

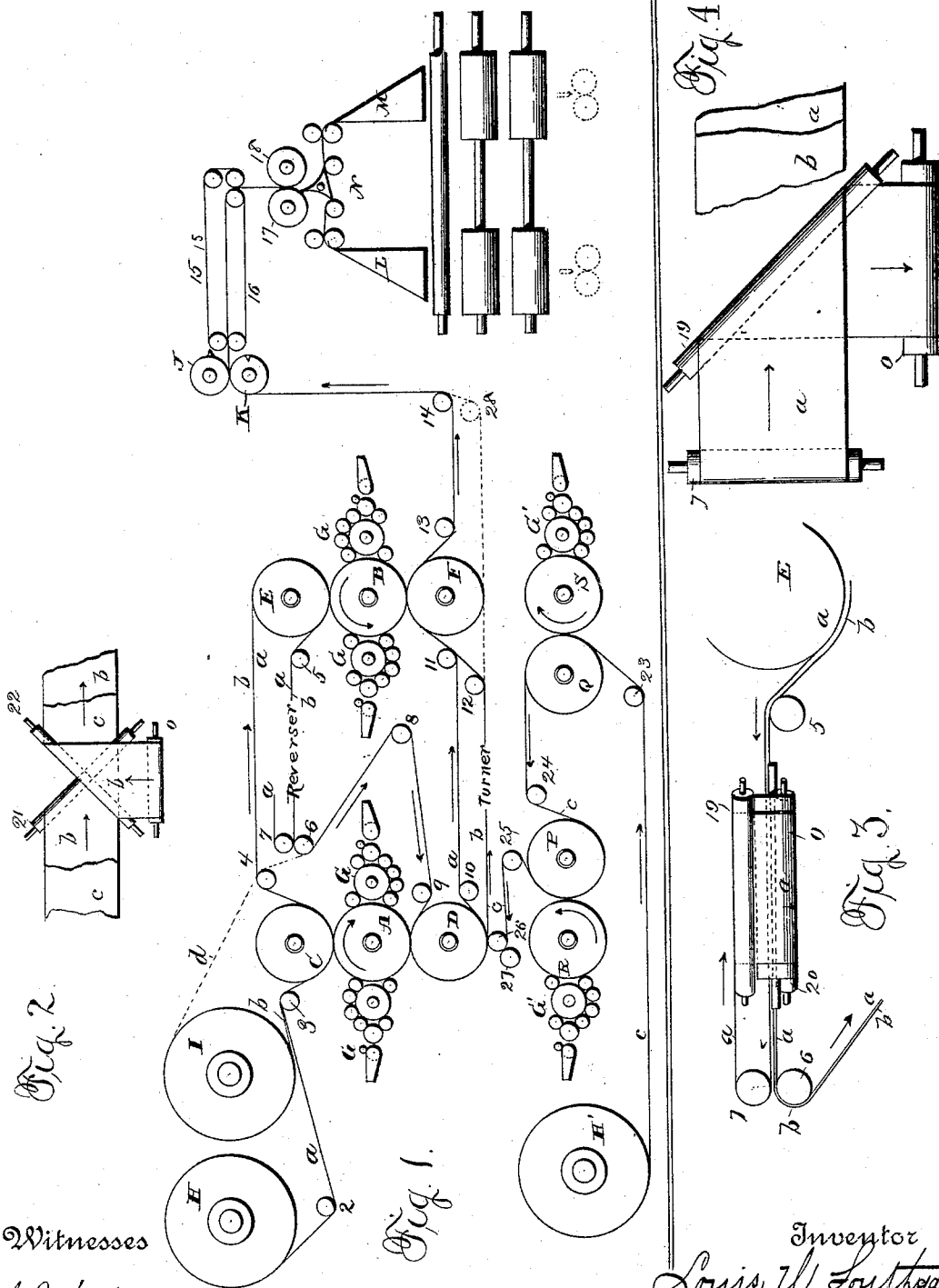
(No Model.)

2 Sheets—Sheet 1.

L. W. SOUTHGATE.
PRINTING PRESS.

No. 474,032.

Patented May 3, 1892.



UNITED STATES PATENT OFFICE.

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

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 474,032, dated May 3, 1892.

Application filed September 10, 1891. Serial No. 405,358. (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-Presses, of which the following is a specification.

The aim of this invention is to carry out the improvement shown, described, and claimed in my application, Serial No. 402,947, filed August 17, 1891, so that three webs may be printed, associated, and folded, as hereinafter described.

To this end the invention consists of the device described and claimed in this specification, and illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic view of the press and folder mechanism, showing how the webs are printed, associated, and folded. Fig. 2 is a plan of the web-turner. Fig. 3 is a side elevation of what I term the "web-reverser." Fig. 4 is a plan of the device shown in Fig. 3; and Figs. 5, 6, and 7 are diagrams illustrating the arrangement of plates and the way in which twelve, ten, and six page papers are printed and folded.

Referring to the said drawings and in detail, A and B represent two type-cylinders geared to run synchronously in opposite directions. Mounted vertically above and below the type-cylinder A are the impression-cylinders C and D, and vertically above and below type-cylinder B are similarly-arranged impression-cylinders E and F. Arranged horizontally on each side of each type-cylinder are suitable inking devices G G, which will thus ink the type-cylinders, so that the same will print in connection with each impression-cylinder. Two rolls of paper H and I are mounted at one side of the printing mechanism, as shown, so that two webs or a double web *a* and *b* may be drawn from said rolls H and I. The web *a* from the roll H is drawn down under roll 2 and then unites with web *b* from the roll I, and the double web thus formed passes over roll 3 and then between impression-cylinder C and type-cylinder A. From here the double web runs around roll 4, impression-cylinder E, thus in contact with type-cylinder B, and then overroll

5 to roll 6. At this point the web *a* is turned back over roll 7 into the reverser, hereinafter to be described, and is turned under web *b*. From the roll 6 the double web runs around the rolls 8 and 9 and impression-cylinder D, and thus again in contact with the type-cylinder A. From impression-cylinder D the webs are divided, the web *a* going up over roll 10 and across to roll 11, while the web *b* goes through a turner, then to roll 12, and then reunites with the web *a*. The double web then passes around impression-cylinder F and thus in contact with type-cylinder B, then around rolls 13 and 14 to the cutting or perforating cylinders J and K, and then by belts 15 and 16 to the cylinders 17 and 18. Arranged below said cylinders 17 and 18 is a switch N, of any of the usual constructions, which may be set to alternately switch the sheets to the former folders L and M, arranged back to back. Arranged below the formers are the presser-rolls of usual construction, and also cutting and folding cylinders, as shown, and as described at length in my companion application before referred to. The reverser consists of the roll 7, the two parallel forty-five-degree turner-bars 19 and 20, and parallel cylinder O. The web *a* is carried back over the roll 7, out over turner-bar 19, over parallel cylinder O, back in up over turner 20. This will simply place web *a* under the web *b* as the webs are then traveling and will not turn either web. The turner consists of the turner-bars 21 and 22, arranged at forty-five degrees to the travel of the web and at right angles to each other and of the parallel cylinder O. This turner is of the ordinary construction, and the same is used to turn web *b* over in the usual manner.

All the mechanism so far described is substantially the same as described and claimed in my companion application before referred to and will not be further described in this case, except to state that by using the same two oppositely-disposed eight or two oppositely-disposed six page papers may be printed and folded, or four four-page papers oppositely or not may be printed and folded at every revolution of the type-cylinders.

The requirements of modern newspaper-work rarely call for more than an associated

twelve-page paper. If a fourteen, sixteen, or larger paged paper is required, the best and the common way of producing the same is to run the press twice or to print parts of the paper on different presses, and to associate the products independently of the printing and folding mechanism.

The aim of this invention is to enlarge the capacity of the mechanism described in my former application, so that the same will produce also a twelve or ten page paper. To do this, I add another printing mechanism or a third web and associate the webs, as herein-after described. A preferred arrangement of these instrumentalities is shown, and the same consists of a printing mechanism mounted under that previously described. Of course a web previously printed could be associated with the other webs; but the preferred way is to print all the webs at the same time. My arrangement consists of the oppositely-running type-cylinders S and R and the impression-cylinders P and Q. A roll of paper H' is mounted on the same side of the machine as the rolls H and I, and a web c is drawn from the same. This web passes around roll 23 and impression-cylinder Q, and thus in contact with type-cylinder S, where one side is printed, then around roll 24 and impression-cylinder P, and thus in contact with the other type-cylinder R, where the second side is printed and the web perfected. From the impression-cylinder P the web c is carried around rolls 25 and 26 and brought into contact with or associated with web b. A slit 27 is mounted so that the same may be used in connection with the roll 26 for a purpose described to slit the web c. When the web c is used, webs b and c both go to the turner and here, as shown in Fig. 2, the webs b and c are both lead over the same, thereby web c is turned up over web b as the webs are then traveling, and thus the supplemental web c will issue from the printing mechanism between webs a and b. Sometimes it is not advisable to run all the webs between the impression-cylinder F and type-cylinder B, and when this is the case the web b or the webs b and c, as it happens, may be run out under impression-cylinder F, up over roll 28, and associated with web a on roll 14, as indicated in dotted lines in Fig. 1. It is evident, also, that the web c may be associated with web b at any point beyond impression-cylinder D, and also that the turner may be located at any point in the travel of the webs between impression-cylinder D and the folder.

The operation will now be described, and the case of a twelve-page paper will first be considered, and reference should be had to Fig. 5 to understand this operation. Fig. 5 shows at the top the disposition of plates on the cylinders developed into plan, and the left-hand column shows the first or leading part of the webs and the right-hand column shows the following or last part of the webs printed, and at the bottom of the figure is in-

dicated how the associated webs are folded. It may also be noted that when the webs come the second time in contact with the type-cylinders that the second set of plates on the type-cylinders will print on the webs over the pages previously printed by the first set of plates, and vice versa. Webs a and b are first presented to type-cylinder A, where pages two and eleven and eight and five are printed on web a. Then the webs are presented to cylinder B, and pages seven and six and one and twelve are printed on web b. Now the web a is next turned under web b, or the webs are reversed. The webs are again presented to cylinder A and pages eight and five and two and eleven printed on web b. The web c is now added. This web c as printed consists of oppositely-disposed four-page papers, which will form the second leaf of the product, or pages three and four and nine and ten. The webs b and c now pass through the turner, and this will place web c on top of web b, as the webs are then moving. Webs b and c now unite with web a, and web a is now presented to type-cylinder B, and pages one and twelve and seven and six are printed on the same. The associated product will now consist of oppositely-disposed twelve-page papers. The three webs are now led through the cutting or perforating cylinders J and K, which perforate the webs, then into the bite of the cylinders 17 and 18, which will pull the sheets from the webs, and these associated sheets are alternately switched to each former folder and oppositely folded, as indicated in Fig. 5. Thus two twelve-page papers are printed at every revolution of the type-cylinders. For a ten-page paper one of the webs is run half the width of the other webs and the half-width web is preferably the supplemental web c. When the web c is half-width, the operation is the same as when twelve-page papers are printed and may be easily followed by the diagram in Fig. 6. The product will be folded as shown in the bottom of the figure. Thus two ten-page papers can be printed at every revolution of the type-cylinders. To print an eight-page paper, the webs a and b only may be used, and the operation then will be the same as described in my application before referred to, or, again, a single web may be printed by the cylinders A and B and associated with web c to form alternately or regularly disposed eight-page papers. During either of the above-described operations of course the third web could also be printed and carried out of the press and thereafter handled as desired. When the product consists of papers all disposed the same way on the webs, the cylinders J and K are rendered inoperative, and the associated product led over the formers or a single former and the cutting mechanism under the formers is used, the folding mechanism being run at a slightly-decreased speed. This operation is set forth at length in my companion application before referred to. For the fast printing and

folding of six-page papers the folder is set as last described and all three webs are used. Web *c* is slit by the slit 27, and the web *a* and one-half of the web *c* is led over one former and the web and the other half of the web *c* is led over the other former. This operation may be easily followed by reference to Fig. 7 and results in four six-page papers at every revolution of the type-cylinders. A six-page paper can also be printed by running any two of the webs as a half-width web—as, for example, the webs *a* and *b*—and as described at length in my other application; also, the web *c* may be associated with a web printed on the cylinders A and B, either being half-width, as desired, and this product may be oppositely disposed or not, as desired, and may be folded by the folder. For a four-page paper one web may be run and printed, so as to form alternately-disposed papers or not, and the paper can be properly folded by the folder previously described. The preferred way to produce four-page papers is to run any two of the webs and then lead one web over one former and the other web over the other former, so as to print four four-page papers at every revolution of the type-cylinders. When webs *a* and *b* are the webs to be used in this operation, the manner of printing the same is described in my former application. In all cases where only two of the webs are being delivered to the folder described the third web could be printed and run outside the machine and thereafter handled, as desired. Thus six four-page papers could be printed at every revolution of the type-cylinders. When only one web is to be used in connection with type-cylinders A and B, the preferred arrangement is to lead a web, as at *d*, Fig. 1, over rolls 4, 6, 8, and 9 to the lower impression-cylinders, which are always set in register with each other. During this operation impression-cylinders C and E are moved away from the type-cylinders and two of the inking apparatuses G are thrown out. Thus I have invented a machine which will print and fold either two twelve-page, two ten-page, two eight-page, four six-page, or four four-page papers, as desired, for every revolution of the type-cylinders, and, further, the machine is one of single width, and the number of plates during the aforesaid operations is kept at a minimum.

Modifications of the arrangements herein shown may be made by a mechanic skilled in designing printing-press machinery without departing from the scope of my invention.

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

1. The method of perfecting and associating three webs, which consists in perfecting two webs or a double web, perfecting a supplemental web, bringing the supplemental web against one of the two webs, turning the latter and the supplemental web, and associating all three webs, whereby the supplemental web

will lie between the double web, substantially as described.

2. The method of perfecting and associating three webs, which consists in printing on the exterior surfaces of a double web, reversing the webs and printing on the then exterior surfaces of the double web, perfecting a supplemental web, and then associating the three webs, substantially as described.

3. The method of perfecting and associating three webs, which consists in printing on the exterior surfaces of a double web, reversing the webs and printing on the then exterior surfaces of the webs, perfecting a supplemental web, bringing the same in contact with one of the two webs, and turning the latter and the supplemental web, substantially as described.

4. The method of forming six-page papers and similar products, which consists in perfecting two webs, perfecting a third web, slitting the same and then leading the supplemental web in contact with one of said two webs, turning the latter and the supplemental web and associating one web and one part of the supplemental web and the other web and the other part of the supplemental web, and finally severing sheets from each associated web and part web to form the desired product, substantially as described.

5. The combination, with a printing mechanism adapted to perfect a double web and a supplemental printing mechanism adapted to perfect a supplemental web, of means for leading the supplemental web in contact with the double web, and a turner arranged to turn one part of the double web and the supplemental web, whereby the supplemental web will be disposed between the double web, substantially as described.

6. The combination, with a printing mechanism adapted to perfect a double web and a supplemental printing mechanism adapted to perfect a supplemental web, of a slit for said supplemental web, means for leading the supplemental web against the double web, and a turner arranged to turn one part of the double web and the supplemental web, substantially as described.

7. The combination, with a printing mechanism adapted to perfect a double web and a supplemental printing mechanism adapted to perfect a supplemental web, of a slit for the supplemental web, means for leading the supplemental web in contact with the double web, and a turner arranged to turn one part of the double web and the supplemental web, and two oppositely-arranged longitudinal folders, and means for leading one web and part of the supplemental web to each folder, substantially as described.

8. The combination of the type-cylinder A, having the coating impression-cylinders C and D, and the type-cylinder B, having the coating impression-cylinders E and F, the reverser arranged between impression-cylinders E and D, whereby two webs may be per-

fect, the turner arranged between cylinders D and F, the supplemental printing mechanism adapted to perfect a supplemental web, and means for directing the same to said turner, substantially as described.

9. The combination of the type-cylinder A, having the coacting impression-cylinders C and D, and the type-cylinder B, having the coacting impression-cylinders E and F, the reverser arranged between impression-cylinders E and D, whereby two webs may be perfected, the turner arranged between cylinders D and F, the supplemental printing mechanism adapted to perfect a supplemental web, means for directing the same to said turner, and a slitter arranged to slit said supplemental web, substantially as described.

10. The combination of the type-cylinder A, having the coacting impression-cylinders C and D, and the type-cylinders B, having the coacting impression-cylinders E and F, the reverser arranged between impression-cylinders E and D, whereby two webs may be perfected, the turner arranged between cylinders D and F, the supplemental printing mechanism adapted to perfect a supplemental web, means for directing the same to said turner, means for cutting said webs so as to form as-

sociated sheets, two oppositely-arranged folders, and a switch arranged to switch said sheets alternately to said folders, substantially as described.

11. The combination of the type-cylinder A, having the coacting impression-cylinders C and D, and the type-cylinders B, having the coacting impression-cylinders E and F, the reverser arranged between impression-cylinders E and D, whereby two webs may be perfected, the turner arranged between cylinders D and F, the supplemental printing mechanism adapted to perfect a supplemental web, means for directing the same to said turner, a slitter arranged to slit said supplemental web, and two oppositely-arranged folders, and means for directing one web and one part of the supplemental web to one folder and the other web and the other part of the supplemental web to the other folder, substantially as described.

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

LOUIS W. SOUTHGATE.

Witnesses:

FREDERICK B. HARLOW,
HENRY S. BACON.