

(No Model.)

4 Sheets—Sheet 1

W. SCOTT.
PRINTING MACHINE.

No. 594,566.

Patented Nov. 30, 1897.

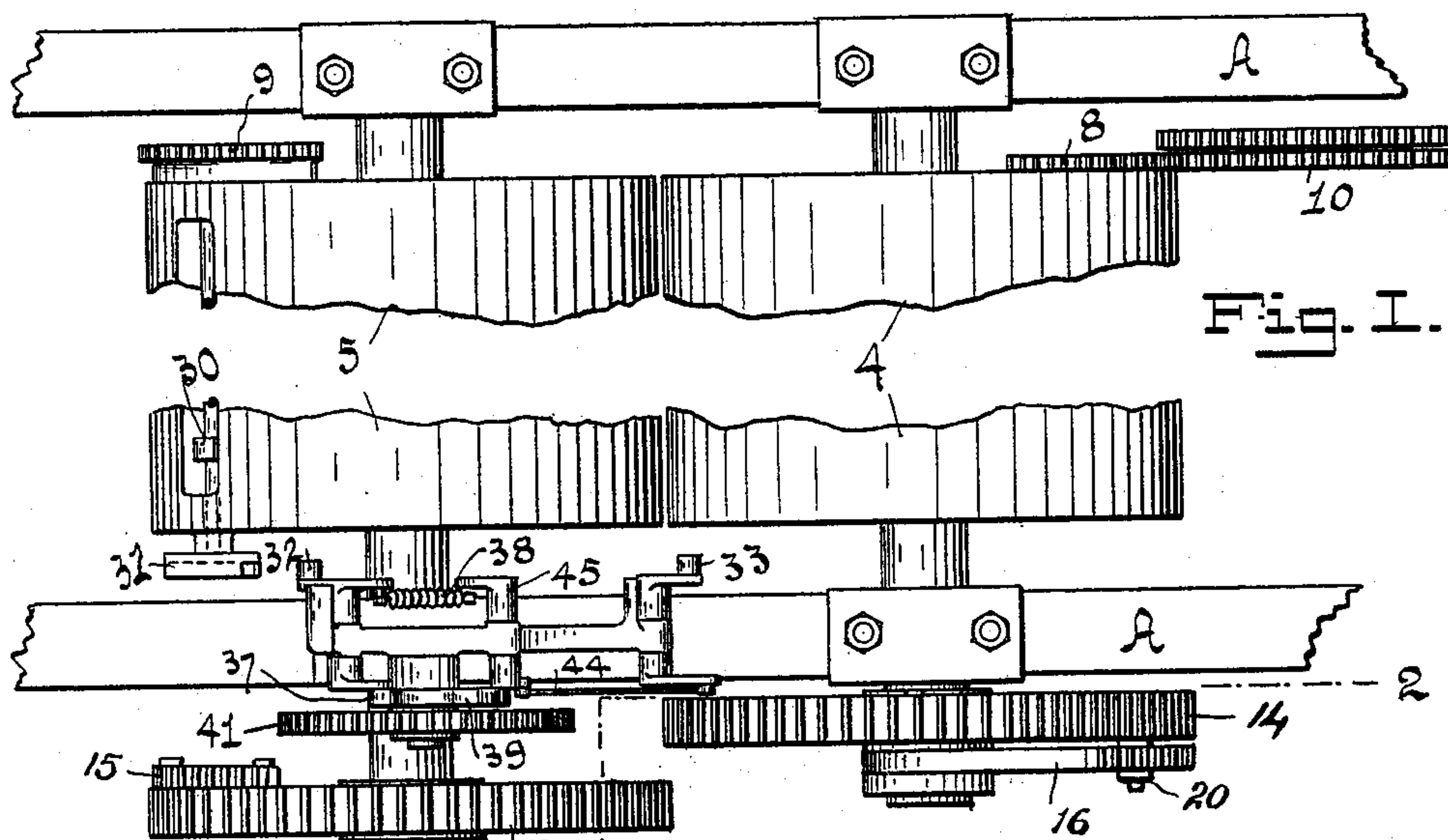


Fig. I.

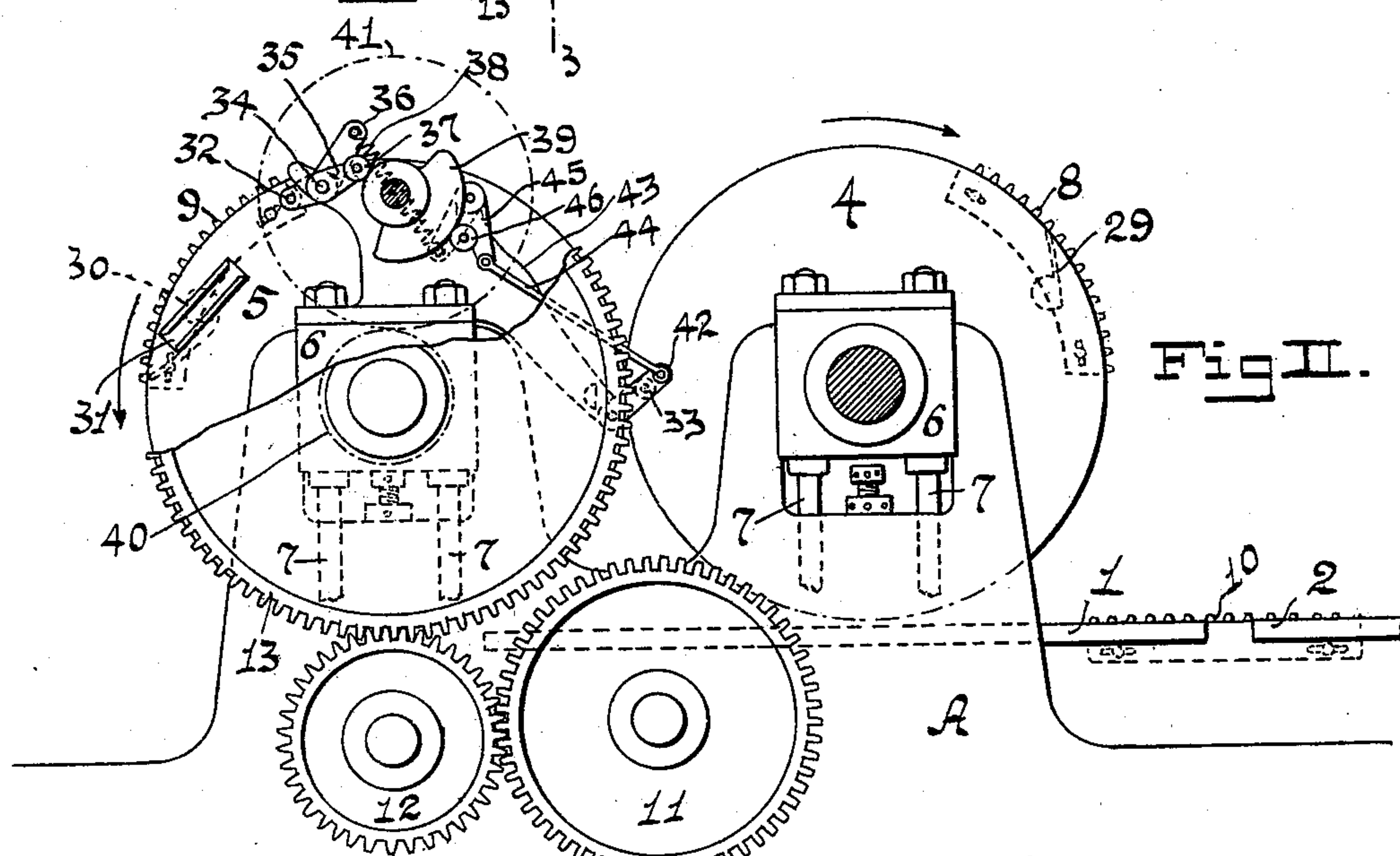


Fig. II.

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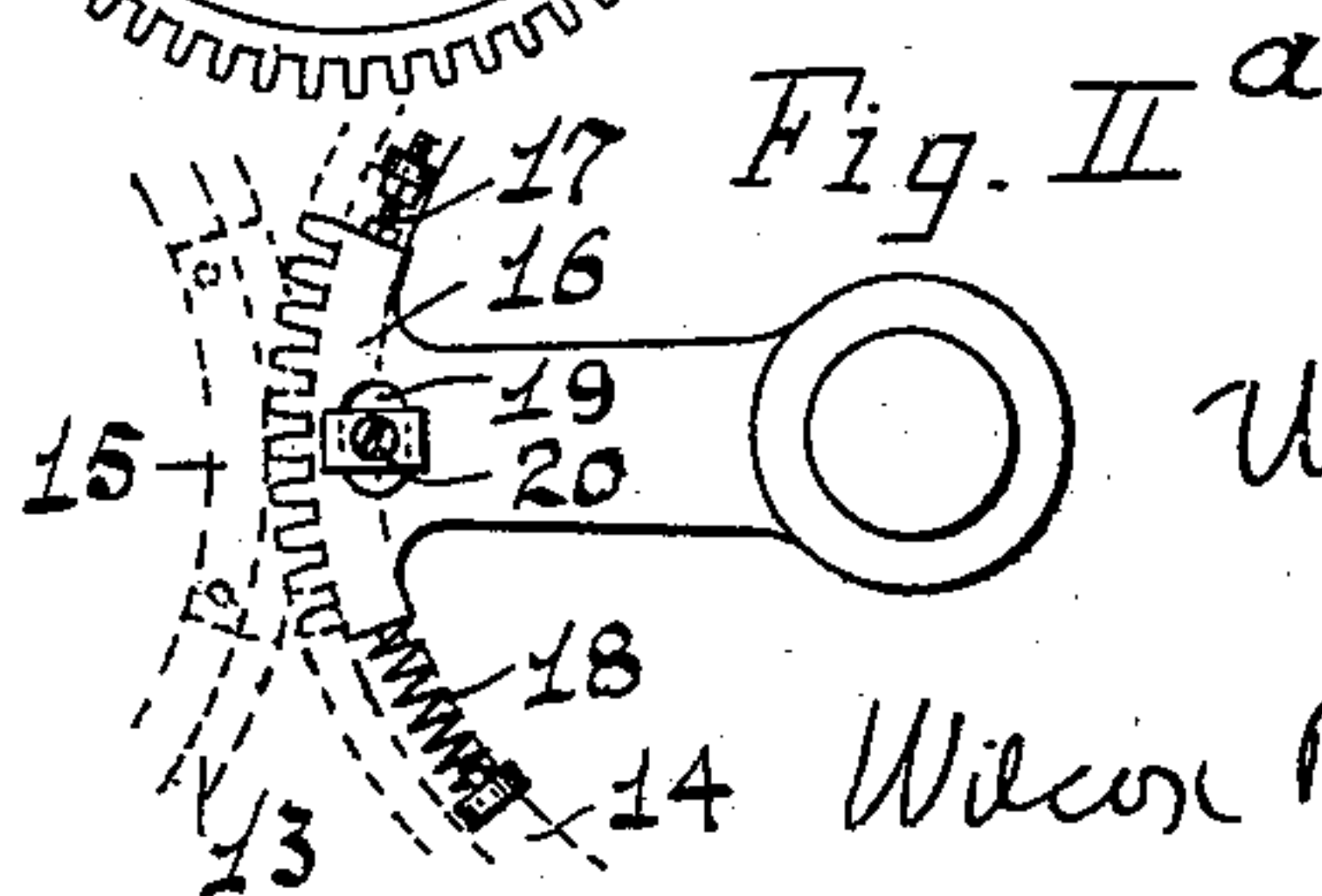
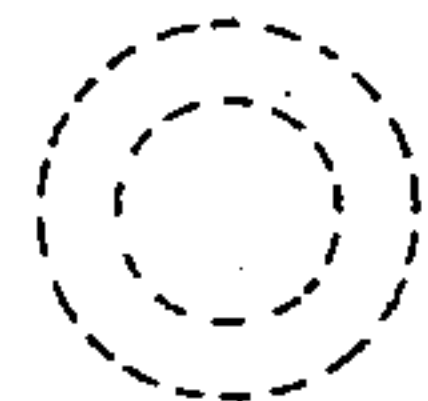


Fig. II a

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Fig. IV.

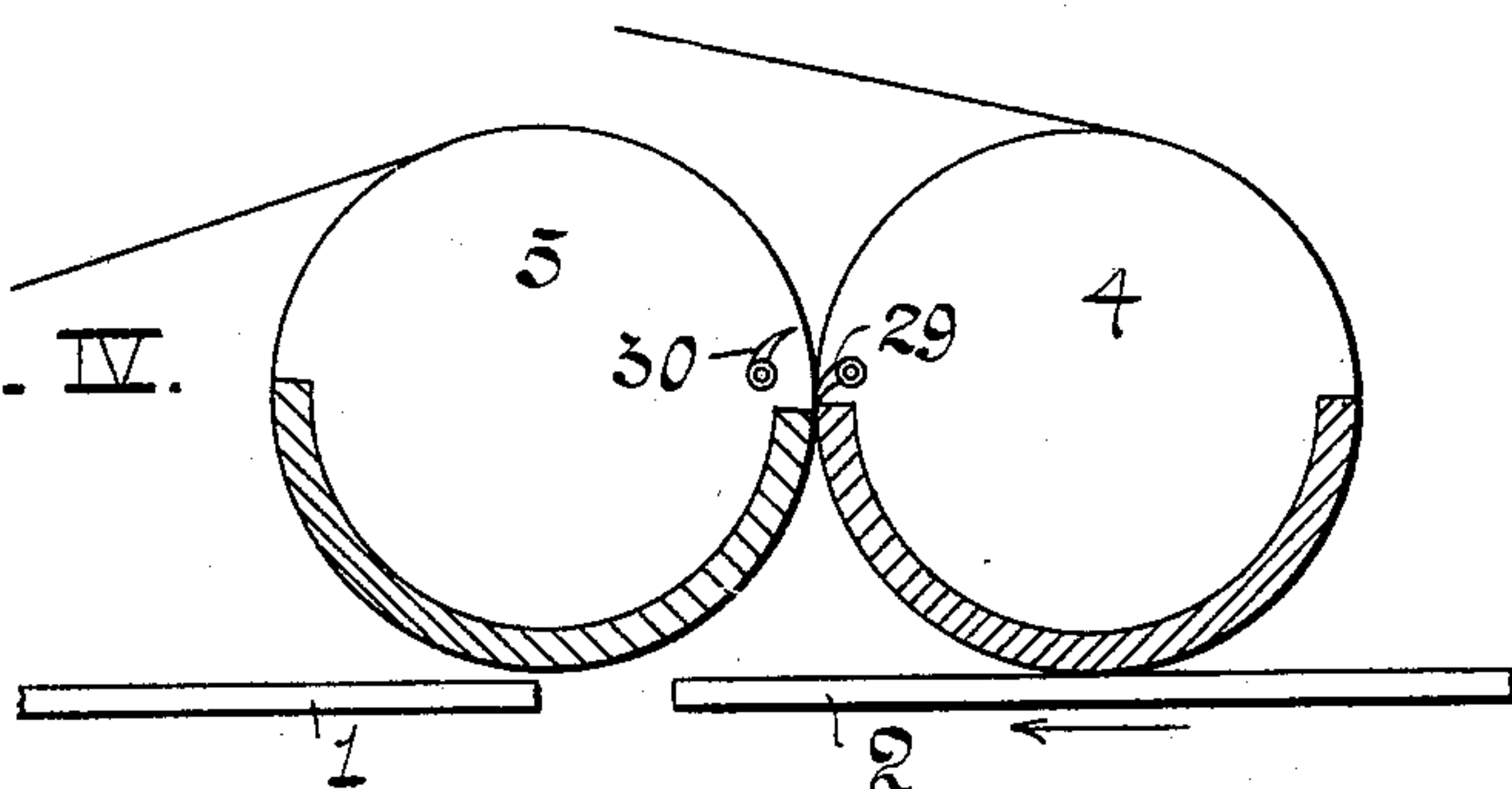


Fig. V.

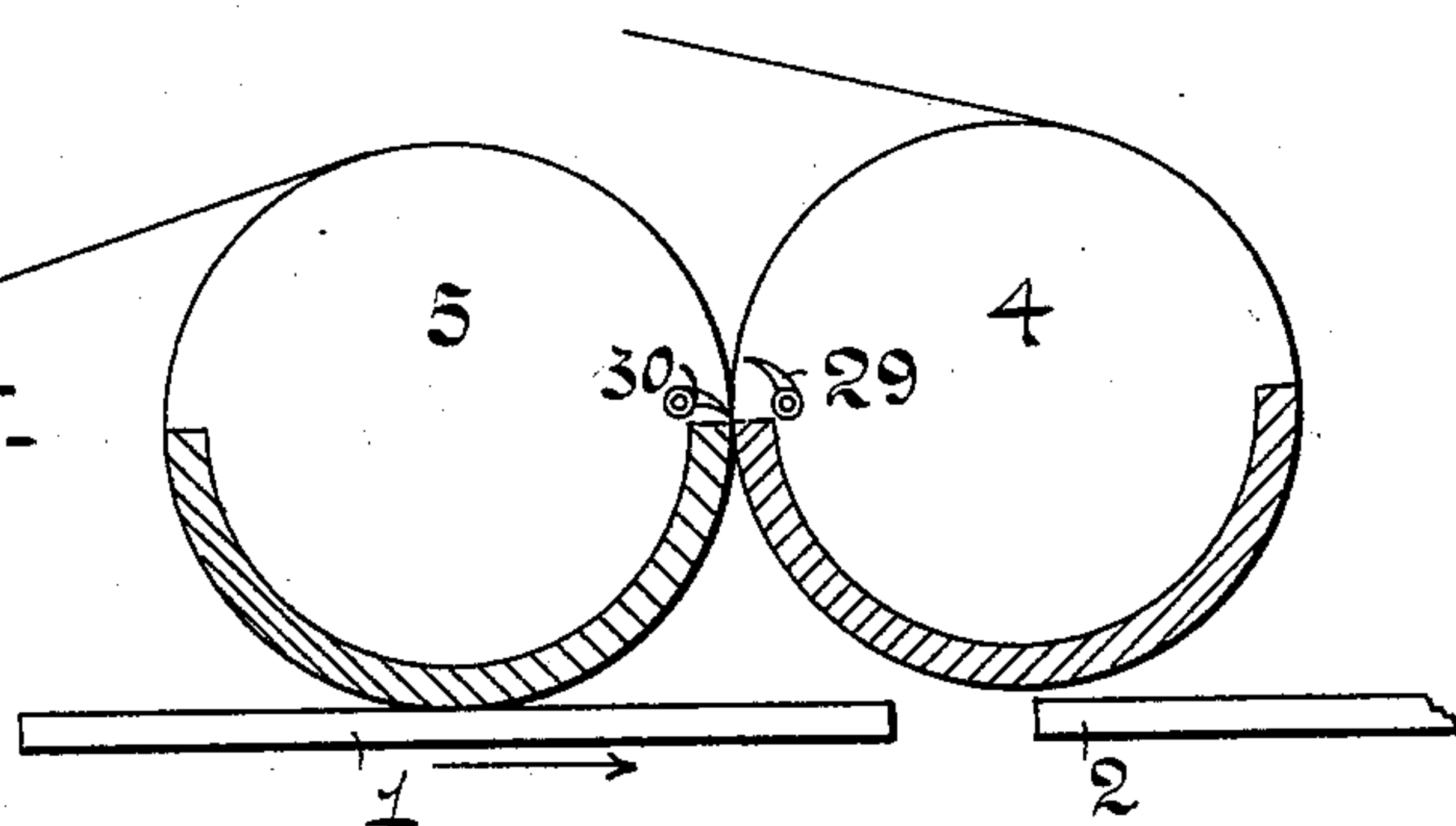
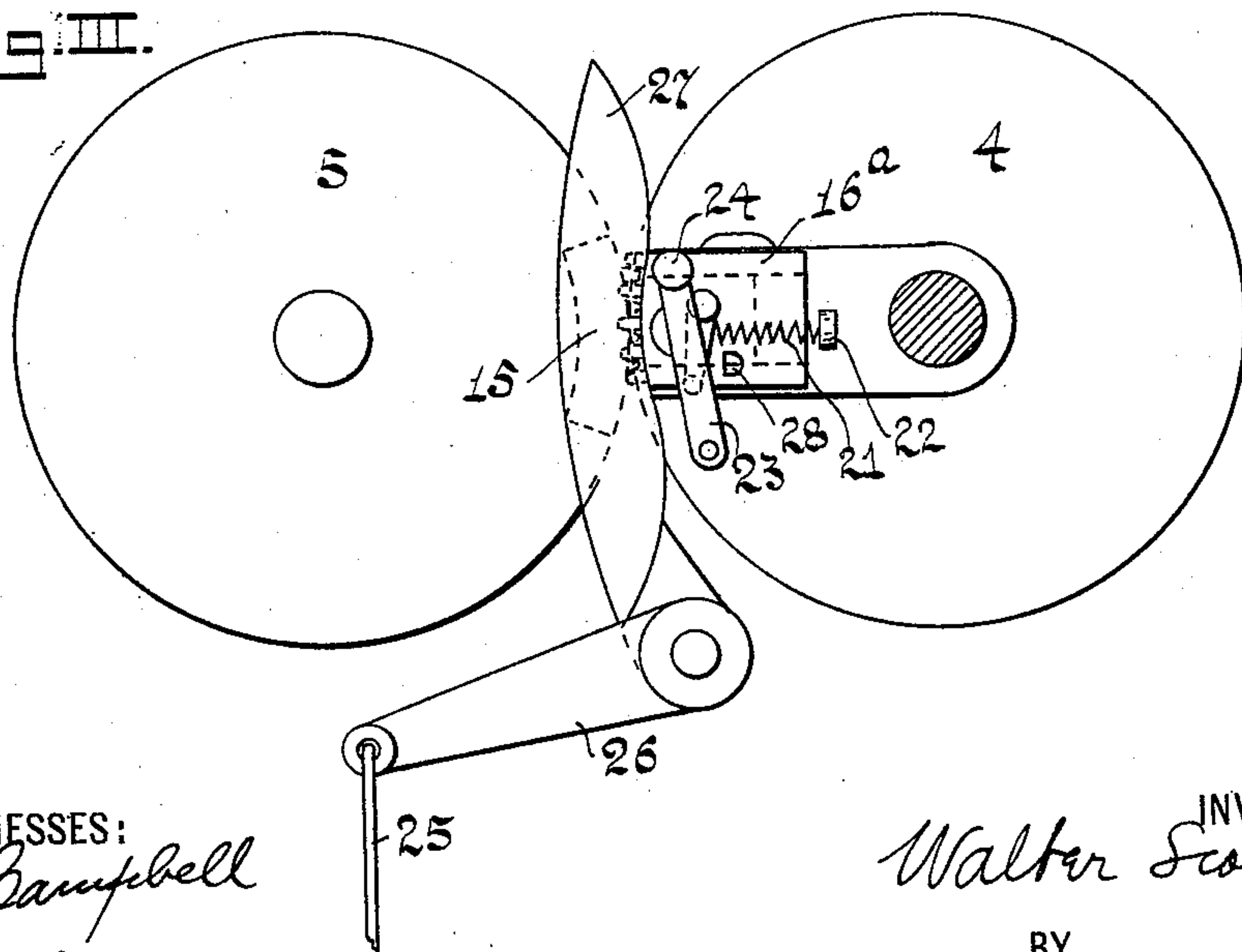


Fig. III.



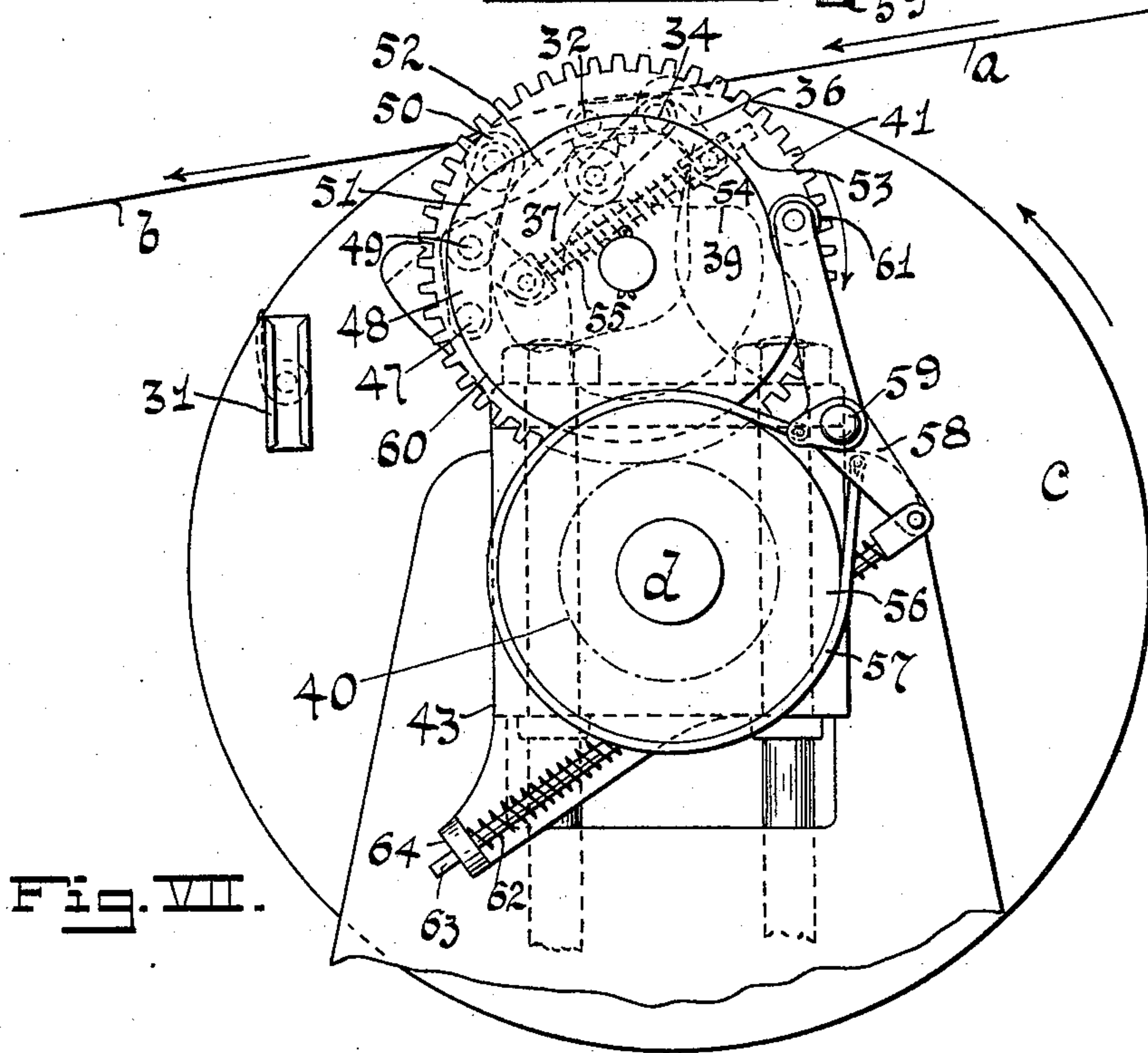
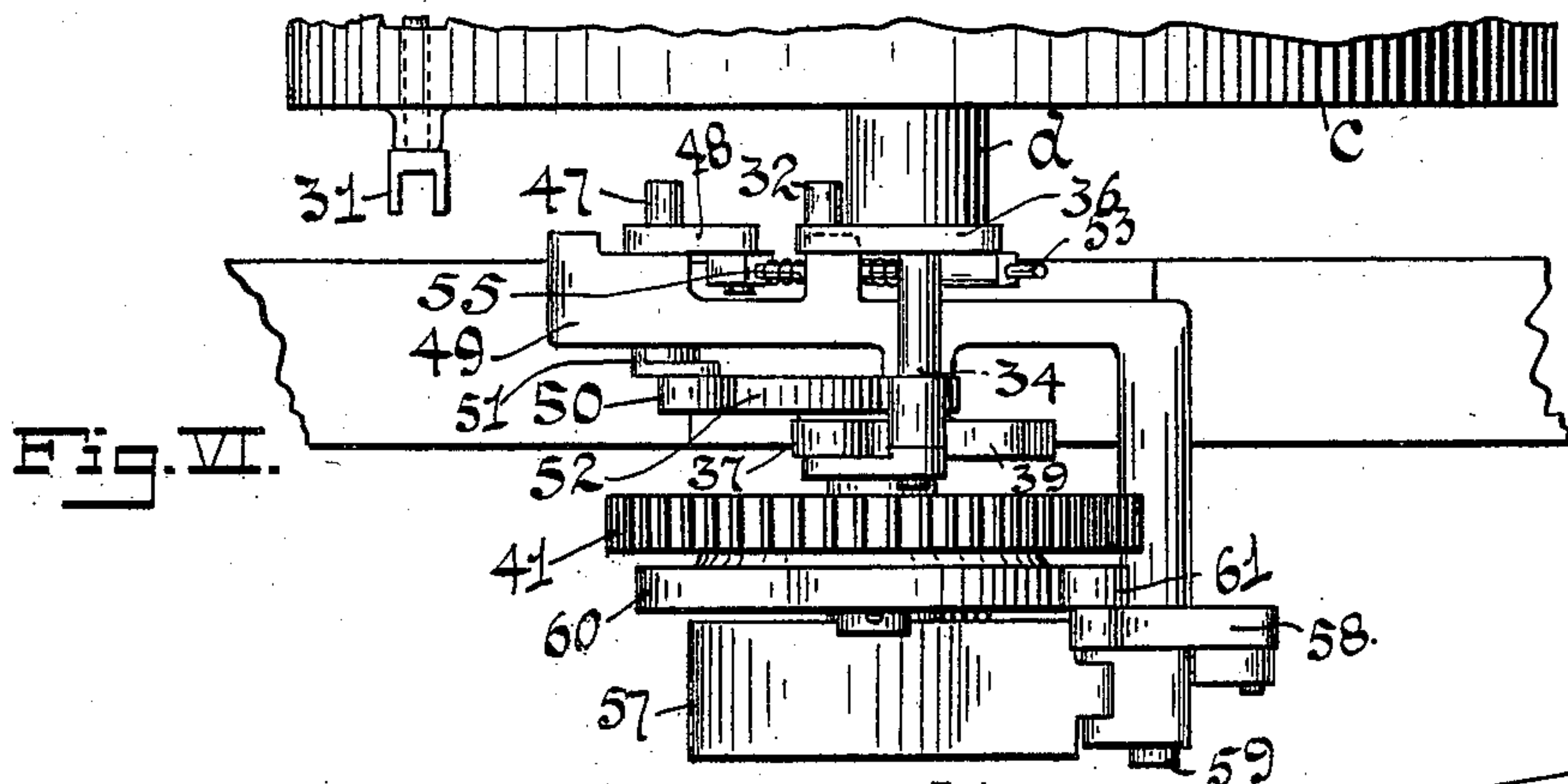
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(No Model.)

4 Sheets—Sheet 4.

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Fig. VIII.

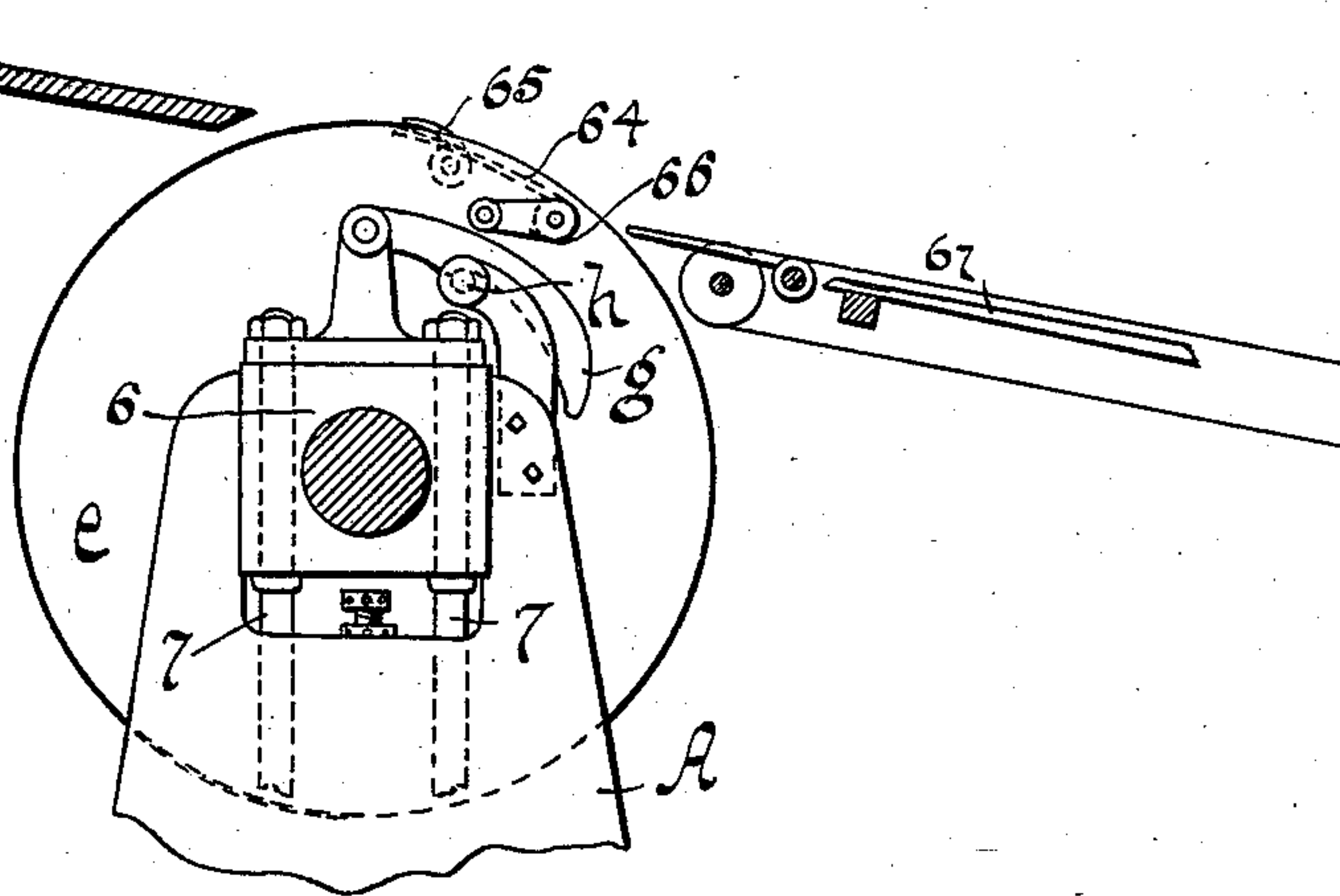
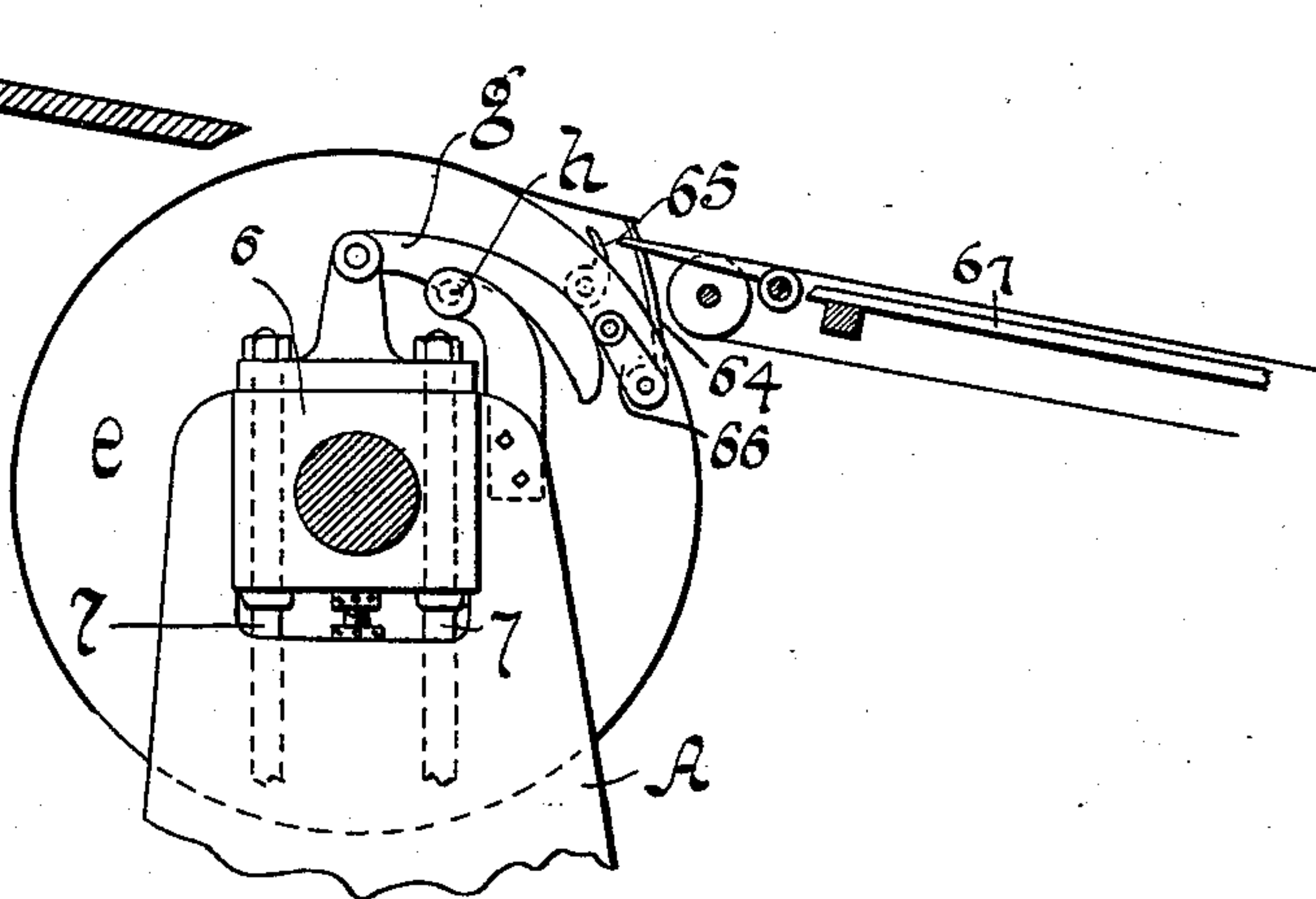


Fig. IX.



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UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 594,566, dated November 30, 1897.

Application filed March 23, 1895. Serial No. 542,887. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

This invention relates to printing-machines wherein the impression is taken between one or more impression-cylinders and a coacting form-bearer. In some of these machines there are a plurality of impression-cylinders which take impressions upon the same sheet, which is transferred from one to the other, which impression-cylinders coact with a reciprocating type-bed or with form-cylinders and are or are not lifted or moved during the return stroke of such a bed and are or are not stopped during such a return. The object of this invention is to improve the operation of the sheet-retaining mechanism of such machines, and in the case of a two-cylinder machine whose cylinders are alternatively lifted to render more certain the operation of transferring the sheet from one to the other thereof in proper register and in the event of throwing off an impression to avoid any damage to the machinery and to render such throwing off easy of doing and also to improve the mechanism for guiding the heads of sheets away from impression-cylinders.

To these ends the invention consists of the devices and combinations of devices herein-after more particularly described, and then pointed out in the appended claims.

The preferred form of the invention is illustrated in the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view showing the invention applied to a two-cylinder machine. Fig. 2 is a side elevation, partly in section, on the line 2 3 of Fig. 1 of the mechanism shown in Fig. 1. Fig. 2^a shows the mechanism omitted from Fig. 2. Fig. 3 shows a modification of the mechanism shown in Fig. 2^a. Figs. 4 and 5 are diagrammatic views illustrating the operation of the two impression-cylinders. Fig. 6 is a plan view of a brake and a gripper and a modification of the gripper mechanism. Fig. 7 is a side elevation of the mechanism shown in Fig. 6, and Figs. 8 and 9 are two

views of the sheet guiding or lifting mechanism.

Any suitable framework, as A, may be employed, and also any suitable type or form bearers may be used. The form-bearer shown in the drawings is a reciprocating bed carrying two forms 1 and 2, which coact with the impression-cylinders 4 5, respectively, in the manner set forth in my Letters Patent No. 425,710, dated April 15, 1890. The cylinders 4 and 5 are respectively the primary and the secondary impression-cylinders. The journals of these impression-cylinders are carried in boxes 6, mounted upon the rods 7, and are or may be operated in the manner set forth in said patent. These impression-cylinders carry segment-gears 8 9 for coaction with the rack 10 on the type-bed in the manner described in said patent. The impression-cylinders are driven by suitable gearing 11, 12, 13, and 14, as will be understood. The gears 13 and 14 are not in the same plane with the others and are provided with supplemental means for causing a transfer of the sheet from one to the other cylinder in correct register. The means shown for this purpose in Figs. 1 and 2^a consist of a tooth-segment 15 on the inside of the gear 13 and a movable tooth-segment 16 on the gear 14, which movable segment is normally pressed against an adjustable stop 17 by the spring 18. This movable segment 16 is pivoted upon the axis of gear 14 and is guided by means of the slot 19 and the pin and washer 20. The normal position of the segment 16 is against a stop 17, in which position its teeth mesh with those of the segment 15 and prevent any inequality in the motion of the two cylinders, so that the sheets are transferred from one to the other in proper register. As it sometimes happens that an impression must be thrown off, it is necessary that both impression-cylinders shall be lifted in such case. Means for so throwing off the impression are fully described in the patent aforesaid, and it is the object of the just-described mechanism to permit of this while attaining the required register of sheets in transferring them during the regular operation of the machine. Whenever it is desired to throw off an impression the mechanism is tripped and pri-

mary cylinder 4 is prevented from descending into the position shown in Fig. 4. When the segments 15 and 16 come to engage in such cases, the provision for the relative motion of cylinder 4 and segment 16 prevents breakage or stoppage of the parts.

In the modification shown in Fig. 3 the segment 15 coacts with a movable segment 16^a on the impression-cylinder 4 in the following manner: The segment 16^a is capable of motion radially of the cylinder 4 or its gear 14 and is held outward by means of a spring 21, which acts between the stop 22 and the toggle 23. One link of this toggle is pivoted to the segment 16^a, and the other is pivoted to the cylinder 4 or its gear 14 and carries an antifriction-roller 24 at its free end. The normal position of the parts is that shown in Fig. 3. When, however, it is desired to throw off an impression, the attendant operates the trip mechanism described in the aforesaid patent, which mechanism is connected by means of the link 25 and bell-lever 26 with the cam 27, the last named being normally out of the path of the antifriction-roller 24, and moves this cam to the right in Fig. 3 into the path of said roller and operates the toggle and moves the toggle against the stop 28 on the sliding segment and thereafter the segment and all toward the axis of the cylinder 4, thus moving the gear-tooth of the segment 16^a out of the path of those of the segment 15. On the release of the trip mechanism the cam 27 returns to normal position and the spring 21 returns the toggle and segment 16^a.

Fig. 4 shows the position of the parts of the grippers 29 and 30 at the moment the transfer of the sheets is about to be made from the cylinder 4 to the cylinder 5, and also shows the relative positions of the impression-surfaces of said cylinders as they pass each other at this time. Fig. 5 is a like view showing the relation of said surfaces as they pass each other during the second or return stroke of the bed, at which time the cylinder 5 takes the impression.

The gripper-operating mechanism shown in Figs. 1 and 2 will now be described. The grippers 29 30 are carried upon a shaft as usual, which shaft is provided with a slotted or cam head 31 of usual construction. The pins 32 33 for operating the said T-head are carried by pivoted arms, whose axes of motion are parallel to the axis of the impression-cylinder 5, as in my Letters Patent No. 508,053, dated November 7, 1893. The axis or shaft 34 for the pin 32 is provided with two arms 35 36, the first of which carries an antifriction-roller 37 and the second of which is connected with a spring 38. The roller 37 coacts with a cam 39, which is driven from the axis of cylinder 5 by means of the gears 40 41, the latter of which is twice the diameter of the former. The pin 33 is borne by an arm 42, which is pivoted in an extension of the frame 43, which itself is bolted upon the journal-box 6 of the cylinder 5. This arm 42 is con-

nected by means of the link 44 with the bell-lever 45, which is journaled upon the said framing 43, and has a roller 46 for coaction with the cam 39 aforesaid. The bell-lever 45 is connected with the spring 38 aforesaid, which thus acts to hold both rollers 37 and 46 against the cam 39. If at any time the slotted T-head 31 should be in a wrong position, so that either the pin 32 or 33 could not enter its slot to operate it, such pin will strike the side of the T-head and be moved in or out, according to the pin so striking, distending the spring 38 and sliding along the T-head until it passes the same, thus avoiding any danger or damage to the machine. This function is also fully set forth in my last patent aforesaid. When the parts are in normal position, the spring 38 has little, if any, action or movement of extension or compression, thus conducing to a long life thereof. The cylinder 4 may be provided with a like mechanism, it being understood that the pins 32 33 are for actuating the grippers of the cylinder 5. The tumbler or T-head 31 shown in Fig. 2 is in a wrong position for passing the pin 32 the next time it comes around thereto, the direction of motion being that indicated by the arrow on the left of the impression-cylinder 5, for when this T-head again arrives at the pin 32 the roller 27 will be upon the high portion of the cam 39 and the pin 32 will be inward of the position shown, so that it will strike the inner side of the said T-head, and its roller 37 of course would be moved off the cam for the time being by the action of the T-head upon the pin 32.

The brake and gripper mechanisms shown in Figs. 6 and 7 will now be described. In this case the gripper mechanism is shown in connection with a single-cylinder machine in which the feed is at or near the top of the cylinder and the delivery somewhat in advance in the direction of the motion of the rotation of the cylinder, the feed being indicated by the line *a* and the delivery by the line *b*. The pin 32 is carried by substantially the mechanism above described and operates to close the grippers to receive sheets. The pin 47 for opening the grippers to release the sheets as they go to the delivery is borne by the arm 48 from the axis or shaft 49 and is operated by means of the roller 50 on arm 51 from said shaft 49 and the cam 52, which is on the axis of the gear 41. The arms 36 and 48 are connected by means of the rod 53, which is pivotally connected with the arm 48 and which passes through the sleeve 54, which is pivotally connected with the arm 36. A compression-spring 55 surrounds said rod and abuts against a shoulder thereon and against the sleeve 54 aforesaid. Should the T-head 31 be in a wrong position when it approaches either the pin 32 or 43 when the latter is in its gripper-operating position, the said pin will strike the side of the T-head, and its operating-roller will be lifted from the corresponding cam, the spring 55 being put under

greater compression during this time, as will be readily understood.

The impression-cylinder *c* in the construction shown in Figs. 6 and 7 is a two-revolution cylinder which is lifted during the return of the bed. The spring 55 is not subject in the normal positions of the parts to much, if any, compression or extension, as above noted in connection with spring 38. For the purpose of causing the cylinder to be in proper position or register I provide a suitable brake mechanism, which will now be described. The shaft *d* of this cylinder *c* is provided with a friction-disk 56, fast thereon. A brake or friction strap 57 surrounds said disk, said strap having its ends secured to the bell-lever 58 at opposite sides of the plane passing through the axis of the impression-cylinder *c* and the pivot 59 of the bell-lever in such manner that as the lever is moved in one direction the strap is tightened upon the periphery of the disk 56 and is loosened as the lever is worked in the other direction. The lever 58 is operated by means of the cam 60 on the axis or shaft of the gear 41, there being an antifric-tion-roller 61 on the said lever. This roller is kept in contact with the cam by means of the push-spring 62, surrounding the rod 63, which is pivotally connected to the bell-lever 58 and passes loosely through a lug or projection 64 on the framing 43, which carries the gripper-operating mechanism. In this way the cylinder is caused to be in proper position for coaction with the forms when it again takes an impression.

The improved sheet guiding or lifting mechanism shown in Figs. 8 and 9 will now be described. The impression-cylinder *e* has a rising-and-falling motion by suitable means, as the rods 7. The journal-boxes 6, or one of them, has pivoted to it a cam *g*, which cam rests upon a pin or projection *h* of the fixed framework *A* of the machine. The cylinder *e* is provided with suitable sheet-lifting fingers 64 and grippers 65. The shaft of the lifting-fingers 64 has an arm 66, which lies in the vertical plane of the cam *g*. When the impression-cylinder is in a raised position, as in Fig. 8, at which time it could be taking a sheet or would be lifted from the bed, as the case may be, the cam *g* lies so far inward that the roller of the cam 66 does not touch it, and the lifting-fingers are inoperative. When, however, the impression-cylinder is down, as in Fig. 9, the cam *g* is lifted or moved relative to the cylinder, so that the roller of the arm 66 will ride thereupon and the lifting-fingers be operated, as shown.

While I have described the preferred forms of the invention, it is obvious that many changes may be made in the details and in parts of combinations without departing from the spirit thereof. The means for causing registry during the transfer of sheets may be constructed in other ways and the movable gear-segment may be moved by means and in directions other than those shown without de-

parting from the invention, and other changes may be made also.

The end teeth of one or both segments 15 16 are sharpened off by preference in order to give ease of action to the parts.

It is understood, of course, that grippers 29 30 are not operated by the same mechanism, but that each set has its own operating mechanism by which it is operated at suitable times.

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

1. In a printing-machine, the combination with an impression-cylinder having a rising-and-falling motion, guide or lifting fingers thereon, a cam rising and falling with and also movable relatively to the cylinder, and a fixed projection or pin on the framework for operating said cam, substantially as described.

2. In a printing-machine, the combination of an impression-cylinder having a rising-and-falling motion, a cam pivotally connected therewith, the pivot of said cam rising and falling with said cylinder, lifting-fingers on said cylinder, and a fixed pin or projection on the framework for coaction with said cam to move the same on its pivot and operate the lifting-fingers, substantially as described.

3. The combination with a two-revolution cylinder, and the slotted T-head of its gripper-shaft, of two pins, one for closing and the other for opening the grippers during alternate revolutions of the cylinder, pivoted arms for carrying said pins, said arms having their axes of motion parallel to the axis of the cylinder, and mechanism provided with an elastic or yielding element for rocking said arms to move said pins into and out of positions wherein they operate said gripper-shaft, and whereby said pins slide over or pass a misplaced T-head, substantially as described.

4. The combination with a two-revolution cylinder, and the slotted T-head of its gripper-shaft, of two pins, one for closing and the other for opening the grippers during alternate revolutions of the cylinder, pivoted arms for carrying said pins, shafts carrying said arms, said shafts being parallel to the axis of the cylinder, second arms on said shafts, and cam-operated means provided with an elastic or yielding element for rocking said arms and shafts to move said pins into and out of position for operating said gripper-shaft, and whereby the said pins slide over or pass a misplaced T-head, substantially as described.

5. The combination of a rising-and-falling two-revolution cylinder, boxes in which the shaft of said cylinder is journaled and by means of which the cylinder is lifted and lowered, a frame carried by one of said boxes, a rock-shaft journaled in said frame parallel to the axis of the cylinder or nearly so, grippers on said cylinder, connections from said rock-shaft for operating said grippers, a brake-wheel on said cylinder, a second shaft in said

frame driven from the cylinder, and connections from said second shaft for rocking said rock-shaft and for controlling said brake-wheel, substantially as described.

- 5 6. The combination of a reciprocating form-carrier, two impression-cylinders alternately rising from and falling to position for coac-
tion with said carrier to take impressions and
one transferring the sheets to the other, a
10 toothed gear-segment fixed on one of said cylinders, a toothed gear-segment movable circumferentially of the other of said cylinders, a spring normally pressing said movable segment against a stop on said cylinder, and
15 mechanism for throwing off impressions, at which time said movable segment is moved circumferentially of its cylinder when in mesh with said fixed segment, substantially as described.

7. In a printing-machine, the combination 20
of an impression-cylinder, the slotted T-head of the gripper-shaft, two pins borne by pivoted arms for operating said head, cam-controlled mechanism for rocking said arms on
their pivots, said mechanism containing a 25
spring which during normal operation of the mechanism exerts substantially the same force and keeps the pin-moving mechanism against the cam or cams, substantially as described. 30

Signed at New York, in the county of New York and State of New York, this 22d day of March, A. D. 1895.

WALTER SCOTT.

Witnesses:

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R. W. BARKLEY.