

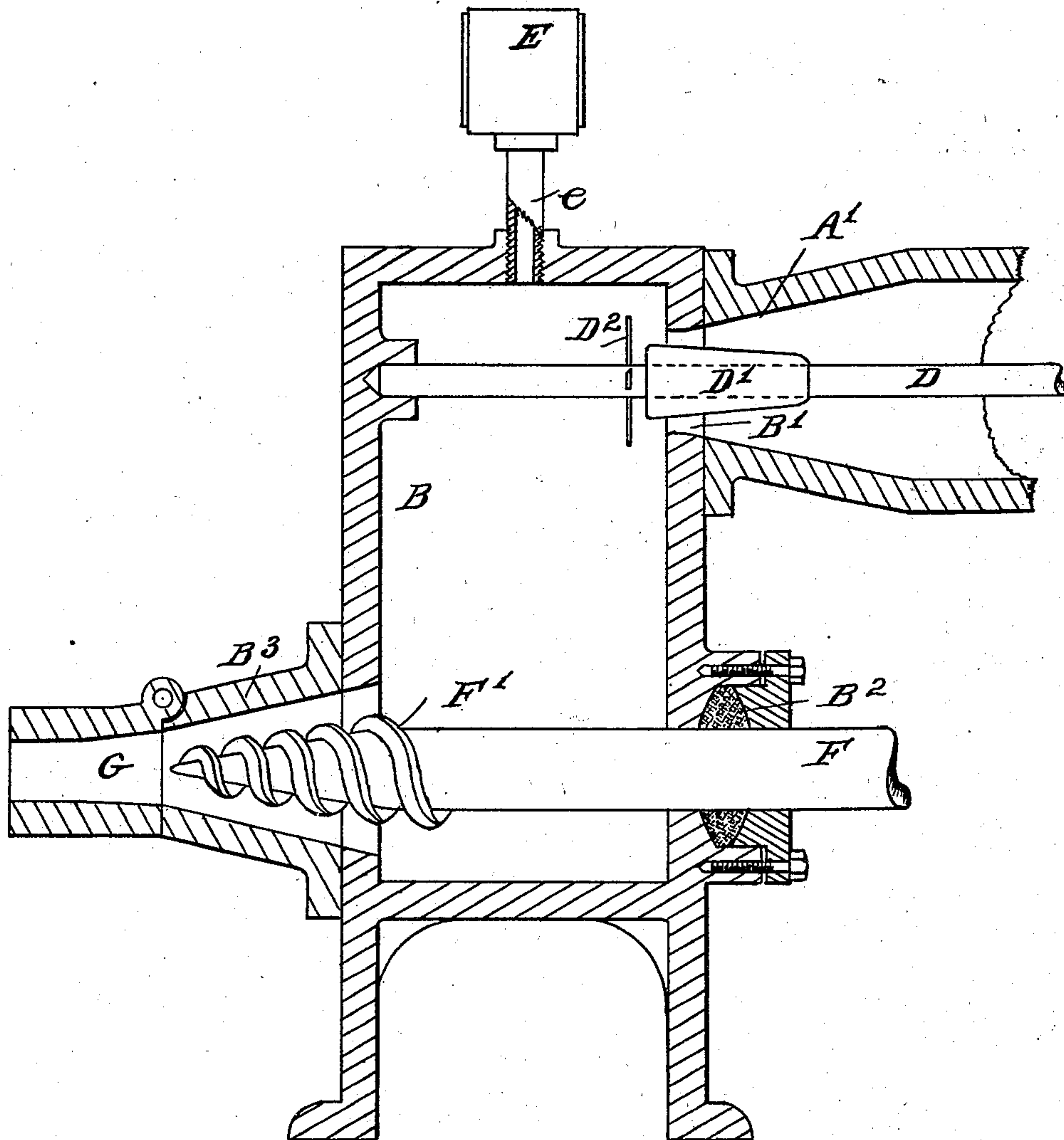
No. 701,957.

Patented June 10, 1902.

R. H. STALEY.
METHOD OF WORKING CLAY.

(Application filed Aug. 1, 1901.)

(No Model.)



Witnesses
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RALEIGH H. STALEY, OF SPRINGFIELD, ILLINOIS.

METHOD OF WORKING CLAY.

SPECIFICATION forming part of Letters Patent No. 701,957, dated June 10, 1902.

Application filed August 1, 1901. Serial No. 70,540. (No specimens.)

To all whom it may concern:

Be it known that I, RALEIGH H. STALEY, a citizen of the United States, residing at Springfield, in the county of Sangamon and State of Illinois, have invented a new and useful Method of Working Clay, of which the following is such a full, clear, and exact description as will enable others skilled in the art to which it appertains to make and use my said invention.

My invention relates to the art of working clay for use in brick-making, and the purpose of my invention is to provide a method for reworking and compressing clay in practical vacuum in such manner as to exhaust the contained air from the clay, thereby obviating the forming of laminations or blisters in the completed product.

I will hereinafter describe my improved method as applied to the making of brick from stiff-tempered clay; but it may be employed in working comparatively dry clay, either for making brick or for other purposes in which the use of homogeneous clay is desirable.

It is found in practice that under the methods of working stiff-tempered clay commonly practiced prior to my invention considerable quantities of air and gases are accumulated and sealed within the clay bar from which the brick are made and the contained air or gases prevent proper cementing and binding of the clay.

In the ordinary method of making bricks the clay from the pug-mill comes to and is deposited in the brick-machine in chunks, and the compressing-screw of the brick-machine engages with these chunks of tempered clay and forces them successively into the nozzle of the brick-machine. The chunks of clay do not always follow closely one after the other. That part of the clay bar which is passing through the nozzle and the die at the front or outer end of the nozzle forms a practically air-tight closure of the front end of the nozzle, and air entering the rear end of the nozzle is practically sealed therein by the next succeeding chunk of clay entering and closing the rear end of the nozzle. The configuration of the nozzle and die is such as to constantly press the moving body of clay from the sides toward the center and in-

crease the density of that part of the bar of clay which rubs on the inner surface of the nozzle and die. The volume of air which has entered the nozzle between the two chunks is gradually inclosed and compressed by the moving body of clay until a globule of air is formed and sealed within the body of clay which is moving through the nozzle, the inward pressure of the clay by the inside wall of the nozzle causing the sealing of the air-globule within the mass of clay. By reason of the retardation of the outer part of the mass of clay caused by the friction of that part against the inside walls of the nozzle and the die the central part of the mass of clay being less dense, moves forward more rapidly than the external and denser parts of the mass, and the air sealed within the mass tends to increase the creeping of the central part of the mass of clay. The creeping of the clay produces laminations therein, which injuriously affects the quality of brick made therefrom. That globules and laminæ of air are contained in the bar of clay and that these laminæ run lengthwise of the bar may be demonstrated by placing a green brick cut from the bar under the bell of an air-pump and exhausting the air from the bell, when the expansion of the air contained in the brick will rupture the brick and disclose the globular and laminated structure such as I have described.

During the operation of burning under the intense heat to which paving-brick are subjected the contained air and gases expand and produce such great pressure within the brick as to cause separation of the above-described laminations by reason of the air forcing its way from the center to the edges or ends of the brick, and thence escaping or else forcing the top or bottom of the brick up or down, as the case may be, and thus forming blisters.

It is an essential quality of good paving-brick that they shall be smooth and straight, uniformly hard throughout, and free from laminations or blisters.

My improved method is designed to overcome the difficulties mentioned and to greatly facilitate the making of a product of the best quality.

With these ends in view my invention in

its essential features consists of the steps hereinafter described, taken in substantially the order stated.

To make my invention effective, I preferably employ the mechanism hereinafter described, and shown in the annexed drawing, to which reference is hereby made. I do not, however, restrict myself to the precise means disclosed, as it is obvious that the same result may be attained by the use of other equivalent means which will readily suggest themselves to those skilled in the art.

In the drawing I have shown in vertical axial section a simple form of mechanism suitable for the practice of my invention and have thereon designated the several parts by reference letters and characters and will now describe the same.

The pug-mill is contiguous to the vacuum-chamber B, and the nozzle A' of the pug-mill discharges through an opening B into the chamber B. The rotatable pug-mill mixing-shaft D extends axially through the nozzle A' and through the opening B' into the chamber B and is mounted to turn therein. A conical collar D' and blades D² are secured to and turn with the shaft D. An air-pump E, driven by any suitable motor, is connected with the chamber B by a pipe e.

The brick-machine shaft F turns in a stuffing-gland B² on the wall of the chamber B, extends transversely through the chamber, and carries at one end an expressing-screw F', which is coaxial with the nozzle B³ and the die G.

The operation of the apparatus is as follows: The pug-mill is operated to force suitably-tempered clay through the nozzle A' and opening B' into the chamber B. As the clay slides through the opening B' it is compressed by the collar D' and made denser, so that the clay itself forms a practically air-tight closure of the opening B'. The shaft D turns within the clay-tube, and the blades D² cut or break the clay into small pieces, which fall down into the chamber. When a sufficient quantity of disintegrated clay has accumulated in the chamber B, the shaft F is turned by any suitable means to operate the screw F', so as to compress the clay within the nozzle B³, force it therethrough, and eject it through the die G. The compressed clay surrounding the worm F' within the nozzle B³ forms a practically air-tight closure of the nozzle. The air-pump E is then started and exhausts the air from the chamber and does so continuously so long as the apparatus continues in operation. The clay as it comes from the pug-mill contains more or less air and gases. By shredding or disintegrating the clay within the sealed chamber B the air and gases may be extracted by the pump E or other equivalent means, and the disintegrated clay falling down in the chamber may be compressed by the worm F' practically *in vacuo*, thereby avoiding the sealing of air in the compressed clay. By the continuous operation of the air-exhaust a

practical vacuum is continuously maintained within the chamber B.

From the foregoing it will be seen that the clay itself serves to continuously seal the openings in the chamber B, so as to prevent the flow of air into the chamber, and that practically no air enters the chamber except that which is sealed in the clay previous to its disintegration.

The method in its essence consists in disintegrating clay and extracting the air and gases therefrom while in said disintegrated condition and then pressing said clay in vacuum, so as to prevent the sealing of air therein.

In order that the process may be continuous, the pug-mill is preferably connected to discharge directly into the vacuum-chamber, and the shredding or disintegrating device is contained within the vacuum-chamber; but it is obvious that the clay may be prepared or tempered in any suitable mill disconnected from the vacuum-chamber and may be shredded or disintegrated by any suitable appliance disconnected from the vacuum-chamber, and the shredded or disintegrated clay may then be placed in the vacuum-chamber, and the chamber may then be sealed and the air exhausted therefrom, and the clay may then be pressed in vacuum, as already described.

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

1. The method of working clay, consisting in providing tempered clay, disintegrating said clay in vacuum, exhausting the air from said disintegrated clay and compressing said clay in vacuum, substantially as set forth.

2. The method of working clay, consisting in providing tempered clay, introducing said clay under pressure into a vacuum-chamber, disintegrating said clay in vacuum, exhausting the air from said disintegrated clay, compressing said clay in vacuum, and expelling said compressed clay from said vacuum-chamber, substantially as set forth.

3. The method for the continuous working of clay, consisting in providing tempered clay, introducing said clay continuously under pressure into a vacuum-chamber, utilizing said incoming clay as a seal against admission of air to the vacuum-chamber, disintegrating said clay in vacuum, exhausting the air from said disintegrated clay, compressing said clay in vacuum, expelling said compressed clay from said vacuum-chamber and utilizing said compressed clay as a seal against the admission of air into the vacuum-chamber, substantially as set forth.

In witness whereof I have hereunto subscribed my name, this 16th day of April, 1901, in the city of Springfield, Illinois.

RALEIGH H. STALEY.

Witnesses:

N. DU BOIS,

ANNIE A. DAY.