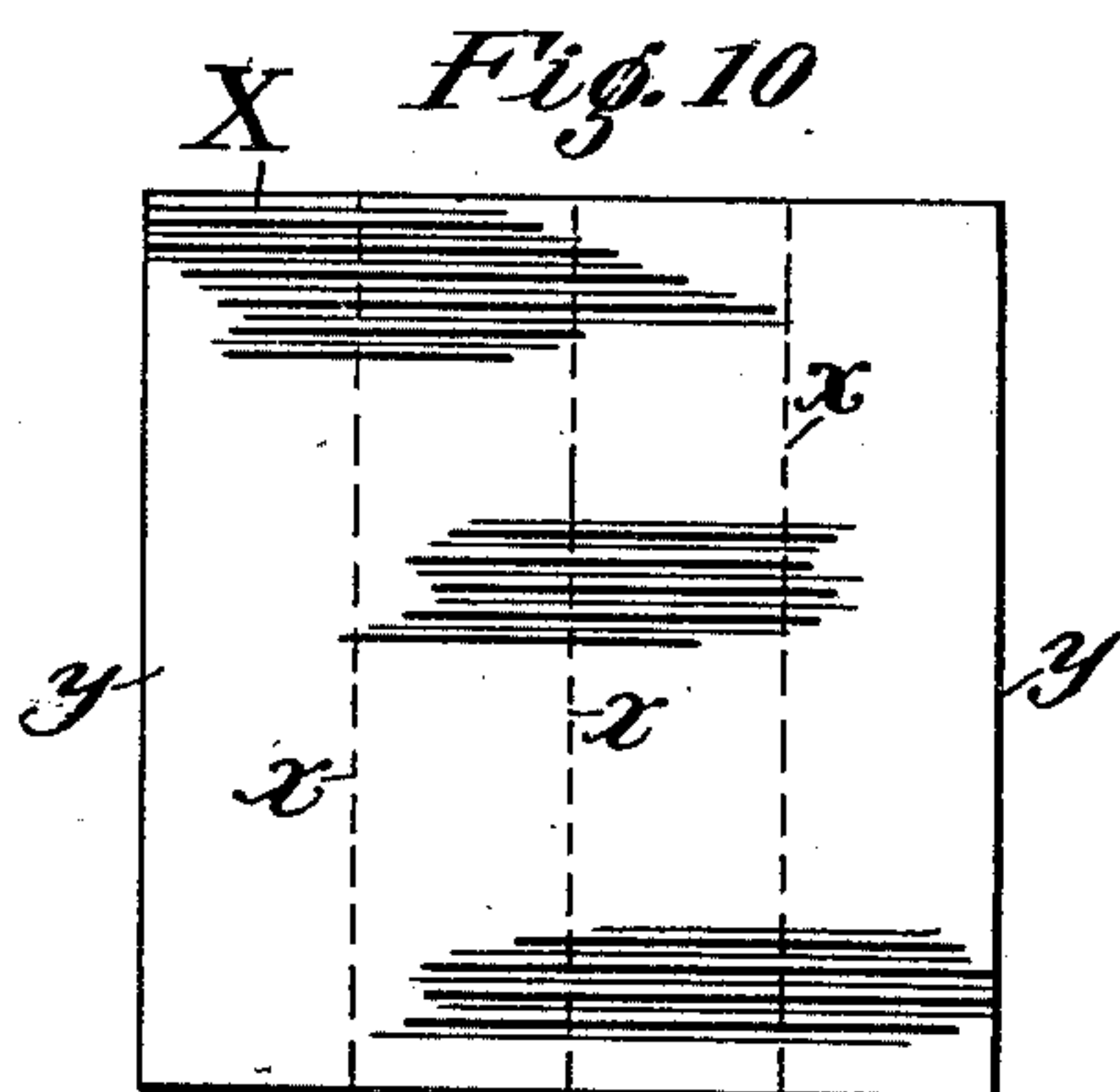
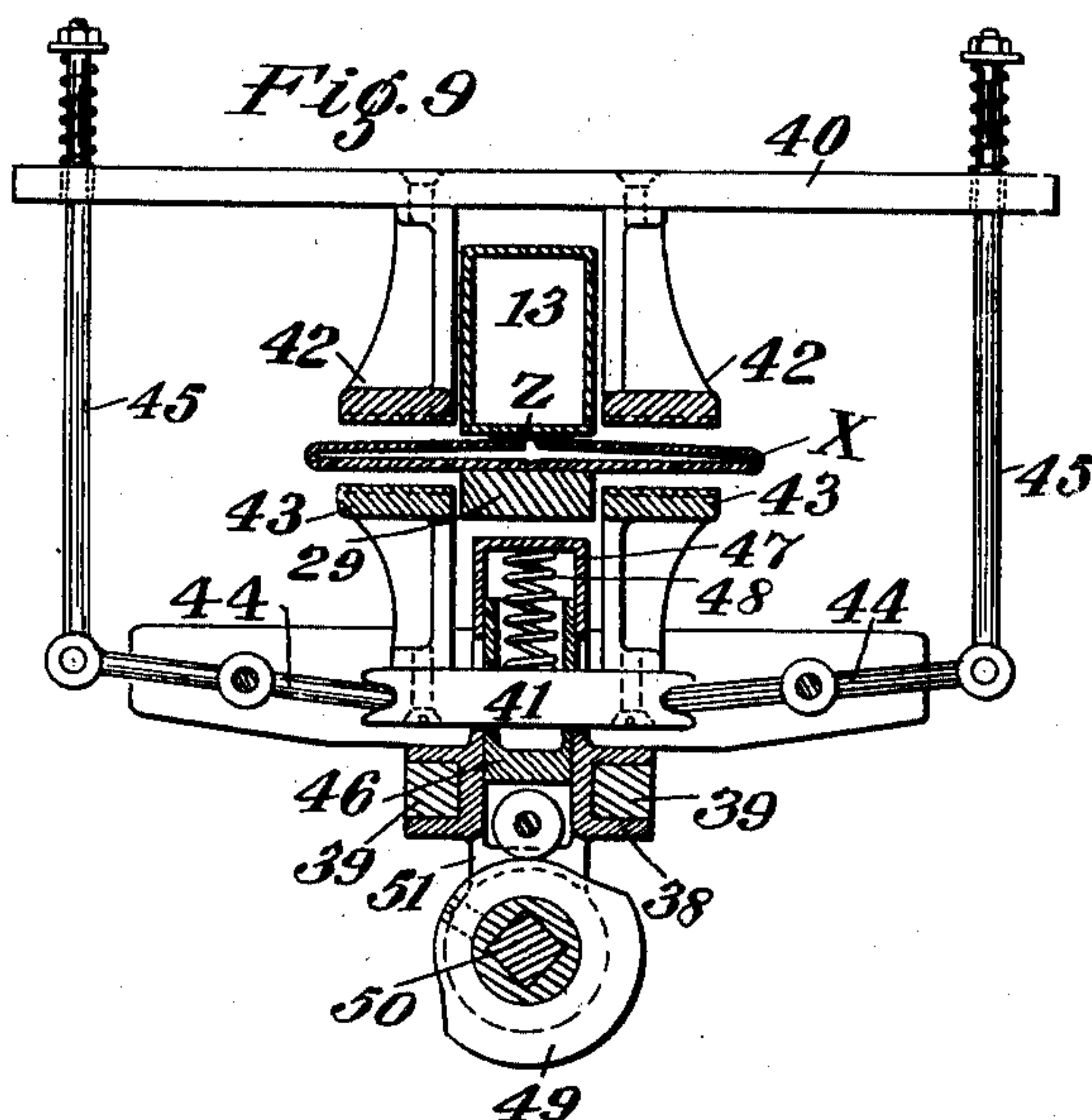
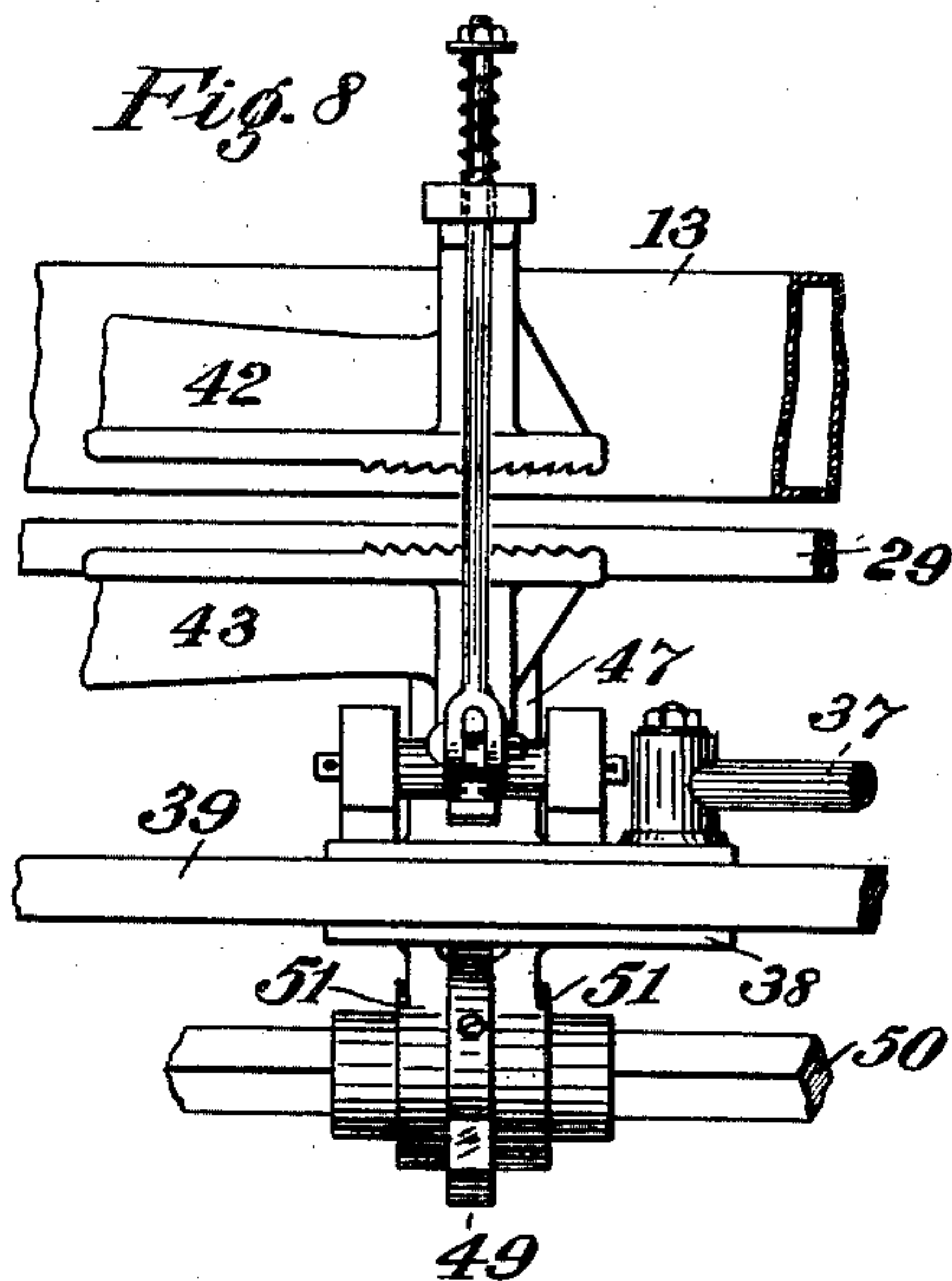
Patented June 24, 1902.

W. G. CHAPIN.
CARTON MACHINE.

(Application filed Nov. 13, 1901.)

(No Model.)

3 Sheets—Sheet 3.



Witnesses
Bert C. Jones.
Charles W. Hilduth

Inventor:
William G. Chapin
By his Attorney
Henry Connors

UNITED STATES PATENT OFFICE.

WILLIAM G. CHAPIN, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE THOMPSON & NORRIS COMPANY, A CORPORATION OF NEW JERSEY.

CARTON-MACHINE.

SPECIFICATION forming part of Letters Patent No. 703,184, dated June 24, 1902.

Application filed November 13, 1901. Serial No. 82,081. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. CHAPIN, a citizen of the United States, residing in the city of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain Improvements in Carton-Machines, of which the following is a specification.

This invention relates to machines for folding, gluing, and cutting off cartons or tubes made from creased paper-board to be used for packing purposes.

In the present case the machine which embodies this invention takes in a strip of longitudinally-creased paper-board, folds it along the creases, glues together the margins, and then cuts off the cartons in uniform lengths from the strip.

In the accompanying drawings, which serve to illustrate the invention, Figure 1 is a side elevation of the machine, and Fig. 2 a plan thereof. Fig. 3 is an elevation of the delivery end of the machine, seen at the left in Figs. 1 and 2; and Fig. 4 is an elevation of the other or receiving end of the machine. Fig. 5 includes a plan and transverse section of the feed-crank detached. Fig. 6 is a vertical sectional view taken transversely through the knife of the cutter at the delivery end of the machine. Fig. 7 is a vertical cross-section of the machine substantially at line x in Fig. 1. Figs. 8 and 9 are enlarged views of the gripper device of the feed mechanism, the former being side elevation and the latter a cross-section, taken transversely of said axis. Fig. 10 shows the blank for the carton. Fig. 11 shows the same partly folded. Fig. 12 shows the carton completed and closed by a hinging-strip, and Fig. 13 shows the completed carton expanded. These last four figures are designed merely to exhibit the product of the machine. Fig. 14 is a perspective view showing a carton with eight sides constructed according to this invention. Fig. 15 is an enlarged sectional view of one of the turning devices, and Fig. 16 is an enlarged view of the adjustable guide for the hinging-strip.

The machine as seen in Figs. 1 and 2 takes in a creased strip of paper-board of uniform width and any length whatever. The creases extend lengthwise, as indicated by the dot-

ted lines x in the blank X. (Seen in Fig. 10.) Usually what is known as "corrugated" board is used, but any suitable paper-board may be employed for the cartons. As the creased strip is fed into the machine the outer flaps or sides y are folded in as seen in Fig. 11, and when folded down they are secured together by a hinging strip or tape z . (Seen in Figs. 12 and 13.) Fig. 12 shows the flattened carton Y as it emerges from the machine and is cut off, and Fig. 13 shows the same expanded. Obviously there may be more creases, so that the carton will have a polygonal cross-section, as indicated in Fig. 14; but the number seen in Fig. 10 will usually suffice.

In the machine, 1 designates the main frame, the strip a of creased paper-board being supplied from the right in Figs. 1 and 2 and moving as it is intermittently fed toward the left in said figures. It will suffice for the present to say that the intermittent feed device grips the strip a , moves it forward a distance corresponding to the length of a carton, and then releases it and moves back to take a fresh hold. As the strip moves along the marginal flaps y are gradually turned up and in and folded down by a series of rotatably-mounted turning devices 2, mounted on bearers 3. These bearers are adjustable laterally, being supported at 4 on a slotted bridge-bar 5 on the frame. The turning devices 2 present in succession increasingly-inclined surfaces to the flaps y . The strip passes under fixed guides 6 as it passes through the folders, and after passing the last folder the strip passes under a roller 7, which flattens down the side flaps, the edges of which come near together. At this point the hinging-strip z is applied. This strip comes from a roll Z, passes about a guide-roller 8, thence over a glue-applying roller 9, which dips in a glue-fountain 10, and thence down to and through a guide 11 and to the folded strip to which it is to be applied. This guide 11 is seen clearly in Fig. 7, and its lower lip, which is directly in contact with the folded flaps on the strip of paper-board, has a parting blade or rib 12, which engages the narrow space between the meeting edges of the flaps y , and thus slightly separates the edges of the flaps and evens them at the moment

the glued or gummed hinging-strip z is applied. Just beyond the point where the guide 11 is situated the folded strip a with the hinging-strip z passes under a heater or drier 13 in the nature of an elongated square tube of metal in the longitudinal axis of the machine and supplied with steam through pipes 14 from any source. This heater rests on the strip while the latter is stationary between the intermittent feeding operations, and its function is to dry the glue or gum used in securing the hinging-strip. The heater or drier has a slight up-and-down movement sufficient to allow it at the proper time to press rather lightly on the folded strip and at another time when the strip is being fed along to allow the strip to move freely under it. The steam-supply pipes 14 are so bent or coiled, as seen in Fig. 1, as to permit of this slight up-and-down movement of the heater, and the means for lifting the heater comprises a cam 15 on a shaft 16 at the delivery end of the machine. This cam bears on an arm 17 on a rock-shaft 18, which has another arm 19, that takes under an adjusting-nut on the upper extremity of a lifting-rod 20, coupled below to the heater. This rod is embraced by a compressive spring 21 between the heater and a fixed bracket 22, through which the rod 20 extends. In order to be able to raise both ends of the heater simultaneously with the cam 15, this mechanism of the rock-shaft 18, arm 19, lifting-rod 20, and spring 21 is duplicated at the other (or right hand) end of the heater, and the rock-shafts are rocked simultaneously by a connecting-rod 23, which couples arms 24 on the respective rock-shafts. The heater 13 may be raised at any time by hand through the medium of a cam-lever 25, coupled to an arm on the rock-shaft 18 at the right in Figs. 1 and 2.

It may be stated here that 26 is the main driving-shaft of the machine and that the glue or gum applying roller 9 is driven therefrom through a belt 27 and suitable pulleys, and the shaft 16 is also driven therefrom through a link belt 28 and suitable sprocket-wheels.

In its passage through the machine the folded strip a is supported on a fixed narrow bed 29, which is situated directly under the heater and, as shown in Fig. 9, is of the same width as the heater.

The feeding mechanism will now be described, premising that it consists of grippers, means for opening and closing the latter, and means for moving the grippers to and fro longitudinally of the machine for intermittently feeding the carton-strip.

On an upright shaft 30, rotatably mounted in the frame of the machine, Fig. 1, and driven from the main shaft 26 through bevel-gears 31, is fixed the feed-crank 32, Fig. 5, which has an adjustable wrist 33 to vary the throw of the crank. The feed-crank is a bar slotted to form a keeper-guide for the block forming

the base of the wrist, and said block is made adjustable along said slotted guideway by means of a screw 34, which screws through the block and has a collared bearing at 35. For rigidity the bar of the crank is fixed in a ring-like band 36. A connecting-rod 37 couples the wrist of the crank with the carriage 38 of the gripper, Figs. 8 and 9, which latter is slidable on fixed ways 39, extending lengthwise of the machine. The gripper itself is constructed as will now be described. To cross-bars 40 and 41 are secured, respectively, the pairs of upper and lower jaws 42 and 43. The heater 13 and bed 29 are situated between the jaws of the pairs, as best seen in Fig. 9. Between the transverse members of the gripper-carriage 38 are fulcrumed two levers 44, one at each side, and these levers are coupled at their outer ends to the lower extremities of draw-bars 45, said bars having spring-cushioned couplings at their upper ends to the bar 40, carrying the upper jaws 42. At their inner ends the levers 44 have knuckle-bearings in the ends of the bar 41, carrying the lower jaws 43. With this construction when the bar 41 is pushed upward the lower jaws ascend and the upper jaws descend, thus bringing the jaws together on the carton strip or sheet between them. In order to operate the jaws, the bar 41 extends through and is fixed in the walls of a tubular plunger 46, which is slidable up and down in a casing 47, fixed in the carriage 38, the casing being slotted to permit the movement of the bar 41. A spring 48 in the casing depresses the bar 41. The plunger 46 is moved upward at the proper time to close the jaws, and the latter are held closed by a cam 49, slidable but non-rotative on a shaft 50, rotatively mounted in the frame. As here shown, the shaft 50 is square. The cam 49 is collared in pendent brackets 51 on the carriage 38, said brackets furnishing bearings for the cam, which is merely rotated by the shaft 50. This shaft is driven from the upright shaft 30 through bevel-gears 52.

It may be explained here that the cams 15 and 49 are so set that the former holds the heater 13 elevated while the latter is holding the gripper-jaws closed; also, that the crank 32 acts to move the gripper outward or toward the left in Fig. 1 while the cam 49 is holding the grippers closed. When the gripper-carriage reaches the end of its outward travel, the cam 49 releases the gripper, and simultaneously the cam 15 allows the heater to descend on the carton-strip. The latter now remains stationary, while the grippers move back or inward to seize the strip at another point. At the time the carton-strip is fed outward it is protruded beyond the end of the machine, and while held stationary the carton is cut off by a cutter, which will now be described with especial reference to Fig. 6.

In the shaft 16 is a crank 53, and the wrist of this crank is coupled by a connecting-rod 54 to a knife-gate 55, mounted to slide up and

down in guides 56 on the frame. This gate carries a knife 57, which cuts or shears the carton from the strip supported on the broad extremity 29^a of the bed 29, the knife playing close to the end of the said bed.

In order to hold the carton-strip firmly at the knife while being cut, a presser-foot 58 is provided. The stem of this presser-foot extends up through the knife-gate 55, and this stem is embraced by a compressed spring 59 between the said gate and the foot and tending to depress the latter. On the upper end of the said stem is an adjustable stop-nut 60. The presser-foot bears first on the carton-strip as the knife descends and presses thereon yieldingly, as will be readily understood.

Fig. 15 shows the preferred construction of the turning device 2. The turner is rotatably mounted on an upright stem on a disk-like base 2^a, which latter is rotatably mounted in the bearer 3. The corrugated strip to be folded passes over the disk 2^a, and the two parts 2 and 2^a can turn independently of each other.

Fig. 16 illustrates more in detail the form and construction of the guide 11. This guide will have by preference a lip 11^a to keep the strip *z* in place.

As the strip to be folded passes through the machine and the flaps at its margin are folded over as the strip moves along, being fully folded over at the advanced end and wholly flat at the point where the strip enters the machine, it is found that the middle portion of the strip tends to curve longitudinally, the upper side being concave. In the construction of this machine the bearers 3 are made curved, as may be seen in Fig. 1, so that it will fit the curved strip, and thus afford a proper support for same as it passes through the flap turning or folding mechanism. This curvature of the bearers terminates at about the point where the hinging and closing strip *z* is applied.

Having thus described my invention, I claim—

1. In a machine for the purpose specified, the combination with a cutter, of means for folding over the flaps of the creased strip *a*, means for feeding said strip intermittently to the cutter, and means for applying a gummed or glued strip *z* over the joint between the folded flaps of the carton-strip as the latter is fed, of a movable heater for drying said applied strip, and means for moving said heater, substantially as and for the purpose set forth.

2. In a machine for the purpose specified, the combination with the cutter, of means for folding over the flaps of the creased strip *a* as it is moved along, means for applying adhesive material to the strip *z*, means for applying said strip to the meeting edges of the flaps on the strip as the latter is moved along, and a heater for drying said strip, of an intermittent feeder for the strip, said feeder comprising a movable upper gripper-jaw and

a movable lower gripper-jaw, means coupling said jaw for simultaneous action, a reciprocating carriage on which said jaws are mounted, a spring for retracting said jaws, a cam, rotatively mounted in said carriage for closing said jaws, and means for rotating said cam during the reciprocation of the carriage, substantially as and for the purpose set forth.

3. In a machine for the purpose set forth, the combination with an intermittently-operating cutter, an intermittently-operating feeder for the carton-strip, means for applying an adhesive hinging-strip to the moving carton-strip and means for drying the adhesive material on said strip, said means comprising a hollow heater 13, mounted movably over the bed of the machine, means for supplying steam to said heater, and means for alternately raising and lowering said heater, substantially as set forth.

4. In a machine for the purpose set forth, the combination with a reciprocating carriage, of the gripper device thereon, comprising the upper jaws 42, the bar carrying the same, the lower jaws 43, the bar carrying the same, the draw-bars 45, the coupling-levers 44 whereby the upper and lower jaws are made to operate simultaneously, the spring for opening the jaws, a cam rotatively mounted in the carriage and bearing on the lower jaw of the gripper device for closing the jaws of the latter, and means for rotating said cam uniformly during the movements of the carriage, substantially as set forth.

5. In a machine for the purpose specified, the combination with the mechanisms for folding, feeding and cutting the carton-strip, and means for applying an adhesive hinging-strip thereto, of means for pressing and drying the adhesive material of the last-named strip, said means comprising the hollow metal heater 13, the pipes 14 for supplying steam thereto, the rock-shaft 18, having a lifting-arm, the lifting-rod 20, the spring 21 on said rod, the arm 17 on the rock-shaft, and the rotating cam 15, adapted to bear on the arm 17 and lift the heater, substantially as set forth.

6. In a machine for the purpose specified, the combination with means for feeding forward the strip to be folded, and means for gradually turning over the marginal flaps on the strip, of the curved bearers supporting said turning means, substantially as and for the purpose set forth.

7. The combination with the bearer, of a disk-like base 2^a rotatively mounted thereon, and a turner or folder 2 rotatively mounted on said base, substantially as set forth.

In witness whereof I have hereunto signed my name, this 19th day of October, 1901, in the presence of two subscribing witnesses.

WILLIAM G. CHAPIN.

Witnesses:

GEORGE J. RIEGLER,
EDW. H. KELSEY.