

No. 885,340.

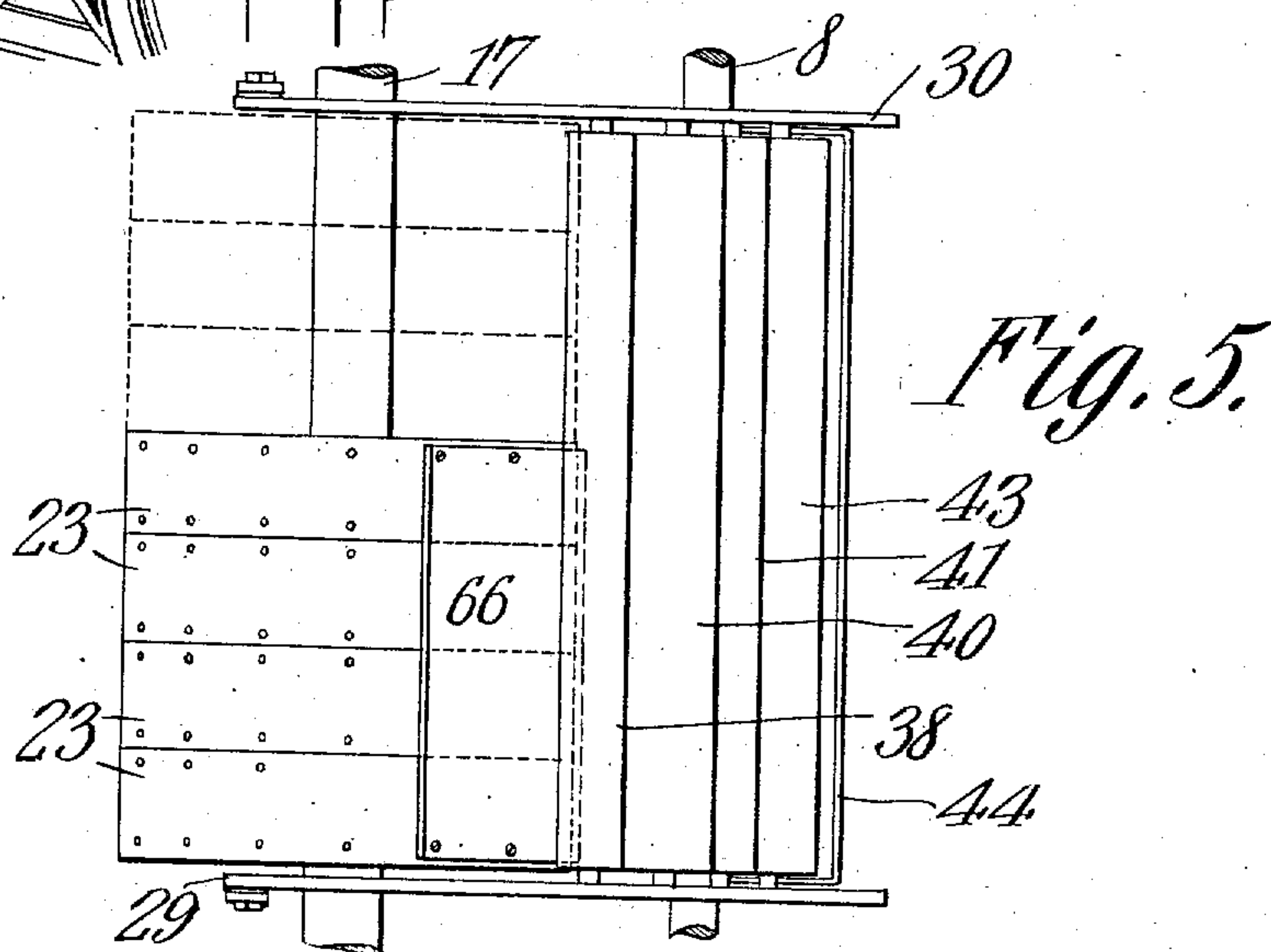
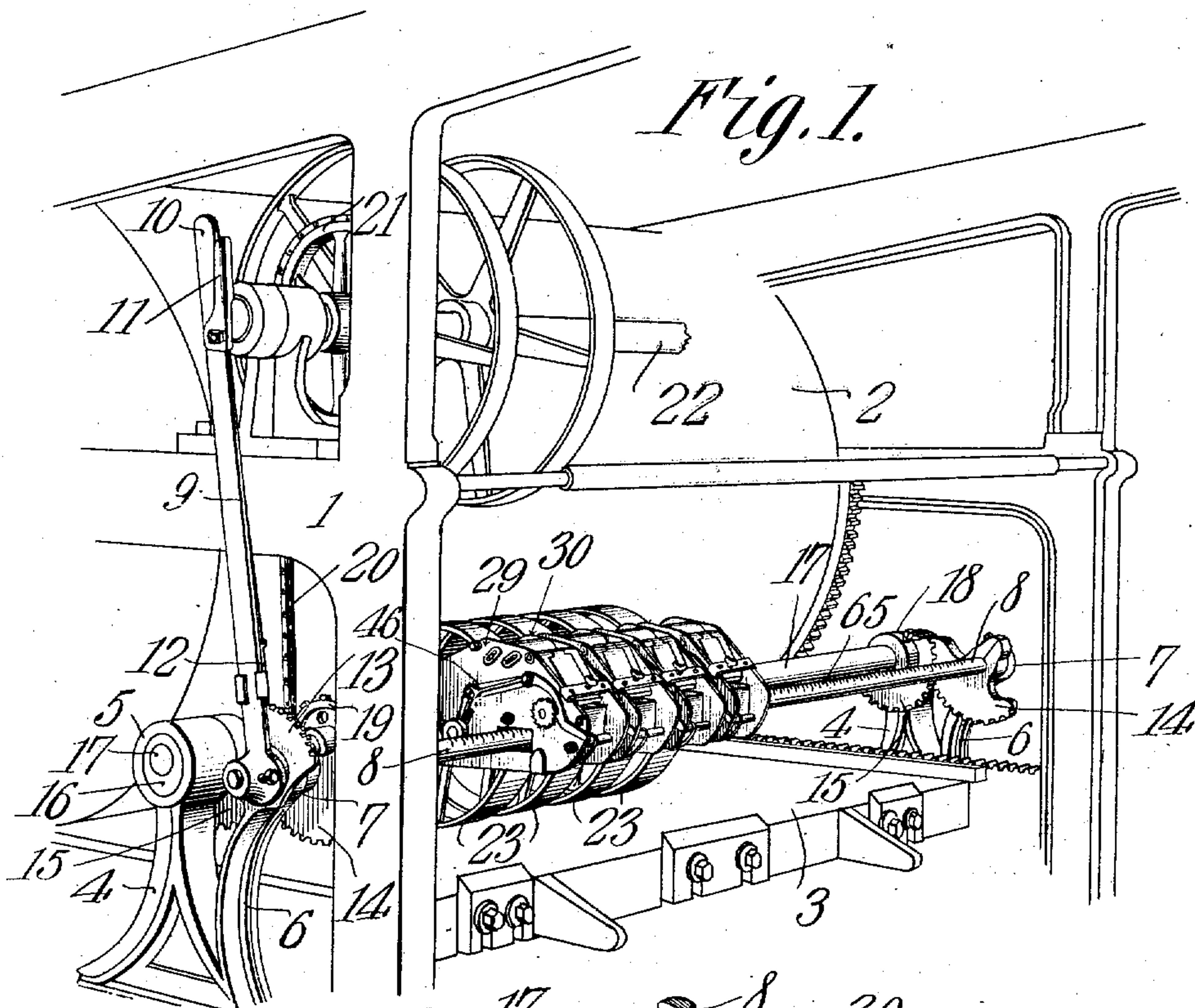
A. P. HARLAND.

PATENTED APR. 21, 1908.

COLOR PRINTING ATTACHMENT FOR PRINTING PRESSES.

APPLICATION FILED SEPT. 12, 1907.

4 SHEETS—SHEET 1.

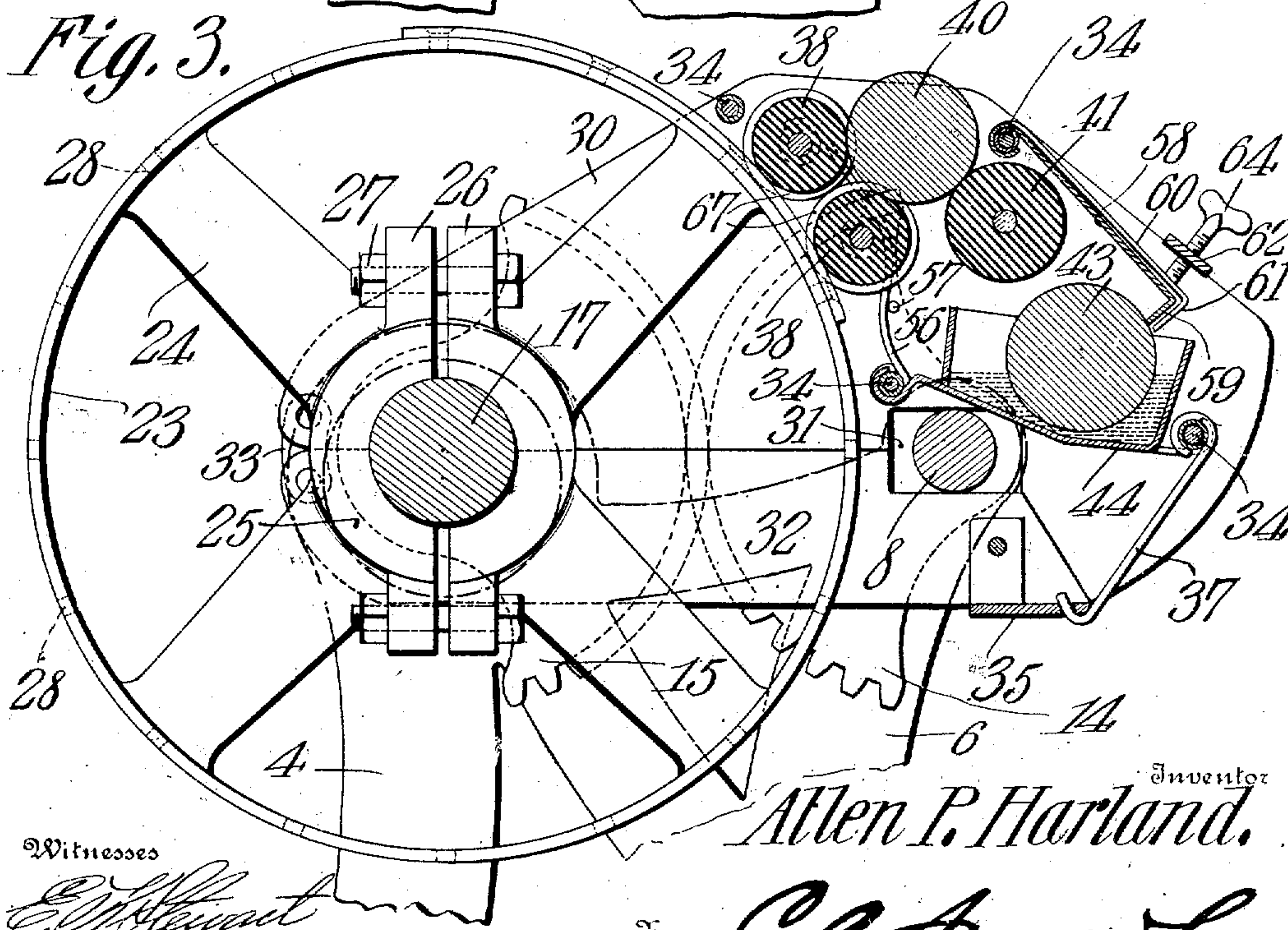
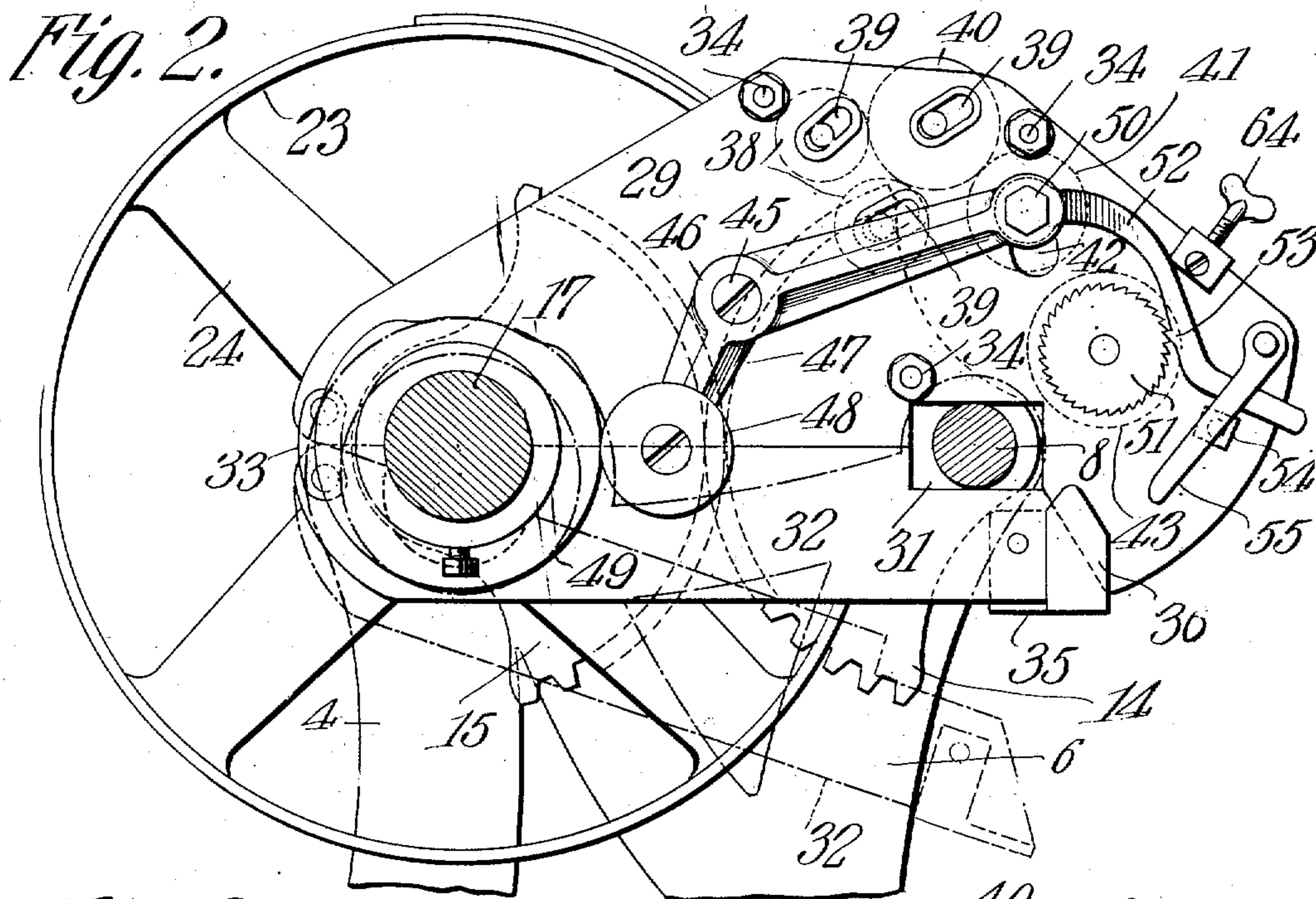


Witnesses.

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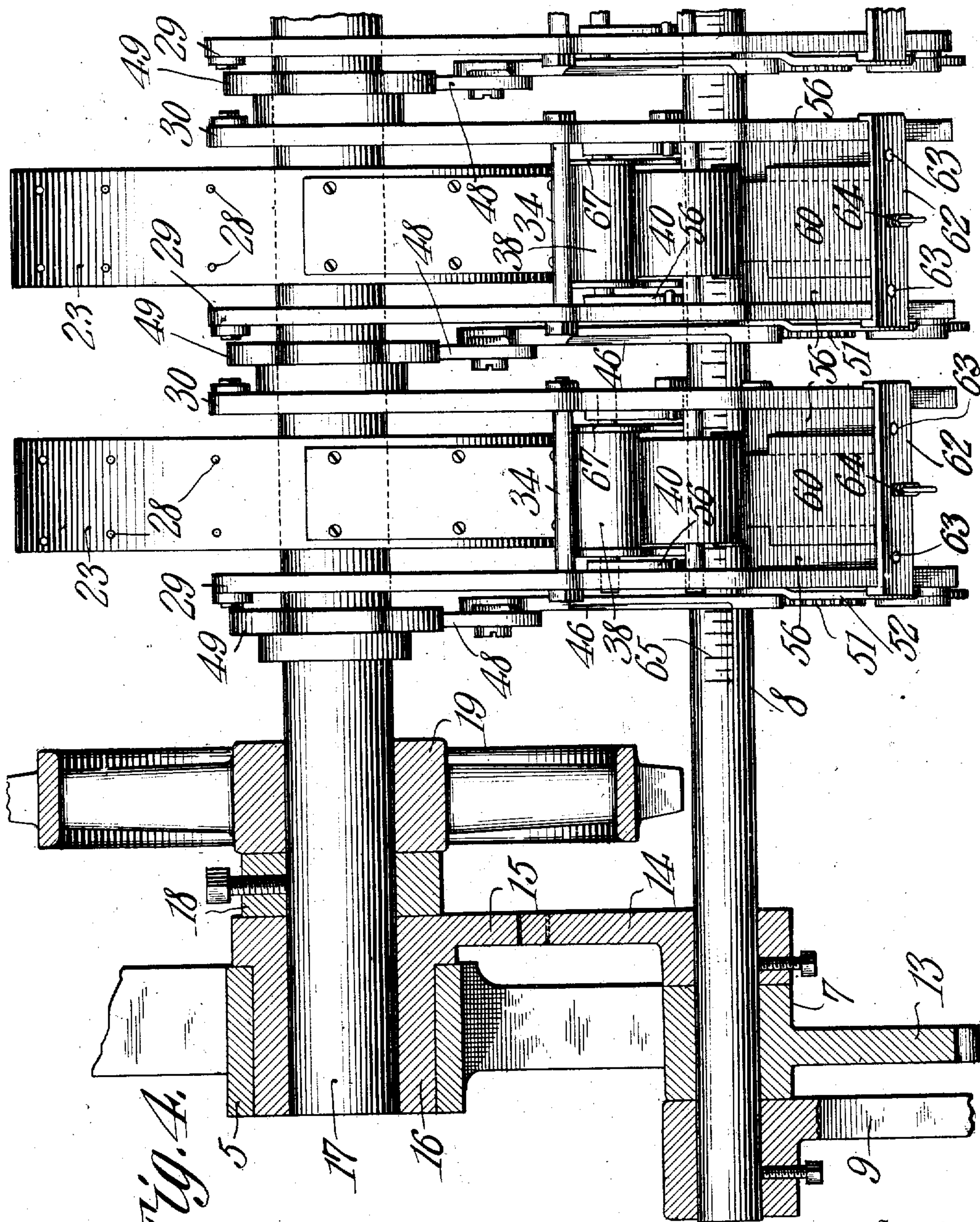


Fig. 4.

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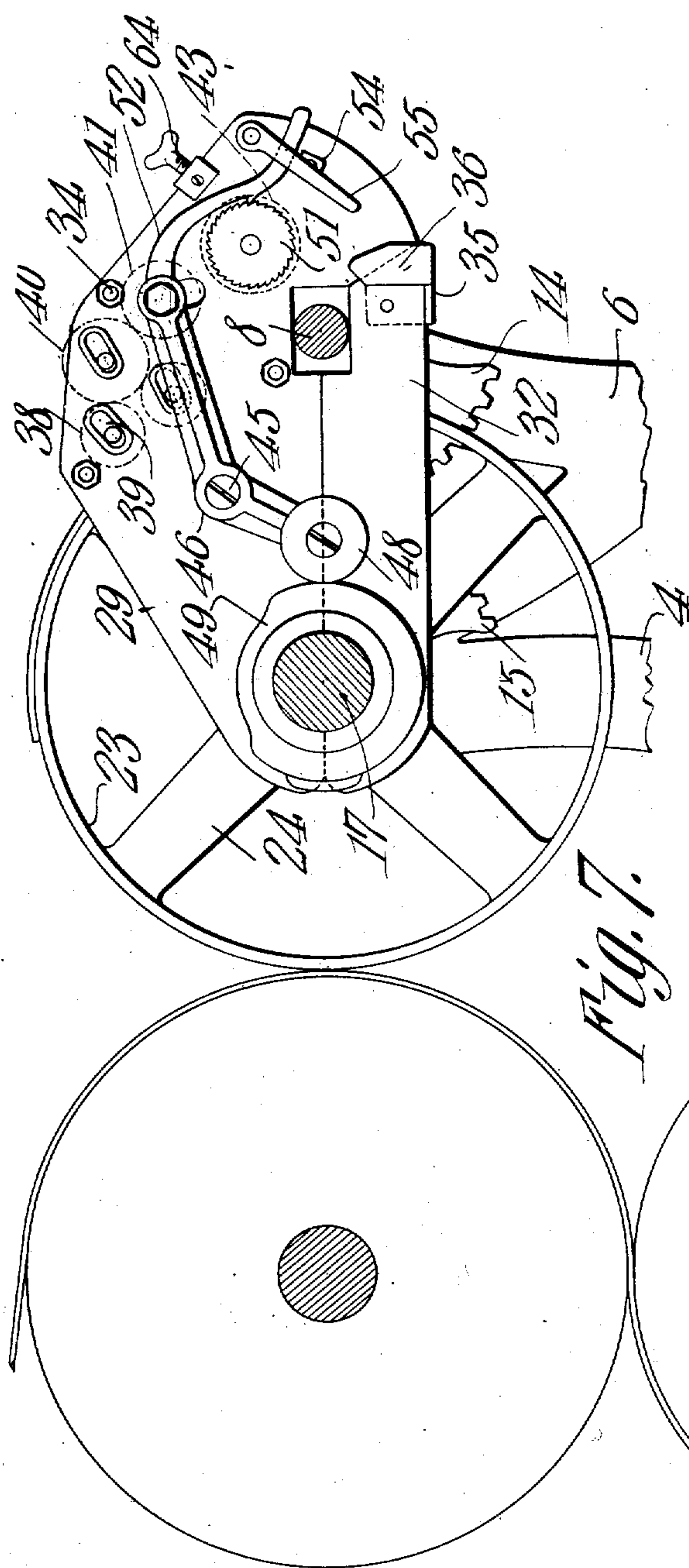


Fig. 7.

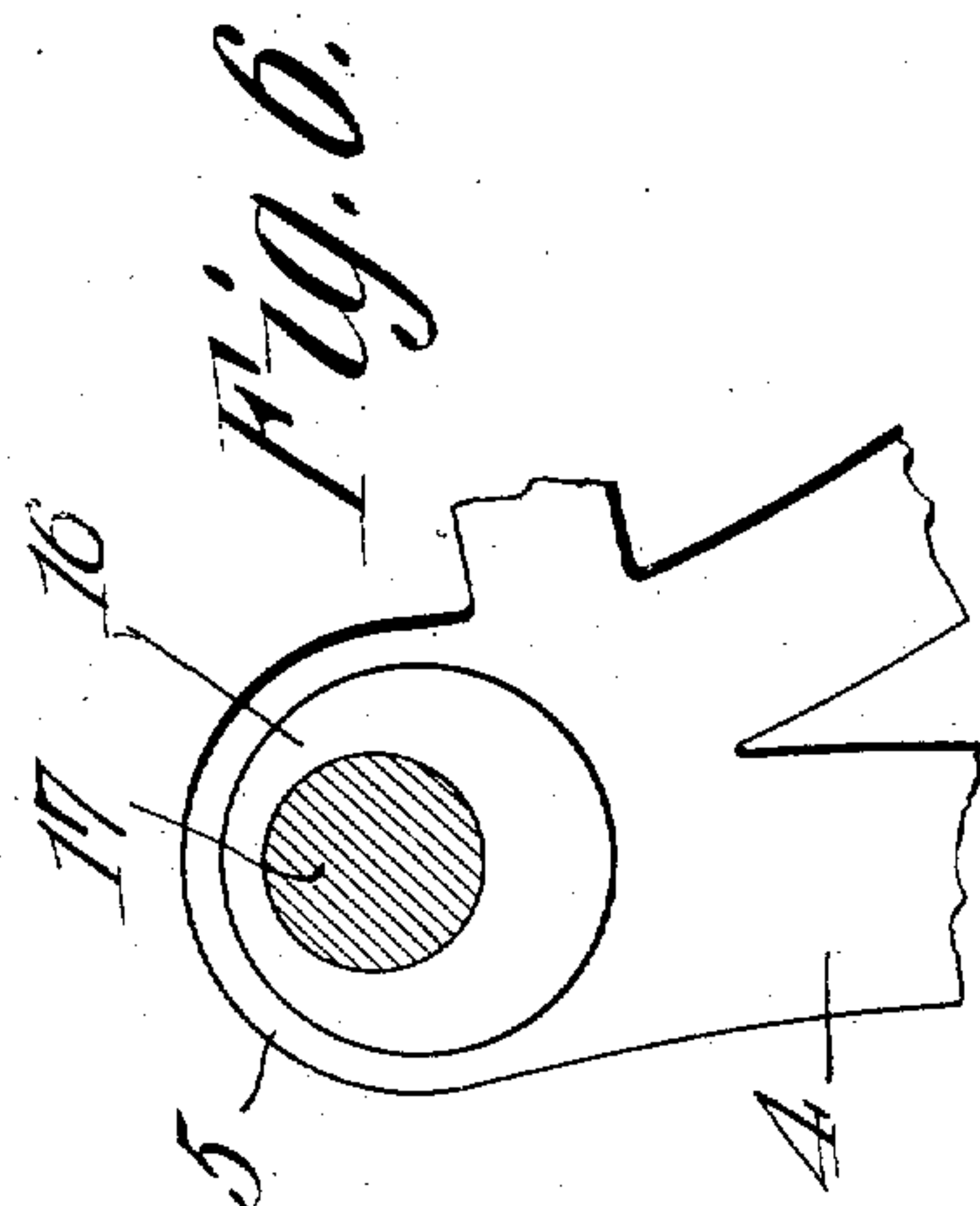


Fig. 6.

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UNITED STATES PATENT OFFICE.

ALLEN P. HARLAND, OF DYERSBURG, TENNESSEE.

COLOR-PRINTING ATTACHMENT FOR PRINTING-PRESSES.

No. 885,340.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed September 12, 1907. Serial No. 392,587.

To all whom it may concern:

Be it known that I, ALLEN P. HARLAND, a citizen of the United States, residing at Dyersburg, in the county of Dyer and State of Tennessee, have invented a new and useful Color-Printing Attachment for Printing-Presses, of which the following is a specification.

This invention has reference to improvements in color-printing attachments for printing presses, and is designed to provide a means whereby portions of the printed matter may be produced in any desired color and in any desired location simultaneously with the printing of the other parts of the work, and this attachment may be applied to a printing press of any approved construction without change in said press and without interfering with its normal operation.

The present invention provides a means whereby as many different colors may be used as may be desired, and whereby printing being done in any color may be changed to any other color by a simple system of substitution of ink reservoirs.

The invention also provides means whereby type forms used to produce imprints of various colors may be brought into perfect register with the spaces left in the main imprint for such colored portions, and this may be done without changing the position of the type forms with relation to the parts which carry them.

The invention likewise comprises means whereby any particular type form used in any location upon any one of a number of form carriers will fit any other of the carriers in the same or another position and will also fit when the ends are reversed to print right and left.

In accordance with the present invention there are provided a number of units capable of being used either separately or in multiples, so that either small or large spaces may be printed in colors at the same time. If the units are used separately then the number of colors is limited only by the number of units used. If the units are used in multiples, that is to say, when two or more units are united to form a composite unit and are used either alone or together with other composite or single units, then, again, the number of colors which may be printed is limited only by the number of such composite or single units employed.

Furthermore, the invention contemplates

the use of interchangeable ink reservoirs, so that the color of the imprints may be quickly changed at will without disturbing the type forms or their relation to the surface upon which the imprints are made.

The invention likewise includes means for throwing the members designed to produce the colored imprints into and out of operative relation with the surface to be printed, and for regulating the degree of pressure with which the imprinting surface is brought to bear upon the surface to be printed, and also for locking these printing members in the desired position.

The present invention is applicable to various types of printing presses and is not limited in its application to any particular type.

The invention both as to its purposes and its practical embodiment will be best understood by a consideration of the following detailed description, taken in connection with the accompanying drawings forming part of this specification, in which,—

Figure 1 is a perspective view showing the invention applied to a press of the cylinder and reciprocating bed type; Fig. 2 is a side elevation of one of the color printing units; Fig. 3 is a longitudinal section of the same; Fig. 4 is a horizontal section, partly in elevation, showing a number of related units and adjacent parts; Fig. 5 is a plan view of a printing unit made up of a number of type form carriers brought together to constitute a carrier for a single type form with a single inking mechanism constructed to include a multiple type carrier; Fig. 6 is a detail view of one of the supporting members for the shaft upon which the type carriers are mounted; and Fig. 7 is a diagrammatic representation of the manner of applying the invention to a web press.

Referring to the drawings, there is shown a portion of the frame 1 of a printing press employing a cylinder 2 and a reciprocating bed 3, all of familiar construction and only illustrated in the drawing in sufficient detail to indicate a cylinder and reciprocating bed press. Fast to the frame on each side thereof is a pedestal 4 terminating at the upper end in a cylindrical bearing or journal box 5 and having a side branch 6 also terminating in a journal box 7, the journal boxes 5 and 7 being in the same horizontal plane but spaced one from the other. Mounted in the journal boxes 7 of the two pedestals 4 is a rock-shaft

8 projecting through and beyond one of the journal boxes, say the one shown in the foreground in Fig. 1, and there this shaft has applied to it a manipulating lever 9 terminating in a handle 10 adjacent to which the lever 9 carries a latch lever 11 connected in the usual manner to a dog 12 arranged to engage the teeth of a segmental rack 13 formed on the upper end of the side extension 6 of the pedestal 4. By means of the lever 9 the shaft 8 may be rocked on its longitudinal axis and will be held in any adjusted position by the engagement of the dog 12 with the teeth of the rack 13. Adjacent but interior to each journal 7 the shaft 8 has fast thereon a gear segment 14 in mesh with another gear segment 15 having a hub 16 extending to one side thereof and journaled in the adjacent journal bearing or box 5. Each segment 15 with its hub 16 is bored eccentrically to its axis and there receives the corresponding end of a shaft 17 parallel with the shaft 8. When the shaft 8 is rocked upon its longitudinal axis the gear segments 14 participate in this movement and impart a movement of rotation to the gear segments 15 which are thereby correspondingly rocked on their axes in the journal boxes 5. The axis of the shaft 17 being eccentric to the axis of the segments 15, the said shaft 17 will, when the shaft 8 is rocked, have a movement to or from the shaft 8 depending upon the direction of movement of said shaft 8 about its axis. Now, since the shaft 8 is in fixed relation to the cylinder 2, when the shaft 8 is rocked upon its longitudinal axis the shaft 17 will approach or recede from the cylinder 2 as the case may be. The shaft 17 is free to turn in its bearings in the hub 16 but is prevented from longitudinal movement with relation to said hubs by collars 18 fixed upon said shaft and abutting said hubs, and since the hubs 16 are of less diameter than the corresponding segments 15 these segments are held in their seats in the journal boxes 5 by the collars 18.

Adjacent to one of the collars 18 the shaft 17 has fixed thereon a sprocket gear wheel 19 receiving motion through a sprocket chain 20 coming from another sprocket gear 21 mounted upon a shaft 22 constituting part of the press, or the shaft 17 may receive motion in other ways, as, for instance, by direct gearing or by connection with other convenient portions of the press.

Mounted upon the shaft 17 are a number of cylinders 23 each supported by spokes 24 extending from a central hub 25 which is split diametrically and provided with ears 26 through which pass bolts 27 by means of which the hubs may be clamped fast upon the shaft 17. These cylinders 23 will be of such width as to carry a printing surface, say a stereotype plate, which will make an im-

be printed in color, and the shaft 17 may carry any number of these cylinders from one up to a number corresponding to the width of the space to be printed in colors. In Fig. 1 there are shown four such cylinders or form carriers 23, but it will be understood that this is only illustrative and a greater or less number may be employed. Because the hubs of these cylinders are split, they may be sufficiently loosened with relation to the shaft 17 to permit of being adjusted to any position along said shaft that may be desired, and may also be rotated about the shaft to any desired point to bring type forms fast on the peripheries of the cylinders or drums into perfect register with the spaces left in the main imprints of the press for the reception of imprints to be produced by these type forms. The drums or cylinders 23 are also provided with series of equally spaced perforations 28 which may be suitably tapped for the reception of screws by means of which the stereotype plates are secured to the peripheries of the cylinders or drums. By making these perforations all accurately spaced about the peripheries of the drums, the stereotype plates, also provided with perforations accurately spaced, may be used interchangeably upon any of the drums without the necessity of readjusting the parts to bring them into register, and these plates may be reversed upon the drums to print right and left.

Flanking each side of a drum 23 are side plates 29—30 constituting the supports for the inking rollers and ink reservoirs by means of which the imprinting surface upon the respective cylinder or drum 23 is inked. The plates 29 and 30 are each provided with a through perforation for the passage of the shaft 17 and also with an elongated slot 31 for the passage of the shaft 8 to allow for the varying distances between the shafts 8 and 17. In order that the plates 29 may be readily removed from the shafts 8 and 17 a lower section 32 of each side plate is made separate from the other section and is hinged thereto by a connecting link 33 adjacent to the passage through which the shaft 17 extends, so that by turning the section 32 about the hinge 33 the side plate may be disengaged from both the shafts 8 and 17. The plates 29 and 30 are joined by a number of bolts 34 which may be shouldered or otherwise formed to space these plates apart sufficiently to receive the drums or cylinders 23, and in order that the sections 32 may be readily held in place to lock the side plates to the shafts 8 and 17 a latch member 35 is hinged to that end of each section 32 remote from the hinge 33, and this latch member has upturned wings 36 partially covering the joints between the free ends of the parts 32 and 30 where these parts come together.

In order to hold the latch plate 35 remov-

print adapted to a space upon the surface to

particular matter upon the corresponding drum or cylinder 23. Of course the main forms of the printing press are blank at the points where the colored imprints are to be made. Now, when the press is set in motion the lever 9 is so manipulated as to cause the rotation of the segments 14 and 15 and the shaft 17 is thereby moved toward the cylinder 2 and the drums or cylinders 23 are brought into operative relation to the paper on the cylinder 2 so as to make imprints thereon in the spaces left by the main forms of the press where it is desired that the colored imprints should register.

In adjusting the color-printing cylinders or drums 23 the printing forms thereon may be brought into approximate register by being secured by screws entering appropriate perforations 28. Then, to bring these im-
printing surfaces into exact register the drums 23 may be moved longitudinally on the shaft 17 or rotatively thereon, or both, as the case may be, by first loosening the bolts 27, which may be done with a suitable socket wrench, then, after the adjustment has been made, tightening these bolts and so fixing the relation of the drums 23 on the shaft 17. The degree of pressure of the imprinting surfaces of the drums 23 upon the paper may be regulated to a nicety by means of the lever 9 and the eccentric mounting of the shaft 17, after which the lever 9 is locked in the adjusted position by means of the dog 12 engaging between two teeth of the rack 13.

Now, let it be assumed that it is desirable to change the colors without changing the type forms upon the drums 23. For this purpose the frames carrying the inking mechanisms are unlatched from the shafts 8 and 17 and again placed thereon at such points as may be desired, and this without the necessity of cleaning the inking devices, although, of course, it will be necessary to clean the printing forms upon the drums 23, this being, however, a very small matter requiring but little time as compared with the cleaning of the inking rollers and the press as a whole. Now, again, let it be supposed that it is desirable to print in color from forms wider than one of the drums 23, then on removing the frames carrying the inking mechanism two or more of the drums 23 may be brought into contact to form a single composite drum of two, three or more times the width of a single drum. This is indicated in Fig. 5 and the ink-carrying frame is in this instance made wide enough to accommodate as many of the drums 23 as would be used for a printing form embracing an entire page, while any number of drums less than the total number necessary to fill the entire inking frame may be used and may be located within the frame in any manner desired. When such composite drum is used then a printing form such as indicated at 66 and of sufficient width to

embrace all the drums 23 which are brought into contact, is employed.

In the form shown in Fig. 5 there may be employed a number of overlapping scraper plates similar to those shown in conjunction with a single drum 23, so that if desired the amount of ink fed to the printing form 66 may be varied as the exigencies of the case may require. It will thus be seen that the single drums 23 may be used separately or united in multiples to print larger spaces, or single and multiple drums may be interspersed, or, in fact, any combination both of width of print and of color, may be used within the capabilities of the particular press and the number of drums 23 adapted thereto.

When a single inking frame capable of including a number of drums 23 is used the imprints will be made in one color, but it is possible to make a single inking frame which will include a number of drums 23 each with individual inking rollers fed from individual ink reservoirs, so that a number of colors may be printed simultaneously. In such case, however, when it is desirable to interchange the colors, all the inking rollers as well as the type form carrying drums must be cleaned.

The relative number of revolutions of the color cylinder or drums will vary with different presses, and, consequently, the driving mechanism between the main press and the shaft 17 must be varied accordingly.

In Fig. 7 there is shown diagrammatically a sufficient portion of a web press to illustrate the application of the invention thereto. In this case the drums 23 and the corresponding impression drum of the web press may be of the same size and rotate with the same speed.

Reverting to the inking rollers 38, it will be observed that they are provided with end flanges or heads 67 which engage with the periphery of the corresponding drum 23 on each side of the printing plate. These flanges may be made of metal, and being always in contact with the drum 23 will be positively and continuously rotated thereby, thus relieving the composition bodies of the rollers 38 from the strain of rotation which would otherwise be imparted to them and also insuring an even distribution of ink.

I claim:—

1. In a printing press, a shaft, type form carrying drums mounted for longitudinal and circumferential adjustment thereon, another shaft adjacent to the first-named shaft, interchangeable inking mechanism, one for each drum and supported by the shafts, eccentric journal bearings for the first-named shaft, and means carried by the second shaft for rotating said bearings to shift the first-named shaft toward or from the second-named shaft.

2. A printing press attachment, comprising a shaft capable of rotative movement, type form carrying drums mounted thereon

bly in place a hook 37 is provided having a hinge connection to an appropriately located bolt 34. The side plates 29 and 30 extend beyond the peripheries of the drums or cylinders 23 and there support a series of inking rollers composed of composition rollers 38 having their journals mounted in slots 39 in the side plates, which slots slant in a direction to cause the inking rollers to gravitate toward the surface of the drums 23, and these inking rollers are engaged by a solid roller 40 also having its journals mounted in slanting slots 39 in the side plates, and this last-named roller 40 is engaged by a composition transfer roller 41 having its journals extending through slots 42 in the side plates and, in turn, receiving ink carried by another roller 43 journaled in the side plates and constantly dipping in an ink reservoir or pan 44, open on the upper edge and having supports on two appropriately located spacing bolts 34.

For the purpose of transferring ink from the roller 43 to the roller 40 there is pivoted to each side plate 29 on its outer face, by means of a pivot screw 45, an angle lever 46 having a short arm 47 carrying a roller 48 in the path of a cam 49 fast on the shaft 17 adjacent to the respective side plate 29. The end of the longer arm of the lever 46 is fast to the journal 50 of the transfer roller 41. The cam 49 is so shaped that through the greater portion of its rotation its periphery will engage the roller 48 in such manner as to maintain the transfer roller 41 in engagement with the solid roller 40. During a shorter period in the rotation of the cam 49 the roller 48 is opposite a depressed portion of the cam, and thus the roller 41 will gravitate to make contact with the ink feed roller 43 to receive a charge of ink which, when the longer portion of the cam 49 comes in contact with the roller 48 and so elevates the roller 41 into contact with the roller 40, is transferred to the last-named roller and from thence is distributed by the inking rollers 38 to the imprinting surface on the corresponding drum or cylinder 23.

The journal of the roller 43 extends through the side plate 29 and there carries a ratchet wheel 51, while pivotally secured to the end of the long arm of the lever 46, say upon the journal 50 of the roller 41, is a pawl 52 having a tooth 53 arranged to engage the teeth of the ratchet wheel 51 and held in operative relation thereto by the weight of the pawl. The lower limit of movement of the pawl 52 is fixed by a nut 54 on one of the bolts 34, while a pivoted latch arm 55, engaging over the nut, serves to prevent the pawl from such lateral movement as would disengage it from the teeth of the ratchet 51. The relation of the pawl 52 and ratchet 51 is such that when the transfer roller 41 is moved away from the roller 43 and into engagement with the roller 40 the tooth 53 will engage a

tooth on the ratchet wheel 51 and so cause a corresponding partial rotation of the roller 43, thus bringing the freshly inked surface into the path of the roller 41 when it is again returned into contact with the roller 43, the tooth 53 under these conditions riding idly over the teeth of the ratchet disk 51. By this means, every time the shaft 17 and the drums 23 carried thereby make one complete rotation, ink is transferred from the roller 43 to the roller 40 and from thence distributed to the printing surfaces on the drums 23.

In order that the inking rollers 38 may bear with sufficient pressure upon the printing surfaces to transfer ink thereto, there are provided one or more springs 56 fast upon one of the bolts 34 at one end and engaging a pin 57 projecting from the corresponding plate 29 or 30 and at the other end engaging the journals of these rollers 38 in such manner as to force them into elastic contact with the printing surfaces. Since the roller 40 may be a solid metal roller its weight will be sufficient to keep it in contact with the rollers 38. To prevent too much ink from being carried by the roller 43 to the roller 41 there are provided two spaced scrapers 58 pivoted upon one of the bolts 34 and having their ends 59 downturned so as to engage the periphery of the roller 43 near the ends thereof, while another plate 60, likewise pivoted upon the same bolt 34 and having a downturned end 61 to bear upon the roller 43, is wide enough to extend over the space between the separated scraper plates 58 and to overlap their contiguous edges. Extending between the two side plates 29 and 30 is a strap 62 provided with tapped perforations 63 for the reception of a thumb-screw 64, so that the thumb-screw may be brought to bear upon either the central elastic scraper plate 60 or either of the end scraper plates 58 and thus increase or decrease the amount of ink permitted to reach the roller 41 as may be desired, so that the amount of ink which ultimately reaches the imprinting surfaces on the drums or cylinders 23 may be regulated to a nicety.

Let it be assumed that the present invention is applied to a press for printing newspapers, and that certain advertisers, wishing to attract attention to their advertisements, desire that the same either in whole or in part shall be printed in colors. If the colored imprints are to occur in several columns the drums or cylinders 23 with their inking mechanisms—a drum or cylinder and its inking mechanism constituting a color-printing unit—are all adjusted along the shaft 17 to register with the space in which the imprint is to occur. To facilitate this adjustment the shaft 8 may be graduated, as indicated at 65. In each reservoir 44 is placed a supply of the colored ink to be used in connection with the

for longitudinal and circumferential adjustment, another shaft adjacent to the first shaft, rack segments upon the second shaft, other rack segments upon the first shaft in mesh with the first-named rack segments, and eccentric bearings for the first-named shaft formed in the second-named rack segments whereby the first-named shaft may be adjusted toward or from the second-named shaft.

3. In a printing press, an attachment therefor comprising a shaft carrying printing drums and movable to and from the surface to be printed, and removable and interchangeable inking mechanisms also mounted on said shaft and participating in the movement of the latter to and from the surface to be printed.

4. In a printing press, a color printing attachment therefor comprising a drum or cylinder for carrying a printing form, said drum or cylinder having an unbroken cylindrical periphery provided with series of equally spaced means extending entirely around the periphery for the attachment thereto of the printing or type form, and also provided with a split hub and clamping means therefor whereby the drum may be secured to the shaft and may be adjusted longitudinally and circumferentially with relation to the shaft.

5. An attachment for printing presses consisting of a rotatable drum adapted to receive type or printing forms and to be secured upon a shaft, and an ink frame carrying an ink reservoir and ink rollers for transferring ink from the reservoir to the type form on the drum, said ink frame having two members one carrying the reservoir and ink rollers, and the other being hinged to the first-named member and adapted to embrace the shaft carrying the rotatable drum, and a latch for coupling the two members of the frame together.

6. An attachment for printing presses comprising a shaft, a number of drums adjustable longitudinally of said shaft, and a number of ink frames, each carrying an ink reservoir and ink rollers for transferring ink from the reservoir to the respective drums, each of said ink frames being attached to the shaft carrying the drums and interchangeable one with the other.

7. In a printing press, a type-form carry-

ing drum, a shaft for supporting the same, an inking frame composed of two members one carrying an ink reservoir and ink-transferring rollers between said reservoir and drum and the other member being hinged to the first-named member to embrace the shaft to removably lock the inking frame to the shaft, and a latch for connecting the two members of the inking frame together.

8. In a printing press shaft, type-form carrying drums mounted thereon, removable interchangeable inking mechanisms carried by said shaft, and means on the shaft, and co-acting means coupled to the inking mechanism for feeding ink from the reservoir to the respective drum when the shaft is rotated.

9. In a printing press, a rotatable shaft, type-form carrying drums mounted thereon and provided with means for adjusting them both longitudinally and circumferentially with relation to said shaft, said adjusting means being interior to each drum within the length thereof so that the drums may be brought into end engagement for united action or be separated for individual action, and inking means for the drums carried by the shaft.

10. In a printing press, a rotatable shaft movable to and from the surface to be imprinted, drums mounted thereon and adjustable longitudinally and circumferentially with relation to said shaft and adapted to be brought into end engagement for united action or to be separated for individual action, and inking means for the drums carried by the shaft and participating in its movement toward or from the surface to be printed.

11. In a printing press, a number of printing units, all mounted for simultaneous operation upon a single shaft, each printing unit comprising a rotatable drum adapted to receive type or printing forms, and an inking mechanism mounted upon the shaft carrying the drums, each inking mechanism being removable as a whole and interchangeable with the inking mechanisms of any one of the other drums.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ALLEN P. HARLAND.

Witnesses:

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JAS. M. WALKER.