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2 Sheets-Sheet 1

FIG-4

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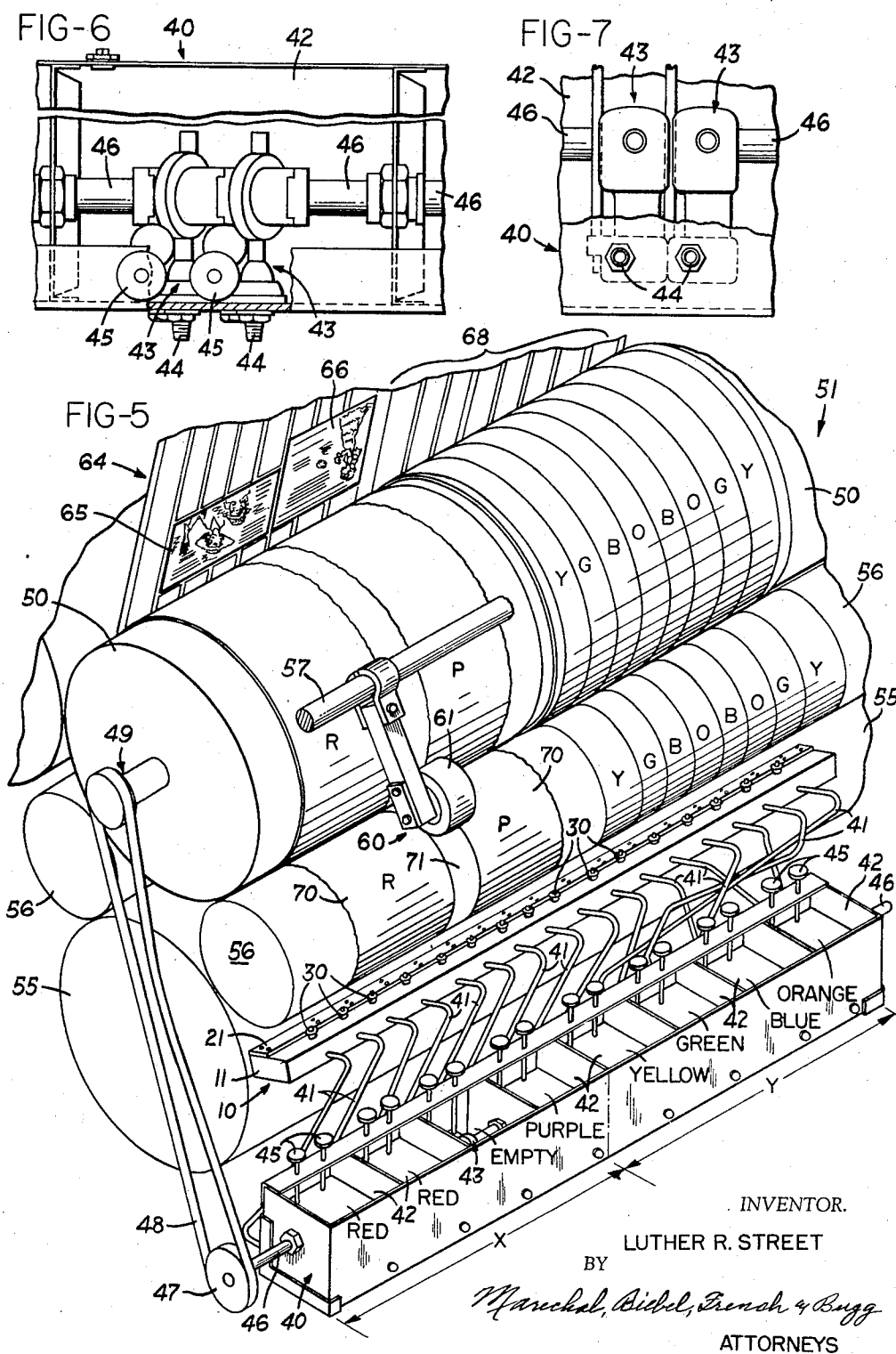
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INKING APPARATUS FOR PRINTING PRESS

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2 Sheets-Sheet 2



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INKING APPARATUS FOR PRINTING PRESS

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5 Claims. (Cl. 101—210)

This invention relates to printing presses, and more particularly to apparatus for applying different colors of ink to an inking drum of a printing press.

A principal object of this invention is to provide a simply and economically constructed inking apparatus for use with a printing press in applying different colors of ink to a traveling web while using only a single inking drum.

Another object of this invention is to provide an inking apparatus of simple construction for selectively applying color ink directly to an inking drum either in separate bands for coloring advertisements and the like, or in separate or overlapping bands for producing background color on a page printed with the usual black ink.

Another object of this invention is to provide an improved ink rail having openings for selectively applying relatively broad or narrow bands of ink to an inking drum to provide flexibility in meeting varying inking requirements and an ink fountain for supplying the ink rail with a plurality of colors of ink under pressure.

Other objects and advantages of this invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawings:

Fig. 1 is a schematic side elevation of a portion of a newspaper printing press showing the operation of the invention in applying color ink to the traveling web of newsprint;

Fig. 2 is a front elevation of an ink rail according to the invention, with lengths of the rail removed as indicated, showing the outlets for applying ink to the inking drum;

Fig. 3 is a top plan view of the ink rail shown in Fig. 2;

Fig. 4 is an enlarged section of the ink rail taken along the line 4—4 of Fig. 3;

Fig. 5 is a somewhat schematic fragmentary perspective of a portion of a printing press including the improved ink rail and ink fountain for supplying ink to the rail;

Fig. 6 is a top plan view of a compartment in the ink fountain of Fig. 5 showing the ink pumps; and

Fig. 7 is a fragmentary side elevation of an ink containing compartment also showing the ink pumps.

Referring to the drawings, which illustrates a preferred embodiment of the present invention, an ink rail 10 is provided for simultaneously applying a plurality of different colors of ink to a single inking drum so that several sets of printing rolls are not unnecessarily occupied merely to achieve several colors on a single page of printed matter. The ink rail 10 comprises an elongated body 11 of generally rectangular cross sectional shape having a series of longitudinally aligned ink receiving inlet openings 12 along one side thereof, each of these openings being internally threaded to receive a hose fitting 13 for connecting the openings with a supply of ink.

Longitudinally spaced pairs of ink conducting passages, including an upper passage 15 and a lower passage 16,

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extend inwardly from the inlet opening 12 for conducting ink from the inlet side of the body 11 to the opposite side thereof where a vertically extending opening 17 forms an outlet for discharging a relatively thin band of ink and opening 18 forms an outlet for discharging a relatively broad band of ink. Each outlet opening 17 extends vertically whereas outlet opening 18 extends horizontally so that when outlet 17 is used, several colors of ink can be placed on a single inking drum, and when outlet 18 is used, bands of greater width can be placed on the inking drum to provide for inking of a wide display or advertisement, for example.

A feature included in rail 10 which gives improved results in applying ink to a printing press is the reservoir 20 located within the rail between each outlet opening 18 and each upper passage 15. The reservoir 20 receives ink from passage 15 at or adjacent the bottom thereof, making it impossible for ink to be discharged from outlet 18 until the reservoir has been completely filled, and thus assuring a uniform ink discharge throughout the entire width of the opening. The upper ends of the reservoirs are closed by a longitudinally extending closure plate 21 which is secured to the rail by means of screws 22 which screw into the body 11 in the web portions 23 between successive reservoirs. Closure plate 21 cooperates with body 11 to define the upper limit of outlet opening 18.

Since the flow of ink from each pair of outlets 17 and 18 occurs alternately, that is, one outlet will be used to the exclusion of the other because of the different widths of ink bands desired in different applications, the flow of ink is selectively controlled by means of a tapered plug 30 which has passages 31 and 32 extending therethrough. The passages 31—32 are disposed at right angles with respect to each other and are of essentially the same diameters as their corresponding fluid passages 15 and 16. The plug 30 tapers inwardly from bottom to top and is retained in position by a coil spring 35 which acts against a washer 36, the washer being retained on the plug by a cotter pin 37. The upper end of plug 30 is formed into an operator stud 38 having substantially parallel sides for engagement with a tool or by hand to turn the plug and align one of the passages 31 or 32 with its corresponding fluid conducting passage 15 or 16.

Continued operation of ink rail 10 over a prolonged period of time requires that the rail be supplied with a continuous, uniform supply of ink capable of meeting the demand. Therefore, the ink rail 10 is operably connected to an ink fountain 40 by a plurality of conducting tubes 41, which are preferably flexible to facilitate the changing of tube connections from one inlet opening 12 to another to achieve various color arrangements. The fountain 40 comprises a plurality of separate ink containing compartments 42 each of which contains a pair of cam, or eccentrically operated pumps 43. Thus for each compartment 42 there are two pumps 43 and a separate flexible tube 41 for each of the pumps, the tubes being joined to the pumps by means of fittings 44. The pumping rate can be controlled at will, or entirely shut off, by means of a control knob 45 extending upwardly from each of the pumps 43.

All of the pumps 43 are simultaneously driven by a drive rod 46 which extends through the eccentric operating mechanism of each of the pumps throughout the length of ink fountain 40, and the driving rod 46 is in turn driven by means of a pulley 47 which can be driven from any suitable source of power. For example, in Fig. 5 of the drawings the pulley 47 is driven by a chain 48 which is in turn joined to the shaft 49 of plate cylinder 50 of printing press 51. Also in Fig. 5 the inking apparatus, viz. the ink rail 10 and ink fountain 40, is shown mounted in the position it would have under most nor-

mal situations, with ink rail 10 positioned adjacent the ink drum 55 of printing press 51 for the application of ink thereto. A pair of smaller form rollers 56 contact plate cylinder 50 and inking drum 55 to effect a transfer of ink from the ink drum to the plate cylinder during the printing operation. A mounting rod 57, which extends the width of the printing press 51 but is here only shown in fragmentary form, is adapted to receive a spacer 60 which has a roller 61 for contact with distributing roll 56 to remove a band of ink in those instances where it is desired.

Considering the operation of the present invention as applied to the printing of the usual newspaper having an eight-column page width, or a sixteen-column width when the newsprint is running through the press, since two pages are printed simultaneously, a sheet of newsprint 64 is shown leaving the plate cylinder 50 with the first eight columns on the left including a pair of picture advertisements 65 and 66 which extend across several columns and the last eight columns 68 constituting only separate single columns of copy. In this situation each ink rail 10 will have sixteen inlet openings 12 and thirty-two outlet openings 17 and 18, the number of inlet openings 12 corresponding to the number of columns present on the normal width of the newsprint 64. Obviously the rail 10 can be suitably modified to operate on any other width of newsprint. The ink fountain 40 in this example will have eight ink containing compartments so that the two tubes 41 coming from each compartment give a total of sixteen tubes, the proper number to insure a supply of ink to each inlet opening 12.

Dividing the ink fountain into groups X and Y of four compartments each and dealing first with group X, it will be seen that the tubes 41 are arranged to apply two wide bands of ink 70 to the form roll 56 and that ink has been omitted from one of the compartments to aid in establishing an uninked area 71 between the bands 70. The roll 61 of the spacer 60 contacts the distributing roll 56 in the uninked area 71 to remove any ink which tends to diffuse from the bands 70 and cause a co-mingling of the colors within area 71. In this situation the horizontal outlet openings 18 are used to give wide coverage of the advertisements 65 and 66 which each occupy more than one column of a newspaper page. The use of the outlet openings 18 insures a wide dispersion of the ink applied to the ink drum 55 so that substantially uniform wide bands 70 are obtained on form roll 56 to provide a uniform supply of ink for printed matter several columns wide.

While the present inking apparatus is useful in superimposing color ink into appropriate voids left on a page printed otherwise in black ink, for example as in the printing of advertisements as set forth in the preceding paragraph, it is also extremely useful in providing for the application of color ink on a completely printed page as a background drawing attention to that particular page. Where a single color is to form the background for a printed page the coloring can be accomplished by the means previously described in the connection of the coloring of advertisements 65 and 66. On the other hand, where a plurality of colors are to be applied to a single page to create a multicolor background, for instance the last eight columns 68 of newsprint web 64, the tubes 41 can be connected to section Y of ink fountain 40 as shown. Where the tubes from the yellow ink compartment are connected to the inlet openings corresponding to columns 1 and 3, the remainder of the tubes which conduct green, blue, and orange ink, are connected to the other openings to give the color effect shown in the drawings. The final color arrangement is shown with the different bands of colors on distributing roll 56 being indicated by the first letter of each of the colors.

In producing the eight columns of different colors of ink as shown in section Y, the vertical outlet openings 16 are used so that a narrow stream of ink is applied to

ink drum 55 to keep dispersion or diffusion of adjoining colors into each other at a minimum, although some dispersion will occur. Since the outlet openings 16 are widely spaced, as compared to horizontal openings 18, and deliver a stream with greater vertical than horizontal width to the center of the same area spanned by the associated horizontal opening, the streams of ink coming from openings 16 do not diffuse into each other to the same extent as the ink from openings 18. By virtue of this fact it is possible to obtain a separate color for each of the eight columns 68, although, during continued operation of the press each of the eight ink bands will tend to spread out and interdiffuse somewhat. However, due to the relatively short period of time which the ink is present on the ink drum 55 and form roll 56 separate and distinct bands of color are obtainable. This arrangement enables the achievement of a rainbow effect which forms a very effective background for the usual printed page and is particularly useful as a background on a page of advertisements.

As an example of the manner in which a traveling web of newsprint can be inked reference is made to Fig. 1 of the drawings where the paper roll 75 feeds a web of newsprint through two groups of printing rolls 76 and 77 for the application of black ink printing to the front and rear surfaces of the web. From these two groups of rollers the web is fed around the impression cylinder 80 of a third group of rollers 81 for contact with plate cylinder 82 which receives color ink from the inking apparatus 83 through ink drum 84 and distributing rollers 85. By feeding the web in this manner, color ink can be applied to one side of the traveling web by the plates carried on plate cylinder 80 which contact the web. Thus either application of color ink to individual advertisements or in separate bands can be effected or the entire web can be given the rainbow background.

In the event that color ink is desired on both sides of the previously printed web, the web will follow the dotted line course 90 through a lower set of color inking rolls 91. In the rollers 91 the ink transfer is effected in the same manner as that previously described in connection with group 81 except that the ink is applied to the opposite side of the web. Thus by using only a single series of printing rolls it is possible, with the present inking apparatus, to obtain thirty-two columns of color printing, the equivalent of four newspaper pages, with no unnecessary tie up of an excessive number of printing rolls to obtain different colors on each page of printed matter. The capability of producing this amount of color printing with the small number of printing rolls is particularly desirable for small newspaper or printing establishments which ordinarily do not have the equipment necessary to produce several color columns on a printed page. Also, for those concerns having relatively small presses, it is impractical to tie up the number of printing rolls required to apply a number of colors to a page using conventional equipment, since such a tie-up necessarily limits the number of black and white pages which such concerns can produce.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that this invention is not limited to this precise form of apparatus and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. An ink rail for simultaneously applying different colors of ink to a printing press inking drum, comprising an elongated body having a plurality of inlet openings spaced along one said thereof to receive ink from an ink supply source, longitudinally spaced pairs of passages including an upper and a lower passage extending inwardly from each of said inlet openings for conducting ink from the inlet side of said body to the side adjacent said inking drum, a pair of separate outlet means of different effective widths for each of said pairs of upper and lower

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passages providing for the application of ink to said inking drum in streams of correspondingly different widths, means for selectively connecting one passage or the other of each of said pairs of passages with the associated said inlet opening, and the narrower of each of said pairs of outlet means being located in substantially centered relation with the associated wider outlet means to deliver a relatively more concentrated stream of ink to the center of the same area of said drum as is spanned by said associated wider outlet means.

2. An ink rail for applying color ink to the inking drum of a printing press, comprising an elongated body having a plurality of longitudinally aligned ink receiving openings along one side thereof, a pair of passages connecting each of said ink receiving openings to the side of said rail adjacent the inking drum, a horizontally extending opening forming an outlet for one of said passages, a vertically extending opening forming an outlet for the other of said conducting passages, each said vertically extending opening being located in substantially centered relation with the associated said horizontally extending opening to deliver a relatively more concentrated stream of ink to the center of the same area of said drum as is spanned by said associated horizontally extending opening, and means mounted within said rail for selectively connecting one or the other of each of said pairs of passages with the associated said ink receiving opening to effect flow of ink through the selected one of said passages and its cooperating outlet to apply ink to the inking drum.

3. An ink rail for applying color ink to the inking drum of a printing press, comprising an elongated body having a plurality of longitudinally aligned ink receiving openings along one side thereof, a pair of ink conducting passages connecting each of said ink receiving openings with the side of said rail adjacent the inking drum, a plurality of reservoirs within said rail each receiving the ink from one passage of each of said pairs of passages, a horizontally extending opening adjacent the upper end of each said reservoir forming the outlet for the application of ink to said ink drum, a plurality of vertically extending openings each forming the outlet for one of the others of said passages, each said vertically extending opening being located in substantially centered relation with the associated said horizontally extending opening to deliver a relatively more concentrated stream of ink to the center of the same area of said drum as is spanned by said associated horizontally extending opening, and means mounted within said rail for selectively connecting one or the other of each of said pairs of passages with the associated said ink receiving opening to effect flow of ink through the selected one of said passages and its cooperating outlet to apply ink to said inking drum.

4. An ink rail for simultaneously applying different colors of ink to a newspaper printing press inking drum,

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comprising an elongated body having a plurality of inlet openings along one side thereof corresponding to the number of columns on a newspaper page, a pair of fluid conducting passages connecting each of said inlets with a corresponding pair of outlet openings on the side of said body adjacent said inking drum, one of said outlet openings being vertically extended to deliver a narrow stream providing for the application of a different color of ink to each column on the newspaper page, the other of said outlet openings being horizontally extended to deliver a stream of greater width, each of said vertically extended openings being located in substantially centered relation with the associated said horizontally extended opening to deliver said narrow stream of ink to the center of the same area of said drum as is spanned by said associated horizontally extended opening, and a valve operably connected to each pair of said fluid conducting passages for selectively effecting a flow of ink through one or the other thereof.

5. An inking apparatus for simultaneously applying different colors of ink to a printing press inking drum, comprising an elongated body having a plurality of inlet openings spaced along one side thereof, an ink fountain having a plurality of compartments for containing different colors of ink, means for separately connecting each of said inlet openings with a selected one of said compartments in accordance with the color of ink in said compartment, longitudinally spaced pairs of passages including an upper and a lower passage extending inwardly from each of said inlet openings for conducting ink from the inlet side of said body to the side adjacent said inking drum, a pair of separate outlet means of different effective widths for each of said pairs of upper and lower passages providing for the application of ink to said inking drum in streams of correspondingly different widths, means for selectively connecting one passage or the other of each of said pairs of passages with the associated said inlet opening, and the narrower of each of said pairs of outlet means being located in substantially centered relation with the associated wider outlet means to deliver a relatively more concentrated stream of ink to the center of the same area of said drum as is spanned by said associated wider outlet means.

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