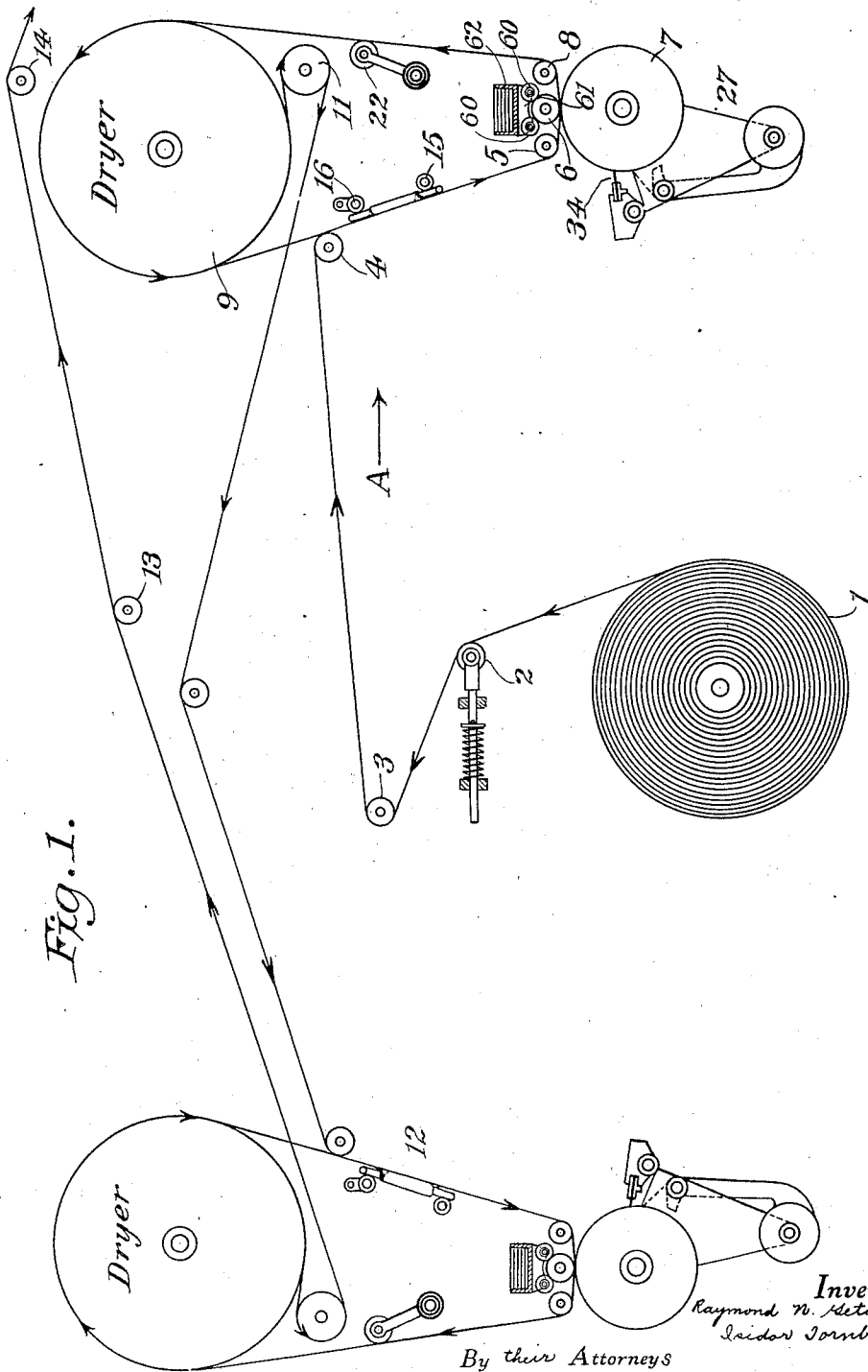


R. N. GETCHES AND I. TORNBERG.
 PERFECTING MULTICOLOR WEBB PRESS.
 APPLICATION FILED JUNE 11, 1919.

Patented Apr. 12, 1921.

5 SHEETS—SHEET 1.

1,374,196.



Inventors
 Raymond N. Getches +
 Isidor Tornberg.

By their Attorneys

Sheffield & Betts.

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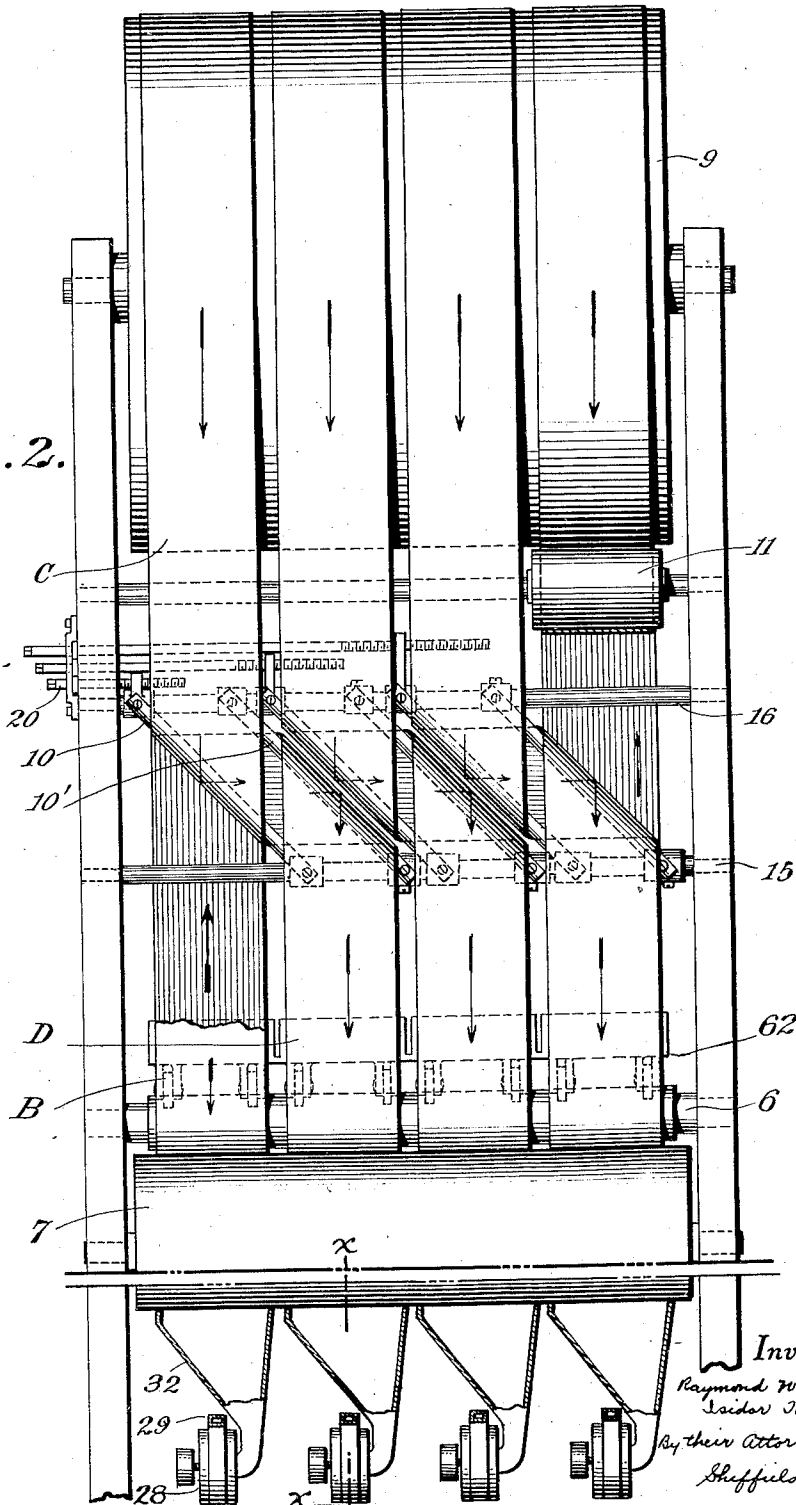
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Fig. 2.



Inventors

Raymond W. Getches &
Isidor Tornberg

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Sheffield & Betts

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5 SHEETS—SHEET 3.

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Fig. 3.

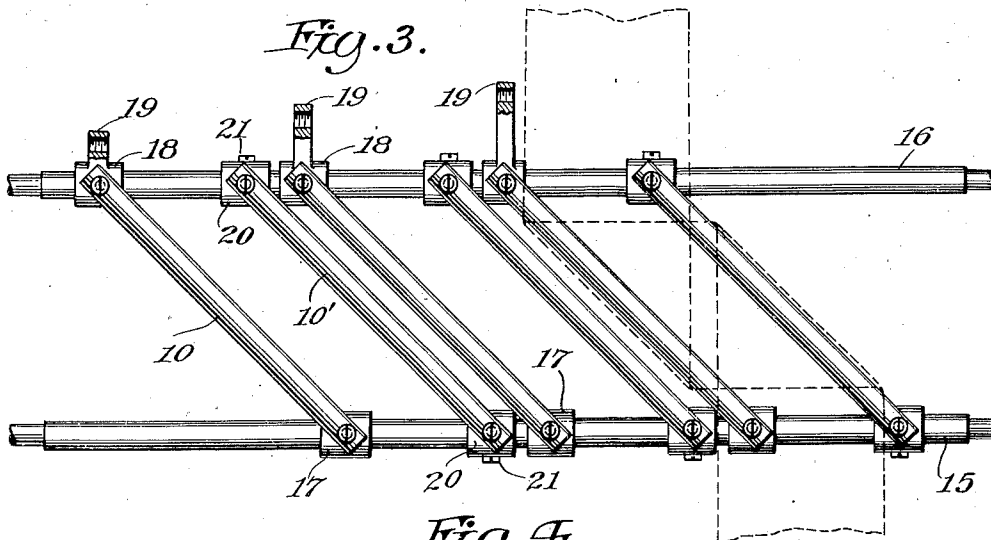


Fig. 4.

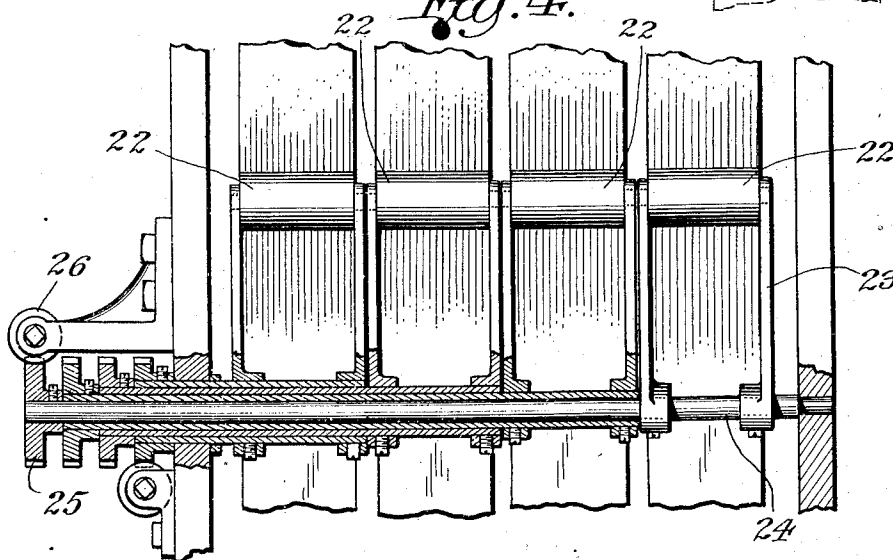


Fig. 5.

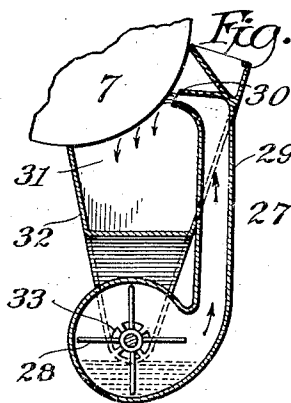
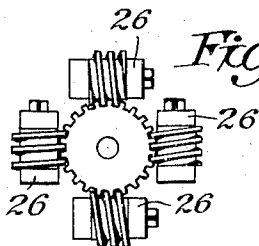


Fig. 6.



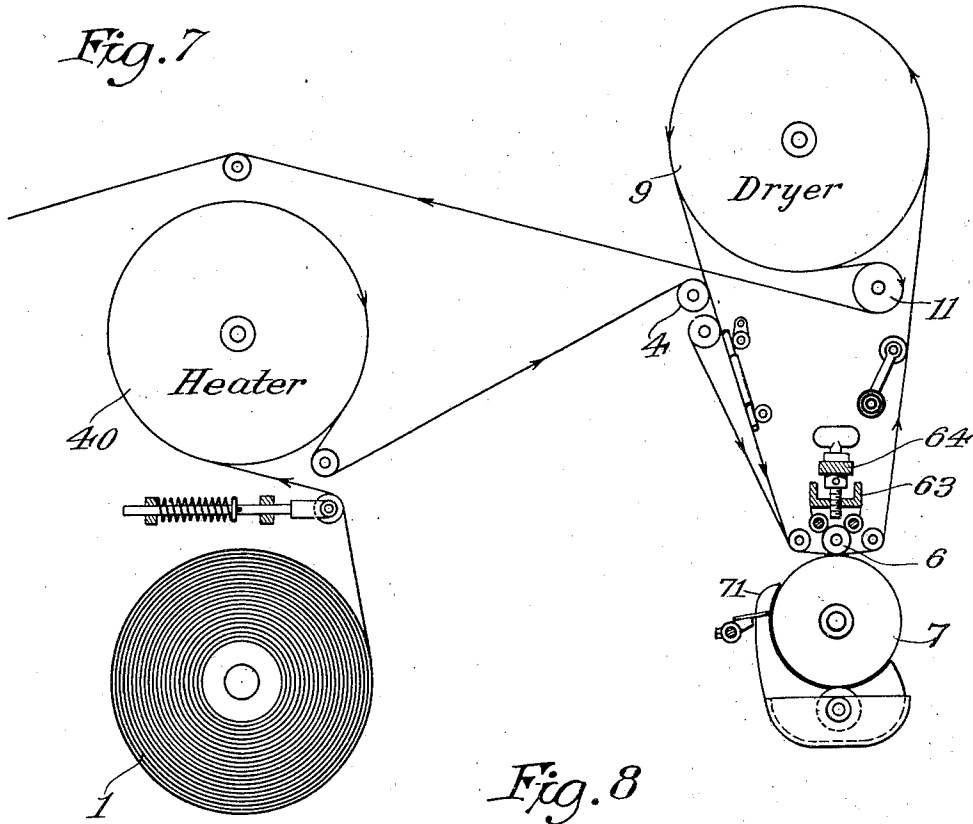
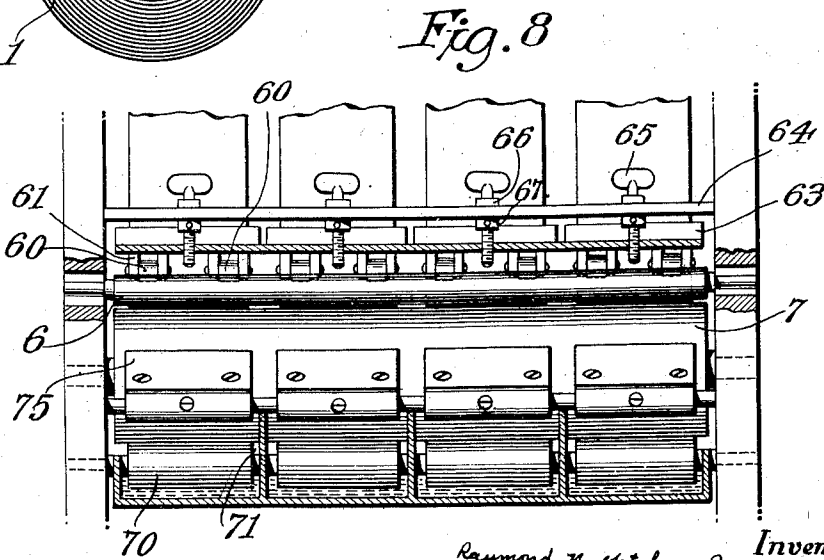
Inventors
Raymond N. Getches + Isidor Tornborg
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5 SHEETS—SHEET 4.



Inventors
 Raymond N. Getches & Isidor Tornborg

By their Attorneys

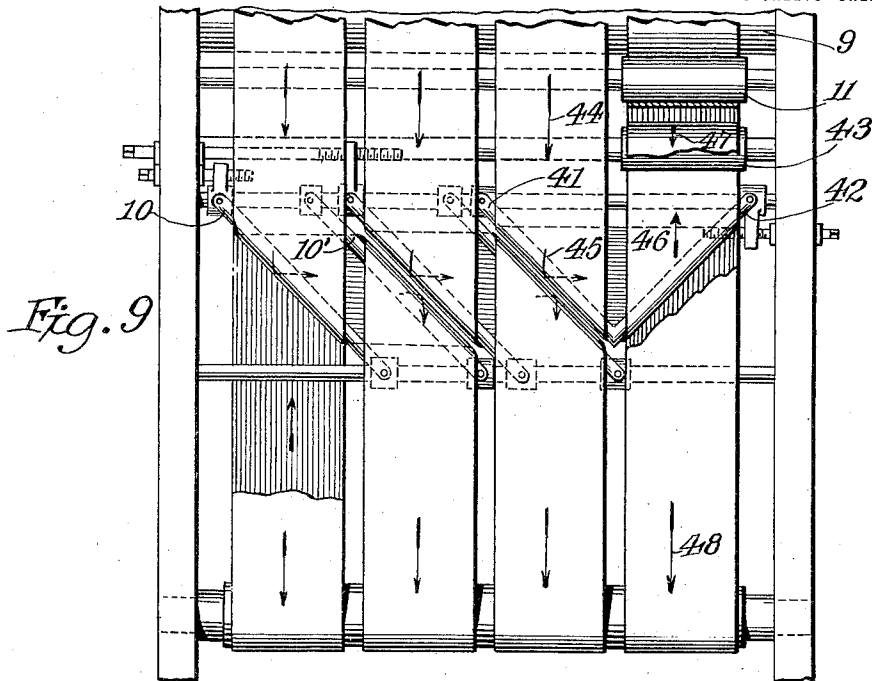
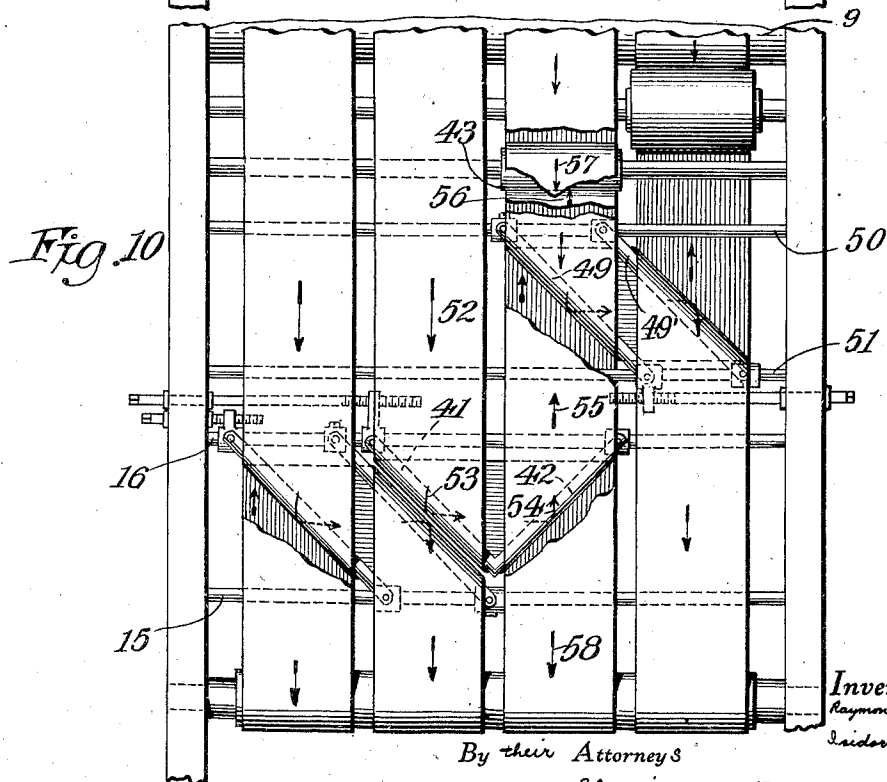
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5 SHEETS—SHEET 5.



Inventors
 Raymond N. Getches
 Ivar Tornberg

By their Attorneys

Sheffield Betts

UNITED STATES PATENT OFFICE.

RAYMOND N. GETCHES, OF GLEN RIDGE, AND ISIDOR TORNBERG, OF PLAINFIELD,
NEW JERSEY.

PERFECTING MULTICOLOR WEB-PRESS.

1,374,196.

Specification of Letters Patent.

Patented Apr. 12, 1921.

Application filed June 11, 1919. Serial No. 303,440.

To all whom it may concern:

Be it known that we, RAYMOND N. GETCHES, a citizen of the United States, and a resident of Glen Ridge, county of Essex, State of New Jersey, and ISIDOR TORNBERG, a citizen of the United States, and resident of Plainfield, county of Union, State of New Jersey, have jointly invented certain new and useful Improvements in Perfecting Multicolor Web-Presses, of which the following is a full, clear, and complete disclosure.

Our invention relates to multicolor web presses and more especially to those operating on the intaglio principle.

The principal object of our invention is to insure improved color tone and register in multicolor printing by providing the ink of one color shall be dried before the next is applied.

A second object of our invention is to provide means whereby a single unitary printing mechanism may be used for printing webs of different widths.

A third object of our invention is to provide means whereby the web may be readily kept in perfect register.

A fourth object of our invention is to provide a novel apparatus for method of applying ink to the forms.

The novel features of our invention are pointed out in the appended claims. The invention itself, however, together with future objects and advantages, will best be understood by reference to the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a diagrammatic view of a web press mechanism embodying our invention;

Fig. 2 is an elevational view, parts being broken away, looking in the direction of the arrow A in Fig. 1;

Fig. 3 is a detail view illustrating the turning bars appearing in Fig. 2;

Fig. 4 is a detail view, partly in section, of the idler rollers and mounting therefor appearing in Fig. 1;

Fig. 5 is a detail sectional view of our improved inking mechanism;

Fig. 6 is a detail view of the means for adjusting the idler rollers of Fig. 4, Fig. 6 being taken from the left of Fig. 4;

Fig. 7 is a diagrammatic view of a multicolor web press according to our invention, in which the web is perfected on a single printing cylinder or mechanism;

Fig. 8 is an elevational view, partly in section, of the lower end of a press unit, such as is shown in Figs. 1 and 7, illustrating our novel knife arrangement, our improved impression cylinder arrangement, means for preventing the commingling of inks of different colors and the manner of using roller inking mechanism instead of the spray inking mechanism shown in Figs. 1 and 2;

Fig. 9 is an elevational view, parts being broken away, of one arrangement of turning bars and reversing bars used in connection with the press unit of Fig. 7 when perfecting on the same press unit; and

Fig. 10 is a view similar to Fig. 9, but showing a different relative arrangement of the turning mechanism and reversing mechanism.

In Fig. 9 the press unit is arranged to print in three colors on one side and perfect in one color on the other side, whereas in Fig. 10 it is arranged to print in two colors on one side and perfect in two colors on the opposite side.

Throughout the separate views the same parts are designated by the same reference characters.

Referring to the drawings more in detail, 1 is a roll of paper from which the web is led to the printing mechanism, Fig. 1 showing the web as passing over the usual tensioning roller 2, a guide roller 3 and a second guide roller 4 before arriving at the printing mechanism. From the roller 4, the web passes downwardly this length of web appearing at point B, in Fig. 2, then passes around guide roller 5 between the impression roller 6 and printing cylinder 7. The web then passes up over the guide roller 8, around a heated drum, such as 9, returning to the same side of the apparatus

on which is the roller 4, this length of the web appearing at C in Fig. 2. The web then passes around a pair of turning bars, 10—10', these being inclined to the path of the web in the usual manner and serving to offset it with relation to the cylinder 7, so that the web now appears at the point D on Fig. 2, from which position it may readily pass downwardly again between the printing cylinder and impression roller. This process is repeated as often as desired to apply the different colors being used.

After passing over the heated drum 9 the last time, the web is brought around a pulley or roller 11 from which point it runs to a second perfecting mechanism 12, identical with that just described. From the perfecting press 12, the web then passes over the rollers 13 and 14 to a folding and cutting mechanism (not shown) which may be of any known desired type.

It will be seen that the turning bars 10—10' are mounted between horizontal rods 15 and 16 and it will be understood that bars such as 10' are normally fixed in position relative to the rods 15 and 16, whereas the bars such as 10 may be adjusted longitudinally of the rods while the press is in operation for the purpose of maintaining sidewise register of the successive impressions in the web in the lengths where it runs from the cylinder 9 to the printing cylinder 7. To permit of the adjustment just mentioned, the bars 10 are fastened at their ends to sleeves such as 17 and 18 which are slidable on the rods 15 and 16, respectively, and the sleeves 18 are provided with threaded lugs, such as 19, which cooperate with threaded bolts, such as 20, carried by the frame of the press, whereby the sleeves 18 may be adjusted horizontally in an obvious manner. The bars 10' are fixed at their opposite ends to sleeves, such as 20, which are normally fixed to the rods 15 and 16 by some convenient means, such as the set screws 21. The sleeves 20 and bars 10' can, of course, be adjusted on the rods 15 when the machine is not in operation, or any pair or pairs of bars may be removed, when desired, to permit the use of webs whose width is a multiple of that shown.

On the side of the mechanism opposite the turning bars, are idler rollers such as 22 which may be adjusted to promote exact longitudinal register and remove unnecessary slack in the web. The details of this mechanism appear in Figs. 4 and 6. The rollers 22 are mounted at one end of arms such as 23, the other ends of said arms being mounted on one of a set of concentric shafts, such as 24. The shafts 24 run to the outside of the frame of the machine and each carries a worm wheel, such as 25, which meshes with a worm, such as 26, suitably supported from the frame and by which the corre-

sponding shaft and roller 22 may be adjusted, as desired.

I prefer to apply the inks to the forms on the printing cylinder 7 by forcing it thereon in a continuous stream, the inking mechanism being indicated in Fig. 1 at 27 and shown in detail in Fig. 5. Such mechanism in the preferred form, comprises a pump such as 28 by which the ink may be forced up through the conduit 29 and projected against the face of the form on the printing cylinder 7 by a nozzle 30 in a continuous stream. Ink not adhering to the printing surface at the moment falls downwardly, as indicated by the arrows 31, into a hood such as 32, the lower end of which is contracted and bent to connect with the casing of the pump 28, the ink returning to the interior of the pump through apertures, such as 33, shown in Fig. 5. It will be seen that a certain amount of air will be forced through the pipe 29 by the pump 28 so that the stream delivered against the printing surface will not be a solid stream of liquid, but will be more in the nature of a spray. Since we prefer to use what is known as an intaglio press, we have shown a scraper or so-called "doctor's knife" at 34 in Fig. 1, which scrapes off all the ink which does not get into the finely etched lines comprising the intaglio etching and likewise returns it to the ink pump.

Referring more particularly to Fig. 7, we have shown herein an initial heater 40 intermediate the paper roll 1 and the printing mechanism. This preliminary heater or drier may be used in order to insure that the paper web shall be tempered exactly the same for each of the impressions. After leaving the preliminary heater, the course of the web in the arrangement of Fig. 7 is the same as that in Fig. 1 until the point is reached at which it is desired to reverse the face of the web presented to the forms. When this point has been reached, instead of running the web over a pair of parallel turning bars, such as 10, 10', we pass it over a pair of V-shaped bars, such as are shown at 41 and 42, as will be seen in Fig. 9, this operation will result in the web being directed upwardly away from the printing mechanism, but we reverse its direction again so that it may pass down to the printing mechanism by running it over a roller, such as 43, whereupon it will be seen that the opposite face from that first printed will be presented to the forms. In carrying out these changes of direction, a given point on the web occupies successively the positions indicated by arrows 44, 45, 46, 47 and 48. After the printing face has been reversed, the web passes over the drying drum 9, thence proceeds as before described in Fig. 1. However, it will be seen that the roller 11 may be omitted in the arrangement

of Fig. 7, provided the folding mechanism is in a certain position with respect to the press unit.

In Fig. 10, the reversal of the printing face is accomplished in the same manner as in Fig. 9, but the V-shaped bars 41, 42 have been shifted to the left the distance occupied by one form so that a pair of turning bars to the right of the bars 41, 42 is necessary. The last mentioned pair of turning bars are indicated at 49, 49' and we have shown these bars as adjustably mounted on rods 50 and 51, which are above the level of the rods 15 and 16. Now it will be seen that the position of the bars 49, 49' relative to the V-bars 41 and 42, may be varied as desired, provided there is no interference between the various lengths of the web. In the arrangement of Fig. 10, of course, the roller 43 is moved to the left the same amount as the V-bars 41, 42 and for convenience of illustration, we have shown this roller in Fig. 10 above the bars 49 and 49'. In Fig. 10 the course of a point on the web is indicated, in the operation to reverse the printing face, by the arrows 52, 53, 54, 55, 56, 57 and 58.

The proper design and adjustment of the impression rollers becomes more and more difficult and important as the length of the form cylinder and impression roller increases. For the best printing effects, it is desirable that the diameter of the impression roller be as small as possible, but the problem of obtaining uniform pressure on the paper throughout the length of the impression roller has forced the designers of presses to the use of stiff, heavy and consequently large diameter rollers. We intentionally make our impression roller, such as 6, of so small a diameter that it is comparatively flexible under the pressures and within the deflections met with in web press practice. Consequently, we are not only able to obtain sharp impressions, but we can apply different desired pressures to the different lengths of web which pass under the various bands or zones of the roller. We accomplish these results by applying the load on the impression roller by means distributed along its length and varying especially over the zones of the impression roller in contact with the web. We prefer to use for this purpose a mechanism comprising a plurality of rollers such as 60, which we arrange in pairs in planes at right angles to the axes of the impression rollers 6, there being preferably two such pairs of impression rollers 60 bearing against the impression roller in each band or zone in contact with the web. The rollers 60 are preferably carried in brackets, such as 61, fixed to the underside of a channel, such as 62 or 63. The vertical webs of these channels are preferably cut in the planes dividing the forms so as to make

the channels flexible and we then adjust the weight or pressure on the channels, in accordance with the pressure desired on the different lengths of web. The channel 61, shown in Fig. 1, is designed to receive weights so that the pressure may be arranged as desired, but our preferred arrangement for this purpose is shown in Fig. 8, in which we provide a cross bar or rod, such as 64, on which are mounted four set screws, such as 65, one for each form, these set screws being mounted to rotate freely in the rod 64, but held from vertical movement by means of collars, such as 66, 67, and the screws have threaded engagement with the horizontal web of the channel 63, whereby the pressure on same can be adjusted as desired. Of course, the pressure along the whole length of the impression roller 6 can be readily equalized, but we count it a great advantage also to be able to adjust the presses on the different webs so that if desired the web may be printed heavily and the color yellow or other color, printed light. In this way we are able to readily obtain fine gradations of color. If desired, channel members 61 and 63 may be entirely cut through to provide separate sections for each form, and the same can also be done with the impression roller, but we find that sufficient flexibility can be readily obtained without this and find that it promotes mechanical simplicity to have the sections formed integral.

In order to prevent the different colored inks from the inking rollers, such as 70, from spreading at the edges of the form and mingling with deleterious results on the printing, we provide partitions, such as 71, in the planes of division between the forms, the partitions 71 extending into juxtaposition to the forms on cylinder 7, and, if desired, having means pressing against the forms to effectively prevent the spreading of ink.

We find it advantageous also to divide the doctor's knife into sections, such as shown at 75, this arrangement acting to hinder the spreading of the ink along the edge with consequent mixing at the edges of the forms. It will be understood that the form of the knife structure may be varied widely without departing from our idea of interrupting the edge in contact with the form.

It will be seen that the partitions for preventing spreading and mixing of the inks, as well as the special knife structure for the same purpose, may both be readily used in connection with the form of spraying ink mechanism shown in Figs. 1, 2 and 5.

It will be seen that the ink applied to the web in any given impression is dried before the next succeeding impression. We find that the drying promotes the register of the colors since there is no tendency to blur,

due to the spreading of the ink at the time of a subsequent impression. Drying the ink of one color before applying the next enables us, moreover, to obtain highly im-
 5 proved results as to tone and definition of the color printing.

Mechanical register is insured not only by the provision of the adjustable turning bars and the adjustable idlers previously
 10 mentioned, but also by the fact that the printing cylinder is an absolutely unitary structure of the same diameter throughout, thus eliminating all difficulties which are ordinarily encountered, due to different
 15 sized cylinders or slightly different driving speeds. It has always been exceedingly difficult to obtain printing cylinders of exactly the same diameter and to obtain gears of exactly the same running precision for the
 20 different cylinders. Moreover, even when these ideal conditions were fulfilled in a new press, it has been found exceedingly difficult to maintain the gear conditions exactly the same after they have been in use for any
 25 length of time, which produces what is known as backlash. We find that an exceedingly relatively long cylinder may be made of substantially the same diameter throughout without undue difficulty in manufacture.
 30 A further object in using a single relatively long printing cylinder with a corresponding impression cylinder, resides in the fact that we are thereby enabled to print webs of greatly differing widths on the same
 35 press. For instance, the drawings show the press operating on a relatively narrow web, making four successive impressions. By merely changing the arrangement of the turning bars and using a wider roller in
 40 place of the one shown at 11, with corresponding adjustment of the forms and inking mechanism, it will be seen that we can use a web either twice or four times as wide as the one illustrated, using either two inks
 45 or one ink, as the case may be.

These mechanical adjustments, it will be seen, are only such as can be readily carried out by the persons ordinarily in charge of web presses, when once their desirability has
 50 been suggested.

While we have described our invention in the form preferred by us, we do not wish to be limited thereto as to the details of construction or arrangement, and we wish it
 55 particularly understood that parts of our invention may be used without the whole.

Having thus described our invention, what we claim is:

1. The combination in a web press of a
 60 means for supporting a plurality of forms in alinement and impression means cooperating therewith, and means for passing a web to each of the forms comprising means intermediate each two forms for offsetting
 65 the web and a heated revoluble drum around

which the web passes, said drum being of sufficient size and temperature that the ink is dried when the web passes around the drum once at printing speed.

2. The combination in a web press of a 70 form cylinder and an impression roller cooperating therewith, a heated revoluble drum around which the web passes immediately after passing between said cylinder and roller, and means to which the web 75 passes immediately after leaving said drum for off-setting the web to bring it in line with the next form, said drum being of sufficient size and temperature that the ink is dried when the web passes around the drum 80 once at printing speed.

3. The combination in a web press of a relatively long form roller adapted to hold a plurality of forms, a relatively long flexible impression roller, and means whereby 85 the pressure between the forms and the impression roller may be set as desired at different points along the length of the impression roller.

4. The combination in a web press of a 90 relatively long form roller having a plurality of forms thereon and means whereby the pressure between the separate forms and the individual lengths of the web in contact therewith may be set to different 95 desired values, said means comprising a relatively long impression roller of relatively small diameter, idler rollers running on said impression roller and means whereby the pressure between said idler rollers 100 and said impression roller may be set as desired.

5. The combination in a web press of an impression roller, four idler rollers contacting with said impression roller, and means 105 whereby the pressure between said idler rollers and said impression roller may be set as desired.

6. The combination in a web press of a relatively long form cylinder, a relatively 110 long flexible impression roller for cooperating with the forms carried by said cylinder, a series of idler rollers running against said impression roller, and means whereby the contact pressure between said idler rollers 115 and said impression roller may be set at different values at different points along said impression roller.

7. The combination in a web press of a relatively long form cylinder, a relatively 120 long flexible impression roller for cooperating with the forms carried by said cylinder, a series of idler rollers running against said impression roller, and means whereby the contact pressure between said idler rollers 125 and said impression roller may be set at different values at different points along said impression roller, said means including saddles for said idler rollers and set screws acting on said saddles.

8. A multicolor web press comprising relatively long form and impression cylinders and means for passing a web between said cylinders a plurality of times, comprising a rotating cylindrical structure, a plurality of sets of parallel turning members intermediate said cylindrical structure and

said printing cylinders, a pair of turning members in V-relation to each other, and a roller over which the web is passed after leaving the said V members to present the opposite face of the web to the forms. 10

RAYMOND N. GETCHES.
ISIDOR TORNBERG.