

No. 637,564.

Patented Nov. 21, 1899.

E. HETT.

MULTICOLOR PRINTING PRESS.

(Application filed July 19, 1894. Renewed May 27, 1899.)

(No Model.)

10 Sheets—Sheet 1.

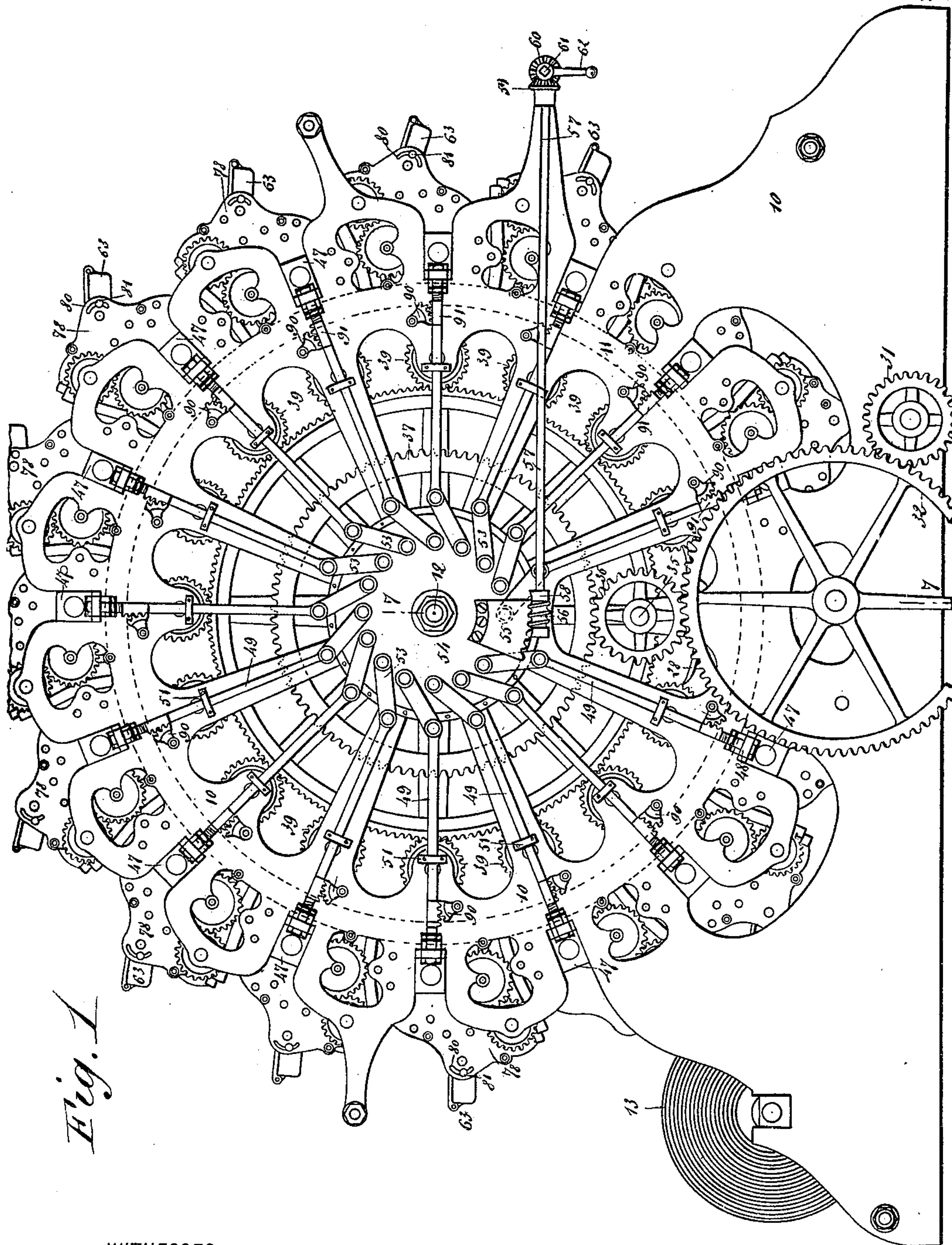


Fig. 1

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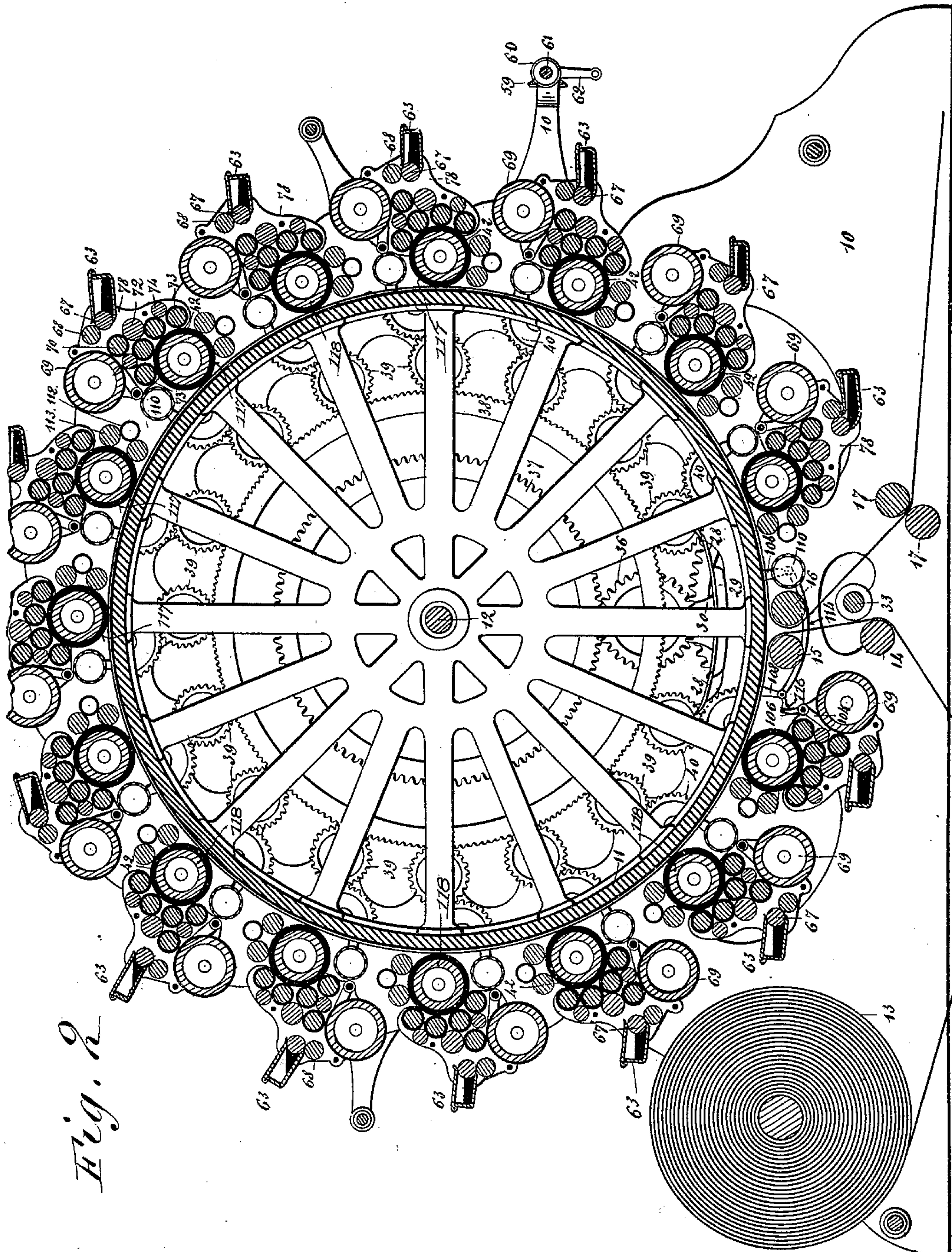


Fig. 2

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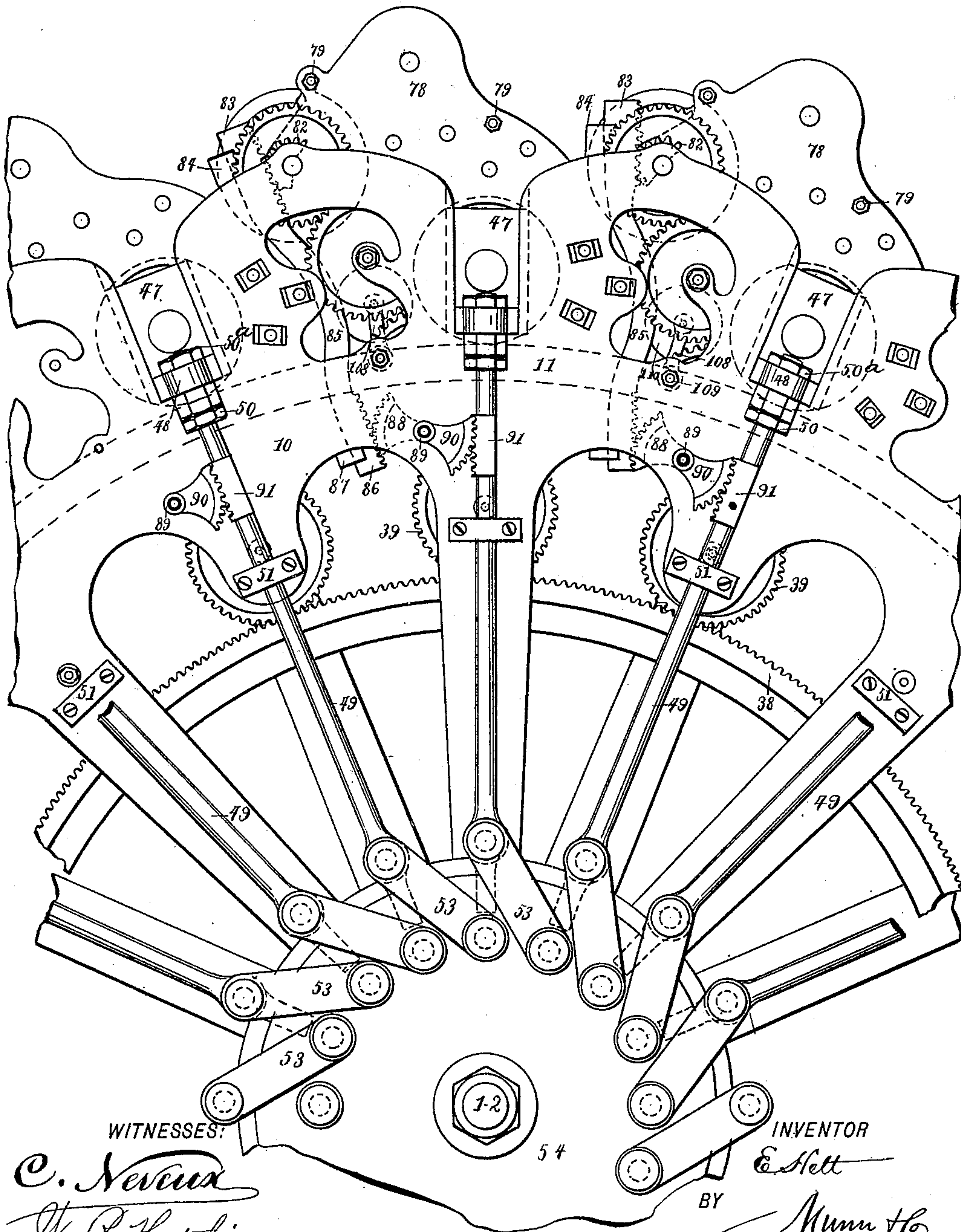
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Fig. 5



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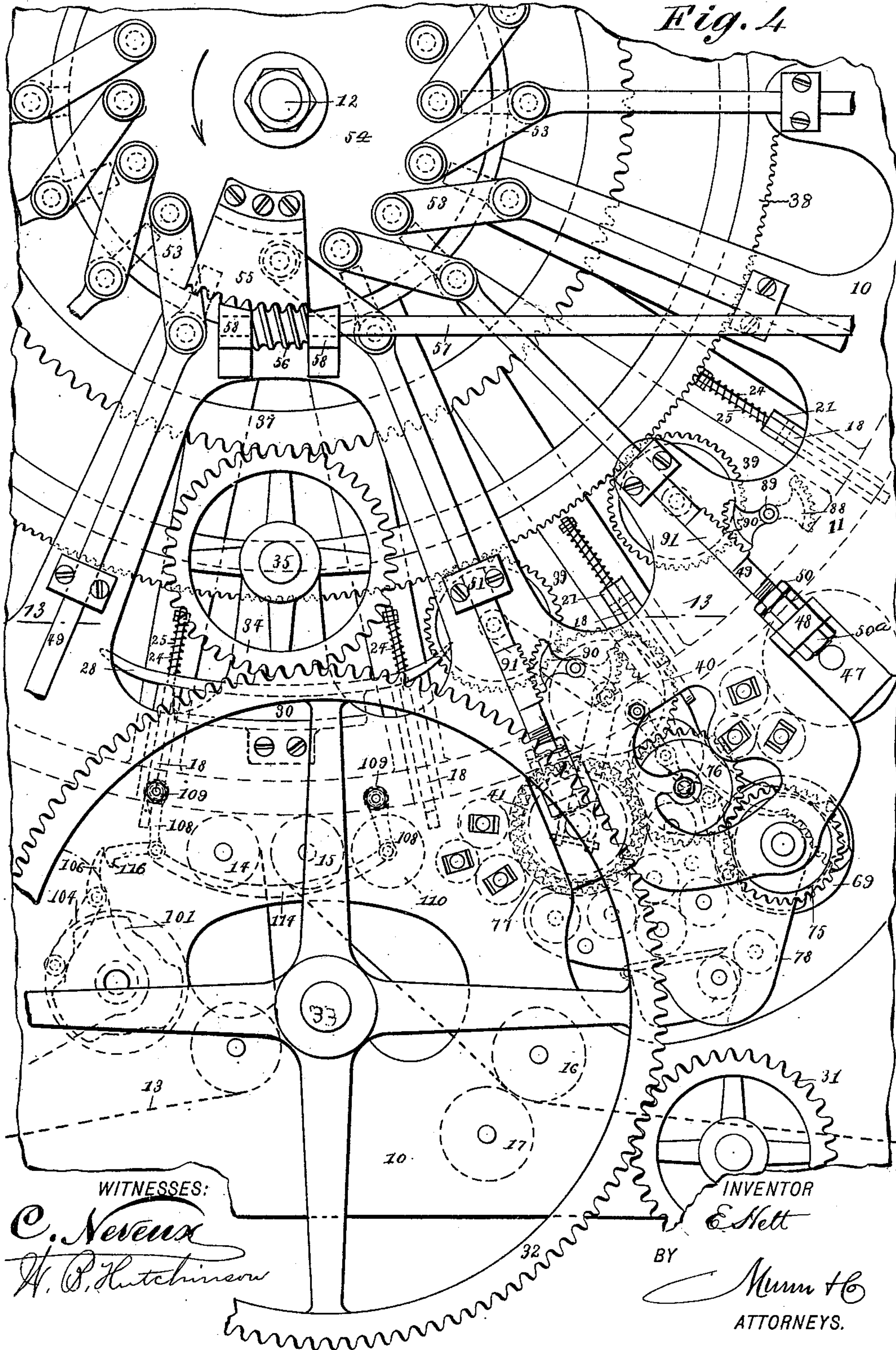
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Fig. 4



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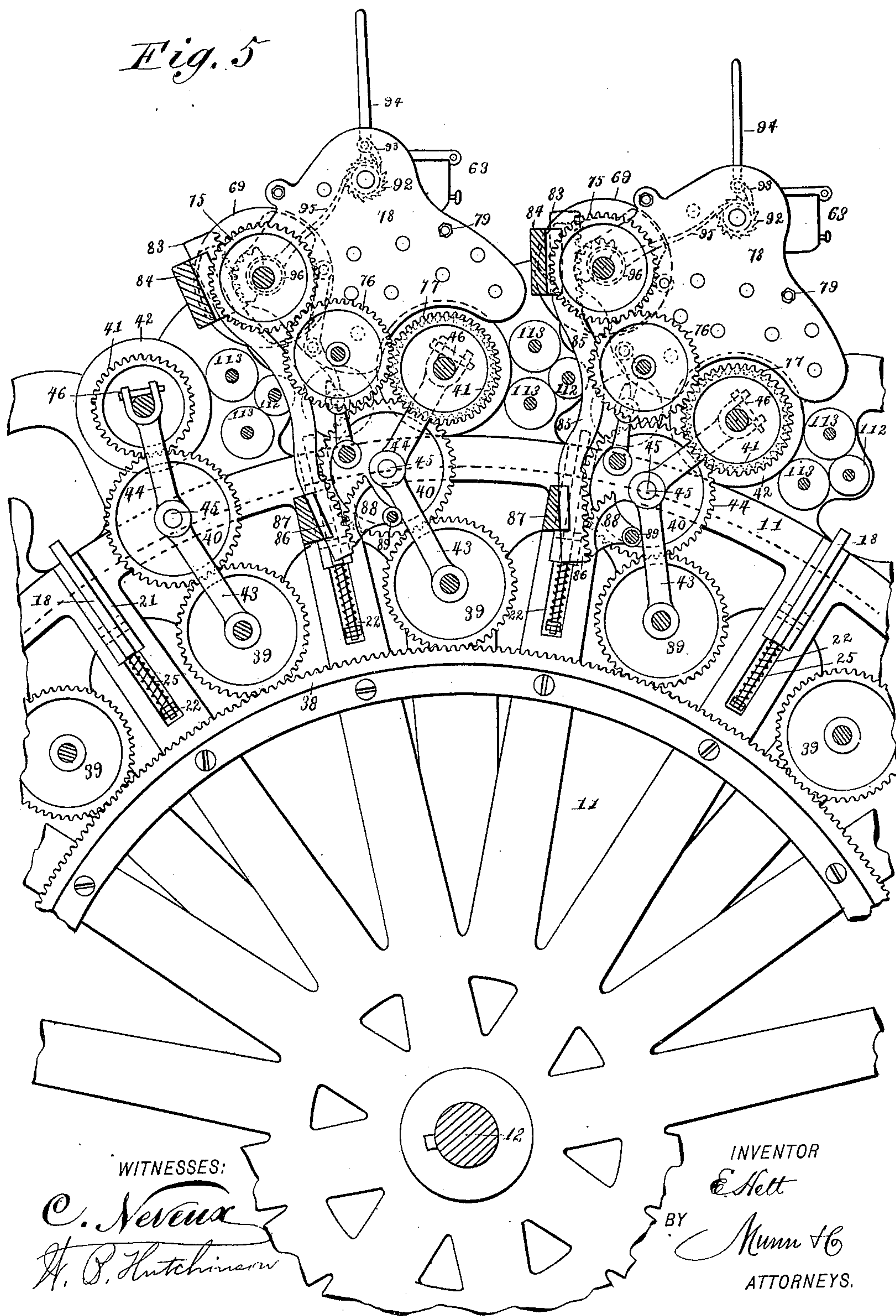
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Fig. 5



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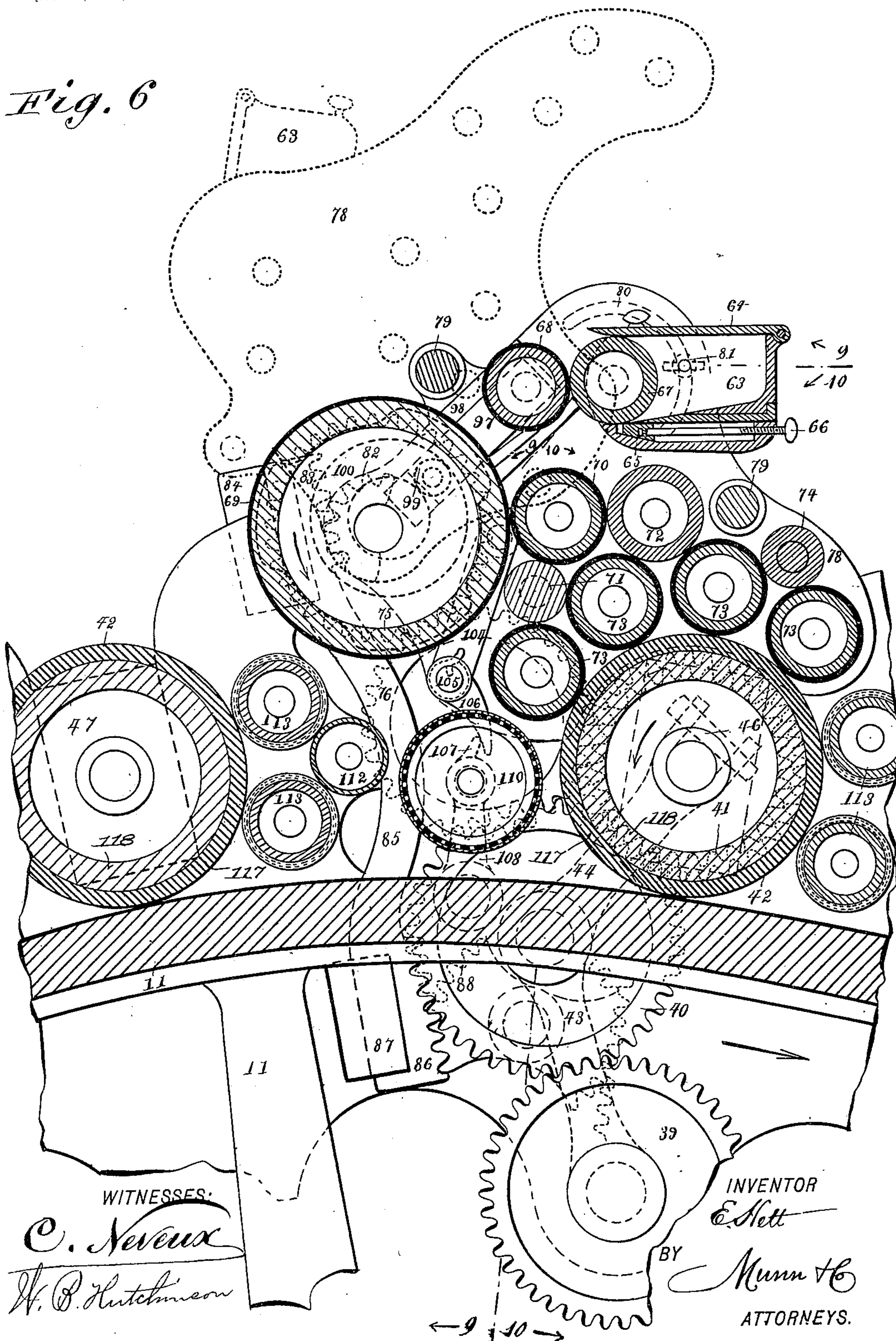
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Fig. 6



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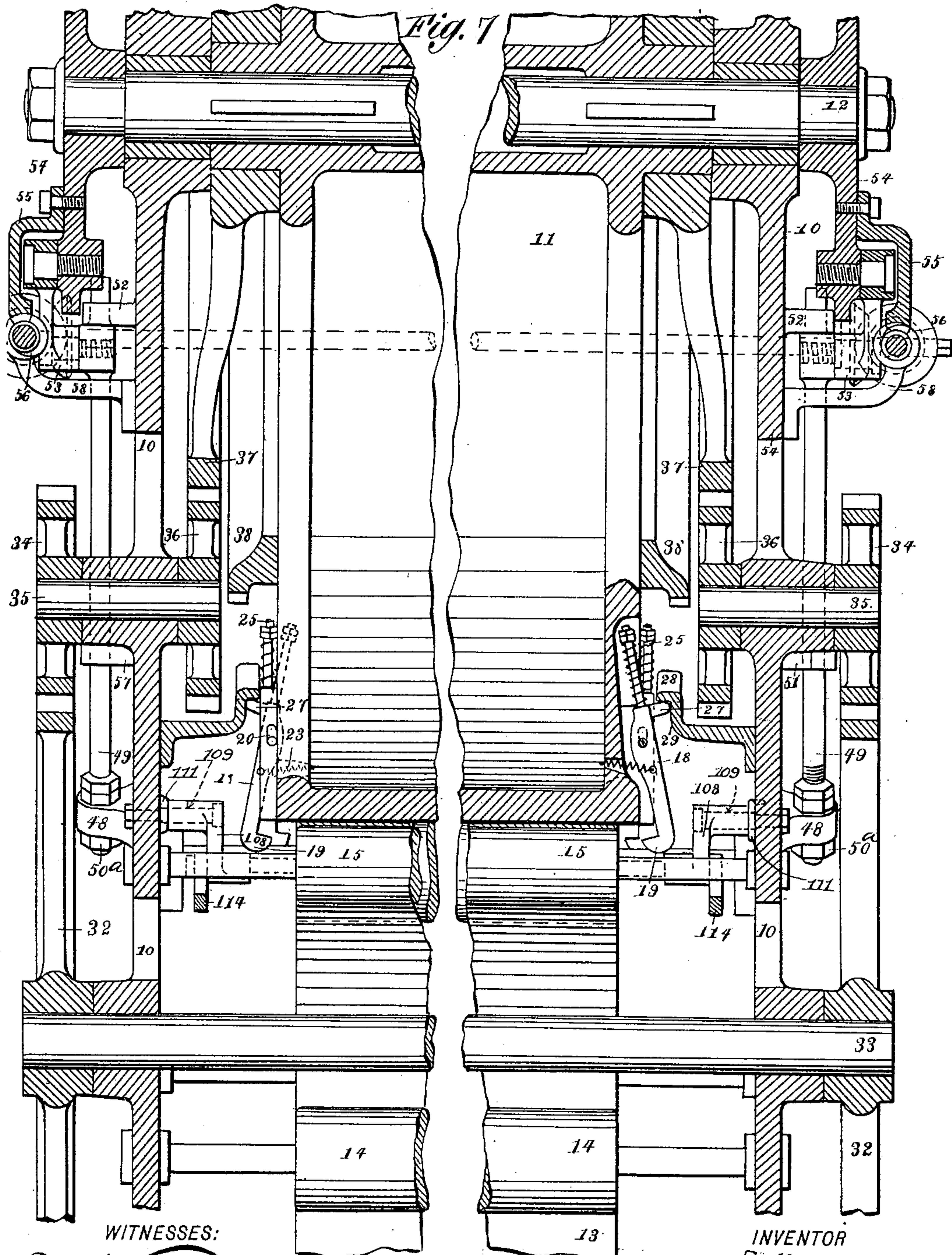
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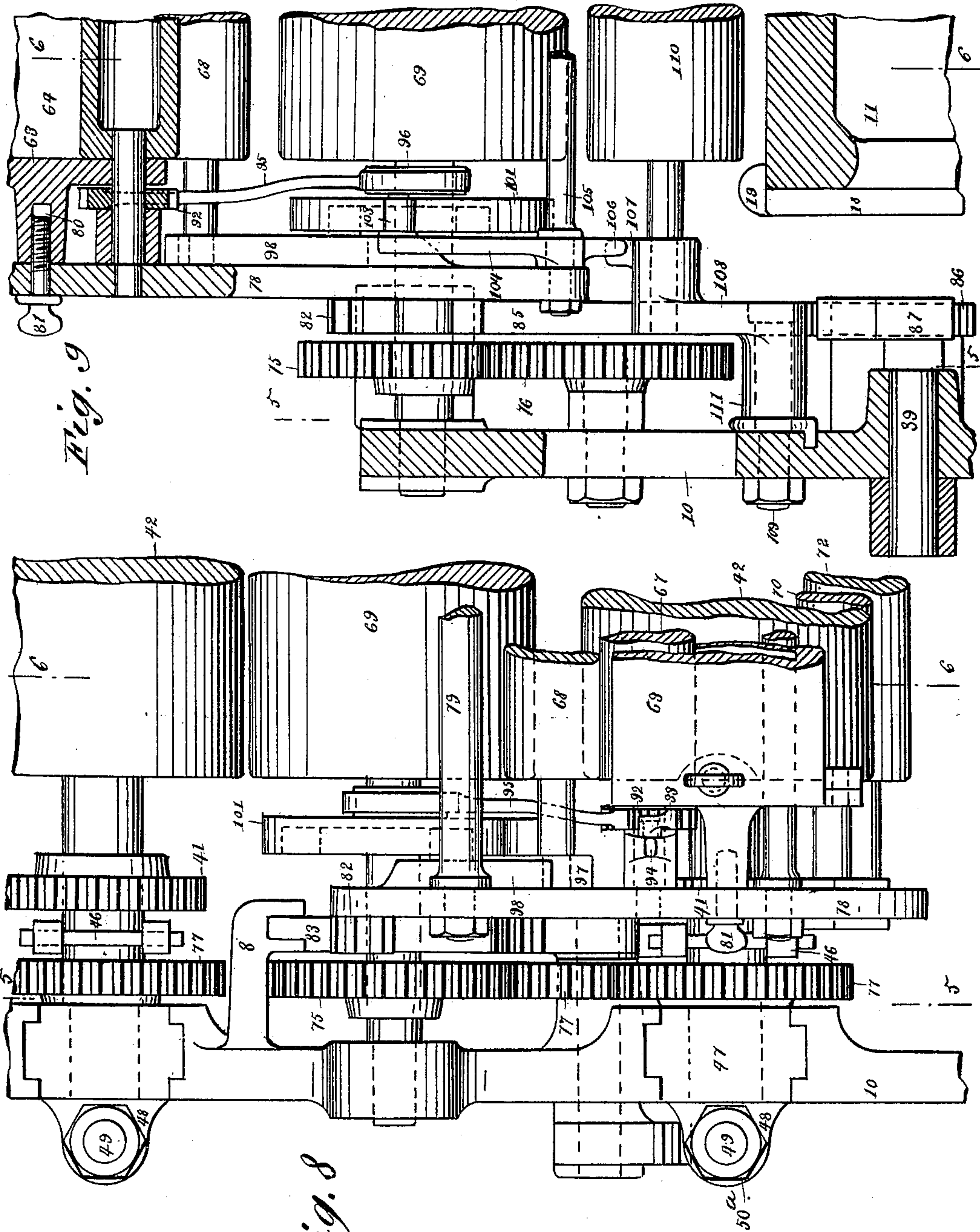
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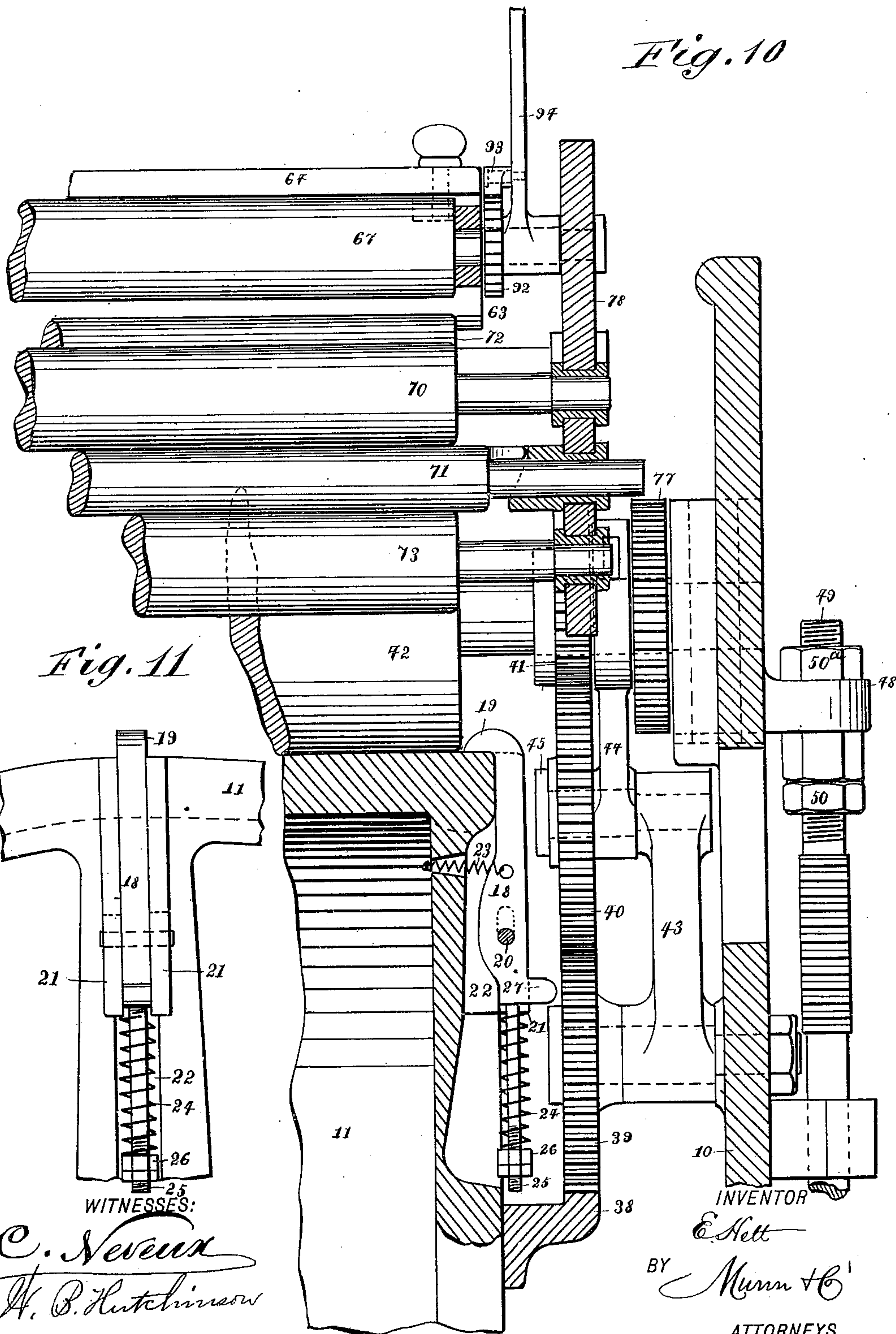
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Fig. 13

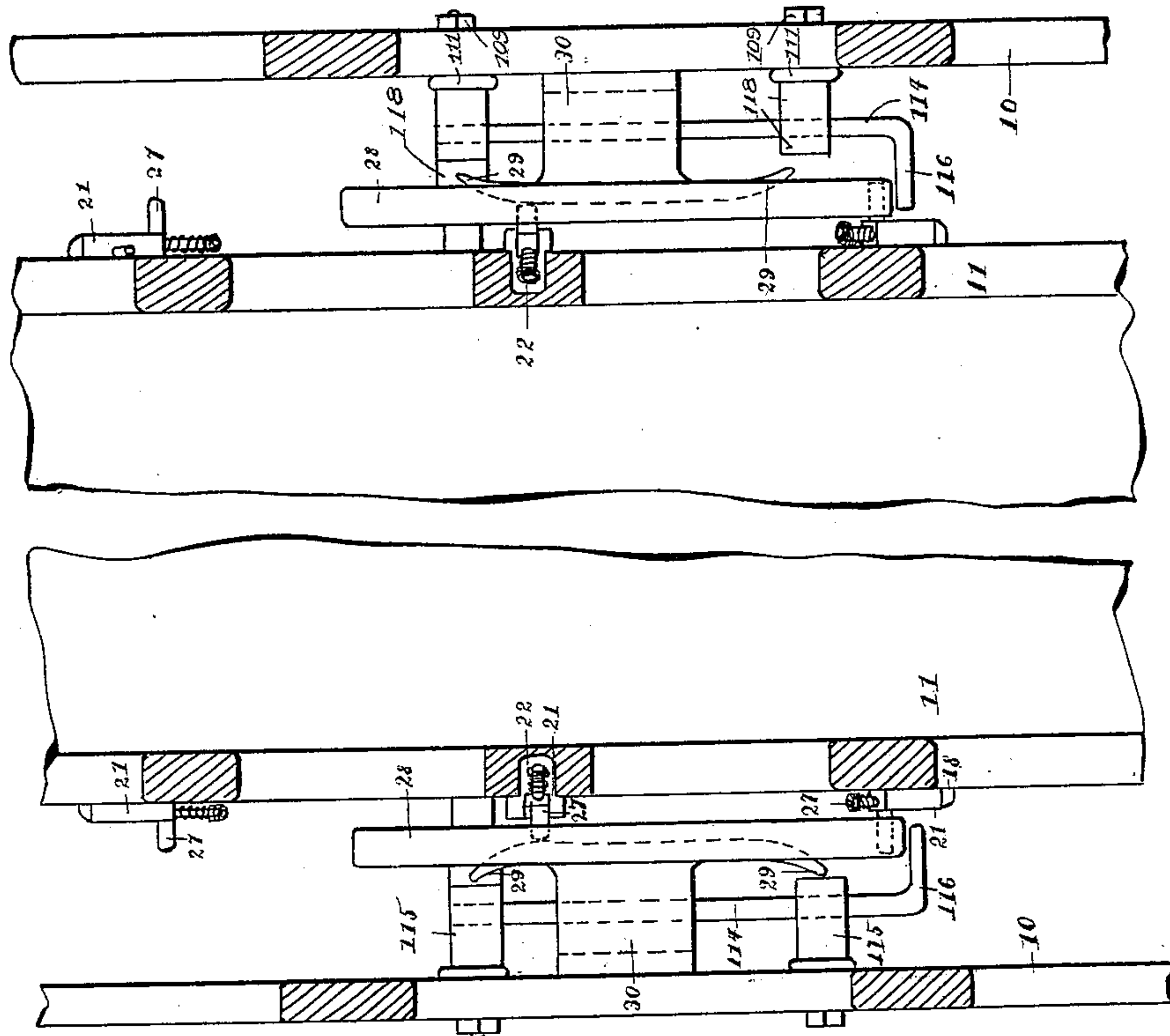
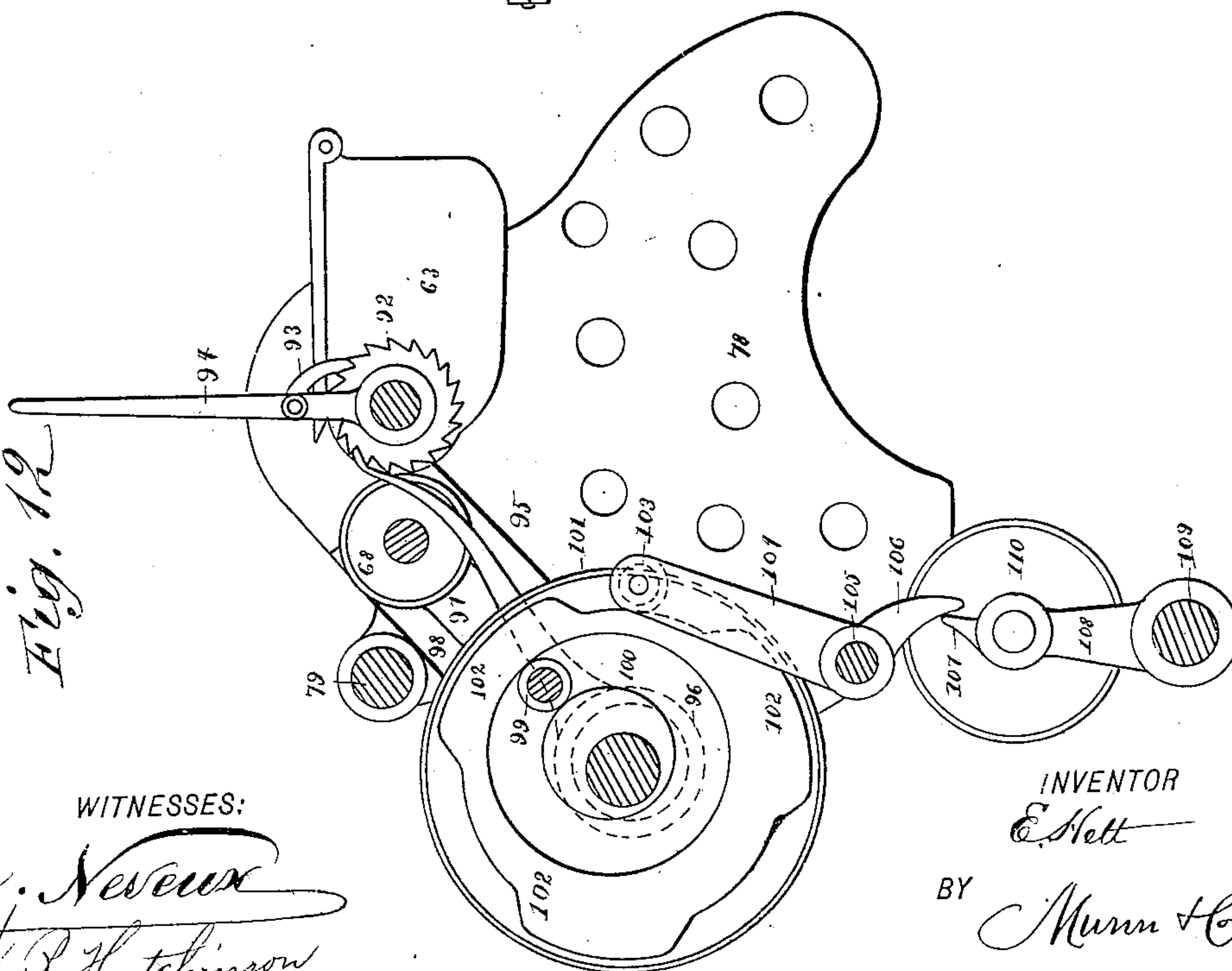


Fig. 12



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UNITED STATES PATENT OFFICE.

EDWARD HETT, OF NEW YORK, N. Y.

MULTICOLOR-PRINTING PRESS.

SPECIFICATION forming part of Letters Patent No. 637,564, dated November 21, 1899.

Application filed July 19, 1894. Renewed May 27, 1899. Serial No. 718,570. (No model.)

To all whom it may concern:

Be it known that I, EDWARD HETT, of New York, (New Dorp,) in the county of Richmond and State of New York, have invented
5 a new and Improved Multicolor - Printing Press, of which the following is a full, clear, and exact description.

My improvements relate primarily to printing-presses, and have special applicability to
10 multicolor lithographic-printing presses, although many of the details are applicable also to transfer-presses.

The object is to perfect and at the same time to quicken and cheapen the work of printing-
15 presses, and especially to make the rotary-press principle practicable and available for the purposes of the delicate and intricate work required in multicolor lithographic printing.

20 The improvements consist in the mechanisms and combinations herein set out and claimed.

The rotary-press principle has not heretofore been practicable or available for the
25 purposes of ordinary multicolor lithographic work, although suggestions and attempts have been made in that direction, so that to-day all the ordinary multicolor lithographic work of the arts is practically accomplished with
30 flat printing-surfaces and by successive operations of printing, in spite of the enormous comparative economies in general of the rotary-press principle. The present improvements are some of my improvements looking
35 to the attainment of the rotary-press principle in multicolor lithographic work.

One part of my present invention consists in mechanism for readily moving the printing-surface out of contact with the impression-surface and for reliably and adjustably
40 attaining and maintaining the necessary pressure between the surfaces when in contact, and for positively driving the printing-surface whether in or out of contact with the impression-surface and for driving it relatedly
45 to the driving of the impression-surface and of the other printing-surfaces.

Another part of my invention consists in
50 mechanism for readily swinging the inking devices toward and from the printing-surfaces and in mechanism for controlling the ink supply and distribution.

Another part of my invention consists in mechanism for controlling the water supply and distribution.

Another part of my invention consists in mechanism for appropriately holding and releasing the paper.

The invention also consists in many details of construction and many combinations of
60 mechanisms.

The accompanying drawings, which form a part hereof, show a multicolor-printing press embodying my improvements capable of simultaneously and continuously printing fifteen different colors.

Like numbers of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the machine. Fig. 2 is a central cross-section of the machine, showing the position of the paper in the press and the arrangement of the printing-surfaces and of the inking mechanisms around the main drum. Fig. 3 is a broken enlarged detail view showing particularly the arrangement for moving the printing-surfaces and inking mechanisms inwardly and outwardly. Fig. 4 is a broken enlarged detail view of the lower portion of the machine, showing the driving mechanism and the means for driving and
70 for shifting the position of the printing-surfaces and inking mechanisms. Fig. 5 is a broken elevation taken inside the machine-frame on the line 5 5 of Fig. 9 and showing the mechanism for driving the printing-surfaces
75 and the inking mechanisms and also certain accessories. Fig. 6 is an enlarged cross-section on the line 6 6 of Figs. 8 and 9 and shows in detail the arrangement of the printing-surfaces with relation to the main drum and also
80 the inking and dampening mechanisms. Fig. 7 is a broken enlarged cross-section on the line 7 7 of Fig. 1 and shows the mechanism for shifting the position of the printing-surfaces and of the inking mechanisms and shows
85 also the grippers for holding the paper on the main drum. Fig. 8 is an enlarged broken plan of the printing-surfaces and accessory mechanism. Fig. 9 is a broken sectional view on the line 9 9 of Fig. 6, looking in the
90 direction of the arrows. Fig. 10 is a sectional view on the line 10 10 of Fig. 6, looking in the direction of the arrows. Fig. 11 is an enlarged detail view of one of the grippers and
100

illustrates the manner in which it is fastened to the main drum. Fig. 12 is an enlarged detail sectional view showing in detail the mechanism for regulating the supply of ink and water, and Fig. 13 is a broken sectional plan on the line 13 13 of Fig. 4.

The machine is provided with a suitable frame 10, which may be of any approved kind, and in this is held a revoluble main impression-drum or impression-cylinder 11, which is carried by a shaft 12, which is journaled in the frame and over which runs the web or paper from the roll 13, which is arranged in substantially the way usual in printing on the web, being hung in the frame at one side of the main drum, and from this the paper-web travels over guide-rollers 14 and 15 to the main drum 11, thence around the drum and off over a guide-roller 16, (see Fig. 2,) and thence between rollers 17, after leaving which the paper is taken care of in the usual way. The paper is held snugly on the drum 11 by grippers 18, which are arranged on opposite sides of the drum and at necessary intervals around its periphery, each gripper having a head 19, which is adapted to clamp over the paper on the face of the drum, as best shown in Fig. 7, and bind the paper in place. Each gripper has a slotted and pivoted mounting, as shown at 20, so that it may have a longitudinal movement and also tilt on its pivot, and it is held between parallel ribs 21 on the drum 11, (see Fig. 11,) and swings in a recess 22 in one of the spokes of the drum 11. The head of each gripper is pulled to place against the side of the drum by a spring 23, (see Fig. 10,) and is pressed downward, so as to bring the head 19 against the paper on the face of the drum, by a spring 24, which is arranged upon the shank 25 of the gripper and held in place by a nut 26.

It is obvious that at the points where the paper-web is delivered to and passes from the main drum the grippers must release their hold to prevent the paper from being turned or torn, and to this end each gripper is provided on its outer side and at the point below its pivot with a rounded lug 27, which is adapted to engage a cam 28, (see Figs. 7 and 13,) this cam being stationary at a point above the rollers 15 and 16, and as soon as the head 19 is released from the paper the lug 27 strikes a vertical cam 29, which tilts the gripper, as shown in Fig. 7, and entirely frees the paper from the gripper. The cams 28 and 29 are for convenience formed in a single piece, which is integral with the bracket 30, and this is rigidly secured to the main frame 10.

The machinery may be driven, of course, in any convenient way; but it is preferably driven, as illustrated, from gear-wheels 31 on opposite sides of the machine, and the connections between each gear-wheel and the driving mechanism on one side of the machine will only be described, as the driving mechanism on the two sides or ends of the machine are duplicates. The gear-wheel 31

meshes with and drives a larger gear-wheel 32, which is secured to the shaft 33, journaled in the frame 10, as shown in Fig. 7, and the gear-wheel 32 drives a smaller gear-wheel 34 above it, which is secured to the shaft 35, journaled in the frame 10, and has at its inner end a gear-wheel 36, (see Fig. 7,) meshing with and driving a larger gear-wheel 37, which is secured to the main impression-drum 11 and shaft 12. The main impression-drum has secured to each end a large gear-wheel 38, which drives the circumferentially-arranged series of gear-wheels 39, which are each journaled on the main frame 10, and each gear-wheel 39 has an intermediate gear-wheel 40, and this drives the gear-wheel 41, which is keyed on the shaft of the printing-surface 42, which is thus positively driven. The size of the gear-wheel 41 is so regulated that the printing-surface is given the same surface speed as the main impression-drum, and so is adapted to print on the paper which is carried by the main impression-drum. The entire series of printing-surfaces are thus positively and relatedly driven and with the main impression-drum and at the same surface speed. Figs. 2 and 6 show the printing-surfaces as having an outer portion and an inner portion; but I do not herein claim that feature of construction or any of its combinations, reserving it for other applications. By connecting the printing-surface with the impression-drum in the manner described the gear-wheel 41 of the printing surface or cylinder can be made small, as shown. The printing-surfaces are arranged around the main impression-drum in a series, as shown clearly in Fig. 2. The shafts of the printing-surfaces and the journals of the gear-wheels 39 are connected to links 43 and 44, the pivot 45 of which forms the journal of the intermediate or vibrating gear-wheel 40, and thus when the printing-surfaces are moved outwardly the links straighten, as shown at the left hand in Fig. 5, and the gear-wheel 40 vibrates or swings in between the gear-wheels 41 and 39. By this means the entire series of printing-surfaces continues to be positively and relatedly driven and with the main impression-drum even when moved outwardly out of surface contact with the latter. The upper link 44 at each end of the main drum connects by means of a suitable coupling 46 with the shaft of the printing-surface 42, and the coupling may be of any suitable kind.

To enable the printing-surfaces to be moved outwardly or inwardly—that is, to be moved perpendicularly or radially outward from the impression-face of the main drum—as, for example, to be detached—each printing-surface is carried by radially-sliding boxes 47, which are held in suitable slideways in the main frame 10, and each sliding box 47 is provided with a lug 48, which connects with and through which the sliding box is carried by a pressure-rod 49. To permit of the ready and independent adjustment of the position of each

printing-surface to the main impression-drum and of the ready application and removal of each printing-surface to and from its carrying-supports without interfering with that adjustment when once secured, the outer end of each pressure-rod is screw-threaded and inner adjusting-nuts 50 and outer securing-nuts 50^a are provided. The pressure-rods 49 are radially arranged to carry the strain directly and in the direction of their length and slide in guides 51 and 52, while the inner ends of the pressure-rods are pivotally connected by means of links 53 with a revoluble or movable shifting device or plate 54, centered on the shaft 12 of the main impression-drum, this arrangement being carried out at each end of the machine, and the shifting device or plate 54 has thereon a rack 55, which meshes with a screw 56 on the shaft 57, (see Fig. 4,) and this shaft turns in suitable bearings 58 and has at its outer end a beveled pinion 59, (see Fig. 1,) which meshes with a similar pinion 60 on the transverse shaft 61, which is journaled on arms of the main frame 10 and is provided with a handle 62, by which it may be turned. This means of revolving the plate is practically self-locking. By turning the handle 62 the shafts 57 at the opposite ends of the machine are turned, the racks 55 moved so as to turn the shift-plates 54, and these move the links 53, which act on the pressure-rods 49, so as to thrust the pressure-rods radially outward and raise the boxes 47 and the entire series of printing-surfaces thereby. In the same way the turning of the handle 62 in the opposite direction brings the printing-surfaces down perpendicularly and simultaneously upon the impression-surface of the drum and constitutes the means for obtaining the necessary pressure between those respective surfaces in the operation of printing. It is of course apparent that when the printing-surfaces are moved outwardly or inwardly it will be desirable to provide for also moving the inking mechanisms outwardly and inwardly, and the arrangement for doing this will be hereinafter described.

The ink is supplied to each printing-surface from a fountain 63 of substantially the usual kind, the inking mechanism being best shown in Fig. 6, and each fountain is provided with a lid 64 to enable it to be filled, with the customary plug 65 to control the supply to the discharge-roller, with a stem 66 to regulate the plug, and with a discharge-roller or ink-feeding roller 67 in its mouth. The fountain and the group of inking-rollers, to be presently described, may be tilted up away from the printing-surface, as specified below. The ink-feeding roller 67 delivers to a vibrating or ductor roller 68, which is preferably leather-covered, and this supplies ink intermittently to the main ink-distributing roller 69, which carries ink to the leather-covered roller 70, and the latter carries ink to the metal rollers 71 and 72, which carry it to the leather-covered rollers 73, being as-

sisted in this function by the intermediate metal roller 74, and the rollers 73 are arranged over a comparatively large extent of the printing-surface 42, so as to ink the same quickly and yet well.

The main ink-distributing roller 69 has gear-wheels 75 at its ends, which, by means of the intermediate gear-wheels 76, connect with the gear-wheels 77 on the shafts of the printing-surfaces 42, and in this way the inking mechanism is driven. The main ink-distributing roller 69 is journaled in the main frame of the machine and the other rollers for supplying the ink and distributing and applying it to the printing-surfaces are journaled in a swinging frame 78, the opposite sides of which connect by cross-rod 79, and this swinging frame is centered with and hung on the shaft of the main ink-distributing roller 69 and is adapted to swing inwardly and outwardly into the positions shown in Fig. 6. This frame 78 also carries the ink-fountain 63, and to this end the frame is provided with slots 80 to receive the fastening-pins 81, by which the fountain is held in place, and this construction permits the fountain to be adjusted at the desired inclination.

It is desirable that each frame 78 shall be automatically swung inward or outward when the printing-surface is similarly moved, and to this end each frame 78 has on its opposite ends and near its fulcrum segmental racks 82, each rack meshing with a sliding rack 83, which is formed on the outer end of a rack-bar 85, which moves in a slideway 84 on the frame 10, and the inner end of the rack-bar 85 terminates also in a rack 86, which slides in a slideway 87 on the frame 10, and the inner rack 80 meshes with a segmental rack or gear 88 on a transverse shaft 89, journaled on the frame 10 and having at its outer end a rack 90, which projects from the opposite side of the shaft to the rack 86, and the rack 90 meshes with a rack 91 on the pressure-rod 49, and as each pressure-rod 49 is connected with each frame 78 in the manner just described it follows that when the shift-plate 54 is actuated so as, for instance, to raise the printing-surfaces from the main drum 11 the rack-bars 85 will be pulled down by reason of their gear connection with the pressure-rods, and this will cause the racks 83 to engage the racks 82 and tilt the frame 78 outward, as shown by dotted lines in Fig. 6, so that the printing-surfaces are thereby free to move outwardly and the surface of the drum or impression-cylinder is freed from pressure. The reverse motion of the shift-plate 54 both brings down the printing-surfaces onto the impression-surface with the necessary pressure and also brings down the groups of inking-rollers 73 onto the printing-surfaces.

A ratchet mechanism is used to turn the roller 67, which feeds the ink from the fountain 63, and the ratchet-wheel 92, which is secured to the shaft of the ink-feeding roller, (see Fig. 4,) is driven by a pawl 93, which is

pivoted on a lever 94, journaled loosely on the shaft of the roller, and by moving the lever backward and forward the roller may be turned so as to feed the ink, but after the machine is in operation the roller is driven positively and automatically, the ratchet-wheel 92 being engaged and driven by a pawl 95, which is operated by an eccentric 96 on the shaft of the main ink-distributing roller 69.

The ink is delivered from the ink-feeding roller 67 to the vibrating or ductor roller 68, which is constructed to deliver ink intermittently but positively to the main ink-distributing roller 69, and to this end the vibrating or ductor roller 68 is journaled in slide-plates 97, (see Figs. 6 and 12,) which slide-plates move in slideways 98 in the swinging frame 78, and each slide-plate has at its inner end a roller 99, running on a cam-groove 100 of the wheel 101, which is carried by the shaft of the main ink-distributing roller 69, and thus the slide-plates and vibrating or ductor roller 68 are vibrated or reciprocated and moved alternately into contact with the ink-feeding and the main ink-distributing rollers 67 and 69. The same wheel 101, which has the cam-groove 96 therein, is also provided with a series of cams 102, which are adapted to press against a roller 103 on the arm 104, (see Fig. 12,) which is fulcrumed on a shaft 105 and has a toe or extension 106 extending into the path of another toe 107 on the arm or link 108, which is journaled on a stud 109 on the frame 10, this arrangement being duplicated at each end of the machine, and the arms or links 108 carry the water-supply rollers 110, which extend across the face of the main impression-drum 11, but out of contact with the drum, and each water-supply roller 110 is hollow and adapted to contain an internal supply of water to dampen an adjacent printing-surface, as described presently, and the water-supply roller is perforated, as shown in Fig. 6, and is covered by a cloth, through which the water oozes, so that when the roller is swung into contact with the water-distributing roller 112 it will moisten the same, and this roller will carry the moisture to the felt-covered water-distributing rollers 113, which latter dampen the next printing-surface 42. The arms 108 and water-supply rollers 110 are thrown back to position by a return-spring 111. (See Fig. 9.) It will be seen that the several water-distributing rollers, with the exception of the main fountain or water-supply roller 110, are stationary and that the water-supply roller 110 of one group of rollers and printing-surface dampens the printing-surface 42 of the next group. The construction of the water-supply roller 110 has not been shown or described with great detail, as it is shown and claimed in a separate application for patent—to wit, Serial No. 530,220, filed May 28, 1894.

By reference to Fig. 2 it will be seen that there is necessarily an extra space beneath the main drum 11 between two groups of

printing-surfaces and their rollers at a point where the paper web enters and leaves the machine, and a slight modification of the arrangement for moving the water-supply roller is made to provide for this space. Here the links 108 are arranged precisely as above specified and the water-supply roller 110 is hung in a second pair of links or arms 108, one pair being without a roller, as shown clearly in Fig. 2, and the two pairs of links 108 are pivotally connected at their lower ends by rods 114, and each of these rods has one end turned in, as more clearly shown in Fig. 13, the inturned end being marked 116 and being adapted to engage the toes 106 of the arms 104, thus taking the place of the toes 107 on the links 108 of the other water-rollers. The gear-wheels 41 and 40 should, when the machine is originally put together and its parts adjusted, be marked so that the same marked tooth of the one gear may always be put into the same marked recess of the other and the positive relationship of the several printing-surfaces be thereby maintained.

In operating the machine the printing-surfaces are prepared for printing the several colors to be printed in a manner which forms no part of the invention as herein claimed. The prepared printing-surfaces are suitably mounted in the machine, so that their respective impressions on the paper-web will exactly register. The ink-fountains are then supplied with inks of the proper colors and the water-supply rollers with water. The main impression-drum is provided with a suitable cover, preferably of yielding rubber, so that it will present a good surface to the paper under the printing-pressure of the printing-surfaces, and the paper-web is introduced into the machine. The several printing-surfaces are adjusted radially by the adjusting-nuts 50 until the right printing-pressure is obtained, and they are secured in place by the securing-nuts 50^a. The several groups of inking-rollers having been suitably inked, the printing is started. The printing-surfaces print simultaneously, and each prints its impression exactly in register over the impressions of the preceding printing-surfaces, the register, once secured, being necessarily maintained by the machine, irrespective of the rapidity of the work. The successive impressions upon any one part of the paper-web, which together constitute the picture that is being printed, are thus attained at practically one printing operation without handling of the paper between impressions and without substantial drying intervals between impressions, and the picture comes out of the machine finished, and finished pictures follow each other as fast as the paper-web travels through.

The pressure of the printing-surfaces upon the impression-surface may be regulated from time to time by the handle 62. The individual printing-surfaces may be separately regulated by the adjusting-nuts 50. The same

mechanism which serves to achieve the pressure contact of these parts also serves to move them apart. The printing-surfaces may readily be removed from the impression-drum and
 5 from the machine upon unscrewing the securing-nuts 50^a and lifting the shafts carrying them out of the machine, and all may be replaced and the shafts restored to operative position, and this may be done without losing
 10 the related and positive driving connection which is essential to continued accurate register, for the marked tooth of the gear can be put in the marked recess. It will be observed that the mechanism which moves the printing-surfaces toward and from the impression-
 15 surface and which secures and maintains the pressure contact at all times positively carries the printing-surfaces and carries them independently of the printing motions of the impression-surface, and is thereby enabled to accurately and positively control said printing-surfaces.

The combination of impression-drum or other suitable impression surface or surfaces
 25 with a series of printing-surfaces and means for at once carrying the printing-surfaces and moving them inwardly and outwardly toward and from the impression-surface independently of the printing movements of the impression-surface is important. The special
 30 features of the means herein shown for moving the printing-surfaces inwardly and outwardly toward and from the impression-surface are also important. The series of printing-surfaces are carried from the center and
 35 are thrust outwardly from the center and are drawn inwardly toward the center in securing the necessary pressure between them and the impression-surface. They are carried and
 40 are controlled at will by a central shifting device separately from and independently of the printing movements of the drum, but centered with the drum. They are carried and
 45 controlled by direct-thrust pressure bars or rods moving radially. They are carried in sliding boxes sliding radially in fixed ways. These boxes are adjustable on the pressure-
 50 bars, so that the pressure between each printing-surface and the impression-surface may be initially and independently regulated. The whole mechanism is self-locking and gives great leverage and power and has great strength, with lightness of parts. The driving mechanism for the printing-surfaces is
 55 important, for it secures a positive and accurately-related driving of the entire series of printing-surfaces both with respect to each other and with respect to the impression-surface whatever the position of the printing-surfaces may be, whereby an accurate
 60 register of the entire series of printing-surfaces when once attained is automatically and reliably maintained. Again, the inking mechanisms are positively driven with the printing-surfaces, as are also the dampening mechanisms, and the proper relative supplies

of ink and water are thereby positively secured and maintained. The water-supply is constant and is automatically regulated in quantity, and the water is kept filtered and
 70 clean and is kept away from other parts of the press and from the air and can be relied upon in rapid presswork, and the construction is simple and compact, making practicable the necessary multiplication of parts involved
 75 in multicolor-presswork with a large number of colors or printings. Again, the inking mechanisms are bodily removable out of the way of the printing-surfaces and are automatically raised and lowered with the printing-surfaces, and this in such way as not to
 80 disarrange or interfere with or stop the driving of the inking mechanism.

The results which are secured by my improved press in efficiency, capacity, and economy are greatly in advance of anything heretofore known in the art. A single press such
 85 as is shown in the drawings will do the work and take the place of fifteen presses of the kind now in use in printing lithographs in
 90 fifteen colors—that is to say, this one press will print fifteen colors simultaneously, whereas this work would require fifteen presses of the present style, each one working separately and printing a separate color.
 95 Moreover, so much time is saved in the handling of the prints that it is estimated that my improved press will print about four thousand seven hundred complete fifteen-color lithographs in the same time that it would require one of the present style of presses to
 100 print seven hundred copies in a single color. The capacity of my improved press will therefore be seen to be about a hundred times greater than that of the old presses in printing a fifteen-color job. Great additional
 105 economy is also secured in the saving of space for the presses, of labor of workmen in handling the presses and the product, and of time in turning out the work.

The machine of the drawings might be varied in many different ways without departing from my invention.

I have claimed in many pending applications those inventions and features of invention which are more or less incidentally shown
 115 or described herein, but are not herein claimed. Moreover, it is obvious that the invention in many of its aspects is not limited to lithographic printing or to lithographic presses.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a printing-press, the combination with a main impression-drum having a continuous impression-surface, of a series of printing-surfaces arranged on the impression-face of the
 125 drum and positively driven with the drum, and mechanism for moving the same radially into or out of contact with the impression-face of the drum, said mechanism being independent in its operation of the printing operation of the drum but centered with the

drum and operatively connected with the printing-surfaces, substantially as and for the purposes set forth.

2. In a lithographic-printing press, the combination with a main impression-drum having a continuous impression-surface, of a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, and mechanism for moving the same into or out of contact with the impression-face of the drum, said mechanism including toggle devices arranged to move the printing-surfaces, substantially as and for the purposes set forth.

3. In a lithographic-printing press, the combination with a main impression-drum having a continuous impression-surface, of a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, and mechanism for moving the same into or out of contact with the impression-face of the drum, said mechanism including a series of radial arms connected for operation with the printing-surfaces, and means for operating said arms, substantially as and for the purposes set forth.

4. In a printing-press, the combination with a main impression-drum having a continuous impression-surface, of a series of printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, and mechanism for moving the same into or out of contact with the impression-face of the drum, said mechanism including a series of radial arms connected for operation with the printing-surfaces and toggle devices for actuating said arms, substantially as and for the purposes set forth.

5. In a printing-press, the combination with a main impression-drum having a continuous impression-surface, of a series of printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, and self-locking mechanism for moving the same into or out of contact with the impression-face of the drum, said mechanism being independent in its operation of the printing operation of the drum, substantially as and for the purposes set forth.

6. In a lithographic-printing press, the combination with a main impression-drum having a continuous impression-surface, of a series of lithographic-printing surfaces, the printing-surfaces being geared to the impression-drum so as to work together both when they are in and out of printing contact with the drum, means for moving said surfaces into and out of contact, said means being controlled at will separately from and independently of the printing movement of the impression-drum, substantially as and for the purposes set forth.

7. In a printing-press, the combination with a main impression-drum having a continuous impression-surface, of a series of printing-surfaces, said drum and printing-surfaces be-

ing geared so as to work together both when in and out of printing contact, means for radially moving the printing-surfaces into and out of contact with the impression-drum, said means being controlled at will separately from and independently of the printing movement of the impression-drum, substantially as and for the purposes set forth.

8. In a lithographic-printing press, the combination with a main impression-drum having a continuous impression-surface, of a series of rounded and continuous lithographic-printing-surfaces, said drum and printing-surfaces being geared so as to work together both when in and out of printing contact, means for radially moving the printing-surfaces into and out of contact with the impression-drum, said means being controlled at will separately from and independently of the printing movement of the impression-drum, substantially as and for the purposes set forth.

9. In a lithographic-printing press, the combination with a main impression-drum having a continuous impression-surface, of a series of rounded and continuous lithographic-printing surfaces, said drum and printing-surfaces being geared so as to work together both when in and out of printing contact, means including radial arms for moving a printing-surface and the impression-drum into and out of contact, said means being controlled at will separately from and independently of the printing movement of the impression-drum, substantially as and for the purposes set forth.

10. In a printing-press, the combination with suitable impression surface or surfaces, of one or more printing-surfaces, a printing-surface and its impression-surface being operatively connected through intermediate vibrating gear-wheels so as to work together both when they are in and out of printing contact, means for moving said surfaces into and out of contact, said means being controlled at will separately from and independently of the printing movement of the impression-surface, substantially as and for the purposes set forth.

11. In a lithographic-printing press, the combination with suitable impression surface or surfaces, of one or more lithographic-printing surfaces, a printing-surface and its impression-surface being operatively connected through intermediate vibrating gear-wheels so as to work together both when they are in and out of printing contact, means for moving said surfaces into and out of contact, said means being controlled at will separately from and independently of the printing movement of the impression-surface, substantially as and for the purposes set forth.

12. In a printing-press, the combination with a main impression-drum, of a series of printing-surfaces, said drum and printing-surfaces being operatively connected through intermediate vibrating gear-wheels so as to work together both when in and out of printing contact, means for moving a printing-sur-

face and the impression-drum into and out of contact, said means being controlled at will separately from and independently of the printing movement of the impression-drum, substantially as and for the purposes set forth.

13. In a lithographic-printing press, the combination with a main impression-drum, of a series of lithographic-printing surfaces, said drum and printing-surfaces being operatively connected through intermediate vibrating gear-wheels so as to work together both when in and out of printing contact, means for moving a printing-surface and the impression-drum into and out of contact, said means being controlled at will separately from and independently of the printing movement of the impression-drum, substantially as and for the purposes set forth.

14. In a lithographic-printing press, the combination with a main impression-drum, of a series of lithographic-printing surfaces, said drum and printing-surfaces being operatively connected through intermediate vibrating gear-wheels so as to work together both when in and out of printing contact, means including radial arms for moving a printing-surface and the impression-drum into and out of contact, said means being controlled at will separately from and independently of the printing movement of the impression-drum, substantially as and for the purposes set forth.

15. In a printing-press, the combination with a main impression-drum having a continuous impression-surface, of a series of rounded and continuous printing-surfaces, said drum and printing-surfaces being geared so as to work together both when in and out of printing contact, self-locking means for moving a printing-surface and the impression-drum into and out of contact, said means being controlled at will separately from and independently of the printing movement of the impression-drum, substantially as and for the purposes set forth.

16. In a printing-press, the combination with a main impression-drum, of a series of printing-surfaces, said drum and printing-surfaces being operatively connected through intermediate vibrating gear-wheels so as to work together both when in and out of printing contact, self-locking means for moving a printing-surface and the impression-drum into and out of contact, said means being controlled at will separately from and independently of the printing movement of the impression-drum, substantially as and for the purposes set forth.

17. In a printing-press, the combination, substantially as described, with a main impression-drum having a continuous impression-surface, of a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, and mechanism for moving the same into and out of contact with the impression-face of the drum, said mech-

anism having a revoluble shifting device controlled at will separately from and independently of the printing operation of the drum but centered with the drum and operatively connected with the printing-surfaces, substantially as and for the purposes set forth.

18. In a printing-press, the combination, with a main impression-drum having a continuous impression-surface, of a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, and mechanism for moving the same into and out of contact with the impression-face of the drum, said mechanism having a shifting device controlled at will separately from and independently of the printing operation of the drum but centered with the drum, and a series of pressure-bars operatively connected with the printing-surfaces, substantially as and for the purposes set forth.

19. In a printing-press, the combination with a main impression-drum, of a series of printing-surfaces arranged on the impression-face of the drum, mechanism for moving the same into and out of contact with the impression-face of the drum, said mechanism being controlled at will separately from and independently of the printing operation of the drum but centered with the drum and operatively connected with the printing-surfaces, and a series of links and of chains of gear-wheels carried thereon positively driving the printing-surfaces with the main drum whether the printing-surfaces are in or out of surface contact with the main drum, substantially as and for the purposes set forth.

20. In a printing-press, the combination with a main impression-drum, of a series of printing-surfaces arranged around the periphery of the drum, a series of intermediate vibrating gear-wheels driven by the drum and driving the printing-surfaces and arranged to keep them in gear both when the printing-surfaces are in and out of printing contact, and means for simultaneously moving the printing-surfaces into and out of contact with the impression-drum and simultaneously moving the said intermediate vibrating gears to correspond, said means being controlled at will separately from and independently of the printing operation of the drum, whereby the operating connection between the drum and the impression-surfaces is maintained both when the drum and said surfaces are in contact and when they are out of contact, substantially as and for the purposes set forth.

21. In a printing-press, the combination with a main impression-drum, of a series of printing-surfaces arranged around the periphery of the drum, a series of intermediate vibrating gear-wheels driven by the drum and driving the printing-surfaces and arranged to keep them in gear both when the printing-surfaces are in and out of printing contact, and self-locking means for simultaneously moving the printing-surfaces into and out of

contact with the impression-drum and simultaneously moving the said intermediate vibrating gears to correspond, said means being controlled at will separately from and independently of the printing operation of the drum, whereby the operating connection between the drum and the impression-surfaces is maintained both when the drum and said surfaces are in contact and when they are out of contact, substantially as and for the purposes set forth.

22. In a printing-press, the combination with a main impression-drum, of a series of printing-surfaces arranged around the periphery of the drum, a series of intermediate vibrating gear-wheels driven by the drum and driving the printing-surfaces and arranged to keep them in gear both when the printing-surfaces are in and out of printing contact, and means including radial arms for simultaneously moving the printing-surfaces into and out of contact with the impression-drum and simultaneously moving the said intermediate vibrating gears to correspond, said means being controlled at will separately from and independently of the printing operation of the drum, whereby the operating connection between the drum and the impression-surfaces is maintained both when the drum and said surfaces are in contact and when they are out of contact, substantially as and for the purposes set forth.

23. In a printing-press, the combination with a main impression-drum, of a series of printing-surfaces arranged on the impression-face of the drum, mechanism for moving the same into and out of contact with the impression-face of the drum, said mechanism having a shifting device controlled at will separately from and independently of the printing operation of the drum but centered with the drum, and a series of pressure-bars operatively connected with the printing-surfaces, and a series of links carrying a series of chains of gear-wheels positively driving the printing-surfaces with the main drum whether the printing-surfaces are in or out of surface contact with the main drum, substantially as and for the purposes set forth.

24. In a printing-press, the combination with a suitable impression-surface, of a series of rounded and continuous printing-surfaces positively driven therewith, and mechanism for perpendicularly moving the same into and out of contact with the impression-surface, said mechanism having a shifting device controlled at will separately from and independently of the printing movement of the impression-surface and a series of pressure-bars operatively connected with the shifting device and operatively connected with the printing-surfaces, substantially as and for the purposes set forth.

25. In a printing-press, the combination with a suitable impression-surface, of a series of printing-surfaces, and mechanism for moving the same into and out of contact with the

impression-surface, said mechanism being controlled at will separately from and independently of the printing movement of the impression-surface and operatively connected with the printing-surfaces, and a series of links and of chains of gear-wheels carried thereon positively driving the printing-surfaces with the impression-surface whether the printing-surfaces are in or out of surface contact with the impression-surface, substantially as and for the purposes set forth.

26. In a printing-press, the combination with a suitable impression-surface, of a series of printing-surfaces, and mechanism for moving the same into and out of contact with the impression-surface, said mechanism having a shifting device controlled at will separately from and independently of the printing movement of the impression-surface, and a series of pressure-bars operatively connected with the shifting device and operatively connected with the printing-surfaces, and a series of links and of chains of gear-wheels carried thereon positively driving the printing-surfaces with the impression-surface, whether the printing-surfaces are in or out of surface contact with the impression-surface, substantially as and for the purposes set forth.

27. In a press, the combination with a main impression-drum having a continuous impression-surface of a rounded and continuous printing-surface positively driven with the impression-drum, and mechanism for radially moving the same into and out of contact with the impression-drum, said mechanism having a shifting device controlled at will separately from and independently of the printing movement of the drum, and direct-pressure bars operatively connected with the shifting device and operatively connected with the printing-surface, substantially as and for the purposes set forth.

28. In a press, the combination with a suitable impression-surface, of a printing-surface and mechanism for moving the same into and out of contact with the impression-surface, said mechanism being controlled at will separately from and independently of the printing movement of the impression-surface and operatively connected with the printing-surface, and links and a chain of gear-wheels carried thereon positively driving the printing-surface with the impression-surface, whether the printing-surface is in or out of surface contact with the impression-surface, substantially as and for the purposes set forth.

29. In a press, the combination with a suitable impression-surface, of a printing-surface and mechanism for moving the same into and out of contact with the impression-surface, said mechanism having a shifting device controlled at will separately from and independently of the printing movement of the impression-surface and pressure-bars operatively connected with the shifting device and carrying the printing-surface, and links and a chain of gear-wheels carried thereon positively driv-

ing the printing-surface with the impression-surface, whether the printing-surface is in or out of surface contact with the impression-surface, substantially as and for the purposes set forth.

30. In a printing-press, the combination with a main impression-drum having a continuous impression-surface, of a printing-surface and mechanism for moving the same radially into and out of contact with the impression-surface of the drum, said mechanism having sliding boxes carrying the printing-surfaces, direct-pressure bars carrying the sliding boxes, and a shifting device controlled at will separately from and independently of the printing movement of the impression-drum, and carrying the pressure-bars, substantially as and for the purposes set forth.

31. In a printing-press, the combination with a main impression-drum having a continuous impression-surface, and a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, of mechanism for moving the same radially into and out of contact with the impression-face of the drum, said mechanism having a series of radially-sliding boxes carrying the printing-surfaces, a series of pressure-bars carrying the sliding boxes, a shifting device controlled at will separately from and independently of the printing movement of the drum but centered with the drum, and carrying the pressure-bars, substantially as and for the purposes set forth.

32. In a printing-press, the combination with a main impression-drum, and a series of printing-surfaces arranged on the impression-face of the drum, of mechanism for moving the same into and out of contact with the impression-face of the drum, said mechanism having a series of radially-sliding boxes carrying the printing-surfaces, a series of pressure-bars connecting with the sliding boxes, a shifting device controlled at will separately from and independently of the printing movement of the drum but centered with the drum, links connecting the shifting device with the pressure-bars and gear mechanism for moving the shifting device, substantially as and for the purposes set forth.

33. In a press, the combination with a suitable impression-drum having a continuous impression-surface and a rounded and continuous printing-surface arranged on the face thereof, of mechanism for adjustably moving the printing-surface radially into and out of contact with the impression-drum, said mechanism carrying the printing-surface and being centered with the drum but controlled at will separately from and independently of the printing movement thereof and being adjustable to and fro radially of the drum in the direction of the motion of the printing-surface, substantially as and for the purposes set forth.

34. In a press, the combination with a suitable impression-surface and a printing-sur-

face arranged on the face thereof, of adjustable mechanism for moving the printing-surface into and out of contact with the impression-surface, said mechanism including a non-removable adjusting part and a removable part connected to the printing-surface, whereby the printing-surface may be removed and restored without affecting the adjustment, substantially as and for the purposes set forth.

35. In a press, the combination with a suitable impression-surface and a printing-surface arranged on the face thereof, of mechanism for moving the printing-surface into and out of contact with the impression-surface, said mechanism including pressure-bars carrying the printing-surface and having adjusting-nuts to adjust the position of the printing-surface thereon and removable securing-nuts to hold the printing-surface in the adjusted position, whereby the printing-surface may be adjusted and may then be removed and restored without affecting the adjustment, substantially as and for the purposes set forth.

36. In a press, the combination with a suitable impression-surface and a printing-surface arranged on the face thereof, of adjustable mechanism for moving the printing-surface into and out of contact with the impression-surface, said mechanism including a non-removable part connected to the carrying mechanism of the printing-surface, a removable part connected to the printing-surface itself and an adjusting part to adjust the one upon the other, whereby the printing-surface may be removed and restored without affecting the adjustment, substantially as and for the purposes set forth.

37. In a press, the combination with an impression-drum having a continuous impression-surface and a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, of a series of slideways supported in the frame of the machine and a series of sliding boxes therein carrying the printing-surfaces, and mechanism for carrying and simultaneously moving the sliding boxes in the slideways radially of the drum and controlled at will separately from and independently of the printing movement, substantially as and for the purposes set forth.

38. In a press, the combination with an impression-drum having a continuous impression-surface and a series of printing-surfaces arranged on the impression-face of the drum, of a series of radial slideways supported in the frame of the machine and a series of sliding boxes therein carrying the printing-surfaces, and mechanism for adjustably moving the sliding boxes in the slideways radially of the drum, said mechanism being adjustable to and fro in the direction of the motion of the sliding boxes and controlled at will separately from and independently of the printing movement, substantially as and for the purposes set forth.

39. In a press, the combination with a suitable impression-surface and a printing-surface, of slideways supported in the frame of the machine and sliding boxes therein carrying the printing-surface, and mechanism controlled at will separately from and independently of the printing movement of the impression-surface for moving the sliding boxes in the slideways perpendicularly to the impression-surface, said sliding boxes with the printing-surface carried by them being removable from the slideways and from the mechanism moving them in the slideways, substantially as and for the purposes set forth.

40. In a press, the combination with a suitable impression-surface and a printing-surface arranged on the face thereof, of slideways supported in the frame of the machine and sliding boxes therein carrying the printing-surface, and mechanism for moving the sliding boxes in the slideways, said sliding boxes with the printing-surface carried by them being adjustable on the mechanism moving them in the slideways and being removable from said mechanism and from the slideways, substantially as and for the purposes set forth.

41. In a press, the combination with an impression-drum having a continuous impression-surface and a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, of a series of radial slideways supported in the frame of the machine and a series of sliding boxes therein carrying the printing-surfaces, and mechanism for moving the sliding boxes in the slideways radially of the drum, said mechanism having a series of radial pressure-bars carrying the sliding boxes and controlled at will separately from and independently of the printing movement, substantially as and for the purposes set forth.

42. In a press, the combination with an impression-drum having a continuous impression-surface and a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, of a series of radial slideways supported in the frame of the machine and a series of sliding boxes therein carrying the printing-surfaces, and mechanism for moving the sliding boxes in the slideways radially of the drum, said mechanism having a series of radial pressure-bars carrying the sliding boxes and a shifting device controlled at will separately from and independently of the printing movement of the drum but centered with the drum and operatively connected with the pressure-bars, substantially as and for the purposes set forth.

43. In a press, the combination with an impression-drum having a continuous impression-surface and a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, of a series of radial slideways supported in the frame of the ma-

chine and a series of sliding boxes therein carrying the printing-surfaces, and mechanism for moving the sliding boxes in the slideways radially of the drum, said mechanism having a series of radial pressure-bars carrying the sliding boxes and a revoluble shifting device controlled at will separately from and independently of the printing movement of the drum but centered with the drum and operatively connected with the pressure-bars, substantially as and for the purposes set forth.

44. In a press, the combination with an impression-drum having a continuous impression-surface and a series of rounded and continuous printing-surfaces arranged on the impression-face of the drum and positively driven with the drum, of a series of radial slideways supported in the frame of the machine and a series of sliding boxes therein carrying the printing-surfaces, and mechanism for moving the sliding boxes in the slideways radially of the drum, said mechanism having a revoluble shifting device controlled at will separately from and independently of the printing movement of the drum but centered with the drum and operatively connected with the sliding boxes, substantially as and for the purposes set forth.

45. In a printing-press, the combination with a suitable impression-surface, of a series of printing-surfaces and a series of ink-frames carrying the inking devices for the printing-surfaces, and mechanism for moving the printing-surfaces and the ink-frames inwardly and outwardly, substantially as and for the purposes set forth.

46. The combination with a suitable impression-surface, of a printing-surface, an ink-frame carrying the inking devices for the printing-surface, and mechanism for moving the printing-surface and the ink-frame inwardly and outwardly, said mechanism having a shifting device controlled at will separately from and independently of the printing movement of the impression-surface, pressure-bars operatively connected with the printing-surface and a gear mechanism connecting the pressure-bars with the ink-frame, substantially as and for the purposes set forth.

47. The combination with a fixed central impression-surface, of a series of printing-surfaces, a series of ink-frames carrying the inking devices for the printing-surfaces, and a common mechanism for moving both the printing-surfaces and the ink-frames inwardly and outwardly, substantially as and for the purposes set forth.

48. The combination with a fixed central impression-surface, of a series of printing-surfaces, a series of ink-frames carrying the inking devices for the printing-surfaces, and a common mechanism for simultaneously moving both the printing-surfaces and the ink-frames inwardly and outwardly, substantially as and for the purposes set forth.

49. The combination with a main impres-

sion-drum, a series of printing-surfaces arranged around the drum and movable to and from the drum, a series of ink-frames carrying inking devices for the printing-surfaces, and mechanism for moving the printing-surfaces to and from the drum and the ink-frames to and from the printing-surfaces, substantially as and for the purposes set forth.

50. The combination with the main impression-drum, a series of printing-surfaces arranged around it, and a series of ink-frames carrying the inking devices for the printing-surfaces, of the radially-movable pressure-bars to move the printing-surfaces into and out of contact with the impression-drum, and a gear mechanism connecting the pressure-bars with the ink-frames to move the inking devices into and out of contact with the printing-surfaces, substantially as and for the purposes set forth.

51. The combination with a suitable impression-surface, a printing-surface and a swinging frame carrying the inking devices for the printing-surface, of pressure-bars for moving the printing-surface into and out of contact with the impression-surface, and mechanism connecting the pressure-bars with the swinging frame and including racks on the swinging frame, sliding rack-bars held in suitable slideways and connecting with the racks of the swinging frame, and a gear connection between the sliding rack-bars and the pressure-bars, substantially as and for the purposes set forth.

52. The combination with the main impression-drum, the printing-surfaces arranged around it, and the swinging frames carrying the inking devices for the printing-surfaces, of the pressure-bars for moving the printing-surfaces into and out of contact with the impression-drum, the racks on the swinging frames, the rack-bars held in suitable slideways and connecting with the racks of the swinging frames, and a gear connection between the sliding rack-bars and the pressure-bars, substantially as and for the purposes set forth.

53. In a printing-press, the combination with a main impression-drum and a series of printing-surfaces arranged around it and a series of ink-frames carrying the inking devices for the printing-surfaces, of mechanism for simultaneously moving inwardly or outwardly the frames which carry the inking devices, said mechanism being independent of the drum but centered therewith, substantially as and for the purposes set forth.

54. In a printing-press, the combination with a main impression-drum and a series of printing-surfaces arranged around it and a series of ink-frames carrying the inking devices for the printing-surfaces, of mechanism for moving inwardly and outwardly the frames which carry the inking devices, said mechanism having a revoluble shifting device independent of the drum but centered therewith, substantially as and for the purposes set forth.

55. In a press, the combination with suitable impression and printing surfaces, of an inking mechanism including a main ink-distributing roller positively driven with the printing-surface, an ink-feeding roller and a vibrating or ductor roller, both positively driven with the main ink-distributing roller, and supplementary distributing-rollers, and a swinging frame, the frame carrying the feeding, the vibrating, and the supplementary distributing rollers, and being centered with the shaft of the main ink-distributing roller, substantially as and for the purposes set forth.

56. In a press, the combination with suitable impression and printing surfaces, and suitable driving mechanism, of an inking mechanism including a main ink-distributing roller, an ink-feeding roller and a vibrating or ductor roller, the latter two both positively connected with and driven by the main ink-distributing roller, supplementary distributing-rollers, and a swinging frame, the frame carrying the feeding, the vibrating and the supplementary distributing rollers and being centered with the shaft of the main ink-distributing roller, and a positive connection between said main ink-distributing roller and the driving mechanism, whereby the inking mechanism is positively driven whatever the position of the swinging frame, substantially as and for the purposes set forth.

57. In a press, the combination with a suitable impression-surface and suitable driving mechanism, of a printing-surface movable toward and from the impression-surface and in all of its positions positively connected with and driven by the driving mechanism, and an inking mechanism including a main ink-distributing roller positively connected with and driven by the printing-surface in all of the latter's positions, a swinging frame centered with the shaft of the said main ink-distributing roller, and, carried on the swinging frame, an ink-feeding roller, a vibratory or ductor roller, and supplementary distributing-rollers, the ink-feeding roller and the vibratory or ductor roller being both positively connected with and driven by the main ink-distributing roller, substantially as and for the purposes set forth.

58. In a press, the combination with suitable printing and impression surfaces and inking mechanism and suitable main driving mechanism, of a dampening device including a hollow water-supply roller having internal water-supply and a group of water-distributing rollers and mechanism for swinging the water-supply roller and one of the water-distributing rollers intermittently but positively into contact with each other, said mechanism being positively driven with the main driving mechanism, substantially as and for the purposes set forth.

59. In a press, the combination with a suitable impression-surface and a suitable printing-surface, of a hollow water-supply roller having internal water-supply and a group of

water-distributing rollers, one of the water-distributing rollers revolving in contact with the printing-surface, the water-supply roller being mounted on pivoted arms and having
 5 mechanism for intermittently but positively swinging it into contact with one of the water-distributing rollers, substantially as and for the purposes set forth.

60. In a lithographic press, the combination
 10 with a suitable impression surface or surfaces, and a series of lithographic-printing surfaces and suitable driving mechanism, of a series of inking mechanisms, one for each printing-surface, each including an ink-feeding roller
 15 positively driven with the main driving mechanism, and a series of dampening mechanisms, one for each printing-surface, each including a hollow water-supply roller intermittently and positively swung into contact with a water-distributing roller, substantially as and
 20 for the purposes set forth.

61. In a press, the combination with a suitable impression-surface and a suitable printing-surface, of an inking device including a
 25 main ink-distributing roller positively driven with the printing-surface, and a dampening device including a hollow water-supply roller having internal water-supply and a group of water-distributing rollers and mechanism for
 30 swinging the water-supply roller and one of the water-distributing rollers intermittently but positively into contact with each other, said mechanism being positively driven with the printing-surface, substantially as and for
 35 the purposes set forth.

62. In a press, the combination with suitable printing and impression surfaces and suitable driving mechanism, of an inking mechanism including a main ink-distributing roller positively
 40 driven with the main driving mechanism, an ink-feeding roller and a vibrating or ductor ink-roller, both positively driven with the main ink-distributing roller, and a dampening device including a vibrating hollow
 45 water-supply roller intermittently and positively swung into contact with a water-distributing roller, substantially as and for the purposes set forth.

63. In a press, the combination with a suitable
 50 impression-surface and a suitable printing-surface positively driven with it, of an inking device including a main ink-distributing roller, an ink-feeding roller and a vibrating or ductor ink-roller, and mechanism for
 55 vibrating the latter into contact alternately with the ink-feeding roller and the main ink-distributing roller, said mechanism being positively driven with the printing-surface, and a dampening device including a hollow

water-supply roller having internal water- 60 supply and a group of water-distributing rollers and mechanism for intermittently but positively swinging the water-supply roller and one of the water-distributing rollers into
 contact with each other, said mechanism being 65 positively driven with the printing-surface, substantially as and for the purposes set forth.

64. The combination with the paper-carrying surface, of paper-holding grippers mounted at the sides thereof and provided with
 70 heads to overlap the paper, said grippers having a slotted and pivoted mounting and having springs to hold the heads inward over the paper and down on the paper, and cams
 75 fixed in the frame of the machine and arranged in the path of the grippers and adapted first to raise the grippers in their slots and the heads of the grippers from the paper
 80 and then to swing the grippers on their pivots and the heads of the grippers outwardly from over the paper, substantially as and for the purposes set forth.

65. In a multicolor lithographic press, the combination with a large impression-drum 85 having a circumferentially-continuous uniformly-elastic impression-surface, of a series of small uniform printing-forms having circumferentially-continuous cylindrical lithographic-printing surfaces arranged circum- 90 ferentially around the impression-drum, mechanism to move the printing-surfaces toward and from the impression-surface and to move the printing-surfaces into, and hold
 95 them in, printing contact with the impression-drum in accurate and permanent relationship each printing-surface to all the others, a series of inking mechanisms, one for each printing-surface, each inking mechanism including a group of ink-distributing 100 rollers arranged on the outer side of the printing-surface away from the drum and mechanism to move them toward and from the printing-surface, and a series of dampening mechanisms, one for each printing-sur- 105 face, arranged between adjacent printing-surfaces, each dampening mechanism including a group of water-distributing rollers and mechanism to move them toward and from the printing-surface, and suitable pa- 110 per supplying and delivering devices for supplying paper on the web, substantially as described.

EDWARD HETT.

Witnesses:

WARREN B. HUTCHINSON,
 C. SEDGWICK.