

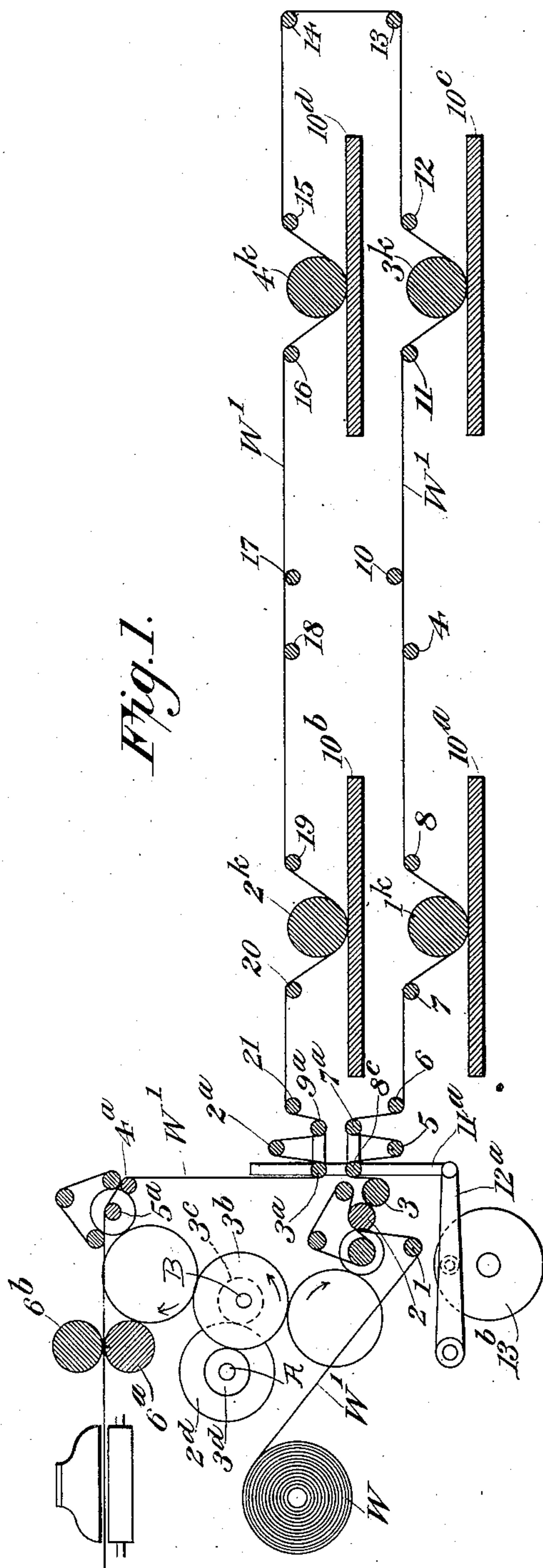
No. 884,123.

PATENTED APR. 7, 1908.

H. F. BECHMAN.  
PRINTING PRESS.

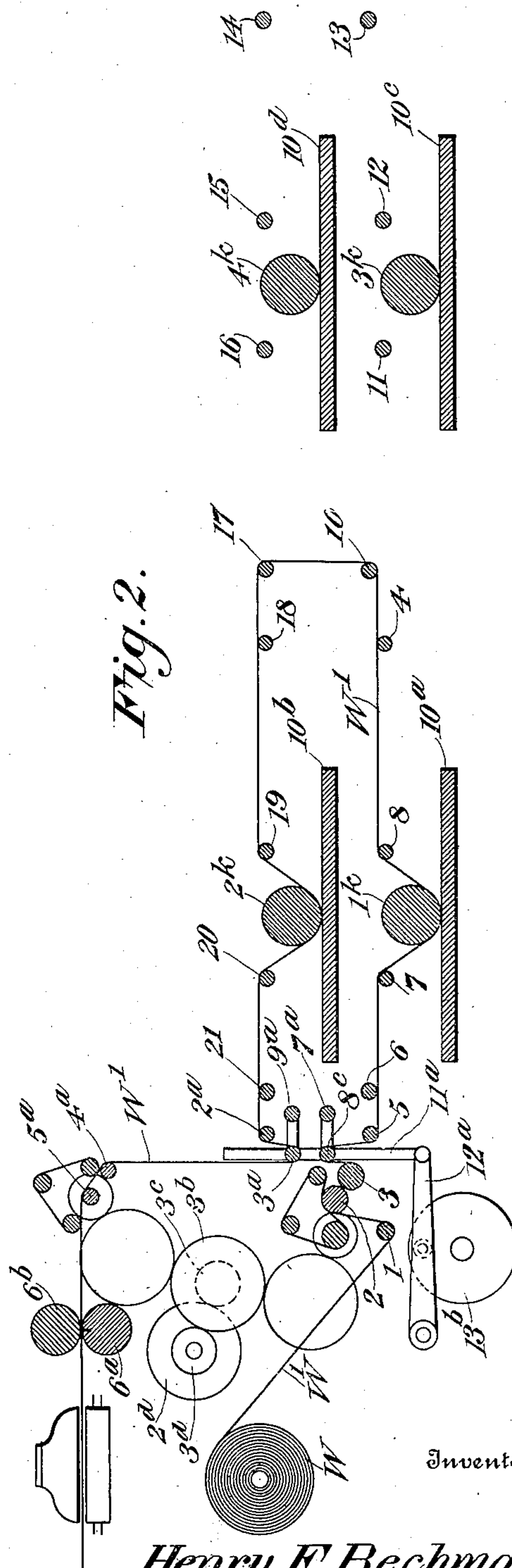
APPLICATION FILED JUNE 19, 1907.

2 SHEETS—SHEET 1.



Witnesses

Witnesses  
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James P. Mansfield.



Inventor:

*Henry F. Bechman.*

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Attorneys

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2 SHEETS—SHEET 2.

Fig.3.

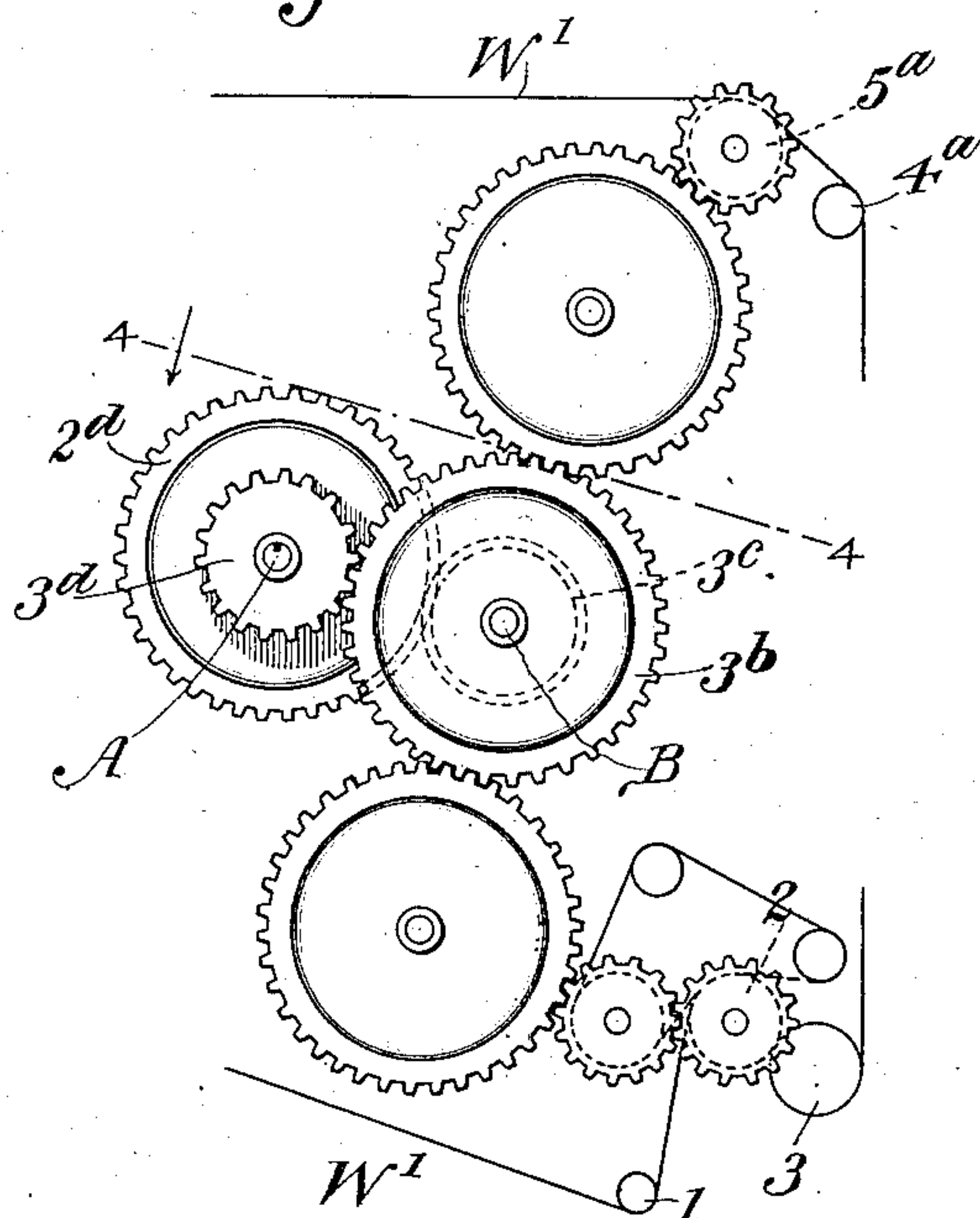


Fig.5.

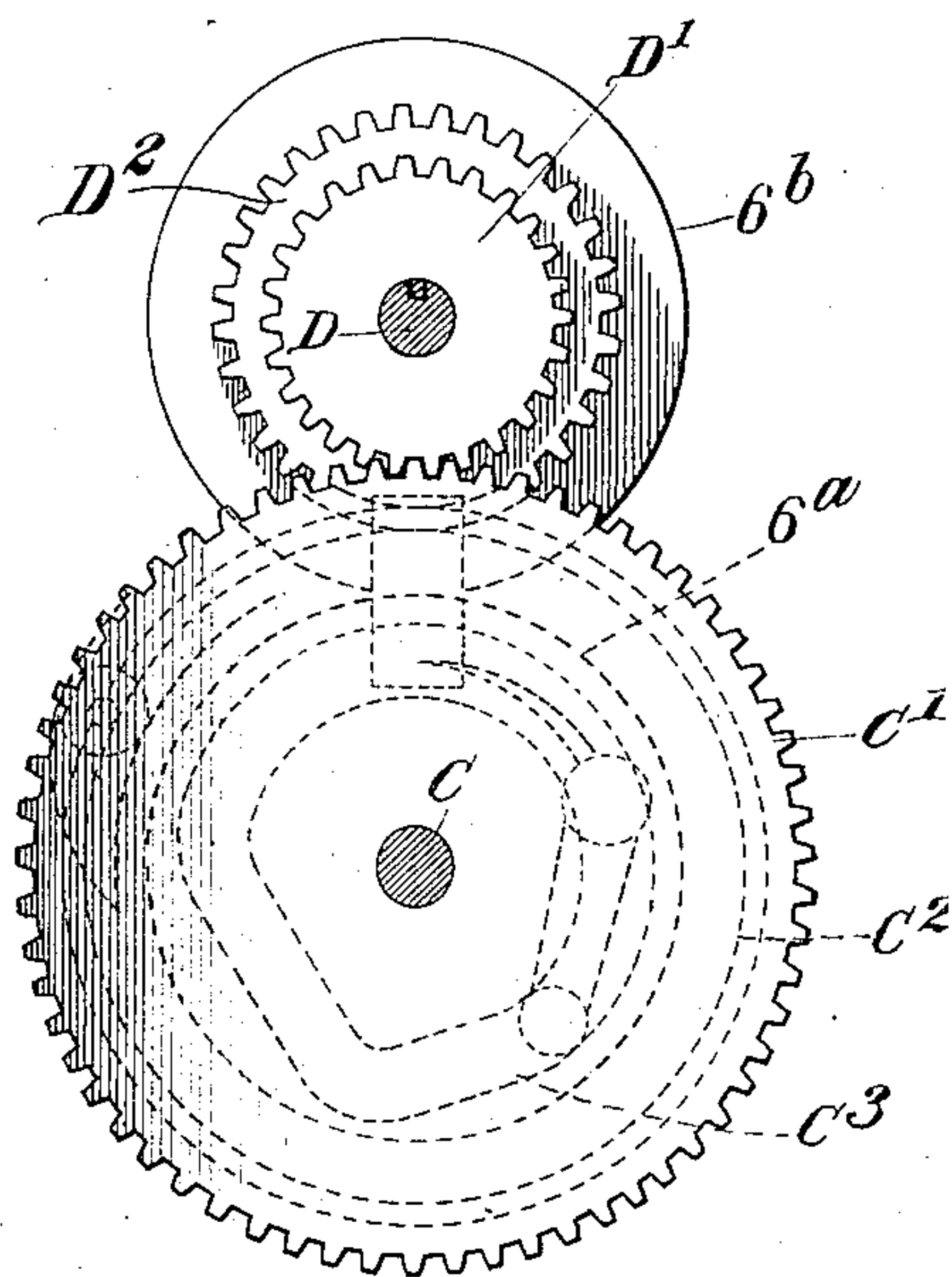
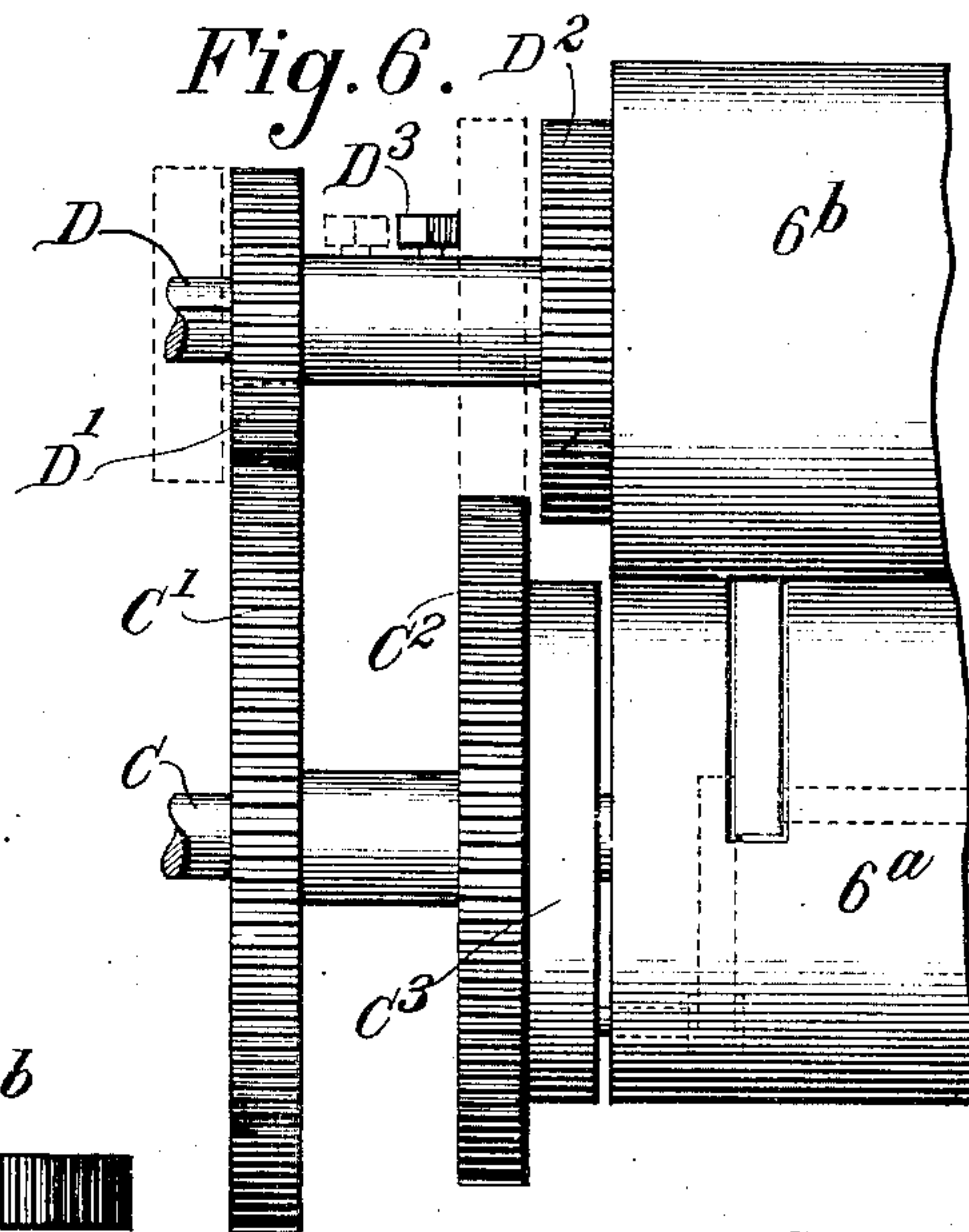
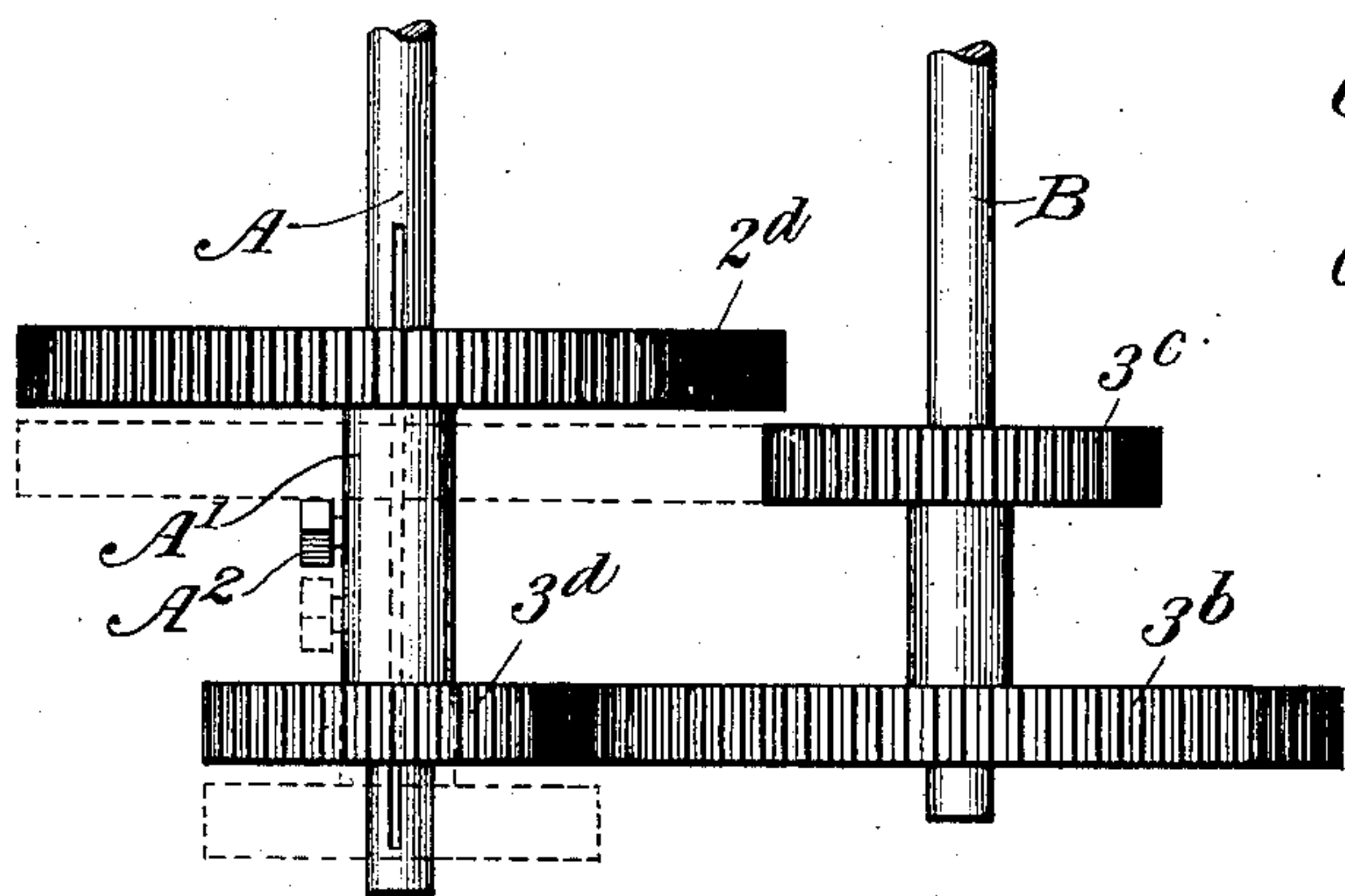


Fig.4



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# UNITED STATES PATENT OFFICE.

HENRY F. BECHMAN, OF BATTLE CREEK, MICHIGAN, ASSIGNOR TO DUPLEX PRINTING PRESS COMPANY, OF BATTLE CREEK, MICHIGAN, A CORPORATION OF MICHIGAN.

## PRINTING-PRESS.

No. 884,123.

Specification of Letters Patent.

Patented April 7, 1908.

Application filed June 19, 1907. Serial No. 379,722.

To all whom it may concern:

Be it known that I, HENRY F. BECHMAN, of Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Printing-Presses; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

The present invention relates to improvements in flat bed web perfecting printing presses, and aims to provide novel means whereby with a press of this type embodying a plurality of printing couples the web can be properly fed through any desired number of the couples, thereby enabling the press to be economically employed for both heavy and light work.

The invention further contemplates the provision of a compensating mechanism operating to form a plurality of loops in the web, the number of loops being variable according to the manner in which the web is threaded through the rollers and depending upon the number of printing couples in use. This construction has the advantage of enabling proper compensation to be made for the various number of couples employed without necessitating the adjustment of the cams or mechanical portion of the compensating device.

Still another feature of the invention resides in the provision of gearing which can be readily adjusted to feed the web at the required speed according to the number of printing couples in use.

The invention will be fully understood from the accompanying drawings and summarized in the claims following the description of the machine illustrated in the drawings.

In said drawings—Figure 1 is a diagrammatical longitudinal sectional elevation of the machine showing the arrangement of the printing, feeding, looping and delivering mechanisms, and the mode of threading the web through the press when both pairs of printing couples are being employed. Fig. 2 is a similar view showing the mode of threading the web through the press when only one pair of the printing couples is being utilized. Fig. 3 is an enlarged detail view of the changeable gearing for varying the speed of the web. Fig. 4 is a detail plan view of such

gearing. Fig. 5 is a detail end view, and Fig. 6 a detail plan view of the cutting and collecting cylinders and their gearing.

Broadly speaking, the press comprises a plurality of printing couples of which the reference characters  $10^a$ ,  $10^b$ ,  $10^c$ , and  $10^d$ , indicate the type beds, and  $1^k$ ,  $2^k$ ,  $3^k$ , and  $4^k$ , the co-acting impression cylinders, feed rollers 2 and 3 designed to receive the web  $W'$  from the roll  $W$ , a collecting and cutting roller  $6^a$ , and a compound compensating device which can be employed in connection with a selected number of printing couples, the said compensating device being similar to that shown in my prior patent No. 805,620 granted November 28, 1905.

The press shown in the drawings comprises two pair of printing couples, the type beds of each pair being arranged one above the other in parallel planes, and the web  $W'$  can be either threaded through both pair of the said couples or through only a single pair. When the web passes through all the couples as shown in Fig. 1 the press will print an eight, twelve, or a sixteen page paper; while when the web is only passed through a single pair of the printing couples as shown in Fig. 2 the press will print either a two, four, six, or eight page paper.

The compensating device comprises the vertically reciprocating bar  $11^a$  actuated in a well known manner through the medium of the lever  $12^a$  and cam groove in the wheel  $13^b$ , the said wheel being properly geared to the drive shaft or operated in any other suitable manner. Carried by this reciprocating bar  $11^a$  are the lower set of looping rollers  $8^c$  and  $7^a$  operating upon the web as it is fed to the printing couples, and the upper set of looping rollers  $3^a$  and  $9^a$  engaging the web as it is delivered from the printing couples. Coöperating with the lower set of movable looping rollers are stationary rollers or idlers 5 and 6, and coöperating in a similar manner with the upper set of movable looping rollers are idlers  $2^a$  and 21. It will be observed that one compensating loop can be formed in the web  $W'$  for each pair of printing couples, and that the number of the loops actually formed depends upon the manner in which the web is threaded through the rollers.

For the proper working of the press it is necessary that the web be shifted or fed twice as fast when both pair of the printing couples are in use as indicated in Fig. 1 as when



but a single pair is in use as shown in Fig. 2. To accomplish the desired result the drive shaft is provided with the two gear wheels 2<sup>a</sup> and 3<sup>a</sup> designed to mesh respectively with the gear wheels 3<sup>c</sup> and 3<sup>b</sup> carried by a second shaft interposed between the drive shaft and the mechanism of the press. Any suitable shifting or clutch device is provided whereby the gear wheel 2<sup>a</sup> may be thrown into mesh with the gear wheel 3<sup>c</sup>, or the gear wheel 3<sup>a</sup> into mesh with the gear wheel 3<sup>b</sup> according to whether both pair of the printing couples are being employed or only a single pair. These gears are so proportioned that the web W' is shifted or fed twice as fast in the former instance as in the latter.

As shown in Figs. 3 and 4, the gears 2<sup>a</sup>, 3<sup>a</sup>, are connected by a sleeve A' slidably keyed to the shaft A, while gears 3<sup>b</sup>, 3<sup>c</sup>, are fixed on shaft B. The gears 2<sup>a</sup>, 3<sup>a</sup>, can be slid on shaft A, so as to bring gear 3<sup>a</sup> into mesh with gear 3<sup>b</sup> (as indicated in full lines Figs. 3 and 4) or shifted so as to bring gear 2<sup>a</sup> into mesh with gear 3<sup>c</sup> as indicated in dotted lines Fig. 4. Gears 2<sup>a</sup>, 3<sup>a</sup>, can be fastened in adjusted position by set screw A<sup>2</sup>.

Referring more specifically to Fig. 1, the web W' is drawn from the roll W, runs under the roller 1, passes up and over the feed roll 2 and down and under feed roll 3, then extends over the looping roller 8<sup>c</sup>, under the idler 5, and over and around the looping roller 7<sup>a</sup>. From here the web is drawn around the idlers 6 and 7, passes under the impression cylinder 1<sup>k</sup>, is drawn over the idlers 8, 4 and 11, passes under the impression cylinder 3<sup>k</sup>, extends up and over the idler 12, is drawn around the coaxing rollers 13 and 14 and the idler 15, passes under the impression cylinder 4<sup>k</sup>, is drawn over the idlers 16, 18 and 19, and passes under the impression cylinder 2<sup>k</sup>. The web then passes over the idlers 20 and 21, down and around the looping roller 9<sup>a</sup>, up and over the idler 2<sup>a</sup>, down and around the looping roller 3<sup>a</sup>, up and over idler 4<sup>a</sup> and over upper delivery roll 5<sup>a</sup>, and thence over to the cutting and collecting cylinder 6<sup>a</sup>. This cylinder can be provided with a collecting device so that two successive sheets can be collected on same, or the web may be run direct through to the folder. The cylinder 6<sup>b</sup> is the male cutting cylinder while 6<sup>a</sup> is the female cutting and collecting cylinder.

The cutting and collecting cylinders are shown more clearly in Figs. 5 and 6. The shaft C of the collecting cylinder 6<sup>a</sup>, may have gears C', C<sup>2</sup>, fixed thereon. And shaft D of cylinder 6<sup>b</sup> has gears D', D<sup>2</sup>, slidably mounted thereon. When sheets are to be collected gears D', C' may be brought into mesh, and the cam C<sup>3</sup> attached to gear C<sup>2</sup>. When not collecting, gears C<sup>2</sup>, D<sup>2</sup>, can be put in mesh, and cam C<sup>3</sup> fastened to the cylinder 6<sup>a</sup>. Gears D', D<sup>2</sup>, can be fastened in adjusted position by set screw D<sup>3</sup>. The particular

construction of this collecting mechanism is not claimed herein.

Referring to Fig. 2 the web W' is drawn from the roll W, passes around the idler 1, up and around the feed roller 2 and down and around the feed roller 3, up and over the looping roller 8<sup>c</sup>, and down and around the idler 5. Thence the web is drawn under the idler 6, around the idler 7, passes under the impression cylinder 1<sup>k</sup>, over the idlers 8 and 4, around the idler 10, up and around the idler 17, over the idlers 18 and 19, under the impression cylinder 2<sup>k</sup>, and over the idlers 20, 21 and 2<sup>a</sup>. The web then passes down and around the looping roller 3<sup>a</sup>, up and around the idler 4<sup>a</sup> and over upper delivery roll 5<sup>a</sup>, and finally reaches the cutting and collecting cylinder 6<sup>a</sup>.

The travel of the impression cylinders is the same in both instances, the only difference being in the threading, feeding and compensating of the web. When the press is used as indicated in Fig. 1 the web is fed twice as fast as would be required in Fig. 2 and two of the compensating loops are formed in the web, while in the latter instance but one compensating loop is formed.

Now if an operator desired to run an eight page paper collected, he could run a four page width roll which web would cover one-half the cylinder; and if he desired to run a twelve page paper, a three-quarter width web would be used; and in case of sixteen pages, a full width web would be used which would cover four forms side by side as commonly used on the Duplex press.

While only two pair of printing couples have been shown in the present instance it will be readily understood that the invention could be readily extended to include any desired number of printing couples. It is also to be understood that slight minor changes can be made in the construction shown without in any manner departing from the spirit of the invention.

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

1. In a perfecting printing press, the combination of a plurality of pairs of printing couples each comprising a flat stationary bed and reciprocating cylinder, means for feeding a web to one or more pairs of the printing couples at a speed varied according to the number of pairs of couples between which the web is fed, and a compensating device adapted to act in conjunction with any selected number of the printing couples and feed of web.

2. In a perfecting printing press, the combination of a plurality of printing couples each comprising a flat stationary bed and a reciprocating cylinder, means for feeding a web to a selected number of couples, means for regulating the speed of the web feed according to



the number of couples between which the web is led, and a compensating device adapted to act in conjunction with any selected feed of web and alternately stop the part of the web in the press during impressions and shift it forward after impressions.

3. In a perfecting printing press having flat stationary beds and reciprocating cylinders, the combination of a plurality of printing couples, means for feeding a web to a selected number of the couples at a speed varied according to the number of pairs of couples between which the web is led, and a compensating device comprising means for forming a plurality of loops in the web, the number of loops being variable according to the number of couples in use and depending upon the speed of the web feed and the method of threading the web through the compensating device.

4. In a perfecting printing press having flat stationary beds and reciprocating cylinders, the combination of a plurality of printing couples, means for feeding a web to a selected number of the couples at a speed varied according to the number of pairs of couples between which the web is led, and a compensating device adapted to act in conjunction with any selected number of the printing couples and in accordance with the speed of the web feed, and comprising a plurality of movable looping rollers and intermediate stationary rollers cooperating therewith.

5. In a perfecting printing press having flat stationary beds and reciprocating cylinders, the combination of a plurality of printing couples, means for feeding a web to a selected number of the couples, means for regulating the feed according to the number of couples in use, and a compensating device adapted to act in conjunction with any selected number of the couples and comprising a plurality of movable looping rollers and intermediate stationary rollers cooperating therewith, the number of loops formed being variable and depending upon the manner of threading the web through the compensating device.

6. In a perfecting printing press having flat stationary beds and reciprocating cylinders,

the combination of a plurality of printing couples, a web feed and delivery mechanism, a drive shaft, a plurality of gear wheels carried by the drive shaft, a second shaft interposed between the drive shaft and the feed and delivery mechanism, gear wheels carried by the second shaft and cooperating with the first mentioned gear wheels to regulate the speed of the web, means for feeding the web to a selected number of the couples, and a compensating device adapted to act in conjunction with any selected number of the said couples.

7. In a perfecting printing press having flat stationary beds and reciprocating cylinders, the combination of a plurality of printing couples, means for threading a web through a selected number of the couples, means for feeding the web, means for regulating the feeding of the web, a cutting and collecting cylinder receiving the web, and a compensating device comprising means for forming a plurality of loops, the number of loops being variable according to the number of printing couples in use and depending upon the manner of threading the web.

8. In a perfecting printing press having flat stationary beds and reciprocating cylinders, the combination of a plurality of pairs of printing couples, each couple comprising a type bed and a cooperating impression cylinder and the type beds of each pair of couples being arranged one above the other in approximately parallel planes, means for threading a web through any selected number of pairs of the couples, means for regulating the feeding of the web, and a compensating device comprising means for forming a plurality of loops in the web, the number of loops being variable according to the number of pairs of printing couples in use and depending upon the manner of threading the web through the compensating device.

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

HENRY F. BECHMAN.

Witnesses:

I. K. STONE,  
F. W. DUNNING.