4 Sheets—Sheet 1.

W. LITTLEJOHN.

Bagasse Furnaces.

No. 208,476. Patented Oct. 1, 1878.

Fig 1.

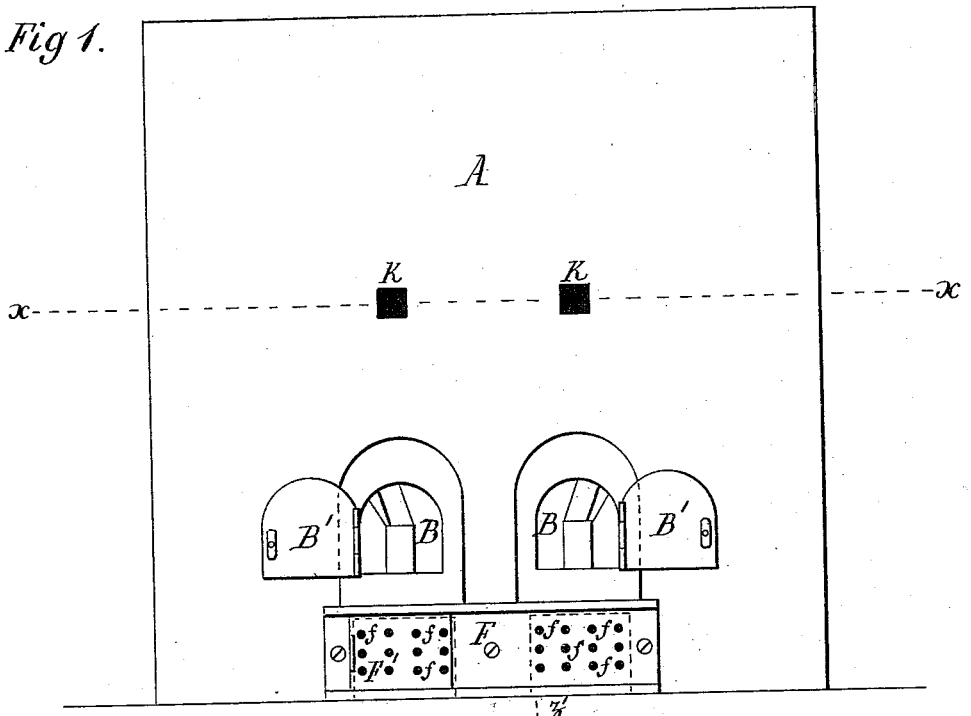

Fig 2.

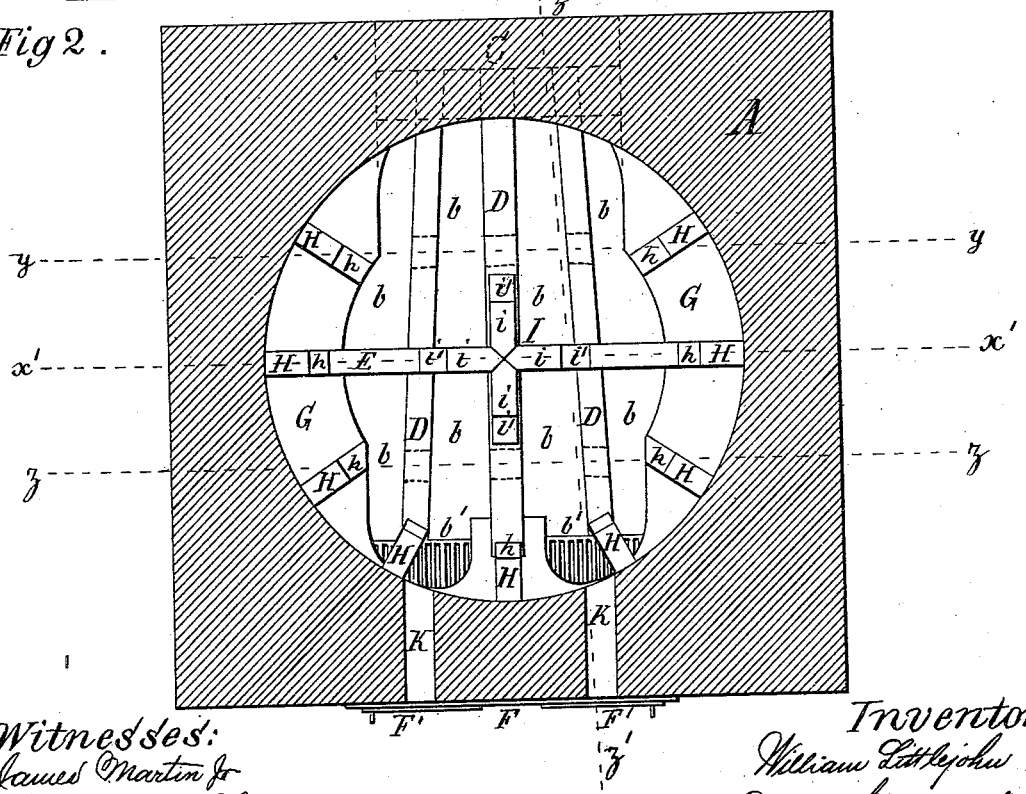

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Fig 3.

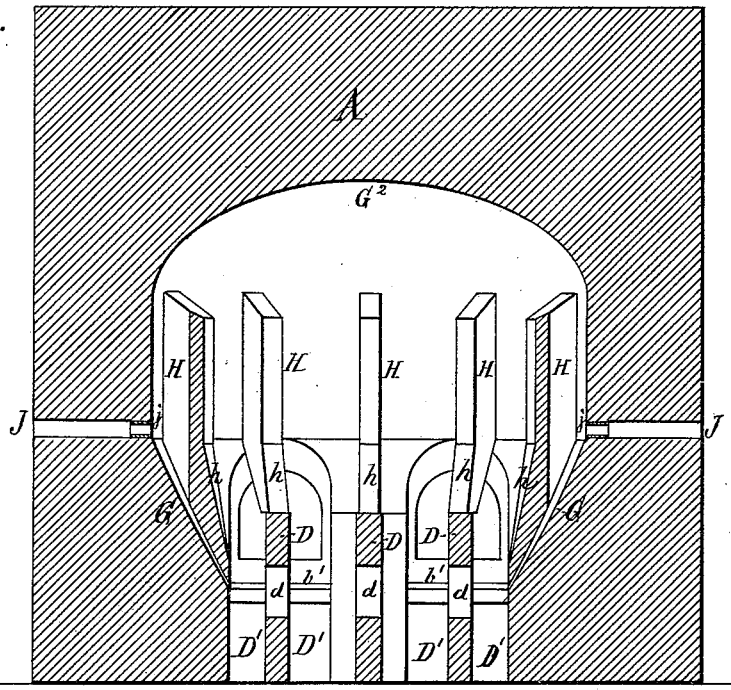

Fig 4.

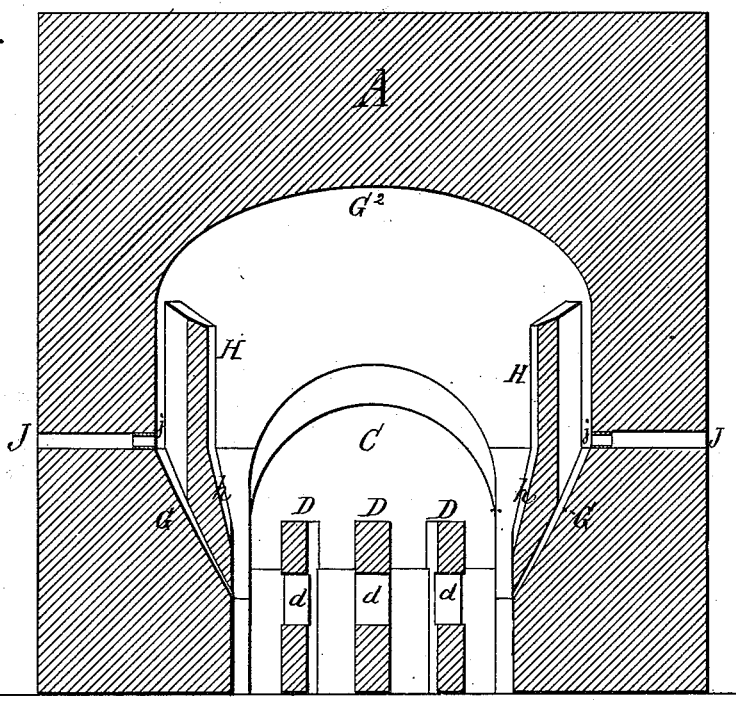

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Fig 5

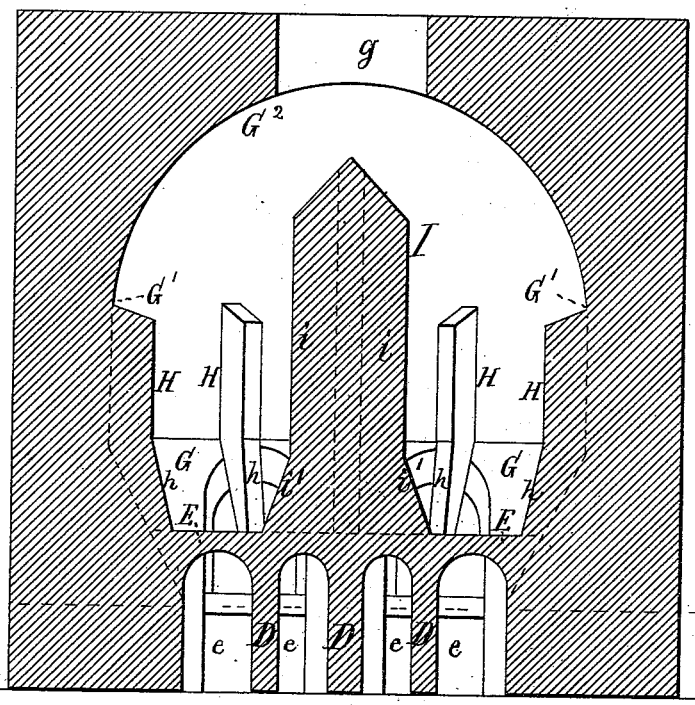
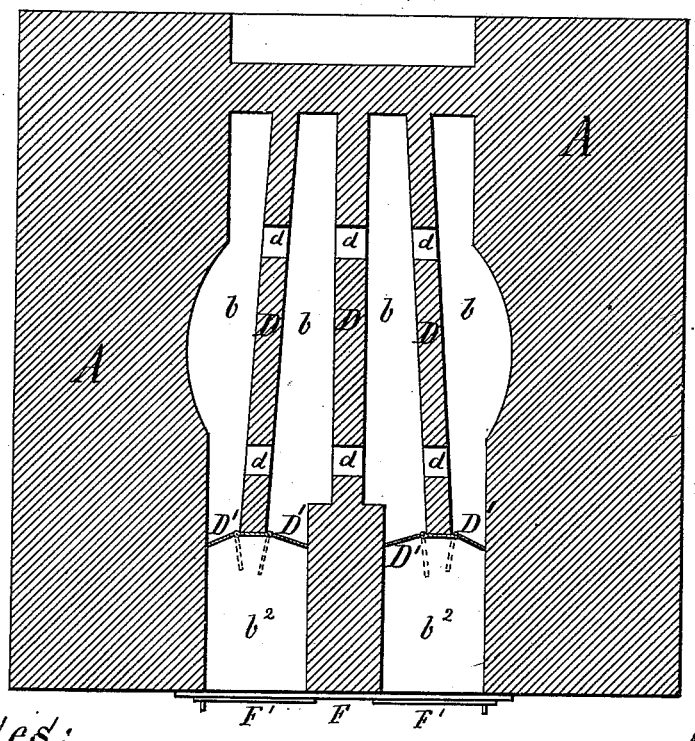


Fig 6.



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4 Sheets—Sheet 4.

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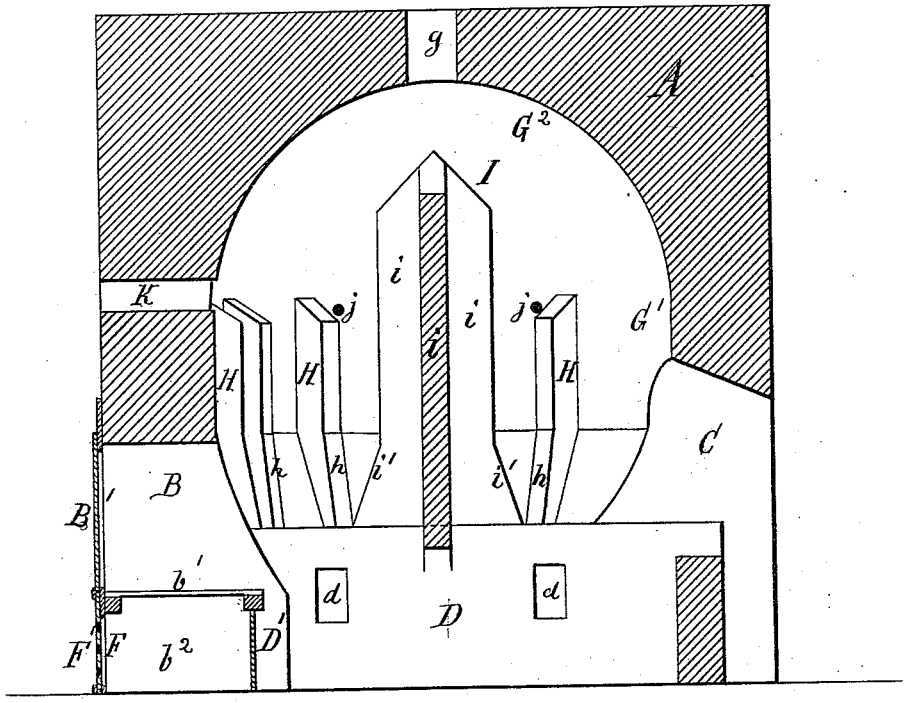
Fig 7.



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UNITED STATES PATENT OFFICE.

WILLIAM LITTLEJOHN, OF MARSHALL, TEXAS.

IMPROVEMENT IN BAGASSE-FURNACES.

Specification forming part of Letters Patent No. **208,476,** dated October 1, 1878; application filed April 17, 1878.

To all whom it may concern:

Be it known that I, WILLIAM LITTLEJOHN, of Marshall, in the county of Harrison and State of Texas, have invented a new and useful Improvement in Bagasse Burners or Furnaces, which improvement is fully set forth in the following specification and accompanying drawings, in which latter—

Figure 1 is a front elevation of my bagasse-burner. Fig. 2 is a horizontal section in the line *x x* of Fig. 1. Fig. 3 is a vertical section in the line *y y* of Fig. 2, looking to the front. Fig. 4 is a vertical section in the line *z z* of Fig. 2, looking backwardly. Fig. 5 is a vertical central section in the line *x' x'* of Fig. 2, and Fig. 6 is a horizontal section in the line *y' y'* of Fig. 5. Fig. 7 is a vertical section in the line *z' z'* of Fig. 2.

The nature of my invention consists in certain constructions, combinations, and arrangements of parts hereinafter fully described and specifically claimed, whereby a bagasse-furnace is produced which burns the bagasse freely, and with such regularity and economy that it may be advantageously used for manufacturing purposes, such as heating steam-boilers and similar contrivances.

In the drawings, A represents a structure of brick or masonry, forming the outer part of the furnace. It resembles a cube in shape; but it may be round, with spherical top, or of any other suitable shape. It has two front openings, B, and one large rear opening, C.

The interior of the furnace consists of an ash-pit and fire-room. The ash-pit is divided longitudinally between the openings B and C into chambers *b* by walls D, so arranged that the middle one is on the center line of the furnace, and those to the right and left rise each in a central position at the openings B. The said walls D are connected by a central transverse arched bridge, E, having passages *e* between the walls D and the interior surface of the furnace.

About midway between the bridge E and their terminations the walls D are provided with openings *d*, whereby the chambers *b* are laterally connected.

The openings B are provided with doors B' and grates b^1, fastened in position at a suitable height, and abutting against the front ends of the right and left walls D, which walls are much higher than the grates, in order to obtain the most advantageous arrangement between the fire upon the grates and the bagasse upon the walls D, as will be hereinafter shown.

The rear part of the ash-pit b^2, below the grates b^1, may be closed by swinging doors D', suitably hung to the ends of the walls D, which doors, when closed, serve to prevent the draft of the ash-pit b^2 from entering the ash-pit *b b* of the main furnace.

The front of the ash-pit is provided with perforated doors F and slides F', with perforations *f*, which may be placed in any position with respect to each other, admitting more or less draft to the ash-pit by moving the slides accordingly.

From the altitude of the grates b^1 the inner space of the furnace widens by means of an inverted conical step, G, above which it becomes cylindrical, as at G^1, and spherical at the top, G^2. A top opening, *g*, serves as a feed-hole, through which the bagasse is thrown into the furnace.

The step G and wall G^1 are provided with vertical columns H, two of which are supported by the walls D, so that they, in conjunction with the said walls, serve to divide the draft coming from the openings B.

In the center of the furnace, and upon the center wall, D, and the bridge E, a cruciform pinnacle, I, is erected, which is pointed at the top, so as to pierce and easily divide the bagasse thrown down upon it through the feed-hole *g*.

The four vertical ribs *i* of the pinnacle are made flaring near the base, as at *i'*, in order that the partly-consumed bagasse may slide down on them without spreading and filling up the corner spaces of the pinnacle.

To prevent the spreading of the gradually-sinking bagasse around the ribs H, and the consequent filling up of the spaces between them, their bases are made slanting toward the center of the furnace, as at *h*.

The walls D and E serve as a coarse grating, upon which the bagasse is finally consumed by the fire, and between which the ashes drop down into the divisions or chambers *b* of the ash-pit.

The furnace is, at a suitable altitude, provided with horizontal draft-holes J, which, in practice, will be provided with doors, whereby the draft is regulated, and which are, near the combustion-chamber, provided with linings of iron tubing of smaller diameter than the passages J, as seen at *j* in Figs. 3 and 4.

The front wall, above the openings B, is provided with two channels, K, of such size that a pole or rod may be introduced for the purpose of stirring up the burning bagasse in the furnace. These channels or openings, when not used, are closed up by means of doors.

The walls D are, toward the rear opening, C, laterally inclined to each other, so as to facilitate the cleaning of the chambers *b* through the ash-pit b^2 and doors D′.

Bagasse is introduced through the opening *g* until a sufficient quantity is accumulated upon the walls D. Wood or coal fires are then started upon the grates b^1, and the doors D′ are closed to guide the draft from the ash-pit b^2 up through the grates b^1. The fire upon the grates b^1 is kept up until it has communicated with the bagasse to such extent that the bagasse burns freely and independently of the fires on the grates b^1, whereupon the said fires are either allowed to go out or not kept up to the same extent as at first. The doors F and D′ are now thrown open to admit fresh air into the chambers b^1, which air rises partly through the bagasse and partly along the inner corners of the ribs H and *i*, and thus effects a thorough consumption of the bagasse and the gases emanating therefrom. If more fresh air is desired to perfect the combustion in the furnace, the passages J are opened. The bagasse is continually thrown into the furnace through the hole *g*. It drops upon the point of the pinnacle I, whereby it is pierced and pushed toward the interior surface of the furnace all around the pinnacle, in such manner that the inner corners of the ribs H and *i* are free of it, and allow the draft to pass up unobstructed. The burning gases pass out of the furnace through the opening C, and are conducted under a boiler or other apparatus which requires heat for its operation. If, by reason of accidental unequal settling of the bagasse, more draft should be necessary at some portion than at others of the furnace, the surplus draft in some of the chambers *b* has freedom to pass through the openings *d* toward the place where it is needed.

The furnace described is one of the larger class, wherein two or more grates, b^1, in as many separate combustion-chambers, denominated "openings B," are used with advantage. In smaller furnaces one grating, b^1, and one combustion-chamber suffice; and the walls D are, in this case, so arranged as to divide with their front ends, in conjunction with the columns H, the draft from the grates b^1 and the ash-pit b^2, in a similar manner as has been shown and described with reference to the larger furnace; and the arrangement of the doors D′ will be such that one of those doors may be applied between each pair of walls D.

I am aware that bagasse-furnaces are provided with smaller wood and coal furnaces to start their operation; but their operation without my improvements has always been very difficult and without satisfactory results, especially in regard to an uninterrupted high temperature—such, for instance, as is necessary for steam-boilers.

The great trouble in all other bagasse-burners is to make the bagasse burn freely and rapidly, because it packs in the center and against the walls of the chamber, so that the flame cannot pass through it, which trouble is obviated perfectly by my pinnacle and side columns or ribs, as those furnish openings or flues for the flame in the center and all around the chamber-wall.

Having described my invention, what I claim is—

1. The combination of the pinnacle I, side columns H, and perforated walls D, substantially as described.

2. In a bagasse-furnace, the ribbed or winged central pinnacle, I, having a space all around it between its wings and the outer wall, and said pinnacle having a grated or other suitable support, whereby the bagasse which is introduced into the furnace is radially divided and distributed and prevented from packing centrally against the sides of the body of said pinnacle, and whereby a central draft through the bagasse is secured, substantially as set forth.

3. In a bagasse-furnace, the combination of the doors D′, the walls D, having openings *d*, and the bridge E, having passages *e*, substantially as and for the purpose set forth.

4. The combination of the grate or grates b^1 in a chamber or chambers provided with a draft door or doors, B^1, the ash-pit or ash-pits b^2, provided with a draft door or doors, F F′, and the combustion-chamber of the furnace provided with the pinnacle, the columns, the longitudinal walls, and draft-doors D′, substantially as set forth.

Witness my hand in the matter of my application for a patent for bagasse-furnace this 12th day of April, 1878.

WILLIAM LITTLEJOHN.

Witnesses:

AMORY R. STARR,

CHAS. M. RAYNET.