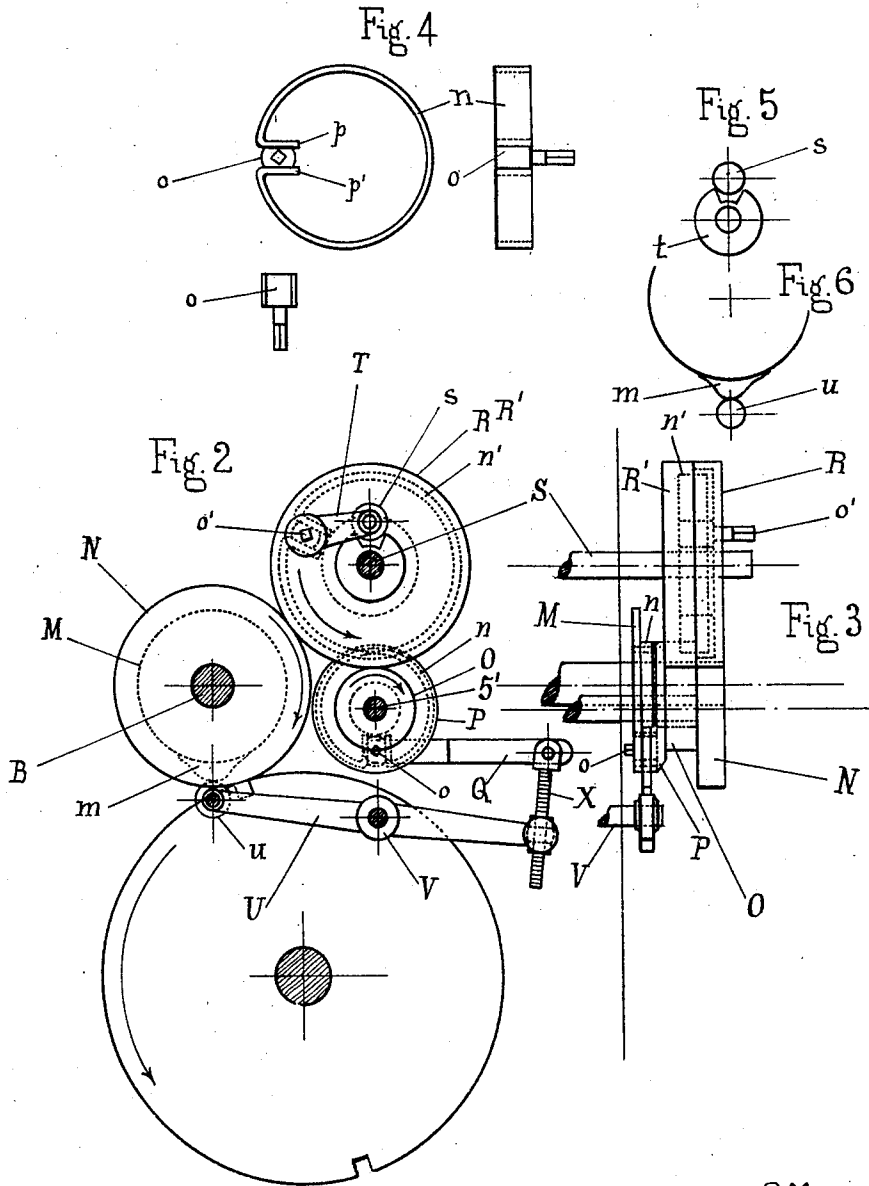


P. MARTIN.
 ROTARY PRINTING PRESS.
 APPLICATION FILED MAY 31, 1913.

1,386,573.

Patented Aug. 2, 1921.
 4 SHEETS—SHEET 2.



Witnesses
 Charles Crompton
 John A. Percival

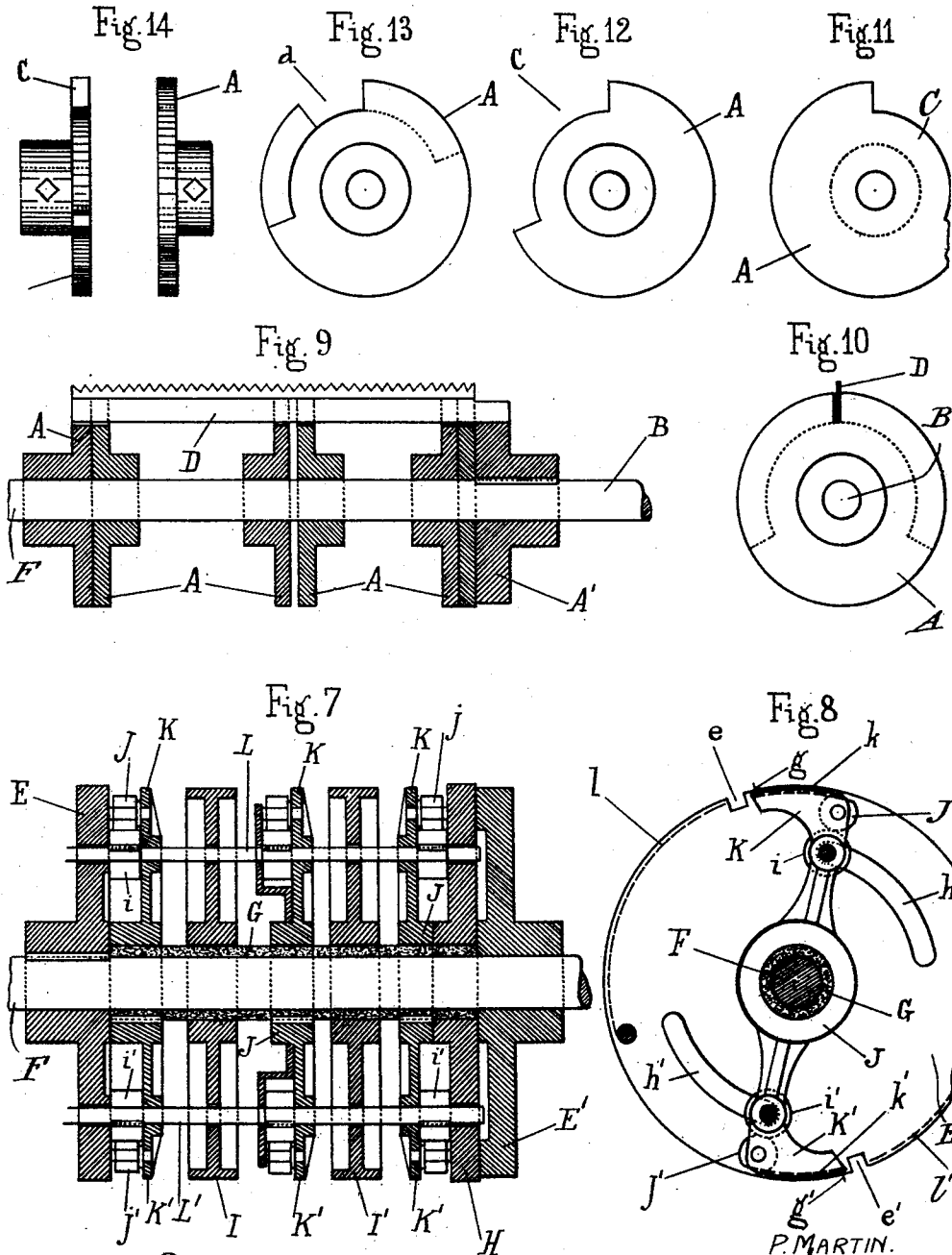
P. MARTIN.
 Inventor.
 By *Ernest D. Marks*
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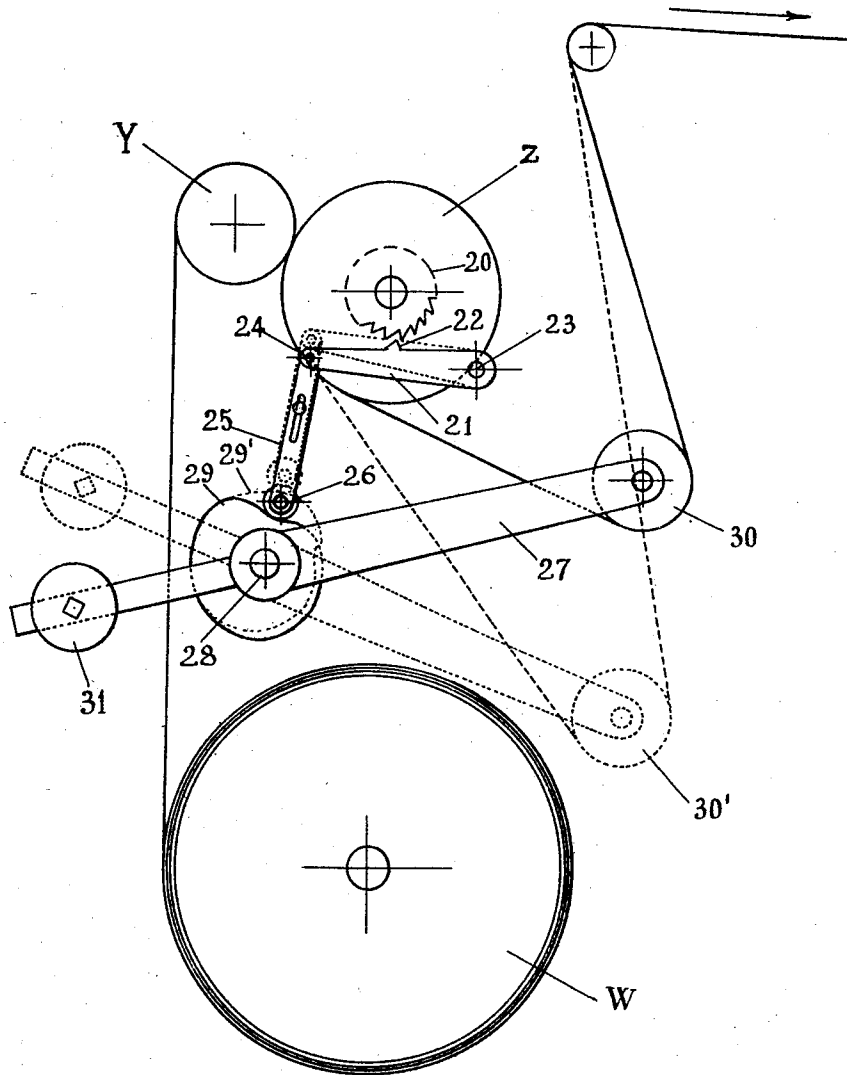
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4 SHEETS—SHEET 4.

Fig. 15



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UNITED STATES PATENT OFFICE.

PAUL MARTIN, OF ROUBAIX, FRANCE.

ROTARY PRINTING-PRESS.

1,386,573.

Specification of Letters Patent.

Patented Aug. 2, 1921.

Application filed May 31, 1913. Serial No. 771,036.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, PAUL MARTIN, a citizen of the French Republic, residing at No. 50 Rue de la Redoute, Roubaix, France, have invented certain new and useful Improvements in Rotary Printing-Presses, (for which I have filed applications in France, June 5, 1912, Patent No. 444,745, and in England, Aug. 16, 1912, Patent No. 18,826,) of which the following is a specification.

This invention relates to rotary web printing machines of the type in which after printing, the paper is cut off into sheets of a size adjustable to agree with the amount of stereo on the printing cylinder.

The object of this invention is to increase the efficiency and the accuracy of operation of such machines, insuring a correct register when the press is printing on both sides of the paper, or when the same sheet is printed in different colors on one and the same press.

This object is effected by a simple and precise combination of devices comprising two cylinders, a cutting cylinder and a delivery cylinder, suitably operated, together with a suitable number of tightening rollers, capable of adjustment according to the size of the sheet, and also two rollers provided near the cutting and delivery cylinders which are required for feeding the paper to the exact length of the sheet and with exact register, and adjustment. Arrangements are also made whereby the web is unwound from the reel intermittently to correspond to the required feed.

One form of this invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a diagrammatic side view of the principal parts of the improved press showing the path of the paper web.

Figs. 2 and 3 are respectively a side and end elevation of the mechanism for starting and stopping instantaneously the supplementary paper feeding cylinders.

Fig. 4 illustrates a spring employed as a brake.

Figs. 5 and 6 illustrate the cams for operating the brakes at the desired times.

Figs. 7 and 8 illustrate the construction of the delivery cylinder.

Figs. 9, 10, 11, 12, 13 and 14 illustrate the operation of the cutting cylinder.

Fig. 15 illustrates the means for driving the paper reel.

As shown, the rotary press comprises two cylinders 1 and 1' on which the printing blocks or stereotypes are fixed. The latter are in contact with the blanket cylinders and the corresponding impression cylinders 2 and 2'. 3 and 4 are two drums constituting the cutting and delivery devices for the printed sheets. The drum 3 carries a saw tooth or knife edged blade; the drum 4 which is provided like the cutter with two cheeks for feeding the paper, has two diametrically opposed grooves and is provided with the necessary delivery blades for delivering the cut sheets.

5 and 6 are intermittently rotating rollers arranged in advance of the cutting and delivery drums. 7 is a first tightening roller for tightening the paper web in such a manner that the distance $b\ c$ between the cylinders 1 and 2, 3 and 4 in passing between 5 and 6 shall be double the length of the sheet to be printed. A suitable number of tightening rollers 8, 9 and 10 are provided for tightening the paper so as to produce a stretch $a\ b$ equal to the stretch $b\ c$.

The cutting cylinder 3 (Figs. 1 and 9 to 14) consists of a series of plates A mounted on an axle B. These plates have a notch or recess C formed along a portion of their circumference. These plates are arranged in pairs so as to allow of regulating the size of the cut away sector d by turning the plates A. A saw blade D serves as a cutter for cutting the paper and is fixed on the two plates mounted on the ends of the axle B.

The delivery cylinder 4, (Figs. 1, 7 and 8) consists of two cheeks E and E' fixed on the shaft F. This shaft carries a long sleeve G on which is mounted a plate H and two rings I and I'. The cheeks E and E', the plate H and the rings I and I' are formed with two grooves $e\ e'$ arranged diametrically opposite each other into which the knife of the cutter is adapted to enter for cutting the web. A certain number of sleeves J each fixed with two wings K and K' which carry the impaling pins g and g' for engaging the cut end of the web, are arranged so as to be capable of moving around the axle F by turning on G. Grooves such as h and h' are formed in the cheeks E and E', the plate H, and the rings I and I' for the purpose of enabling the sleeves J to be displaced. The wings K and K' are connected by two axles

L and L' upon which are keyed the pinions *i i'* gearing with the toothed sectors *j* and *j'* fixed to the delivery blades *k k'*. The purpose and operation of this arrangement of delivery cylinder was described in the specification of my prior Patent, No. 1042938, dated Oct. 29, 1912.

Rollers 5 and 6 are provided for feeding the paper at the proper time and during the desired period. The two rollers 5 and 6 are provided with a device for effecting the instantaneous starting and stopping of the feed. The rotary motion is controlled by two brakes which are operated as follows:—

The axle B of the cutting cylinder is provided at one end with a plate M upon which is fixed a suitable cam *m*, and at its other end with a toothed wheel N. The axle 5' of the roller 5 carries, in addition to the toothed wheel O, a dish-shaped member P, in which is arranged a brake consisting of a simple leaf spring *n* (Fig. 4) adapted to be moved apart by the rotation of the stud *o* formed with two flat surfaces situated between the ends *p* and *p'*. This rotation is imparted by means of a lever Q which acts at the proper times to produce an absolute stoppage of the roller 5.

Two toothed wheels R and R' arranged side by side are mounted so as to revolve freely on a pin S carried by the frame of the machine. The wheel R gears with the wheel N and the wheel R' gears with the wheel O. The wheels R, R' are formed with an angular recess in which is arranged a clutch *n'* (similar to the brake *n* shown in Fig. 4) which acts to connect the wheels R and R', the wheel R being always driven by the wheel N. This clutch is operated by means of the lever T which acts upon the stud *o'* during the rotation of the wheels by means of the roller *s* that rotates over the cam *t*. U is a lever rocking on a pin V fixed on the frame of the machine. It is connected at one end to the lever Q by the connecting rod X and is provided at its other end with a roller *u* rolling on the cam *m*.

The tightening devices consists of rollers 7, 8 & 9 (Fig. 1) which are suitably placed and constructed so as to be capable of sliding for the purpose of varying the lengths of the stretches of paper while maintaining strictly the same proportions between the fixed points *a b* and *b c*.

The operation of the improved press is as follows:—

The paper following the path indicated by the arrows in Fig. 1, passes first between the cylinders 1' and 2' whereby it is printed on one side and then over the tightening rollers 8, 9 and 10 and between the cylinders 1 and 2, whereby it is printed on its other side.

The perfected web then passes to the cutting and delivery devices 3 and 4 by passing

on its way between the feeding cylinders 5 and 6 and if necessary over the tightening roller 7.

The press is regulated in such a manner as to insure that the knife of the cylinder 3 shall operate at the moment when the gap between the ends of the stereo on the roller 1 is situated on the line connecting the centers of the cylinders 1 and 2. The same applies to the cylinder 1'.

The impression cylinders 1 and 2, 1', 2' have the same diameter as the cutting cylinder 3; their peripheral speed is the same as that of cylinders 5 and 6 which feed the paper.

If the paper is continually in contact during one complete revolution, first with the impression cylinders 1 and 2, 1' and 2' and secondly with the cutting and delivery drums 3 and 4, the length of the cut sheet delivered by the operation of the delivery blades *k* and *l*, *k'* and *l'* will be equal to the perimeter of the cylinder which carries the printing block or stereo or of the cutting cylinder. This will be the maximum length which can be delivered by the machine.

If it is desired, for instance, to work upon sheets of shorter length, it will then be sufficient to furnish the stereo cylinder over only a portion of its circumference to an extent corresponding to the length of the paper which is to be used. In such a case since the pressure between the printing and the impression cylinders is no longer continuous, the feed of the paper is, according to my invention, interrupted at the part where there is no stereo.

Since the cutting and delivery drums are adapted to feed the paper, it is sufficient to arrange that these drums be out of contact during a period equal to the period during which the paper is no longer fed by the impression cylinders. This can be readily done by means of the construction of the cutting cylinder. It is sufficient to turn the plates A in such a manner that the length of the arc of the circle which is interrupted or of the cut away sector formed by each group of juxtaposed plates shall be equal to that portion of the circumference of the stereo cylinder which is not furnished with stereos.

Since the impaling pins *g*, *g'* are adjusted to correspond to this interrupted arc of a circle by means of the movable sleeves J with wings K and K' as hereinbefore described, the cutting and the delivery of the printed sheets will be consequently effected at the desired length corresponding to the length of the circumference of the stereo cylinder which is covered by the stereo or stereos.

Since the paper is fed intermittently although the press rotates continuously, the sheets will be of less length than the per-

imeter of the cutting cylinder. The tightening rollers will now have positions at 7', 8', 9' and 10', such that the lengths of the paper *a b* and *b c* will be equal to twice the developed circumference of the cutting cylinder 3 less twice the length of the arc of the sector *d*.

In practical working it is obvious that these elements will not be sufficient to provide for the speed of the rotary parts in working, the speed acquired by the paper causing irregularities. Consequently, in order to insure the proper feeding of the paper with a consequent regularity in the length of the sheets and exactness of register, use is made of the rollers 5 and 6 arranged in front of the cutting and delivery drums 3 and 4. These cylinders revolve in an intermittent manner for feeding the paper during the necessary period. They cease to revolve at the moment of cutting the paper. The starting and stopping of these cylinders are controlled by the brake *n* and clutch *n'* hereinbefore described, the operation of which is controlled by the cams *t* and *m*.

The two wheels R and R' which are loose on the axle S engage the one with the wheel N and the other with the wheel O. When the roller *s* rolls over *t*, the clutch *n'* comes into operation and the wheel O rotates; the rollers 5 and 6 are then in motion and the paper is fed. When the cam *m* meets the roller *u*, the roller *s* is situated in the recess in *t* and *n'* does not operate, but *n* operates through the medium of the levers U and Q so as to fix the wheel O and leave the cylinders 5 and 6 stationary, thus preventing the paper from being pulled. The cams *t* and *m* (Figs. 5 and 6) are shaped to produce as the result of their operation a determined interruption of the feed so that it will be necessary to change the cams for each different size of sheet, and to replace them by others which will correspond to the aperture of the sectors of the cutting drum.

The machine can also be utilized for sheets of various widths, the drums 3 and 4 being adjusted for this purpose. As regards the drum 4 (Fig. 7) it will be sufficient to shift the plate H nearer to E, to slightly alter the distance between the rings I and I' and to arrange conveniently the sleeves J. As regards the drum 3 (Fig. 9) the end plates A and A' are left in their initial positions and the sector plates comprised between the plates A and the plates A' are shifted so that the last sector plate corresponds to the plate H of the drum 4 and consequently the impaling pin situated at that end and the middle plates with the middle impaling pin of the drum 4.

It is obvious that the improved press in order to work perfectly will require a device which will allow of unwinding the reel of

paper as required. It will therefore be necessary to provide mechanism for driving the paper reel controlled so as to deliver the paper web intermittently to agree exactly with the different lengths of the sheets which are to be cut on the machine. In this manner shocks and consequent breaking of the paper occurring at the restarting of the pulling of the press will be prevented. Among the numerous devices which might be adopted, I prefer to use the hereinafter described type which comprises on the one hand a cylinder for driving the paper reel, viz., a cylinder composed like the cutting cylinder, of a series of plates having a notch or recess formed along a portion of their circumference, and on the other hand a catch for locking the reel during the passage of the recess provided in each group of the juxtaposed plates constituting this cylinder.

The paper coming from the reel W is fed onward by the two cylinders Y and Z being pressed between these cylinders, the cylinder Z being driven by a suitable friction mechanism.

The paper fed by the cylinders Y and Z must be always greater in quantity than the quantity consumed by the press, and therefore it is necessary to provide a suitable mechanism for this purpose and also for insuring that this excess quantity shall never be too great.

On the axle of the cylinder Z there is fixed a ratchet wheel 20 and below this ratchet wheel there is provided a lever 21 having a tooth 22, pivoted at 23, and connected at 24 to a connecting rod 25 bearing a roller 26. A lever 27 pivoted at 28 is fixed to a cam 29 and carries at one end a roller 30 and at its other end a counter-weight 31.

As the paper passes over the cylinder as indicated by the arrow, the cylinder 30 will impart constantly to the paper the necessary tension for preventing it from flapping. When the cylinder 30 is in the position 30' the cam 29 will have the position 29'; the connecting rod 25 will have lifted the lever 21 and thus caused the tooth 22 to engage the ratchet wheel and thus stop the feed cylinder Z. Since the paper is being pulled continually it will move the lever 27 in the opposite direction so as to disengage the tooth 22 from the ratchet wheel 20 and thus allow the cylinder Z to rotate. This compensating mechanism will prevent such a large excess of paper being fed as would inconvenience the proper working of the machine.

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

1. In a rotary or other printing press for printing webs comprising printing and impression cylinders, the combination of cutting and delivery drums, means of regula-

tion capable of varying the duration of contact of said cutting and delivery drums, two supplementary cylinders rotating intermittently for feeding the paper during the
5 period of time corresponding to the time of impression of the impression cylinders and the pressure periods of said cutting and delivery drums, a brake and a clutch for regulating the starting and stopping of said
10 supplementary cylinders in a precise manner.

2. In a rotary or other printing press comprising printing and impression cylinders, the combination of cutting and delivery
15 drums, means of regulation capable of varying the duration of contact of said cutting and delivery drums, two supplementary cylinders rotating intermittently in such a manner as to feed the paper during the period
20 of time corresponding to the time of impression of the impression cylinders and the pressure periods of the cutting and delivery cylinders, and a group of tightening rollers by the adjustment of which the length of
25 paper comprised between the point of contact of the printing and impression cylinders for printing on one side of the paper and the point of contact of the printing and impression cylinders for printing on the other
30 side of the paper and the length comprised between said latter impression cylinders and said cutting and delivery cylinders are made equal to each other and to double the length of the sheets.

3. In a rotary or other printing press 35 comprising printing and impression cylinders and a paper reel, the combination of cutting and delivery drums, means of regulation capable of varying the duration of contact of said cutting and delivery drums, 40 two supplementary cylinders rotating intermittently in such a manner as to feed the paper during the period of time corresponding to the time of impression of the impression cylinders and the pressure periods 45 of the cutting and delivery cylinders, and a group of tightening rollers by the adjustment of which the length of paper comprised between the point of contact of the printing and impression cylinders for print- 50 ing on one side of the paper and the point of contact of the printing and impression cylinders for printing on the other side of the paper and the length comprised between said latter impression cylinders and said 55 cutting and delivery cylinders are made equal to each other and to double the length of the sheets, means for feeding a length of web from the paper reel in excess of the length actually required for the impression, 60 and means for insuring that said excess length shall not exceed a determined amount.

In testimony whereof I affix my signature in presence of two witnesses.

PAUL MARTIN.

Witnesses:

ACHILLE LEPERT,
HENRI DORCHIES.