

# UNITED STATES PATENT OFFICE.

SAMUEL CRUMP, OF POUGHKEEPSIE, NEW YORK.

## PROCESS OF DRYING AND VARNISHING PRINTS.

SPECIFICATION forming part of Letters Patent No. 644,281, dated February 27, 1900.

Application filed December 1, 1899. Serial No. 738,848. (No specimens.)

*To all whom it may concern:*

Be it known that I, SAMUEL CRUMP, a citizen of the United States of America, and a resident of Poughkeepsie, in the county of Dutchess and State of New York, have invented certain new and useful Improvements in Processes of Drying and Varnishing Prints, of which the following is a specification.

This invention relates to an improved process of drying and varnishing ink or color impressions produced by letter-press, lithographic, and similar methods, including typographical, illustrative, and ornamental matter, such as may be employed for labels, show-cards, posters, wall-paper, and similar productions.

An application for Letters Patent on this invention was filed in Great Britain May 18, 1899.

The object of this invention is to produce simply, effectively, and rapidly a lustrous print, lithograph, or similar production the surface of which instantly becomes dry, to the end that such prints, lithographs, or similar productions may at once be freely handled and piled together or rolled, and to the end also that the color and other effects may be improved, and to the end also that rapid printing, and especially rapid multicolor-printing, may be made practically manageable.

The varnishing of printed matter has hitherto been accomplished by applying one or more coatings of dissolved or liquid varnish over the entire surface of the sheet or fabric after the inked or color impression is dry, covering the unprinted as well as the printed portions; or where it has been desirable to varnish or gloss the printed portions only the varnish or glue and varnish has heretofore been printed—i. e., applied in solution—by a separate printing-surface. The objections to this last method arise from its expense and also from the difficulty of perfectly registering the subsequent varnishing or glossing impression upon the previously printed and dried impression, so as to make the latter exactly register with the former. The use of this method usually results in varnishing or glossing some portions of the plain ground and leaving unvarnished some portions of the impression, thus impairing

whatever sharpness of definition the original impression may have had and imparting an imperfect and unsatisfactory appearance to the work. It is, furthermore, necessary in these preëxisting methods or processes to properly dry the original impression before receiving that of the varnish or glue and varnish and then to dry that varnish impression for a considerable time before the work can be handled or delivered, involving not only vexatious delay to the printer or lithographer and his customer, but also requiring extensive drying-space, especially where several color impressions are successively applied.

Still another method now in vogue of obtaining a gloss print is that of printing the original impression with ink in which a necessarily-limited amount of dissolved or liquid varnish and drier or of glue has been previously mixed. The sheets thus printed must, however, be hung up or kept separate until thoroughly dry; otherwise they would offset and stick together because of the character of this kind of ink. If a drier is used, it dries rapidly upon the distributing-rolls and interferes with the proper distribution of the ink, besides clogging the printing-surface, so that it will not produce a clear and sharp impression.

In preparing the work for the present process the desired designs, of whatever nature or character, are first impressed upon the desired material—such as paper, fabric, or other absorbent surface—in the usual way from type, electrotype, lithographic stone, or any character of printing-surface in any desired size, ink, or color or equivalent liquid printing material. The next step consists in applying dry powdered varnishing material in any convenient way upon the design or impression while the latter is still wet enough for the powder to adhere. The dry powder is applied equally to all parts of the surface of the impressed material, but it adheres only to the parts of the surface which carry the still wet ink or size of the design or impression. The superfluous powder not so adhering is then removed in any suitable way, leaving varnishing material only on the printed portions of the paper or other absorbent surface and not on the unprinted portions. The varnishing material may be comminuted in



any way and may be any of the commercial gums—as gum-dammar, gum-sandarac, kauri, or any other similar varnishing material capable of being applied as fine dry powder. It may also be composed of or include a suitable proportion of any desired drier—such as litharge, manganese, burnt umber, sugar of lead, or oleate of lead—the selection and proportion of these components being determined by their affinities, by the colors to be produced, and by the degree of luster desired. This pulverized material when dusted or brushed upon the imprinted surface before the ink or size has become dry adheres only to the imprinted design, the superfluous powder being then brushed or shaken off, so that only those portions which are wet with the ink retain a covering of dust. The amount of powder thus adhering to the design may be varied to almost any desired extent. The heavier impressions or the heavier portions of a given impression will naturally absorb the greater quantity of the powder, and to gain the highest and best effects of this process the impressions should be thoroughly impregnated with the powder. The next step in the process consists in heating the printed and powdered article to a temperature sufficient to fuse or dissolve the powdered varnishing material. This may be done by placing the sheets in an oven, or they may be passed directly from the dusting-off machine through a suitable melting-machine at a uniform rate suitable for the fusing or dissolving operation, during which the powdered varnishing material fuses or dissolves and flows together to form a new surface over the original printed impression, becoming intimately incorporated therewith as a crust or veneer thereto. The next step consists in chilling the crust or veneer, which instantly hardens and becomes dry. This chilling consists in reducing the temperature below the fusing-point of the crust or veneer, and it may be conveniently attained by simply removing the paper from the hot box, or it may be expedited by a fan-blast or by a cold blast. The immediate result of the chilling is to harden the entire outer surface of the print or impression, so that it is at once ready for commercial delivery and can be handled and piled or rolled without offsetting the impression. Even if the underlying ink is not immediately and entirely dry it is covered and protected by the new surface produced by this process.

The structure formed by this process is composed of a basic or foundation layer of ink, pigment, or size overlaid and protected by a surface crust or veneer of varnishing material coextensive with the design and integral therewith. The limited application of the varnishing material leaves the intervening spaces or background of the paper undisturbed in character and appearance, thus leaving the sheets flexible to a considerable degree as compared with the results obtained by applying varnish over their entire surface

and heightening greatly the color contrasts and effects.

In selecting the colors for the production of brilliant effects by this process it will be observed that the darker inks and colors will yield a greater contrast than the lighter shades. The desired color might be obtained by mixing the varnishing material with a dry tint and applying it upon a wet impression made with colorless size or similar vehicle suitable for receiving and retaining the combined varnishing material and color.

An important advantage in the use of this process is that the finished product is dry and ready to use at once upon being chilled, whereas in the older processes of applying varnish in solution several hours are usually required to dry the varnished sheets sufficiently to enable them to be packed together and handled without sticking or slurring.

Another important advantage of the use of my invention is that the varnishing material is applied to the design or impression and to every part of it and in perfect register therewith and is not applied to any part of the background or unprinted portions. Thus the color and other effects are heightened by sharpness of definition, by contrast with the non-lustrous background, and in case of different colors by intensified contrast with each other.

Any available kind of gum having the general characteristics of those above enumerated may be employed in this process, nor is the process restricted to the use of a drier or of any particular kind or proportion of drier, this being permissibly wholly omitted or varied, according to the gum or varnishing material with which it is to be combined or according to the effects desired. The temperature to which the varnished sheets are exposed, as well as the duration of that exposure, may also be varied, according to the character of the gum and according to the character and thickness of the printed sheets. In many other ways, which will suggest themselves to an intelligent operator, this process may be modified without departing from the essential characteristics herein set forth.

I have found that to produce the effects of my process it is necessary that the paper or other suitable material be of a more or less absorbent nature and that the temperature be sufficient to fuse the applied varnishing material.

This process may be employed upon continuous webs of paper or other suitable material, as well as upon separate sheets. The web may be at once rewound in roll form after being chilled or the sheets stacked after being chilled. The dusting off and fusing and chilling steps of the process may to advantage be performed from three to twelve hours after the dusting on of the powdered varnishing material.

I claim as my invention—

1. The process of producing and drying a



lustrous print or lithograph upon an absorb-  
ent material, which consists in impressing or  
transferring the design or print upon the ma-  
terial with ink or size, applying dry powdered  
5 varnishing material upon the design or im-  
pression while wet, and subjecting it to a heat  
sufficient to fuse the varnishing material and  
unite it with the ink or size, as a surface  
coating or crust thereof, and chilling the  
10 same.

2. The process of producing a lustrous print  
or lithograph upon an absorbent material,  
which consists in impressing or transferring

the design or print upon the material with  
ink or size, applying dry powdered varnish 15  
upon the design or impression while wet, and  
subjecting it to a heat sufficient to dissolve  
the varnish and incorporate it with the ink  
or size, as a surface coating or veneer thereof,  
and chilling the same. 20

Signed at New York city, New York, this  
28th day of November, 1899.

SAMUEL CRUMP.

Witnesses:

EDWIN SEGER,

JOHN O. GEMPLER.