UNITED STATES PATENT OFFICE.

THEODORE H. WREDE, OF COVINGTON, KENTUCKY.

IMPROVEMENT IN PROCESSES FOR LEACHING COAL-ASHES.

Specification forming part of Letters Patent No. **185,998**, dated January 2, 1877; application filed November 24, 1875.

To all whom it may concern:

Be it known that I, THEODORE HENRY WREDE, of Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in the Compound of Caustic Alkali, and in the process of making the same, of which the following is a specification:

The object of my invention is, first, to produce a superior article of alkaline compound, and one which can be handled in packages much better than caustic soda of commerce, and also to produce the same at a less cost, which cheapness is due in part to the process employed, and partly to the characteristic qualities of the compound.

My invention consists in the process of compounding or combining certain salts of coal-ashes with either caustic soda or with caustic potassa, (chemically known as the hydrated protoxide of sodium or of potassium.)

The first step in my process of making the alkaline compound is to extract certain salts from coal-ashes. The following is the preferred plan: I take coal-ashes (those obtained from the Kanawha or splint coal preferred) and put them in a leach-tub, the same as in extracting lye from wood-ashes. Boiling-hot water containing about one per cent. of caustic soda in solution is poured in and filtered through the leach.

As bituminous-coal ashes usually contain carbonates and sulphur, either in a free or combined state, a little quicklime should be mixed with the ashes, or else lime-water or the milk of lime may be added to solution of salts extracted from the coal ashes. The amount of lime-water or lime used will depend upon the amount of sulphur or sulphates combined with the salts to be utilized. These salts composing the alkali are salts of silicate of aluminium and of potassa or soda, and using ashes from Kanawha coal, I use from two to five per cent. So, also, any deleterious ingredient other than sulphur can be removed in like manner by mixing, either with the ashes or with the soluble salts obtained, the proper ingredient to neutralize such substance or render it insoluble.

The proportion of lime, coal-ashes, and water is usually as follows: Coal-ashes, (Kanawha,) two to three bushels; lime, from one to five per cent., depending on the amount of sulphur and carbonates; caustic soda, about one and a half pound; boiling-hot water, sixteen gallons. The proportion may be varied, greatly depending on circumstances.

The specific gravity of the soluble salts obtained will be about 2½° Baumé. Weaker lye may be used; but it takes a longer time to evaporate the water in the second step of the process.

The second part of my process consists in combining the salts or lye extracted from the coal-ashes with either caustic soda or caustic potassa, depending on the character of the use for which the product is intended.

When the alkaline compound is intended for use in making hard soap, caustic soda is used; and when for soft soap, caustic potassa is used, or different proportions of the two may be combined, according to circumstances, depending somewhat upon the proportion of the ingredients held in aqueous solution of salts.

To sixteen gallons of the aqueous solution I add about one hundred pounds of caustic soda, and boil briskly until the mixture is reduced to the desired gravity.

The product can be molded into cakes of any desired size, which are, as soon as hardened, placed in tin boxes; or wooden boxes may be used when made impervious to moisture by coating the inside with bees-wax, asphaltum, or paraffine, &c., (these boxes should be securely sealed;) or the cakes can be placed in grease and secured from atmospheric influence in any desired form. The alkaline compound may be poured hot into tin boxes, which are then sealed or soldered.

When caustic potassa, or a combination of caustic potassa and caustic soda is used to produce my alkaline compound, the process of combining them with the salts of coal-ashes is similar to that of caustic soda.

There are many advantages attained by my process: first, it can be carried on in all seasons of the year; second, it can be made in a much shorter time, and it cools or hardens much more rapidly; third, to prepare alkaline compound, the caustic soda or potassa can be

used in large lumps, which do not require to be broken up, as the salts rapidly combine with the caustics.

Having described my invention, what I claim is—

An alkaline compound composed of the salts of soda combined with the salts of coal-ashes, substantially as herein set forth.

In testimony whereof I have hereunto set my hand this 6th day of November, 1875.

T. HENRY WREDE.

Witnesses:
JOHN O'GARA,
EDWARD BOYD.