

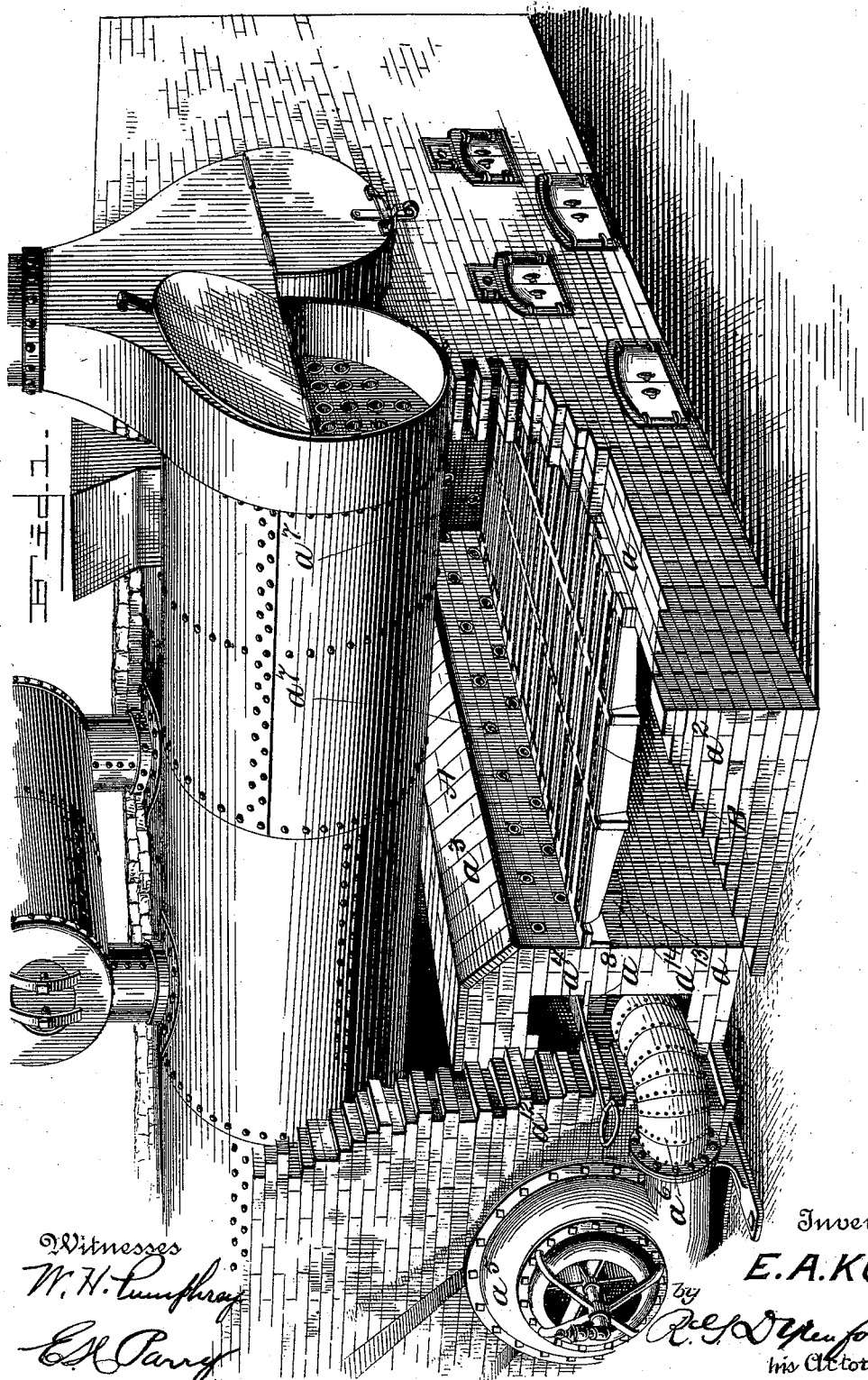
(No Model.)

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E. A. KOCH.  
BAGASSE BURNER.

No. 527,001.

Patented Oct. 2, 1894.



Witnesses  
W. H. Humphrey  
E. H. Parry

Inventor,  
E. A. KOCH,

by  
R. S. W. for the  
his Attorney.

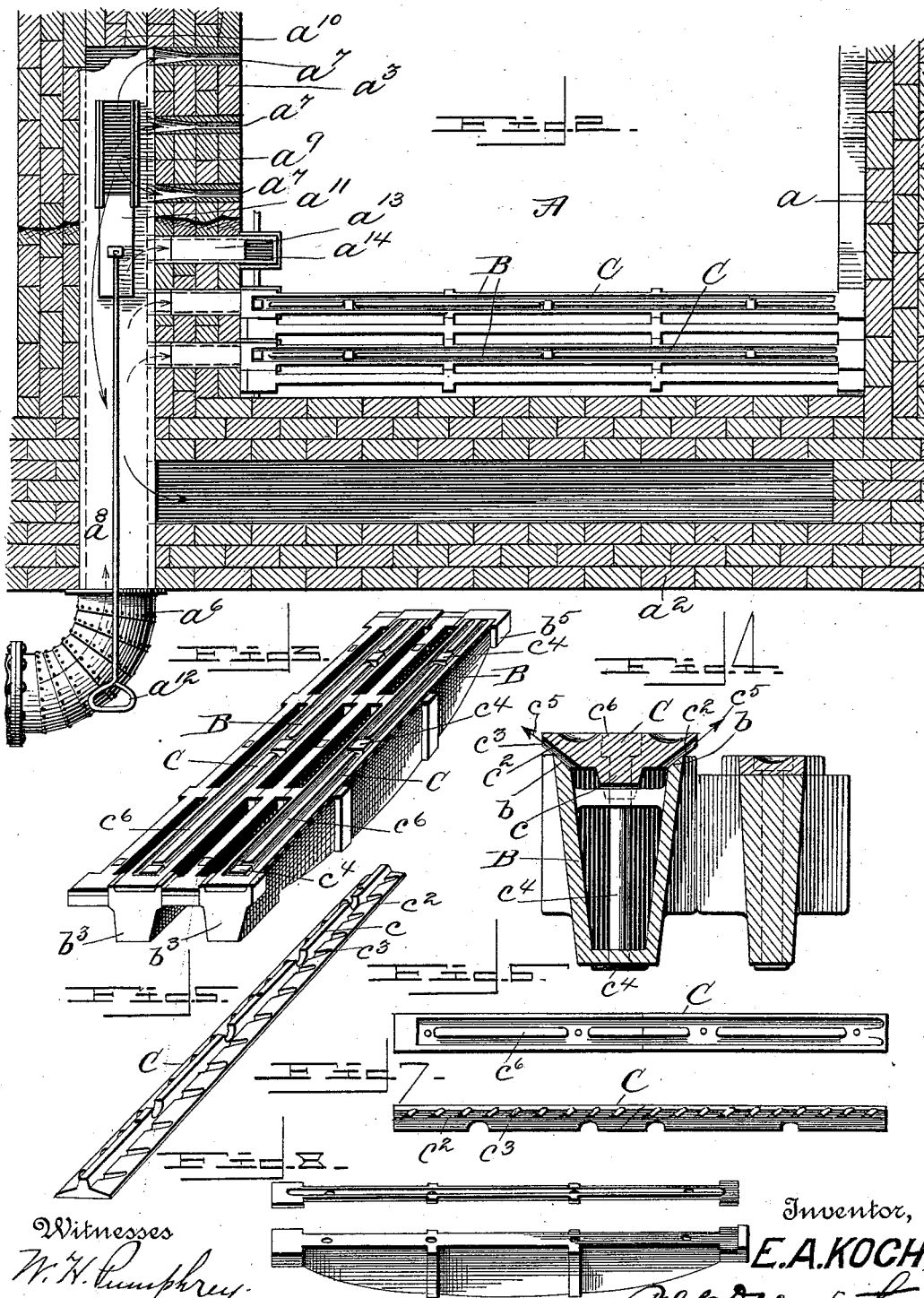
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# UNITED STATES PATENT OFFICE.

EDOUARD ALPHONSE KOCH, OF BAYOU GOULA, LOUISIANA.

## BAGASSE-BURNER.

SPECIFICATION forming part of Letters Patent No. 527,001, dated October 2, 1894.

Application filed April 9, 1894. Serial No. 506,899. (No model.)

*To all whom it may concern:*

Be it known that I, EDOUARD ALPHONSE KOCH, a citizen of the United States, residing at Bayou Goula, in the parish of Iberville and State of Louisiana, have invented certain new and useful Improvements in Bagasse-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to furnaces, and, particularly, to the class known as bagasse burners.

The object is to obtain complete combustion of wet or green fuel, such as bagasse, saw-dust, and the like, and, to this end, properly distribute and regulate the blast and discharge it under the bottom and along the sides of the burning mass.

With these objects in view, the invention consists, generally, in novel construction and arrangements of parts in a bagasse furnace, and in a hollow blast grate bar having peculiar features of construction, either combined or taken separately.

The invention is illustrated in the accompanying drawings, in which—

Figure 1— is a view in perspective, of a bagasse burning furnace, with a portion of the inclosing wall broken away, showing the grate-bars in position and their relations. Fig. 2— is a fragmentary, sectional view, taken horizontally of Fig. 1, namely, through the plane of the upper surface of the grate-bars and partially through the higher plane of the air-tuyeres, showing the bridge-wall with its chamber divided vertically and also horizontally, with damper in the horizontal partition, and tuyeres leading into the grate-bars and over them, and, also, one of the chambered side-walls, with passage from the chambered bridge-wall, on one side of its vertical partition, into the chamber of the side-wall. Fig. 3— is a detail view in perspective of a portion of the grate, showing the alternate and relative arrangement of the solid and hollow bars. Fig. 4— is a sectional view in detail, on an enlarged scale, and taken transversely of the bars, showing a hollow and a solid bar arranged side by side at a suitable distance apart, and provided with spac-

ing lugs, the beveled edges of the hollow bar, the lid or cover similarly beveled and removably secured on the hollow bar, by bolts, and having its edges projecting beyond the sides of the bar proper and the air outlet or discharge openings formed between the beveled meeting faces of the bar and lid. Fig. 5— is a view in perspective, showing, in detail, the under side of the lid or cover of the hollow bar. Fig. 6— is a top plan view, showing a lid formed in sections, or centrally joined. Fig. 7— is a view in elevation, showing the side of the lid; and Fig. 8— is a view in perspective, showing, in detail, the solid bar and its detachable top or cover-plate.

The furnace illustrated by the drawings, is designed especially for wet, green, or finely-divided fuel, particularly, bagasse, now commonly used as fuel in the furnaces of sugar houses, and is provided with a battery of boilers, arranged in a horizontal series, a steam-drum located above and connected with the boilers, a mud-drum below the boilers and in the rear of the combustion-chamber, hoppers through which the fuel may be introduced into the combustion-chamber, and an air-blast or source of air-supply, such as a fan or blower.

In the drawings, A, represents the combustion-chamber of the furnace, formed by the front wall,  $a$ , the side walls,  $a^2$  and the bridge-wall,  $a^3$ . The bridge-wall is made hollow or chambered at  $a^4$ , and communicates with the source of air-supply,  $a^5$ , through a feed-pipe,  $a^6$ . The side walls are also hollow or chambered, as shown, and communicate with the bridge-wall. Air-tuyeres,  $a^7$ , in the side and bridge-walls, are arranged above and, if desired, below the grate, and communicate with the chamber  $a^4$ , of the bridge-wall. This chamber is divided by a horizontal plate or partition,  $a^8$ , and the upper subdivision is again divided centrally by a vertical partition,  $a^{10}$ . In the plate,  $a^8$ , a number of openings,  $a^9$ , are formed and covered by slide-dampers,  $a^{11}$ , which may be readily operated from the side of the furnace by pull-rods,  $a^{12}$ . From the lower subdivision of the chamber,  $a^4$ , a series of pipes or flues,  $a^{13}$ , lead directly into the combustion-chamber, and terminate in upturned flared mouths,  $a^{14}$ , to receive tapering extensions of the hollow grate-bars.

B, represents the hollow grate-bar, open at the top, with the upper faces,  $b$ , of its sides beveled inward to form a seat for a lid or cover, and provided at one end with a downward projecting hollow extension,  $b^3$ , which is tapered to fit snugly into the flared mouth of the air-pipe,  $a^{18}$ , through which air is introduced into the bar. The opposite end of the bar is cut away, to form a shouldered seat,  $b^5$ , which, when the bar is placed as shown in Fig. 1, rests upon a ledge or other support of the front wall of the combustion-chamber.

C, represents an approximately T-shaped lid or cover, on the lower face of which a longitudinal extending rib,  $c$ , is formed. The edges of the lid are cut away or beveled inward toward the rib and in these beveled surfaces,  $c^2$ , at each side of the rib, diagonally disposed notches, cuts, or grooves,  $c^3$ , are formed. This lid is placed or seated upon the bar, completely closing the open top thereof, and secured by lock-bolts,  $c^4$ , which pass through openings of both the bar and lid, or it may be held thereon by any other suitable means. With the lid in position, and its beveled faces lying in close contact with the beveled faces of the seat of the bar, outlets,  $c^5$ , from the interior of the bar will be formed by the cuts, notches, or grooves,  $c^3$ , which are arranged diagonally, so as to discharge the air toward the bridge-wall and directly into the fuel. As shown in Figs. 6 and 7 of the drawings, the lid may be formed in sections, thus making it possible to replace a burned out or fractured portion at one half or one-third the original cost of the lid. The solid grate-bar may also be provided with a removable cover, as shown, to be replaced, as burned, and may be in sections. To avoid accumulation or deposit in the outlet-openings of the bars, the top or a part of the bar above the openings is given an increased width, so that there are projections or ledges sufficiently beyond the sides of the bar to keep the openings clear and free from particles of fuel, and this feature I claim with or without having the top removable as a lid.

The upper face of the lid is reinforced by having strengthening ribs,  $c^6$ , adapted to support the fuel and shield the lid proper from excessive heating and consequent warping, also as spacing ribs, forming longitudinal passages on the lid and affording free passage for the air between the ribs; and the lid may be turned end for end.

From the foregoing description, it will be apparent that in addition to the natural draft which, under favorable conditions, is sufficient to operate the furnace, a blast of air may be directed into the fuel from the tuyeres of either side-wall of the combustion-chamber or from both side and bridge-walls; from the hollow grate-bars, or from the side and bridge-walls and grate-bars, by means of the slide-dampers in the chamber of the bridge-wall. This ready and complete control of the

air-blast greatly increases the heating capacity or power of the furnace and, at the same time, secures a marked economy in the consumption of fuel by reason of more complete combustion.

A great advantage of the present grate-bar over any other, and one which distinguishes it from all others, and would seem to furnish the crucial test, both of distinguishment and of advantage, is the fact that, the air not having to struggle up through the fuel lying directly on the surface of the grate-bar, as is the case where openings, whether perpendicular or oblique, are on the surface of a grate-bar, the natural draft will, in many cases, suffice for adequate combustion in the furnace. Inasmuch as the openings of the present grate-bar are at the side, the ledge will keep the fuel from choking them, and they will discharge freely into the open grating space between the common grate-bar and the hollow-blast grate-bar, so that the draft is very free; and, as the openings incline, preferably, to the rear, and are, preferably, at equal distances apart, the combustion is greatly equalized and the trend is all the stronger from front to rear, carrying the heated products of combustion to the place where they are to exert and to perform their function, with greatest effect.

A feature of the grate-bar which greatly adds to its value, is the provision of the entirely removable lid, or top-plate, and another is the division of this lid, where it is desired to have it so, into parts, so that the front part, burning out first, can be replaced without loss of the rest. By the provision of removability of the whole lid, the burning out of the lid does not affect use of the rest of the bar, but this can be continued in use with a new lid, thus effecting a saving of three-fourths of the cost of a whole bar; while, by capability of division of the lid, a saving of seven-eighths of the cost of the whole bar may be effected. Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a furnace, the combination with the chambered bridge and side walls, the chambers thereof communicating with a source of air-supply and provided with outlets terminating in air-tuyeres opening into the combustion-chamber, of a grate composed of alternate hollow and solid bars, the hollow bars being connected with the chamber of the bridge-wall, and regulating dampers in the bridge-wall chamber controlling the air-supply, substantially as described.

2. In a furnace, the combination with the chambered side and bridge walls, the chambers thereof communicating with a source of air-supply and provided with outlets terminating in air-tuyeres opening into the combustion-chamber, of a grate composed of alternate hollow and solid bars, the hollow bars being connected with the chamber of the bridge-wall, and dampers in the bridge wall

chamber by which the air-blast may be controlled and directed through the tuyeres or the hollow bars, substantially as described.

3. In a furnace, a chamber in a wall, the chamber having a horizontal partition, provided with one or more valves or dampers operated to establish or cut off communication between the parts of the chamber above and below the partition, and having openings out of the chamber, above and below the partition, substantially as and for the purpose set forth.

4. In a furnace, the combination with the chambered side and bridge walls, a connection from a source of air-supply to the chambers and outlets from the chambers terminating in air-tuyeres opening into the combustion-chamber, of a grate composed of alternate hollow and solid bars, the hollow bars being connected with the chamber of the bridge-wall and provided with removable lids or covers and outlets between the adjoining surfaces of the bar and the lid, substantially as described.

5. A hollow grate-bar, open at the top and provided with an inlet, a lid removably secured upon the bar and completely closing the open top, the edges of the lid projecting beyond the sides of the bar, and a series of outlets formed between the adjoining faces of the bar and lid, substantially as described.

6. A hollow grate-bar, open at the top and provided with an inlet, a lid removably se-

cured upon the bar, and completely closing the open top thereof, the lower face of the lid being beveled from each edge, inward toward the center and diagonally notched or grooved to form a series of outlets discharging the air toward the bridge-wall and directly into and under the fuel, substantially as described.

7. A hollow grate-bar having lateral openings slanting upward and backward to discharge the air, when the grate-bar is in position, backward and directly under and into the fuel, and provided with a lid projecting laterally over the openings, to guard them and spread the blast, substantially as described.

8. The combination with a hollow grate-bar having lateral openings slanting upward and rearward, of grate-bars having their surfaces provided with one or more grooves, substantially as described.

9. The combination with a hollow grate-bar of a lid or cover having a spacing rib or spacing ribs forming longitudinal passages on its surface, and made detachable and in sections, substantially as and for the purpose set forth.

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

EDOUARD ALPHONSE KOCH.

Witnesses:

JAS. M. RHORER, Jr.,

H. LOURRIERE.