

No. 856,011.

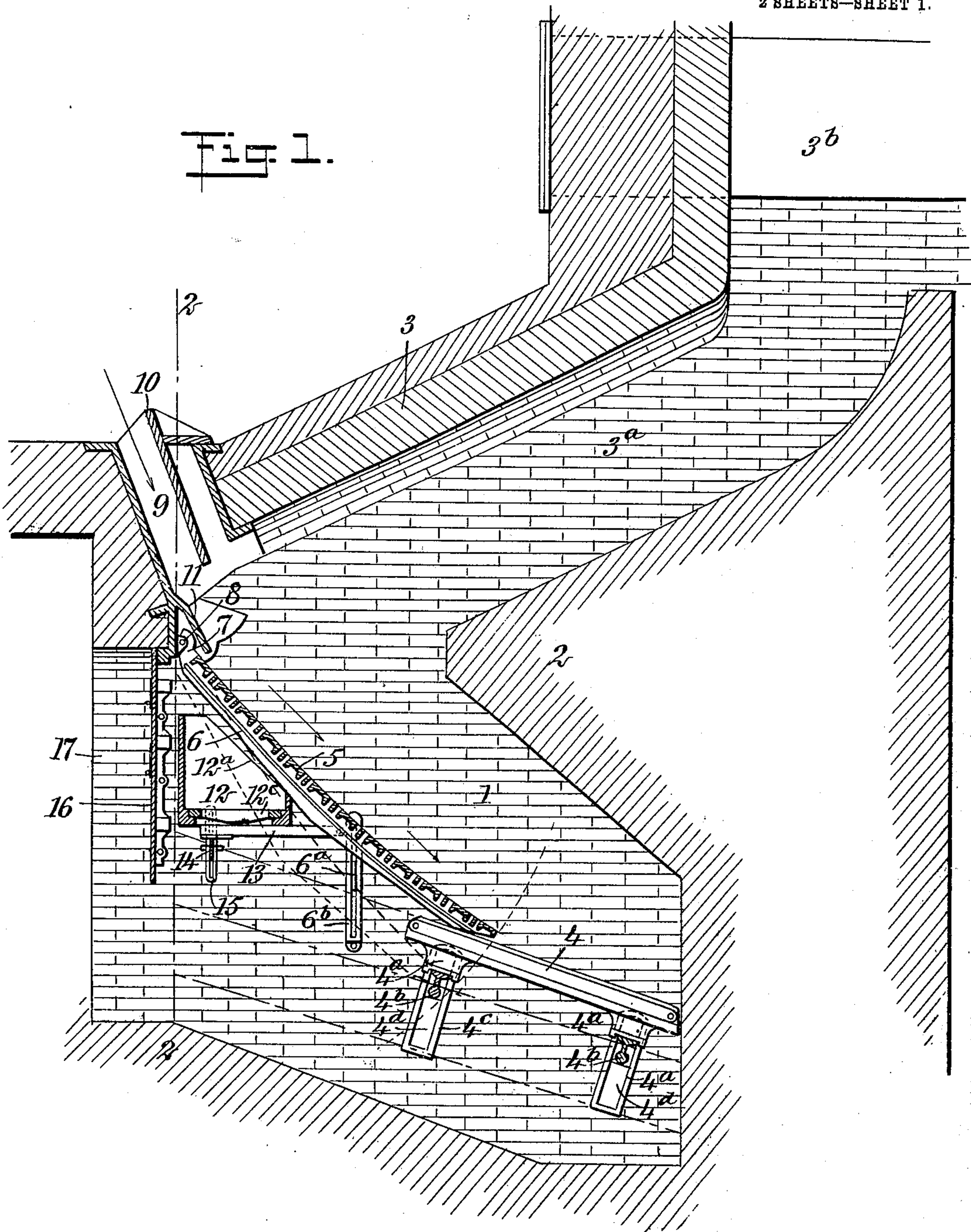
PATENTED JUNE 4, 1907.

F. F. WILLEMS.  
BAGASSE FURNACE.

APPLICATION FILED OCT. 31, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

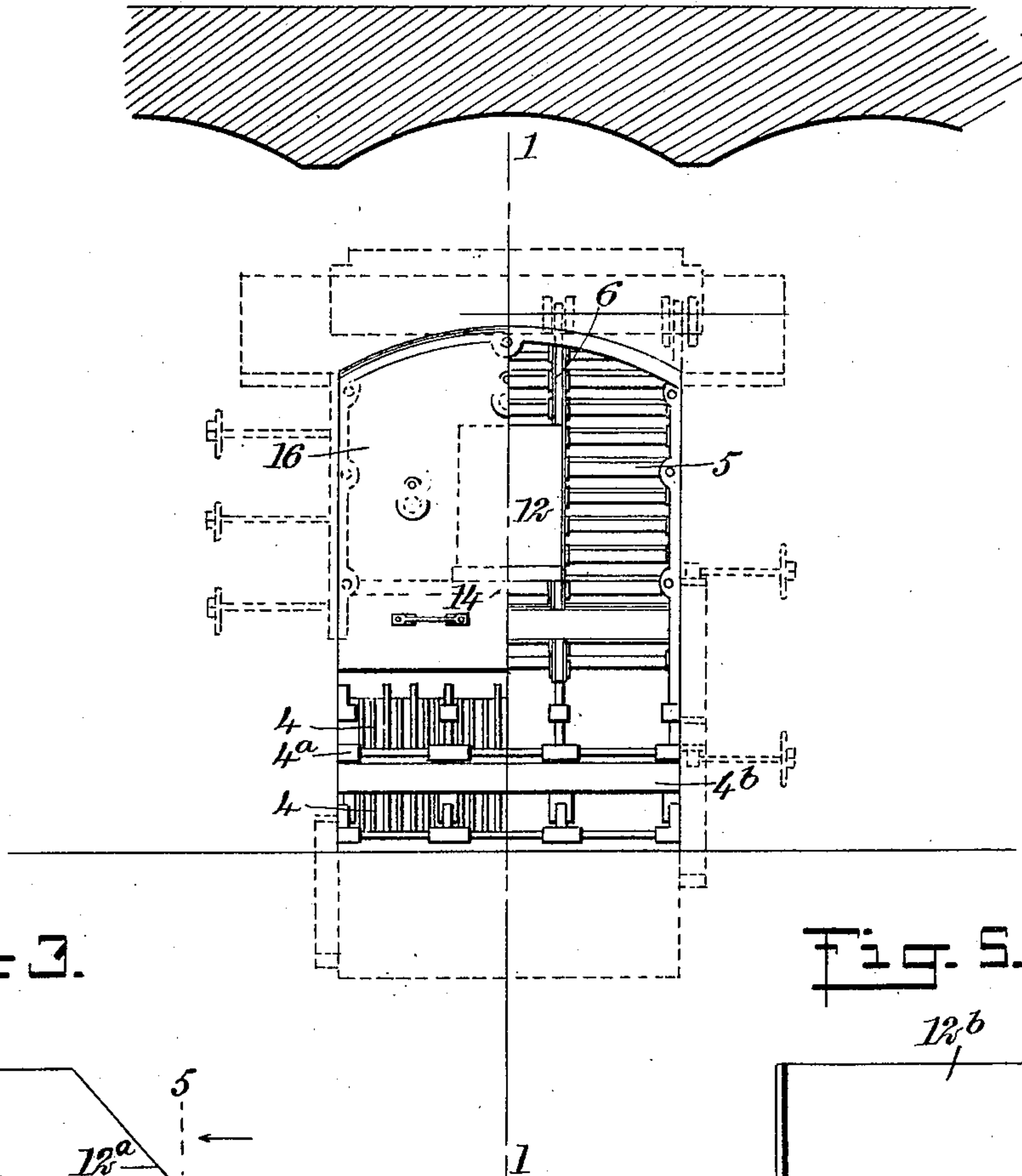


Fig. 3.

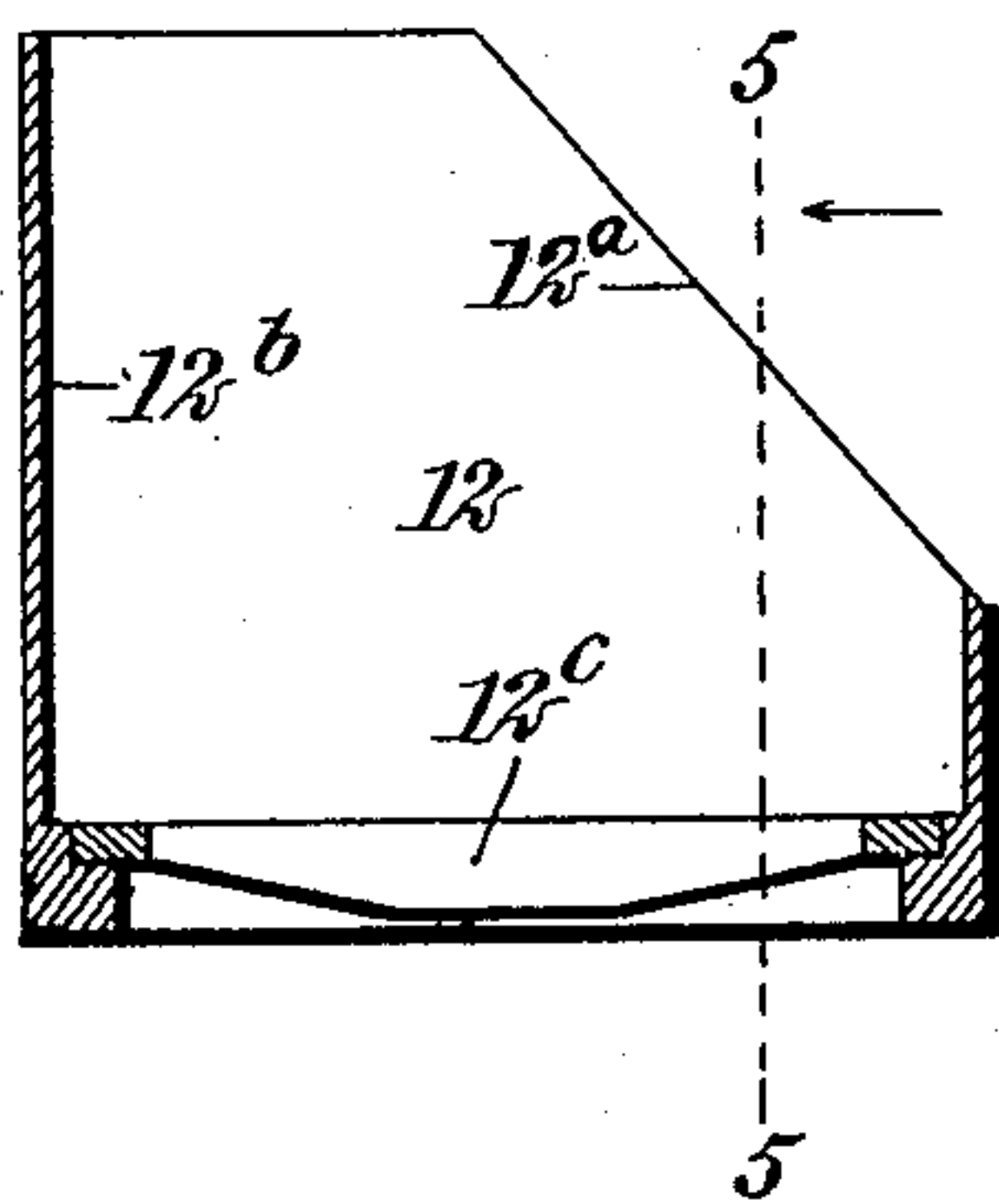


Fig. 5.

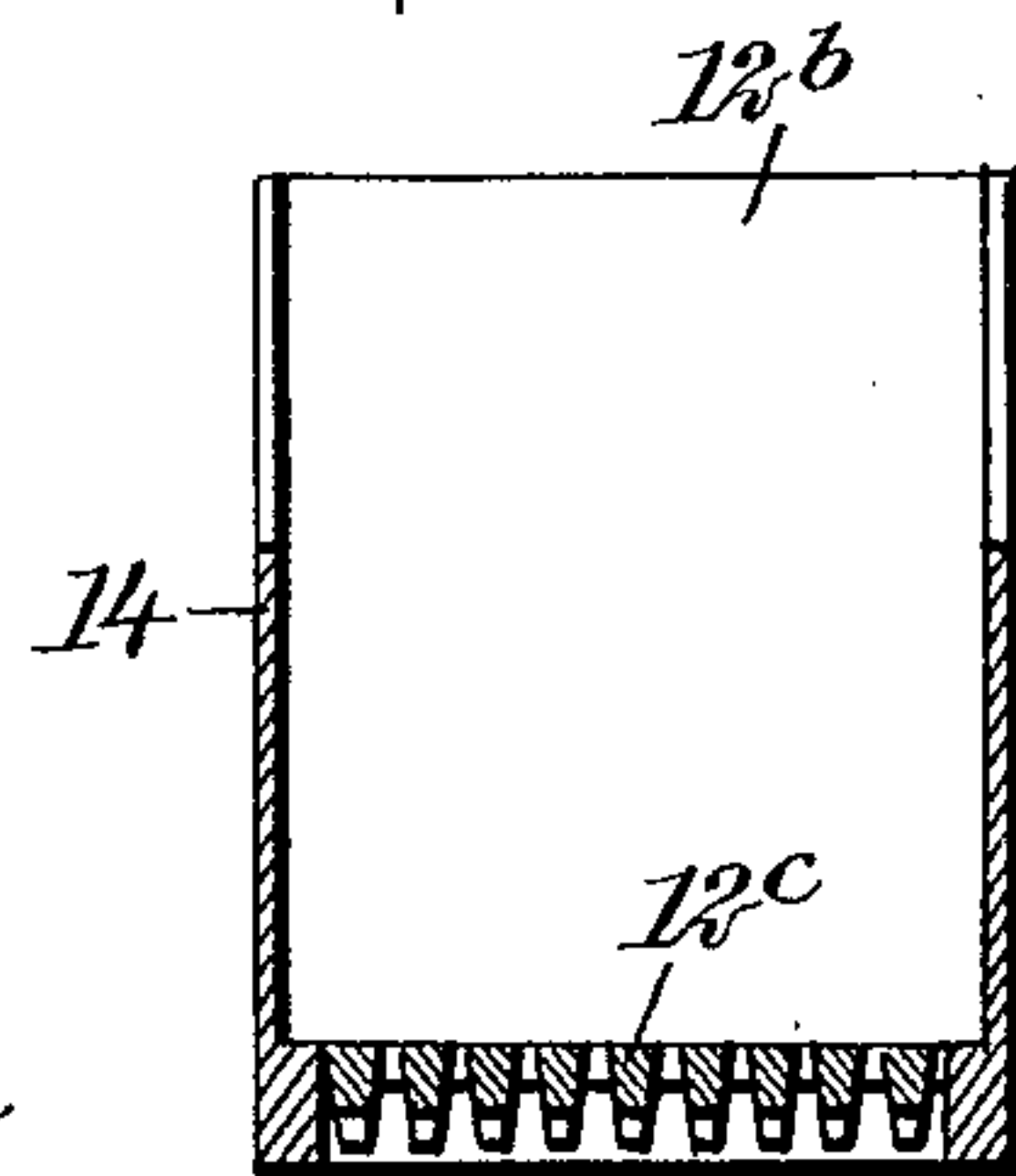
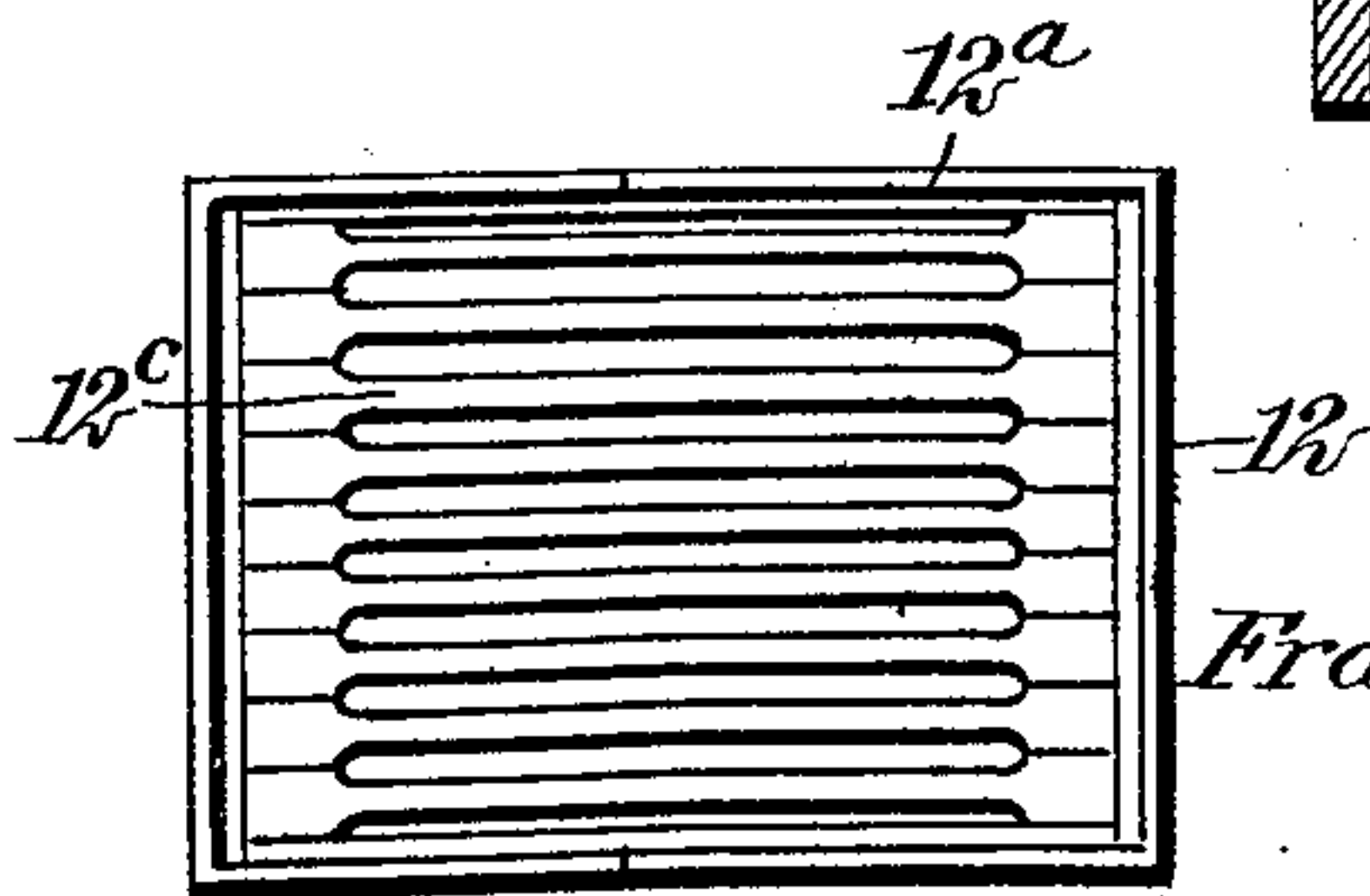


Fig. 4.



**WITNESSES**

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# UNITED STATES PATENT OFFICE.

FRANS F. WILLEMS, OF DELANGGOE, JAVA.

## BAGASSE-FURNACE.

No. 856,011.

Specification of Letters Patent.

Patented June 4, 1907.

Application filed October 31, 1906. Serial No. 341,434.

*To all whom it may concern:*

Be it known that I, FRANS FREDERIK WILLEMS, a subject of the Queen of the Netherlands, and a resident of Delanggoe, Soerakarta, Island of Java, Dutch East Indies, have invented a new and Improved Bagasse-Furnace, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in furnaces, and more particularly to furnaces adapted for the burning of bagasse, the fiber refuse of sugar cane discharged from the juice-extracting machinery.

The object of the invention is to provide a furnace in which the bagasse may be dried before reaching the grate bars, and may thus be utilized more economically as a fuel.

The bagasse as it comes from the juice-extracting machinery is of great bulk and contains a very large percentage of moisture, which moisture is thoroughly driven off after the bagasse enters the furnace but before it reaches the main grate bars.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, in which

Figure 1 is a longitudinal section of a furnace provided with my improvements, and on the line 1—1 of Fig. 2; Fig. 2 is a transverse section, the left-hand portion being on a line outside of the furnace, and the right-hand portion being on the line 2—2 of Fig. 1; Fig. 3 is a longitudinal section of the auxiliary or drying furnace; Fig. 4 is a plan view of said auxiliary or drying furnace; and Fig. 5 is a transverse section on the line 5—5 of Fig. 3.

In my improved furnace there is provided a main combustion chamber 1, and a bridge wall 2 spaced from the upper arches 3 of the furnace, whereby a flue 3<sup>a</sup> is formed leading to the boiler 3<sup>b</sup>. Below the combustion chamber are located two sets of grate bars 4 and 5, which grate bars are set at an angle to each other, the lower grate bars 4 being nearly horizontal, while the upper grate bars 5 are at an obtuse angle thereto and spaced in a parabolic curve. The lower grate bars are secured to a frame 4<sup>a</sup> carried by two horizontal bars 4<sup>b</sup>, which latter may be moved up and down within guides 4<sup>c</sup>, and held in place by means of blocks 4<sup>d</sup> of varying size which may be inserted within the guides 4<sup>c</sup> and beneath the lower edges of the bars 4<sup>b</sup>.

The grate bars 4 preferably extend longitudinally of the furnace, while the grate bars 5 are arranged transversely thereto. These latter bars are, as above stated, arranged in a parabolic curve and secured to a frame 6, which frame is provided with extensions 7 pivoted to a shaft 8 carried by the front wall of the furnace adjacent the opening thereto. The lower end of the frame 6 rests upon the lower grate bars 4, and as the latter are raised or lowered, the inclination of the former is varied. When the grate bars 4 are in their lowermost position, the grate bars 5 and supporting frame 6 occupy the position shown in dotted lines in Fig. 1. The inclined grate may be moved by means of levers, not shown, and when placed in the proper position may be supported by means of a bar 6<sup>a</sup> inserted within guides 6<sup>b</sup> upon the side walls of the furnace.

Adjacent the upper end of the grate bars 5 is located the fuel inlet passage 9, the size of said inlet being controlled by a loose plate 10 supported therein. Adjacent the lower end of the inlet opening is a guide plate 11 extending over the shaft 8 and the end of the frame 6, whereby the fuel entering the inlet passage 9 is directed onto the upper ends of the grate bars 5. The bagasse is fed by hand or automatically into the inlet opening 9 and as it falls upon the grate bars 5, its passage down said bars is retarded, due to the fact that these bars extend transversely of the furnace giving a step-ladder effect. The grate bars are placed at such an angle that the bagasse may move slightly downward to the lower grate, and means are provided whereby the bagasse may be thoroughly dried while at the upper end of this grate and be in a condition to be rapidly burned as it reaches the lower end of the grate and the second grate below. This means comprises an auxiliary or drying furnace 12 arranged directly below the upper grate bars 5, and having its front side 12<sup>a</sup> cut away so as not to interfere with the free movement of said grate bars. The rear wall 12<sup>b</sup> of said furnace is formed solid to prevent the entrance of cold air from the outside, while the lower wall of the furnace is provided with suitable grate bars 12, whereby the cold air which enters the furnace proper may pass to the auxiliary furnace and support the combustion therein, which furnace serves to dry the bagasse upon the upper grate bars 5, inasmuch as all of the products of combustion from the auxiliary



furnace must pass through between said bars.

The drying furnace is preferably of less width than the main furnace, and is centrally located as indicated in Fig. 2. In order to support the furnace, I provide suitable bars 13 pivoted to the frame 6, and having their outer ends supported upon a bar 14 having its ends resting in guides 15 upon the walls of the furnace. The air for supporting the combustion of the fuel in the auxiliary furnace, as well as upon the main grate bars, enters through an opening beneath a large removable plate 16 supported within the front brick arch 17 of the furnace. This plate may be supported in any suitable manner, whereby it may be readily removed, said plate being either hinged or loosely bolted in place, as may be desired. Suitable openings may be provided in this plate whereby it is possible to examine the condition of the fire and the grate bars without opening said plate.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An apparatus of the class described, comprising an inclined grate, a second substantially horizontal grate, means for varying the position of one of said grates and an auxiliary or drying furnace beneath the upper end of the inclined grate.

2. An apparatus of the class described, comprising a grate, a second grate having one end thereof pivotally supported and having the opposite end resting upon the first mentioned grate, and means beneath the upper end of the first mentioned grate for drying the material thereon.

3. In an apparatus of the class described, a grate, an inclined curved grate having one end thereof adjacent the first mentioned grate and at an angle thereto, means beneath the upper end of the curved grate for drying the material thereon, and means for varying the position of both grates.

4. In an apparatus of the class described, a substantially horizontal grate, a curved inclined grate having the upper end thereof pivoted and the lower end thereof adjacent the first mentioned grate, and a furnace beneath the upper end of the curved grate for drying the material thereon.

5. In an apparatus of the class described, a grate, means for varying the elevation thereof, a second inclined grate having one end thereof pivoted and the opposite end thereof terminating adjacent the first mentioned grate, means for varying the position of said inclined grate, and means beneath the upper end of said inclined grate for drying the material thereon.

6. In an apparatus of the class described, a grate having longitudinal grate bars, a second curved inclined grate having one end thereof pivoted and the bars thereof arranged transversely in a parabolic curve, means beneath the upper end of said inclined grate for drying the material thereon, and means for admitting material to the upper end of said last mentioned grate.

In testimony whereof I affix my signature in presence of two witnesses.

F. F. WILLEMS.

Witnesses:

F. C. BOOL,  
J. G. POEM.