

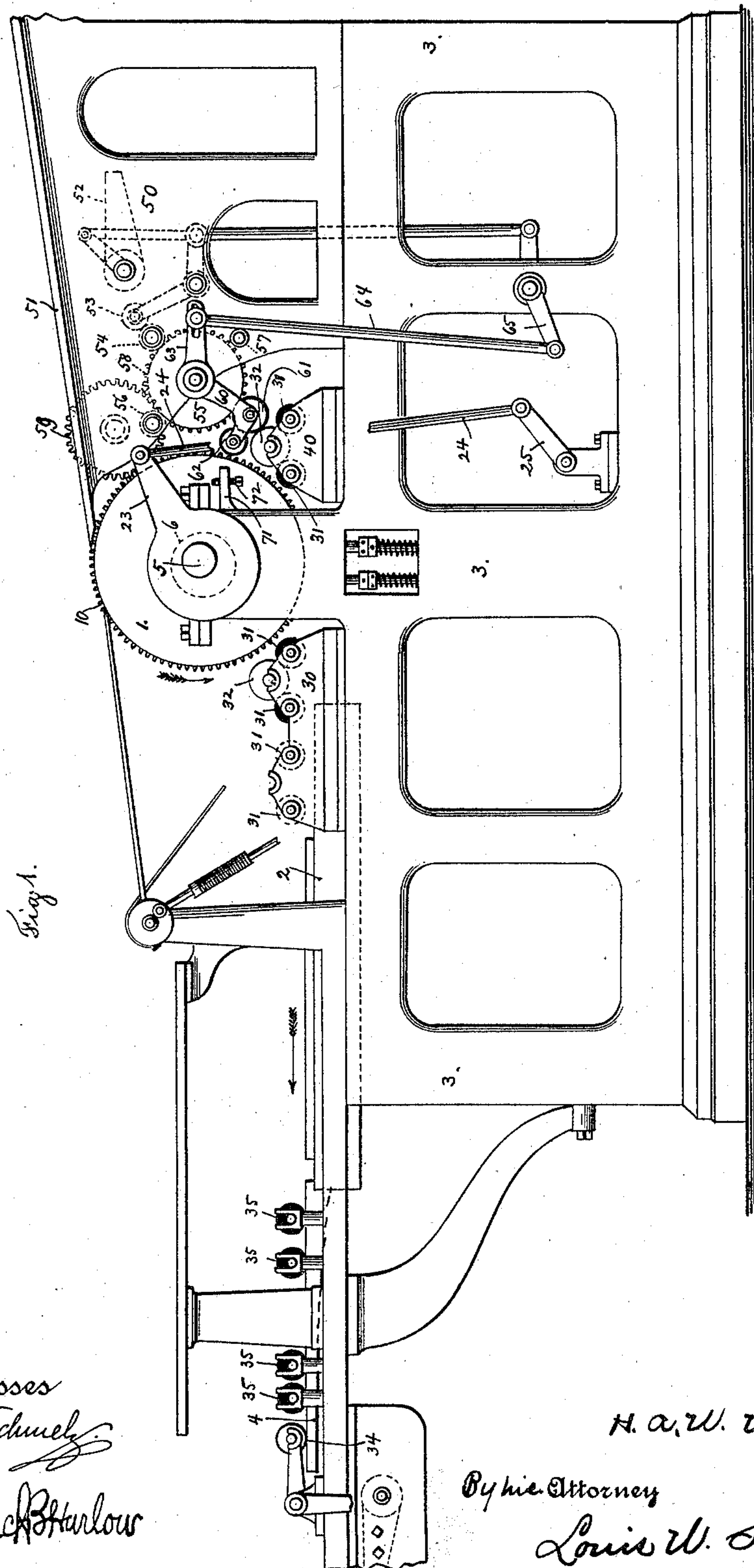
(No Model.)

3 Sheets—Sheet 1.

H. A. W. WOOD.  
CYLINDER PRINTING PRESS.

No. 585,995.

Patented July 6, 1897.



Witnesses  
*Chas. F. Schuch*  
*Frederick B. Harlow*

Inventor  
*H. A. W. Wood*

By his Attorney  
*Louis W. Southgate*

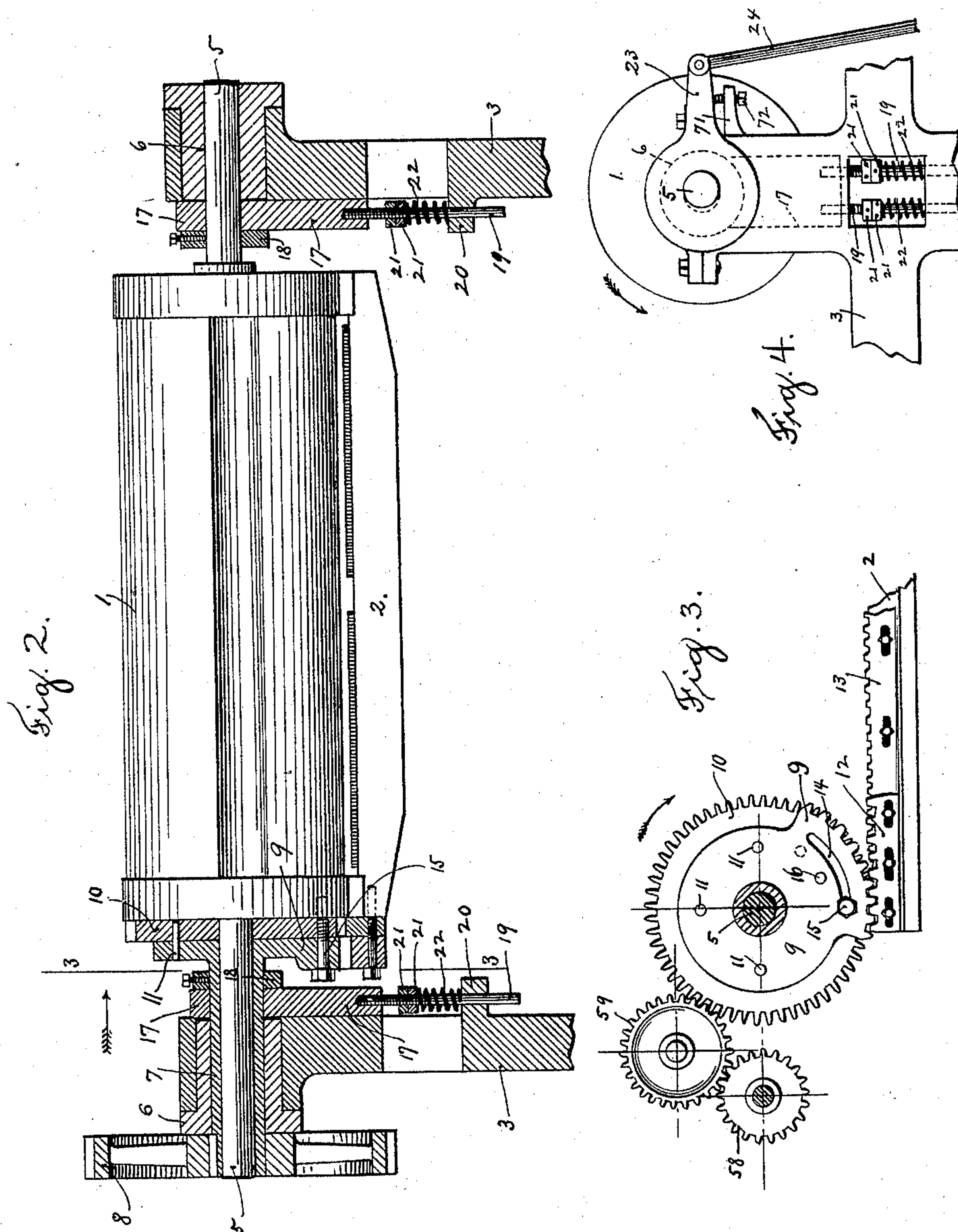
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3 Sheets—Sheet 2.

H. A. W. WOOD.  
CYLINDER PRINTING PRESS.

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Patented July 6, 1897.



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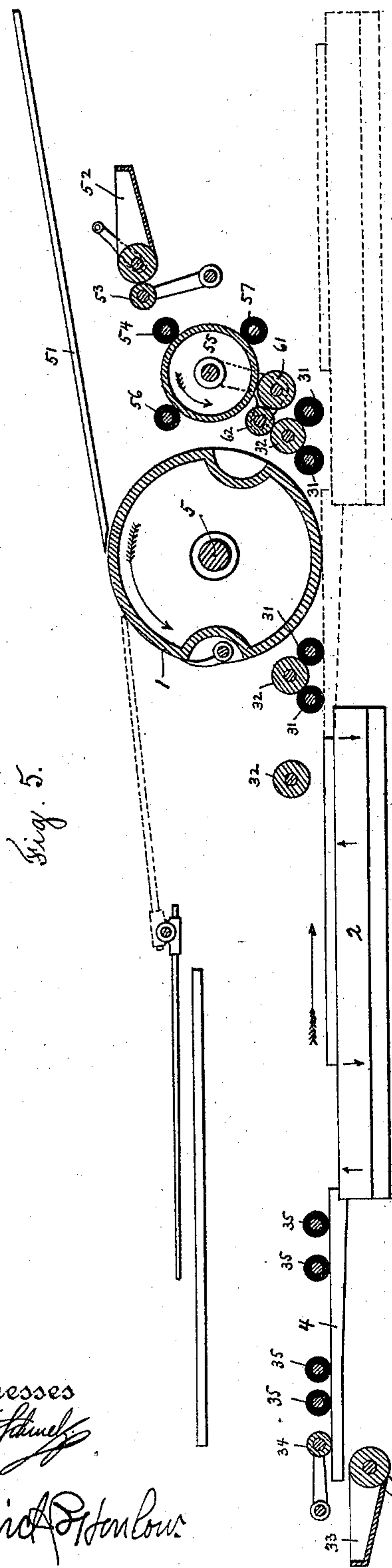
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3 Sheets—Sheet 3.

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CYLINDER PRINTING PRESS.

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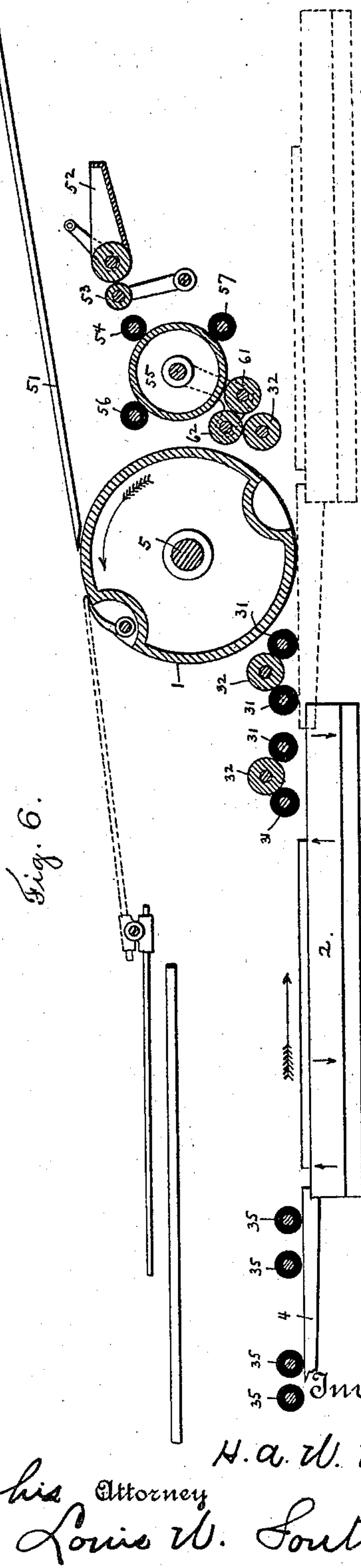
Patented July 6, 1897.



## Witnesses

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# UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, N. Y., ASSIGNOR TO THE CAMPBELL PRINTING PRESS AND MANUFACTURING COMPANY, OF SAME PLACE.

## CYLINDER PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 585,995, dated July 6, 1897.

Application filed March 3, 1892. Serial No. 423,585. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Cylinder Printing-Presses, of which the following is a specification.

The aim of this invention is to improve the arrangement of parts in cylinder printing-presses, and while the improvements will be hereinafter described in connection with the two-revolution cylinder-press I wish to be understood as contemplating the application of the improvements to all forms of cylinder printing-presses whether drum, multirevolution, stop, oscillating, or other printing-presses.

Referring now to the drawings, which illustrate one application of my improvements to a two-revolution press, Figure 1 is a side elevation. Fig. 2 is a central sectional view showing the bearings and gearing of the impression-cylinder. Fig. 3 is a sectional view on line 3 3 of Fig. 2. Fig. 4 is a side elevation of the impression-cylinder bearing; and Figs. 5 and 6 are diagrammatic views in section, illustrating the different arrangements of inking devices and forms.

Presses in the present state of the art, regarded from the point of inking, may be classed in three types. The first is arranged with the ordinary cylinder, or, as it is commonly known, "rack-and-screw distribution," and the same consists in arranging the entire ink holding, distributing, and depositing apparatus adjacent to the impression-cylinder. The second type consists in placing the ink-holding member at one end of the machine remote from the impression-cylinder and using a distributing table or plate attached to one end of the bed and traveling with it to distribute and convey the ink to the depositing-rolls, which are near the cylinder. These rolls may be two, four, six, or eight in number. The third type of inking device consists in a double arrangement of this latter, in which two depositing or form rollers are placed at each side of the impression-cylinder, and a distributing-table is carried at each end of the bed, and an ink-holding member or fountain is placed at each end of the press and

remote from the cylinder. This form of distribution is known as "double-end" in contradistinction to those in which the inking is upon a single-end.

The disadvantage of the first and second types of distribution is that the greatest amount of ink is deposited upon that portion of the printing-form touched first by the rollers immediately after receiving their charge of ink, the rest of the form receiving gradually less and less ink until, particularly if the form be large, the difference between that portion nearest the ink-fountain, or the tail of the form, and that portion farthest off, or the head of the form, is quite perceptible.

For clearness I should note that that portion of the form here termed the "head" is always nearest the gripping device in the cylinder when the printing-surface upon the cylinder and the form begin their contact, and the other end of the form is known as the "tail." On the other hand, the advantages of the said first and second forms of distribution are obvious and are as follows: First, the type-bed when to the rear of the cylinder is fully accessible and the form may be handled thereon in the most expeditious manner, and, second, there is but one fountain and set of inking apparatus to attend.

While upon the double-end press, although there is great evenness of distribution by reason of the freshly-charged rollers inking from both head and tail of the form and thereby correcting the imperfection in the distribution of each other, two complete sets of fountains and distributing-rollers must be kept in operation and attended to, and, further, the form is very inaccessible by reason of the rear fountain and ink-table, which obstruct the rear portion of the press, which in the single-end press is left free and clear, yet for fine and delicate printing the double-end press is necessary and is accepted despite its evident inconveniences. In printing establishments using such machines it is often desirable, when an inferior grade of work is to be done, to place the same upon a double-ender, and in such case the rear inking apparatus is dispensed with or thrown out of operation and the forward one only used, the press being then virtually a two-roller press.



It frequently happens that the work to be done requires four rollers, but is not of a sufficiently profitable character to make it advisable to run both sets of inking apparatus. The press then becomes practically useless for the job.

The aim of my invention is therefore to so arrange a press that it may be used as a double-ender with two form-rollers on each side of the impression-cylinder and the two fountains in operation or as a single-ender with four rollers at one side of the cylinder only and only one ink-fountain in operation, the other being thrown out of operation, the four rollers thus receiving all their ink from one fountain, and this without increasing the length of the run of the bed over that necessary for the clearing of four rollers.

My invention is to be distinguished from the plan of placing two rollers behind a cylinder and four rollers in front of the cylinder and permitting the bed to run beneath and to clear each and all said sets of rollers in its travel and discarding one set of rollers, either front or behind the cylinder, as may be desired, to make the press a single or a double ender, for the following reason: If this plan were adopted, the length of the travel of the bed necessarily would be increased the width of two rollers, because it is not permissible to reverse the bed when the rollers bear at all upon the form.

The essence of my invention consists in arranging the press so that either two rollers at each side of the cylinder or four rollers at one side of the cylinder may be used without increasing the run of the bed over that necessary for a double-end or a four-roller single-end as at present constructed. This then makes the machine available as a single-end two-roller, as a single-end four-roller, or as a double-end four-roller without decreasing its speed in the least, which, so far as I am informed, is a distinctly novel arrangement. By this arrangement I keep the stroke of the bed a constant and as short as possible. Further, to make the bed accessible from the rear I place the rear ink-fountain and distributing apparatus adjacent to the impression-cylinder.

Referring now to the drawings and in detail, 1 represents the impression-cylinder, 2 the reciprocating bed, and 3 the framing of the press. The bed 2 has the usual forward ink-table 4, which acts to take the ink from the front fountain and carry the same to the form-rollers front of the impression-cylinder.

The cylinder 1 is mounted on the usual shaft 5, which shaft is mounted so as to be raised and lowered by the usual eccentric bushings 6. On the gear side of the cylinder the shaft 5 has mounted thereon the bushing 7, and it is this bushing 7 which turns in the eccentric bushing on that side of the press. On the other end of this bushing 7 is keyed or fastened the impression-cylinder driving-gear 8, and on the inner end of the bushing

7 is formed or fastened the starter-segment 9. Between the starter-segment 9 and the impression-cylinder 1, mounted loosely upon the shaft 5, is the register-gear 10, and the segment 9 and the gear 10 are fastened together by pins 11, as shown. The starter-segment is adapted to engage the short rack 12, fastened upon the side of the bed, and the gear 10 is adapted to coact with the register-rack 13, fastened to the side of the bed. The teeth of the gear 10 are made very fine and very long and only the tips of the teeth engage the rack 13, so that when the impression-cylinder is raised the gear 10 and the rack 13 will be out of mesh, so that the same will operate as described in my prior patent, No. 492,505, granted February 28, 1893. Passing through a slot 14, cut in the register-segment 9 and the gear 10, is a bolt 15, which is tapped into the side of the impression-cylinder 1. A dowel-pin 16 is also passed through the segment 9 and the gear 10 into the impression-cylinder, and there are two holes in the impression-cylinder into which the pin is adapted to enter, whereby the cylinder 1 may be set in two positions relatively to the driving and registering mechanisms of the impression-cylinder. Thus all that has to be done to set the impression-cylinder is to loosen the bolt 15, remove dowel-pin 16, move the impression-cylinder and replace dowel-pin 16, and tighten bolt 15. The slot 14 is useful in that it may be used to determine this independent movement of the impression-cylinder.

Bearing on the shaft 5 or on the bushing 7, as the case may be, are the yokes 17, which are held in place laterally between the eccentric bushings 6 and collars 18. In the ends of these yokes are secured the rods 19, which pass through lugs 20, formed on the inside of the frame. The rods 19 are screw-threaded, and fitting on the same are the nuts 21, and between the nuts 21 and the lugs 20 are placed the springs 22, which thus act to counterbalance the weight of the impression-cylinder. This is a very advantageous method of counterbalancing the impression-cylinder over the old way used in connection with the eccentric bushings of attaching a spring to the operating-lever, for by my method the operating mechanism does not have to act against the counterbalancing-springs. The force of the springs acts directly on the shaft and not through any intermediate mechanism, and most of all because the springs may be set to slightly overbalance the weight of the impression-cylinder, so that the shaft 5 will be kept always against the top of the hole in the bushings where the wear due to the impression comes.

In the old method before referred to if the hole in the bushings should wear the shaft will bear on the top of the hole during the impression and upon the under side when not under impression, and thus the cylinder will rise and fall over the various forms and will



wobble in its bearings. This of course necessitates new bearings or bushings when the wear in the hole is at all noticeable, and as all the force of the impression necessarily comes on these bushings they will wear rapidly.

By my new method of applying the springs directly against the shaft the shaft will at all times be held against the top of the eccentric bushings and it is not material if the hole in the same becomes a good deal worn, for the throw of the bushing may be adjusted to get the right impression, and as the shaft never drops in the bushing the impression-cylinder will not bound as the same passes from form to form. Further, it will be seen that the operating mechanism does not have to be operated against the counterbalancing-springs. Therefore I consider this arrangement of counterbalancing-springs in connection with eccentric bushings a very desirable arrangement and one that adds to the operation.

The eccentric bushings have extending arms 23, which are connected by links 24 to cranks 25, mounted on a shaft which is oscillated in the usual manner, so that the impression-cylinder will be raised and lowered at the proper times.

Extending from the frame is a lug 71, and passing through the same is a set-screw 72, which is set to limit the downward movement of the extending arm 23, so that no matter how loose the connections are the impression-cylinder will always be brought with the same pressure against the form.

On the sides of the frame just front of the impression-cylinder are fastened the brackets 30, and these brackets 30 have bearings for four or more form-rollers 31 and two distributor-rollers 32, which may be mounted in the usual manner. At the front end of the side frame is fastened in the usual way the ink-fountain 33, and the same has the usual ductor-roll 34 for depositing the ink on the table 4. Also in the end of the frame are mounted in the usual way the distributing-rollers 35 for spreading the ink evenly on the table 4. This arrangement is well understood and needs no specific explanation. On the side frames just back of the impression-cylinder are fastened brackets 40, in which may be placed in the usual manner two form-rollers 31 and a distributing-roller 32, and, if desired, two front form-rollers 31 and one of the front distributing-rollers may be placed in the bracket 40, so that only two sets are needed no matter whether the press is to be used as a single or as a double ender.

Adjacent to the rear of the impression-cylinder and preferably in the frames 50, that are used to support the feed-table 51, is mounted the second or rear inking apparatus.

The device may consist of the usual fountain 52 and the ductor-roller 53. The ductor-roller 53 is arranged to deposit the ink upon the roller 54, which bears on the large drum distributor-cylinder 55. It is an advanta-

geous construction to have the ductor-roller deposit upon the roller between the same and the large distributor-cylinder, as then the ink deposited upon the roller 54 is presented to a number of points upon the large cylinder instead of one point, which is the case where no intermediate roller is used between the ductor-roller and the drum-cylinder. The cylinder 55 may also have the two additional distributing-rollers 56 and 57. The cylinder 55 is driven from the register-gear 10 by means of gear 58 and intermediate 59. The register-gear 10 and the intermediate 59 are so placed and the teeth of the same sufficiently intermeshed so that the vertical rising and falling movement of the impression-cylinder will not throw the same out of gear.

Mounted on hubs concentric with cylinder 55 are frames 60, which carry rollers 61 and 62. The roller 61 bears on cylinder 55, but the roller 62 does not touch cylinder 55, but bears against roller 61. Hence rollers 61 and 62 will revolve in opposite directions.

The frames 60 have extending rear arms 63, which are connected by links 64 to cranks 65, mounted on a shaft which is oscillated at the proper time. If desired, from this shaft also may extend connections for operating the ductor-roller 53 and the ink-fountain 52. The idea of this swinging double roller is to bring that roller 61 or 62 into contact with the distributing-roll of the cluster, so that the cylinder 55 may be continuously rotated in the same direction and continuously act to convey ink to the form-rollers and the rolls of the cluster turned in one direction or the other, depending upon the movement of the bed, and thereby kept constantly in contact with the forms. The top or distributing roller of the cluster may be positively driven from the registering-rack on the bed, if so desired, as is specifically described in my prior patent before referred to.

In Fig. 1 roller 61 is shown in contact with the distributing-roller 32, and hence the form-rollers 31 are turning in an opposite direction from the cylinder 55 or the impression-cylinder 1, and hence the rolls 31 are turning for the return stroke of the bed, which is shown as just completing its return stroke.

In Figs. 5 and 6 the roller 62 is shown as bearing on the distributing-roller 32 and the bed as just commencing its forward stroke. Hence by means of the mechanism for moving the rollers 61 and 62 the cylinder 55 may be continuously driven in the same direction and the cluster-rollers alternately rotated in opposite directions from the bed or rack.

In Fig. 5 the press is shown as arranged as a double-end press, the forms being set to the arrows on the bed pointing downwardly and the impression-cylinder moved forwardly as regards the driving mechanism or the registering mechanism. The press as thus organized will work as the ordinary double-end press and needs no detailed description, except that it may be stated that the fountain



52 and its distributing mechanism are set so that the rear inking-rollers 31 will deposit their fresh supply on the head of the form.

In Fig. 6 the press is shown as arranged as a single-ender, which is done by disconnecting the rear fountain 53, putting all form-rollers front of the impression-cylinder, setting the forms on the bed to the arrows that point upwardly, and moving the impression-cylinder to its rear position relatively to the driving or registering mechanism. As thus organized, the press is adapted to operate as the ordinary single-end press.

Only two form-rollers and one distributing-roller may be placed on the machine, if desired.

Thus my device is a very simple one, that will accomplish all the functions and have all the advantages previously recited.

The number of form-rollers used front or front and back of the impression-cylinder may be varied as desired.

A skilled mechanic may apply certain features of my invention to other forms of presses and may greatly vary the details without departing from the scope of my invention as expressed in the claims.

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

1. In a cylinder printing-press, a bed of extra length, whereby a form may be placed in different positions thereon, an impression-cylinder cooperating therewith, means for adjusting the cylinder relatively to the different positions of the form, and means whereby the inking-rollers may be arranged to form either a double-end or single-end press, substantially as described.

2. In a cylinder printing-press, the combination of brackets and ink-fountains, whereby the form-rollers may be set to form either a double or single end press, a bed of extra length whereby the forms may be set in different positions to coact with the different arrangement of form-rollers, an impression-cylinder, and means for adjusting the same relatively to the bed, whereby the cylinder may be set to properly coact with the forms in their different positions, and whereby the run of the bed may remain a constant, substantially as described.

3. In a cylinder printing-press, the combination of an impression-cylinder, a driving-gear, a starter-segment and a register-gear

connected together, and an adjustable connection between the impression-cylinder and these parts, substantially as described.

4. In a cylinder printing-press, the combination of the shaft 5, the impression-cylinder mounted thereon, the bushing fitted on the shaft, the driving-gear fastened on said bushing, the starter-segment formed or fastened to the bushing, and means for connecting the starter-segment and impression-cylinder in different relative positions, substantially as described.

5. In a cylinder printing-press, the combination of the shaft 5, the impression-cylinder mounted thereon, the bushing fitted on the shaft, the driving-gear fastened to said bushing, a starter-segment formed or fastened to the bushing, a register-gear secured to said starter-segment, and means for connecting the starter-segment, register-gear and bushing and impression-cylinder in different relative positions, substantially as described.

6. In a cylinder printing-press, the combination of form-rolls 31, distributing-roll 32, drum distributor 55, roll 61 bearing on drum 55, a roll 62 bearing on roll 61, and means for moving the rolls 61 and 62 alternately against roll 32, substantially as described.

7. In a cylinder printing-press, the combination of the shaft, an impression-cylinder mounted or carried thereon, eccentric bushings mounted in the frame in which said shaft is journaled, means for oscillating said bushings to raise and lower the impression-cylinder, and springs arranged to push said shaft against the top of the bushings, substantially as described.

8. In a cylinder printing-press, the combination of a main shaft, the impression-cylinder mounted thereon, the eccentric bushings mounted in the frame in which said shaft is journaled, means for oscillating said bushings to raise and lower the impression-cylinder, and springs arranged to push up on the under side of the main shaft to counterbalance the weight of the impression-cylinder, said springs being independent of and not attached to the eccentric-bushing-operating mechanism, substantially as described.

In testimony whereof I have set my hand in the presence of two subscribing witnesses.

H. A. WISE WOOD.

Witnesses:

JAMES J. RAFFERTY.

LOUIS W. SOUTHGATE.