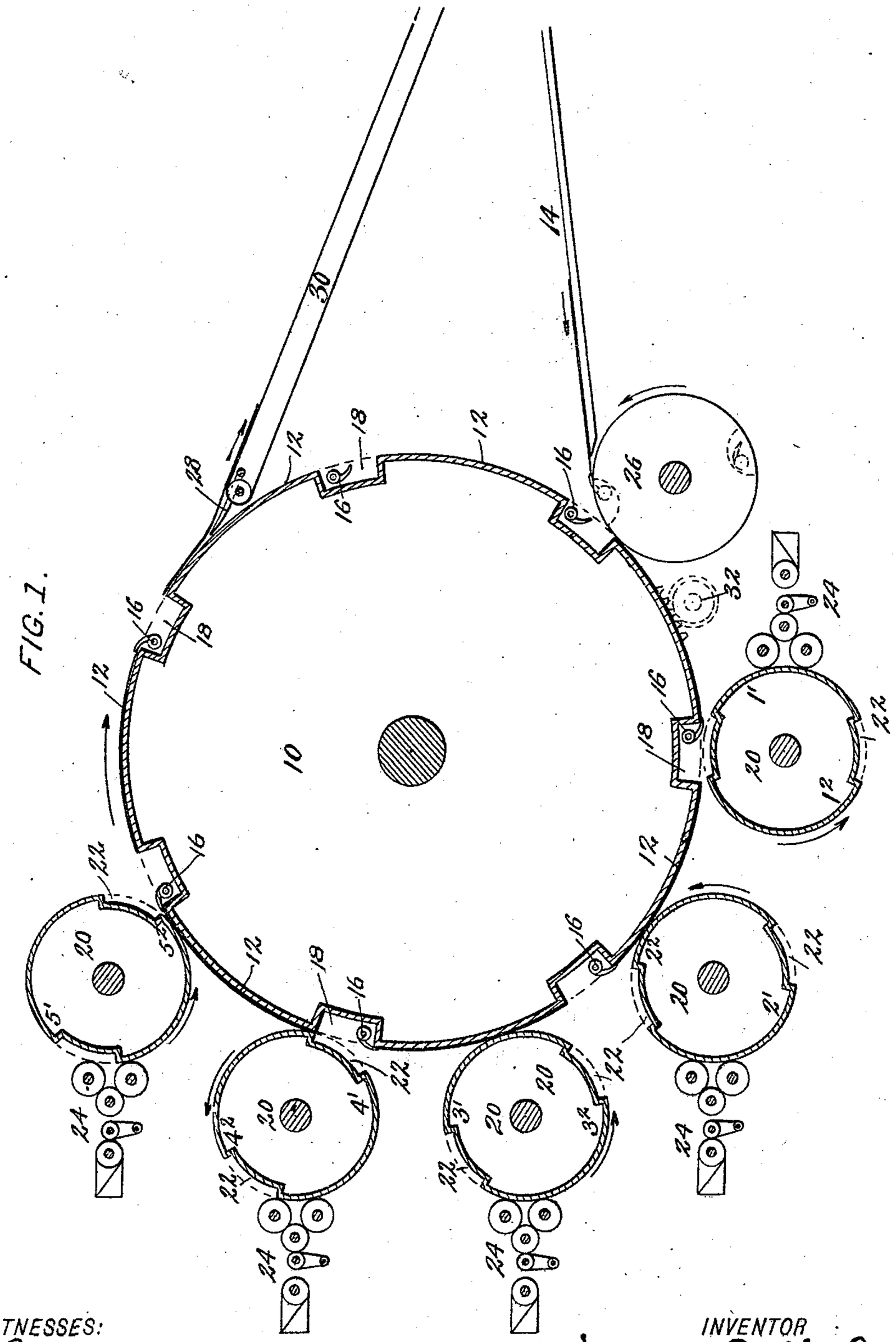
(No Model.) 2 Sheets—Sheet 1.

W. C. WENDTÉ.

MULTICOLOR PRINTING PRESS.

No. 517,907. Patented Apr. 10, 1894.

FIG. 1.



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(No Model.) 2 Sheets—Sheet 2.

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No. 517,907. Patented Apr. 10, 1894.

FIG. 3.

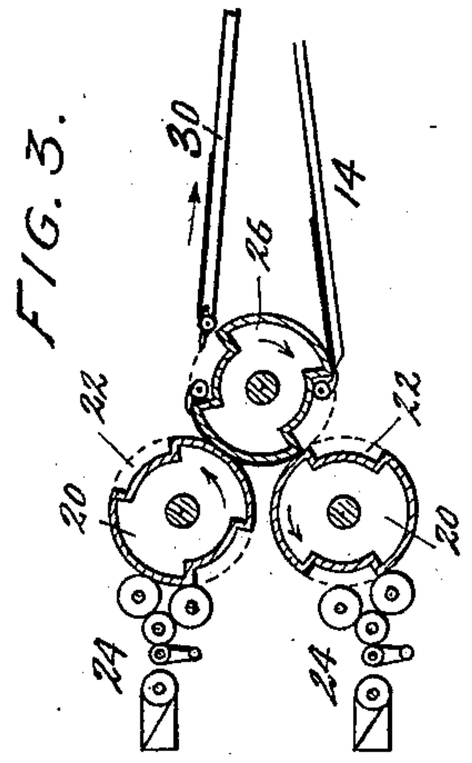
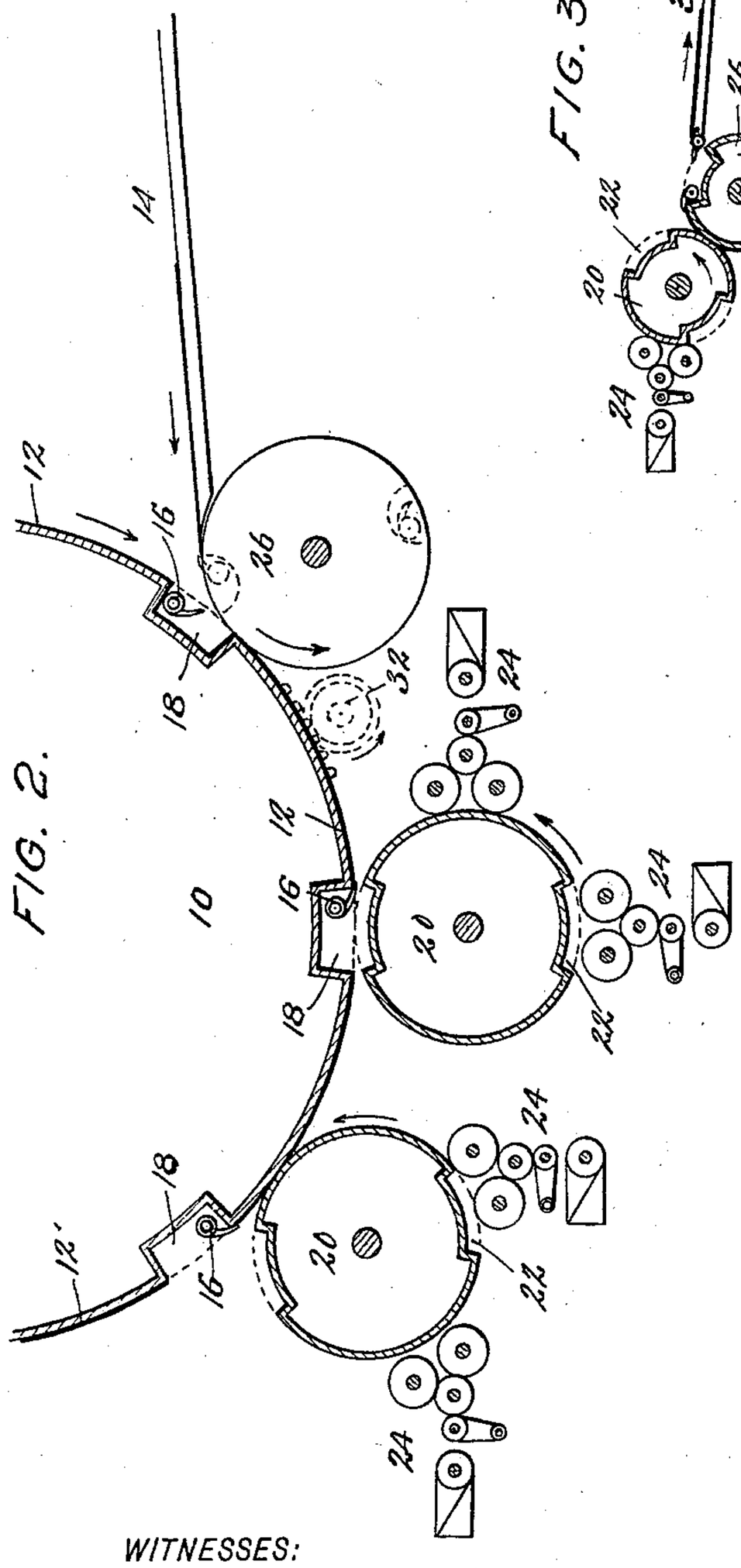


FIG. 2.



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MULTICOLOR-PRINTING PRESS.

SPECIFICATION forming part of Letters Patent No. 517,907, dated April 10, 1894.

Application filed June 30, 1893. Serial No. 479,283. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. WENDTÉ, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Multicolor-Printing Presses, (designated "Case C,") of which the following is a specification.

This invention is related to an important class of printing machines intended for the production of pictures and ornamental delineations in two or more colors; and more specifically to those adapted to print on sheets of paper, and on the same side of each sheet, a number of superimposed impressions each with an ink of such a color as in the aggregate will produce the desired design at every complete revoluion of the press.

In the press which forms the subject matter of this invention, the sheet of paper is fed to an impression-cylinder, on which two or more impression-surfaces of sufficient size are provided. These surfaces are separated from each other by gaps across the cylinder of the usual dimensions, and in each gap grippers are placed which are constructed and operated in the well known way to seize the leading edge of the sheet as the same is presented to them at the end of the feed-board or otherwise. Each impression-surface bearing its sheet of paper is then carried past a number of form-cylinders which revolve operatively against the impression-cylinder. The form-cylinders are all of equal diameter and are provided with two forms each, separated by gap-spaces or depressions, which correspond in size and angular position with the gaps on the impression-cylinder, so as to register with the same in passing. The relation between the impression- and form-cylinders is such that half the diameter of one of the latter is an aliquot part of the whole diameter of the impression-cylinder. Each form is inked with the color it is to print; and as a sheet upon one of the impression-surfaces passes a form it receives an impression from the same, and going on to the next form-cylinder receives a second impression in another color upon the first, and so on to the end of the color series. In this press the same form cannot print on two adjacent impression-surfaces, but invariably skips one such surface. The intervening impression-surfaces thus passed over are, without loss of time, receiving impressions from the second series of forms, so that every time a sheet is fed another has received all its colored printings be they few or many. Such a sheet when completed is discharged from the press before the impression-surface which carried it reaches the feed-board, where it gets a new sheet.

In the drawings, which are all diagrammatic, Figure 1, is a press printing five colors. Fig. 2, shows a modified arrangement of the inking apparatus, and Fig. 3, is a two color press.

The first figure shows a large impression-cylinder marked 10 on which are seven impression-surfaces 12 packed as is usual in printing machines with rubber blanket, paper, cardboard, &c., to receive impressions from the forms. These surfaces are large enough to carry the largest sheet which it is intended the press shall print. The paper on the feed-board 14 is fed to the grippers 16 of ordinary construction operating in the gaps 18, which separate the impression-surfaces.

In Fig. 1 there are five form-cylinders 20 and the press is intended for printing five colors only. Each form-cylinder carries two forms the circumferential length of either one of which together with that of one of the separating gap-spaces 22 being equal to that of one impression-surface 12 on the impression-cylinder and the gap 18 belonging thereto. The gap-spaces or depressed surfaces 22 on the form-cylinders that separate the forms, it will be understood, are not for the same purpose as those containing grippers, for their function is to represent in length on the surface of the form-cylinders said gaps 18 on the impression-cylinder and provide room for the devices which strain and hold the curved forms upon the suitable form-supports arranged for them. This is done in many different ways well understood and not shown in the figures. These forms are marked near the leading edge in the order in which they print. Nos. 1′, 2′, 3′, 4′, and 5′; and Nos. 1^2, 2^2, 3^2, 4^2, and 5^2; the first series giving the picture by printing on every second form-surface and skipping those that are interme-

diate; while the second series prints upon the surfaces omitted by the first, a picture identical with the first as far as the colors which compose it are concerned. The inking apparatus for these ten forms are marked 24, and in such a press may be stationary, the forms passing under the fixed form-rollers and receiving their ink just before they reach the paper, and as this takes place as each one of the two forms passes the form-rollers, the same color is necessarily printed by each. But it does not follow that the designs on each series of forms should be the same, though they must of course be each consistent among themselves and print in register one after the other on each sheet fed to the impression-cylinder; nor, for like reasons, does it follow that the two forms must be identical in size.

This multicolor press might be under-fed (as in Fig. 3,) directly from a feed-board carrying the leading edge of the sheet direct to the grippers which are to take it, but I prefer to adopt another method which is better adapted to the objects in view. For this purpose I employ a feed-cylinder 26, geared to the impression-cylinder, which is provided with two sets of grippers diametrically opposed to each other. To these the sheets of paper are overfed from the feed-board 14, and are by it carried to the grippers belonging to the several impression-surfaces as they pass. The delivery of the printed sheets is made face up, in a way well understood, by curved stripping fingers at 28, and over tapes 30, to a table or other receptacle. The pinion at 32 drives this machine in the usual way.

In Fig. 2, a part of the press just described is drawn for the purpose of showing a modification which in many cases is of value. This consists in making use of two sets of inking apparatus to ink the forms. These are provided with cam arrangements for dropping the form-rollers at the proper time, so that it is thereby possible to employ the press for the production of two jobs of work at the same time differing from each other both in design and color. It is obvious that a press so furnished with lifting form-rollers to bring always the desired colors upon each of the forms, avoiding and inking each alternately, may also be used for a single color and for duplicate designs also if desired.

Fig. 3, shows a two color press which has an impression-cylinder with only two impression-surfaces upon it and two form-cylinders 20, bearing each two forms and one set of inking apparatus 24 for each. The feed to this press is under from the board 14, and the delivery is as before by fingers 28 and tapes 30.

This press offers many advantages. That it is very rapid is obvious, the reason lying in the fact that all the several colors are being printed together and almost all the time however numerous the forms may be. In addition, the small angle covered by a form renders it easy to bend and strain flexible metal sheets bearing the etched design over the form-supports and hold them while making ready and printing.

Having thus described my invention I wish it understood that I do not confine myself to the specific details of construction here shown, for it is plain that the same may be greatly modified without affecting the principles on which my invention rests. It may, for instance, be explained that although two forms upon each form-cylinder will usually prove most valuable in practice, and the description hereinbefore given has been confined to that aspect of my invention, for the reason stated, and to avoid complexity, still a larger number of forms can be used, and in certain cases, (as with small work and short editions thereof,) with advantage. The law above stated defining the relations between the diameters of impression- and form-cylinders may then be generalized by stating, that when two forms are used half the diameter of the latter must go into the diameter of the former without a remainder; when three are used, one third must do the same; and when four, one fourth must be the aliquot number, and so on indefinitely. And, it is further manifest, that as when two forms are employed one impression-surface is always skipped, so when three are held upon the same form-cylinder, two such surfaces will be skipped, and should four be used three impression-surfaces will pass a form before it prints again, and so with higher numbers.

In this press the dimensions of the impression-surfaces must be large enough for the largest sheets to be printed; but it is plain that smaller sheets and smaller forms to correspond may without any difficulty be substituted for those of full size at any time. The statement should also be made, though it is of itself sufficiently obvious, that although every second impression-surface may be skipped in printing, it by no means follows that the total number of such surfaces should be even. In Fig. 1, the number is odd, so that any one form in that press, while adhering to its own series of impression-surfaces so far as the production of work is concerned, will have been in contact with them all when the impression-cylinder has made two complete revolutions.

What I claim is—

1. A multicolor printing machine consisting of an impression-cylinder having two or more impression-surfaces of equal size, with a gap for each containing grippers; in combination and in operative contact with two or more equal-sized form-cylinders the radius of each of which is an aliquot part of the diameter of the impression-cylinder; with two forms on each of said form-cylinders, each form covering less than half its circumference and adjusted, angularly, to register with an independent series of the impression-surfaces; and with inking apparatus for each form-cylinder adapted to ink both forms with a single color; substantially as described.

2. A multicolor printing machine consisting of an impression-cylinder having two or more impression-surfaces of equal size, with a gap to each containing grippers; in combination and in operative contact with two or more equal-sized form-cylinders the radius of each of which is an aliquot part of the impression-cylinder; with two forms on each of said form-cylinders, each form covering less than half its circumference and adjusted angularly to register each form with an impression-surface after passing the previous impression-surface; and with two sets of inking apparatus for every form-cylinder constructed and adapted to ink each of the two forms thereon independently of each other; substantially as described.

3. In a multicolor printing press adapted for printing sheets, an impression-cylinder, in combination and in operative contact with two or more form-cylinders each provided with two forms, which cover respectively less than half its circumference; with a plurality of impression-surfaces on the impression-cylinder, every alternate one of which registers with one of the forms on the form-cylinder, and every intermediate impression-surface with the other; and with grippers for each impression-surface in gaps on the impression-cylinder between said surfaces; substantially as described.

4. In a multicolor printing press adapted for printing sheets; the combination of an impression-cylinder provided with two or more impression-surfaces separated by gaps; with two or more forms, on two or more equal-sized form-cylinders, a fraction of the diameter of one of which, having unity for its numerator and the number of forms for its denominator, is an aliquot part of the diameter of the impression-cylinder; and with form-supports separated by gap-spaces to carry said forms, of size and angular position corresponding with the impression-surfaces and gaps of the impression-cylinder, and registering each set of related forms, with an independent series of impression-surfaces on the impression-cylinder; substantially as described.

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