(No Model.) 2 Sheets—Sheet 1.

E. S. SEARS.

MEANS FOR MAKING EMBOSSED AND PRINTED DECORATIVE MATERIALS FOR WALLS, &c.

No. 454,667. Patented June 23, 1891.

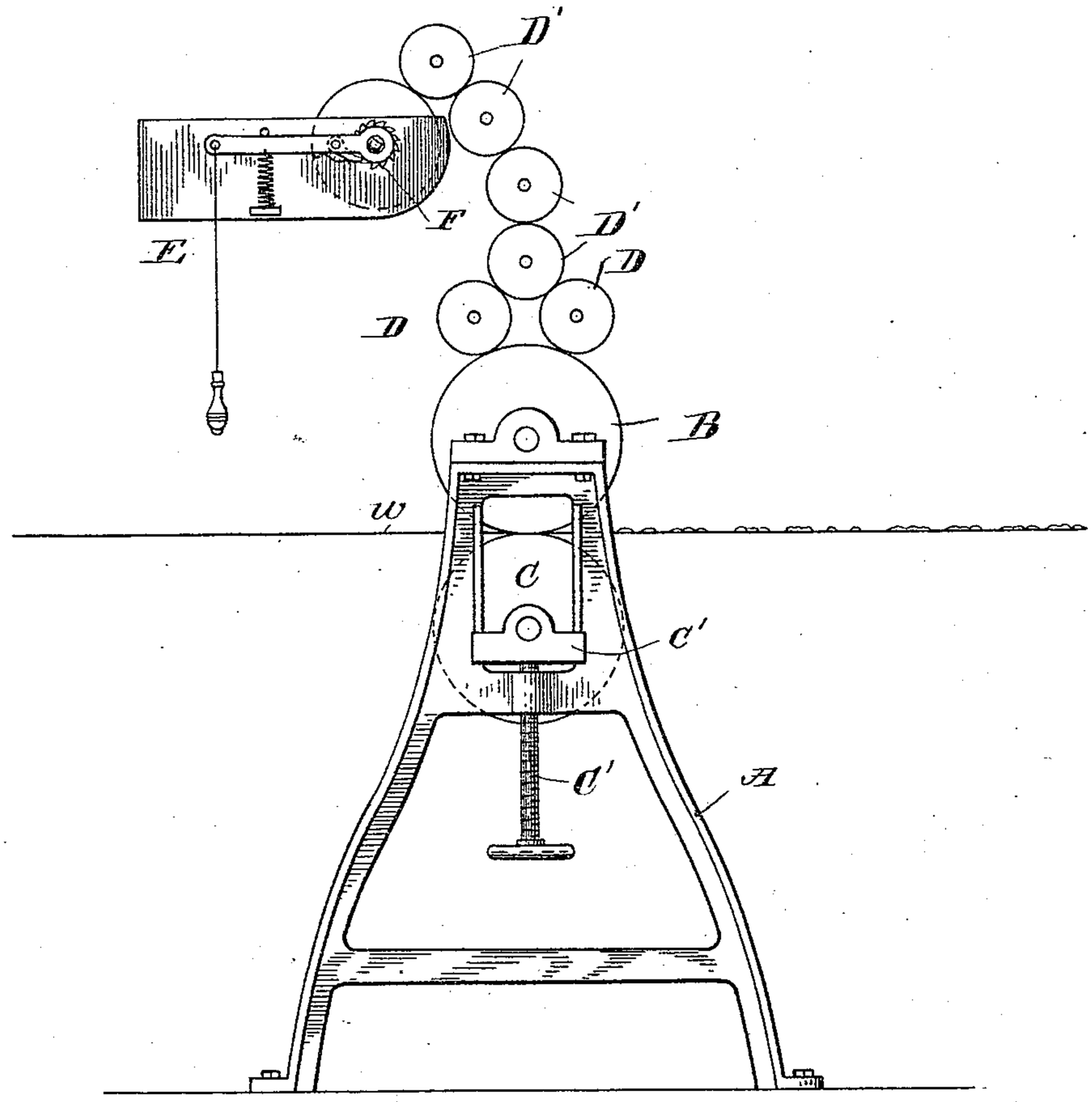

Fig. 1.

WITNESSES.

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(No Model.) 2 Sheets—Sheet 2.

E. S. SEARS.

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Fig. 2.

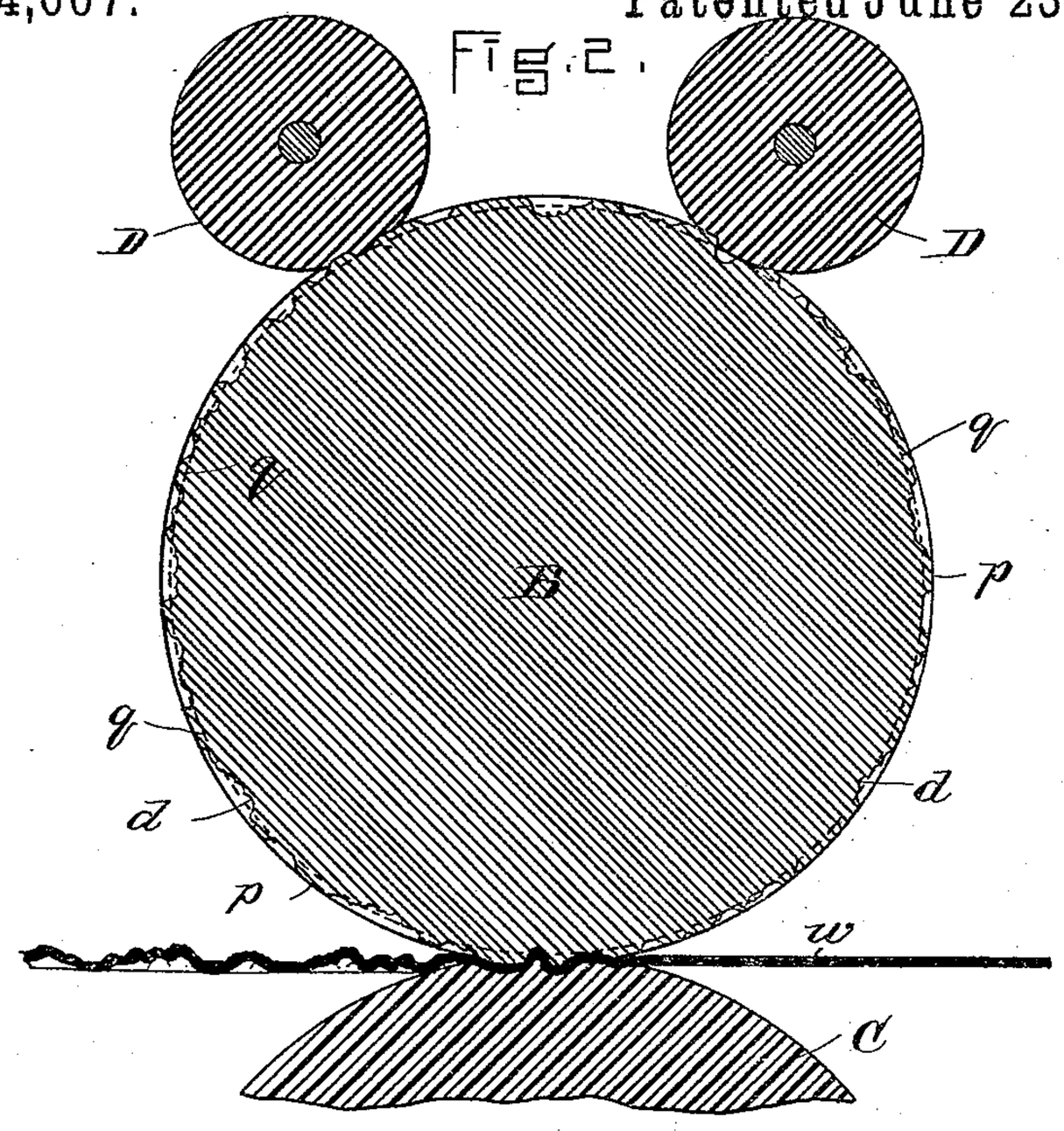
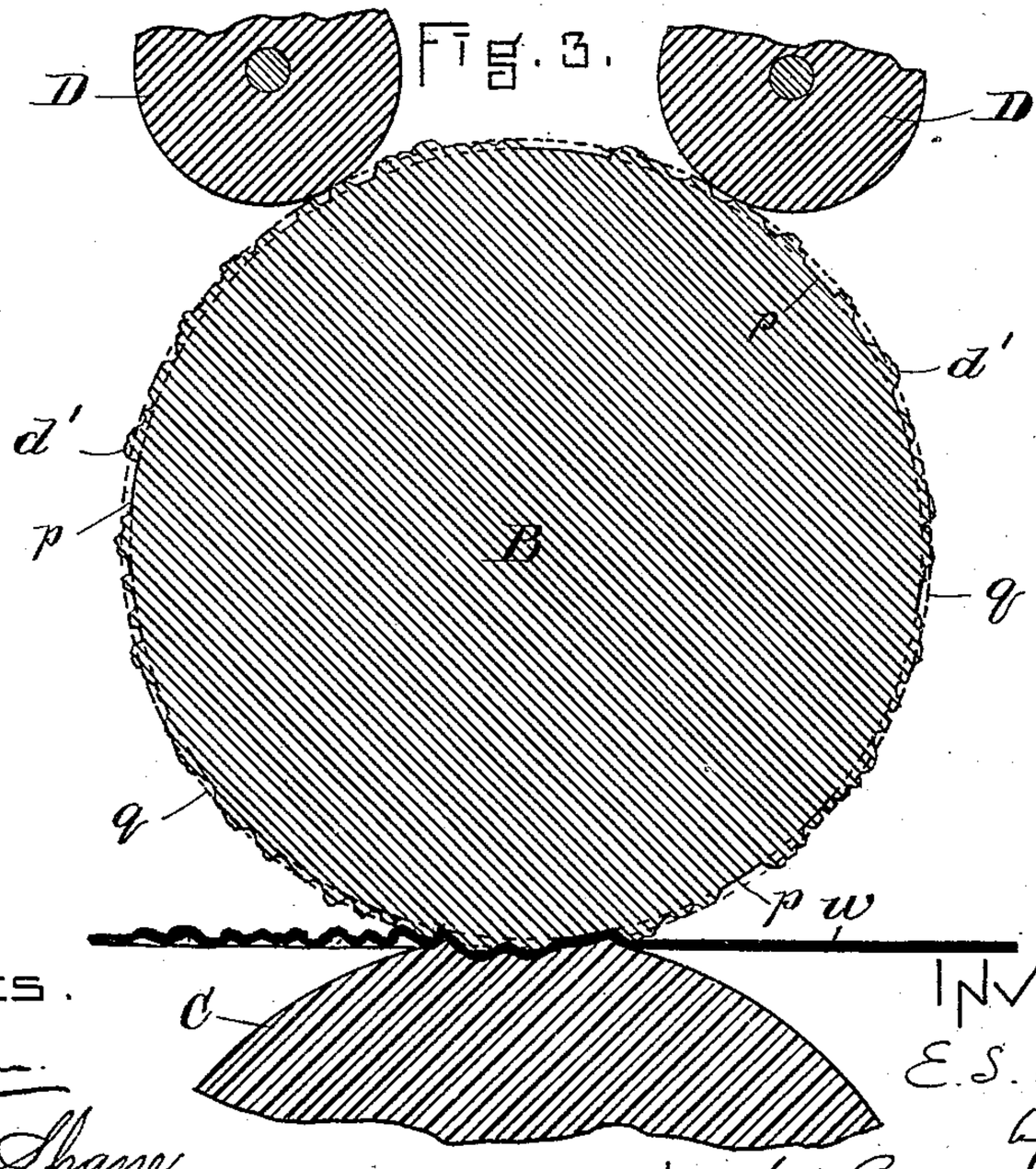


Fig. 3.



WITNESSES.

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UNITED STATES PATENT OFFICE.

EDWARD S. SEARS, OF WINTHROP, ASSIGNOR TO THE AMERICAN DECORATIVE COMPANY, OF BOSTON, MASSACHUSETTS.

MEANS FOR MAKING EMBOSSED AND PRINTED DECORATIVE MATERIALS FOR WALLS, &c.

SPECIFICATION forming part of Letters Patent No. 454,667, dated June 23, 1891.

Application filed January 24, 1891. Serial No. 378,889. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. SEARS, of Winthrop, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in the Means for Making Embossed and Printed Decorative Materials for Walls, &c., of which the following is a specification.

This invention relates to certain new and useful improvements in means for decorating wood pulp, paper, cloth, leather, or other material to be used for the covering of walls and ceilings and for other purposes in connection and simultaneously with the embossing of the same, the purpose being at one and the same operation to emboss the material and to produce upon it decorative effects similar to those now obtained either by first printing in colors upon the surface of the paper or other material the design to be embossed and subsequently embossing the same or by embossing the material in a plain state and afterward painting, staining, or otherwise decorating it by hand; and I do hereby declare that the following is a clear, full, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, of which—

Figure 1 is a vertical section of a rotary embossing-machine by means of which the simultaneous embossing and decoration may be done. Fig. 2 represents an enlarged section of a portion of the engraved roll and the rolls that apply color thereto, the engraved roll being provided with intaglio or sunken designs. Fig. 3 represents a similar section showing the engraved roll provided with relief or raised designs.

The same letters of reference indicate the same parts in all of the figures.

In the drawings, B represents an engraved embossing-roll, of metal or other suitably-rigid material, having its periphery adapted either by depressions or intaglio designs *d*, as shown in Fig. 2, or by raised or relief designs *d'*, as shown in Fig. 3, to co-operate with an elastic or yielding surfaced impression-roll C in embossing a web of paper or other like material by forming projections on one side and corresponding indentations in the opposite side. The roll C is composed of a rigid hub or core and a coating of a yielding nature, such as india-rubber or some of its compounds, as shown in Letters Patent of the United States No. 366,755, dated July 19, 1887.

The shafts of the rolls B C are mounted in bearings on a supporting-frame A of any suitable construction, the bearings C' of the roll C being vertically adjustable by means of adjusting-screws C^2, so that the roll C can be adjusted to the thickness of the web interposed between it and the engraved roll B.

D D represent color-applying rolls of yielding material, arranged to bear on portions of the engraved roll, as hereinafter described. Said rolls are preferably made of a composition of glue and glycerine or glue and molasses, the rolls being of the same nature as those used in printing-presses to apply ink to the printing-surfaces.

The color employed, which may be printer's ink or any other suitable composition in a fluid or semi-fluid state, is supplied from a reservoir E to the rolls D D through suitable transferring-rolls D' or in any other suitable way, as my invention is not limited to any particular means for applying color to the yielding rolls D.

The chief novelty of my invention lies in the presentation of one or more color-applying rolls of yielding material to an engraved roll of hard material, used in connection with an impression-roll adapted to co-operate with the engraved roll in embossing a web of paper, and by "engraved roll" I mean a roll that has its surface diversified by intaglio depressions in or relief projections on its periphery.

An essential feature of my invention is the relative adjustment of the color-applying rolls, so that their peripheries will bear only on the higher portions of the engraved roll and not on the lowest or most depressed portions, the amount of color applied being determined by the height of the surface of the roller—that is to say, the highest portions will receive the greatest supply of color, while those somewhat lower, yet not so far depressed as to be beyond the reach of the color-applying rolls, will receive a smaller supply or lighter coating, so that the color-applying rolls will apply color to the portions of the

engraved roll with which they come in contact in the inverse ratio to the elevation or depression of said portions and will not apply any color to the most deeply-depressed portions. The result is that a web of paper, wood pulp, leather, or any other suitable material adapted to be embossed by the action of the rolls B C will in its passage between said rolls be not only embossed, but at the same time colored or printed on portions of its surface, the color applied to the web being diversified or shaded by the variations in the depth of the coating applied by the rolls D D, caused by the variations in the height of the surface of the engraved roll.

The manner in which the apparatus operates and the results it produces are as follows: As the metallic embossing-roll revolves, the elasticity and adhesiveness of the color-rollers resting upon it cause its motion to be imparted to them and by them in turn to the other rollers in combination with them; or, if it is desired, any suitable arrangement of gearing or pulleys and belts or other well-known devices may be attached to the set of rollers for the purpose of setting and maintaining them in motion, the proper mechanism at the same time permitting the outflow of the color from the fount or reservoir above described, and the same being distributed or spread upon the surface of the color-rollers and upon such portions of the design engraved upon the metallic embossing-roll as are most elevated or least depressed. The traveling web of wood pulp, paper, cloth, leather, or other material which it is desired to emboss and decorate passes between the engraved embossing-roll and the impression-roll covered with india-rubber or other elastic substance, and at the same instant that it is embossed it also receives a coating of the color upon such portions of the design as correspond to the most elevated or least depressed portions of the metallic embossing-roll. By this means not only are similar effects to those gained in ordinary printing from types or engraved blocks (in which all portions which are to be colored are put upon the same plane) produced, but also delicate gradations of color and shading are obtained by the application of color in varying degrees to the more elevated or less depressed portions of the design engraved upon the metallic embossing-roll, and the transference of the same to the surface of the wood pulp, paper, cloth, leather, or other material which is at the same instant and in the same operation embossed in relief of varying heights, this transference of color and embossing being effected by the elastic impression-roll above described.

The foregoing description will be made clearer by reference to Figs. 2 and 3, the former showing sunken or intaglio designs *d* below the periphery *p*, while the latter shows varied or relief designs *d'* above said periphery. In said figures the dotted line *q*, parallel with the periphery *p*, shows the extreme inward limit which can be reached by the yielding or elastic surfaces of the color-applying rolls D D, said limit being within the periphery *p* of the intaglio embossing-roll and outside of the periphery of the relief-roll. It will be seen that in both cases portions of the engraved roll are above and portions below the line *q*, and that the portions above said line are of varying height, so that they receive color-coatings of different depth or strength from the color-applying rolls, the portions below the line *q* receiving no color at all. The result, therefore, will be that a web *w*, of paper or other material passed, between the intaglio embossing-roll and the accompanying impression-roll will be embossed in raised or relief patterns on its upper surface and at the same time colored on its unembossed or smooth portions and on the shallower parts of its raised patterns, the strength of the color being in proportion to the height of the surface to which it is applied, the highest portions of the raised patterns receiving no color from the embossing-roll, while the lower portions receive coatings of varying strength or depth.

A web *w*, passed between the relief-embossing roll and the impression-roll, will have depressed intaglio designs impressed in its upper surface, the lower or deepest portions of said designs being at the same time colored or shaded in varying degrees, according to their depth. In this case the embossed or smooth portion of the web and the shallower portions of the depressed designs will not be colored, the colored portions being confined to the deepest portions of the depressed ornamentation. It will be seen that by thus simultaneously embossing and printing and shading a web of material I effect a considerable saving in the expense of manufacturing embossed decorative material as compared with the usual means, which involve separate operations for embossing and coloring, the result produced by my improved means being quite as satisfactory as that produced by the successive operations heretofore involved.

By the term "lowest portions," as used in connection with the surface of the embossing-roll, I mean those portions which are nearest the axis or center of rotation of said roll, and by "highest" and "higher" portions I mean those that are farther from said axis or center.

I claim—

As a means for making embossed and colored or shaded decorative material, the combination of an engraved embossing-roll, one or more color-applying rolls arranged to bear on the higher portions of the engraved surface of the embossing-roll without touching the lowest portions, whereby said color-applying rolls are adapted to apply to the surface of the embossing-roll a coating of color whose continuity is broken by the lowest portions of the said surface, while the strength or depth of said coating is varied by variations

in the height of the portions of the surface to which it is applied, and an impression-roll adapted to co-operate with the engraved roll in conforming a web of suitable material to the surface of the engraved roll and causing said web to receive the interrupted and graded coating of color on the engraved roll, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 16th day of January, A. D. 1891.

EDWARD S. SEARS.

Witnesses:

ELIAB PARKER,

C. F. BROWN.