

# UNITED STATES PATENT OFFICE.

MARSHALL C. LEFFERTS, OF NEW YORK, N. Y., ASSIGNOR TO THE  
CELLULOID MANUFACTURING COMPANY.

PROCESS OF PRINTING UPON OR DECORATING THE SURFACE OF CELLULOID.

SPECIFICATION forming part of Letters Patent No. 346,376, dated July 27, 1886.

Application filed December 29, 1885. Serial No. 187,016. (Specimens.)

*To all whom it may concern:*

Be it known that I, MARSHALL C. LEFFERTS, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in the Process of Printing upon or Decorating the Surface of Celluloid, of which the following is a specification.

10 The invention relates to an improved process of printing or decorating a surface of celluloid or analogous compound of pyroxyline. It may be used in connection with any compound having the characteristics of celluloid.

15 The invention consists in printing upon or otherwise applying to the pyroxyline surface, in a suitable ink or color, the desired design, and afterward subjecting the surface and impression thereon to heat and pressure, as hereinafter more fully described.

To illustrate and explain my process, I will first describe the treatment of a piece of material in the form of a thin sheet.

25 Having applied the design to the sheet, by means of a press or otherwise, I place the sheet bearing the impression in what is known as a "steam-table press," with the printed face of the sheet in contact with a polished plate or surface. Arranged in this way, the sheet and 30 the impression it bears are subjected to the proper degree of heat and pressure—say from one hundred and eighty (180) to two hundred and thirty (230) degrees Fahrenheit—for about a minute, the pressure being about six hundred pounds to the square inch. In working 35 sheets of the thickness of one-sixteenth of an inch, or of greater thickness, the pressure will not be so great, only that degree of pressure being required which may be necessary to flow the surface of the sheet and effect a satisfactory 40 impression. If the sheet is thin, it will be desirable to back it up with a layer or layers of blotting-paper or other elastic material, for the purpose of preventing or correcting inaccuracies and defects, which are likely to be 45 caused by any inequality or irregularity in the plate or sheet. To prevent the sheet from adhering to the backing, a layer of any non-adhesive substance—such as metal, tin-foil, or celluloid—which has been properly oiled or lubricated may be interposed.

If desired to impart a finished or calendered surface to both sides of the sheet, the desired object may be accomplished by a sheet of polished metal, which will be placed in contact 55 with the reverse side of the sheet of celluloid.

In treating thick pieces of material there is danger of the heat and pressure causing the material to flow, whereby the impression will be blurred or distorted. This danger I obviate 60 by performing the operation in a die or receptacle in which the material is so closely and compactly fitted that its shape is preserved, and any displacement of the decorated surface thus prevented. Any die or mold 65 which will prevent a change in the surface that carries the impression may be made use of.

My process is useful in connection with all kinds of printing, and in using the word "design" I intend to include every species of im- 70 pression, simple or complex, in the whole range of the printer's art. Inks of different kinds may be used. The only requirement is, that the ink shall be of such a nature that a sharply-defined impression can be produced, 75 and of such strength or density that a small quantity only is necessarily used to give the desired impression. Inks which spread easily, or which require to be used freely, are not desirable. I have found that excellent results 80 may be obtained with aniline ink, such as is used for rubber stamps in office-work. I do not, however, confine myself to the use of an ink of any particular kind; nor do I limit my claim to any particular method of printing; 85 nor to the use of plates, types, or stamps of any particular kind. The nature of the ink and manner of causing the application of the design may be greatly varied, according to circumstances and the results that are desired. 90

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The process hereinbefore described of applying a design to a surface of celluloid or analogous compound, which consists in, first, 95 applying the design to the surface, and, second, subjecting the surface bearing the design to heat and pressure, substantially as described.

2. The process herein described of applying 100 a design to a surface of celluloid or analogous compound, which consists in, first, printing or

otherwise applying the design in ink or color, and, second, subjecting the surface bearing the design to the action of heat and pressure while it is in contact with a polished surface, substantially as described.

5 3. The process herein described of applying a design to sheets of celluloid or analogous compound, which consists in, first, applying the design in an ink or color, and, second, subject-  
10 ing the sheet, while interposed between an elastic backing and a polished surface, to the action of heat and pressure, substantially as set forth.

4. The process of applying a design to a sur-

face of celluloid or analogous compound, which 15 consists in preventing the displacement of the design by confining the surface to be decorated in a suitable mold or die, and applying the heat and pressure while the surface is thus confined, substantially as set forth. 20

Signed at Newark, in the county of Essex and State of New Jersey, this 19th day of December, A. D. 1885.

MARSHALL C. LEFFERTS.

Witnesses:

ISAAC F. ROE,

ABRAHAM MANNERS.