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BLEACHING SOLUTION.

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To all whom it may concern:

Be it known that I, HARRY M. WEBER, a citizen of the United States, and a resident of Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Bleaching Solutions, of which the following is a specification.

This invention relates to a bleaching solution and to the process of making same and relates especially to a composition containing phosphates and chlorine compounds present in definite or limiting proportions and the invention in its specific aspects relates to a composition made by chlorinating a soluble alkaline phosphate.

In particular the invention relates to the chlorination of trisodium phosphate or other phosphates such as ortho, meta and pyrophosphates preferably in an aqueous vehicle to form a bleaching solution adapted for various bleaching operations such as the whitening of textiles, discharging colors, removing fruit stains and ink stains and the like. The solution may of course be used to bleach and efface handwriting in ordinary ink.

For many years it has been known that useful bleaching solutions could be produced by incorporating chlorine and alkaline phosphates, Gmelin, Handbook of Chemistry, volume 2, page 294, published in 1849, under the section relating to the preparation of hypochlorous acid the statement appears that when chlorine is passed into a solution of terbasic phosphate of soda till it is no longer absorbed a liquid is obtained having strong bleaching properties and yielding hypochlorous acid when distilled.

In the present invention I do not lay claim broadly to bleaching compositions of this general character but am concerned with a certain procedure and the employment of certain proportions whereby, starting with trisodium phosphate for example I am enabled to make bleaching solutions in a very simple manner at a low cost and of a high degree of effectiveness which are well suited for the removal of stains, handwriting in ink and the like and which have satisfactory keeping qualities so that bottles of such composition may be preserved for domestic or other uses over a considerable period of time.

Thus I may proceed as follows. An aqueous solution containing 3 per cent by weight of trisodium phosphate is prepared and chlorine gas is passed into this solution in the cold until 1 per cent by weight of the gas has been absorbed. This yields what would appear to be a very dilute and inefficient bleaching composition but tests have shown on the contrary that it has remarkably active bleaching qualities. For example when handwriting in ordinary ink is moistened with this solution the ink vanishes almost immediately. Furthermore there is an advantage in using such a dilute solution for this or kindred purposes in that the tissue or fabric is less likely to be injured, when applied to paper for the removal of ink or other stains no large deposit of salts remains on the surface of the paper to subsequently cause yellowing or other changes.

As a practical limiting range I prefer to use not less than 1 per cent and not over 6 per cent of trisodium phosphate and not less than ¼ of 1 per cent and not over 2 per cent of chlorine. Free chlorine is objectionable as it attacks textile material and cellulose fibres.

Another feature of interest is that by increasing the phosphate above 6 per cent and introducing a corresponding amount of chlorine or in fact with any proportion of chlorine the action generally speaking is slower than when the proportions are confined to not in excess of 6 per cent of the phosphate. The preparation and use of such dilute solutions and the employment of the limiting range specified constitute specific features of my invention.

A modified method which however is not as satisfactory as the foregoing is that of over-chlorinating the trisodium phosphate and subsequently bringing back to neutrality by the addition of sodium carbonate, bicarbonate or caustic soda. This is especially suitable when using for example disodium phosphate, pyrophosphate and certain other phosphates. In some cases the phosphate may be replaced by borates, for example a mixture of equal parts of trisodium phosphate and sodium borate, that is ordinary borax, may be chlorinated within the limiting ranges set forth above and this solution employed for bleaching pur-

poses. Solutions made up in this way will haxe a content of total solids which may amount to 10 or 12 per cent which is objectionable in the removal of ink stains owing to the amount of saline matter left in the paper. In the preferred form of my invention not over 8 per cent of total solids exist in the solution. In the illustration given above where 3 per cent of trisodium phosphate is employed to 1 per cent of chlorine the total solids will not exceed approximately 4 or 5 per cent. It will be appreciated that the attainment of such dilute solutions having adequate bleaching power constitutes an important advance in the art of producing stable solutions for domestic or office use capable of removing fruit stains, ink stains, handwriting in ink and the like.

In making these dilute solutions I may add that it is preferable to use a pure form of the sodium phosphate, to employ distilled water in preparing the solution and in general to carry out the process in such a manner as to avoid the introduction of metallic compounds such as those of iron, also free sulphur or other bodies which would tend to have a catalytic effect upon the chlorinated solution to destroy its bleaching activity. It is recommended therefore that great care be taken in preparing the solution to use pure materials to minimize as far as possible conditions promoting instability. Operations under these conditions and product derived therefrom, that is a stain remover or ink eradicator essentially free from catalysts promoting instability also constitutes a phase of my invention.

What I claim is:—

1. The process of making a bleaching solution adapted to whiten textiles, remove fruit stains, ink lines or stains and the like which comprises subjecting an aqueous solution containing between one and six per cent of trisodium phosphate to the action of chlorine gas until the solution takes up approximately one per cent of chlorine.

2. The process of making a bleaching solution adapted to whiten textiles, remove fruit stains, ink lines or stains and the like by subjecting an aqueous solution of an alkaline phosphate containing only a few per cent of the latter to the action of chlorine in the cold until the solution has taken up not in excess of approximately two per cent of chlorine.

3. A bleaching solution adapted to whiten textiles, remove fruit stains, ink lines or stains and the like comprising between one and six per cent of trisodium phosphate, chlorinated with not to exceed approximately two per cent of chlorine.

4. A bleaching solution adapted to whiten textiles, remove fruit stains, ink lines or stains and the like comprising chlorinated trisodium phosphate solution, the total solids of such solution not exceeding eight per cent.

In testimony that I claim the invention set forth above I have hereunto set my hand this 20th day of December, 1923.

HARRY M. WEBER.

Witnesses:

J. D. CARDINELL,

ARTHUR SCHRODER.