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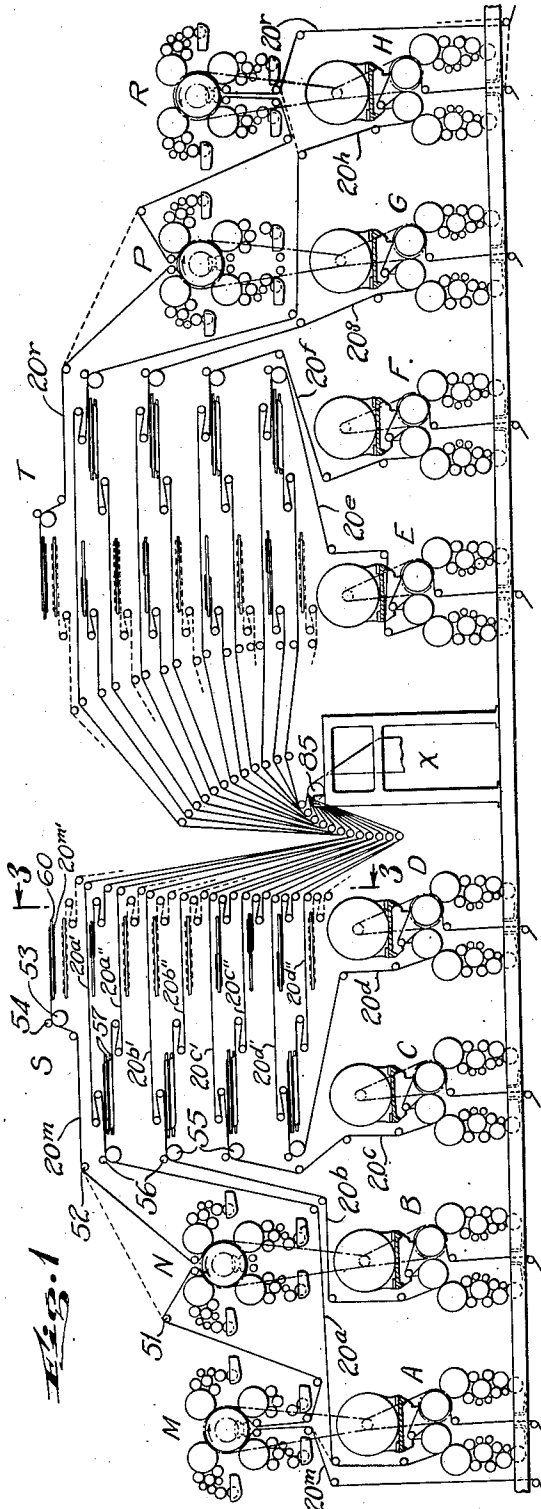
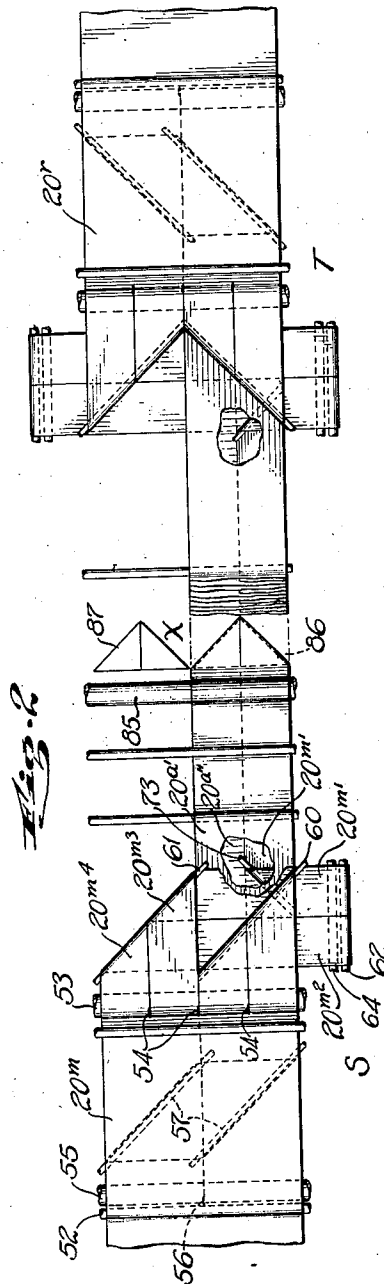
H. A. W. WOOD

2,050,031

PRINTING PRESS

Original Filed Feb. 20, 1931

2 Sheets-Sheet 1



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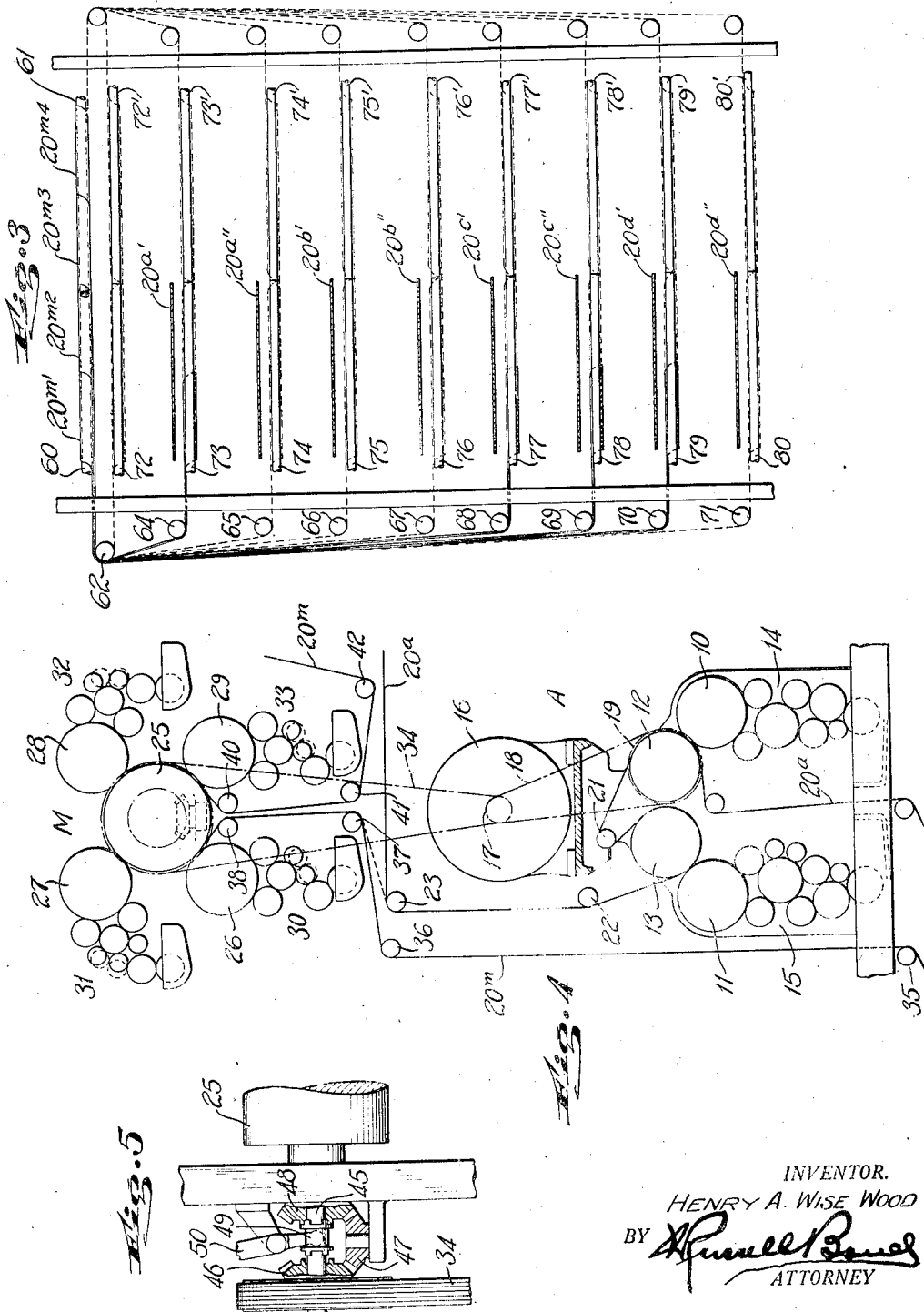
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,050,031

PRINTING PRESS

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Application February 20, 1931, Serial No. 517,138
Renewed November 15, 1934

7 Claims. (Cl. 270-5)

My invention relates to web printing presses and has for an object to provide a novel combination of single color and multi-color press units, whereby one or more webs may be printed in a plurality of colors, either on one or both faces of the web, and then be interleaved, in any order desired, with other webs bearing single color impressions.

In my copending application, Serial No. 512,029, filed January 29, 1931, since issued as Patent No. 1,970,929, I disclose a multiple web press wherein the webs, after receiving a single color on each face thereof, are passed through a multi-color unit to receive a plurality of colors on one of the other faces of each web. Another arrangement is shown in my copending application Serial No. 514,376, filed February 9, 1931, wherein a single multi-color press unit is combined with a plurality of ordinary perfecting press units. Thus, one face of one of the webs is printed in a plurality of colors and then this web is slit into two or more ribbons which are distributed at will among the other webs. The present invention provides a plurality of multi-color units combined with a plurality of single color perfecting units, the arrangement being such that a web may, if desired, be passed through two multi-color units in series, one of the multi-color units being reversed, whereby the web will receive multi-color impressions on each face thereof.

The invention further contemplates slitting the multi-color web into a plurality of ribbons and then interleaving said ribbons at will with the other single-color webs before passing the webs to the folder.

Other objects of the invention will appear in the following description of a preferred embodiment and thereafter the novelty and scope of the invention will appear in the claims.

In the accompanying drawings:

Figure 1 is a view, largely diagrammatic, showing, in side elevation, a web press comprising a plurality of single and multiple impression units with a common folder therefor;

Fig. 2 is a plan view on a larger scale of a portion of the web assembling and interleaving mechanism;

Fig. 3 is a view in section taken on the line 3-3 of Fig. 1;

Fig. 4 is a view in side elevation of one of the single color units and a multi-color unit cooperating therewith; and

Fig. 5 is a view of a reversing clutch for one of the multi-color units.

By the term "single-color unit" as used in this specification and the claims, I refer to a press unit which makes a single impression on one face of the web as distinguished from a "multi-color unit" which makes a plurality of impressions on one face of the web. Thus, the ordinary perfecting unit I term a single-color unit, although it makes two single impressions, one on each face of the web, and although these impressions, while usually black, may be of any color or of different color on one face from that on the other.

The press illustrated in the drawings comprises two groups of single-color perfecting press units A, B, C, D and E, F, G, H, located respectively on opposite sides of a folder X. Mounted above the units A and B are two multi-color units M and N respectively, while above the units G and H are two multi-color units P and R respectively. Above the units C and D is an assembling and interleaving mechanism S for the webs that come from the units at the left of the folder, as viewed in Fig. 1, while a similar assembling and interleaving mechanism T for the units on the right of the folder, is located above the units E and F.

The single-color units are all substantially alike and the following description of the unit A, as shown particularly in Fig. 4, will apply to all of the rest of the single-color units. The unit A comprises a pair of plate cylinders 10 and 11 and a pair of impression cylinders 12 and 13 cooperating respectively therewith. The plate cylinders are provided with individual inking systems 14 and 15 respectively. Mounted above cylinders 12 and 13 is a motor 16. A sprocket wheel 17 fixed on the motor shaft is connected by a chain belt 18 to a sprocket wheel 19 on the shaft of cylinder 12. It will be observed that each single-color unit has an individual driving motor. These motors are synchronized by any suitable means (not shown) such as are well known in the art.

The web 20a, which passes through the unit A, is led between the cylinders 10 and 12, about a compensating roll 21, between cylinders 11 and 13, and then is guided by rolls 22 and 23 around the motor 16.

The multi-color unit M which is mounted above the single color unit A has a single impression cylinder 25, against which bear four plate cylinders 26, 27, 28 and 29, with their individual inking systems 30, 31, 32 and 33. The cylinder 25 is driven by the motor 16 through a chain belt 34. A web 20m is guided about the

unit A, and to the impression cylinder 25, by rollers 35, 36, 37 and 38. Thence it passes in the direction of the arrow (Fig. 1) about the cylinder 25, to receive impressions from the plate cylinders 26, 27, 28 and 29, after which it is guided out of the unit by rolls 40, 41 and 42.

The multi-color unit N is similar to the unit M except that the web 20m is adapted to pass in reverse direction therethrough. In other words, the direction of rotation of unit N is reversed with respect to that of unit M.

In order to make the multi-color units interchangeable a reversing clutch is provided on each of said units. Thus, as shown in Fig. 5, the belt 34 drives a sprocket wheel which turns freely on the shaft 45 of the cylinder 25. Fixed to the sprocket wheel is a bevel gear 46 which meshes with a bevel gear 47, and the latter, in turn, meshes with another bevel gear 48 journaled freely on the shaft 45. Splined to the shaft 25 is a clutch sleeve 49 formed with clutch teeth at opposite ends thereof. Cooperating clutch teeth are formed on the adjacent end faces of the gears 46 and 48 and by means of a clutch lever 50 connected to the clutch sleeve, the latter may be shifted into or out of engagement with either of the gears 46 and 48.

In the particular inking system illustrated the fountain roll and pick-up roll must always run in the same direction, but suitable reversing means, such as described in said copending applications, may be employed to permit of reversing the form rolls with respect to the pick-up roll.

The web 20m is led to the top of unit N over a guide roll 51, Fig. 1, and then passes counterclockwise about the impression cylinder of unit N, so that the web receives on one face, impressions from the plate cylinders of unit M and on the other, impressions from the plate cylinders of unit N. From the unit N the web 20m is led over a roll 52 to the assembling mechanism S where it passes over a drag roll 53 and is slit into ribbons by slitter rolls 54.

The webs 20a, 20b, 20c and 20d from the perfecting press units A, B, C and D, are led into the assembling mechanism over individual drag rolls 55 and are slit in two by slitter rolls 56. By means of the customary angle bars 57 (Fig. 2) the half webs at one side may be turned under those at the other side. In Fig. 3, the half webs coming from the left hand side of the full webs are designated by the symbol (') and those from the right hand side by the symbol ("). Thus, there is a bank of half webs maintained in spaced superposed relation by means of suitable guide rolls and indicated by the reference numerals 20a', 20a'', 20b', 20b'', 20c', 20c'', 20d' and 20d''.

The web 20m, as illustrated, is slit into four ribbons, 20m¹, 20m², 20m³ and 20m⁴. These are diverted toward the left (as viewed in Fig. 3) about angle bars 60 and 61 (see also Fig. 2) and then pass down the left hand side of the bank over a roll 62. A series of rolls, 64, 65, 66, 67, 68, 69, 70 and 71 is provided about which the ribbons may be bent back into the bank of half webs at any level desired. A series of angle bars 72, 73, 74, 75, 76, 77, 78, 79 and 80 is provided for turning the ribbons into alignment with the bank of half webs.

In the particular arrangement illustrated, the ribbon 20m⁴ is passed around the roll 64 and angled turning bar 73 so that it is introduced between the half webs 20a' and 20a''. The ribbon

20m³ passes about the roll 68 and angle bar 77, and is introduced between the half webs 20c' and 20c''. The other two ribbons 20m' and 20m'' are carried about rolls 70 and 69 respectively and about turning bars 79 and 78 respectively, so that the ribbons are introduced above and below the half web 20d'. Obviously, the ribbons could be introduced in any other order among the half webs of the bank. If desired, the single color webs need not be carried under one another but may continue side by side to a pair of folding forms 86 and 87 in the folder X. For this reason, provision is made for introducing the ribbons either in the left hand bank or the right hand bank of half webs. Accordingly, 15 rolls corresponding to the rolls 64—71, are provided on the right hand side of the assembling mechanism, as shown in Fig. 3, and the turning bars 60 and 61 may be disposed at an angle of 90 degrees to the position they occupy in Fig. 2, so that the ribbons into which the multi-color web is slit may be carried toward the right and then be interleaved with the single color webs by introducing them from the right hand side of the bank. To this end, suitable turning bars 25 72', 73' . . . 80' are provided. If desired, the ribbons 20m¹ and 20m² may be carried down the left hand side of the assembling mechanism and the ribbons 20m³ and 20m⁴ down the right hand side and then be interleaved with the single 30 color webs in any order desired.

The arrangement of press units on the right hand side of the folder X is substantially the same as that on the left hand side. In this case, the web 20r passes consecutively through the 35 multi-color press units R and P receiving color impressions on both faces thereof and then is carried on to the assembling and interleaving mechanism T. The single color units E, F, G and H print the webs 20e, 20f, 20g and 20h which 40 are also led to the assembling mechanism T. Here the webs are treated in the same way as are the webs in the assembling mechanism S.

The webs from the assembling mechanisms S and T are led about suitable guide rolls and brought to a common drag roll 85. Thence, the webs are passed over the folding form 86 or 87, or both, of the folder X. As shown in Fig. 2, the web 20r is slit into four ribbons, two of which are carried to the right and two to the left of the bank of half webs and they are then interleaved with the single color webs in any desired position.

As shown in Fig. 4, the web 20a may pass from the roll 23 directly to the roll 37 and thence be carried through the multi-color unit M. The web 20a would then take the place of the web 20m and it could be passed over the unit N from roll 51 to 52 so that it would receive multi-color impressions on one face only and a single impression on the other. On the other hand, the web 20a could be passed through both of the color units M and N so as to receive five impressions on each face. The same latitude is provided in the case of the color units P and R. 65 Thus, the web 20h could be carried through the unit R and run thence either through the unit P or directly to the assembling mechanism T. It will be understood that the usual compensating mechanism is provided for bringing all of 70 the webs or part width webs into register with one another before they are led into the folder.

It will be seen that by this invention the number of color pages may be regulated to suit any condition required. A fractional width roll could

be used on one pair of color units with a full roll on the other. A single full width color unit could be used, or, if it were desired to use a half width color page for a cover sheet, one pair of color units could be silenced and a half width roll could be used on the other pair. It will thus be seen that by my invention the color sheets may be interleaved between the single color sheets at will and they may all be led into a single folder to form a fully associated unitary product.

It will be understood that the particular embodiment shown in the drawings is to be taken as illustrative and not limitative of my invention and that I reserve the right to make such changes in form, construction and arrangement of parts as fall within the spirit and scope of the following claims.

I claim:

1. In a printing press, a plurality of single-color units each adapted to print a web, means for assembling the webs, a pair of multi-color units adapted to print on opposite sides of another web, and means for introducing the latter web at any desired position in the assembly of webs.

2. In a web printing press, two web printing groups, a folder intermediate between said groups, means for leading printed webs from both of said groups to said folder, each group comprising a plurality of a single color perfecting press units and a pair of multi-color press units, one of the pair being reversible and having a reversible inking system, whereby a web passed through the pair may receive multi-color impressions on each face thereof, and means for introducing the latter web at any desired position among the other webs of the group.

3. In a web printing press, two web printing groups, a folder intermediate between said groups, means for leading printed webs from both of said groups to said folder, each group comprising a plurality of a single color perfecting press units and a pair of multi-color press units, one of the pair being reversible, whereby a web passed through the pair may receive multi-color impressions on each face thereof, means for slitting the latter web into a plurality of ribbons, and means for distributing said ribbons at will among the other webs of the group.

4. A web printing press, comprising at least two interchangeable sets of printing units, each

set including a single color perfecting press unit and a multi-color press unit superposed thereabove and a motor between the two units providing a common drive therefor, the multi-color unit having a reversible inking system, means for reversing each multi-color unit and its inking system, means for leading a web through each single color unit, means for leading another web in one direction through one multi-color unit and in opposite direction through the other multi-color unit to perfect the latter web in colors, means for slitting the latter web into ribbons, means for assembling the webs, and means for distributing the ribbons individually in any desired position among the other webs.

5. In a web printing press, a folder, two rows of printing units aligned therewith, one of said rows consisting of single color units for perfecting a plurality of webs in single color, the other row comprising a plurality of multicolor units for perfecting a web in multicolors, and means for distributing the multicolor web at will among the single color webs and leading them as a unit to the folder.

6. In a web printing press, a plurality of press units arranged in parallel rows and adapted to lead webs to a common folding point in the plane of the rows, a folder at said point and with the intake edge thereof disposed transversely to said rows, one of the rows comprising single color press units arranged to perfect a plurality of webs in single color, another row comprising multicolor press units constructed and arranged to perfect a web in multiple colors, and means for assembling the webs and leading them as a unit to the folder, including means for slitting at least one of the webs and distributing the slit portions at will in the assembly of webs.

7. In a web printing press, a plurality of press units arranged in a pair of opposed rows for leading webs to an intermediate folding point in the plane of said rows, a folder at said point and with the intake edge thereof disposed transversely to said rows, each of the rows comprising single color and multicolor perfecting press units for printing a plurality of webs, means in each row for slitting at least one of the webs and for distributing the slit portions at will among the other webs, and means for leading the webs from both rows as a unit to the folder.

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