

No. 680,533.

Patented Aug. 13, 1901.

E. E. MARINIER & E. L. NAVOIT.

MACHINE FOR SIMULTANEOUSLY PRINTING AND EMBOSSED PAPER.

(Application filed June 21, 1898.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 2.

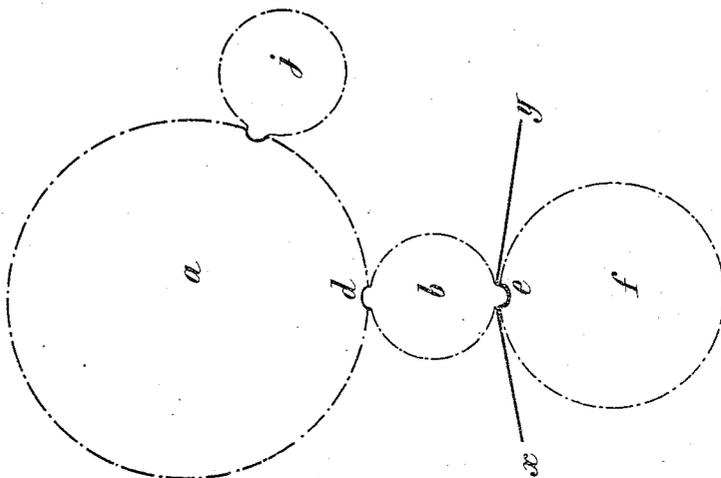
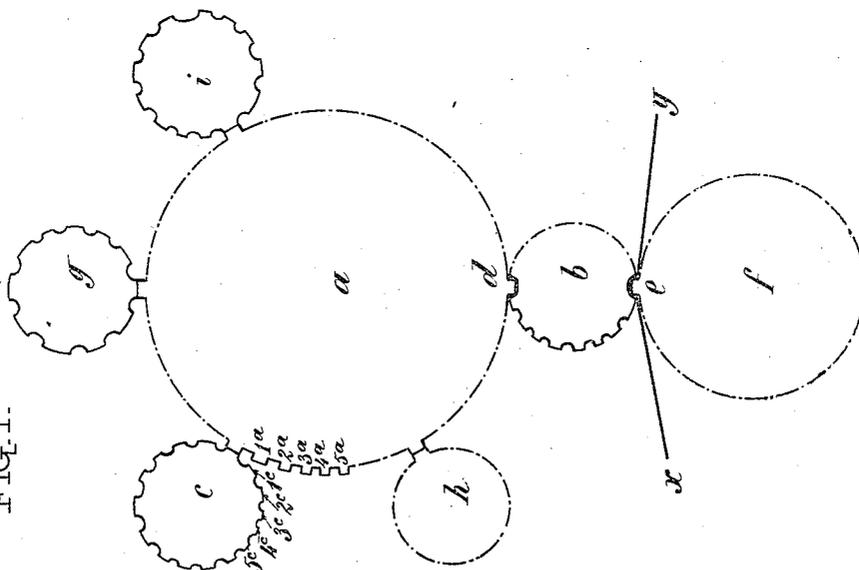


FIG. 1.



Witnesses

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FIG. 4

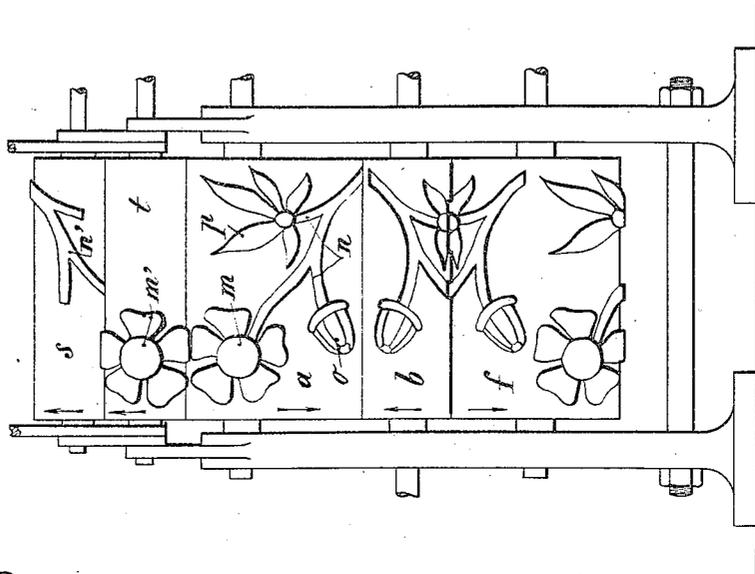
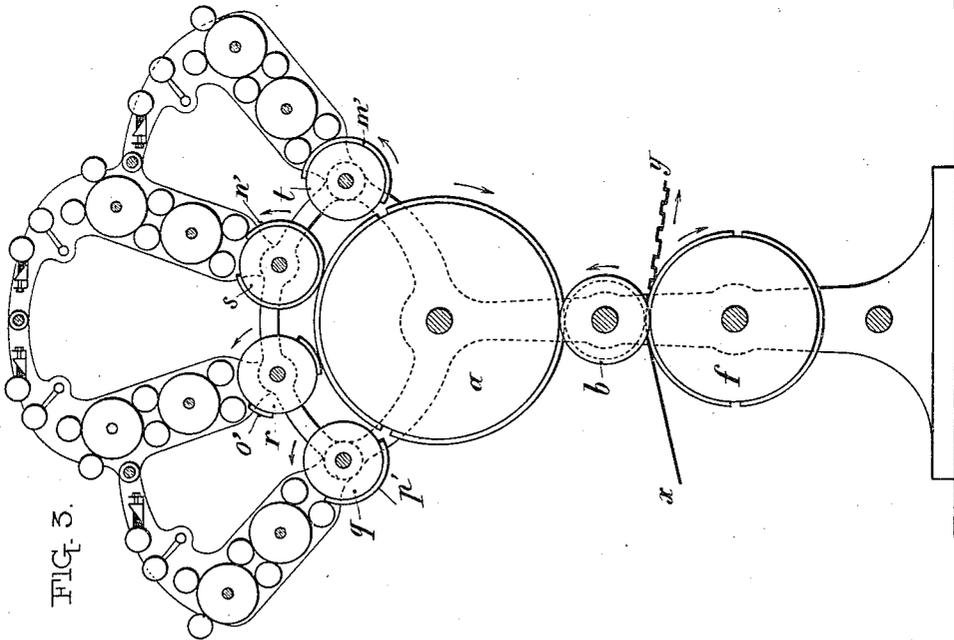


FIG. 3.



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UNITED STATES PATENT OFFICE.

ERNEST EDOUARD MARINIER AND EUGÈNE LOUIS NAVOIT, OF PARIS,
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MACHINE FOR SIMULTANEOUSLY PRINTING AND EMBOSSING PAPER.

SPECIFICATION forming part of Letters Patent No. 680,533, dated August 13, 1901.

Application filed June 21, 1898. Serial No. 684,105. (No model.)

To all whom it may concern:

Be it known that we, ERNEST EDOUARD MARINIER and EUGÈNE LOUIS NAVOIT, citizens of the Republic of France, residing at Paris, France, have invented certain new and useful Improvements in Apparatus for Printing, Embossing, or Ornamenting Fabrics and the Like, of which the following is a specification.

The present invention relates to a machine whereby by a single passage of the material through the machine and by a single contact of this material with the engraved printing-cylinder the material is simultaneously embossed and printed. The printing may be in any desired number of colors deposited at the desired places not only in the intaglio parts of the embossing-rollers, but also in the relief parts. This operation constitutes a new means of mechanically obtaining this result by a single contact with the embossing-roller, which result could not be obtained by the various kinds of machines known up to the present time.

In order to arrive at a clear understanding of our invention, we give the following description, with the aid of the accompanying drawings, in which—

Figures 1 and 2 are diagrammatic views illustrating the essential characteristic features of our invention. Figs. 3 and 4 are views by way of example of a machine constructed according to this invention, the machine being represented in elevation in Fig. 3, while Fig. 4 is a right side elevation of Fig. 3, the inking-rollers shown in Fig. 3 being omitted in Fig. 4 to permit an easier understanding in this figure of the combination of the essential parts of the machine.

The improved machine for producing the above result comprises, as shown in Fig. 1 of the accompanying drawings, a main color-receiving cylinder *a* for applying to the intaglio and relief portions of the engraved printing-cylinder *b* all the colors which must finally appear on the reliefs or in the recessed portions of the embossed paper or material. With this object the cylinder *a*, the diameter of which is equal to or a multiple of that of the cylinder *b*, receives on its relief and in its hollow parts or on its surfaces all the neces-

sary colors. The application of these colors is effected in the ordinary manner by a series of supplementary color-rollers, each color being taken up by ordinary inking-rollers arranged about the circumference of the central roller *a* and by them deposited on a transfer-roller, which in its turn transmits it to the cylinder *a*, each of these transfer-rollers being so formed as only to receive the color on those parts of its periphery corresponding to the relief or intaglio parts of the cylinder *a* on which the particular color is to be deposited. The cylinder *a* thus receives in its rotary motion all the colors from the inking-rollers with which it is in contact, each color being applied in its correct place thereon, and it is thus able to transmit them in its turn to the reliefs or intaglio portions of the correspondingly-engraved printing and embossing cylinder *b*. In this manner the various colors are deposited in the hollows or on the relief portions at the desired places in a single continuous operation, while the complete embossing of the material printed upon takes place at the same time as the printing. Let us take, for instance, the cylinder *c*, Fig. 1, which may be of rubber and which is so engraved or formed that only those parts which are to transmit color—say red—are in relief. This cylinder *c* receives from its inking-rollers (not shown in Fig. 1, as they may be of any convenient arrangement) the red color on its relief portions and transfers it to the corresponding parts of the central cylinder *a*, which is an exact multiple of the engraved cylinder *b*, to which it in turn transmits the color. By means of suitable gearing the roller *c* is rotated at a similar peripheral speed to that of the cylinder *a*, so that the reliefs of the cylinder *c* correspond with the reliefs of the cylinder *a* which are to receive the red color. The reliefs of the cylinder *c*, of rubber or any other material, coincide only at the moment of the contact with the relief portions of the cylinder *a*, and thus transfer to the reliefs of the cylinder *a* the red color with which they themselves are charged. Similarly and successively the relief parts 1^c 2^c 3^c 4^c 5^c of the cylinder *c* charged with red color come into contact with the corresponding reliefs 1^a, 2^a, 3^a, 4^a, and 5^a of the

cylinder *a*, of which they are exact counterparts, and cover them with the red color. These relief portions of the cylinder *a* are supplied with red color. When, therefore, 5 these relief portions come into contact at *d* with the corresponding recesses of the engraved cylinder *b*, these recesses will be charged with the red color, and when they arrive at *e*, the contact-point of the engraved 10 cylinder *b* and of the pressure-cylinder *f*, the color in the recesses will be deposited on the material *x y*, which will at the same time be embossed in relief owing to the roller *f* being provided with the corresponding design in 15 relief. This operation of embossing and printing in red is therefore effected by one and the same operation at the point *e*. Let us assume that at the same time other parts of the cylinder *a* receive blue color from the 20 corresponding engraved cylinder *g* and yellow from the cylinder *h* in the same way as has just been described for the red color, and it will be obvious that as the cylinder *a* rotates it will transfer the yellow and blue 25 colors received from the cylinders *h* and *g* to the engraved cylinder *b* at the contact-point *d*, and similarly the colors so deposited in the corresponding recesses in the cylinder *b* will in turn be transferred at the point *e* to 30 the material *x y* and simultaneously be embossed and printed in relief at one and the same time.

Around the cylinder *a* a number of cylinders of rubber or other suitable material may 35 be placed, according to the diameter of the said cylinder *a*. Each supplementary or feeding cylinder may apply one or more colors, as it may itself act like the cylinder *a*—viz., it may be the receiver in a similar manner of 40 several colors from auxiliary rollers arranged around it, which colors it transmits to the cylinder *a*. Thus the cylinder *i* instead of only transmitting to the cylinder *a*, say, green color, for instance, can take from 45 two or more auxiliary cylinders with which it is in contact two or more different colors, which it will then transmit to the cylinder *a*, by which means it is possible simultaneously to print and emboss a great number of colors.

Up to the present we have only taken into 50 consideration the printing of reliefs. It is easy, however, to understand that the inking-cylinders may be formed in such a manner that their relief portions exactly correspond 55 to the intaglio portions of the cylinders *a*, so that they deposit their color in the recessed parts of the cylinder *a*. The cylinder *a* will in its turn deposit this color on the corresponding relief portions of the engraved cylinder *b*, which will in its turn deposit it in 60 the recessed parts of the embossed material at the contact-point *e*, Fig. 2.

The machine represented in Figs. 3 and 4 as a constructive example of the invention is 65 constituted to emboss and print in four colors. The design represented on the cylinder *a*, Fig. 4, is to be embossed in relief and printed in

four different colors on the material *x y*. The parts *m n o p* of this design are to be printed, 70 respectively, in blue, green, red, and yellow, for instance. In the machine illustrated the cylinder *a* has a diameter equal to three times that of the printing-cylinder *b*, and the cylinder *f* a diameter double the size of that of the same cylinder *b*. The design indicated on the 75 cylinder *a* is reproduced once in intaglio on the cylinder *b*, twice in relief on the cylinder *f*, and three times in relief on the cylinder *a*. The four main color-rollers *q r s t* being provided, respectively, in relief with replicas of 80 the four parts *m n o p* of the design, as shown in Fig. 4, the relief portion of each of these rollers receives from suitable inking-rollers the color corresponding to that part of the design which it represents. Thus the relief *m'* 85 of the roller *t* will receive blue ink, the relief *n'* of the roller *s* green, and so on, and these colors will be transferred in the manner described to the material *x y*, which will be simultaneously embossed as it passes between 90 the cylinders *b* and *f*.

We claim—

1. A machine for simultaneously printing and embossing paper and other material comprising an embossing-cylinder, provided with 95 relief and intaglio portions, a pressure-roller, a main intaglio and relief ink-receiving cylinder which turns in contact with a corresponding embossing-cylinder and receives colors either in its recesses or on the relief parts, and 100 during its rotation transports them to the corresponding parts of the embossing-cylinder, so that the latter in conjunction with a corresponding pressure-roller applies the colors to the material and at the same time embosses 105 it, at the single operation, substantially as described.

2. In an apparatus as described, the combination with a printing and embossing roller, of a receiving-roller having relief and intaglio 110 portions corresponding respectively with the intaglio and relief portions of the embossing-roller, the latter and the receiving-roller being arranged to rotate relatively to each other and to cooperate as set forth whereby the 115 raised and recessed portions of the receiving-roller will transfer color respectively to the corresponding depressed and raised portions of the printing and embossing roller, independent color-applying rollers arranged to rotate 120 in contact with and adapted to transfer different colors to the receiving-roller, and a pressure-roller arranged to cooperate with the printing and embossing roller, and having raised portions corresponding with the depressed 125 portions of said printing-roller and depressed portions corresponding with the raised portions of same.

3. In an apparatus as described a central ink-collecting roller provided with a design 130 in intaglio and relief on its circumference, a printing and embossing cylinder in contact therewith and having the design correspondingly in relief and intaglio, a pressure-roller

in contact with the printing and embossing roller and having the design correspondingly in intaglio and relief, a series of color-supply rollers about the circumference of the ink-collecting cylinder each color-supply roller having that portion of the design which is to appear in its respective color formed in relief on its circumference and a series of color-feeding rollers for each color-supply roller substantially as described.

4. In an apparatus as described, the combination with an embossing-roller, of a collecting-roller having embossed portions corresponding with the recessed portions of the embossing-roller and depressed portions corresponding with the raised portions of the roller, the latter and roller arranged to rotate relatively to each other and to cooperate as set forth whereby the raised portions of roller will transfer colors to the depressed portions of roller, independent color-applying rollers arranged to rotate in contact with and adapt-

ed to transfer different colors to the raised portions of the collecting-roller, a supplementary roller arranged to cooperate with the roller and having portions adapted to come in contact with the raised portions of said roller, color-applying rollers adapted to transfer colors to the portions of said supplementary roller which come in contact with the raised portions of roller, and a roller arranged to cooperate with roller and having raised portions corresponding with the depressions of said roller and depressed portions corresponding with the raised portions of the latter roller.

In witness whereof we hereto set our hands in the presence of the two subscribing witnesses.

ERNEST EDOUARD MARINIER.
EUGÈNE LOUIS NAVOIT.

Witnesses:

LOUIS SULLIGER,
EDWARD P. MACLEAN.