

H. F. BECHMAN.

PRINTING PRESS.

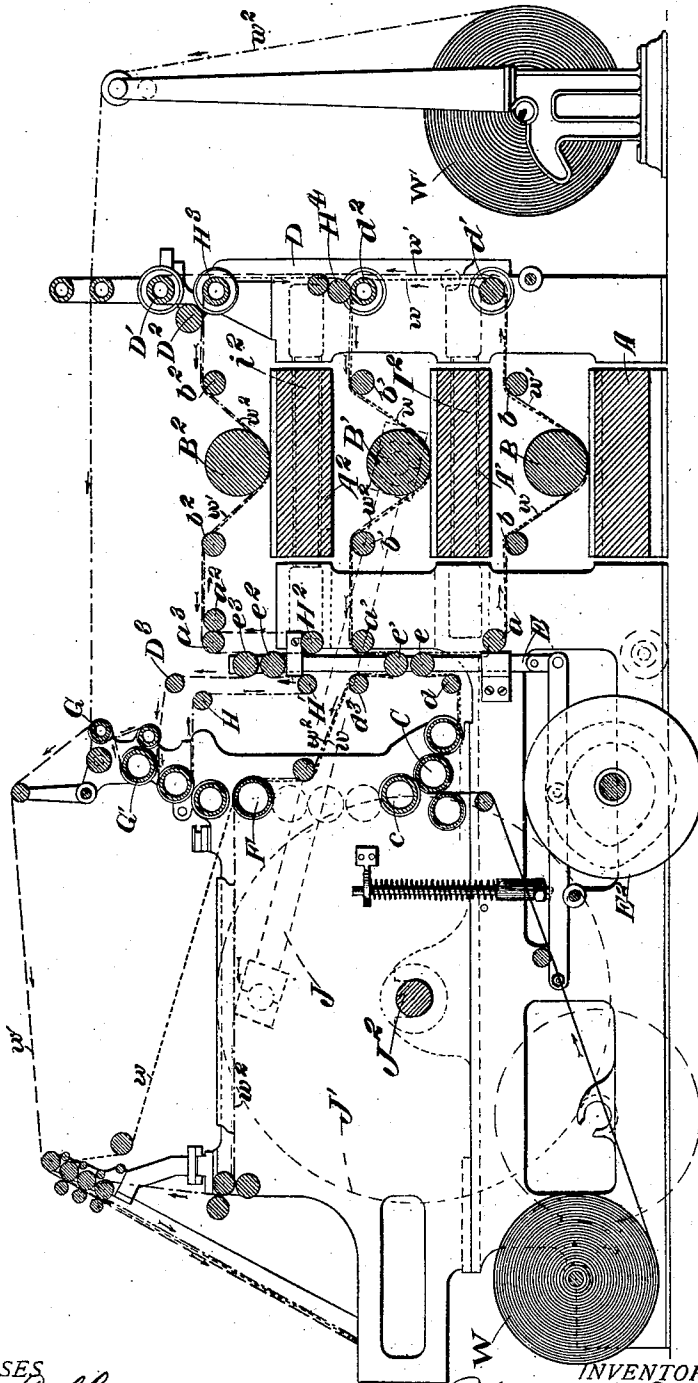
APPLICATION FILED MAY 21, 1903.

969,514.

Patented Sept. 6, 1910.

3 SHEETS—SHEET 1.

Fig 1



WITNESSES
C. Edward Ruffey
James Mansfield.

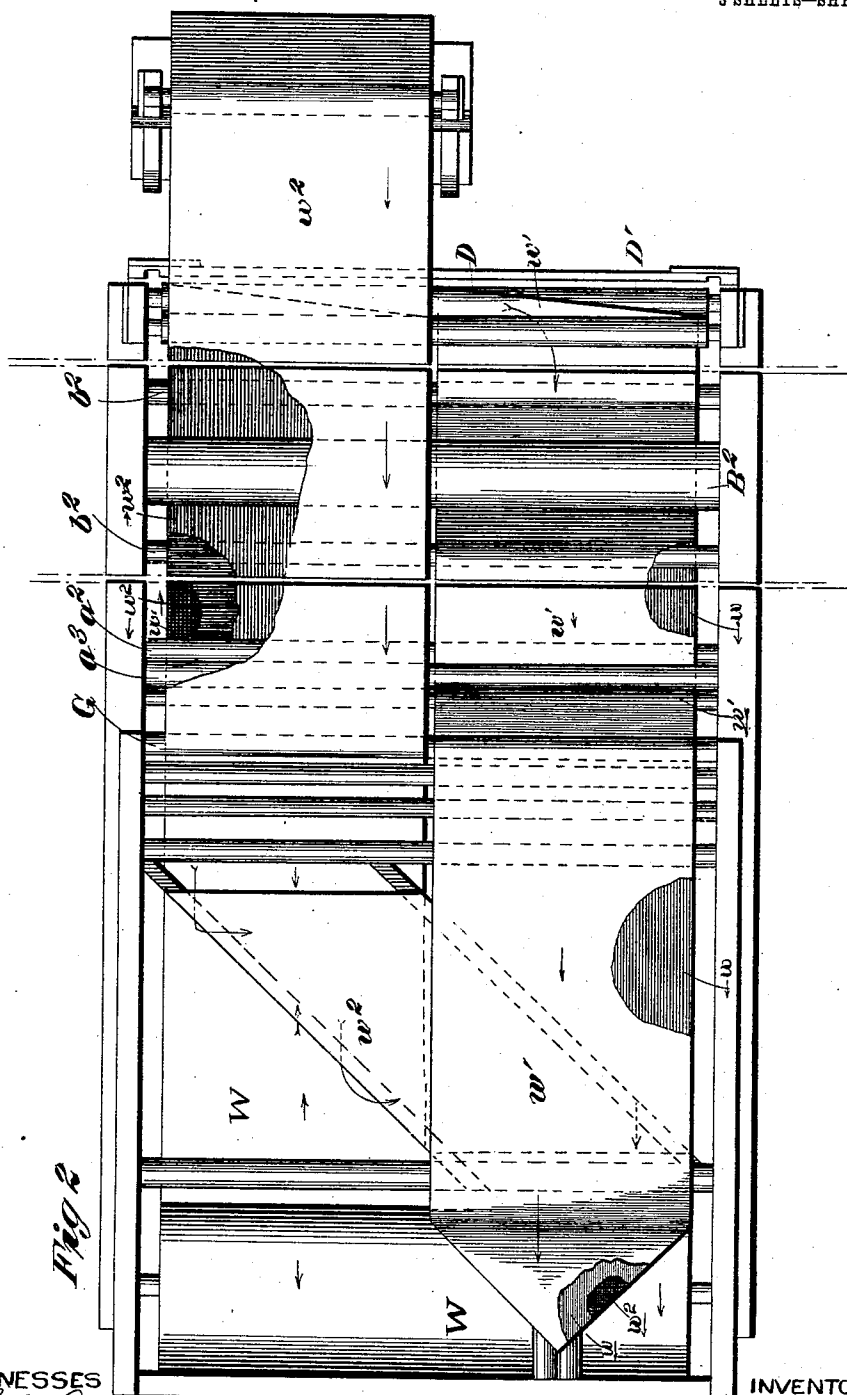
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3 SHEETS—SHEET 2.



WITNESSES

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INVENTOR

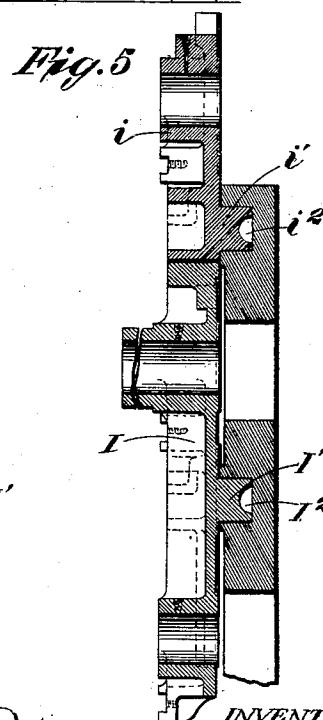
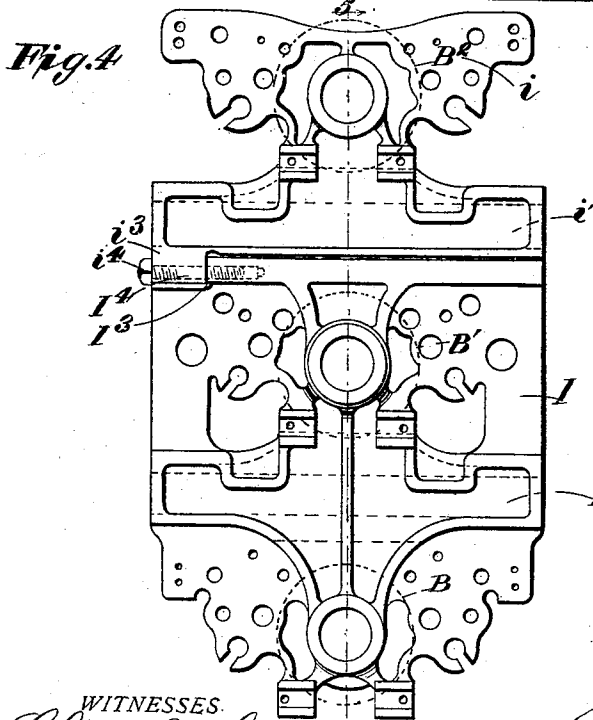
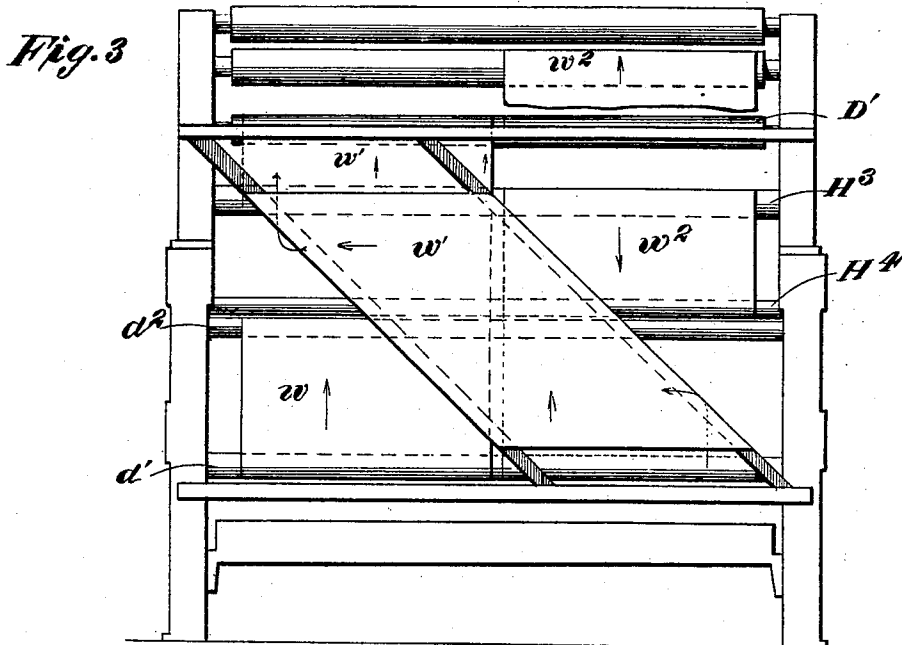
Henry F. Bechman
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3 SHEETS—SHEET 3.



WITNESSES.
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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.

PRINTING-PRESS.

969,514.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed May 21, 1903. Serial No. 158,148.

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.

This invention is an improvement in stationary-bed traveling cylinder web perfecting presses, of the "Cox-duplex" type, such as shown in the Patent to Jos. L. Cox, No. 478,503 of July 5, 1892.

The object of the present invention is to provide such a press with a third printing couple located above and parallel with the other beds and cylinders, and capable of being used conjointly therewith to print a large newspaper, or of being placed out of operation when it is desired to print a smaller paper. By the employment of this upper extra bed and cylinder the size of the newspaper which can be printed on an ordinary duplex press can be increased one half, and produced in the same time that the ordinary sized paper can be produced. This improvement adds materially to the utility and productiveness of the machine, largely increases its capacity for work, and renders it capable of producing any size of news papers up to 12 pages, at each operation.

The essential features of the invention and the novel parts and combinations thereof for which protection is desired will be summarized in the claims, and are fully understood from the following explanation, and accompanying drawings.

Figure 1 represents a diagrammatical longitudinal vertical section through the complete machine, showing the arrangement of beds and cylinders, and web feeding and guiding mechanism. Fig. 2 is a broken top plan view of Fig. 1. Fig. 3 is an end view. Fig. 4 is an enlarged side elevation of one of the cross heads, and Fig. 5 a detail vertical section on line 5—5 Fig. 4.

A, A', A² designate three type beds located above one another in three superposed parallel planes; coacting with each type bed is a cylinder B, B', B² which are journaled in reciprocating cross heads mounted in guides on the opposite side frames of the press, said cross heads carrying web guide

rollers *b*, *b'*, *b*² on opposite sides of each cylinder, and suitable inking mechanism, (not shown) as commonly used in these presses.

The main web comes from a roll *W* passes through the feed rolls or devices *C*, in passing which it is longitudinally divided by a slit *c*, it passes then under a stationary guide *d*, up over a looping roller *e*, down under a fixed guide *a*, over rollers *b*, under cylinder *B*, to a guide and coaxing roller *d'* at which point the two portions *w*, *w'* of the main web separate. The part *w* of the web passes up over a guide and coaxer roller *d*² back over rollers *b'* and under cylinder *B'* to a stationary guide *a'* thence down under a looping roller *e'*, over a stationary guide *d*³, and thence over suitable guides to and between the delivery rolls or devices *F*, from whence it passes to the folding mechanism. The part *w'* of the main web passes from roll *d'* onto a deflector which may be composed of angle bars or rolls *D D* by which it is brought back above and in line with the part *w*, but passes up to and over a stationary guide and coaxing roll *D'* parallel with and above roll *d*², thence it passes under guide *D*² to and over guides *b*² and under cylinder *B*² to a stationary guide *a*³, down under a looping roller *e*³, over a stationary guide *D*³, to the delivery rolls *G*, *G'*, or other suitable delivery mechanism, by whence it passes over suitable guides to the folding mechanism.

The web *w*² comes from a second roll *W'*, conveniently located at the front end of press, or elsewhere if desired, and passes over suitable guides above the top bed and cylinder to the rolls *G*, *G'*, at one side of web *w'*, passing rollers *G* oppositely to web *w'*, so that the two webs are fed oppositely by the rollers, as indicated in drawings. Thence web *w*² passes over guide *H*, under stationary guide *H'* up over looper *e*², down under guide *H*² up over guide *a*², to and over guides *b*² under cylinder *B*², to and over a coaxer *H*³ above and parallel with roller *d*² down under guide *H*⁴ back to and over rollers *b'* and under cylinder *B'* to guide *a'* down under looper *e'* over guide *d*³ to delivery rolls *F*, as shown in the drawings.

From the foregoing description and drawings it will be noted that the webs *w*, *w'*, lie side by side and move in same direction over

bed A and under cylinder B, receiving the first impressions from forms on bed A. That web w is then returned directly between the cylinder B' and bed A' receiving perfected impressions from type on bed A, and passes thence to the delivery, this being the course of the web in the ordinary two-high bed and cylinder Cox-duplex press. It will also be seen that the web w' after being first impressed on bed A, is perfected by cylinder B² on bed A², (web w' being deflected so as to come over the length of web w overlying bed A',) web w' being printed on beds A, A². It will also be noted that web w^2 is first printed from forms on bed A² by cylinder B², passing between said cylinder and bed in a direction opposite to the web w' , but running beside the latter; web w^2 is then perfected from forms on bed A' by cylinder B', running between said bed and cylinder beside and in the same direction as web w .

Web w^2 is fed into the press by the same mechanism which feeds out web w' , and for this purpose it is preferable to make the part of rolls G which feed in web w^2 , very slightly less in diameter than the part which feeds out web w' , or to so construct the combined feeding and delivery mechanism that the web will be fed out sufficiently fast to keep it taut, and fed in sufficiently fast to supply the demands of the press. Further web w^2 is fed out and delivered by the same mechanism and at the same speed as web w .

The several looping rollers e, e', e^2, e^3 , may all be mounted on the same equalizer bars and moved synchronously by the cams E², such as are employed in the ordinary duplex presses. The feeding and delivery mechanisms correspond in construction and functions with those of said duplex presses and are such that the webs are continuously fed to and delivered from the printing mechanism, while the portions thereof extending between the beds and cylinders are momentarily stopped during the actual printing periods, as described in said Cox's patent.

The two lower cylinders A, A', are journaled in cross-heads I having internal ribs I' guided in ways I² on the side frames of the press, and reciprocated by means of pitmen J connected to crank wheels J' on the main drive shaft J² as in the ordinary duplex press. The upper cylinder B² is journaled in cross-heads i having internal ribs i' guided in ways i^2 on the sides of the press above bed A' and parallel with guide ways I². The cross-heads I, i , might be integral, but I prefer to make them separate and provide means for rigidly but detachably connecting them, so that when connected they will reciprocate as one, and the necessity for extra driving mechanism for the upper cylinder be avoided.

As shown the cross-head i is provided

with a depending lug i^3 , which fits a recess I³ in the adjacent cross-head I; a stud I⁴ is rigidly secured to this cross-head I and passes through the lug i^3 and is bound thereby by a nut i^4 , (see Fig. 4). This forms a simple rigid connection between cross-heads I, i , while permitting ready detachment or separation thereof. This lug i^3 is on the end of the crosshead nearest the drive wheels, and is put in this place because the greatest load when reversing comes on the fast center, and with the lug in this position, the strain of the load does not come on the stud. The load on the stud occurs when press is passing over the slow center, and the strain is very light as compared with that of reversing.

When it is desired to print only a small, or eight page paper, the cross-heads i can be disconnected from cross-heads I, after being moved out to the farthest position to the right, and the upper cylinder will then remain idle during the operation of the others, the press then being threaded and operated as an ordinary duplex press.

To recapitulate briefly, the operation of the press is as follows,—when printing a twelve-page paper, the main web is 70 inches wide—which is the width of the ordinary eight-page roll. This web, however, is split when passing through the lower feed rolls, as shown, and of course passes through the lower printing couple as two independent webs. After passing the lower printing couple, both webs pass under coaxer roll marked d' . At this point, the two webs separate, one w passing over guide d^2 , on the drive side of press, and through printing couple on middle bed, then through the equalizers to the delivery in the usual manner. Now, going back to where the webs separate at d' , the web w' on plain side of press passes over angle-bars, and over coaxer roll D', and through printing couple on top bed, on drive side, and then on through the top equalizer and into the upper delivery.

The four pages which are printed on the lower bed, are "backed up" on the middle and upper beds, that is, the opposite sides are printed on the middle and top beds. This is done in order to run the four-page web from paper roll W on the plain side of press—a straight-line run—without passing over any angle-bars until after passing into the folder.

The first printing on the four-page web w^2 from paper roll W' is done on the top bed, on plain side of press, after which it passes over coaxer roll H², and down and under coaxer roll H⁴, and then through printing couple on middle bed, on plain side of press, and then through the equalizers in the usual manner, and into the upper delivery.

The rolls G have two sizes. This is necessary in order to have a little more speed on drive side of press to comb the web after passing through the printing couples, and be of proper size to feed the right amount of paper on the plain side of press.

The upper cross-head, which carries the upper cylinder, may be detached from the main cross-head, which carries the two lower cylinders. When thus detached, only the two lower beds are used, as when printing eight pages, or less.

When changing from a twelve-page paper to a ten-page paper, it will only be necessary to use a 53 inch roll instead of the 70 inch, and run through in the manner heretofore described, having the narrow portion of the web, after being split at lower feed rolls, on drive side of press, and the two-page width on plain side. This narrow web should pass through the lower and middle printing couples, and when folded, the narrow sheet is between the two four-page sheets. This is done for the purpose of keeping the narrow sheet in place, and when the paper is opened it will not leave the position in which it was placed by the folder.

It is preferable to superimpose the two halves of the wide web and print same, one on the middle bed and the other on the upper bed. This is done to avoid turning the web w^2 completely over, for if the web were turned completely over, it would be necessary to turn so many angles that it would make it dangerous for web shifting in the printing couples, and especially where the web has to be shifted intermittently. It would be easy to do if the web at this point was continuously running, but it is very difficult to do with an intermittently shifting web.

Color printing may also be done on this machine, and more colors used than on the eight-page duplex press. For instance, the narrow, or, as it is commonly called, four-page web, which is printed on the plain side of press, after passing through upper feed rolls, is passed around roll H, and H', over equalizer roll e^2 , and around roll H², up and over roll a^2 , over roll b^2 , under cylinder B², over roll b^2 , over roll H³, under H⁴, and over b' , under cylinder B', over b' , and over a' , around e' , over d^3 , and into the delivery rolls F, then in the usual manner around the angle-bars and up to the top of the former, and then, instead of going into the folder, is carried back to the feed rolls C, on drive side of press, led therethrough, and then passed in the usual manner through the first printing couple A, B, then around coaxer rolls d' and d^2 , through the second printing couple B' A', over the equalizers or looping rollers, to the delivery rolls and back in the usual manner to the top of the former, and down into the folder. It will be observed

from the foregoing description, that this particular web passes through two of the printing couples four times—two on plain side and two on drive side of press. Meanwhile, a four-page roll is placed in the machine, on plain side of press, and is printed in first printing couple, on lower cylinder B, then passed around d' , and around the angle-bars, and up over coaxer roll D', and through the upper printing couple on drive side of press, then passed over the equalizers or looping rollers to the delivery rolls G, and is assembled with the first web at top of former, this method of threading the webs will produce an eight-page paper in colors.

The invention is not restricted to the mechanical embodiment thereof illustrated in the drawings, nor to the particular construction of printing couples, or feeding and delivering mechanism, and

Having thus fully described and explained its essential features and parts, what I claim and desire to protect by Letters Patent is:

1. In a printing press, three printing couples, arranged one above the other in parallel planes with means for feeding three webs through the couples so that they shall be perfected thereby, each couple acting upon two of the webs, substantially as described.

2. In a printing press, three printing couples, arranged in parallel planes, and means for guiding three webs through the press, one web being perfected by the first and second couples, a second web by the first and third couples, and a third web by the third and second couples, substantially as described.

3. In a printing press, the combination of three printing couples, each comprising a bed and a co-acting cylinder, with means for feeding three webs through the couples to be perfected thereby, each couple acting upon two of the webs.

4. In a printing press, the combination of three printing couples, each comprising a bed and co-acting cylinder arranged in parallel planes, and means for feeding three webs through the press, one web being perfected by the first and second couples, the second web by the first and third couples, and the third web by the third and second couples, all substantially as described.

5. In a printing press, the combination of three stationary type beds, a traveling cylinder co-acting with each bed, means for reciprocating the cylinders, means for guiding webs of paper between the first and second beds and cylinders; means for guiding webs of paper between the first and third beds and cylinders, and means for guiding webs of paper between the second and third beds and cylinders, substantially as described.

6. In a printing press, the combination of three stationary parallel type beds arranged one over the other, a traveling cylinder co-acting with each bed, means for simultaneously reciprocating the cylinders, means for guiding a web of paper between the first and second beds and cylinders, means for guiding a web of paper between the first and third beds and cylinders, means for guiding a web of paper between the second and third beds and cylinders, whereby one, two or three webs may be perfected, and means for throwing one cylinder out of operation when a third web is not printed, substantially as described.

7. In a printing press, the combination of three printing couples arranged in parallel planes, means for feeding a wide web and for slitting said web into two parts before reaching the printing mechanism, means for leading one portion of the split web between two of the printing couples to be perfected thereby; means for leading the other portion of the split web between two printing couples to be perfected thereby, means for leading a third web between two of the printing couples to be perfected thereby, and means for assembling the webs before folding, substantially as described.

8. A printing press comprising three type beds arranged in three superposed parallel planes, three cylinders co-acting with the beds, and means for guiding webs between the beds and cylinders so that they shall be perfected thereby, each web passing between two of the beds and cylinders, and web feeding and web delivering mechanism, substantially as described.

9. A printing press comprising three stationary type beds arranged in three superposed parallel planes, and three reciprocating cylinders co-acting with the beds; with means for guiding webs through the press so that they shall be perfected thereby at each operation of the press, web feeding and web delivering mechanism, and a single mechanism for looping the webs, substantially as described.

10. A printing press comprising three type beds, arranged one above the other in three superposed planes, three impression cylinders co-acting with said beds, means for directing webs between the beds and cylin-

ders so as to be perfected thereby, web feeding mechanism and web delivering mechanism, and a single mechanism for looping all the webs; with means whereby one cylinder can be kept out of operation when it is desired to print a less number of webs, substantially as described.

11. A printing press comprising three stationary type beds arranged one over the other in three superposed planes, three traveling impression cylinders co-acting with said beds, means for guiding webs between the beds and cylinders, so as to be perfected thereby at each operation of the press, web feeding mechanism and web delivering mechanism, and a single mechanism for looping all the webs; with means for placing one of the cylinders out of operative condition.

12. A printing press comprising three parallel stationary type beds, arranged one above the other in three superposed planes, three impression cylinders co-acting with said beds, means for reciprocating said cylinders over the beds, means for directing webs between the beds and cylinders so as to be perfected thereby at each operation of the press, web feeding mechanism and web delivering mechanism, and a single mechanism for looping all the webs; with means whereby one cylinder can be put out of operation when it is desired to print a less number of webs, substantially as described.

13. The combination in a web printing press of three stationary form beds arranged in three superposed parallel planes, a traveling impression cylinder co-acting with each bed, a reciprocating mechanism for actuating said impression cylinders, connections whereby one of said impression cylinders may be thrown out of operation and the other two kept in operation; with web guides, web feeding mechanism, web delivery mechanism, and a single mechanism for looping all the webs.

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

HENRY F. BECHMAN.

In presence of—

FRANK W. DUNNING,
GUY H. FENN.