

M. Thompson,
Steam Boiler Furnace,
No 12,678, Patented Apr. 10, 1855.

Fig 1.

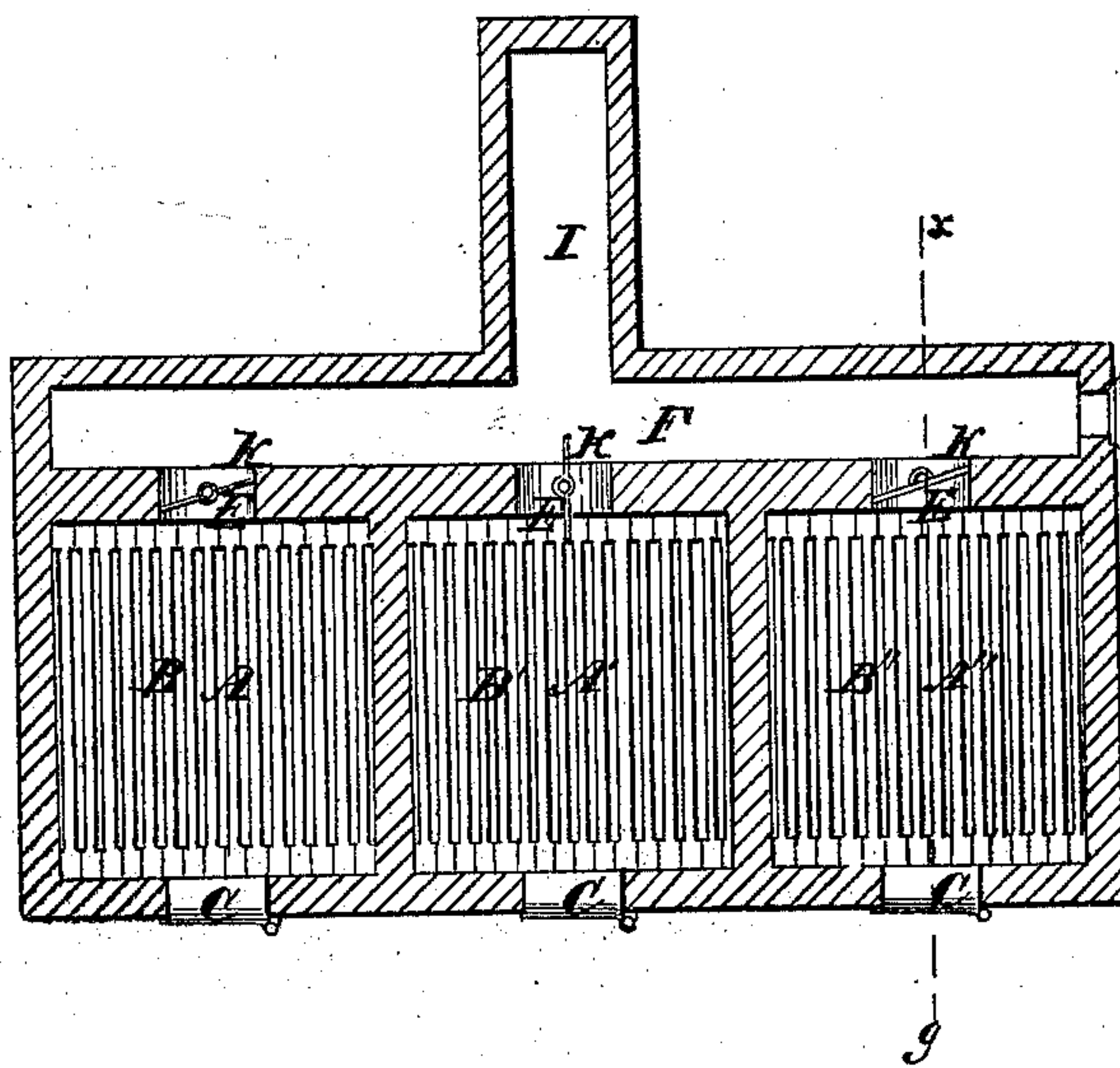
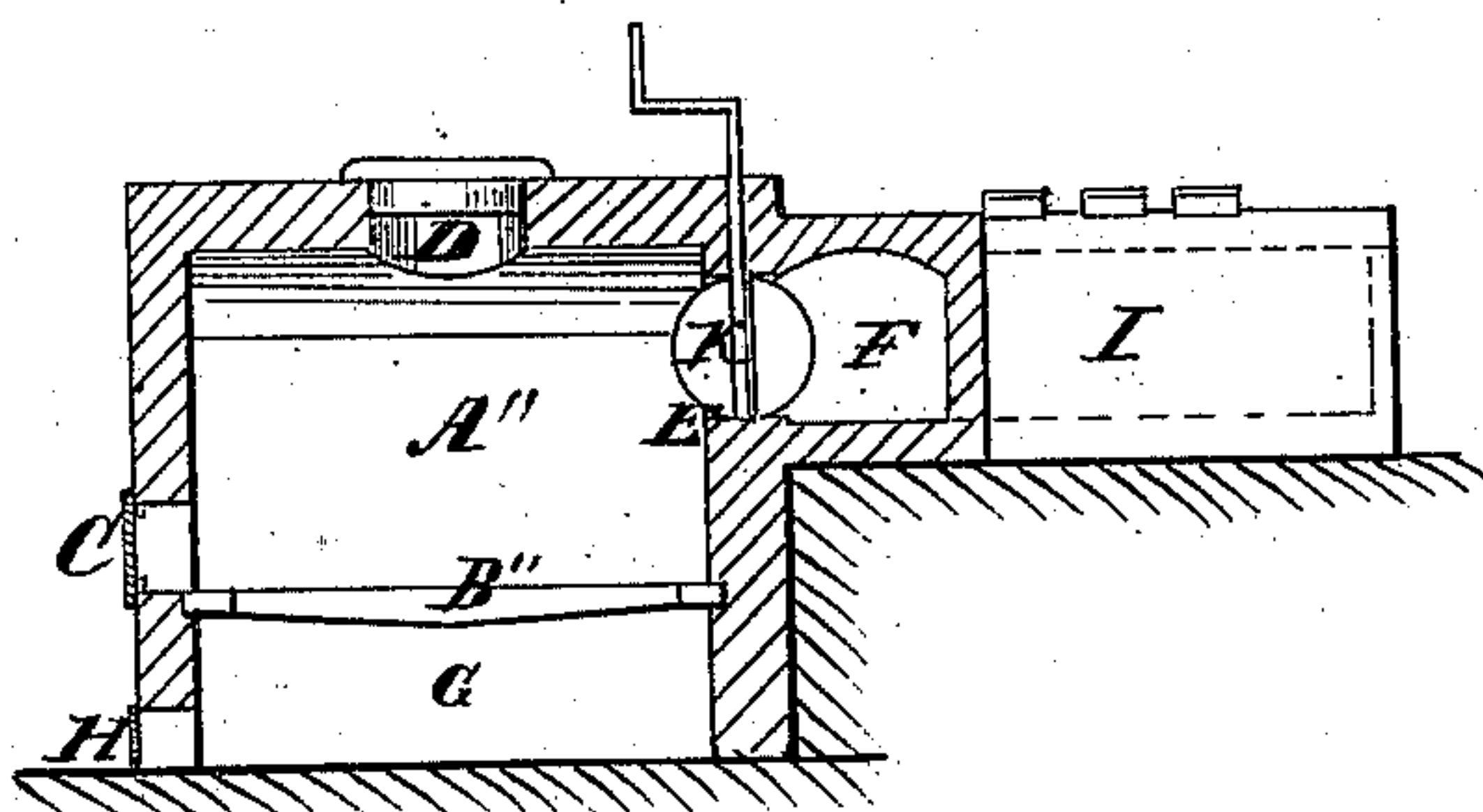


Fig. 2.



UNITED STATES PATENT OFFICE.

MOSES THOMPSON, OF HENRICO COUNTY, VIRGINIA.

FURNACE FOR BURNING WET FUEL.

Specification of Letters Patent No. 12,678, dated April 10, 1855.

To all whom it may concern:

Be it known that I, MOSES THOMPSON, of the county of Henrico and State of Virginia, have invented a new and useful improvement in burning tan-bark, bagasse, sawdust, and other kinds of fuel in a wet state for the purpose of creating heat, to generate steam, or to be employed in heating or drying operations; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1, is a horizontal section of a furnace, constructed according to my invention. Fig. 2, is a vertical section of the same, in the line, *x, y*, of Fig. 1.

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

The main object of my invention is to effect the more economical use for fuel, of tan-bark, bagasse, or other trashy matters in a wet state, but where the fuel is dry it is much less useful and I do not claim its application thereto. It is also applicable to the burning of fuel of that or other descriptions in a dry state.

The nature of my invention consists in the employment in the manner hereinafter described, of a series of fire chambers, arranged side by side, or in any convenient way to admit of the whole series communicating with the same heating flue, which said fire chambers are furnished with dampers by which their respective communications with the flue and the ash pit may be closed or opened at pleasure. This arrangement is for the purpose of enabling the process of heating the fuel to an intense degree in a nearly air tight chamber, and then admitting a free supply of air to promote its rapid combustion to be conducted without interruption to the operations which the heat generated is intended to effect.

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

The furnace shown in the drawings, has three fire chambers, A, A', A''. Three is the number shown, as I consider that number in most cases to be best adapted for practical operation. The fire chambers are of square, but may be of other form, with grate bottoms, B, B', B'', and arched tops. They are separated by walls of non conduct-

ing material, and lined throughout with fire brick. Each is provided with a door, C, in front, for the purpose of lighting and tending the fire, with an opening, D, at the top, for the purpose of supplying the fuel when it consists of tan-bark, saw dust, or other material of a similar nature, and with an opening, E, at the back, which leads to the flue, F; the opening, E, being provided with a damper, K. Each fire chamber has a separate ash pit, G, below it, which is furnished with a door, H, to regulate the admission of air. The flue, F, extends across the back of all three fire chambers, and the chimney may be at one end, or may be placed in the rear with a flue, I, leading to it from the flue, F. If the furnace is used for generating steam, the best place for the boiler will be in the flue, I, which will be made of proper size to receive and nearly surround it. If used for other purposes, any arrangement may be made that may be considered best, but the thing to be heated ought to be so high as not to require the products of combustion to descend on their passage to it.

The mode of conducting the operations of the furnace is as follows:—Fires being lighted in all the fire chambers, two of the three have the doors, H, H, of their ash pits closed, and the dampers, K, K, so nearly closed as only to allow a sufficient escape of the gases generated by the slow combustion which then goes on, to prevent explosion. The other fire chamber in the meantime has the damper, K, open, and the door of the ash pit opened far enough to admit any quantity of air that may be requisite to promote such a degree of combustion in the chamber as may be necessary to generate the amount of heat required. The air should be drawn in (except when excluded) by natural draft, and if a high stack be used there should be a damper in it to check the draft. When the fuel in the open chamber is reduced to a desirable degree, that chamber is closed and recharged, and another opened and supplied with air until the fuel within it is reduced, when it is closed, recharged, and another opened; each in its turn being opened and freely supplied with air, to generate and supply the requisite amount of heat, while the others are closed and successively supplied with fresh wet fuel to heat and decompose the fuel to such a degree as is desirable before allowing

rapid combustion and escape of the heat to take place. Each fire chamber should be supplied successively with fuel at proper intervals by any convenient means, either 5 through the hole, D, or through the door, C, in front just before closing the fire chamber.

The principal advantage of a furnace and process of this description consists in heating and decomposing the fuel—without any further loss of heat than is absorbed by the 10 poor conducting material of which the furnace is constructed—to such a degree, as will, when a proper supply of air is admitted, cause the most perfect combustion of 15 the gases and smoke to be effected. This could not be effected in a single fire chamber without interruption to the proper supply of heat, but when two or more fire chambers are employed, no interruption takes place, 20 as one furnace is always in full operation. Another advantage consists in always holding a certain quantity of heat in reserve in the closed chambers, which may be immediately brought into action by opening one or 25 more of the chambers. A similar, but inferior result might be produced by having several separate grates and ash pits to the same fire-chamber, each grate charged successively and its ash pit for a time closed 30 immediately after fresh charging, to exclude the air. I have described this in my caveat upon which this application is based, but do not use it because of its inferiority in practice, although it involves my principle. 35

After ample experiments I have discovered that any results which can be produced by the use of dry fuel, are entirely inferior 40 to mine in proportion to the quantity used, and that results like mine can only be attained by the use of wet fuel, similar to what I have herein mentioned, fed into an

intensely heated chamber. Under such circumstances, the water in the fuel, in the presence of the carbonaceous substances in 45 the furnace, will be decomposed, giving its oxygen to the carbonaceous matter, dispensing with a draft and its cooling and wasteful influences, and rendering the combustion so perfect that no smoke is visible. 50

I do not claim the within described arrangement of a series of fire chambers to communicate with one common flue irrespective of the purpose for which, and the manner in which I employ the said arrangement. 55 But

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

The combustion, for the purposes of a high degree of heat, of bagasse, refuse tan, 60 saw-dust, and other refuse substances, or very wet and green wood, by the employment of a series of fire chambers arranged in any manner substantially as described, to communicate with one flue, when any number of the said chambers are nearly closed 65 to the flue, and to the admission of air when first charged, as described, while the remaining chamber or chambers is in free communication with the flue, and has a free 70 supply of air admitted, and each chamber in its turn is nearly closed and then opened, and has air admitted—whereby the heat required is furnished by the combustion of the fuel in one or more chambers, while the fuel 75 in the other chamber or chambers, is being heated and decomposed to a desirable degree, as herein set forth, no artificial blast being used.

MOSES THOMPSON.

Witnesses:

O. D. MUNN,
JNO. W. HAMILTON.