

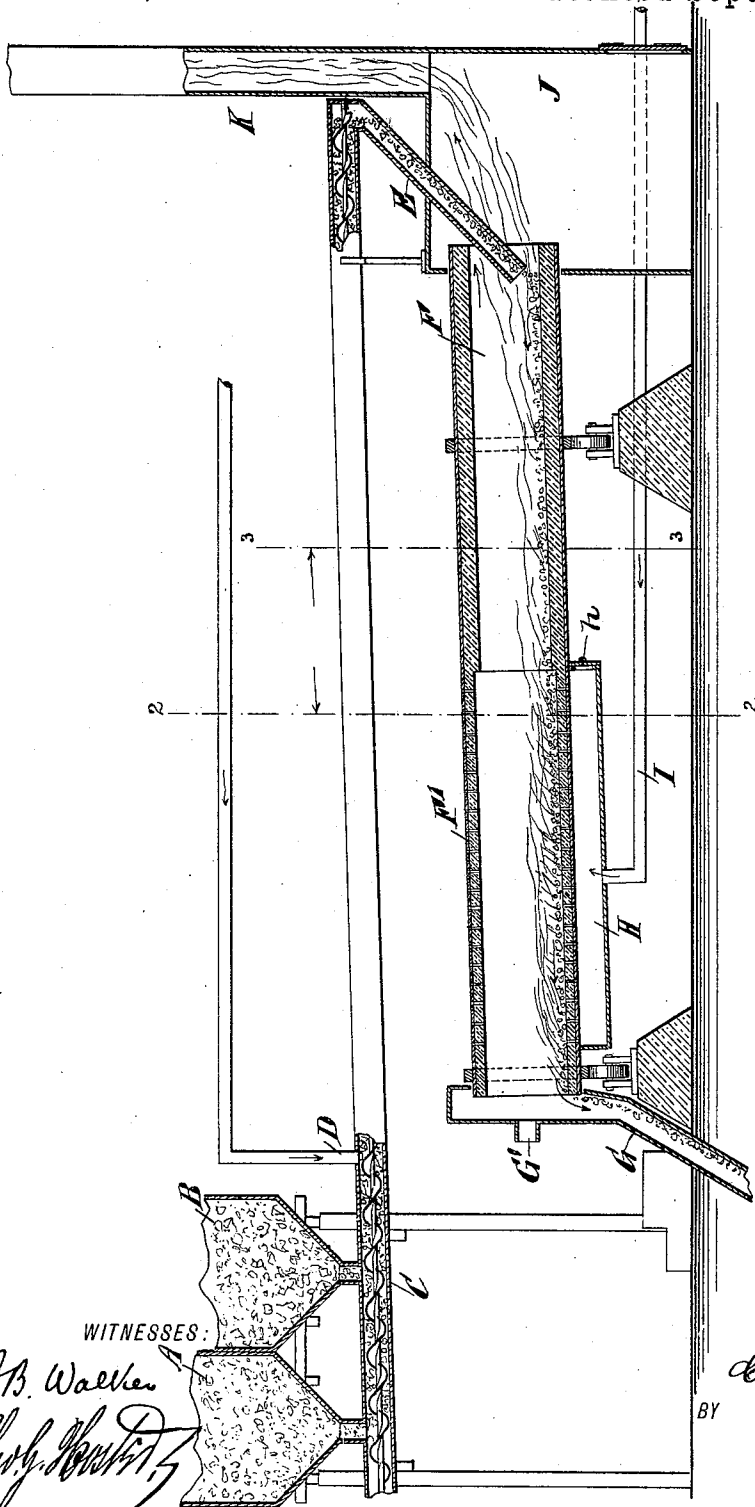
(No Model.)

C. BONNEVILLE.

METHOD OF AND APPARATUS FOR CALCINING CEMENT.

No. 568,599.

Patented Sept. 29, 1896.



WITNESSES:

J. B. Walker
Chas. H. Smith

INVENTOR

C. Bonneville

BY

Attorneys.

UNITED STATES PATENT OFFICE.

CLIFFORD BONNEVILLE, OF ALLENTOWN, PENNSYLVANIA.

METHOD OF AND APPARATUS FOR CALCINING CEMENT.

SPECIFICATION forming part of Letters Patent No. 568,599, dated September 29, 1896.

Application filed February 8, 1896. Serial No. 578,555. (No model.)

To all whom it may concern:

Be it known that I, CLIFFORD BONNEVILLE, of Allentown, in the county of Lehigh and State of Pennsylvania, have invented a new and Improved Method of and Apparatus for Calcinig Cement, of which the following is a full, clear, and exact description.

This invention relates to the manufacture of that cement with reference to which it is customary to combine with the raw cement material a portion of combustible material, after which the mixture is rendered plastic and formed into blocks or lumps for calcining or burning, which operation deprives the mixture of combustible material, thus producing a porous block of calcined cement material ready to be crushed to produce the final and marketable article.

The object of the invention is to provide superior means by which this art may be prosecuted; and to this end the invention consists, first, in the method of calcining in which the raw cement material and a proportion of cement are combined with a combustible material, the mass made plastic by the application of water and then immediately and concurrently subjected to a calcining and rolling action, resulting in the formation of independent balls or lumps immediately prior to the setting of the cement proper which is contained in the mass, and in the calcining of the balls or lumps upon and immediately after the formation of the same; and the invention consists, secondly, in an apparatus in which this process may be effectively performed.

Reference is to be had to the accompanying drawing, which represents a longitudinal section of my apparatus and which forms a part of this specification.

The apparatus is provided with two hoppers A and B, emptying into a conductor C, through the entire length of which a screw extends. The material passing into the conductor C from the hoppers is thus thoroughly intermixed by the operation of the screw. Feeding into the conductor C is a water-tube D.

The calcining-shell F is inclined toward the hoppers and mounted to roll freely under the influence of suitable driving mechanism. The

lower and therefore the discharge end of the shell F empties into an outlet-chute G, having a fuel feed-orifice G'. The upper end of the shell passes into a smoke-box J, from which a chimney K passes. The conductor C extends from the hoppers over the shell to the smoke-box J and feeds into the upper end of the shell F by means of a branch E, which passes through the smoke-box and into the upper end of the shell.

The lower portion F' of the shell F is perforated, so as to permit the passage of air into the shell from the air-chamber H, which chamber is held stationary below the shell and made to snugly engage the side thereof. Air is fed to the chamber H under pressure through the medium of a pipe I. The chamber H is provided with a door h, by which access may be had to the chamber for the purposes of cleaning.

In performing the processes in which my invention consists the hopper A is filled with raw cement material and a small proportion of cement proper. The hopper B is filled with a combustible material. The hoppers emptying into the conductor C and the screw thereof being continuously revolved will simultaneously intermix the several ingredients and at the same time advance the mass along the conductor to the branch E, it being understood that the liquid from the pipe D has meantime been combined with the mass to give it a plastic form.

The purpose of the combustible material is to furnish fuel for assisting in the calcining operation of the raw cement material, and the purpose of the cement proper is to provide means by which the balls or lumps into which the mass is subsequently formed may be hardened and held together, which operation is attained by the setting of the cement proper soon after it is mixed with the water from the tube D. This operation takes place when the mass reaches the shell. The shell being continuously revolved and the plastic mass being introduced in a thoroughly intermingled state into the upper end of the shell, the rolling action of the shell will form the mass into separate or independent balls or lumps. When this takes place, the operation having been so timed, the cement proper will firmly set,

so as to harden the balls or lumps and prevent them from breaking or from amalgamating with each other.

5 The principal part of the calcining operation is effected at the lower portion of the shell. Consequently, since the separation of the material into lumps and the setting of the cement takes place at the upper portion of the shell, as the separate balls roll down the
10 shell and reach the portion F' thereof the principal part of the calcining operation takes place and the calcined balls or lumps roll out of the shell into the discharge-chute G.

The gist of the process lies, therefore, in the
15 intimate mixture of the cement proper, the raw cement material, and the combustible material, the forming of the same into a plastic mass, and the subjection of the mass to a concurrent rolling and calcining operation,
20 so that the cement proper may set as the mass is formed into separate lumps and so that the thus hardened lumps may roll down the shell and be subjected to the calcining operation proper. It is absolutely essential that the
25 elements of the mass be thoroughly commingled, and it is equally necessary that the thus thorough mixture reach the upper end of the shell in a completely plastic form and before the mixture has had time to set; but the
30 cement must also be in condition to set immediately upon its introduction to the shell. It will thus be seen that the location of the hoppers A and B adjacent to the discharge or lower end of the shell and the discharge of the
35 conductor C over the shell to the smoke-box J is an essential condition, since by these means that nice and necessarily accurate timing of the operation is effected.

In starting the furnace oil may be used to heat the shell and start the combustion of the
40 fuel. In doing this the oil is introduced to the shell by any suitable means through the medium of the feed portion G' in the outlet-chute G. After the fuel is once burning the
45 use of the oil is discontinued and air is let into the chamber II and to the fuel in the shell F, so as to keep said fuel burning, as previously explained.

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

1. The method of calcining, which method consists in first combining raw cement material and cement proper with a combustible material, second, intimately intermixing and
55 dampening the mass to form it into a plastic state, and third in subjecting the thus plastic mass to a concurrent rolling and calcining operation by which the mass is formed into separate lumps immediately prior to the setting of the cement proper and by which the
60 combustible material is burned out upon and immediately after the setting of the cement proper; thereby calcining the raw cement material, substantially as described. 65

2. A calcining apparatus having an inclined rolling shell, the lower portion of which is perforated, and a stationary air-chamber, the upper edges of which snugly engage the lower side of the perforated portion of the shell,
70 substantially as described.

CLIFFORD BONNEVILLE.

Witnesses:

D. R. HORNE,
C. R. JAMES.