

No. 637,573.

Patented Nov. 21, 1899.

E. HETT.

GUIDING AND DELIVERING DEVICE FOR PRINTING PRESSES.

(Application filed May 18, 1897.)

(No Model.)

6 Sheets—Sheet 1.

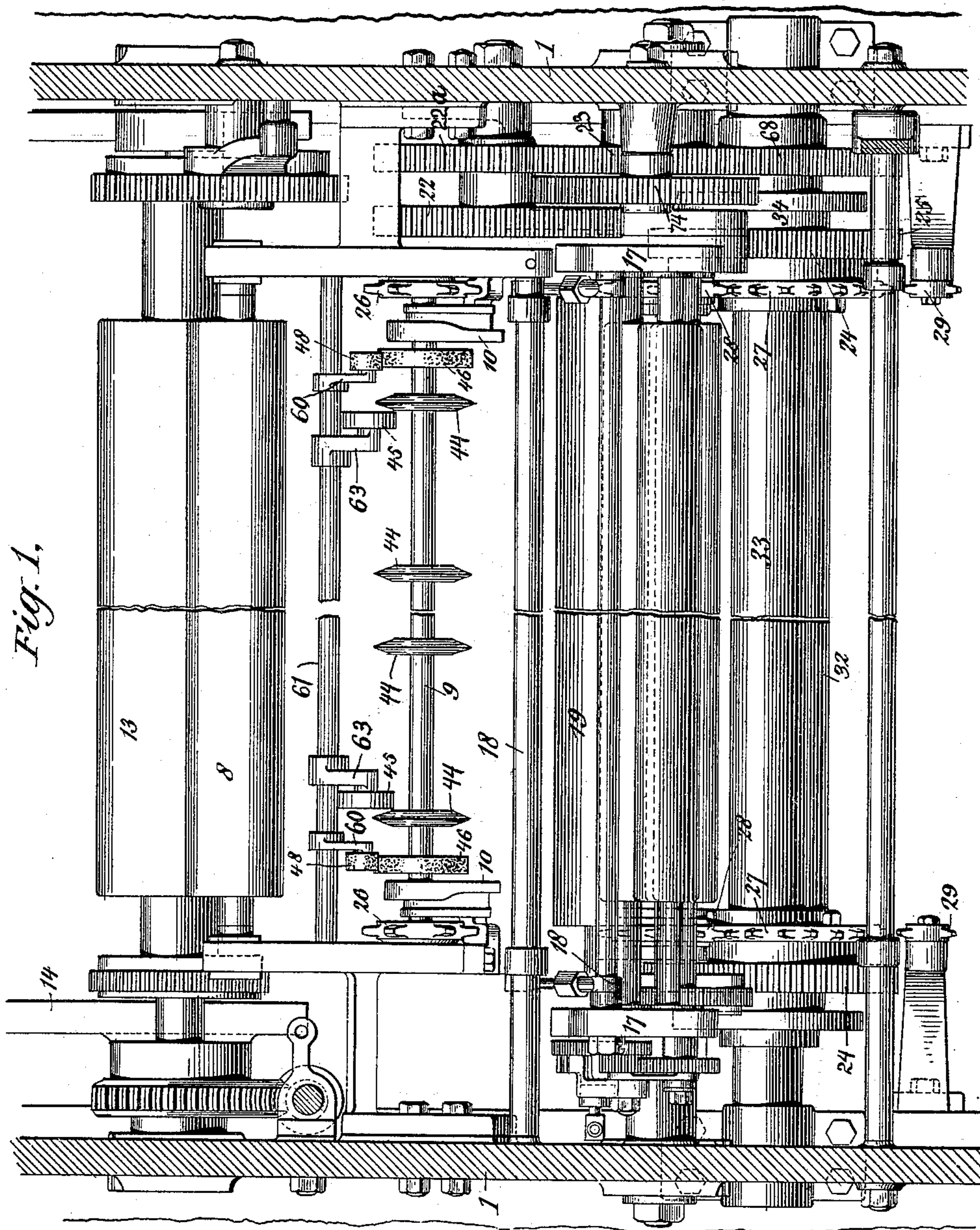


Fig. 1.

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Fig. 2.



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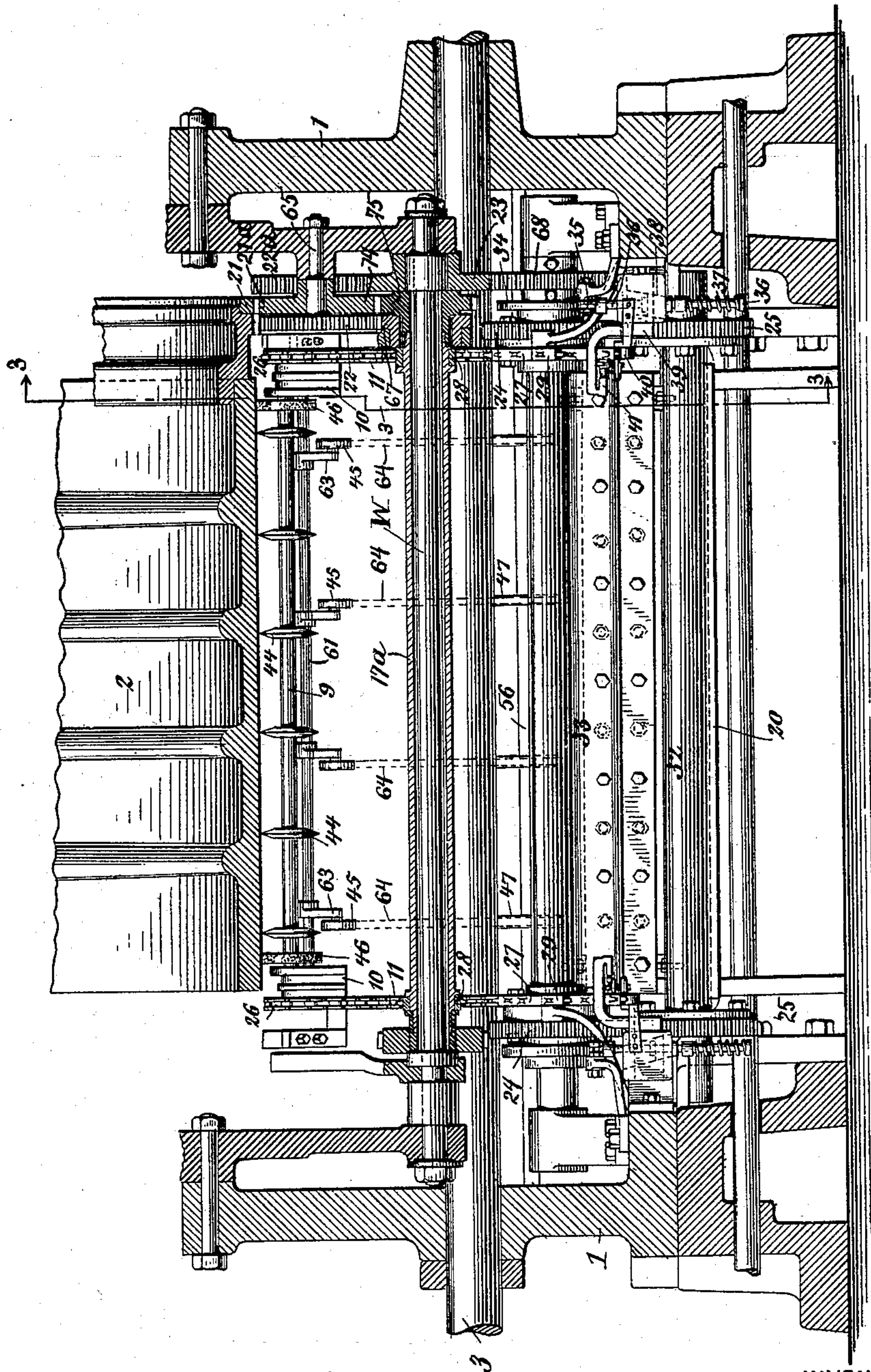
GUIDING AND DELIVERING DEVICE FOR PRINTING PRESSES.

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6 Sheets—Sheet 2.

Fig. 2.



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6 Sheets—Sheet 3.

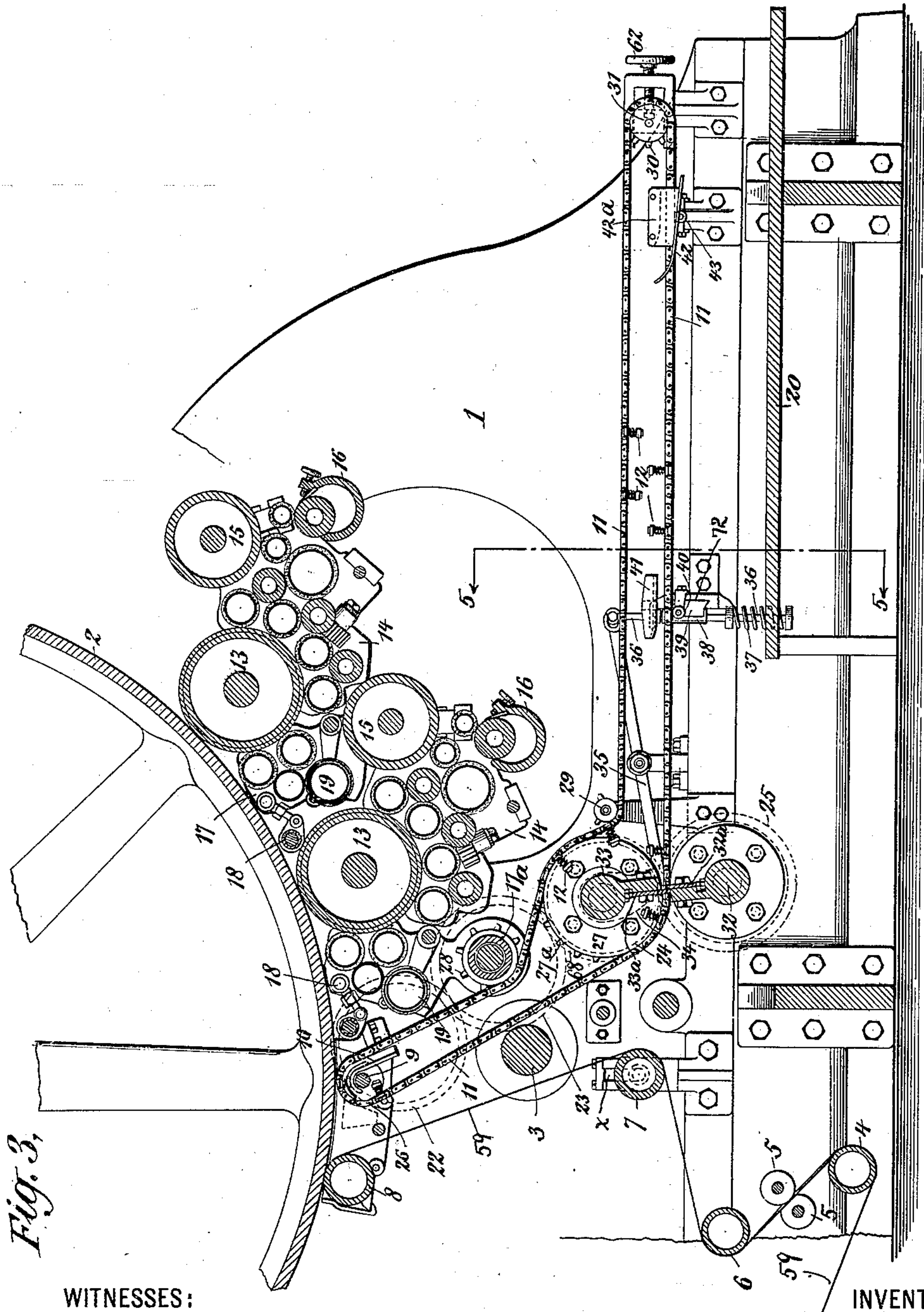


Fig. 3.

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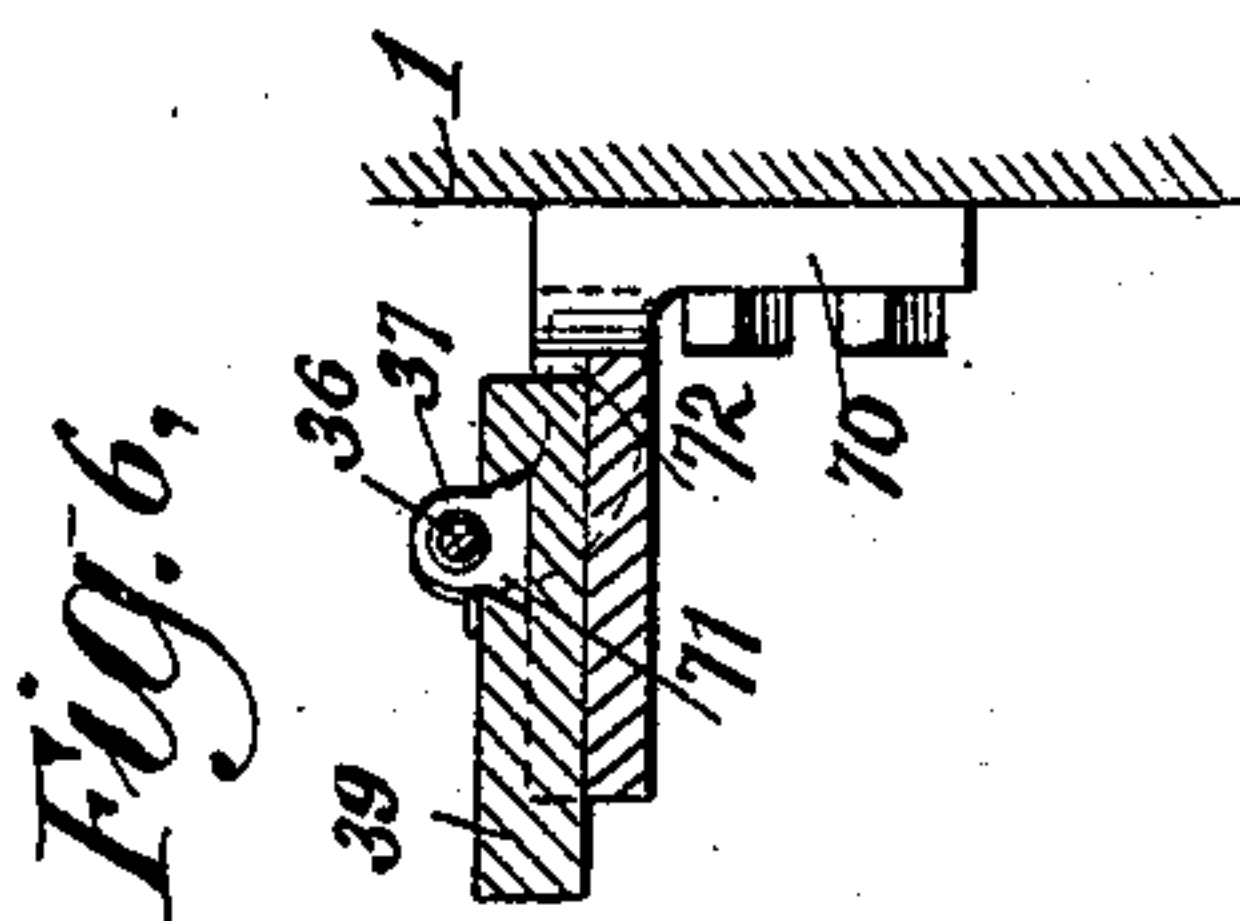
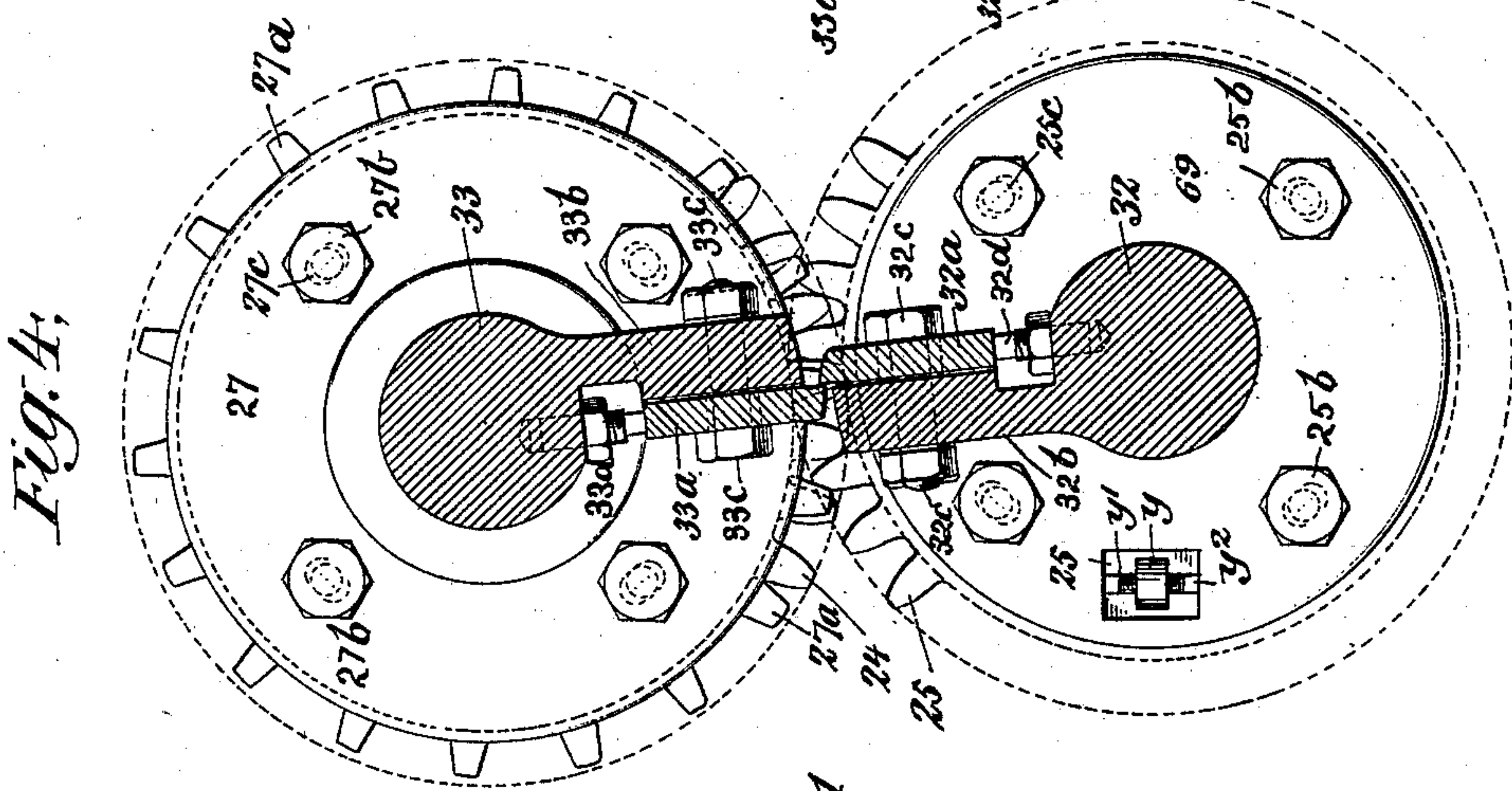
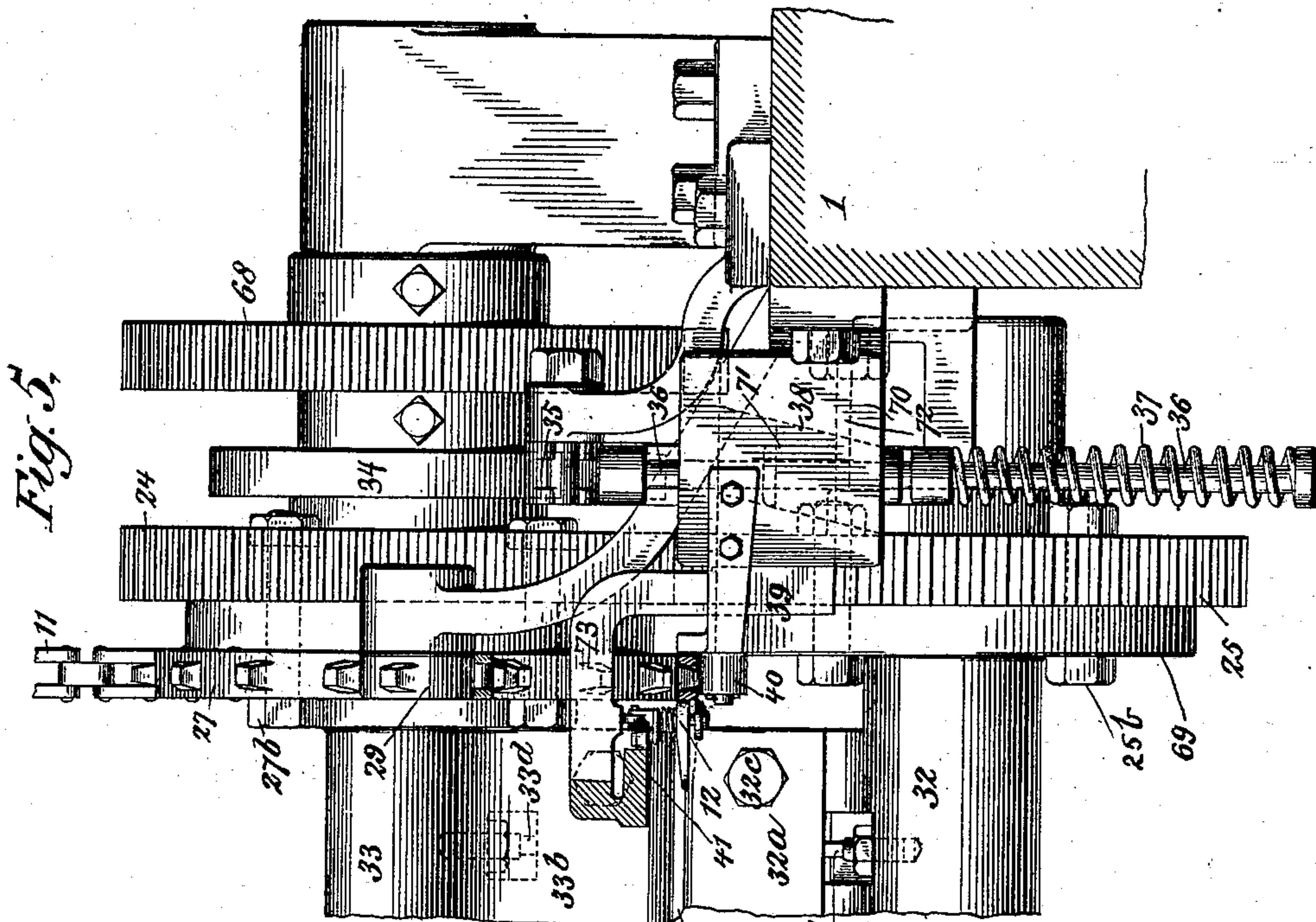
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GUIDING AND DELIVERING DEVICE FOR PRINTING PRESSES.

(Application filed May 18, 1897.)

(No Model.)

6 Sheets—Sheet 4.



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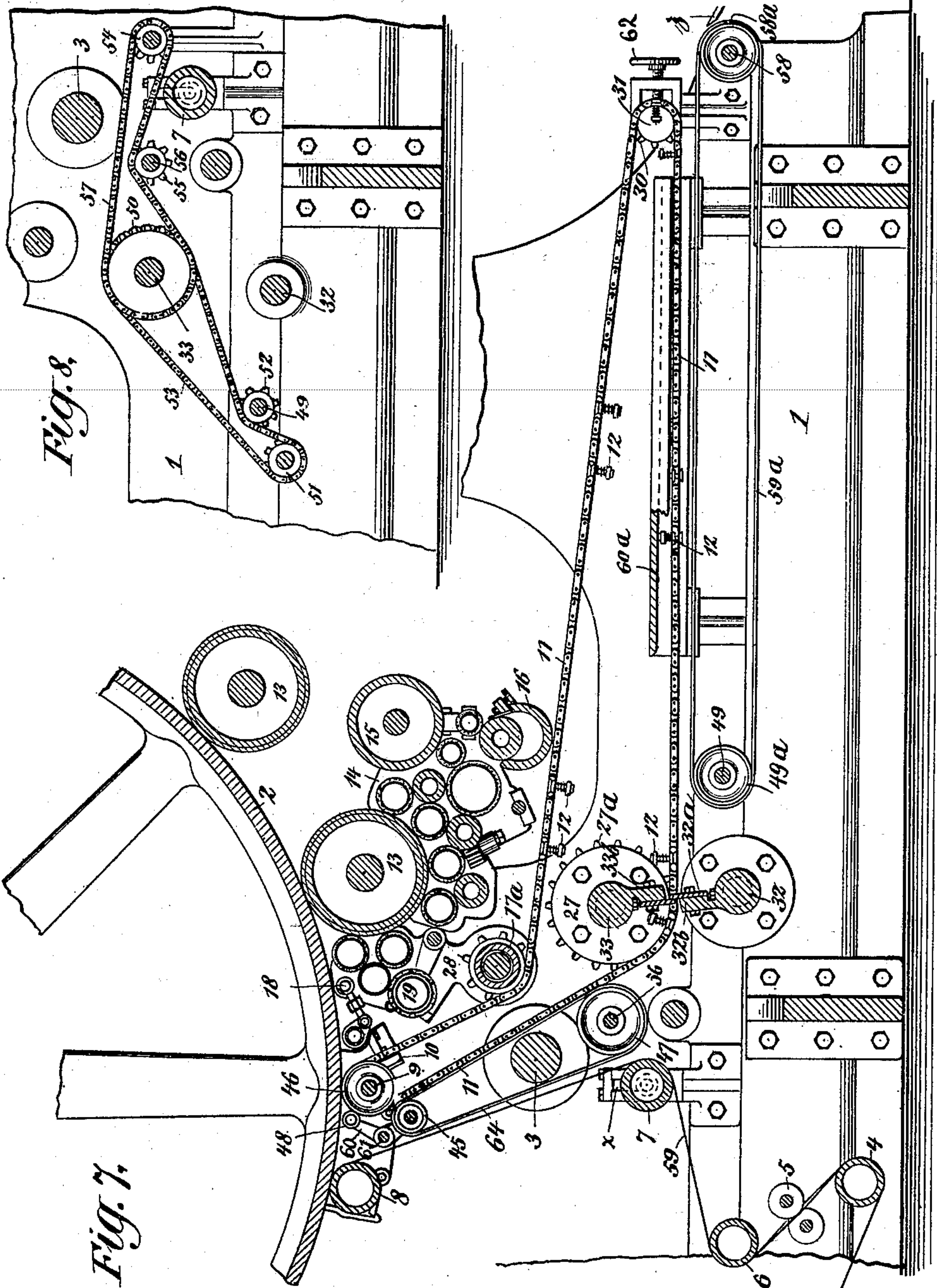
E. HETT.

GUIDING AND DELIVERING DEVICE FOR PRINTING PRESSES.

(Application filed May 18, 1897.)

(No Model.)

6 Sheets—Sheet 5.



WITNESSES:

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Patented Nov. 21, 1899.

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GUIDING AND DELIVERING DEVICE FOR PRINTING PRESSES.

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(No Model.)

6 Sheets—Sheet 6.

Fig. 12,

Fig. 11,

Fig. 10,

Fig. 15,

Fig. 14,

Fig. 13,

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UNITED STATES PATENT OFFICE.

EDWARD HETT, OF NEW YORK, N. Y.

GUIDING AND DELIVERING DEVICE FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 637,573, dated November 21, 1899.

Application filed May 18, 1897. Serial No. 637,022. (No model.)

To all whom it may concern:

Be it known that I, EDWARD HETT, a citizen of the United States, and a resident of New York, (New Dorp,) in the county of Richmond, in the State of New York, have invented certain new and useful Improvements in Guiding and Delivering Devices for Printing-Presses, of which the following is a specification.

My invention relates to guiding and delivering devices for printing-presses.

It has for its object to simplify and perfect the guiding and delivering of the paper, to cause the paper to be guided to the press and delivered from it more regularly, smoothly, and in better alinement than formerly, to support the paper during delivery, to cause it to be cut with precision into sheets of the proper size, and to deliver the same more expeditiously and with less liability to block the delivery devices.

It consists of the devices hereinafter more specifically described and claimed.

My improved devices are well adapted to be used in connection with multicolor lithographic presses and in the drawings accompanying this specification are so shown. It is evident, however, that some, if not all, of such devices can be used upon other forms of printing-presses.

Figure 1 is a plan view of my improved devices with the drum and certain other parts of the mechanism of the press removed. Fig. 2 is a vertical elevation, partly in section, as viewed from the front of the press. Fig. 3 is a vertical longitudinal section on line 3 3 of Fig. 2, as viewed from the left. Fig. 4 is a vertical cross-section of the knives and knife-supporting shafts and their connections. Fig. 5 is an elevation of devices for releasing the grippers, viewed from the front of the machine, taken on line 5 5 of Fig. 3. Fig. 6 is a horizontal section of parts of the said releasing devices. Fig. 7 is a vertical longitudinal section of the preferred form of my improved delivery devices. Fig. 8 is a vertical longitudinal elevation, partly in section, of the driving-chains. Fig. 9 is a detail view of cam 10. Figs. 10, 11, and 12 are detail side elevations, partly in section, showing the grippers and cam 41 in different positions relative to each other; and Figs. 13, 14, and 15 are top views of the same.

1 is the framework of a multicolor lithographic press.

2 is the drum, and 3 the main driving-shaft, by means of which motion is imparted through suitable shafts and gearing (not shown) to different parts of the machine.

13 14 15 16 17 18 19 and other parts connected with them, unlettered in the drawings, represent printing, damping, and inking mechanisms and appurtenances of a multicolor lithographic printing press, such as are shown in my application, Serial No. 593,796, filed June 1, 1896. As they form no part of my present invention and are inserted in the drawings only to show the general position and relation of my improvements in reference to the other parts of such a press, they will not be further described, except to say that they may be of any pattern or construction usual in such presses.

59 is the paper web upon which the printing is to be done. It first passes over roller 4. It is then cut or trimmed by the slitters 5. These slitters consist of two pairs of circular knives, one pair on each side of the machine. The pairs are arranged at the proper distance apart—to wit, the required width of the web—and they trim or cut off the excess in its width, thus causing the web to be of the proper width and in proper alinement with the drum. It is essential in a lithographic press that the web when presented to the printing-surfaces shall always be in exactly the proper position, as otherwise the printing when completed will not be in its proper place upon the finished sheets. A slight departure from the exact position of the printing matter upon the sheets may be fatal to the success of the work. The slitters insure this required accuracy in location. The web 59 then passes over rollers 6 and 7, between roller 8 and drum 2, and then around nearly the entire periphery of the latter, where the multicolor-printing takes place. By placing roller 6 in the position shown in the drawings the opposite surface of the web is presented to the roller from that presented to the rollers 4 and 7. In this way both surfaces of the web are alternately presented to the action of the rollers and are equally pulled or drawn, causing the web to be presented to the drum with a much smoother surface and one freer from

wrinkles or folds than would otherwise be the case. The printing upon the web is thus made more perfect. Roller 7 is movable vertically in bearings α , as shown in Fig. 3. The weight of the roller thus causes a tension upon the web, while the freedom of upward movement of the roller in its bearings tends to relieve the web from any undue strains. As the roller can move upward or downward at either end alone, irrespective of the other end, strains upon the web at one side only can also be guarded against. After passing around the periphery of drum 2 through nearly a complete revolution of the drum the web passes between the rubber rollers 46 and 48. (Shown in Fig. 7.) Roller 46 is mounted upon and is driven by shaft 9, and roller 48 is a loose roller mounted by means of an arm 60 upon a stationary shaft 61 and pressing upon roller 46, thus bringing to bear upon the web the necessary amount of friction to lead it from the drum. At this point the web is seized upon both of its sides by grippers 12, carried by chains 11, one on each side of the web. One of these chains 11 and its connections are shown in their preferred form in Fig. 7 and in a modified form in Fig. 3. As shown in Fig. 7, chain 11 is driven by the pins 27^a of sprocket-wheel 27, mounted upon shaft 33, driven as hereinafter described. Each chain has grippers 12, arranged in sets of two, the two of a set being comparatively close together, one intended to grip the forward end of a sheet and the other the rear end of the preceding sheet. These grippers may be of any usual construction, provided with jaws which are capable of being opened by any suitable mechanism for seizing or releasing the sheet and which are spring-pressed to take a firm grip upon the strip. One form of gripper is shown in Fig. 5 and Figs. 10 to 15, inclusive, and hereinafter described. 10 are the cams for opening the jaws of the grippers to enable them to seize the web, and 60^a 60^a (shown in Fig. 7) are cams for opening the jaws of the grippers to cause them to release their hold upon the sheet. In the devices shown in Fig. 3, 41 and 42^a are the cams for releasing the hold of the grippers upon the web and sheets, as will hereinafter be described. The chain 11 runs over a sprocket-wheel 30, mounted upon a loose roller 31. By means of wheel 62, having a screw-threaded shaft which enters a screw-threaded socket in sliding bearings carrying roller 31, as shown in Fig. 3, the roller 31 and sprocket-wheel 30 may be moved forward and backward to tighten or loosen the chain 11. The chain 11 next engages sprocket-wheel 28, loosely mounted on sleeve 17^a. (Shown in Fig. 2.) It then engages with sprocket-wheel 26 on shaft 9, and at the same time cam 10 forces open the jaws of the grippers 12, and the latter seize the web as it comes from the drum and carry it down to the revolving knives 32^a and 33^a. By these knives the web is cut across its entire width about midway

between the two grippers 12 of a set of grippers, the two grippers thereafter gripping the one the rear end of one sheet and the other the forward end of the next sheet. There is of course a corresponding set of grippers on the other side of the web.

Mounted upon shaft 9 are a number of wheels 44, revolving with the shaft. These wheels press lightly upon the web as it leaves the drum and guide and support the web as it passes from the drum and aid in breaking it from the drum and turning it into the proper direction to proceed to the cutting-knives. The peripheries of the wheels 44, which come into contact with the web, are preferably made somewhat sharp, as shown in Fig. 1, and may also be serrated to prevent smearing.

Arms 63, secured to rod 61, carry loosely-revolving wheels 45. Upon shaft 56 are mounted an equal number of wheels 47. (See Fig. 2.) These wheels are driven by the rotation of shaft 56, the latter being driven by chain 57, as hereinafter described. Wheels 45 and 47 carry endless tapes 64, as shown in Fig. 2. These tapes move in the same direction and at a slightly-faster rate of speed than that of the web, and they serve to support the web and to lead it onward in its course toward the knives.

The knives 32^a and 33^a are secured to the knife-supports 32^b and 33^b, which are projections from the revolving knife-support shafts 32 and 33. Shaft 33 is driven by means of gear 68, mounted on the shaft in the manner hereinafter described. Shaft 33 has integral with it and on each end a sprocket-wheel 27, provided with teeth 27^a, and it also has a gear-wheel 24, which is secured to the shaft by screw-threaded bolts and nuts 27^b. The shaft 32 has secured to it at each end, by means of screw-threaded bolts and nuts 25^b, the gear-wheels 25. By the meshing together of the teeth of gear-wheels 24 and 25 shaft 32 is caused to revolve. The knives 32^a and 33^a are secured to their supports 32^b and 33^b by screw-threaded bolts and nuts 32^c and 33^c. The knives are also made adjustable toward or away from each other by means of screw-threaded projections 32^d and 33^d, which enter part way into the shafts 32 and 33, and their nuts, as shown in Fig. 4. The cutting edges of the knives preferably overlap each other slightly and are preferably made slightly concave, as shown in Fig. 4. The openings 27^c in sprocket-wheel 27 and gear-wheel 24 are made slightly larger than is necessary to merely receive the bolt 27^b, in order to permit the gear 24 to be slightly adjustable relatively to the gear 25 to overcome lost motion. Similarly-shaped openings 25^c are also made in gears 69 and 25. A still finer adjustment of gears 24 and 25 can be made through screw-threaded rod y' , carrying blocks y^2 at each end, and passing through an interiorly-screw-threaded piece y , mounted in a part of gear 25, projecting into a cut-out portion of

flange 69. By turning y gear 25 can be accurately adjusted relative to gear 24. By means of the mechanism above described the knives can be accurately adjusted and lost motion between the gearings be effectually guarded against. The web is accurately cut across its entire width by the revolving knives about midway between the two grippers of a set. The grippers then carry the separate sheets forward until, with the form of releasing mechanism shown in Fig. 7, the grippers at the forward end of the sheet strike against the cams 60^a. These cams force open the jaws of the grippers, releasing the forward end of the sheet, which falls down until it rests upon the endless delivery-tapes 59^a. These tapes are mounted upon wheels 49^a, secured to and revolving with the shaft 49, and upon loose wheels 58^a, mounted upon a shaft 58. As many of these tapes may be used across the width of the web as is desired. Motion is imparted to shaft 49 through chain 53, as will be presently described. The various proportions of the parts are made such that the delivery-tapes 59^a move somewhat more rapidly than the web as it comes from the drum. Accordingly when the forward end of the sheet falls upon the more-rapidly moving tapes the latter tend to pull the sheet out straight and smooth, and by the time the grippers holding the rear end of the sheet reach the cams 60^a the sheet is fully and smoothly extended. The cams 60^a then open these grippers, and the rear end of the sheet then falls upon the tapes 59^a. The relatively more rapid movement of these tapes causes the sheet to be advanced some little distance from the succeeding sheet before the latter is also finally released by the grippers, and in this manner blocking of the sheets at the delivery end is effectually prevented. The sheets are then fed off from the tapes 59^a upon any suitable inclined table or rack, such as z , (shown in Fig. 7,) and being evenly and smoothly extended and separated from one another they readily pile themselves evenly and in regular order.

Motion is imparted to shafts 49 and 56 and through them to the delivery-tapes 59^a and supporting-tapes 64, respectively, by means of the chains 53 and 57, respectively, as shown in Fig. 8. Both of these chains are shown as ordinary bicycle-chains. The chain 53 engages with the teeth of a sprocket-wheel mounted upon and moving with the shaft 33 and is thus driven by the latter shaft. After leaving the said sprocket-wheel the chain passes over a sprocket-wheel mounted upon a shaft 51 and then engages with sprocket-wheel 52, mounted upon shaft 49. The object of passing the chain over the sprocket-wheel upon shaft 51 first is to give the chain the proper direction when it reaches sprocket-wheel 52. The chain next passes around the sprocket-wheel upon shaft 33. In this way motion is imparted to shaft 49 and delivery-tapes 59^a. Motion is imparted to shaft 56,

and through it to delivery-tapes 64 by means of chain 57, as follows: Chain 57 passes over another sprocket-wheel mounted upon shafts 33 and revolving with the shaft. Motion is thus given to chain 57. The chain next passes over sprocket-wheel 55, mounted upon shaft 56, imparting motion to that shaft, and through it to the wheels 47, which carry the endless delivery-tapes 64. The chain then passes over a sprocket-wheel mounted upon the roller 54 in order to give it the proper direction before returning to sprocket-wheel upon shaft 33.

Fig. 3 shows a somewhat different arrangement for the sprocket-chain 11 and a different form of cam and connections for releasing the grippers. In this case the sprocket-chain 11, instead of running direct from the sprocket-wheel 30 to sprocket-wheel 28, as in Fig. 7, engages with teeth 27^a on sprocket-wheel 27, mounted on shaft 33, first passing, however, below and engaging with the teeth of a sprocket-wheel loosely mounted on shaft 29. This form, however, requires finer adjustment and more careful attention than that shown in Fig. 7, which latter is my preferred form. In Fig. 3 two cams 41 and 42^a are shown for releasing the hold of the grippers. Of these cam 41 releases only those grippers that hold the rear end of the sheet, while cam 42^a operates upon all the grippers. In order to prevent cam 41 from operating upon and opening the grippers that hold the front end of the sheet, the cams 41 are moved out of the path of the grippers immediately after operating the grippers which hold the rear end of the sheet, so that the grippers holding the front part of the sheet do not strike upon these cams. The cams are then returned into the path of the next set of grippers, which are holding the rear of the following sheet. The mechanism for moving the cams 41 out of the path of the grippers and back into it again is as follows: 35 is a lever mounted at its center, as shown in Fig. 3. The left-hand end, as seen in the said figure, comes in contact with a cam 34, of an appropriate shape, upon shaft 33, which causes the lever 35 to be rocked up and down with a single rotation of the shaft. To the other end of the lever 35 is loosely fastened a rod 36. This rod 36 carries a cylindrical block 38, the axis of which is at an acute angle to the rod 36, as shown in Fig. 5. The block 38 moves in a cylindrical slot 71 in plate 39, of substantially the same size and having the same general direction of axis. This plate 39 moves in beveled grooves 72 in brackets 70. Plate 39 carries the cam 41 upon an arm 73. As the right-hand end of lever 35, as shown in Fig. 3, is raised rod 36 is pulled upward, and block 38, moving with it in slot 71, forces plate 39 to the left, carrying with it the arm 73 and cam 41, thus removing the latter entirely out of the path of the grippers at the front end of a sheet. The cam 34 on shaft 33 is arranged so as to time this movement of the cam 41 to

the left just before the grippers holding the front end of the sheet approach the cam 41. Immediately after they have passed, the lever 35, through the cam 34, is depressed at its right end, causing the rod 36, plate 39, and cam 41 to resume their normal position, so that cam 41 shall lie in the path of the grippers. This operation of moving the cam 41 to the left is repeated after the next set of grippers has been operated by the cam, and so on. Cam 42^a strikes all of the grippers, including those holding the front of the sheet, thus releasing the hold of the grippers upon the front end of the sheet. Shoe 42 lies slightly in advance of cam 42^a and is located partly below the level of the sheet. The sheet strikes the shoes 42 and is forced downward and out of the path of the grippers as they close up after leaving the cams. The form of gripper 12 and of cam 41 used in connection with the devices shown in Fig. 3 is shown in detail in Figs. 10 to 15, inclusive. As there shown, the gripper has two jaws 12^a and 12^b. 12^b is fixed, while 12^a can be moved horizontally until it is nearly at right angles to 12^b, as shown in Fig. 15. 12^a is held in its normal position immediately under 12^b by spring 12^f. 12^c is a small roller mounted upon arm 12^d. Arm 12^d and jaw 12^a are both rigidly secured to rod 12^{d'}, the latter turning in sleeve 12^{b'}, which is integral with 12^b. 12^{b2} is a stop to limit the backward movement of 12^a. 12^e is a small roller at the top of the gripper secured to rod 12^{d'}. 41^a and 41^b are cam-surfaces upon cam 41.

The operation of cam 41 and its cam-surfaces upon gripper 12 is as follows: Fig. 10 represents the gripper in its normal position just before it reaches cam 41, with jaws 12^a and 12^b in contact, gripping the sheet between them. Roller 12^c strikes cam-surface 41^b, depresses arms 12^d, roller 12^c, rod 12^{d'}, and jaw 12^a, compressing spring 12^f, and separates jaws 12^a and 12^b, as shown in Fig. 11. Next roller 12^c strikes cam-surface 41^a, pushing rod 12^{d'} and jaw 12^a to the left, thus withdrawing it from beneath the sheet, allowing the latter to fall down. After the gripper has passed the cam spring 12^f returns the parts to their normal position.

Cam 42^a is constructed similarly to cam 41.

Motion is imparted to the various parts of the mechanism as follows: Teeth 21 upon drum 2 mesh with the teeth upon gear 22. Gears 22 and 22^a are integral with each other. Gear 22^a drives gear 23, mounted upon shaft *w*. Gear 23 drives gear 68. The gear 68 and gear 24 are both mounted upon and are integral with shaft 33 and are of the same size as shown in Fig. 5. In this way shaft 33 is caused to rotate. Gear 24 meshes with and drives gear 25, thus revolving shaft 32. Gear 74 is driven by a separate set of teeth 21^a, mounted upon drum 2, and drives gear 75 upon sleeve 17^a, the latter sleeve carrying sprocket-wheel 28, which is loosely mounted on sleeve 17^a, as heretofore described. Sleeve

17^a carries a gear-wheel at its other end similar in all respects to gear 75. (See Fig. 2.) These gears are for the purpose of oscillating the damping-frames; but as the mechanism for this purpose forms no part of the present invention it is not shown in detail and will not be further described.

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

1. The combination with the drum of a printing-press, of rubber rollers for guiding the paper web from the drum, grippers mounted upon a sprocket-chain adapted to grip and carry the paper web and deliver the same, gearing for driving said sprocket-chain, cams for opening said grippers to enable them to seize the paper web, endless supporting-tapes moving in the same direction as that of the paper web and adapted to receive, support and aid in the guiding of the web while passing from the drum to the knives, revolving knives to cut said web into sheets, and cams to open the said grippers to cause them to release their hold upon the paper sheets, substantially as set forth.

2. The combination with the drum of a printing-press, of rubber rollers for guiding the paper web from the drum, grippers mounted upon a sprocket-chain adapted to grip and carry the paper web and deliver the same, gearing for driving said sprocket-chain, cams for moving said grippers to enable them to seize the paper web, revolving knives to cut said web into sheets, cams to open said grippers to cause them to release their hold upon the paper sheets, and endless tapes for delivering the sheets, moving at a greater rate of speed than that of the paper web, substantially as set forth.

3. The combination with the drum of a printing-press, of rubber rollers for guiding the paper web from the drum, revolving wheels adapted to press against the paper web to assist in guiding it from the drum, grippers mounted upon a sprocket-chain adapted to seize and carry the paper web and deliver the same, gearing for driving said sprocket-chain, cams for opening said grippers to enable them to seize the paper web, endless supporting-tapes moving in the same direction as that of the paper web and adapted to receive, support and aid in the guiding of the web while passing from the drum to the knives, revolving knives to cut said web into sheets, cams to open said grippers to cause them to release their hold upon the paper sheets and endless tapes for delivering the sheets moving at a greater rate of speed than that of the paper web, substantially as set forth.

4. The combination with the drum of a printing-press, of rubber rollers for guiding the paper web from the drum, revolving wheels adapted to press against the paper web to assist in guiding it from the drum, grippers mounted upon a sprocket-chain adapted to seize and carry the paper web and deliver

the same, gearing for driving said sprocket-chain, cams for opening said grippers to enable them to seize the paper web, endless supporting-tapes moving in the same direction as that of the paper web and adapted to receive, support and aid in the guiding of the web while passing from the drum to the knives, revolving knives to cut said web into sheets, cams to open said grippers to cause them to release their hold upon the paper sheets, endless tapes for delivering the sheets moving at a greater rate of speed than that of the paper web, and chains, driven by the knife-support shaft, for imparting motion to the rollers carrying the supporting-tapes and the delivery-tapes, whereby the supporting-tapes and the delivery-tapes are fed forward at a faster rate of speed than the web, substantially as set forth.

5. In a press, the combination of two series of movable grippers, one series arranged on each side of the paper, each gripper composed of a fixed jaw and a movable jaw, the latter adapted, when acted upon by suitable cam-surfaces, to separate from the stationary jaw and then to turn sidewise from underneath the paper to permit the escape of the latter,

cam-surfaces for operating the movable jaw, movable supports upon which said grippers are mounted, and means for driving said supports, substantially as set forth.

6. In a press the combination of two series of movable grippers, one series arranged on each side of the paper, each gripper composed of a fixed jaw and a movable jaw, a roller connected with the movable jaw and adapted, when acted upon by a suitable cam-surface, to depress the said jaw, a second arm and a roller thereon, also connected with said movable jaw and adapted, when acted upon by a suitable cam-surface, to move the movable jaw sidewise from underneath the paper to permit the escape of the latter, cams for operating said movable jaw, movable supports upon which said grippers are mounted, and means for driving said supports, substantially as set forth.

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

EDWARD HETT.

Witnesses:

EDWIN SEGER,
SIDNEY MANN.