

No. 637,606.

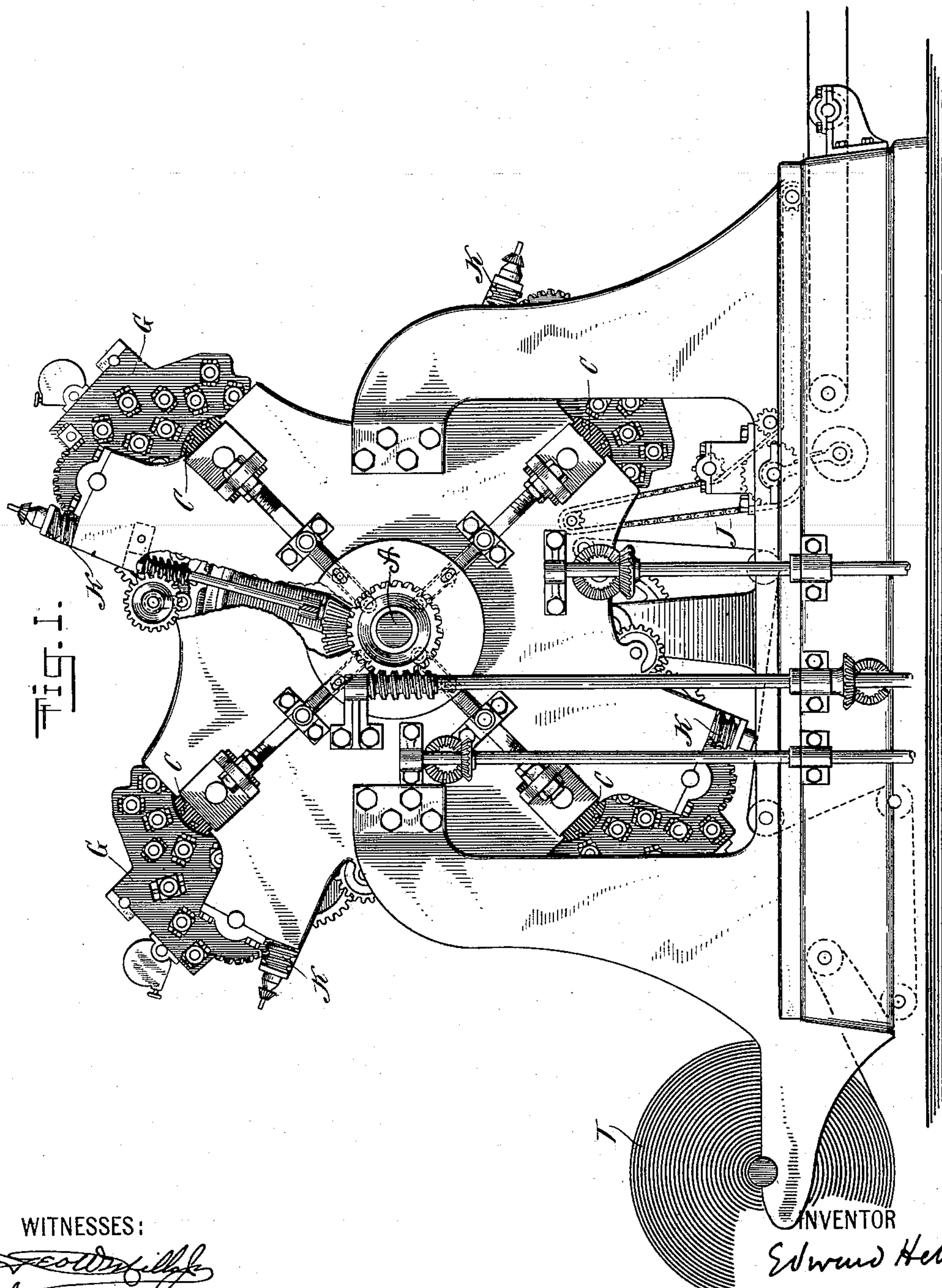
Patented Nov. 21, 1899.

E. HETT.  
PRINTING PRESS.

(Application filed Mar. 6, 1899.)

(No Model.)

6 Sheets—Sheet 1.



WITNESSES:

*Scott D. Wilgus*  
*Sidney Mann.*

INVENTOR

*Edward Hett*

BY

*Kenyon & Kenyon*  
ATTORNEYS

No. 637,606.

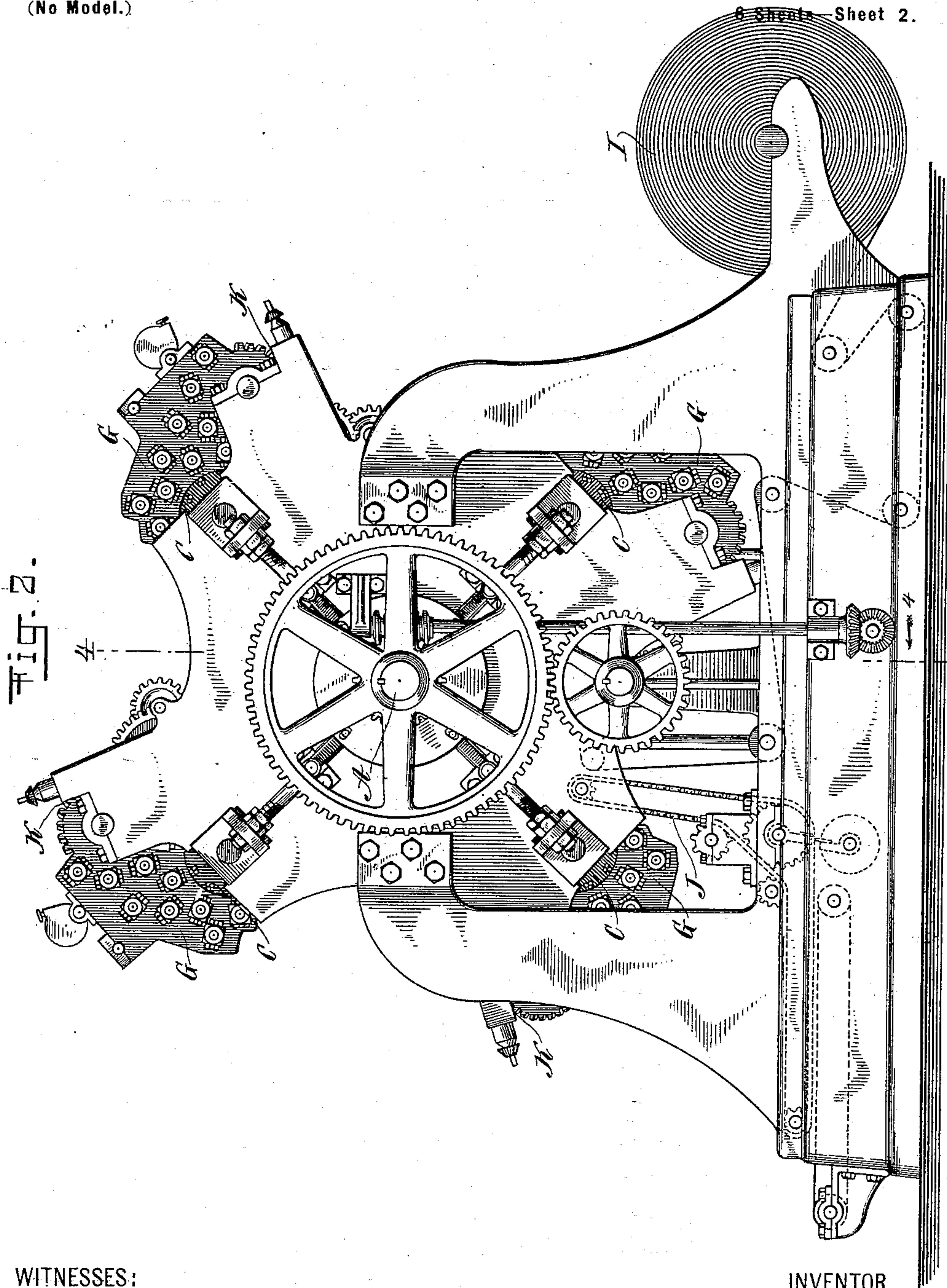
Patented Nov. 21, 1899.

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PRINTING PRESS.

(Application filed Mar. 6, 1899.)

(No Model.)

8 Sheets—Sheet 2.



WITNESSES:

*Scott D. Hille*  
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No. 637,606.

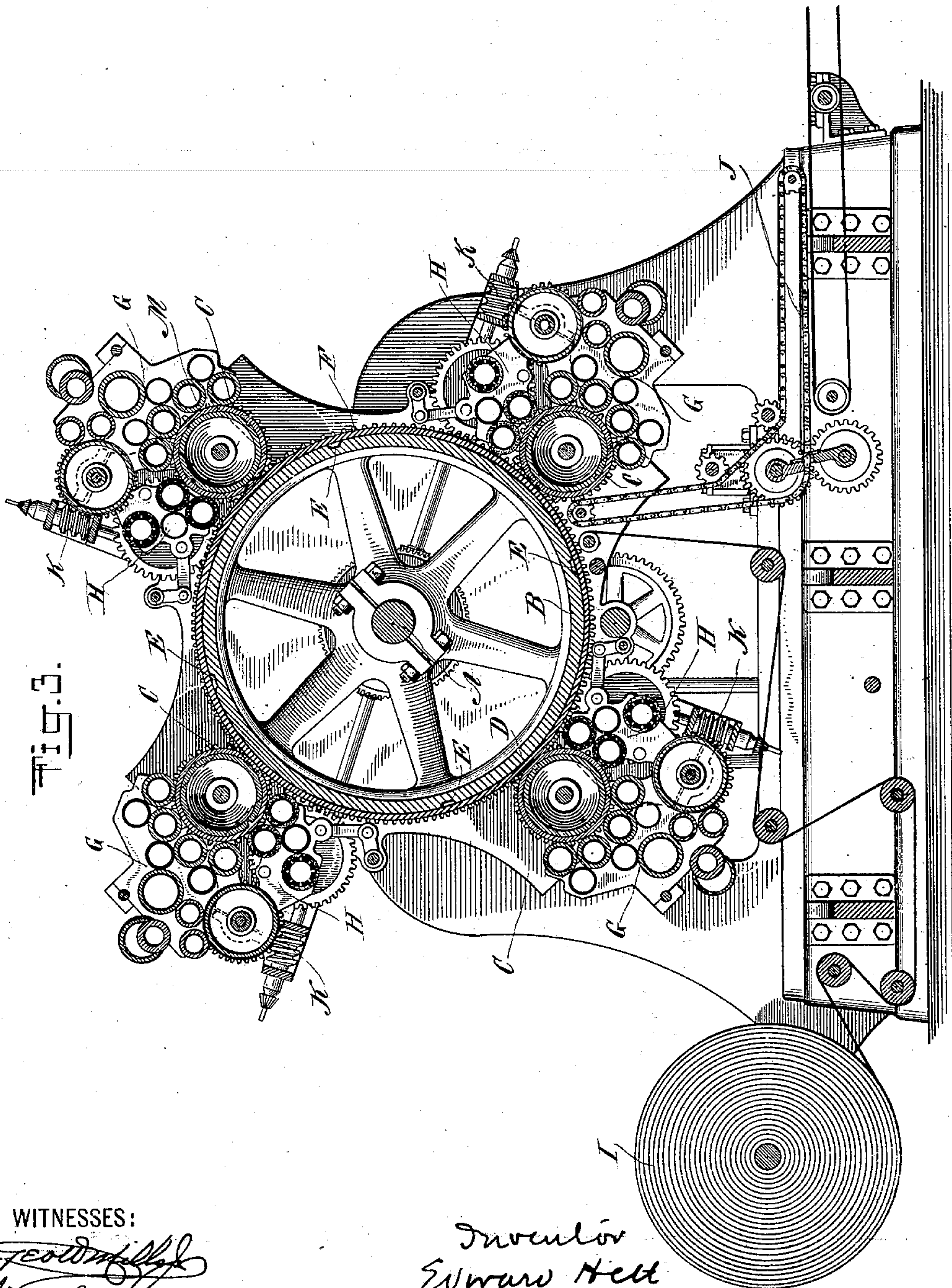
Patented Nov. 21, 1899.

E. HETT.  
PRINTING PRESS.

(Application filed Mar. 6, 1899.)

(No Model.)

6 Sheets—Sheet 3.



WITNESSES:

*Frederick J. [Signature]*  
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No. 637,606.

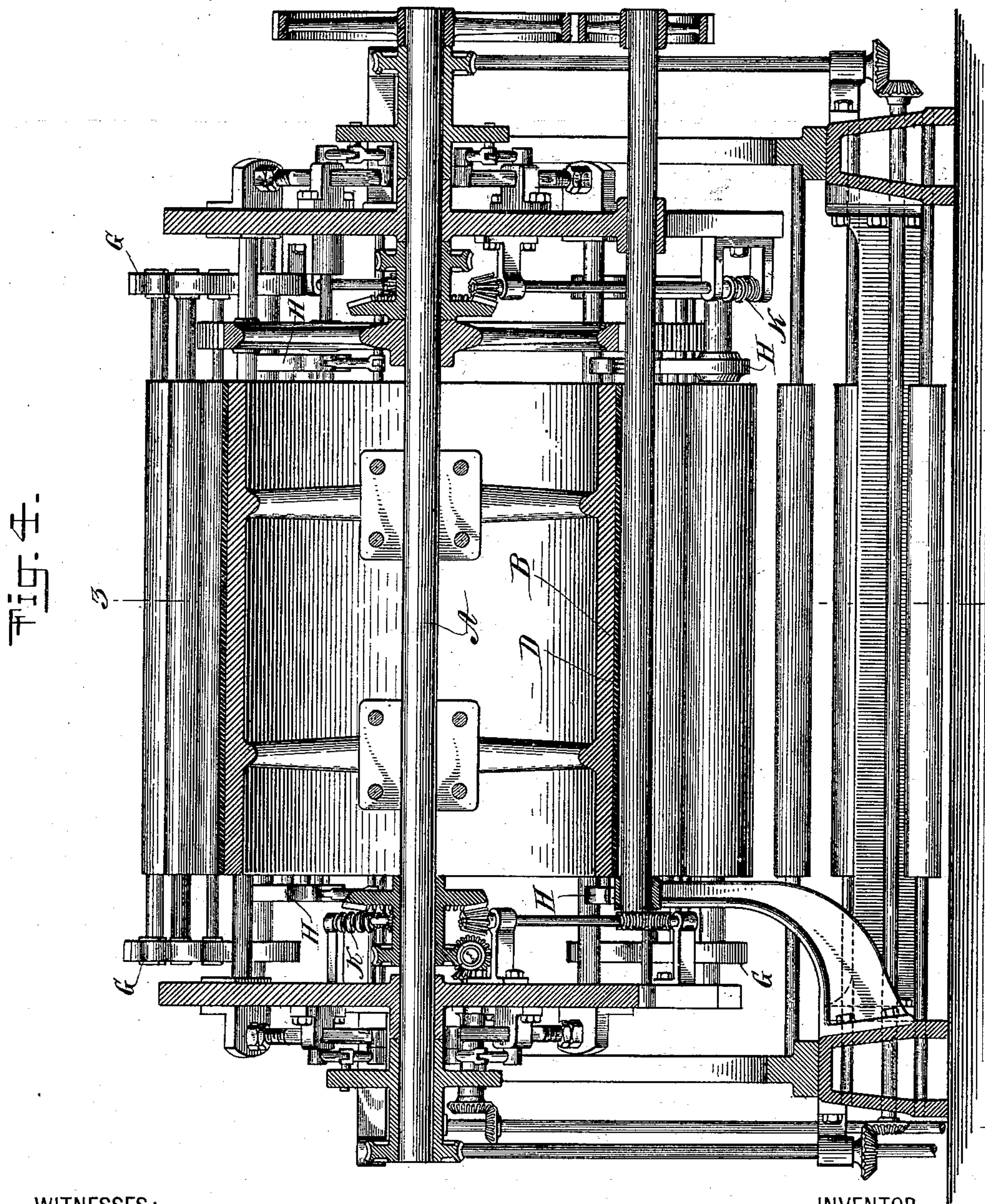
Patented Nov. 21, 1899.

E. HETT.  
PRINTING PRESS.

(Application filed Mar. 6, 1899.)

(No Model.)

6 Sheets—Sheet 4.



WITNESSES:

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No. 637,606.

Patented Nov. 21, 1899.

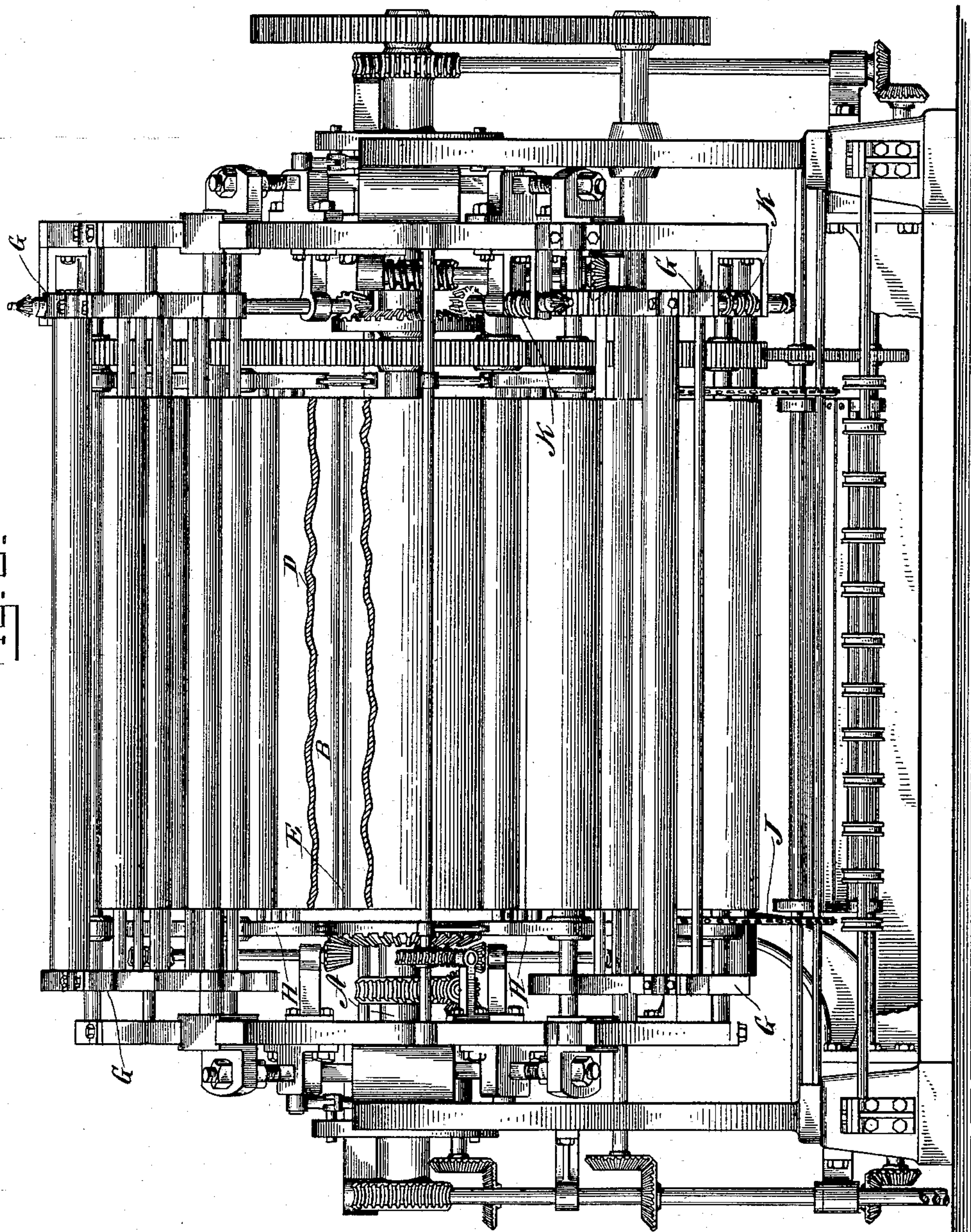
E. HETT.  
PRINTING PRESS.

(Application filed Mar. 6, 1899.)

(No Model.)

6 Sheets—Sheet 5.

Fig. 5.



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No. 637,606.

Patented Nov. 21, 1899.

E. HETT.  
PRINTING PRESS.

(Application filed Mar. 6, 1899.)

(No Model.)

6 Sheets—Sheet 6.

Fig. 6.

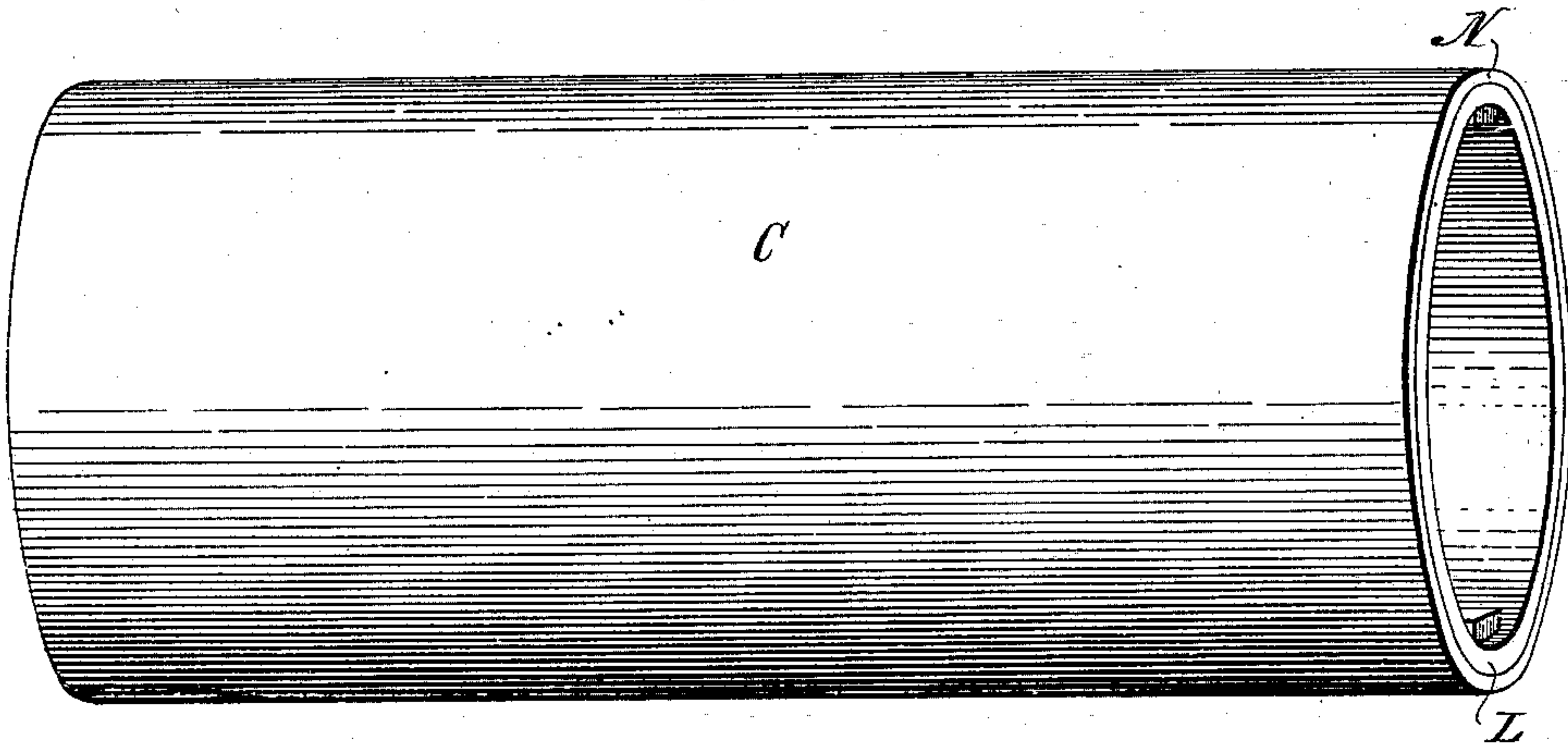
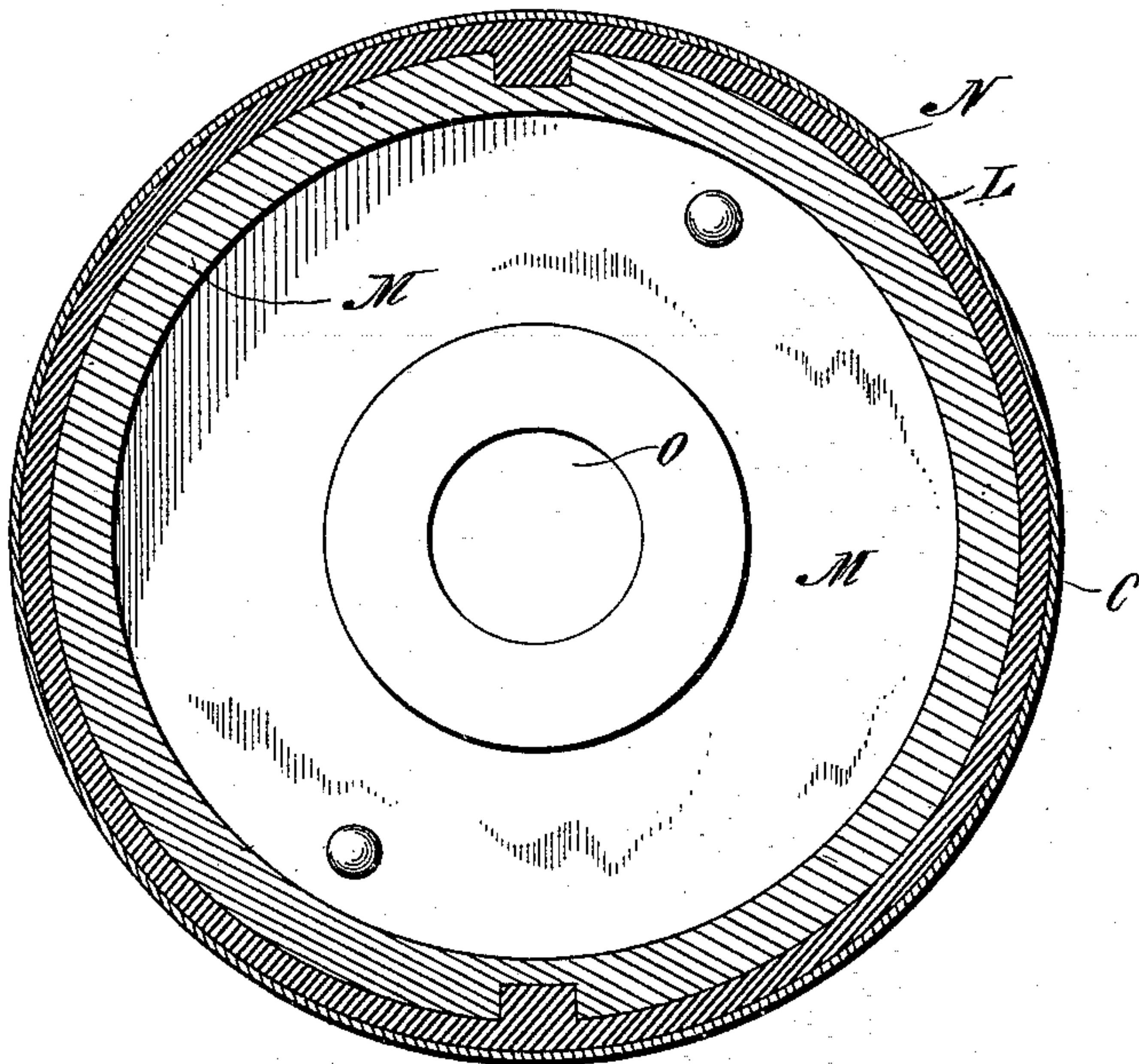


Fig. 7.



WITNESSES:

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*Sidney M. Hett*

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*Edward Hett*

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# UNITED STATES PATENT OFFICE.

EDWARD HETT, OF NEW YORK, N. Y.

## PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 637,606, dated November 21, 1899.

Application filed March 6, 1899. Serial No. 707,924. (No model.)

*To all whom it may concern:*

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

The present invention has relation to printing-presses, and especially to multicolor planographic printing presses employing a central impression-drum and a series of surrounding cylindrical printing-surfaces.

The general purposes to be accomplished by the present invention have special reference to multicolor-printing upon the web, especially multicolor lithographic printing from cylindrical impression and printing surfaces as distinguished from flat surfaces; printing each color, shade, or tint of a design separately by means of its own printing-surface; printing with accurate registry the successive colors in approximately instantaneous succession in the same press and upon the web without the intervals for drying needed in other forms of printing; having regard to the vastly-increased quantity of work turned out in a given time with diminished labor; the improvement in the quality of the work, and other results and advantages.

In carrying out my invention instead of employing a single impression-surface of proper size to receive one impression of the design or designs to be printed or a continuous impression-surface of suitable size to receive a plurality of impressions of the design or designs to be printed I employ an impression device consisting of a series of discontinuous impression-surfaces arranged with their entrance ends a fixed distance apart, to which distance the circumferential length of the printing-surface conforms and having slots or openings in the metallic base between adjacent impression-surfaces, the slots or openings running across the width of the impression-surface, and this in combination with a printing device consisting of an interior form-supporting device and an exterior removable and replaceable hollow printing-form or with a series of such printing devices properly placed with reference to one another and to the impression device, and with suitable inking mechanism or mechanisms and

means for supplying the paper on the web, whereby the printing pressure of the printing device or devices on the paper is periodically and intermittently somewhat relieved for a brief instant. I preferably employ a printing device or printing devices that are circumferentially continuous in combination with the series of impression-surfaces that are discontinuous, and I employ an impression-drum presenting to the printing surface or surfaces such a series of discontinuous impression-surfaces.

The accompanying drawings, which form a part hereof, show a four-color planographic-printing press which embodies my invention in its preferred form.

Like letters of reference indicate like parts in all the figures.

Figure 1 is an elevation of the right-hand side of the press. Fig. 2 is an elevation of the left-hand side of the press. Fig. 3 is a central cross-section of the press, made on the lines 3 3 of Fig. 4. Fig. 4 is a longitudinal central cross-section of the press, made on the lines 4 4 of Fig. 2. Fig. 5 is a rear view of the press, a portion of the outer surface of the impression-drum being cut away to show one of the slots in the metallic surface thereof. Fig. 6 is a detail view of one of the printing-tubes, and Fig. 7 is a sectional view showing the tube on its interior support.

In practical use for four-color-printing purposes the press herein described and shown presupposes such a preliminary preparation of the series of printing-surfaces before they come to the press as is set out, for instance, in my pending method application, Serial No. 695,281, filed November 2, 1898, and especially a preliminary transferring to the printing-surfaces such as is set out, for instance, in my pending applications for transfer-press, Serial No. 703,082, filed January 23, 1899, and Serial No. 732,437, filed October 4, 1899. The permanent adjustment or adaptation in some approved manner of the printing devices to such related system of transferring and to the impression-surfaces of the central impression-drum is also presupposed.

A is the main shaft of the press, by which, directly or indirectly, the motions of the various parts of the press are actuated and controlled.



B is the impression-drum, which by its revolution drives the printing devices C C C C by means of cogs meshing into cogs of the said devices. D is the metallic base or supporting part of the said drum B, and F is the outer continuous cushioning-surface thereof, usually made of india-rubber and vulcanized upon the said metallic base in such a way as to become immovable upon it and unitary therewith.

E E E E are longitudinal slots in the metallic base extending across the width of the drum from one side to the other. The outer cushioning-surface is continuous over the entire impression-drum, both over the metallic base and over the slots or openings therein.

G G G G are the series of inking mechanisms, consisting of suitable ink-fountain, ductor-roller, main and supplementary distributing rollers, and riders of the character shown in the drawings or any other approved character.

H H H H are the series of dampening mechanisms, consisting of a suitable water-fountain with distributing-rollers of the character shown in the drawings or of any other approved form and which may be omitted altogether where deep etching or routing is employed to cut away the surface of the printing device which is not to be actually employed in printing, as is the case in some forms of relief plate-printing.

I is the paper-roll, with its train of guide-rollers.

J shows the train of mechanism for cutting and delivering the sheets after leaving the impression-drum, and K K K K show the mechanisms for forcing the inking mechanisms respectively away from the printing devices to enable the latter to be removed from the press when desirable; but as this present invention does not concern the details of the inking, the dampening, the feeding, or the delivery mechanisms or the details of the mechanism for lifting the inking mechanisms away from the printing devices they will not be further described.

The invention relates to the impression-surface, and especially to means for carrying on the printing upon an impression-surface which is not a continuous surface, as the same has been heretofore shown and described by me in prior applications for Letters Patent, but which is a discontinuous surface—a surface made discontinuous by slots in the metallic base or support extending across from one side of the impression-surface to the other. The slots exist in the metallic base or support, but they do not extend into or through the outer india-rubber surface. These slots operatively divide up the surface of the impression device into a plurality or series of separate impression-surfaces. While the pressure of the printing-rollers upon the paper is somewhat relieved at these points, there is still sufficient pressure to keep the paper in proper place and line; and the invention also relates

to the printing devices C C C C and their combination with the described impression-drum. These printing devices, instead of being composed in whole or in part of lithographic stone such as has heretofore been used in flat-surface printing, but, so far as I know, unsuccessfully for cylindrical or rounded surface printing, are constructed as follows: The printing-surface may be of zinc cast into the form of a tube, preferably cylindrical in shape, although its form or shape may vary and the tube may be formed otherwise than by casting and of any other suitable material. The printing-surface is preferably circumferentially continuous, and thus adapted to receive the desired design in the most favorable manner. This cylindrical printing-tube when made of zinc or similar material may, after casting, be compressed by rollers or otherwise compacted to remove defects and then carefully turned to the exact size and suitably polished, after which by the sand-blast or other process and by the use of chemicals a suitable surface for printing may be produced upon the tube, or the zinc may be cast under pressure or deposited electrolytically or otherwise. The printing-tube is hollow and is supported in the press and in handling by an interior form-support, (shown at M in the drawings.) It is removable from and replaceable on this support at will and is accurately adjustable in all directions. The tube and its supporting-form, which may vary greatly, may be of the specific character and constructed and combined together as described in my application for Letters Patent, Serial No. 537,582, filed February 7, 1895, and Serial No. 702,845, filed January 20, 1899, or in any other approved form, so long as the printing-tube is removable from and replaceable on an interior support, when the printing-tube will be in position to do its work of printing. Fig. 6 shows the printing-tube in its preferred form, wherein it consists of an inner strengthening-shell of copper L, internally tapered from end to end, and an outer exactly cylindrical surface layer of zinc N integral therewith. Fig. 7 shows its method of combination with the interior support, which is a hollow cylinder M, itself suitably supported on a shaft O and externally tapered from end to end to match L. L has two splines to take into and slide in slots in M. The tube is slipped on the support and against an adjustable stop and held there by suitable means. The support is adjustable circumferentially on the shaft by suitable means. After the printing has been accomplished the tube may be removed from the interior support and can be filed away or kept in store until it is used again, or the design can be removed from the tube by suitable chemicals or the surface of the tube can be removed in any desired way and a new surface cast or otherwise produced on the tube, and the tube will then be ready for receiving another design on its surface. It is to be observed that these printing-sur-



faces may be developed in any well-known way into lithographic, relief, or other character of printing-surface, as may be desired. Such a method of printing from cylindrical surfaces is thus accomplished as results from providing many separate printing-tubes, each corresponding exactly to one of the impression-surfaces—that is to say, the circumference of each tube is just equal to that portion or portions of the length of the impression device or circumference of the impression-drum which extends from the entrance end of each impression-surface to the entrance end of the next impression-surface, thus including the length of the impression-surface and the width of the next adjacent slot in the metallic base. The result is that the whole of a design covering any given printing-tube, being adapted to the impression-surface, will be found in the operation of the press printed upon the paper supported by the impression-surface between adjacent slots, which slots may correspond with margins in the design. Nevertheless the paper will be periodically somewhat relieved from pressure for a brief instant while the printing surface or surfaces are rolling over the slot or slots in the metallic base and may then automatically readjust its position on the impression device and relieve itself from gathering twists or strains or breaking or displacing tendencies before the printing pressure begins again. Preferably the successive impression portions of the impression device are all equal in length and the slots all equal in width; but in any case the distance circumferentially from the beginning of any one impression-surface to the beginning of the next impression-surface must be the same as all the corresponding distances on the impression device. Preferably, also, all the printing-surfaces of the series are equal in circumferential length. In the example shown in the drawings the surface of the impression-drum is divided into four equal separate impression-surfaces by four equal longitudinal slots, and there are four printing devices of the description heretofore given, all of the same size, corresponding to said impression-surfaces and upon all of which each one of the printing-surfaces successively operates. The impression-drum may, however, have its surface divided into any other number of separate surfaces by such slots, and the printing-surfaces may conform in number thereto and must conform in size to the relative positions of the entrance ends of said impression-surfaces.

My invention is especially applicable to printing on the web, and I therefore preferably provide means for supplying and delivering paper on the web, as shown in the drawings.

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

1. In a printing-press, the combination with a printing device consisting of an interior form-supporting device and an exterior re-

movable and replaceable hollow printing-form and suitable inking mechanism, of an impression device consisting of a series of discontinuous impression-surfaces arranged with their entrance ends a fixed distance apart to which distance the circumferential length of the printing-surface conforms and having in the metallic base slots or openings between adjacent impression-surfaces which slots do not extend through the cushioning-surface, whereby the printing pressure of the printing device on the paper is periodically relieved, and means for supplying the paper in the web, substantially as described.

2. In a planographic-printing press, the combination with a printing device consisting of an interior form-supporting device and an exterior removable and replaceable hollow planographic-printing form and suitable inking and dampening mechanism, of an impression device consisting of a series of discontinuous impression-surfaces arranged with their entrance ends a fixed distance apart to which distance the circumferential length of the printing-surface conforms and having in the metallic base slots or openings between adjacent impression-surfaces which slots do not extend through the cushioning-surface, whereby the printing pressure of the printing device on the paper is periodically relieved, and means for supplying the paper in the web, substantially as described.

3. In a printing-press, the combination with a printing device consisting of an interior form-supporting device and an exterior removable and replaceable hollow circumferentially-continuous printing-form and suitable inking mechanism, of an impression device consisting of a series of discontinuous impression-surfaces arranged with their entrance ends a fixed distance apart, to which distance the circumferential length of the printing-surface conforms and having in the metallic base slots or openings between adjacent impression-surfaces which slots do not extend through the cushioning-surface, whereby the printing pressure of the printing device on the paper is periodically relieved, and means for supplying the paper in the web, substantially as described.

4. In a planographic-printing press, the combination with a printing device consisting of an interior form-supporting device and an exterior removable and replaceable hollow circumferentially-continuous planographic-printing form and suitable inking and dampening mechanism, of an impression device consisting of a series of discontinuous impression-surfaces arranged with their entrance ends a fixed distance apart, to which distance the circumferential length of the printing-surface conforms and having in the metallic base slots or openings between adjacent impression-surfaces which slots do not extend through the cushioning-surface, whereby the printing pressure of the printing device on the paper is periodically relieved, and means



for supplying the paper in the web, substantially as described.

5. In a printing-press, the combination with a series of printing devices, each consisting of an interior form-supporting device and an exterior removable and replaceable hollow printing-form and a series of suitable inking mechanisms, of an impression device consisting of a series of discontinuous impression-surfaces arranged with their entrance ends a fixed distance apart, to which distance the circumferential length of the printing-surfaces conforms and having in the metallic base slots or openings between adjacent impression-surfaces which do not extend through the cushioning-surface, whereby the printing pressure of the printing devices on the paper is periodically relieved, and means for supplying the paper in the web, substantially as described.

6. In a printing-press provided with suitable inking, paper feeding and delivery mechanisms, the combination of a central impression-drum having a series of discontinuous impression-surfaces separated from each other by longitudinal slots in the metallic base which do not extend through the cushioning-surface, with a series of printing devices whose surfaces are arranged to correspond with the said impression-surfaces, each printing device having an interior form-support and an exterior removable and replaceable hollow printing-form, substantially as described.

7. In a planographic-printing press provided with suitable inking, dampening, paper feeding and delivery mechanisms, the combination of a central impression-drum having a series of discontinuous impression-surfaces separated from each other by longitudinal slots in the metallic base which do not extend through the cushioning-surface, with a series of printing devices whose surfaces are arranged to correspond with the said impression-surfaces, each printing device having an interior form-support and an exterior removable and replaceable hollow printing-form, substantially as described.

8. In a printing-press provided with suitable inking, paper feeding and delivery mechanisms, the combination of a central impression-drum having a series of discontinuous impression-surfaces separated from each other by longitudinal slots in the metallic base which do not extend through the cushioning-surface, with a series of printing devices whose surfaces are arranged to correspond with each one of the said impression-surfaces and the next adjacent slot and so to contact successively with each one of the impression-surfaces and with all in identical register, each printing device having an interior form-support and an exterior removable and replaceable hollow printing-form, substantially as described.

9. In a planographic-printing press provided with suitable inking, dampening, pa-

per feeding and delivery mechanisms, the combination of a central impression-drum having a series of discontinuous impression-surfaces separated from each other by longitudinal slots in the metallic base which do not extend through the cushioning-surface, with a series of printing devices whose surfaces are arranged to correspond with each one of the said impression-surfaces and the next adjacent slot and so to contact successively with each one of the impression-surfaces and with all in identical register, each printing device having an interior form-support and an exterior removable and replaceable hollow printing-form, substantially as described.

10. In a printing-press provided with suitable inking, paper feeding and delivery mechanisms, the combination of a central impression-drum having a series of discontinuous impression-surfaces separated from each other by longitudinal slots in the metallic base which do not extend through the cushioning-surface, with a series of printing devices whose surfaces are arranged to correspond with the said impression-surfaces, each printing device having an interior form-support and an exterior removable and replaceable hollow circumferentially-continuous printing-form, substantially as described.

11. In a planographic-printing press provided with suitable inking, dampening, paper feeding and delivery mechanisms, the combination of a central impression-drum having a series of discontinuous impression-surfaces separated from each other by longitudinal slots in the metallic base which do not extend through the cushioning-surface, with a series of printing devices whose surfaces are arranged to correspond with the said impression-surfaces, each printing device having an interior form-support and an exterior removable and replaceable hollow circumferentially-continuous printing-form, substantially as described.

12. In a printing-press provided with suitable inking, paper feeding and delivery mechanisms, the combination of a central impression-drum having a series of discontinuous impression-surfaces separated from each other by longitudinal slots in the metallic base which do not extend through the cushioning-surface, with a series of printing devices whose surfaces are arranged to correspond with each one of the said impression-surfaces and the next adjacent slot and so to contact successively with each one of the impression-surfaces and with all in identical register, each printing device having an interior form-support and an exterior removable and replaceable hollow circumferentially-continuous printing-form, substantially as described.

13. In a planographic-printing press provided with suitable inking, dampening, paper feeding and delivery mechanisms, the combination of a central impression-drum having



a series of discontinuous impression-surfaces separated from each other by longitudinal slots in the metallic base which do not extend through the cushioning-surface, with a series  
5 of printing devices whose surfaces are arranged to correspond with each one of the said impression-surfaces and the next adjacent slot and so to contact successively with each one of the impression-surfaces and with  
10 all in identical register, each printing device having an interior form-support and an ex-

terior removable and replaceable hollow circumferentially-continuous printing-form, substantially as described.

In testimony whereof I have signed my 15 name to this specification in the presence of two subscribing witnesses.

EDWARD HETT.

Witnesses:

GEO. W. MILLS, Jr.,  
EDWIN SEGER.