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PREVENTION OF TARNISH OF BRONZE PRINTING

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2 Claims. (Cl. 117-13)

This invention concerns improvements relating to the prevention of tarnish on bronze or brass printing on paper and paperboard materials, whether coated or uncoated, for example bronze printing on folding boxboard. It is to be understood that for the purposes of this specification and the appended claims the term "paper" is to be construed as unlimited as to either the thickness or flexibility of the material and therefore as including paperboard. By such printing, various bronze or gold effects are produced with metallic pigments. The printing may be carried out by first sizing or pre-printing the paper with an undercolour, varnish or other ink medium and subsequently dusting a fine metallic powder, produced from bronze or brass, over the design. Alternatively the printing may be carried out by using printing inks in which the fine metallic powder is directly incorporated as pigment.

In the printing industry the term "bronze powder" is used to denote both powders of true bronze and also powders of substances which would not be considered true bronze, for instance, brass. It is to be understood that in this specification the term bronze also includes brass.

The presence of sulphur and sulphur compounds in the atmosphere or as constituents of paper has a pronounced tarnishing effect on bronze-printed or brass-printed material. However, acidity of the paper or paperboard is more usually the cause of tarnishing, especially when the material is stored in stacks or bundles after the printing. Tarnishing is increased when such printed material is stored in conditions of high relative humidity and temperature, the effect of relative humidity being particularly noticeable.

Other factors are also of importance: For example, high copper content and fine particle size increase the tendency of bronze or brass powders to tarnish. On the other hand, copper content and particle size also influence the colour and brilliance of bronze or brass print and some compromise has frequently to be accepted in practice in regard to these two factors, although very fine powders of high copper content should preferably be avoided.

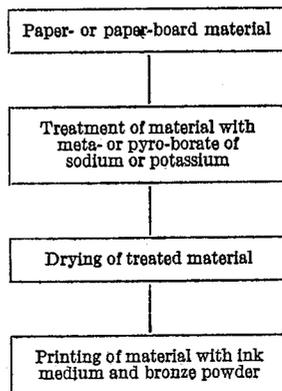
The invention seeks to prevent or inhibit the tarnishing of such printing, particularly where the printed material is stored in the form of stacked sheets, collapsed folded containers or assembled containers, especially in atmospheres of high relative humidity and temperature.

Hitherto, no specific precautions have apparently been taken to prevent such tarnishing as may occur either during storage or after fabrication. Printings produced by the dusting process, particularly gold effects produced from brass or bronze powders by the usual processes, are especially liable to tarnishing in atmospheres of high relative humidity and temperature. Even in the case of printings produced with a printing medium, for example a plastic resin, in which the metallic powder is incorporated, although the said medium offers some protection against tarnishing, nevertheless tarnishing will occur under unfavourable conditions such as have been referred to above.

According to the present invention, the paper or paperboard material is treated during fabrication or after

fabrication, but prior to printing, with a borate of sodium or potassium, for example sodium metaborate or sodium pyroborate (borax), the amount of anhydrous borate applied being between 2% and 6% by weight by the said material.

The process may be represented diagrammatically as follows:



Depending upon the material treated the borate may be applied by impregnation with or deposition from an aqueous solution or by coating with a coating composition. In the case of uncoated paper it may be necessary to treat both sides of the material, but with paper coated on one side a sufficient degree of protection may possibly be achieved by treating the uncoated side only.

The equivalent rate of application of the borate in terms of grammes per square metre of the surface of the material for any specific rate of application on a percentage by weight basis will depend upon whether the material is treated on one or both sides and upon the substance weight of the material so treated.

By way of example, paper of substance weight 180 lbs. per 1,000 sheets each 30" x 40" might be treated by impregnation at the rate of 3% of anhydrous borate, i.e. 5.4 lb. of anhydrous borate per 180 lb. of the said paper. Again, for example, folding boxboard of substance weight 510 lbs. per 1,000 sheets 30" x 40" coated on one side might be treated by deposition from an aqueous solution with 2% by weight of anhydrous borate, i.e. 10.2 lb. of anhydrous borate for 510 lbs. of the said board, either by deposition on both sides of each of the 1,000 sheets or by deposition on the uncoated side only or part might be deposited on the uncoated side and the remainder incorporated in the coating composition.

In the case of uncoated paper it may be necessary to treat both sides of the material, but with paper coated on one side, a sufficient degree of protection may be achieved by treating the uncoated side only. Nevertheless, if desired, the coated side can be treated either by deposition or by incorporation of the borate in the coating itself.

Borate solution may be applied in various ways, for example by allowing the paper to pass between rubber rollers set to transfer the solution from a contained or trough, by spraying the solution on to the paper prior to drying the calendering, by impregnating the paper as it passes through a trough containing the solution and subsequently drying, or by incorporating the borate in a surface coating treatment to which the paper material is submitted during its manufacture, for example prior to laquer coating or cast-film coating.

The printing itself may be carried out in any known manner, particularly in one of the ways referred to above.

We claim:

1. The method of printing on paper with bronze powder which comprises treating the paper with a com-

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position consisting essentially of a substance selected from the group consisting of metaborate of sodium and metaborate of potassium, the amount of anhydrous metaborate applied being between 2% and 6% by weight of the paper and printing on the treated paper with said powder.

2. The method of printing on paper with bronze powder which comprises treating the paper with a composition consisting essentially of a substance selected from the group consisting of pyroborate of sodium and pyroborate of potassium, the amount of anhydrous pyroborate

applied being between 2% and 6% by weight of the paper and printing on the treated paper with said powder.

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