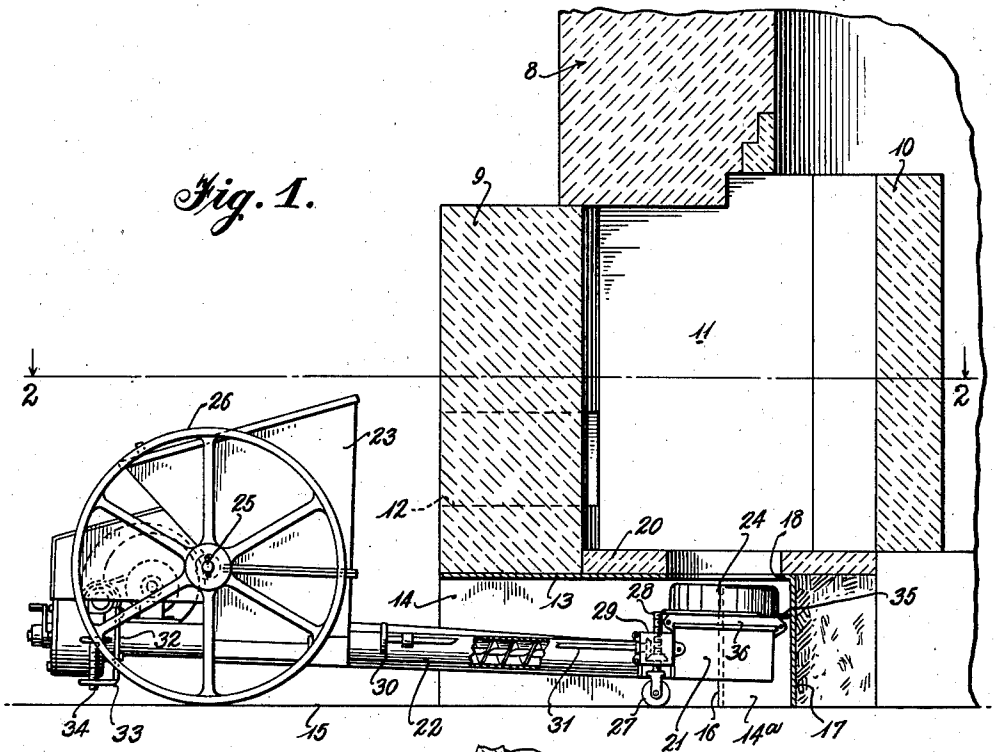
May 8, 1945. E. A. LANCASTER, JR 2,375,743

HEARTH PLATE

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Fig. 1.



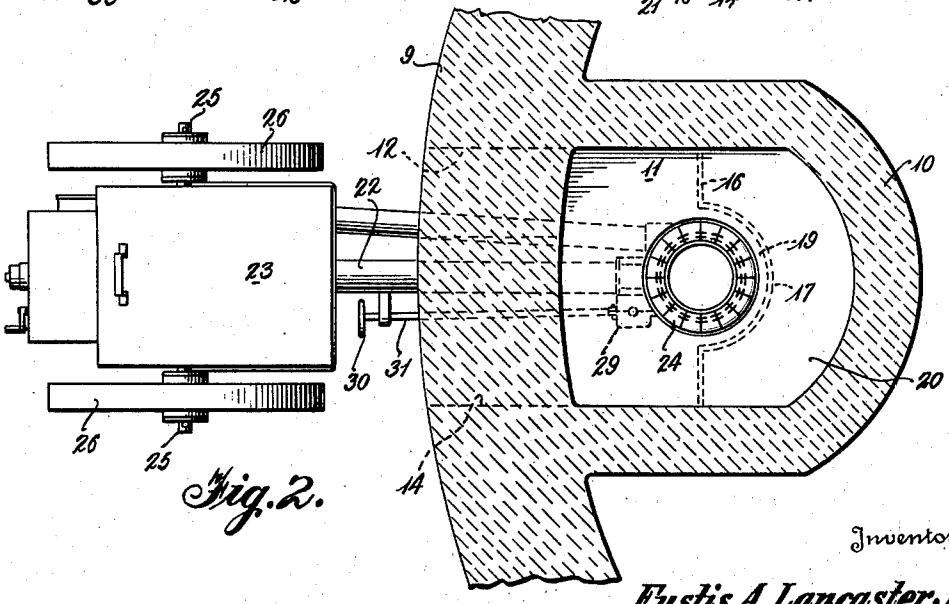


Fig. 2.

Inventor

Eustis A. Lancaster, Jr.

By James P. Burns

Attorney

May 8, 1945. E. A. LANCASTER, JR 2,375,743

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Fig. 3.

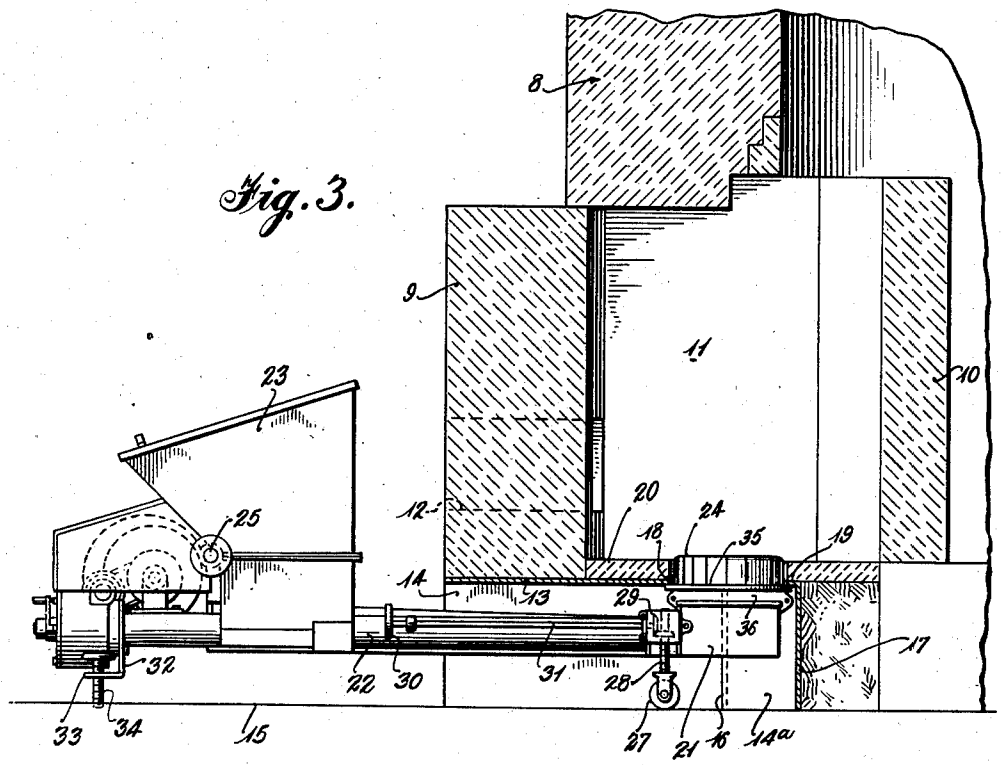


Fig. 4.

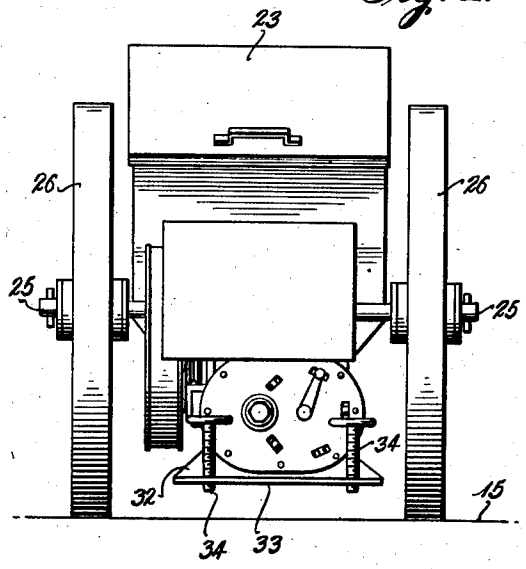
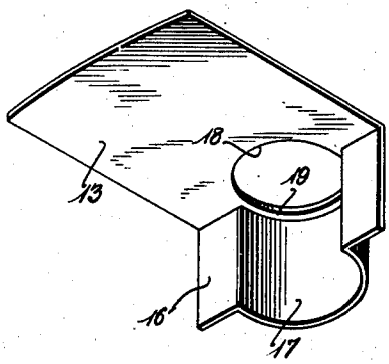


Fig. 5.



Inventor

Eustis A. Lancaster, Jr.

By James P. Burns

Attorney

Patented May 8, 1945

2,375,743

UNITED STATES PATENT OFFICE

2,375,743

HEARTH PLATE

Eustis A. Lancaster, Jr., Johnson City, Tenn., assignor to Architectural and Industrial Sales Corporation, a corporation of Tennessee

Application March 17, 1941, Serial No. 383,855

2 Claims. (Cl. 110—1)

This invention relates generally to kilns fired by automatic stokers of the under feed type and employed in the burning of clay products for the manufacture of brick, tile and the like, and has particular reference to certain improvements therein, including an improved hearth plate adapted for facilitating kiln-placement of the burner unit of a portable stoker.

Brick plants usually are equipped with batteries of kilns varying in number between twelve and thirty. Round, beehive type, down draft kilns with from ten to twelve radially disposed fireboxes are commonly employed; and for some time past it has been the practice to fire the kilns with coal supplied from automatic stokers that are detachably and interchangeably engageable with built-in retort burners permanently installed in the kiln structure at each firebox. As the time required to cool off, unload and reload a kiln is about equal to that required in burning, seldom more than half the kilns in a plant are burned at one time, and after each firing period the stokers from the burned kilns are disconnected and moved to the kilns next prepared for burning, where they are connected to the respective firebox burners. The stokers are cumbersome, and the services of several men are required to disconnect, shift, and reconnect each unit; all of which is time consuming, expensive, and the cause of undesirable wear on the connecting elements.

An object of this invention is to provide, in association with a firebox, a novel hearth structure arranged to receive and position an underfeed burner that is a permanent part of an automatic, portable stoker which is interchangeably engageable with any of a number of similar firebox hearths; whereby automatic stokers with attached retort burners may be easily and quickly exchanged from one firebox to another as needed.

Another object is to provide, in a kiln organization including an underfeed firebox and a hearth apertured to receive therethrough a portable stoker-attached retort burner which is interchangeably engageable therewith, burner-carried closure means cooperative with the burner for hearth engagement to close the hearth aperture when the burner is in service position.

Other objects will be readily apparent to those skilled in the art. They include the provision of means for transporting, levelling, and adjusting the interchangeable stokers relative to the hearths with which they are to be engaged.

In the drawings:

Figure 1 is substantially a vertical section through a kiln firebox and hearth, showing a stoker as wheeled into position preparatory to its service engagement with the hearth.

Figure 2 is a horizontal section taken on the line 2—2 of Figure 1.

Figure 3 is a section similar to Figure 1, but illustrating the stoker as adjusted into service position.

Figure 4 is a rear elevation of the stoker.

Figure 5 is a bottom perspective view of the hearth plate.

In its disclosed embodiment, the invention is shown as applied to a brick kiln 8 of any suitable, well-known form, having in its wall structure 9 a radially arranged series of conventional bag walls 10 which provide fireboxes 11 entirely around the kiln. For present purpose, only one bag wall 10 and its firebox 11 are indicated in Figures 1, 2 and 3; the remainder being omitted from any view herein to avoid repetition of identical detail. The firebox is accessible for cleaning purposes through a passageway 12 provided through the wall 9 in the usual manner of kiln construction.

The bottom of each firebox consists of a flat hearth plate 13 of cast iron or other suitable material built in the masonry and foundation of the kiln wall and extending the full width of the firebox from substantially its rear wall to the exterior face of the kiln wall 9. The plate provides a roof over a stoker receiving passage 14 formed through the base of the wall 9 and opening at its inner end to a complemental chamber 14a directly beneath the firebox. The floor of the passage and chamber is substantially coincident with the kiln ground level 15.

At its inner end the hearth plate 13 is formed with an integral, downwardly directed vertical wall portion 16 that defines the inner end of the chamber 14a and which is centrally bowed rearwardly to provide a substantially semicircular socket recess 17. The plate is further provided with an opening 18 therethrough in registry with the socket and extending somewhat forwardly thereof, leaving a narrow marginal flange 19 at the top of the socket recess. Within the confines of the firebox the hearth plate is floored with a refractory covering 20 except over the area of the opening 18.

If desired, the firebox hearth may be constructed entirely of refractory material over the chamber 14a; in which case the presence of the plate 13 is not essential.

The passage 14 with its terminal chamber 14a is so dimensioned that it permits ready insertion

and free bodily movement of a retort burner assembly 21 therein. The burner is an attached unit of an automatic stoker comprising the burner, a transmission section 22, and a fuel hopper portion 23, all of known construction. The burner includes a tuyère 24 in and on which coal from the hopper is burned as it is fed upwardly from the transmission 22. The stoker may be of any type suitable for the purpose, and, in order to adapt it to this invention, it is modified to the extent of being equipped with an axle 25 that is permanently attached to the hopper assembly 23 in appropriate position to mount detachable ground bearing wheels 26 which provide a wheeled support by which the stoker may with facility be moved from one firebox to another. Also, the burner assembly 21 carries a swivel caster 27 having a jack screw pintle 28 that is a component element of a conventional screw jack assembly, designated generally by the numeral 29, which is operated from a remote control hand wheel 30 located adjacent the hopper on the end of an operating shaft 31 mounted on the transmission section 22. The hopper section assembly, furthermore, has appropriately secured thereto a bracket member 32 having a horizontal flange 33 through which, at opposite sides of the longitudinal axis of the stoker, ground engageable jack screws 34 are threaded for vertical adjustment in levelling the stoker.

When a kiln is to be fired, the requisite number of stokers are wheeled into position in front of their respective fireboxes and advanced to move their burners into and through the passages 14 beneath the hearths 13 until they seat within the sockets 17, at which point, as shown in Figures 1 and 2, the tuyère 24 of each stoker will be disposed in vertical alignment with its hearth opening 18 which, it will be understood, is of requisite shape and size to conform to the tuyère whatever be its particular configuration, and which has sufficient clearance relative to the tuyère to permit its ready unhampered vertical movement in and through the opening.

In the interests of plant economy the wheels 26 are removed for use on other stokers, although such removal is not essential, and the stoker is anchored and levelled to ground irregularity by appropriate adjustment of the ground bearing screws 34. The caster jack 29 is then operated by means of the hand wheel 30 to elevate the burner to its service position as shown best in Figure 3, with the tuyère 24 substantially filling the hearth aperture and being projected slightly above the hearth into the firebox. The stoker and its attached burner may then be set in operation.

The burner is provided with closure means 35, here shown as a flat ring slidably fitted over the tuyère and seated loosely on an annular abutment 36 which forms a part of the burner at the base of the tuyère, which engages against the under face of the hearth plate and its flange 19 to effect complete closure of the hearth aperture and prevent burning coals and ashes from dropping down into the chamber 14*a*. The closure means serves also as a stop means limiting the extent of elevation of the burner relative to the hearth.

When burning is completed, the caster jack is manipulated to lower the burner beneath the hearth, the wheels 26 are mounted, and the entire assembly of stoker and burner may then be withdrawn from its firebox and trundled to the firebox where it is next to be used.

I claim:

1. A hearth plate for the purpose described, comprising a plate member having a burner-receiving opening therein, the end of said plate adjacent the opening being directed downwardly out of the plane of said plate and substantially perpendicularly thereto, and said downwardly directed end having a bowed portion arranged so that its axis coincides with the axis of said burner-receiving opening.

2. A hearth plate for a furnace having a firebox and a passage therebelow, the hearth plate being adapted to provide the bottom of the firebox and to roof-over the passage, and being formed to provide a burner-receiving opening therethrough, and a burner-guide member formed integrally with said plate and depending therefrom in the zone of said opening, said member being formed to provide a substantially semi-circular wall defining a burner-positioning socket having its axis coincident with the axis of said burner-receiving opening, for centering a burner with respect to the plate opening.

E. A. LANCASTER, JR.