UNITED STATES PATENT OFFICE.

JAN STEYNIS, OF NEW YORK, N. Y., ASSIGNOR TO STEYNIS OZONE COMPANY, A CORPORATION OF NEW YORK.

PROCESS OF ANILIN-BLACK DYING.


To all whom it may concern:

Be it known that I, JAN STEYNIS, a subject of the Queen of the Netherlands, residing in the city, county, and State of New York, have invented or discovered certain new and useful Improvements in Processes of Anillin-Black Dyeing, of which the following is a full disclosure.

My invention relates to the production of anilin black on textile fibers and textile materials of all kinds.

It particularly relates to the production of anilin black on the animal fibers, silk and wool, separately or in conjunction with each other, or with cotton, these substances being frequently combined in forming wool-silk, silk-cotton and wool-cotton piece goods.

The processes of anilin black dyeing heretofore used consisted in the formation of anilin black by an oxidizing process from salt of anilin, and while these old processes are very largely used and generally satisfactory in the case of all silk goods, they do not result in very good blacks on cotton, and give even less satisfaction in the case of wool and goods composed in part of cotton, wool or silk. With the methods and materials heretofore employed in anilin black dyeing of silk and wool, either the oxidation is not carried far enough to produce a deep black, or the fiber is injured, resulting, particularly in the case of silk, in reducing the luster of the fiber, which is extremely detrimental, because the luster is one of the chief elements in the value of this expensive material. Uneven dyeing is also a common drawback.

I have found that the use of ozone in the production of anilin black upon textile fibers, particularly silk and cotton, or combinations of silk or wool and cotton, makes possible the production of very fine blacks in an economical, effective and expeditious manner, adapted to a large scale of operation. In practising my invention, I first impregnate the fibrous material with a solution comprising a salt of anilin as, for instance, hydrochlorid, with or without a suitable soluble oxidizing agent, such as sodium chlorate. I find that the presence of such soluble oxidizing agent is in general desirable.

I have also found that it is desirable to include in the impregnating solution a suitable catalytic agent, such as copper sulfate and auxiliary substances to control the acidity and other properties of the bath, such as ammonium chlorides, gums, glycerin, etc., may be likewise incorporated to meet specific conditions and to adapt the solution to different qualities of material. The impregnating solution is preferably forced into the material by drying the material, or in any other suitable way, as by squeezing the material, before subjecting it to ozone. During the impregnating and drying of the fiber a partial oxidation of the salt of anilin takes place. Then subject the fiber to ozone and have found that certain conditions must be observed to get the best results.

I have also found that it is desirable to have the goods moist or wet during the treatment with ozone. This condition may be produced by a variety of means, as will be well understood by those skilled in the art of dyeing; for instance, the goods may be wetted by sprinkling, sponging, or passing over a wet lap roller, and the ozone gas may be saturated with water vapor so that it will not rapidly dry the goods. I prefer maintain the moist or wet condition throughout the treatment with ozone, and this may be accomplished in numerous ways. For example, the goods may be passed continually or periodically over a wet lap roller while being subjected to the ozone gas. This feature of continually or periodically wetting the goods is particularly important in case dry ozone is used, because the ozonized air would otherwise rapidly dry out the goods, resulting possibly in slow or uneven and unsatisfactory oxidation. Should this happen, however, little damage is done, because the goods can be again wetted and subjected to ozone so as to bring out the desired uniform color.

I have also found that in practising my invention the use of ozone of low medium concentration gives the best results, and I preferably use ozonized air containing not more than five grams of ozone gas per cubic meter. I have also found that there is an advantage in applying ozone to the goods at about ordinary atmospheric temperature.

I have also found that the time within which the operation may be completed may be materially shortened, and a better and more uniform color obtained by forcing the
ozone into close contact with the individual fibers. This may be accomplished by applying it to the fiber in a blast under pressure, or in the case of piece goods by maintaining a difference in pressure between the supply of ozone on one side of the goods and the other side of the goods, thus forcing or sucking it through the material, and thereby bringing it into close and intimate contact with the fibers, and rapidly and uniformly developing the desired color. The treatment with ozone is continued until the desired degree of oxidation is obtained. This will vary with the details of treatment and the quality and weight of the goods. Using a medium weight of cotton piece goods, and ozone of a concentration of about two grams per cubic meter of air, a very satisfactory result has been obtained by me in about fifteen minutes. After the ozone treatment it is desirable to subject the goods to a thorough soaping in a hot soap solution.

The various operations hereinbefore specified require comparatively little time when compared with the time taken by the old methods of anilin dyeing, and they may be carried out continuously, which is an advantage of considerable importance, particularly in the case of commercially dyeing piece goods, which, as heretofore practised, has been both tedious and expensive.

In carrying out the process above described any suitable apparatus may be employed.

While I have described one way of practising my improved process, I am aware that variations may be made therein by those skilled in the art without departing from the scope of my invention and claim.

What I claim is:

The improvement in the process of anilin black dyeing which consists in impregnating the fibers of the material with a solution comprising salt of anilin, sodium chlorate, and copper sulfate, obtaining a partial oxidation and thorough impregnation by drying the material, and periodically passing the goods over a wet lap roller and treating with a forced blast of dry ozonized air containing not more than five grams of ozone gas per cubic meter, said treatment being carried on at ordinary atmospheric temperature.

JAN STEYNIS.

Witnesses:

WALTER S. JONES,
OLIVER M. PENNINGTON.