

March 22, 1938.

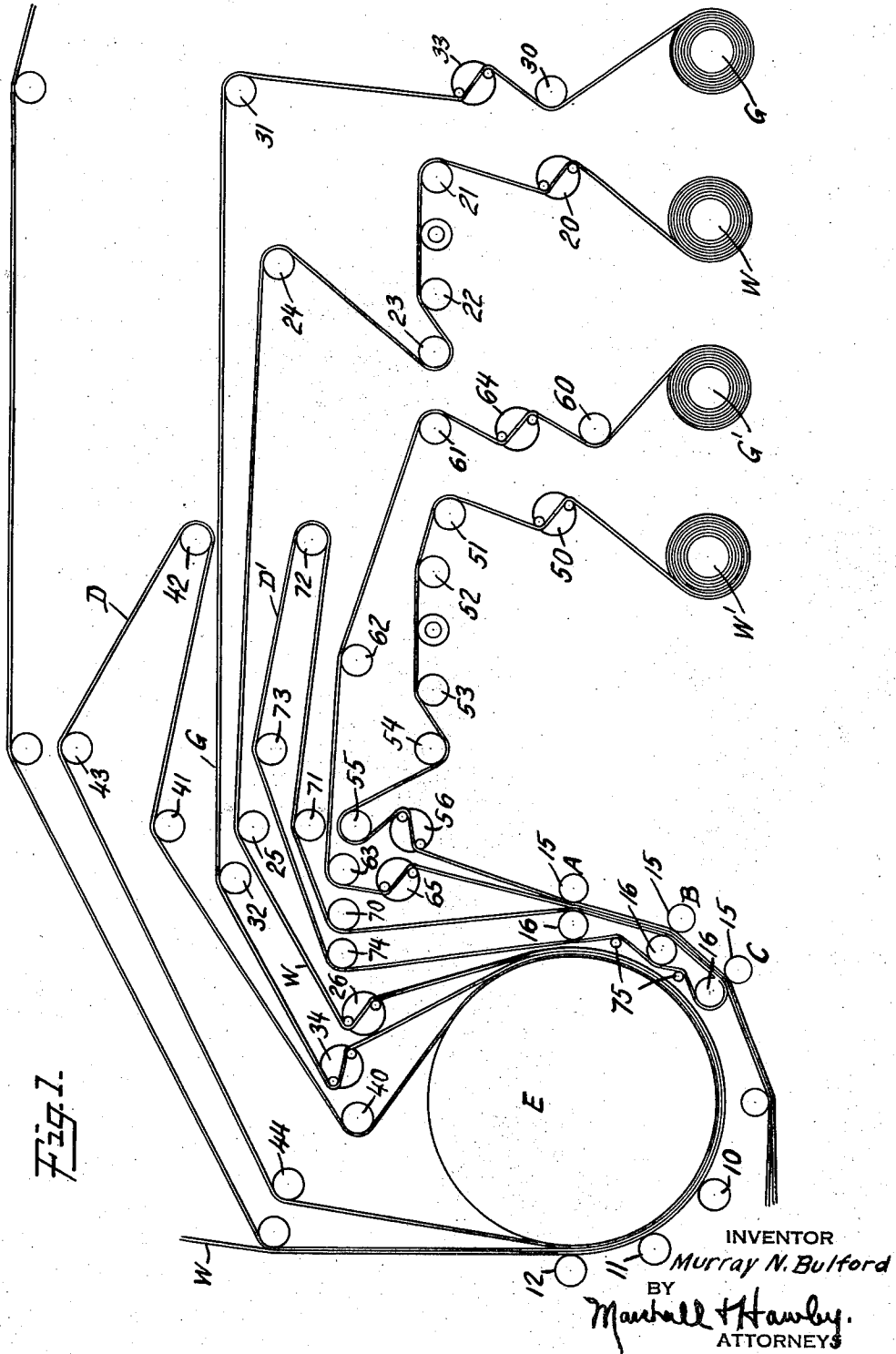
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2,111,613

CLOTH OR FABRIC PRINTING MACHINE

Filed May 20, 1936

2 Sheets-Sheet 1



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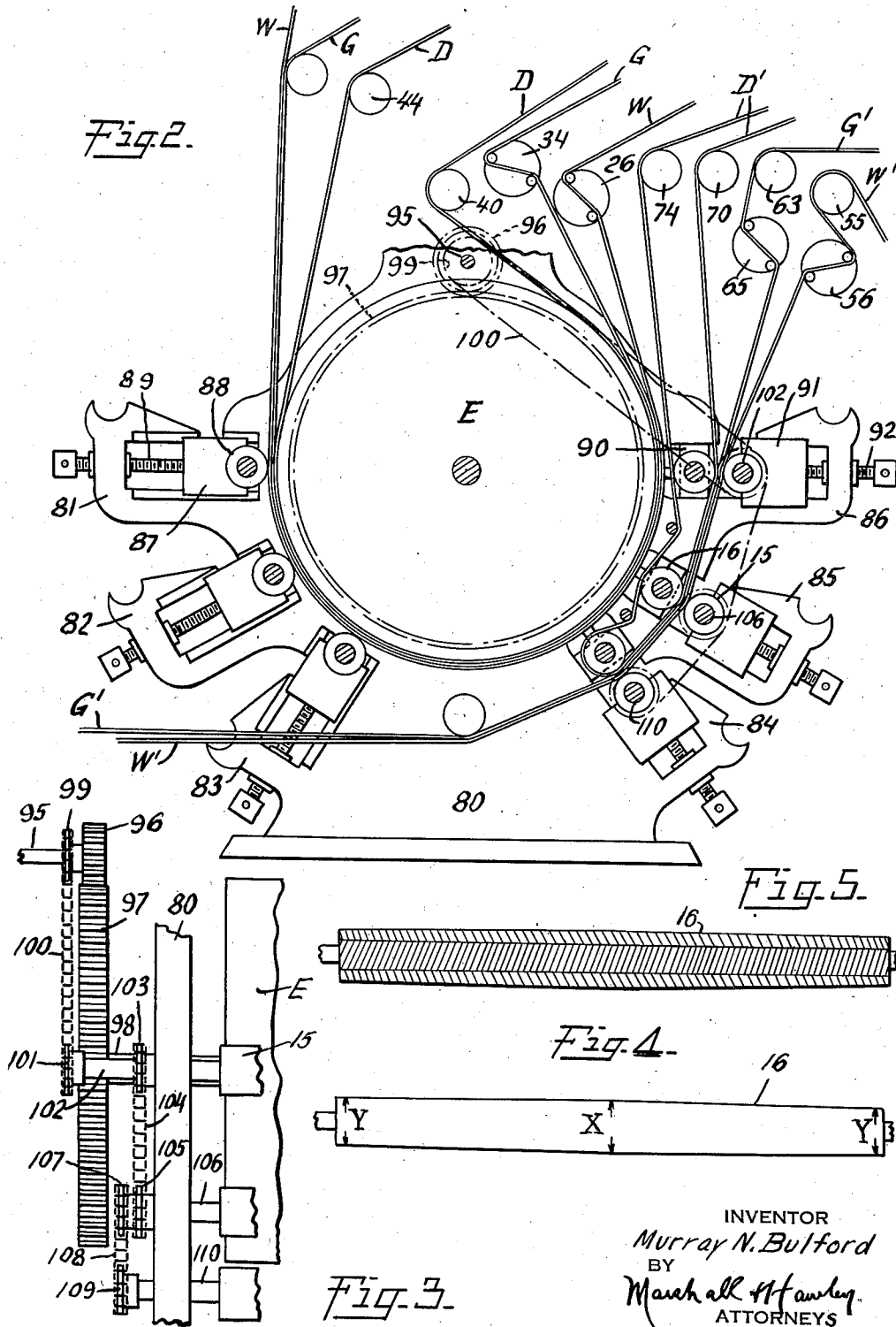
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

2,111,613

## CLOTH OR FABRIC PRINTING MACHINE

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3 Claims. (Cl. 101—178)

This invention relates to cloth or fabric printing machines, and particularly to a machine for simultaneously printing a plurality of webs.

The usual cloth printing machine prints only one web of fabric in single or multi-colors. Such printing is carried out by using one or a plurality of printing rollers associated with and disposed around the periphery of a relatively large cylinder.

To secure a clear or sharp print of fine patterns or lines, heavy pressure must be exerted against the web or sheet. The bearings for the printing rollers are made adjustable so that the rollers can be adjusted toward the axis of the cylinder to provide this heavy pressure. However, the pressure is not uniform across the cylinder and to counteract this inequality of pressure the cylinder periphery is built up by winding a web of textile fabric, such as a woolen sheet, around the cylinder forming what is technically known as "lapping". During the printing of the web the end of the lapping leaves a mark across the web or sheet printed.

In multiple web printing machines of the type shown in Patent 2,033,618 granted March 10, 1936 to Foley, et al. the problems above mentioned are even greater than in the ordinary single web printing machine for the second or multiple webs are printed between printing couples comprising a pair of cylinders or rolls of relatively small diameters. The end of the lapping on the pressure rollers which press the web against the printing rollers leaves cross marks on the web very much closer together than those made on the large cylinder.

Futhermore, the relatively small diameter pressure rollers are axially warped or distorted out of their true cylindrical shape by their heavy pressure. Due to these conditions the print on the cloth or sheet is not uniform.

This invention has for its salient object to provide a multiple web printing machine having its printing and pressure rollers so constructed and arranged that the print on the cloth or web will be sharp, free from cross marks and will be uniform across the width of the web or sheet.

Another object of the invention is to provide a multiple web printing machine so constructed and arranged that a uniform and heavy pressure can be exerted across the entire length of the printing and pressure rollers, thus producing a clear, uniform and sharp print across the entire width of the material printed.

Further objects of the invention will appear from the following specification taken in con-

nection with the drawings, which form a part of this application, and in which

Fig. 1 is a diagrammatic elevational view of a multiple web printing machine constructed in accordance with the invention;

Fig. 2 is an end elevation of the cylinder, printing rollers and printing couples constructed in accordance with the invention;

Fig. 3 is a fragmentary elevational view showing the driving connections for the mechanism;

Fig. 4 is an elevational view of one of the pressure rollers used in the printing couples; and

Fig. 5 is a sectional elevation of the roller shown in Fig. 4.

The invention briefly described consists of a multiple web printing machine comprising a plurality of printing couples adapted to print a plurality of webs or a plurality of designs or colors on one web, each printing couple comprising a printing roller and a pressure roller. The pressure between the pressure roller and the printing roller can be regulated and the surface of the pressure roller is crowned or made slightly convex from end to end, the roller being thicker in the middle than at the ends. As pressure is exerted against the pressure roller and on the web disposed between the rollers the conformation of the pressure roller provides a uniform pressure throughout the length of the roller, thus producing a sharp well defined and uniform print across the width of the cloth.

The invention further includes a blanket formed preferably of elastic material such as rubber and led between the printing and pressure rollers of the printing couples, thus forming a backing between the back grey and the pressure roller. The blanket is formed preferably in a closed loop or endless belt and a blanket of this type is provided between the printing rollers and the cylinder as well as between printing and pressure rollers of the printing couples. The provision of a blanket of this type prevents the lapping marks from showing on the printed sheet or web and provides additional backing for the cloth or web being printed.

Further details of the invention will appear from the following description.

In the diagrammatic showing in Fig. 1 there are shown two rolls W and W' of the white cloth to be printed and two rolls G and G' of the backing cloth or back grey, a back grey being provided in backing relation to each of the white cloth webs or sheets to be printed.

The printing cylinder is shown at E and there are illustrated three printing rolls 10, 11, and 12

which coact with the cylinder E in printing the web W.

Three printing couples A, B, and C are illustrated, each of these couples comprising a printing roller 15 and a pressure roller 16.

The white cloth or sheet W is led from the supply roll around a tension device 20 and around guide rollers 21, 22, 23, 24, and 25 to a tension device 26 and thence around the cylinder E and in contact with the printing rollers 10, 11, and 12.

The back grey G is led around guide rollers 30, 31, 32 and tension devices 33 and 34 to the cylinder E, the back grey G being disposed between the cylinder and the white cloth W.

An endless blanket D of elastic material is led around the cylinder E between the cylinder and the back grey G, the blanket being guided around rollers 40, 41, 42, 43, and 44, the roller 42 preferably being adjustable to place the desired tension on the blanket D.

The second web or sheet W' is led through the tension device 50 and around guide rollers 51, 52, 53, 54, and 55 to a tension device 56 and thence between the printing and pressure rollers 15 and 16 of the three printing couples A, B and C.

The second back grey G' for the second web or sheet W' is led around guide rollers 60, 61, 62, and 63 and through tension devices 64 and 65 to a position in back of the second web or sheet W' and between the web and the pressure rollers 16.

A second blanket D' is led between the back grey G' and the pressure rollers 16, this blanket being guided around guide rollers 70, 71, 72, 73, and 74 and around the pressure roller 16 of the printing couple C. Guide rollers 75 are provided between the first and second and between the second and third pressure rollers to keep the blanket D' away from the white cloth W and cylinder E.

In order to provide an even uniform pressure and to secure a sharp well defined print across the width of the sheet or web, the pressure rollers 16 are preferably surfaced with elastic material, such as rubber, and are crowned as illustrated in Fig. 4. From this figure it will be seen that the diameter X at the center of this roller is greater than the diameter Y at the ends thereof.

Fig. 2 illustrates more in detail the mounting of the printing couples and printing rollers. The cylinder E is mounted in a printing machine frame 80 having a plurality of brackets 81, 82, 83, 84, 85, and 86 extending radially relative to the axis of the cylinder E. The brackets 81, 82, and 83 have mounted therein bearing blocks 87 in which are mounted printing rollers 88, screws 89 being provided for pressing the printing rollers toward the axis of the cylinder E and exerting pressure against the web being printed.

In each of the brackets 84, 85, and 86 there is mounted one of the printing couples comprising printing rollers 15 and pressure rollers 16. The rollers 16 are mounted in blocks 90 and the rollers 15 are mounted in bearing blocks 91, it being understood that the blocks 90 and 91 are disposed at the ends of the rollers. Each of the blocks 91 is engaged by a screw 92 by means of which pressure may be exerted against the ends of the printing rollers in order to provide a heavy pressure on the web being printed. The blocks 90 disposed at the inner ends of the brackets maintain the pressure rollers in spaced relation relative to the periphery of the drum or cylinder E. Each of the pressure rollers 16 is crowned in the manner shown in Fig. 4.

Any suitable driving connections for the rotating parts may be provided and in the form of the invention shown the main drive shaft is illustrated at 95 and may be driven from any suitable source of power. This shaft has mounted thereon a gear 96 which meshes with a gear 97 on the cylinder shaft 98 and rotates the cylinder. The shaft 95 has also secured thereto a sprocket wheel 99 which is connected by a chain 100 to drive a sprocket wheel 101 mounted on the shaft 102 of the printing roller 15 disposed in the bracket 86. The shaft 102 also has secured thereto a sprocket wheel 103 which is connected by a chain 104 to drive a sprocket wheel 105 mounted on the shaft 106 of the printing roller disposed in the bracket 85. Shaft 106 also has secured thereto a sprocket wheel 107 which is connected by a chain 108 to drive a sprocket wheel 109 mounted on the shaft 110 of the printing roller carried by the bracket 84.

By means of the driving connections just described the rotation of the cylinder E and the operation of the printing couples are synchronized.

It will be understood that the printed webs W and W' are led from the printing mechanism to drying cans and are suitably disposed of after leaving the printing mechanism. This statement also applies to the back greys G and G'.

From the foregoing description it will be evident that the provision of crowned pressure rollers will effect an even pressure throughout the length of the pressure and printing rollers, thus rendering it possible to obtain a clear, sharp and distinct print across the entire width of the web or sheet. Furthermore, by the provision of a backing blanket in back of each of the back greys marks due to the ends of the lapping on the cylinder are eliminated.

Although one specific embodiment of the invention has been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the construction and in the arrangement of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. In a web printing machine, a printing roller and a pressure roller, means for guiding a web to be printed between said rollers, means for guiding a back grey into backing relation to the web to be printed and between said rollers, and means for adjusting one roller relative to the other roller, the pressure roller having a crowned outer surface having a greater diameter at the central portion and tapering to a lesser diameter at the ends of the pressure roller.

2. In a web printing machine, a printing roller and a pressure roller, means for guiding a web to be printed between said rollers, means for guiding a back grey into backing relation to the web to be printed and between said rollers, and means for adjusting one roller relative to the other roller, the pressure roller having a crowned outer surface formed of elastic material and having a greater diameter at the central portion and tapering to a lesser diameter at the ends thereof.

3. A pressure roller for a printing couple of a cloth printing machine consisting of a core surfaced with elastic material, the outer surface of the roller being crowned and the elastic material being thicker at the central portion and tapering toward the ends of the roller.

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