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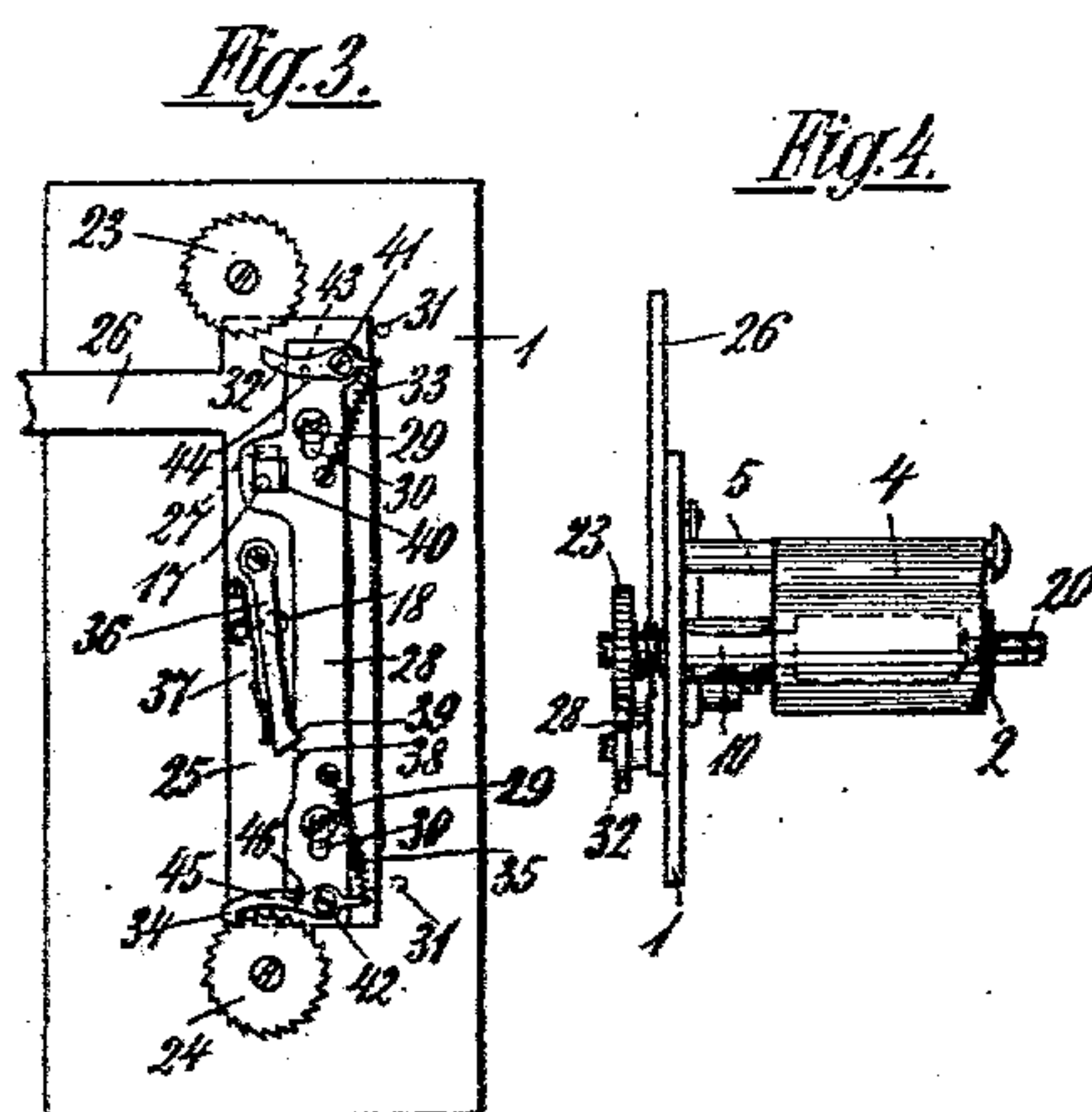
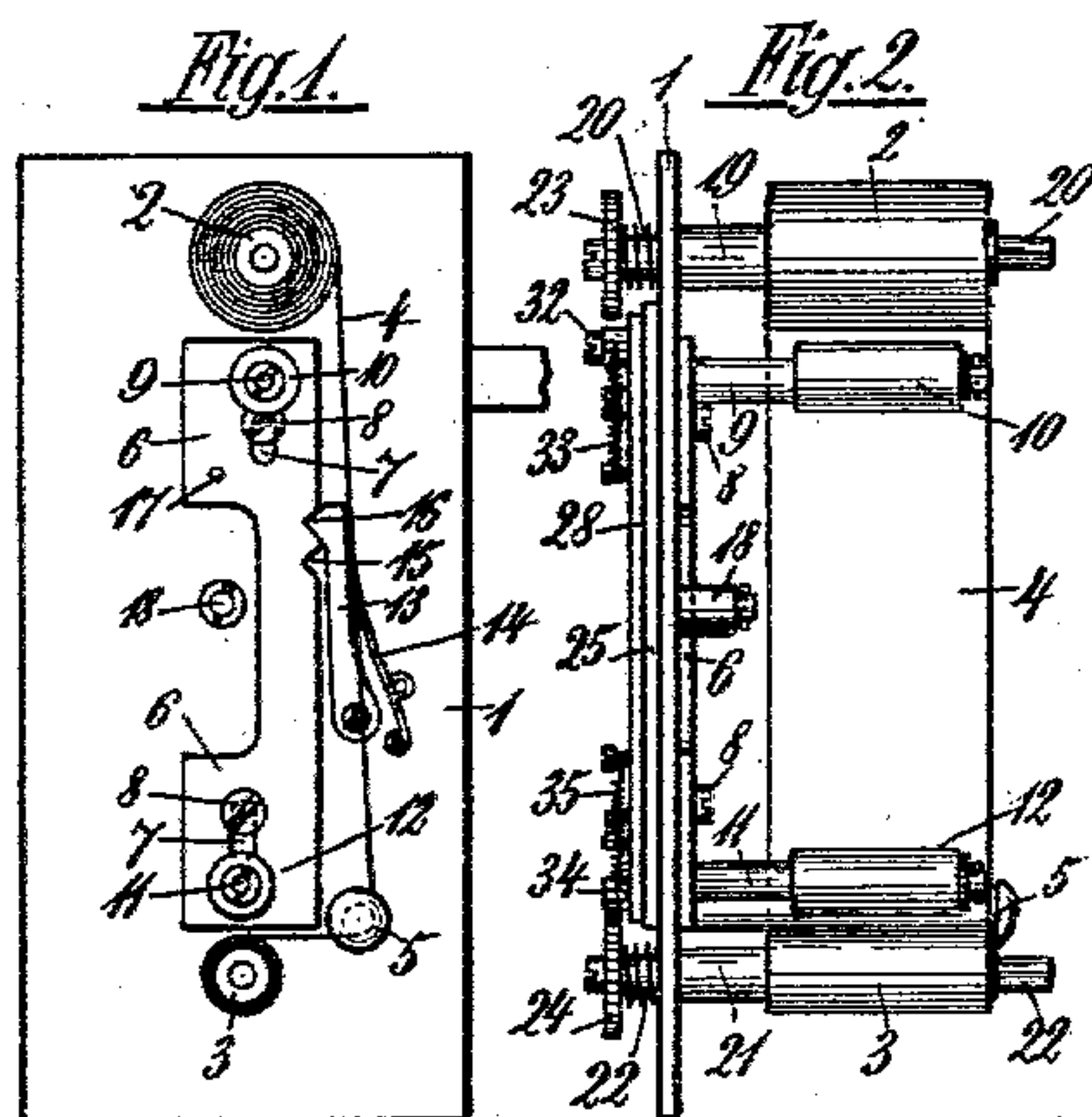
Patented Dec. 9, 1902.

R. BÜRK.  
RIBBON FEEDING MECHANISM.

(Application filed Oct. 9, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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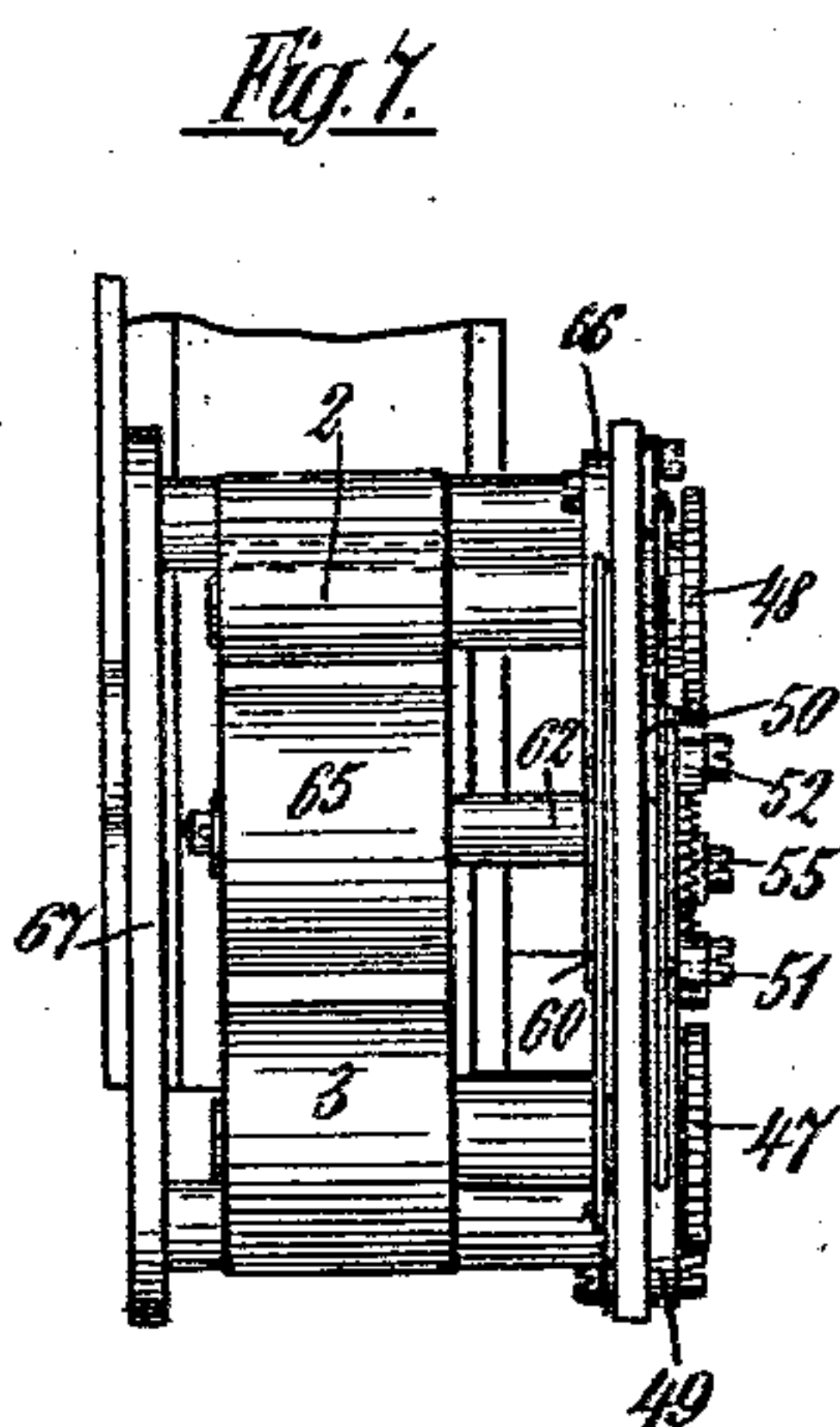
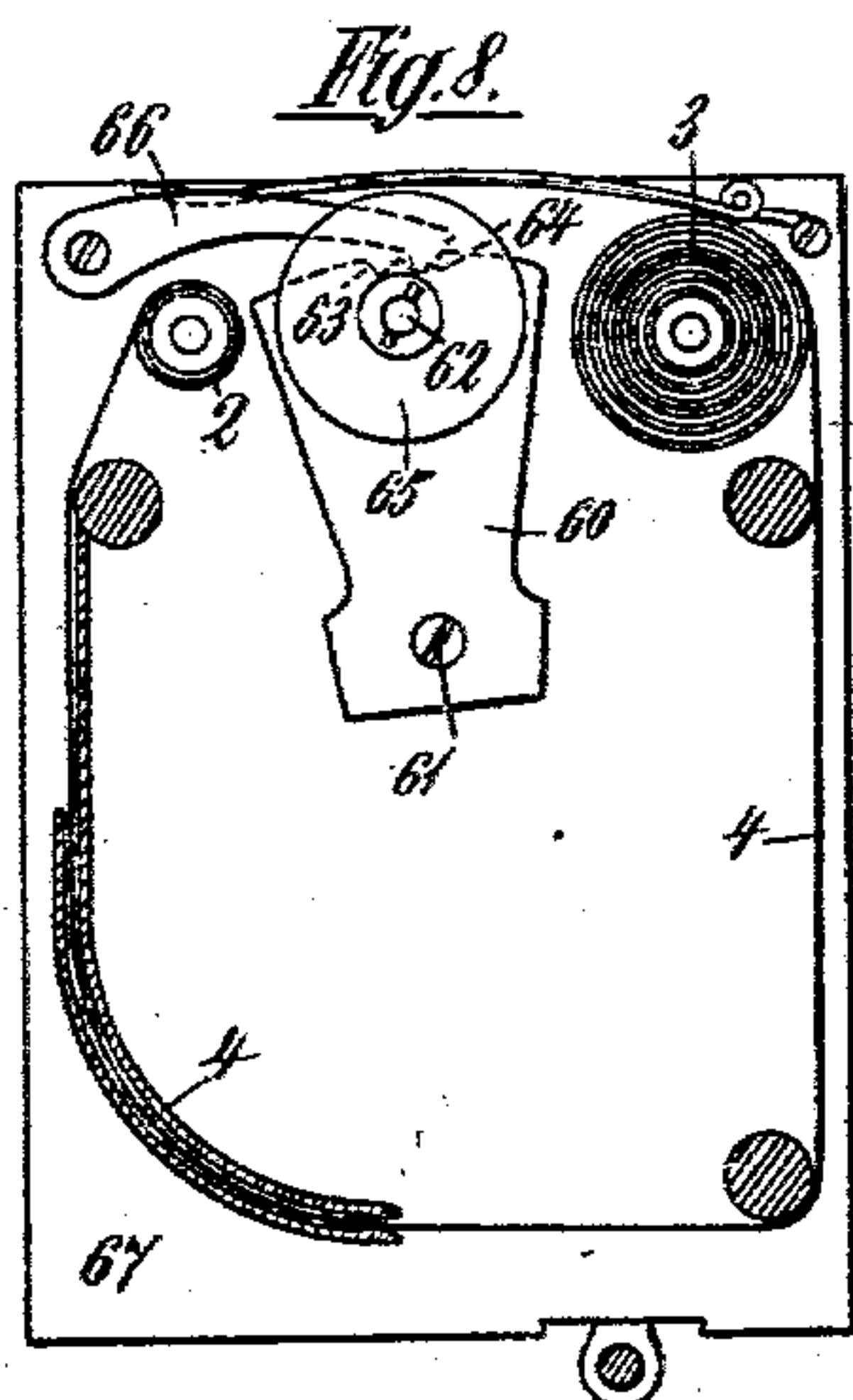
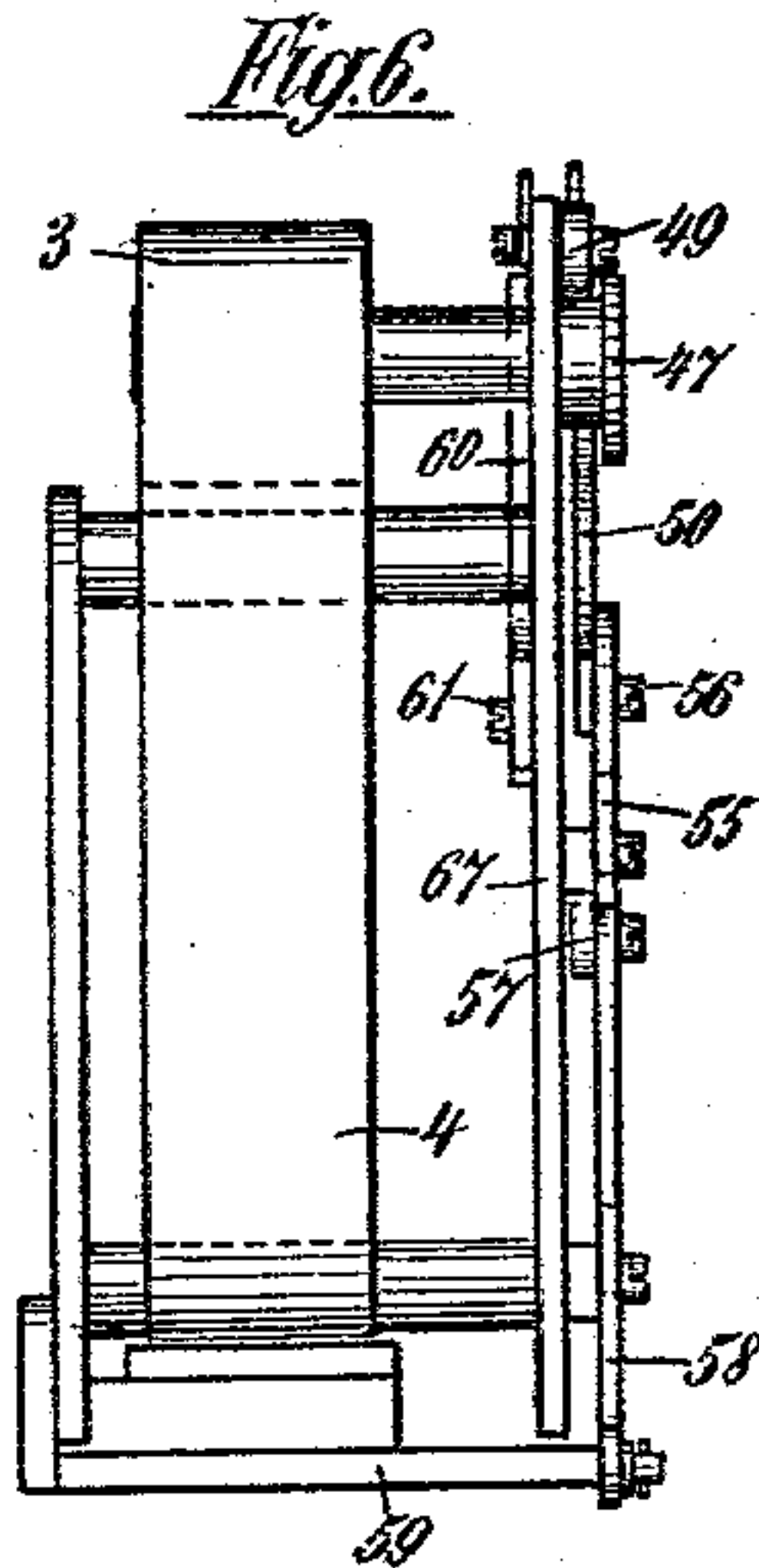
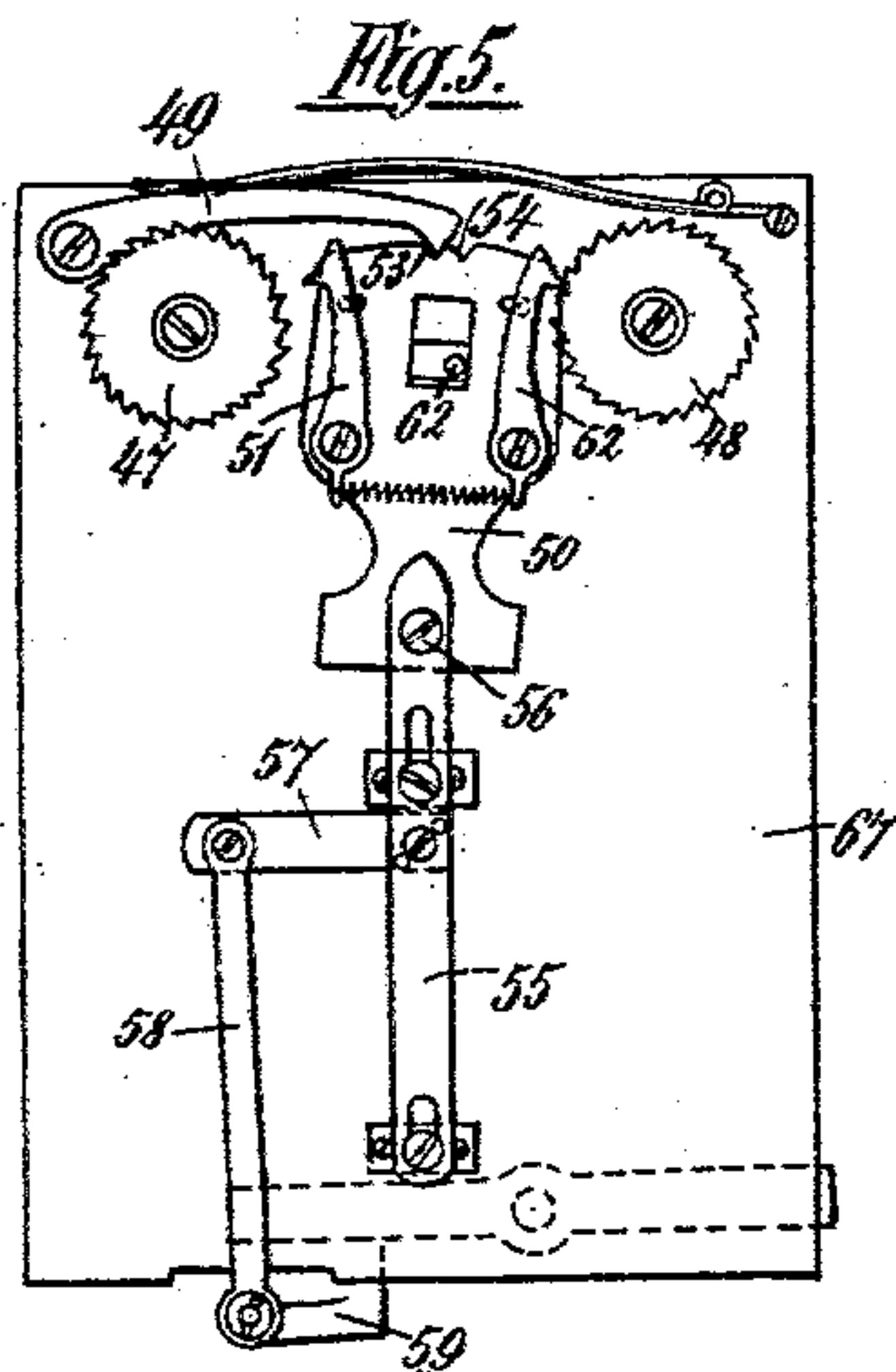
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3 Sheets—Sheet 2.



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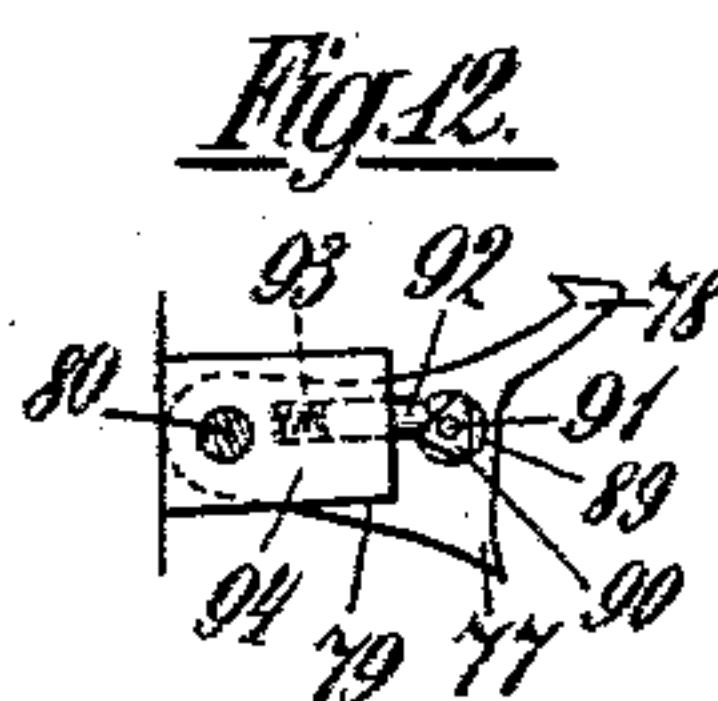
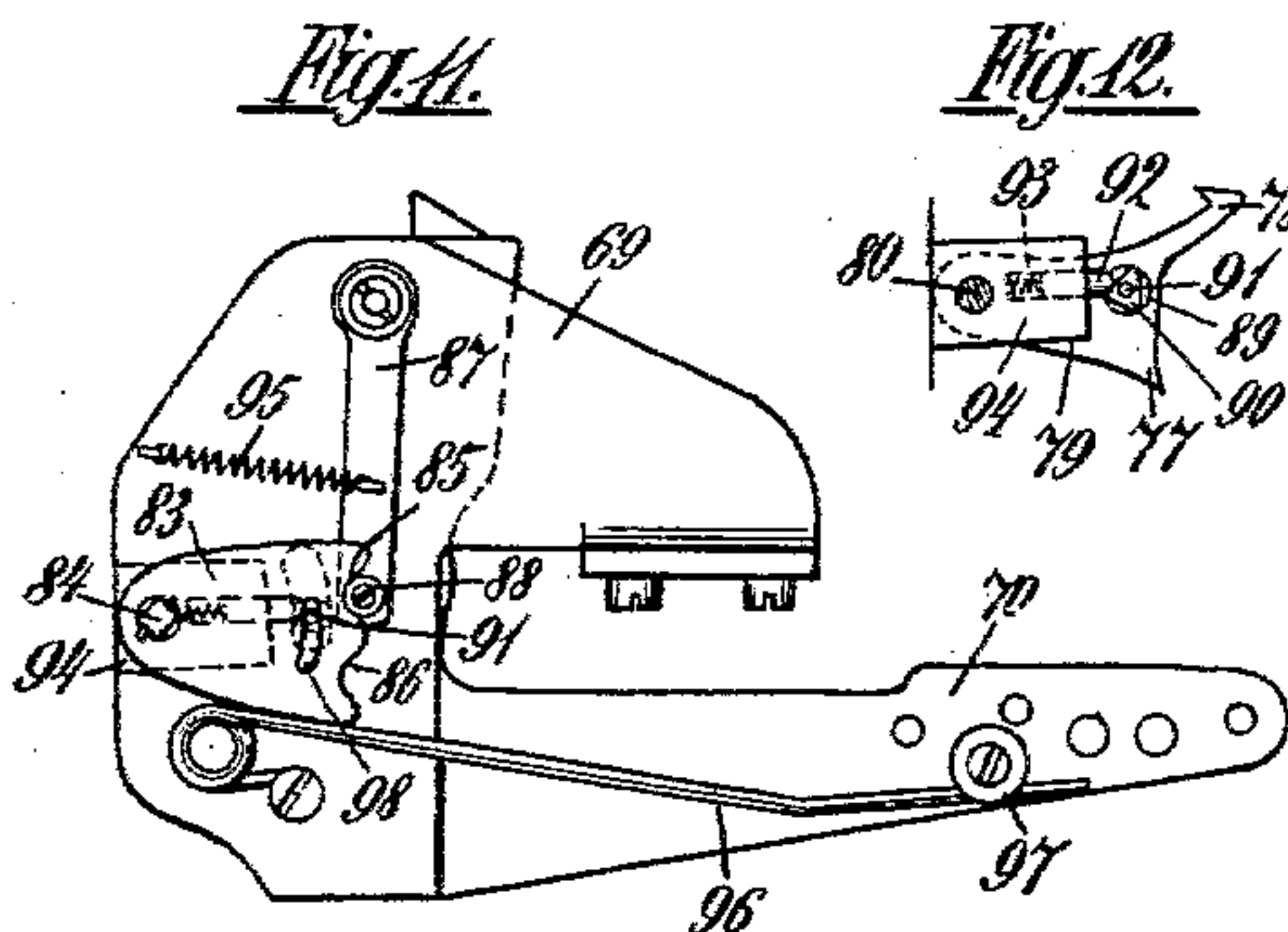
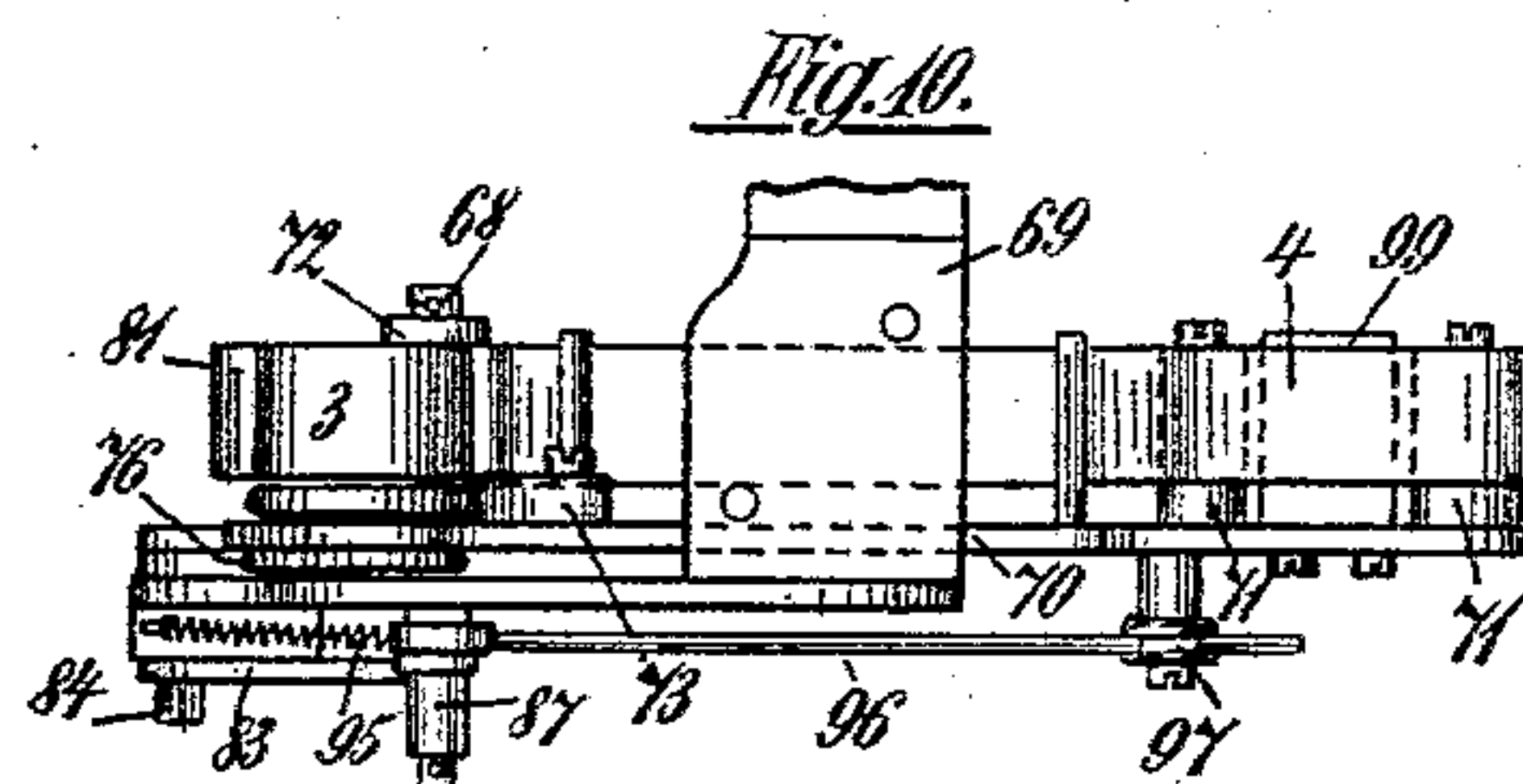
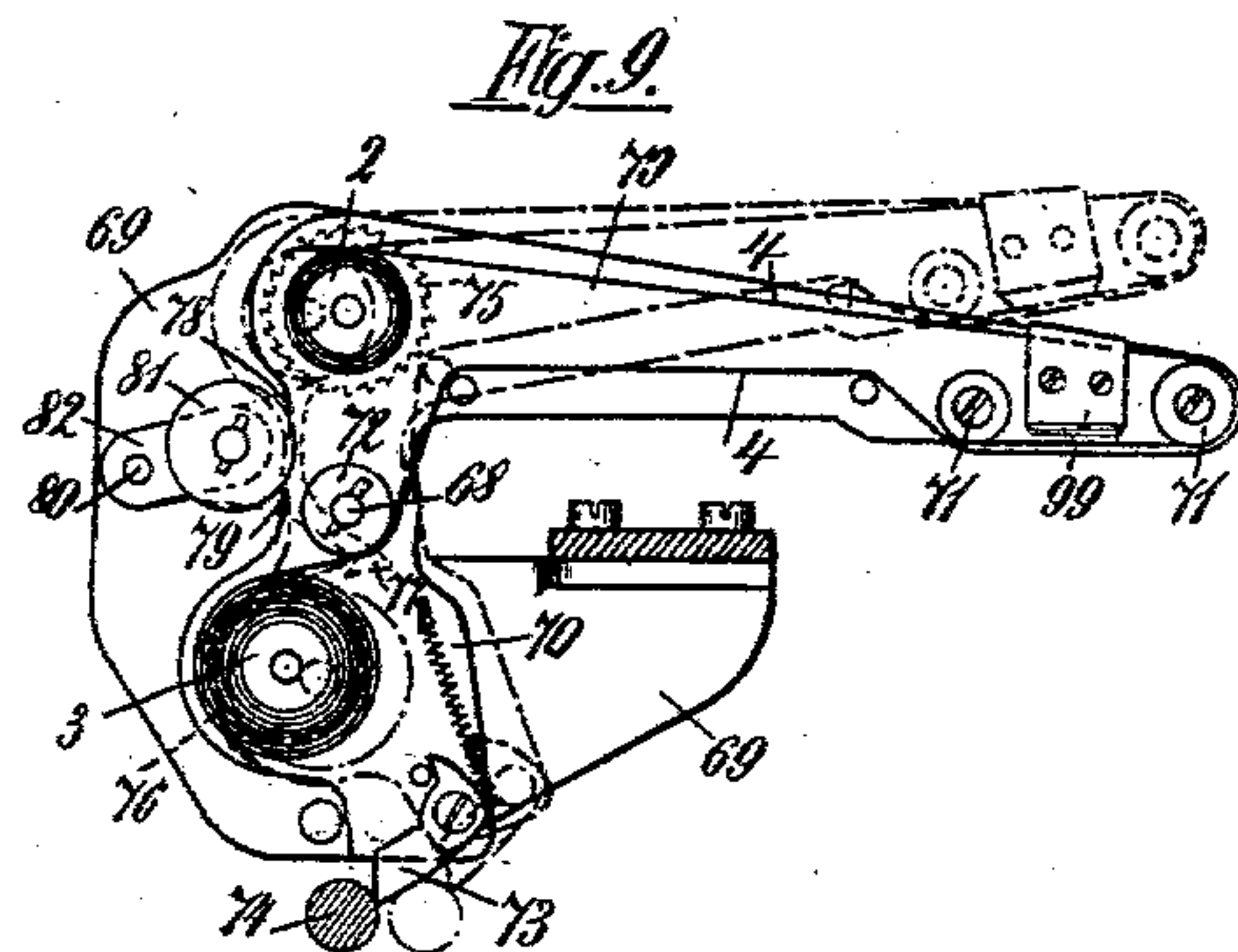
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RIBBON FEEDING MECHANISM.

(Application filed Oct. 9, 1900.)

(No Model.)

3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

RICHARD BÜRK, OF SCHWENNINGEN, GERMANY.

## RIBBON-FEEDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 715,456, dated December 9, 1902.

Application filed October 9, 1900. Serial No. 32,517. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD BÜRK, a citizen of the German Empire, residing at Schwenningen, Württemberg, Germany, have invented certain new and useful Improvements in Ribbon-Feeding Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-

10 pertains to make and use the same.  
This invention relates to inking bands or ribbons which are moved constantly or intermittently, the ends of which are fixed on two winding-spools and are wound alternately from one spool onto the other, and vice versa, and has for its object a means for automatically reversing the direction of movement of the ribbon after the winding up on one of the spools has been completed.

20 The inking ribbons or bands employed for checking apparatuses, type-writing machines, and the like each time a type has struck them are usually moved forward to an extent approximately equal to the height of the type in such a way that a fresh portion of the ribbon always comes into use. Both ends of the ribbons are for this object fixed on winding rollers or spools, on which the ribbon is wound from one onto the other alternately. On a change of spools taking place there is of course a corresponding alteration of the direction of movement of the ribbon.

35 In most of the devices for moving the inking band or ribbon hitherto employed—for instance, for type-writing machines—the change is usually effected by hand; but, for instance, in workmen's time-recorders or checking apparatuses there are also automatic reversing mechanisms, which are, however, so complicated and uncertain in action that they have hitherto not been made practical use of.

45 The object of the present invention is to provide an extremely simple automatically-acting mechanism for reversing the direction of movement of inking ribbons or bands, the most essential novelty of which consists in the reversal being effected suddenly—that is to say, in jerks—toward the end of the winding up of the ribbon on one of the spools in such a way that the device for shifting and

removing one winding roller or spool is instantaneously placed out of action, while that of the empty spool is instantaneously set in action.

Most winding-up rollers or spools for inking-ribbons are operated by ratchet-wheels which are moved forward after each stroke of a type by ratchets, levers, pawls, or the like to the extent of one tooth—that is to say, the inking-ribbon is moved forward a short piece. If the ratchet mechanism of the one ratchet-wheel for one winding-roller is in action, of course during this time the ratchet mechanism for the other winding-roller must be thrown out of action. At each alteration of the direction of movement of the inking-band one or other of the ratchet mechanisms of the winding-rollers must necessarily be thrown into or out of action. This improved automatic reversal of movement is, on the contrary, effected by means of one or two counter-rollers resting at the moment on the winding-rollers in such a way that after one of the winding rollers or spools has almost completely wound up the inking band or ribbon a slide or pivotal piece, by the forcing back of the counter-roller resting on the ribbon, is pushed back with it or turned. This slide is provided with two notches, in one of which engages the point of a catch-lever, which is pressed down by a spring. As soon as this point lies between the two notches, or rather has already somewhat exceeded the limit, it springs immediately into the next notch, by which means the slide is moved forward in jerks for a short piece before it again completely engages with one of its notches in the point of the stop-lever. A pin is also fastened on this slide, which pin engages in a slot of a slide, which is also movable or pivoted and on the ends of which the pawls for the two ratchet-wheels of the winding-up rollers are mounted. As soon as the first-mentioned slide has completed its jerky motion it carries with it the slide carrying the ratchet-wheel pawls, also in a jerky movement, so far that one pawl comes rapidly out of engagement with its ratchet-wheel, while the other comes as rapidly into engagement with its respective ratchet-wheel and a dead-point—that is to say, any failure to operate the wheels is avoided.



According to the construction of the machine or apparatus for which the inking band or ribbon is to be employed the arrangement of the automatic intermittently-operated shifting device and its driving mechanism may be varied.

In the accompanying drawings, for instance, Figure 1 is a front view, Fig. 2 a side view, Fig. 3 a back view, and Fig. 4 a plan view, of a mechanism for an intermittent or jerky reversing movement having a reversing-slide and a ratchet-lever or pivotal slide movably arranged on a pivoting elbow-lever. Figs. 5 to 8 are four similar views of a mechanism for intermittently reversing movement in which reversing-slides and ratchet-levers are pivotally arranged and the latter in addition receives a sliding movement for operating the changing-bars. Figs. 9, 10, and 11 are respectively a longitudinal section, a plan view, and a side elevation, of a modification; Fig. 12, a detail view of a mechanism for intermittent reversal of movement in which both the reversing-slide and the pawl-slide are pivotally arranged, but in which the reversal is differently attained to the two preceding arrangements. This third arrangement serves for a special object—namely, to utilize the mechanism carrying the inking band or ribbon as a printing-hammer—that is to say, to pivotally mount this device so that after a certain movement, as shown, for instance, in Fig. 9 in a dotted position, it is allowed to spring against the type-wheel, and thereby to effect the printing. As the ratchet-wheels here rotate with it the shifting-bars are made fast in such a way that on the return of the inking-ribbon, or rather on the turning back of the plate carrying the whole arrangement, one of the ratchet-wheels is turned to the extent of one tooth, and thereby actuates its winding roller or spool.

In all three arrangements, as well as in the one shown in Figs. 1 to 4, the inking band or ribbon 4 is fixed with both ends on the winding rollers or spools 2 and 3, which are mounted firmly on spindles 20 and 22, which are carried in bearings 19 and 21, fixed on the base-plate 1, and have at one of their ends ratchet-wheels 23 and 24. Pawls 32 and 34 are drawn by springs 33 and 35 in the direction of engagement, but are limited in their rotary movement by means of pins 43 and 45, fixed on them, which pins engage in slots 44 and 46 in a slide-bar 28 and by abutting on the ends of the slots engage alternately with either ratchet-wheel 23 or 24, the said pawls being pivotally mounted on pins 41 and 42, carried by said slide 28. This slide-bar 28 is movably mounted on an elbow-lever 25, pivoted on a pin 18, which lever through its arm 26 is connected with the mechanism which operates the inking-ribbon device in the ordinary manner. Consequently at each stroke of the type the said lever is turned, together with the slide-bar 28, so far

that according as the pawl 34 or 42 is in engagement the ratchet-wheel 24 or 23 is moved forward each time to the extent of one tooth. For limiting the pivoting motion of the elbow-lever 25 stop-pins 31 are provided on the base-plate 1. A pin 17 is fixed on a slide 6, and projects through a slot in the plate 1 and also through recesses 27 and 40 in the elbow-lever 25 and the slide-bar 28. The pin has for its function during the intermittent displacement of the reversing-slide 6, which is movably mounted on the plate 1 by means of screws 8 engaging in slots 7, to slide with it the change-bar slide 28 which is also movably held on the pivoting elbow-lever 25 by means of screws 29, each passing through its slot 30, but only so far that always only one of the pawls 34 and 32 comes into or out of engagement with its respective ratchet-wheel. The displacement of the reversing-slide 6 takes place by means of counter pressure-rollers 10 and 12, mounted by means of pins 9 and 11 at the ends of the slide, of which rollers always one bears against the roller or spool which at the moment is winding up the inking-ribbon and when the latter increases in diameter pushes the slide 6 toward the other winding roller or spool. As soon, then, as the projection on the slide situated between its two catches or notches 16 and 15 has passed beyond the point of the pawl or stop lever 13, which is pressed on by a spring, this latter snaps into the next catch of the slide 6, by which means the slide makes a small jerk forward. The pin 17 of said slide also carries with it the change-bar slide 28 so far that one pawl is brought out of engagement with its ratchet-wheel, but the other pawl comes into engagement with its ratchet-wheel. The ratchet movement of the one winding-roller thereupon ceases, while the other winding-roller is brought into action. In order that while the pawls 32 and 34 are in action—that is to say, so long as a change of direction has not taken place—no displacement of the supports of the same—that is to say, of the slide 28—may take place. Catches or notches 38 and 39 are also provided on the latter, in one of which the point of a pawl or stop lever 36, pressed on by a spring 37, engages and holds the slide fast. Of course in the case of the slide 28, as with the slide 6, a jerky movement takes place. As already mentioned at the commencement, the intermittent direction-changing mechanism shown in Figs. 5 to 8 differs from that shown in Figs. 1 to 4 merely by the slide 6 carrying only one counter-roller 65, serving for both winding rollers 2 and 3, which counter-roller is mounted on a lever 60, pivoted on a pin 61. The shifting-bar slide 50 is also pivotally mounted on a pin 56 and carries above two pawls 51 and 52, which alternately engage in ratchet-wheels 47 and 48, mounted on the winding-roller shafts, and this slide, like the slide 28 of the preceding arrangement, is provided with catches or notches 54 and 53, in which a



pawl or stop lever 49 engages under spring-pressure for the purpose of exactly fixing the position of the pawls. The pivoting shifting-slide 50 is coupled with a movable bar 55, which is operated at each imprinting by means of a cross-piece 57, fixed thereon by means of the bar 58 and lever 59 in any suitable manner. In a recess in the slide 50 there engages the projecting end of a pin 62, which is fixed on a lever 60 and carries the counter-roller 65. When the winding-roller has reached its maximum size—that is to say, when the winding up is completed—the roller 65 carries the lever 60 to one side, thus suddenly stopping the movement and retaining the roller by the engagement of the point of the pawl or stop lever 66 in one of the catches or notches 63 and 64 of this lever. The pin 62 of the lever 60 engages in the recess of the slide 50 and turns it so far that with one of its pawls it comes into or out of engagement with the respective ratchet-wheel. The whole arrangement is fixed on a plate 67.

The reversing device shown in Figs. 9 to 12, which was already mentioned at the commencement, is intended to serve special purposes and only differs essentially from the one described in connection with Figs. 5 to 8 by the plate 70, carrying the inking-ribbon 4, being movably held on a pin 68 of a fixed support 69. This inking-ribbon is now carried on the plate 70 over two rollers 71, between which there is mounted a printing-hammer 99, lying in front close to the inking-ribbon 4. When the plate 70 is brought into the position shown in dotted lines in Fig. 9 and then released, a spring 96, mounted on the fixed plate 69, presses with its free end, which bears on a roller 97, on the revoluble plate 70 and forces back this plate into a certain normal position, thus causing the imprinting-hammer to strike the ribbon 4 at the desired point against the types. The shifting of the ratchet-wheels 75 and 76 takes place in this device by the points 78 and 77 of a pawl-lever 79, which points are stationary during the winding-up movement and said pawl-lever 79 being pivoted on a pin 80, fixed on the fixed support 69. On the same pin there is firmly mounted an arm 82, which carries the counter pressure-roller 81. Further, a pawl-lever 83 is secured on the pin 80 and is provided with notches 85 and 86, in one of which alternately there engages a roller 88, which is mounted on a pawl or stop lever 87 and which is drawn against the lever 83 by a spring 95. The pawl-lever 83 is provided with a slot 98, in which engages a point 91 of a pin 89, fixed on the pawl-lever 79, which point 91 in the intermittent adjustment of the pawl-lever 83 also intermittently adjusts the pawl-lever 79. It will be understood that the progressive shifting of the pressure-spool 81, mounted on the arm 82, causes a corresponding gradual movement of the lever 83 until the contact-roller 88 reaches the point midway between the two notches 85 and 86, when

the tension of the spring 95 causes the roller 88 to descend into the next notch, and in doing so the lever 83 is instantaneously shifted to the extreme limit of its path. The lever 83 in its sudden movement disengages the lever 79 from the filled spool and brings it into engagement with the empty spool, the pressure-spool 81 on the arm 82 being also brought into a position contiguous to the empty spool and in such relation thereto as to be again progressively shifted as the spool fills. A bolt 92 serves for the precise adjustment and fixing of the pawl-lever 79, said bolt being adjustably mounted on the fixed plate 69, or rather in a projection 94 thereon, which bolt is elastically held by means of a spring 93 and is tapered at its point at both sides and pressed according to the position of the lever 79 against inclined surfaces 90, also arranged on this pin 89, thereby retaining the pawl-lever in its adjusted position, Fig. 12. When the inking-ribbon plate 70 is turned, both ratchet-wheels are revolved on the axis of rotation 68 of the plate, and on the return movement of the plate 70 one of the ratchet-wheels 75 and 76 rests against one of the teeth 77 or 78 of the pawl-lever 79, which turns its ratchet-wheel one tooth farther. The plate 70 is limited in its movement by a dog 73, pivoted on the frame 69 and engaging a suitable pin on the plate 70. To prevent the said dog from slipping out of engagement with the pin on the plate 70, a stop 74 is provided, against which the lower end of the dog impinges.

It is evident that in addition to the three intermittently-operated devices for changing the direction of movement hereinbefore described many other differently-shaped devices for changing the direction of movement may be employed, according to the construction and object of the inking-ribbon. All these arrangements if they are to work correctly must exhibit the object of the invention—namely, the intermittent or jerky displacement of the slide, lever, or the like carrying the pawls.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a ribbon-feeding mechanism, the combination, with the ribbon-spools, of means adapted to be actuated by the winding of the ribbon on one of the spools and having a plurality of locking-faces, means connected with the first-named means and carrying pawls for actuating the ribbon-spools and provided with locking-faces, and detents engaging the locking-faces.

2. The combination with the ribbon-spools, of a bar adapted to be actuated by the winding of the ribbon on one of the spools and having a plurality of locking-faces, a detent engaging one of said faces, a second bar connected with the first bar and carrying means for actuating the ribbon-spools and provided



with a plurality of locking-faces, and a detent engaging one of said faces.

3. In a ribbon-feeding mechanism, the combination with the ribbon-spools, of a movable bar adapted to be actuated by the winding of the ribbon on the spools, a second movable bar connected with the first-named bar and carrying means for actuating the spools, means for holding said means in engagement with one or the other of the spools as the ribbon is wound upon said spool and means for actuating the ribbon-spools.

4. In a ribbon-feeding mechanism, the combination with the ribbon-spools, of means mounted on a sliding bar and contacting with the spools, whereby the increase in bulk of the spools gradually actuates the bar, means for suddenly actuating the bar to the limit of its movement at a determined point, and a second bar connected with the first-named bar and carrying means for actuating one or the other of the spools as the ribbon is wound from one to the other.

5. In a ribbon-feeding mechanism, the combination with the ribbon-spools, of rolls mounted on a movable bar and contacting with the spools whereby the increase in bulk of the spools gradually actuates the bar, means for suddenly actuating the bar to the

limit of its movement at a determined point and a second bar connected with the first-named bar and carrying-pawls for actuating one or the other of the spools as the ribbon is wound from one to the other.

6. In a ribbon-feeding mechanism, the combination with the ribbon-spools, of a pivotally-mounted lever, a slidably-mounted bar connected therewith, pawls carried by the bar and adapted to engage one of the spools, rolls mounted on a second bar and contacting with the spools whereby the increase of the bulk of the spools gradually actuates the second bar, means for suddenly actuating the second bar to the full limit of its movement when the spool attains a predetermined bulk, means connecting the second bar with the first-named bar whereby such sudden movement of the second bar will bring the pawls carried by the first-named bar into engagement with the spool upon which it is desired to wind the ribbon.

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

RICHARD BÜRK.

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