

UNITED STATES PATENT OFFICE.

WINTHROP C. DURFEE, OF BOSTON, MASSACHUSETTS.

PROCESS OF DYEING.

SPECIFICATION forming part of Letters Patent No. 666,846, dated January 29, 1901.

Application filed March 30, 1897. Serial No. 629,990. (No specimens.)

To all whom it may concern:

Be it known that I, WINTHROP C. DURFEE, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Processes of Dyeing and Printing Fibrous Materials, of which the following is a specification, reference being had therein to the accompanying drawings.

At present in practice in the arts of dyeing and printing fibrous materials use is made of acetic, lactic, oxalic, and tartaric acids and of their salts, variously known as "acetates," "lactates," "oxalates," and "tartrates." Acetic and oxalic acids serve chiefly as mild substitutes of the mineral acids, their organic nature rendering them less liable than the latter to injure the fibers or coloring principals. Lactic and tartaric acids, however, seem to possess qualities which tend to the attainment of better results in the coloring of the fibers. Tartaric acid and tartrates are superior to lactic acid and lactates as assistants for use in dyeing, &c. I have given careful consideration to the recognized differences in merits and desirability of the organic acids and the salts of organic acids in common use and have followed this by extended investigations and experiments. The results of these latter have led me to the conclusion that the order of merit and desirability for use as assistants in dyeing and printing fibrous materials in the case of the organic acids and their salts which have been mentioned depends in great measure upon the molecular weight in proportion to their acidity and also to the presence of the group CHOH , which is found in those acids that have given the best results. Thus acetic and oxalic acids do not contain the group CHOH , but only the group COOH . Lactic and tartaric acids contain the said group CHOH , lactic containing one group CHOH , while tartaric contains two groups CHOH . It is my view that superior usefulness in dyeing and printing fibrous materials is related in some manner to the presence of the group CHOH . Upon this conclusion I have come to the belief that could an acid be procured containing a larger number of groups

CHOH than any of the organic acids now in use with the same acid power such an acid would produce improved and superior results in all the processes of dyeing and printing if used in the said processes in connection with the mordants therein employed. These conditions are fulfilled in dibasic saccharic acid, which is an acid that may be produced from sugar or other suitable substitutes by careful oxidation and has not hitherto been known to commerce nor to the general science of chemistry, except as an incidental by-product of certain reactions. Dibasic saccharic acid ($\text{C}_6\text{H}_{10}\text{O}_8$) has the group CHOH in greater proportions than tartaric acid, it possessing four groups CHOH in its constitution. By actual trial I have proved that dibasic saccharic acid and its salts do have properties that render them superior to all those organic acids and their salts which are in common use in the processes of dyeing and printing wool, silk, cotton, linen, and other fibers or fabrics composed of them.

In a pending application for patent I have described and claimed a method invented by me whereby dibasic saccharic acid may be made commercially and economically, so that it is a desirable and advantageous article for use in the processes of dyeing and printing. In practice I find that the use of dibasic saccharic acid in connection with the substances which are applied to such materials in the same processes secures greater fullness, beauty, brilliancy, evenness, and permanence in the colors which finally are produced.

I claim as my invention—

The improvement in the processes of dyeing and printing fibrous materials, which consists in subjecting such materials to the action of dibasic saccharic acid ($\text{C}_6\text{H}_{10}\text{O}_8$) or its salts in connection with the mordants which are employed in the said processes, as herein set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WINTHROP C. DURFEE.

Witnesses:

ALICE H. MORRISON,
WM. A. MACLEOD.