

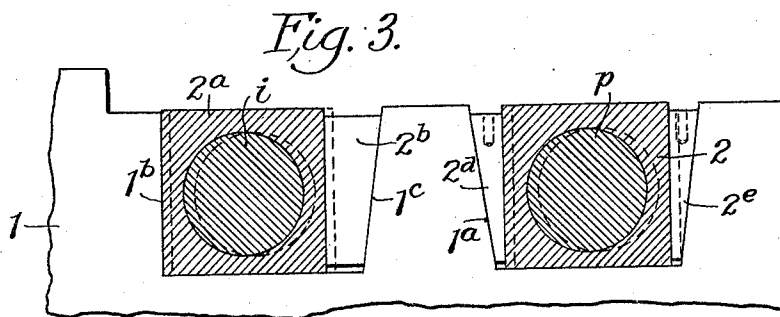
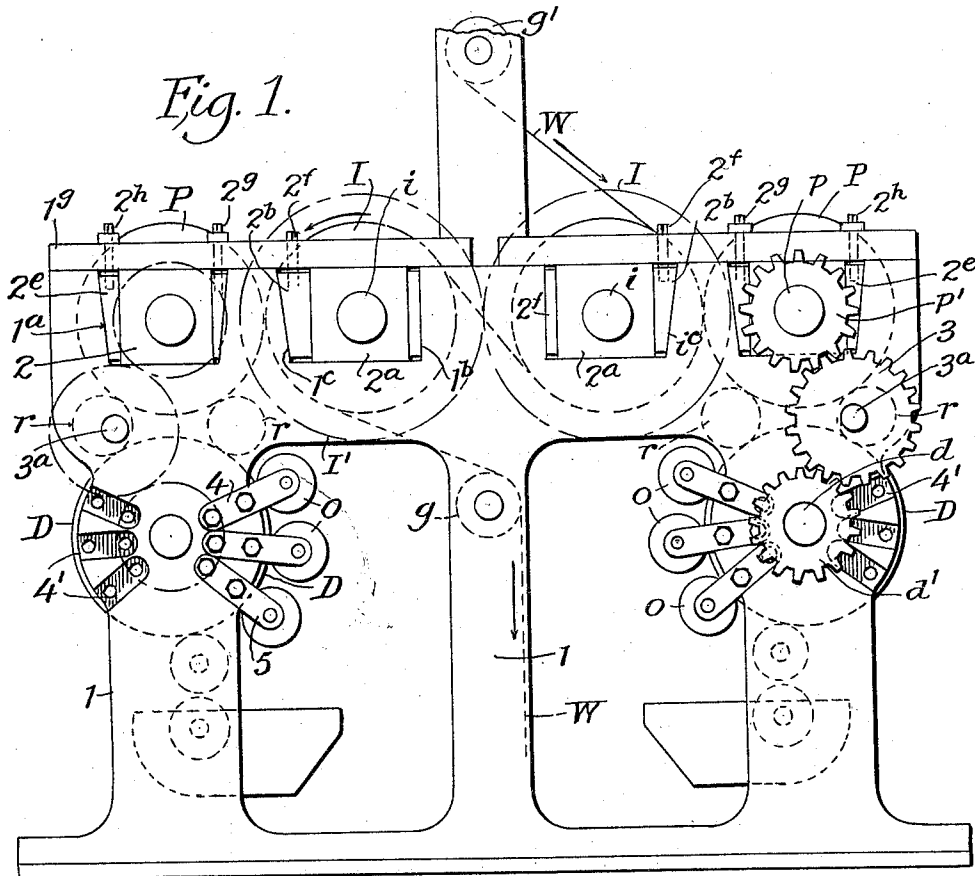
March 14, 1933.

H. F. BECHMAN

1,901,076

CHANGEABLE ROTARY PRESS

Original Filed Sept. 13, 1924 2 Sheets-Sheet 1



Inventor
Henry F. Bechman (Deceased)
City National Bank & Trust
Company of Battle Creek (Administrator)

Alexander Swell
Attorneys

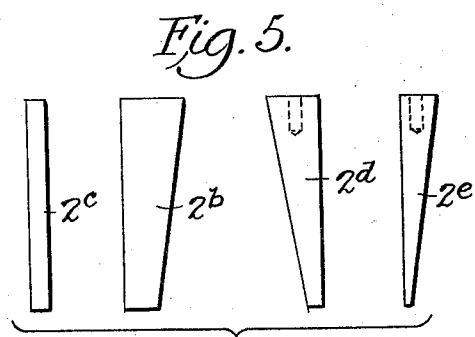
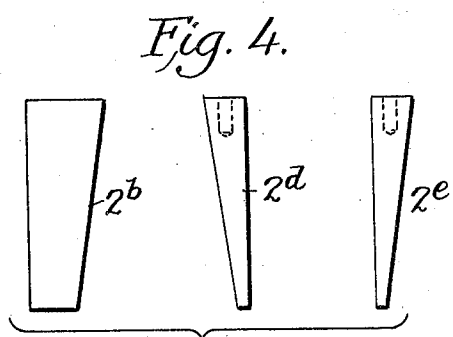
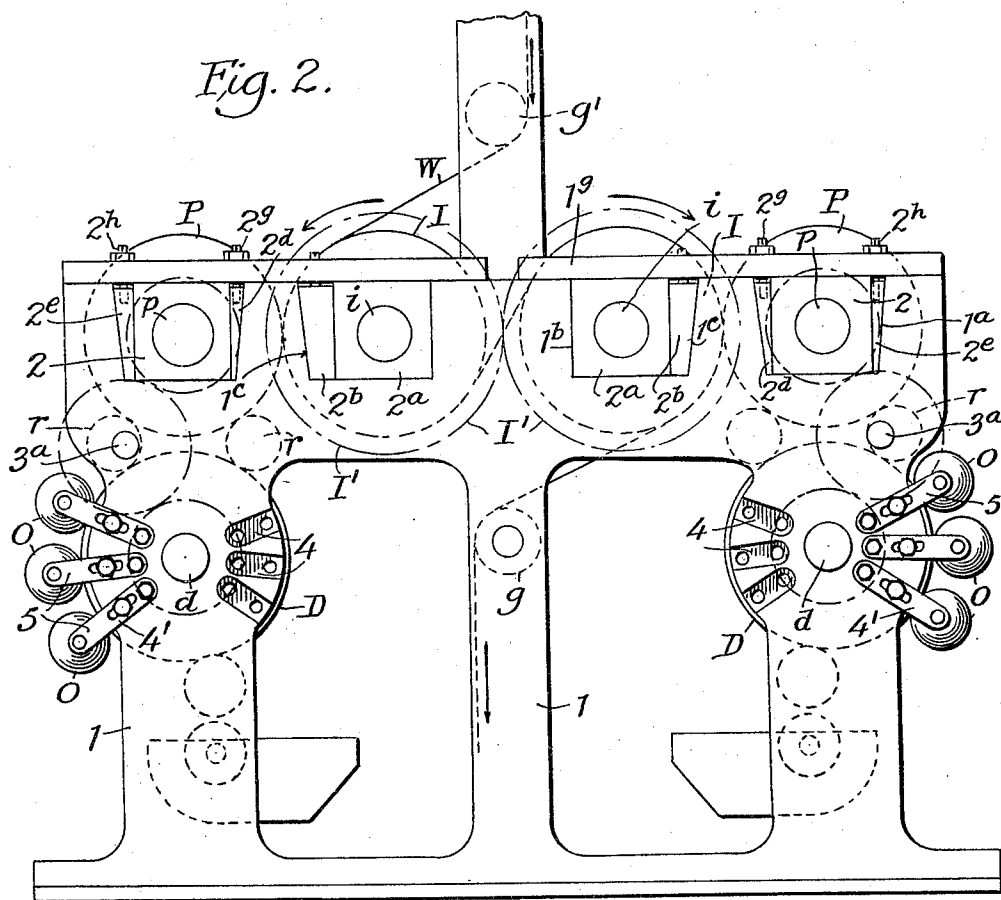
March 14, 1933.

H. F. BECHMAN

1,901,076

CHANGEABLE ROTARY PRESS

Original Filed Sept. 13, 1924 2 Sheets-Sheet 2



Inventor
Henry F. Bechman (Deceased)
City National Bank & Trust
Company of Battle Creek (Administrator)

By *Alexander Swell*
Attorneys

UNITED STATES PATENT OFFICE

HENRY F. BECHMAN, DECEASED, LATE OF BATTLE CREEK, MICHIGAN, BY CITY NATIONAL BANK & TRUST COMPANY OF BATTLE CREEK, OF BATTLE CREEK, MICHIGAN, ADMINISTRATOR, ASSIGNOR TO DUPLEX PRINTING PRESS COMPANY, OF BATTLE CREEK, MICHIGAN, A CORPORATION OF MICHIGAN

CHANGEABLE ROTARY PRESS

Original application filed September 13, 1924, Serial No. 737,553. Divided and this application filed May 5, 1930, Serial No. 450,008. Renewed August 16, 1932.

This application is a division of Henry F. Bechman's application for changeable rotary press, filed Sept. 13th, 1924, Serial No. 737,553, and is filed in compliance with official requirement for division.

This invention is an improvement in rotary web printing presses adapted for printing newspapers, and its object is to produce a press which can be easily and quickly altered to produce a newspaper of another desired length of sheet, by substituting for the printing and impression cylinders therein other like cylinders of the proper size; and which press can be readily changed so as to allow the direction of run of the web to be reversed by reversing or changing the position of the ink distributing rollers.

To make more clear the object of the invention, it should be understood that large newspapers are customarily printed on rotary web presses and these papers are usually either approximately $21\frac{1}{2}$ " ; $22\frac{3}{4}$ " ; or $23\frac{3}{8}$ " in length; and the plate and impression cylinders are usually made two sheets long in circumference and therefore for the said lengths of sheets the cylinders of the press would be $13\frac{3}{4}$ " ; $14\frac{1}{2}$ " ; or 15" in diameter, respectively.

These large newspaper presses are practically only built to order, (unless the publisher can find a second hand press which would suit him) and the plate and impression cylinders therein are made of the proper diameter to print the particular length of sheet desired by the publisher; and the press is constructed and adapted to economically and efficiently print pages of one particular length. Furthermore, cylinders, frames, gearing, etc., of the press are not usually manufactured until the order (determining the length of sheet) is given, as it would throw an immense financial burden on manufacturers to carry large newspaper machines for different sizes of pages in stock.

It frequently happens that after a newspaper publisher has purchased one or more presses adapted to print a given size of page, conditions change, which make it desirable for him to alter the length of pages in his papers; and heretofore in order to do this

he has had to expend a large amount of money and time in exchanging his old presses for new ones adapted to print the desired page length.

Another practical difficulty hitherto experienced by press owners has been in regard to the location of the paper web supply. Some newspaper plants are so arranged that it is advantageous to feed the web into the press from above, and in others the web must be fed from below. The direction of revolution of the cylinders, ink drums and ink rolls of a printing press must be in harmony with the direction of the paper travel; and the direction of the paper travel and the direction of rotation of the ink drum and the position of the ink rollers which distribute the ink on the ink drums depends upon the direction of rotation of the plate cylinders; and if the direction of run of web is changed, the direction of rotation of the plate cylinders must be changed, and the direction of rotation of the ink drum must be correspondingly changed; and therefore the position of the adjustable ink distributing rollers must be changed, because the ink must be distributed between the point of the ink supply to the drum and the form rollers which transfer ink from the drum to the printing surfaces on the plate cylinders. At times it is advantageous or necessary to make this change in direction of run of the web after the presses have been installed.

Newspaper presses constructed in accordance with the present invention will enable the newspaper owner to change the length of the page without having to buy an entirely new press, as the plate and impression cylinders therein can be removed and substituted by like cylinders of a size adapted to print the desired length of page without necessitating any other material changes in the press; and also will enable the ink drum to be rotated in either desired direction, according to the desired run of the web through the press either up or down, as the ink distributing rollers are made changeable from one side of the ink drum to the other, so that they can be properly located between the point of ink supply to the drum and the

form rollers. This invention also enables the manufacturer to practically "stock" machines for printing any desired length of page at practically one third the cost heretofore involved in so doing; and allows alterations in size of presses to be made at a much smaller expenditure of time and money than heretofore; and also allows changes in position of the paper supply and run of the inking mechanism with practically no change in the printing section; and all the said changes can be made very quickly and economically when desired. If a newspaper publisher has presses made in accordance with the present invention he can change his paper from one size or length of page to another, or change the direction of the run of the web as stated, and such changes can be made if necessary in the newspaper plant without "losing an edition", because the time and labor required to make such changes is so much less than that required for taking down one press and installing another in its place.

In carrying out the invention, the frames of the press are built with openings to receive the cylinder boxes, and allow them to be adjusted in the various positions necessary for different sized cylinders; and interchangeable filling pieces or blocks are provided to correctly position the boxes according to the sizes of the different cylinders.

The frames of the press are also so built that the supports for the ink distributing rollers can be interchangeably positioned at either side of the inking drum so as to come between the ink supply and form rollers; and with these few changes the press can be readily adapted to print papers of any one of the usual length of page.

To enable others skilled in the art to readily understand and adopt the invention, the invention is described with reference to the accompanying drawings, which illustrate one perfecting unit of a printing press embodying the invention; it being obvious that if more than one perfecting unit is employed all the perfecting units are constructed substantially alike. Reference is made to the appended claims for summaries of the essentials of the invention and novel features of construction and novel combinations of parts for which protection is desired by this application.

In said drawings:

Figure 1 shows a side elevation of a press equipped with cylinders adapted to print pages say $22\frac{3}{4}$ " in length and arranged for the web of paper to be led into the press from beneath.

Figure 2 shows the same press equipped with a larger size of cylinders adapted to print pages say $23\frac{1}{8}$ " in length, and also arranged for the web of paper to be led in from above.

Figure 3 is a detail view showing the rela-

tive position of the journal boxes of a pair of plate and impression cylinders and filling in pieces.

Figure 4 is a detail view of the wedges and filling in pieces used to position the journal boxes of one size of cylinders.

Figure 5 is a detail view of a set of interchangeable wedges and filling in pieces used to position the journal boxes of another size of cylinders.

The frame of the press may be of any suitable construction and each side frame 1 is provided at its top end with pairs of openings 1a, 1b for the journal boxes 2, 2a of the shafts *i* and *p* respectively of the impression cylinders I and plate cylinders P. These cylinders are preferably arranged parallel and in approximately the same plane; with the impression cylinders I between the plate cylinders P.

The openings 1b are larger than the journal boxes 2a of the impression cylinders I so as to permit the journal boxes 2a of different sized impression cylinders to be interchangeably placed in the openings 1b. The journal boxes can be securely confined in said openings by means of suitable interchangeable wedge shaped filler plates 2b, interposed between one side of the boxes and the inclined side 1c of the openings 1b, as shown in Figures 1, 2 and 5. If desired filler plates or shims 2c of suitable thickness can be interposed between the opposite vertical side wall of the opening 1b and the boxes, as indicated in Figure 1.

The openings 1a are also larger than the boxes 2, so as to permit journal boxes of plate cylinders of different sizes to be interchangeably placed in the openings 1a. The boxes 2 can be accurately positioned in the openings 1a by means of wedge plates 2d and 2e, which are interposed between the opposite sides of the boxes 2 and the oppositely inclined sides of the openings 1a.

By vertically adjusting the wedges 2d, 2e, boxes 2 can be adjusted laterally toward or from the boxes 2a and correspondingly adjust the plate cylinders toward or from the related impression cylinders. Interchangeable sets of wedge plates 2b, 2d, 2e and shims 2c can be provided or kept in stock by the manufacturer to suit the size of boxes 2, 2a of the cylinders to be used in the press.

The wedge plates 2b, 2d, 2e can be readily adjusted by any suitable means. As indicated in Figures 1 and 2, bolts 2f, 2g, 2h are tapped through a cap plate or bar 1g attached to the top of the side frames 1 and closing the top of the openings, as usual in press construction.

In Figure 1 the cylinders I and P are of a smaller size than are the similar cylinders I and P in Figure 2, and the shims 2c are employed as in Figure 1, so as to set the smaller impression cylinders I further outward in

the slots 1*b* and toward the related plate cylinders P. The wedges 2*b*, 2*d*, 2*e* are so adjusted that the peripheries of the plate and impression cylinders will properly coact as required in printing the web.

In Figure 2 the plate and impression cylinders P and I are slightly larger than the plate and impression cylinders P and I in Figure 1 therefore the shims 2*c* are omitted, and the wedges 2*b* are properly adjusted to so locate the boxes 2, 2*a* that the peripheries of the cylinders P and I will be in proper operative relation.

The two impression cylinders I, I are preferably intergeared as usual by means of gears I', only the pitch line of said gears being indicated in broken lines in Figures 1 and 2. As usual the plate and impression cylinders in each pair are intergeared by gears on the opposite ends of the cylinder shafts, said gears having their pitch or runing line in line with the peripheries of the cylinders, thus driving the cylinders in unison in the usual manner; such gears are well known and are not shown, as their addition to the drawings would simply obscure same.

Each plate cylinder received ink, as usual, from form rolls *r*, *r*, taking ink from a drum D arranged below the related plate cylinder. Each drum D is driven in proper time and relation with its related plate cylinder by means of a gear *p*' on the plate cylinder shaft meshing with an intermediate gear 3 mounted on a stud 3*a*, and in turn meshing with a gear *d*' on the shaft *d* of the drum D.

Ink is supplied to the drum D by any suitable means, preferably by a fountain located therebeneath in the usual manner, such ink supplying devices are common and well understood and may be of any desired kind.

As shown in Figure 1, the web W is led in from below over a guide *g* and then passed between one plate cylinder P and its related impression cylinder I, then down between the impression cylinders, and then up between the second impression cylinder and its related plate cylinder, to and over a guide *g*'; and thence to a folder (not shown). Consequently in this construction, the ink distributing rollers O must be arranged at the inner side of the drum and between the ink supply to the drum and the innermost form roller.

As shown in Figure 2, the web W is led from above downward past the guide *g*', then between the first pair of plate and impression cylinders P and I; then up between the impression cylinder I; then down between the second pair of impression cylinders I and P; then down and over the guide roller *g*, and then down to a folder (not shown). In this construction the direction of rotation of the cylinders and drums is opposite their direction of rotation in the construction shown in Figure 1. Consequently the distributing

rollers O must be placed at the outside of the drum between the ink supply to the drum and the outermost form roller.

From the foregoing description and the drawings, it should be clearly understood that the main frames, drums, ink rollers, ink supply, cylinder bearings, and in fact practically all of the important and expansive parts of the press, remain the same and are used whatever length of page is printed; and that all that is necessary in order to change the press to print another length of page is to remove the plate and impression cylinders and their gears and replace them by like cylinders and gears of the proper size, and properly position the latter in place. If only the lead of the web is to be reversed, it is only necessary to shift the ink distributing rollers from one side of the drum to the other.

Thus, referring to Figures 1 and 2, in order to change the press from the size of machine shown in Figure 1 (printing a certain length of page) to the size of a machine such as shown in Figure 2, (to print a different length of page) all that is required is to substitute for the cylinders of the diameter shown in Figure 1, the like cylinders of the diameter shown in Figure 2; and substitute gears I', P', of the proper size, and substitute spacing pieces or wedges 2*a*, 2*d*, 2*e* of the proper size. In some cases, the intermediate gear 3 may be replaced if desired.

If the stub carrying gear 3 should be made adjustable it will never be necessary to change the gear 3, but merely shift its position. This will be understood by pressmen and is not a material feature. If it is desired to change the speed of the drum in some cases the gear *d*' may be replaced.

If the direction of run of the web remains the same as in Figure 1, when another size of cylinders are substituted in such press, it would not be necessary to change the position of the ink distributing rollers O; but if the direction of run of the web is reversed then the distributing rollers O should be shifted to the position indicated in Figure 2.

Oppositely tapered wedge for adjusting movable bearings have been heretofore used. In the present invention the tapered face of the wedge impinges against the tapered or inclined face of the opening in the frame; and the wedge moves in line with the screw adjustment, that is it is at right angles to the direction of the applied pressure. It will be seen that the side of the wedge plates 2*d*, 2*e* which impinges against the inclined side of the opening in the side frame has its face inclined complementary to the face of the opening. The wedges 2*b*, shown in connection with the impression cylinders, are not used for adjustment but simply as filler pieces so as to permit the easy insertion of the rectangular impression cylinder bearings in

the openings of the frame, and secure same in proper position. After setting the bearings in proper position the wedge 2b is inserted and tightened by the screw 2f which locks the bearing firmly in place in the frame opening. This construction obviates the close fitting which would otherwise be necessary on the rectangular filler pieces 2c (if used) and requires only exact fitting of the cap 1g and of the bottom of the slots in the frame. Wedges 2b are locking means only; but wedges 2d and 2e are both locking and adjusting means. It is not necessary for wedge plates 2b to have screw adjustment for two directions and therefore I have not shown in the drawings threaded holes in wedges 2b. The wedges 2d and 2e may for adjusting purposes require motions both upward and downward and consequently threaded screw holes are indicated therein.

It will be noted that each of the openings is larger at top than at bottom, and each has at least one inclined side which are matters of real practical importance. Further the bearing boxes and wedges in all adjusted positions practically completely fill the openings in the frame, the angular sides of the openings fitting the angular sides of the wedges and the wedges hold the boxes firmly, and the large contact surfaces of the wedge with the box and the side of opening provide solid substantial abutments to receive the printing pressure in each and every adjusted position of the boxes, and the threads of the adjusting screws have to stand only the comparatively slight aligning pressure of the wedges.

Forming the openings with inclined sides and wider at the top than at the bottom enhances the strength of the frame and at the same time enables the press builder to conform to the requirements of the trade.

Newspaper press builders are handicapped by standard page lengths which have become established in the printing trade. There are at present three standard lengths of pages used, and each necessitates use of mating cylinders of a certain fixed diameter and a certain fixed center distance between such cylinders. In order to make the openings in the frame large enough to support a bearing with three different dimensions of center distances and still retain the supporting metal of the frames between the openings strong to support or resist the immense pressures required between the plate and impression cylinder in modern newspaper presses, the shape of the openings in the frame become very important. If these openings were shaped in the ordinary manner the section of metal (between the openings) which resists the pressure would be weakened at the point where the strain is applied, and the construction would not stand the speeds or pressures now used in newspaper presses.

By properly shaping the frames, arranging the general positions of the cylinders, proportioning the cylinder bushings, providing adequate holding means for locking these elements together, and providing proper inking means and web guides there is produced a novel and practical interchangeable-size rotary cylinder press for newspaper work; which is of great value to newspaper press builders and publishers. The invention enables the press builders to build and put out presses which with the same frames, the same inking mechanisms, the same journal adjusting devices, and interchangeable cylinders can be used for presses whose cylinders may vary up to three inches in diameter according to the length and size of the page of paper desired to print. This obviously saves large expenses in the initial manufacture of presses to print different sizes of pages; and the capability of having his press when purchased for one size of page readily altered to print pages of another length by merely substituting new cylinders therein, is a great advantage and saving of time and expense to the users of the presses.

What is claimed is:

1. In a rotary cylinder web printing press, a main frame provided with a plurality of aligned openings in each side frame for the reception of journal boxes, each opening having an inclined side; rectangular journal boxes mounted in said openings; plate and impression cylinders mounted in said boxes, said cylinders being changeable in accordance with the length of page to be printed wedge plates for laterally adjusting the plate cylinder boxes in their openings in accordance with the size of the cylinders employed, means for adjusting the wedges and means for leading a web through the press and between the plate and impression cylinders to be printed thereby.

2. In a rotary printing press capable of having its plate and impression cylinders substituted by like cylinders to print pages of another length; a main frame having aligned openings in its side frames for the reception of journal boxes each opening having an inclined side, rectangular journal boxes mounted in and smaller than said openings, plate and impression cylinders journaled in said boxes, an adjustable wedge plate interposed between one side of each journal box and the inclined opposed side of the opening, and means for adjusting said wedge plate at right angles to the direction of the applied pressure to adjust the journal boxes of the plate cylinder laterally in the opening.

3. In a rotary printing press capable of having its plate and impression cylinder substituted by like cylinders to print pages of another length; a main frame having a plurality of adjacent openings in each side for

the reception of journal boxes, each opening being wider at top than at bottom, straight sided journal boxes smaller than and mounted in said openings; plate and impression cylinders mounted in said boxes, said cylinders being changeable in accordance with the desired length of page to be printed; wedge plates interposed between the sides of each journal box and the inclined sides of the openings, and means for longitudinally adjusting such wedge plates at right angles to the direction of the applied pressure to adjust the journal boxes of the plate cylinder laterally in the openings.

4. In a rotary printing press capable of having its plate and impression cylinders substituted by like cylinders to print pages of another length; a main frame provided with openings for the reception of the journal boxes of plate and impression cylinders, each of said openings having an inclined side; journal boxes mounted in said openings and laterally adjustable therein; plate and impression cylinders mounted in said boxes said cylinders being changeable in accordance with the desired length of page to be printed; adjustable wedge plates interposed between the straight sides of said journal boxes and the inclined sides of the openings, and means for longitudinally adjusting such wedge plates at right angles to the direction of the applied pressure to adjust the journal boxes of the plate cylinder laterally in the openings.

5. In a rotary printing press capable of having its plate and impression cylinders substituted by like cylinders to print pages of another length; a main frame provided with openings for the reception of journal boxes, each of said openings being wider at top than at bottom, and having at least one inclined side; rectangular journal boxes mounted in said openings and laterally adjustable thereon, adjustable plates interposed between said journal boxes and the inclined sides of the openings each plate having an inclined side engaging the inclined side of the related opening and a straight side engaging the straight side of the opposite journal box, and plate and impression cylinders mounted in said boxes, said cylinders being interchangeable with like cylinders of different diameter in accordance with the desired length of page to be printed.

6. In a rotary cylinder web printing press capable of having its plate and impression cylinders substituted by like cylinders to print pages of another length; main side frames having aligned openings for the reception of journal boxes, each of said openings having an inclined side; rectangular journal boxes mounted in said openings, plate and impression cylinders mounted in said boxes said cylinders being changeable in accordance with the desired length of page

to be printed, adjustable wedge plates interposed between said journal boxes and the inclined sides of the openings each wedge plate having an inclined face to engage the inclined face of the related opening and a straight face engaging the straight face of the rectangular journal box; and means for longitudinally adjusting each wedge plate in its opening.

7. In a rotary cylinder web printing press having interchangeable plate and impression cylinders adapted to print pages of different lengths; a main frame having a plurality of openings in each side for the reception of the plate and impression cylinder journal boxes, the impression cylinder openings having one straight side and one side inclined, and the plate cylinder openings having both sides inclined; journal boxes mounted in said openings; plate and impression cylinders mounted in said boxes said cylinders being changeable in accordance with the desired length of page to be printed; wedge plates interposed between said journal boxes and the inclined sides of the openings; and means for adjusting the wedge plates to adjust the plate cylinder journal boxes in the openings.

8. In a rotary cylinder web printing press having interchangeable plate and impression cylinders adapted to print pages of different lengths; a main frame having a plurality of aligned openings in each side frame for the reception of the plate and impression cylinder journal boxes, said openings being larger at top than at bottom, the impression cylinder openings having their innermost sides straight and their outermost sides inclined, and the plate cylinder openings having both sides inclined; rectangular journal boxes mounted in and smaller than said openings; plate and impression cylinders mounted in said boxes, said cylinders being changeable in accordance with the length of page to be printed; wedge plates interposed between said journal boxes and the inclined sides of the openings, each wedge plate having a straight face engaging the journal box and an inclined face engaging the inclined face of the related opening; and means for adjusting the wedge plates to adjust the plate cylinder journal boxes in the openings.

9. In a rotary printing press capable of having its plate and impression cylinder substituted by like cylinders to print pages of another length; a main frame having a pair of adjacent openings in each side for the reception of journal boxes, straight sided journal boxes mounted in said openings; a co-acting pair of plate and impression cylinders mounted in said boxes, said cylinders being changeable in accordance with the desired length of page to be printed, the openings for the boxes of one cylinder being wider than such boxes and having its oppositely facing sides inclined; wedge plates interposed be-

tween the inclined sides of such openings and the journal boxes therein, and means for longitudinally adjusting such wedge plates at right angles to the direction of the applied pressure to adjust such journal boxes and the cylinder laterally.

CITY NATIONAL BANK & TRUST

COMPANY OF BATTLE CREEK,

Administrator of Henry F. Bechman, Deceased,

By GLENN VAN DENBERGH,

Asst. Trust Officer.