No. 895,774. PATENTED AUG. 11, 1908.

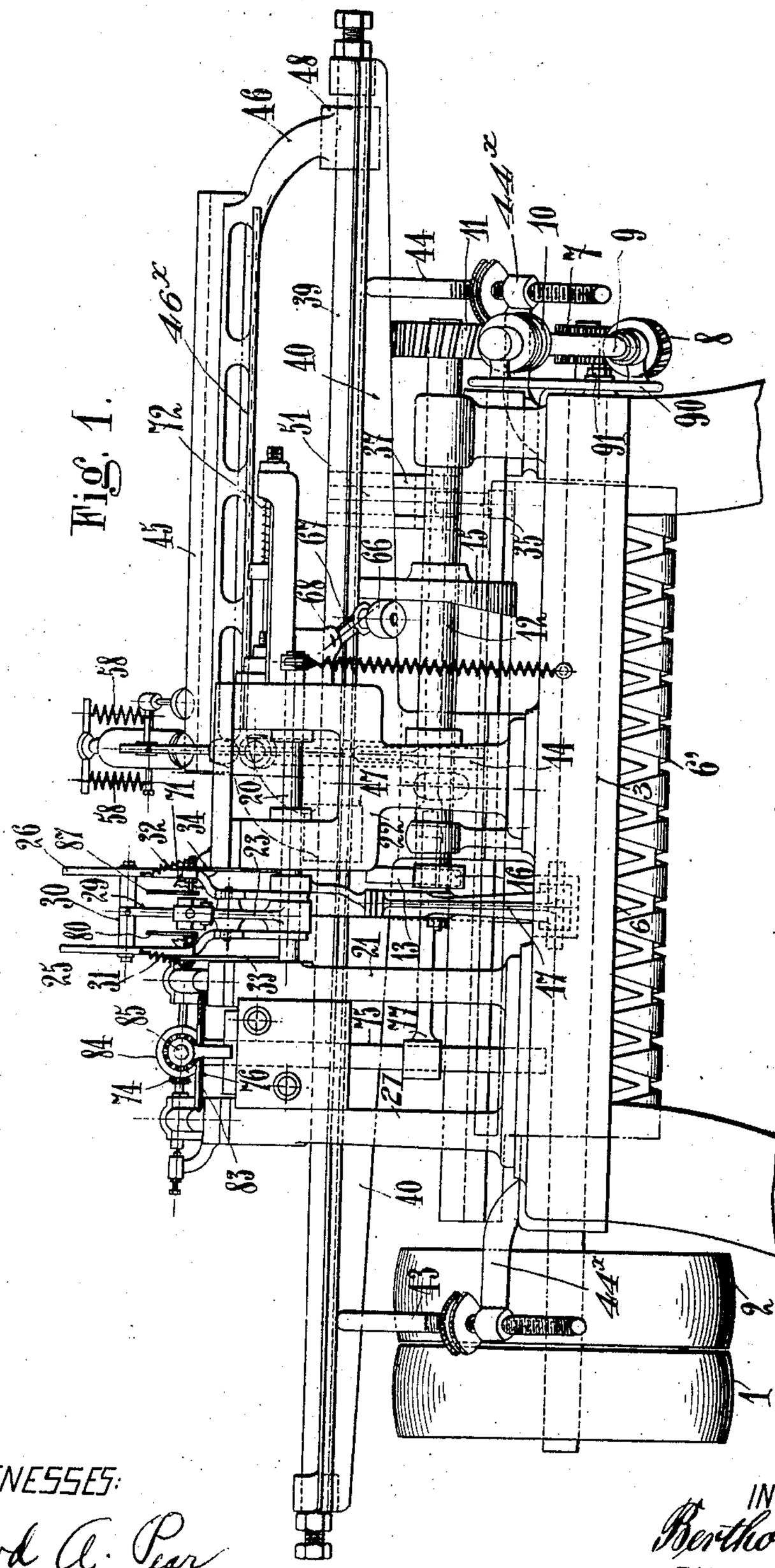
B. LAUER.

MACHINE FOR TURNING CORKS.

APPLICATION FILED MAR. 21, 1906.

11 SHEETS—SHEET 1.

Fig. 1.



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11 SHEETS—SHEET 2.

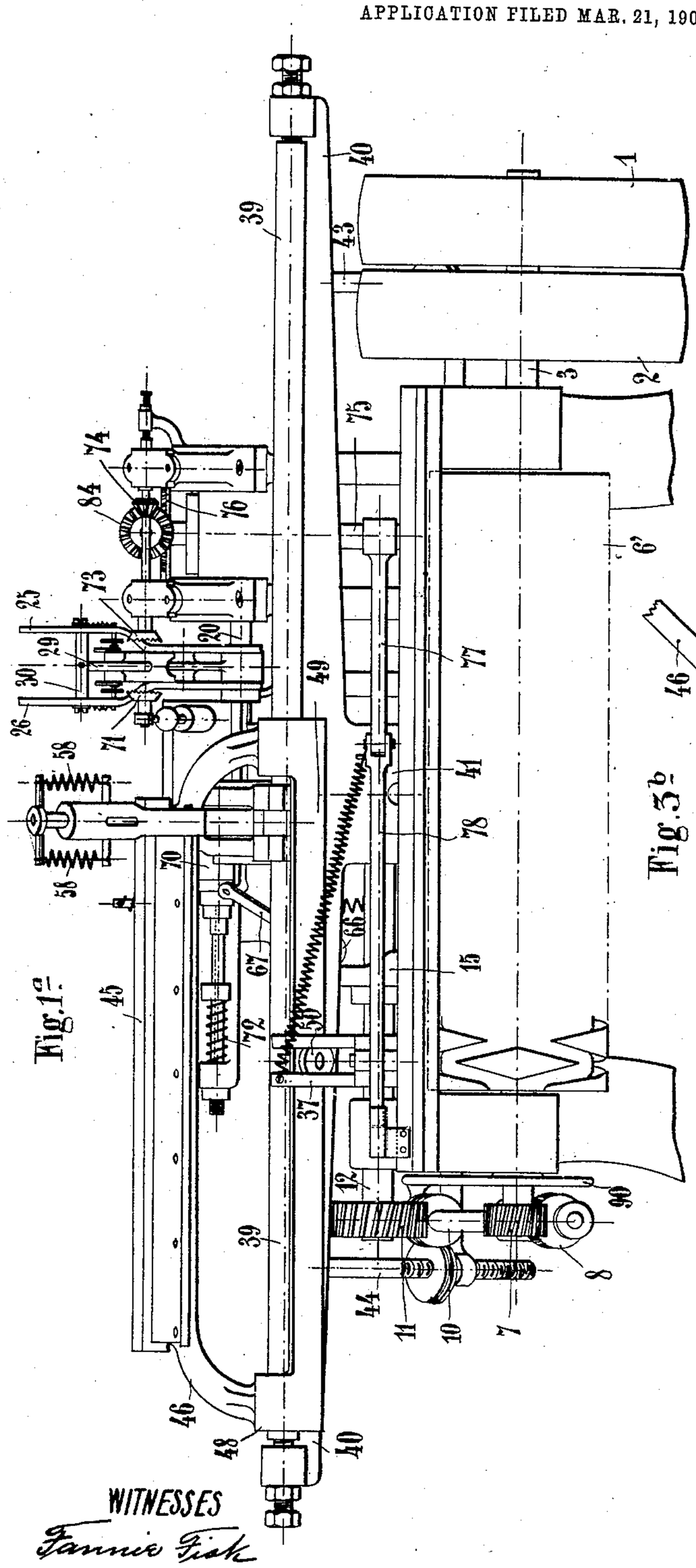

Fig. 1a.

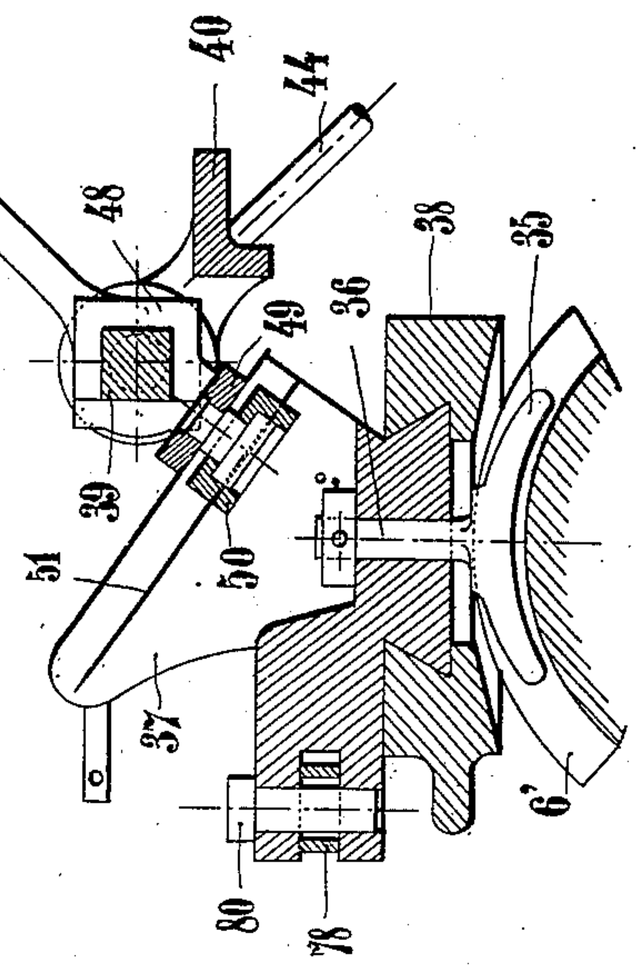

Fig. 3b.

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MACHINE FOR TURNING CORKS.

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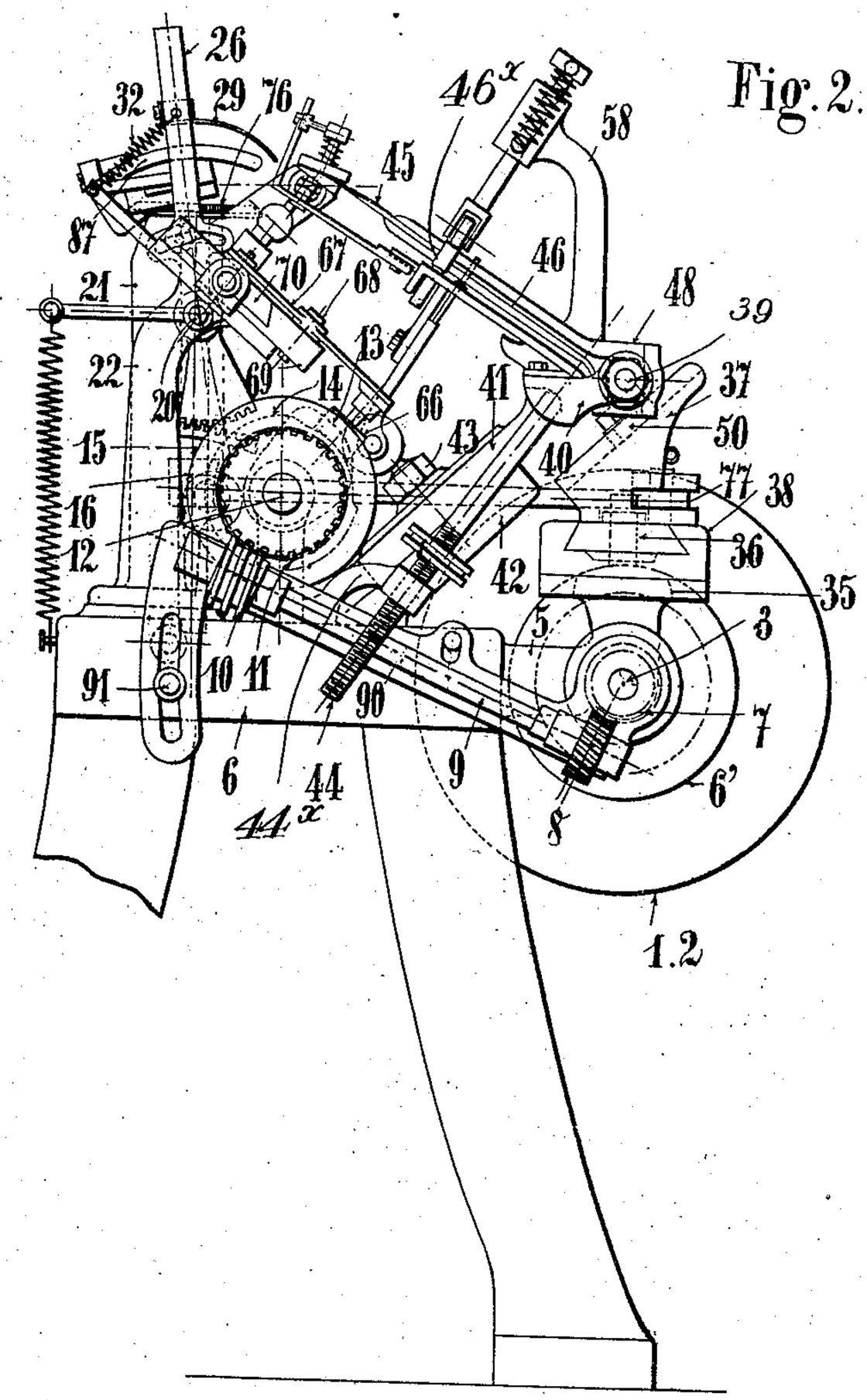
11 SHEETS—SHEET 3.

Fig. 2.



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11 SHEETS—SHEET 4.

Fig. 3a

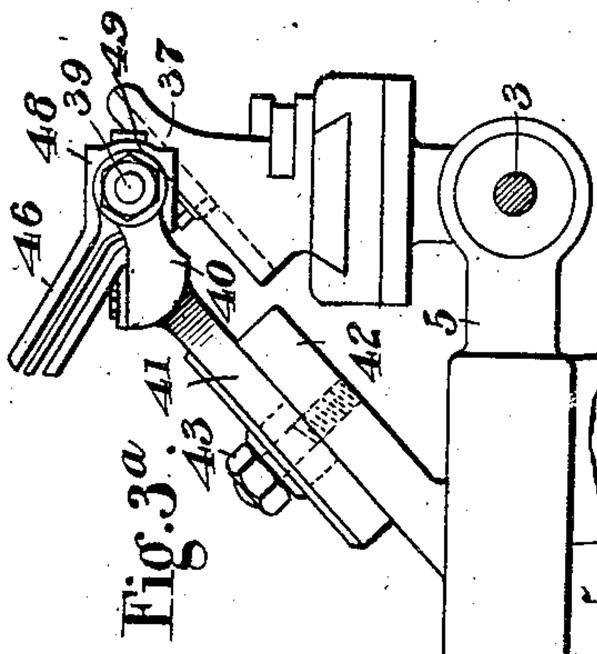

Fig. 3.

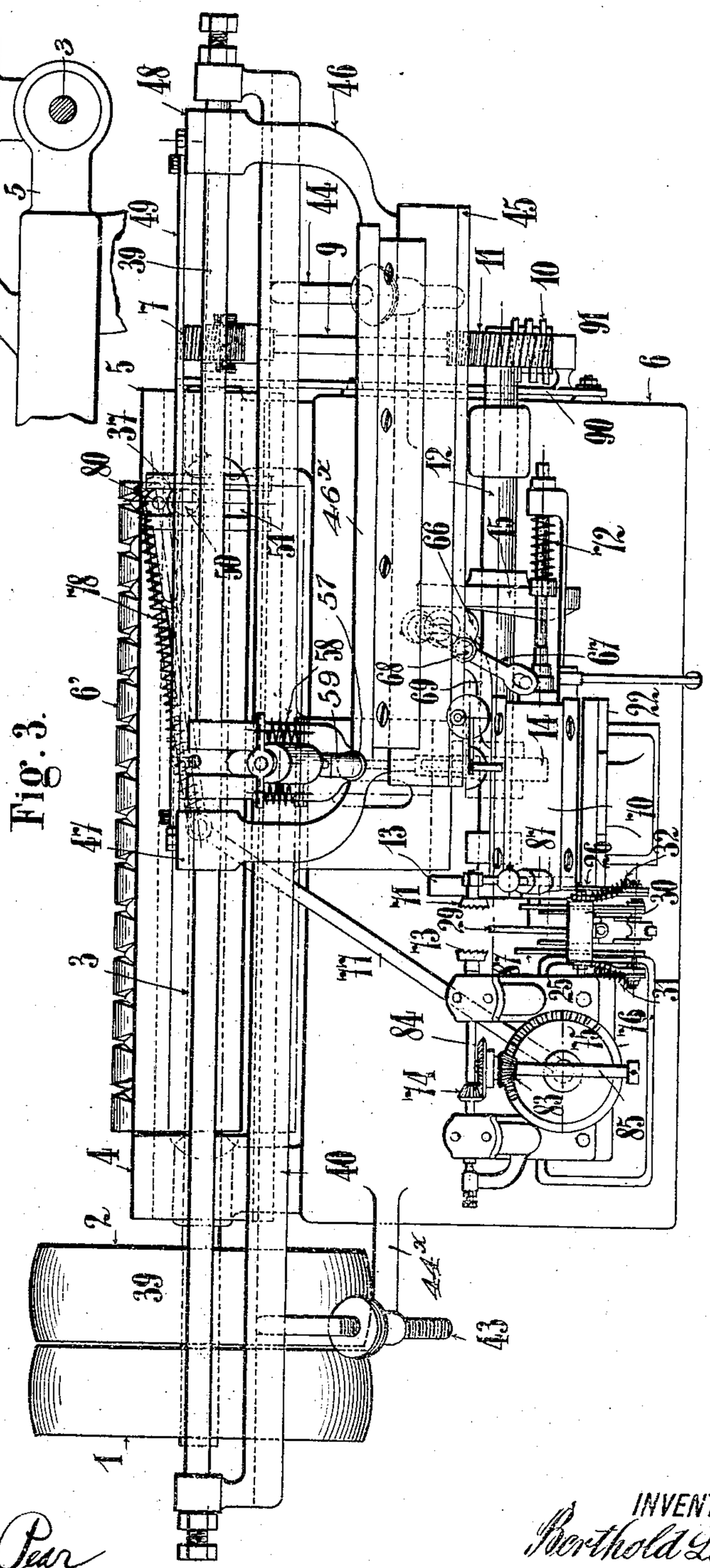

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Fig. 6.

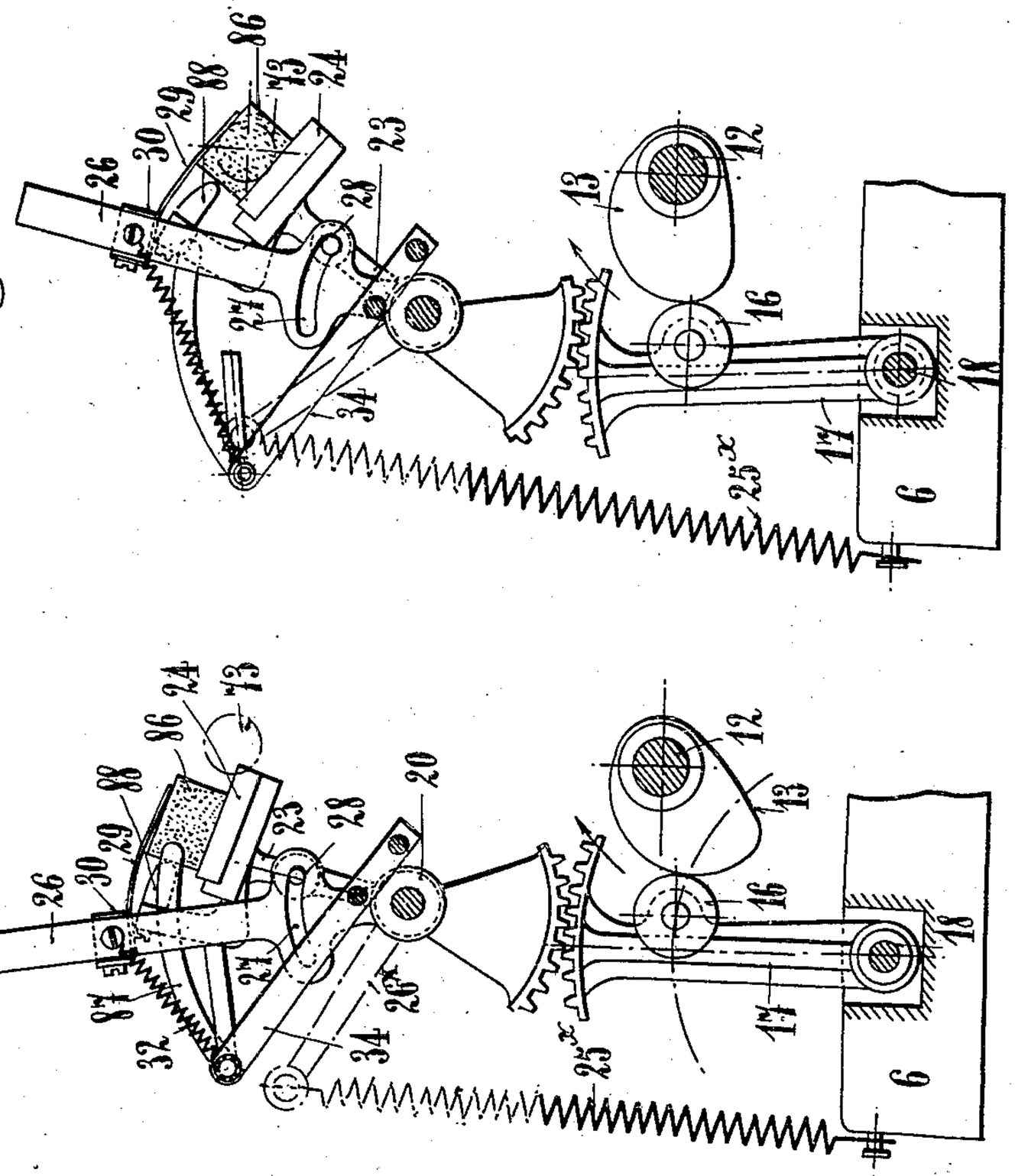

Fig. 5.

Fig. 4.

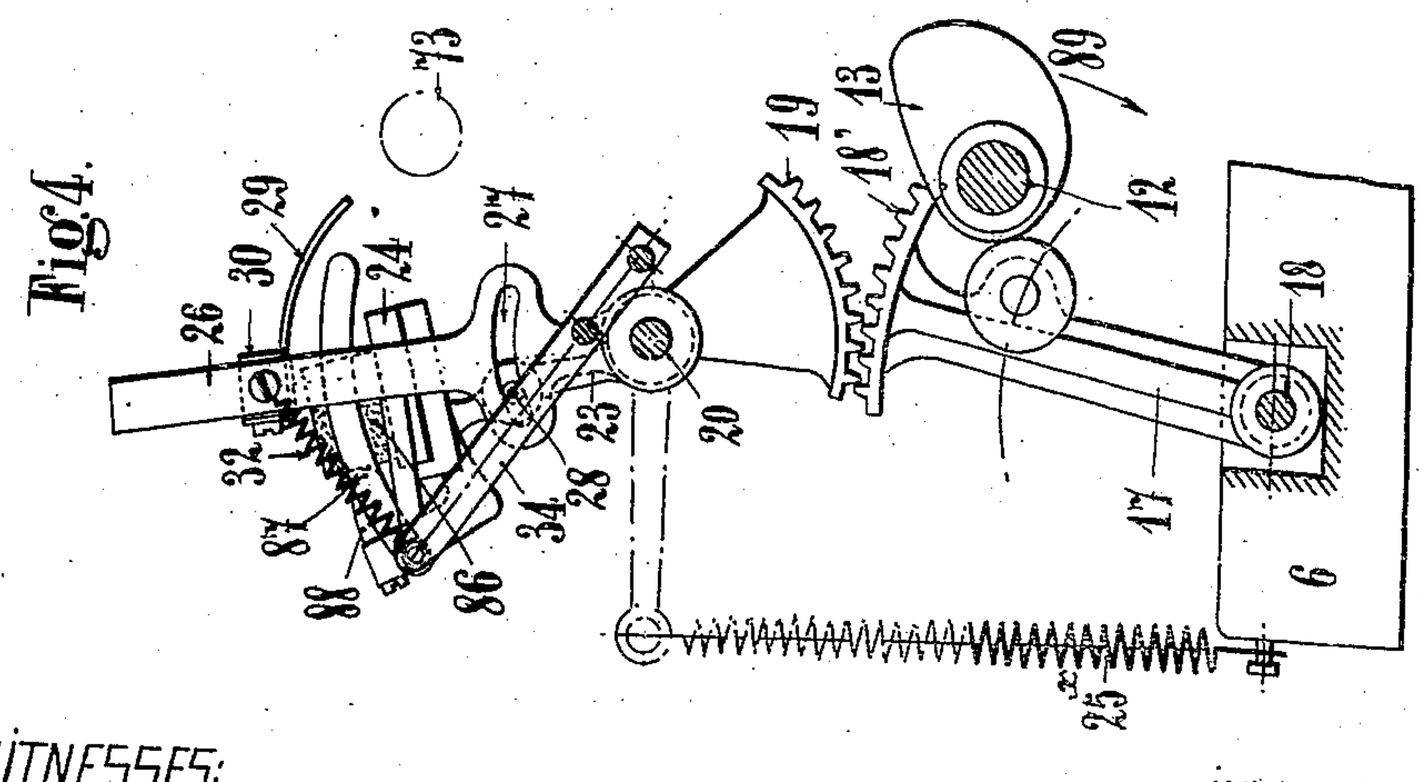

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Fig. 7.

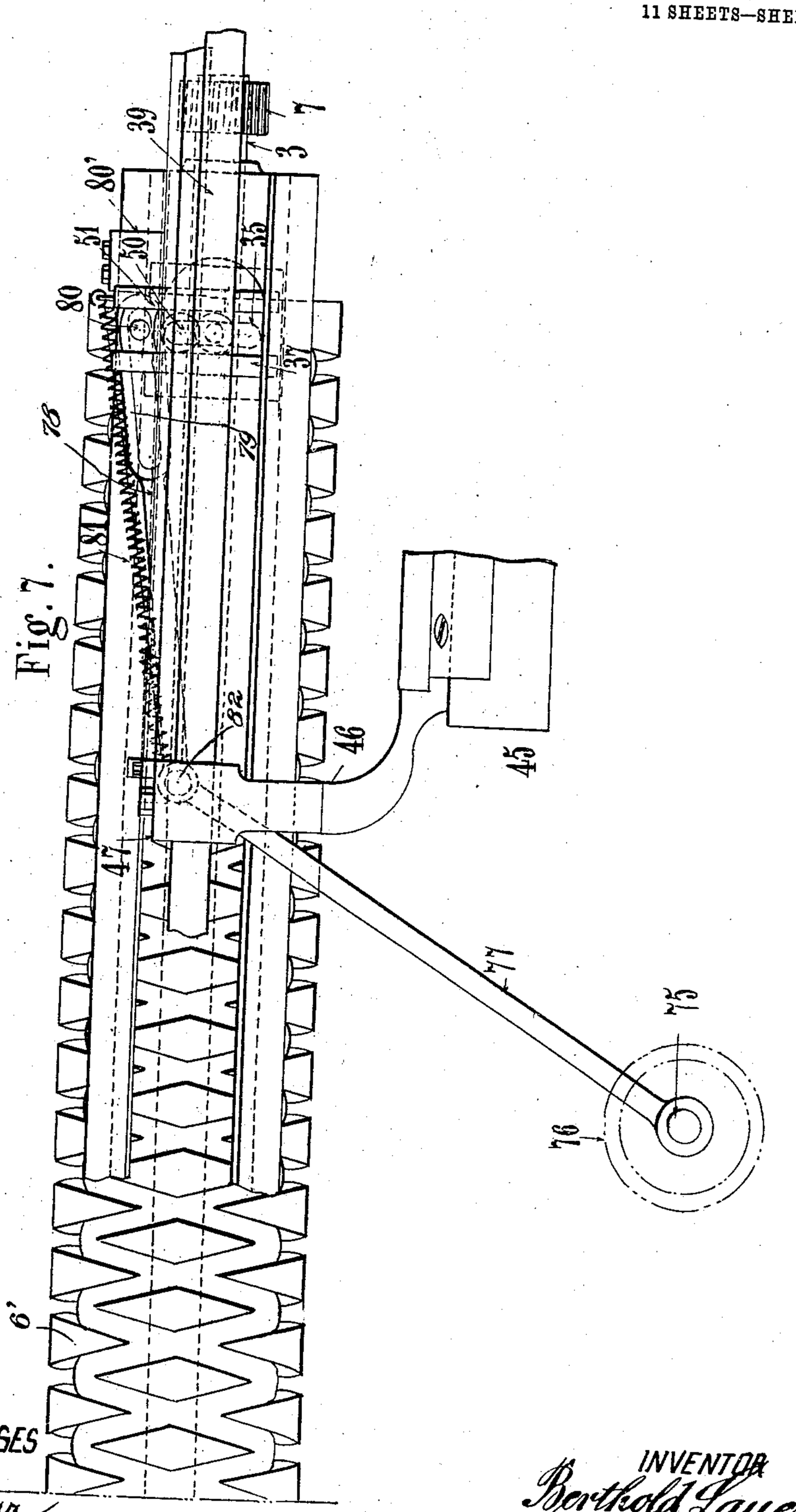

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Fig. 8.

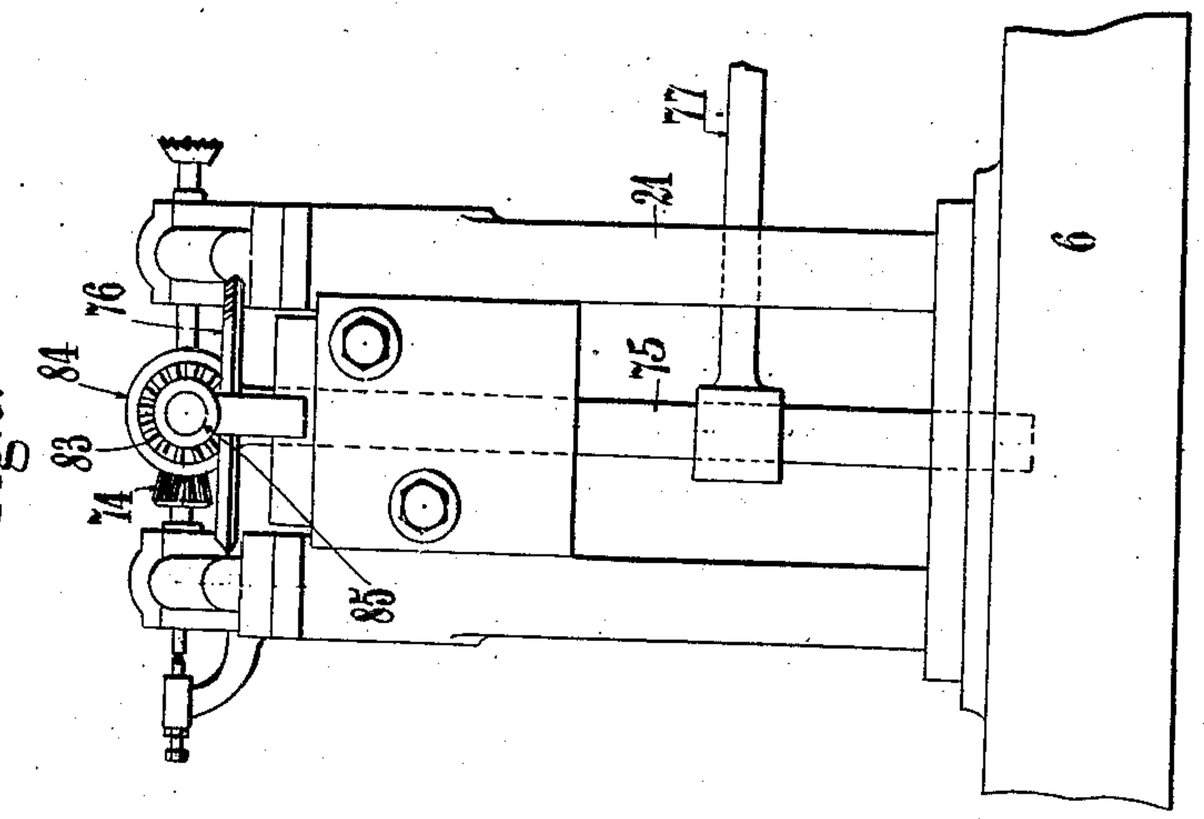
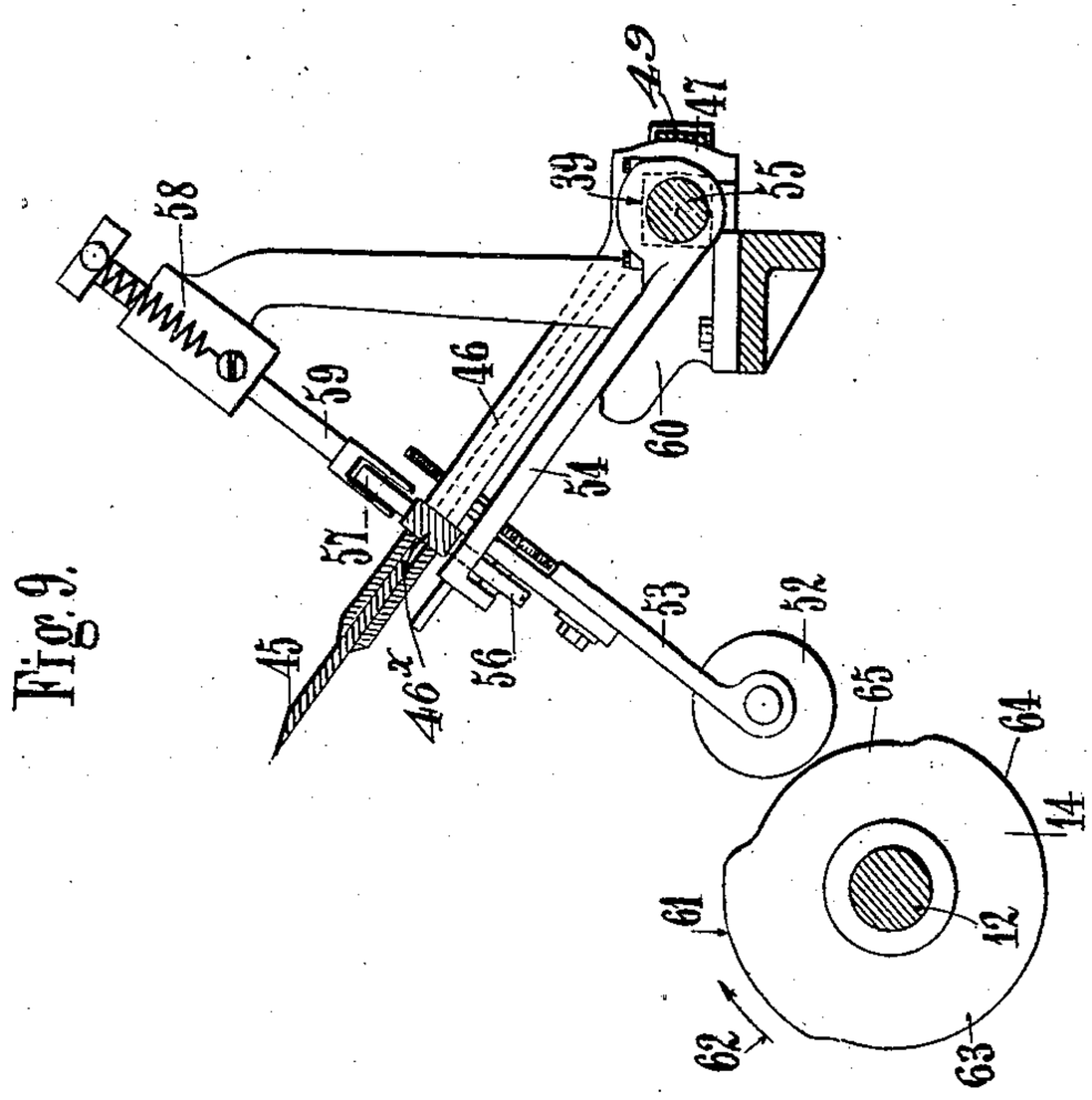


Fig. 9.



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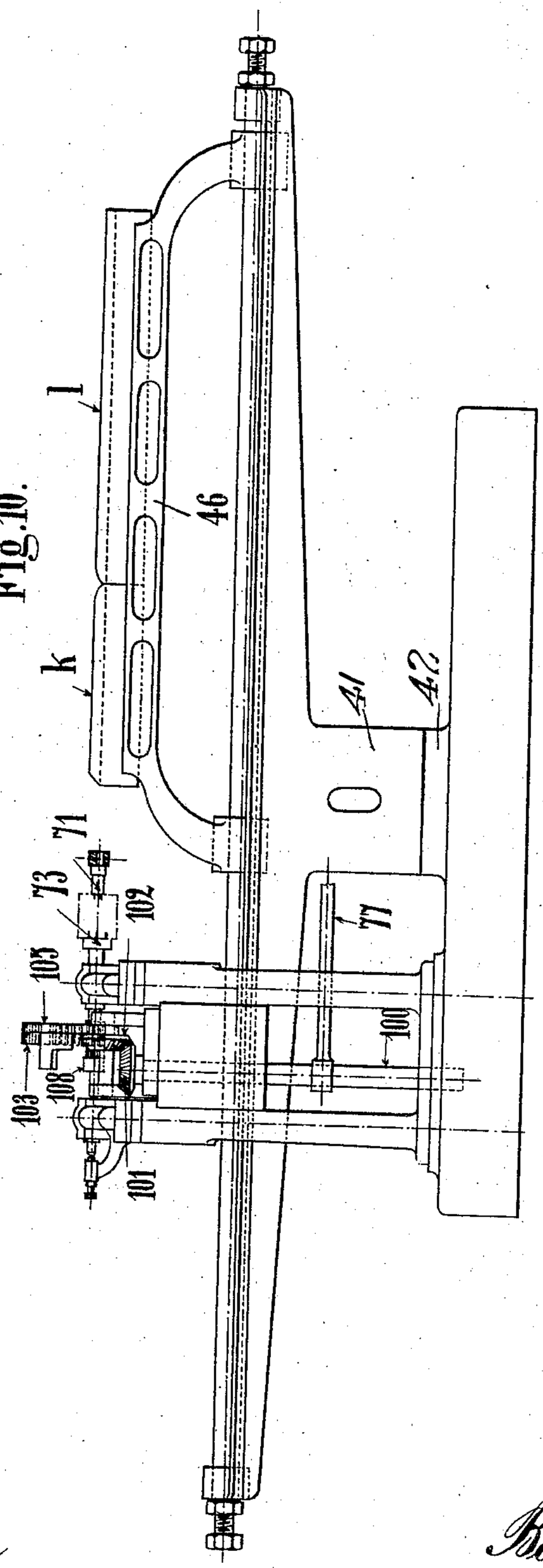
11 SHEETS—SHEET 8.

Fig. 10.



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11 SHEETS—SHEET 9.

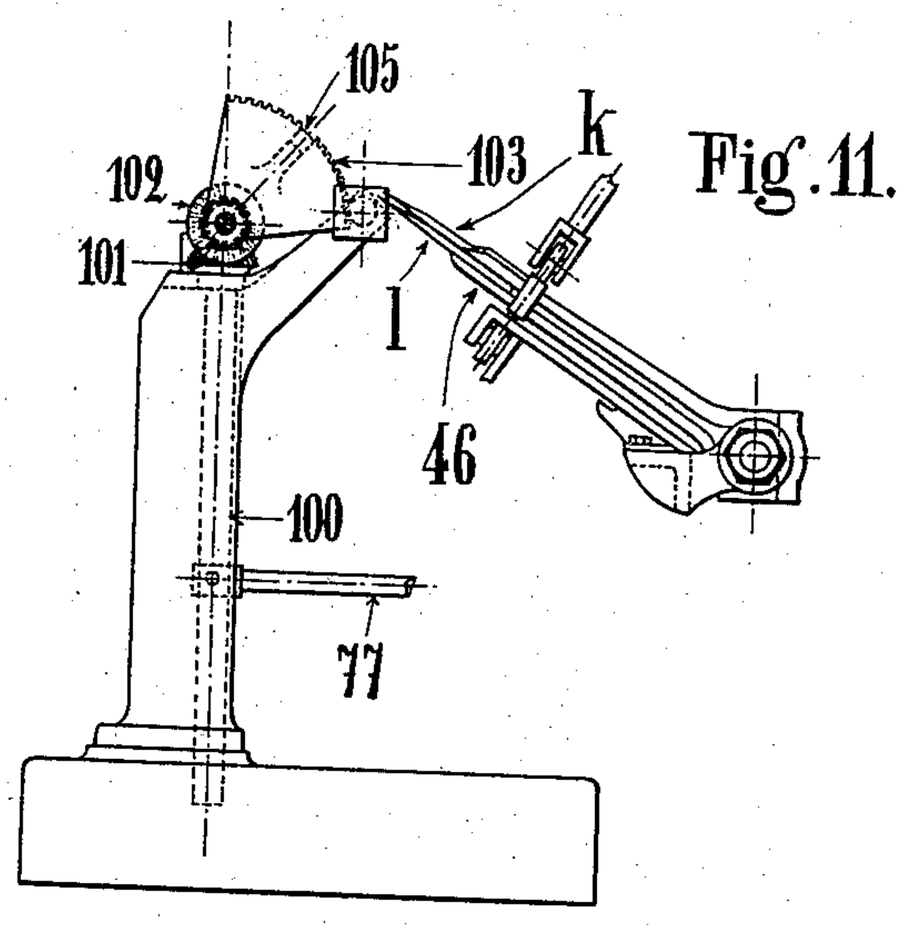

Fig. 11.

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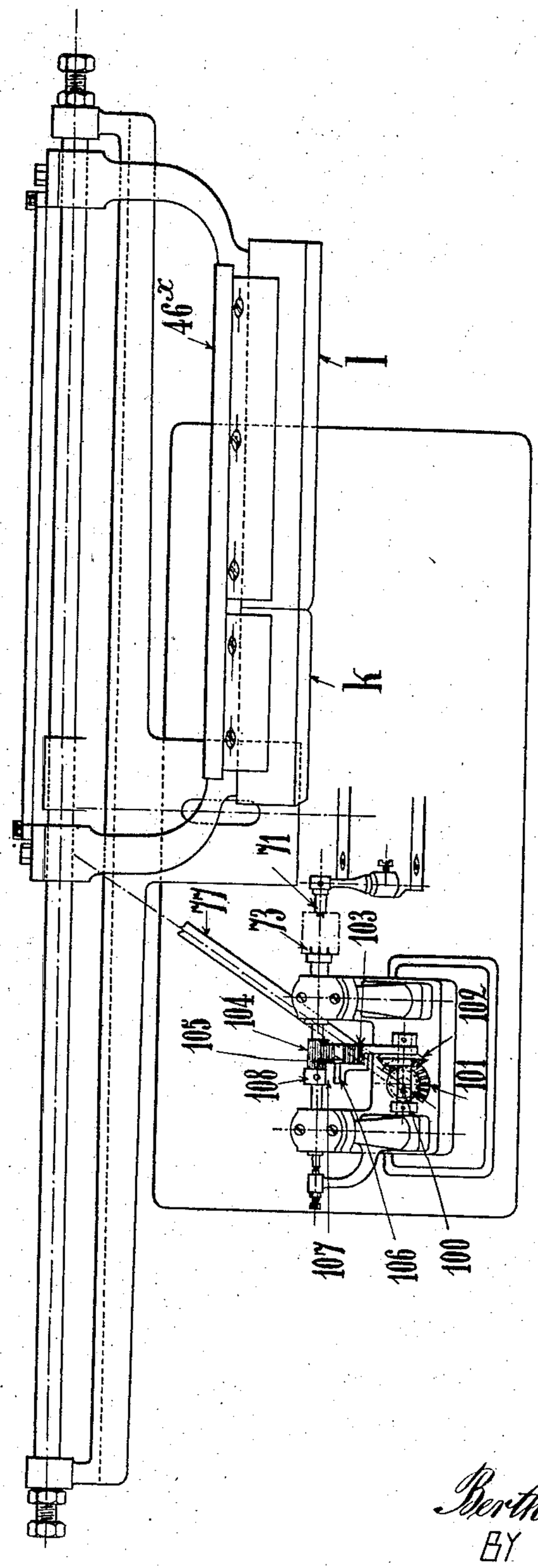
MACHINE FOR TURNING CORKS.

APPLICATION FILED MAR. 21, 1906.

11 SHEETS—SHEET 10.

Fig. 19.



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11 SHEETS—SHEET 11.

Fig.13.

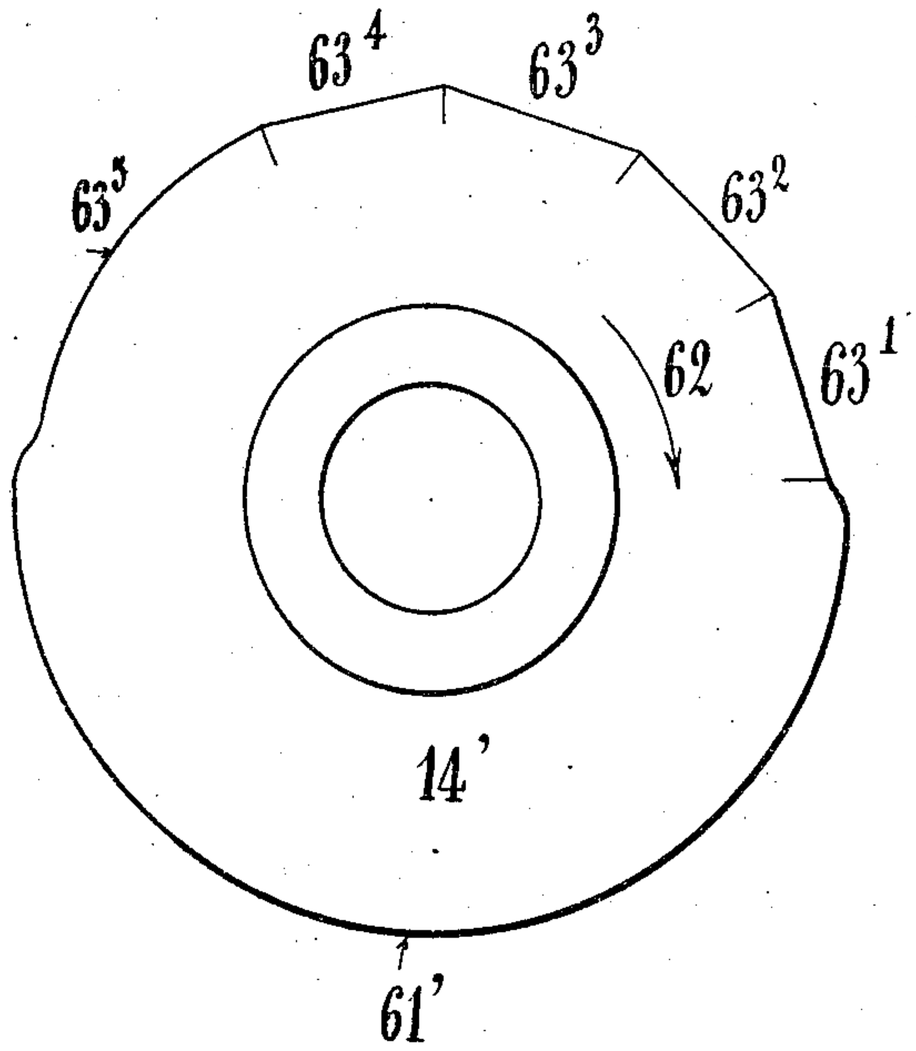
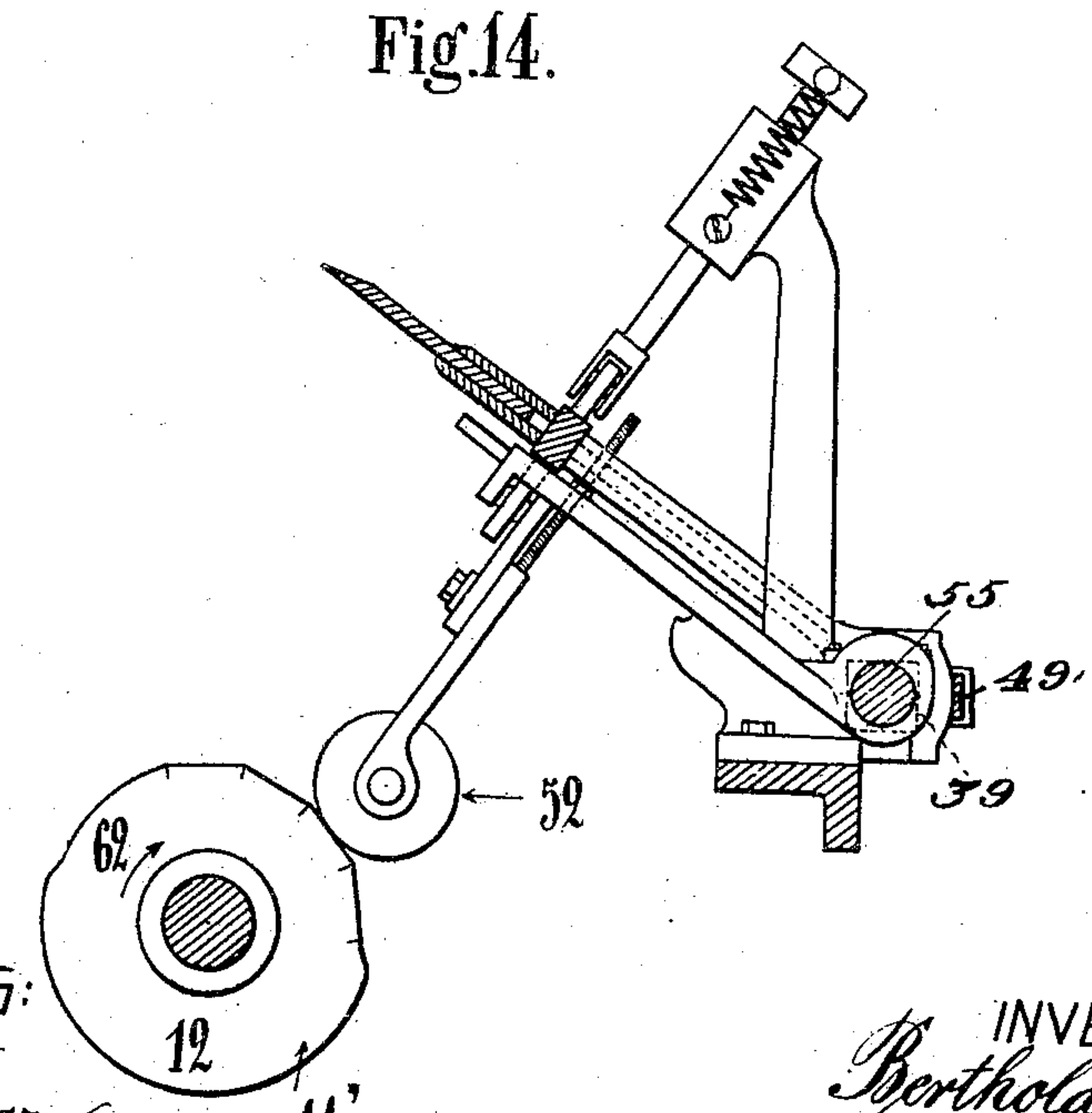


Fig.14.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR TURNING CORKS.

No. 895,774. Specification of Letters Patent. Patented Aug. 11, 1908.

Application filed March 21, 1906. Serial No. 307,221.

To all whom it may concern:

Be it known that I, BERTHOLD LAUER, a citizen of the Republic of the United States, and resident of Paris, France, have invented a new and useful Machine for Turning Corks, which machine is fully set forth in the following specification.

This invention relates to a machine for turning cork stoppers of cylindrical or conical shape, or square corks, or corks with any number of sides, in one or two operations.

The characteristic features of the machine will be seen from the following description.

The accompanying drawings, show, by way of example, a machine according to this invention.

Figure 1 is a front elevation of a machine for turning cylindrical or conical corks in two operations with a single knife. Fig. 1[a] is a rear elevation of the machine. Fig. 2 is an end elevation of the machine. Fig. 3 is a top plan view. Fig. 3[a] is a detail end elevation of the knife and its mounting. Fig. 3[b] is a vertical transverse section of the rear part of the machine showing the knife-actuating mechanism. Figs. 4, 5 and 6 are detail views showing various stages of the feeding operation of the cork blocks or blanks. Fig. 7 is a plan, on a larger scale, of the mechanism for advancing the blade. Fig. 8 is a detail view showing the connection between the device advancing the blade and the device causing the cork blocks to rotate. Fig. 9 is a side elevation of the device for raising the blade. Fig. 10 is a front elevation of a modified construction of the machine for roughly cutting and finishing the cork in a single operation by means of two blades secured to one and the same blade holder or rest. Fig. 11 is a side elevation of the said machine. Fig. 12 is a plan. Fig. 13 shows, on a larger scale, a cam for raising the blade, arranged for manufacturing square corks. Fig. 14 is a side elevation of the device for raising the blade, in which the modified cam is used.

Driving gear for the machine.—The machine is driven by means of fast and loose pulleys 1 and 2, the fast pulley is keyed to the spindle 3, Figs. 1, 2 and 3 rotating in bearings 4 and 5, secured to the table 6 of the bed of the machine, on which table are placed all the parts. To the spindle 3 is keyed a screw 6′ with a right hand and left hand screw-thread, Figs. 1, 2, 3 and 7. The same spindle carries, at the end opposite that at which are placed the pulleys 1 and 2, a helical pinion 7 engaging with another similar pinion 8 keyed to the spindle 9 of a worm 10 engaging with a worm-gear 11 keyed to the end of the horizontal spindle 12 journaled in bearings carried by the table 6 at the front of the machine. To the horizontal spindle 12, Figs. 1, 2 and 3, are keyed at suitable points, starting from the left hand side of the machine in Fig. 1, the cam 13 or feeding cam, the cam 14 for raising the blade, and finally the cam 15 which controls the movement for releasing the cork blocks. Those are the parts which, when the machine is started, control the various devices and regulate their intervention for converting cork, cut elsewhere into square blocks, into perfectly cylindrical or conical corks, or into corks with sides. The various devices will now be described, following as much as possible the order of their working in the machine: (1) the device for bringing in or feeding cork blocks, (2) the device for moving the blade and the device for raising the said blade, (3) the device for gripping the block, between the spindles of the headstock and tailstock and (4) the device which enables it to be turned during the operations of the blade.

Device for feeding the cork blocks.—The cam 13, in its rotation, acts on a roller 16, Figs. 1, 4, 5 and 6, secured to an arm 17 hinged at 18 to the table 6. The free end of the arm 17 carries a toothed sector 18′, the teeth of which engage with those of another toothed sector 19 the spindle 20 of which is supported by the parts 21 and 22 of the bed or frame which form the headstock and tailstock respectively. To the spindle 20 is keyed an arm 23 supporting a platform 24 which participates therefore in the oscillating movement of the sector 19. A spring 25[×] stretched between the table 6 and an arm 26[×] secured to the end of the spindle 20, serves to bring back the parts just described. At each side of the platform 24 are pivoted, loose on the spindle 20, arms 25 and 26 each provided at 27 with an oblong opening having the shape of an arc of a circle forming a path for a pin 28 arranged on each side of the arm 23. A spring blade 29 is secured to a bar 30 which forms a distance-piece between the arms 25 and 26. Moreover, two return-springs are arranged, one 31 between the arm 25 and an arm 33 secured to the part 21 of the frame, and the other 32 between the arm 26 and an arm 34 secured to the part 22 of the bed or frame.

Device for moving and raising the blade.— In the helical grooves of the screw 6′ with double screw-thread travels a thread-follower 35 having the shape of a crescent, Figs. 2 and 7. Said thread-follower 35 is suitably pivoted at 36 under a slide 37 capable of moving in a dovetail guide 38. The ends of the grooves of the screw 6′ connecting the right-hand thread with the left-hand thread by a rounded portion, and the thread-follower 35 being pivoted as hereinbefore explained, it will be understood that a rotary movement imparted to the said screw will result for the slide 37 in a longitudinal reciprocating movement. Mounted on the bed of the machine, at the rear part of the same, is a T-shaped standard 40, the ends of which extend beyond the ends of the bed and are upturned, as shown, to receive a guide-rod 39. The ends of said rod 39 are of circular cross-section, so that it may be rocked in the standard 40, but said rod for the greater part of its length is of square or other polygonal cross-section. The guide-rod 39 extends longitudinally of the machine, at the rear thereof, above the feed-spindle 6′. The blade 45 is supported by a bridge or holder 46, the two constituting a knife which slides by the ends 47 and 48 of the holder on the square guide-rod 39; these ends 47 and 48 are connected by a bar 49 which carries a roller 50 engaging with a groove 51, Figs. 1, 3 and 7, made in the oblique portion of the slide 37, the result being that the blade 45 is caused to participate in the movement of the said slide in longitudinal direction irrespective of the height of the blade. The guide-rod 39, and consequently the blade-holder, may be adjusted vertically. For this purpose the standard 40 is provided with a base-block 41 which is capable of being slid along an inclined block 42 mounted on the frame of the machine, the connection between said base-block and the block 42 being made by a bolt fixed to the block 42 and extending through a slot in the base-block 41 of the standard. Said bolt is provided with a nut 43 by means of which, after the base-block 41 of the standard has been shifted along the inclined block 42 in the desired direction, the base-block 41 may be tightly clamped in position. This adjustment of the guide-rod and its support causes the roller 50 to be moved transversely of the machine in its groove 51, but the engagement of said roller with said groove, by which the knife is moved by the slide 37, is still maintained. For the purpose of causing the guide-rod 39 to assume a position oblique to the spindle 6′, the support 40 is provided at its ends with screws 43′, 44 which engage threaded openings in brackets $44^{\times}$ extending laterally from the bed, as shown in Figs. 1 and 2.

The blade 45 (see Fig. 9) is raised by means of the cam 14 through the intermediary of a roller 52 at the end of a support or bracket 53 extending at right angles to the holder 46 in such a manner that the distance of the roller can be varied. This roller is carried by an arm 54 extending beneath the holder 46 and upon which the bar $46^{\times}$ at the rear edge of the blade is supported, this arm being capable of oscillating about a round portion 55 of the guide-rod 39. The arm 54 engages the bar $46^{\times}$ of the blade-holder or rest 46 by means of a roller 56 upon which said bar travels longitudinally of the machine. Springs 58 acting by means of a rod 59 on a roller 57 resting on the bar $46^{\times}$ of the holder 46 insure contact of the roller 52 with the cam 14, except during the time when a recess in the said cam enables the arm 54 to rest on a stop 60 on the bed of the machine.

The cam 14 shown in Fig. 9 has four faces and it enables a cylindrical or conical cork to be produced in two operations of the blade. When the cam is in its first position the roller 52 is in contact with the face 61 of the said cam. The blade is raised while the cork block is being brought in. The cam turns in the direction of the arrow 62, Fig. 9; the roller 52 comes in contact with the part 63 of the edge of the cam. That is the second position during which the blade makes an operation for roughly cutting the block. In the third position, it is the portion 64 of the cam on which the roller 52 travels. This portion, which is projecting relatively to the portion 63, brings about the raising of the blade for bringing it back after it has effected the first operation. In the fourth position of the cam, the roller 52 falls into a recess 65, but the arm 54 striking the stop 60, there is no contact between the said roller and the cam. This position of the blade is that, during which the second operation is effected for finishing the cork.

Device for gripping and rotating the block.— The uneven portion of the gripping cam 15 suitably adjusted on the spindle 12, acts at a suitable moment on a roller 66 mounted on the end of a lever 67 pivoted at 68 to a fixed part 69 (Figs. 1 and 2) supported by the standard 22 which forms the tailstock. The part 69 forms a dovetailed guide in which travels a part 70 carrying a movable jaw 71. The part 70 is connected to the lever 67. A spring 72 (Figs. 1 and 3), has the tendency of always bringing the movable jaw 71 nearer to the fixed jaw 73 of the headstock 21 arranged opposite. The intervention of the projection of the cam 15 causes, on the contrary, the jaw 71 to move away, as will be readily understood on examining Fig. 3 of the accompanying drawing. To the spindle of the fixed jaw 73 is keyed a beveled pinion 74. A vertical spindle 75, Figs. 1, 3 and 7, which carries at its upper end a beveled, partly toothed, pinion 76, is connected to the part 37, Fig. 7, by an arm 77 and a rod 78, the point of connection or joint 80 of the said

rod with the part 37 being, however, capable of varying, owing to a slotted head 79 of the said rod. A spring 81 is stretched between the part 37 and the shackle 82 of the joint of the rod 78 and of the arm 77. A stop 80′, Fig. 7, secured to the guide 38, serves to stop the rod 78, thus assisting the tension of the spring 81. The movement of the thread-follower 35 on the screw 6′, and consequently of the slide 37 in the guide 38, thus brings about, as will be understood, an oscillation of the pinion 76, which causes the small pinion 83 to rotate and the small pinion 84 keyed to the same horizontal spindle 85, Figs. 1, 3 and 8. The pinion 84 transmits the movement received to the pinion 74 with which it engages and hence rotates the headstock spindle carrying the jaw 73.

Operation of the machine.—The introduction of the cork block or blank into the machine takes place at the moment when, the blade being in the extreme right hand position, Fig. 1, the parts of the feeding or bringing in device are in the position shown in Fig. 4, and the cam 14 in its first position. It is understood that at first the most general case will be described, in which the parts of the machine are combined and adjusted in such manner as to manufacture a cork in two operations of the blade, one operation for roughly cutting the cork block, and the other for turning the cork. The cork block or blank 86 is, therefore, placed on the platform 24 between the bars 87 and against the stop 88 secured to the arm 23. The cam 13, owing to the movement of the spindle 12, rotates in the direction of the arrow 89 and acts on the roller 16 of the arm 17 which oscillates about the point 18, causing the sector 19 to participate in its movement, the result of which is to bring the platform 24 under the spring 29 which is placed on the cork block and presses it against the platform. At that moment, the arm 23 which, up to that moment was moving between the arms 25 and 26 without affecting them, causes them to participate in its movement by means of the pins 28 which engage with the walls of the slots 27, Fig. 5. The bars 87 which are fixed, release then the block which continues its movement in order to come into the axis of the jaws, being simply pressed against the platform 24 by the spring 29. When the block 86 has arrived in the axis of the jaws 71 and 73, against the adjacent jaw 73, the arm 17 returns, while the platform, being pulled back, releases the block which at that moment is compressed between the fixed jaw 73 and the movable jaw 71. The latter, which during the bringing in of the block was kept away by the action of the projection of the cam 15 on the roller 66 of the lever 67 driving the part 70, applies the block against the fixed jaw 73, under the influence of the rotation of the cam 15, and compresses the said block by the action of the spring 72.

Owing to the movement of the machine, the blade 45, carried by the thread-follower 35, the slide 37, the roller 50 and its support, has advanced, during the bringing in or feeding, towards the right, (Figs. 1 and 2) in the "raised" position, the cam 14 being in the first position. During the same time, the rod 78 presses against the stop 80′, Fig. 7; the arm 77, and consequently the jaw 73, stop, while the movable point 80 of connection of the rod 78 with the part 37, continues to move towards the right hand side in the slotted head 79. But as soon as the block 86 is compressed between the two jaws 71, 73, the slide 37 which has arrived at the end of its right hand travel, comes back and strikes with the point 80 the bottom of the slotted head 79, causing the rod 78 to participate in its movement, so that the lever 77 and the pinion 76 are caused to oscillate. The oscillation of the pinion 76 results in the pinions 83, 84 and 74, and consequently the cork block, being caused to rotate. The cam 14 passes then into the second position, the blade 45 is lowered to a certain extent and meets the block 86 from which it removes a shaving. This is the rough cutting of the block. When the blade 45 has arrived at the end of its travel towards the left hand side, Figs. 1 and 2, the cam 14 passes into its third position, so that, when the said blade returns, it is raised and does not meet the roughly cut block. During the return of the blade caused by the movement of the follower 35 on the corresponding screw-thread of the screw 6′, the block 86 and the jaws 73 71 turn in opposite direction, the partly toothed pinion 76 is moved back owing to the pull exercised on the rod 78 and on the end of the arm 77 by the slide 37 moved as already described. When the blade arrives into its right hand end position, Figs. 1 and 2, the follower 35 changes screw-thread on the screw 6′, so that it at once starts again towards the left hand side. At the end of an instant, the roughly finished block begins to rotate, the cam 14 which is in its fourth position, allows the blade to descend, and the said blade, supported by the stop 60 (through the intermediary of the arm 54), meets the roughly finished block and finally turns it. At the moment of the return of the blade 45, the cam 14 arrives into its first position, and the cam 15 presents its projection to the roller 66. The result of this is, first, to raise the blade, then to move away the jaw 71, the action of the spring 72 being overcome. The finished cork falls, and the blade returns into the position shown in Figs. 1 and 2. The machine is ready to receive another cork block for transforming it into a perfect cork as just described. The rod 39 being parallel to the driving spindle 3, Figs. 1, 3 and 7, the

corks obtained are cylindrical. In order to obtain conical corks, whether large or small it is sufficient to adjust the blade in an oblique direction relatively to the axis of the said driving spindle, by screwing or unscrewing the screw 43, and by unscrewing or screwing the screw 44, so as to incline the support of the blade holder or rest. There is no necessity to change any part for changing the shape. The blade, although it is longitudinally controlled, remains free transversely, only the roller 50 is moved in the groove 51 of the part 37. It is frequently advisable, more particularly when it is desired to turn small cylindrical or conical corks, to do it in a single operation of the blade. In that case, the helical pinion 11, must be changed and replaced by a pinion of a diameter equal to one half of the first, and the raising cam 14 with four positions, is replaced by a cam with two positions. The construction of the machine enables these modifications to be effected very quickly. The intermediate spindle 9 and the worm 10 are mounted on a bracket 90 (Fig. 2) movable about the driving spindle 3 and adjustable to suit the diameter of the helical pinion 11 used by means of a tightening bolt 91. The platform 24 on which are placed the cork blocks, can be adjusted to the necessary thickness, so that the block arrives in the center of the jaws 71, 73.

The machine described can be designed in such manner as to obtain the rough cutting and the final finishing of the cork in a single operation. To that end, the blade holder or rest 46 is provided with two blades *k*, *l*, Figs. 10, 11 and 12 secured one behind the other, but in parallel planes. The blade *k*, which is at a higher level relatively to the blade *l* and does the rough cutting, is of a length corresponding to one turn of the cork block. The blade *l* which finishes the cork, has a double length corresponding to one and a quarter turns of the cork. It must, however, be remembered that the cork block or the roughly cut cork must be standing still at the moment when the blade engages with it. Consequently, on the pivot pin 100, Figs. 10, 11 and 12, of the arm 77 is mounted a toothed sector 101 engaging with a conical, partly toothed, pinion 102. To the same horizontal pin of the pinion 102, is keyed a sector 103 engaging with a small spur pinion 104 keyed to the pin of the fixed jaw 73. The portion 105 of the sector 103 has no teeth on a given length.

If the machine is started, and a cork block introduced by the means already described between the jaws 73, 71, the blade *k* will attack the cork block before the latter starts rotating. When the said blade has penetrated into the whole length of the cork block, the arm 77 begins to move and causes the pinions 101 and 102 to oscillate. The toothed sector 103 is lowered, the result of which is that the spur pinion 104, and, consequently, the cork block, begin to rotate. This block makes one revolution while the blade *k* rough cuts it. After this revolution has been effected, a kind of stop 106, secured to the sector 103, comes to rest against the flat portion of a ring 108 keyed to the spindle of the pinion 104, the result being that any momentum which the said pinion might have had at the moment when its teeth arrived at the place 105 where the sector 103 has no teeth, is destroyed. The pinion 104 is thus stopped, and the cork rendered immovable during the time that the blade *l* is penetrating into it. After the blade has penetrated into it, the second portion of the teeth of the sector 103, comes into contact with the teeth of the pinion 104, and again causes the latter to rotate. The cork makes $1\frac{1}{4}$ revolutions about itself during the time that the blade *l* is finishing it. The roughly cut cork is turned and removed. The sector 103, the pinion 104 and the conical pinions 101 and 102 return to their original position at the moment when the blades *k l* come back.

In order to enable the machine shown in Figs. 1–9 to produce corks of square cross-section and rounded off at the corners, such as for instance corks of champagne bottles, or corks with any desired number of sides, it is sufficient to substitute for the cam 14 with four positions, a cam 14′ of a special shape (Fig. 13). This cam being with two positions, the helical pinion 11 must also be replaced by a pinion of the same kind of half the diameter. In the first position of the cam, the roller 52, in front of which the cam 14′ is keyed to the spindle 12, is in contact with the circular projection 61′ of the said cam. The blade is raised during the time that the cork block is brought in. The cam rotates in the direction of the arrow 62.. In the second position of the cam, the roller 52 comes in contact with a portion provided with four sides 63^1 63^2 63^3 63^4 in a recess of the cam, so that the blade which has come in contact with the cork block, successively cuts it on its four faces, the machining of the faces corresponding to the passage of the roller 53, on the faces of the cam, and the shaping of the rounded off corners of the cork corresponding to the passage of the said roller on the tops. The portion of the cam cut so as to form faces, is terminated by a portion 63^5 serving to connect with the part 61′ which causes the rising of the blade so as to enable the finished cork to fall out, and a new cork block to be brought in. It goes without saying that production of corks with any number of sides greater than four, whatever be their number, can be obtained in the same manner. It is sufficient for the purpose to mount on the spindle 12 a cam provided with a suitable number of sides.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent:

1. The combination, with the blank-rotating mechanism and the driving-spindle, of a slide connected with said spindle to move longitudinally of the machine and having a transverse groove, an inclined block mounted on a fixed part of the machine, a support having a base-portion adjustable on said inclined block, a guide-rod carried by said support, and a knife mounted to travel along said guide-rod and carrying a device to engage the groove in said slide.

2. In a machine for turning corks, the combination, with the headstock and the spindle thereof, of a driving-spindle from which the operative parts of the machine are actuated, an oppositely threaded worm-spindle carried by said first-named spindle, a thread-follower embracing said worm-spindle, a slide connected with said thread-follower and guided longitudinally of the machine, a rockable spindle geared to said headstock spindle, an arm connected with said rockable spindle, a rod connecting said arm with said slide, and a spring connecting the slide with the joint between said arm and rod.

3. In a machine for turning corks, the combination, with the headstock and the spindle thereof, of a driving-spindle from which the operative parts of the machine are actuated, an oppositely threaded worm-spindle carried by said first-named spindle, a thread-follower embracing said worm-spindle, a slide connected with said thread-follower and guided longitudinally of the machine, a vertical rockable spindle geared to said headstock spindle, a rod 78 slidably secured to said slide by a slotted head 79, and means connecting said rod with said rockable spindle.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

BERTHOLD LAUER.

Witnesses:
EMILE LEDRET,
HANSON C. COXE.