Jan. 4, 1927. 1,612,949

G. W. SIMPSON

FABRIC PRINTING MACHINE

Filed April 5, 1926 3 Sheets-Sheet 1

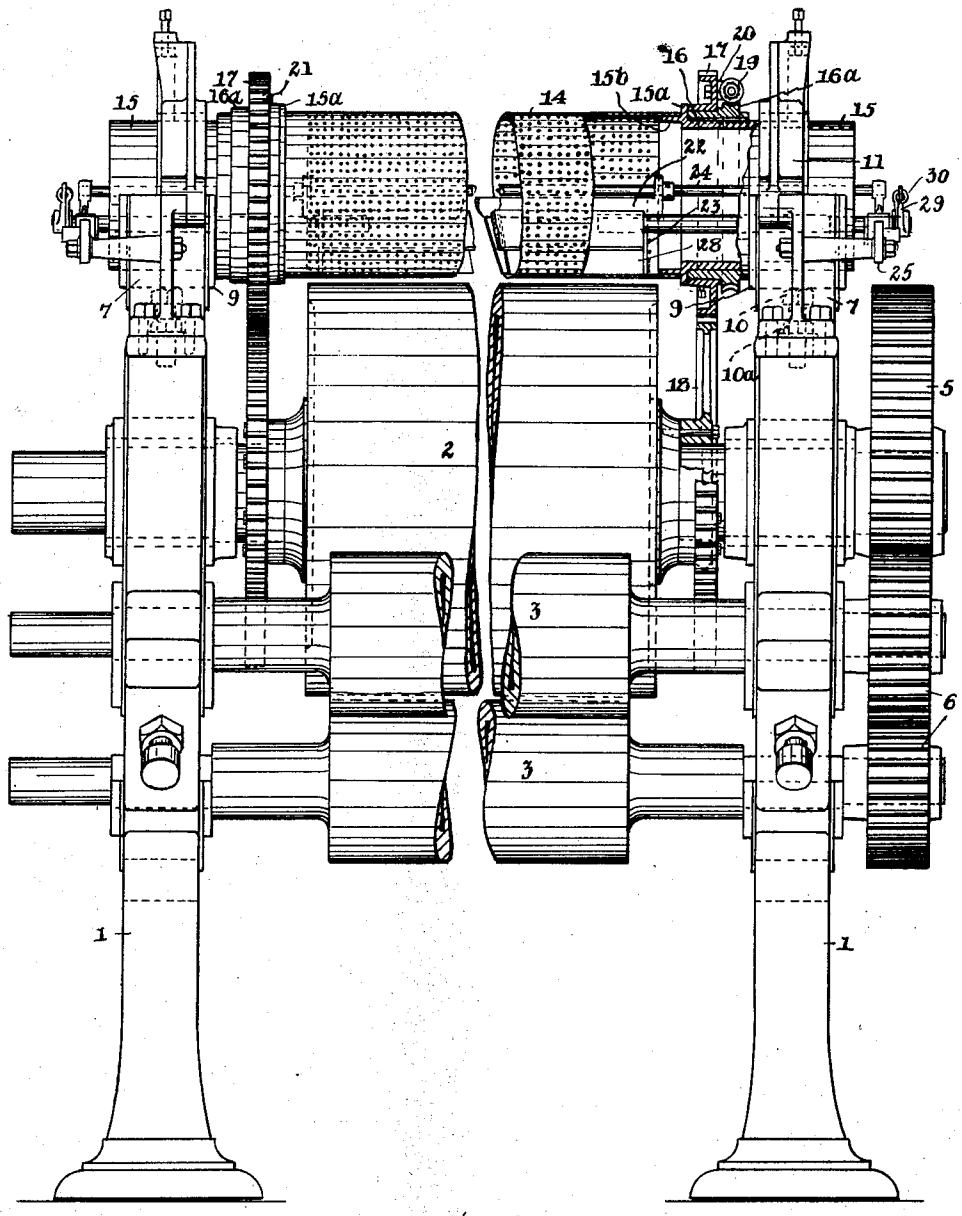

Fig. 1.

WITNESS

Wm. H. Bell.

INVENTOR,

George W. Simpson,

BY

John Sinnard

ATTORNEY

Jan. 4, 1927. **1,612,949**

G. W. SIMPSON

FABRIC PRINTING MACHINE

Filed April 5, 1926 3 Sheets-Sheet 2

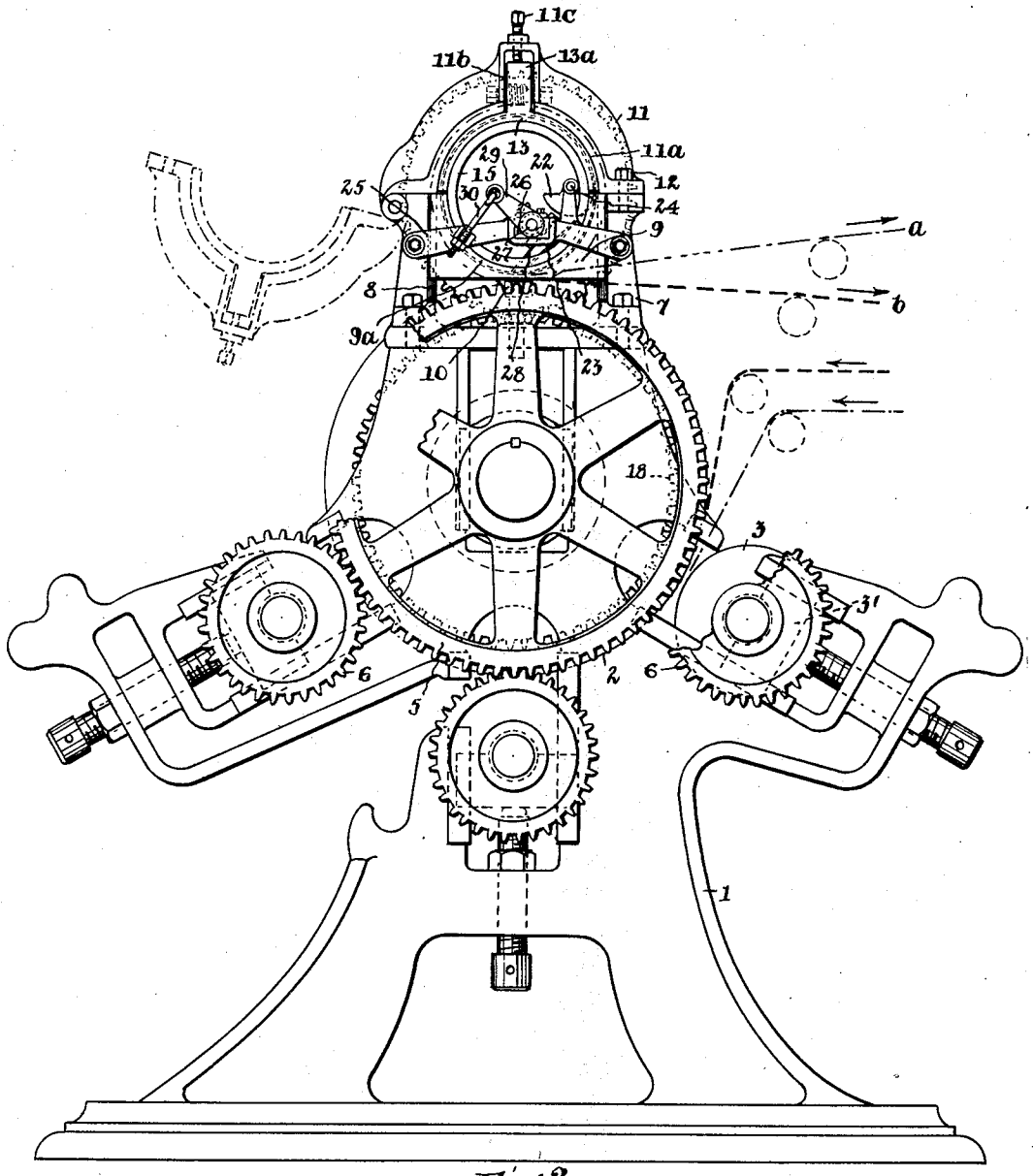

Fig. 2.

WITNESS

Wm. Uhell

INVENTOR,
George W. Simpson,
BY
Johnson Howard
ATTORNEY

Jan. 4, 1927. 1,612,949

G. W. SIMPSON

FABRIC PRINTING MACHINE

Filed April 5, 1926 . 3 Sheets-Sheet 3

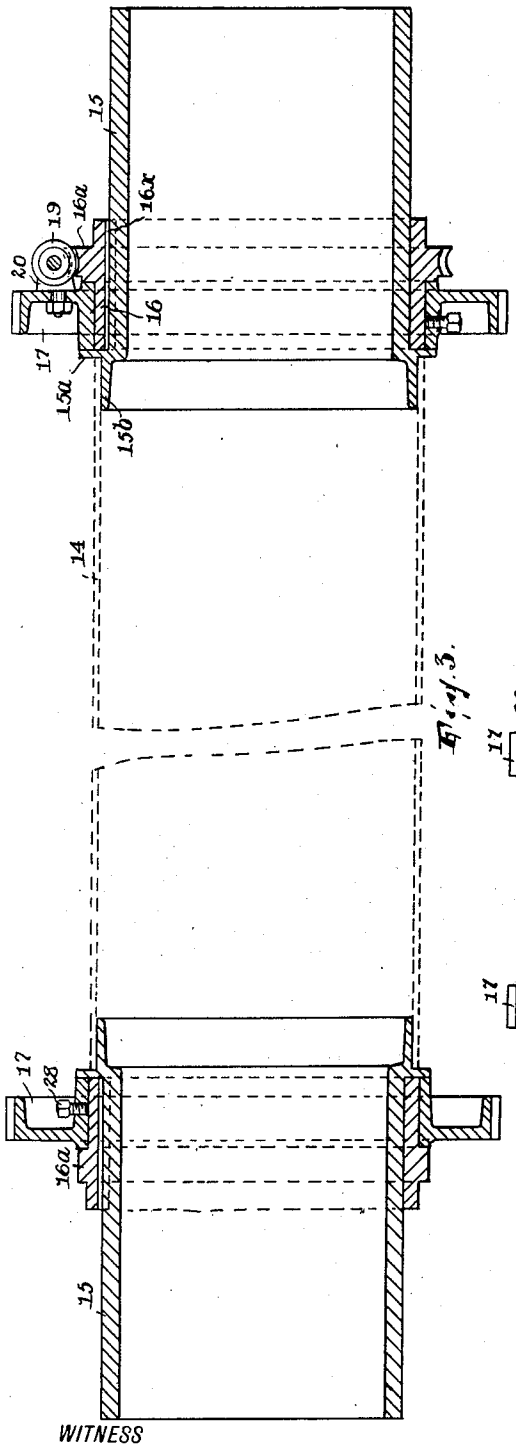

Fig. 3.

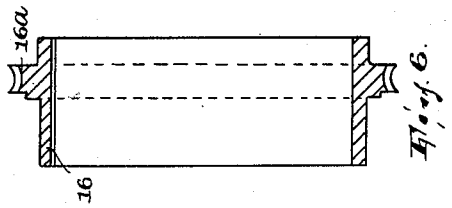

Fig. 6.

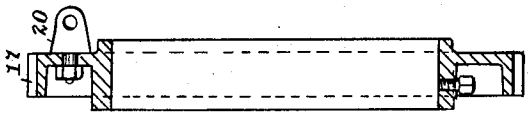

Fig. 5.

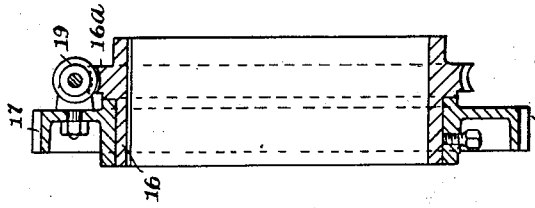

Fig. 4.

WITNESS

Wm. Mell

INVENTOR,
George W. Simpson,
BY
John Lindsay
ATTORNEY

Patented Jan. 4, 1927. 1,612,949

UNITED STATES PATENT OFFICE.

GEORGE W. SIMPSON, OF PATERSON, NEW JERSEY.

FABRIC-PRINTING MACHINE.

Application filed April 5, 1926. Serial No. 99,720.

This invention relates to machines for printing fabrics and other sheet material and particularly to machines of this class in which the printing is accomplished between a so-called cylinder and a printing roller or rollers. usually engraved. It is known to print such material also by means of a stencil through the openings in which the printing substance is passed to the fabric, such being known as "flock-printing" when the printing substance is adhesive and a suitably colored powder is applied in an aftertreatment and made to adhere to the fabric. The principal object of this invention is to provide an efficient machine in which both the roller printing and the stencil printing may be accomplished.

In the drawings—

Fig. 1 is a front elevation of the machine partly in section;

Fig. 2 is a side elevation;

Fig. 3 is a longitudinal sectional view of the stencil and certain parts associated with it; and

Figs. 4, 5 and 6 are similar sectional views of said parts, Fig. 4 showing them assembled and Figs. 5 and 6 disassembled.

The frame of the machine is afforded by two uprights or side-frames 1 and in this are journaled in suitable bearings the trunnions of the cylinder 2 and of the printing rollers 3, grouped about the cylinder, the bearings 3′ of the rollers being adjustable toward and from the cylinder as usual and as shown. The trunnions of the cylinder and rollers are at one side of the machine provided with intermeshing gears, as the gear 5 on the cylinder and gears 6 on the rollers, and the construction and arrangement are such in the present instance (where there is a plurality of the rollers) that they successively print, as in different colors, different parts or motifs of a given design. The color pans and other accessories incident to the proper application of the color to the printing rollers are not shown as not material to the present invention; nor is it shown how the train including the cylinder and rollers is driven, as also immaterial. The parts so far described are the essential elements of a roller printing machine of well known type. The stencil printing mechanism is superimposed (in the present example) upon this machine.

Each upright 1 is surmounted by a bearing support 7 bolted thereto and provided with a vertical guideway 8 in which is slidable a bearing block 9 resting upon the head of a screw 10 tapped into a nut 10^a which in turn rests on support 7 at the bottom of its said guideway or recess 8; the bearing block has a semi-circular recess or bearing surface 9^a formed therein. Arched over the guideway and pivoted to the support at one side of the guideway (so as to move in a vertical plane) is a yoke 11 having a semi-circular recess 11^a and being adapted in its (working) position shown to be secured at the other side of the guideway by the cap-screw 12. This yoke contains a semi-circular bearing piece 13 which is complementary to the bearing surface 9^a and which has an upright stem 13^a received by a vertical slot 11^b in the yoke and upwardly opposed by a set-screw 11^c. Recess 9^a and the bearing piece 13 together form a bearing, and since most of the wear comes on the latter, as will appear this member is preferably hardened.

The bearings thus formed, one at each side of the machine, receive the cylindrical trunnions or heads of a rotary stencil, as follows: The stencil proper is a thin cylinder 14 usually of copper, perforated with holes of circular or any other form. Each trunnion or head thereof is a cylindrical member 15 having at its inner end a peripheral flange 15^a and an inwardly projecting or cylindrical flange 15^b, the latter being fitted into and rigidly secured, as by brazing or otherwise, to the end of the stencil proper. Splined on the trunnions 15 at 16^x are the bushings 16 which abut the flanges 15^a, being removable from the trunnions. When the stencil is in place in its mentioned bearings these bushings, by closely fitting between and affording shoulders to abut the bearings 9, confine the stencil against movement lengthwise thereof or transversely of the fabric being printed. The stencil according to this invention is positively rotated, and this is accomplished through means with respect to which the stencil is rotatively adjustable. To these ends a gear 17 is fitted on each bushing so as to be capable of turning thereon but confined against play lengthwise of the stencil by the flange 15^a and an annular abutment 16^a formed on the bushing. Each gear 17 meshes with a gear 18 fixed on the trunnion of the cylinder. The rotary adjustment of the stencil with respect to the gearing 17—18 is effected by turning a worm 19 which may have a faceted head for that purpose and

which is engaged with a peripherally grooved worm-wheel afforded by one abutment 16ª, said worm being revoluble in a forked bracket 20 which is bolted to the side of the adjoining gear 17; due to the pitch of the worm the stencil and gear are held against relative rotation except when they are subjected to the screw-like action of the worm upon the latter being turned. After the adjustment is effected the stencil is made fast with respect to the other gear 17 by tightening up a set-screw 21 tapped therein and adapted to bind against the corresponding bushing 16.

A color pan for liquid color is shown at 22 housed within the stencil, being perforated in the usual way at the bottom to permit the color to drip therefrom onto a blade 23 which underlies and may be secured to the pan and is arranged at an incline and forms the color distributor. The pan is supported by a horizontal shaft 24 secured at its ends in upstanding arms on two brackets 25 each of which is bolted to the outer face of a bearing support 7, bridging its recess 8. Each bracket contains a bearing 26 for the shaft 27 of an inclined doctor blade 28 which bears upon the interior of the stencil over the cylinder and is designed to force the (viscid) liquid color through the stencil holes onto the fabric, each end of shaft 27 having for this purpose an arm 29 which is connected with the bracket by an eye-bolt and nut connection 30 so that the doctor blade may be made to exert appropriate pressure on the stencil.

The fabric to be printed enters at the right in Fig. 2 between the series of printing rollers and the cylinder and then passes between the stencil and cylinder, usually accompanied by a backing of suitable sheet material, as a "blanket"; the space shown between the cylinder and stencil is for accommodating the fabric and such backing and appropriate spaces for the same purpose may be made to exist between the cylinder and printing rollers upon adjusting back the latter. The fabric and backing may be guided to the machine and also from it after the printing in any well-known way, their paths of delivery in the present case being indicated at *a* and *b* in Fig. 2.

The stencil is driven, as through the gearing 17—18, positively so that there may be no possible blurring or deformation of the stencil deposit as by any pause in the rotation of the stencil. To the same end the gear-ratio as to gears 17—18 should be such that the stencil will move at precisely the same peripheral speed as the fabric, which of course takes its speed from the cylinder.

Whenever it becomes necessary to remove a stencil, as for cleaning, the yokes are released and swung back as shown by dotted lines in Fig. 1, leaving the stencil, with the bushings carrying the gears, free for such removal as a unit, whereupon the bushings and gears may then be removed from the stencil itself. On replacement of the parts if rotary adjustment of the stencil relatively to the gears 17 is necessary, as if the stencil has been changed for another, this is accomplished, as already stated, by releasing set-screw 21 and turning the worm 19. By utilizing a screw or worm 19 the adjustment is a micrometer one in effect.

When the parts are set for proper operation of the machine the stencil should be positioned relatively to the fabric to be printed so as to contact therewith but not to exert any such pressure as that exerted by the (engraved) printing rollers. The spacing of the stencil from the fabric is obtained by proper adjustment of the bearing blocks 9. After the yokes are in operative position, held down by the cap-screws 12, the set-screws 11ᶜ are manipulated to cause the bearing-pieces 13 to coact with the bearing-blocks 9 to fit the stencil heads or trunnions so as to form true bearings without setting up appreciable frictional resistance to the rotation of the stencil.

One important feature of my invention resides in the positive driving of the stencil proper from both ends, or at both sides of its actual printing portion. It has been sought to drive the stencil positively, as through gearing, from only one end. But when this is done, if the stencil becomes cramped in the relatively opposite bearing so that the frictional resistance to its rotation is at that end excessive, the stencil is likely to become torsionally distorted, frequently rendering its thin stencil proper incapacitated for further use. This will happen if an undue thickness, as a fold, of the fabric passes between the stencil and cylinder and either tilts it bodily or bends it so that the axis in the portion of the stencil which occupies said bearing is out of true or no longer parallel with the axis of the cylinder.

Having thus fully described my invention what I claim and desire to secure by Letters Patent is:

1. In combination, supporting means, a cylinder journaled therein, the supporting means having a pair of spaced guideways arranged side by side and extending substantially radially with respect to the cylinder, recessed bearing means adjustable lengthwise of and in each guideway, means in the supporting means to adjust the bearing means in each guideway, and a stencil received by the recesses thereof and journaled in the bearing means with its axis substantially parallel with that of the cylinder, said bearing means being separable to permit removal of the stencil therefrom transversely of its axis.

2. In combination, supporting means, a cylinder journaled therein, the supporting means having a pair of spaced guideways arranged side by side and extending substantially radially with respect to the cylinder and having parts thereof removable and normally obstructing the outer ends of the guideways, bearing members respectively adjustable in and lengthwise of the guideways, other bearing members opposed to the first-named bearing members and forming therewith bearing means and respectively adjustable in said parts lengthwise of the guideways, and a stencil journaled in the bearing means.

3. In combination, supporting means, a cylinder journaled therein on a horizontal axis, the supporting means having a pair of spaced vertical guideways extending radially upward from the cylinder and having parts thereof at the upper ends of the guideways removable and normally obstructing said ends, bearing blocks adjustable in the guideways and having upwardly open bearing recesses, arcuate bearing pieces adjustable lengthwise of the guideways respectively in said parts and having their concavities forming bearing means with the recesses of the respective blocks, and a stencil journaled in said bearing means.

4. In combination, supporting means, a cylinder journaled therein, the supporting means having a pair of spaced guideways arranged side by side and extending substantially radially with respect to the cylinder, opposed recessed members in each guideway together forming a bearing, means to adjust each member in its guideway toward the other, and a stencil journaled in the bearings formed by said members.

5. In combination, supporting means, a yoke pivoted thereon to swing upwardly, means to secure the yoke against upward movement, and complementary bearing forming parts carried by said supporting means and yoke, that one of said parts which is carried by the yoke being adjustable toward and from the other.

6. In combination, supporting means, a cylinder and a stencil journaled therein on substantially parallel axes, and rotation-transmitting gearing operatively connecting the cylinder and stencil, and having a part thereof surrounding and removable from the stencil endwise thereof, the stencil being adjustable rotatively around its own axis relatively to said part.

7. In combination, supporting means, a cylinder and a stencil journaled therein on substantially parallel axes, and rotation-transmitting gearing operatively connecting the cylinder and stencil and having a part thereof surrounding and removable from the stencil endwise thereof, and means, connecting the stencil and said part, for adjusting the former rotatively with respect to the latter.

8. In combination, supporting means, a cylinder and a stencil journaled therein on substantially parallel axes, and rotation-transmitting gearing operatively connecting the cylinder and stencil and having a part thereof surrounding and removable from the stencil endwise thereof, and means, connecting the stencil and said part, for adjusting the former rotatively with respect to the latter, said means being splined on and removable from the stencil endwise thereof.

9. In combination, supporting means, a cylinder and a stencil journaled therein on substantially parallel axes, said means having open bearings receiving the stencil, and rotation-transmitting means operatively connecting the cylinder and stencil and having a part thereof concentric with the stencil axis and interposed between one of said bearings and a part of the stencil and thereby limiting movement of the stencil lengthwise of its axis in one direction.

In testimony whereof I affix my signature.

GEORGE W. SIMPSON.