

No. 703,189.

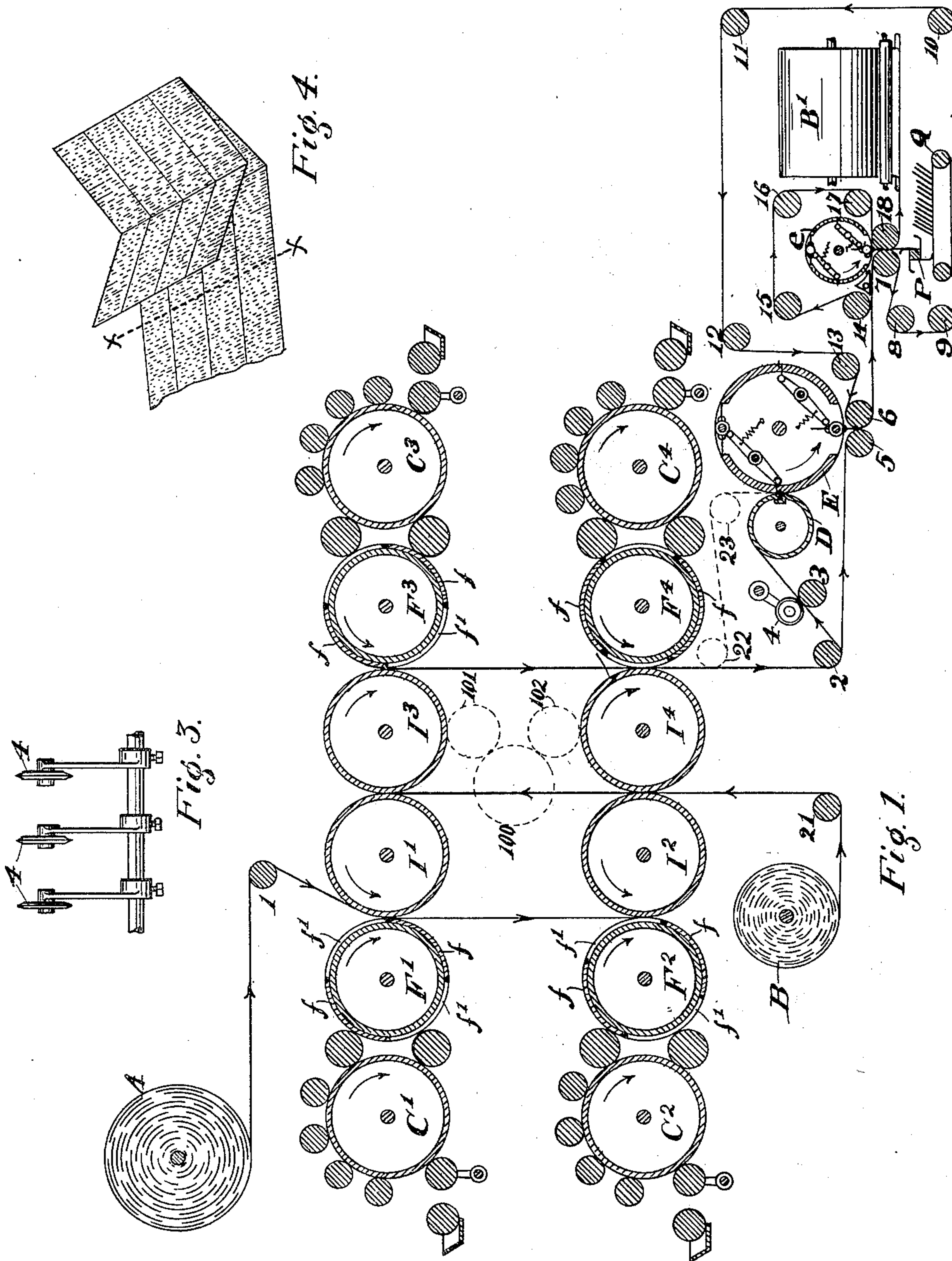
Patented June 24, 1902.

J. L. FIRM.  
PRINTING PRESS.

(Application filed Apr. 1, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
Chas. W. Thomas.  
H. L. Reynolds.

Inventor  
J. L. Firm.

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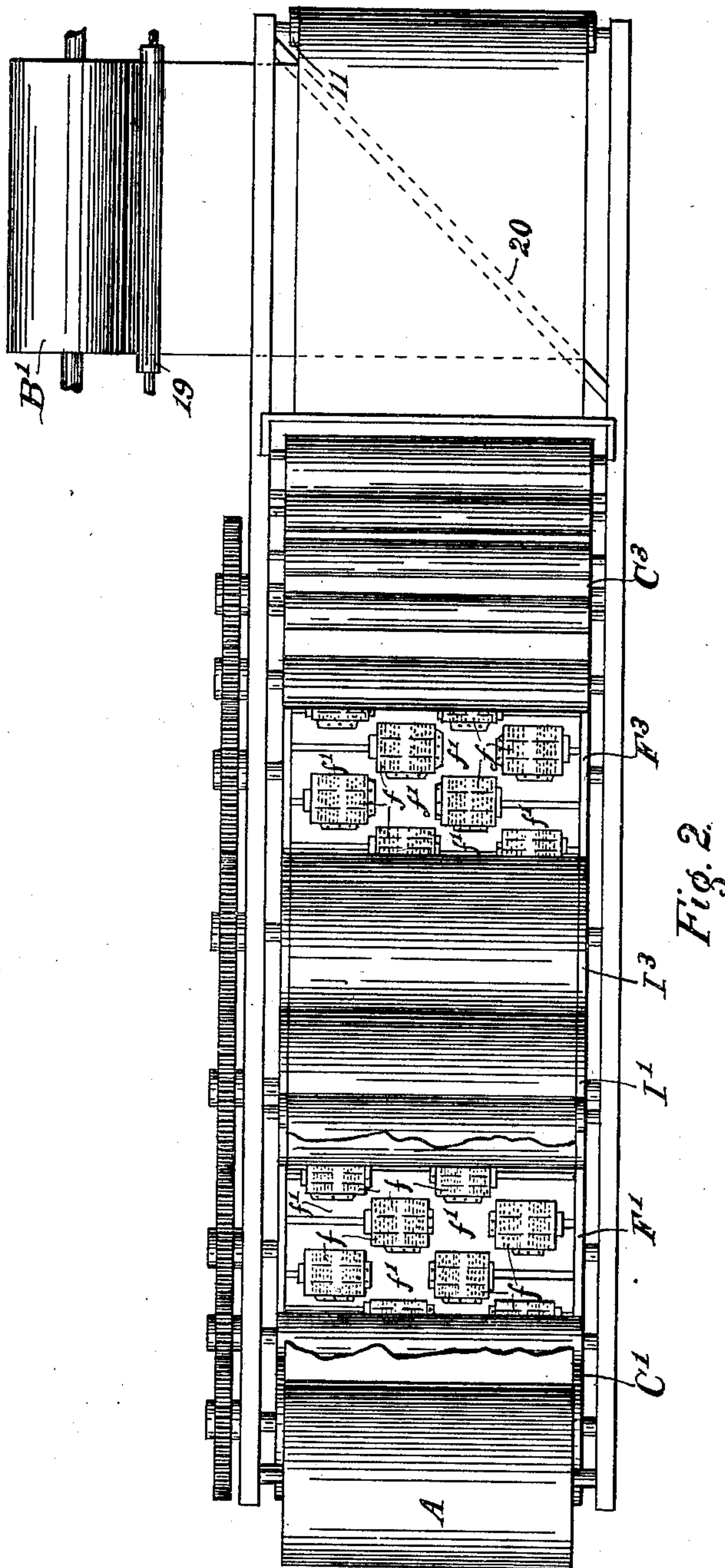
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# UNITED STATES PATENT OFFICE.

JOSEPH L. FIRM, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GOSS PRINTING PRESS COMPANY, OF CHICAGO, ILLINOIS.

## PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 703,189, dated June 24, 1902.

Application filed April 1, 1901. Serial No. 53,828. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH L. FIRM, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Printing-Press, of which the following is a full, clear, and exact description.

My invention relates to an improvement in printing-presses by which a rotary press is enabled to successfully print a character of work not usually undertaken thereon—namely, that in which different parts of the work vary widely in the quantity of ink required, as where illustrations and text are used together, as in magazine-work.

My invention comprises the novel features which will be hereinafter described, and particularly pointed out in the claims.

Figure 1 is a sectional elevation of my press. Fig. 2 is a plan view thereof with the web broken away at one point to show the arrangement of the forms on the cylinders. Fig. 3 shows the slitters which may be used to divide the web after printing. Fig. 4 shows the method of folding the product.

In my present invention I employ an upper and a lower deck each containing two printing-couples composed of a form and an impression cylinder and conduct the web from one deck to the other, so that the successive impressions given the web are produced alternately by printing-couples in different decks, the form-cylinders having forms secured thereon to cover substantially only half their surface, the forms alternating both circumferentially and longitudinally of the cylinders with substantially equal blank spaces and two cylinders being required to perfect each side of the web. I do not herein claim, broadly, the use of forms so arranged upon the cylinders, as the same is the subject-matter of an application, Serial No. 26,688, filed by me August 13, 1900. The press shown in said application differs from that herein shown in having a single impression-cylinder, which is employed in common by both form-cylinders of a deck and in conducting the web in contact with both form-cylinders of a deck before leading it to the other deck.

In the form of press shown herein the upper deck consists of the two impression-

cylinders  $I^1$  and  $I^3$ , located side by side at the center of the deck, the form-cylinders  $F^1$  and  $F^3$ , located outside of the impression-cylinders, and the inking mechanisms  $C^1$  and  $C^3$  at the end of the deck, and the lower deck consists of the impression-cylinders  $I^2$  and  $I^4$ , form-cylinders  $F^2$  and  $F^4$ , and inking mechanisms  $C^2$  and  $C^4$ , similarly arranged. The two decks are connected to turn together, as by the gears 100, 101, and 102.

The web leads from a roll A over a guide-roller between the first printing-couple, consisting of form-cylinder  $F^1$  and impression-cylinder  $I^1$ , then across to the other or lower deck and through the second printing-couple, consisting of the form-cylinder  $F^2$  and impression-cylinder  $I^2$ , and then upward to the upper deck, passing between the impression-cylinders  $I^2$   $I^4$  and  $I^1$   $I^3$ , then through the third printing-couple, composed of the form-cylinder  $F^3$  and impression-cylinder  $I^3$ , then downward to the lower deck and through the fourth printing-couple, consisting of form-cylinder  $F^4$  and impression-cylinder  $I^4$ . The forms  $f$  upon the form-cylinders are arranged, as shown in Fig. 2, so as to alternate with blank spaces  $f'$  of substantially equal size, both circumferentially and longitudinally of the cylinders, so that passage of the web through one printing-couple prints only one-half of one side thereof, the other half being printed by its complementary printing-couple, which is so arranged as to print upon the spaces left blank by the forms of the first couple. Thus the second printing-couple completes the printing of the first side of the web and the fourth printing-couple completes the printing of the second side of the web. After the web has been printed on one side and before it starts across to the upper deck an offset web B, which is inserted in the form of a roll, is associated with the printed web and in contact with the printed side thereof. This offset web passes about the impression-cylinders  $I^3$  and  $I^4$  with the printed web and between the printed web and the cylinders. Both webs lead over the guide-roller 2 and are then temporarily separated, both, however, leading to the folding mechanism, but by a different course, so that the printed web is cut and the offset web is not cut. The



printed web leads to the cutting-cylinder D of the folding mechanism, by which it is severed into the proper lengths, while the offset web leads directly to the folding-rollers 5 and 6, passing between the same along with the severed and folded web. The cutting and folding mechanism, consisting of the cylinders D and E, rollers 5 and 6, and the mechanism carried thereby, as well as the folding cylinder and rollers e, 7, and 18, are the usual type of rotary folders—such, for instance, as are shown in United States Patent No. 658,209, issued to me September 18, 1900—and as their particular construction forms no part of my present invention and is, moreover, well known in the art a full description is deemed unnecessary. The printed web in its passage from roller 2 to the cutting-cylinder D may be acted upon by slitters 4 and roller 3 to divide it into several narrow webs. After leaving the first rotary folder the two webs may lead to a second rotary folder consisting of cylinder e and rollers 7 and 18, where the severed sections of the printed web are again folded. The folded papers or signatures are then taken care of by the spider P and apron Q in the well-known manner. An additional folding carrier may be added to further fold the paper, if desired. After passing between the rollers 7 and 18 the offset web is conducted about the second folding mechanism and the paper-delivering mechanism by means of the rollers 8, 9, 10, 11, 12, and 13, its direction of movement being indicated by the arrow-heads, and then passes between the rollers 7 and 18 a second time, but on the opposite side of the printed papers or signatures. The offset web then continues over the same course as before until it reaches the roller 14, and then by means of rollers 14, 15, 16, and 17 it is carried about the second rotary folder and is delivered to the roller 18, where it again meets the printed signatures, passing between rollers 7 and 18 with the signatures. The offset web is then passed over turning-bars 20, by which it is led out to one side, where it is wound up as roll B'.

The above-described manner of employing an offset web in combination with rotary folders and the mechanism employed are not herein claimed, as they are made the subject-matter of an application, Serial No. 42,621, filed by me January 8, 1901.

If desired, the printed web may be led to

the folding mechanism over the rollers 22 and 23, thus avoiding the slitters 4.

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

1. A printing-press having two superposed decks, each deck consisting of two impression-cylinders in the center and a form-cylinder at each end, each form-cylinder having forms secured thereto to cover substantially half the surface of the cylinder, each form being adjacent both circumferentially and longitudinally to a blank space of substantially equal size.

2. A printing-press having two superposed decks each consisting of two printing-couples composed of a form-cylinder and an impression-cylinder, means for leading a web in succession first through the printing-couples at one end of each deck and then between the pair of impression-cylinders in each deck and then through the printing-couples at the other end of each deck.

3. A printing-press having two superposed decks each consisting of two printing-couples composed of a form-cylinder and an impression-cylinder, means for leading a web in succession first through the printing-couples at one end of each deck and then through the printing-couples at the other end of each deck, said form-cylinders having forms thereon which are adjacent both circumferentially and longitudinally thereof to substantially equal blank spaces, the second cylinder printing on the same side of the web as the first cylinder and in the spaces left blank by the first cylinder.

4. A printing-press having two superposed decks each consisting of two printing-couples composed of a form-cylinder and an impression-cylinder, means for leading a web in succession first through the printing-couples at one end of each deck and then between the pair of impression-cylinders in each deck and then through the printing-couples at the other end of each deck, and means for conducting an offset web with the printed web while passing between the impression-cylinders and through the second pair of printing-couples.

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Witnesses:

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