Feb. 11, 1969 C. KAUFMANN 3,426,680

ROTARY PRINTING PRESS FOR CHANGEABLE FORMATS

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Sheet 1 of 2

Fig. 1

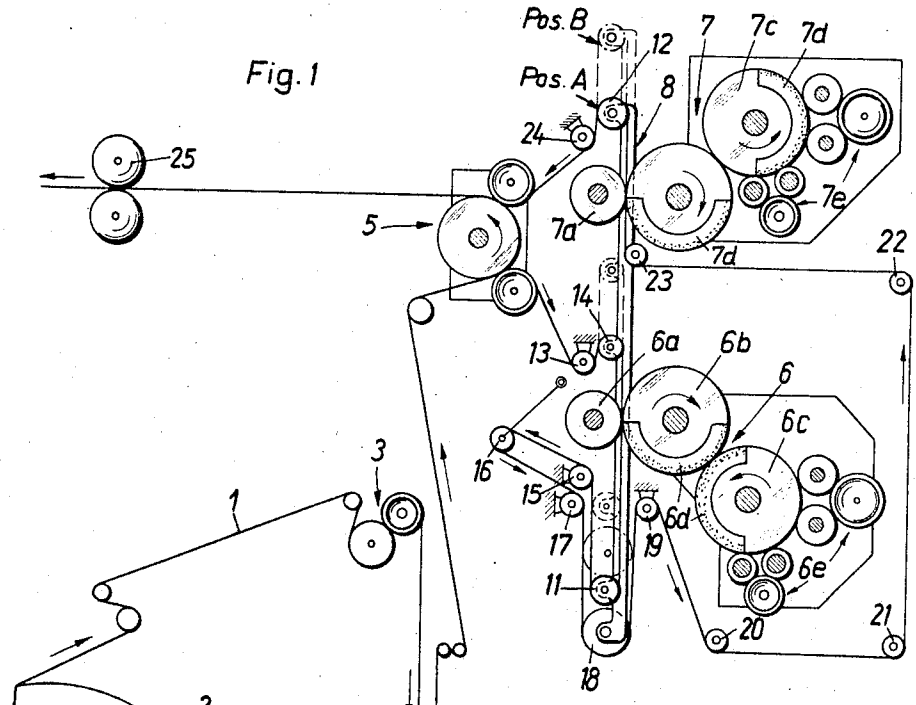
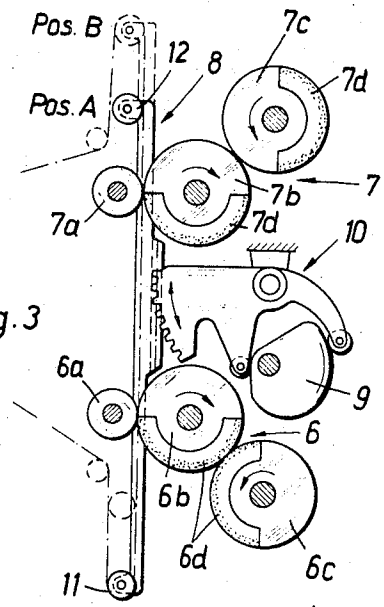


Fig. 3



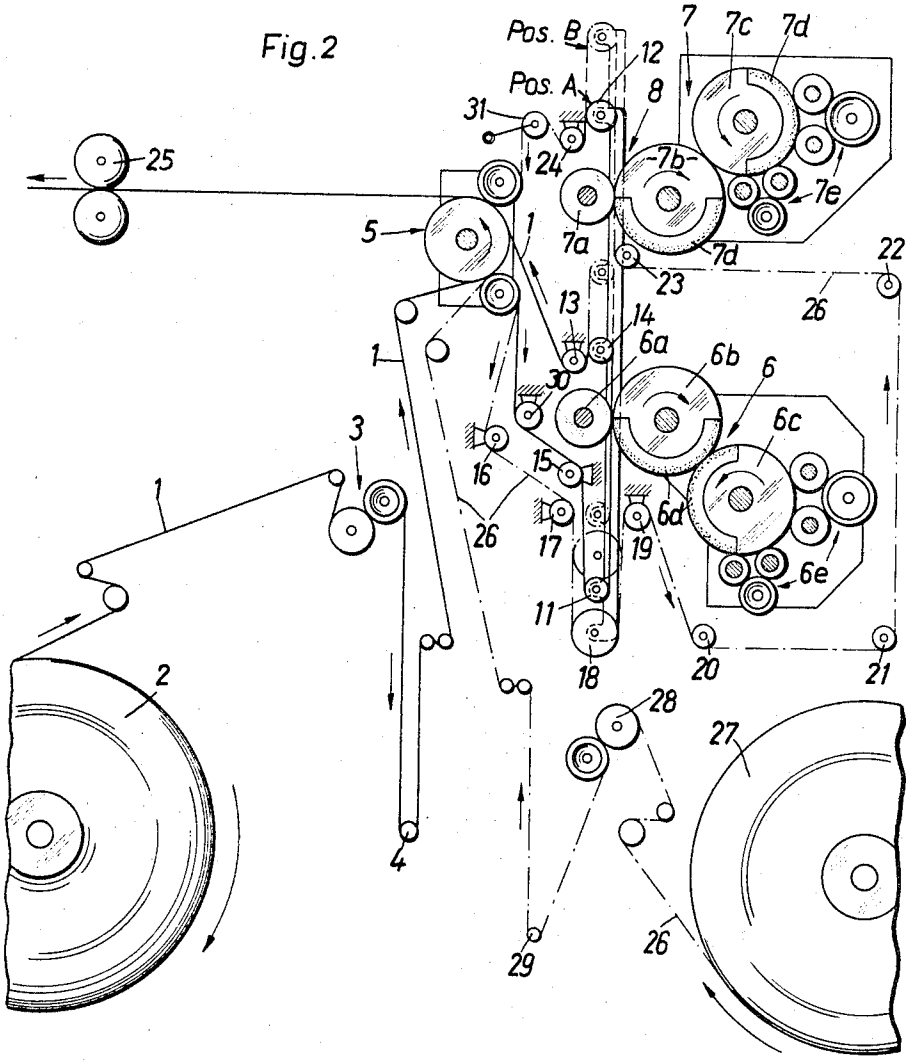
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Fig.2



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ROTARY PRINTING PRESS FOR CHANGEABLE FORMATS

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U.S. Cl. 101—181 8 Claims
Int. Cl. B41f 5/06, 13/04

ABSTRACT OF THE DISCLOSURE

An improved rotary printing press is disclosed of the type incorporating printing or blanket cylinders which print along part of their circumference and a displaceable control carriage which accommodates the paper web to the peripheral or circumferential velocity of the printing cylinders which is returned or retracted into desired position during the pause in printing. An inner and an outer pair of control rollers are disposed on the displaceable control carriage and a separate printing unit is provided for each of the pairs of control rollers. The inventive arrangement is such that the forward and reverse sides of a paper web can be simultaneously printed. In an alternative embodiment of the subject invention, each pair of control rollers has delivered thereto its own paper web.

The present invention relates to a new and improved rotary printing press for changeable formats of the type incorporating printing or blanket cylinders which print along part of their circumference and a displaceable control carriage which accommodates the paper web to the peripheral or circumferential velocity of the printing cylinders and which is returned or retracted into desired position during the pause in printing.

Previously known rotary printing presses of this type possess the disadavntage that upon utilizing the printing unit for printing the front side or reverse side of the paper web the direction of rotation of the entire printing unit must be reversed if there is to be avoided guiding of such paper web over turnover rods. However, a turnover rod guide arrangement is disadvantageous because the danger exists that the wet print will be smudged. Moreover, longer paper paths are required.

Accordingly, a primary object of this invention relates to the provision of an improved rotary printing press wherein the guiding of the paper web renders it possible, without changing the direction of rotation of the printing unit and without using turnover rods, to carry out printing of the front or reverse side or a two-color front side printing respectively.

Another significant object of this invention has reference to an improved rotary printing press which enables the printing operation to be carried out at high speeds and without the danger of smudging the wet print.

Still a further noteworthy object of this invention resides in a new and improved construction of rotary printing press, particularly for offset printing, wherein front and reverse side printing of a paper web or two-color front side printing can be carried out efficiently, at high speeds while still producing a very sharp and clear printed pattern and without any marked danger of smudging the ink and while utilizing shorter paper paths.

An essential feature of the present invention resides in providing the control carriage with an inner pair of control rollers and an outer pair of control rollers and each such pair of control rollers has associated therewith a printing unit. As a result the control carriage is equipped

with two paper web guide arrangements, each of which cooperates with one of the aforesaid respective printing units. The direction of rotation of the printing units remains the same for printing the front side and also the reverse side, and this is of particular importance in an offset press on account of the required introduction of water prior to inking.

In order to be able to simultaneously print the forward and reverse sides of a paper web, there is provided, according to the invention, in the paper web guide path from the one pair of control rollers to the other pair a stationary group of turning or deflecting rollers. However, it is also possible to deliver to each pair of control rollers its own paper web.

According to a preferred embodiment, the paper web of the outer pair of control rollers is guided about the printing unit associated with the inner pair of control rollers.

Other features, objects and advantages of the invention will become apparent by reference to the following detailed description and drawings wherein like reference characters have been used for substantially the same or analogous elements throughout the various embodiments, and in which:

FIGURE 1 schematically illustrates a first embodiment of inventive rotary printing press depicting the manner of guiding the paper web within the control carriage for forward and reverse side printing;

FIGURE 2 schematically illustrates a modified form of rotary press for guiding two paper webs within the control carriage, wherein each paper web is printed at its front side; and

FIGURE 3 illustrates details of the drive for the control carriage of FIGURES 1 and 2.

Describing now the drawings, it will be understood that only enough of the physical structure of the inventive rotary press has been shown and described so as to enable one skilled in the art to readily understand the underlying teachings of the present invention, and known structure such as the supports and bearing blocks for the various rollers or cylinders have been intentionally omitted to preserve clarity in the drawings. Thus, in the schematically depicted exemplary embodiment of rotary printing press of FIGURE 1, depicted as an offset printer, a paper web **1** is delivered from a supply roll **2** via a continuously operating feed unit **3** to a supply loop-forming unit or roller **4**. The paper web **1** is pulled out of the supply loop-forming unit **4** in accordance with the momentarily adjusted or preset length by means of an intermittently working main feed device **5**. This paper web **1** is then initially delivered via the stationarily mounted guide roll **13** to the control roll or roller **14** mounted at a displaceable control carriage **8** and from this location is guided downwardly to the control roller **11**, likewise mounted at such control carriage **8**. The control rollers **11** and **14** form the inner pair of control rollers of the control carriage **8**.

Within this path and during the upward stroke of the displaceable control carriage **8**—driven in a manner to be fully considered in connection with the drive means of FIGURE 3—the reverse side of the paper web is printed by the printing or blanket cylinder **6***b* of the printing unit **6**, here assumed to be an offset printer. In addition to the printing cylinder **6***b* covered with a blanket of rubber **6***d* along a part of its circumference, this known offset printing unit **6** also has an impression cylinder **6***a* and a plate cylinder **6***c* with which cooperate the usual moistening and inking rollers, generally designated by reference character **6***e*. The paper web **1** then travels via the group of stationary turning or reversing rollers incorporating the stationary guide roll **15**, the register or

tube roll **16** and the stationary guide roll **17** to the control roller **18** mounted at the control carriage **8** and from there to the stationarily mounted guide rollers **19, 20, 21, 22** and **23**. From this location, the paper web **1** is guided past a similar printing unit **7** incorporating the impression cylinder *7a*, the printing or blanket cylinder *7b* partially covered with the rubber blanket *7d*, the plate cylinder *7c* and the associated moistening and inking rollers *7e*, upwardly to the control roll or roller **12** mounted at the control carriage **8**. These control rollers **12** and **18** form the outer pair of control rollers of this control carriage **8**. During upward stroke or displacement of the control carriage **8** the paper web **1** is printed at its front side by the printing unit **7**. This paper web **1** is then once again delivered to the main feed device **5**, via the stationarily mounted guide roller **24**, which then intermittently delivers such to the subsequently arranged supplementary device or processing station **25** for further processing of such paper web.

The drive means for the displaceable control carriage **8** is depicted in FIGURE 3. This control carriage **8** is driven in known manner via a rockable toothed segment **10** and a cam drive **9** such that the paper web, during the printing period of the printing cylinders *6b* and *7b* of the printing units **6** and **7** respectively, is moved exactly with the peripheral or circumferential velocity of such printing cylinders from position A to position B. During this time the main feed device **5** is at standstill whereas during return of the control carriage **8** from position B to position A it forwardly withdraws or pulls the paper web **1** according to the momentarily adjusted length and delivers such through the machine.

It is also to be clearly understood that with the aid of the control rollers **11, 12, 14** and **18** mounted at the control carriage **8** it is also possible to simultaneously print two paper webs. Such a variant arrangement is depicted by the embodiment of FIGURE 2, wherein like reference characters have again been used for the same or analogous elements. The paper web **1** payed off the supply roll or roller **2**, as already described, is delivered to the main feed device **5**. The same happens with regard to the other paper web **26**, whereby such is likewise pulled off its supply roller **27** by the continuously operating feed unit **28** and delivered to the supply loop-forming unit or roller **29**. Now the paper web **1** travels from the main feed device **5** in the opposite direction over the stationarily mounted guide rollers **30** and **15** to the control roller **11** mounted at the control carriage **8** and from here through the printing unit **6** having the printing cylinder *6b*, upwards to the control roller **14** mounted at the control carriage **8**. The paper web **1** is again delivered to the main feed device **5** via the stationarily mounted guide roller **13**. The other paper web **26** travels in the same direction out of the main feed device **5**, over the stationarily mounted reversing or guide rollers **16** and **17** to the control roller **18** mounted at the control carriage **8**. From this location the paper web **26** arrives at the stationarily mounted guide rollers **19, 20, 21, 22** and **23** and from there moves through the printing unit **7** with the printing cylinder *7b* to arrive at the control roller **12** mounted at the control carriage **8**. During upward movement or stroke of the control rollers **18** and **12**, the paper web **26** is printed at the front side by the printing cylinder *7b* of the printing unit **7**. This paper web **26** is likewise conveyed to the main feed device **5** via the stationarily mounted guide roller **24** and register roll **31**, from which location both paper webs **1** and **26** are then conjointly delivered to the further processing station **25**.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practised within the scope of the following claims.

What is claimed is:

1. A rotary printing press for a paper web, said rotary printing press comprising:

an elongated, displaceable carriage means;

first and second pairs of web control roller means disposed on said carriage means in spaced relationship along the length thereof, said first and second pairs of web control roller means respectively defining inner and outer roller pairs with respect to the ends of said elongated carriage means;

first and second rotary printing unit means disposed adjacent said elongated carriage means in spaced relationship along the length thereof, said first and second printing unit means being respectively provided for said inner and outer roller pairs defined by said first and second pairs of web control roller means, said rotary printing unit means having a given peripheral velocity; and

oscillating drive means for said displaceable carriage means for linearly moving said displaceable carriage means at a velocity substantially equal to said given peripheral velocity of said rotary printing unit means.

2. A rotary printing press as defined in claim **1**, further including supply means for at least one paper web to be printed.

3. A rotary printing press as defined in claim **2**, wherein each printing unit means incorporates a printing cylinder constructed to print along part of its circumference, said displaceable control carriage means being displaced by said oscillating drive means during the printing operation to accommodate the paper web to the peripheral velocity of said printing cylinder of each printing unit.

4. A rotary printing press as defined in claim **2**, further including guide means disposed adjacent said carriage means for guiding the paper web from one of said inner and outer roller pairs on said carriage means to the other, said guide means including stationarily mounted reversing roller means for reversing the surface of the paper web presented to said printing unit means respectively provided for said inner and outer roller pairs.

5. A rotary printing press as defined in claim **4**, further including stationarily mounted deflecting roller means for guiding the paper web from one of said outer control roller means to the other of said outer control roller means around said printing unit means, provided for said inner pair of control roller means.

6. A rotary printing press as defined in claim **1**, including separate supply means for a separate paper web which is to be delivered to each pair of control roller means.

7. A rotary printing press as defined in claim **6**, further including means for guiding each paper web from its supply means to a given pair of control roller means for printing thereon by the associated printing unit means.

8. A rotary printing press as defined in claim **1**, wherein said oscillating drive means includes a toothed segment operably engaging said control carriage means, and a cam for selectively driving said toothed segment.

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