

*N<sup>o</sup> 26, 162,*

[illegible]



# UNITED STATES PATENT OFFICE.

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## BAGASSE-FURNACE.

Specification of Letters Patent No. 26,162, dated November 22, 1859.

*To all whom it may concern:*

Be it known that I, A. J. CHAPMAN, of Bayou Goula, in the parish of Iberville and State of Louisiana, have invented a new and  
5 useful Improvement in Bagasse-Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

10 Figure 1, is a side elevation of a bagasse furnace constructed with my improvements. Fig. 2, is a vertical longitudinal section of the same, taken in the line  $z, z$ , of Figs. 3  
15 and 4. Fig. 3, a transverse section of the same taken in the line  $z', z'$ , in Fig. 1. Fig. 4, a horizontal section taken in the line  $z, z$ , in Fig. 2. Figs. 5, 6 and 7, are detached parts of the arrangement.

20 Similar letters of reference, in each of the several figures indicate corresponding parts.

The nature of my invention consists, first, in the employment of the central air heating chamber having discharge passages, leading  
25 into the furnace, in its sides, and a central descending flue, in combination with a double walled furnace having an air heating chamber between its walls and discharge passages through its inner wall leading into  
30 the fire chamber, substantially in the manner hereinafter described; second, the combination of the partitioned and valved air heating chamber between the walls of the furnace, with the upper and lower hot air pas-  
35 sages and mixing chamber, substantially as and for the purposes hereinafter described; third, the combination of the auxiliary valved flue leading directly to the chimney, with the valved boiler flue and the furnace,  
40 substantially as and for the purposes hereinafter set forth; fourth, the combination of the valve in the hopper with the cylinder feeder, carrier drum, cam, and lever, substantially in the manner and for the pur-  
45 poses hereinafter set forth.

To enable others, skilled in the art, to make and use my invention, I will proceed to describe its construction and operation.

50 F, is the body of the furnace; B, B, the boilers; C, the chimney of the boiler flue.

The main embodiment of the furnace is built of circular form, having an arch dome. The fuel is admitted through the crown by hopper  $h$ , similar to other bagasse furnaces.  
55 I make use of oxygen from the air to support combustion. The air is heated pre-

paratory to being used, and this is done by being admitted through the flue  $i'$ , seen in Figs. 1 and 3, into a skeleton chamber  $n$ , situated in the center of the furnace, which  
60 allows portions of the air to pass directly to the fuel through openings  $n^2$ , as indicated by the arrows in Fig. 4. In the center of the chamber  $n$ , there is a flue  $i$ , for the purpose of allowing the other portion of the air to  
65 pass to chambers  $f, f$ , made in the walls of the furnace, as seen in Figs. 2 and 3. From the chambers  $f, f$ , the air passes by means of openings  $z, z$ , made in the inner wall of the  
70 brick work to the fuel, as represented in Fig. 2. This brings the air in contact with the fuel, both on the inner side of the furnace and the outer sides of the chamber  $n$ , and at the same time the heating of the air renders  
75 it more effective for the purposes of combustion, and by thus taking the heat from the walls, they are preserved from injury by being overheated.

X, is a horizontal partition by which the chambers are separated and an upper and  
80 lower air chamber formed.

V, is a damper passage in the partition, by which the air can be let into the upper chamber to supply the fuel when the furnace contains a large supply of fuel and ex-  
85 cluded from the same when only a small, or a medium amount of fuel is in the furnace.

$a$ , and  $b, b$ , are separated flues leading from the furnace to a circular mixing chamber  $e$ , situated between the boiler flue B', and  
90 the furnace. The flue  $a$ , is separable from those  $b, b$ , by a partition  $n'$ , and the heated air, supplied from the upper air chamber between the walls of the furnace, descends in a current and meets the heated air which  
95 comes from the lower air chamber between the walls of the furnace and through the flues  $b, b$ , and thus the heated air or gases from the two chambers of the furnace are caused to mingle perfectly or a superabun-  
100 dance of oxygen coming from one place can be brought in union with combustible gases coming from other places, and a profitable use of the same secured. The mixing chamber and the furnace have doors  $c, c, u, d$ , on  
105 each side, for the purpose of supplying fuel and removing ashes, and other solid products of combustion.

Y, is a flue, leading from the mixing chamber, and past the boilers, so that should  
110 the bagasse produce more heat than may be required to act on the boilers and if the



boilers are not in use for a short period and the burning of the bagasse going on; the whole of the heat can pass through the flue to the chimney by the closing of the damper  $r$ , and operating  $r'$ .

$U'$ , is a door leading into flue  $a$ .

$i^2$ , is a flue leading from flue  $i$ , to side flues  $f$ , seen in Figs. 2 and 5.

The Figs. 1, 2, 3, and 7, show the arrangement for feeding the bagasse to the furnace.  $h'$ ,  $h^2$ , are two wheels over which a pitch chain works so as to cause them to revolve together.  $h'$  is on a shaft which carries a drum  $h^3$ , the bagasse carrier moving over said drum. On this shaft is another grooved wheel to receive another endless chain which conveys the motion from the sugar mill to the drum, and consequently the carrier, from which latter it is conveyed, by the pitch chain or wheel  $h^2$ , to a cylinder  $S$ , in the hopper, said cylinder being open on one side to receive the bagasse. Between this cylinder and the drum, is a check valve  $o'$ . This valve is moved by a cam  $b'$ , on the shaft of the cylinder  $S$ .  $O$ , is a weighted lever attached to the shaft of the valve  $O'$ , and is connected loosely to the arm by a bar  $b$ ; the movement of the cam renders the opening of the valve at stated intervals regular, and but momentary. The cam being set to allow the valve to open just when the open side of the cylinder is up to receive the bagasse and to close instantly and shut off the passage from the hopper while the cylinder is turning to deposit its load into the furnace. The cylinder by its shape also closes the feed passage of the hopper and thus no sparks can escape from the furnace during the operation of depositing the bagasse from the hopper into the cylinder and from the cylinder into the furnace.

In the operation of this furnace, I first put wood in door  $d$ , for the purpose of heating up the furnace, preparatory to receive the bagasse; and continue this mode of heating the furnace for about one hour. I then

fire under the boilers, until the furnace is about one half full of bagasse; it will be understood in the meantime that the mill has been started to grind cane, so the bagasse can be made to fill the furnace, as stated; by the time above mentioned the furnace is sufficiently heated to dry the bagasse which may have been put into it. I then open the door to flue  $i$ , so that combustion can go on, and allow the operation to proceed. If during this operation a large quantity of bagasse is in the furnace, the damper  $V$ , is opened, but if a small quantity, it is closed.

What I claim as my invention and desire to secure by Letters Patent, is—

1. The employment of the central air heating chamber  $n$ , having discharge passages  $n^2$ , leading into the furnace, in its sides and a central descending flue,  $i$ , in combination with a double walled furnace  $F$ , having an air heating chamber  $f$  between its walls and discharge passages  $z$ , through its inner wall leading into the fire chamber, substantially as and for the purposes set forth.

2. The combination of the partitioned and valved air heating chamber  $f$ ,  $v$ ,  $x$  between the walls of the furnace, with the upper and lower hot air passages  $a$ ,  $b$ , and mixing chamber  $e$ , substantially as and for the purposes set forth.

3. The combination of the auxiliary valved flue  $y$ ,  $r'$  leading directly to the chimney with the valved boiler flue  $B'$   $r$  and the furnace  $F$ , substantially as and for the purposes set forth.

4. The combination of the valve  $o'$  in the hopper, with the cylinder feeder  $S$  carrier drum  $h^3$ , cam  $t'$ , and lever  $o$ , substantially as and for the purposes set forth.

The above specification of my improved bagasse furnace signed and witnessed this 16th day of September, 1859.

A. J. CHAPMAN.

Witnesses:

C. M. BRADFORD,  
JOHN A. JAQUESS.