

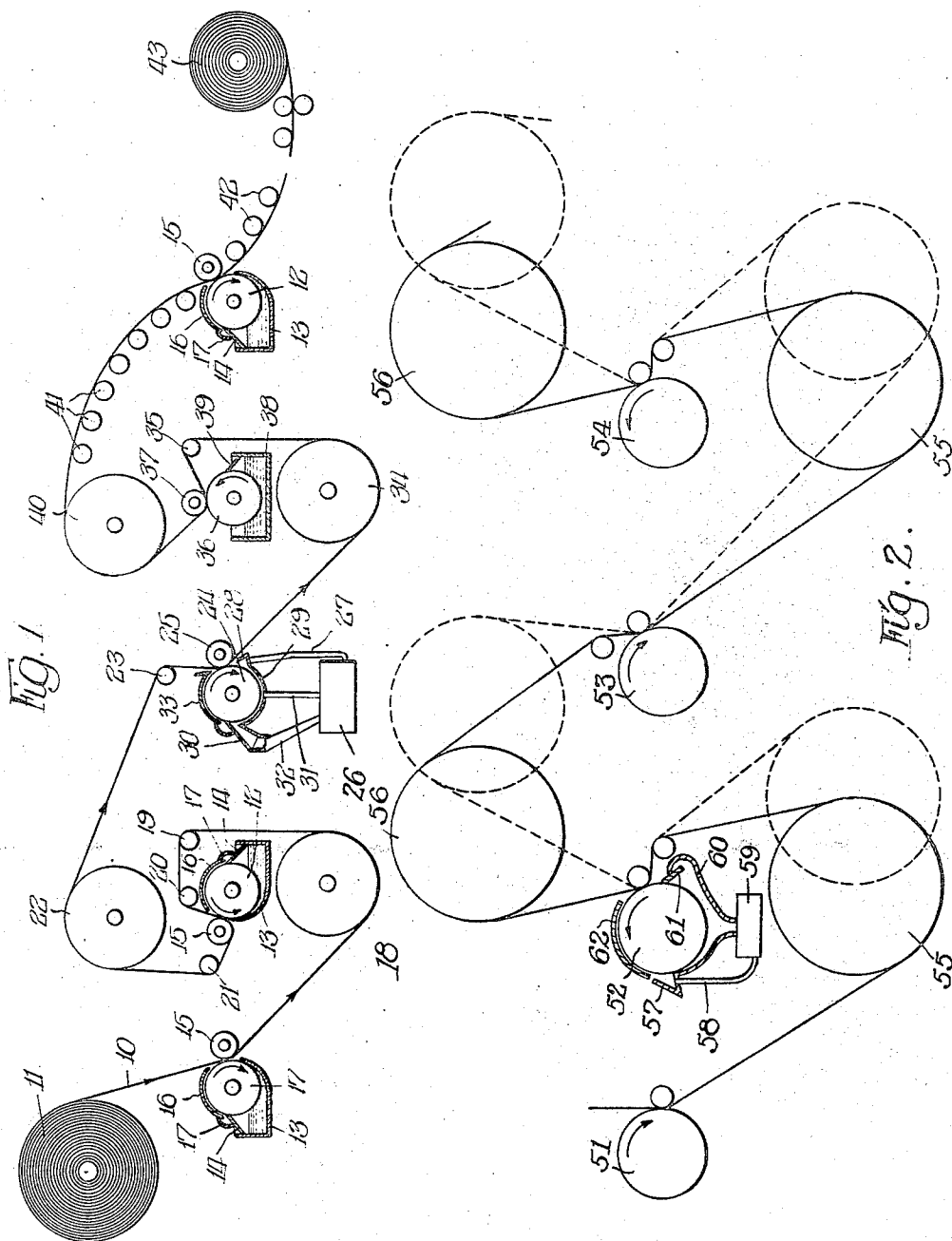
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NEWSPAPER INTAGLIO PERFECTING PRESS

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NEWSPAPER INTAGLIO PERFECTING PRESS

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The present invention relates to an improved intaglio printing press of the perfecting type, in which a continuous web is printed on both sides and folded into a newspaper or the like, and has for a principal object the provision of a multi-color intaglio perfecting printing press in which there is practically no dead web space.

An additional object of the invention is to provide a multi-color intaglio perfecting press for newspaper work, in which compactness is achieved with an increased printing efficiency.

Still another object of the invention is the provision of a perfecting intaglio printing press which will operate at high speed and by which it is possible to obtain particularly desirable results from the standpoint of registration of colors or designs.

Still another object of the invention is the provision of a perfecting intaglio printing press in which the initial color is printed on one side of the web and thereafter the second color is printed on the opposite side of the web, this procedure being repeated through a series of printing units in which different colors or designs on the same side of the web are in registration and the web is progressed alternately below the printing units and above the printing units.

These and other objects of the invention will be observed from a consideration of the following specification and by reference to the accompanying drawing, in which

Fig. 1 is a somewhat diagrammatic view of a perfecting press constructed in accordance with the invention and showing various types of color-applying units which may be used in the device; and

Fig. 2 is a schematic view somewhat similar to that of Fig. 1 and showing an alternate type of printing assembly.

In intaglio printing machines the web to be printed or decorated generally is passed through a series of multi-color units in each of which an etched cylinder travels in a color bath and deposits upon the web a quick-drying ink. As it is necessary for the web to dry before it reaches the next adjacent color unit to prevent offset, there is required a certain distance between the color units wherein the volatile solvents of the ink can evaporate. Various schemes of leading the web through intaglio presses have been suggested but these schemes involve dead web space and other objections which are remedied by the present invention. Any undue web travel through the press results in complications from the standpoint of registration of the colors. It also re-

quires a larger press than is desirable. In accordance with the present invention there is provided a multi-color perfecting intaglio press in which there is a minimum of web space not used in the drying operation. That is, the entire web space between colors is available for drying. This is effected by printing the web first on one side and then on the other in alternate relation. More particularly, the first color is printed on one side of the web and the web thereafter is carried in a circuitous route to the next adjacent color with out the freshly printed side of the web having contacted a roller or guide member. Then, the web is printed on the opposite side and again is carried over a circuitous route to the next adjacent color without the printed side of the web coming in contact with a roller or guide member. The third color is deposited upon the side of the web upon which the first color was deposited and in register with the first design. This type of arrangement is made possible by the use of side mounted impression rollers at least on the color units printing one side of the web. Various types of mechanisms involving the principles of operation very possible and certain constructions are described herein for purposes of illustration and explanation which will provide an understanding of the invention.

In the embodiment shown in Fig. 1 a web 10 of newspaper material is taken from a roll 11 and passed through the initial color unit. This initial color unit consists of an etched intaglio printing cylinder 12 which rotates in a color bath 13, the latter being provided with a doctor blade 14. It will be noted that the impression cylinder 15 is mounted on the side of the etched intaglio printing cylinder and that the web 10 passes between the impression roller and the printing cylinder to provide a downward path of travel during the printing moment. The ink contained in the bath 13 is of the quick-drying intaglio type and may vary in compositions considerably. Inks of this sort are well known in the art and it is not thought necessary to refer to them more specifically. It is sufficient to say that the inks contain highly volatile solvents which after the ink is deposited on the web will dry or evaporate within a few feet of travel. The particular time of drying will depend upon the speed of the press and the type of ink used. Between the doctor blade 14 and the impression cylinder 15 there extends a guard member or hood 16 which has a flexible tail member 17 sealing the guard member to the doctor blade. The guard member 16 is spaced from the printing cylinder and acts to

retard evaporation of the solvent of the inks from the etched portions of the cylinder between the doctor blade and the impression cylinder. Since the doctor blade 14 is a substantial distance from the impression roller 15 there is an appreciable period of time after the printing cylinder is scraped in which it is possible for the solvent to escape. The use of the guard permits the impression cylinder to be mounted on the opposite side of the intaglio printing cylinder from the doctor blade and when the surface of the printing cylinder reaches the web to be printed the ink deposited on the cylinder is sufficiently liquid to insure a clear-cut deposit.

After the web 10 passes through the initial printing unit it continues its downward path of travel about a drum 18. This drum may, if desired, be heated and generally there will be provided some sort of air-blowing device to increase the speed of evaporation of the solvent from the ink as the web passes between colors, thereby cutting down the drying space required. From the drum 18 the web passes upwardly about two idlers 19 and 20 which carry the web above and around the second printing unit.

The second printing unit is a duplication of the first printing unit except that it is complementary or oppositely positioned. The etched cylinder 12 of the second unit rotates in the opposite direction from the corresponding unit of the first cylinder, and the impression cylinder 15 of the second unit is oppositely mounted with respect to the impression cylinder of the first unit, as will be seen in the drawing. The first time that the freshly printed side of the web 10 contacts with a roller or guide member is when the web passes beneath the impression cylinder 15 of the second unit. The second printing operation is effected beneath this second impression cylinder so that it will be seen there is no dead web between the first two colors. The distance between the two units is sufficient to effect complete drying.

The second impression cylinder 15 likewise is mounted on the side of the printing cylinder and after the web is printed with the second color it passes about the idler 21 and upwardly around the second or upper drum 22. Drum 22 may be heated as stated with respect to drum 18 and there generally will be provided a drying blast of air at this point. After the web passes about drum 22 it is taken to the first color about the roller 23. Roller 23 contacts the dry side of the web and the portion of the web which carries the second color does not contact the roller guide until the third color is deposited on the web.

Various types of color units may be used in the improved press and in showing the third color there has been illustrated a type of intaglio printing unit which is somewhat different from the units composing the first and second colors. The third color unit consists of a printing cylinder 24 which rotates in the same direction as the printing cylinder of the first color unit as shown by the arrow. Cylinder 24 has an impression cylinder 25 mounted on its side so that the printing contact again is on the side of the printing cylinder during the downward path of travel of the web 10. The ink for cylinder 24 is supplied from a tank 26. A pump (not shown) transfers the intaglio ink from tank 26 through lines 27 to an open trough 28 adjacent the printing cylinder. The lower edge of trough 28 is spaced from the printing cylinder a few thou-

sandths of an inch so that the entire cylinder is covered with an even coating of the intaglio ink. It will be noted that the trough 28 is close to the impression cylinder 25 so that little distance is afforded between the impression cylinder and the ink fountain in which the color can dry on the cylinder. A lower pan 29 extends from the trough 28 to the opposite side of the printing cylinder where there is positioned a doctor blade 30. This pan constitutes an ink basin and causes the return of excess ink from the cylinder to the tank 26 through line 31. Ink scraped by the cylinder 30 also may be returned to the tank 26 through the line 32. An evaporation shield 33 extends from the doctor blade 30 to a point closely adjacent the impression roller 25 in spaced relation with respect to the printing cylinder. In this type of an intaglio printing unit it will be seen that there is very little opportunity afforded the escape of solvent from the printing cylinder. The line 27 transfers excess ink into the trough 28 so that the ink spreads completely across the length of the printing cylinder.

From the third printing unit the web 10 passes downwardly beneath a lower drum 34. This drum is similar to the drum 18. From the drum 34 the web 10 passes upwardly about a roller 35 and then through another intaglio printing unit which is represented as being a conventional type. This fourth unit consists of a printing cylinder 36 having an impression cylinder 37 mounted directly above it. The cylinder 36 rotates in a color bath 38 and is provided with a doctor blade 39 of the usual type. Again, between the third printing unit and the fourth printing unit there is no dead web space. The side of the web printed by the third color unit does not contact a roller or guide until it reaches the impression cylinder 37 where the fourth color is deposited on the web in proper register with the design or color printed by the second unit.

The web bearing the fourth color passes upwardly about a drum 40 which is similar in construction and position to the drum 22. Thereafter the web passes over a series of rollers 41 which preferably are positioned closely enough together to prevent or retard the weaving of the web in its travel. Rollers 41 conduct the web 10 to a fifth color unit which is similar in construction to the initial color unit. Between the fourth color unit and the fifth color unit the printed side of the web does not contact a roller until it reaches the impression cylinder 45 where the fifth color is deposited. After the fifth color is printed the web passes beneath rollers 42 and after drying is wound into a roll 23.

In the mechanism described it will be noted that the odd numbered printing units deposit colors on the same side of the web in predetermined relation, and the even numbered printing cylinders deposit colors on the opposite side of the web. Also, it will be noted that the odd numbered printing unit effects the printing operation while the web is in a downward path of travel and the impression cylinder is side mounted with respect to the printing cylinder. Throughout the entire press there is no dead web space. The third color unit may be accurately registered with respect to the first color unit and the fourth color unit likewise may be in register with respect to the second color unit. Several types of color units have been illustrated to show that the invention is not confined to the particular type of color-applying mechanism.

The drive for the printing press may be conventional although it is preferred to effect the drive in part by the drums 18, 22, 34 and 40. In most instances it will be found desirable to over-feed these drums slightly. The frictional contact of the drums with the web is sufficient to produce a carrying effect of the web through the press. Three colors have been shown as being applied on one side of the web while two colors have been shown as being applied on the other side of the web. It will be understood that any number of colors may be used for either side of the web.

In Fig. 2 the press layout is illustrated somewhat diagrammatically and variant positions of the driven drum over which the printed web passes between colors are shown. The four consecutive colors shown are indicated at 51, 52, 53 and 54, respectively. The lower drums between the odd and even number are indicated at 55 while the upper drums between the even and odd color units are indicated at 56.

From the color unit 51, where the web initially is printed in downwardly traveling position on the side of the printing cylinder, the web may pass about the first drum 55. In the first position shown the path of travel is somewhat short. Where it is desired to increase the space between the two color units the drum 55 may be shifted along the press to the position shown in dotted lines to provide a longer path of travel for the web. Thus, for a printing cylinder of eight inches diameter and a drum of 40 inches diameter, the first shown position of the drum 55 provides approximately 15 feet of drying space between the first and second color. The other position of the drum 55 provides approximately three feet additional drying space.

A still different type of color bath is shown for the second color 52. This bath consists of a trough 57 which is supplied with color through the line 58 from tank 59. The lower end of the trough 57 is spaced from the printing cylinder 52 a few thousandths of an inch, as described with respect to the third color unit of Fig. 1, to deposit a layer of ink on the printing cylinder as it rotates. Below trough 57 is a pan 60 which drains into the tank 59. A doctor blade 61 is positioned closely adjacent the impression roll of the color unit so that there is very little space between the doctor blade and the printing point. This is of advantage in preventing drying of ink on the cylinder between the doctor blade and the point at which the ink is deposited on the web. A cover 62 may be mounted in spaced relation about the printing cylinder between the impression roller and the trough 57 if it is desired to retard drying of residual ink on the cylinder.

After leaving the second printing unit the web 10 passes around the upper drum 56 and is carried to the third color unit 53. From the third color unit the web passes about the second drum 55 and then passes through the fourth color unit 54.

Various positions of the upper drum 56 are shown in the drawing and by moving these drums as desired it is possible to increase or decrease the amount of drying space between the even numbered color units and the odd numbered color units.

In the arrangement of the mechanism as shown in Fig. 2 it is possible to provide a relatively large number of colors in a small space. The dimensions specified herein with respect to the printing cylinder and the drums will provide the press having an overall height of less than 13 or 14 feet and the distance between the color units may be less than four feet. For a press having eight colors printing four colors on each side of the web, the color units themselves may occupy less than 35 feet, although the length may be greater or less as desired.

The press constructed in accordance with the present invention is considerably more simple than previously known presses and is more economical of manufacture since a number of parts are eliminated and the size of the press is small. One of the greatest problems in the intaglio printing of newspapers is registration. In the interest of economy it is essential that the press be operated at a rapid rate. In each of the designs shown in the drawing it will be noted that the odd numbered color units effect the printing operation while the web is in a downward path of travel. The printing position is on the side of the etched gravure cylinder in the designs in which the color units are in side-by-side relation.

It will be seen that the principle of the invention is applicable to a number of different types of construction. All of these various changes and modifications are intended to be included in the appended claims.

I claim:

1. In an intaglio perfecting press, a plurality of horizontally spaced color units having etched cylinders rotating in alternately reversed direction, an impression roll for each of said cylinders mounted at one side thereof to effect a printing operation on a downwardly traveling web only at a side contact portion of the cylinder, and means for conveying the web from one cylinder and impression roll to an adjacent cylinder and impression roll with the previously printed portion of the web uncontacted and exposed for drying, said means including drying rolls above and below said color units.

2. An intaglio printing press, comprising a plurality of spaced color printing units each having an etched printing cylinder and a side mounted impression roll providing a printing line at one side of said cylinder, and means for directing a web in upward and downward direction over said units for printing alternately on opposite sides of said web, said means including spaced heating and drying rolls on opposite sides of said units.

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