(No Model.) 2 Sheets—Sheet 1.

E. SOLVAY.

LIMEKILN.

No. 386,665. Patented July 24, 1888.

Fig. 1.

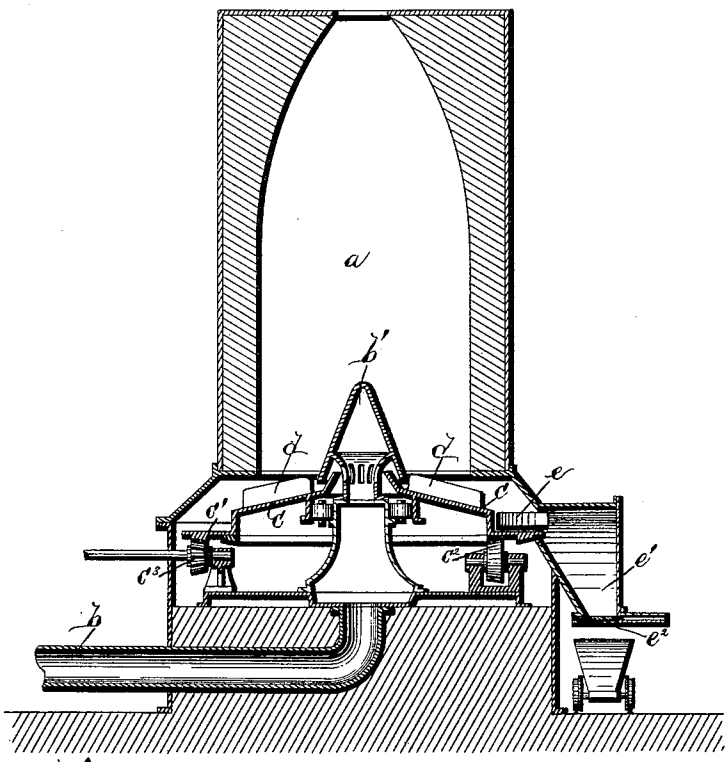
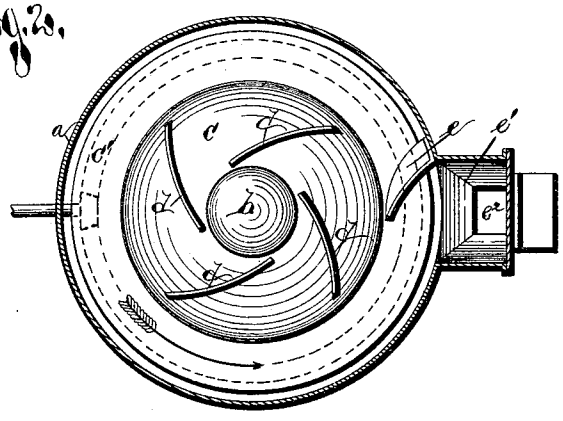


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

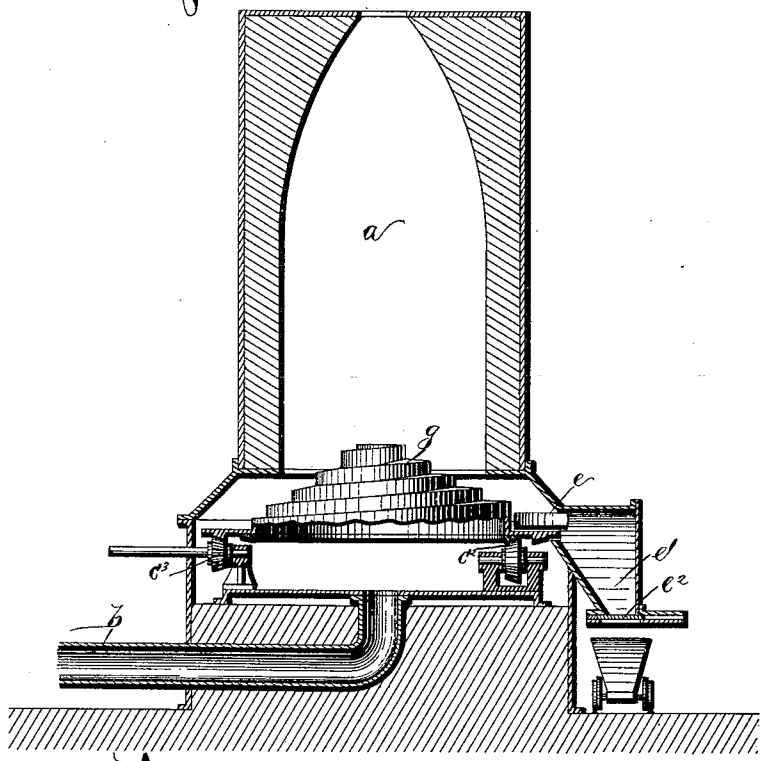
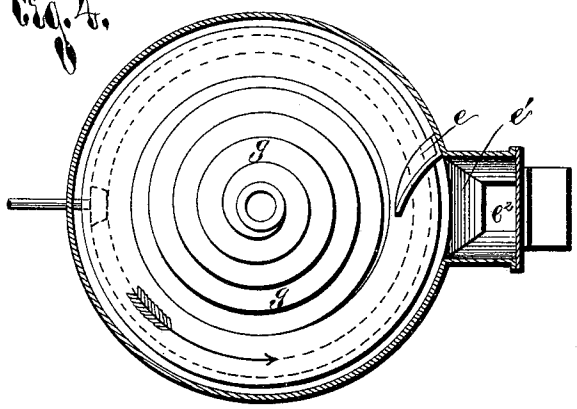


Fig. 4.



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UNITED STATES PATENT OFFICE.

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

LIMEKILN.

SPECIFICATION forming part of Letters Patent No. 386,665, dated July 24, 1888.

Application filed March 29, 1888. Serial No. 268,887. (No model.) Patented in Belgium August 26, 1887, No. 78,672; in France August 26, 1887, No. 185,507, and in England October 1, 1887, No. 13,322.

To all whom it may concern:

Be it known that I, ERNEST SOLVAY, of Brussels, Belgium, have invented new and useful Improvements in Limekilns, (for which I have obtained patents in Belgium, No. 78,672, August 26, 1887; France, No. 185,507, August 26, 1887, and Great Britain, No. 13,322, October 1, 1887,) 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 limekilns; 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 central vertical section of my invention, and Fig. 2 is a horizontal section showing the discharging mechanism in plan. Figs. 3 and 4 are similar views of a modified form of discharging-plate.

In some cases it is found very advantageous to introduce a blast of air at the bottom of limekilns instead of merely using their natural draft or of drawing air into the upper part of the kiln—for instance, when small limestone is used or when it is desired to utilize refuse, &c. I have found that this forced draft is only effective and practical on condition that the bottom of the kiln is completely closed; and I have combined with it a new mode of discharging the kiln mechanically, which not only is more regular and effective, but is more economical than hand labor.

The kiln *a* is of any size, material, or form most desirable, and is provided at its bottom with a space in which the discharging and forced-draft devices are placed, this space being made air tight, so that no air is admitted except that which passes through the draft-supply pipe. The forced draft is supplied through a pipe, *b*, which passes in through the bottom to the center of the kiln, and is provided on its end with a cone, *b'*, which extends up in the center of the kiln and serves to part and spread the charge which rests upon it. This cone is formed with suitable openings for the passage of the air, as clearly seen in Fig. 1. In this figure the cone is shown as stationary, but it may when desirable be made to revolve. Surrounding the base of the cone is a plate, *c*, slightly conical in form, and provided with a horizontal annular flange, *c'*, around its outer edge. This plate is supported upon suitable rollers, c^2, and constantly revolved by means of a gear, c^3, which is secured upon a shaft driven from any suitable motive power.

Upon the upper face of the plate *c* are a series of tangential wings, *d*, which serve to gradually work the charge outward till it falls upon the annular flange *c'*, from which it is swept by means of a wing, *e*, fixed to the side of the kiln, into a hopper or receptacle, *e'*, provided with a valve, e^2, at its bottom, which is opened at any time to discharge the contents into wagons or other devices for carrying it away.

The charge is placed in the kiln from the top and rests upon the cone and revolving plate, and as this plate revolves the finished product at the bottom is gradually worked to the outside and automatically and evenly discharged. This discharge insures an evenness of the product not obtainable when the discharge is made by hand, and the forced draft insures the full and perfect burning of all small stone, refuse, &c. It will be noted that the lower part of the inner wall of the kiln is perfectly straight, so as to present no obstacles to the settling of the charge. The material is fed in at the top by means of any elevator, (not necessary to show herein,) and the operation is thus perfectly automatic and continuous.

In Figs. 3 and 4, I have shown a modification, in which the cone and plate are made in one, and the latter, instead of the tangent wings, is formed with a spiral shoulder, *g*, which serves the same purpose of forcing the material to the point of discharge. The blast-pipe is connected to this plate in a similar manner to the first and the operation is the same. This form is sometimes preferable when it is desired to revolve the central cone.

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

1. The combination, with a limekiln, of a revolving disk placed in the bottom of the kiln and provided with means for forcing the lime gradually from the center to the outer edge of the disk, substantially as and for the purpose set forth.

2. The combination, with a limekiln, of a revolving conical disk in the bottom of the kiln, having a horizontal annular flange, tangent wings for forcing the material out to and upon the annular flange, and a scraper to sweep the lime off said flange at the point of discharge, substantially as and for the purpose set forth.

3. The combination, with a limekiln having its inner sides made vertical at the lower end, of a revolving disk in the lower part of the kiln for automatically discharging the material, substantially as and for the purpose set forth.

4. The combination, with a limekiln having its lower end made air-tight, of an air-blast pipe introduced into the lower end of the kiln, and having a discharge nozzle or cone, *b'*, connected to the blast-pipe and extended up into the center of the charge under operation, substantially as shown and described.

5. The combination, with a limekiln, of a cone projecting into the lower center thereof and connected to an air-blast, and a revolving disk surrounding the cone and adapted to continuously work the lime outward to a discharge-point, 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, in Belgium.

ERNEST SOLVAY.

Witnesses:
P. LIENIENUL,
T. A. FÜRSTENHOFF.