

**1,005,516.**

*Fig. 1.*

*Fig. 2.*

*Fig. 3.*

*Fig. 4.*

*Fig. 5.*

*Fig. 6.*

*Fig. 7.*

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# UNITED STATES PATENT OFFICE.

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FURNACE FOR DRYING SAND AND CRUSHED STONE.

1,005,516.

Specification of Letters Patent.

Patented Oct. 10, 1911.

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*To all whom it may concern:*

Be it known that I, WILLIAM D. CRAVEN, Jr., a citizen of the United States, residing in Ridley Park, county of Delaware, State of Pennsylvania, have invented certain Improvements in Furnaces for Drying Sand, Crushed Stone, &c., of which the following is a specification.

My invention relates to certain improvements in furnaces for drying sand, crushed stone, or other granular material.

One object of the invention is to quickly dry the granular material as it is fed continuously through the furnace. The products of combustion coming in direct contact with the particles of material as they pass over the heated plates.

A further object is to so construct the drier that it can be readily taken apart and transported from one point to another and set up quickly for use.

In the accompanying drawings,—Figure 1, is a perspective view of my improved furnace for drying sand; Fig. 2, is a vertical sectional view; Fig. 3, is a sectional plan view on the line 3—3 Fig. 2; Fig. 4, is an enlarged sectional view of a portion of one of the inclined planes; Fig. 5, is a view showing one method of vertically adjusting the short inclined plane; Fig. 6, is a view of a modification of the means for regulating the flow of sand through the space between the two inclined planes, and Fig. 7, is a view illustrating a modification of the means for spacing the plates.

A is the casing of the drier, made in four sections secured together by bolts *a*—*a*, each of the sections consists of a channel iron frame *a'* and side plates *a*<sup>2</sup>, *a*<sup>3</sup>, and the space between the plates is packed with asbestos or other non-conducting material. At the bottom of one of the side plates in the present instance is an opening *e* communicating with the fire chamber E, this opening may be closed by any suitable door, if desired.

B is an inclined plane extending from one upper corner to the diagonally opposite lower corner of the casing, C is a short in-

clined plane extending from the opposite upper corner to a point in close proximity to the surface of the other inclined plane B, allowing a clear passageway *d* for the material as it travels over the inclined surfaces. The two inclined planes form a hopper D into which the material is discharged either directly from wagons or it may be shoveled into the hopper, as desired.

*d'* is an outlet at the bottom of the inclined plane B, and this outlet may be closed by a sliding or other door *D'*. A slide valve *f* may be mounted at the lower end of the inclined plane C, and this valve can be adjusted so as to increase or diminish the amount of material passing through the space between the two inclined planes. The inclined plane B is made as clearly shown in Fig. 3. A series of supporting bars *b* are securely mounted on the casing A and extending transversely is a series of plates *b'* secured to the bars *b* by rivets. The heads *i* of these rivets extend above the plates as clearly illustrated in Fig. 4, and one plate overlaps another, the overlapping portion rests upon the heads of the rivets leaving a clear space *g* between the two plates for the passage of the products of combustion. The overlapping of the plates is sufficient to prevent any sand passing between the plates and into the fire chamber, and consequently the products of combustion will readily pass between the plates, and as the layer of sand on the inclined plane is comparatively light the products of combustion will find their way through the body of sand and escape at the top of the chamber. As the several plates are spaced apart the products of combustion will pass through the body of sand at all points in its travel from top to bottom of its chamber.

The inclined plane C in the present instance is made similar to the inclined plane B, having supporting bars *c* and sets of overlapping plates *c'*, the plates being held apart by the rivet heads *i'*, Fig. 6. In the present instance the back of the upper portion of the inclined plane is a frame con-

sisting of horizontal angle bars B' and vertical angle bars B<sup>2</sup>. This frame aids in supporting the load carried by the inclined plane B. The inclined plane C is supported  
 5 in like manner by a horizontal bar C' and uprights C<sup>2</sup>. I preferably pivot the inclined plane section C to the casing at c<sup>2</sup> so that it can be turned up on the pivot that access may be had to the entire space above  
 10 the inclined plane B, and this section C may be vertically adjusted so as to regulate the space between the two inclined planes if desired. One method of this adjustment is clearly shown in Fig. 5, in which a series of  
 15 bolt holes are made in the supporting frame which may aline with holes in the casing, and by passing bolts h through the holes after the frame is adjusted it will be securely held in position.

20 In Fig. 6, I have shown a modification of the means for regulating flow of sand through the space between the two inclined planes. In this instance a plate f' is pivoted at the edge of the inclined plane C and this  
 25 plane may be regulated by an arm f<sup>2</sup> attached to the trunnion of the plane, either on the inside or on the outside of the casing and can be held in the position to which it is adjusted by any suitable means. The discharge opening d' for the material is preferably at a point above the bottom of the casing, as in Fig. 2, so that material may be discharged directly into a wheel barrow or conveyer, if desired.

35 In Fig. 7, I have shown a modification of the means of spacing the plates, each plate b<sup>2</sup> has a series of lugs b<sup>3</sup> at the outer edge, bent downward to rest on the plate below it, and the distance apart of the plates  
 40 may be regulated by making the lugs of a greater or less length. The inclination of the planes B and C may be varied without departing from the essential features of the invention.

45 By the above construction it will be seen that I can make a very cheap and substantial drier which can be roughly handled without injury and which will dry the sand, broken stone, or other granular material,  
 50 sufficiently so that it can be used in road, roof, concrete or other construction. The process can be regulated somewhat, depending upon the coarseness of the material and the speed of travel of the material through  
 55 the drier. The drier is portable and can be readily shipped from one point to another and it is the general practice to use a wood fire without a grate, the fire being made directly upon the ground, but it will be understood that a grate may be used without  
 60 departing from the essential features of the invention.

I claim:—

1. The combination in a drier, of a casing,

an inclined plane extending diagonally 65 through the casing, a discharge opening at the bottom of the inclined plane, the inclined plane being made up of a series of overlapping plates spaced apart forming a series of shallow passages for the products 70 of combustion.

2. The combination of a casing, two inclined planes, one plane extending diagonally through the casing, the other extending diagonally in the opposite direction to a 75 point near the surface of the first mentioned inclined plane, the two inclined planes forming a hopper, a discharge opening in the casing at the lower end of the first inclined plane, and a fire chamber under the first 80 mentioned inclined plane, said first mentioned inclined plane being made up of a series of overlapping plates spaced apart.

3. The combination of a casing, of two inclined planes extending diagonally in opposite 85 directions and forming a hopper, one inclined plane being of greater length than the other, the casing having a discharge opening at the lower end of the long inclined plane a fire chamber in the lower part 90 of the casing, each of said inclined planes being made up of overlapping plates spaced apart forming slots for the passage of the products of combustion.

4. The combination in a casing of an inclined 95 plane extending diagonally through the casing, a second inclined plane extending diagonally toward the first inclined plane and forming with a hopper for the material to be dried, the casing having a 100 discharge opening at the bottom, a fire chamber under the first mentioned inclined plane, and means for regulating the flow of sand through the space between the two inclined planes. 105

5. The combination of a casing, an inclined plane extending diagonally through the casing, a second adjustable inclined 110 plane extending diagonally in an opposite direction toward the first mentioned inclined plane, a discharge opening at the bottom of the casing for the dried material, a fire chamber under the first mentioned inclined plane, means for securing the adjustable inclined plane in any position to 115 which it is adjusted.

6. The combination of a casing, an inclined plane extending diagonally through the casing, a fire chamber underneath said 120 inclined plane, the casing having a discharge opening located at the base for the dried material a second inclined plane extending diagonally in an opposite direction to the first mentioned inclined plane, said 125 inclined plane being pivotally mounted so that it can be turned on its pivot to expose the inner surface of the first mentioned inclined plane.

7. The combination in a drier of an inclined plane consisting of supporting bars, a series of overlapping plates riveted to the said supporting bars, the heads of the  
5 rivets securing one plate to the bars forming the spacing supports for the overlapping portion of the plate next above it.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLIAM D. CRAVEN, JR.

Witnesses:

WM. E. SHUPE,

WM. A. BARR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."