

UNITED STATES PATENT OFFICE.

FRIEDRICH LUDWIG SCHMIDT, OF CHARLOTTENBURG, GERMANY, ASSIGNOR TO THE ROESSLER & HASSLACHER CHEMICAL COMPANY, A CORPORATION OF NEW YORK.

PROCESS OF BLEACHING.

1,155,104.

Specification of Letters Patent.

Patented Sept. 28, 1915.

No Drawing. Original application filed January 9, 1911, Serial No. 601,695. Divided and this application filed May 7, 1914. Serial No. 836,890.

To all whom it may concern:

Be it known that I, FRIEDRICH LUDWIG SCHMIDT, a citizen of the German Empire, residing in Charlottenburg, Germany, have
5 invented certain new and useful Improvements in Processes of Bleaching, of which the following is a specification.

This invention relates to an improved process of bleaching by means of borates
10 containing active oxygen in the presence of compounds of zinc.

Sodium perborate possesses the property of giving off its oxygen rather rapidly in water at a temperature as low as 50° C.
15 This is a disadvantage in the application of sodium perborate as a bleaching agent, inasmuch as the washing and bleaching process can only properly begin at a higher temperature, so that a large proportion of the
20 oxygen will be driven off and its effect lost before the efficient temperature is attained.

In view of this fact, the discovery that magnesium perborate evolves its oxygen at a higher temperature represented an advance.

It is known that mixtures of sodium perborate and a magnesium salt in equivalent proportions can be employed for bleaching; instead of pure magnesium perborate. In this case the magnesium perborate is formed
30 from the sodium perborate and the magnesium salt by double decomposition. The proportions which are used in the latter process are such that the whole of the sodium perborate is decomposed by the mag-
35 nesium salt. To this extent the latter process differs from that with magnesium perborate in the fact that the magnesium perborate is produced by the said double decomposition just before the bleaching
40 occurs.

While the employment of magnesium perborate for bleaching purposes represents an advance as regards the bleaching effect, owing to the greater stability of the magne-
45 sium perborate under boiling, yet, on the other hand, its high price and some other shortcomings militate against its wide employment.

I have found that it is possible to obtain
50 the effect of greater resistance to boiling with the cheap sodium perborate and with other alkali metal perborates containing active oxygen, by adding certain substances to the same. These substances include the

salts of magnesium, and their base, mag- 55 nesia itself. The process so far as it extends to the addition of magnesium, differs from the above-mentioned process according to which sodium perborate is completely decomposed by equivalent proportions of 60 magnesium salt.

It is not necessary to add to the alkali metal perborate so much magnesium compound that the whole bleaching process is carried out with magnesium perborate, that
65 is to say, that all the sodium perborate is decomposed by the magnesium salt. On the contrary, it is possible to attain the said effect of greater resistance to boiling with only very small proportions of an addition 70 of a magnesium compound. The addition of a fraction of a molecular proportion suffices to attain a very distinct effect. This action of less than equivalent molecular proportions of magnesium salt was not to 75 be foreseen, for in the process the greater portion of the sodium perborate remains unaltered in solution, and the natural assumption would therefore be that this unaltered sodium perborate would split off the oxy- 80 gen as readily as do ordinary solutions of sodium perborate.

The process utilizing only small quantities of magnesium salt is of special advantage on account of its technical advantage 85 over the process using either ready prepared magnesium perborate or freshly formed magnesium perborate. Both magnesium perborate and the magnesium borate into which the former becomes converted after 90 the bleaching action are insoluble. There is therefore in the bleaching liquor a considerable quantity of such magnesium precipitate, which, owing to the large quantity present, has a detrimental effect and is diffi- 95 cult to remove from the bleached goods. By using smaller quantities of magnesium salt, less of this troublesome precipitate has to be dealt with, and the less the quantity of mag- 100 nesium salt used the smaller is the quantity of the precipitate.

The process above described is claimed in a separate application filed by me January 9th, 1911, under Serial Number 601,695, of which this application is a division.

I have further found that not only mag- 105 nesium possesses the described action, but the same action is also possessed by com-

pounds of zinc. The addition of one-fifteenth of a molecular proportion of chlorid of zinc is found to make the solution stable so that the percentage of oxygen remaining after heating is much greater than when the zinc chlorid is not present. It is well-known, of course, that zinc chlorid readily ionizes in solution.

The following is an example of the bleaching process as carried out by borates containing active oxygen, when also chlorid of zinc is employed: 200 kilograms of cotton, which is freed in the well-known manner by boiling it with caustic soda from the pectic compounds, is treated with a solution of 2000 liters of water containing 10 kilos of caustic soda, 5 kilos of soap, 1.5 kilos of sodium perborate, and 0.14 kilo of zinc chlorid, for about five hours in an open vessel, or for from three to four hours under pressure at a temperature of 110° C., under continuous stirring of the mass. After cooling, the bleached cotton is separated from the bleaching liquor, washed and dried. The quantity of zinc chlorid can be increased or decreased.

In the place of caustic soda, other alkaline substances, as for instance sodium carbonate, can be used and other additions of cleansing substances, as Turkey-red oil, may be made. In place of cotton, other vegetable fibers, such as linen, can be treated with advantage by the improved bleaching process, also textile fabrics.

The stabilizing effect of the soluble com-

pounds of zinc applies not only to sodium perborate, but also to the other borates containing active oxygen, which can be obtained by crystallization or by mixing or melting. It applies also to perborax and such borates containing active oxygen, as manufactured by the process covered by Letters Patent of the United States issued to me, October 24th, 1911, under No. 1,006,798.

The said stabilizing substances may be added to the active borates and the mixture of both of them, ready for use, may be placed upon the market; or the procedure may be such that they are added just before use or during use.

It is not necessary that the salts or bases having an action in the described sense shall be of the ordinary kind; for example, the per-salts and peroxids of the same will serve the purpose.

I claim:

The process herein described of washing and bleaching fibers by means of a perborate, which consists in applying the same to the fibers in the presence of a soluble inorganic compound of zinc in less than a molecular proportion.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

FRIEDRICH LUDWIG SCHMIDT.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.