

**May 21, 1968**

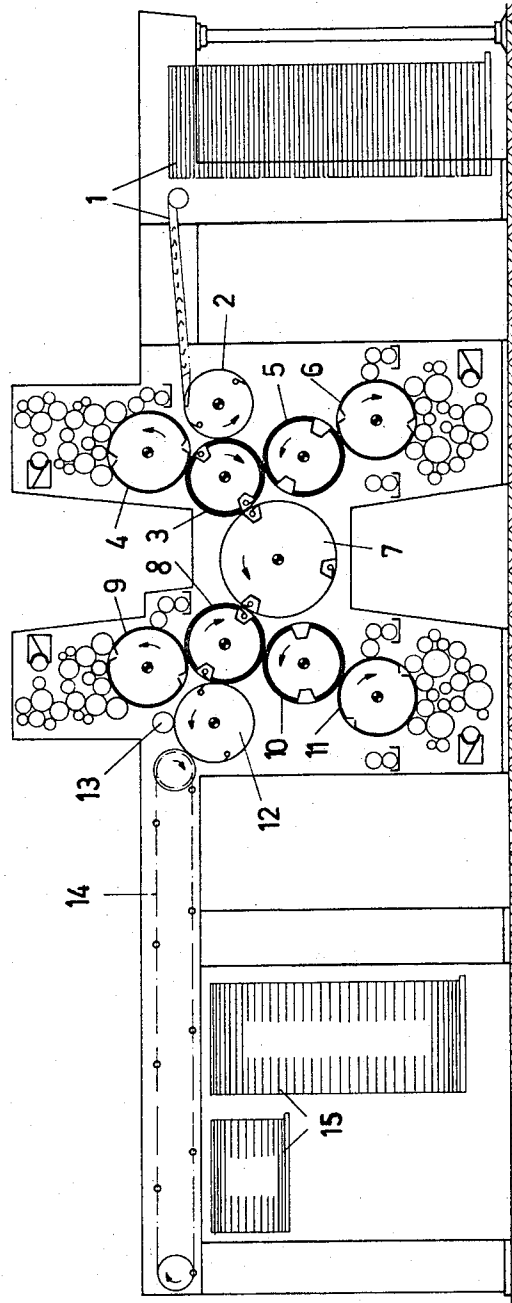
**H. B. BOLZA-SCHÜNEMANN**  
 ROTARY SHEET-FED OFFSET PRINTING PRESS FOR  
 PERFECTING WORK OR RECTO PRINTING

**3,384,011**

Filed March 14, 1966

2 Sheets-Sheet 1

**Fig. 1**



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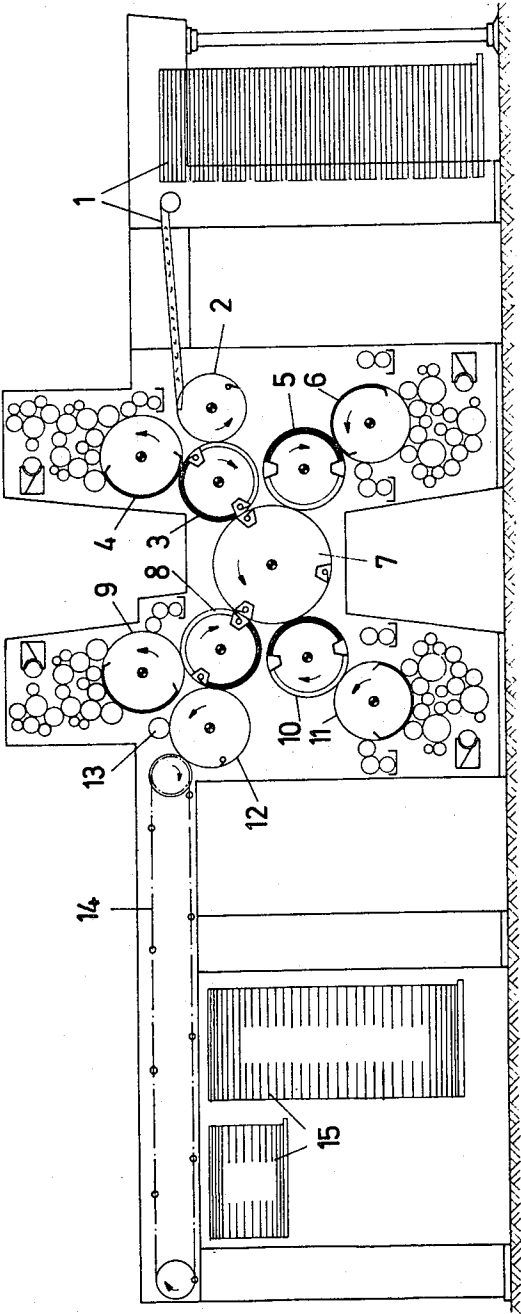
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2 Sheets-Sheet 2

Fig. 2



1

2

3,384,011

## ROTARY SHEET-FED OFFSET PRINTING PRESS FOR PERFECTING WORK OR RECTO PRINTING

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3 Claims. (Cl. 101—177)

The present invention relates to a rotary sheet-fed offset printing press for selectively printing of perfecting work or of pure recto work by means of several offset units, the common impression cylinder of which is in un-

ever circumferential ratio to the blanket and plate cylinders each of which has a circumference of two sheet lengths.

There are various presses known of the above-mentioned type and especially of the kind which are provided with two blanket cylinders on the impression cylinder. In these presses, the sheet to be printed is taken along from the sheet feeding mechanism to the delivery mechanism by means of the impression cylinder which always cooperates with the blanket cylinders. In one press construction it is necessary for the sheet to pass the feeder table again before it is released by the impression cylinder. Another press construction provides that the printed sheet is taken up by a delivery drum. Although these presses are well suited for pure recto work, they can be employed only to a very limited extent for perfecting work. For perfecting work, the sheet is printed blanket to blanket simultaneously, that is, on both sides at the same time. For this purpose, the three printing surfaces of the impression cylinder are covered with a receptive rubber blanket for receiving the ink or image from one of the two blanket cylinders of the offset units. Thus, the image has to be transferred once more from one of the blanket cylinders to another. This necessity, however, constitutes a considerable disadvantage since it is practically unavoidable that the splitting of the ink occurring at a repeated transfer will result in a more or less shallow print and varying tonal values on the recto and verso sides. Consequently, these presses are not suitable for producing perfection work of a high quality. Difficulties would also arise when trying to print four colors wet-on-wet or two colors recto and two colors verso since with these presses it seems impossible to arrange four blanket cylinders of offset units around the impression cylinder without considerably hampering the accessibility.

Among the presses of other known designs which may be employed for selectively producing recto or perfecting work, there is a rotary sheet offset printing press which has a five-cylinder printing unit, in which the common impression cylinder for both offset units has the same circumference of only one sheet length as the blanket and plate cylinders. A conversion from two-color work to perfecting work is made possible inasmuch as the blanket cylinder of one reversible offset unit may be selectively brought in contact either with the common impression cylinder or with the delivery cylinder which cooperates with the latter and serves as impression cylinder for perfecting work. Therefore, the recto and verso printing process is not carried out simultaneously blanket-to-blanket, but requires two different printing areas and a printing unit with six cylinders resulting in considerable mackling danger. For lack of space it would also be impossible to convert this arrangement to a two-color perfecter or a four-color press.

It is an object of the present invention to provide a rotary sheet-fed offset printing press of the type as mentioned at the very beginning which has several offset

units with a common impression cylinder which has a circumference of three sheet lengths, and to design such a printing press in a manner so as to permit one or several blanket cylinders of the offset units to be brought selectively either in contact with one of the adjacent blanket cylinders according to the principle of blanket-to-blanket for carrying out perfecting work, or for pure recto work according to the principle of steel-against-blanket to permit the blanket cylinder or cylinders of the offset units to be brought in contact with the impression cylinder which, for perfecting work, conveys the sheet from the recto to the verso printing unit and thus serves as a sheet transfer cylinder without any printing function. A further object of the invention is to permit the blanket cylinders to be effective either with one or two sheets on their circumference during the perfecting process.

A wet or dry offset press which is designed according to the present invention has the advantage of permitting the production of two-color perfecting work or of wet-on-wet four-color process work at the lowest possible expense, namely, by requiring only one impression cylinder, for example, for four blanket cylinders of offset units. Especially, however, this press satisfies the wish so often expressed to permit it to be used selectively not only for printing two sides, such as two-color recto and two-color verso, but also for producing pure four-color recto work of a high quality. It also insures an absolutely exact register by the fact that the four-color impression is obtained in a single gripper operation. Three-color recto work and one-color verso work may also be carried out in the same manner. The press according to the invention has the further advantage that the printing units are easily accessible. For perfecting work it is also possible to feed two sheets at each revolution of the blanket and plate cylinders and thus to double the performance of this highly popular type of production.

The features and advantages of the present invention will become more clearly apparent from the following detailed description thereof which is to be read with reference to the accompanying drawings, in which—

FIGURE 1 shows diagrammatically the press according to the invention in the position when employed as a two-color perfecter, while

FIGURE 2 shows diagrammatically the same press in the position when employed for producing four-color work.

As illustrated in the drawings, the printing press according to the invention is provided with a common cylinder 7 for four offset units, each of which comprises one pair of plate and blanket cylinders. Cylinder 7 may also be employed as an impression cylinder. The offset units 3, 4 and 5, 6 as well as the offset units 8, 9 and 10, 11 which are arranged in pairs and may be connected to each other are mounted so as to be symmetrically disposed at the opposite sides of the impression cylinder 7, the circumference of which is one and a half times larger than the circumference of one of the plate cylinders.

FIGURE 1 shows the sheets traveling from the feeder 1 to a stop drum 2 serving as a sheet feed mechanism which is provided with two gripper systems and carries out one half revolution per sheet with a subsequent standstill. The sheets are thus conveyed to the continuously rotating blanket cylinder 3 which has two gripper systems on its circumference and two rubber blankets and is thus able to carry two sheets. Plate cylinder 4 prints upon blanket cylinder 3, and the sheet then lies loosely on the already printed rubber blanket. The actual impression takes place between the blanket cylinders 3 and 5 simultaneously, that means, on both sides at the same time, since blanket cylinder 5 also received an impression by the other plate cylinder 6 of this group of two offset units.

Thereafter, the sheet which is printed in one color on both sides is conveyed to the larger impression cylinder 7 which is equipped with three gripper systems along its circumference and operates without pressure against the blanket cylinder 3, serving as a transfer cylinder only and transporting the sheets to the first blanket cylinder 8 of the other group of offset units which likewise comprises two pairs of plate and blanket cylinders. Blanket cylinder 8 is likewise provided with two gripper systems and two rubber blankets and receives the image from plate cylinder 9. The sheets are then printed for the second time with one color on both sides between the blanket cylinders 8 and 10, since blanket cylinder 10 also receives ink from plate cylinder 11. Thereafter, the sheet is picked up by a delivery drum 12 which cooperates with a severing and perforating device 13, and is transferred to the endless chain gripper systems 14 and transported to and deposited on one or two delivery piles 15. When using two piles 15, the sheets of each half of the plate and blanket cylinders are deposited separately which has the advantage that different plates may be employed for printing at the same time.

FIGURE 2 shows blanket cylinders 5 and 10 in a different operating position. They are released from the adjacent blanket cylinders 3 and 8 and brought in contact with the large impression cylinder 7. The sheet feeder 1 is set to feed one half of the number of sheets and only one gripper system of stop drum 2 is used, while the second system remains open. Only one half of each plate and blanket cylinder is employed for printing.

Blanket cylinder 3 picks up the sheet from the stop drum 2 and transfers it without impression to the large impression cylinder 7. The first impression is effected by blanket cylinder 8 and, contrary to FIGURE 1, the sheet is not as yet removed from cylinder 8 but passed by means of the grippers of impression cylinder 7 along the blanket cylinders 8, 10 and 5 and then once more—but now for impression—along the blanket cylinder 3. The four-color impression is thus completed with exact register by a single gripper operation. The sheet then continues to blanket cylinder 8 which has already been used for printing. Due to the uneven diameter ratio between the impression and blanket cylinders, for example, of 3 to 2, the sheet will then arrive on an empty section of blanket cylinder 8 and be taken up by the latter, and it will then be transferred to the delivery drum 12 and be carried by the chain grippers 14 to the delivery pile 15.

For changing the plate and blanket cylinders from one position to the other, eccentric bushings are employed. The reversal of blanket cylinders 5 and 10 together with the associated plate cylinders 6 and 11 is effected by sliding gears. Damping devices are provided for both directions of rotation of plate cylinders 6 and 11, as well as shift gears so that the ductors of the ink fountains will always rotate in one direction from the ink blade. For perfecting work the gripper control is effected at all transfer points by means of fixed cams, while for recto work the grippers of the impression cylinder are controlled so that each sheet carries out approximately one and one-

half revolutions on the impression cylinder. This control may be effected, for example, by means of a revolving cam which is provided with two projections which are offset at an angle of about 90° to each other. This revolving cam is driven at the same speed as the blanket cylinders and therefore overtakes the grippers of the impression cylinder, or the gripper cams are rhythmically displaced in the axial direction of the cylinder. Each second set of grippers on the blanket cylinders remains open continuously and will therefore not receive any sheets.

If no four-color work but only two-color work is desired, a sheet offset press will suffice which is designed in accordance with the principle of the invention and is provided with two offset units which may be coupled to each other and in which one blanket cylinder may be selectively brought in contact with the impression cylinder or with the adjacent blanket cylinder of the other offset unit.

Although my invention has been illustrated and described with reference to the preferred embodiment thereof, I wish to have it understood that it is in no way limited to the details of such embodiment but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed my invention, what I claim is:

1. In a sheet offset printing press having several offset units for selectively printing of perfecting work or of pure recto work comprising blanket and plate cylinders arranged in pairs, each having a circumference corresponding to the length of two sheets, and an impression cylinder of a larger diameter and having an uneven circumferential ratio to said blanket and plate cylinders, means for moving at least one blanket cylinder selectively in contact with an adjacent blanket cylinder for carrying out perfecting work according to the principle of rubber-on-rubber, or in contact with said impression cylinder for carrying out pure recto work according to the principle of steel-on-rubber, said impression cylinder serving solely as a sheet transfer cylinder without printing function when carrying out perfecting work.

2. In a sheet offset printing press as defined in claim 1, in which each of said blanket and plate cylinders has two printing surfaces for perfecting work.

3. In a sheet offset printing press as defined in claim 1, in which for producing pure recto work, suitable means are provided for maintaining the sheets on said impression cylinder for more than one revolution thereof, said press then being adapted to print all colors in one gripper operation.

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