

(No Model.)

8 Sheets—Sheet 1.

S. A. GRANT.

ROTARY ENVELOPE MACHINE.

No. 387,065.

Patented July 31, 1888.

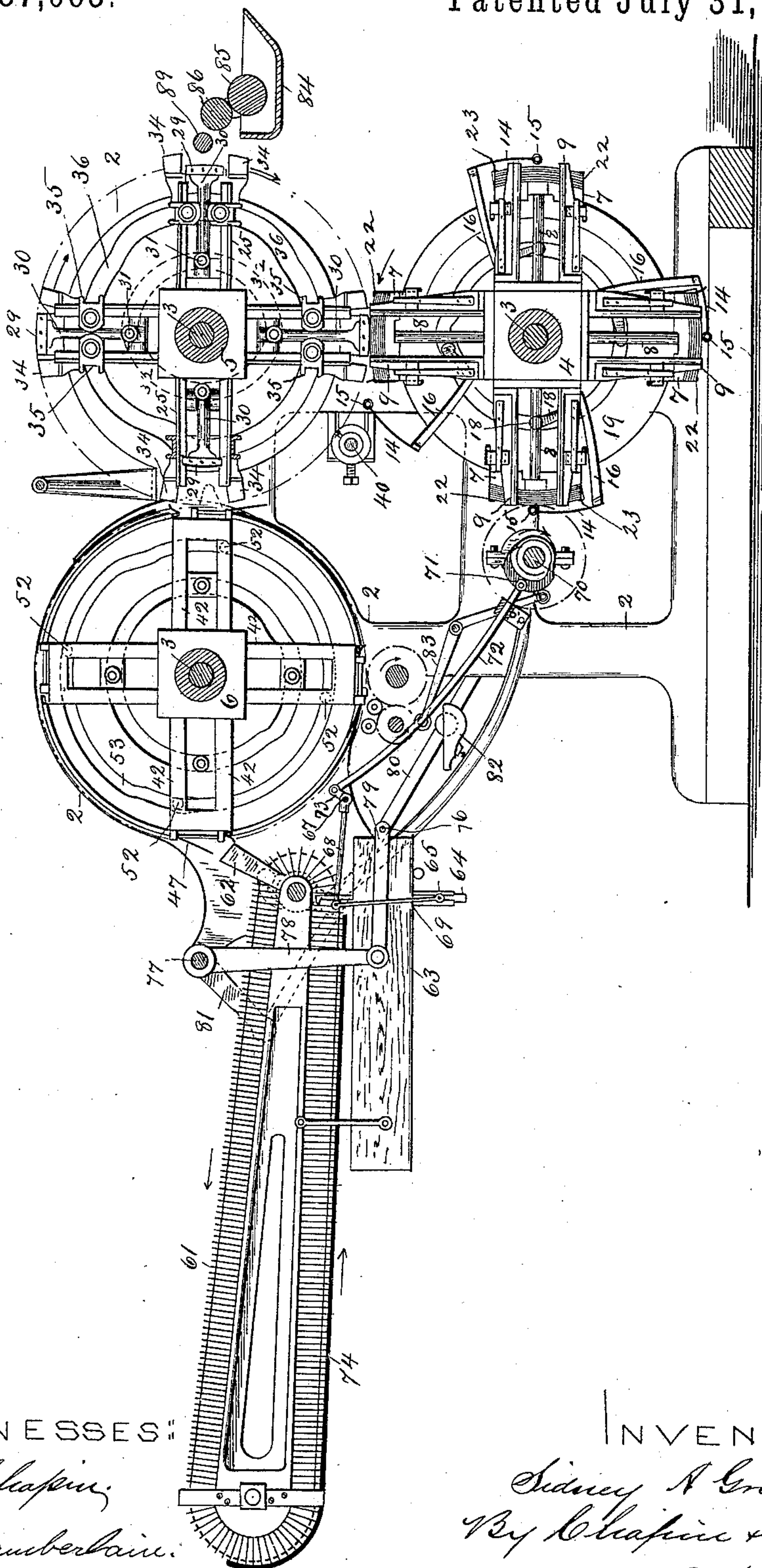


Fig. 1

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(No Model.)

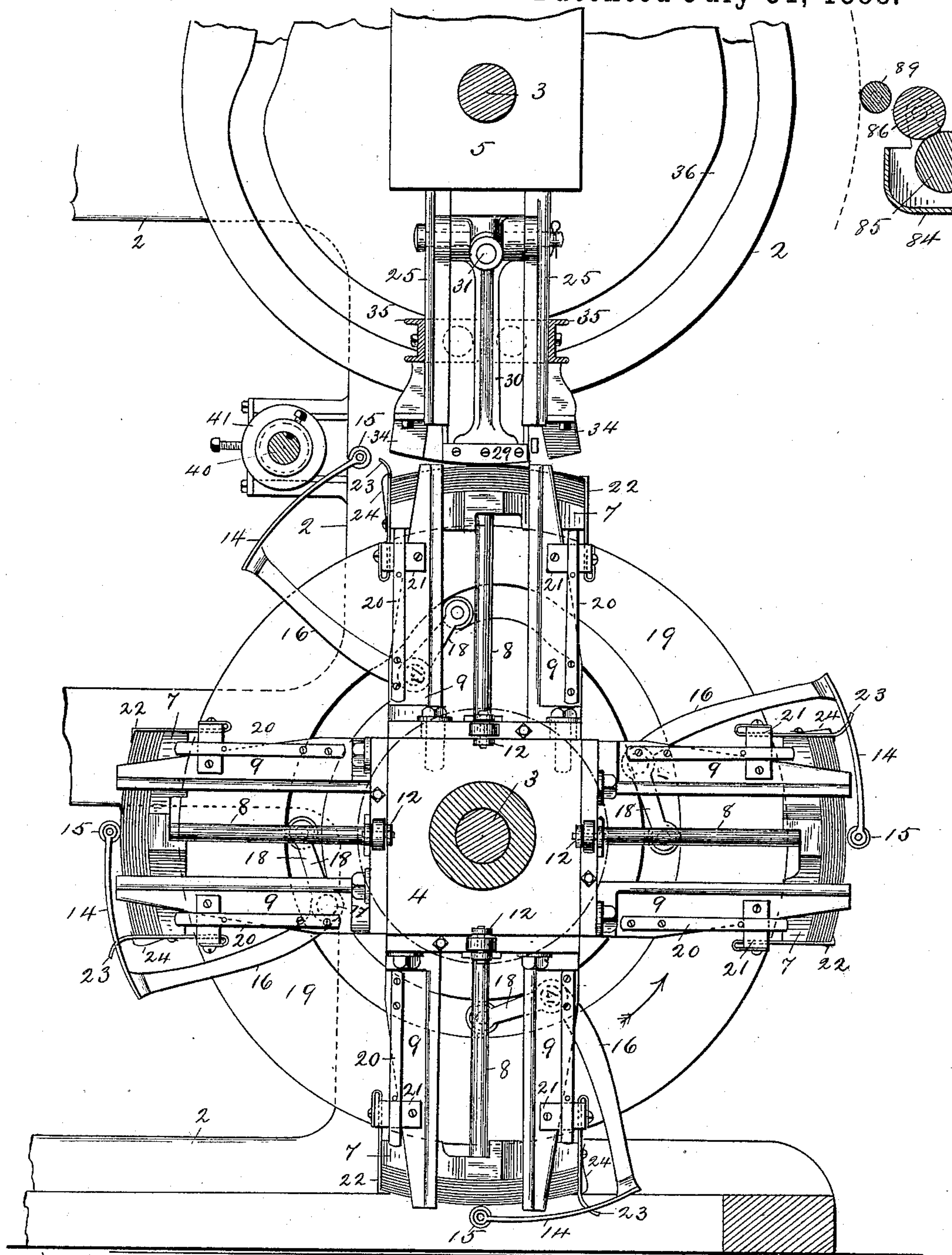
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Fig. 2

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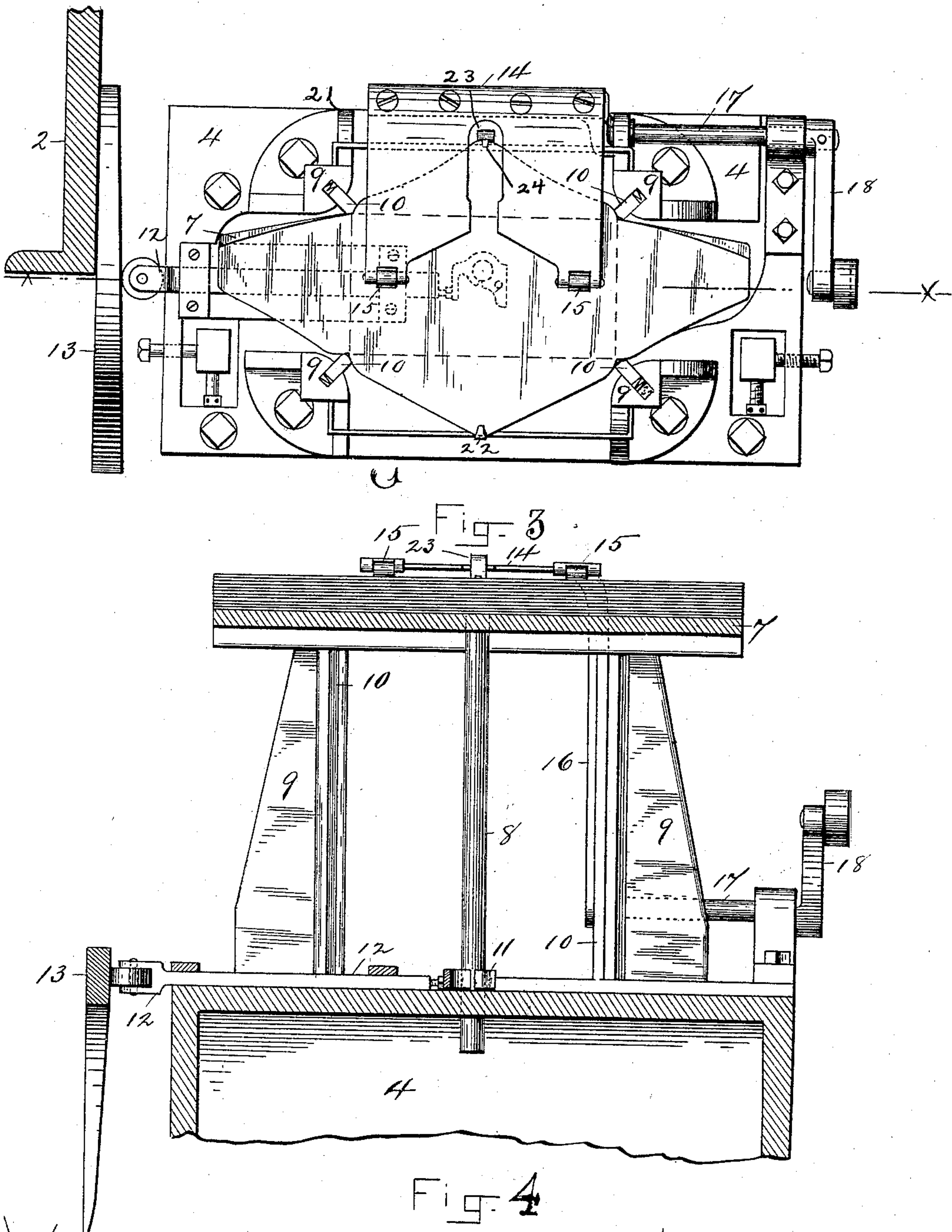


Fig. 4

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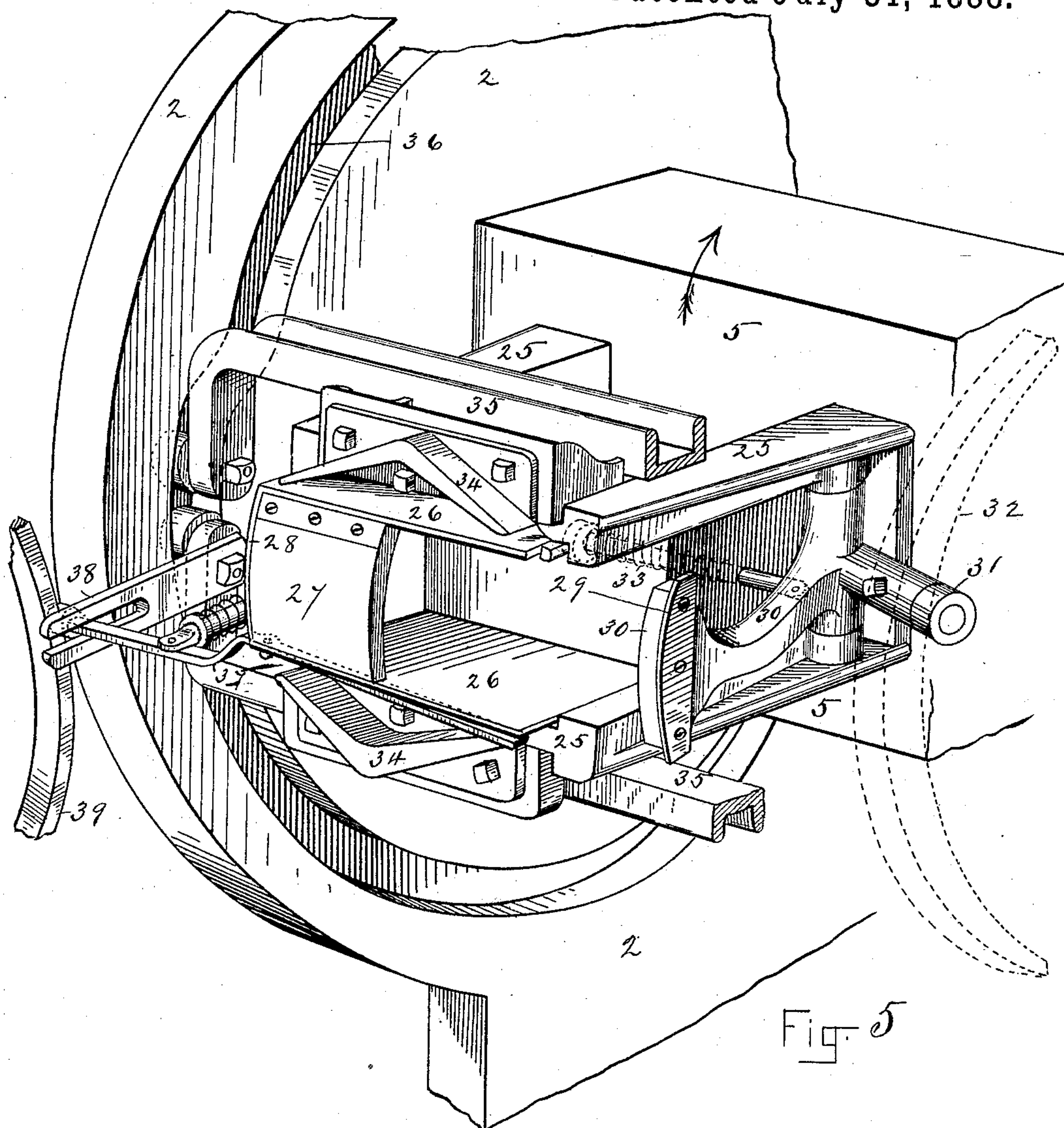


Fig. 5

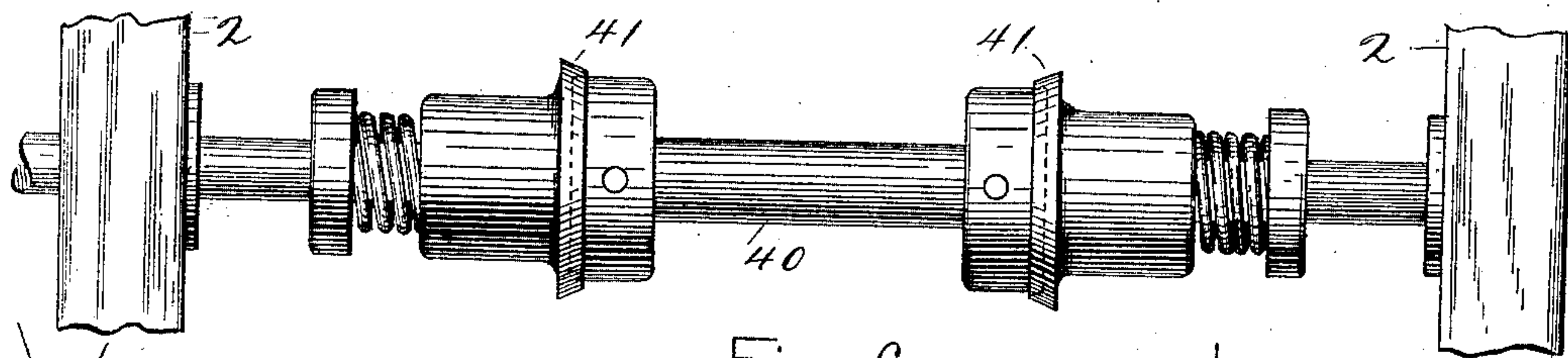


Fig. 6

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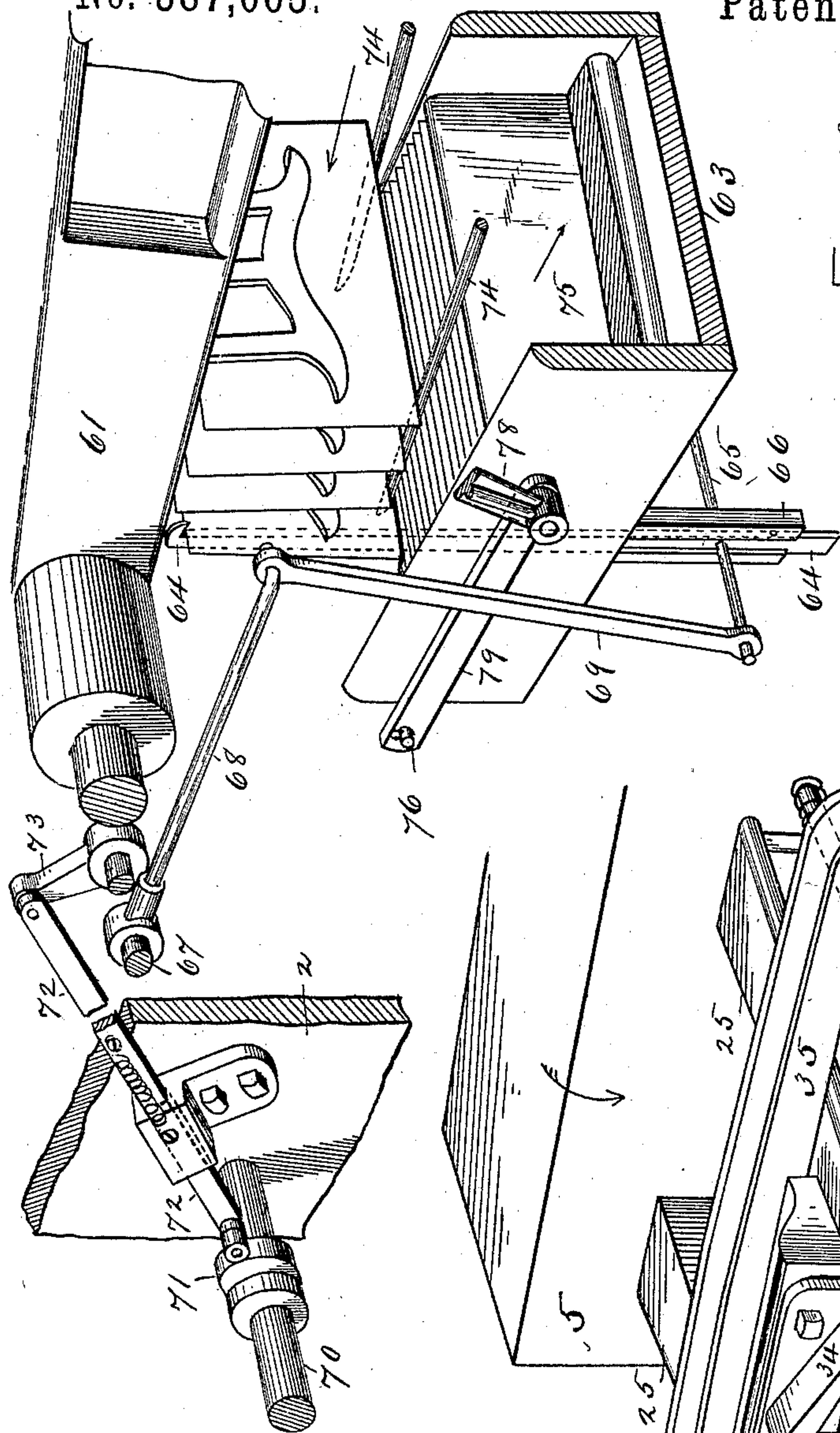


Fig-10

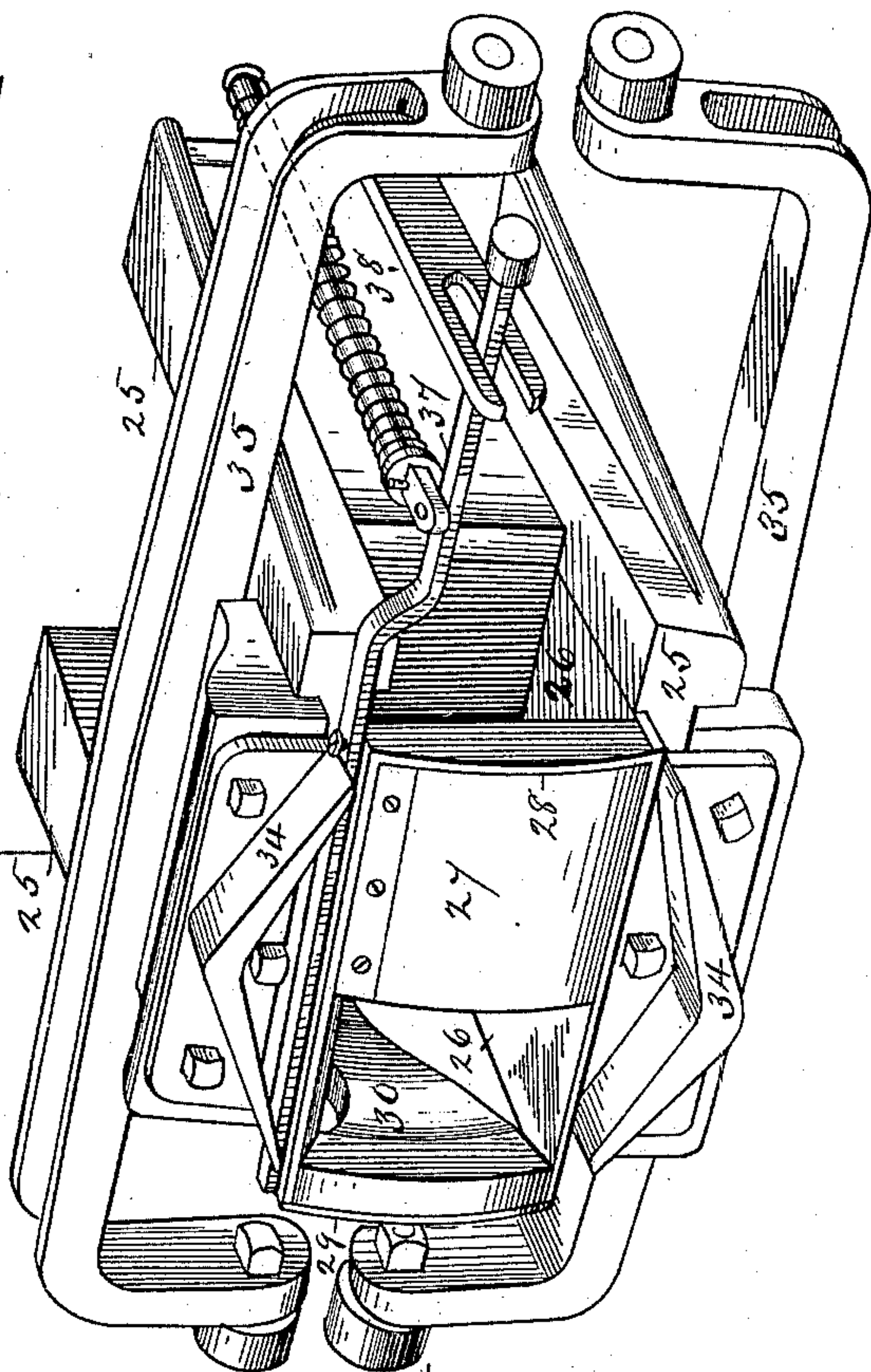


Fig-7

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(No Model.)

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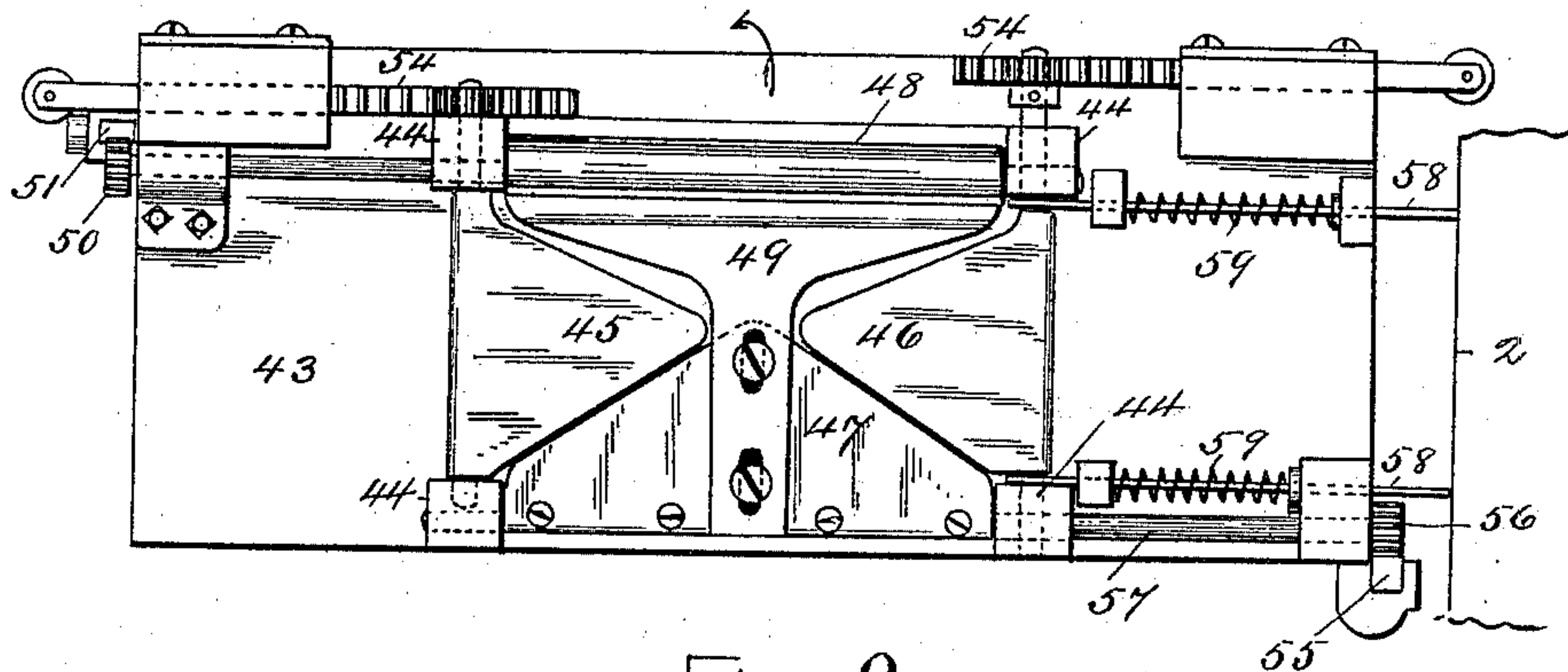


Fig. 9

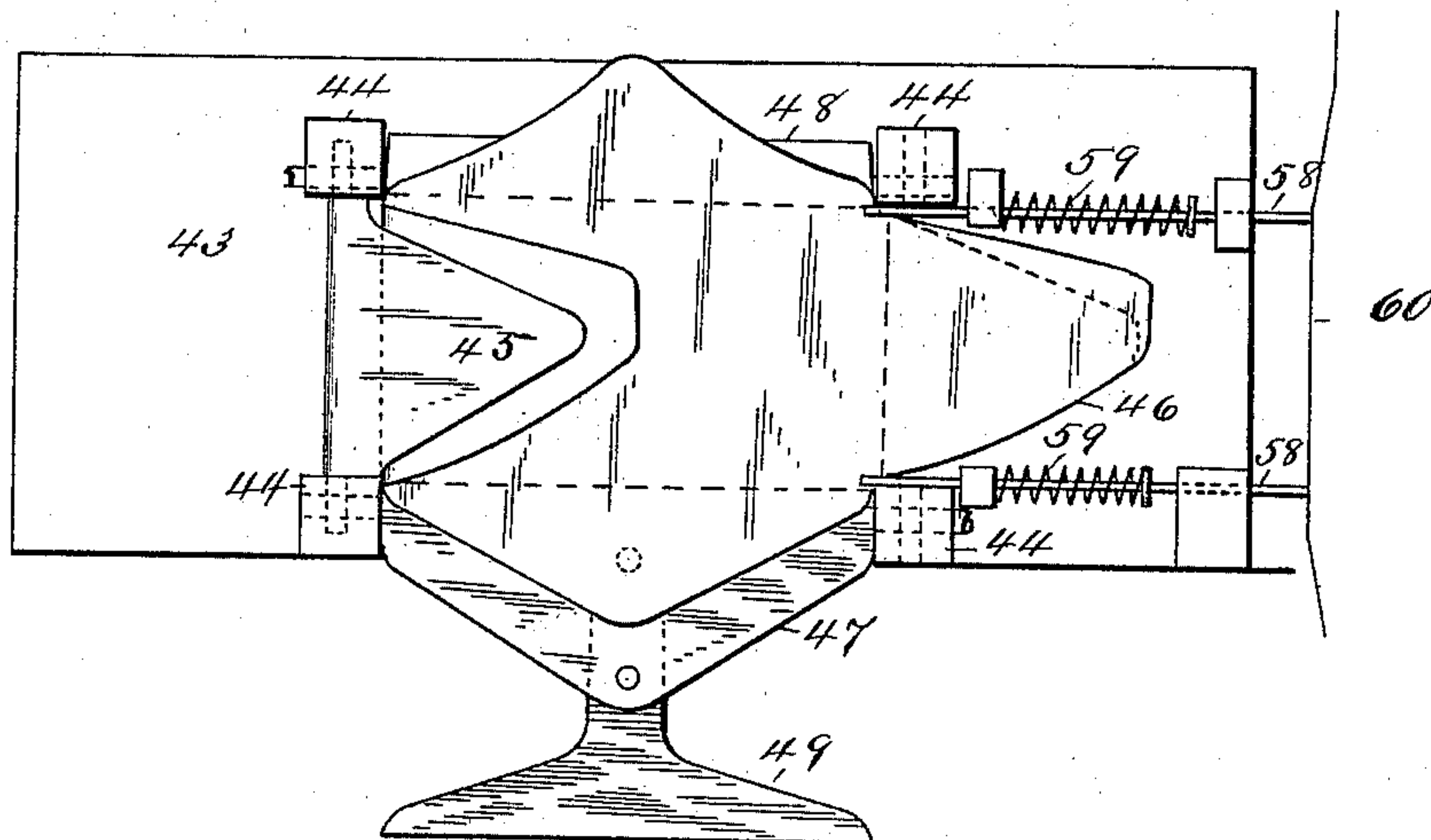


Fig. 8.

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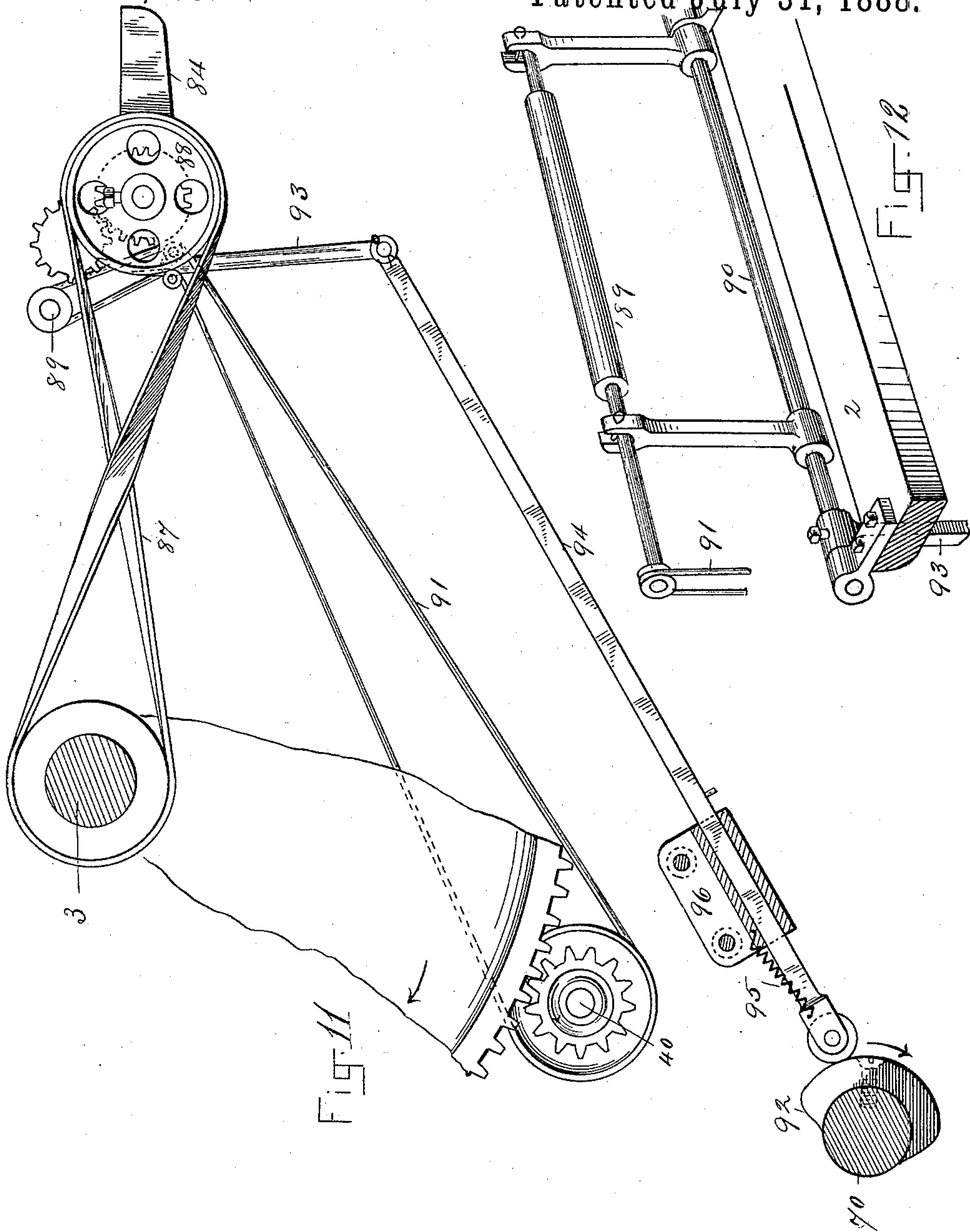
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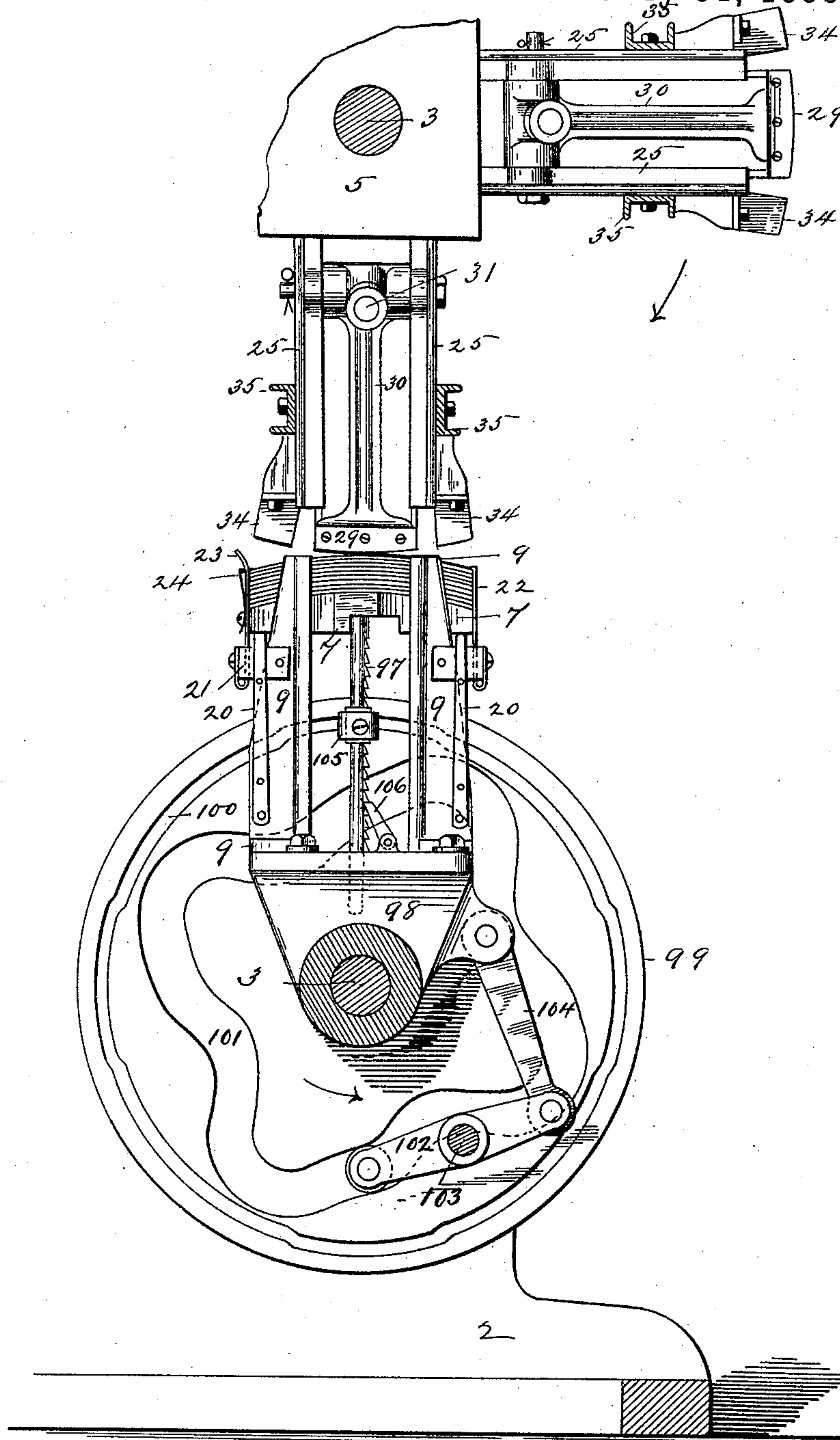
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ROTARY ENVELOPE MACHINE.

No. 387,065.

Patented July 31, 1888.



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FIG. 13

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UNITED STATES PATENT OFFICE.

SIDNEY A. GRANT, OF SPRINGFIELD, MASSACHUSETTS.

ROTARY ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 387,065, dated July 31, 1888.

Application filed May 24, 1886. Serial No. 203,063. (No model.) Patented in Canada April 30, 1886, No. 23,954; in England September 2, 1886, No. 11,200; in France September 9, 1886, No. 178,423; in Germany September 9, 1886, No. 39,714; in Belgium September 13, 1886, No. 74,518, and in Austria-Hungary August 8, 1887.

To all whom it may concern:

Be it known that I, SIDNEY A. GRANT, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Rotary Envelope-Machines, of which the following is a specification.

This invention was patented in Canada, No. 23,954, April 30, 1886; in England, No. 11,200, September 2, 1886; in France, No. 178,423, September 9, 1886; in Germany, No. 39,714, September 9, 1886; in Belgium, No. 74,518, September 13, 1886, and in Austria-Hungary August 8, 1887.

This invention relates to improvements in envelope-machines of the rotary class, and is in the nature of an improvement on my patent of October 21, 1884, the object being to provide improved means for retaining piles of envelope-blanks on the blank-table wheel and feeding said piles outwardly and for releasing the blanks one after the other when said piles are carried under the picker-arms, for operating the gumming devices, for creasing and carrying the blank to the folding-box, for transferring the blank from the picker-box to the folding-box, for folding the envelope, and for effecting the delivery of the envelopes from the drying-chain into the receiving-box.

In the drawings forming part of this specification, Figure 1 is a side elevation, partly in section, the side of the frame being removed, of an envelope-machine embodying my improvements. Fig. 2 is a side elevation, enlarged from Fig. 1, of the blank-table cylinder and a portion of the picker-cylinder, together with a portion of the frame of the machine to which said cylinders are attached. Fig. 3 is an enlarged plan view of one of the four blank-tables shown in Fig. 2, showing the top of a pile of blanks thereon, a portion of the frame in section, and an edge view of a cam which operates a part of the blank-feeding devices, as hereinafter described. Fig. 4 is a section through line *xx*, Fig. 3. Fig. 5 is a perspective view of a portion of the frame and of one of the picker-boxes, together with portions of the mechanism by which it is operated, as below described. Fig. 6 is a

side view of the creaser-shaft and of the rotating creasers. Fig. 7 is a perspective view of the picker-box and operating mechanism shown in Fig. 5, but in a reversed position. Fig. 8 is a plan view of one of the folding-boxes, showing an envelope-blank thereon and one of the end flaps folded, and one of the side-flap-folding wings in an open position. Fig. 9 is a plan view of the folding-box and its folding-wing operating devices, showing the three folding-wings closed against the envelope. Fig. 10 is a perspective view from the outer end of the drying-chain, looking toward the machine, of a section of the envelope-receiving box and a portion of said chain directly over said box, together with the mechanism by which the envelopes are drawn out of said chain and made to drop into said box. Fig. 11 is a side elevation of the devices which operate the gumming-roll to swing it between the gum-roll and the pickers. Fig. 12 is a perspective view of the gumming-roll and the rock-shaft to which it is attached, together with a portion of the frame on which the latter is secured. Fig. 13 is a side elevation of a portion of the picker-cylinder and of two pickers, and of a modified construction of the blank-table cylinder, showing only one table connected therewith, and means for imparting to the latter a vibratory motion, whereby one blank-table is made to co-operate with and supply blanks for several rotating pickers and creasers, as hereinafter set forth.

In the drawings, 2 is the frame of the machine, of suitable form to permit of hanging therein, on transverse shafts 3, the blank-table frame 4, the picker-frame 5, and the folding-box frame 6.

The blank-table frame 4 is of square form in cross-section, and is of any suitable metallic construction, and is mounted to rotate with its shaft 3. On each of the four faces of said frame 4 is attached a table, 7, by a post, 8, the inner end of which is placed in a socket in the side of frame 4, and in which it has an endwise motion, for the purpose hereinafter set forth. Said blank-table 7 is fixed on the end of the post 8, and with the latter has a movement toward and from the shaft 3.

Four posts, 9, are fixed on the side of frame

4, parallel with post 8, in the position shown, surrounding the latter, and in a groove in the inner edge of each of said posts 9 is set a guide-strip, 10; and behind each of said strips in the said groove are placed spiral springs, one of which is shown in Fig. 3, to force each strip outward, and the blank-table 7 is located between the posts 9, and the edges of said strips 10 are made, by the action of said springs, to bear against the edge of table 7, thereby guiding and retaining it in proper position during its said movements toward and from frame 4. The said post 8, to which table 7 is attached, passes through a spring-clamp, 11, fixed on the side of frame 4, consisting of a metallic plate split on one side, as shown in Figs. 3 and 4, and having an arm thereon, against which a sliding bar, 12, is moved by the engagement of the outer end of the latter with the side of a cam-strip, 13, whereby the spring-clamp 11 is clamped around post 8, and the latter, during said engagement of sliding bar 12 with said cam-strip, is prevented from having said endwise movement; but when, during the rotation of frame 4, one of the blank-tables in swung under said frame the end of the sliding bar 12 moves off from said cam-strip and releases the spring-clamp, letting the blank-table and its post 8 move by gravitation outward from frame 4 against the vibrating blank-retainer 14, which determines the proper position of the surface of the pile of blanks to cause the latter to properly cooperate with the pickers, hereinafter described, against which the pile of blanks is brought immediately after having been carried under the frame 4, as aforesaid. The said blank-retainer 14 consists of a slotted metal plate, having rollers 15 attached to its edge, as shown in Fig. 3, to obviate any frictional contact between said plate and the upper blank of the pile, and attached by its rear edge to the end of the arm 16, which is attached to the end of a shaft, 17, hung in bearings on frame 4 and on one of said posts 9, (see Figs. 3 and 4;) and on one end of said shaft is a crank-arm, 18, having a roller-stud thereon, which engages in a cam-groove in a disk-shaped plate, 19, which is attached to frame 2, and whose center is coincident with the center of the shaft of frame 4; and as frame 4 rotates, together with the blank-tables thereon, the said crank-arm is vibrated by its engagement with said cam-groove in such a way as to swing the blank-retainer 14 over the pile of blanks as soon as a blank has been separated from the pile, and prevent any blanks from escaping from the latter during the rotation of the table to bring it again in contact with the pickers; and as said table is again about to be brought under the latter said retainer is swung off from the pile, as shown in Fig. 2. When the table 7 and the pile of blanks drop more or less by gravitation, as aforesaid, the blanks fall against the retainer 14, and are thereby held in position until they are again brought to the upper side of frame 4.

To each of the posts 9 which surround the blank-table is secured a metal strip, 20, on which is secured a metal clip, 21, one end of the latter being also secured to said post 9; and to said clip is attached a flat spring-hook, 22, which engages with one edge of the blank-pile, as shown, and to a like clip at the opposite edge of said pile is attached a flat spring-arm, 23, which projects by the edge of the pile, and its upper end is curved outwardly. Said arm 23 has attached to its outer side a spring-hook, 24, whose upper end passes through a hole in the spring-arm 23 and projects slightly over the top of the pile, as shown in Fig. 2.

The purpose of the spring-hooks 22 and 24 is to hold the edges of the pile of blanks down against the curved face of table 7, and only to such a degree as to permit blank after blank to be removed freely therefrom.

The frames 4, 5, and 6, to which are attached, respectively, the blank-tables, the pickers, and the folding-boxes, are suitably geared together, whereby said frames have such coinciding rotary motions as to bring the blank-tables, pickers, and folding-boxes into conjunction, as and for the purpose herein set forth.

The frame 5 is of substantially the same form and construction as the said frame 4, and to each side thereof is attached a set of picker devices, as below described. Four posts, 25, project from each side of frame 5, and between said posts and attached thereto are two sides, 26, of a picker-box, and between the latter is secured a curved face, 27, extending from one end to about the center of the box, both ends of said box being open, as shown in Fig. 5. A curved strip, 28, connects the ends of the sides 26 at one end of the box, and the outer edges of said sides and strip 28 constitute, practically, the folding-lines of the back and front flap and one end flap of the envelope, said strip 28 being only about the width of the thickness of the curved face 27, as shown in Fig. 7.

As above stated, the edge of the strip 28 constitutes, practically, the folding-line of one end flap of the envelope, and to provide a like strip for the other end flap the strip 29 is secured on a vibrating arm, 30, which is hung between two of said posts 25 at one end of the picker-box, the end of said arm which carries strip 29 being adapted to swing against and from the adjoining end of said box, as below described, and when swung against the end thereof said strip 29 is brought to a position relative to the sides 26 substantially like that of the strip 28. Said arm 30 is provided with a stud-arm, 31, which engages with the edge of a cam-strip, 32, (shown in dotted lines in Fig. 5,) and to the inner side of arm 30 is connected a retracting-spring, 33, which acts to hold said stud-arm in engagement with said cam-strip and to swing the free end of arm 30 against the end of the picker-box. Two pickers, 34, one on each side of said picker-box, are attached each to a picker-bar, 35, one on each side of the picker-box and outside of the

posts 25, said picker-bars being provided with roller-studs in the ends thereof, as shown, which engage in a cam-slot, 36, in the inner opposite sides of the frame 2, whereby, when frame 5 rotates, said pickers 34 are given a reciprocating motion by the side of the picker-box.

Referring to Fig. 5, the arrow thereon indicates the direction in which the picker-box in practice rotates, and upon what is, under such conditions, the rear side of the picker-box is pivoted a lever, 37, one end of which passes through a slotted guide-bar, 38, and engages with a cam-strip, 39, secured to a convenient part of the machine, and one end of a spring-plunger is pivoted to said lever between the picker-box and said guide-bar, the spring on which plunger acts to hold the end of the lever 37 against said cam-strip, and the latter, when said lever by the rotation of the picker-box devices is brought against it, causes the lever to swing on its pivot and move that portion of it which extends by the side of the picker-box outward beyond the edge of said side, thereby disengaging from the latter that portion of the envelope-blank which may be lying thereon when the picker-box swings against the folding-box and thereby permitting the lower end of the envelope-blank to hang down at this stage of the operation to insure the proper folding of the first-folded end flap on the crease-line.

In Figs. 1 and 2 is shown, in end view, a creaser-shaft, 40, and in Fig. 6 said shaft and the creasers thereon are shown in side elevation, said shaft being hung in suitable bearings on frame 2 in such position that the edges of the strips 28 and 29 at the ends of the picker-box, engage with the edges of the creasers 41 on said shaft while the picker devices are moving over the creasers carrying an envelope-blank, and thereby the folding-lines for the end flaps of the envelope are formed.

The frame 6, on which are supported four sets of folding-box devices, as shown in Fig. 1, is of substantially the same form and construction as the aforesaid frames 5 and 4, and from each side of said frame 6 project four posts, 42, to which are attached the below-described flap-folding mechanism. On the outward ends of said posts is secured a plate or platform, 43, and on the face of said platform are projections 44, in which are the bearings for the shafts of the end-flap-folding wings 45 and 46, and side flap-folding wings 47 and the seal-flap-folding shaft 48, as shown in Fig. 9. The said end-flap-folding wings 45 and 46 are of the usual form, and so, also, is the wing 47; but to the latter is attached adjustably, as shown, a seal-flap-folding guide, 49, which is adjustable to and from the side of folding-shaft 48, to bring the edge of said guide, over which the seal-flap is folded, to a proper position relative to said shaft, whereby the folding-lines between said flap and the body of the envelope are properly adjusted.

In place of the usual seal flap-folding wing, the said folding-shaft 48 is provided, whose bearings are eccentric to its longitudinal center, one end of said shaft extending through a suitable bearing on plate 43 beyond the end of the latter, and has thereon a pinion, 50, with which a rack, 51, (shown in end view in Fig. 9,) engages, said rack being given an endwise motion by the engagement of its lower end at 52, Fig. 1, with the cam-slot 53 in the frame 2, while the frame 6 and the folding devices thereon rotate.

One end of each of the shafts on which the wings 45 and 46 are hung extends beyond said projections 44, and thereon is fixed a pinion with each of which a rack, 54, engages, said racks having imparted thereto a horizontal motion in one direction by a suitable cam on the adjoining side of the frame of the machine, and in the opposite direction by a suitable spring, (not shown in the drawings,) whereby the requisite vibratory motion is given to the folding-wings 45 and 46. A like vibratory motion is given to the folding-wing 47 by a rack, 55, which engages with a pinion, 56, on the end of the shaft 57, on which said folding-wing is secured. The rack 55 is given an endwise motion by the engagement of its lower end with a similar cam-groove to 53 in the opposite side of the frame of the machine. Two blank-holding pins, 58, passing through suitable projections on the plate 43, have endwise motions therein, one end thereof reaching over the shaft of the folding-wing 46 and the other ends thereof extending beyond the edge of plate 43. A spiral spring, 59, is placed on each of said pins, between a collar thereon and one of said projections, and serves to move each of said pins in one direction. The outer ends of said pins engage with the adjoining side of the frame of the machine, a portion of which has thereon a cam projection, 60, Fig. 8. The engagement of the end of said pins with said cam projection throws the pins forward, as in said figure, and when they encounter the plane sides of frame 2, as in Fig. 9, they drop back, as there shown.

In Fig. 8 is shown, in dotted lines, between the projections 44 on the plate 43, the outlines of a base-plate located between said projections, on which the blank is deposited and against which the latter lies when its several flaps are folded down by the above described folding-wings. The top side of said plate is about on a plane with the under side of said folding-wings when they occupy the positions over the plate shown in Fig. 9.

To the rear side of the machine is attached the drying chain 61, (shown inside elevation in Fig. 1, and partly shown in Fig. 10,) said drying-chain being of the ordinary well-known construction, to which motion is given by suitable connection with a moving part of the machine. Said chain operates in close relation to the rotating folding-boxes above described, and when one of the latter arrives over the end of the chain the folding-wing 47 and the

side wings swing off from the folded envelope, releasing it and letting it drop into a chute, 62, Fig. 1, by which it is guided into the chain, and by the latter the envelopes so received are carried around in the direction indicated by the arrow in said figure, and are dropped therefrom into a receiving-box, 63, Figs. 1 and 10, which is suspended from the driving-chain frame, as shown. To insure the delivery of the envelopes from the chain into said receiving-box, two hook-bars, 64, one of which is shown in each of said Figs. 1 and 10, are attached to a cross-bar, 65, under said box, said hook-bars having a vertical sliding motion in a support, 66, which is imparted to them by the connection of said cross-bar 65 with a rock-shaft, 67, by means of an arm, 68, and a connecting-rod, 69. (Shown in said figures.) Motion is imparted to said rock-shaft 67 by the shaft 70, having thereon a cam, 71, with which the end of a sliding bar, 72, engages, whereby the latter is given a reciprocating endwise motion, and the opposite end of said sliding bar is connected to an arm, 73, on said shaft 67.

Attached to the under side of the drying-chain and reaching up and partially around its rear end are two guide-rods, 74, the extreme ends over which the envelopes are dropped from the chain being shown in Fig. 10, said guide rods supporting the envelopes until they arrive at that point over the receiving-box 63 where they are engaged by the hook-bar 64 and drawn downward into said box.

An ordinary freely-moving abutment block, 75, is placed in the delivery end of said receiving-box, as shown in Fig. 10, against which the envelopes are pushed in the ordinary way as they fall into the receiving-box, the pusher devices employed in the construction herein described and shown consisting of a cross-bar, 76, extending across the rear end of a receiving-box, having thereon a suitable arm (not shown in the drawings) reaching into the end of said box. A reciprocating horizontal motion is given to the cross-bar 76 and its said arm by means of the rock-shaft 77, Fig. 1, with which said cross-bar is connected by means of the vibrating arm 78 and a connecting-rod, 79, arranged each side of said receiving-box and connected to each end of said cross-bar.

Motion is imparted to said rock-shaft 77 by the connecting-rod 80, one end of which is connected to the end of arm 81 on said shaft, and its opposite end engaging with a suitable cam on shaft 70, whereby said rod is given a reciprocating endwise motion.

The parts 82 and 83 and rollers above the latter in Fig. 1 indicate devices for inking type-blocks for printing, which in other constructions of the machine herein described are located under each folding-box, and are operated to print the envelopes during the process of gumming and folding the same, which printing devices do not constitute any part of the present application.

The devices by which the gum is applied to the pickers 34, Figs. 5 and 7, are constructed

as follows: A gum-box, 84, is located opposite the center of frame 5, (see Figs. 1, 2, and 11,) in which the ordinary gum-rollers, 85 and 86, operate in the usual manner. Rotary motion is given to said gum-rollers by a belt, 87, or other suitable connection with one of shafts 3 of the machine, the gum-roll 83 having on its shaft a pulley, 88, and a geared connection with the gum-roll 86. A gumming-roller, 89, is supported between the gum-roll 86 and the picker devices on frame 5 on a rock-shaft, 90, and is rotated by a belt, 91, having a suitable connection with shaft 40. (See Fig. 11.) Motion is imparted to said rock-shaft 90, whereby the gumming-roll 89 is vibrated from roll 86 against the pickers 34, and vice versa, by the connection of said shaft with a cam, 92, on shaft 70, by means of the arm 93, attached to shaft 90, and the connecting rod 94, one end of which is connected to said arm and the opposite end of which engages with said cam. An expansible spring, 95, is connected to rod 94, and acts between that and the supporting-block 96 to hold the end of said rod in engagement with said cam.

Referring to Fig. 13, the frame 5 and the picker devices shown thereon are the same as those illustrated in the other figures and heretofore described, and the envelope table, the posts 9, and retaining springs 23 and 24 are substantially the same as those shown in Fig. 2; but the means for operating said table to move the blanks outwardly are different from those shown in said figures, and are constructed and operate as follows, and consist of the ratchet-post 97, which in this construction takes the place of the post 8 in Fig. 2, and in so far as it supports the table 7 performs the function of the latter.

The blank holding devices in Fig. 13 consist only of a single table in connection with the before-mentioned accessories, mounted on a frame, 98, which is supported on a shaft, 3, which in Fig. 2 carries frame 4, said shaft 3 in Fig. 13 rotating freely within frame 98, and having secured thereon the circular cam-plate 99, having in its side the cam-grooves 100 and 101. A vibratory lever, 102, is pivoted on a stud, 103, which is fixed in a convenient part of the frame of the machine.

One end of lever 102 is provided with a roller-stud, which engages with said cam-groove 101, and the opposite end of said lever is connected with the frame 98 by the connecting-rod 104.

The object of the modified construction shown in Fig. 13, relating to the blank-holding mechanism, is to provide means for operating a single blank-holding table in conjunction with several sets of rotating picker devices such as are shown on frame 5, by giving said table an oscillating motion whereby it is brought into conjunction with each set of said picker devices as the latter are rotated, and obviate, if desired, the construction of four sets of blank-table devices to operate with said picker devices. When the cam-plate 99

rotates, the lever 102 is given a vibratory motion, and thereby the envelope-table on frame 98 is vibrated to the right, and upon engagement with the picker devices the latter and the table swing together to the left, and during said movement a blank is taken from the pile by the pickers, and immediately that the latter swing clear of the table the said table is quickly vibrated again to the right to engage with the succeeding picker devices. The ratcheted post 97 has the collar 105 frictionally secured thereon, a stud on the side of said collar entering the groove 100, whereby said collar is given a longitudinally-reciprocating motion on the post 97. A pawl, 106, pivoted on frame 98, has its free end engaging with the ratchet-teeth on said post, and when the latter and table 7, by the upward movement of collar 105, are lifted pawl 106 prevents the backward movement of said table when said collar slides toward frame 98, and thereby said table and the blanks thereon are moved and held in a proper position for the engagement of the picker devices with the latter. When the blank-table is to be supplied with blanks, the pawl 106 is swung away from post 97 to depress table 7, the lower end of said post meanwhile moving in a socket in frame 98.

The operation of the rotating blank-tables and the devices co-operating therewith for holding, retaining, and delivering envelope-blanks one by one to the picker devices having been described above, the operation of the gumming devices, pickers and creasers, and folding devices upon the blank is as follows: In the course of the rotation of the picker devices on frame 5, whereby the latter are brought in succession against the blanks on the tables 7, the pickers 34, before reaching said blanks, swing opposite to the gum-roll 86, and when in that position the gumming-roller 89 swings from the latter roll, from which it has taken gum, against the pickers 34, gumming the edges thereof. The pickers and the face of the picker-box then swing against the outer blank of the pile, and said pickers become adhesively attached to the latter and pick it off from the pile. As the pickers and blank-table approach one another, the point of the forward picker strikes the curved end of the spring arm 23, forcing the latter and the end of spring-hook 24 away from the edge of the pile of blanks and leaving the forward edge of the top blank free to be lifted up by the pickers, and the latter then draw said blank from the pile. The spring-arm 23 resumes its position, as shown in Fig. 2, as soon as the point of the picker disengages itself from it. The blank having been picked up, as aforesaid, it is next carried against the edges of the creasers 41, the latter rotating opposite the strips 28 and 29 at the ends of the picker-box, thereby creasing or forming the folding-lines on which the end flaps fold. At this point in the operation the vibrating arm 30 is against the end of the picker-box, as shown in Fig. 7; but immediately that the latter passes by said creasers said arm 30 swings

outward away from the end of the picker-box, as shown in Fig. 5, to allow the folding-wing 45, Fig. 8, which is the first folding-wing to operate, to swing into the end of the box and fold under one end flap of the blank, thereby seizing the latter and drawing it from the picker devices onto the folding-bed, as shown in Fig. 8, where the blank is shown in the position it occupies when first attached to said devices. While the blank lies in said position with one end folded, the ends of the pins 58 encounter the cam-strip 60, and are moved to carry their inner ends slightly over the blank, as shown, whereby the latter is held down against the bed-plate, while the folding-wing 46, which next operates, folds over the other end flap, and before the latter is brought to its place against the body of the envelope the ends of pins 58 have passed beyond said cam-strip, and they are by the springs 59 drawn back, as shown in Fig. 9, clear of the envelope, thereby permitting wing 47 with the back-flap and folding-shaft 48 with the seal-flap to operate unobstructedly to properly fold said back and seal flaps. The back-flap-folding wing and its extension next swing over, following the end flap, 46, bringing the edge of said extension 49 at the folding-line of the seal-flap, holding the latter against the side of the folding-shaft 48, and the latter then rocks over the edge of said extension, folding the seal-flap over the latter, thus completing the folding of the envelope. By folding the seal-flap over the edge of said extension, as described, its gummed surface is prevented from coming in contact with any part of the envelope under it before it shall have become dried. Immediately that the folding devices have operated, as aforesaid, their operating-racks, as described, so change their positions as to open out the folding-wings at or before the time the folded envelope is brought over the end of the drying-chain, thereby releasing it and allowing it to drop into the drying-chain, as above described, and thus at each revolution of the frames 4, 5, and 6 four envelopes are gummed, folded, and delivered into said drying-chain, and from whence they are delivered into the receiving-box ready for bundling.

What I claim as my invention is—

1. In a rotary envelope-machine, as a means for feeding the blank-table outwardly toward the pickers and for holding said table and the blanks thereon against the action of the latter, the combination, with the blank-table 7, hung on a rotating frame, substantially as described, of a post, 8, connected by one end to said table and having its opposite end entering a socket in the frame 4, a spring-clamp, 11, fixed on the latter and surrounding said post, a sliding bar, 12, having an endwise movement on frame 4 against and from one side of said clamp, and a cam-strip on the frame of the machine, with which the outer end of said sliding bar engages, substantially as set forth.

2. As means for limiting the outward movement from frame 4 of the blank-table and

the pile of blanks thereon, a blank-retainer, 14, and means, substantially as described, for swinging the latter over and off from the pile of blanks while the latter is being rotated opposite the picker devices, combined and operating substantially as set forth.

3. In combination, the blank-table 7, having, together with the blanks thereon, a free outward movement from frame 4, the crank-shaft 17, having arm 16 thereon, the blank-retainer 14, secured on the latter, and a suitable cam for the engagement therewith of the crank-arm on said shaft 17, whereby the blank-retainer is given a vibratory motion over the pile of blanks during the rotation of said frame, substantially as set forth.

4. In combination, the pickers 34, having a rotary motion with frame 5, opposite and in conjunction with the blank-table 7, a spring-arm, 23, secured at the edge of the latter and having a curved free end for engagement with said pickers, a spring-hook, 24, having its free end projecting through said arm, and the spring-hook 22, substantially as set forth.

5. The rotating frame 5, a picker-box located between suitable supporting-posts projecting from the side of said frame and having a partly-covered face and open ends, and having across one end thereof the curved strip 28, the vibratory arm 30, having the curved strip 29 thereon, and means, substantially as described, for swinging the end of said arm against and from the end of said box while the latter, with frame 4, is rotated, combined and operating substantially as set forth.

6. The combination, with the picker-box, of the pickers 34, one on each side of the latter, the bars 35, to which said pickers are attached, the frame 2, having a cam-groove therein, with which the ends of said bars engage, whereby the pickers are given a reciprocating motion by the sides of said bar, substantially as set forth.

7. In combination, the picker-box, the pickers 34, and the lever 37, pivoted on the side of said box, and means, substantially as described, for imparting a vibratory motion to said lever while the frame 5 and the picker-box rotate, substantially as set forth.

8. In combination, the picker-box having the curved strip 28 across one end, the arm 30, having the curved strip 29 thereon, and the

creaser-shaft 40, having thereon the creasers 41, to rotate in engagement with said strips 28 and 29, substantially as set forth.

9. In combination, the rotating frames 5 and 6, the picker-box, the vibratory arm 30, means, substantially as described, for swinging the latter away from the end of said box, and the folding-wing 45, swinging into the open end of the latter under the envelope-blank thereon and seizing the blank, substantially as set forth.

10. In combination, the rotating frame 6, the plate 43, supported on the latter, the end-flap-folding wings 45 and 46, the back flap-folding wing having the adjustable extension 49 thereon, the eccentric seal-flap-folding shaft 48, rolling over the edge of said extension, and means, substantially as described, for imparting vibratory motions to said wings and a rocking motion to said shaft, substantially as set forth.

11. In combination, the rotating frame 6, the plate 43, the end-flap-folding wings 45 and 46, the back-flap-folding wing having the adjustable extension 49 thereon, the eccentric seal-flap-folding shaft 48, rolling over the edge of said extension, the pins 58, extending over the shaft of one of the end-flap-folding wings, and means, substantially as described, for imparting a reciprocating endwise motion to said pins and vibratory motions to said wings and a rocking motion to said shaft, substantially as set forth.

12. In combination, the back-flap-folding wing 47, having the adjustable extension 49 thereon, and the eccentric seal-flap-folding shaft 48, and means, substantially as described, for imparting a vibratory motion to said folding-wings and a rocking motion to said shaft, substantially as set forth.

13. In combination, in an envelope-machine, the rotary frame 4, the blank-table 7, (having convex surface,) secured to the frame, the posts 9, attached to the frame and extending opposite the edges of said table, and the spring-actuated guide-strip, 10, secured in grooves in said posts, so as to bear against the edges of the table, substantially as described.

SIDNEY A. GRANT.

Witnesses:

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WM. H. CHAPIN.