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PRINTING PRESS

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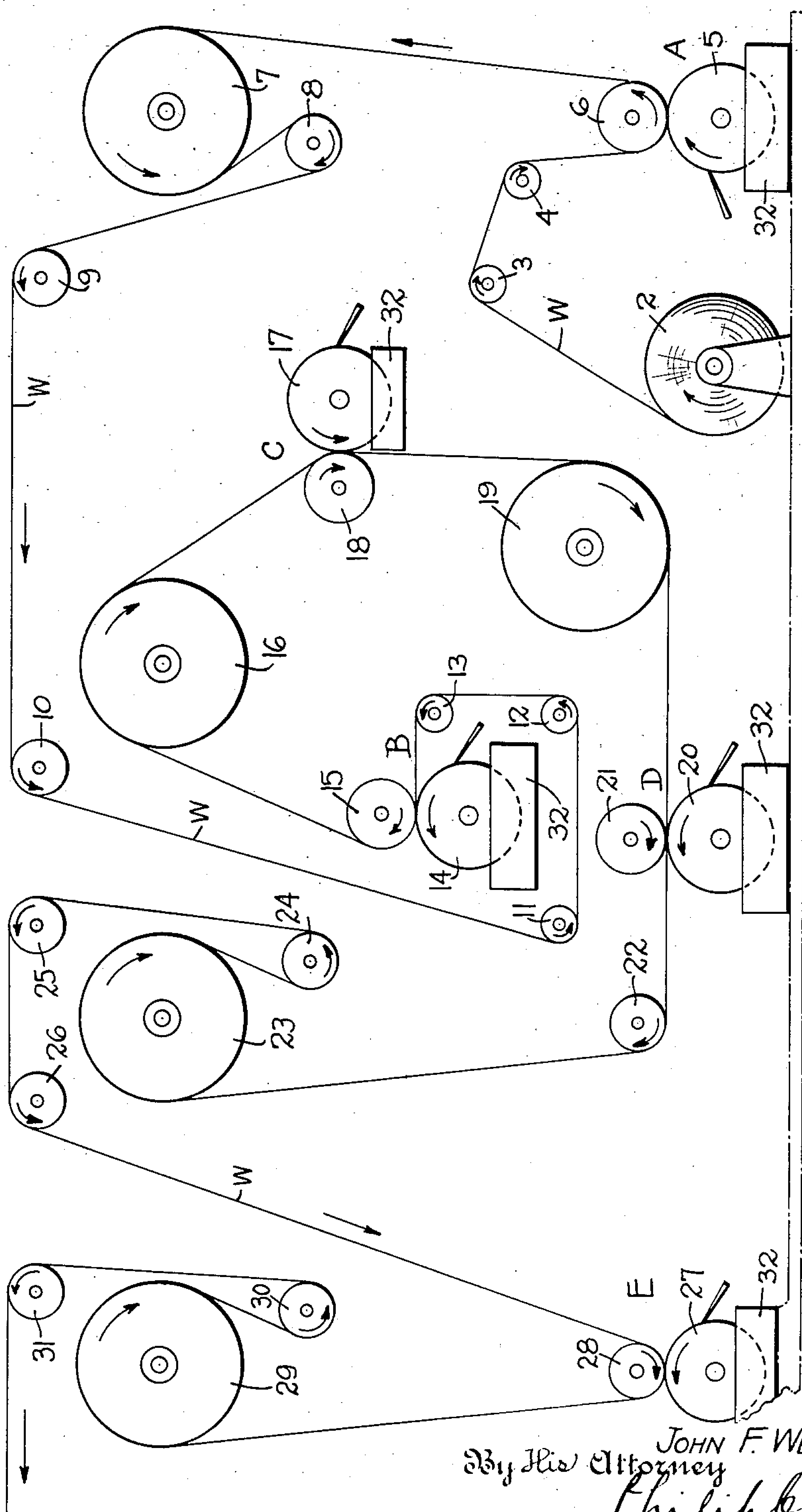

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PRINTING PRESS

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My invention relates more particularly to multi-color web printing presses for printing on both sides of the web, and especially to web gravure presses printing from intaglio plates.

Drying the freshly-printed web is essential in conjunction with intaglio presses as otherwise the ink would off-set and cause smearing of the web. Therefore in this type of press for intaglio work, it is necessary to lead the printed web successively over series of idler rolls and around heated drums or cylinders after each color printing to dry the ink sufficiently to enable the travelling web to pass without offsetting between the cylinders of the next printing couple. In such drying it is desirable that the web should contact with at least one-fourth of the peripheral surfaces of the drying drums with a more extended surface contact for the web if possible, and it is also advantageous to use as few idler rolls as possible. The various ink fountains of the separate printing units must be maintained in horizontal position, and the drying drums between each unit as well as the idler rolls must be kept out of contact with the freshly-printed side of the web in its course of travel.

The objects of my invention are, among other things, to attain these advantages in a multi-color web press and also to avoid the drawbacks heretofore encountered in web gravure presses printing from intaglio plates. To this end I have provided a novel and efficacious arrangement of the several printing units so located with respect to each other that the web may be passed from one printing couple or unit over a drying drum and then directly into the next couple without running over intermediate idler rolls and without forming undesirable loops. By my invention the length of the web between successive printing couples is greatly reduced so that greater accuracy of register in the successive printings is attained.

The figure shows one constructioon embodying my invention in which the various parts of the press are shown diagrammatically in side elevation as adapted for printing one color on one side of the web and four colors on the opposite side, the five printing couples or units being sequentially designated "A", "B", "C", "D" and "E" respectively as indicated on the drawing.

In the particular form of web press illustrated, the novel arrangement of printing couples or units is used especially for printing the first, second and third colors printed on the second side of the web as will be hereinafter set forth.

Referring to the figure, the web W is taken from the paper roll 2 over the idler rolls 3 and 4 and then is passed between the printing cylinder 5 and impression cylinder 6 of the first printing unit "A" to receive the single color on the first side of the web W. Such printed web then passes upwardly around the drying drum 7 and then over a series of idler rolls 8, 9, 10, 11, 12 and 13 (the printed side being outside the drum and rolls, except the roll 8), and is thereby brought into position to enter the second printing unit "B".

The web W in entering between the printing cylinder 14 and impression cylinder 15 of the unit "B" receives the first color on the opposite side while passing between such cylinders 14 and 15.

The web now perfected with a single color on each side now passes directly over the drying drum 16 with the first color received in unit "B" out of contact with the drum 16 and then is passed directly from this drum 16 to the printing cylinder 17 and impression cylinder 18 of unit "C" where it receives the second color on the opposite side of the web W.

The web then passes directly over the drying drum 19 and then to the left in the drawing between the printing cylinder 20 and impression cylinder 21 of the unit "D" for the third color on the opposite side, after which the web W passes around the idler roll 22 and around the drying drum 23 and over the three idler rolls 24, 25 and 26 before passing between the printing cylinder 27 and impression cylinder 28 of the unit "E" to receive the fourth color.

The web now having one color on the first side and four colors on the opposite side

passes upwardly around the drying drum 29, and thence around the idler rolls 30 and 31 as indicated at the left side of the drawing. The several ink fountains are indicated by the reference numeral 32, and the arrows indicate the direction of travel for the web W as well as the direction of rotation of the various cylinders, drying drums and idlers shown in the drawing.

Heretofore in the usual construction of the web gravure presses, the web W has been conducted from one color to the next substantially according to the arrangement between the printing units "D" and "E" with the web conducted some distance to the drying drum 23 and then wrapped around this drum as far as possible to secure maximum drying after which the web usually passes in a reverse loop around the idler rolls 24, 25 and 26 and then down to printing unit "E".

This conventional arrangement requires at least three times the length of web as contrasted with the path of travel of the web W between printing units "B" and "C", and then units "C" and "D" as hereinbefore explained according to my novel and improved arrangement. For example in a press of normal size the length of web between my printing units "B" and "C" and also "C" and "D" is about 8 feet as compared with about 28 feet between units "D" and "E".

Furthermore according to my improved construction no idler rolls contact with the freshly-printed second side of the web from the printing cylinder 14 in unit "B" until it has passed around the drying drum 23 and is brought into contact with the idler roll 24, so that the three colors imparted by the successive printing units "B", "C" and "D" are super-imposed on the web W with no other contact except that of their printing cylinders 14, 17 and 20 respectively.

Such short travel of the web W between printings on the same side of the web permits an advantageous control of register on the successive colors, and the color designs requiring accurate register can be printed in units "B", "C" and "D", while printing cylinder 27 of unit "E" is usually employed for a color allowing less accuracy of registration.

This novel arrangement of registering units "B", "C" and "D" may likewise be repeated on the same web W and for either side, for example, by passing the web from idler 26 or the idler 31 to another series of idlers like the group 8 to 13 into another series of printing units arranged similarly to units "B", "C" and "D". Again a similar grouping of printing units may be arranged facing in the opposite direction to print on the opposite of the web W in three or more colors.

My improvement in the novel arrangement of these printing units saves valuable floor space since the total length of my web press as shown is about one-half of that required in known presses printing a similar grouping of colors. My press is less expensive to build since a less number of idlers are used and the quality of the printing is enhanced because of the more accurate register of colors as hereinbefore explained.

I claim as my invention:—

1. In a rotary web printing-press, a plurality of printing couples, and a plurality of drying drums arranged in the path of the web between said printing couples, some of said printing couples being so grouped in proximity to their respective drying drums in staggered relationship with each other, the drums being located in staggered relationship with their respective printing couples, that the web will pass directly from one printing couple over its respective drum and directly into the next printing couple with the freshly printed side of the web out of contact with said drums.

2. In a rotary web printing-press, a plurality of printing couples, and a plurality of drying drums arranged in the path of the web between said printing couples, some of said printing couples being so grouped in proximity to their respective drying drums in staggered relationship with each other, the drums being located in staggered relationship with their respective printing couples, that the web will pass directly from one printing couple over its respective drum and directly into the next printing couple.

3. In a rotary web printing-press, a series of printing couples arranged to print successively and directly on the same side of the web, a series of drying drums arranged in staggered relationship with respect to the preceding printing couple in the path of the web between said printing couples so that the opposite side of the web passes directly over a drying drum between each successive printing, the freshly printed side of the web being out of contact with any element of the press while passing from one printing couple to another printing couple.

4. In a rotary web gravure press, a plurality of printing couple units through which the traveling web passes, and a series of drying drums around which the web is wrapped disposed between said units with the freshly-printed side of the web out of contact with said drums, some of said units being so grouped in proximity to their drying drums in staggered relationship with each other, the drums being located in staggered relationship with their respective printing couples, that the web will pass from each of said units and thence directly over its respective drum to the succeeding printing couples.

5. An intaglio printing-press for printing multi-color impressions upon a traveling web

comprising, in combination, a series of printing couples through which the web successively and directly passes, and a series of drying drums arranged in staggered relationship with respect to the preceding printing couple in the path of the web between said couples so that said web passes directly from one printing couple partially around its respective drying drum and directly into the next couple with the freshly-printed side of the web out of contact with said drums and any element of the press.

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