

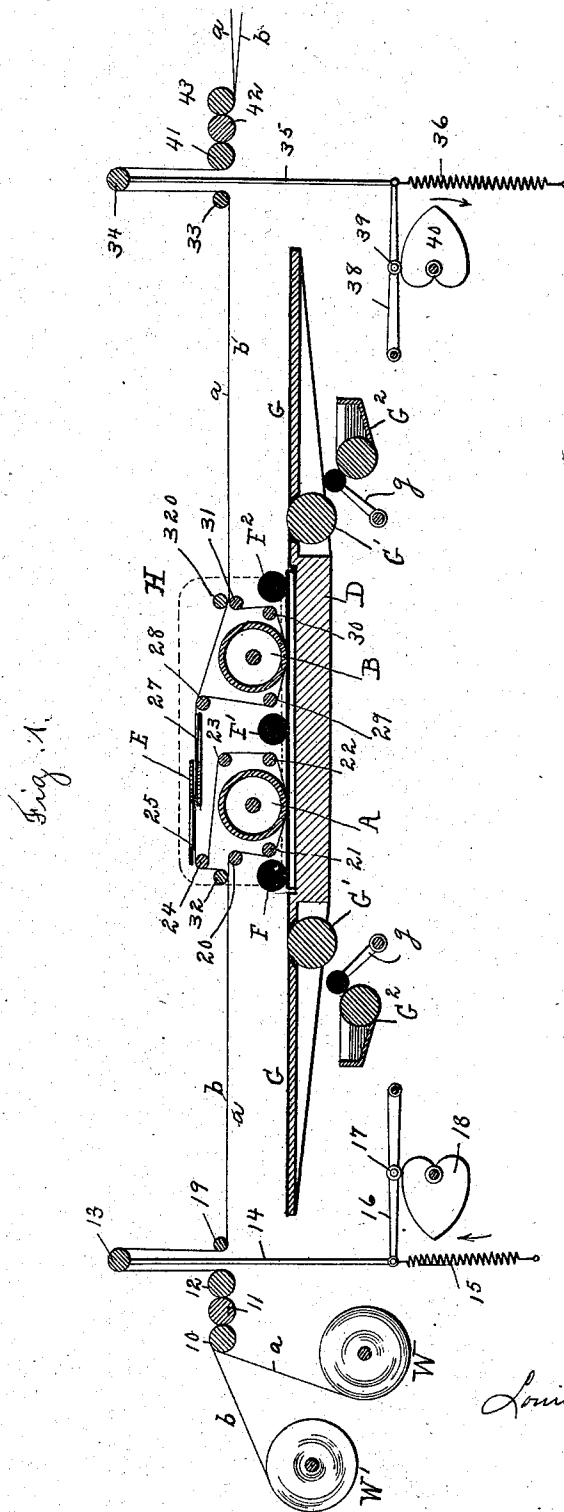
(No Model.)

2 Sheets—Sheet 1.

L. W. SOUTHGATE.
PRINTING MACHINE.

No. 557,907.

Patented Apr. 7, 1896.



Witnesses
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Inventor
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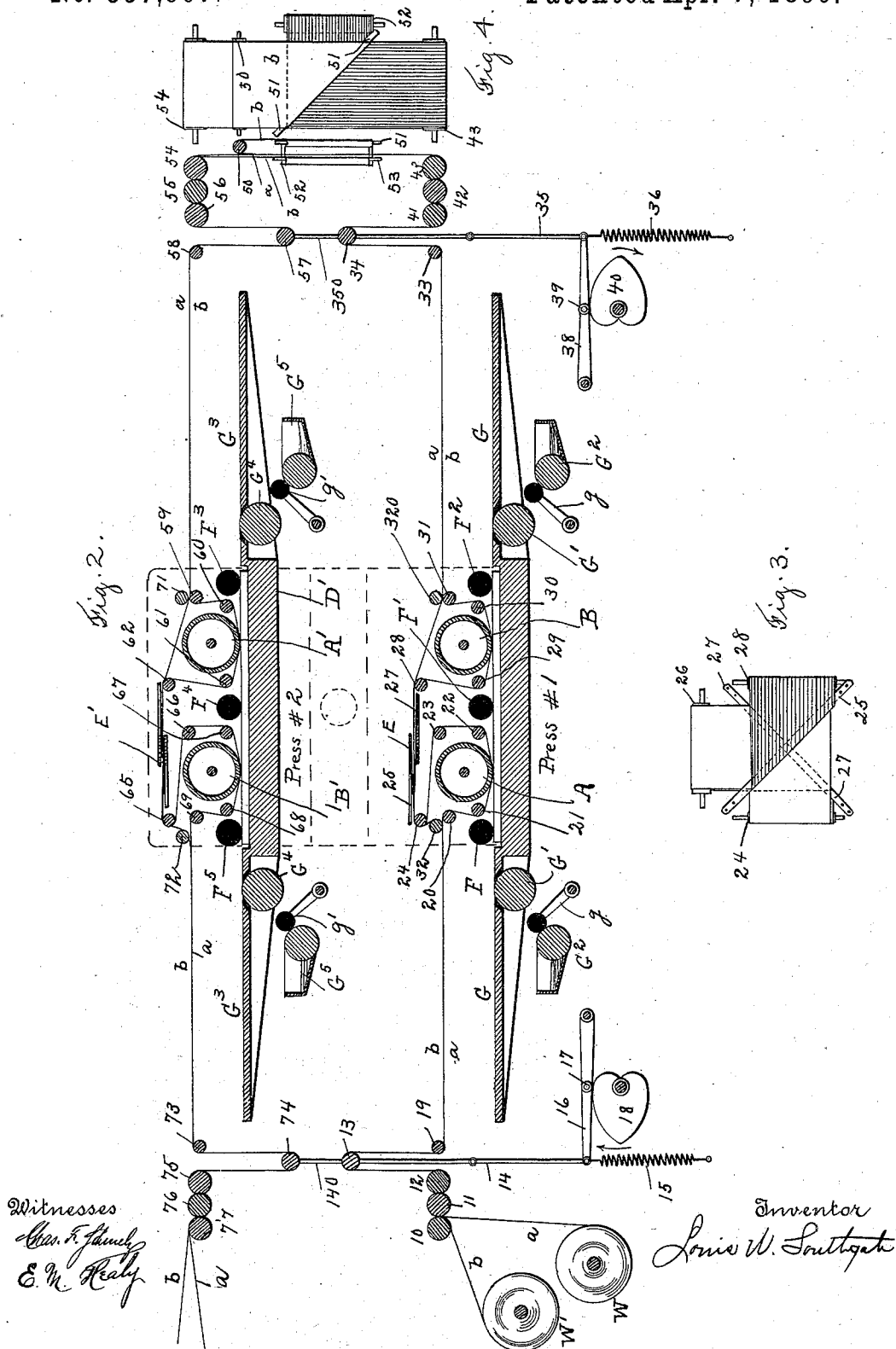
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

LOUIS W. SOUTHGATE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE CAMPBELL PRINTING PRESS AND MANUFACTURING COMPANY, OF NEW YORK, N. Y.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 557,907, dated April 7, 1896.

Application filed April 6, 1893. Renewed June 28, 1895. Serial No. 554,379. (No model.)

To all whom it may concern:

Be it known that I, LOUIS W. SOUTHGATE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Printing-Machines, of which the following is a specification.

The aim of this invention is to improve the construction of printing-presses, and especially relates to web-printing presses, which are known in the art as "traveling-cylinder" web-printing presses, although some of my improvements, as indicated by the scope of the claims, may be applied to web-printing presses in which both the bed and cylinder move or to printing-presses in which the bed reciprocates and the cylinder is stationary.

My invention relates to a peculiar form of such printing-press, which consists in so arranging the parts that two webs can be printed from the same form or forms, thereby doubling or multiplying the capacity of the machine.

Referring to the drawings and in detail, I will describe one form of my invention, it being understood, of course, that the same can be designed and varied by a skilled mechanic to suit the exigencies of any particular location or use or form of press.

Referring to the drawings and in detail, Figure 1 represents in diagram one form of my improvement applied to a press in which only a single bed is used. Fig. 2 represents a press in which two beds are used and by which, if desired, two separate and independent webs can be perfected. Fig. 3 represents the turner device which is used between the cylinders, and Fig. 4 represents a view of a part I term the "web-reverser."

I will now first describe the form of press shown in Sheet 1, and referring to the same and in detail A and B represent two impression-cylinders, which are mounted in a suitable reciprocating carriage H, so as to both be capable of coacting with a form or forms placed on the bed D.

E represents a suitable web-turner, which is arranged in the path of the web or webs between the two cylinders.

F F' and F² represent form-rollers, which are arranged, as shown, on the outside of each impression-cylinder, and one, as F', between the two impression-cylinders.

At each side of the bed D, and slightly below the level of the forms placed upon the same, are arranged ink-tables G, projecting through which are the drum-cylinders G', to which ink may be supplied from the fountains G² by means of the usual vibrating ductor-rollers g.

The form-rollers F F' and F² are mounted in the carriage H, so as to drop onto the ink-tables G when they are off the forms, so that when the cylinders are off the forms in either direction ink will be given to all of the form-rollers.

Any other suitable form of ink-supplying apparatus that will give ink to the form-rollers F F' and F² may be used.

The device, as shown, may be used either in connection with a double or single web, the carriage H being reciprocated by any of the usual and well-known mechanisms for reciprocating the impression-cylinders, and I will describe the way my invention is used first with the single web, as a, which is led from a web-roll, as W.

From the web-roll W the web a passes in through the continuously-driven rollers 10, 11, and 12, which will slowly unwind the web from the roll in the usual manner. From the last roll, 12, the web passes up over the looping-roller 13, which is mounted in arms 14, which arms 14 have connected to the ends thereof springs, as 15, and connected to these arms 14 are the pivoted arms 16, which carry rollers 17, which bear on cams 18, which cams 18 are of any desired shape, this device being so arranged that the web will be fed forward when the impression-cylinders are off the forms in either direction, as is well understood. From the looping-roller 13 the web passes down under a stationary guide 19, then around the guides 20, 21, 22, and 23, carried by the reciprocating carriage H and arranged around the impression-cylinder A, as shown. From the guide 23 the web is led back around a guide 24 and then to the turner E. This turner may consist of two right-angled forty-

five-degree turner-bars, as 25 and 27, and a parallel roll, as 26. From the last turner-bar, 25, the web passes to the guide or roll 28, down under the guide or roll 29, under the impression-cylinder B, then up over the guides 30 and 31.

It will be seen that the turner device E is arranged over the first impression-cylinder A and that the web is led back to the same by means of the roller 24. This forms a very compact arrangement of parts, as by this means the impression-cylinders A and B can be kept close together, thereby shortening their stroke and shortening the path of the web.

From the guide 31 the web passes to the guide 33, mounted at the end of the press, then up over the looping delivery-roller 34, which is mounted in arms 35, which are normally pulled down by means of springs 36, and to which arms 35 are connected the pivoted arms 38, which carry rollers 39, which bear on the cams 40, and from the looping-roller 34 the web passes into the bite of the continuously-running delivery-rollers 41, 42, and 43, the action of this delivery mechanism being well understood.

The operation of the press thus organized is apparent.

As the impression-cylinders reciprocate back and forth over the forms they will present opposite sides of the web to the same forms and the web will be printed or perfected in the manner which is known as "work and turn"—that is, if there are two forms on the bed side by side the web will be printed so as to be capable of being slit and cut into sheets, which sheets will be each printed upon one side by one of the forms; or, again, if there are four forms on the bed side by side the web could be perfected so as to be capable of being cut and slit into sheets which would have the matter of two of the four forms printed on each side.

Of course the arrangement of forms may be further varied and carried out, as desired, depending upon the work to which the press is to be applied.

The web may be continuously fed into and out of the press, as shown, and may be intermittently shifted by the looping-rollers when the impression-cylinders are off the form in either direction, and this is the preferred arrangement, although the press might be so built that the web would be only shifted when the impression-cylinders are off the bed in one direction. It is preferred to move the turner device with the carriage, although, of course, it would be within the scope of my invention to arrange this turner on a stationary part of the machine.

My device can also be used to print on one side of two webs, which are preferably associated, and the way this can be done is to simply associate a web, as *b*, from the web-roll *W'* with the web *a*, so that the two webs will be led through the press together, where-

by the same feeding and delivery mechanism suffices for both webs, although, of course, it would be within the scope of my invention to use a separate manipulating device for each web. It is preferred when this separate web is used to lead but one of the webs around each impression-cylinder, although, of course, it would be within the scope of my invention to manipulate the associated double web exactly the same as the single web is manipulated.

When it is desired to lead but one of each of the two webs around each impression-cylinder, the same can be done by simply adding two rollers 32 and 320 on the carriage, as shown. With this arrangement the webs *a* and *b* will travel together as far as the roll 32, when the web *a* will follow the path above indicated to and about the first impression-cylinder, while the web *b* will be led up over the guide 32 to the roll 24, at which point the two webs *a* and *b* will be associated as they pass the turner.

The turner will so manipulate one of the webs, as the web *a*, which would be led out over the turner 27, around the parallel roll 26, up over the turner 25, that the web *a* will be placed on top of the web *b*, and after passing to the roll or guide 28 the web *a* will be led directly to the guide 320, mounted over the roll or guide 31, where it will be again associated with the web *b*, that the two webs may thereafter run as one web. Meanwhile the web *b*, which after passing the turner device became the lower web, has been led down about the guide 28, beneath the guide 29, under the impression-cylinder B, where it receives its impression, about the guide 31, where it is again associated with the web *a*. By this means it will be seen that I can use my device to print on one surface of each of two webs. It will be seen, also, that by the preferred arrangement for the two webs last described the first-printed web will not pass under the impression-cylinder B, and hence there will be no offset during the printing operation. Thus this machine, as shown in Sheet 1, is capable of a variety of uses, either with a single or a double web.

The form-inking rollers will take ink, as before described, when the impression-cylinders are off the form-bed in either direction, whereby the form can be properly inked so that the impressions can be taken on both the forward and the backward movement of the cylinders.

The emerging printed web or webs can be further manipulated, associated, cut, collected, or folded, as desired.

My invention also is especially applicable to the perfecting form of traveling-cylinder press, and I have shown one arrangement, in Sheet 2 of the drawings, illustrating the perfecting form of my press, it being understood, of course, that the printing mechanisms of a perfecting-press can be arranged in the same plane, or in any other well-known manner, as

well as directly over one another, as shown in said second sheet. In this second sheet of drawings I have shown a press, designated as "press No. 1," exactly the same as the press described in the first sheet of the drawings, and over the same I have shown a similar press, which is designated as "press No. 2," consisting of the first impression-cylinder A', the second impression-cylinder B', the bed D', the turner E', the form-rollers F³, F⁴, and F⁵, and ink-tables G³, ink-drums G⁴, ink-fountains G⁵, and ductor-rollers g', exactly the same as before described.

The press No. 1 will not again be specifically described, as it is preferred to use the specific press, as before described, in the perfecting form of a machine.

This perfecting form of press is especially adapted for use in connection with the double or associated web, and I will further describe the same as using the double web.

From the last continuously-running delivery-roller 43 of press No. 1 the two associated webs are led upward, as shown, but the web b is turned back over the roll 50, and the position of the webs is reversed by a peculiar turner device, which consists of a forty-five-degree turner-bar 51, which deflects the web laterally out of the machine, as shown, around a vertical roller 52, then back into the press, under a turner 53, which will change the position of the webs, and will bring the two printed sides of the webs together, so that the two webs will be associated at the point where they again unite to form the associated web, which is unprinted, on the exterior surfaces. From the reversing device the associated webs run into the bite of the continuously-running rollers 54, 55, and 56, and these rollers, acting in connection with the looping device and with the continuously-running delivery-rollers of press No. 1, will move the webs continuously at an even speed through the reverser, which is the preferred form of arrangement. From the continuously-running roller 56 the web is led down under a looping-roller 57, which preferably is mounted in extensions 350 of the arms 35 of press No. 1, then up over the guide 58. From the guide 58 the associated webs pass to the guides carried by the carriage, and the preferred arrangement here is to lead the web b over the guide-rollers 59 and 60, under the impression-cylinder A', then up over the guides 61 and 62, and to lead the web a around a roller, as 71, up to the guide 62, whereby there will be only one web under the impression-cylinder A', and thus one web will not offset on the other. From the guide 62 the two webs are again associated, and the web b is turned over the web a by means of the turner E', which consists of two right-angled forty-five-degree turner-bars and a parallel roll arranged and constructed as the turner E of press No. 1. From the turner the webs pass to the roll 65, and then the web a is carried back by means of guides 66 and 67 under the impression-cylinder B', and then up

over the guides 68 and 69, all these guides being mounted in the carriage, as shown. It is preferred also not to lead the web b under the impression-cylinder A', but to lead the web b directly from the roll or guide 65, so that the same will again be associated with the web a as the same leaves the impression-cylinder B', and this can be nicely done by leading the web b under a guide or roller 72, mounted in the carriage, as shown. From this point the two associated webs pass to a stationary guide 73, around a looping-roller 74, which is preferably arranged in extensions 140 of the arms 14, and then into the bite of the continuously-running rollers 75, 76, and 77.

The impression-cylinders A and B and A' and B' are preferably mounted in this perfecting form of press in the same reciprocating carriage H', which carriage is reciprocated in any of the usual manners, not necessary here to describe. By this means it will be seen that a double web can be run through this press and perfected from forms placed upon the two beds, by which means the capacity of the ordinary traveling-cylinder press is doubled without unnecessarily increasing the speed of the parts; also, it will be seen that the same feeding and delivery mechanism suffices for both webs, and two cutters and folders can be used, if desired, one handling each web at a low speed, whereas if a single web were used the speed of the web would have to be double that of the two webs which I use.

It is preferred to use a looping device at the end of the press, so that the webs will run continuously around the reversing mechanism, so that the pull of the feed on the web will be slight.

From the continuously-running delivery-rollers the webs may be thereafter manipulated in any desired manner, either singly or associated.

The arrangement of the various details, as before stated, can be varied by a skilled printing-press designer 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. The combination in a printing-press of a form-bed, two traveling impression-cylinders coacting with said form-bed, a turner arranged in the path of a web led from one of said impression-cylinders to the other, and web-shifting mechanism for the web, substantially as described.

2. The combination in a printing-press of a form-bed, two traveling impression-cylinders coacting therewith and adapted to coact with said form-bed, a turner interposed in the path of a web led from one of said impression-cylinders to the other, and means for shifting said web around the impression-cylinders, when the impression-cylinders are off the bed in either direction, substantially as described.

3. The combination in a printing-press of a form-bed, a reciprocating carriage carrying two impression-cylinders coacting with said form-bed, a turner mounted in said carriage, adapted to turn a web between the impression-cylinders, and suitable web-shifting devices, substantially as described.

4. The combination in a printing-press of a form-bed, two traveling impression-cylinders coacting therewith, guides for leading a double or associated web so that each web may be presented to the form, a turner arranged to turn said webs between the cylinders, and suitable web-shifting devices, substantially as described.

5. The combination in a printing-press of a form-bed, a reciprocating carriage carrying two traveling impression-cylinders coacting with said form-bed, guides for leading a double or associated web so that the same can be presented by the impression-cylinders to the form, a suitable turner device for the webs mounted in said carriage, and suitable web-shifting devices, substantially as described.

6. The combination in a printing-press of a form-bed, a reciprocating carriage carrying two traveling impression-cylinders coacting therewith, suitable web-guides mounted in the carriage, a web-turner device mounted in the carriage, and arranged substantially over one of said impression-cylinders, and intermittently-acting web-shifting devices, substantially as described.

7. The combination in a printing-press of a form-bed, two traveling impression-cylinders coacting therewith, means for continuously feeding a web into and out of the press, looping devices adapted to intermittently shift a web around the impression-cylinders, and a turner device interposed in the path of the web, between the impression-cylinders, substantially as described.

8. The combination in a printing-press of a form-bed, two traveling impression-cylinders coacting therewith, suitable guides adapted to associate and lead two webs through the press, means for continuously feeding the associated webs into and out of the press, loopers adapted to intermittently shift the associated webs around the impression-cylinders, and a turner interposed in the path of the associated webs between the impression-cylinders, substantially as described.

9. The combination in a printing-press of a form-bed, a reciprocating carriage carrying two impression-cylinders coacting with said form-bed, a turner device, suitable web-guides and form-rollers arranged outside and between said impression-cylinders, and suitable intermittently-acting web-feeding devices, substantially as described.

10. The combination in a printing-press of a form-bed, a reciprocating carriage carrying two impression-cylinders coacting therewith, suitable web-guides mounted in the carriage, a web-turner also mounted in the carriage,

the form-rollers F, F', and F² mounted in the carriage, the form-roller F' being arranged between the impression-cylinders, and means for supplying ink to said form-rollers, when they are off the form-beds, substantially as described.

11. The combination in a printing-press of a form-bed, a reciprocating carriage carrying two traveling impression-cylinders coacting therewith, web-guides mounted in the carriage so as to lead one of two associated webs around each cylinder, a suitable web-turner arranged in the carriage, adapted to turn one web between the two cylinders, and means for intermittently shifting the associated web, whereby two webs can be printed from the same form, substantially as described.

12. The combination in a printing-press of a form-bed, a reciprocating carriage carrying two impression-cylinders coacting therewith, web-guides as 20 and 23 adapted to guide a web around one impression-cylinder, and guides 28 and 31, adapted to guide a web around the other impression-cylinder, a suitable turner carried by the carriage, guides or rollers also carried by the carriage, whereby one of a double web can be led around each cylinder, and means for associating and intermittently shifting a double or associated web around the impression-cylinders, substantially as described.

13. The combination in a printing-press of two form-beds, four impression-cylinders, two of which are adapted to coact with each bed, suitable web-guides, turner devices, and web-shifting devices, the whole so arranged that double or associated webs may be each perfected, substantially as described.

14. The combination in a printing-press of two form-beds, two impression-cylinders coacting with each bed, a turner arranged between each pair of impression-cylinders, a reverser arranged between the two pairs of impression-cylinders, and suitable web-shifting devices, the whole so arranged that two webs can be perfected, substantially as described.

15. The combination in a printing-press of two form-beds, a separate pair of impression-cylinders coacting with each form-bed, a turner arranged between each of the cylinders which comprise each pair, a reverser arranged between the two pairs of impression-cylinders, and a single intermittently-acting web-shifting device, the whole so arranged that two associated webs or a double web can be perfected, substantially as described.

16. The combination in a printing-press of two form-beds, a reciprocating carriage carrying two separate pairs of impression-cylinders so arranged that two impression-cylinders will coact with each bed, of two turner devices arranged between the impression-cylinders that coact with each bed, a web-reverser arranged between the two pairs of impression-cylinders, means for continuously feeding a double or associated web into and out of the press, and intermittently-acting

web-shifting devices, the whole so arranged that a double or two associated webs can be perfected, substantially as described.

17. The combination in a printing-press of two form-beds, a separate pair of impression-cylinders coacting with each form-bed, a web-turner interposed in the path of the webs between each of the cylinders forming the pairs, a web-reverser arranged in the path of the webs between the pairs of impression-cylinders, intermittently-acting web-shifting devices for shifting the webs around the impression-cylinders and intermittently-acting web-shifting devices, arranged so that the web can run continuously through the reverser, the whole so arranged that a double or two associated webs can be perfected, substantially as described.

18. The combination in a printing-press of two form-beds, a separate pair of impression-cylinders coacting with each of said form-beds, a turner arranged between each of the cylinders comprising said pairs, a web-reverser arranged in the path of the webs between the pairs of impression-cylinders, continuously-running rollers arranged in the path of the webs before and after the same pass to and from the reverser, and a coacting double-looping device, and of intermittently-acting web-shifting devices, adapted to shift the webs around the impression-cylinders, the whole so arranged that a double or two associated webs can be perfected, substantially as described.

19. The combination in a printing-press of two form-beds, a separate pair of impression-cylinders coacting with each of said form-beds, web-turners arranged in the path of the webs between each of the cylinders comprising said pairs, a web-reverser arranged in the path of the webs between the pairs of impression-cylinders, and intermittently-acting web-shifting devices adapted to shift the webs around the impression-cylinders when they are off the form-beds in either direction, the whole so arranged that a double or two associated webs can be perfected, substantially as described.

20. The combination in a printing-press of two form-beds, a separate pair of impression-cylinders coacting with each of said form-beds, web-turners arranged in the path of the webs between each of the cylinders comprising the pair, a web-reverser arranged in the path of the webs between the pairs of impression-cylinders, the reverser being adapted to reverse the position of the webs without turning either of the same, whereby the first-printed sides of the web will be brought together, the looping devices arranged so that the webs will run continuously through the reverser, and intermittently-acting web-shifting devices adapted to shift the webs around the impression-cylinders, when the impression-cylinders are off the form-beds in either direction, substantially as described.

21. The combination in a printing-press of

two form-beds, a pair of impression-cylinders coacting with each of said form-beds, web-turners arranged in the path of the webs between each of the cylinders comprising said pairs, a web-reverser adapted to reverse the relative position of the webs, arranged in the path of the webs between the two pairs of impression-cylinders, continuously-running rollers adapted to draw the webs continuously through the reverser, a looping-frame carrying two looping-rollers around which the webs are oppositely looped before and after the same pass to the reverser, continuously-running rollers for feeding the webs into and out of the press, two looping-rollers around which the webs are looped before and after the same pass to the press, the looping-rollers for shifting the webs around the impression-cylinders moving oppositely to the looping-rollers that control the webs in the reverser, the whole so arranged that a double or two associated webs can be perfected, substantially as described.

22. The combination in a printing-press of two form-beds arranged one directly over the other, of a separate pair of impression-cylinders coacting with each of said form-beds, a web-turner arranged in the path of the webs between each of the impression-cylinders comprising said pairs, a web-reverser arranged in the path of the webs between the pairs of impression-cylinders, and intermittently-acting web-shifting devices adapted to shift said webs around the impression-cylinders, the whole so arranged that a double or two associated webs can be perfected, substantially as described.

23. The combination in a printing-press of two form-beds, a separate pair of impression-cylinders coacting with each of said form-beds, suitable web guides and turners, and a web-reverser arranged so that each of a double or two associated webs is led around one of the impression-cylinders that coacts with each bed, and suitable intermittently-acting web-shifting devices, substantially as described.

24. The combination in a web-printing press of two form-beds, a reciprocating carriage carrying a separate pair of impression-cylinders adapted to coact with each of said beds, a web-turner arranged in the path of the webs between each of the cylinders comprising said pairs, a web-reverser arranged in the path of the webs between said pairs of impression-cylinders, and form-rollers arranged between each of the cylinders comprising the pairs of cylinders, and outside of each of said cylinders, suitable ink-supplying devices adapted to supply ink to said form-rollers, and intermittently-acting web-shifting devices adapted to shift the web around the impression-cylinders, substantially as described.

25. The combination in a printing-press of two form-beds, a reciprocating carriage carrying a pair of impression-cylinders coacting with each of said form-beds, suitable web-guides, and web-turners arranged substan-

tially over one of each of the cylinders comprising the pairs, a web-reverser and suitable intermittently-acting web-shifting devices, the whole so arranged that a double or two
5 associated webs can be perfected, substantially as described.

In testimony whereof I have hereunto set

my hand in the presence of two subscribing witnesses.

LOUIS W. SOUTHGATE.

Witnesses:

E. M. HEALY,

FREDERICK B. HARLOW.