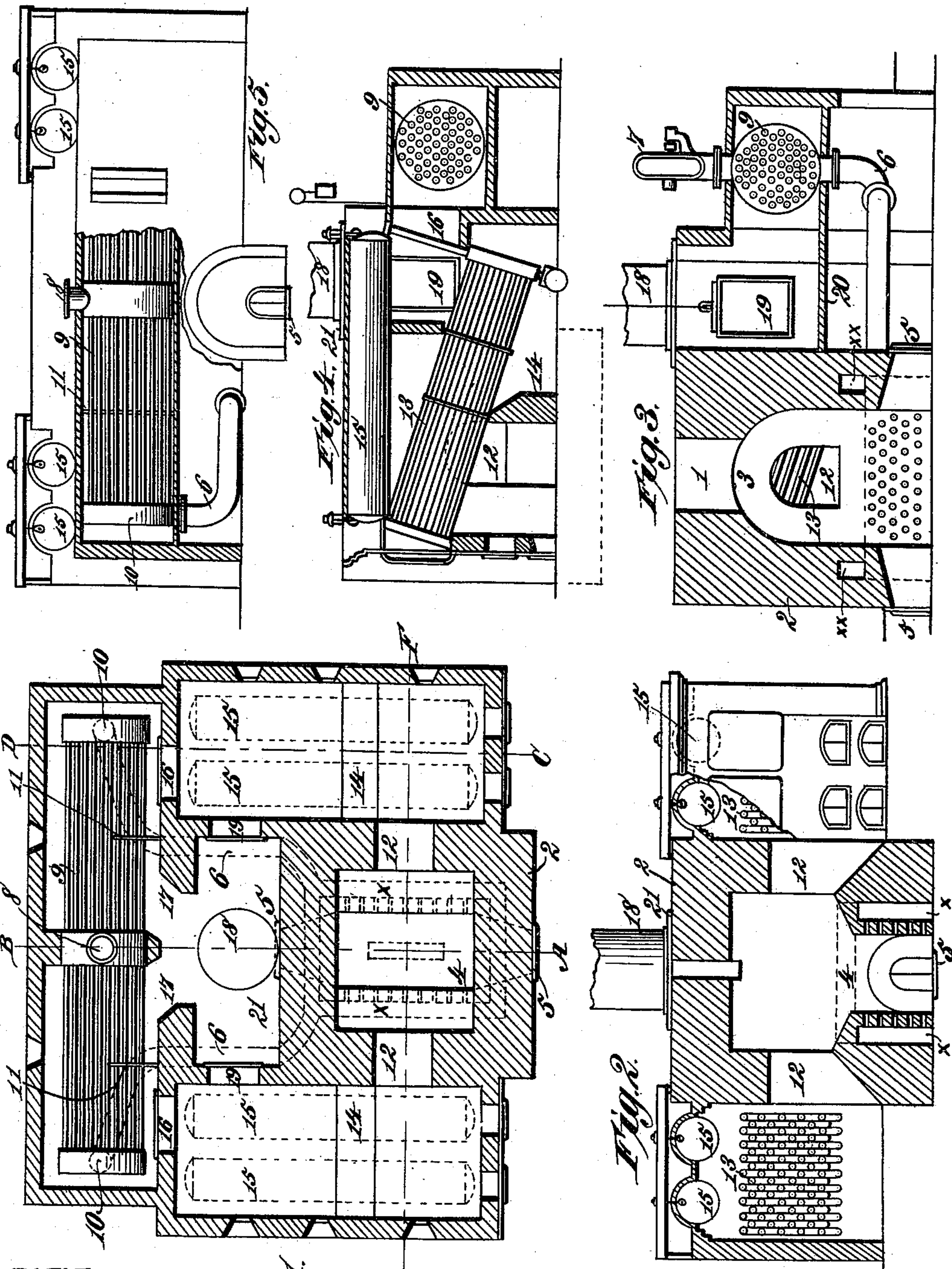


(No Model.)

F. COOK.
BAGASSE FURNACE.

No. 408,588.

Patented Aug. 6, 1889.



Witnesses:
Phat. G. Smith,
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Fig. 1.

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UNITED STATES PATENT OFFICE.

FREDERIC COOK, OF NEW ORLEANS, LOUISIANA.

BAGASSE-FURNACE.

SPECIFICATION forming part of Letters Patent No. 408,588, dated August 6, 1889.

Application filed November 15, 1888. Serial No. 290,963. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC COOK, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements 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 annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

The object of my invention is to provide an improved furnace for burning damp bagasse possessing the following features: A central bagasse-furnace situated between a divided battery of steam-boilers arranged so that each half of the battery may be at an equal distance from the bagasse-furnace, and thus the heating-surface of the outside boilers is brought nearer the furnace than if all the boilers were on one side or in front of it; also, the arranging of a bagasse-furnace, steam-boilers, an air-heater, an air-forcer, and a smoke stack, together with regulating-dampers, so that the waste heat on its passage to the smoke-stack may pass from the boilers to and around the pipes of an air-blast heater, which blast, after such heating, is forced at a high temperature to the bagasse-furnace, and also the arrangement of dampers to be such that the waste heat can be shut off from the air-heater and pass direct to the smoke-stack, so that either a cold or a hot blast can be had at will for the bagasse-furnace.

It is also my object to produce an improved air-heater for heating the air by the waste gases of combustion, by which construction all bends or turns are avoided and large heating-surface obtained.

I attain these objects by the arrangements and mechanism shown on the drawings, in which—

Figure 1 is a horizontal section partly through line E F. Fig. 2 is a vertical section and part outside view of boiler-front. Fig. 3 is a vertical section through line A B, Fig. 1. Fig. 4 is a section through line C D. Fig. 5 is a rear view, partly in section, of the air-heater and rear of boilers.

The damp bagasse from the sugar-mill is conveyed by carriers (not shown) to any suit-

able feeder (not shown) that is situated over the feed-hole 1 at top of the bagasse-furnace 2. The furnace shown has an arched top 3 inside and a contracted base 4 square with the axis of the arched top. On each side of the contracted base are tuyeres for air-blast connecting to air-passages x on sides, which air-passages x are connected together by other air-passages xx over the cleaning-doors 5 of the furnace, and the blast-pipes 6 connect the united passages with the air-boxes of air-heater.

At 12 are the flues for exit of heat from furnace. Right and left to each half of boiler-battery the blower 7 forces cold air into the air-box 8, which has a head each, and into which heads connects one end of tubes 9, while the other end of tubes 9 connects to one head of two other air-boxes 10, both air-boxes and tubes being practically air-tight. These end air-boxes connect to the blast-pipes 6.

At 11 are division-plates through which the tubes 9 pass, and these plates cause the waste heat from boiler to pass more thoroughly among the tubes and deflect the current.

The boilers 13 (shown) are water-tube boilers, and the battery is divided into two divisions of substantially similar dimensions, each located in a boiler-chamber upon each side of the bagasse-burner.

14 is the bridge-wall, and 15 the drums.

The heat from bagasse-furnace 2 enters under the inclined tubes at openings 12, and after passing transversely through the tubes, in the usual way with this character of boilers, the waste heat passes out at openings 16 to the air-heater, thence it passes through openings 17 to smoke-stack 18. When steam is being raised, the dampers at openings 16 are closed and dampers at openings 19 are raised. The heat then passes direct to smoke-stack 18, and not through the heater, and thus avoids the danger of overheating the heater-tubes when no air is passing through. Steam may be raised with ordinary wood, either thrown in through furnace-doors under the boilers or into the bagasse-furnace.

The boilers may be provided with auxiliary furnaces with grates (not shown) for firing with any fuel from the front; but where wood is cheap I prefer leaving the grates out, on account of danger of destruction from the

bagasse-furnace heat passing over them after steam has been raised and the mill started.

The smoke-stack is raised from the ground, the base being elevated, as shown on drawings, and the hearth of heater extends under stack. A smoke-chamber is thus formed whose top is also covered around the base-plate 21.

In the consumption of green bagasse for the generation of steam my experiments have demonstrated that the degree of heat generated by the bagasse-burner varies inversely in proportion to the distance from the burner of the boiler-tubes. Thus while I am able to obtain, under ordinary circumstances, a temperature of 2,000° Fahrenheit at the points where the products of combustion emerge from the openings 12, this temperature decreases within a certain distance from said openings to 1,200°, and at a farther distance to 400° Fahrenheit, or thereabout, the above figures being approximate only.

It is well known that in many sugar-producing countries coal is a costly fuel and difficult to obtain, while wood is usually extremely scarce. For this reason the bagasse is necessarily the most economical fuel. By the arrangement shown and described I have found that the heat actually used in the generation of steam is greatly economized as compared with the methods formerly in use. My experiments have also demonstrated that the bagasse-burner to work successfully should have a large capacity. A small burner adapted to a single boiler, or one of small horse-power comparatively, is quite too small to get the best effect from the fuel burned. It requires a certain mass of fuel to secure the high temperature necessary to the combustion of the wet bagasse; but a large battery of boilers sufficient to absorb the heat from such a bagasse-burner when placed at one side of the burner, as has heretofore been done, meets with the difficulty that those parts farthest from the furnace get much less heat than those immediately adjacent, and there is thus a serious loss of effect. By my invention both these necessary conditions are made possible—namely, a burner large enough to burn bagasse to advantage and sufficient boiler capacity to absorb the heat therefrom without that loss which was a necessary result of the former arrangement. There is also an important advantage in the reduced cost of construction, due to making one bagasse-burner answer for twice the amount of boiler, as well as reducing the amount of boiler required in consequence of the increased efficiency of surface; but the chief advantage of my invention is the ability by its use to burn the bagasse in a furnace of sufficient capacity to obtain the full generation of its heat, and then utilize that heat to the best advantage with the least amount of boiler-surface.

I make no claim to arranging a boiler upon one side of a bagasse-burner, as this has been done in several instances. The essential purpose of my invention is to provide an arrangement of the boiler or boilers whereby they shall be brought into the closest possible proximity to the bagasse-burner of sufficient size for efficient combustion, whereby the maximum temperature developed by the combustion of the bagasse shall be expended in the generation of steam without material loss or waste.

I make no claim in this application to any matter shown and described in my pending application filed of even date herewith, Serial No. 290,962.

I do not confine myself to the special bagasse-furnace and boilers described and shown, as any other kind of boiler or bagasse-furnace may be used—that is, a central bagasse burner or furnace situated between steam-boilers for the purpose described; but

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

1. A central furnace for burning bagasse, situated between a divided battery of steam-boilers and supplying heat from one furnace to each divided part of the battery, as described.

2. A central furnace for burning bagasse, situated between a divided battery of steam-boilers, part being each side of the bagasse-furnace, the boiler-setting arranged with exit-holes and dampers to admit and regulate the waste heat from boilers to air-heating pipes, and exit-holes with dampers leading direct to chimney.

3. The combination of a central bagasse-furnace with steam-boilers each side of the furnace-openings and dampers in the boiler-walls to admit or close off the waste heat from an air-blast heater or turn it direct to the smoke-stack, an air-blast heater, and an air-forcer.

4. An air-heater without bends or turns, composed of straight tubes connected to air-boxes and provided with dividing or heat-diverting plates through which the tubes pass for the purpose of deflecting the heat, substantially as described.

5. A bagasse-furnace arranged, as described, to receive a cold or hot blast by means of regulating-dampers to let on or shut off waste heat from an air-blast heater, or to let the heat pass direct to chimney without passing through the heater.

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

FREDERIC COOK.

Witnesses:

O. L. LE BLANC,
JAS. D. COLE.