

UNITED STATES PATENT OFFICE.

STEWART F. CARTER, OF NORTH ADAMS, MASSACHUSETTS, ASSIGNOR TO
THE WINDSOR COMPANY, OF SAME PLACE.

PROCESS OF PRODUCING WHITE EFFECTS ON FABRICS.

SPECIFICATION forming part of Letters Patent No. 606,776, dated July 5, 1898.

Application filed October 28, 1897. Serial No. 656,722. (No specimens.)

To all whom it may concern:

Be it known that I, STEWART F. CARTER, a subject of the Queen of Great Britain, residing at North Adams, in the county of Berkshire and State of Massachusetts, have invented a certain new and useful Improvement in Processes of Producing White Effects on Cotton and other Fabrics, of which the following is a specification.

10 The object of my invention is to produce white effects upon fabrics which will be more durable than is possible with prior processes.

In calico-printing and in the printing of other fabrics prior to my invention with white effects it has been the custom to imprint upon the fabric a suitable white pigment, such as 15 oxid of zinc or sulfate of barium, to which albumen is added, and to subject the fabric to the effect of steam, by which the albumen is coagulated. This coagulation of the albumen has resulted in the mechanical fixing of the color, but only to an imperfect extent, since the color can be and frequently is removed and disfigured by the friction occasioned by ordinary use. It has also been 25 suggested, and it has been practiced to a limited extent, to imprint upon the fabric tungstate of soda to which gum or starch has been added, the fabric being subsequently passed 30 through a solution of barium chlorid, the chemical reaction resulting in the formation of tungstate of barium, which is an insoluble white pigment and which produces the color effect desired, and also in the formation of sodium chlorid, which of course dissolves out. It has also been proposed that the process last referred to be reversed and to imprint upon the fabric with barium chlorid, the fabric being subsequently passed through a 40 bath of tungstate of soda. With either of the processes just referred to the color is still too fugitive to meet all the requirements of use.

I have discovered that a sulfocarbonate of 45 cellulose when applied to a fabric and subjected to heat, so as to be decomposed, possesses the property of adhering with such tenacity to the fabric as to be practically incapable of removal, and, basing my invention upon this discovery, I add to such a sulfocarbonate of cellulose a suitable white pigment,

preferably tungstate of barium, which when the former is subjected to heat will be fixed with almost absolute permanence upon the fabric. The sulfocarbonate of cellulose to 55 which I have referred and which I use in carrying out my improved process is known on the market as "viscose," and it is prepared in accordance with the terms of Letters Patent of the United States No. 520,770, dated 60 June 5, 1894, granted to Henry G. Nichols, trustee, and to which reference is made for the method of production and the chemical properties of such substance.

In carrying out my invention I prefer to 65 proceed as follows: A suitable aqueous solution of viscose is obtained, such as is referred to in said patent, and to such solution is added, by preference, tungstate of soda. The relative proportions of these substances depend 70 upon the intensity of the pattern desired; but for ordinary work such proportions may be five pounds of tungstate of soda to one gallon of the viscose solution. The fabric is printed with this mixture in any suitable way and 75 with any suitable patterns. After the printing has been effected the fabric is subjected to a sufficient heat to decompose the viscose, causing the same to unite tenaciously with the fabric and forming a bond for the pigment, 80 which is to be subsequently produced from the tungstate of soda. The temperature to which the fabric should be subjected may vary between 160° and 200° Fahrenheit, and preferably should be produced by the action 85 of free steam, as is common in the art of calico-printing. After the removal of the fabric from the heating-room in which the decomposition of the viscose has been effected the fabric is passed through a suitable bath of 90 barium chlorid, resulting, as before stated, in the formation of tungstate of barium in the form of a white precipitate, which will be bonded tenaciously to the fabric by reason of the peculiar property of viscose which I have 95 discovered and to which I have referred. After being passed through the barium-bath the fabric may be washed and bleached, if required, although I find that by the use of tungstate of barium little or no after bleaching is necessary, owing to its intense whiteness. 100

I have found in practice that white colors, and particularly those produced by tungstate of barium when applied as I have explained, are so tenaciously affixed to the fabric that
 5 the latter can be washed, bleached, and even passed through acids without destroying or even affecting the colors in any way.

It will be obvious that instead of adding to the viscose tungstate of soda and passing the
 10 fabric through a bath of barium chlorid it will be possible to imprint upon the fabric with the barium chlorid and to pass the fabric through a bath of tungstate of soda, the identical chemical reaction taking place in
 15 the latter case as in the former. It is also to be understood that instead of producing tungstate of barium upon the fabric, as I have explained, by first imprinting thereon with tungstate of soda or barium chlorid and subsequently
 20 subjecting the fabric to a bath of one or the other, as the case may require, precisely the same effect will be obtained if the tungstate of barium is first produced by adding to the tungstate of soda the desired quantity
 25 of barium chlorid. In the latter case the tungstate of barium, which will form as a heavy white precipitate, will be mixed with the viscose imprinted upon the fabric and simply subjected to heat, so as to decompose
 30 the viscose and intimately affix the pigment, as explained. The principal advantage of first producing the tungstate of barium as just explained is that it does away with the necessity of passing the fabric through the
 35 bath of barium chlorid or tungstate of soda, as the case may be, and also enables the tungstate of barium to be maintained at hand in bulk for use as exigencies may require. Another
 40 advantage of using the tungstate of barium in the first instance and without the bath, as first explained, is that by so doing other colors may be applied to the fabric at the same operation and some of which, if a bath were used, might be affected.

45 Although I prefer to employ a pigment comprising tungstate of barium, as I find in practice that such a pigment appears to possess the greatest practical advantages, still it will be understood that other pigments may be
 50 used and be bonded or affixed permanently to the fabric by the employment of viscose or a sulfocarbonate of cellulose, as I have explained. Among these other pigments which may be used may be mentioned barium sul-

fate, with which I have experimented and
 55 which may be produced by passing the fabric through a bath of sodium sulfate after the printing has been effected with the barium chlorid. I find, however, that barium sulfate does not possess the "covering" qualities of
 60 barium tungstate, and I therefore do not consider the same so desirable.

The essence of my invention residing in the discovery which I have made that a sulfocarbonate of cellulose, such as viscose, when
 65 applied to a fabric and subjected to heat possesses the property of adhering to the fabric with such tenacity as to be practically incapable of removal I wish to have my invention understood as covering that discovery
 70 without being limited to the particular pigment or pigments which may be bonded or affixed to the fabric by such a bonding agent.

Having now described my invention, what I claim as new therein, and desire to secure by
 75 Letters Patent, is as follows:

1. The improved process for producing white effects on cotton and other fabrics, which consists in first subjecting the fabric to the
 80 action of a sulfocarbonate of cellulose, such as viscose, in imprinting designs upon the fabric with a suitable pigment, and in subjecting the fabric to heat so as to decompose the viscose, substantially as set forth.

2. The improved process for producing
 85 white effects on cotton and other fabrics, which consists in subjecting the fabric to the action of a sulfocarbonate of cellulose, such as viscose, in imprinting designs upon the fabric with tungstate of barium, and in subjecting
 90 the fabric to heat so as to decompose the viscose, substantially as set forth.

3. The improved process for producing white effects on cotton and other fabrics, which consists in imprinting designs upon the fabric
 95 with a mixture of viscose and tungstate of soda; then in subjecting the fabric to heat so as to decompose the viscose; and finally, in passing the fabric through a bath of barium chlorid, so as to form upon the fabric tung-
 100 state of barium in the form of the designs, substantially as set forth.

This specification signed and witnessed this 19th day of October, 1897.

STEWART F. CARTER.

Witnesses:

FRANK L. DYER,
 JNO. R. TAYLOR.