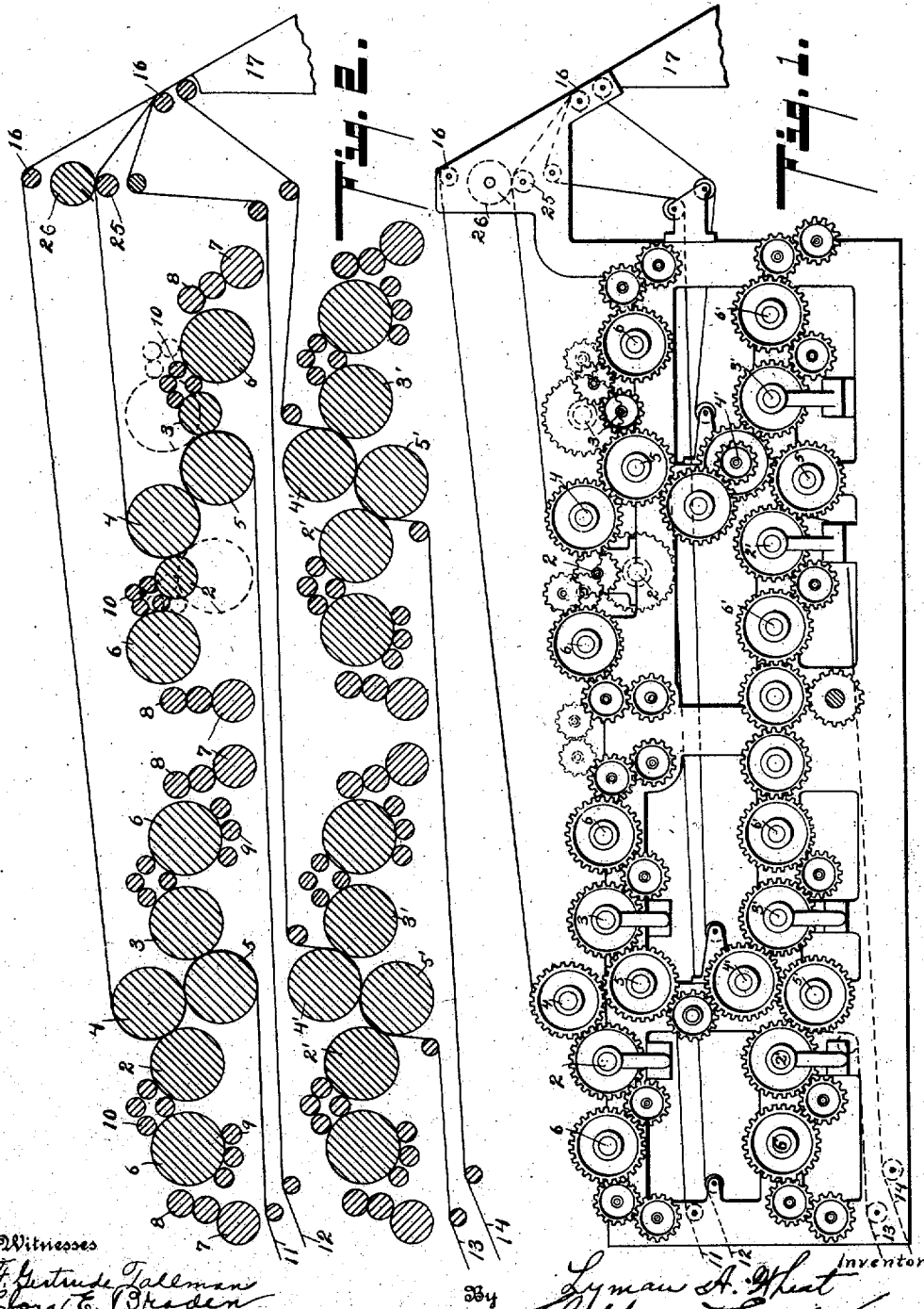


L. A. WHEAT.
DOUBLE LINE ROTARY PRESS.
APPLICATION FILED APR. 3, 1909.

Patented Oct. 25, 1910.

4 SHEETS—SHEET 1.

973,599.



Witnesses
F. Gertrude Tallman
Clara E. Braden

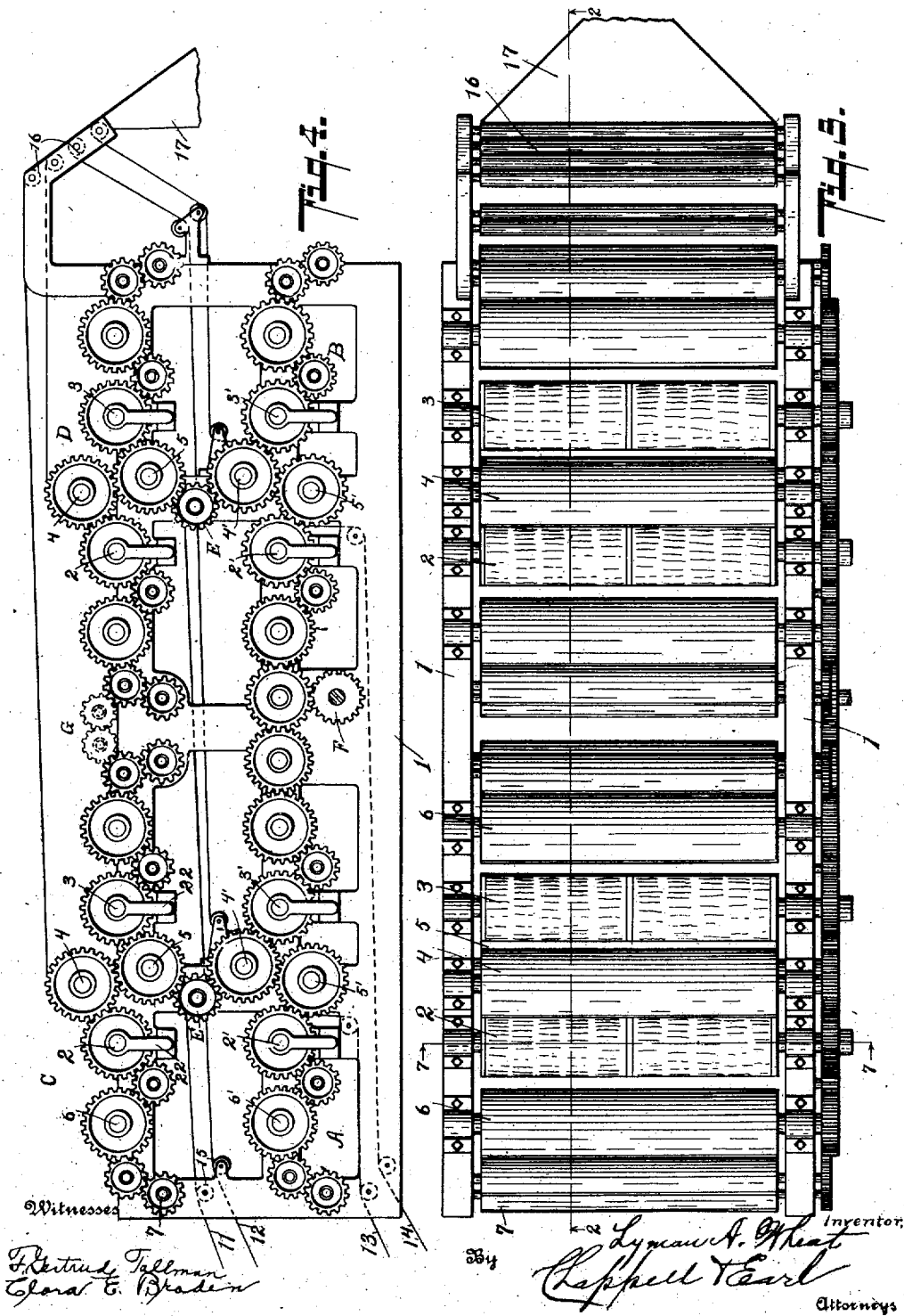
Lyman A. Wheat Inventor
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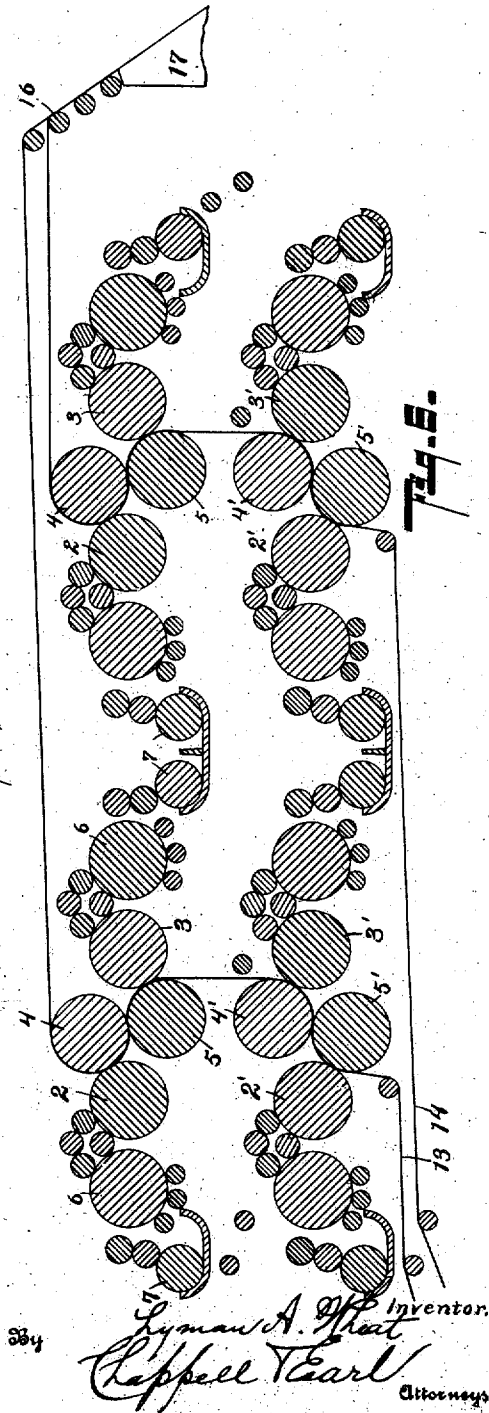
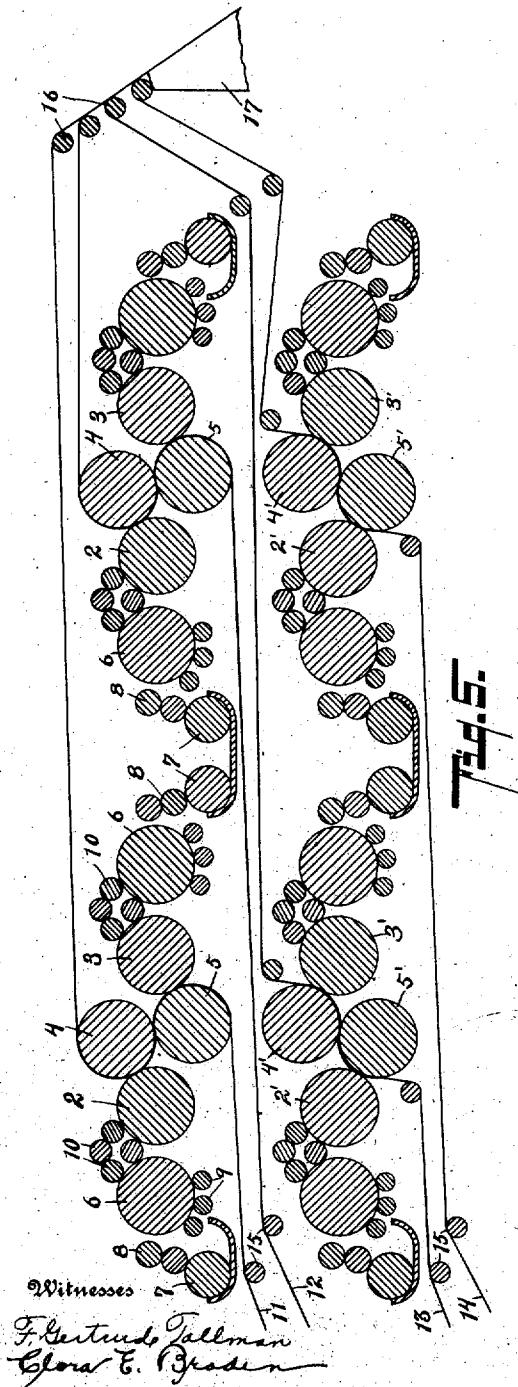


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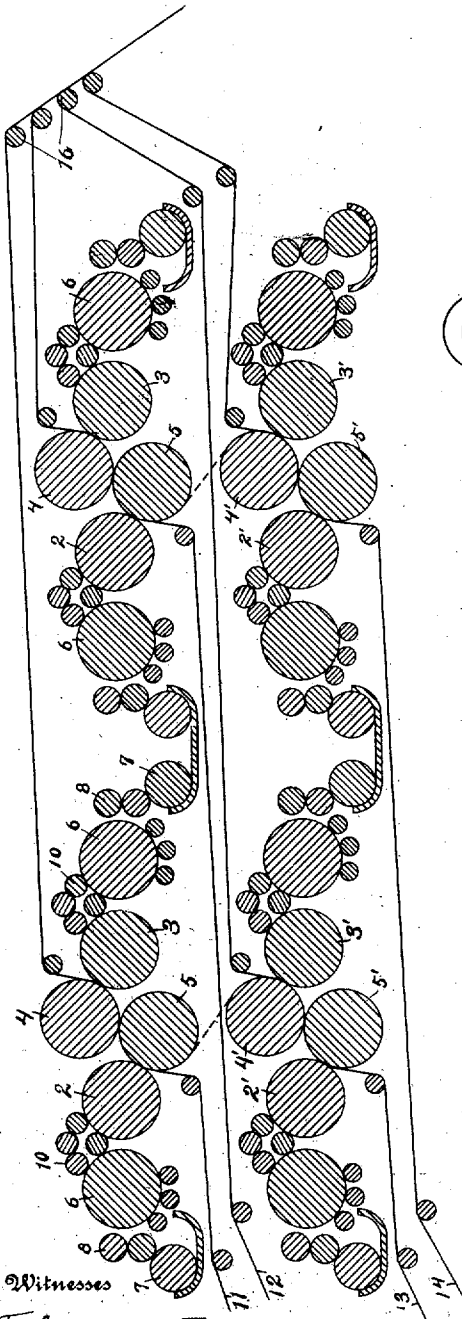


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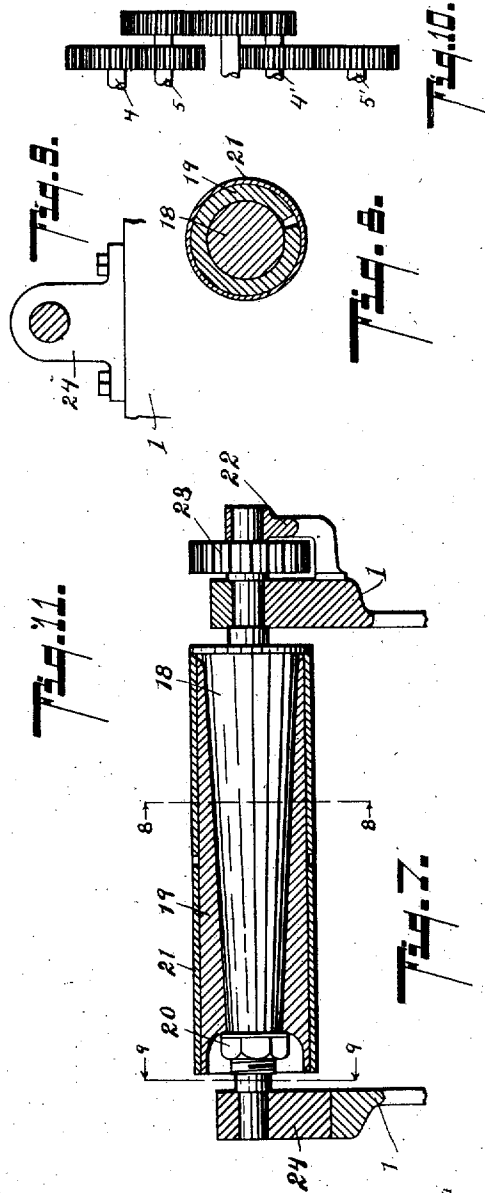
Patented Oct. 25, 1910.

4 SHEETS—SHEET 4.

973,599.



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UNITED STATES PATENT OFFICE.

LYMAN A. WHEAT, OF BATTLE CREEK, MICHIGAN.

DOUBLE-LINE ROTARY PRESS.

973,599.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed April 3, 1909. Serial No. 487,677.

To all whom it may concern:

Be it known that I, LYMAN A. WHEAT, a citizen of the United States, residing at the city of Battle Creek, county of Calhoun, State of Michigan, have invented certain new and useful Improvements in Double-Line Rotary Presses, of which the following is a specification.

This invention relates to improvements in double line rotary presses.

The objects of this invention are to provide a double line rotary press of large capacity in which the paging can be in multiples of two.

A further object is to provide an improved construction of integral or continuous electrotypes or stereotype plate for rotary presses.

A further object relating to details is to provide a construction of press in which single-plate and double-plate stereotype cylinders may be interchanged, whereby the capacity of the press can run two, four, six, eight, ten, twelve, fourteen, sixteen, and multiples of two up to the capacity of the press, which with plates two pages long, as illustrated, would be 32 pages.

A further object is to provide an improved means of supporting the mandrels for such cylinders, making them accessible.

A still further object is to provide an improved construction of mandrel adapted for use in this relation which is expandable whereby cylindrical plates may be adjusted and supported in any position thereon to secure proper register, said tubular cylindrical plates being adapted to be inserted over the end of the mandrel and its adjustable shell.

Further objects, and objects relating to details of construction, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is fully illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure 1 is a side elevation view of a printing press embodying the features of my invention, the same being arranged for a single-plate cylinder for one of the perfecting mechanisms, the gears for the double-plate

perfecting mechanism being indicated by dotted lines. Fig. 2 is a longitudinal view, taken on a line corresponding to line 2—2 of Fig. 3, through the various cylinders and ink-rolls, drums and guides constituting the machine, the rolls all being shown conventionally, the details of the construction not being indicated. Fig. 3 is a plan view of the entire structure with the larger plate cylinders in place. Fig. 4 is a side elevation similar to that appearing in Fig. 1, in which the machine is adjusted for the full double-plate or plates of even size throughout the entire machine, like those appearing in Fig. 3. Fig. 5 is a sectional view, similar to the sectional view of Fig. 2, except that the rolls are all shown of the same size, either single-plate or double-plate. Fig. 6 is a similar sectional view to Fig. 5 in which the machine is threaded up with a web for color work. Fig. 7 is a longitudinal sectional view taken on line 7—7 of Fig. 3. Fig. 8 is a transverse detail sectional view of the plate cylinder taken on line 8—8 of Fig. 7. Fig. 9 is a detail sectional view on line 9—9 of Fig. 7, showing the detail of the construction whereby the end box is removable and the plate made accessible. Fig. 10 is a detail view of the gears which are in use when one of the perfecting mechanisms is of the single page size. Fig. 11 is a detail sectional view, similar to that appearing in Fig. 2, showing a modified arrangement of the plate and impression cylinders whereby different threading of the web is possible.

In the drawing, the sectional views are taken looking in the direction of the little arrows at the ends of the section lines, and similar numerals of reference refer to similar parts throughout the several views.

Considering the numbered parts of the drawing, the frame is made up of the sides 1—1 of the construction usual for double line presses. The particular press that I have illustrated here is made up of four perfecting mechanisms, two on the lower level and two on the upper level, exactly superimposed, which perfecting mechanisms I will call A, B, C and D, respectively. These perfecting mechanisms are coupled together by suitable intermediate gears E and are driven from the gear F below. The single intermediate gear E might be made use of with intermediate gears G interposed between the upper perfecting mechanisms

C and D, but it is found that the driving is most effective by the intermediate gears E. These gears are adjustable so they can be moved into or out of mesh, depending on

what perfecting mechanisms are to be used.

Each perfecting mechanism of the upper tier C—D is made up of the plate cylinders 2—3 and impression cylinders 4—5, the same being geared together so that the gear of the cylinder 2 meshes with the impression cylinder 4, and the plate cylinder 3 meshes with the impression cylinder 5, and the gears of the impression cylinders 4 and 5 mesh together.

Inking rollers and mechanisms consist of the drum 6, the various rolls 7, 8, 9 and 10 being provided for the plate cylinders. The perfecting mechanisms of the lower tier are made up of the plate cylinder 2', the gear of which is arranged to mesh with the impression cylinders 5', and the plate cylinder 3', the gear of which is arranged to mesh with the impression cylinder 4', and the gears of the impression cylinders 4' and 5' intermesh. Such variation secures a slightly different course for the web of paper through the machine, and enables the same to be delivered to better advantage from the lower tier of the perfecting mechanisms A—B to the upper tier C—D when color work is required, such threading being clearly indicated in Fig. 6, where one color is printed on the lower tier and another color on the upper tier.

The inking fountain is divided and has two compartments, where color work is required, to enable the whole or part of the paper to be produced in that way. The web of the paper 11, for ordinary plain work, is delivered through the perfecting mechanism C and passes over the rollers 16 to the folder 17. A web 12 is threaded through to the perfecting mechanism D and delivers out to the guide rolls 16 to the folder 17. A web 13 delivers to the perfecting mechanism A and passes out over suitable guides to the rolls 16, thence to the folding mechanism, and a fourth web 14 delivers (see Fig. 5) to the perfecting mechanism B, and thence out over suitable guides.

When it is desired to print in two colors, the web 13, when passing through the perfecting mechanism A, passes directly upward to the perfecting mechanism C where the second color is applied, and it then passes to the guide rolls of the folder. Where the whole publication is to be printed in two colors, the web 14 is threaded into the perfecting mechanism B and thence passed upward to the perfecting mechanism D, where the second color is applied and the same passed to the folder mechanism.

In Fig. 11, I show a modification in which the perfecting mechanisms of the upper and lower tiers are the same as that illustrated

in the lower tier of that to which I have already referred. The manner of threading for the purposes clearly appears from an inspection of the said Fig. 11.

The mandrel, on which the tubular plates are supported, is made collapsible, having a conical portion 18 and a corresponding sleeve portion 19, which slips onto the same and expands to the proper dimension, being retained in place by a nut 20. The outer box, 24, is removable, being secured in place by suitable bolts, and, when it is slipped off, the plates 21, which are complete tubes, are slipped to proper position and the mandrel expanded into the same by crowding the sleeve portion 19 onto the conical portion 18 by means of the nut 20. The mandrel is driven from its gear 23, the shaft being supported by an additional supporting bracket 22. The box 24, and the manner in which it is secured in place by cap screws or bolts, clearly appears in Fig. 9. By making the boxes of both ends removable, it will be seen that the mandrels can be readily taken out and mandrels of another size substituted, so that mandrels of half size, indicated in Fig. 1, may be used, preferably for the perfecting mechanism D. This requires a slightly different arrangement of the impression rolls of larger size to permit of the introduction of the smaller plate roll, and have it move into proper relation with the impression cylinder, which clearly appears from an inspection of Fig. 2, where the full-sized or double page plate rolls are indicated by dotted lines and the single page plate rolls, so-called, are indicated by the full lines. The difference will readily appear by comparison with the perfecting mechanism beneath it. This changing is capable of accomplishment by simply substituting the mandrels for the different sized plates, which is practical and easily accomplished, and, by this method, the capacity of the machine is not impaired, as it would be if all plates were of the single page size for the purpose of securing proper multiples of two.

Where the single page plate is made use of, it is necessary to change the gear and reduce the surface rate of the single page plate one half. For that purpose, gears, as indicated in Fig. 10, of different sizes are substituted and put in place to secure the proper rate of movement. The web 12 then travels at only one-half the rate of the other webs and must be divided into one page lengths or the shorter lengths, as it approaches the folder. This is done by a cut-off device arranged in the rolls similar to that made use of in folders which grip the paper after it is severed and insures its being properly fed, the roller 26, with the cutter 25, being in dimensions to correspond with the size of the plate cylinder. I have

shown this cutter 25 in conventional form, as appears in Fig. 2. The web 13 is brought up by suitable guides underneath this roll so that the page that is cut off travels upon it after it has been engaged by the feed rolls, and the whole is fed along together into the folder mechanism. I desire to comment in this behalf that, while the special form of plate and means for supporting it is perfectly adapted to this form of press and is especially designed for it, yet the press itself will be very effective when arranged in this way, no matter how the plates may be supported on the cylinder, whether they are the semi-circular plates or the full tubes, whether by some process the printing cylinders are made solid and are supported on suitable driven journals from the ends.

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

1. In a double line rotary press, the combination of perfecting mechanisms arranged in tiers one above the other, each perfecting mechanism consisting of couples of printing and impression cylinders, the impression cylinders being arranged centrally and one above the other and the impression cylinders being geared to coact, the impression cylinders being provided with gears that mesh the one with the other, one set of such mechanism being provided with detachable boxes whereby the printing cylinders may be removed and those of a different size substituted, and suitable changeable intermediate gears by which the speed of such impression cylinders is made to correspond to their dimensions; a folder; a cut-off feed mechanism for any web that is to move at a lower rate arranged in proximity to the folder whereby the severed sheet drops into the folder and is engaged by the more rapidly moving webs as they advance, all coacting substantially as described and for the purpose specified.

2. A type cylinder for rotary presses consisting of a tapered mandrel 18 suitably driven from a gear 23; an adjustable expansible shell 19; a nut 20 on a screw on the end of said mandrel for expanding the said shell 19 by pressing it onto the tapered mandrel 18; tubular plate cylinder 21 forming a closed tube or cylinder around the said expansible shell; and a removable support and box for the outer end of said mandrel to permit the placing of said tubular plate cylinder on the said mandrel over the end thereof, all coacting substantially as described and for the purpose specified.

3. A type cylinder for rotary presses consisting of an expansible shell; a tubular plate on the same, said shell being provided with supports and journal boxes, at each end, one of which supports and journal

boxes is removable, whereby the tubular plate can be passed over the end of said cylinder and expansible shell, coacting for the purpose specified.

4. In a double line rotary press, the combination of a series of perfecting mechanisms, each perfecting mechanism consisting of couples of plate and impression cylinders, the impression cylinders being geared to coact with and being provided with gears that mesh the one with the other, one set of such perfecting mechanisms being provided with cylinders of half the diameter of the others, whereby multiples of the unit of the press may be effectively produced by combining the perfecting mechanisms having the smaller cylinders with the perfecting mechanism having the larger cylinders; a folder and cut-off means for severing the web that moves at the lower rate from the smaller cylinder into sheets in proximity to the folder, so that they will be delivered with the more rapidly moving webs.

5. In a double line rotary press, the combination of a series of main perfecting mechanisms consisting of couples of plate and impression cylinders, of comparatively large size, capable of printing a plurality of pages on their circumference with gears for driving the same; a perfecting mechanism with plate cylinders of small size capable of printing one page on their circumference arranged to coact with any one or any combination of the remaining perfecting mechanisms of the series containing the cylinders of larger diameter; a gear connection for said smaller cylinder perfecting mechanism timed to rotate at the proper rate to deliver its single page, whereby multiples of the unit of the press may be effectively produced by combining the various perfecting mechanisms; a web guiding means for each perfecting mechanism; and a cutting mechanism for cutting the web of the small cylinder perfecting mechanism into sheets, coacting as specified.

6. In a double line rotary press, the combination of a series of main perfecting mechanisms, consisting of couples of plate and impression cylinders, of comparatively large size, capable of printing a plurality of pages on their circumference with gears for driving the same; a perfecting mechanism with plate cylinders of small size capable of printing one page on their circumference arranged to deliver and coact with any one or any combination of the remaining perfecting mechanisms of the series containing the cylinders of larger diameter; means for detachably securing said small plate cylinder perfecting mechanism in place; a gear connection for said smaller cylinder perfecting mechanism timed to rotate at the proper rate to deliver its single page, whereby multiples of the unit of the press may be effectively

tively produced by combining the various perfecting mechanisms; a web guiding means for each perfecting mechanism; a perfecting mechanism with full size printing cylinder with means of detachably securing the same in place whereby it can be substituted for said small plate cylinder perfecting mechanism; and a cutting mechanism for cutting the web of the small cylinder

perfecting mechanism into sheets; and a 10 folding mechanism, coacting as specified.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

LYMAN A. WHEAT. [L. S.]

Witnesses:

EDWIN C. LEWIS,

ERWIN A. SALISBURY.