

Jan. 12, 1926.

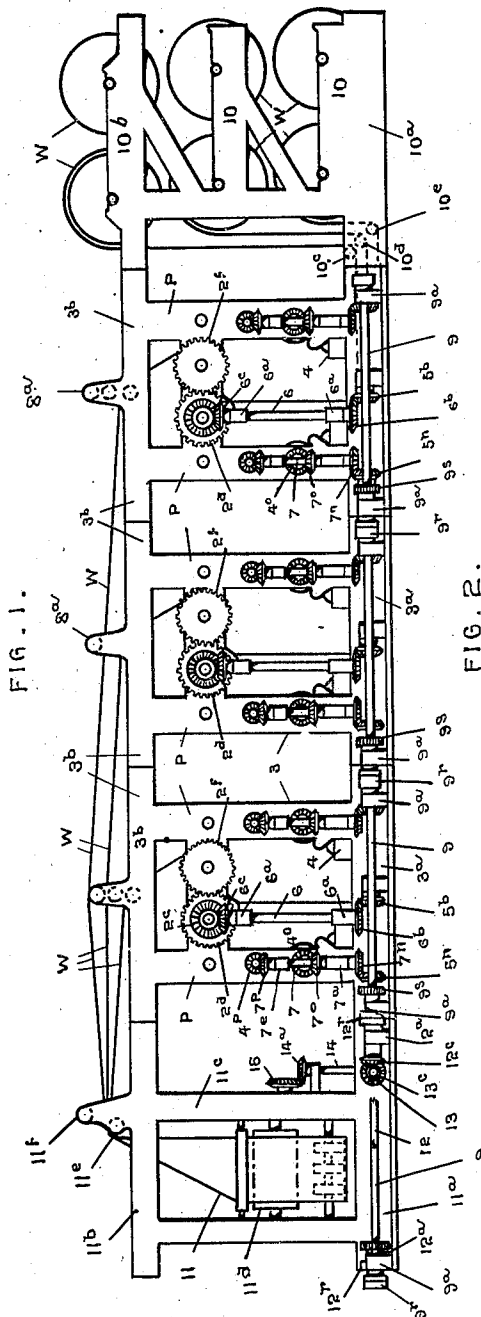
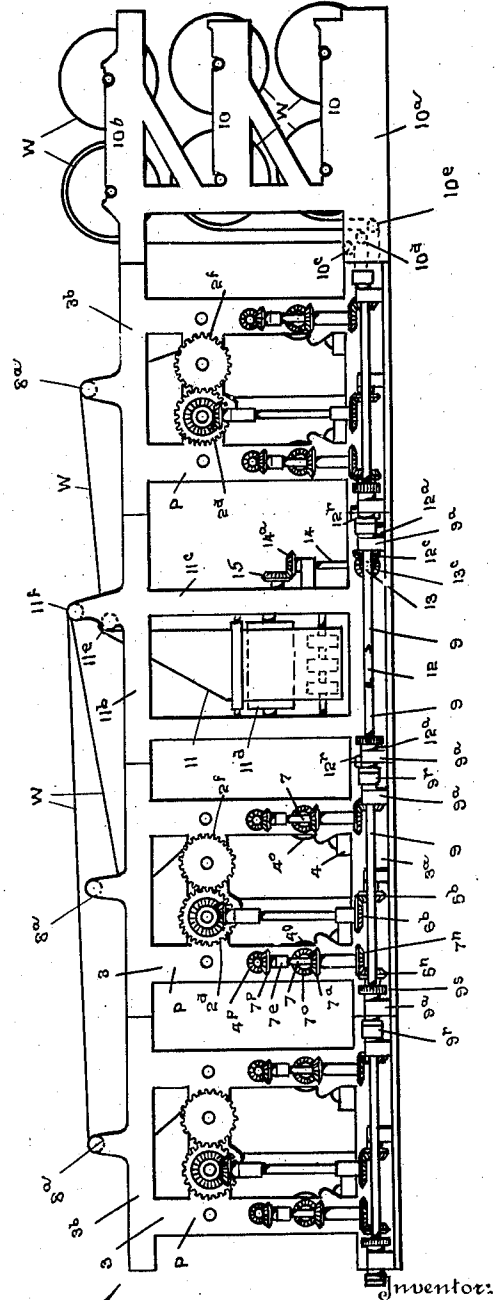
1,569,065

H. F. BECHMAN

WEB PRINTING PRESS

Filed Jan. 17, 1925

3 Sheets-Sheet 1



Inventor:
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3 Sheets-Sheet 2

FIG. 3.

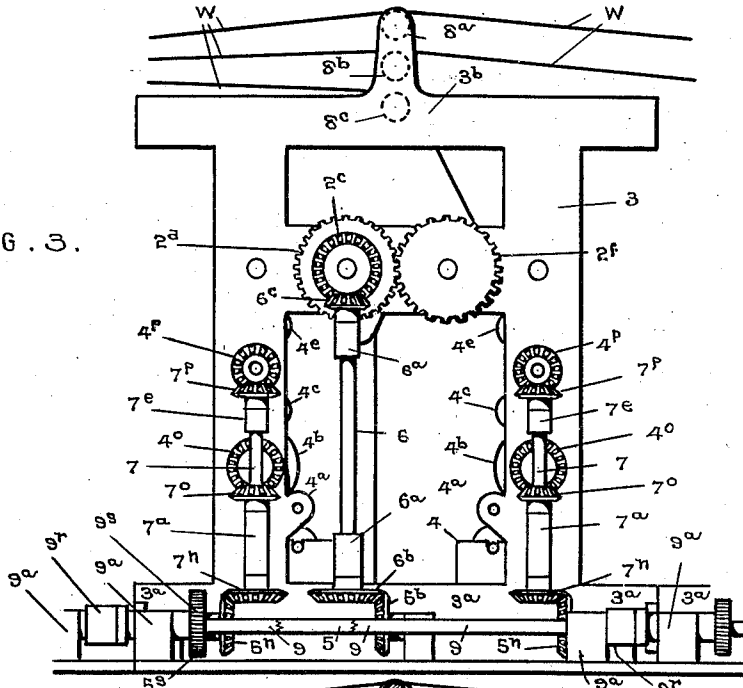
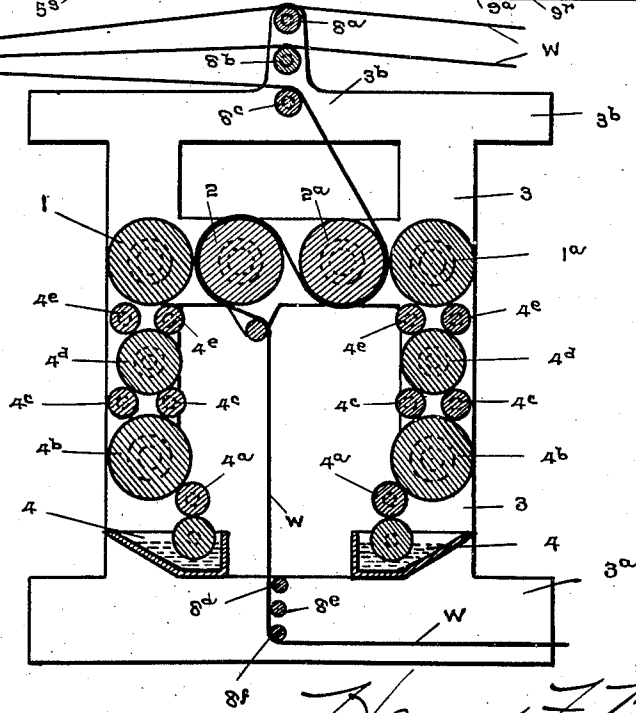


FIG. 4.



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3 Sheets-Sheet 3

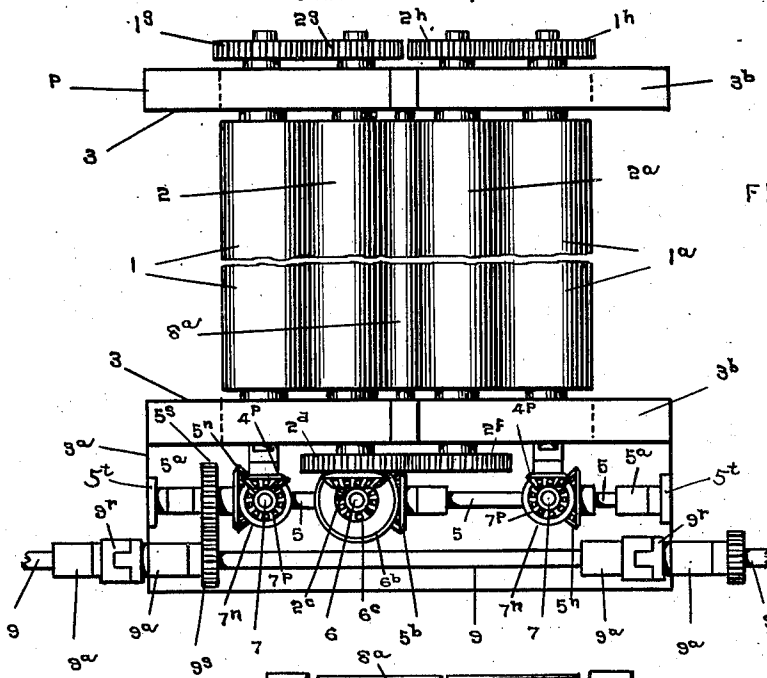
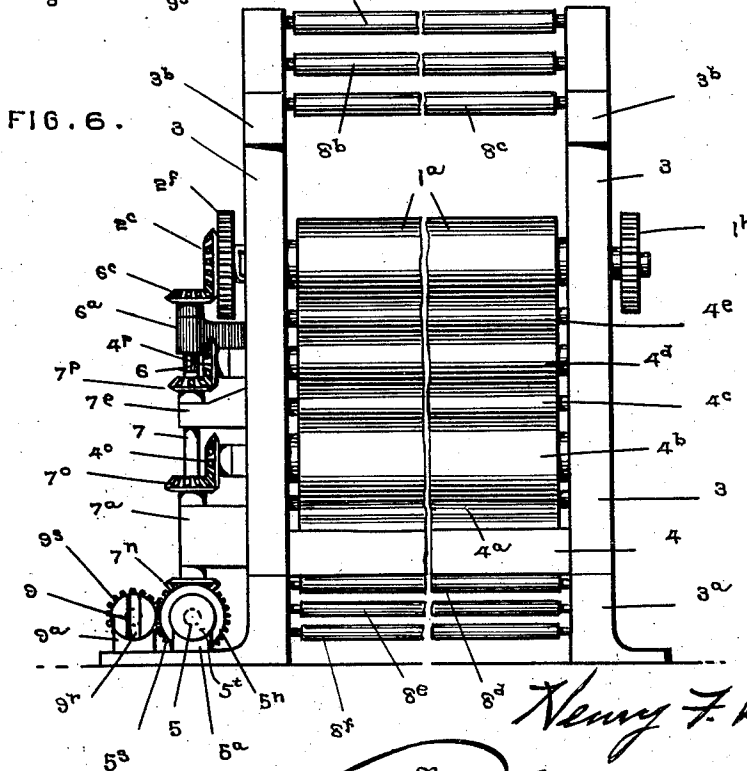


FIG. 5.



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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, A CORPORATION OF MICHIGAN.

WEB-PRINTING PRESS.

Application filed January 17, 1925. Serial No. 3,163.

To all whom it may concern:

Be it known that I, HENRY F. BECHMAN, a citizen of the United States, residing at Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Web-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 rotary web presses particularly designed for use in newspaper publishing offices. One of its objects is to provide a novel printing press having printing units, folding units, and feed roll units capable of being arranged in any desired relation; and which press can be enlarged at any time by the addition of one or more similar printing units, or folding units, or feed roll units; and in which the folder can be arranged at the end of the series of printing units or intermediate any of the printing units, as may be desired. The novel press is of great simplicity, is capable of any desired variety of relative arrangement of the units, and of being added to, or enlarged at will in accordance with the growth of the paper. The aforesaid object is attained by making the various units of a given base size, so that each is interchangeable in position with any other; and additional units may be added to the machine when it is desired to enlarge it; or units may be removed from the machine if desired without necessitating by such changes any expensive alterations or additions, the various units being relatively so formed that they are capable of being interconnected in any desired relation to make a press of any desired total page capacity.

Another object of the invention is to provide novel means for independently driving the plate cylinders and the inking mechanisms of each printing unit.

Another object is to provide novel means whereby the various units may be driven in synchronism, whatever may be the relative arrangement of the different units.

I will explain the invention with reference to the accompanying drawings, in which I have illustrated one practical form of press embodying the various features of the invention, and having interchangeable

printing, feeding and folding units; and I have set forth in the claims the essentials of the invention and the novel features of construction and the novel combinations of parts for all of which protection is desired.

In said drawings:

Figure 1 is a side elevation of a complete press embodying three printing units, a feed roll unit and a folder unit.

Fig. 2 is a similar view showing another arrangement of the same units.

Fig. 3 is an enlarged end elevation of one of the printing units from the drive side.

Fig. 4 is a sectional view of a printing unit.

Fig. 5 is a top plan view of a printing unit.

Fig. 6 is a side elevation of a printing unit.

In the said press each printing unit P is constructed alike, and a description of one will explain all. As shown, each printing unit P consists of two plate cylinders 1 and 1^a between which are interposed two impression cylinders 2, 2^a respectively coacting with the plate cylinders. These cylinders have their shafts journaled in bearings in framing 3 of any suitable construction, which is mounted upon a base 3^a which base may be mounted upon any suitable substructure, or foundation, not shown, to secure the unit in the desired position. Beneath each plate cylinder 1 and 1^a is an inking mechanism which may be of any suitable construction, but in the example shown preferably comprises a fountain 4, ductor roll 4^a, drum 4^b, distributors 4^c, a second drum 4^d, and form rolls 4^e, by which the ink is transferred from the second drum 4^d to the plate cylinder.

I provide means for positively driving the printing cylinders and also means for positively driving each inking mechanism independently of the printing mechanism, and for this purpose, as shown in the drawings, a horizontal drive shaft 5 (Figs. 5 and 6) is fixedly journaled in bearings 5^a attached to one end of the base 3^a, and this shaft 5 carries a beveled gear 5^b meshing with a beveled gear 6^b, on a vertical shaft 6, which is journaled in bearings 6^a on the adjacent side frame 3. Shaft 6 carries a beveled gear 6^c which meshes with a beveled pinion 2^c on the shaft of one of the impression cylinders 2, and to the same cylinder, adjacent

gear 2^c, is keyed a pinion 2^d, which meshes with the pinion 2^f on the adjacent cylinder 2^a, and at the opposite end of the machine, pinion 2^e of the shaft of the cylinder 2 meshes with the pinion 1^e on the shaft of the cylinder 1; and a pinion 2^b on the shaft of cylinder 2^a meshes with a pinion 1^b on the shaft of cylinder 1^a. By this means the cylinders are driven at uniform peripheral speeds and directly from the shaft 5. Each of the inking mechanisms below the cylinders 1, 1^a are driven from the shaft 5 by the following means. The drives being duplicate, a description of one will explain both.

On the shaft 5 is a beveled pinion 5ⁿ meshing with a beveled gear 7ⁿ on a vertically disposed shaft 7 journaled in bearings 7^a on the frame 3 and on the shaft 7 is a beveled pinion 7^o meshing with a beveled pinion 4^o on the shaft of the drum 4^b. And on the upper end of shaft 7 is another gear 7^p meshing with a gear 4^p on the shaft of the roll 4^d. A bearing 7^o may be provided for the shaft 7 below the gear 7^p, as indicated in Figures 3 and 6. In this manner the drum 4^b and roll 4^d are positively driven directly from the shaft 5 and independently of the cylinder drives. The gearing is so proportioned that the inking mechanisms are driven in proper unison with the plate cylinders. If desired the several rolls of the printing mechanism may be inter-gearred in the usual manner with the drum 4^b and roll 4^d, but this inter-gearing is not a feature of the present invention, and therefore is not illustrated herein. The frame 3 of the unit has extensions 3^b extending above the printing cylinders which are provided with bearings for guide rollers indicated at 8^a, 8^b and 8^c. The top member 3^b of the frame is as long as the base 3^a, and if two such units are placed side by side as indicated in Figure 1, so that the bases 3^a abut, the top member 3^b will also abut, and when so placed the bases and the top members are securely bolted together at their abutting edges or sides to form a rigid and continuous frame.

The shafts 5 are of such length that when the units are attached together in this manner, the ends of the shafts 5 of adjacent units will be close together, and they may then be united by means of suitable couplings 5^t of the usual type, so that the shafts 5 will operate as one.

Obviously as the printing units are alike in construction and size any number of such units may be placed side by side and united as described, and when so united they will operate as one.

To drive the press or any unit thereof power may be applied directly to the shafts 5 or to any one of such shafts. Preferably when it is desired to have the units capable of being operated individually or in any de-

sired groups, a drive shaft 9 is employed extending the length of the press beside the several units thereof. This shaft 9 may be composed of drive shaft sections, each mounted in bearings 9^a on a section 3 (parallel with the shaft 5) see Figs. 5 and 6, and the drive shaft sections 9 are coupled together by couplings 9^r of any suitable type. The shaft 9 may be connected directly to a motor or other primary driving means, not shown, such as are commonly used in printing presses. The shafts 5 or 9 may be driven by a suitable motor or motors located at any desired point or points. When the units are assembled and connected as shown, the shaft sections 9 form a continuous drive shaft and motion is transmitted from each shaft section 9 to the related shaft section 5 by means of a pinion 9^s on said shaft section 9 and engaging gear 5^s on the adjacent shaft section 5. While I prefer to employ the main drive shaft 9, in some cases the shafts 5 might be directly driven by the motor or motors.

It is to be understood that in some cases the shaft 9 may be omitted and the press or its various units may be driven entirely from the shaft 5, which may be made in sections coupled together as described. In most cases it may be preferred to use the shaft 9 and dispense with shaft sections 5. When the shaft 9 is so used it should extend the entire length of the machine, and be geared to the several units like the shaft 5. Or the shaft 9 may be used with the shaft 5 and in such case the shaft sections 5 need not be connected together, but each shaft section 5 will be operated from shaft 9 as described and drive its related unit. In other words it is not necessary to couple the shaft sections 5 when the shaft 9 is used; and if the shaft sections 5 are coupled together it is not always necessary to provide the shaft 9. Where great flexibility is desired in the press and to insure that the press or any of its units can be operated under all conditions, it is preferably equipped with both the shafts 5 and 9 as above described; and either or both shafts used as desired.

The feed roll section or unit of the press comprises a base 10^a provided with roll supports 10 of any suitable type adapted to carry as many web rolls W as may be desired. The base 10^a is the same size as the base 3^a, and therefore can be abutted against the side of the base 3^a, or if desired can be placed between the bases 3 of two printing units. The top members 10^b of the feed roll unit frame may correspond in length and size with the top members 3^b, of the printing unit frame; and members 10^b can be connected to members 3^b, like members 3^b are connected to each other. The base 10^a is also provided with means for fastening it

to the base 3^a of a printing unit similar to the fastenings of adjacent bases 3. The base 10^a is also provided with web guides (as 10^c, 10^d, 10^e) for the webs and additional web guides may be provided if more than three printing units are employed in the press, if all the printing units are to be fed from the one feed roll unit.

The folder unit has a base 11^a which corresponds in size with the base 3^a, and on the base 11^a is mounted a folding mechanism having a former 11, and folding rolls 11^d and other parts such as commonly used in standard former folders for newspaper presses. In the folder frame and above the former are journaled web guide rollers 11^e and 11^f, over which the webs coming from the press units are directed to the former. On one end of the folder base 11^a is a drive shaft 12 journaled in bearings 12^a and corresponding in position with the shaft 5 of a printing unit. Shaft 12 carries a bevel pinion 12^c meshing with bevel pinion 13^c on the shaft 13 which is suitably geared to a shaft 14 carrying a bevel gear 14^a engaging a bevel gear 15 on the folder driving shaft so that the folder will be driven by the shaft 12. The shaft 12 is driven directly from and in unison with the adjacent shaft 5, to which the folder shaft 12 is connected by couplings 12^e.

The coupling 12^e could be dispensed with when the shaft 9 is employed. In that case the coupling could be used on the shaft 9 and the shaft 12 would be simply a unit driveshaft similar to the shaft 5 of the printing units.

The folder base 11^a is of the same size as the base 3^a of a printing unit and can be bolted to the adjacent printing unit base 3^a just as one base 3 can be bolted to another, as above described.

The frame 11^c of the folder unit is provided with top members 11^b which correspond to the top members 3^b of a printing unit, so that when the folder unit is placed adjacent the printing unit, or between the printing units, the top members 11^b of the folder unit can be bolted to the top members 3^b of the printing unit or units, just as the top members 3^b of adjacent printing units can be bolted together.

The folder unit is thus interchangeable in position with the printing units. When the folder unit is attached to a printing unit the shaft 12 is coupled to the adjacent shaft or shafts 5 of the printing units so that the shaft 12 will be driven from the shaft 5.

If desired the shaft 12 could be geared to shaft 9 instead of shaft 5 or when the shaft 9 is used alone the shaft 12 can be geared to shaft 9 by gears similar to gears 5^s and 9^s.

In Figure 1, the folder unit is shown arranged at one end of a series of three print-

ing units, at the other end of which series is the feed roll unit. In Fig. 2 the folder unit is shown as arranged intermediate two of the printing units.

Each of the printing units may be provided with suitable web guides to direct the webs which pass through the press. If there are three units there would be three sets of guides within each printing unit. As shown, each printing unit is provided with web guides 8^d, 8^e, and 8^f below the cylinders, and with web guides 8^a, 8^b, 8^c, above the cylinders. The webs *w* are led from the rolls *W* on the feed roll unit under suitable guides 10^c, 10^d, 10^e to the web guides 8^d, 8^e and 8^f of the press units and then between the plate and impression cylinders, and up over web guides as 8^c, 8^a, or 8^b, to the guide roller 11^f or 11^e of the folder unit.

Any one familiar with rotary web presses will readily understand how the webs may be led in various ways through the press according to the number of pages which it is desired to print and the number of webs it is desired to assemble at the folder. And the units can be readily provided with such web guides, angle bars and turners and slitters as may be required to enable the webs to be directed through the press and assembled at the folder in any desired manner.

From the foregoing description and drawings, it should be understood that the printing units, the folder units, and the feed roll units are all preferably constructed with bases and top members which are similar in size and which are adapted to be fastened together as above explained; also that any desired number of such units may be placed side by side and fastened together; also that the folder unit can be placed at the end of the series of printing units, or the folder unit can be placed between printing units; also that the feed roll unit can be placed either at the end of the row of units or in an intermediate position as may be desired; also that if it is desired to increase the size of the press all that is necessary is to attach one or more like printing units (as many as may be desired) to the series; and another folder unit or folder units, as may be desired and additional feed roll units, if desired. The various units can be arranged in any order desired, and in whatever order they may be arranged the respective bases 3^a, 11^a, 10^a and top members 3^b, 10^b, 11^b will all fit to each other, and the various shaft sections 5 and 12 will be alined and can be connected and driven as above described.

As will be obvious to those familiar with the art; the great practical advantage of this press is that it may be augmented in size in accordance with the growth of the paper. If each printing unit is adapted

to print say sixteen pages, if that is sufficient for his present news, a publisher would only have to buy one printing unit, one folder unit, and one feed roll unit. As the paper increases in size or circulation he can buy another printing unit and bolt it to one end of the press already installed; or he can separate the units of such press and place the new printing unit between the folder and the first printing unit, or between the latter and the feed roll unit; and as the paper increases in size and circulation, the owner is not put to the expense of buying another press, but can simply add to the original press whatever additional units he requires to enable him to print newspapers of the desired size, or the desired quantity of newspapers.

By independently driving the printing mechanism and the inking mechanisms as described the printing cylinders are relieved of the labor of operating the inking mechanism and vice versa.

I do not herein claim the means for driving the printing cylinders and inking mechanism independently.

I claim:

1. In a printing press, a plurality of similar printing units and a folder unit; each of said units having a similar base frame whereby the said units are interchangeable in position and may be arranged in any desired relation.

2. In a printing press, a plurality of similar printing units and a folder unit; each of said units having a similar base frame and a similar top member whereby the said units are interchangeable in position and may be arranged in any desired relation.

3. A printing press comprising a printing unit; a feed roll unit; and a folder unit; each unit having a base frame of like proportions to the base frame of the other units, whereby the said units are interchangeable in position and may be arranged in any desired relation.

4. A printing press comprising a printing unit; a feed roll unit, each unit having a base frame similar to the base frame of the other units, whereby the said units are interchangeable in position and may be arranged in any desired relation; each printing unit having a shaft section and gearing between said section and the printing and inking mechanisms of each unit; the shaft sections of adjacent units being connectable when the units are connected.

5. In a press as set forth in claim 2, each printing unit also having a drive shaft section beside the first mentioned shaft section; and gearing between said shaft sections; the drive shaft sections of adjacent units being also connectable when the units are assembled in a press.

6. A printing press comprising a printing

unit; a feed roll unit, and a folder unit, each unit having a base frame of like proportions to the base frame of the other units, whereby the said units are interchangeable in position and may be arranged in any desired relation; each printing unit having a shaft section, and gearing between said section and the printing and inking mechanisms of each unit; the shaft sections of adjacent units being connectable when the units are connected.

7. In a press as set forth in claim 6, each printing unit also having a drive shaft section beside the first mentioned shaft section; and gearing between the said shaft sections; the drive shaft section of adjacent units being also connectable when the units are assembled in a press.

8. In a printing press a plurality of similar printing units and a folder unit; each of said units having a similar base frame and a similar top member, whereby the said units are interchangeable in position and may be arranged in any desired relation, each printing unit having a drive shaft section, and gearing between said shaft and the inking mechanisms of such unit; and gearing between said shaft section and the printing cylinders of such unit, the shaft sections of adjacent units being connectable when the units are connected.

9. In a press as set forth in claim 8, each printing unit also having a drive shaft section mounted thereon beside the first mentioned shaft section; and gearing between the shaft sections of the same unit; the drive shaft sections of adjacent units being connectable when the units are assembled in a press.

10. In a printing press, a plurality of similar printing units; a feed roll unit, and a folder unit, each of the said units having a base frame and a top member of similar proportions, whereby the said units are interchangeable in position and may be arranged in any desired relation.

11. In a printing press as set forth in claim 10, each printing unit having a drive shaft section, and gearing between said section and the printing and inking mechanisms of such unit; the shaft sections of adjacent units being connectable when the units are connected.

12. A printing press comprising a printing unit; a feed roll unit, and a folder unit, each unit having a base frame of like proportions to the base frame of the other units, whereby the said units are interchangeable in position and may be arranged in any desired relation; each printing and folding unit having a shaft section, the said shaft sections of adjacent units being connectable when the units are connected; gearing between the said shaft section of each printing unit and the cylinders and inking mech-

anisms of such unit; and gearing between the shaft section of the folder unit and the folding devices. sections of the same unit; said drive shaft sections of adjacent units being connectable when the units are connected. 10

13. In a press as set forth in claim 12, each printing press unit having a drive shaft section mounted thereon beside the first mentioned shaft and gearing between the shaft In testimony that I claim the foregoing as my own I affix my signature.

HENRY F. BECHMAN.