

June 21, 1932.

H. M. BARBER

1,864,166

WEB PRINTING ROTARY PRESS

Filed June 16, 1931

2 Sheets-Sheet 1

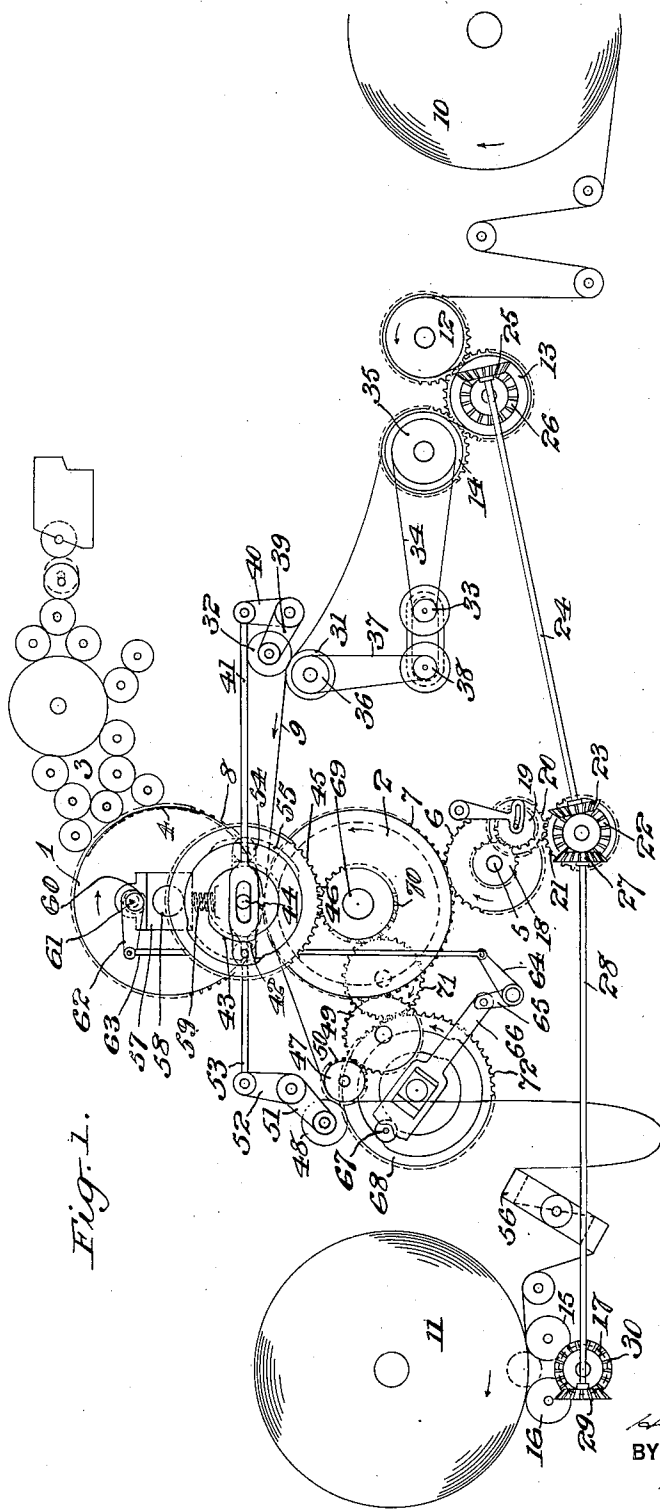


Fig. 3.

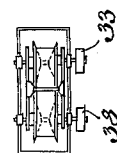
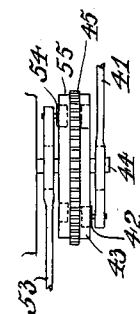


Fig. 2.



INVENTOR

Howard M. Barber

BY

Howard M. Barber

ATTORNEYS

June 21, 1932.

H. M. BARBER

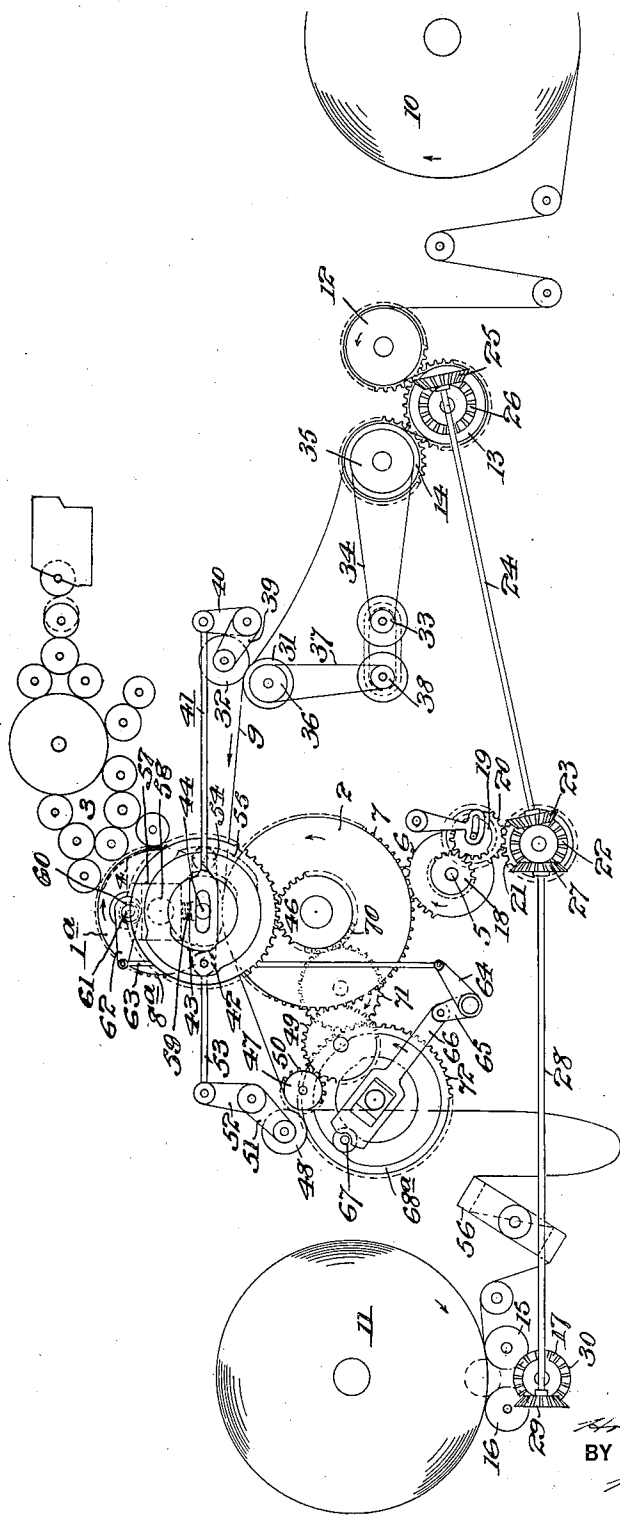
1,864,166

WEB PRINTING ROTARY PRESS

Filed June 16, 1931

2 Sheets-Sheet 2

Fig. 4.



INVENTOR

Howard M. Barber

BY

Howard M. Barber

ATTORNEYS

UNITED STATES PATENT OFFICE

HOWARD M. BARBER, OF PAWCATUCK, CONNECTICUT, ASSIGNOR TO C. B. COTTRELL & SONS COMPANY, OF WESTERLY, RHODE ISLAND, A CORPORATION OF DELAWARE

WEB PRINTING ROTARY PRESS

Application filed June 16, 1931. Serial No. 544,717.

The object of my invention is to provide novel means for printing successively on the web with predetermined spacings between the impressions within the range of the press.

My invention comprises, generally, means for bringing the form and impression cylinders into coaction during the printings and out of coaction between the printings.

My invention furthermore includes a mechanism in which the form cylinder may have a circumference equal to or less than the maximum length of form and spacing.

My invention also includes means whereby the mechanism for bringing the form and impression cylinders into and out of coaction during and between the printings respectively may be rendered inoperative, when desired.

My invention also comprises, in a printing press of the above character, web advancing means operable to pass the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, according to the required spacings between the impressions.

My invention more particularly comprises, in a printing press of the above character, alternately acting web advancing units located respectively on the delivery and feeding-in sides of the printing couple for controlling the passage of the web therethrough; the web advancing unit on the delivery side of the printing couple being driven by the printing couple at the surface speed thereof and the web advancing unit on the feeding-in side of the printing couple having a variable speed drive therefor to permit said unit to be driven at the same surface speed as the printing couple or at lesser speeds.

My invention also includes, in a press of the above character, a change gear drive for the web supply and take-up units, the web supply units serving to drive the web advancing unit on the feeding-in side of the printing couple through the above mentioned variable speed drive.

Two practical embodiments of my invention are represented in the accompanying drawings in which:

Fig. 1 represents a diagrammatic side elevation of one embodiment of my invention

in which so much of a web printing rotary press is shown as will give a clear understanding of my invention; the parts being shown in the positions they assume just before the web advancing unit on the feeding-in side of the printing couple releases control of the web and just before the web advancing unit on the delivery side of the printing couple takes control of the web to pass it through the printing couple at the surface speed thereof during the printing operation, the form cylinder being in its lowered position, the form cylinder in this instance making two revolutions for each cycle of the press;

Fig. 2 represents a diagrammatic detail top plan view of the cam mechanism for controlling the alternate action of the drop rolls of the web advancing units;

Fig. 3 represents a diagrammatic top plan view of the variable speed drive for the web advancing unit on the feeding-in side of the printing couple; and

Fig. 4 represents a diagrammatic side elevation, similar to Fig. 1, of another embodiment of my invention, the form cylinder in this instance being shown as two-thirds of the diameter of the form cylinder shown in Fig. 1 and as making three revolutions for each cycle of the press, instead of two revolutions as provided for in the embodiment illustrated in said Fig. 1.

In the embodiment shown in Fig. 1 the form and impression cylinders of the web printing couple are denoted by 1 and 2 respectively, the form cylinder in this instance making two revolutions for each cycle of the press and having a circumference less than the maximum length of the form and spacing, as distinguished from the structure disclosed in my copending application filed June 10, 1931. Serial No. 543,288, in which the circumference of the form cylinder is equal to the maximum length of the form and spacing and the form cylinder rotates one revolution for each cycle of the press.

A suitable inking mechanism 3 is provided for the form 4 on the cylinder 1, which form may be of any desired length.

The form and impression cylinders may be

driven at a constant speed from the main drive shaft 5 through the train of gears 6, 7 and 8.

The web is denoted by 9, its supply roll by 10 and its re-wound roll by 11. The web supply unit is shown as comprising the web feeding rolls 12, 13 and 14. The web take-up or re-winding unit is shown as comprising the rolls 15, 16 and 17. These two units are driven at selected speeds, according to the form spacings, from the gear 18 on the main drive shaft 5 through the change gear 19 and the gears 20, 21 and 22; the roll 13 of the web supply unit being driven from the gear 22 through the gear 23, shaft 24 and gears 25, 26, while the roll 17 of the web take-up unit is driven from the gear 22 through the gear 27, shaft 28 and gears 29, 30.

Alternately acting web advancing units are provided on the opposite sides of the printing couple. The web advancing unit on the feeding-in side of the printing couple comprises a web feed roll 31 and its coacting drop roll 32. The roll 31 is driven at the required speed to control the spacing lengths, from the web supply unit, through a variable speed drive either at the surface speed of the printing couple or at predetermined lesser surface speeds, according to the spacing lengths required between the impressions. In the present instance the variable speed drive is shown as the well known "Reeves" drive, its pulley 33 being driven through a belt 34 from the pulley 35 on the shaft of the web feed roll 14. The pulley 36 on the shaft of the roll 31 is driven by a belt 37 from the pulley 38 of the said variable speed drive.

The drop roll 32 is brought into coaction with its web feed roll 31 at the proper time to control the passage of the web through the printing couple during the spacing periods between the printings. In the present instance it is mounted on one arm 39 of a bell crank lever, the other arm 40 of which is provided with a rod 41 which carries a stud or roller 42 traveling in a box cam 43 on a cam shaft 44, which shaft is driven from the shaft of the impression cylinder 2, through the gears 45, 46.

The web advancing unit on the delivery side of the printing couple comprises a web feed roll 47 and its coacting drop roll 48. The web feed roll 47 is driven at all times at the surface speed of the printing couple from the impression cylinder gear 7, through the gears 49, 50.

The drop roll 48 is brought into coaction with its web feed roll 47 at the proper times to pass the web through the printing couple at the surface speed thereof during the printing strokes. In the present instance this drop roll 48 is mounted on one arm 51 of a bell crank lever, the other arm 52 of which is provided with a rod 53 which carries a stud

or roller 54 traveling in a box cam 55 on the cam shaft 44.

A tension device 56 of any well known or approved form is provided for the web as it passes to the re-winding roll.

The means which I have shown for bringing the form and impression cylinders into coaction during the printings and out of coaction between the printings, is as follows:

The journal box 57 for each end of the shaft 58 of the form cylinder is vertically movable, a spring 59 tending to lift the journal box 57 to raise the form cylinder out of contact with its impression cylinder. An eccentric cam 60 in engagement with the top of the journal box 57 is carried by a rock shaft 61, the arm 62 of which is connected by a rod 63 to one arm 64 of a bell crank lever, the other arm 65 of which is provided with a rod 66 carrying a stud or roller 67 traveling in a box cam 68 which is driven from the shaft 69 of the impression cylinder 2 through the train of gears 70, 71, 72. In the embodiment shown in Fig. 1 the form cylinder would be brought into coaction with the impression cylinder its first revolution and out of coaction with the impression cylinder its second revolution. In the embodiment shown in Fig. 4 the form cylinder is brought into coaction with the impression cylinder on its first revolution and out of coaction on its second and third revolutions. In the embodiment shown in Fig. 4 the form cylinder which is shown as two-thirds the diameter of the form cylinder illustrated in Fig. 1, is denoted by 1^a and it is driven from the gear 7 of the impression cylinder through the gear 8^a. Also, in this form, the cam 68^a is substituted for the cam 68, illustrated in Fig. 1.

It is also to be understood that the web travels at the same surface speed as the form and impression cylinders during the printings whether the spacings be longer or shorter and also that when the maximum spacings are being used the web also travels at the same surface speed as the form and impression cylinders at all times. However, when shorter spacings between the impressions on the web are required the relative speeds of the rolls in the web supply unit and the rolls in the web advancing unit at the feeding-in side of the printing couple are such as to cause the web to accumulate between the said units when the rolls 31 and 32 have control of the web, in an amount sufficient to permit the speed of the web to be accelerated by the coaction of the rolls 47 and 48 and passed through the printing couple at the surface speed thereof during the printings.

The drop rolls 32 and 48 of the two web advancing units are alternately lifted by their respective cams 43 and 55 so that the rolls 31 and 32 of the web advancing unit on the feeding-in side of the printing couple are caused to release the web as the rolls 47 and

48 of the web advancing unit on the delivery side of the printing couple take control thereof, and vice versa, it being understood that the cam shaft 44 in both of the embodiments illustrated makes one revolution for each cycle of the press.

From the above description it will be seen that the web advancing rolls 31 and 32 are caused to travel at a predetermined surface speed which is slower than that of the rolls 12, 13 and 14 on all except the maximum spacings for which the press is designed. Therefore, the means for controlling the passage of the web through the printing couple causes the web to travel with the form and impression cylinders during the successive printings of the web at the same speed where the maximum spacings are required. Where lesser spacings are required the speed of the web is retarded between the printings, the surface speed of the web advancing rolls 31 and 32 being adjusted by the variable speed drive to suit the required lesser spacing lengths between the impressions. It will be understood that the rolls 47 and 48 of the web advancing unit at the delivery side of the printing couple are always driven at the same surface speed as the printing couple.

It will also be seen that the surface speeds of the web supply unit rolls and the web take-up unit rolls may be adjusted for each form spacing as required, by the change gear drive therefor, the take-up rolls being driven at a speed which will ensure a perfectly wound roll when the web is placed under the proper tension by the tension device 56.

It will be evident that the mechanism for bringing the form and impression cylinders into and out of coaction during and between the printings respectively, may be rendered inoperative, when desired, by removing the gear 71, for instance.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the particular embodiments herein shown and described, but

What I claim is:—

1. In a web printing rotary press, a printing couple driven at a constant speed, web advancing means for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for bringing the form and impression cylinders into coaction during the printings and out of coaction between the printings.

2. In a web printing rotary press, a printing couple driven at a constant speed, the form cylinder having a circumference less than the maximum length of form and spacing, web advancing means for passing the web through the printing couple at the sur-

face speed thereof during the printings and at the same or lesser speeds between the printings, and means for bringing the form and impression cylinders into coaction during the printings and out of coaction between the printings.

3. In a web printing rotary press, a printing couple driven at a constant speed, web advancing means for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for bringing the form and impression cylinders into coaction on one revolution of the form cylinder and out of coaction on another revolution thereof in the cycle of the press.

4. In a web printing rotary press, a printing couple driven at a constant speed, the form cylinder having a circumference less than the maximum length of form and spacing, web advancing means for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for bringing the form and impression cylinders into coaction on one revolution of the form cylinder and out of coaction on another revolution thereof in the cycle of the press.

5. In a web printing rotary press, a printing couple driven at a constant speed, web advancing means for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for bringing the form and impression cylinders into coaction on one revolution of the form cylinder and out of coaction on other revolutions thereof in the cycle of the press.

6. In a web printing rotary press, a printing couple driven at a constant speed, the form cylinder having a circumference less than the maximum length of form and spacing, web advancing means for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for bringing the form and impression cylinders into coaction on one revolution of the form cylinder and out of coaction on other revolutions thereof in the cycle of the press.

7. In a web printing rotary press, a printing couple driven at a constant speed, web advancing means for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for moving the form cylinder into coaction with the impression cylinder during the printings and out of coaction therewith between the printings.

8. In a web printing rotary press, a print-

ing couple driven at a constant speed, the form cylinder having a circumference less than the maximum length of form and spacing, web advancing means for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for moving the form cylinder into coaction with the impression cylinder during the printings and out of coaction therewith between the printings.

9. In a web printing rotary press, a printing couple driven at a constant speed, alternately acting web advancing units for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for bringing the form and impression cylinders into coaction during the printings and out of coaction between the printings.

10. In a web printing rotary press, a printing couple driven at a constant speed, the form cylinder having a circumference less than the maximum length of form and spacing, alternately acting web advancing units for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for bringing the form and impression cylinders into coaction during the printings and out of coaction between the printings.

11. In a web printing rotary press, a printing couple driven at a constant speed, alternately acting web advancing units for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for moving the form cylinder into coaction with the impression cylinder during the printings and out of coaction therewith between the printings.

12. In a web printing rotary press, a printing couple driven at a constant speed, the form cylinder having a circumference less than the maximum length of form and spacing, alternately acting web advancing units for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings, and means for moving the form cylinder into coaction with the impression cylinder during the printings and out of coaction therewith between the printings.

13. In a web printing rotary press, a printing couple driven at a constant speed, the form cylinder having a circumference less than the maximum length of form and spacing, and web advancing means for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings.

14. In a web printing rotary press, a printing couple driven at a constant speed, the form cylinder having a circumference less than the maximum length of form and spacing, and alternately acting web advancing units for passing the web through the printing couple at the surface speed thereof during the printings and at the same or lesser speeds between the printings.

15. In a web printing rotary press, a printing couple driven at a constant speed, a web advancing unit driven by the couple for passing the web therethrough at the surface speed thereof during the printings, another web advancing unit for passing the web through the printing couple at the same or lesser speeds between the printings, a variable speed drive for the second named web advancing unit, means for causing said web advancing units to act alternately on the web, and means for bringing the form and impression cylinders into and out of coaction.

16. In a web printing rotary press, a printing couple driven at a constant speed, the form cylinder having a circumference less than the combined maximum length of form and spacing, a web advancing unit driven by the couple for passing the web therethrough at the surface speed thereof during the printings, another web advancing unit for passing the web through the printing couple at the same or lesser speeds between the printings, a variable speed drive for the second named web advancing unit, means for causing said web advancing units to act alternately on the web, and means for bringing the form and impression cylinders into and out of coaction.

In testimony, that I claim the foregoing as my invention, I have signed my name this 9th day of June, 1931.

HOWARD M. BARBER.