

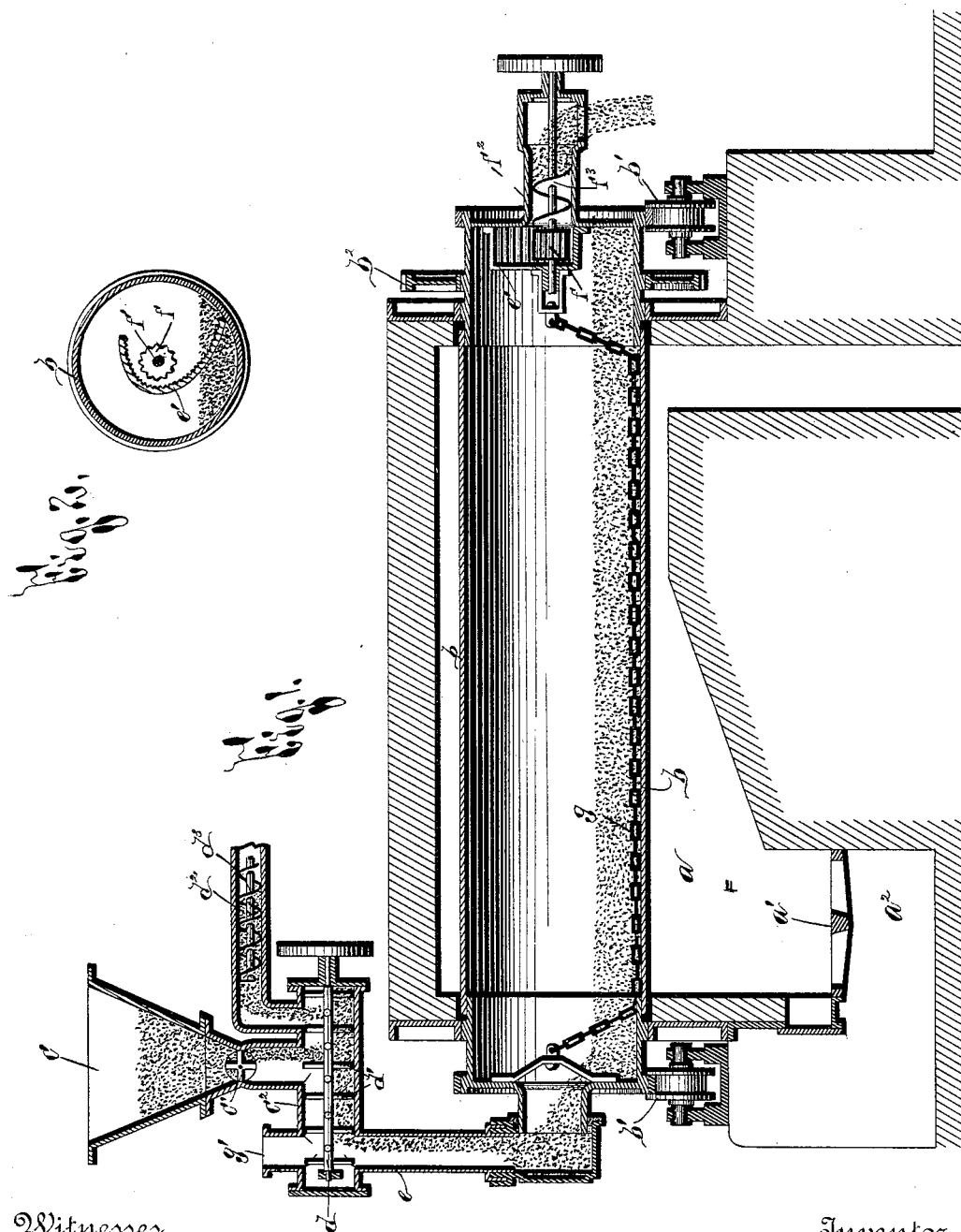
(No Model.)

E. SOLVAY.

APPARATUS FOR ROASTING SODIUM BICARBONATE.

No. 386,664.

Patented July 24, 1888.



Witnesses
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UNITED STATES PATENT OFFICE.

ERNEST SOLVAY, OF BRUSSELS, BELGIUM, ASSIGNOR TO THE SOLVAY PROCESS COMPANY, OF SYRACUSE, NEW YORK.

APPARATUS FOR ROASTING SODIUM BICARBONATE.

SPECIFICATION forming part of Letters Patent No. 386,664, dated July 24, 1888.

Application filed March 29, 1888. Serial No. 268,886. (No model.) Patented in Belgium August 11, 1887, No. 78,547; in France August 11, 1887, No. 185,282, and in England October 1, 1887, No. 13,323.

To all whom it may concern:

Be it known that I, ERNEST SOLVAY, of Brussels, Belgium, have invented new and useful Improvements in Furnaces for the Decomposition of Bicarbonate of Soda, (for which I have obtained foreign patents in England, October 1, 1887, No. 13,323; in France, August 11, 1887, No. 185,282, and in Belgium, August 11, 1887, No. 78,547,) of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to an improvement in furnaces for the decomposition of bicarbonate of soda; and it consists in certain peculiarities of the construction and arrangement of the same, substantially as will be hereinafter more fully set forth and claimed.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe its construction and operation, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal section of my device, and Fig. 2 is a cross-section of the discharge end of the cylinder.

a represents a furnace of any usual or desired form, provided with grate-bars a' and ash pit a'' , as usual. Over this furnace, set in brick-work or other suitable material, is a cylinder, b , composed of three parts, as shown in Fig. 1, said parts being rigidly secured together, and of considerable length in proportion to its diameter. This cylinder is supported upon rollers b' and provided at one end with a toothed ring or gear, b'' , by which it is revolved by connection with any desired motive power.

The working of the bicarbonate of soda is better effected by the admixture with it of a small quantity of soda already calcined, and I effect this mixture, as well as the proper and regular feeding of the bicarbonate, by means of the following devices:

The bicarbonate is fed into a hopper, c , in the bottom of which is a revolving feeder, c' , which feeds the material regularly and evenly into a cylindrical chamber, c'' , upon which the hopper is set. This chamber is provided with a longitudinal shaft, d , having arms d' , acting to stir the material and break up any lumps

into which it may be formed, and connected with the rear end of this cylindrical chamber c'' is a pipe, d'' , connected to a suitable source of supply, provided with a conveyer screw, d''' , for feeding in the requisite quantity of calcined soda, which is mixed with the bicarbonate of soda in the chamber c'' . It will be noted that the conveyer screw d''' ends just before reaching the end of the pipe in which it acts, thus causing the calcined soda to collect in and fill the end of the pipe, forming an air-tight plug therein, for a purpose presently explained.

The cylindrical chamber c'' is connected by a pipe, e , with the forward end of the revolving cylinder b , and the material is fed through this pipe to the roasting-cylinder, through which it slowly passes from front to rear. At the rear end this cylinder b is provided with a curved or spoon like lifter, e' , (shown clearly in Fig. 2,) having its inner face corrugated. This lifter revolves with the cylinder, and at each revolution lifts up a quantity of the dry material from the bottom of the cylinder and carries it up between its corrugated face and the corrugated or fluted surface of a roller, f , secured upon a shaft, f' , and which revolves in an opposite direction to the cylinder. This shaft passes out through a discharge-pipe, f'' , at the end of the cylinder, and is provided with a short screw-flight, f''' , to aid in conveying off the material which is fed therein from the lifter. This conveyer-flight is also cut short, allowing the material to mass in the pipe and form a plug to hermetically seal it against the admission of any air to the cylinder.

To prevent any scale from forming on the inside of the revolving cylinder, I secure the ends of a chain, g , to the inlet and outlet ends of the cylinder, and allow the body of the chain to lie upon the bottom of the cylinder, as clearly seen in Fig. 1. This chain acts as a scraper and keeps scale and particles of the soda from adhering to the metal.

In operation the bicarbonate and carbonate of soda are fed in proper quantities to the chamber c'' , where they are mixed and fed through the tube e to the cylinder b , through which they slowly pass, and are taken up by the lifter, all lumps broken by it and the cor-

rugated roller, and finally discharged perfect carbonate of soda.

It is important that no air should be allowed to enter the cylinder, and this I accomplish by allowing the material to accumulate and form a plug, which seals all the connections, but does not interfere with the continuous operation of the apparatus. This also prevents the escape of the steam and gases at these points, they being compelled to pass up through the tube *c* and cylinder *c'* and out through an opening, *g'*, especially provided for them, and from which they are conducted off to any point desired.

15 Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a revolving roasting-cylinder and a furnace for heating the same, of a mixing-chamber connected to said cylinder and having an inlet for the bicarbonate and one for the carbonate, whereby a mixture is made and fed continuously to the cylinder, substantially as and for the purpose set forth.

2. The combination, with the revolving roasting-cylinder, of an outlet for the soda

provided with a conveyer-shaft having a corrugated roller on its end and a tangentially-curved lifter within the cylinder formed with a corrugated face, whereby the material is continuously discharged and all lumps crushed, substantially as and for the purpose set forth.

3. The combination, with the mixing-chamber of an apparatus for decomposing bicarbonate of soda, of a hopper thereon having a feeding-valve in its bottom, and a pipe connected thereto and provided with a conveyer stopping short of its connecting-point, whereby the material is induced to fill the openings and prevent the admission of air, substantially as and for the purpose set forth.

4. The combination, with the rotary roasting-cylinder, of a discharge-pipe and a conveyer therein made shorter than the pipe, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand, this 31st day of December, 1887, in the presence of two witnesses, at Brussels, Belgium.

ERNEST SOLVAY.

Witnesses:

P. LIENIENUL,

T. A. FÜRSTENHOFF.