

Feb. 15, 1949.

O. R. WOLF

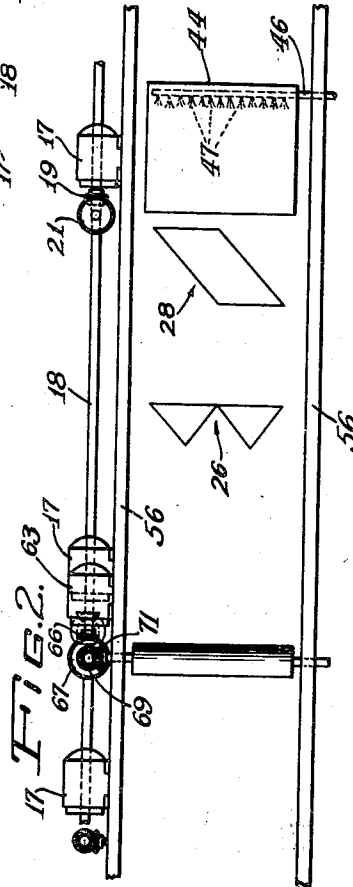
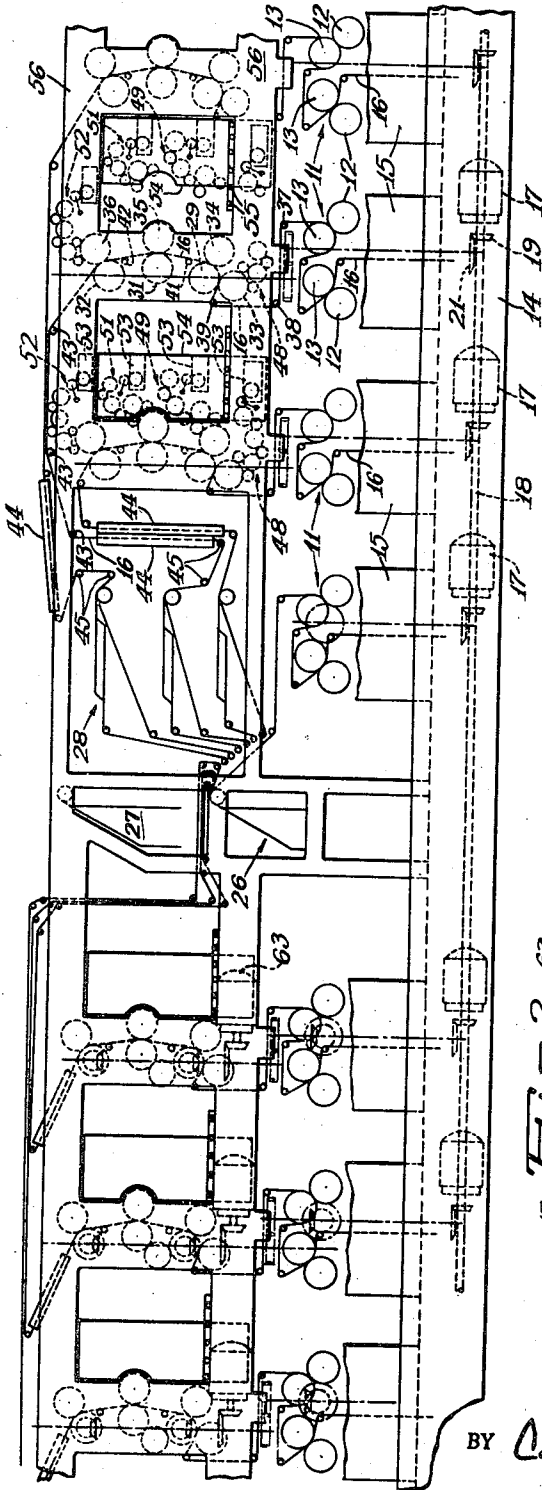
2,462,032

MULTICOLOR PRINTING PRESS

Filed Jan. 1, 1945

6 Sheets-Sheet 1

FIG. 1.



INVENTOR.
Otto R. Wolf
BY *Carl L. Dyer*
Attorney

Feb. 15, 1949.

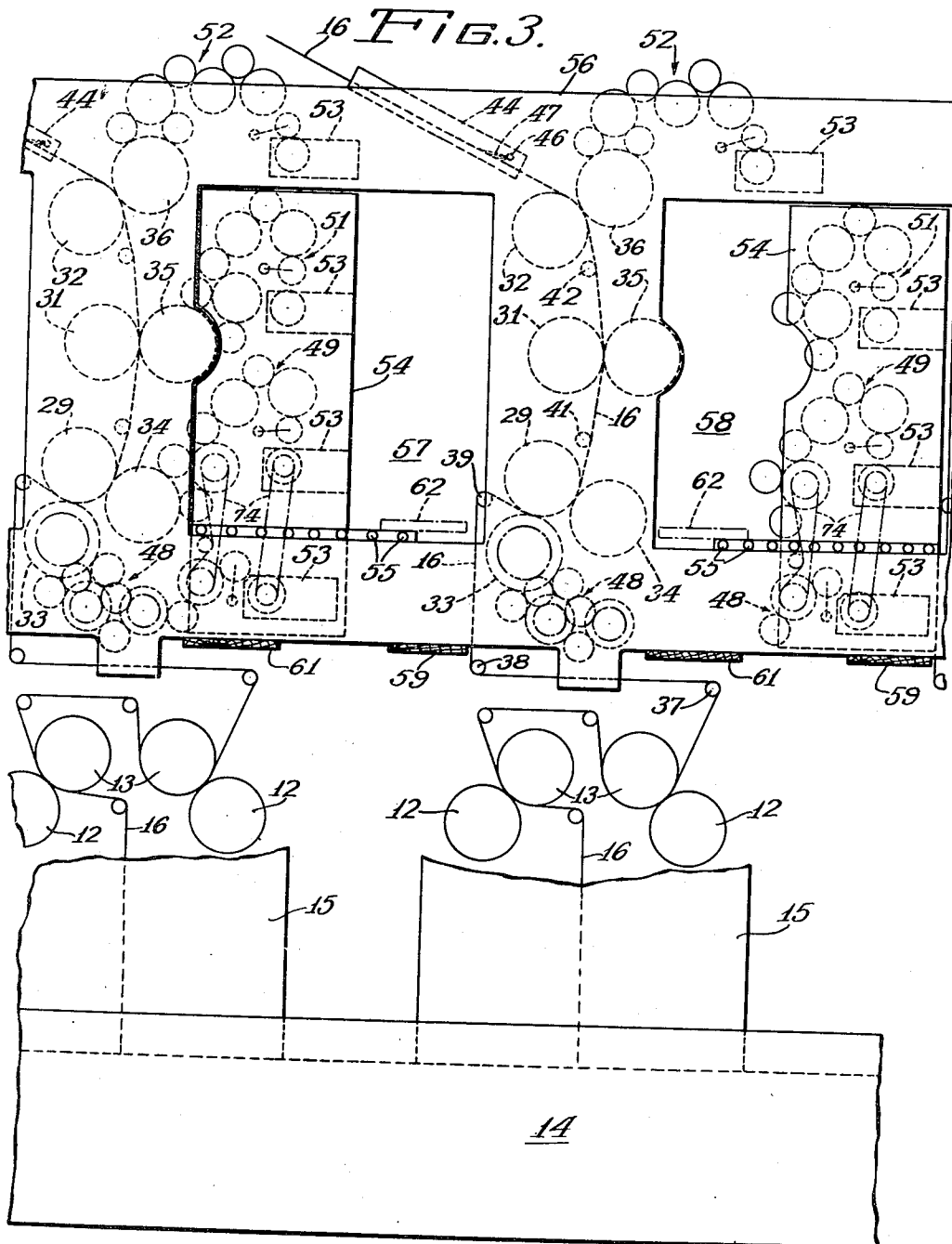
O. R. WOLF

2,462,032

MULTICOLOR PRINTING PRESS

Filed Jan. 1, 1945

6 Sheets-Sheet 2



INVENTOR
Otto R. Wolf
BY *Carl V. Hopp*
Attorney

Feb. 15, 1949.

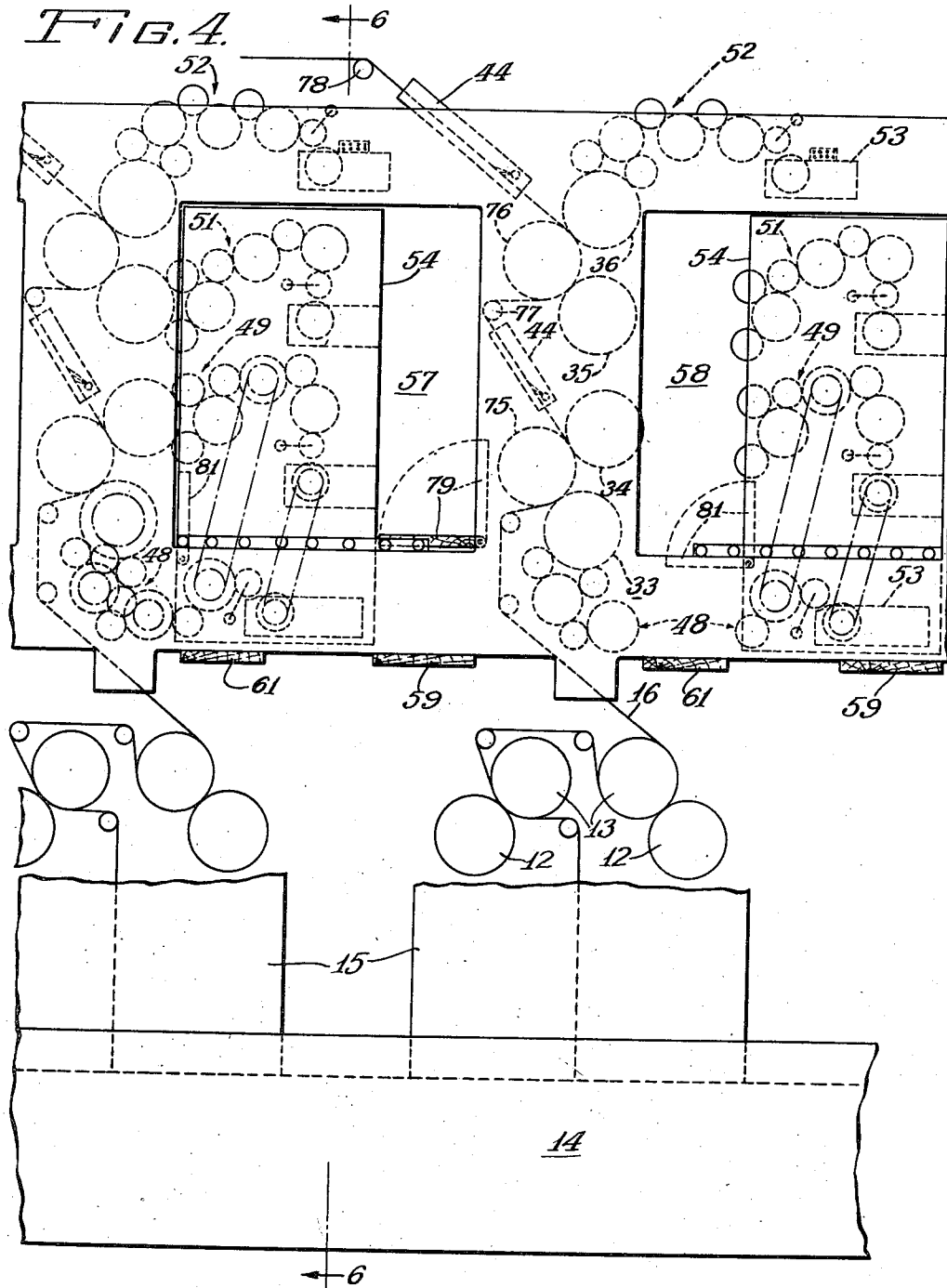
O. R. WOLF

2,462,032

MULTICOLOR PRINTING PRESS

Filed Jan. 1, 1945

6 Sheets-Sheet 3



INVENTOR.
Otto R. Wolf
BY *Carl H. Lloyd*
Attorney

Feb. 15, 1949.

O. R. WOLF

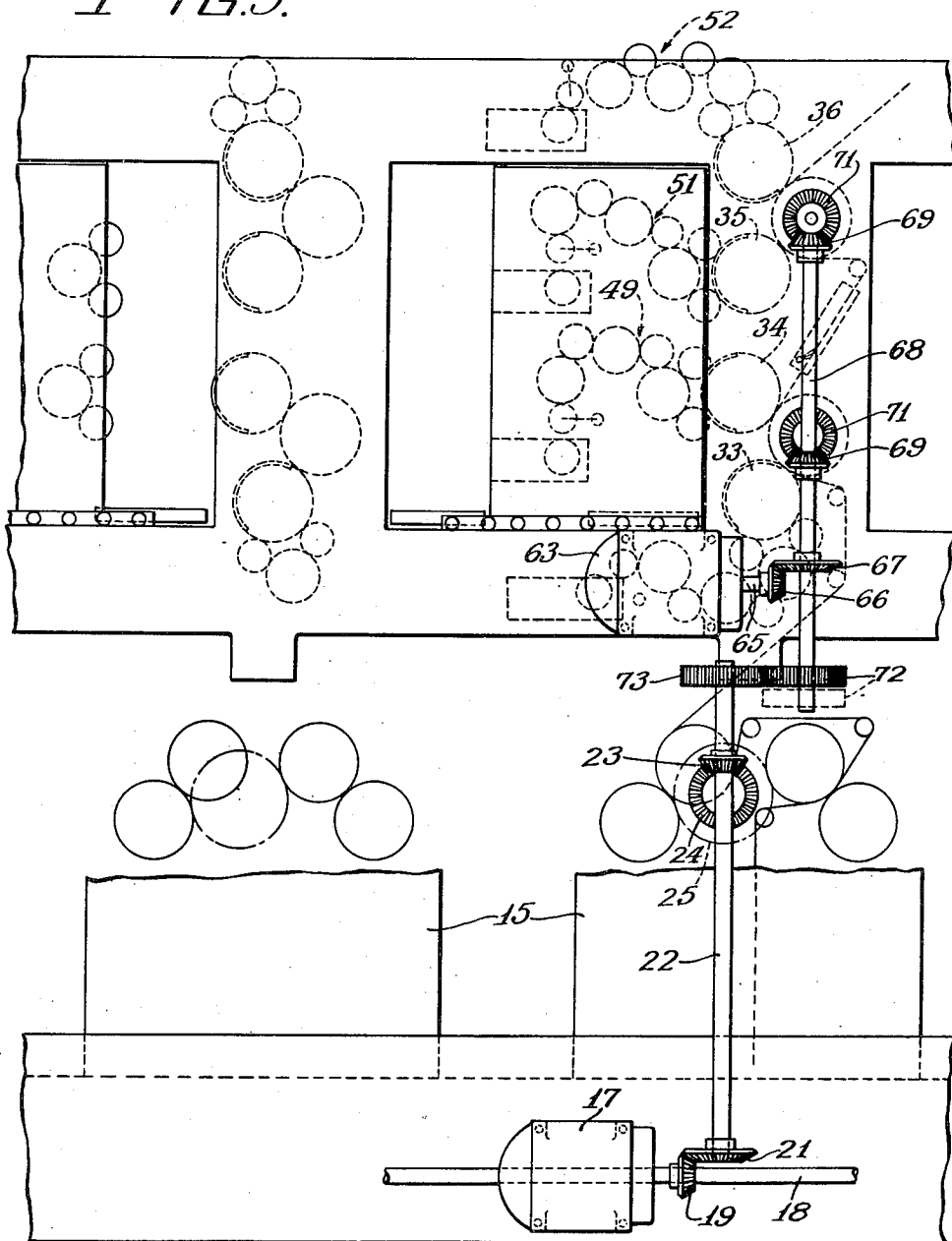
2,462,032

MULTICOLOR PRINTING PRESS

Filed Jan. 1, 1945

6 Sheets-Sheet 4

FIG. 5.



INVENTOR.

Otto R. Wolf

BY *Carl V. Hopp*

Attorney

Feb. 15, 1949.

O. R. WOLF

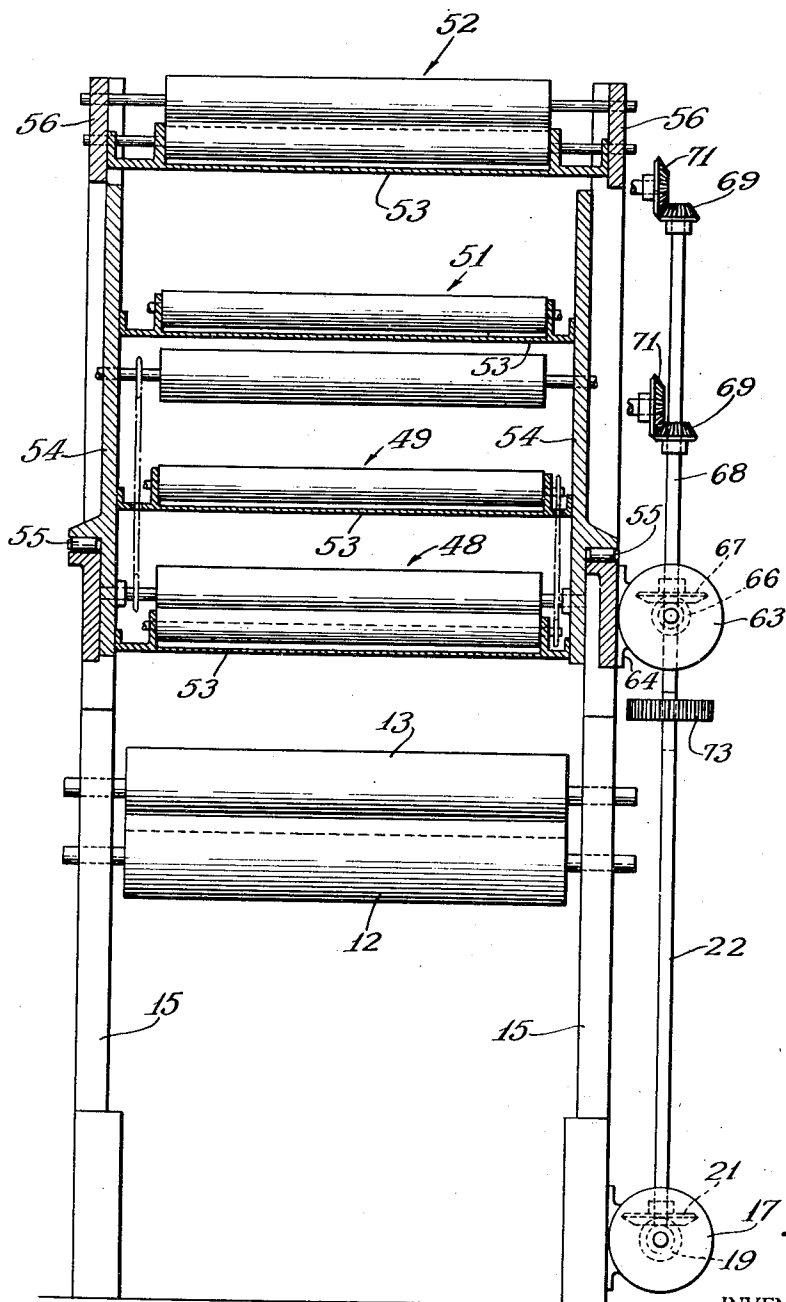
2,462,032

MULTICOLOR PRINTING PRESS

Filed Jan. 1, 1945

6 Sheets-Sheet 5

FIG. 6.



INVENTOR.

Otto R. Wolf

BY

Carl V. Lloyd

Attorney

Feb. 15, 1949.

O. R. WOLF

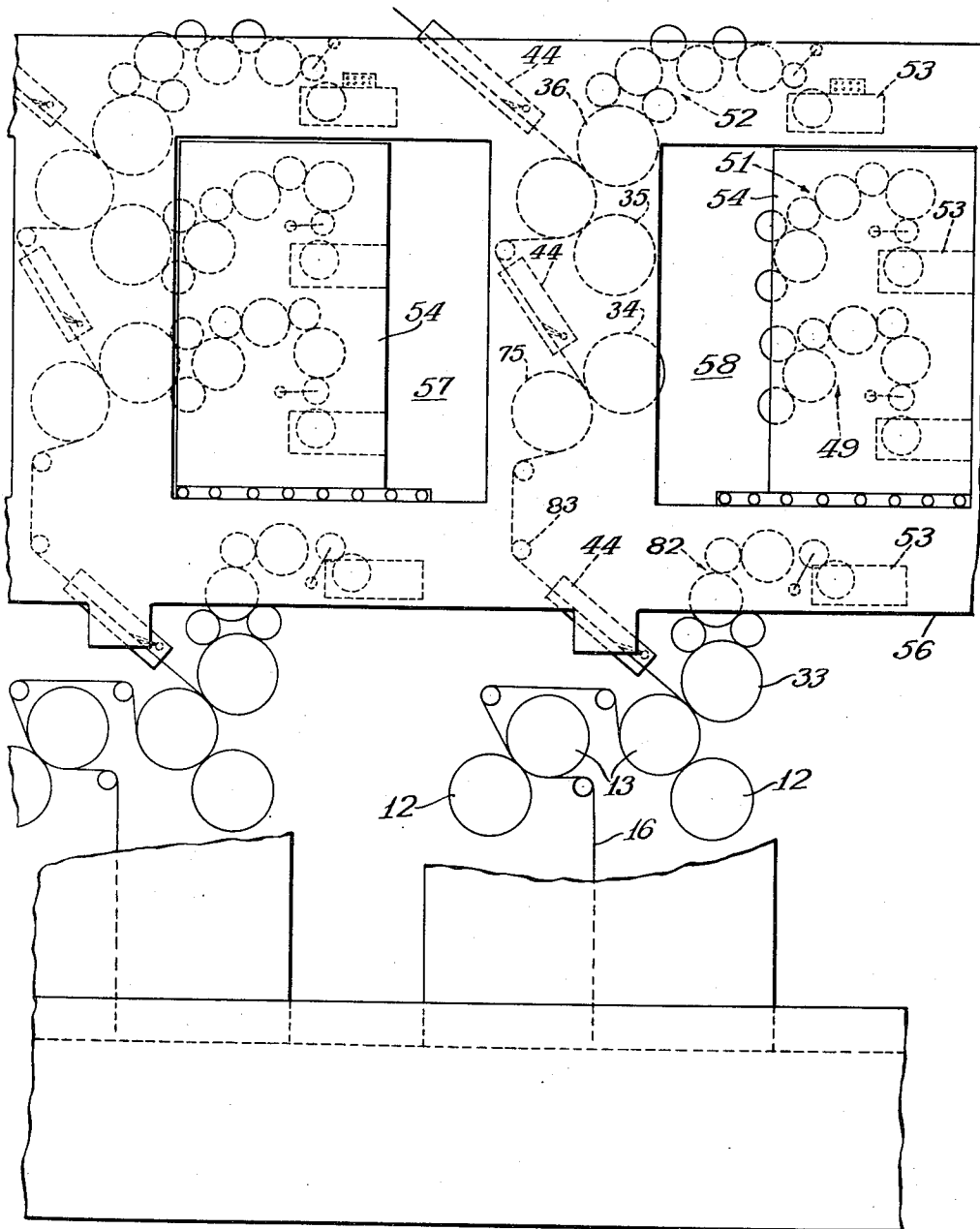
2,462,032

MULTICOLOR PRINTING PRESS

Filed Jan. 1, 1945

6 Sheets-Sheet 6

FIG. 7.



INVENTOR.
Otto R. Wolf
BY *Carl H. Drey*
Attorney

UNITED STATES PATENT OFFICE

2,462,032

MULTICOLOR PRINTING PRESS

Otto R. Wolf, Oak Park, Ill., assignor to Tribune Company, Chicago, Ill., a corporation of Illinois

Application January 1, 1945, Serial No. 570,882

11 Claims. (Cl. 270—5)

1

This invention relates to printing presses and particularly to newspaper presses for printing webs both in black and in colors. In the preferred construction each unit of a series prints a web on both sides in black and on one side in four colors.

An important object of the invention is to provide a combined black and color unit contained within practical limits of space, both as to width and height, in which the color-printed side of the web does not contact any of the usual guide rollers until after the ink thereon has been dried or set so it will not smudge.

A further object is to provide such a construction in which the color and black units are arranged in superposed relationship and the color unit is of substantially the same width (lengthwise of a row of press units) as the black unit so that one color unit may be employed with each black unit of a series when the units are positioned close together in a row as in modern press rooms of newspapers of large circulation.

Another object is to provide a press construction of this character in which access may be conveniently had to the plate cylinders of the color unit for attaching or removing the plates; also in which the web leads are short enough to avoid undue difficulty in threading the web through the unit in case of a web break.

The difficulties of combining color printing units with ordinary black printing units within the usual space limitations have heretofore been so great that only a very few pages of a newspaper could contain color. This was because there could only be one color unit for several, or at most for every two, black units. With the present construction color can be printed on a great many more webs than has previously been possible; even, if desired, on every web in a press combination with perhaps the exception of one, which, in the press arrangement illustrated is the one printed on the unit which is located immediately back of the folder and above which the usual turning bar arrangements are positioned. Printing color on one side of every web would mean that it would appear on every other page of the newspaper, which would provide a great deal more color in the paper than has hitherto been possible, and this is of great practical importance in view of the modern tendency to use more and more color in newspaper printing.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings, in which:

2

Fig. 1 is a diagrammatic side elevational view partly broken away of a line of press units (with one folder shown) in which one form of my invention is embodied;

Fig. 2 is a top plan view of the central portion of the structure shown in Fig. 1, illustrating diagrammatically a part of the drive mechanism and one of the ink drying elements, in addition to elements of a unit, a folder and a turning bar construction;

Fig. 3 is an enlarged view of two adjacent units of the form shown in Fig. 1, the inking mechanism of one color unit being shown in the normal operative position and that of the other color unit being shown with part thereof withdrawn to permit plating of the plate cylinders of the unit;

Fig. 4 is a view similar to Fig. 3 but showing a somewhat modified form of color unit;

Fig. 5 is a view of the structure shown in Fig. 4 taken from the opposite side, showing the driving mechanism for one unit, with the other unit shown only in outline;

Fig. 6 is a view taken on Fig. 4 approximately along the section line 6—6; and

Fig. 7 is a view similar to that of Figs. 3 and 4 but showing a third modification of the color unit.

Upon said drawings I have shown part of a row of standard black press units 11, which are commonly called "perfecting press" units, and each of which comprises two plate cylinders 12 and two compression cylinders 13. These units are mounted upon a suitable base or substructure 14 and have side frames 15 which support the plate and impression cylinders, and also the usual inking systems (not shown) which are commonly called ink motions and which supply ink to the plate cylinders in well known manner. Each black unit prints on both sides of a web 16 which is drawn into the unit from a web roll mounted on a suitable reel or other support (not shown) beneath the press substructure 14. The plate cylinders ordinarily each carry four plates, each adapted to print one page of the newspaper so that eight pages are printed by each unit.

The plate cylinders and inking systems are driven in conventional manner by means of motors 17 mounted on a horizontal drive shaft 18 carrying bevel gears 19 which mesh with gear wheels 21 on the lower ends of vertical drive shafts 22 (see Fig. 5), the latter in turn carrying bevel gears 23 which mesh with gear wheels 24 on shafts which carry spur gears 25 by which the cylinders of the unit are driven in the customary manner.

A folder 26 is shown in the line of press units

3

and comprises the usual folding mechanism as well as upper formers 27.

It will be understood that in a large press room there are a number of such folders located at intervals in a long line of press units, and that Fig. 1 shows only a section of the line, which may include as many units and folders as production requirements and the building size and arrangement may determine.

In accordance with my invention a color unit is, or may be, provided for each black unit, with the exception, in the embodiment shown, of the unit immediately back of the folder, above which unit the usual turning bar arrangements, generally indicated at 28, are located.

In the form of color unit shown in Figs. 1 and 3 there are three impression cylinders 29, 31 and 32, arranged in substantially a vertical line and four plate cylinders 33, 34, 35 and 36, the last three of which are also arranged in substantially a vertical line. It should be noted, however, that the impression cylinder 31 and the plate cylinder 35 are positioned slightly to the right of the respective vertical lines, which facilitates the travel of the web through the color unit by holding the web taut and providing a substantial wrap around the impression cylinder 31. The plate cylinder 33 is located somewhat to the left of the substantially vertical line of the cylinders 34, 35 and 36 and the impression cylinder 29 coacts with both the plate cylinder 33 and the plate cylinder 34, whereas there is a separate impression cylinder for each of the plate cylinders 35 and 36.

The web 16, after leaving the perfecting press unit, passes rollers 37, 38 and 39, thence between the impression cylinder 29 and the plate cylinders 33 and 34. After leaving the latter cylinders the web passes over a roller 41, between the impression cylinder 31 and plate cylinder 35, over a roller 42, and between the impression cylinder 32 and the plate cylinder 36. It will be noted that the side of the web which is not printed in color contacts the rollers 41 and 42 and that the color-printed side of the web does not touch any of the rollers until after the web leaves the color unit. After leaving such unit the web passes over additional rollers 43 and through an ink-drying or setting device 44 before the color-printed side contacts any of the guide rollers. The webs from the unit at the right of the folder then pass over guide rollers 45, with the color-printed side thereof in contact with said rollers, and thence through the conventional turning bar arrangements and into the folder. The webs from the unit at the left of the folder, as shown, pass directly into the folder but the colored ink thereon is likewise dried or set before the color-printed side of the web contacts any guide roller.

The element 44 may be either an ink-drying device in which the ink is dried by heat or an ink-setting device in which the ink is set by means of steam. In the latter case a steam pipe 46 is provided and extends into the device 44, which is in the form of a box or other enclosure, the part of the pipe within said enclosure being apertured to provide steam jets 47 which are directed onto the color-printed side of the web.

The ink motions for the plate cylinders of the color units are indicated respectively by the numerals 48, 49, 51 and 52 and comprise the usual series of ink distributing and form rollers for carrying the ink from ink fountains 53 to

4

the plate cylinders. As shown, the ink motions 49 and 51, as well as part of the ink motion 48, are mounted on a carriage 54 which is movably mounted on rollers 55 in the upper frame structure 56. When the press is operating the carriage is in the position shown at the left in Fig. 3 and is adapted to be moved to the position shown at the right in said Fig. 3 for the purpose of permitting access to the plate cylinders 34, 35 and 36 for attachment or removal of plates therefrom. The carriage is adapted to be locked in the operative position and to be moved back and forth in manner which is well understood in the printing press art and which therefore is not illustrated in detail.

The left hand portion of the lower ink motion 48 is stationarily mounted, as is the entire ink motion 52. It will also be seen that the ink motion 48 extends downwardly at an angle from the plate cylinder 33 and the ink motion 52 extends upwardly at an angle from the plate cylinder 36, thus providing a substantial amount of space intermediate these two ink motions permitting the ink motions 49 and 51 to be mounted at an angle with respect to their respective plate cylinders 34 and 35, thereby conserving space lengthwise of the row of press units.

When the carriage 54 is in the operative or closed position shown at the left of Fig. 3 an aisle space 57 is provided between adjacent color units and when it is in the inoperative or open position shown at the right of Fig. 3 an aisle space 58 is provided between the plate cylinders of the unit and the withdrawn ink motions. Platforms 59 and 61 are provided beneath these aisle spaces, respectively, and a platform 62 is, or may be, provided at a higher level in the aisles particularly to facilitate access to the upper plate cylinders 36, the latter platform, as shown, being merely a removable board or plate extending from one of the side frames to the other, although if desired provision might be made for a permanent platform suitably hinged or otherwise attached to the frame so that it could be moved to a position which would not obstruct movement of the carriage and movable ink motions into or away from operative position.

It will be noted that in this form of the invention the plate cylinders 34, 35 and 36 may be plated from the aisle space 58 when the carriage 54 is withdrawn and the plate cylinder 33 may be plated from the opposite side, access thereto being had from one of the platforms 59. As shown, the web 16 would be broken in order to provide access to the cylinder 33 for replating after the web has been threaded through the unit, but, as will later appear, all four plate cylinders may be plated from the aisle space 58 in another form of the invention, illustrated in Figs. 4 and 5.

For driving the color units, separate motors 63 are, or may be, provided. The housings of these motors are provided with attaching brackets 64 secured to the upper frame structure, and the motor shafts 65 carry bevel gears 66 meshing with mating gears 67 on vertical shafts 68 which carry bevel gears or pinions 69 meshing with gears 71 on certain of the cylinder shafts. At the lower end of the shaft 68 there is a spur gear 72 meshing with a corresponding gear 73 on the upper end of the shaft 22, said gear 72 being splined on the shaft 68 and being thus adapted to be moved to the dotted line position shown in Fig. 5 when it is desired to operate the

5

black unit without the color unit. It will thus be seen that while separate drives are provided for the black and color units, said units are driven in synchronism by gearing the shafts 22 and 68 together, and any color unit may be silenced at any time by disengaging the gears 72 and 73.

The cylinders of the ink motions may be driven in the conventional or any preferred manner and those of different ink motions of a particular unit may be interconnected where desired, certain of the connections being diagrammatically shown at 74. The driving and interconnecting elements for the ink motions are not shown in detail since per se they form no part of the present invention and are well understood in the art.

It will now be evident that with the construction shown in Figs. 1 to 3, each web (except the one in the unit immediately back of the folder) may be printed in black on both sides and in four colors on one side and the color-printed side of the web is protected against smudging since it does not contact a guide roller until the web has left the color unit and has passed through one of the drying or ink-setting devices 44. Furthermore, the color units are contained within substantially the same horizontal area as the black units upon which they are superposed so that there may be one color unit for each black unit and sufficient aisle space may be provided for plating and "make-ready" purposes. The color units are also kept within practical limits as to height, the combined black and color units being substantially within the limits of the height of the folders, including the upper formers.

While ordinarily the web printed upon by any particular color unit will be the one which is printed in black by the perfecting unit immediately beneath such color unit, it will be understood that the web might be one proceeding from some other perfecting unit if this should be expedient for any desired grouping of units to meet the requirements of the page make-up of a particular issue of the newspaper to be printed.

In Figs. 4, 5 and 6 I have shown a modified form of the invention in which all four of the plate cylinders 33, 34, 35 and 36 are arranged in substantially a vertical line and in which only two impression cylinders, numbered 75 and 76, are employed, cylinder 75 coacting with plate cylinders 33 and 34 and cylinder 76 coacting with plate cylinders 35 and 36. In this construction the distance between the impression cylinders is greater than in the previously described form of the invention and one of the ink-drying or setting elements 44 is interposed between these two impression cylinders. It will be noted that in order to provide additional space for this purpose the cylinders 33 and 34 are not centered upon the impression cylinder 75 as are the cylinders 35 and 36 upon the cylinder 76, but are rotated somewhat about said impression cylinder 75 in clockwise direction so that the cylinder 34 is in a lower position relative to the cylinder 75 than is the cylinder 36 relative to the cylinder 76.

The web, after being printed in two colors by the cylinders 33 and 34, passes through said drying element 44 and the color-printed side thereof then passes over the guide roller 77 and between the impression cylinder 76 and plate cylinders 35 and 36 by which the other two colors are printed. After leaving the latter cylinders the web passes through another drying or setting element 44 and over a guide roller 78, from which it is directed to the folder by suitable additional guide rollers.

6

In Fig. 4 I have shown platforms 79 and 81 which are hinged to the frame so that they may be arranged in either horizontal or vertical position. These platforms are thus arrangeable in the aisle spaces 57 and 58, respectively, when required for use in servicing the color units and may be moved to a vertical, non-obstructing position when not in use.

With this arrangement all four of the plate cylinders are accessible from the aisle 58 and provision is made for preventing smudging of the color ink, yet the unit is very compact and has many of the advantages of the form of units shown in Figs. 1 to 3 inclusive. The web has a substantial wrap around the impression cylinders 75 and 76 so that only one impression cylinder is required for each two plate cylinders and the web is guided through the unit without need of compensating rollers or other special means to maintain proper registration.

The ink motions are arranged in substantially the same manner in this modification of the invention as in the first form described, with two of the systems being adapted to be completely withdrawn by means of the carriage 54 and with a part of the lower system being movable with said carriage and the other part stationary. The upper inking system is entirely stationary, as in the other form.

Fig. 5, as above pointed out, illustrates the same mechanism as Fig. 4, the view being taken from the opposite side and showing particularly the driving elements. The cylinders and ink motions are indicated only in outline to avoid unnecessary duplication.

In Fig. 6 certain of the parts of one of the units of the form shown in Figs. 4 and 5 are illustrated in section, this view showing particularly the mounting of the carriage 54 on the frame and showing parts of the ink fountains and rollers of the ink motions which, as above mentioned, are substantially the same in this construction as in the first described form of the invention.

In Fig. 7 I have shown another modification in which the lowermost plate cylinder of the color unit is mounted adjacent the perfecting unit so as to coact with one of the impression cylinders 13 of that unit. The ink motion for this plate cylinder, which I have indicated by the reference numeral 82, is mounted in stationary position on the upper frame 56 and one of the drying or setting elements 44 is interposed between said lower plate cylinder and a guide roller 83 over which the web passes to the next printing cylinders of the color unit. Otherwise the construction is substantially the same as that in the second modification of the invention illustrated in Figs. 4 to 6 inclusive.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

I claim:

1. In a newspaper press, a perfecting press unit, including plate and impression cylinders, a folder, including upper formers, and a multi-impression color unit of substantially the same horizontal dimensions as the perfecting unit, said units being arranged in superposed relationship and being together of a height not substantially greater than the normal height of the folder with upper formers, the color unit comprising four plate cylinders arranged in general

7

vertical relationship, coacting impression cylinders, one of which provides the impression for two of the plate cylinders, one of the latter being disposed at an angle to a vertical line through the other, said plate and impression cylinders of the color unit being of the same diameter as the corresponding cylinders of the perfecting unit, an ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, the ink motion for said angularly disposed plate cylinder being arranged substantially below the center line of the latter and beneath the other plate cylinder which coacts with said common impression cylinder, a part of such ink motion being stationary and a part thereof being movably mounted, and web guide rollers for guiding the web from the perfecting unit through the color unit to the folder.

2. In a newspaper printing press, a perfecting press unit, a folder, including upper formers, and a multi-impression color unit of substantially the same horizontal dimensions as the perfecting unit, said units being arranged in superposed relationship and being together of a height not substantially greater than the normal height of the folder with upper formers, a color unit comprising four plate cylinders arranged in general vertical relationship, coacting impression cylinders, an ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, and a horizontally movable carriage on which at least two of the ink motions are carried, one of said ink motions being stationary and being disposed substantially above the center line of the plate cylinder served thereby, extending inwardly from the aisle side of the color unit a substantially greater distance than the ink motions carried by said carriage, said carriage being movable away from the plate cylinders to provide aisle space from which at least two of the plate cylinders may be plated.

3. In a newspaper printing press, a perfecting press unit, a folder and a multi-impression color unit, said units being arranged in superposed relationship, the color unit comprising a plurality of plate cylinders arranged in general vertical relationship, coacting impression cylinders, an ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, and a horizontally movable carriage on which part of the ink motions are supported, said carriage being movable away from the plate cylinders to provide aisle space from which certain of the plate cylinders may be plated, at least one of said ink motions being stationary and another thereof having a part which is stationary and a part which is movable with said carriage, each of said last two ink motions extending inwardly from the aisle side of the color unit a substantially greater distance than the ink motions carried by said carriage.

4. In a newspaper printing press a combination of a plurality of perfecting press units arranged in a row, a folder in the line of perfecting units, a plurality of multi-impression color units each arranged in superposed relationship to one of said perfecting units, said color units each comprising four plate cylinders arranged in general vertical relationship, coacting impression cylinders, one of which provides the impression for two of the plate cylinders, one of the latter being disposed at an angle to a vertical line through the other, said plate and impression cylinders of the color unit being of the same diameter as the corresponding cylinders of the

8

perfecting unit, an ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, the ink motion for said angularly disposed plate cylinder being arranged substantially below the center line of the latter and beneath the other plate cylinder which coacts with said impression cylinder, and a carriage on which certain of said ink motions are mounted, an aisle space being provided between the ink motions of one unit and the cylinders of the next unit and said carriage being movable into said aisle space to provide space from which the three upper plate cylinders may be plated, the lower plate cylinder being accessible for plating from the side opposite that from which the other plate cylinders are plated.

5. In a newspaper printing press, the combination of a plurality of perfecting press units arranged in a row, a folder in the line of perfecting units, a plurality of multi-impression color units one for each of said perfecting units except one adjacent one side of the folder, said perfecting and color units being arranged in superposed relation and being of substantially the same horizontal dimensions, said color units each comprising four plate cylinders arranged in general vertical relationship, coacting impression cylinders, an ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, and a carriage on which the remainder of said ink motions are mounted, one of the ink motions of each unit being stationary and being disposed substantially above the center line of the plate cylinders served thereby and another of the ink motions being partly stationary and partly movable and being disposed substantially below the center line of the cylinder served thereby, an aisle space being provided between the ink motions of one unit and the cylinders of the next unit and said carriage being movable into said aisle space to provide a space between certain of the ink motions and plate cylinders of the color unit from which such cylinders may be plated, the cylinders of the color unit being of the same diameter as the corresponding cylinders of the perfecting unit and at least each perfecting and color unit combination except one adjacent the folder being arranged to print a web on both sides in black and on one side in four colors.

6. In a newspaper printing press, a perfecting press unit including plate and impression cylinders, a folder, including upper formers, and a multi-impression color unit of substantially the same horizontal dimensions as the perfecting unit, said units being arranged in superposed relationship and being together of a height not substantially greater than the normal height of the folder with the upper formers, the color unit comprising four plate cylinders arranged in general vertical relationship and three impression cylinders, one of which provides the impression for two of the plate cylinders, one of the latter being disposed at an angle to a vertical line through the others, said plate and impression cylinders of the color unit being of the same diameter as the corresponding cylinders of the perfecting unit, an ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, the ink motion for said angularly disposed plate cylinder being arranged substantially below the center line of the latter, and a horizontally movable carriage on which the complete ink motions for two of the plate cylinders and part of the ink motion for

the angularly disposed plate cylinder are carried, the remainder of the ink motion for the latter plate cylinder and the complete ink motion for the fourth plate cylinder being stationarily mounted in respect to said plate cylinders.

7. In a newspaper printing press, a perfecting press unit including plate and impression cylinders, a folder, including upper formers, and a multi-impression color unit of substantially the same horizontal dimensions as the perfecting unit, said units being arranged in superposed relationship and being together of a height not substantially greater than the normal height of the folder with the upper formers, the color unit comprising four plate cylinders arranged in general vertical relationship and three impression cylinders, one of which provides the impression for two of the plate cylinders, one of the latter being disposed at an angle to a vertical line through the others, said plate and impression cylinders of the color unit being of the same diameter as the corresponding cylinders of the perfecting unit, an ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, the ink motion for said angularly disposed plate cylinder being arranged substantially below the center line of the latter, and a horizontally movable carriage on which the complete ink motions for two of the plate cylinders and part of the ink motion for the angularly disposed plate cylinder are carried, the remainder of the ink motion for the latter plate cylinder and the complete ink motion for the fourth plate cylinder being stationarily mounted in respect to said plate cylinders, said complete stationary ink motion serving the top plate cylinder, and being disposed substantially above the center line of the latter, and the ink motion, a part of which is stationary and a part of which is movable, serving the bottom plate cylinder.

8. In a newspaper printing press, a perfecting press unit, a folder and a multi-impression color unit of substantially the same horizontal dimensions as the perfecting unit, said units being arranged in superposed relationship, the color unit comprising four plate cylinders arranged in substantially a vertical line, coating impression cylinders, an ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, and a horizontally movable carriage on which at least two of the ink motions are supported, said carriage being movable away from the plate cylinders to provide aisle space from which at least two of the plate cylinders may be plated, the ink motion for the lower plate cylinder being arranged substantially below the center line of the cylinder and the ink motions for the two intermediate plate cylinders being arranged angularly in relation to their respective plate cylinders, thereby reducing the horizontal area occupied by said ink motions.

9. In a newspaper printing press, a perfecting press unit, a folder and a multi-impression color unit of substantially the same horizontal dimensions as the perfecting unit, said units being arranged in superposed relationship, the color unit comprising four plate cylinders arranged in substantially a vertical line, coating impression cylinders, an ink motion for each plate cylinder of normal size and number of rollers for newspaper

color printing, and a horizontally movable carriage on which at least two of the ink motions are supported, said carriage being movable away from the plate cylinders to provide aisle space from which at least two of the plate cylinders may be plated, the ink motion for the upper plate cylinder being arranged substantially above the center line of the cylinder, the ink motion for the lower plate cylinder being arranged substantially below the center line of the cylinder and the ink motions for the two intermediate plate cylinders being arranged angularly in relation to their respective plate cylinders, thereby reducing the horizontal area occupied by said ink motions.

10. In a newspaper printing press, a perfecting press unit, a folder and a multi-impression color unit of substantially the same horizontal dimensions as the perfecting unit, said units being arranged in superposed relationship, the color unit comprising four plate cylinders arranged in substantially a vertical line, coating impression cylinders, an ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, and a horizontally movable carriage on which at least two of the ink motions are supported, said carriage being movable away from the plate cylinders to provide aisle space from which at least two of the plate cylinders may be plated, the ink motion for the upper plate cylinder being arranged substantially above the center line of the cylinder and the ink motions for the two intermediate plate cylinders being arranged angularly in relation to their respective plate cylinders, thereby reducing the horizontal area occupied by said ink motions.

11. In a newspaper printing press, a perfecting press unit, a folder and a multi-impression color unit, said units being arranged in superposed relationship, the color unit comprising four plate cylinders arranged in substantially a vertical line, coating impression cylinders, and ink motion for each plate cylinder of normal size and number of rollers for newspaper color printing, and a horizontally movable carriage on which at least two of the ink motions are supported, said carriage being movable away from the plate cylinders to provide aisle space from which at least two of the plate cylinders may be plated, the ink motion for the upper plate cylinder being arranged substantially above the center line of the cylinder and the ink motions for the two intermediate plate cylinders being arranged angularly in relation to their respective plate cylinders, thereby reducing the horizontal area occupied by said ink motions.

OTTO R. WOLF.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,670,569	Claybourn	May 22, 1928
1,952,028	Hehle et al.	Mar. 20, 1934
2,050,031	Wood	Aug. 4, 1936
2,104,065	Zuckerman	Jan. 4, 1938
2,138,704	Matuschke	Nov. 29, 1938
2,160,527	Tornberg	May 30, 1939
2,244,593	Zuckerman	June 3, 1941