

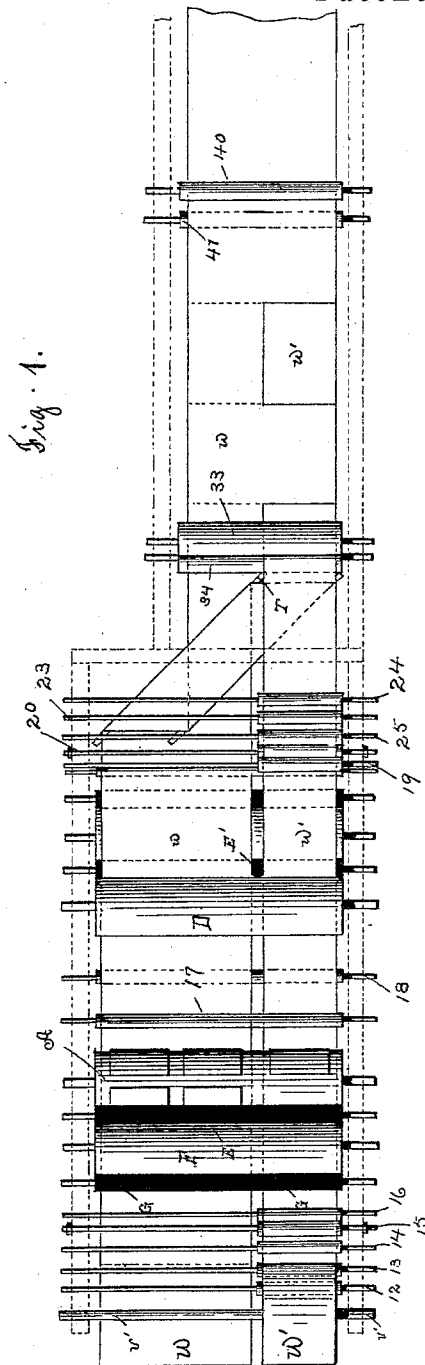
(No Model.)

5 Sheets—Sheet 1.

H. A. W. WOOD.
PRINTING MACHINE.

No. 571.850.

Patented Nov. 24, 1896.



Witnesses
Chas. F. Schuck
E. M. Healy.

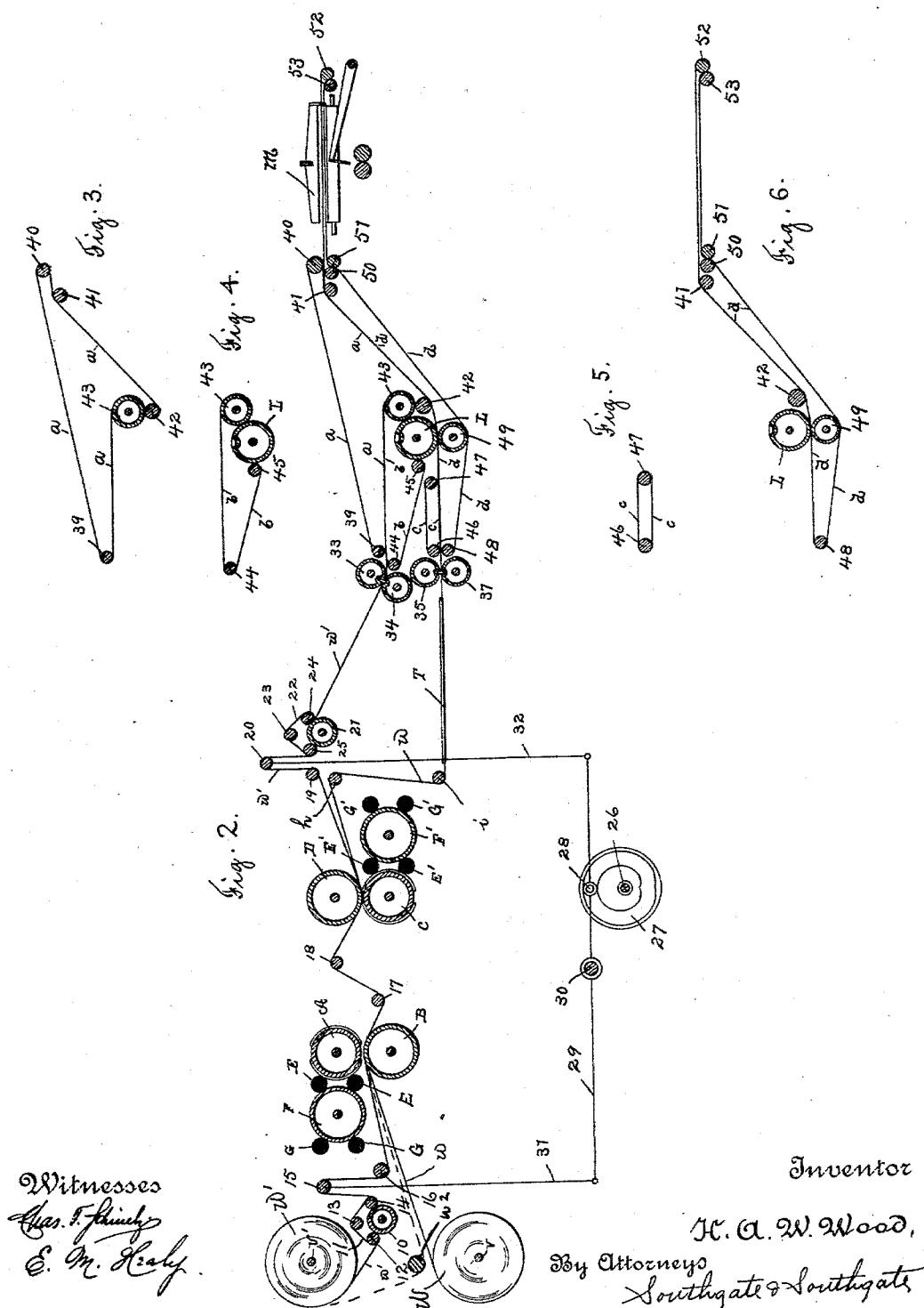
Inventor

H. A. W. Wood,
By Attorneys
Southgate & Southgate

5 Sheets—Sheet 2.

No. 571,850.

Patented Nov. 24, 1896.



(No Model.)

5 Sheets—Sheet 3.

H. A. W. WOOD.
PRINTING MACHINE.

No. 571,850.

Patented Nov. 24, 1896.

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Witnesses
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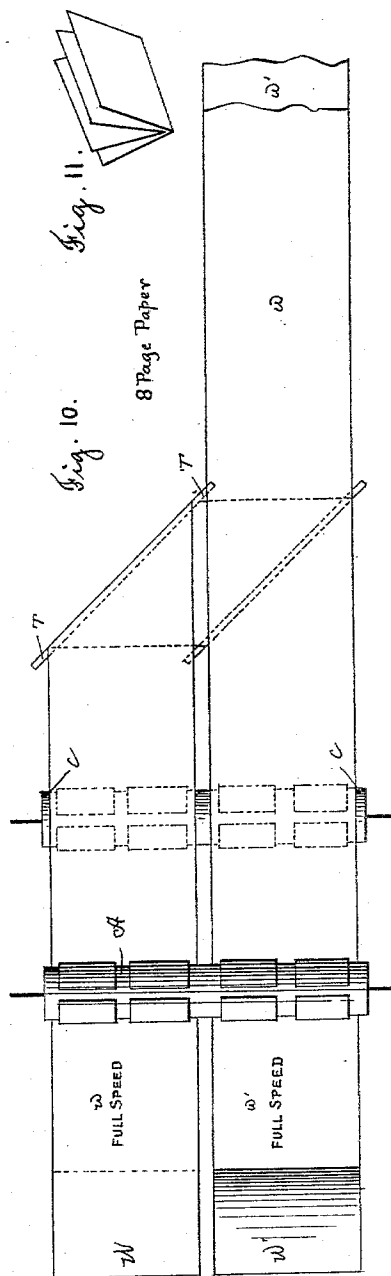
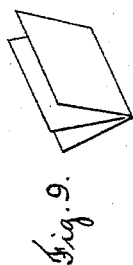
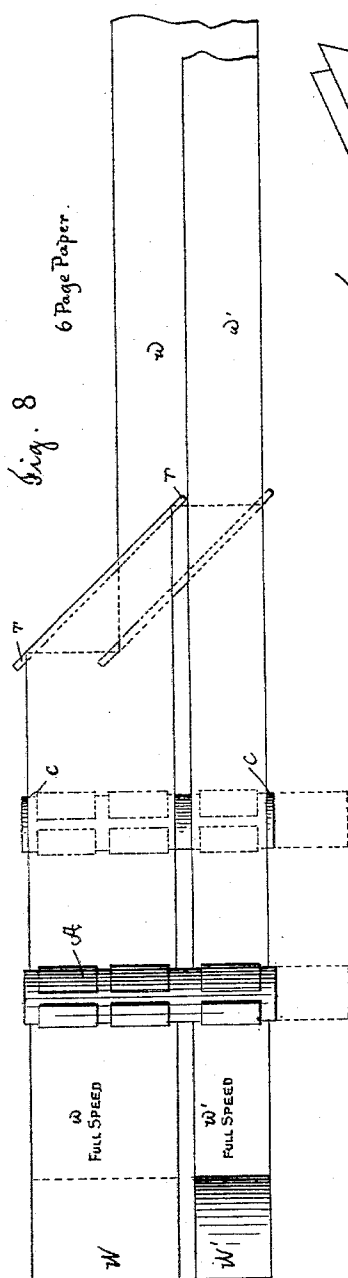
(No Model.)

5 Sheets—Sheet 4.

H. A. W. WOOD.
PRINTING MACHINE.

No. 571,850.

Patented Nov. 24, 1896.



Witnesses
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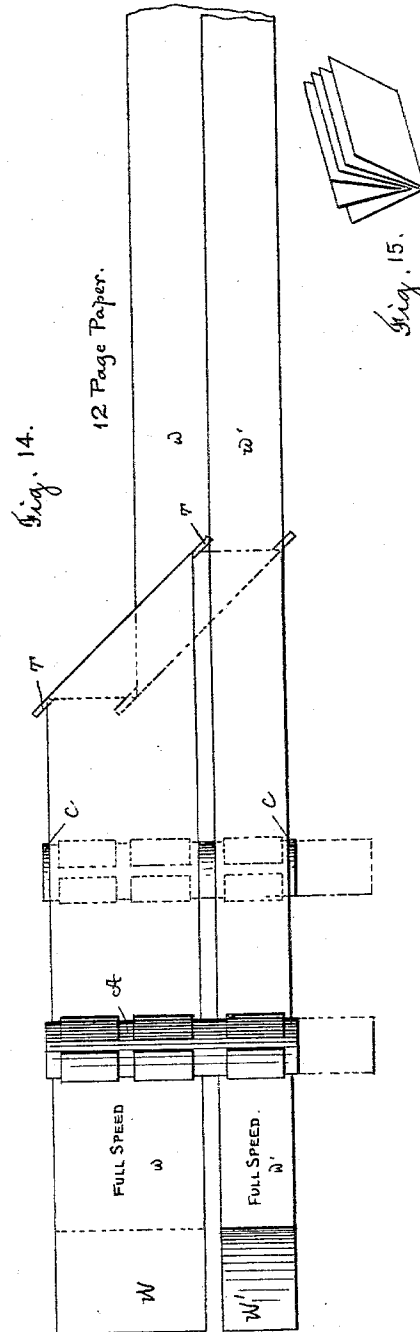
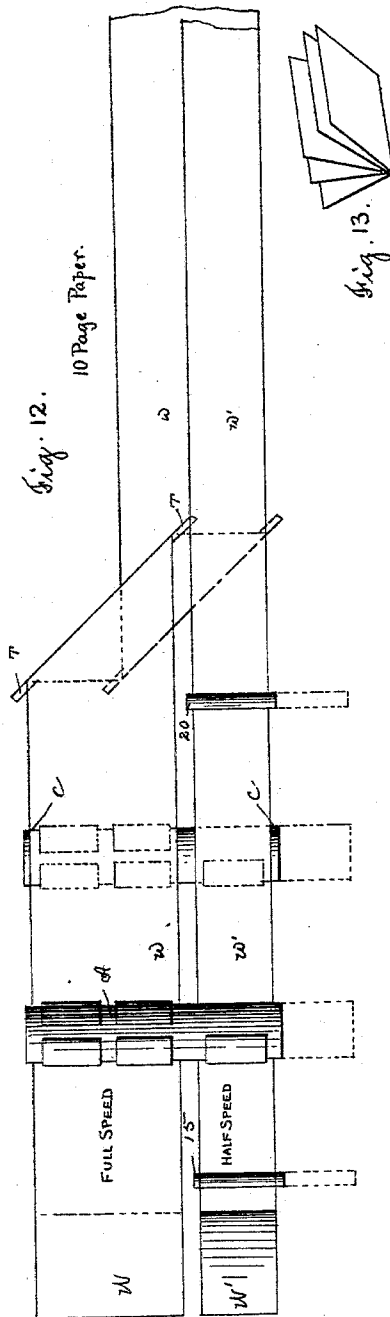
(No Model.)

5 Sheets—Sheet 5.

H. A. W. WOOD.
PRINTING MACHINE.

No. 571,850.

Patented Nov. 24, 1896.



Witnesses

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UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, N. Y., ASSIGNOR TO THE CAMPBELL PRINTING PRESS AND MANUFACTURING COMPANY, OF SAME PLACE.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 571,850, dated November 24, 1896.

Application filed June 20, 1894. Serial No. 515,128. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State

of New York, have invented a new and useful Improvement in Printing-Machines, of which the following is a specification.

My invention relates to a novel printing-machine for printing upon and manipulating a plurality of webs; and the especial object of my invention is to provide a simple printing mechanism from which a great variety of products can be obtained, as hereinafter described.

To these ends my invention consists of the parts and combinations of parts, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying five sheets of drawings, Figure 1 is a diagrammatic plan view of a printing-press constructed according to my invention, the parts being adjusted to produce a ten-page paper. Fig. 2 is a diagrammatic sectional view of the same. Figs. 3, 4, 5, and 6 are detail views of the tapes for handling and collecting the sheets. Fig. 7 is an enlarged detail view of the sheet-collecting mechanism. Figs. 8 and 9 are diagrammatic views illustrating the way a six-page paper is produced. Figs. 10 and 11 are diagrammatic views illustrating the way an eight-page paper is produced. Figs. 12 and 13 are diagrammatic views illustrating the way a ten-page paper is produced. Figs. 14 and 15 are diagrammatic views illustrating the way a twelve-page paper is produced, and Figs. 16 and 17 are diagrammatic views illustrating the way a fourteen-page paper is produced.

My invention consists in combining with a rotary press, which may be used to print a plurality of webs, means whereby one of the webs may be manipulated at a less speed than the peripheral speed of the printing-cylinders, the speed of the printing-cylinders remaining constant. By this arrangement, with the ordinary three-page-wide press, I can obtain four, six, eight, ten, or twelve page papers, and with a four-page-wide press I can obtain the above and also fourteen or sixteen page papers. A ten-page product is extremely

difficult to obtain with the present printing mechanisms that are in use, and also a fourteen-page product is one of the most difficult to get.

In the application of my invention to a three-page-wide press by running a full-width and a half-width web and by manipulating the half-width web or supplemental web at half speed and by collecting the same with two sheets from the main web I can obtain a ten-page product.

It is very desirable in presses to run the printing-couples at a constant speed, and I have devised, in combination with a press of this character, a novel feeding mechanism, whereby one of the webs will be alternately run and held stationary, so that only a portion of the periphery of the printing-cylinders will be utilized, whereby the press can be run at a constant speed and yet only a partial product delivered. By this arrangement I am enabled to obtain a ten-page paper in a three-page-wide press and also a fourteen-page paper in a four-page-wide press and still run the printing-couples at a constant speed. Further, the application of my invention in this manner leaves the press so that it can be used as an ordinary three-page-wide or four-page-wide press.

Referring to the drawings and in detail, A designates the first printing-cylinder, which is arranged in peripheral contact and coöperates with an impression-cylinder B, the printing-cylinder being provided with form-inking rollers E, to which ink is conveyed from the distributing-rollers F and G.

C designates the second printing-cylinder, having similar form-inking rollers E', which receive ink from the distributing-rollers F' and G', the printing-cylinder C engaging and coöperating with an impression-cylinder D for printing upon and perfecting the webs that are fed through the machine.

In the preferred arrangement of my improved printing-press I provide two webs, or a main web and a supplemental web, which are printed on and sheets therefrom associated to form the desired product.

From the web-roll W the main web *w* is led over and around the impression-cylinder B and between the same and the first printing-

cylinder A, down under and around the guide-roller 17, up over and around a guide-roller 18, the web being perfected between the second printing-cylinder C and its impression-cylinder D. From the second printing-couple the main web passes up over and around a guide-roller *h*, down under and around a guide-roller *i*, over and around suitably-arranged turner-bars T, between the cutting or perforating cylinders 35 and 37, from whence the web is fed between suitable tapes for feeding and associating the product of the two webs, as hereinafter described. From a second web-roll W' a supplemental web *w'* is led over and around a constantly-running feeding-in roller 10, which coöperates with suitable endless tapes 11, the tapes 11 passing over the tape-rolls 12, 13, and 14. From the feeding-in roller 10 the supplemental web *w'* passes up over and around a looping-in roller 15, down under and around a guide-roller 16, through the first printing-couple formed by the printing-cylinder A and its impression-cylinder B, down under and around the guide-roller 17, up over and around the guide-roller 18, and is perfected between the second printing-couple formed by the printing-cylinder C and its impression-cylinder D. From the second printing-couple the supplemental web *w'* passes under and around a guide-roller 19, up over and around the looping-out roller 20, down over the constantly-running feeding-out roller 21, which coöperates with endless feeding-out tapes 22, which pass over the tape-rollers 23, 24, and 25. From the feeding-out roller 21 the supplemental web *w'* passes down through the cutting or severing cylinders 33 and 34 and is fed into or received by the tapes for delivering and associating the two products, as hereinafter described.

The feeding-in looping-roller 15, as shown most clearly in Fig. 2, is journaled in pitmen 31, and the looping-out roller 20 is also journaled in similar pitmen 32, the pitmen 31 and 32 being connected to opposite ends of levers 29, which are mounted on a transverse shaft 30.

The feeding-in and the feeding-out rollers are positively actuated up and down by means of cams 27, mounted on a shaft 26 and engaging and actuating rollers 28, carried by the levers 29.

The cam-shaft 26 may be actuated by any of the ordinary forms of gearing and is arranged to make turn for turn with the printing-cylinders.

The constantly-running feeding-in roller 10 and the constantly-running feeding-out roller 21 may be driven by any suitable form of gearing (not necessary here to show or describe at length) and are arranged to turn at one-half the peripheral speed of the printing-cylinders.

As shown most clearly in Figs. 1 and 12, those portions of the printing-cylinders A and C which print upon and perfect the supplemental web may be provided each with a sin-

gle form, which extends substantially around one-half of the circumference of the printing-cylinders. It will thus be seen that the printing-cylinders, as arranged to print upon a supplemental web, engage and print upon the web during substantially one-half of their revolution and leave the web disengaged during the remainder of their revolution, or, in other words, the supplemental web is only in impression during one-half of the revolution of the printing-cylinders, there being an impression interval and a non-impression interval during each revolution.

The constantly-running feeding-in rollers and the looping-in rollers for the supplemental web are proportioned so that the supplemental web fed into the press is taken up by the looping-roller, and the supplemental web through the printing-press is withheld during a non-impression period and is advanced by the combined action of the looping-rollers and the constantly-running feeding-rollers at the same peripheral speed as the printing-cylinders during the impression interval; and it follows, therefore, that while two imprints will be made in the length of the main web *w* a single imprint will be made on the supplemental web *w'*.

Referring now to the arrangement of the devices for associating and delivering the product from the press, it will be seen that the supplemental web *w'*, after passing the cutting-cylinders 33 and 34, is fed into and between the constantly-running tapes *a* and *b*. The tapes *a* and *b* move at the same speed as tapes *c* and *d* for the main web, and the sheets cut from the supplemental web *w'* will be accelerated, a space along the tapes alternating with each printed sheet, the sheets from the web *w'* being fed by the tapes *a* and *b* to a suitable collecting-cylinder L. As shown most clearly in Fig. 3, the endless tapes *a* pass over the guide-roller 39, over and around a guide-roller 43, under and around a guide-roller 42, over a guide-roller 41, over and around a guide-roller 40, and complete their travel back to the guide-roller 39. As shown in Fig. 4, the endless tapes *b* pass from the guide-roller 44 over and around a guide-roller 43, over the collecting-cylinder L, under and around a guide-roller 45, and complete their travel back to the guide-roller 44. The main web *w*, after passing the cutting-cylinders 35 and 37, as before described, is led between the constantly-running tapes *c* and *d*, and the sheets from the main web *w* are led to the collecting-cylinder L. As shown in Fig. 5, the endless tapes *c* pass around the tape-pulleys 46 and 47. As shown in Fig. 6, the endless tapes *d* pass from the tape-roll 48 under the collecting-cylinder L, under and around a guide-roller 42, over and around a guide-roller 41, over and around the tape-roller 52, over the tape-roller 53, down between the tape-rollers 51 and 52, down and under the guide-roller 49, and complete their travel back to the roller 48.

To insure the printed sheets being properly placed upon and delivered by the endless tapes, I provide suitable small guides *g*, as shown most clearly in Fig. 7.

5 The collecting-cylinder *L* is provided with the usual gripping devices and with the usual oscillating stripping-fingers *N*, as most clearly shown in Fig. 7, and when a ten or fourteen page product is desired the collecting-cylinder *L* is preferably arranged to collect two of the printed sheets from the main web *w* and to associate the same with a single printed sheet from the supplemental web *w'*. From the collecting-cylinder *L* the associated sheets 10 are fed up between the tapes *a* and *d*, and are brought into position to be engaged by any suitable form of folding device, as shown at *M*.

By the mechanism before described it will be seen that the two webs can be led in position, one over the other, and sheets from each web can be associated from sheets cut from the other web.

Suppose now that, as before described, my press is made three pages wide. Then I can obtain two four-page papers for each revolution of the printing-cylinders in the ordinary way, and when four-page papers are thus produced the supplemental web is not led into the press, nor are plates put upon the portions of the printing-cylinders which print the supplemental web.

I can obtain a six-page paper by running the main web and supplemental web both at full speed and simply associating the two webs, as shown in Figs. 8 and 9, when the product will be two six-page papers for each revolution of the printing-cylinders.

I can obtain an eight-page paper by running the press simply with the main web and associating two four-page papers, when the product will be one eight-page paper for each revolution of the printing-cylinders.

I can obtain a twelve-page paper by running the main web and the supplemental web at full speed, associating the two webs to form six-page papers, and collecting the two six-page papers to form the twelve-page paper, as shown in Figs. 14 and 15. Of course, instead of running separate full-width and supplemental webs through the press at full speed, as indicated in Figs. 8 and 14, a single web of a width equal to that of the main web plus that of the supplemental web can be run through the press and slit into sections of the desired width in the ordinary way. These are the only products that can be obtained with the ordinary three-page-wide press, and it will be seen that it leaves the ten-page paper out.

60 Now it is extremely desirable to make a marketable press three pages wide, so that the same will deliver a ten-page product.

As before described, when the supplemental web is used the same will be led into the press without passing through the web-manipulating mechanism; that is, the web *w'* will be led

from the web-roll *w'* over a roll or guide *w''*, and thence through the press over the same rolls as the main web *w*, and the two webs will be associated in the associating device, the supplemental web then not passing to the cutting-cylinders 33 and 34, which turn at half the peripheral speed of the cutting-cylinders 35 and 37; but now, if a ten-page product is wanted, the supplemental web *w'* is led through its feeding mechanism and then to the cutting-cylinders 33 and 34. By this arrangement the supplemental web will be fed into and out of the press at one-half the speed of the main web, the web alternately standing still and running between the guide-rollers 16 and 19, and in this arrangement only one plate being put on the printing-cylinders to print on the supplemental web, as shown in Fig. 12, which shows the arrangement of press, and Fig. 13, the product obtained thereby. Sheets are then cut from the supplemental web by the cutting-cylinders 33 and 34, and these sheets are associated with two sheets cut from the main web. By this means a ten-page product can be obtained and still leave the press in its ordinary shape. This is a very desirable arrangement.

Again, if my invention should be applied to a press four pages wide, the supplemental web being the same width as the main web, the two webs could be run together at full speed, and two eight-page products could be obtained for each revolution of the printing-cylinders, as shown in Fig. 10, or, again, two eight-page papers could be associated to form a sixteen-page paper. Of course instead of two webs two pages wide a single web four pages wide could be run through this arrangement of press and such web slit into two sections to be manipulated as above described. A ten-page paper could also be obtained in a four-page-wide press by running the same as shown in Fig. 12, and, further, a fourteen-page paper could be obtained by organizing the press as shown in Fig. 16, which shows how the press is arranged, and Fig. 17, the product thereof. In this case a three-page-wide web is run at full speed and is associated and collected to form twelve-page papers, and a supplemental web is run at half-speed and one sheet therefrom is associated with the twelve-page papers to form the fourteen-page product. By this means the ordinary four-page-wide press can be arranged to produce a fourteen-page product and the printing-cylinders run at a constant speed. A slitter *Z* and a supplemental turner-bar *T* are used in this arrangement, as shown in Fig. 16.

Of course any web associating or collecting mechanism could be used, and of course as many plates may be used on the printing-cylinders either axially or circumferentially as desired, and the two webs run at any desired relative speed in the further carrying out of my invention.

In some cases it may be desirable, when

both webs are run at full speed, as in the arrangements shown in Figs. 8, 10, and 14, to use one wide web instead of two.

Again, any kind of a suitable web-manipulating mechanism that will withhold the supplemental web during the non-impression period can be used without departing from the spirit of my invention.

Again, when the supplemental web-manipulating mechanism is not used the same can be thrown out of gear, if so desired.

My invention of course is applicable to any form of rotary web-printing press.

In the particular devices chosen to illustrate my invention I have shown presses arranged with the columns running around the same. This is the preferred but not the necessary way to carry out my invention, as my invention can be used as well in a press in which the columns are arranged parallel with the axes of the cylinders. Therefore I do not wish to limit my invention in any sense to the details herein shown and described, as the same may be varied and arranged by the ordinary printing-press designer in many different ways 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 with a rotary web-printing press capacitated to print upon a plurality of webs, and in which the cylinders run at a constant relative peripheral speed, means for withholding one of the webs during a part of the revolution of the cylinders, and guiding devices arranged so that another web can be led through the press at the peripheral speed of the cylinders, substantially as described.

2. The combination with a rotary web-printing press in which the cylinders run at a constant relative peripheral speed, of guides whereby one web may be led through said press continuously, at full speed, and web-manipulating mechanism whereby another web may be led through said printing mechanism at full speed for one-half a revolution of the printing-cylinders, and withheld for the other half of the revolution of the printing-cylinders, substantially as described.

3. The combination with a rotary web-printing press of guides for leading a web continuously through said printing mechanism at full speed, a web-manipulating mechanism for another web arranged to allow the same to run alternately at full speed, and then to stop the same for each half-revolution of the printing-cylinders, and a collecting or associating mechanism for collecting or associating the product of the two webs, substantially as described.

4. The combination with a printing-machine adapted to print upon a plurality of webs, of a web-feeding device adapted to alternately advance and withhold one only of the webs, substantially as described.

5. The combination with a web-printing machine adapted to print upon a plurality of webs, and through which one or more webs may be run at full speed, of a web-feeding mechanism adapted to alternately advance and withhold one of the webs, and means for associating or collecting the product of the webs, substantially as described.

6. The combination with a web-printing press adapted to print upon a plurality of webs, and through which one or more of the webs can be run at full speed, of suitable guides, and a web-feeding mechanism arranged so that one of the webs can be run either at full speed, or so that the same can be alternately advanced and withheld by the feeding mechanism, substantially as described.

7. In a printing-machine, the combination of a web-guiding mechanism for a main web, a continuously-operating feeding-in device for a supplemental web, a continuously-operating feeding-out device for the supplemental web, and looping-rollers for withholding the supplemental web during a non-impression period, and for advancing the same during an impression period, substantially as described.

8. The combination of a printing-machine, feeding-in and feeding-out devices for a supplemental web, adapted to feed the web at substantially one-half the speed of the main web, means for withholding the supplemental web during a non-impression period, and for advancing said web during an impression period, with guides, whereby a main web can be run at full speed through the machine, substantially as described.

9. In a printing-machine, the combination of a web-guiding mechanism for a main web, constantly-running feeding-in and feeding-out devices for advancing a supplemental web at one-half the speed of the main web, and looping-rollers for intermittently feeding the supplemental web through the printing mechanism, substantially as described.

10. In a rotary printing-machine, the combination of a printing and impression cylinder for printing upon two webs, means for constantly advancing one web, and means for withholding the second web during a non-impression period, and for advancing the same during an impression period, substantially as described.

11. In a printing-machine, the combination of printing-cylinders and impression-cylinders for printing upon and perfecting two webs, means for constantly advancing one of the webs, means for withholding the second web during a non-impression period, and for advancing said web during an impression period, and means for associating the products of the webs, substantially as described.

12. In a rotary printing-machine, the combination of printing and impression cylinders for printing upon and perfecting two webs, means for constantly advancing one of

the webs, and means for intermittently advancing the second web through the printing mechanism, substantially as described.

13. In a printing-machine, the combination
5 of printing and impression cylinders for printing upon and perfecting two webs, one web running constantly through said printing mechanism, with constantly-running feeding-in and feeding-out mechanism for advancing a supplemental web at one-half the
10 speed of the main web, and means for intermittently feeding the supplemental web through the printing mechanism, substantially as described.

14. In a printing-machine, the combination
15 of printing and impression cylinders for printing upon and perfecting two webs, constantly-running feeding-in and feeding-out devices for a supplemental web, looping-roll-
20 ers for withholding the supplemental web

during a non-impression period, and for advancing said web through the printing mechanism during an impression period, and means for associating the products of said webs, substantially as described.

15. In a printing-machine for printing upon
25 and perfecting two webs, the combination of a web feeding and guiding mechanism for a supplemental web adapted to feed the supplemental web to and out of the printing
30 mechanisms at one-half the speed of the main web, and a mechanism for collecting sheets cut from said webs, substantially as described.

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

II. A. WISE WOOD.

Witnesses:

LOUIS W. SOUTHGATE,
EDWARD C. MANNERS.