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C. F. DAUSMANN

2,034,694

METHOD AND MEANS FOR MAINTAINING WEB REGISTER IN MULTICOLOR PRESSES

Filed May 3, 1935

2 Sheets-Sheet 1

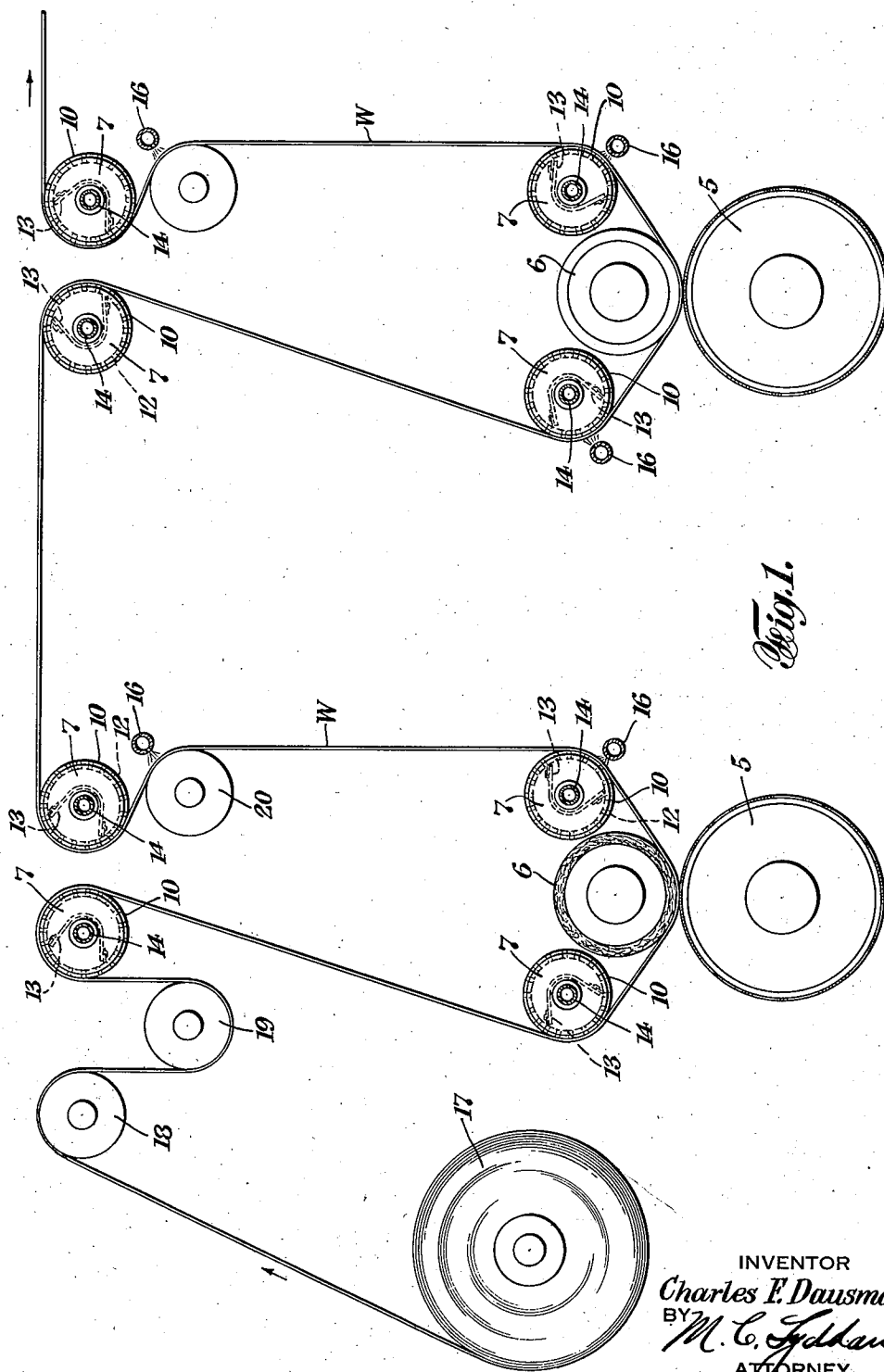


Fig. 1.

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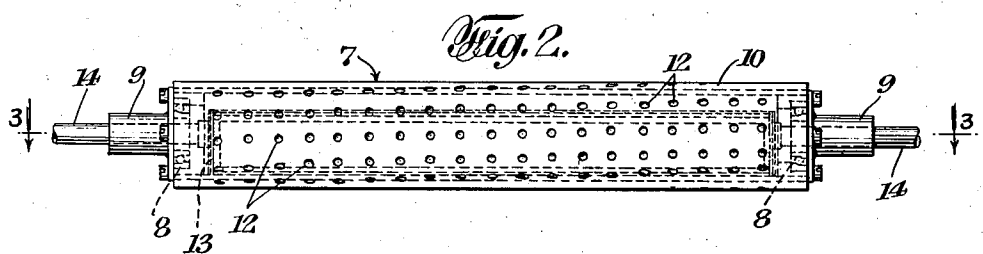
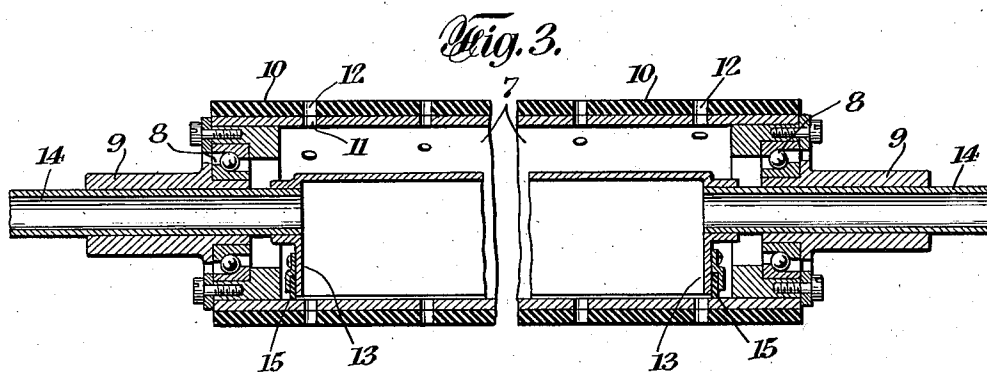
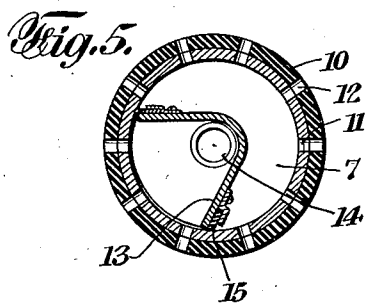
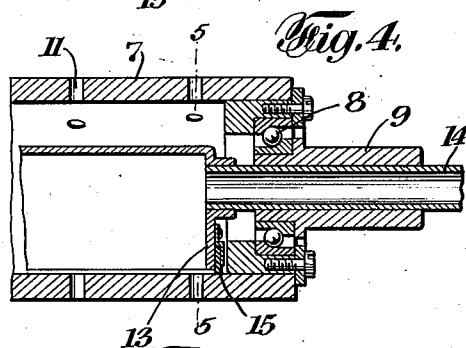
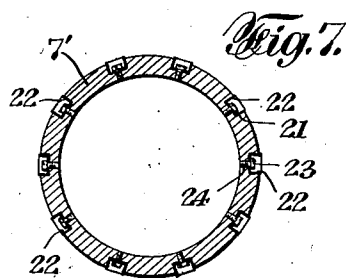
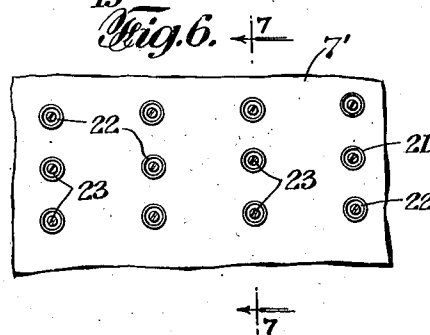
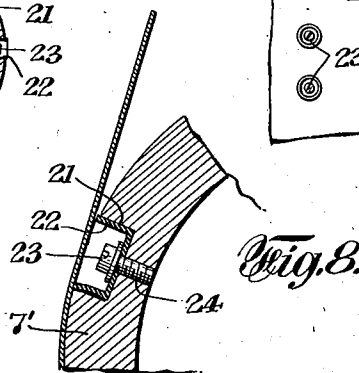
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METHOD AND MEANS FOR MAINTAINING WEB REGISTER IN MULTICOLOR PRESSES

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2 Sheets-Sheet 2



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METHOD AND MEANS FOR MAINTAINING
WEB REGISTER IN MULTICOLOR PRESSES

Charles F. Dausmann, Hempstead, N. Y.

Application May 3, 1935, Serial No. 19,573

20 Claims. (Cl. 101—181)

This invention relates to an improved method and means for maintaining web register in a multicolor web printing press.

In the art of multi-color printing upon paper or other web it is essential that the movement of the web between spaced printing couples of the press be accurately controlled and exact registration of the web with the printing cylinders be maintained, if the overlapping or unaligned superimposing of the different colors is to be prevented.

Perhaps the most successful means heretofore employed for this purpose is my prior invention, in which endless blankets extending between spaced printing couples are moved at the same speed as the paper web and in contact therewith, an example of which is disclosed in Patent No. 1,482,356 issued to me on January 29, 1924. While the patented invention has given highly satisfactory results within certain operating limits, it is not suitable for use in connection with modern high speed newspaper or other web presses owing to the high frictional resistance of the moving blankets.

It is, therefore, the general object and purpose of my present invention to provide a new web registering method and means which is more particularly applicable to high speed multi-color printing presses, and will unfaillingly operate to secure perfect registration of the paper web with the spaced printing cylinders and without increase of the operating power now required for the high speed multi-couple newspaper press.

To the above end I provide a method of web control which consists essentially in mechanically gripping the paper web at spaced points in the press, and particularly at each side of each impression roller, while permitting free linear movement of the web, to thereby positively prevent lateral shifting or deviation of the web from its path of movement between spaced printing couples.

In a practical embodiment of my new method web registering rollers are employed, each roller being provided with a multiplicity of web gripping edges, uniformly distributed over its cylindrical surface. The paper web, as it passes around and in contact with the periphery of the rollers, is thus positively gripped at spaced points across the width of the web and securely held against shifting movement axially of the roller. Preferably, the web is subjected to air pressure to forcibly urge the web into contact with said gripping edges. In one mechanical arrangement the air may be directed against the printed side of the

web and thus subserve the additional purpose of drying the ink after each impression.

One of the detail objects of the invention is to provide a web registering roller in the form of a hollow cylinder having longitudinal rows of openings in its wall, extending at a slight angle to the axis of the cylinder and providing gripping edges which progressively make and break contact with the paper web across the width of the latter as the roller rotates.

An additional object resides in the provision of a stationary suction box within the registering roller and connected at its opposite ends with a suitable air suction pump.

In an alternative embodiment, the wall of the registering roller may be provided with spaced suction cups having flexible walls projecting slightly from the periphery of the roller to afford the web gripping edges.

In general, my present invention aims to provide a web registering method and means for high speed multi-color presses, which is readily applicable to standard presses of this type now in general use, without requiring material alterations therein and at comparatively small expense, and which will efficiently function for the purpose in view at reasonable operating and maintenance costs.

With the above and other objects in view the invention consists in the improved method and means for maintaining web register in a multicolor press and in the several novel features of said method and means, as will hereinafter be more fully described and subsequently incorporated in the subjoined claims.

In the drawings, wherein I have shown several forms of apparatus by means of which the desired web register may be obtained, and in which similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a semi-diagrammatic view, illustrating one application of my improved web registering method and means to a multi-color printing press, certain of the parts being shown in section.

Fig. 2 is a side elevation, showing one form of web registering roller.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a view similar to Fig. 2, showing another form of registering roller.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4.

Fig. 6 is a fragmentary elevation illustrating a further alternative form of the registering roller.

Fig. 7 is a section taken on the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary section on an enlarged scale, showing the coaction of one of the suction cups with the paper web.

Referring more particularly to Fig. 1 of the drawings, in which I have shown, more or less diagrammatically, two of the printing couples of a multi-color web press, each couple includes a printing cylinder 5 and an impression roller 6. For convenience, I have shown the printing couples in horizontally aligned, spaced relation, with the impression rollers mounted above the printing cylinders, but, it will be evident, from the following description, that my invention is also applicable to any other desired relative arrangement of the printing couples in the press frame.

Proper registration of the paper web, indicated at W, with the printing cylinders 5, which print thereon in relatively different colors, is obtained by means of a plurality of registering devices suitably mounted in the press frame. Each of these devices includes a web guiding and gripping member in the form of a hollow cylinder roller 7. This web registering roller, at its opposite ends, is provided with ball bearings 8, co-operating with trunnions 9 fixed in the frame, and supporting the roller for substantially frictionless rotation.

The rollers 7 may be of copper, brass or other metal and are of a length slightly exceeding the width of the web W. The peripheral surfaces of these rollers are accurately ground and, if desired, may be covered by a sheath of hard rubber or other suitable material. The latter, however, is not essential, insofar as the effective functioning of my invention is concerned.

In one embodiment of the invention, each registering roller 7 is provided with a plurality of longitudinally extending rows of openings or perforations 11 in its wall, and the sheath 10, if employed, has similar rows of registering openings or perforations 12. Preferably, these openings are circular in form, and the rows of openings are uniformly spaced circumferentially of the roller and extend longitudinally thereof at a slight angle to the axis of rotation of the roller, as clearly seen in Figs. 2 and 4 of the drawings. Thus the openings in each row provide a multiplicity of spaced, web gripping edges which progressively make and break contact with the surface of the paper web across the width thereof, as the registering roller rotates about its axis.

In conjunction with each web registering roller 7 I provide means for positively urging the paper web into contact with the edges of the openings 11 or 12. One such means may comprise a suction box 13, mounted within the hollow roller in fixed relation thereto. The roller supporting trunnions 9 are of tubular form to receive the pipes 14, connected with a suitable air suction pump and to opposite ends of the suction box 13. This box is sector-shaped in cross-section and is open at its outer side along the entire length of the box. The edges of the box walls are provided with suitable packing means 15, engaging the inner surface of the roller 7 to form an airtight connection therewith. The air suction effect will thus be substantially uniform throughout the length of the rows of openings 11, so that the paper web, at spaced points across its width, will be drawn or pulled with equal pressure against the edges of the openings 11, as the latter are progressively brought into engagement with

one side of the web in the rotation of the registering roller. The web is thereby momentarily frictionally gripped at a large number of spaced points of comparatively small area across the width of the web. The latter is thus securely held against lateral shifting movement in the direction of the roller axis, but without sensible resistance to its free linear movement around the roller surface or possible damage to the paper web.

In combination with the suction box 13, or independently thereof, for the same purpose, I may use the air jet delivery pipes 16, arranged in parallel relation to the roller 7, closely adjacent to the point of contact of the paper web therewith. Each pipe is connected to a suitable air compressor and is provided with longitudinally spaced jet orifices, through which air is delivered against the side of the paper web which receives the printed impressions from the cylinders 5. Thus, the web will be forced under pressure against the gripping edges of the registering roller and at the same time the ink is dried in the movement of the web between spaced printing couples. However, such use of the air jets for the purpose of drying the ink is not claimed herein per se, since it forms the subject-matter of Patent No. 1,834,147, issued to me on December 1, 1931.

In the arrangement of the printing couples as shown in Fig. 1 of the drawings, I preferably provide one of the web registering devices, as above described, at each side of each impression roller 6, with the axes of the rollers 7 intersecting a common horizontal plane, above and in spaced relation from the horizontal plane of the axis of the impression roller 6, so that there will be a minimum stretch of the paper web between the registering rollers 7 and the pass between the printing cylinder 5 and impression roller 6. In this manner any possibility of side sway or lateral deviation of the paper web from its path of movement as it enters the pass to receive the printed impression is practically obviated.

In addition to the web registering devices which are associated with the impression roller 6, a pair of said devices is mounted above and in suitably spaced relation from each of the printing couples. The paper web withdrawn from the roll 17, first passes over an idler roller 18, then under and around the tension roller 19 to one of the upper registering rollers 7. From this registering roller the web moves downwardly to the registering roller 7 at one side of the impression roller 6 of the first printing couple, which guides and directs the web to the pass thereof, to receive the first printed impression in ink of one color. The web then moves upwardly over the registering roller 7 at the opposite side of the impression roller 6 and over a second idler roller 20, to the other registering roller 7 of the upper pair of registering devices. From this roller 7 the web moves over the upper and lower pairs of registering devices of the other printing couples in succession, each of which makes a printed impression upon the web in a different color from the preceding printed impressions. It will be apparent that, by such arrangement of the web registering devices, each of which has a positive holding action upon the moving web to prevent lateral deviation of the web from its path of linear movement, the differently colored printed impressions will be accurately applied to the web surface, and overlapping or unaligned superimposing of an ink

impression of one color upon an impression of a contrasting color will be precluded.

If desired, an air jet pipe 16 may be associated with each of the idler rollers 20, for further drying of the ink impressions, as shown.

In Figs. 6, 7 and 8 of the drawings I have shown a modified form of the web registering device. In this construction the wall of the roller 7' is provided in its outer surface with rows of spaced circular recesses 21, which extend longitudinally at an angle to the axis of the roller. In each of these recesses a suction cup 22 of rubber, or other suitable composition material, is secured by means of a screw 23, passing through an opening in the bottom wall of the cup and threaded into the tapped opening 24 in the wall of the roller.

The yieldable annular wall of each suction cup 22 projects slightly beyond the periphery of the roller 7', so that the paper web W, contacting therewith as clearly seen in Fig. 8, presses said wall into the recess 21. Thus, the web will have smooth, continuous contact with the periphery of the roller, while the edge of the cup wall, by frictional gripping contact with the surface of the web, effectively holds the latter against axial shifting movement on the roller. These suction cups act progressively to grip and release the web across the width thereof in the same manner as the registering device first above described.

From the above description the operation and several advantages of my present invention will be fully understood. Owing to the comparatively small area of contact of the web registering rollers 7 with the paper web, and low frictional resistance to its linear movement, my invention is applicable to the modern high speed newspaper press for printing in a variety of contrasting colors. It will be seen that the new method of maintaining web registration is characterized essentially by the momentary progressive mechanical gripping of the web, over small areas thereof, across its width, at spaced points in the press, and particularly at each side of the web pass of each printing couple. High operating speeds are therefore permissible, without injury or damage to the paper web. This result is attained primarily by reason of the fact that the web gripping or holding means operates wholly independently of the web feed control, idly mounted roller 7 being rotated only by contact of the moving web therewith and substantially without frictional resistance to the linear movement of the web.

The several forms of apparatus herein illustrated and described for the practical application of my new method are, in certain respects, largely suggestive, though, at the present time, I believe the same to be well adapted for the purpose in view.

However, since it is possible that my invention, in its essential features, might be exemplified in various other mechanical combinations and structural equivalents of the several elements, the privilege is reserved of adopting such changes in these particulars as may fairly be comprehended within the spirit and scope of the invention as claimed.

I claim:

1. A method of maintaining web registration with the spaced printing cylinders of a multi-color press, the step of mechanically gripping the web at a plurality of spaced points across the width thereof and independently of the web feeding means, to hold the web against lateral

deviation from its path of movement without sensible resistance to the linear movement of the web.

2. A method of maintaining web registration with the spaced printing cylinders of a multi-color press, the step of mechanically gripping and releasing the web progressively across the width thereof at spaced points, to hold the web against lateral deviation from its path of movement without sensible resistance to the linear movement of the web.

3. A method of maintaining web registration with the spaced printing cylinders of a multi-color press, which consists in feeding the web over a guiding surface, and positively gripping the web at said surface over small spaced areas of the web and with the web under constant predetermined tension, to hold the web against lateral deviation from its path of movement without sensible resistance to the linear movement of the web.

4. A method of maintaining web registration with the spaced printing cylinders of a multi-color press, which consists in feeding the web over and in contact with a rotating cylindrical surface, and positively gripping the web at said surface over small areas of the web uniformly spaced apart across the width thereof, to hold the web against lateral deviation from its path of movement without sensible resistance to the linear movement of the web.

5. A method of maintaining web registration with the spaced printing cylinders of a multi-color press, which consists in contacting the web with a rotating cylindrical surface, and positively gripping and releasing the web at said cylindrical surface, progressively across the width of the web, over small laterally spaced areas thereof, to hold the web against lateral deviation from its path of movement without sensible resistance to the linear movement of the web.

6. A method of maintaining web registration with the spaced printing cylinders of a multi-color press, which consists in feeding the web over a non-variable path through the press under constant predetermined tension, and mechanically gripping and releasing the web across the width thereof at a plurality of spaced points in the length of the web, and over a comparatively small linear extent thereof, in the movement of the web past said spaced points to and from each printing couple of the press, to thereby positively hold the web against lateral deviation from its path of linear movement through the press.

7. The method of maintaining web registration with the spaced printing cylinders of a multi-color press, which consists in progressively gripping and releasing the web across the width thereof and adjacent to one side of the impression cylinder of each printing couple of the press, to thereby hold the web against lateral deviation from its path of linear movement through the press.

8. The method of maintaining web registration with the spaced printing cylinders of a multi-color press, which consists in contacting the web at each side of the impression roller of each printing couple of the press with an idly rotating cylindrical surface, and positively gripping and releasing small areas of the moving web at each of said rotating cylindrical surfaces, to thereby hold the web against lateral deviation from its path of linear movement through the press.

9. The method of maintaining web registration with the spaced printing cylinders of a multi-

color press, which consists in contacting the web with an idly rotating cylindrical surface having circumferentially spaced web gripping edges, and positively urging the web at spaced points across its width into frictional engagement with said gripping edges, to hold the web against lateral deviation from its path of movement without sensible resistance to the linear movement of the web.

10 10. The method of maintaining web registration with the spaced printing cylinders of a multi-color press, which consists in contacting a small linear extent of the web with an idly rotating cylindrical surface, and subjecting the web on one side thereof and at spaced points across its width, to the influence of high pressure air, to urge the web at said spaced points into frictional gripping engagement with correspondingly spaced parts on said cylindrical surface, and thereby hold the web against lateral deviation from its path of linear movement through the press.

11. In a multi-color web press having spaced printing couples, means at each side of the web pass of each printing couple mechanically gripping the web across the width thereof, in the movement of said web through a non-variable path and under constant predetermined tension without sensible resistance to the linear movement of the web in relation to said means, to prevent lateral deviation of the web from its path of movement through the press and maintain accurate registration of the web with the printing cylinders of the respective couples.

12. In a multi-color web press having spaced printing couples, web registering means arranged at spaced points in the linear movement of the web through the press, each of said means including a rotatably mounted roller having contact with a comparatively small linear extent of the web and rotated by contact of the web therewith, and means associated with said roller, acting to positively grip the web across its width at the contacting surface of the roller, and thereby maintain accurate registration of the web with the printing cylinders of the respective couples.

13. In a multi-color web press having spaced printing couples, web registering means arranged at spaced points in the linear movement of the web through the press, each of said means including a rotatably mounted roller having contact with a comparatively small linear extent of the web and rotated by contact of the web therewith, and means for subjecting the web section contacting said roller, on one side thereof, to the influence of high pressure air to positively urge the web at spaced points across its width into frictional gripping engagement with corresponding spaced parts on the roller surface, and thereby maintain accurate registration of the web with the printing cylinders of the respective couples.

14. In a multi-color web press having spaced printing couples, web registering means including a rotatably mounted roller, having contact with a comparatively small linear extent of the web and rotated by contact of the web therewith, and means associated with said roller acting, in the rotation thereof, to progressively grip and release the web across the width thereof at laterally spaced points, and thereby hold the web against lateral deviation from its path of movement through the press.

15. In a multi-color web press having spaced printing couples, web registering means including a rotatably mounted roller rotated by contact of the web therewith, said roller at its periphery having a plurality of longitudinal rows or web gripping edges, and means for urging small areas of the web, across the width thereof, into frictional engagement with said gripping edges, to thereby hold the web against lateral deviation from its path of movement through the press.

16. In a multi-color web press having spaced printing couples, web registering means including a rotatably mounted roller rotated by contact of the web therewith, said roller being hollow and having a plurality of longitudinal rows of spaced openings in its wall, and air pressure means acting against one side of the web section in contact with said roller, to urge small spaced areas of the web into frictional engagement with the edges of said openings, to thereby hold the web against lateral deviation from its path of movement through the press.

17. In a multi-color web press having spaced printing couples, web registering means including a rotatably mounted roller rotated by contact of the web therewith, said roller being hollow and having a plurality of longitudinal rows of spaced openings in its wall, and air suction means, mounted within the roller, acting through said openings upon spaced areas of the web to cause the same to frictionally grip the edges of said openings and hold the web against lateral deviation from its path of movement through the press.

18. In a multi-color web press having spaced printing couples, web registering means including a rotatably mounted roller, having contact with a comparatively small linear extent of the web, said roller at its periphery having a plurality of longitudinal rows of spaced web gripping edges, extending in non-parallel relation to the roller axis, and means for causing small spaced areas of the web to be progressively gripped, across the width of the web, by the edges on said roller, whereby the web is held against lateral deviation from its path of movement through the press.

19. The method of maintaining web registration with the spaced printing cylinders of a multi-color press, which consists in feeding the web through the press in a non-variable path at a desired speed and under constant predetermined tension, and subjecting a minor linear extent of the web at spaced points in the press to the influence of means acting independently of the web feed control, to hold the web against lateral deviation from its path of linear movement through the press.

20. The method of maintaining web registration with the spaced printing cylinders of a multi-color press which consists in feeding the web through the press at a desired speed, and subjecting a minor linear extent of the moving web adjacent to each cylinder to the influence of means acting progressively across the width of the web, and independently of the web feed control, to hold the web against lateral deviation from its path of linear movement through the press.

CHARLES F. DAUSMANN.

CERTIFICATE OF CORRECTION.

Patent No. 2,034,694.

March 24, 1936.

CHARLES F. DAUSMANN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 70, claim 1, and second column, line 3, claim 2, for the article "A" read In a; page 4, second column, line 5, claim 15, for "or" read of; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of April, A. D. 1936.

Leslie Frazer

(Seal)

Acting Commissioner of Patents.