H. F. BECHMAN.

ROTARY PRINTING PRESS.

APPLICATION FILED MAR. 2, 1905.

1,139,154.

Patented May 11, 1915.

4 SHEETS—SHEET 1.

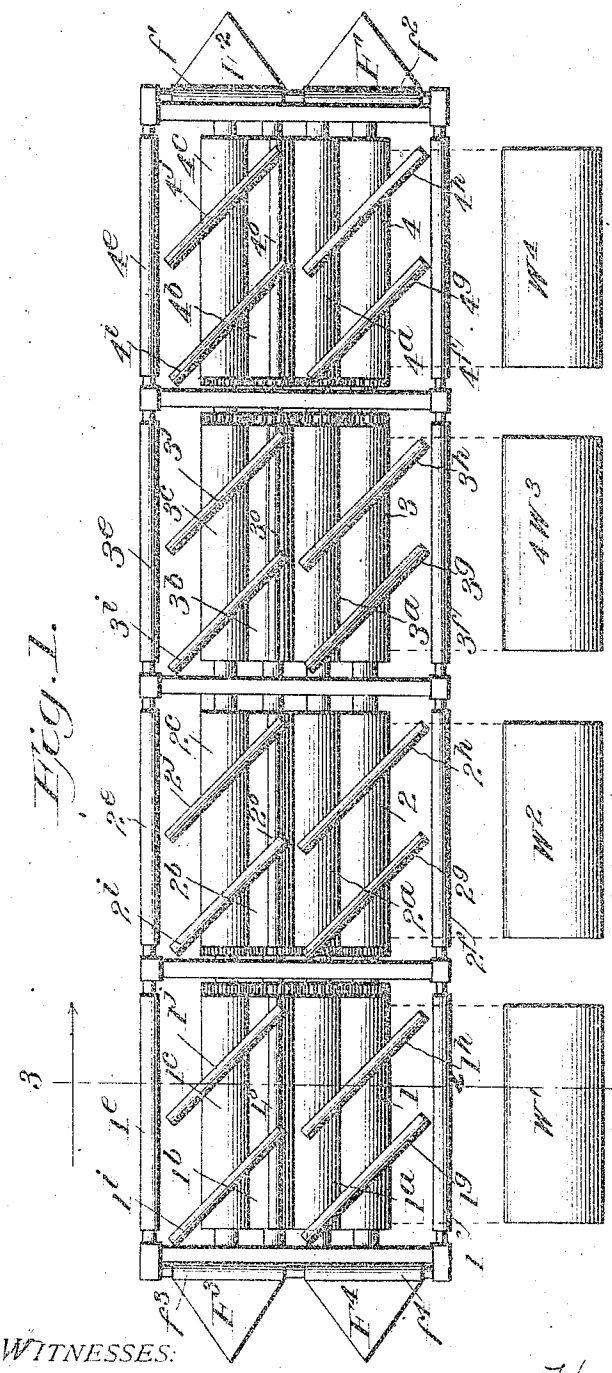


Fig. 1.

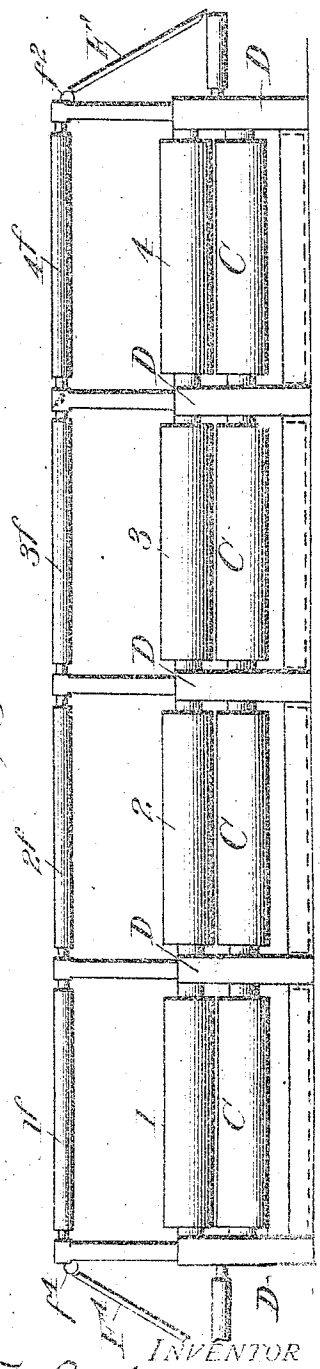


Fig. 2.

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4 SHEETS—SHEET 2.

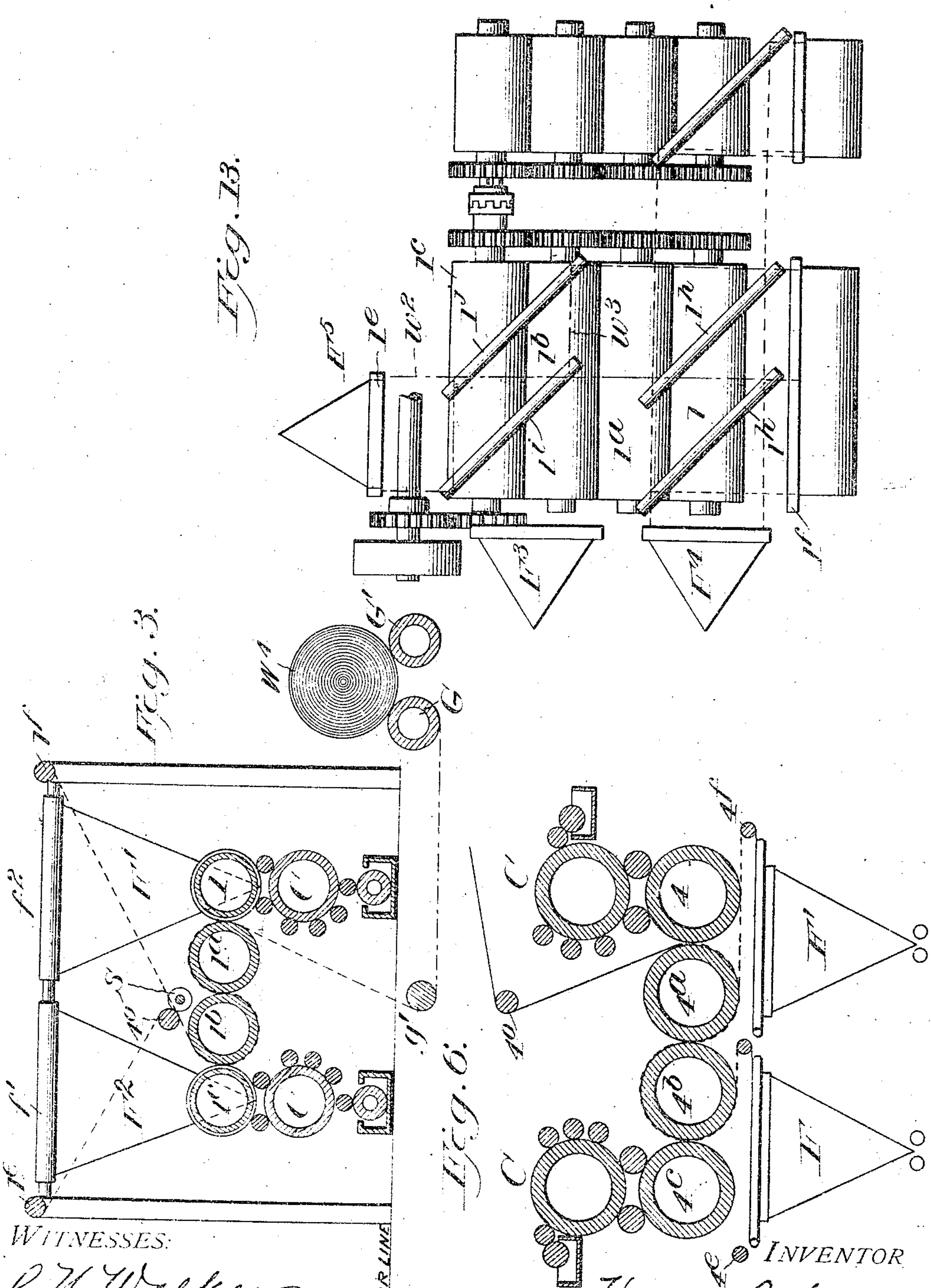


Fig. 13.

Fig. 3.

Fig. 6.

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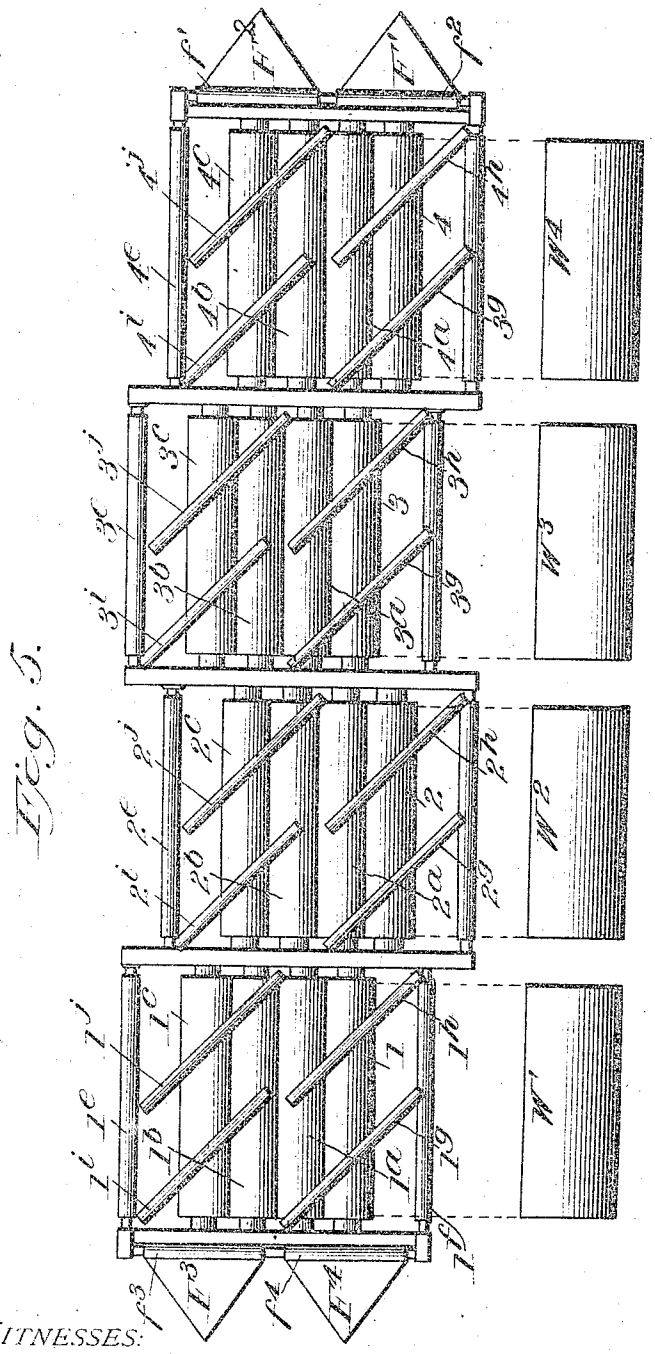


Fig. 5.

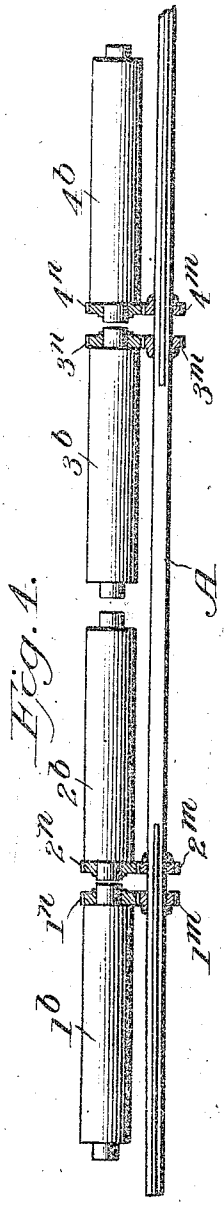


Fig. 4.

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4 SHEETS—SHEET 4.

Fig. 9.

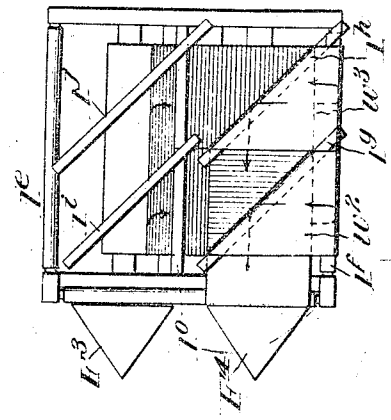


Fig. 12.

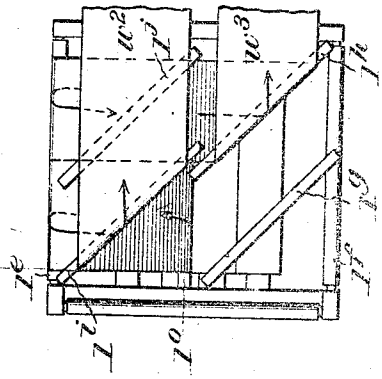


Fig. 8.

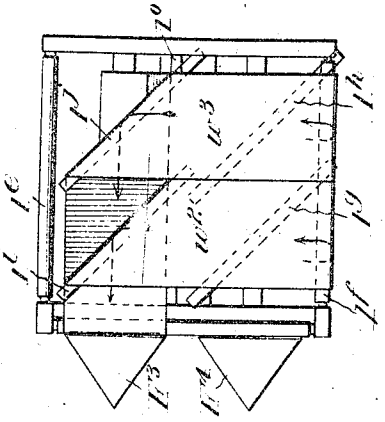


Fig. 11.

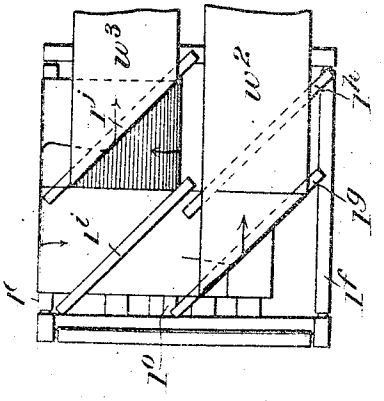


Fig. 7.

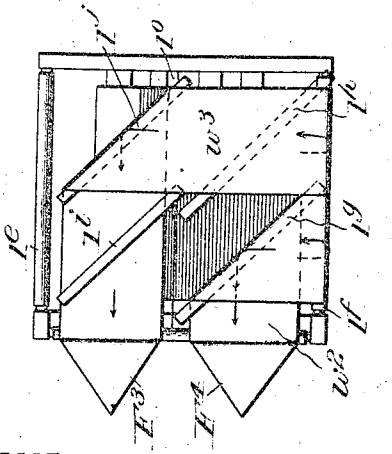
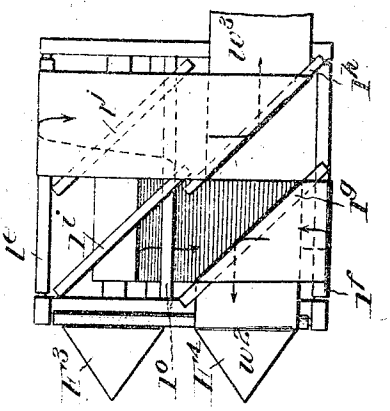


Fig. 10.



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UNITED STATES PATENT OFFICE.

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ROTARY PRINTING-PRESS.

1,139,154. Specification of Letters Patent. Patented May 11, 1915.

Application filed March 2, 1905. Serial No. 248,069.

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 Rotary 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 a rotary-printing-press of that class in which the printing surfaces, usually stereotype plates, are attached to the periphery of one rotary-cylinder, and impressions are taken therefrom by passing a web, or sheets of paper, between the plates on such cylinder and the surface of an opposed co-acting rotary-impression-cylinder.

The primary object of my invention is to provide a rotary printing-press capable of producing perfected newspapers or other publications from stereotype plates, and equal in speed and capacity to the highest class of such machines now in general use,—but which will be more economical to manufacture, will occupy less space and cost less for maintenance and operation; and will be superior in points of durability, accessibility, ease of threading, and uniformity of work; and which will be free from the serious practical objections, inconveniences and limitations of the present known machines.

As compared with machines of like capacity in present use, my machine occupies no more floor space, and is considerably less in height. In the ordinary stereotype printing-presses now in general use, and the so called "straight-line" printing-presses, the perfecting printing mechanisms are superimposed one above the other in two or more "decks," and the plate and impression cylinders extend transversely of the press, between the side frames, and the inking drums and rollers are similarly arranged; this construction necessitates lifting the heavy stereotype plates to heights varying from one to twelve feet, and then slipping such plates endwise of the cylinders into cramped spaces in the press before they can be put in place, and the pressman must crawl into the press in dangerous places to attach the plates to the cylinders; also the heavy paper rolls, and the ink rollers, have to be lifted to corresponding elevations by tackle, and have to be slipped endwise through the press from one side thereof to the other, and the pressman has to crawl into the press to thread the same, and to adjust the blankets and tympans and pack the impression cylinders; and stairs and platforms are required to enable the pressman to reach the upper parts of the press. In such machines the inking mechanisms also are not easily accessible, being necessarily in the interior of the machine, and many of them at such heights as to make the use of ladders or stairs necessary.

I avoid all these objectionable and troublesome features and incidents by my invention; for in my machine all the plate cylinders or couples are in substantially one horizontal plane; all are low down, and within easy reach of the operator; all are arranged longitudinally, instead of transversely, of the main frame; and are directly accessible broadside outermost, and the stereotype plates can be easily put directly in place thereon or removed therefrom by a pressman standing on the floor, without using any tackle and without his having to go into or between any parts of the machine. The impression cylinders are similarly arranged near the floor and easily accessible throughout their entire length, so that they may be packed and tympans changed by an operator on the floor, and with far greater facility than in other presses. Corresponding advantages and facilities of access exist in my machine with respect to the inking mechanisms, every fountain and every roller being easily accessible throughout its entire length by the operator standing on the floor. Thus the work of preparing my press for operation— or "getting ready," is greatly facilitated.

A further important advantage of my machine is that owing to its slight elevation it is free from the serious vibrations to which the upper portions, or decks, of the machines now in use are subjected, and which shorten the life of the machine, limit its speed, and impairs the quality of its work. My machine occupies less than one-half the cubical space of other machines of corresponding capacity and being low, does not require a specially built press room for its accommodation.

Another advantage of my machine is that all the ink fountains therein are in the same

horizontal plane near the floor, and subject to the same conditions of temperature; whereas, in the presses now in general use, the ink fountains are at various altitudes, and the ink in the upper fountains is of a considerably higher temperature than that in the lower fountains, which results in a very unequal quality of printing.

Furthermore in my press the webs are fed into the machine from the side, parallel with the cylinders; and the web-rolls, instead of being elevated above the floor, merely have to be rolled upon unwinding supports beside the press and about on a level with the floor, so that no tackle is required to handle the web rolls in the press room. The webs are not turned or deflected until after they are perfected, then they make but a quarter-turn and pass direct into the folder, and all the webs and parts of webs can be assembled before reaching the folder, being brought into parallel alinement and superposed by merely making a one-quarter turn therein.

Suitable inking mechanisms are provided for the plate-cylinders; and a plurality of folders are located at the ends of the machine, each capable of folding one or more webs; and suitable web-guides and deflectors are provided whereby the various webs may be directed through the machine and to the folders as desired.

The present invention provides a press in which the greatest variety of products of perfected papers can be produced, from the smallest up to the largest size, and parts of the press which it is not necessary to use at any particular time can be readily put out of operation; and while one part of the press is operating other parts may be made ready for printing. Again, if any one of the units of the press should be damaged in any way it can be cut out of operation without affecting the operation of the other parts of the press. The pressman can also inspect all parts of the press from the floor while it is in operation without having to climb steps or ladders; the press can be installed in a room of ordinary height; and is low down so that the side frames and foundations will be less affected by vibration.

The invention resides in the novel mechanisms and parts summarized in the claims; and I will now describe the machine in detail with reference to the accompanying drawings.

Figure 1 is a plan view of a quadruplex rotary-printing-press embodying the invention. Fig. 2 is a side elevation thereof. Fig. 3 is an enlarged transverse section on line 3—3, Fig. 1. Fig. 4 is a detail section showing the cylinder driving mechanism. Fig. 5 is a detail view showing a modified arrangement of parts. Fig. 6 is a detail view illustrating another modified arrangement of parts. Figs. 7, 8, 9, 10, 11 and 12 are details illustrating a few of the possible variations in the manner of directing the web or webs. Fig. 13 is a detail showing a possible variation of folders.

In Figs. 1 and 2 of the drawings four sets of rotary-perfecting-printing-mechanisms are shown, each comprising two plate-cylinders and coacting impression cylinders. The plate-cylinders 1, 2, 3, 4, of the respective printing-mechanisms are arranged in axial alinement at the right-hand side of the press, and their co-acting impresison-cylinders 1^a, 2^a, 3^a, 4^a are also arranged end to end, and preferably in axial alinement throughout the press. The second plate-cylinders 1^c, 2^c, 3^c, 4^c of each printing mechanism are arranged in axial alinement on the left-hand side of the press, and their co-acting impression-cylinders 1^b, 2^b, 3^b, 4^b are also in axial alinement.

The cylinders 1, 1^a, 1^b, 1^c are intergeared so as to rotate synchronously, and so also are the cylinders in each of the succeeding sets of printing-mechanisms. All such printing-mechanisms may be operated synchronously, or in unison, by means of a drive-shaft A, upon which are splined longitudinally adjustable gears 1^m, 2^m, 3^m, 4^m, that respectively mesh with the gears 1^n, 2^n, 3^n, 4^n, on the impression-cylinders 1^b, 2^b, 3^b, 4^b. These gears 1^m, 2^m, 3^m, 4^m are adjustable longitudinally of shaft A, and may be moved into or out of mesh with the cylinder-gears so as to throw the latter into or out of operation, as desired, by the pressman.

The plate-cylinders 1, 2, 3, 4, are supplied with ink from fountains which may be arranged below the cylinders, as in Fig. 3— or above the cylinders as in Fig. 6, any suitable rotary inking-mechanism being arranged to supply ink from the fountains to the plates on the cylinders. Such mechanism being well-known needs no detail description herein; it suffices to say that separate inking-systems C are provided for each of the plate-cylinders 1^b, 2^b, 3^b, 4^b and similar systems c are provided for each of the cylinders 1^c, 2^c, 3^c, 4^c as indicated in Fig. 3 of the drawings.

The cylinders have their gudgeons journaled in upstanding members or standards D of the main-frame in any suitable manner; and above each pair of printing-cylinders are arranged guide-rollers 1^o which are parallel with such cylinders and may be journaled in the standards D.

At the side of the press and above the cylinders 1, 2, 3, 4, (as shown in Figs. 1–3) are guide-rollers 1^f, 2^f, 3^f, 4^f, and at the opposite sides of the press, above the cylinders 1^c, 2^c, 3^c, 4^c and parallel therewith, are guide-rollers 1^e, 2^e, 3^e, 4^e; and between the rollers 1^f and 1^e are arranged the deflector bars 1^g, 1^h, 1^i, 1^j, which lie at an angle of about

forty-five degrees to the rollers 1^e and 1^f. The deflectors 1^g, 1^h are arranged above the cylinder 1, and the deflectors 1^i, 1^j are arranged above the cylinder 1^c. Similar sets of guides 2^e, 2^f and bars or deflectors 2^g, 2^h, 2^i, 2^j are arranged above the cylinders 2 and 2^c, and a similar arrangement of guides 3^e, 3^f and deflectors 3^g, 3^h, 3^i, 3^j are arranged above the cylinders 3 and 3^c; and a similar arrangement of guides 4^e, 4^f and deflectors 4^g, 4^h, 4^i, 4^j are arranged above the cylinders 4 and 4^c.

Preferably at each end of the press are arranged two folding-mechanisms, not fully shown, but constructed in the usual manner; the formers of such mechanisms being shown; two formers F′, F^2 at the right-hand end of the press, and two similar formers F^3, F^4 being arranged at the other end of the press. Transversely arranged guide-rollers f', f^2, f^3 and f^4 are located at the ends of the press, at the heads of the respective formers, to direct webs thereto in the usual manner.

The web for each set of printing-mechanisms is led in underneath the press from rolls W′, W^2, W^3, W^4 conveniently placed at the side thereof, the web-rolls being preferably supported on friction-rollers or shafts G, G′ so located that the web-rolls can be easily rolled thereon. The web can be led from any web-roll through suitable ducts in the floor, to guides arranged below and intermediate the printing-mechanisms, and as the web for each perfecting-mechanism is led thereto in the same manner as the other webs, a description of the lead of the web to the first perfecting-mechanism will explain the web-leads for all the mechanisms.

As indicated in Fig. 3, the web w' is led from the roll W^4 to and around a guide-roller g' below cylinders 1, 1^a, 1^b, 1^c; it then passes up between the cylinders 1 and 1^a, receiving its first impressions from the plates on cylinder 1; it then passes between cylinders 1^b and 1^c, receiving its second or perfecting-impressions from the plates on cylinder 1^c. The web may then be passed around the guide 1^o and carried over roller 1^e, and may be divided by means of a slitter S, located at any suitable point in the machine; and the halves of the web may then be directed to separate folders, or assembled and folded together as desired.

Instead of leading the web, as described, first between the cylinders 1 and 1^a, it might be led first between the cylinders 1^b and 1^c, and then between the cylinders 1 and 1^a. Or, it is obvious, it can be led direct from between either pair of cylinders, 1, 1^a or 1^b, 1^c to guide 1^e; but in the latter case it would not have been perfected.

In the diagram, Fig. 7, the web after being divided by the slitter S, is carried forward to and over roller 1^f; one-half w^2 of the web is then carried back to, over and under deflector 1^g, and then back to former F^4; the other half w^3 of the web is carried to, over and under deflector 1^j, then back to former F^3, both halves being thus folded separately.

In Fig. 8 the web is led from the perfecting cylinder to and over roller 1^f, being slit by the slitter S, and one-half w^2 of the web is led to and over deflector 1^i, thence to former F^3, and the other half w^3 is led to and over the deflector 1^j, to the same folder F^3, both halves of the web being thus assembled and folded together.

In Fig. 9 the web after being perfected, is led to and over roller 1^f, one-half of the web w^2 is carried back to, over and under the deflector 1^g, and then to the former F^4, and the other half w^3 of the web is similarly turned under the deflector 1^h and carried to the former F^4 so that both halves are assembled and folded at F^4.

In Fig. 10 one-half w^2 of the web may be carried around roller 1^f, then back to, and under the deflector 1^g, thence to former F^4; the other half w^3 of the web is led over roller 1^e and then directly to, over and under the deflector 1^h, and is carried in the opposite direction toward former F^2, or to an adjacent printing-mechanism. In this way one-half of the web can be folded by itself after being perfected, while the other half of the web may be led to one of the adjacent printing-mechanisms.

As indicated in Fig. 11, one-half of the web w^2, after being slitted, is led to, under and over bar 1^g, and toward the former F′, or to an adjacent printing-mechanism; and the other half w^3 of the web is similarly turned over bar 1^j and led toward former F^2, or an adjacent printing-mechanism.

Fig. 12 is a similar view showing how both halves of the web can be turned to the right toward formers F′, F^2, or into an adjacent mechanism over the deflectors 1^h and 1^i.

As indicated in Fig. 5, the end to end arrangement of the mechanisms is preserved, although the cylinders are not in exact axial alinement.

In Fig. 6, the inking-mechanisms are shown as arranged above the printing-cylinders, instead of below, and the web-guiding, deflecting and folding mechanisms are below the plane of the cylinders; the same arrangement and operation of parts is preserved however, and this simply shows a possible but not a preferred variation in the construction.

Fig. 13 shows how a folder F^5 might be arranged at the side of the press, or printing cylinders, instead of at the end of the machine,—this would only slightly alter the lead of the webs, and might be found

desirable in some instances. When side folders, as F^5 are used, one-half of the web w^2 after being slitted could pass direct over guide 1^f to the folder F^5; the other half w^3 of the web could pass from guide 1^f to, over and under deflector 1^j, then to, under and over deflector 1^i, and then pass direct to the folder F^5, assembled with half w^2 of the web, as indicated in Fig. 13.

What has been heretofore said regarding the possible leads of the web w' printed by the cylinders 1 and 1^c, applies equally to the webs printed by the cylinders 2, 2^c; 3, 3^c; 4, 4^c; and the web from any of these mechanisms, it will be readily comprehended, can be sent to any one of the four formers F', F^2, F^3, F^4, or certain webs or parts of such webs sent to any one or more of the folders. The possible modes of threading this machine are so numerous that it is needless to explain all, as it will be apparent to one familiar with this class of machines from a mere inspection of the drawings that the web printed or perfected by the cylinders 1, 1^a, 1^b, 1^c can be led over the deflectors and guides to either end of the press: or the web can be divided and part led to either end of the press; or, if divided, both parts of the web can be led to the respective formers at the same end of the press; or that both parts of the web can be assembled and folded on any one former.

In the press shown each pair of plate-cylinders is adapted to perfect a 16 paged paper; as each cylinder can carry 8 full page forms; and when the press is running full, four 16 paged papers can be produced, each led to a distinct folder; or two 32 paged papers can be produced, by assembling the proper number of webs and folding the same on proper formers; or one 64 paged paper can be produced, and assembled at one folder; and, obviously, 16 paged papers might be produced simultaneously with 48 paged papers; and by dividing one of the webs it will be possible to simultaneously produce 8 paged, and 56 paged papers. It would be needless and practically impossible to set forth all the different sizes of papers which can be produced simultaneously on this machine, and the foregoing explanation is simply intended to impart some idea of the capabilities, but not to limit the uses of, the invention.

It will be obvious that when the cylinders are all in axial alinement, as in Figs. 1 and 2, they can all be driven synchronously from the one shaft, and that any one of the sets of printing-mechanisms can be thrown out of operation by shifting the transmission gear or clutch on the main-shaft; that access can be had to the plate-cylinders from the outside and only a few inches above the floor, for in a full sized press for printing newspapers the plate-cylinders would not have to be more than three feet above the floor, and the top-most web-guides would not have to be more than five feet above the floor, or base upon which the press is mounted.

Preferably the press should be erected with a shallow pit, so that a pressman can walk in between and beneath the inking-mechanisms and beneath the cylinders, to facilitate threading of the press and allow ready access to all parts thereof.

The arrangement of the four deflectors above each printing-mechanism, facilitates the assemblage and direction of the webs to any point desired in the press. In order to get the web to either end of the press only one quarter turn need to be made therein over a deflector.

I have not deemed it necessary to show in detail the journal-bearings of the main-shaft; nor the folder-mechanism into which the webs are directed after they leave the former; nor the particular mechanism for driving the inking-devices; as these are all well-known to those familiar with the art; and it is simply the province of the constructor to incorporate them in any press. The invention herein will be fully understood from the foregoing description in connection with the diagrammatical drawings. Of course the length and diameter of the cylinders and the number of printing-couples employed will depend upon the desired total capacity of the press.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A rotary-printing-press, comprising a plurality of sets of rotary-cylinders, the cylinders in adjacent sets being in axial alinement, and means for rotating said cylinders, folders at the opposite ends of the press, and diagonally arranged web-deflectors adjacent to each set of printing-cylinders whereby the webs printed by such cylinders may be directed to any folder.

2. A rotary-printing-press comprising a series of axially alined plate-cylinders and co-acting impression-cylinders, means whereby the cylinders in each series may be rotated synchronously; with means whereby any set of cylinders may be thrown out of operation, folding mechanisms at each end of the press, and a set of diagonally arranged web-guides adjacent to each set of cylinders whereby the web printed by such cylinders may be directed to either folder at either end of the press.

3. A rotary-printing-press, comprising a series of printing-mechanisms, each printing-mechanism containing a pair of plate-cylinders and co-acting impression-cylinders, the cylinders in the several mechanisms being arranged end to end; means for driving the several cylinders synchronously,

a plurality of folding devices at each end of the press, a set of deflectors or guides arranged diagonally of the press adjacent to each printing-mechanism, whereby the web printed on each mechanism may be directed to any folder at will, and means for directing webs through the printing-mechanisms and to the said deflectors, substantially as set forth.

A rotary-printing-press, comprising a series of printing-mechanisms, each printing-mechanism containing a pair of plate-cylinders and co-acting impression-cylinders, the cylinders in the respective mechanisms being axially alined, a shaft and gearing for driving the several cylinders synchronously, a pair of folding devices at each end of the press, a set of deflectors or guides arranged diagonally of the press and cylinders above each printing-mechanism, whereby the web printed on each mechanism may be directed toward either end of the press and to any folding mechanism at will, and means for directing webs to each printing-mechanism and to the said deflectors, substantially as set forth.

5. The combination with a main frame, of sets of rotary printing cylinders arranged end to end in and longitudinally of the frame, folders at the ends of the cylinders, and a set of diagonally arranged deflectors above each set of cylinders whereby the webs printed by the cylinders may be directed to any of the folders.

6. A rotary printing press, comprising a plurality of sets of rotary cylinders, the cylinders in adjacent sets being arranged end to end, and means for rotating said cylinders; a set of folders and diagonally arranged web guides adjacent to each set of printing cylinders whereby the webs printed by such cylinders may be directed to any folder.

7. A rotary printing press comprising a series of plate cylinders arranged end to end and co-acting impression cylinders similarly arranged, and means whereby the cylinders in each series may be rotated synchronously; with means whereby any set of cylinders may be thrown out of operation, a plurality of folding mechanisms, and diagonally arranged web-guides adjacent to each printing mechanism whereby the web printed by any cylinder may be directed to any folder.

8. In a rotary printing machine, the combination of a plurality of closely adjacent rotary perfecting mechanisms arranged end to end in one main frame, and means for operating one or more of them in unison; with a corresponding number of folding devices, to fold their products separately or together substantially as described.

9. In a printing machine, in combination, two sets of web-perfecting printing mechanisms arranged adjacent each other in the same frame, with the cylinders of the respective sets in axial alinement, folding and delivering mechanisms on the outer end of each set, beside the ends of the cylinders, and adapted to fold and deliver the product thereof, and means to optionally cross over the product from one set to the folding and delivering mechanisms of the other set and associate, fold and deliver the same with the product of the said other set.

10. In a printing machine, in combination, two sets of web perfecting printing mechanisms arranged adjacent, with cylinders in the respective sets in line axially, and web rolls feeding to the mechanisms, means to deliver the products from the outer ends of each set separately, and means to optionally associate and deliver products from both sets together, at the outer end of one set.

11. In a printing machine, in combination, two sets of web perfecting printing mechanisms arranged adjacent, each set having a plurality of printing couples, with the cylinders of the couples of the respective sets in line axially, means to feed webs from a plurality of rolls to the respective sets, means to associate and deliver the product from each set separately at the outer end thereof, and means to optionally cross over the product from one set and associate and deliver the same with the product from the other set.

12. In a printing machine, in combination, a plurality of printing couples arranged in two sets in the same frame, with cylinders in the respective sets in line axially with each other, associating, folding and delivering mechanisms for the product of each set, at opposite ends of the machine, and means to cross over the product of one set to the said mechanism of the other set.

13. In a rotary printing machine, the combination of a plurality of closely adjacent rotary perfecting mechanisms arranged end to end in one main frame, all the cylinders extending longitudinally of the frame and accessible from the sides of the press; with means for folding their products separately or together.

14. In a printing press, the combination of a main frame, and a plurality of closely adjacent perfecting mechanisms in said frame, each comprising two rotary plate cylinders and two rotary impression cylinders all arranged close together and in substantially the same plane and the cylinders of the adjacent mechanisms being arranged end to end; with mechanism for folding the product of one or all the perfecting mechanisms separately or together.

15. In a printing press, the combination of a main frame, and a plurality of rotary cylinder perfecting printing mechanisms therein arranged closely adjacent, end to end in substantially the same plane, and all the

cylinders extending lengthwise longitudinally of the main frame; with a folding mechanism at each end of the press adapted to fold the product of one or all the mechanisms separately or together.

16. The combination of a plurality of closely adjacent rotary perfecting printing mechanisms arranged end to end in substantially the same plane, the cylinders therein extending lengthwise of the main frame; with an independent web supply for each perfecting mechanism, the web rolls being arranged beside the press and parallel with the cylinders of the perfecting mechanisms; with a plurality of folding mechanisms adapted to fold the webs separately or together.

17. In a printing press, the combination of a main frame, and two or more closely adjacent rotary perfecting printing mechanisms therein arranged in a row extending lengthwise of the frame; the axes of all the cylinders in said mechanisms being parallel with the longitudinal axis of the main frame and the cylinders in adjacent mechanisms being end to end, and means for delivering the products separately or together.

18. In a printing press, the combination of a main frame, a plurality of closely adjacent rotary perfecting printing mechanisms therein arranged endwise in a row extending lengthwise of the frame, the axes of the cylinders being parallel with the longitudinal axis of the press; means for driving one or more of the several perfecting mechanisms simultaneously and in unison; and means for throwing one or more of such mechanisms out of operation; with a plurality of sets of angle bars above each perfecting mechanism, and means for folding the webs.

19. In a rotary web perfecting printing press, the combination of a main frame, two or more rotary perfecting mechanisms therein arranged closely adjacent and end to end, each having a pair of plate cylinders and co-acting impression cylinders, the plate cylinders being in one plane, and those in adjacent mechanisms arranged end to end, and all extending longitudinally of the main frame; web rolls beside the press and parallel with the printing cylinders, and means for folding the printed webs separately or together.

20. In a printing press, the combination of a plurality of closely adjacent printing mechanisms each comprising rotary plate and impression cylinders, the cylinders in each mechanism being close together side by side, and the cylinders in adjacent mechanisms being arranged end to end longitudinally of the press and in substantially the same plane; means for driving the cylinders, inking mechanisms for the plate cylinders parallel therewith, web supply rolls at the side of the press and parallel with the perfecting mechanisms, and folding mechanisms at the end of the press.

21. In a rotary web perfecting printing press, the combination of a plurality of rotary perfecting mechanisms arranged end to end with the cylinders extending longitudinally of the press and lying in substantially the same plane, a web roll for each perfecting mechanism arranged at one side of the press, and parallel with the printing cylinders, a pair of folding mechanisms; and means for directing a web from any printing mechanism to the same or separate folders whereby the webs may be folded separately or together.

22. A rotary-printing press, comprising a series of printing-mechanisms, each printing-mechanism containing a pair of plate-cylinders and co-acting impression cylinders, the cylinders in the several mechanisms being arranged end to end; means for driving the several cylinders synchronously, a plurality of folding devices exteriorly of the printing mechanism, a set of deflectors or guides arranged diagonally of the press adjacent to each printing-mechanism, whereby the web printed on each mechanism may be directed to any folder at will, and means for directing webs through the printing-mechanisms and to the said deflectors, substantially as set forth.

23. A rotary-printing press, comprising a series of printing-mechanisms, each printing-mechanism containing a pair of plate-cylinders and co-acting impression cylinders, the cylinders in the several mechanisms being arranged end to end; means for driving the several cylinders synchronously, a plurality of folding devices adjacent the printing mechanisms, a set of deflectors or guides arranged diagonally of the press adjacent to each printing-mechanism, whereby the web printed on each mechanism may be directed to any folder at will, and means for directing webs through the printing-mechanisms and to the said deflectors, substantially as set forth.

24. A rotary-printing press, comprising a series of printing-mechanisms, each printing-mechanism containing a pair of plate-cylinders and co-acting impression cylinders, the cylinders in the several mechanisms being arranged end to end; means for driving the several cylinders synchronously, a plurality of folding devices adjacent to each end of the press, a set of deflectors or guides arranged diagonally of the press adjacent to each printing-mechanism, whereby the web printed on each mechanism may be directed to any folder at will, and means for directing webs through the printing-mechanisms and to the said deflectors, substantially as set forth.

25. A rotary-printing press, comprising a series of printing-mechanisms, each print-

ing-mechanism containing a pair of plate-cylinders and co-acting impression cylinders, the cylinders in the respective mechanisms being axially alined, a shaft and gearing for driving the several cylinders synchronously, a pair of folding devices exteriorly of the printing mechanisms, a set of deflectors or guides arranged diagonally of the press and cylinders above each printing-mechanism, whereby the web printed on each mechanism may be directed toward either end of the press and to any folding mechanism at will, and means for directing webs to each printing-mechanism and to the said deflectors, substantially as set forth.

26. A rotary-printing press, comprising a series of printing-mechanisms, each printing-mechanism containing a pair of plate-cylinders and co-acting impression-cylinders, the cylinders in the respective mechanisms being axially alined, a shaft and gearing for driving the several cylinders synchronously, a pair of folding devices adjacent to each printing-mechanism, a set of deflectors or guides arranged diagonally of the press and cylinders above each printing-mechanism, whereby the web printed on each mechanism may be directed toward either end of the press and to any folding mechanism at will, and means for directing webs to each printing-mechanism and to the said deflectors, substantially as set forth.

27. A rotary-printing press, comprising a series of printing-mechanisms, each printing-mechanism containing a pair of plate-cylinders and co-acting impression-cylinders, the cylinders in the respective mechanisms being axially alined, means for driving the several cylinders synchronously, a pair of folding devices adjacent to each end of the press, a set of deflectors or guides arranged diagonally of the press and cylinders above each printing-mechanism whereby the web printed on each mechanism may be directed toward either end of the press and to any folding mechanism at will, and means for directing webs to each printing-mechanism and to the said deflectors, substantially as set forth.

28. The combination with framing, of sets of rotary printing cylinders arranged end to end in said framing, folders adjacent to the ends of the cylinders, and diagonally arranged deflectors above the plane of the cylinders whereby webs printed by the cylinders may be directed to any of the folders.

29. A rotary-printing press, comprising a series of printing-mechanisms, each printing-mechanism containing a pair of plate-cylinders and co-acting impression cylinders, the cylinders in the several mechanisms being arranged end to end; means for driving the several cylinders synchronously, a plurality of folding devices adjacent to the printing mechanisms, a set of deflectors or guides arranged diagonally of the press above the plane of and adjacent to each printing-mechanism, whereby the web printed on each mechanism may be directed to any folder at will, and means for directing webs through the printing-mechanisms and to the said deflectors, substantially as set forth.

30. In a printing machine, in combination, a plurality of printing couples arranged in two sets in framing, with cylinders in the respective sets in line axially with each other, associating, folding and delivering mechanisms for the product of each set, adjacent to opposite ends of the mechanisms, and means to cross over the product of one set to the said mechanism of the other set.

31. In a rotary printing machine, the combination of a plurality of adjacent rotary perfecting mechanisms arranged end to end in framing, all the cylinders extending longitudinally of the framing and accessible from the sides of the press; with means for folding their products separately or together.

32. In a printing-press, the combination of framing and a plurality of rotary cylinder perfecting printing mechanisms therein arranged adjacent, end to end in substantially the same plane, and all the cylinders extending lengthwise longitudinally of the framing; with a folding mechanism adjacent each end of the press adapted to fold the product of one or all the mechanisms separately or together.

33. The combination of a plurality of adjacent rotary perfecting printing mechanisms arranged end to end in substantially the same plane, the cylinders therein extending lengthwise of the framing; with an independent web supply for each perfecting mechanism arranged beside the press and parallel with the cylinders of the perfecting mechanisms; with a plurality of folding mechanisms adapted to fold the webs separately or together.

34. In a printing press, the combination of framing, and two or more adjacent rotary perfecting printing mechanisms therein arranged in a row extending lengthwise of the framing; the axes of all the cylinders in said mechanisms being parallel with the longitudinal axis of the framing and the cylinders in adjacent mechanisms being end to end, and means for delivering the products separately or together.

35. In a printing press, the combination of framing, a plurality of adjacent rotary perfecting printing mechanisms therein arranged endwise in a row extending lengthwise of the framing, the axes of the cylinders being parallel with the longitudinal axis of the press; means for driving one or more of the several perfecting mechanisms simultaneously and in unison; and means

for throwing one or more of such mechanisms out of operation; with a plurality of sets of angle bars above the plane of each perfecting mechanism, and means for folding the webs.

36. In a rotary web perfecting printing-press, the combination of framing, two or more rotary perfecting mechanisms therein arranged adjacent end to end, each having a pair of plate cylinders and co-acting impression cylinders, the plate cylinders being in substantially one plane, and those in adjacent mechanisms arranged end to end, and all extending longitudinally of the framing; web rolls beside the press and parallel with the printing cylinders, and means for folding the printed webs separately or together.

37. In a printing-press, the combination of a plurality of adjacent printing mechanisms each comprising rotary plate and impression cylinders, the cylinders in each mechanism being close together side by side, and the cylinders in adjacent mechanisms being arranged end to end longitudinally of the press and in substantially the same plane; means for driving the cylinders, inking mechanisms for the plate cylinders parallel therewith, web supply rolls at the side of the press and parallel with the perfecting mechanisms, and folding mechanisms adjacent to the end of the press.

38. In a printing-press, the combination of a plurality of adjacent printing mechanisms each comprising rotary plate and impression cylinders, the cylinders in each mechanism being close together side by side, and the cylinders in adjacent mechanisms being arranged end to end longitudinally of the press and in substantially the same plane; means for driving the cylinders, web supply rolls at the side of the press and parallel with the perfecting mechanisms, and folding mechanisms adjacent to the end of the press.

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—
CHARLES A. GRAMES,
CHARLES G. MECHEM.