

UNITED STATES PATENT OFFICE.

FRANK C. MATHERS AND JACOB PAPISH, OF BLOOMINGTON, INDIANA, ASSIGNORS, BY
MESNE ASSIGNMENTS, TO FRANK C. MATHERS & JACOB PAPISH, OF BLOOMING-
TON, INDIANA, A FIRM COMPOSED OF FRANK C. MATHERS AND JACOB PAPISH.

COLORING LIQUOR AND METHOD OF STAINING METALS.

1,308,092.

Specification of Letters Patent.

Patented July 1, 1919.

No Drawing.

Application filed September 22, 1917. Serial No. 192,791.

To all whom it may concern:

Be it known that we, FRANK C. MATHERS, a citizen of the United States, residing at Bloomington, county of Monroe, and State of Indiana, and JACOB PAPISH, a citizen of the Republic of Russia, residing at Bloomington, county of Monroe, and State of Indiana, have invented certain new and useful Improvements in Coloring Liquor and Methods of Staining Metals, of which the following is a specification.

This invention relates to certain improvements in the art of staining metals and it particularly relates to an improved coloring liquor, and to a new and improved method of staining metals by same.

In the art of staining metals the commonly used staining substances are polysulfids, platinum chlorid, arsenic compounds and electrolytically deposited black nickel. All these materials, however, have certain shortcomings, the polysulfids and arsenic compounds being known to lack permanence, the black nickel is to be obtained only with great difficulty, and the platinum is often prohibitive owing to its enormous price.

We have found, however, that compounds containing tellurium produce a dark metallic stain which gives satisfaction in regard to durability and price; a further advantage of our new coloring liquor is that it can be applied to the metals in the same way as the platinum, polysulfid or arsenic stain.

There are several ways of preparing our new coloring liquor and for the better understanding of our invention we shall now illustrate, as an example, one way of preparing it from metallic tellurium, the form in which tellurium is commonly purchased upon the market.

The metallic tellurium is first finely disintegrated and the powder thus obtained is then treated with nitric acid; the mixture of acid and metal is vigorously stirred to prevent free metal remaining in the finished product, which might contain free metal if basic nitrate, being quite insoluble in nitric acid, covers the outside of the metallic particles, and thus shuts off the nitric acid from acting on the metal.

As soon as one has made sure that all the metal has been acted upon, the reaction mass

is heated to volatilize the excess of nitric acid and dried until the residual product of basic tellurium nitrate may be handled conveniently.

The product thus prepared can be heated until it has been changed completely to the tellurium dioxid if so desired.

For security's sake the product should be tested for solubility in hydrochloric acid and upon gently warming one part of the tellurium compound with four parts of concentrated hydrochloric acid and four parts of water, no black residue should show, for such residue indicates that the action with the nitric acid was not complete.

In further preparing the coloring liquor, the tellurium compound made in the above, or any other manner, is dissolved in a suitable solvent whereby one obtains the coloring liquor which will produce a dark adhering, stain, or color, when applied to metals, especially to silver and copper. We prefer to dissolve the tellurium compound in hydrochloric acid, but other acids can be used. The solution we thus obtain may be applied to the metal by dipping, brushing, writing or in any other suitable way.

A convenient solution of the tellurium compound acting as a stain is obtained by dissolving 1 part of basic tellurium nitrate or dioxid, or other tellurium compound in 4 oz. concentrated hydrochloric acid and 4 oz. of water; if necessary the acid may be warmed to facilitate dissolving. The solution thus obtained is further diluted with water until a volume of 12 oz. is reached. If a more dilute solution is desired, the dilution should be made with a mixture of 1 part, by volume, of hydrochloric acid and 2 vol. of water.

The stain works more rapidly if heated, or if the concentration of hydrochloric acid is increased. It is of course understood that the same rules cannot hold good for all kinds of work, for according to the various factors offered by the nature of the various metals, for instance the natural color displayed by them, etc., the actual concentration, temperature, quantity of acid, etc., must be varied to obtain the most satisfactory results for the particular work at hand. The shade of color given by the liquor may be varied somewhat by treating the stained

metal with a little oil, followed by buffing and such other practices generally known and used by men of the art.

Finally, we beg to state that because of
5 considerations of convenience for the manufacturer of the coloring liquor, as well as to save cost in transportation to the consumer, the manufacture of the process is not always fully carried out at the the factory but for
10 economical reasons the tellurium compound is only so far produced that it can be conveniently handled in transportation. This means that in such case we stop the manufacture at the factory with the production of
15 the dry basic tellurium nitrate, or tellurium dioxid. It would then be left to the consumer to complete the manufacture of the coloring liquor by adding to the basic tellurium nitrate, or tellurium dioxid, the necessary amount of hydrochloric or other acid
20 as described above.

What we claim and desire to secure by Letters Patent is:

1. The method of staining a metal consisting of treating said metal with a tellurium compound.
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2. The method of staining a metal, consisting in treating said metal with a soluble tellurium compound.

30 3. The method of staining a metal, consist-

ing in treating said metal with a tellurium compound dissolved in an acid.

4. The method of staining a metal consisting in treating said metal with a tellurium compound dissolved in hydrochloric acid.
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5. The method of staining a metal, consisting in treating said metal with a solution of basic tellurium nitrate in an acid.

6. The method of staining a metal consisting in treating said metal with a solution of basic tellurium nitrate in hydrochloric acid.
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7. The method of staining silver, consisting in treating silver with a soluble tellurium compound.
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8. The method of staining silver, consisting in treating silver with a solution of basic tellurium nitrate.

9. The method of staining silver, consisting in treating silver with a solution of basic tellurium nitrate in hydrochloric acid.
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10. As a new article of manufacture a coloring liquor producing a stain on metals, said liquor consisting of a solution of basic tellurium nitrate in hydrochloric acid.

FRANK C. MATHERS.
JACOB PAPISH.

Witnesses:

G. G. TIPTON,
CHARLES COOPER.