

No. 776,850.

PATENTED DEC. 6, 1904.

G. M. KITZMILLER.

AUTOMATIC REVERSIBLE RIBBON MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED MAR. 30, 1904.

NO MODEL.

4 SHEETS—SHEET 1.

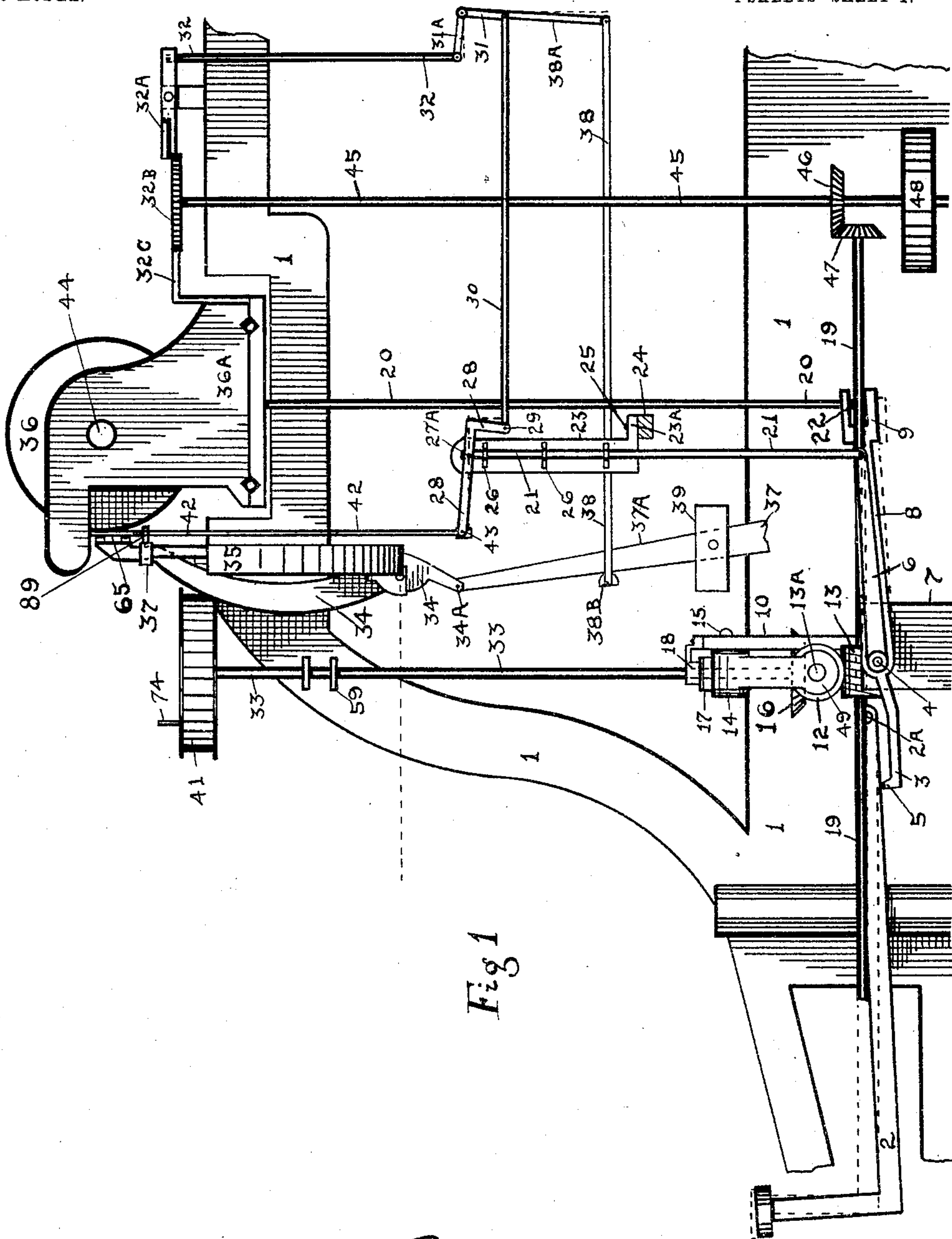


Fig 1

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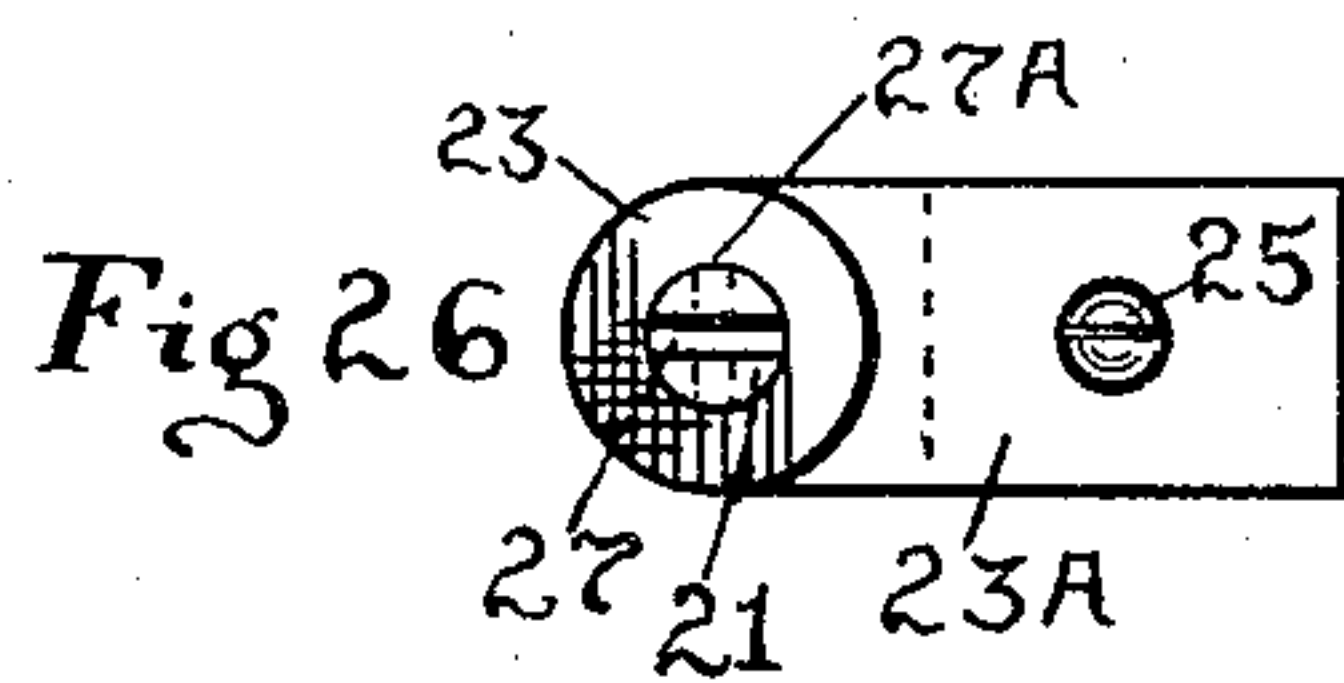
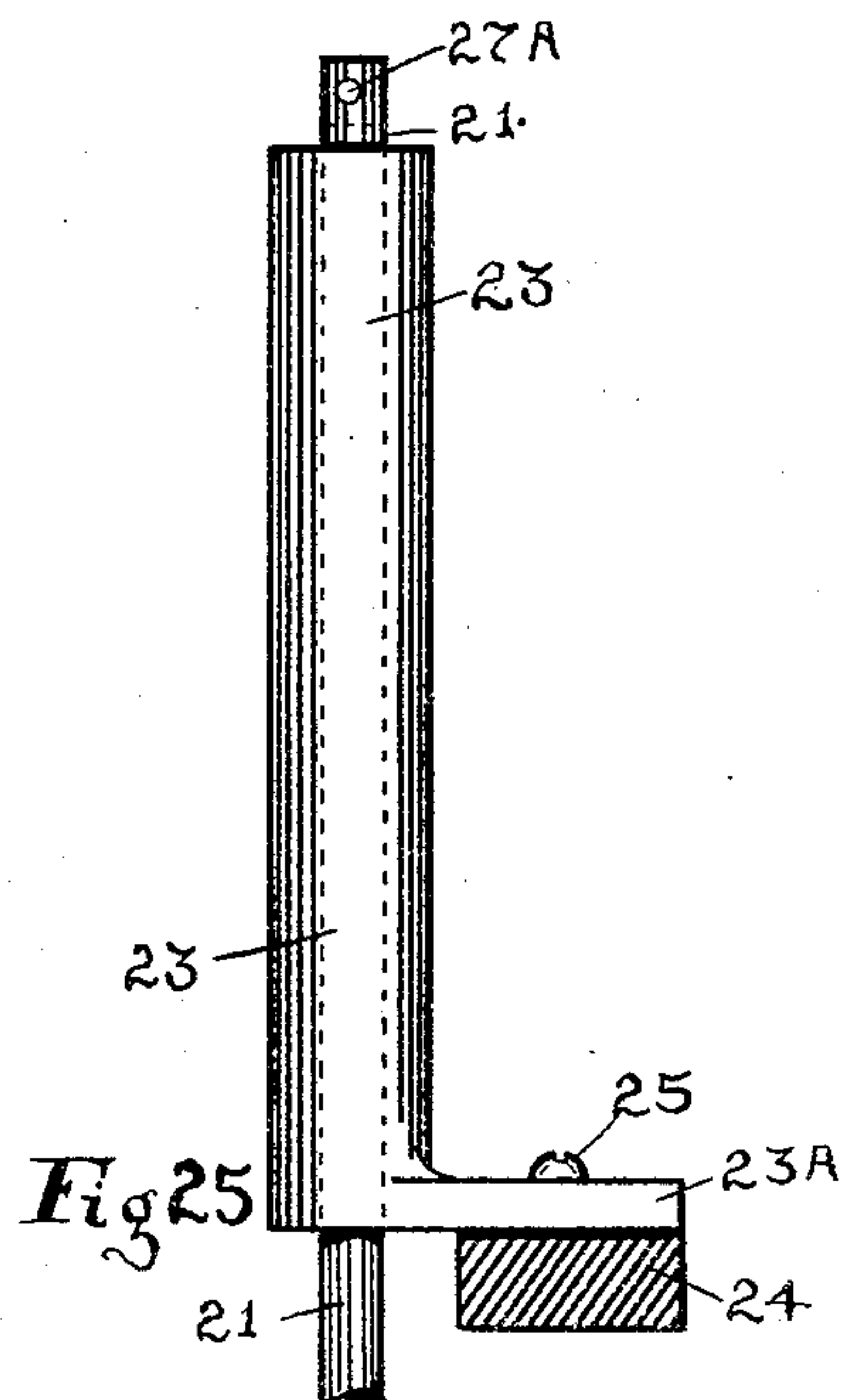
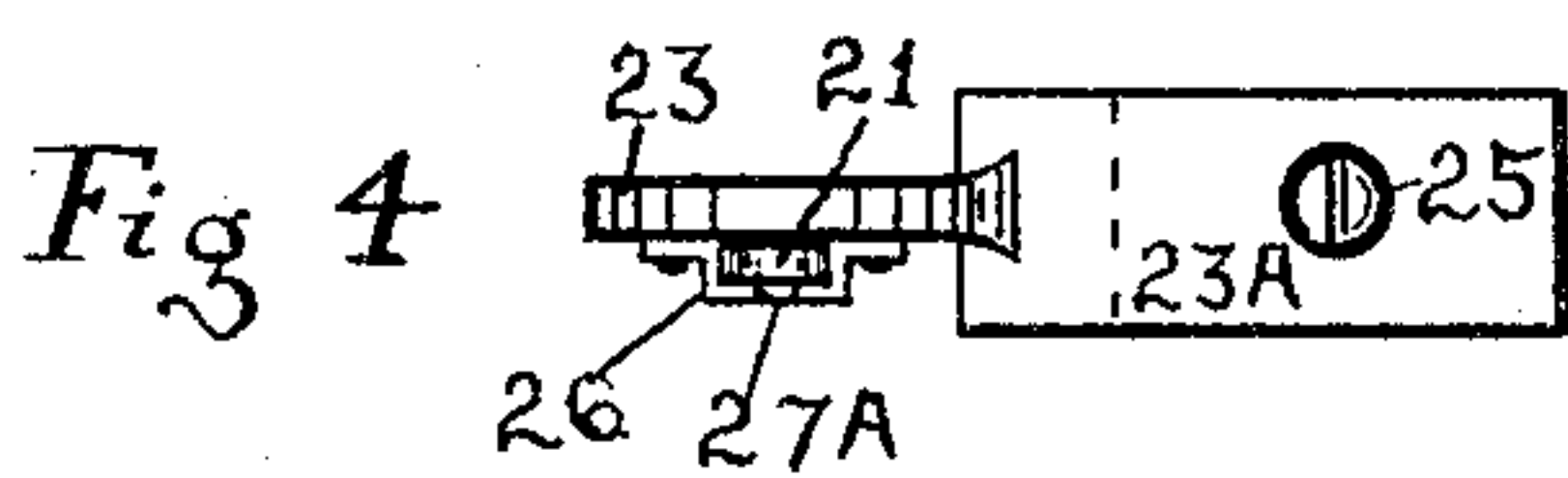
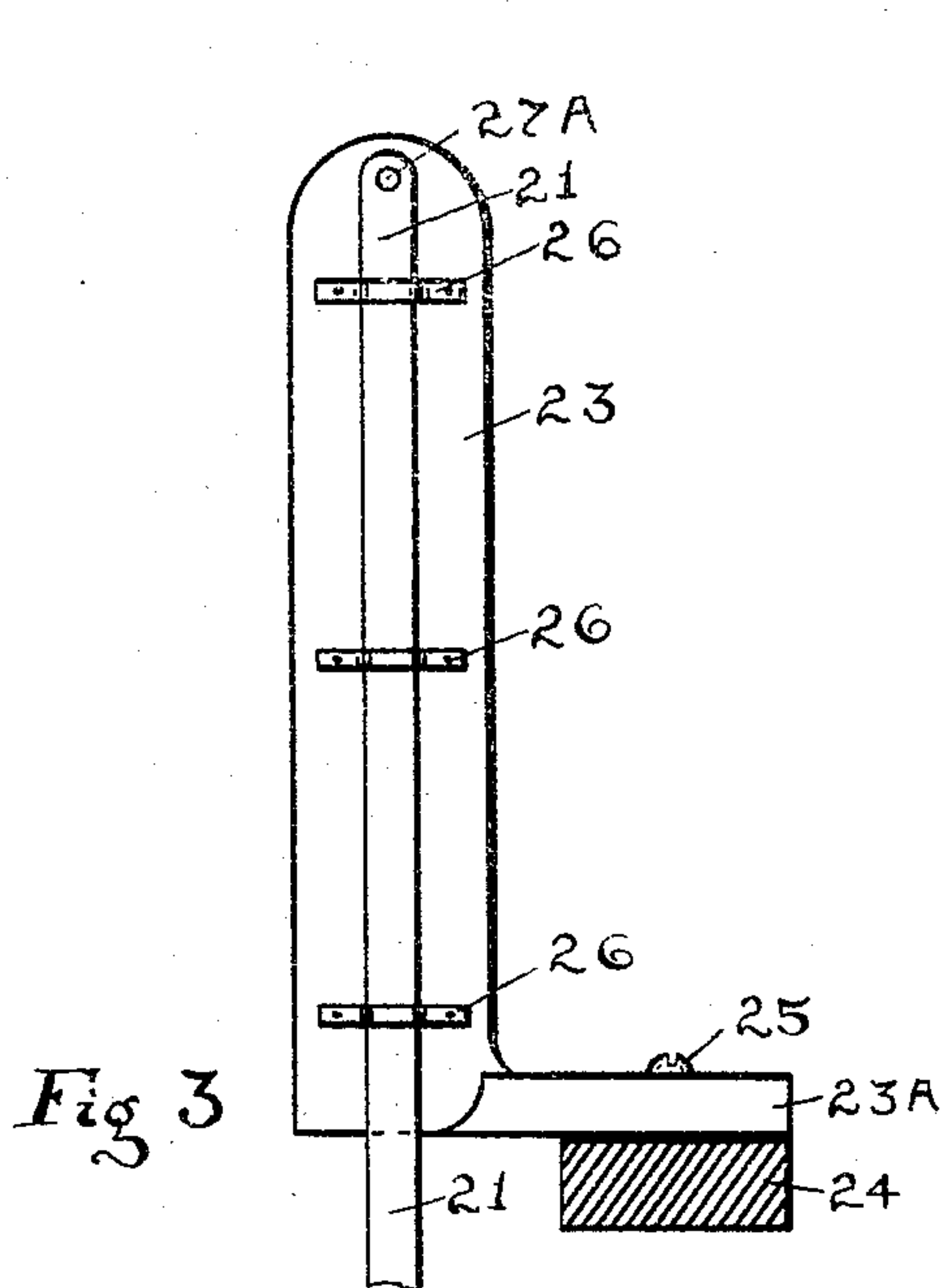
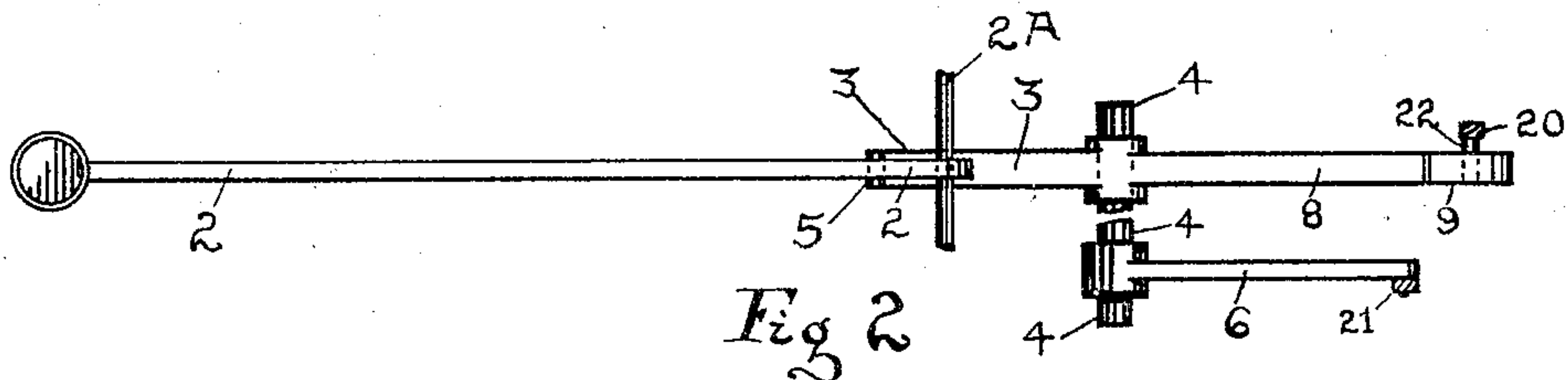
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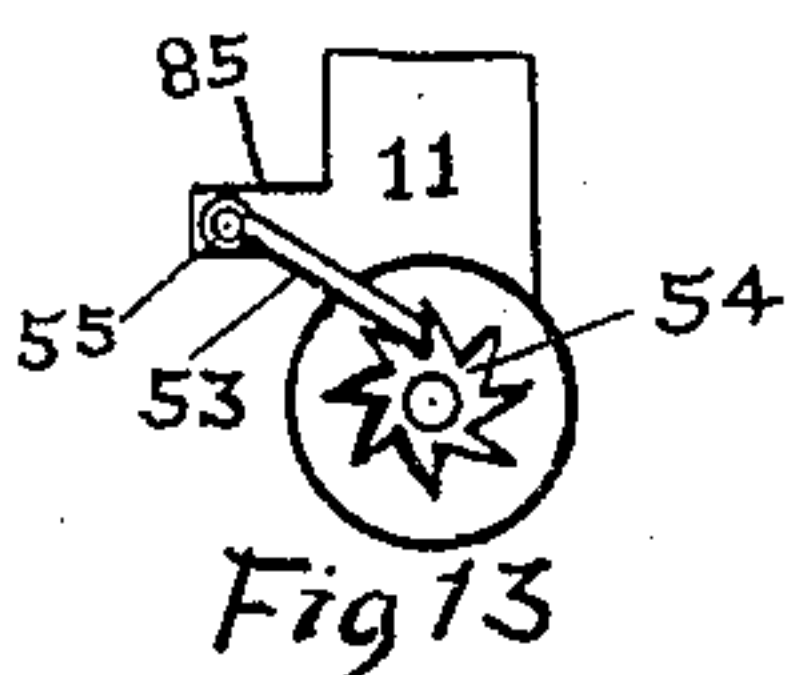
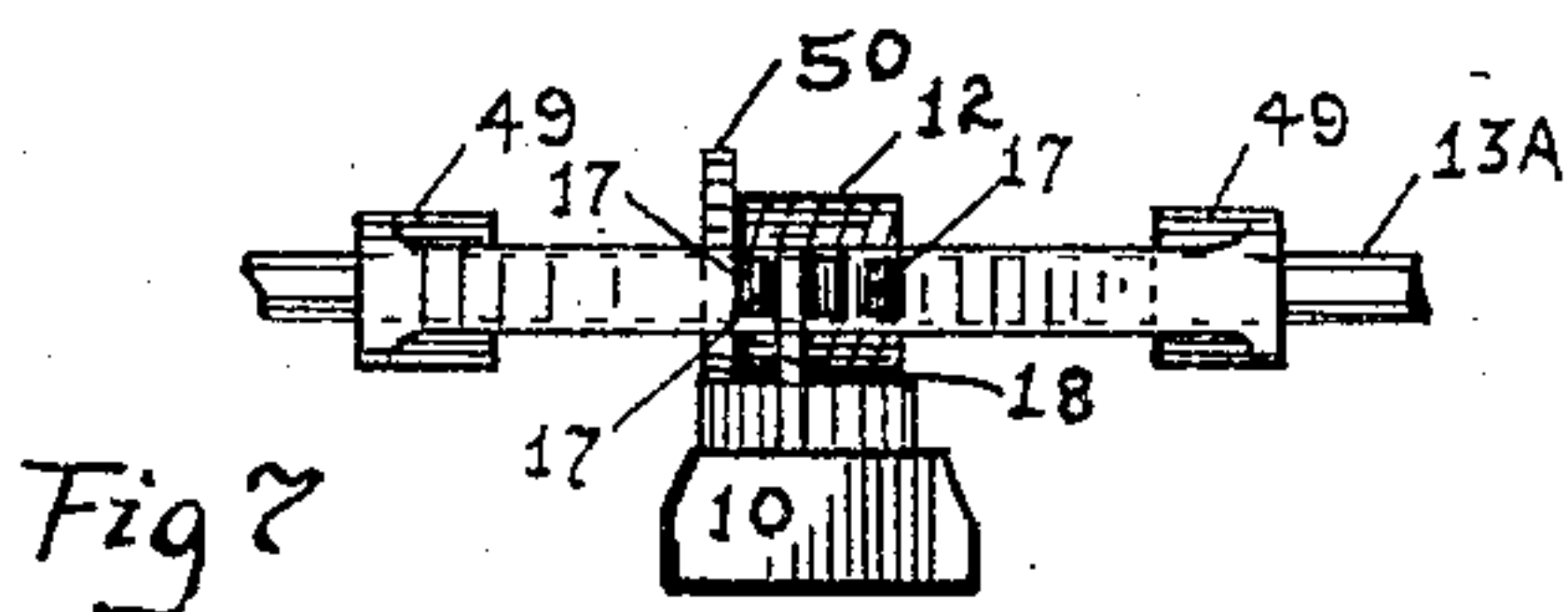
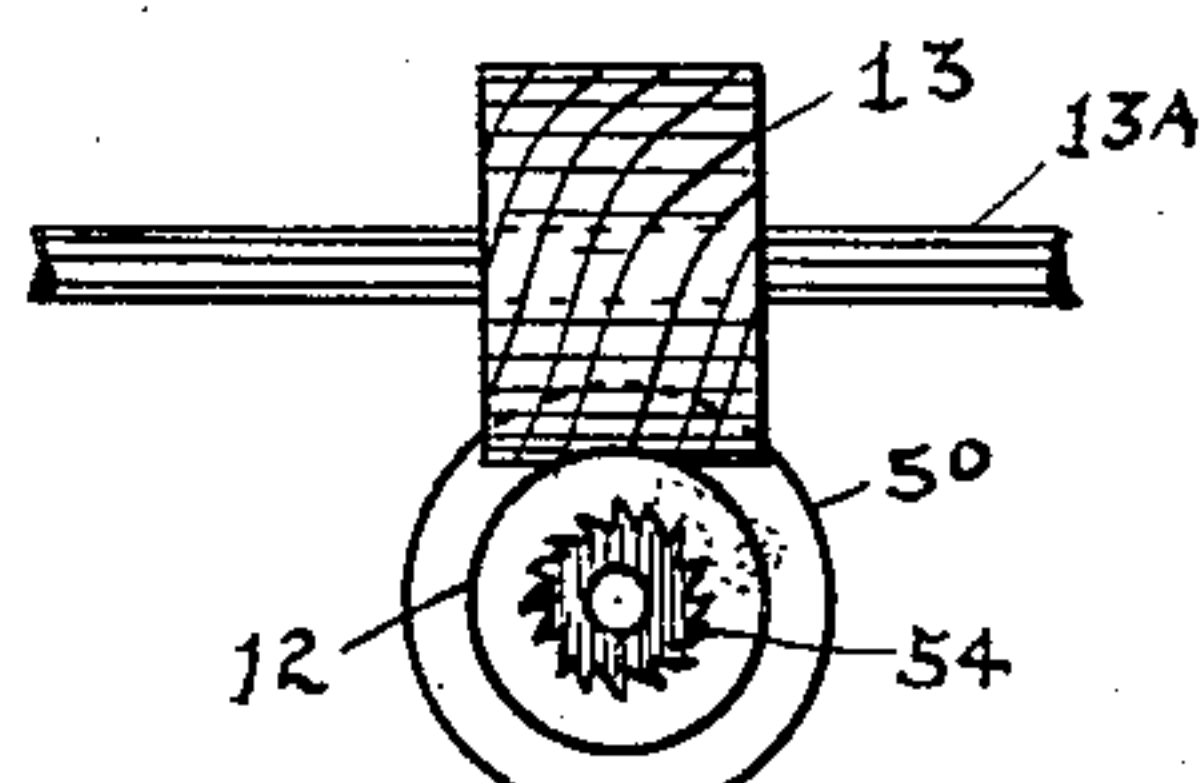
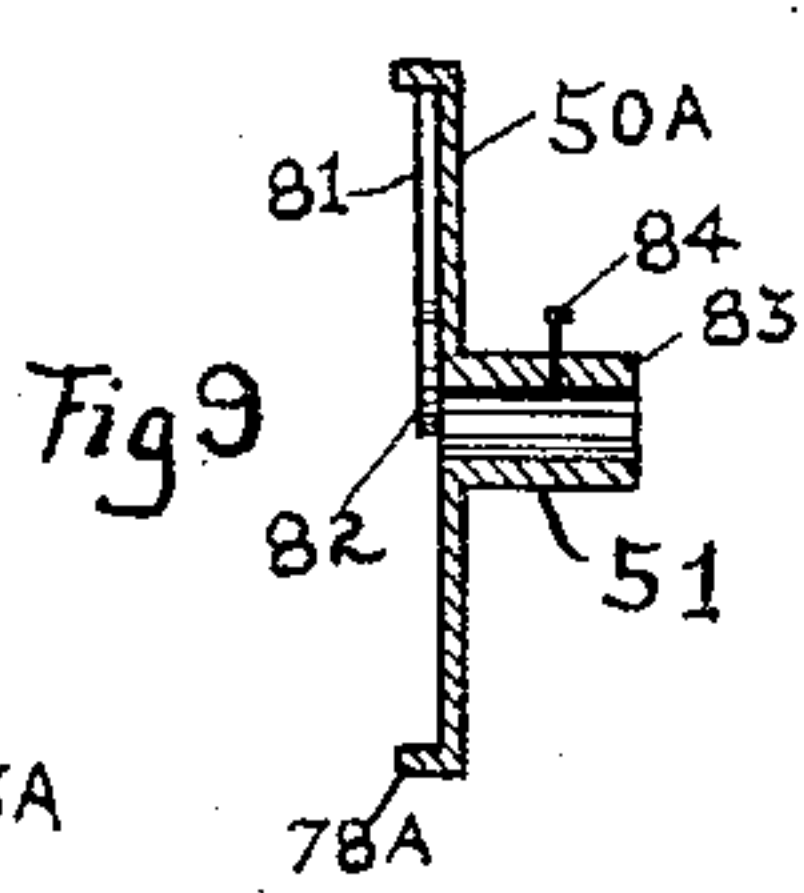
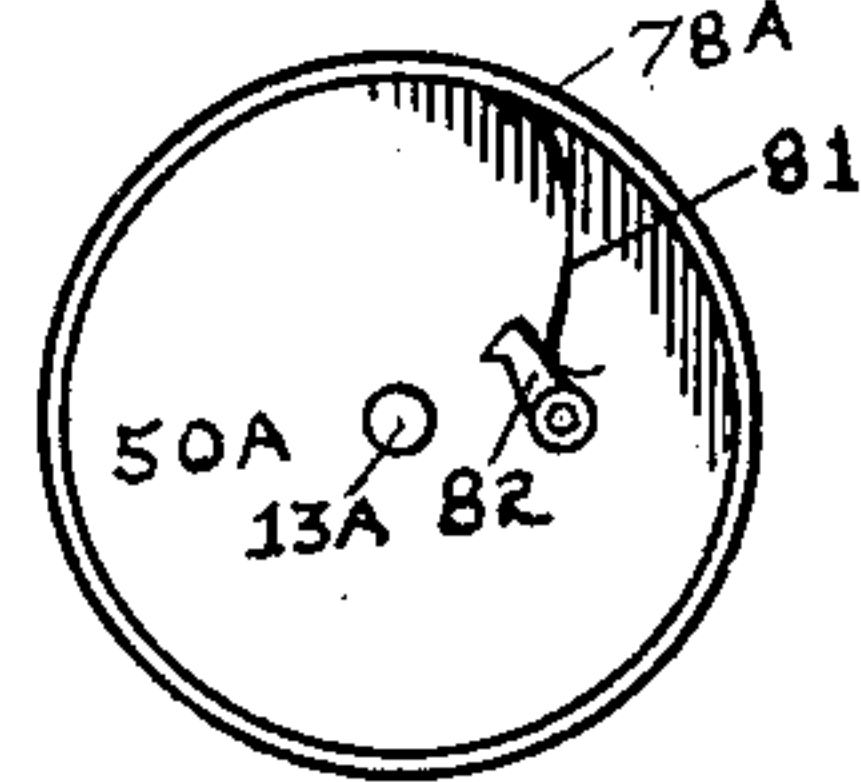
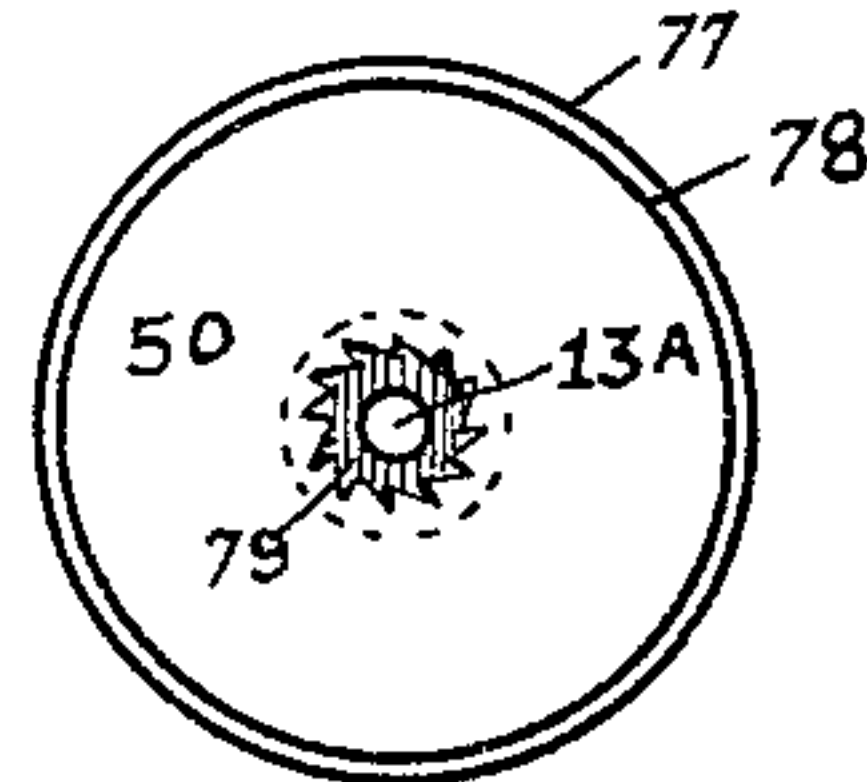
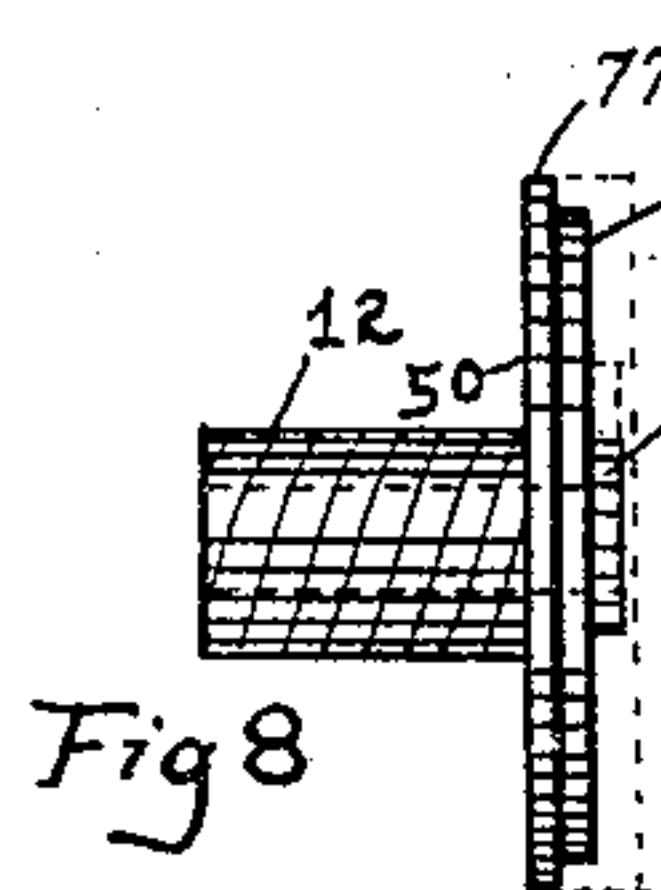
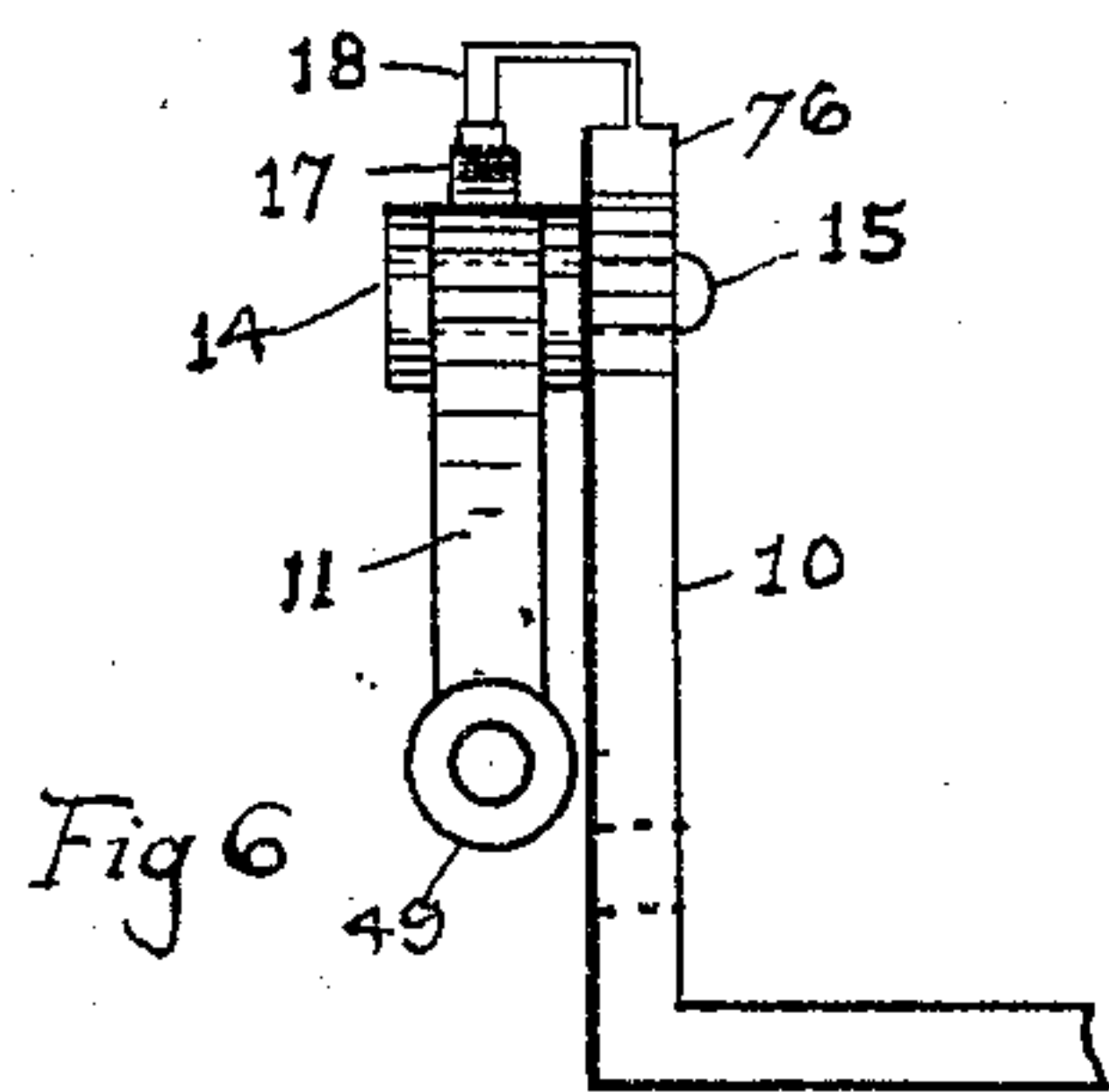
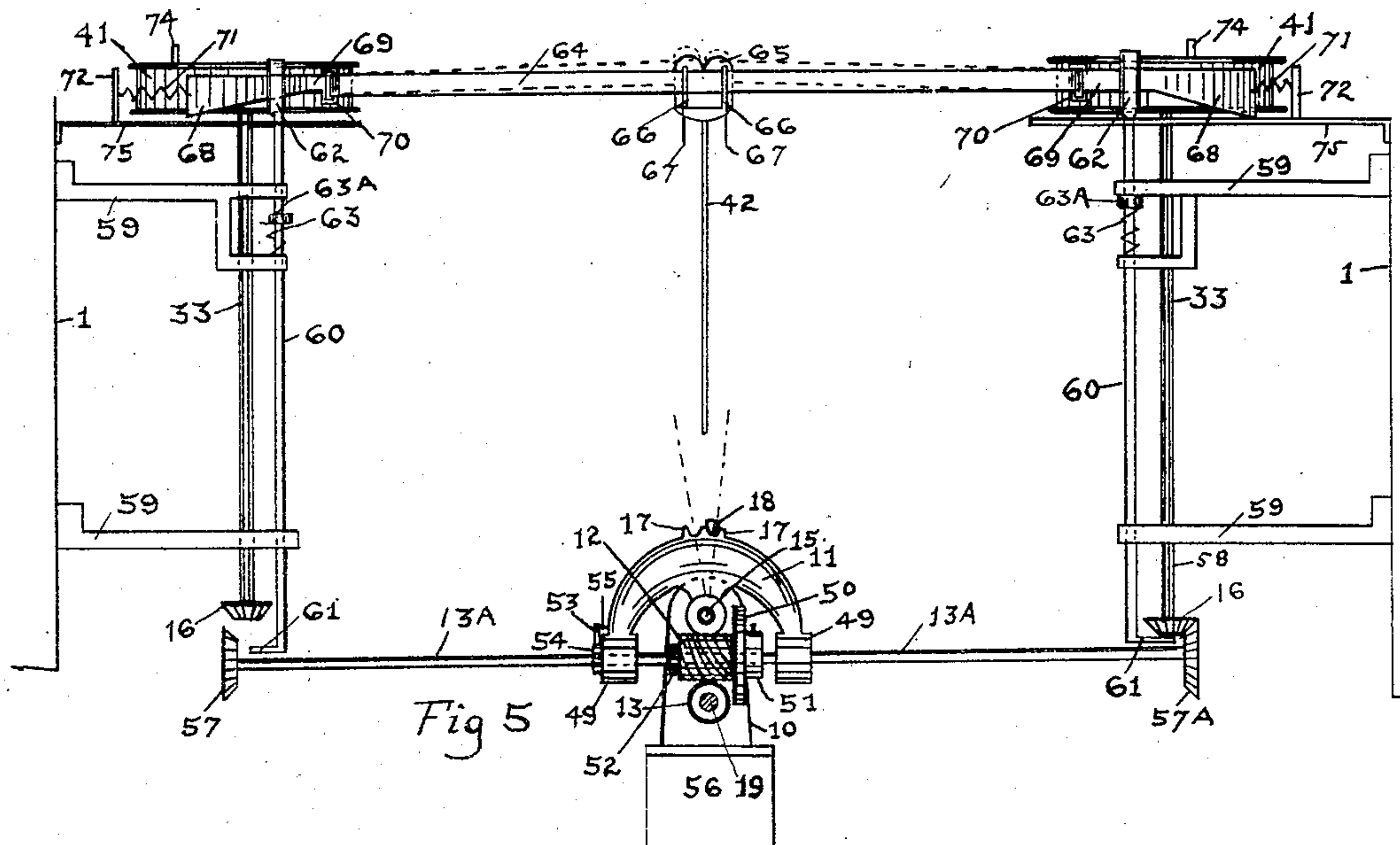
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4 SHEETS—SHEET 3.



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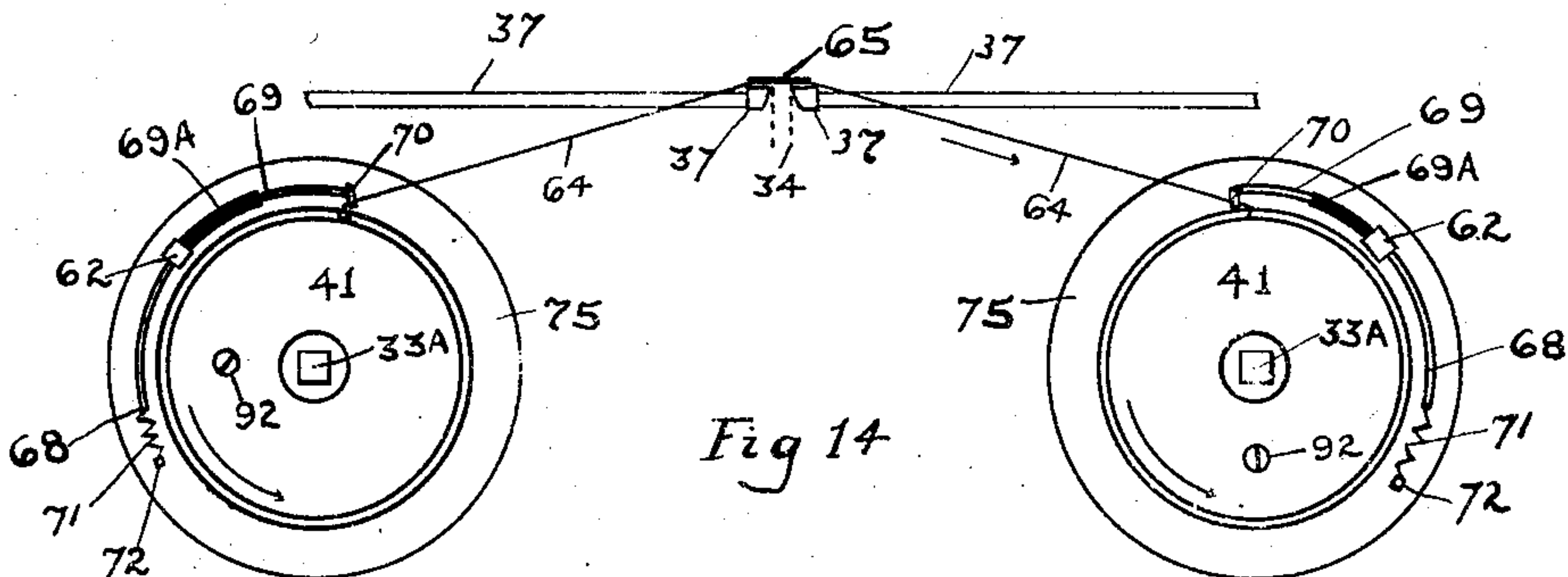


Fig 14

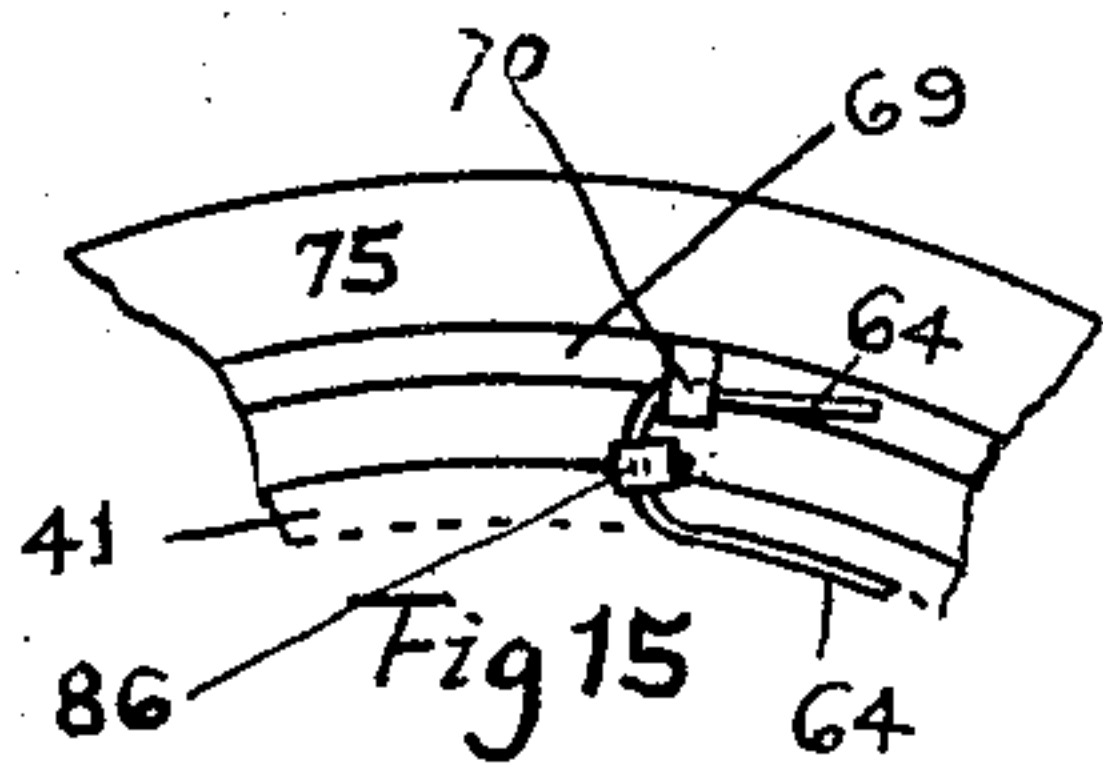


Fig 15

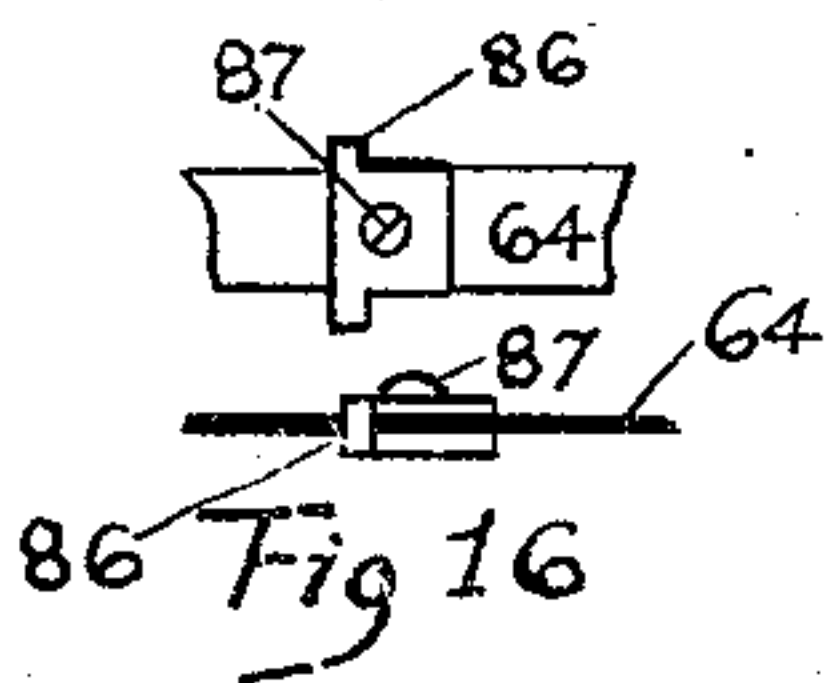


Fig 16

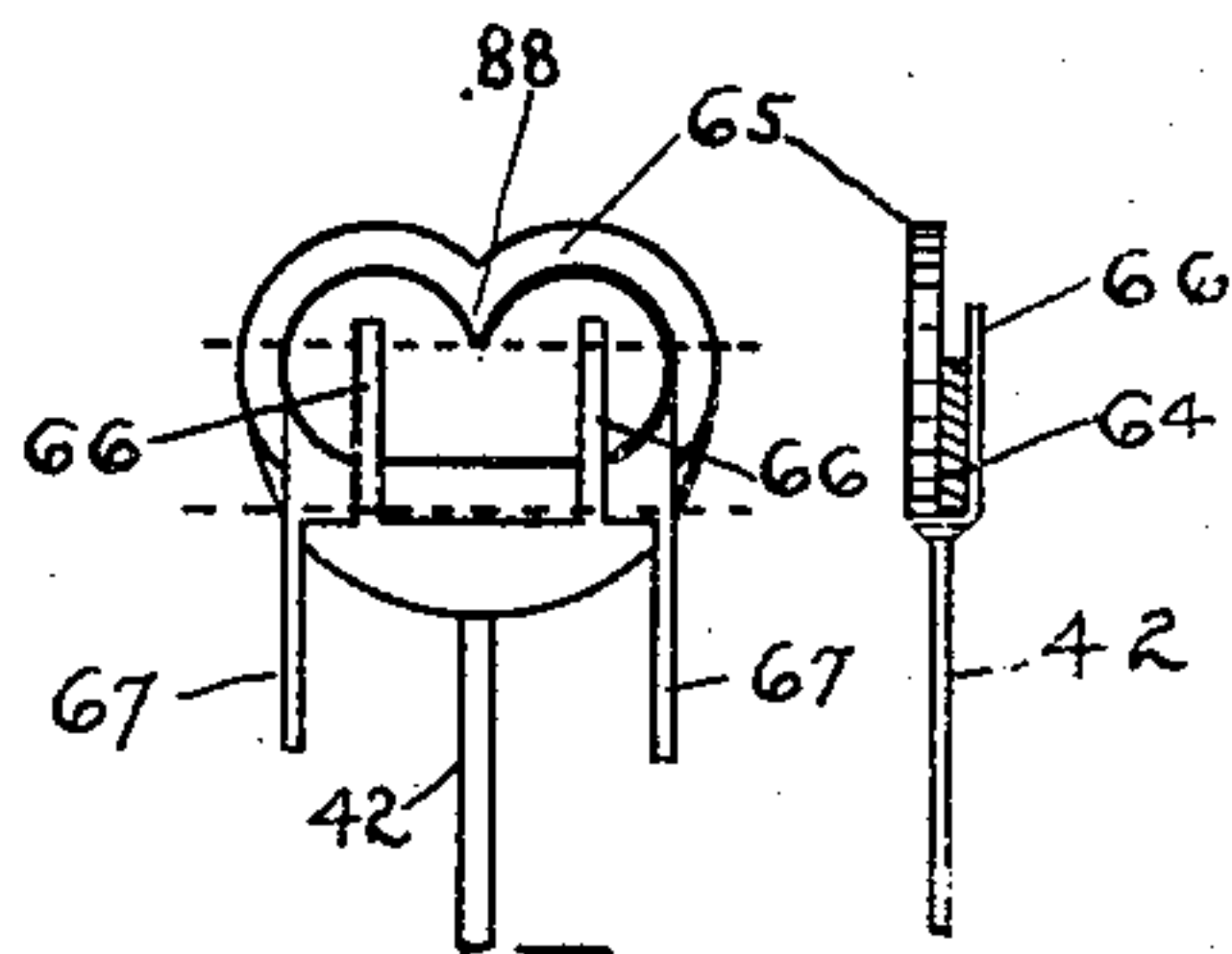


Fig 17

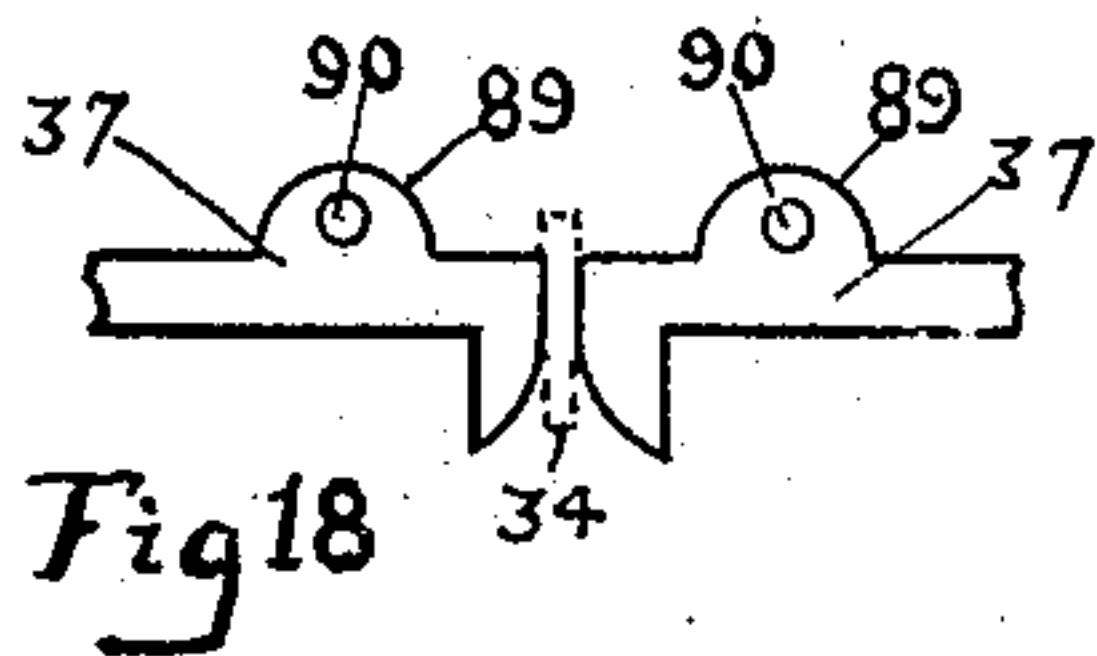


Fig 18

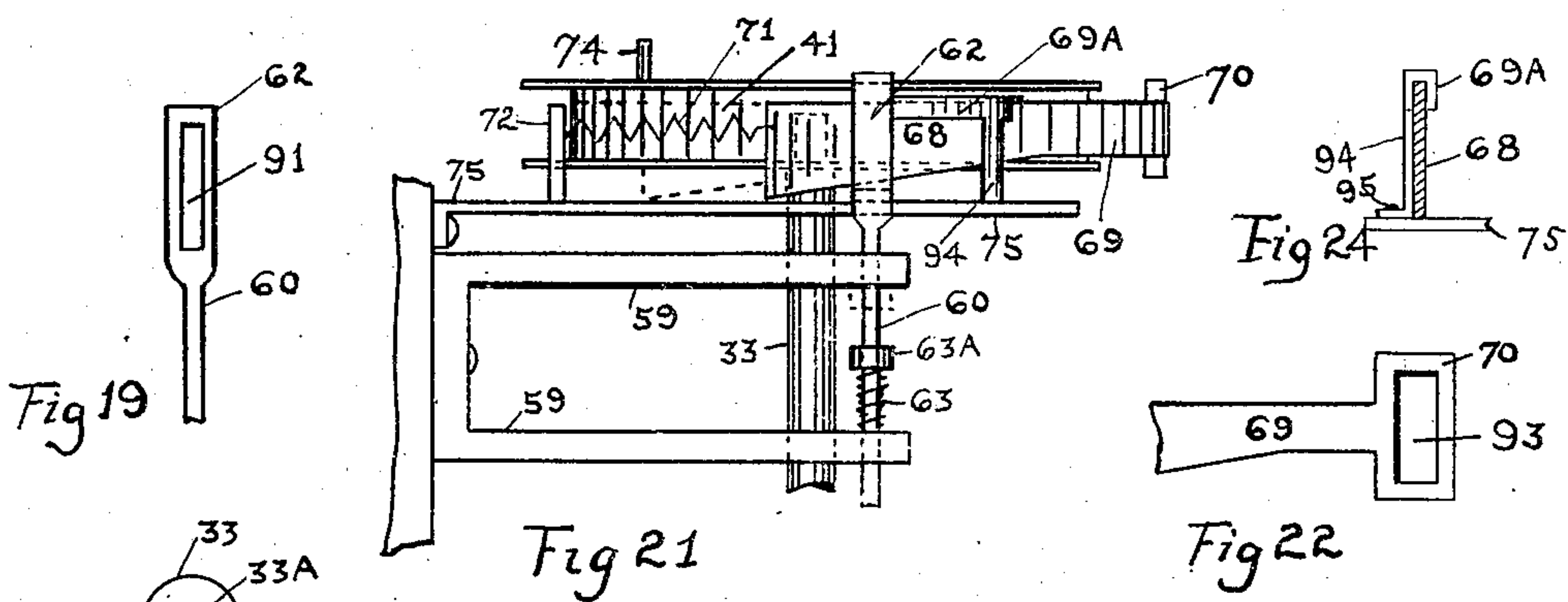


Fig 21

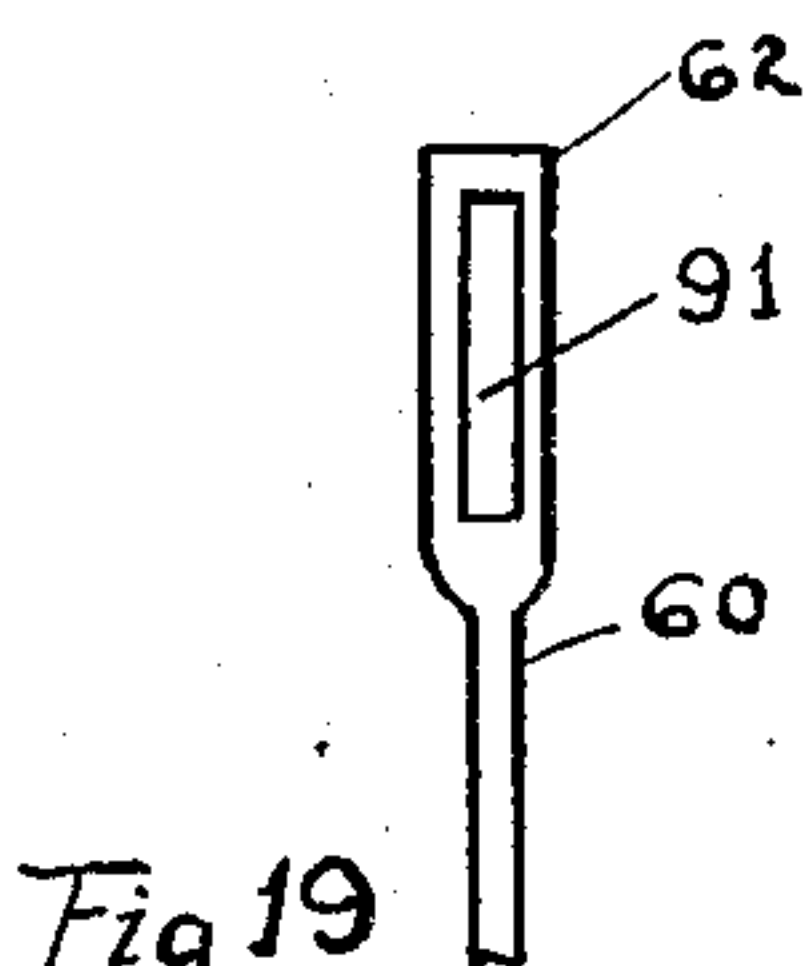


Fig 19

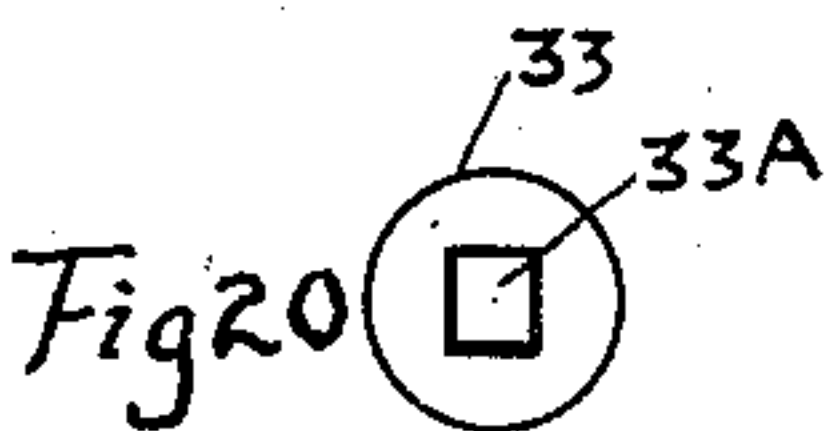


Fig 20



Fig 23

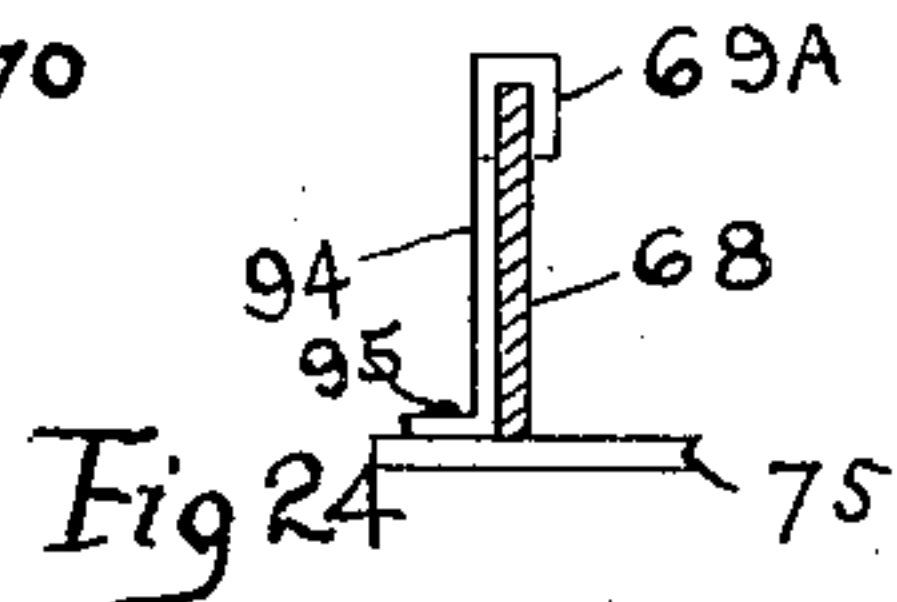


Fig 24

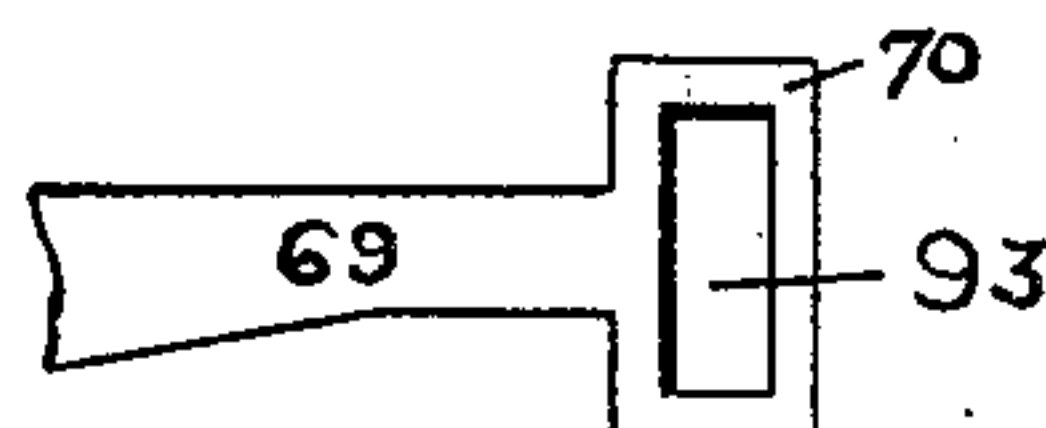


Fig 22

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UNITED STATES PATENT OFFICE.

GEORGE M. KITZMILLER, OF NORFOLK, VIRGINIA, ASSIGNOR TO ELECTRIC TYPEWRITER COMPANY OF NORFOLK, INCORPORATED.

AUTOMATIC REVERSIBLE-RIBBON MECHANISM FOR TYPE-WRITING MACHINES.

SPECIFICATION forming part of Letters Patent No. 776,850, dated December 6, 1904.

Application filed March 30, 1904. Serial No. 200,673. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. KITZMILLER, a citizen of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented new and useful Improvements in Automatic Reversible-Ribbon Mechanism for Type-Writing Machines, of which the following is a specification.

My invention relates to automatic reversible-ribbon mechanism for type-writing machines by which the ribbon is automatically reversed and rewound on the empty ribbon-spool when it has reached the inner end of the ribbon, as will be more fully described.

My invention also has for its object the means hereinafter described for lifting the ribbon to the printing-point in advance of the type.

Referring to the drawings, Figure 1 is a side elevation of a type-writing machine with a part broken away, the mechanism being shown in printing position. Parts not pertinent to my present invention have been omitted. Fig. 2 is a plan of the operating-levers for elevating the platen and ribbon. Fig. 3 is a side elevation of the strapped guide-arm. Fig. 4 is a plan of the same. Fig. 5 is a front elevation of the automatic shifting or oscillating yoke and gearing. Fig. 6 is an end elevation of the yoke. Fig. 7 is a plan of the same. Fig. 8 is a side elevation of the worm or spiral gear, ratchet, and disk. Fig. 9 is a cross-section through the same. Fig. 10 is a front inside view of the same. Fig. 11 is a front or inside view of the pawl casing or cover. Fig. 12 is an end view of the backing-ratchet and one of the worms or spiral gears in elevation. Fig. 13 is a side view of the ratchet and end view of the driving-shaft. Fig. 14 is a plan of the ribbon and spools without the driving mechanism. Fig. 15 is an enlarged plan of the same, showing the ribbon about to be reversed by the lug-plate. Fig. 16 is a side elevation and plan, respectively, of the lug or eared plate on the ribbon near its reversing-point. Fig. 17 is the ribbon-lifting plate in front elevation and side elevation, respectively. Fig. 18 is a plan of the guide for the type-bar. Fig. 19 is an

elevation of the slot-headed shifting-rod. Fig. 20 is a plan of the upper end of the spool-actuating rod. Fig. 21 is a part front elevation of one of the ribbon-spools on an enlarged scale. Fig. 22 is a part side elevation of the curved wedge bar and its looped end. Fig. 23 is an elevation of the upper end of the spool-rod and shown in plan in Fig. 20. Fig. 24 is an end view of the guide for the curved wedge-bar. Fig. 25 is an elevation of a cylindrical form of guide-arm. Fig. 26 is a plan of the same.

In the drawings like reference-numerals indicate corresponding parts in all the views.

1, Fig. 1, is the frame of the machine, which may be of any suitable construction.

34 is a type-bar fulcrumed in a semicircular ring or segment 35.

36 is the platen, which is suitably supported and vertically movable on the carriage 36^A, so it may be elevated for printing in upper-case characters.

32^C is a rack meshing in the gear-wheel 32^B, which is mounted on the shaft 45. The shaft 45 is connected to a suitable motor-spring 48. Meshing in the teeth of the gear 32^B is the escapement 32^A.

37^A is a type-bar lever fulcrumed in the support 39, which extends across the machine and is a common support for all the levers 37^A, the said lever being pivotally connected to the type-bar at 34^A.

38^B is a bar, commonly termed a "universal" bar, which extends across the machine. The bar 38^B is connected to the arm 38^A by the rod 38 and has for its purpose the operation of the escapement when the lever 37^A is operated.

2 is a key-lever fulcrumed on the rod or pin 2^A.

7 is a block or support for the rod 4, which rod extends across the machine and is movably supported in the said block or support 7. Rigidly secured to the rod 4 at the side of the machine is a lever carrying a fork 9 at one end and a dropped portion 3 at the other, which is provided with a lug 5, against which the key-lever 2 comes in contact. The fork 9 engages the foot 22 on the rod 20, Figs. 1 and 2, for elevating the platen, which not be-

ing a feature of my present invention is not more minutely described. Rigidly secured on the rod 4 and located centrally of the machine is an arm 6 for operating the rod 21, which rod passes through the guide straps or loops 26 on the guide-arm 23, the guide being secured to the support 24 by the plate 23^A. I am not confined to the use of a looped or strapped guide-arm, as shown in Figs. 1 and 3, as I may use such a modification as shown in Figs. 25 and 26, wherein a cylindrical guide is used with a rod slotted at 27, Fig. 26, vertically movable in the cylinder. To this rod 21 a bell-crank is fulcrumed in its longer arm, the longer arm being pivotally connected to the ribbon-lift rod 42 and the shorter arm pivotally connected to the rod 30, which is connected to the bell-cranks 31 and 31^A, which through the universal bar 38^B, rod 38, and arm 38^A operate the escapement mechanism.

The operation of the ribbon-lift will be more fully described hereinafter in the operation of my invention.

10, Figs. 1, 5, 6, and 7, is a support for the oscillating or rockable yoke 11. The yoke 11 is pivoted on the block 10 at its upper portion, as at 14, and secured by a pin 15, Figs. 1 and 6, and has two bushings or sleeves 49 at right angles to its axis for the tilting of the shaft 13^A, which carries two bevel gear-wheels 57 and 57^A, which mesh with the gears 16, attached to the ribbon-rotating shafts 33, Fig. 5.

17 represents lugs on top of the yoke 11 for engagement with the spring pawl or stop 18 in order to allow the yoke to rock, disengage itself, and yet permit of its being shifted to different angles in order to throw either of the gear-wheels 57 and 57^A (on each end of the shaft 13^A) in and out of mesh with the gears 16.

19, Figs. 1 and 5, is a shaft extending longitudinally of the machine carrying a worm or spiral gear 13 at one end and a bevel or miter gear 47 at the other, the gear-wheel 47 receiving motion from the motor-spring 48 by means of the gear 46, which operates the shaft 13^A by the worm or spiral gears 12 and 13, the gears 12 and 13 being at right angles to each other. The two spiral gears allow the shaft 13^A to oscillate or rock without getting out of mesh and interrupting the rotation thereof.

50, Figs. 5, 8, and 10, is a disk rigidly secured to the worm 12 between the ratchet-wheel 78 and the worm 12, together forming a unit. The worm 12, disk 50, and ratchet 78 are mounted loosely on the shaft 13^A.

50^A, Figs. 9 and 11, is a casing provided with a spring-actuated pawl, 82 being the pawl and 81 the spring. The casing 50^A is provided with a sleeve 83, Fig. 9, and a set-screw 84 for securing the casing to the shaft 13^A. The casing 50^A is provided with a flange 77, which when in position on the shaft 13^A fits over the recess 78 of the disk 50. The worm 12 is pre-

vented from moving laterally by the collar 52 on the shaft 13^A between the arm 49 of the yoke 11 and the worm or spiral gear 12.

53, Figs. 5 and 13, is a pawl, and 54 is a backing-ratchet which is placed in a reverse position to that of the ratchet 79, so as to prevent a backward rotation of the shaft 13^A when the carriage has reached the end of the writing-line, as will be more fully explained in the description of the operation of my invention. The ratchet 54 is on the outside of the arm 49 and fast to the shaft 13^A. The pawl 53 is supported on a lug 85 by means of a pin 55, Figs. 5 and 13. The yoke 11, already referred to, is provided on top with lugs 17 for engagement with the spring pawl or stop 18, which is secured to the base 76 for the purpose already explained.

59 represents guides or supports for the rods 60 and the ribbon-shafts 33. The shafts 33 are provided at their upper ends with a shoulder and a square lug for the spools 41, as at 33^A, Figs. 14, 20, and 23, at their lower ends with bevel-gears 16, which mesh with the transversely-disposed shaft 13^A.

60 represents rods having a foot or hook 61 at their lower ends and a slot 91 in the head 62 at their upper ends for the passage of the curved wedge-bar 68.

69 is a horizontal portion of the wedge-bar 68, so that there will be a uniform motion in a straight line when the portion 69 comes in contact with the slotted head or yoke.

93 is an eye or loop in the end of the narrow end of the curved wedge-bar 68, as at 69, for the passage of the ribbon. 69^A is a plate, Figs. 21 and 24, for guiding the wedge-shaped bar in its correct position. The guide is supported by an upright or foot 94, Fig. 24, and secured to the plate 75 under the spool 41 by the screws 95.

74 is a handle or knob on the spool 41 for winding the ribbon by hand.

71 represents springs for the wedge-shaped bar 68 and are for the purpose of holding it in its normal position. The spring is fastened to the lug 72.

86, Fig. 16, is the ribbon plate or lug which is attached to the ribbon at one end, the other end of the ribbon being secured to the spool, and has for its object to engage in the eye or loop 70, Figs. 5, 21, and 22, and is secured to the ribbon 64 by means of the screws or pins 87. When the inclined portion of the curved wedge-bar 68 comes in contact with the lower part of the slotted head 62 of the rod 60, it depresses it and the spring 63, and therefore the left-hand foot 61, Fig. 5, descends and pushes the rod 13^A, thereby throwing the gear 57 out of mesh with the gear-wheel 16 and places the other gear, 57^A, in mesh with the right-hand gear 16, thus reversing the direction of travel of the ribbon. This action is caused by the ears or lugs on the plate 86, Figs. 14 and 15, on the ribbon 64 engaging

with the looped portion 70 on the end 69 of the curved wedge-bar 68, which pulls the bar and depresses the rod 60, as already explained.

66, Figs. 1 and 17, represents prongs forming a part of the ribbon-lifting plate 65 and are for the purpose of holding the ribbon in place. Those at 67 are in an opposite direction and are for engaging in the apertures 90 in the guide-bars 37, Figs. 1 and 18, for guiding and supporting the plate 65. The plate 65 may be stamped out of a piece of sheet metal, and the prongs or stems 66 and 67 may be bent in a suitable manner, as shown. The plate 65 has a point 88, made by the intersection of the two circles, forming a pointer for a striking mark or point on the platen 36.

I will now describe the operation of my invention relating to the lateral movement of the ribbon. Upon depressing a key or the space-bar the escapement makes one step, which allows the vertical shaft 45, Fig. 1, and the horizontal shaft 19 to rotate, which motion is imparted to the shaft 13^A through the worms 12 and 13. The worm 12, disk 50, and ratchet 79 (as has been previously explained) are loosely mounted on the shaft 13^A. The spring-actuated pawl 82 in the casing 50^A (the casing being secured to the shaft 13^A, as already explained) engages a tooth of the ratchet-wheel 79 and causes the shaft 13^A to rotate. The gear 57^A on the shaft 13^A being in mesh with the gear 16 on the shaft 33 imparts motion to the spool 41. When the carriage has reached the end of the writing-line and is returned for the commencement of a new writing-line, the pawl 53 engages a tooth of the ratchet 54, which is secured to the shaft 13^A, and prevents a backward rotation of the shaft 13^A, while the worm 12, disk 77, and ratchet 79 are permitted to rotate through the action of the worm 13 on the shaft 19, the pawl 82 passing over the teeth of the ratchet 79. When the ribbon has been wound on one spool, the plate 86 on the ribbon 64 (the ribbon passes through the eye 93 on the curved wedge-bar 69) engages the head 70 and draws the bar out against the action of the spring 71. The wedge portion of the bar 69 (operating in the slot 91 of the rod 60) forces the rod 60 against the action of the spring 63, the foot 61 engaging the shaft 13^A, and forces the gear 57^A (or 57, as the case may be) out of mesh with the gear 16. This action tilts or oscillates the shaft 13^A and throws the gear 57 on the opposite end of the shaft 13^A in mesh with the gear 16, thus reversing the direction of travel of the ribbon. During the operation just described the spring-actuated lug 18 lifts over one of the lugs 17 and maintains the yoke in position, so that the gear 57 or 57^A will remain in mesh with the gear 16 until the operation above described is repeated.

I will now describe the operation of the ribbon-lifting mechanism. A depression of a key or space-bar operates the escapement

mechanism, as is common to writing-machines. In this operation the lever 37^A rocks, forcing the rod 38 and universal bar 38^B toward the front of the machine. Motion is also imparted to the arms 31 and 31^A, the rod 30 being pivotally connected to the arm 31 and the short arm at 29 of the bell-crank 28, the bell-crank being pivotally connected to the rod 21 at 27^A. The longer arm of the bell-crank 28 is pivotally connected to the rod 42, as at 43, which lifts the rod 42 and the ribbon-plate 65 slightly in advance of the type.

The ribbon-lifting plate 65 is provided with upwardly-extending prongs 66, which hold the ribbon in position both in its vertical and lateral travel, while the downwardly-extending prongs 67 pass through the apertures 90 of the divided bar 37, Fig. 18, and guide the plate in its vertical movement. The plate 65 is provided with a point 88 for indicating the printing-point on the platen.

When upper-case characters are to be printed, a depression of the key 2 raises the forked lever 8, which raises the platen through the rod 20. This movement also raises the arm 6, which is rigidly secured to the rod 4, as previously explained, and raises the rod 21, which passes through the straps or loops (or cylindrical guide, as shown in Figs. 25 and 26) of the guide 23. The bell-crank, which is fulcrumed to the rod 21 at 27^A, is lifted, and with it the rod 42 and plate 65, which movement is simultaneous with the platen. Hence the ribbon-plate 65 is in the same relative position to the platen it was before being lifted and when the parts were in their normal position. Now when the platen and ribbon are in the elevated position and a key is depressed it will be seen that the ribbon will be lifted, as before described, slightly in advance of the type.

I am not confined to the exact details of construction herein shown, as I may modify such parts as may be deemed expedient without departing from the subject-matter herein described and claimed.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a ribbon mechanism for type-writing machines, the combination of a movable platen, an escapement, a series of ribbon-carrying spool-mounted shafts, a carriage-controlled gear-carrying shaft, a worm-carrying gear-actuated shaft, a worm-and-ratchet-carrying rockable shaft, a yoke or arched bifurcated arm supporting the said shaft, and means for automatically rocking the said shaft, substantially as described.

2. In a ribbon mechanism for type-writing machines, the combination of a spring-controlled escapement-actuated carriage, a carriage-actuating vertical shaft, a series of gear-actuated ribbon-carrying vertical shafts, a yoke-supported rockable gear-actuated and

ratchet-controlled transverse shaft, a ratchet-controlled worm or spiral gear loosely mounted thereon, a horizontally-disposed spring-actuated geared shaft, a worm mounted on the said shaft, the said worm being at right angles to the worm on the said transverse shaft, and means for engaging and disengaging the said rockable transverse shaft with the said vertical ribbon-carrying shafts, substantially as described.

3. In a type-writing machine, the combination of a ribbon mechanism comprising a gear-controlled vertical shaft, a horizontal gear-controlled shaft extending lengthwise of the machine, a yoke-supported rockable shaft extending transversely of the machine, the said rockable shaft loosely carrying a worm-gear, disk and ratchet, the said worm-gear, disk and ratchet being rigidly secured together, a sleeved casing adjustably secured to the said shaft, said casing carrying spring-actuated pawls for engagement with the said ratchet for permitting a one-way rotation of the said ratchet, disk and worm, ribbon-spools operative by the said rockable shaft, and means for rotating the said shaft, substantially as described.

4. In an automatic reversible-ribbon mechanism for type-writing machines, the combination of a rack, gear and escapement-controlled carriage, an ink-carrying ribbon, a lugged ribbon-plate secured to the ribbon near the inner end, a slotted curved spring-controlled wedge-bar, a slotted spring and wedge controlled rod, and a vertical gear-controlled ribbon-shaft, as described.

5. In an automatic reversible-ribbon mechanism for type-writing machines, the combination of a spring-controlled carriage, a series of key-lever-connected type-bars, a segmental type-bar support, an ink-carrying ribbon, a plate provided with ears or lugs secured to the spool-ribbon near the end thereof, a slotted curved spring and ribbon-controlled curved wedge-bar, a slotted head-spring and wedge-controlled rod, a vertical spool-mounted gear-controlled ribbon-shaft, a gear and ratchet controlled yoke-supportable rockable rotating shaft, and means for imparting motion to the said shaft, substantially as described.

6. In an automatic ribbon-reversing mechanism, the combination with a series of ribbon-lifting arms and levers, a motor-spring, a rockable shaft extending across the machine provided with gear-wheels, an oscillating yoke adapted for movably supporting the said shaft and gear-wheels, means for movably supporting the said yoke, and sleeved arms at right angles to the axis of the yoke, a spiral or worm gear between the said arms and adapted to be moved loosely upon the said rockable shaft, a worm or spiral gear at right angles to the said spiral gear or worm in the yoke, means for driving the said spiral gears or

worms from the motor-spring, and means for regulating the motion of the said worms and gearing by means of the escapement mechanism, substantially as described.

7. In an automatic ribbon-reversing mechanism, the combination with a platen, an escapement mechanism, a rockable yoke supporting a shaft adapted to oscillate or rock with the said yoke, on a spiral or skew gear driving the said rockable shaft, a spiral skew gear at right angles to the said gear, means for driving the said gears, a disk and ratchet-wheel integral with the said worm or skew gear on the rockable shaft, a detachable cover or disk fastened to the said rockable shaft carrying a spring-controlled pawl and adapted to engage in the teeth of the said ratchet in one direction of revolution, a reversely-operating ratchet, a pawl engaging in the said ratchet for preventing a backward revolution of the said rockable shaft, and notches and lugs on the said yoke for maintaining it and the rockable shaft at any angle, substantially as described.

8. In an automatic ribbon-reversing mechanism for type-writing machines, the combination with an escapement mechanism, a motor or driving spring, an oscillating yoke, means for occupying the said yoke in any position, a rockable shaft provided with angle-gearing at each end thereof, a skew or spiral gear adapted to work loose upon the said rockable shaft in rotating in one direction and reversely rotating the same, a ratchet-disk integral with the said spiral gear or worm, a detachable pawl fitting on the said ratchet-disk and for the driving thereof in one direction, a reversely-operating ratchet and pawl on the rockable shaft, a spiral skew gear or worm at right angles to and driving the said spiral gear on the rockable shaft, means for rotating the said spiral gearing from the motor-spring or other source, and rotating ribbon-spools supported on cylindrical shafts having a square end for the said spools, the said cylindrical shafts having gear-wheels at their lower ends and adapted to alternately engage and disengage the said gearing on the rockable yoke-supported shaft, substantially as described.

9. In an automatic reversible-ribbon mechanism, the combination with a series of ribbon-spools, an ink-carrying ribbon, an oscillating spring-controlled yoke, a rockable shaft having gear-wheels at each end thereof, a ratchet-controlled spiral or skew gear on the said rockable shaft, means for controlling the rotation of the said shaft in both directions, and vertically-rotating geared ribbon-spool or bobbin-shafts adapted to alternately engage with one end of the said rockable shafts as it oscillates, and vertical angle end or hooked spring-controlled rods for rocking and depressing the said rockable shaft to throw the said gears thereon in and upon the vertical ribbon spool-

shafts, out of mesh with each other when the ribbon is unwound from one of the said spools, substantially as described.

10. In an automatic reversible-ribbon mechanism for type-writing machines, the combination with ribbon-spools and an ink-carrying ribbon, a skew-gear-actuated rockable ratchet-controlled shaft extending across the machine, the said shaft having gear-wheels at each end, and vertical spool-rotating geared shafts, and angular end slot-headed rods adapted to depress and elevate the said rockable shaft to alternately engage and disengage the said vertical spool-supporting rods and the rockable shaft, a curved partly wedge-shaped spring-controlled incline plane adapted to move in the said slots in the upper portion of the said angle end rods and depress the said rods to engage and disengage the rockable shaft from the said spool-rotating shafts, a curved guide for maintaining the proper position of the said wedge-shaped incline planes, an aperture in the end of the said incline planes for the passage of the ribbon and a lug-plate on the said ribbon near its end for engaging in the said aperture on the incline plane for actuating the said wedge-shaped bar or incline plane and depressing the said lever and the angle end bar for disconnecting the said rockable shaft from the spool-actuating shaft, and supporting-plates beneath the said spools for supporting the said wedge-shaped incline planes and the guide therefor, substantially as described.

11. In an automatic ribbon-reversing mechanism for type-writing machines, the combination with ribbon-spools and an inked ribbon, a rockable spring-controlled geared horizontal shaft, and shafts for supporting the said ribbon-spools, and angle end rods parallel to the said ribbon-shafts for depressing the said rockable shaft out of mesh with the said vertical ribbon spool-shafts, a yoked or slotted head on the upper portion of the said angle end rods, a rotary movable curved wedge-bar engaging in the said slot and depressing it, a grooved guide for maintaining the said wedge-bar in a vertical position, an eye or loop on the smaller end of the said wedge-bar, a plate carrying a lug on the ribbon for engaging in the said eye or loop for actuating the wedge-bar when the ribbon is near its unwound position, and a spring at the large or wedge portion of the said wedge for normally disengaging it from the said slotted head on the angle end vertical rods, substantially as described.

12. In an automatic reversing mechanism for type-writing machines, the combination with a platen, a series of type-bars, an escapement mechanism, a series of key-levers, a shift key-lever pivoted at one end, a forked lever adapted to lift the platen, a transversely-disposed arm-mounted rod, a vertical key-lever-operated rod attached to one end of the

said lever or crank-arm, a stationary guide for supporting the said rod for maintaining the said vertical rod in position, means for raising and lowering the said vertical rod through the guide and a bell-crank or angular arm adapted to oscillate on the said vertical rod, a pin adapted to form a pivot or fulcrum for the said bell-crank on the said vertical rod, a movable ribbon-guide plate, a rod for actuating the said guide-plate, the said rod being attached to the longer arm of the said bell-crank, means for imparting motion to the bell-crank from the escapement mechanism, substantially as described.

13. In an automatic reversing-ribbon mechanism for type-writing machines, the combination with a key-lever-operated platen, a platen-shifting forked lever, an arm or lever operating in unison with the said forked lever, a vertical rod on one end of the said arm or lever, a fixed stationary guide for movably supporting the said rod, a series of loops for maintaining the said rod in its vertical position, an unequal-legged bell-crank movably pivoted on the upper end of the said vertical rod, a pin or pivot rod for connecting the said rod and bell-crank, and adapted to allow it to oscillate, the said bell-crank supported on the said vertical lever in its longer arm, means for connecting the shorter arm thereof to the escapement mechanism, substantially as described.

14. In an automatic reversing-ribbon mechanism for type-writing machines, the combination of a ribbon-lift mechanism, a stationary guide, an unequally-pivoted oscillating arm or bell-crank adapted to move vertically and oscillate around a pin, an arm or lever adapted to vertically lift the said bell-crank, means for operating the said bell-crank from the escapement mechanism when the key-levers are depressed, a ribbon-carrying plate adapted to move simultaneously with the shifting of the platen, and to move slightly in advance of the type, and means for imparting motion to the mechanism through the key-levers and escapement, substantially as described.

15. In an automatic reversible key-lever-operated ribbon mechanism for type-writing machines, the combination with an ink-carrying ribbon, spools adapted to wind and unwind the said ribbon, a ribbon-lifting plate for raising and guiding the said ribbon, the said ribbon-lifting plate having prongs or extensions extending upward and downward for the guiding thereof and the ribbon, apertures for movably guiding the said prongs in position for printing, means for automatically vibrating the said ribbon-lifting plate, means for supporting the said ribbon-spools and reversing their direction of rotation, and square end cylindrical spool-rotating rods having gear-wheels at their lower ends, an arched oscillating spring-pressed arm or yoke, a movably-supported ratchet-controlled rockable shaft

adapted to oscillate or rock so as to engage
and disengage the said gears from the vertical
spool-rotating rod-gearing, a worm or spiral
gear on the said rockable shaft, a ratchet and
5 disk on the said spiral gear or worm, a de-
tachable cover or disk carrying a pawl for en-
gagement with the said ratchet, a ratchet re-
versely operating on the said rockable shaft,
and a plate beneath the said spools, a rotary-
10 movable curved wedge-bar having a slot or
eye at the smaller end, and vertical spring-
controlled rods having bent lower ends, and
a slot or eye on their upper end for the pas-
sage of the said wedge-shaped bar or incline
15 planes, means for causing the ribbon to draw
the said incline planes through the said eye or
slot on the said angle end rods for normally

engaging and disengaging the said gears on
the rockable shaft from the gear-wheel on the
vertical spool-rotating shafts, and a spiral 20
gear or worm at right angles to the said worm
or spiral gear on the rockable shaft, means
for rotating the said spiral gear or worms
from the key-lever mechanism, and means for
maintaining the said yoke and rockable shaft 25
at an angle, substantially as described.

In testimony whereof I have hereunto af-
fixed my signature in the presence of two sub-
scribing witnesses.

GEORGE M. KITZMILLER.

Witnesses:

ROBERT E. TAPLEY,
ALEXANDER CALCOTT.