

UNITED STATES PATENT OFFICE.

CHARLES F. BRADY, OF BROOKLYN, NEW YORK.

PROCESS OF PRINTING PYROXYLINE COMPOUNDS.

SPECIFICATION forming part of Letters Patent No. 409,345, dated August 20, 1889.

Application filed April 26, 1888. Serial No. 271,982. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. BRADY, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented a new and useful Process of Printing Pyroxyline Compounds, of which the following is a full, clear, and accurate description.

The object of my invention is to print colored designs or patterns upon pyroxyline compounds in such a manner that by the use of any ink an absolutely indelible result will be produced; and my invention consists in the process or method herein set forth of so treating and printing such pyroxyline compounds as to produce this result. Pyroxyline compounds treated by my process are especially adapted for the manufacture of collars, cuffs, and other like articles, and can be used for a great variety of purposes, and constitute a new article of manufacture and use.

My process is carried on as follows: I first take a flat sheet of pyroxyline compound of any desirable thickness and subject it to the action of cold rolls, preferably of copper, which are engraved in any desired pattern or design, taking care that the engraving of the design shall be shallow and the pattern a light and open one, so as not to carry too much ink. I thus lay on the flat sheet of pyroxyline the color desired, using in the design or pattern with which the rolls are furnished any printing-ink of the desired color. By this operation the sheets are given the desired colored pattern. After the sheets are thus treated I subject them to the action of steam by placing a number of them at one time for this purpose in a steam-box or other proper receptacle so arranged or placed that each sheet can be thoroughly exposed on all sides to the steam action. The amount of steam should preferably be from three to seven pounds to the square inch. I leave the sheets in the box or other receptacle to be subjected to the steam action from five to thirty-five minutes. The exact degree of steam to the square inch to which the sheets are to be subjected and the amount of time during which they are to be exposed to the steam action are to be varied according to the amount of seasoning the pyroxyline compound to be

printed upon has had, and can be easily ascertained by any person skilled in the nature and use of pyroxyline compounds. The above statements of time and amount are merely directory and can be varied within these limits according to particular circumstances. After being subjected to the steam-pressure it will be found that the flat sheet, while showing the design or pattern in its proper color and holding such color absolutely indelible and fast, are warped and wrinkled, and this disadvantage is to be overcome before they are fit for use. To overcome this difficulty and to make the sheets smooth and merchantable, and for this purpose only, I subject the sheets to any proper smoothing process—such as passing them through smoothing-rolls or any similar smoothing process. After the sheets are subjected to this smoothing process they will be found to be flat and unwrinkled and ready for use. Subjecting the sheets to this smoothing process does not affect the permanency of the colors, either to increase their permanency or to diminish it, the colors having been made indelible by the previous operation of first laying the color on by the pressure and afterward rendering them fast by subjecting them to the steam-heat.

The sheets printed with colored patterns by my process are rendered so indelible as not only to resist the action of water but also of perspiration, alcohol, and even the scouring action of sapolio or sand and water. They therefore are peculiarly adapted for the manufacture of collars, cuffs, shirt-bosoms, and other articles which require frequent washing.

I am aware that pyroxyline compounds have been printed by the simultaneous action of heat and pressure—as, for example, by transfer from metal plates applied under pressure while the sheet of material is placed upon a polished table heated by steam or otherwise. From experiments made under this system I have found extreme difficulty in producing indelible impressions without the use of special inks containing a solvent of pyroxyline. My improvement differs from the above, in that I first apply the coloring-matter by printing in any convenient way to the surface of the pyroxyline and then at a

second operation subject it to the direct action of steam in a closed chamber under moderate pressure, as hereinbefore explained. The effect of this is to so incorporate the pigment or coloring-matter with the body of the pyroxyline as to produce perfectly indelible effects. Then for such manufactures as require it the sheets are smoothed between rollers or by other suitable means.

10 An additional advantage of my improved process is that I am not limited to the superficial area of a steam-table or other level surface, but am enabled to print, by means of rollers, sheets of indefinite length, which I
15 afterward subject to a steam-bath in any suitable form which will properly expose the surface, or by passing the sheet through a suitably-prepared steam-chamber.

20 Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The above-described process of imprinting pyroxyline compounds with indelible pig-

ments or colors, consisting in first applying the pigment or coloring-matter to the sheets 25 of such compounds by pressure and subsequently subjecting them to the direct action of steam in a suitable chamber to render the colors or effects indelible.

2. The above-described process of imprint- 30 ing pyroxyline compounds with indelible pigments or colors, which consists in first applying the pigments or colors to the sheets of such compounds by pressure, subsequently 35 subjecting them to the direct action of steam in a suitable chamber to render the colors or effects indelible, and afterward smoothing the sheets by calendering or other well-known means, substantially as set forth.

In testimony whereof I have hereunto set my 40 hand this 20th day of April, 1888.

CHARLES F. BRADY.

In presence of—

R. T. VAN BOSKERCK,
CHARLES G. COE.