Patented Apr. 16, 1935 1,997,691

UNITED STATES PATENT OFFICE

1,997,691

PURIFICATION OF CAUSTIC SOLUTIONS

Wilmer H. Koch, Niagara Falls, N. Y., assignor to The Mathieson Alkali Works, Inc., New York, N. Y., a corporation of Virginia

No Drawing. Application May 16, 1932, Serial No. 611,640

1 Claim. (Cl. 23—184)

Liquid caustic, that is aqueous solutions of caustic soda containing about 50% by weight of caustic soda, has some advantages, as compared to solid caustic, in specific applications, but the presence of the small amount of iron compounds almost invariably encountered in liquid caustic has involved difficulties in some applications, particularly in the manufacture of rayon and high grade soap and in mercerizing and textile work. For soap manufacture liquid caustic should contain not more than about 0.0040% of iron on the caustic soda and for rayon manufacture not more than about 0.0010%, for example.

This invention relates to an improvement in the treatment of liquid caustic for bringing the iron content below the limits which must be observed in such applications.

Various expedients have been adopted for the purpose of producing liquid caustic sufficiently free from iron for these purposes, including the use of nickel lined apparatus throughout the manufacture of the liquid caustic and the use of silver lined apparatus, but such expedients have involved unfortunate economic penalties.

This invention provides a simple and economical method of reducing the iron content of liquid caustic, to bring it within the limits tolerable in the manufacture of rayon and soap and in mercerizing and textile work, for example.

I have found that the introduction of the water insoluble oxide and hydroxide of magnesium into the liquid caustic, results in the formation of a precipitate from which the liquid caustic can be readily separated and which precipitate occludes, or otherwise carries with it, a large part of any iron compounds present in the liquid caustic. According to this invention, the oxide or the hydroxide is added to the liquid caustic and the precipitate formed is thereafter separated from the liquid caustic, iron compounds present, or a large part of them, being removed from the liquid caustic with this precipitate. The purifying reagent may be added to the liquid caustic in suspension or in solid form. The precipitate formed may be separated from the liquid caustic by filtration, settling or centrifuging, for example.

The invention will be further illustrated by the following example, but it is intended and will be understood that this example is for the purpose of illustration and that the invention is not limited thereto.

I. To a liquid caustic containing 50% by weight of caustic soda and containing 0.0017% by weight of iron on the caustic soda, 0.03% by weight of solid light magnesia on the liquid caustic was added, the precipitate formed was permitted to settle and the settled precipitate was separated from the liquid caustic by filtration. The iron content of the liquid caustic was reduced to 0.00004%.

The temperature of the liquid caustic during the treatment of the invention is not important although I have observed that, with light magnesia, the removal of iron is effective to a greater extent at lower temperatures such as 25°–30° C. than at higher temperatures such as 65° C.

Caustic liquors containing about 50% by weight of caustic soda are commonly designated "liquid caustic" but the treatment of the invention is not limited to caustic liquors of this particular concentration. It is applicable to caustic liquor of any concentration, liquid below about 100° C. For example:

II. To a caustic liquor containing 18% by weight of caustic soda and about 0.0017% by weight of iron on the caustic soda, 0.15% by weight of solid light magnesia on the caustic liquor was added, the precipitate formed was permitted to settle and the settled precipitate was separated from the caustic liquor by filtration. The iron content of the caustic liquor was reduced to 0.00016%

Caustic liquors of this concentration, about 18%, by weight of caustic soda, or somewhat lower concentration, are used extensively in the manufacture of rayon at present. When the treatment is applied to more dilute caustic liquors, settling is more rapid and filtration is easier but increased settling capacity is required.

I have also found that the introduction of the oxide and hydroxide of magnesium in the caustic liquor, according to this invention, results in the formation of a precipitate which occludes, or otherwise carries with it, a large part of any aluminum compounds present in the caustic liquor. For example, the alumina content of caustic liquors may be reduced, by the treatment of the invention, from upwards of 0.040% by weight on the caustic soda to 0.006–0.010%. The invention thus also provides a simple and economical method of reducing the aluminum content of caustic liquors.

The purifying agent may be recovered from the separated precipitate and re-used.

This application is a continuation in part of my copending application, Serial Number 493,236, filed November 3, 1930.

I claim:

The improvement in the purification of caustic liquors which comprises addition to the caustic liquor of a purifying reagent selected from the group consisting of the oxide and hydroxide of magnesium, and the subsequent separation from the caustic liquor of the precipitate formed.

WILMER H. KOCH.