Dec. 2, 1930. O. WILHELM 1,783,819

ROTARY INTAGLIO PRINTING MULTIMACHINE

Filed Dec. 16, 1927

Fig. 1.

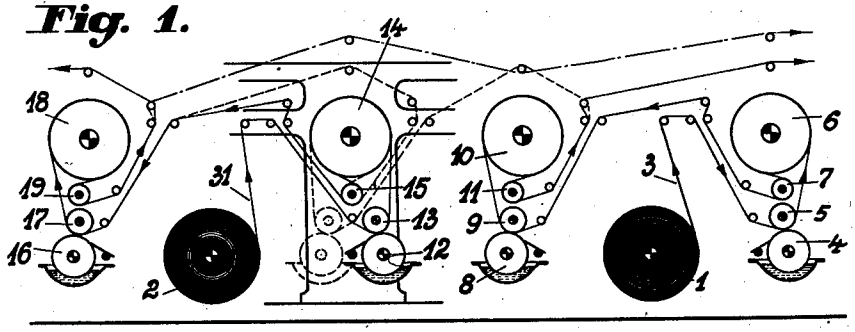



Fig. 2.

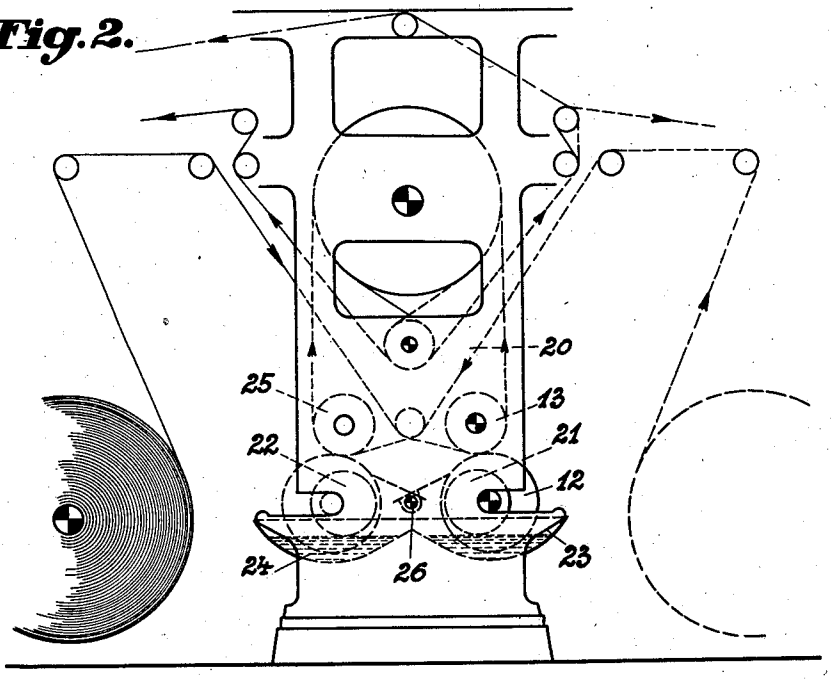
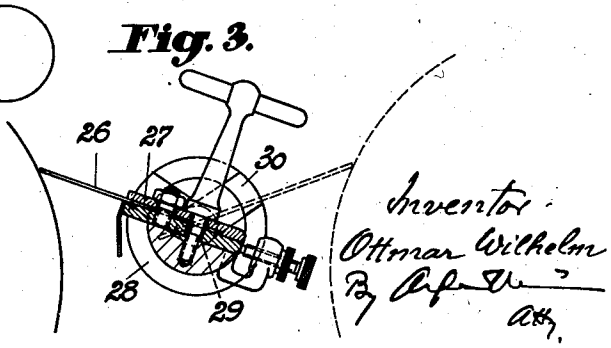



Fig. 4.




Fig. 3.




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# UNITED STATES PATENT OFFICE

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## ROTARY INTAGLIO-PRINTING MULTIMACHINE

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It is old in connection with rotary multi-couple machines for ordinary printing as distinguished from intaglio-printing to design some of the printing couples as reversible couples for the purpose of increasing the applicability of the machines in question. It is, for instance, possible by means of the employment of reversible sets, to employ a two-couple rotary machine which is normally used as a perfecting machine for printing in one colour upon both sides of a paper web, as a machine for printing in one colour on the top side and in several colours upon the reverse side. The reversing of a multi-machine for ordinary (non-intaglio) printing does not present any difficulties. It has hitherto been impossible to employ such an arrangement in connection with rotary multi-machines for intaglio printing, chiefly in view of the fact that the construction of such machines presents difficulties as regards reversing. A rotary intaglio printing machine cannot be easily reversed as the direction of the rotation of the machine is determined by the arrangement of the ductor or scraper. Moreover, it is essential in connection with intaglio printing machines that the forme cylinder be easily exchangeable. These difficulties are avoided by the present invention.

According to the invention, some or all of the forme cylinders of a rotary multi-machine for intaglio printing having exchangeable forme cylinders, are adapted to be reversed. For this purpose, two bearings are provided for a forme cylinder one on each side of a printing couple frame, and the forme cylinder is inserted either into the one or into the other of these two bearings, according to the direction in which it is desired to allow the printing couple to run. With this arrangement, it is preferred to provide either two stationary scraper supports, the one support carrying a scraper adapted for use in the one direction of rotation of the machine, whilst the other scraper is suitable for the opposite direction of rotation, or instead of using two stationary scrapers, a single scraper may be arranged in the middle of the machine frame, said single scraper being adapted to be turned either to the one or the other side according to the forme cylinder being mounted in the one or the other bearing.

The drawing illustrates by way of example the manner in which a two couple rotary intaglio printing machine used normally for perfecting two paper webs in one colour may be converted into a machine for printing upon one paper web the top side in one colour and the reverse side in three colours.

Fig. 1 diagrammatically shows the general arrangement of a machine in elevation.

Fig. 2 shows a single printing couple and Figs. 3 and 4 show two alternative arrangements of the scraping means.

In the embodiment shown in the drawing, four intaglio printing sets or couples are shown arranged side by side. When using the machine for perfecting in one colour upon two paper webs, both paper rolls 1 and 2 are used. One paper web 3 passes from roll 1 between forme cylinder 4 and impression cylinder 5 of the printing set arranged on the extreme right, passes then over a drying cylinder 6 and a cooling cylinder 7, passes then between forme cylinder 8 and impression cylinder 9 of the adjacent intaglio printing set, runs then over a drying cylinder 10 and a cooling cylinder 11 and is finally delivered to folding and cutting apparatus, not shown in the drawings. The path of the paper web is shown in full lines. The second paper web 31 passes from roll 2 between forme cylinder 12 and impression cylinder 13 of an intaglio printing set, then over a drying cylinder 14 and a cooling cylinder 15, then between forme cylinder 16 and impression cylinder 17 of another printing set arranged on the extreme left, passes then over a drying cylinder 18 and a cooling cylinder 19 and is finally delivered to folding and cutting devices which may be arranged either on the right or on the left and are not shown in the drawings.

As may be seen from Fig. 2, a printing set frame 20 is provided with two bearings 21 and 22 for a forme cylinder. When the machinery is operated in the above described manner, the forme cylinder 12 lies in the bear-

ing 21. When the forme cylinder 12 is transferred into the bearing 22, it is rotated in the opposite direction. Each of the two bearings of the forme cylinder is provided with a corresponding ink trough 23 or 24. Similarly, each of the two bearings may be provided with a stationary impression cylinder 13 or 25. The arrangement may, however, be also modified by employing only one impression cylinder which is alternately used either upon the left or the right hand side of the frame 20. In order to enable the forme cylinder to be rotated in opposite directions according to its position in the frame, a common scraper 26 may be used as shown in Fig. 2, such scraper being adapted to be turned either to the one or to the other side as required. When this arrangement is used, the portions 28 of the two lateral bearing standards containing the end journals 29 of a scraper support 27, are provided with slots 30 into which the journals 29 may be inserted. In the alternative arrangement according to Fig. 4, two scrapers 26 are provided, one for each direction of rotation of the forme cylinder. These scrapers always remain in their positions whilst the position of the forme cylinder is changed.

For producing by means of this machine printing in one colour upon one side of the web and printing in three colours upon the reverse side, the forme cylinder 12 is transferred as above described into the forme cylinder bearing 22 arranged upon the left side of the frame 20. In this case only one paper web 3 is used. This web runs from roll 1 between the rollers of the couple 4, 5, is in this couple printed upon the upper side, and is then passed as shown in broken lines through the couples 8, 9; 12, 13 and 16, 17 by which it is printed in three colours upon the reverse side. The paper web is then delivered as in the previous case to folding and cutting devices.

Various other combinations may be easily carried out based on the main idea of the invention.

What I claim is:

1. In a rotary multi-machine for intaglio printing, the combination of an exchangeable form cylinder with two alternative bearings therefor, said bearings being so arranged that said form cylinder when placed in one of said bearings may be rotated in one direction and when placed in the other bearing, in the other direction, and a scraper disposed intermediate said bearings and adapted to be turned to either side.

2. In an intaglio printing machine, inclusive of form and impression cylinders, a frame element, a pair of cylinder of one of the foregoing types mounted in said frame element each for operation at all times in a single definite location, and a third cylinder of the other type for cooperation with either of the cylinders of the pair first mentioned, the frame element having two sets of bearings related, respectively, to the individual cylinders of said pair, and the third cylinder being adapted to be mounted in one set of said bearings for rotation in one direction and for cooperation with the related cylinder of said pair of cylinders, and to be removed from said first set of bearings and mounted in the other set of said bearings for rotation in an opposite direction and for cooperation with the second cylinder of said pair of cylinders.

3. In an intaglio printing machine, a frame element, a pair of impression cylinders mounted in said frame element each for operation at all times in a single definite location, a single form cylinder, and two separate sets of bearings carried by said frame element for the single form cylinder, one set of said bearings having a definite relation to one of said impression cylnders and the other set of said bearings having the same definite relation to the other of said impression cylinders, the single form cylinder being adapted to be mounted in one of said sets of bearings for cooperation with one of said impression cylinders by rotation in a given direction and to be mounted in the other set of said bearings for cooperation with the other impression cylinder by rotation in an opposite direction.

4. In an intaglio printing machine, inclusive of form and impression cylinders, a frame element, a pair of cylinders of one of the foregoing types mounted in said frame element each for operation at all times in a single definite location, and a third cylinder of the other type for cooperation with either of the cylinders of the pair first mentioned, the frame element having two sets of bearings related, respectively, to the individual cylinders of said pair, and the third cylinder being adapted to be mounted in one set of said bearings for rotation in one direction and for cooperation with the related cylinder of said pair of cylinders, and to be removed from said first set of bearings and mounted in the other set of said bearings for rotation in an opposite direction and for cooperation with the second cylinder of said pair of cylinders, and a single scraping means for cooperation with said third cylinder in either of the aforesaid two operative positions of the latter.

5. In an intaglio printing machine, inclusive of form and impression cylinders, a frame element, a pair of cylinders of one of the foregoing types mounted in said frame element each for operation at all times in a single definite location, a single cylinder of the other type, means whereby said last mentioned cylinder may be mounted in one position for cooperation with one of said pair of

cylinders and in another position for cooperation with the other of said pair of cylinders, and scraper means for cooperation with said last-mentioned cylinder in either of the aforesaid two different positions thereof.

In testimony whereof I have affixed my signature.

OTTMAR WILHELM.