

(No Model.)

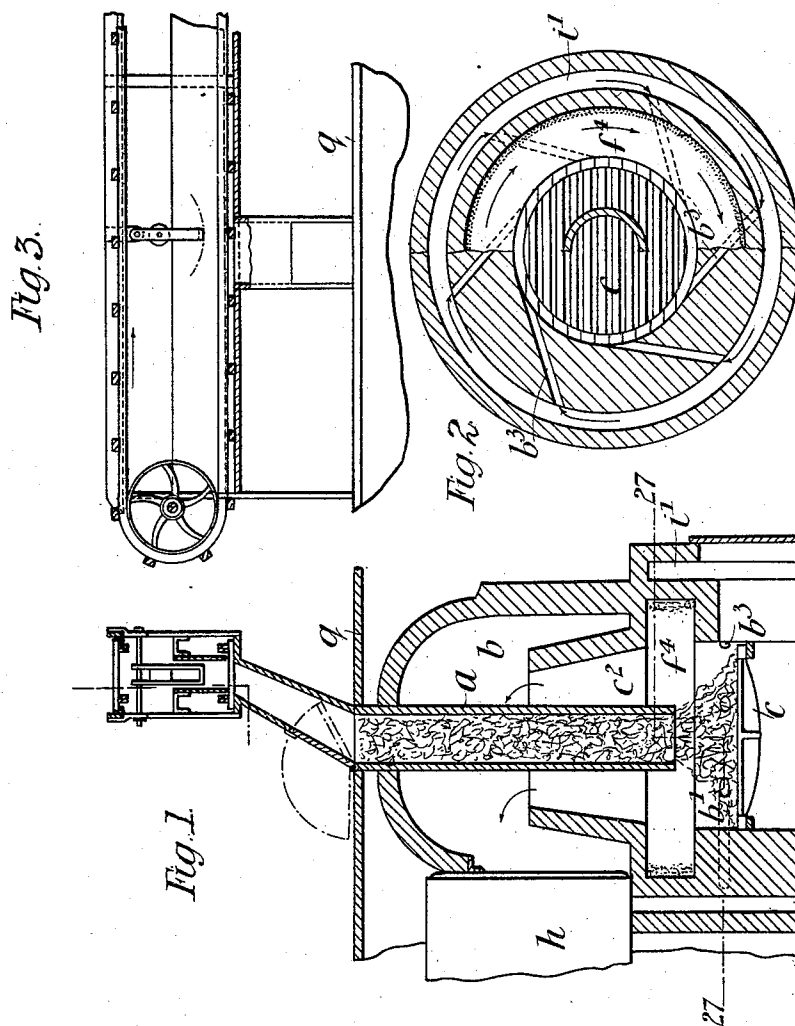
3 Sheets—Sheet 1.

W. P. ABELL.

FURNACE FOR BURNING BAGASSE, SAWDUST, &c.

No. 578,531.

Patented Mar. 9, 1897.



Witnesses.

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(No Model.)

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Fig. 4

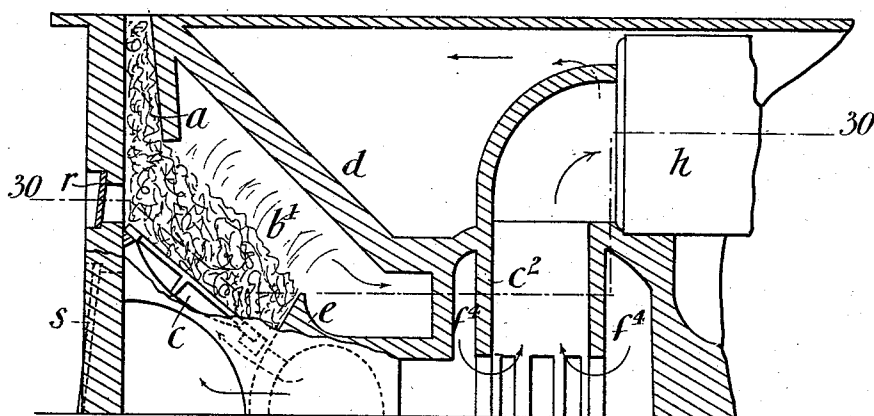
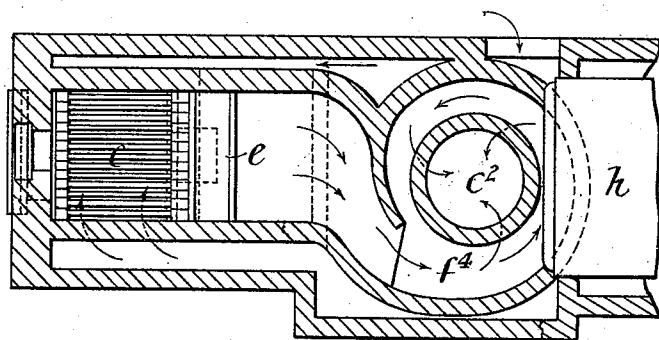


Fig. 5



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Fig. 6.

Fig. 7.

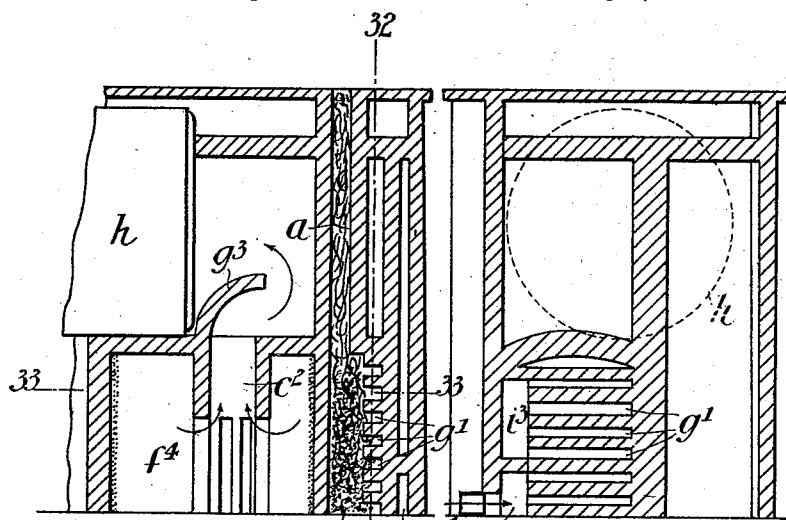
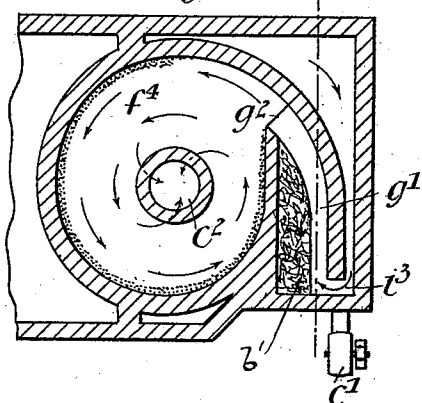


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM PRICE ABELL, OF HINCKLEY, ENGLAND.

FURNACE FOR BURNING BAGASSE, SAWDUST, &c.

SPECIFICATION forming part of Letters Patent No. 578,531, dated March 9, 1897.

Application filed October 11, 1893. Serial No. 487,905. (No model.) Patented in British Guiana May 7, 1892, No. 3,057, and in Barbadoes July 18, 1892, No. 69, and November 21, 1892, No. 71.

To all whom it may concern:

Be it known that I, WILLIAM PRICE ABELL, Whitworth scholar and engineer, a subject of the Queen of Great Britain, residing at Tooley Park, Hinckley, England, and Demerara, British Guiana, have invented new and useful Improvements in Furnaces for Burning Bagasse, Sawdust, &c., (for part of which I have obtained a patent in British Guiana, No. 3,057, dated May 7, 1892, and in Barbadoes, No. 69, dated July 18, 1892, and No. 71, dated November 21, 1892,) of which the following is a specification.

My invention relates to furnaces in which bagasse or megass, diffusion-chips, sawdust, or similar material is utilized as fuel.

So long as the bagasse in a solid form is burned on a grate as at present constructed the constantly-varying demand for a correct quantity of air for perfect combustion can seldom or never be complied with, and even though the quantity be supplied correctly, as far as appliances manipulated with ordinary intelligence admit, still the difficulty is only partly overcome, because bagasse when dried is through its lightness carried away undistilled, and because after the air has entered the furnaces the old system of combustion does not effect a proper mixing of the gas and air, and unless there is an ultimate mixing of the gases and a retention of the combustible solids until they are burned perfect combustion is impossible.

The chief objects of my invention are to provide a furnace for burning bagasse, diffusion-chips, sawdust, and others similar kinds of fuel, in which furnace such fuel is heated, dried, and gases are more or less distilled therefrom before the fuel reaches the hearth, in which the flecks or unburned particles escaping from the fuel under combustion are retained until they are distilled and burned, in which the waste heat is utilized for heating the air for supporting the combustion in the furnace, and which is of simpler construction, occupies less room, and is less expensive than furnaces of a similar kind as heretofore constructed.

My invention, as hereinbelow set forth and as illustrated, comprises a centrifugal cham-

ber constituting a part of the furnace combined with a central outlet surrounded by such chamber, and whereby the flame circulates in the chamber, and whereby the heat that would otherwise be lost is utilized, and whereby the heavier and unburned flecks are retained and consumed; and it also comprises a tangential inlet flue or flues to admit the spent products of combustion, to give them a rotary or whirling action for retaining and consuming them, in combination with means for ready escape of the gases or lighter products of combustion.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of an apparatus illustrating my invention. Fig. 2 is a section on the line 27 27 of Fig. 1. Fig. 3 is a side view of a detail relating to Fig. 1. Fig. 4 is a longitudinal vertical section illustrating a modification. Fig. 5 is a section on the line 30 30 of Fig. 4. Fig. 6 is a longitudinal section illustrating another modification. Figs. 7 and 8 are respectively sections on the lines 32 33 of Fig. 6.

In Figs. 1 and 2 I show a construction wherein the whirling or centrifugal chamber f^4 is arranged above the chamber b' and serves as a combustion-chamber. In these and in other figures, a represents a hopper surmounted by devices for feeding the same; b , combustion-chamber; c , a grate; h , a boiler, and q a platform.

Around the fuel-chamber are fixed tangential twyers b^3 , supplied with air from the chamber v' , which air, entering the said twyers, acquires a whirling motion, which causes the heavier unburned particles of bagasse or chips to remain in the large chamber f^4 by virtue of their weight, while the lighter products of combustion pass up the deflector c^2 . Fig. 3 shows a side view of mechanism also indicated in Fig. 2 for feeding the furnaces.

A modification for retaining the carbon flecks in the combustion-chamber of a furnace until they are distilled and completely consumed is shown in Figs. 4 and 5. In this modified form of apparatus the flames are led into the chamber f^4 tangentially, the said chamber forming a whirling or centrifugal chamber which speedily separates the heavy

unburned particles from the light gases, the sparks and carbon flecks flying off to the circumference and the flames of combustion finding their way to the center and up the flue c^2 and into the boiler h .

In Fig. 4, d is a roof or arch, e a portion of the fuel-chamber, and $r s$ mouthpieces or doors.

In Figs. 6, 7, and 8 I show another modified arrangement for retaining the carbon flecks in the combustion-chamber of a furnace until they are distilled or consumed. $g' g'$ indicate slots running right across and open to the fuel-chamber b' at the bottom of the hopper a . Air enters these slots from the chamber i^3 and then passes in them right along one side of the bottom end of the hopper a in contact with the bagasse therein, the products finally leaving these slots at g^2 and entering tangentially the centrifugal chamber f^4 , thereby producing a rotary motion which causes the heavy unburned particles to cling to the side of the combustion-chamber, as shown by the dots.

The lighter products of combustion ascend through the uptake c^2 and are deflected therefrom onto the hopper a by the deflector g^3 . A chamber g^4 , below the chamber i^3 , is connected with a blower c' , which delivers the air at a higher pressure than the air in i^3 . By this arrangement the unburned heavier particles are revolved round and round the combustion-chamber until they become distilled into gas, which gas, through its com-

parative lightness, finds its exit through the flue c^2 .

Having now particularly described and ascertained the nature of my invention, I declare that what I claim is—

1. A furnace for burning bagasse, or megass, diffusion-chips, sawdust or similar fuel, having a centrifugal combustion-chamber constituting a part of the furnace, such chamber being combined with a central outlet surrounded by said chamber, the combination serving not only to circulate the flame in the central chamber but also to utilize the heat that otherwise would be lost, and to retain and consume the heavier or unburned carbon or fuel flecks, before the flames have parted with their heat, all substantially as set forth.

2. In a furnace, a chamber forming part of the same having in its wall a tangential inlet flue or flues admitting the spent products of combustion and causing them to have a rotary or whirling action, such flue being combined with and surrounding a central outlet through which the gases or lighter products of combustion may pass and escape, while the heavier or unburned carbon or fuel flecks are retained as set forth, by the centrifugal force of the said whirling action, and the centrifugal chamber having the relation to the fire-chamber as shown.

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Witnesses:

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