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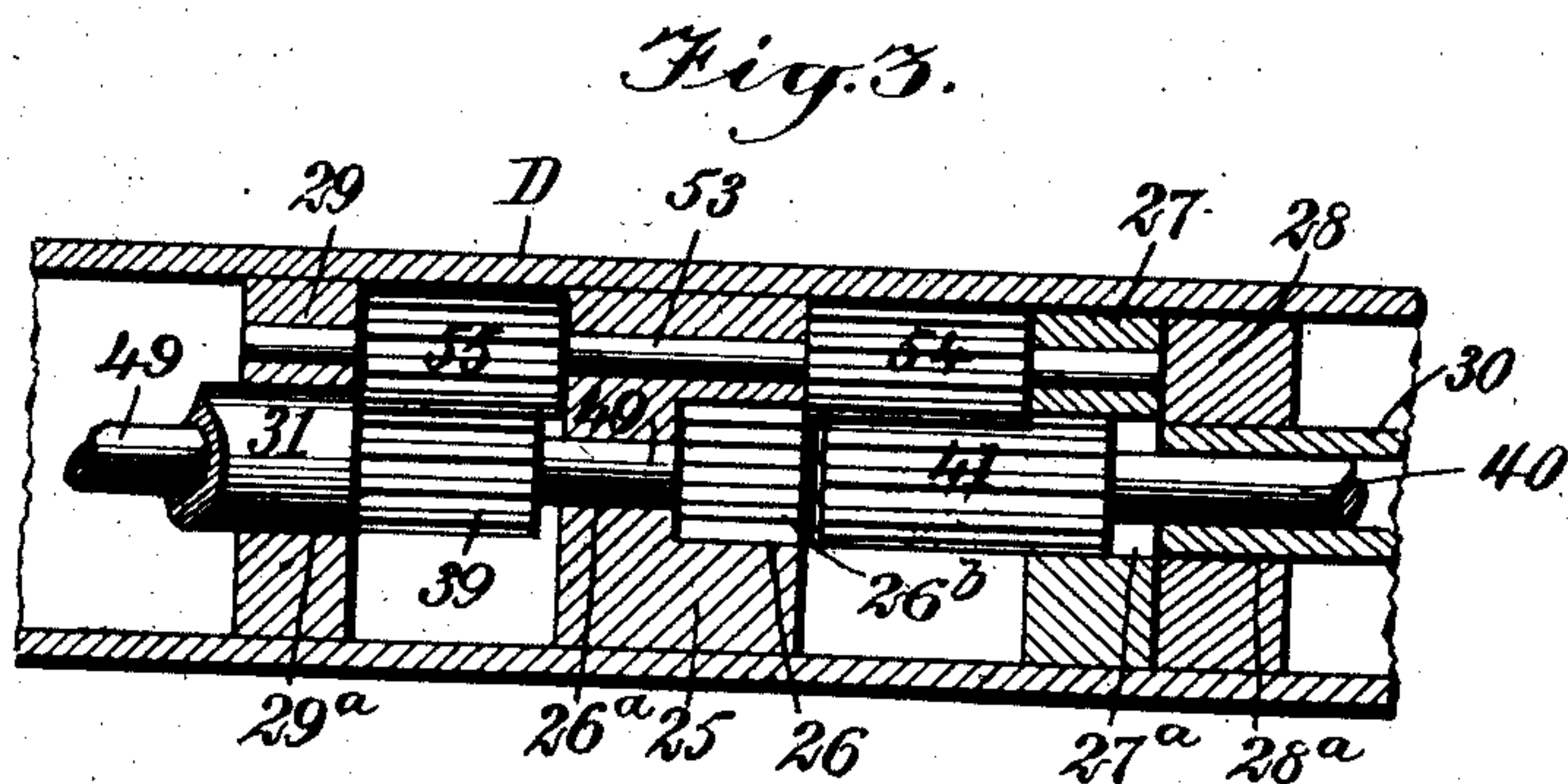
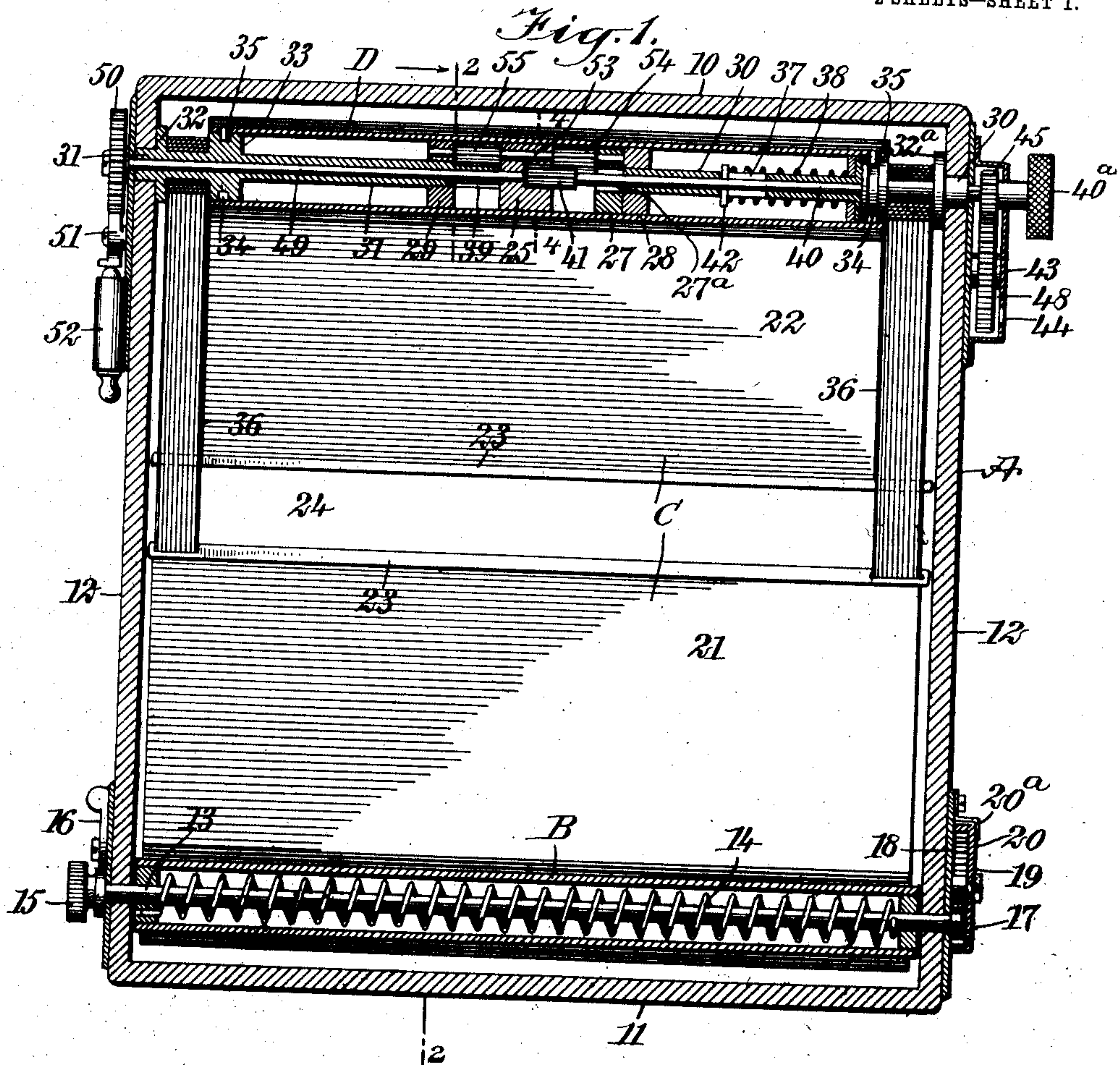
PATENTED APR. 21, 1908.

E. L. HALL.

PHOTOGRAPHIC SHUTTER.

APPLICATION FILED DEC. 29, 1905. RENEWED JUNE 18, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

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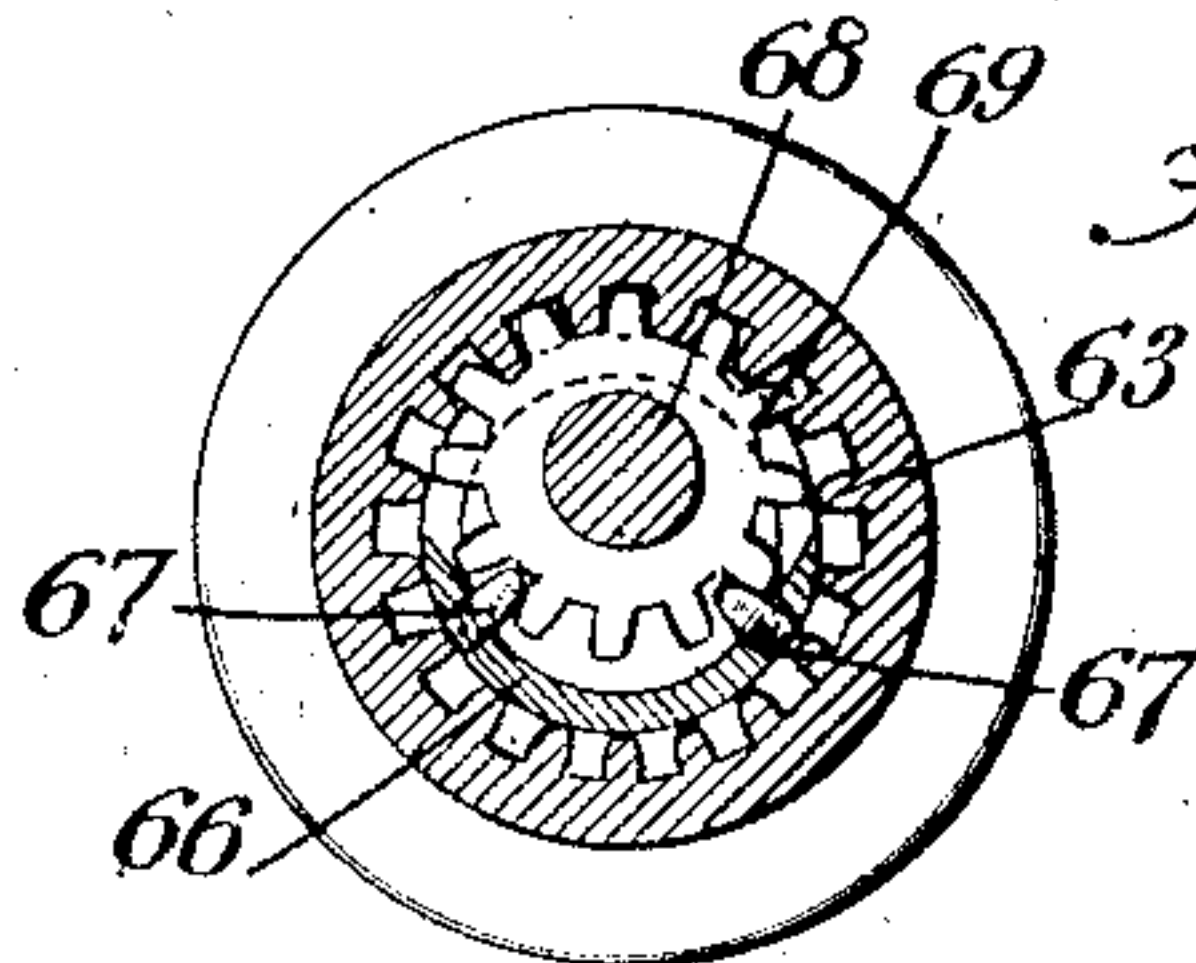
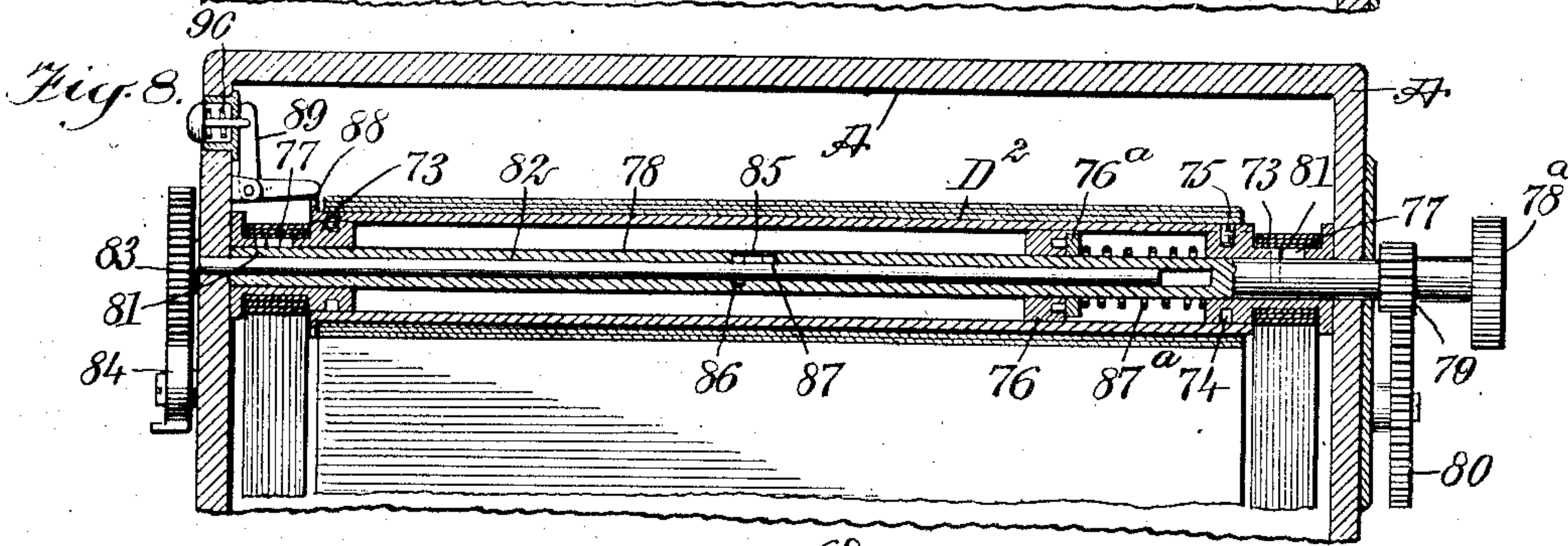
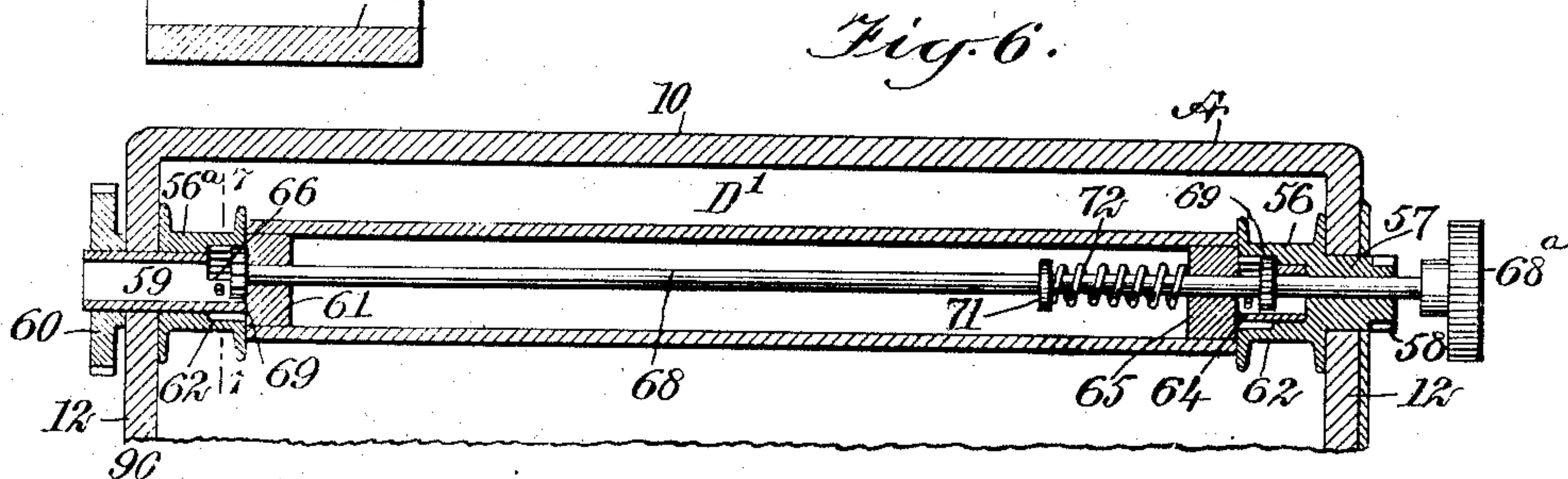
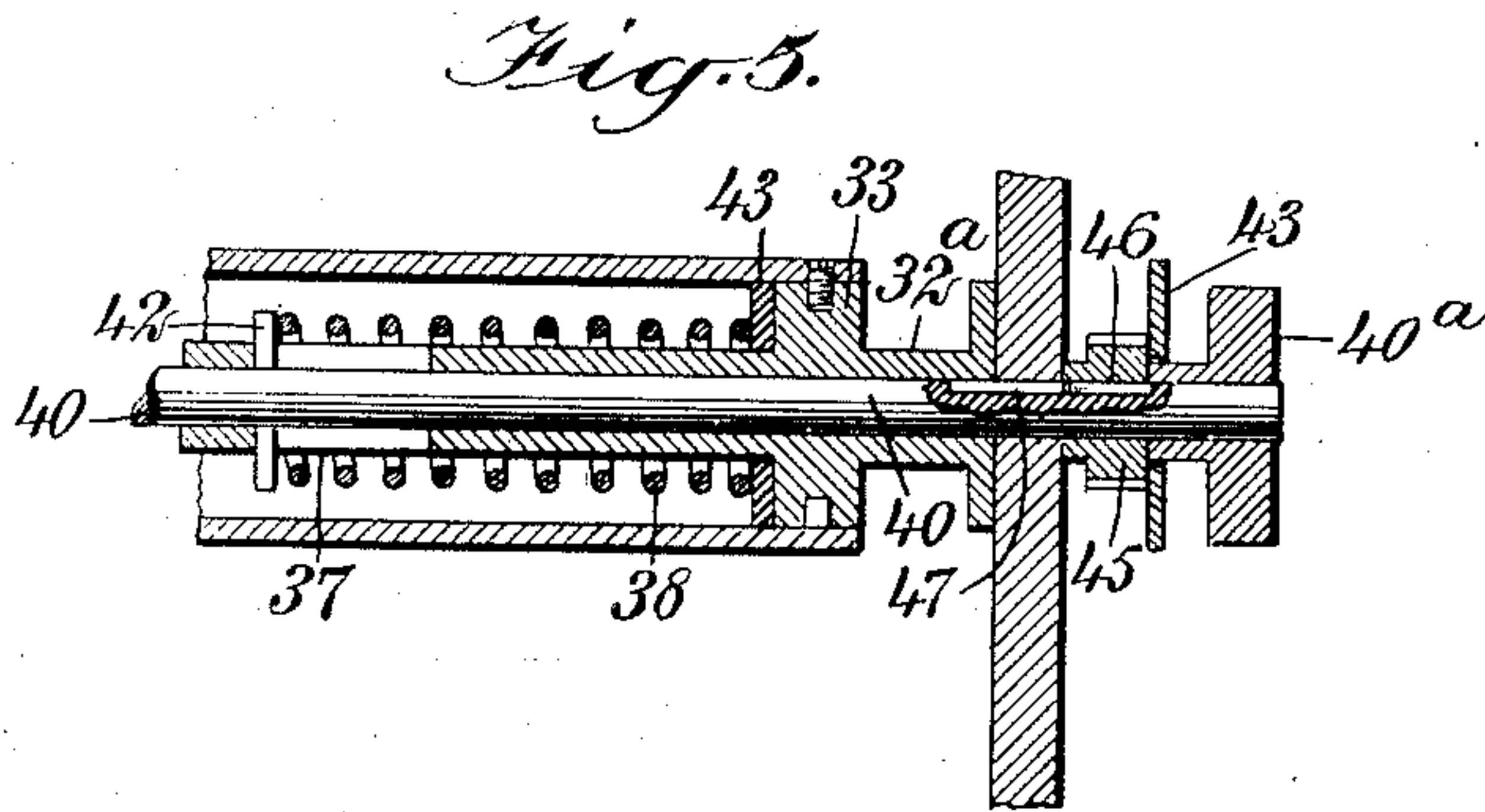
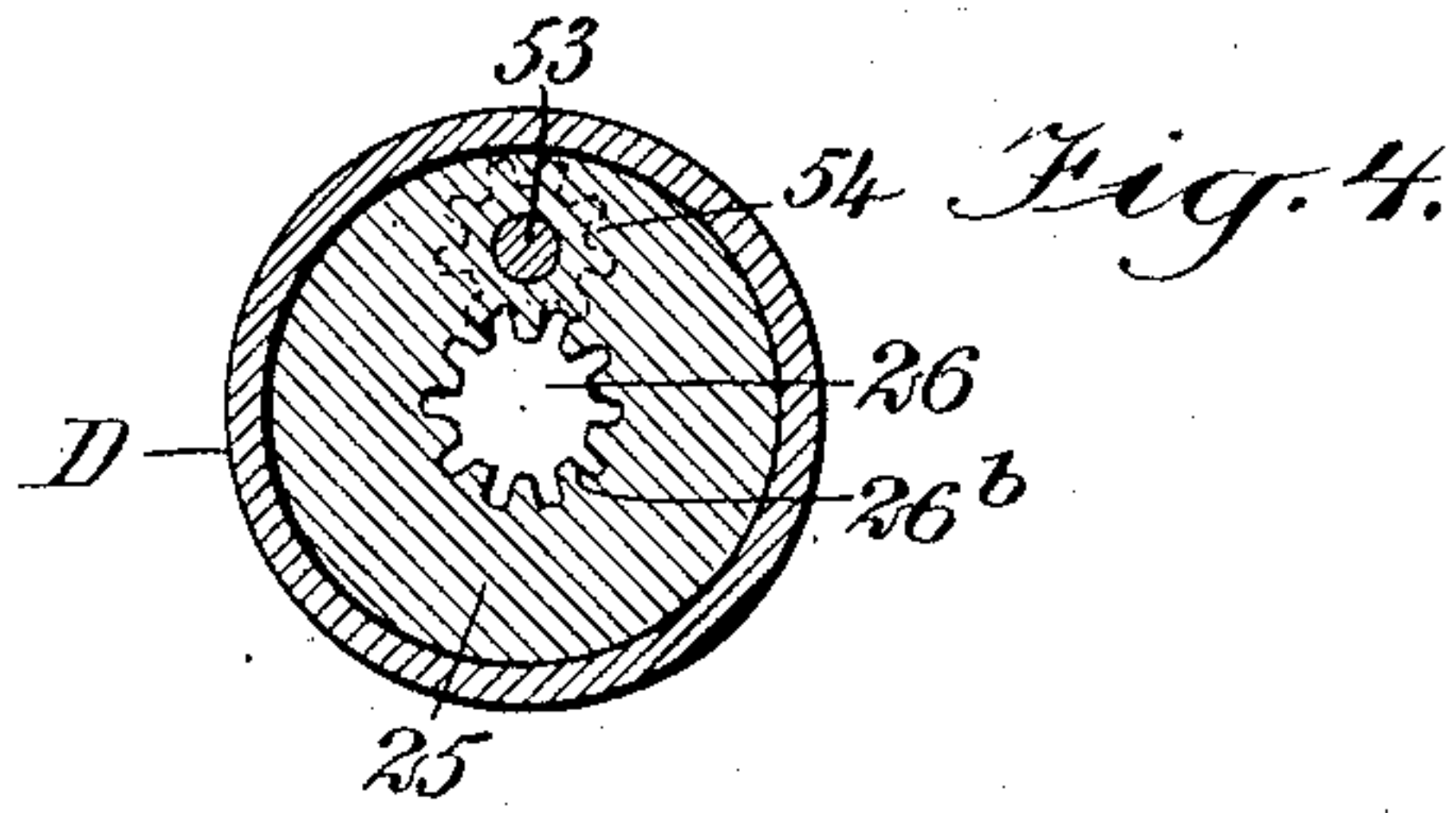
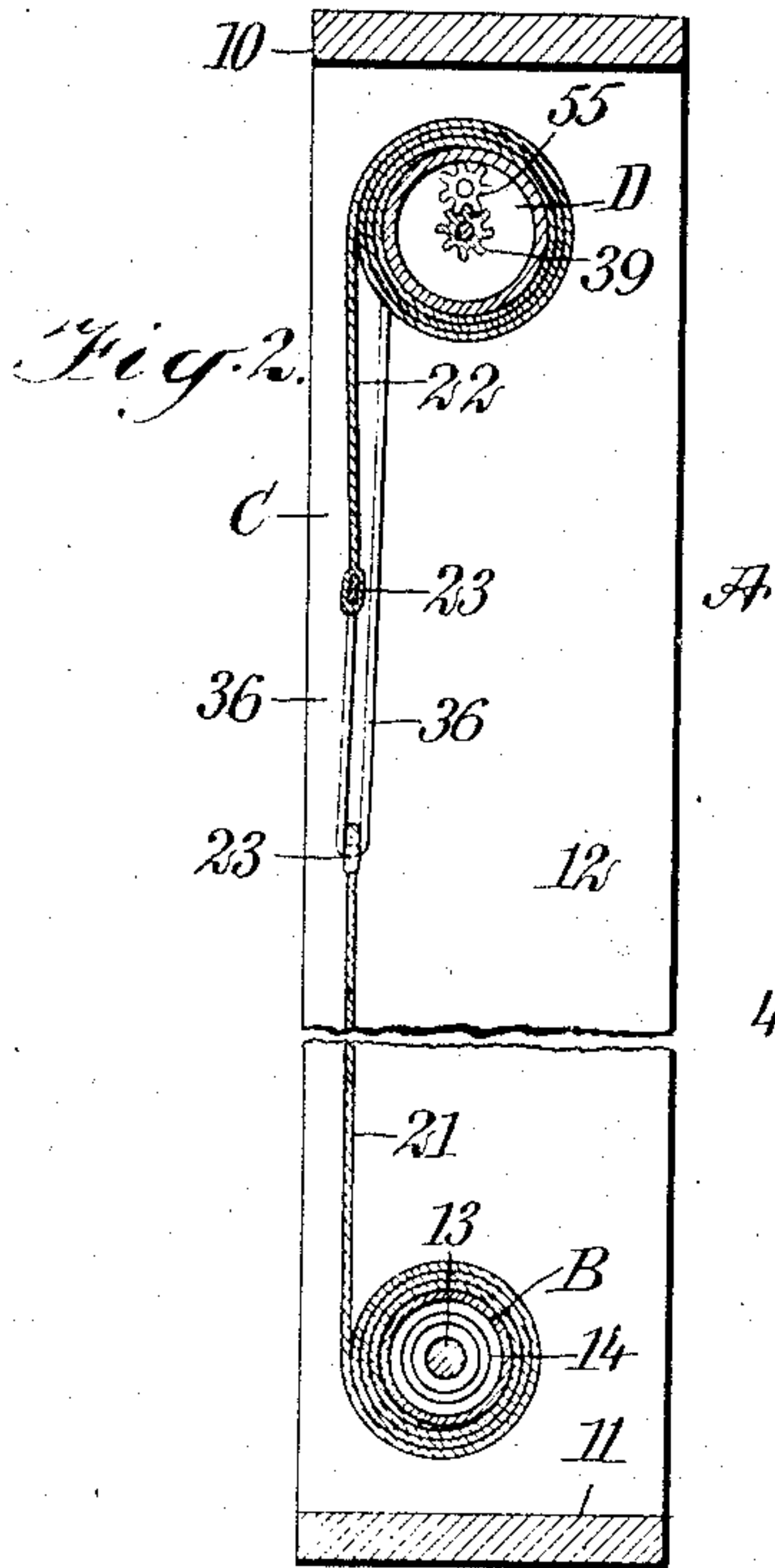
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2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

EDWARD LANDER HALL, OF NEW YORK, N. Y.

PHOTOGRAPHIC SHUTTER.

No. 885,612.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed December 29, 1905, Serial No. 293,769. Renewed June 18, 1907. Serial No. 379,607.

To all whom it may concern:

Be it known that I, EDWARD LANDER HALL, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Photographic Shutter, of which the following is a full, clear, and exact description.

The invention relates to photographic curtain shutters, and the purpose of the invention is to provide a construction whereby a single roller only is employed at the top and bottom of the frame, the lower roller being a tension roller and the upper roller being a winding roller, provided with internally-located and exteriorly-operated means for regulating the extent of the exposure opening in the shutter, said means being also employed to turn the roller jointly with the regulating mechanism when the curtain is to be wound up, and enabling the curtain to be adjusted without turning the winding mechanism.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section through the frame of the shutter and likewise through the rollers therein; Fig. 2 is a vertical transverse section taken practically on the line 2—2 of Fig. 1; Fig. 3 is an enlarged horizontal section through the central portion of the upper roller, illustrating the manner in which the spacing shaft can be operated independent of the roller or be connected with the roller to turn the same; Fig. 4 is an enlarged vertical section through the upper roller, the section being taken practically on the line 4—4 of Fig. 1; Fig. 5 is an enlarged longitudinal section through the right-hand end portion of the upper roller; Fig. 6 is a vertical section through the upper portion of the frame and a longitudinal section through a slightly modified form of the upper roller showing the parts in position for changing the width of the slit; Fig. 7 is an enlarged transverse section through the roller shown in Fig. 6, the section being taken practically on the line 7—7 of Fig. 6; and Fig. 8 is a vertical section through the upper portion of the frame of the shutter and a longitudinal section through a further modified form of the upper roller.

A represents the frame of the shutter, which is given the customary rectangular shape and comprises an upper member 10, a lower member 11 and side members 12. 60

B represents the ordinary hollow tension roller, through the heads of which a shaft 13 is passed and secured, which shaft is journaled in the lower portions of the side members 12 of the frame and extends beyond 65 them. A spring 14 is coiled around the shaft 13, having one end attached to a head of the roller, its other end being secured to the shaft as is shown in Fig. 1. A knob 15 is secured preferably to the left-hand end of 70 the shaft 13, having the customary spur to engage with a detent 16 in order to prevent the tension upon the roller B from becoming accidentally relaxed.

C represents a curtain which consists of the 75 usual two sections 21 and 22, and the opposing inner edges of the sections 21 and 22 are provided with metal binding strips 23, and the space between said strips constitutes an exposure opening 24. The lower edge of the 80 lower section 21 of the curtain is secured to the tension roller B in any approved manner, and the upper edge of the upper section 22 is attached to an upper tubular roller D, held to turn in the frame and which is the only 85 other roller employed. The roller D is tubular and open at each end, and said roller is provided with a fixed central circular block 25, having a circular recess 26 in its right-hand face, provided with longitudinal 90 pinion teeth 26^b formed in its peripheral surface, as is shown in Figs. 3 and 4; and an opening 26^a is also provided, which opening extends from the recess 26 to the left-hand 95 face of the block.

To the right of the central block 25 two 100 other blocks 27 and 28 are fixed in the roller, and said blocks 27 and 28 are provided with openings 27^a and 28^a in longitudinal alinement with each other and with the recess 26, 105 being preferably of the same diameter as said recess; and to the left of the central block 25 another block 29 is secured in the upper roller D, provided with an opening 29^a similarly located to and being of the same 110 diameter as the openings in the blocks 27 and 28.

In connection with the upper roller D, two spacing or adjusting shafts are employed, adapted to regulate the width of the space 115 between the sections of the curtain. These shafts are located at opposite sides of the

center of the roller D, the shaft 30 being to the right and the shaft 31 to the left side of said center as is best illustrated in Fig. 1, and both of the shafts 30 and 31 are tubular. The shaft 30 is journaled at its outer end in the upper portion of the right hand side member 12 of the frame A, and at its inner end is journaled in the opening 28^a in the block 28, and the outer end of the shaft 31 is mounted in the upper portion of the left-hand member 12 of the frame A, its inner end being journaled in the opening 29^a of the left-hand block 29, as is shown in Figs. 1 and 3. Each of said shafts is provided near its outer end within the frame with a reel, and these reels are designated as 32 and 32^a, and the inner flanged portion of each reel constitutes a head for an end of the roller D, as is shown in Fig. 1, but these heads turn loosely in the said roller and are provided with peripheral grooves 34, into which a pin 35 extends, secured to the said roller, so that when the shafts 30 and 31 are in place in the said roller they cannot be accidentally withdrawn.

The reels 32 and 32^a practically fill the spaces between the ends of the roller D and the opposing side surfaces of the frame A. The two curtain sections 21 and 22 are connected at their ends by tapes 36, and these tapes as is shown best in Fig. 1, are attached to the upper curtain section 22 at its bound edge, and are then carried through slots in the bound edge of the lower curtain section 21, and the ends of the said tapes are carried up and are secured to the reels 32 and 32^a in any suitable or approved manner.

The right-hand spacing shaft 30 is provided with a slot 37 therein adjacent to its central portion but within the said roller; and a spring 38 is coiled around the shaft at its slotted portion 37 as is shown in both Figs. 1 and 5. At the inner end of the left-hand spacing shaft 31 a pinion 39 is formed, which pinion occupies a space between the central block 25 and the left-hand block 29 as is best shown in Fig. 3, and this pinion 39 is tubular.

A controlling shaft 40 is loosely passed through the right-hand spacing shaft 30, and at its right-hand end is provided with a knob 40^a, and this controlling shaft 40 extends out beyond the right-hand side of the frame A of the shutter and through the opening 27^a in the block 27 and terminates at its inner end in a pinion 41, which pinion when the controlling shaft 40 is pressed inward enters the recess 26 in the central block 25, the teeth in said recess meshing with the teeth of the pinion, thus locking the controlling shaft to the said center block 25, whereby at such time when the controlling shaft is turned, the upper roller D will likewise be revolved to wind up the curtain thereon.

A pin 42 is passed through the shaft 40 and through the slot 37 in the right-hand spacing

shaft 30 as is shown in Figs. 1 and 5, and the said pin presses against the inner end of the coiled spring 38, the outer end of which spring is usually made to bear against a washer 43, located at the inner face of the right-hand head of said roller D.

The controlling shaft 40 passes through a casing 43, which is secured at the outer face of the right-hand side member 12 of the frame A, and this casing has a sight opening 44 therein. A pinion 45 is located on the controlling shaft 40, having sliding movement on said shaft but being compelled to turn therewith, said pinion being preferably provided with a key 46, which enters a groove 47 in the said shaft, as is shown in Fig. 5. This pinion 45 meshes with a gear wheel 48 likewise located in the casing 43, and a scale is produced upon the outer face of this gear wheel, read through the sight opening 44, so that when the controlling shaft is turned to regulate the width of the exposure opening 24 the gear 48 will be turned and the adjusted width in inches and fractions of an inch can be read from the said scale.

It will be observed that the controlling shaft 40 has sliding movement in the right-hand spacing shaft 30, and that the spring 38 is compressed when the said controlling shaft 40 is drawn outward by means of the knob 40^a to carry the pinion 41 on the said shaft 40 from locking engagement with the roller; and that just as soon as the shaft 40 is released, the spring 38 will act to instantly carry the pinion of the shaft into the toothed recess in the center block 25.

What may be termed a locking shaft 49 is secured at its inner end in the opening 26^a in the center block 25, and this locking shaft 49 extends the length of, and beyond the outer end of the left-hand spacing shaft 31, as is shown in Fig. 1, and is provided with a ratchet wheel 50 secured to its outer end, which is engaged by a pawl or detent 51, so that as the roller is turned to wind up the curtain the ratchet and pawl device will prevent the curtain from accidentally unwinding; but when the exposure is to be made the pawl or detent 51 is carried out of engagement with the ratchet wheel 50 by means of a pneumatic 52, a finger latch or like device, whereupon the tension roller B will act to roll the curtain thereon and effect an exposure.

In connection with the controlling shaft and the spacing shafts a transmitting shaft 53 is employed, and this latter shaft is journaled above said shafts in the blocks 25, 27 and 29 as is shown in Figs. 1 and 3. This transmitting shaft 53 is provided adjacent to its right-hand end with a pinion 54, which pinion meshes with the pinion 41 on the inner end of the controlling shaft 40, so that when this pinion 41 is turned the transmitting shaft 53 is also revolved, and by means of a

pinion 55 at the opposite end of the controlling shaft 53 the left-hand spacing shaft 31 is revolved as the pinion 55 meshes with the pinion 39 on the said shaft 31; and as has been stated, when the pinion 41 is out of the recess 26 and the controlling shaft 40 is turned, the right-hand spacing shaft 30 is compelled to turn with it.

Thus it will be observed that a very simple shutter is provided, having but two rollers an upper and a lower one, and that when the pinion 41 of the controlling shaft 40 is in locking engagement with the teeth at the recess 26 of the upper roller D, said roller D is compelled to turn when the controlling shaft is turned; but when the controlling shaft 40 is drawn out from said recess and revolved its pinion 41 turns the transmitting shaft 53 through the medium of the pinion 54, and motion is thereupon simultaneously imparted to both of the spacing shafts, thus causing the reels to turn and wind up or unwind the tapes 36 to regulate the width of the exposure opening 24, and while such operation is being carried out the roller D remains stationary.

In the construction of the upper roller D' illustrated in Fig. 6, two reels 56 and 56^a are mounted to turn in the frame A. The right-hand reel 56 is provided with a tubular hub extension 57 which is journaled in the right-hand side member 12 of the frame, and at the outer end of this extension a pinion 58 is formed, adapted to mesh with an indicating wheel such as is shown in Fig. 1. The left-hand reel 56^a is tubular throughout and receives the inner end of a tubular shaft 59 journaled in the left-hand side member 12 of the frame, and this shaft carries at its outer end a ratchet wheel 60 corresponding to the ratchet wheel 50 in Fig. 1. The tubular shaft 59 is secured to a block 61 which constitutes the left-hand fixed head for the roller D'; and each of the reels at its inner end is provided with an annular chamber 62, and the said chambers of the reels are provided with pinion teeth 63, as is shown in Fig. 7. A short tubular shaft 64 is loosely mounted in the chamber of the right-hand reel 56, and this shaft forms a portion of or is attached to the right-hand head block 65 for the said roller.

Where the shafts 59 and 64 enter the toothed portions of the chambers in the inner faces of said reels, the upper portions of the said shafts are cut away to expose the said teeth, forming thereby sections 66, shown best in Fig. 7, and in these segmental sections of the shafts 59 and 64 teeth 67 are produced, as is also best shown in Fig. 7. A shaft 68 is passed loosely through the head portions of the roller D' and out through the right-hand end of the right-hand reel 56, terminating in a knob 68^a, and in the chambered portions of each of said reels 56 and 56^a a pinion 69 is se-

cured on the said shaft 68; but said pinions while concentric relatively to the shaft 68 are eccentric relatively to the roller, so that the teeth of the pinions will engage with the upper toothed portions of said reels, leaving a space between the lower portions of the said pinions and the extending portions of the shafts 59 and 64.

The shaft 68 has end movement in its bearings, and within the roller D' a collar 71 is secured on the shaft near its right-hand end, and a spring 72 is coiled around the said shaft, having bearing against the said collar and against the right-hand head of the roller.

Normally the spring 72 will hold the shaft in such position that its pinions will be in engagement with the teeth 67 on said shafts 59 and 64, thus locking the pinions to the said shaft, and at the same time the teeth of the pinions will be in engagement with the teeth of the said reels. Consequently, upon turning the shaft 68 the reels and the roller will turn together to wind up the curtain.

When it is desired to make an adjustment of the curtain, the shaft 68 is drawn outward at its right-hand end as shown in Fig. 6, thus carrying the pinions 69 out from engagement with the teeth on the shafts 59 and 64 around which the reels turn; and upon turning the shaft 68 at such time the reels will be revolved but the roller will remain stationary.

In the construction of the roller D² shown in Fig. 8, two reels 73 are provided, the inner end portions of each of the reels constituting heads for the roller D², and these head portions of the reels have peripheral grooves 74 produced therein, which receive pins 75 extending from the roller, so that the heads are loosely mounted in the roller, and preferably nearer the right-hand than the left-hand end of the roller D² an apertured block 76 is secured to the roller, normally engaged by a clutch collar 76^a.

Each of the reels 73 is provided with a longitudinal slot 77, and a tubular shaft 78 is passed loosely through the said reels, and loosely through the block 76. The clutch collar 76^a is secured to this shaft 78. The shaft 78 extends out beyond the right-hand side of the frame and is provided with a suitable knob 78^a and carries a pinion 79 for engagement with an indicating wheel 80. Pins 81 extend from the shaft 78 out through the slots 77 in the said reels, so that the shaft may have end movement in the reels but the reels are compelled to turn with the shaft.

A small shaft 82, which may be termed a locking shaft, is made to pass loosely through the tubular shaft 78 the greater portion of its length, and at the left-hand end of this shaft 82, which extends beyond the left-hand side of the frame a ratchet wheel 83 is secured, engaged by a pawl 84 for the purpose of holding the curtain in the position to which it may have been wound. The tubular shaft

78 is provided with an interior longitudinal slot 85 at its inner side and an annular slot 86 at one end of the longitudinal slot 85; and a pin 87 extends from the shaft 82, having sliding movement in the slot 85 and being adapted at times to enter the slot 86. A spring 87^a is coiled around the tubular shaft 78, having bearing against the clutch collar 76^a carried by the shaft 78, and against the right-hand head of the said roller. In the operation of this form of the roller the spring 87^a tends to hold the shaft 78 in such position that the pin 87 from the shaft 82 will be in the longitudinal slot 85 in said shaft 78, as is illustrated, and the clutch collar 76^a will be in engagement with the block 76 secured to the roller D². Thus when the shaft 78 is turned the roller and the reels turn together for winding purposes. When, however, an adjustment of the curtain is to be provided for, the shaft 78 is drawn outward at its right-hand end, which will disconnect the clutch collar 76^a from the roller block 76 and will bring the pin 87 in the annular groove 86, thus permitting the reels to be turned without interfering with the ratchet and pawl mechanism and without turning the roller; and in order to make it certain that the roller shall not turn at such time gear teeth 88 are formed at the left-hand end of the said roller, and a bell crank lever 89 is fulcrumed within the frame adjacent to the said teeth, which bell crank lever is exteriorly operated through the medium of a spring-controlled push button 90, so that while the shaft is held out by one hand the operator will push the button 90 inward and thereby bring the elbow lever in engagement with the teeth on the roller, effectually holding the latter against turning.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent,—

1. In a photographic curtain shutter, a

winding roll, a gear controlled shutter adjusting mechanism contained in the winding roll, an exteriorly operated operating device common to both the roll and the gear-controlled adjusting mechanism, and means for directly connecting the roll with said gear adjusting mechanism and for disconnecting it therefrom.

2. In a photographic curtain shutter, a winding roll, spacing shafts mounted to turn in said roll, a transmission shaft also mounted in the roll, reels upon the spacing shafts, gear connections between the transmission shaft and the spacing shafts, a controlling shaft mounted for rotary and sliding movement in the roll and adapted to be exteriorly operated, means for driving the transmission shaft from the controlling shaft, and means operated by the controlling shaft for locking the same and the spacing shafts to the roll.

3. In a photographic curtain shutter, a frame, a tension roller mounted in the frame, a winding roller, curtain-adjusting shafts and gears carried by the winding roller, a controlling shaft in gear connection with the winding roller and the adjusting shafts and gears, means controlled by the controlling shaft for operating the adjusting mechanism independently of the winding roller, or for operating the said adjusting mechanism and the winding roller in unison, and a curtain, one section of which curtain is connected with the tension roller and the other section with the winding roller, and tape connections between the two sections of the curtain and the said reels.

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

EDWARD LANDER HALL.

Witnesses:

J. FRED. ACKER,
JNO. M. RITTER.