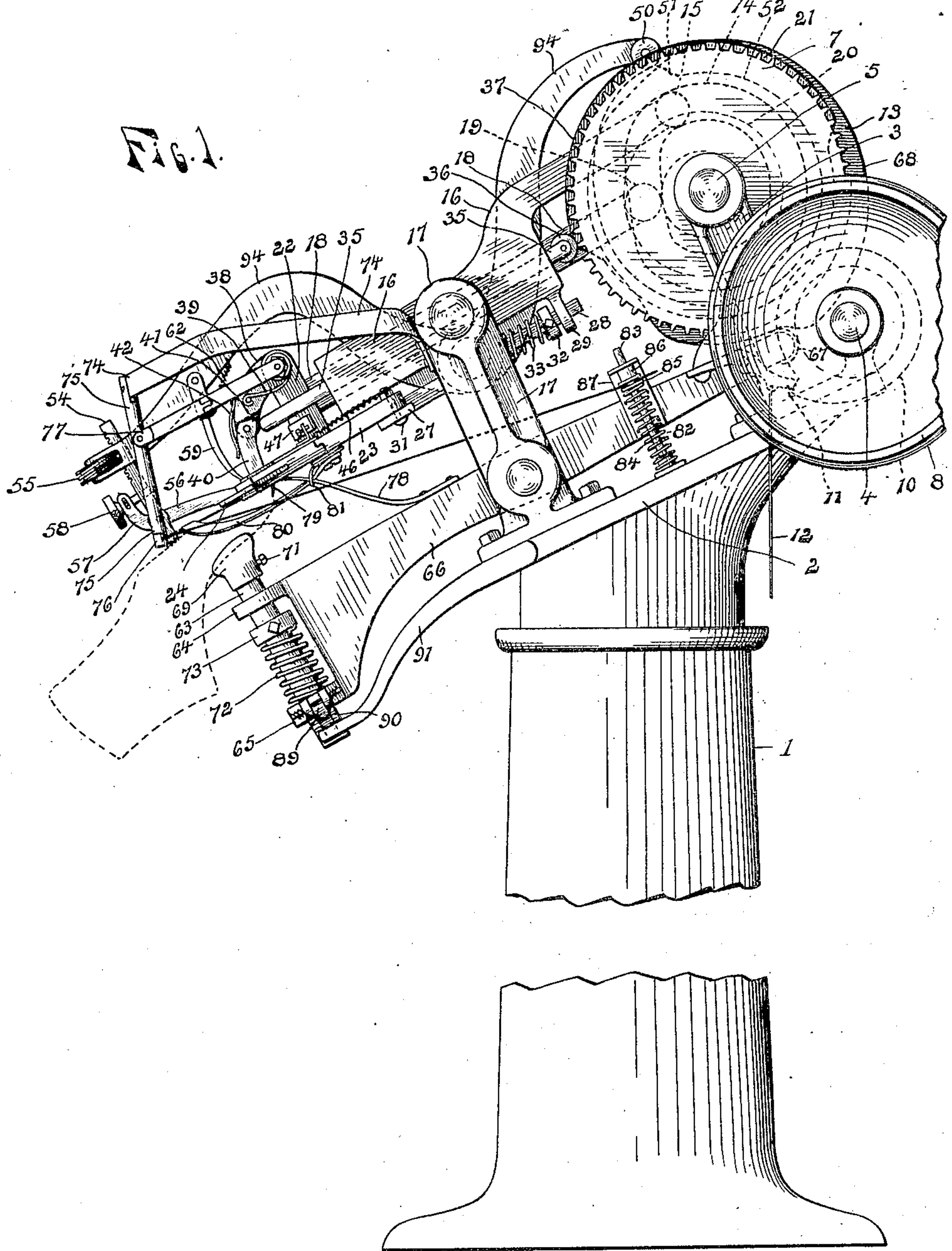


C. F. PYM.  
LASTING MACHINE.  
APPLICATION FILED NOV. 6, 1907.

938,512.

Patented Nov. 2, 1909.

6 SHEETS—SHEET 1.



WITNESSES:

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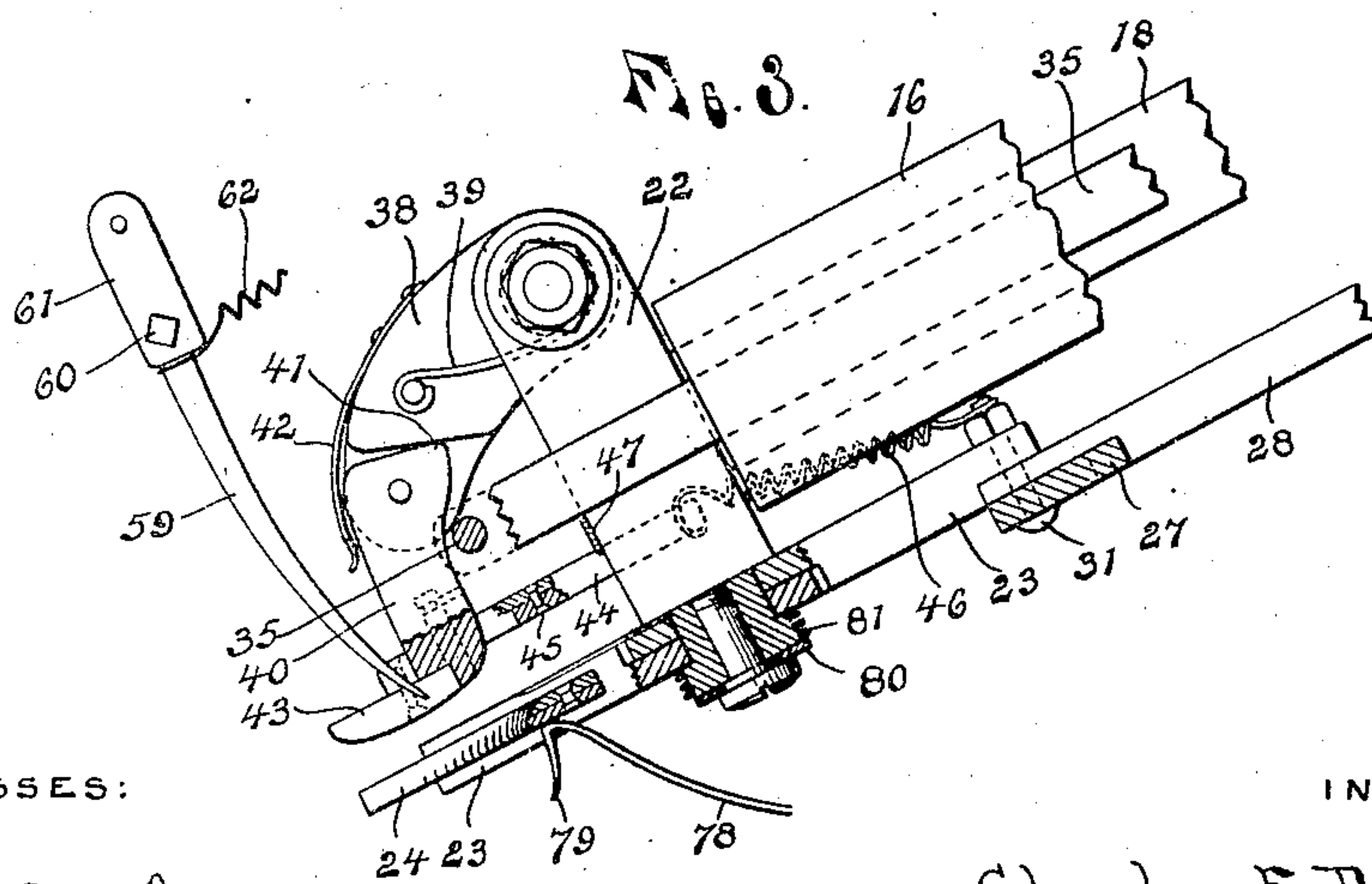
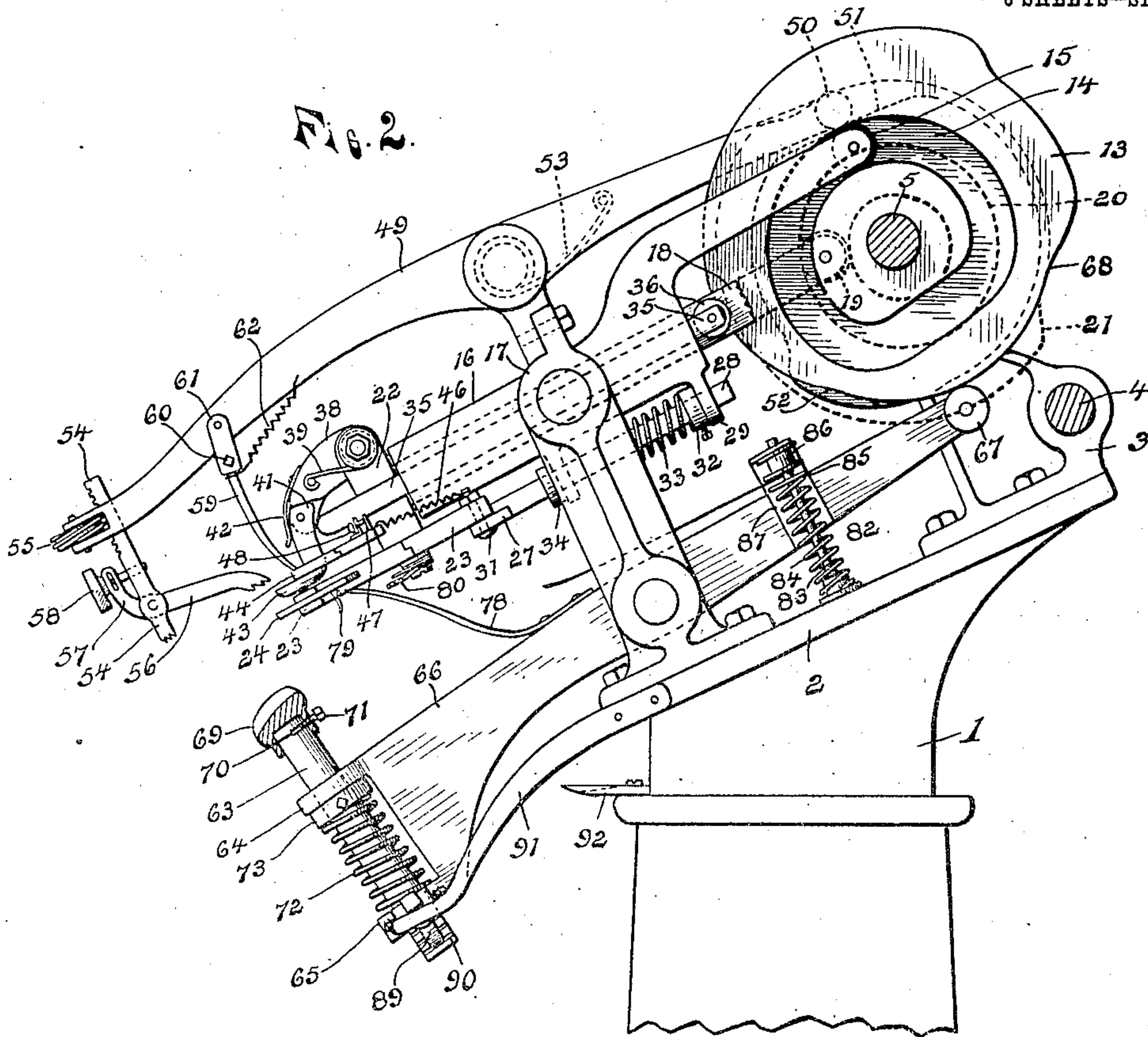
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6 SHEETS—SHEET 2.



WITNESSES:

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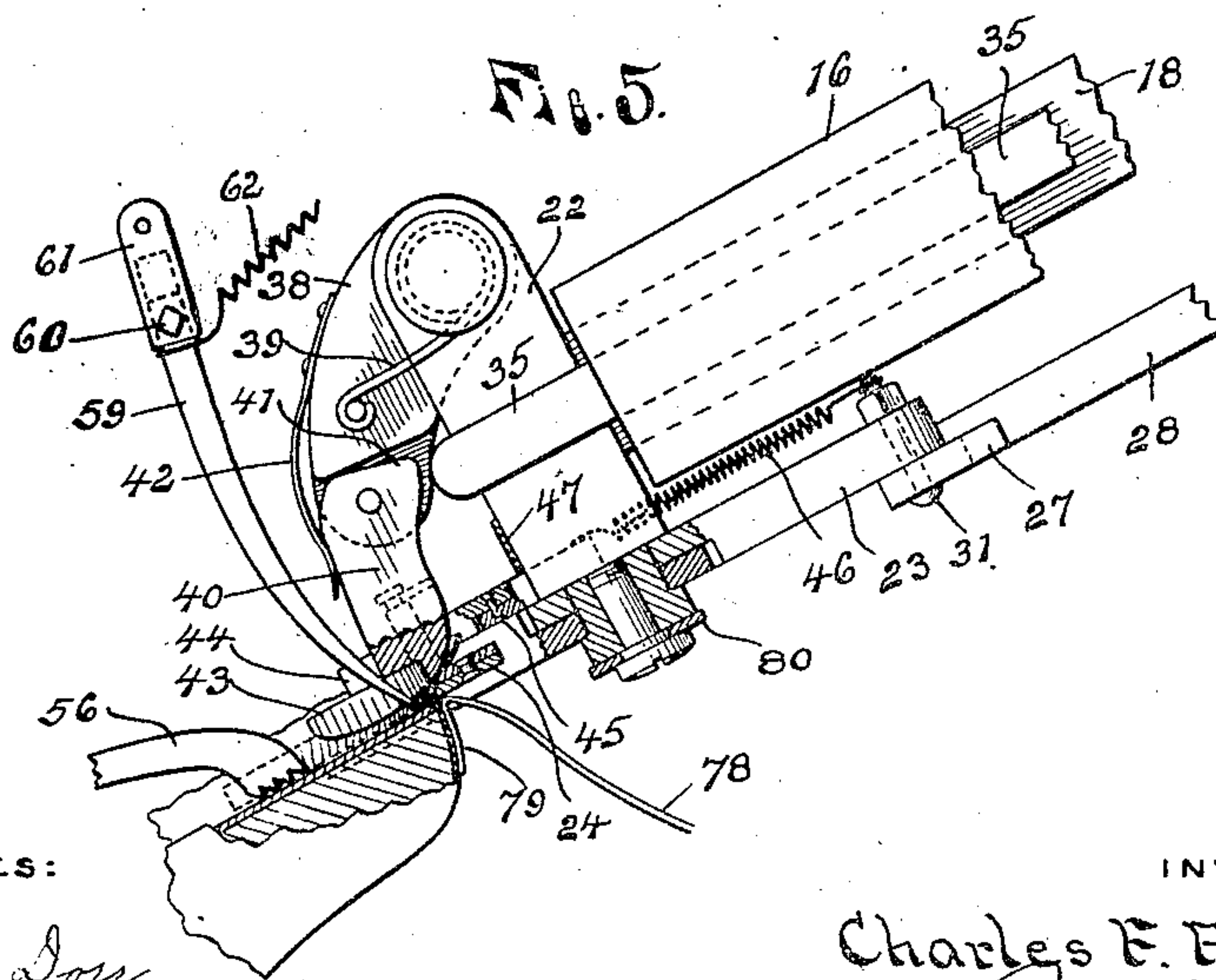
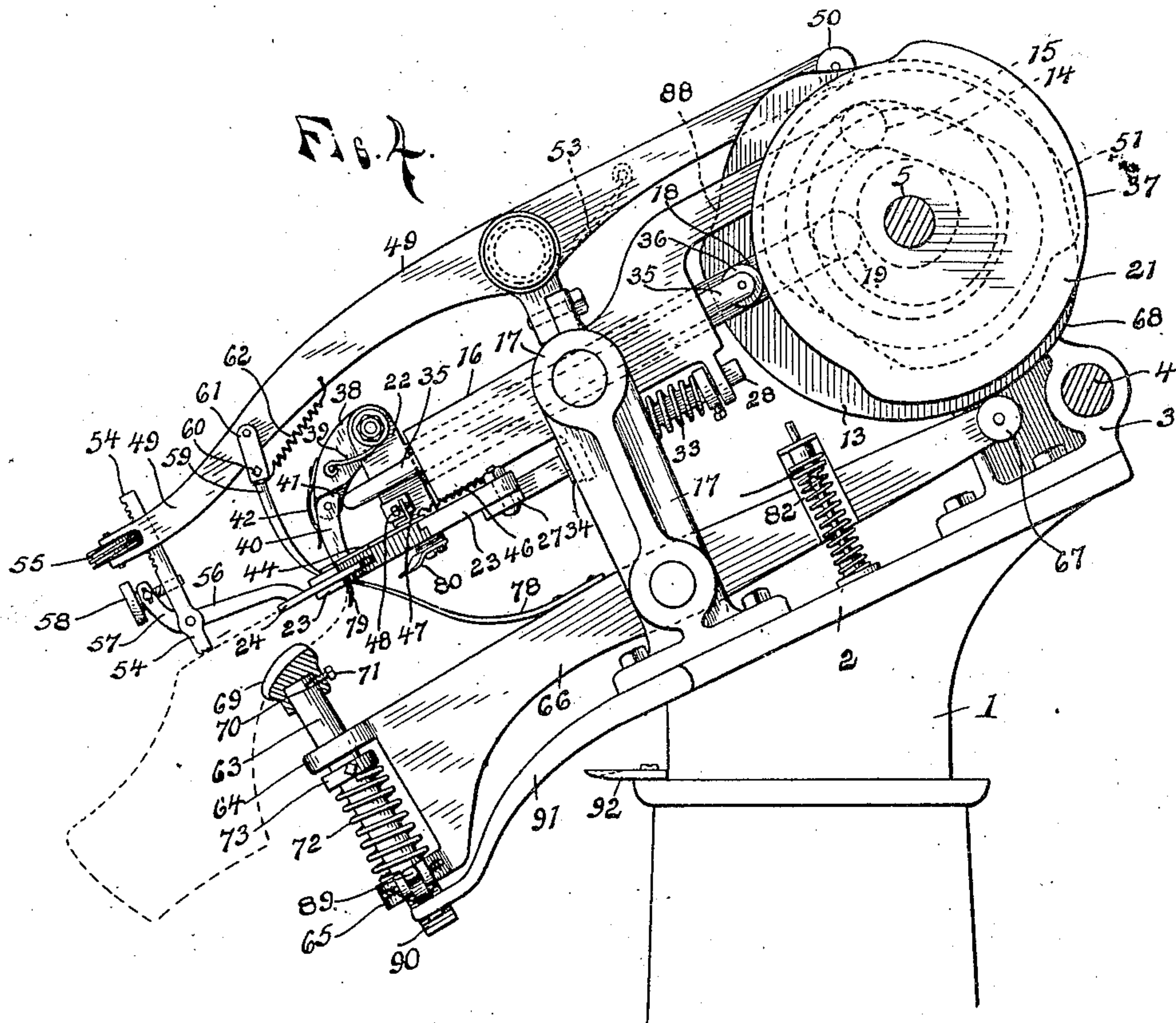
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6 SHEETS—SHEET 3.



WITNESSES:

Anna M. Dorr.  
Anna M. Mayer.

INVENTOR:

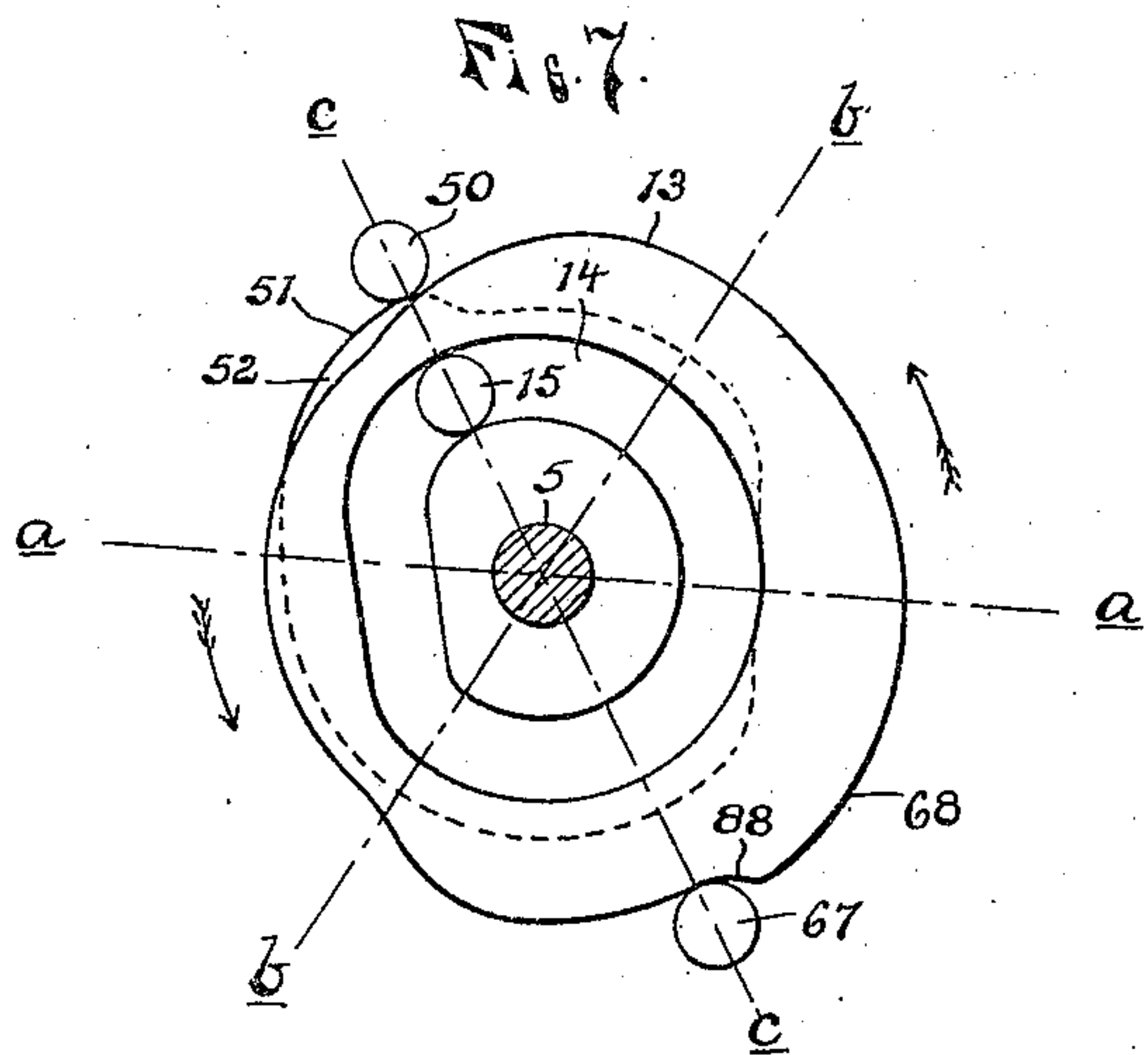
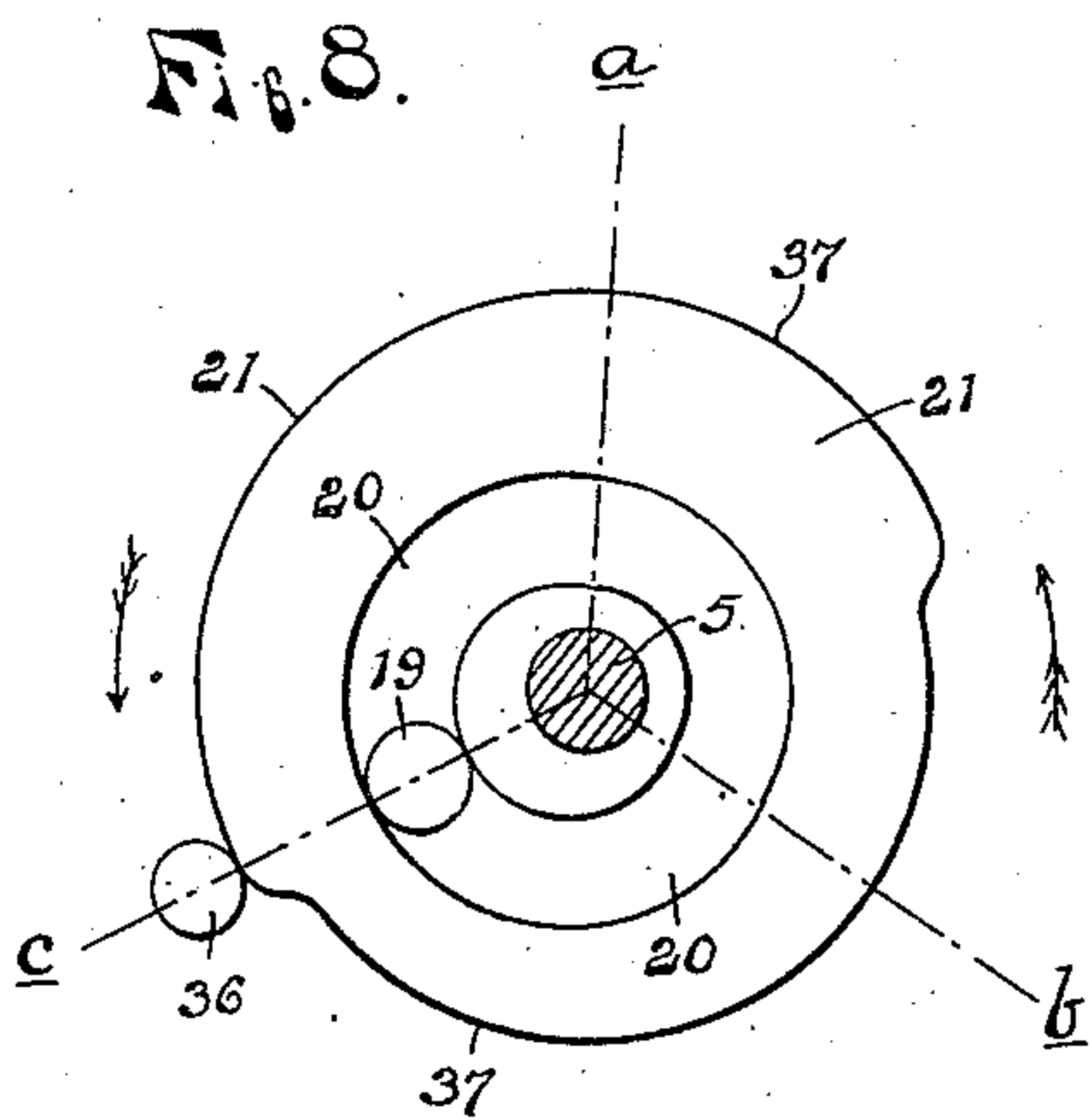
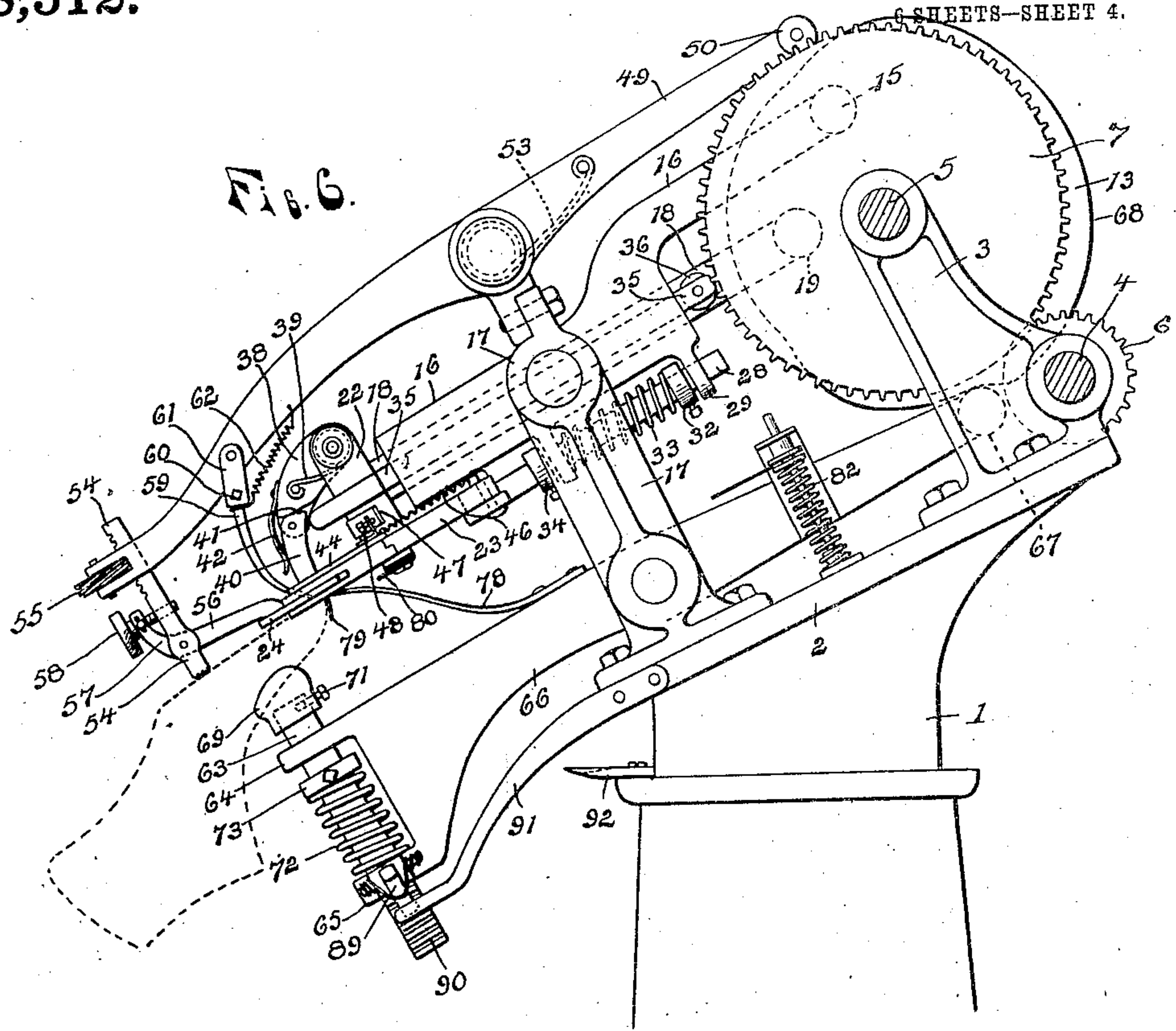
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6 SHEETS—SHEET 4.



WITNESSES:

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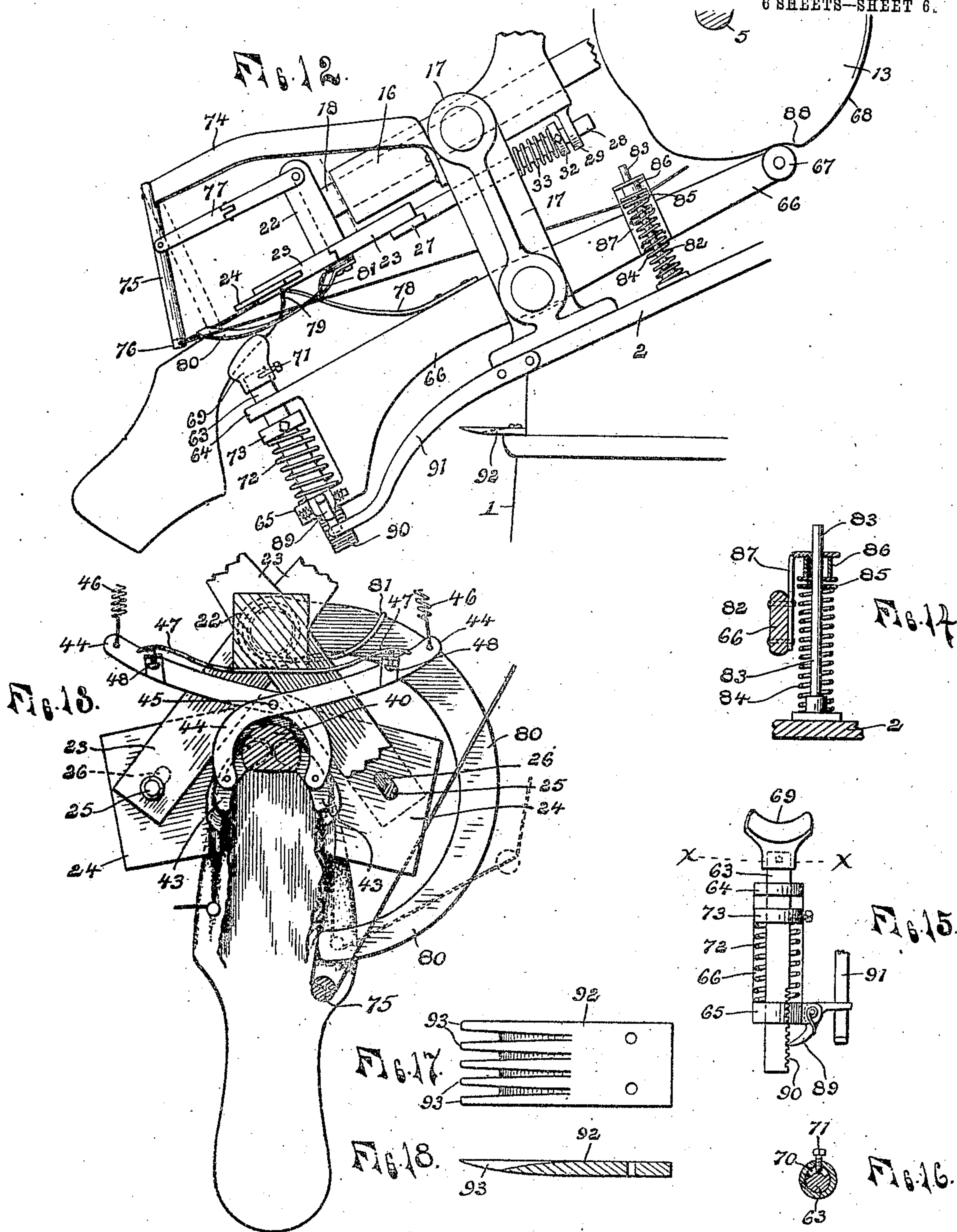


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6 SHEETS—SHEET 6.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

CHARLES F. PYM, OF ESSEX, ONTARIO, CANADA, ASSIGNOR OF ONE-HALF TO KRENTLER BROS. CO., OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

## LASTING-MACHINE.

938,512.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed November 6, 1907. Serial No. 401,015.

To all whom it may concern:

Be it known that I, CHARLES F. PYM, a subject of the King of Great Britain, residing at Essex, in the county of Essex and Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Lasting-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in lasting machines of that class in which "wipers" are employed to last the heels and toes of boots and shoes; and more particularly to improvements in the construction shown in my United States Letters Patent, dated March 17, 1908, No. 882,018.

One of the objects of this invention is to so construct the machine that when a last is placed therein having a boot or shoe in place thereon for lasting, the wipers and last will automatically adjust themselves to conform to any ordinary irregularity or change in the form or size of the shoes being lasted, thus avoiding the necessity for careful and accurate placing of the shoe by the operator, and further to provide a construction which will permit the operator to place the last in position without hindrance and give an unobstructed view of the work.

It is also an object of the invention to provide means for engaging the edge of the shoe upper and clamping the same against the edges of the wipers which means is adapted to yieldingly open and close in conformity with the variable movement of the wipers so that the leather will be firmly held all along its edge regardless of the size of form of the heel or toe of the shoe.

A further object of this invention is to provide means for automatically stretching and securing a wire around the toe of the last to hold a shoe upper in place thereon after the lasting operation, and to so construct the machine that the pressure of the wipers will be relieved at the end of the lasting operation to permit the wire to be drawn closely around the lasted edge. And it is also an object of this invention to provide certain other new and useful features in the construction, arrangement and combination of parts, all as hereinafter more fully described, reference being had to the accompanying drawings in which:—

Figure 1 is a side elevation of a device embodying the invention; Fig. 2, a similar view of the same with parts broken away to show the construction, and embodying a modified form of presser-bar; Fig. 3 is an enlarged sectional detail of the wipers, clamping foot and adjacent parts in the position in which they are shown in Fig. 2; Figs. 4 and 5 are views similar to Figs. 2 and 3, showing the parts in another position; Fig. 6 is a view similar to Figs. 2 and 4 and showing the parts in a different position; Figs. 7 and 8 are details of the various cams; Fig. 9 is a plan view of the machine with one end of the presser-bar broken away; Fig. 10 is an enlarged detail showing the wipers, clamping foot and adjacent parts in plan view; Fig. 11, a similar view showing the wipers closed and the foot in its relative position; Fig. 12 is a detail of the wiring mechanism in side elevation; Fig. 13 an enlarged detail of a portion of the same in plan view; Fig. 14 is a detail of a wire clamp, showing the same in vertical section; Fig. 15 is a front elevation of the jack; Fig. 16, a section of the same on the line  $x-x$ ; Fig. 17 is a plan view of the tack puller; and Fig. 18 is a longitudinal section of the same.

Like numerals refer to like parts in all of the figures.

As shown in the drawings, 1 is a suitable pedestal having a head formed with a top or table 2 which is inclined from the horizontal so that when standing in front of the machine, the operator will have a better view of the machine and of his work. Secured upon this table at its rear edge, are bearing brackets 3 each formed with two bearings, one for a driving shaft 4 and the other for a countershaft 5. Motion is transmitted from the driving to the driven shaft by means of a pinion 6 on the driving shaft in mesh with a gear 7 on the countershaft which pinion and gear are in the proportion of three to one so that one revolution of the driving shaft will turn the countershaft but one-third of a revolution. A suitable belt pulley 8 is mounted loosely on the end of the driving shaft and provided with any well known form of roller clutch located in its hub casing 9. A wheel 10 secured to the driving shaft has a lug adapted to be engaged by a dog 11 to stop the shaft at the



end of each revolution, said dog being released by a rod 12 attached to a foot lever adapted to be moved by the operator.

Secured upon the countershaft is a cam wheel 13 having an internal cam groove 14 engaged by a roller 15 on the tail end of a rocker-bar 16 which is pivoted intermediate its ends upon brackets 17 secured upon the forward edge of the table 2. This rocker-bar is formed with a guide way for a sliding push-bar 18 which is moved longitudinally therein by a roll 19 on its rear end engaging a cam groove 20 in a cam wheel 21 secured on the counter-shaft. A post 22 is secured to the forward end of the push bar and pivotally attached to the lower end of said post at their point of intersection are the crossed levers 23, the forward ends of which are slotted inward to receive the wiper plates 24. These plates are detachably and pivotally secured within their slots by pins 25 passing through holes in the levers and through elongated openings 26 in the plates, said openings extending substantially in a direction longitudinally of the levers. These wiper plates are hinge connected and provided with adjacent formed edges to conform to the shape of the heel or toe of the shoe being lasted, and when said heel or toe is brought into contact with said edges, the wipers are free to shift laterally on their levers to conform to the shape of the heel or toe and bring the center line of the forming notch in the wipers into coincidence with the longitudinal center line of said heel or toe. The wiper plates are turned relatively on their connecting pivot to open and close the forming notch or jaws of the wipers, as the push bar 18 is projected or retracted and the post 22 moved, by connecting the rearwardly extending ends of the crossed levers by a plate 27 which is secured to the forward end of a bar 28 extending rearwardly through openings in ears 29 on the lower side of the rocker-bar 16. Said plate 27 is provided with forwardly converging slots 30 through which the pins or bolts 31 connecting the levers to the plate, pass and slide freely, and sleeved on the bar 28 between its forward bearing and a collar 32, is a coiled spring 33 said collar being adapted to be adjusted on the bar to regulate the tension of the spring and thus determine the pressure with which the wipers will engage the work before said spring will yield and allow the plate 27 to move forward with the levers. A second collar 34 on the bar in front of the forward bearing ear, limits the rearward movement of the bar and is made adjustable thereon to set the wipers relative to the heel or toe of the shoe so that they will be projected a greater or lesser distance over the same in the lasting operation. The push bar with its post and pivotally

attached wipers, and the bar 28 are all carried by and rock with the rocker bar as is also a push-rod 35 which slides in a guideway provided therefor in the rocker-bar at one side of and parallel with the push-bar. On the rear end of this push-bar is a roll 36 engaging an outside cam surface or track 37 on the cam wheel 21 and its forward end is extended laterally to engage a clamping arm 38 which is pivoted at its upper end to the upper end of the post 22. A spring 39 exerts a force to swing the arm downward and said arm is made in two parts, the lower part or forearm 40 being pivoted to the upper part and provided with a shoulder 41 adjacent to its pivot to engage a projecting portion or stop on the upper member and limit its downward turning movement relative to said member. A spring 42 is provided to turn said forearm into engagement with its stop when the arm is raised by the push-rod which engages the upper member of the arm only.

Pivotally attached to the lower end of the clamping arm are two clamping fingers 43 which are curved to conform substantially to the curved contact edges of the wipers and are rounded on their lower side to rest upon the inclined portion of said edges with the upwardly projecting edge of the leather of the upper to be lasted, clamped between. The pivot ends of the clamping fingers are let into the lower end of the clamping arm which end is rounded off so that it, together with said fingers, forms a continuous smooth rounded surface to engage the inner side of the leather. These fingers are turned on their pivots toward and from each other as the wipers are opened or closed, by levers 44 pivotally attached at their forward ends to said fingers and curved rearwardly around the clamping arm where they are crossed and pivoted together at 45. To the rearwardly extending ends of each of said levers is attached a light coiled spring 46 to pull rearwardly on said ends and normally hold the fingers closed or turned toward each other, and secured to the forward side of the post 22 is a flat transversely extending spring 47 which is adapted to be engaged by adjustable stop screws 48 carried by the rear ends of said levers 44 when the clamping arm is lowered to clamp the shoe upper. When the clamping arm is turned upward on its pivot by the push-rod 35, its forearm is turned relative to it by the spring 42 with the clamping fingers extending in a plane substantially parallel to the plane of the wipers, and as the push-rod is retracted, the clamping arm falls lowering the fingers within the upstanding edge of the shoe upper in position to evenly engage and clamp said edge to the formed edges of the wipers, at the same time spreading said edge by the opening out of



the fingers and thus taking out all of the wrinkles. By providing the joint in the clamping arm, the fingers are lowered in position to engage the upstanding edge of the leather evenly throughout their length, the forward ends of said fingers being as low or lower than the end of the arm when the same engage the work, and when the push-rod is fully retracted the spring 39 partially overcomes the spring 42 and the arm straightens out. The fingers are yieldingly turned outward into contact with the work by the spring 47, the active pressure of which may be easily regulated by the stop-screws 48 and the clamping arm is yieldingly held against the work by its spring 39 so that any variation in the shape or size of the last or the thickness of the leather is automatically provided for.

Pivoted intermediate its ends upon one of the bearing brackets 17, is a rocker-bar 49 having a roll 50 on its rear end to engage the outside cam face 51 of a cam wheel 52 secured upon the countershaft 5, a spring 53 being provided to hold the bar with its roll in contact with the cam, and a transverse opening in the forward end of said bar forms a bearing seat for a rack bar 54 the lower end of which is provided with teeth to engage the insole of the shoe being lasted and forms a presser-foot to hold the last in place. A worm 55 is journaled in a slot in the end of the presser-bar 49 in engagement with the teeth of the rack so that by turning said worm the presser foot is adjusted up or down, and pivotally attached to the foot near its lower end is a presser-arm 56 extending rearwardly therefrom and formed with teeth to engage the shoe sole near the point of the toe or end of the heel. A tail piece 57 on the presser arm extends forwardly and upwardly from its pivot and a thumb-screw 58 engages a screw-threaded opening in the foot and is pivotally attached to the tail piece so that by turning said thumb-screw in or out the presser-arm is rocked on its pivot and the position of its contact end relative to the foot is adjusted.

In Fig. 1 is shown a presser bar 94 which is curved downward intermediate its ends to bring its pivot substantially in alinement with the wipers so that when said bar rocks downward at its forward end, the presser foot will not be carried inward toward the wipers and tend to move the last.

To hold the insole down at the extreme point of the toe so that it will not be "wiped up" or turned back by the operation of the wipers, a toe piece 59 is provided consisting of a rearwardly curved bar flattened at its lower end to engage the work and adjustably secured by a set screw 60 at its upper end in a yoke 61 pivotally attached to the presser-bar 49 in such a position that said toe piece will engage near its lower end, the lower end

of the clamping arm between the forwardly extending ends of the clamping fingers, said toe piece being thus yieldingly held in contact with said arm by a coiled spring 62 attached to it at one end and to said presser bar at its opposite end. The toe-piece thus rides upon the clamping arm and is held thereby out of position when the arm is raised, and when said arm is lowered, the toe piece is in position to engage the sole at the proper point and at the proper time, the presser-bar holding said toe-piece in contact with the sole while the wipers are raised and lowered in the lasting operation and the clamping arm forcing said toe-piece out of the way as the wipers are projected forwardly and downwardly upon the work to lay the edge of the upper down upon the sole.

To hold the last upon which the shoe to be lasted is secured, and clamp the same firmly in position for lasting up against the ends of the presser-foot and presser-arm, a jack is provided consisting of a post 63 mounted in bearing ears 64 and 65 on the forward end of a rocker-bar 66 pivoted intermediate its ends between the bearing brackets 17 and having a roll 67 on its rear end to engage an outside cam surface 68 on the cam wheel 13.

On the upper end of the post 63 is a head 69 shaped to conform to the surface of the last just forward of the instep and form a support for said last at a point intermediate the points at which the presser-foot and arm engage the sole. Said head is formed with a socket to receive the upper round end of the post which is provided with a groove 70 to receive the end of a set screw 71 in the head and thus hold the head in place and permit of a free turning movement on the post so that when the last is placed thereon and brought into contact with the wipers, the seat will turn and adjust the last to the wipers, thus providing for the use of rights and lefts and also lasts of various shapes and swings. The foot is yieldingly supported in its bearing ears by a coiled spring 72 sleeved thereon between the lower ear and an adjustable collar 73.

The edge of the shoe upper is held in place after the lasting operation by a wire stretched tightly around the toe upon the laid over and formed down portion of the upper adjacent to its edge, and made fast at its ends to tacks driven into the sole at each side some distance from the point of the toe. To automatically draw this wire to place and partially secure the same to hold the tension while the last is being removed from the machine, a supporting bracket 74 is secured to one of the bearing brackets 17 or other stationary part of the machine, and pivotally attached to the forward end of said bracket is a swinging arm 75 provided with a revoluble head 76 at its lower end having a transverse hole through which the wire is



threaded. A jointed rod 77 is pivotally attached to said swinging arm at one end and at its opposite end to the upper end of the post 22 so that when the push-bar 18 is moved forward motion will be transmitted therefrom to swing said arm, the position of which is such that its lower end carrying the wire will move from a point at one side of and some distance from the toe of the last to a point over and adjacent to the upper surface of the sole, forwardly of the tack to which the wire is to be secured after the lasting operation. To guide the wire to place close up beneath the wipers at the point of the toe, a spring arm 78 is secured at one end to the upper side of the jack-bar 66 with its free end engaging the underside of the wipers, and on this free end of the arm is a turned down portion which forms an abutment or stop 79 against which the toe of the last is placed in putting the same in position for lasting. A curved guide-arm 80 is also provided to guide the wire up over the edge of the sole and over the securing tack as the wire is drawn forward by the swinging arm. This guide-arm is pivotally attached at one end to the lower end of the post 22 and curves laterally outward at one side of the shoe and upward with its free end normally lying directly over and close to the tack to which the wire is to be secured. A spring 81 yieldingly holds said arm turned to the position described and permits of its being turned backward if in the way in inserting the shoe. When the swinging arm is moved forward to stretch the wire around the toe, said wire engages and slides up the inclined end of the guide-arm 80 and drops off the end of said arm behind the securing tack so that when the arm swings backward, the wire is looped around the tack to hold the wire while the last is being removed from the machine.

The wire is supplied from a spool or other device, not shown, and to put a friction on the wire so that when the arm 75 swings forward the wire will be drawn tightly around the toe of the shoe, a tension device 82 is provided, consisting of a post 83 secured to the machine table adjacent to the jack-bar 66 midway between its pivot and its rear end, and on the post is sleeved a coiled spring 84 and a washer 85, and also a thimble 86 having an arm 87 secured to the jack-bar so that said thimble slides up and down on the post as the bar is rocked. The wire being passed between the washer and thimble as the rear end of the jack-bar is rocked downward to raise its forward end to clamp the last, said thimble will be moved downward against the action of the spring 84 and the wire will be frictionally clamped until the bar is again rocked to release the last, when the frictional contact of the thimble with the wire will be relieved, permitting the

wire to be drawn through freely by the operator.

Near the end of the lasting operation, the wipers are pressing down hard upon the edge of the upper and sole, so that it is very hard to draw the securing wire beneath their edges into contact with the formed edge of the leather to hold the same securely, and therefore it is desirable to relieve the pressure slightly just before the swinging arm finishes its forward movement to allow the wire to be drawn beneath the edge of the wipers by the forward movement of said arm. As shown at 88 in Fig. 12, the cam for operating the jack is reduced in size at this point so that the jack will be lowered slightly and as the spring 72 of the jack is compressed by the upward movement of the jack in clamping the last, this spring, by expanding, would maintain the pressure between the last and wipers if it were not for a dog 89 which is pivoted upon the bearing 65 and adapted to engage a series of notches 90 in the post 63 so that as said post is forced downward in its bearings against the action of said spring, it is locked against upward movement by the dog, and thus moves with the jack-bar. To release the dog, a forwardly extending arm 91 is rigidly secured to the table or other convenient stationary part of the machine, and so positioned that when the jack is lowered releasing the last, a tail on the dog will engage said arm just before the jack reaches its lower position and throw the dog out of engagement with the notches.

Ordinarily the shoe upper is secured to the last by tacks driven through the edge of the leather and sole into the last, and usually a tack is placed at the point of the toe. Before the toe can be lasted, it is necessary to remove this tack and for this purpose a puller 92 is secured in a horizontal position to any convenient stationary part of the frame, and consists of a plate provided with a series of tapering slots extending inward from one end of the plate and forming a series of fingers 93 between, this end of the plate being beveled at its lower side and straight on its upper side to form sharp flat ends on the fingers and said slots are extended farther inward at the upper side of the plate than at the lower side. By taking hold of the last near its heel, the pointed ends of the fingers may be shoved beneath the head of the tack and a downward movement of the heel end of the last will then easily pull the tack, and the operator will have the last in his hand in position to be placed in the machine.

In Figs. 7 and 8 the several actuating cams are diagrammatically illustrated showing their relation to each other when the rolls engaging said cams are in the positions indicated by the dotted lines marked *a*, *b*



and *c*, or the three positions in which the machine is designed to be stopped by the dog 11 during each cycle of operation.

When the parts are in the position shown in Figs. 2 and 3, the rolls are in the positions indicated by the lines *a*, and the parts are at rest with the jack down, the roll 67 being in contact with the small part of the jack cam 68; the wipers are in their lowered position, the roll 15 on the rocker-bar being in contact with the concentric inner part of its cam; the push-bar carrying the wipers is in its rearmost position, the roll 19 being in the innermost part of its cam groove; the push-rod 35 is projected forward by its cam raising the clamping arm 38; and the roll 50 on the end of the presser-bar is in contact with a cut-away portion of its cam so that the presser-foot and presser-arm are raised. The parts are thus opened up to give free access in putting the shoe in place with its toe up against the stop on the spring arm 78 and the edge of the upper projecting upward adjacent to the forming edge of the wipers.

When the operator starts the machine by actuating the dog 11 to release the wheel 10 and permit the clutch to operate, the presser bar is first rocked, lowering the presser-foot and arm into contact with the shoe sole and also bringing the end of the toe-piece into engagement with the sole at the end of the toe adjacent to the upstanding edge of the upper. The jack is then raised by its cam, clamping the last firmly between it and the presser foot and arm and a further turning of the cam-shaft, brings its small side of the cam 37 opposite the roll 36 on the push rod and permits the clamping arm 38 to be swung downward by its spring, bringing the clamping fingers in contact with the upstanding edge of the upper and clamping the same firmly against the edge of the wipers. The parts have assumed this position during one turn of the power shaft and are stopped by the dog 11 in the position shown in Figs. 4 and 5 and with the cam rolls in position *b*.

While the machine is at rest in position *b*, the operator threads the securing wire across over the spring arm 78 and makes its end fast to a tack driven into the shoe sole. The machine is then again started and during this rotation of the power shaft and the turning of the cams from position *b* to *c*, the wipers are rocked to their uppermost position and then lowered to their lowest position, at the same time being gradually moved forward by the push-bar to the limit of its stroke. The upward and forward movement wipes and stretches the leather tightly over the last and the downward and forward movement folds the edge of the leather over the last and presses it down hard, the forward movement, causing the

wipers at the same time to close inward. During this movement of the wipers the jack is raised slightly by its cam and the presser foot and arm are forced downward a short distance, so that when the heavy downward pressure of the wipers comes on the last, it will be securely held relative thereto against any possibility of movement. The jack roll 67 just as it reaches position *c* drops to a reduced portion 88 of the cam, thus reducing the pressure of the jack against the wiper to permit the securing wire to be drawn to place, as previously described.

The stopping of the machine in position *c* is not necessary as the securing wire is fastened to its tack to hold the lasted upper in place, by being looped over said tack, as described, and during the turning of the cams from position *c* to *a* the parts are returned to the positions shown in Figs. 2 and 3, or open position, thus releasing the lasted shoe. The cycle of operation is thus completed and the parts are in position to receive another last.

What I claim as my invention is:—

1. In a lasting machine, the combination with wiper plates having formed edges to engage the work, of levers to operate said wipers, and means connecting the ends of said levers to said wipers and permitting a limited movement of said wipers relative to said levers and independent thereof.

2. In a lasting machine, the combination with wiper plates, of levers for carrying and actuating said plates, and means for attaching the wipers to the levers and permitting the same to be moved laterally thereon by the contact of the work with said plates.

3. In a lasting machine, the combination with crossed levers pivotally connected at their point of intersection, and means for turning the same on their pivot, of wiper plates each pivotally attached to one end of one of the levers and having a limited sliding movement thereon.

4. In a lasting machine, the combination with levers and means for operating the same, of pivotally connected wiper plates carried by said levers and having elongated openings, pins passing through said levers and openings and forming the sole means for connecting the wipers to the machine and permitting the wipers to be moved upon the levers by contact with the heel or toe of a last.

5. In a lasting machine, the combination with crossed levers pivotally connected at their point of intersection, of pivotally connected wiper plates having formed edges to engage the work and each provided with an elongated opening extending substantially in a direction longitudinally of said levers, and pins extending through the ends of said levers and through said openings to pivotally attach said plates to the levers.



6. In a lasting machine, the combination with means for laying-over the edge of an upper upon a last in the process of lasting and means for operating the same, of a jack to support a last, a presser member to hold a last upon the jack, and means operating in timed relation to the movement of the laying-over means to raise and lower said jack and member relative to each other and relative to said wipers.
7. In a lasting machine, the combination with means for laying-over the edge of an upper upon a last in the process of lasting, of a jack to support the last, a presser-foot adapted to clamp the last between it and the jack, means for automatically raising and lowering the presser-foot, and separate means for automatically raising and lowering the jack.
8. In a lasting machine, the combination with wipers and means for operating the same to impart thereto an upward wiping motion and a forward and downward movement to lay the edge of a shoe upper over and upon the last in the process of lasting, of a jack forming a seat for the last, a presser foot to press down upon the last, and separate means to actuate the foot and jack, whereby an irregular movement is imparted thereto and one advanced toward the other during the process of lasting to more firmly clamp the last between the same upon the downward and forward movement of the wipers.
9. In a lasting machine, the combination with means for laying-over the edge of an upper upon a last in the process of lasting the heel or toe portion and means for supporting and holding a last during such process, of a member to engage the sole at the heel or toe and means for raising and lowering said member relative to the laying-over means and in timed relation to the movement of said means.
10. In a lasting machine, the combination with means for laying-over the edge of an upper upon the toe portion of a last and means for supporting a last, of a presser foot to hold the last upon its support, a member to which the foot is attached for raising and lowering said foot, a toe member to engage the toe portion of an insole secured on the last, said toe member being attached to and movable with said member, and means for actuating said member in timed relation to the movement of the laying-over means.
11. In a lasting machine, the combination with means for laying-over the edge of an upper upon a last in the process of lasting and means for supporting a last from beneath, of a bar pivoted intermediate its ends, a presser foot adjustably attached to the forward end of said bar to engage the upper side of the last, a toe member pivotally attached to said bar adjacent to said foot and moved into and out of engagement with the insole by the rocking of said bar, and means for rocking said bar on its pivot in timed relation to the movement of the laying-over means.
12. In a lasting machine, the combination with wipers consisting of pivotally connected plates having formed edges to engage the work, of clamping fingers, a pivoted member to which the fingers are pivotally attached adapted to be turned on its pivot to bring the fingers into contact with the work, means for turning said member toward the wipers, and means for turning and yieldingly holding said fingers in contact with the inner surface of the edge of an upper to yieldingly clamp said edge upon the wipers.
13. In a lasting machine, the combination with wipers having formed edges to engage the work, of a clamping arm pivoted at its upper end to swing downward upon the formed edge of the wipers, and fingers attached to the lower end of said arm to engage the upstanding edge of an upper and spread said edge outward and clamp it down upon the formed edge of the wipers, said fingers being shaped to conform to the curve of the said wiper edges and to lie closely thereon throughout their length.
14. In a lasting machine, the combination with wipers and means for operating the same, of a clamping arm having forwardly extending fingers on its lower end to engage and spread the edge of an upper and pivoted at its upper end to swing upwardly and forwardly away from the wipers, said arm being made in two pivotally connected parts, the lower part being free to swing downward when the arm is swung upward, and means for swinging said arm.
15. In a lasting machine, the combination with wipers and means for operating the same, of a clamping arm adapted to engage and clamp the edge of an upper upon the wiper edges and pivoted at its upper end to swing upward away from the wipers, a toe member to engage an insole at its lower end and pivoted at its upper end to swing into engagement with the forward side of the arm, and means for normally holding said toe member in contact with said arm.
16. In a lasting machine, the combination with wipers and means for operating the same, of a clamping arm pivoted at its upper end to swing toward and from the forming edge of said wipers, a toe member to engage an insole at the end of its toe portion, a member to which the toe member is pivotally attached at its upper end to raise and lower said toe member independently of the clamping arm and wipers and means for yieldingly holding the toe member against the forward side of the clamping arm.
17. In a lasting machine, the combination with pivoted wipers and means for opera-



ing the same, of clamping fingers pivoted at one end and adapted to engage the inner surface of the edge of an upper and spread the same outward over the wipers, levers pivotally attached to said fingers to open and close the same, and means to operate said levers to open said fingers as the wipers close and close said fingers as the wipers open.

18. In a lasting machine, the combination with wipers consisting of pivotally connected wiper plates having formed contact edges and means for operating the same, of a clamping arm adapted to engage the wipers at its lower end and pivoted at its upper end to swing upward and away from said wipers, fingers pivotally attached at one end to the lower end of said arm and projecting forwardly therefrom, the lower end of said arm and lower side of said fingers being formed and rounded to engage the inner surface of the edge of an upper and clamp the same upon the upper portion of the formed edges of the wipers and turn the edge outward, a spring to yieldingly hold said arm in clamping position, means for turning said arm upward, and levers pivotally attached to said fingers to turn the same and operated by the movement of said arm.

19. In a lasting machine, the combination with wipers and means for actuating the same, of a clamping arm, clamping fingers pivotally attached at one end to the lower end of said arm and curved to conform to the forming edges of the wipers, levers pivotally attached at their forward ends to said fingers and crossed and pivoted together intermediate their ends, and yielding means to engage and move the rear ends of said levers apart to turn the fingers into clamping position.

20. In a lasting machine, the combination with wipers and means for actuating the same, of a clamping arm pivotally supported at its upper end and consisting of two pivotally connected parts, fingers pivotally attached at one end to the lower end of the lower part of the arm, means for swinging the arm upward on its supporting pivot and means for limiting the turning of the lower part of the arm upon the upper part when the arm is raised.

21. In a lasting machine, the combination with wipers and means for actuating the same, of a clamping arm pivotally attached at its upper end to the wiper actuating means to swing its lower end toward and from the forming edge of the wipers, clamping fingers pivoted at one end to the lower end of said arm, levers pivoted at their forward ends to the fingers and crossed and pivoted together at their point of intersection rearwardly of the arm, means to engage and spread the rear ends of the levers when the clamping arm swings to clamping

position, and means for moving the rear ends of said arms toward each other when the clamping arm is swung upward.

22. In a lasting machine, the combination with wipers and means for carrying and actuating the same, of a clamping arm pivotally attached at its upper end to the carrying means for the wipers, means for yieldingly holding said arm turned with its lower end adjacent to the forming edges of the wipers, fingers pivotally attached to the lower end of said clamping arm to turn outward when the arm is lowered and clamp the edge of an upper to the edge of the wipers, levers pivotally attached at their forward ends to the fingers and crossed and pivoted together at their intersection at the rear of the clamping arm, a spring, and adjustable means carried by the rear ends of said levers to engage the spring and spread the arms to turn the fingers to clamping position when the arm is lowered.

23. In a lasting machine, the combination with wipers consisting of two pivotally connected plates having formed edges to engage the heel or toe of a shoe, of crossed levers to the forward ends of which said wiper plates are pivotally attached, a rocker to raise and lower the wipers, a pusher-bar to the forward end of which the levers are attached at their point of intersection, slidable in a guide way in the rocker, means wholly carried by the rocker for yieldingly forcing the rear ends of the crossed levers to approach each other to close the wipers when the pusher-bar is moved forward, means for actuating the pusher-bar, and means for rocking the rocker.

24. In a lasting machine, the combination with means for laying-over the edge of an upper in the process of lasting, said means being adapted to press said edge down upon the last, of means operating in timed relation to the movement of the laying-over means to automatically relieve the pressure of the laying-over means upon the edge of the upper at the end of the lasting operation to permit a securing wire to be drawn between laying-over means and said edge.

25. In a lasting machine, the combination with means for laying-over the edge of the upper in the process of lasting, of a spring support for the last, means for locking the support, and means operating in timed relation to the movement of the laying-over means for releasing the lock at the end of the lasting operation to permit a securing wire to be drawn between the laying-over means and the edge of the upper.

26. In a lasting machine, the combination with means for laying-over the edge of a shoe upper in the process of lasting, said means being adapted to press said edge down upon the last, of means for automatically stretching a wire about the heel or toe of



the shoe during the process of lasting, and means for relieving the pressure of said laying-over means upon said edge of the upper automatically operating in timed relation to the movement of said laying over means to permit the wire to be drawn between.

27. In a lasting machine, the combination with wipers consisting of pivotally connected plates and means for actuating said plates to force the same over and upon the edge of an upper in the process of lasting, of means for automatically stretching a wire about the toe of the last during the process of lasting, and means for relieving the pressure of the wipers upon the edge of the upper at the end of the lasting operation to permit the wire to be drawn beneath said wipers.

28. In a lasting machine, the combination with wipers and means for operating the same, of a movable support for a last, means for stretching a securing wire about the toe of the last during the lasting operation, and means for automatically moving said support at the end of the lasting operation to relieve the pressure of the wipers upon the lasted edge of the upper and permit the securing wire to slip beneath.

29. In a lasting machine, the combination with wipers and means for operating the same of a yielding support for the last, means for drawing a wire about the toe of the last during the lasting operation, means for locking the support in its depressed position, and means for moving the support in its locked position at the end of the lasting operation to relieve the pressure of the wiper upon the lasted edge of the upper.

30. In a lasting machine, the combination with wipers and means for operating the same, of means for engaging a last at the upper side, means for stretching a wire about the toe of the last during the lasting operation, a yielding jack to engage the last at the lower side, means for moving the jack to clamp the last between it and said means at the upper side, and means for locking the jack in its depressed position.

31. In a lasting machine, the combination with means for laying-over the edge of an upper in the process of lasting and means for supporting a last in position to last a shoe thereon, of means for stretching a securing wire about the end of the last during the lasting operation, and a guide adapted to extend over means on the last to which the wire is adapted to be secured for the purpose of guiding said wire over and into engagement with said means.

32. In a lasting machine, the combination with means for laying-over the edge of an upper in the process of lasting and means for supporting a last in position to last a shoe thereon, of an arm for drawing a securing wire around the toe of the last, means

for moving said arm in timed relation to the movement of the lasting means from a point at one side of the toe portion of the last to a point over the last intermediate its ends, and a guide arm to engage the wire and guide the same up over means on the last to which the wire is adapted to be secured.

33. In a lasting machine, the combination with means for laying-over the edge of an upper in the process of lasting and reciprocating means for actuating the same, of an arm pivotally supported at its upper end and adapted to engage a wire at its lower end to stretch the same around the toe of the last, and means connecting said arm and the reciprocating means to swing said arm on its pivot in timed relation to the movement of the laying-over means.

34. In a lasting machine, the combination with wipers consisting of pivotally connected plates having formed contact edges and a pusher-bar adapted to operate said wipers, of a swinging arm pivotally supported at its upper end and provided with a pivoted head at its lower end through which a securing wire is adapted to pass, a connecting rod to transmit motion to the arm from the pusher-bar and operate said arm in timed relation to the wipers, and means supported by said bar for guiding the wire over the head of a securing tack on the last.

35. In a lasting machine, the combination with wipers consisting of pivotally connected plates having formed contact edges, a pusher-bar, and crossed levers pivotally attached at their point of intersection to said bar and at their forward ends to the wipers to open and close said wipers, of an arm pivotally secured at its upper end to a fixed support and provided at its lower end with means for receiving a securing wire to be stretched around the toe of the last, a jointed rod connecting the arm and the pusher-bar to swing said arm in timed relation to the movement of the wipers, means for supporting a last with a shoe thereon in position to be operated upon by the wipers, and a guide arm attached at one end to the pivot of the crossed-levers and curved laterally outward, upward and over the last with its free end over and adjacent to a securing tack to which the wire is adapted to be secured.

36. In a lasting machine, the combination with wipers and reciprocating means for actuating said wipers, of means for stretching a securing wire around the toe of a last, means for supporting a last with a shoe thereon in position to be operated upon by the said wipers, a guide arm pivotally supported at one end rearwardly of the wipers, and a spring to normally hold said arm turned with its free end over and adjacent to a tack driven into a sole on the last to



which tack the wire is adapted to be secured when drawn about the toe of the last to hold the lasted upper thereon.

37. In a lasting machine, the combination with means for laying over the edge of an upper upon a last in the process of lasting, and means for automatically stretching a securing wire around the toe or heel of the last, of a tension device for the wire, operated to automatically frictionally hold and release said wire in timed relation to the movement of said stretching means.

38. In a lasting machine, the combination with means for laying-over the edge of an upper upon a last in the process of lasting, and means for automatically stretching a securing wire about the toe of the last in timed relation to the operation of said laying-over means, of a pivoted bar, means for rocking said bar in timed relation to the movement of the laying-over and wiring means, and a tension device operated by said bar to intermittently frictionally hold and release the wire.

39. In a lasting machine, the combination with means for laying-over the edge of an upper upon a last in the process of lasting, and means for automatically stretching a securing wire about the toe of the last, of a jack to support the last, a pivoted bar upon one end of which the jack is carried, means for rocking said bar to raise and lower the jack, and a tension device operated by said bar to intermittently clamp and release the wire.

40. In a lasting machine, the combination with means for laying-over the edge of an upper upon the last in the process of lasting and means for automatically stretching a securing wire about the toe of the last, of a jack to support the last, a pivoted bar upon one end of which the jack is carried, means for rocking said bar to raise and lower the jack, and a tension device consisting of a fixed post adjacent to the bar, a coiled spring sleeved on the post, a washer on the post, and a thimble sleeved on the post and provided with an arm secured to the bar.

41. In a lasting machine, the combination with wipers consisting of pivoted plates having formed contact edges to engage the edge of an upper and means for automatically stretching a wire about the toe of the last during the lasting operation, of a jack, a bar pivoted intermediate its ends upon one end of which the jack is secured, and a spring arm secured at one end to the bar between the jack and its pivot and extending upward with its free end adjacent to and adapted to engage the lower side of the wipers at their rear edge.

42. In a lasting machine, the combination with wipers consisting of pivoted plates hav-

ing formed contact edges and means for automatically stretching a wire about the toe of the last during the lasting operation, of a spring arm normally held with its upper free end in contact with the lower side of the wiper plates and a downwardly turned portion on the free end of said arm adapted to form a stop to engage the end of the toe of the last.

43. In a lasting machine, the combination with wipers consisting of pivoted plates having formed contact edges and means for automatically stretching a wire about the toe of the last during the lasting operation, of a rocker-bar, means for rocking said bar in timed relation to the movement of the wipers, a jack on the forward end of said bar consisting of a post mounted in bearings on the bar and provided with a rack at its lower end and a seat for the last at its upper end, a spring to normally hold said post raised in its bearings, and a dog carried by the bar to engage the rack and lock the post in its depressed position, and means for releasing the dog when the bar is rocked to release the last.

44. In a lasting machine, the combination with wipers consisting of pivotally connected plates having adjacent formed edges to engage the work, of a rocker pivoted intermediate its ends, a transverse shaft at the rear of said rocker, a cam on said shaft to rock the rocker, a pusher-bar carried by and movable longitudinally of said rocker and carrying the wipers at its forward end, a cam on said shaft to operate said push-bar, a clamping arm carried by the forward end of the push-bar, a push-rod carried by the rocker and movable longitudinally thereof to raise the clamping arm, and a cam on the said shaft to operate said push-bar.

45. In a lasting machine, the combination with wipers consisting of pivotally connected plates having formed edges, of means for opening and closing said wipers, a push-bar to the forward end of which said means are attached, a rocker provided with a guide way for said push-bar, a jack-bar pivoted intermediate its ends, a jack on the forward end of said bar, a presser-foot to oppose the jack, a presser-bar pivoted intermediate its ends and to the forward end of which the foot is attached, a cam shaft, and a series of cams on said shaft provided with cam surfaces to engage and operate the rocker, push-bar, push-rod, jack-bar and presser-bar.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES F. PYM.

Witnesses:

C. R. STICKNEY,  
OTTO F. BARTHEL.