# UNITED STATES PATENT OFFICE.

THOMAS HOLLIDAY, OF HUDDERSFIELD, COUNTY OF YORK, ENGLAND, ASSIGNOR TO READ HOLLIDAY & SONS, OF SAME PLACE.

## PROCESS OF DYEING.

SPECIFICATION forming part of Letters Patent No. 386,247, dated July 17, 1888.

Application filed January 17, 1887. Serial No. 224,598. (No specimens.)

*To all whom it may concern:*

Be it known that I, THOMAS HOLLIDAY, a subject of the Queen of Great Britain, residing in Huddersfield, in the county of York, England, have invented certain new and useful Improvements in Dyeing Cotton or other Vegetable Fibers, of which the following is a specification.

This invention in dyeing cotton or other vegetable fibers consists in the formation thereon of the various insoluble colored products of the combinations of the nitroso compounds of alpha and beta naphthol with metallic oxides and the production of a further variety of shades of color by the employment of the nitroso compounds in connection with dyestuffs at present in use that produce colors when combined with metallic oxides.

The nitroso compounds I prefer to use in a finely-precipitated state, and the metallic oxides which produce good results are those of iron chrome and copper, though some others produce colors. The metallic oxides can be fixed in the cotton in any known manner, the depth of color obtainable being varied according to the quantity of oxide fixed in the fiber. Taking, for example, one hundred pounds of cotton hanks on which iron oxide has been fixed and boiling it in water to which, say, twenty pounds of a ten per cent. nitroso-naphthol paste has been added, a green color fast to light will be produced.

It is not always necessary to fix on the fiber the metallic oxide before the application of the nitrous compound, as when oil or tannic acid has been applied to the cotton it will absorb from a warm bath of nitroso-naphthol sufficient of that body to produce color when afterward heated in a bath of a metallic salt—such as bichromate of potash or sulphate of iron—though in some cases a metallic salt and nitroso compound may be present in the bath at the same time and the color formed as fast as an oxide is deposited on the fiber. I prefer the separate treatments already mentioned.

The metallic oxides can be employed when fixed on the fiber either by means of dyeing processes or the means usually employed by calico-printers.

Dye-stuffs—such as logwood, fustic alizarine, &c.—can be used in the same bath as the nitroso body, and will vary the resulting colors, or they can be used either before or after.

Cotton or other vegetable fibers can be dyed either in a raw or finished state, or in any state of manufacture.

Having explained the nature of the invention and method of carrying it into effect, I would have it understood that, without confining myself to the details given, I disclaim herein the invention set forth in Letters Patent No. 362,835, granted to me May 10, 1887, which relates to the treatment of animal fibers.

I claim—

1. The dyeing of cotton or other vegetable fiber by the formation thereon of the colored products of the combination of the nitroso compounds of alpha or beta naphthol with metallic oxides, substantially as described.

2. Cotton or other vegetable fiber colored with the combination of the nitroso compounds of alpha or beta naphthol with metallic oxide.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

THOMAS HOLLIDAY.

Witnesses:

C. W. WHITMAN,
*Consular Agent.*

THOMAS H. BARRON,
*Morset Place, Huddersfield.*