(No Model.)

4 Sheets—Sheet 1.

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BAGASSE FURNACE.

No. 334,204. Patented Jan. 12, 1886.

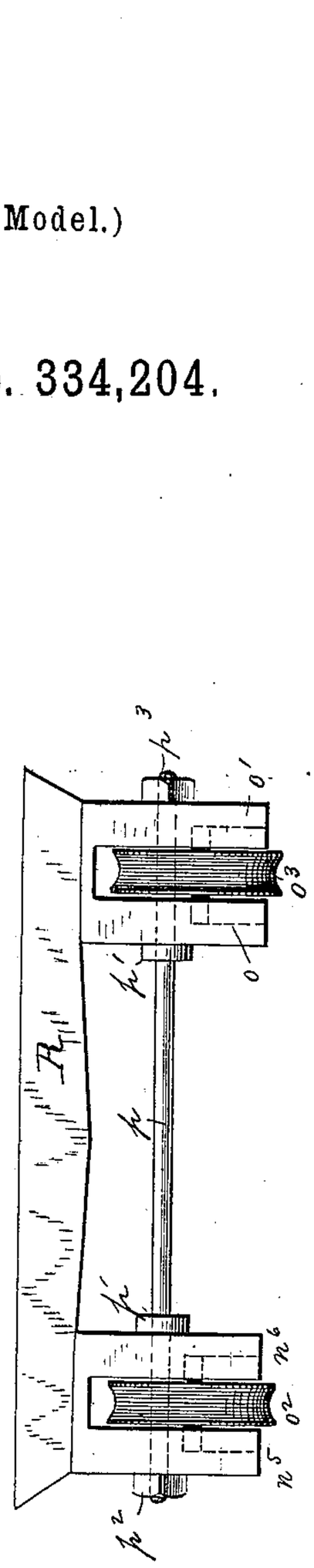

Fig. 2.

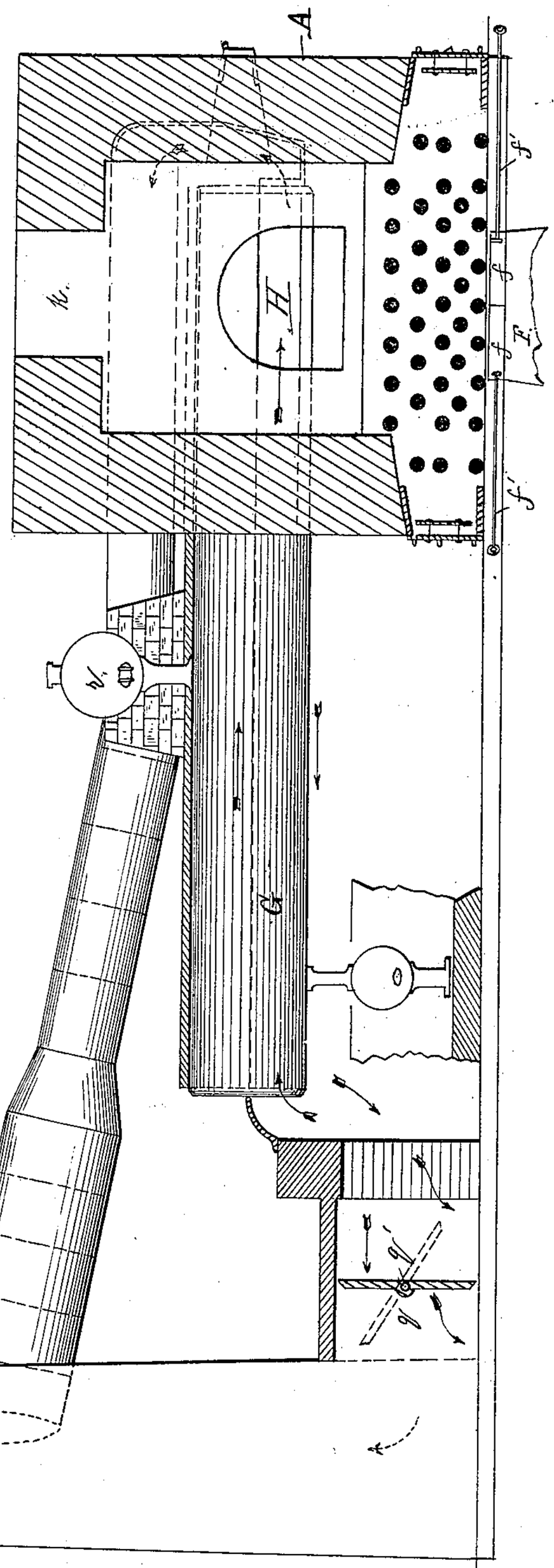

Fig. 1.

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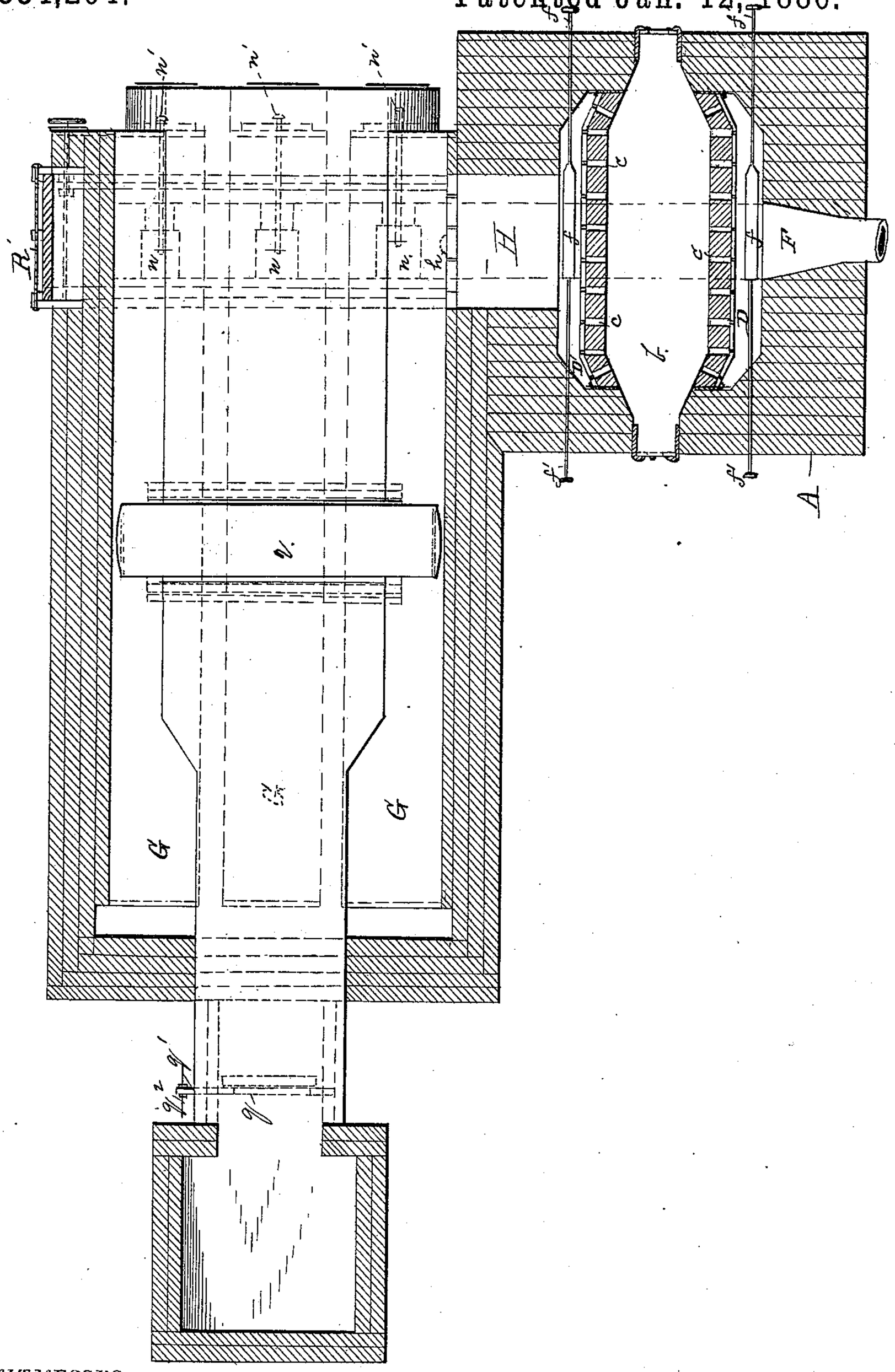

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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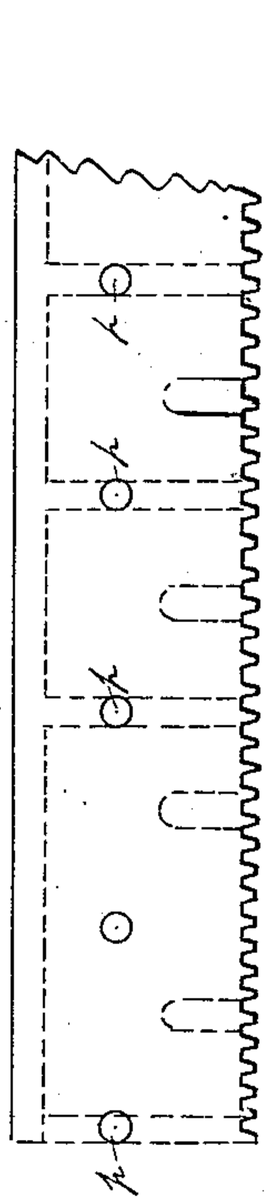

Fig 5.

Fig 3.

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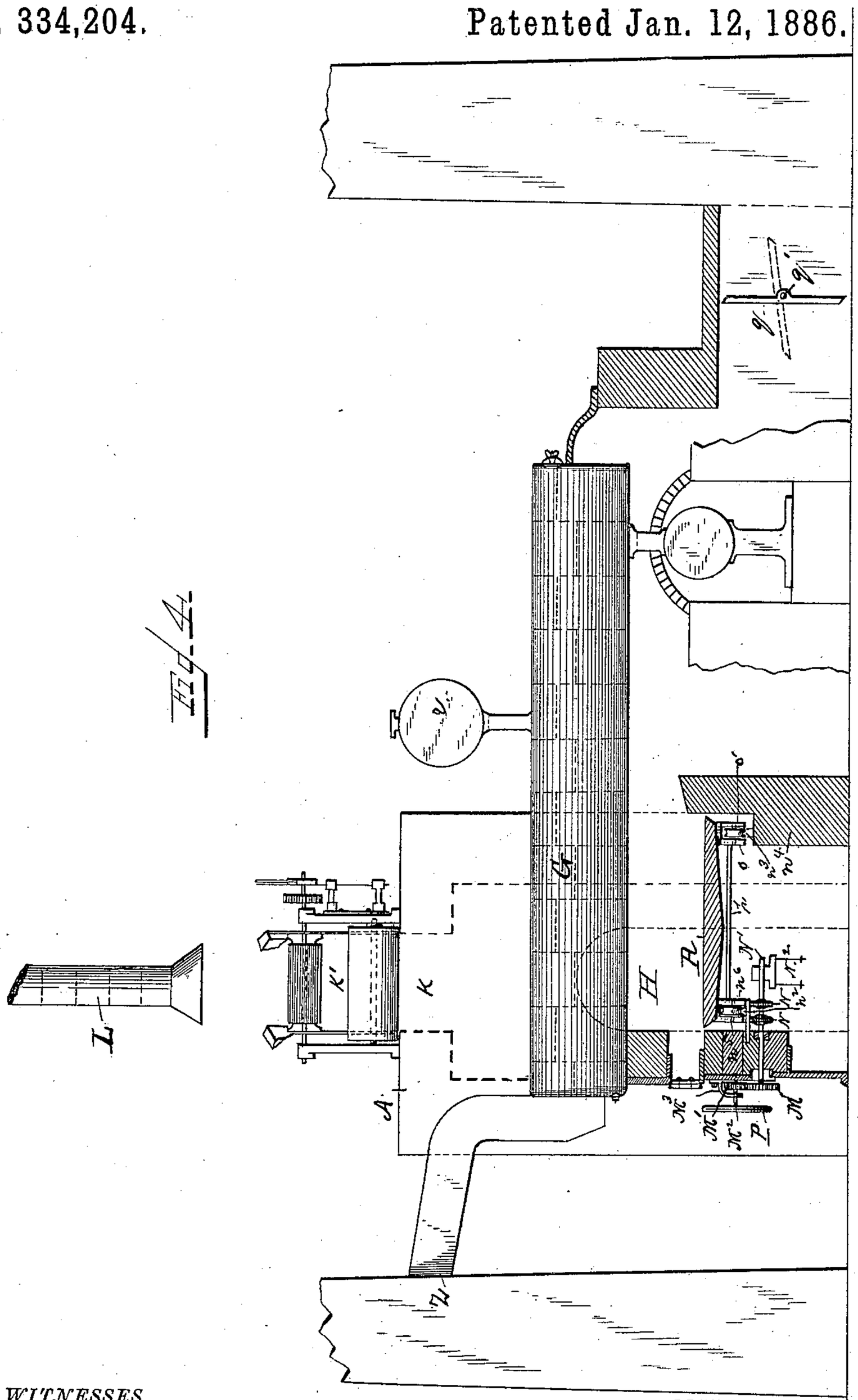

WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM WILSON SUTCLIFFE, OF NEW ORLEANS, LOUISIANA.

BAGASSE-FURNACE.

SPECIFICATION forming part of Letters Patent No. 334,204, dated January 12, 1886.

Application filed September 23, 1885. Serial No. 177,960. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. SUTCLIFFE, a citizen of the United States, and a resident of New Orleans, parish of Orleans, State of Louisiana, have invented new and useful Improvements in Bagasse and other Furnaces, of which the following is a full and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention consists in the combination, in a bagasse-furnace, of a combustion-chamber having side walls provided with perforated or tuyere plates, and air-chambers located in rear of said plates, with a draft-flue having separate communicating openings and valves to each air-chamber, as hereinafter set forth.

My invention further consists in the combination of a bagasse-furnace and a draft-flue, as hereinafter described, with a boiler-furnace having a removable fire-bed.

My invention further consists in the combination of a bagasse-furnace, a boiler-furnace, and a flue connecting same, with a draft-flue having valves, through which air is admitted to either of said furnaces, as hereinafter set forth.

The invention also consists in the combination of a bagasse-furnace, having a feed-opening at the top thereof, with a hopper provided with a gate or valve and means for automatically operating same.

The invention also consists in the combination of a bagasse-furnace and a draft-flue with a boiler-furnace provided with transverse rails, a grate-bar carriage adapted to operate on said rails, and means for operating the carriage, as hereinafter described.

The invention also consists in certain details, combinations, and arrangements, all of which are hereinafter fully described and specifically claimed.

To enable others to understand the construction and operation of my invention, reference must be had to the accompanying drawings, making part of this specification, and on which—

Figure 1 is a longitudinal sectional view of the bagasse-furnace with boilers in rear thereof. Fig. 2 is a horizontal section of the bagasse-furnace and plan of boilers, &c., connected therewith. Fig. 3 is a vertical cross-section of the bagasse-furnace, with side view of feed arrangement and a front elevation of steam-boilers. Fig. 4 is a longitudinal vertical section of boiler-furnace with bagasse-furnace in rear thereof. In this view two chimneys are represented, one at each end of the boiler, the object of which is hereinafter described. Figs. 5 and 6 are details showing, on an enlarged scale, the construction of the grate-bar carriage employed.

On the drawings, A designates the bagasse-furnace, which is preferably made rectangular in form, with a central opening or combustion-chamber, *b*, having an arched top and contracted sides, the latter perforated or provided with tuyere-plates *c*, to admit air from chambers D D′, that are formed in rear thereof. The floors of the chambers D D′ are provided with openings, whereby communication is had with a blast-flue, F, which extends across the base of the bagasse-furnace and boiler-furnace, as shown in Figs. 1 and 2. The aforesaid openings are each provided with gates or valves *f*, having rods or handles *f′* at each end thereof. These handles project through passages formed in the walls of the furnace, so that the supply of air thereto can be regulated from the outside. The boilers G are erected at the side of the bagasse-furnace, so that the furnace thereof shall have communication with the interior of the bagasse-furnace through a passage, H, formed in the adjacent walls thereof. In this passage is fitted a vertically-sliding damper or door, *h*, which is suspended by a chain, *i*, from a windlass, *i′*, whereby it is raised when desired, the door being of sufficient weight to automatically close when the windlass is unlocked.

The top of the bagasse-furnace is provided with a feed-opening, *k*, which is surmounted by a hopper, *k′*, into which the bagasse is automatically fed. Within this hopper, and near the rear wall thereof, is pivoted a gate or valve, k^2, having an operating-arm, k^3, provided with a balance-weight, k^4, and wire rope k^5, the latter carried upward over a loose sheave, k^6, and thence downwardly to a vertically-sliding bar, *l*, having guideways in the carrier-supporting frame *l′*, as shown in Fig. 3.

The bagasse-carrier drum-shaft l^2 is pro-

vided at one of its ends with a crank or arm, l^3, which at each revolution thereof is brought in contact with a roller, m, operating on a pin at the side of the vertically-sliding bar l, and pushes the same downward, thereby causing the valve k^2 to open and discharge the accumulations of bagasse thereon into the combustion-chamber below. Through the action of the weighted lever k^3 the aforesaid valve and its operating parts return to their normal positions as soon as the crank or arm l^3 shall have passed from off the roller m, thus leaving the valve in position to receive another load of bagasse.

Above the mouth of the hopper k' is a chimney, L, for carrying off any sparks which may escape through the feed-flue below.

The boilers—any desired number of which may be used—are erected at one side of the bagasse-furnace, and the floor of their furnace is provided under each boiler with an opening, whereby communication is had with the draft-flue F. These openings are each provided with sliding gates or valves n, having outwardly-projecting handles n', whereby they can be separately opened or closed as required. (See dotted lines in Fig. 2.)

Within the boiler-furnace, and extending across the full width of same, I secure at an even height two rails, n^2 n^3, the former to the rear of the inner facing of the fire-front and the latter on a wall, n^4, which, as usual, forms the rear of the boiler-furnace. These rails form supports for my grate-bar carriage, which is composed of a front and rear set of plates, each set consisting of a pair of plates, n^5 n^6 and o o', the adjacent sides of which are provided with an upper longitudinal strip and a number of similarly-spaced vertical strips, in order that when fitted together each set shall contain a series of compartments for the reception of rollers o^2 o^3, which in the practice of the invention are designed to operate on the rails n^2 n^3. The lower edges of the front set of plates are provided with teeth or racks, which are engaged by the teeth of cog-wheels N, as hereinafter more fully described. The two sets of plates aforesaid are held at requisite distances apart by means of rods or braces p, having collars p' and tightening-nuts p^2 p^3, as shown more clearly in Fig. 6.

The letter R designates the grate-bars, which are laid across the aforesaid set of plates, so as to form a fire-bed of any desired width.

The rails n^2 n^3 are extended through an opening in the outer wall of the boiler-furnace, in order that the grate-bar carriage may be rolled entirely outside of the said furnace whenever occasion may so require. The aforesaid opening is provided with a door, R′, to permit of its being closed when necessary.

The operating cog-wheels N are keyed or otherwise secured on a shaft, N′, which is located beneath the front rail, n^2, and at right angles thereto, the said rail being provided with elongated perforations or slots, in order that the teeth of the wheels N may project through the same, and thus engage the racks forming part of the movable grate-bar carriage. The shaft N′ has its journal-bearing in the boiler-front, and on a column, N^2, which is erected within the boiler-furnace for said purpose. The front end of the shaft N′ is made to project through the boiler-front, and is provided with a cog-wheel, M, which is engaged by a pinion, M′, of a shaft, M^2, that is journaled in a bracket, M^3, connected with said boiler-front, said shaft provided with a hand-wheel, P, whereby the same can be operated as desired.

The outer wall of the boiler-furnace is provided with an opening, through which the rails n^2 n^3 extend in any desired direction. This opening is sufficiently large to permit of a free passage through the same of the grate-bar carriage, in order that it may be rolled outside of the furnace when not required for use therein. R′ is a door whereby the aforesaid opening is closed when desired.

At the rear of the boiler-furnace is a flue connecting same with a chimney. In this flue is fitted a damper, q, having a shaft, q', one end of which projects through the side of the flue, and is provided with an operating lever or wheel, q^2.

The object of the aforesaid flue and damper is to allow the immense volume of smoke produced at the ignition of the bagasse to escape directly to the chimney, instead of having to first pass through the boilers and breeching-flue.

As shown in Figs. 1 and 2, the breeching-flue, or rather a portion of the same, is somewhat flattened, so as to nearly if not entirely cover all the boilers of the battery. In its course rearward this flue partially incloses the steam-drum r, from the rear of which it gradually assumes a circular form, and is made to tap the chimney at the rear of the boilers.

If the heat from the breeching-flue is not desired for superheating the steam, as in the above case, the said flue may be directed to and made to connect with an auxiliary chimney located in front of the boilers, as shown at z in Fig. 4.

The operation of my invention is as follows: The gates or valves through which air is admitted to the air-chambers D D′ being closed and the damper h lowered, fire is started under the boilers on the grate-bars of the movable carriage and the draft-doors opened, as in ordinary firing. When sufficient steam is raised, the blower is started, the aforesaid draft-doors closed, and the gates or valves n opened to admit the forced draft. The cane-mill is then started, and as the crushed canes or bagasse passes from the rollers the same is conveyed by the discharge-carrier to the feeding apparatus of the bagasse-furnace, from whence it is discharged, as described, into the combustion-chamber of the bagasse-furnace, where it is ignited. The damper or door h is then raised to permit the flame and heat to pass under the boilers, and the valves opened to admit the

forced draft into the air-chambers D D′ and through the sides thereof into the combustion-chamber. The firing under the boilers is then discontinued, and the grate-bar carriage rolled out of the boiler-furnace for the protection thereof from the intense heat within said furnace. The gate R′ is then closed and the carriage rolled aside until occasion for its use again.

From the above description it will be seen that my invention dispenses entirely with the use of auxiliary boilers, the same set being in constant use, whether the cane-mill is running or not.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A bagasse-furnace having a combustion-chamber provided at each side of the base thereof with air-chambers having inner walls composed of perforated or tuyere plates, as described, and a draft-flue provided with separate openings and regulating-valves to each air-chamber, substantially as set forth.

2. The combination of a bagasse-furnace, a boiler-furnace, and a communicating flue, as described, with a draft-flue and regulating-valves for admitting air to either of said furnaces, substantially as set forth.

3. The combination of a bagasse-furnace having a feed-opening at the top thereof, a feed-hopper provided with a gate having a weighted arm, a rope adapted to operate over a loose sheave and connect the aforesaid weighted arm with a vertically-sliding bar having a side pin and roller, as described, and a crank connected with the drum-shaft at the discharge end of the bagasse-carrier, whereby the sliding bar and gate are operated, substantially as and for the purpose set forth.

4. The combination of a bagasse-furnace, a draft-flue, and a boiler-furnace, as described, with transverse rails located in the boiler-furnace, a grate-bar carriage adapted to operate on said rails, and means for operating the carriage, substantially as set forth.

5. The combination of a bagasse-furnace, a boiler-furnace, and a connecting-flue, with boilers having a breeching-flue, by which the steam-drum is partially or wholly incased, substantially as and for the purpose set forth.

6. The combination of a bagasse-furnace, a draft-flue, and a boiler-furnace having a flue-connection with said bagasse-burner, and means, substantially as described, to allow an outflow of smoke, when desired, without having the same first pass through the boiler-flues and breeching, as set forth.

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

WILLIAM WILSON SUTCLIFFE.

Witnesses:

GEO. C. TAYLOR,

E. MALONGE.