

APPLICATION FILED SEPT. 4, 1909.

Patented Mar. 7, 1911.

3 SHEETS—SHEET 1.



1. *Fig.*

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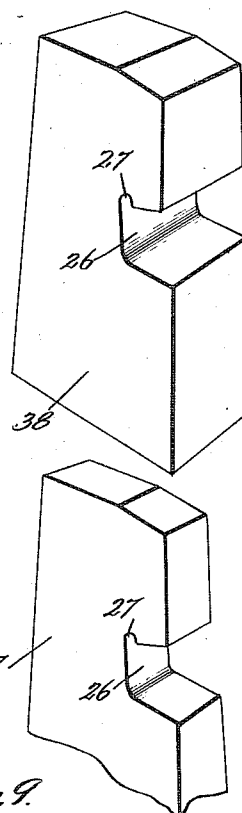
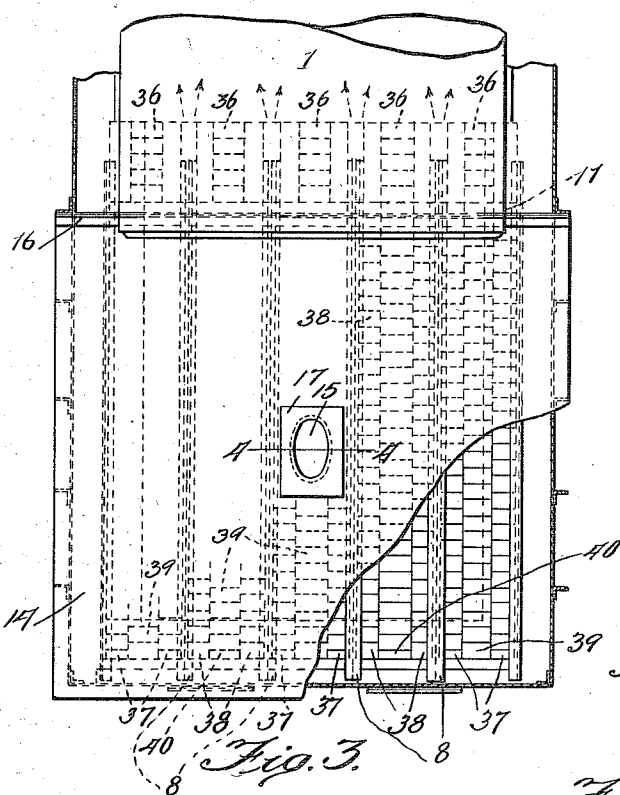
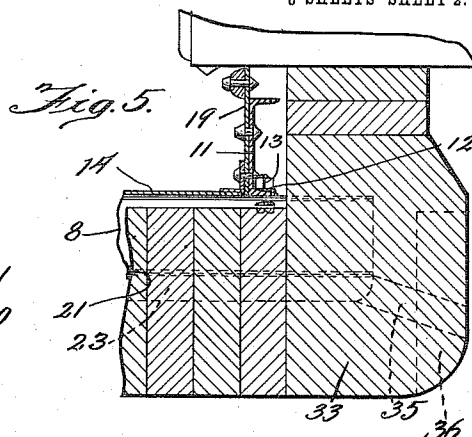
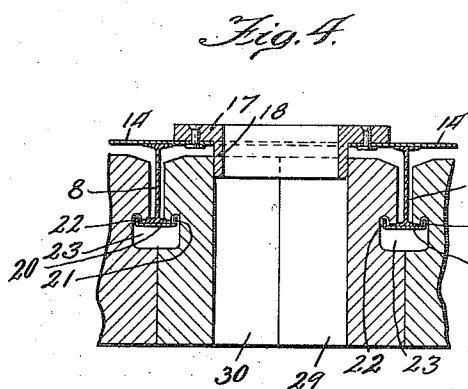
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985,878.

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3 SHEETS-SHEET 2.



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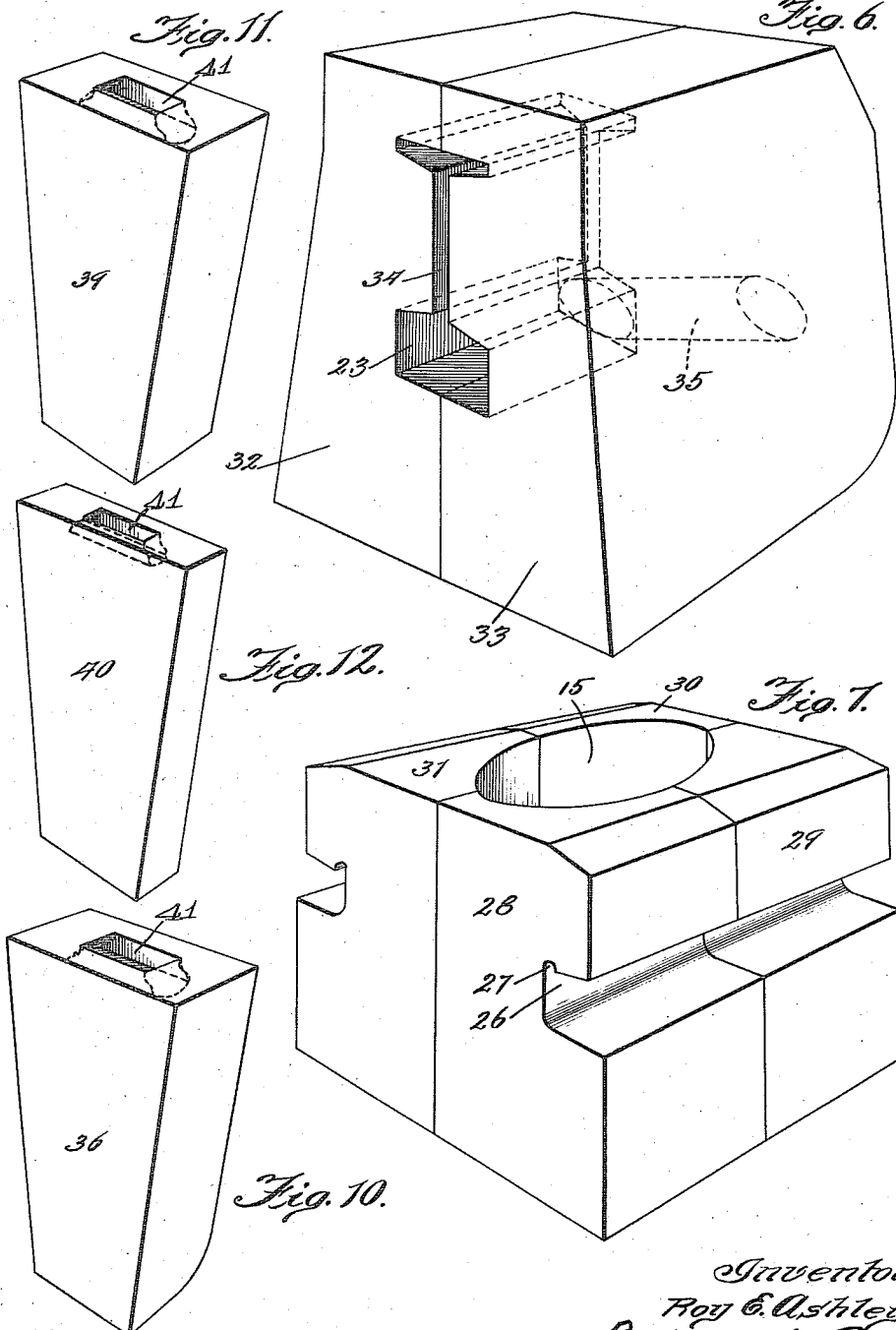
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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985,878.

Specification of Letters Patent.

Patented Mar. 7, 1911.

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To all whom it may concern:

Be it known that I, ROY E. ASHLEY, a citizen of the United States, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to furnaces in general but is more especially related to that class of furnaces commonly designated as Dutch oven furnaces.

The primary object of this invention is to provide a furnace of improved construction which can be economically manufactured, easily erected and readily repaired.

One of the objects of this invention is to provide an improved construction for those furnaces which are peculiarly constructed for the purpose of adapting them to have portions thereof removed and replaced without tearing down any considerable portion of the furnace structure.

More specifically, another object is to provide improved constructional features whereby each fire brick of the furnace lining is held approximately in position independently of the other fire bricks.

Still another object is to provide an improved construction in and about the oven feed spout of flat top ovens.

Other and further objects will appear in the specification and be more particularly pointed out in the claims.

In the drawings which show one exemplification of my invention Figure 1 is a front elevation, partly in section, of a furnace provided with the improvements disclosed in this invention. Fig. 2 is a longitudinal section on the line 2—2, Fig. 1. Fig. 3 is a top plan view, partly broken away, of the flat top oven of the furnace shown in Figs. 1 and 2. Fig. 4 is an enlarged section on the line 4—4, Fig. 3. Fig. 5 is a detail sectional view showing some of the constructional features in and about the inner end of the top wall of the oven. Figs. 6, 7, 8, 9, 10, 11 and 12 are enlarged detail views of the several varieties of fire brick of peculiar construction which go to make up the inner lining of the furnace.

Referring more specifically to the drawings, in which the preferred embodiment of my invention is shown applied to a boiler setting, a boiler 1 is mounted in any suitable

manner not specifically concerned in this invention, said boiler setting being provided with a protruding flat top oven comprising a front wall 2, with a fire door 3 therein, side walls 4 and 5, top wall 6 and grate bars 7, the grate bars 7 being mounted in the lower portion of the fire box. Referring to the present embodiment, according to which the details of my invention are shown more especially as applied to the top wall construction of the oven, said top wall 6 comprises a plurality of structural sections, preferably I-beams 8, which are suspended in any suitable manner above the fire box. Preferably, however, said I-beams extend longitudinally of the fire box, being supported at the front preferably by means of an angle bar 9 riveted or otherwise rigidly secured to the plate 10 extending across the front end of the furnace. Adjacent the rear ends of said I-beams is positioned, according to this preferred embodiment, any suitable structural section, such as the channel beam 11, which extends transversely across the fire box and preferably is supported at each end directly by the side walls 4 and 5 of the furnace.

Referring more especially to Fig. 5, any suitable means may be employed for suspending the rear ends of the I-beams 8 from the channel beam 11 but preferably such means should be detachable, such, for example, as the bolt 12 which is provided with a nut 13 for releasably securing the flanges of said I-beams and channel bar together. Mounted upon the upper flat surfaces of the I-beams 8 and covering the entire flat top of the oven is a flat plate 14 which may be provided with one or more feed spout openings to meet the requirements of any particular instance. According to the present embodiment, a single feed spout opening 15 has been provided approximately at the center of the top plate 14 and preferably is made oval-shaped and arranged longitudinally of the I-beams for a purpose to be hereinafter brought out. The top plate 14 preferably abuts directly against the face of the cover plate 19 and is maintained flat along said abutting edge preferably by means of a small angle bar 16, which is rigidly secured in any suitable manner to the channel beam 11. There is, however, no rigid connection between the

angle bar 16 and the top plate 14 so that when desirable said top plate 14 may be readily removed for the purpose of repair. Seated within the oval-shaped opening 15 in the top plate 14, is a flanged feed spout plate 17, the depending flange 18 of which serves as a suitable closure for the air space between the top of the fire brick lining and the steel decking. Extending part-way around the boiler 1 is a suitable shield or cover 19 which, as shown, is preferably secured in place by being clamped between the channel beam 11 and angle bar 16 hereinbefore referred to.

With a view more especially to facilitating the construction work on the oven, means are provided for holding each part of the furnace lining in position on the supporting beams by making said supporting beams and fire lining parts of peculiar construction whereby the latter are maintained in position under the action of their own weight instead of being forced therefrom. For this purpose the supporting beams, which may be of any suitable cross section, are provided with bent or hooked projections preferably in the form of hook-shaped flanges rigid thereon. As a simple and efficient means for providing these bent flanges, a channel beam 20 is rigidly secured to the lower flange of each of the I-beams 8 with its flanged edges 21, 22, projecting upwardly on either side of said I-beams. In order to adapt the fire lining sections or fire bricks to be suspended from the flanged edges 21, 22, and to be held against lateral displacement therefrom, said fire bricks have been made of several peculiar constructions now to be described.

Referring more especially to Figs. 7, 8 and 9, it will be seen that in several of the types, each fire brick is provided with a lateral recess or notch 26, and extending along the upper corner of the notches 26 is a recess or groove 27, the bricks being thus adapted when fitted one against the other to form a channel with a groove extending along an inner corner of the channel for receiving the flanges 21, 22. By means of this construction, each fire brick is held in approximately its proper position during the placement of Key bricks, as will be described, while at the same time when the bricks are firmly secured in position, air ducts 23 are formed beneath the I-beams 8 and the channel beams 20, thus preventing the destructive heating of said structural sections. The air ducts 23 preferably open from an air space 24 in the front wall of the furnace, which air space is supplied from the outside through a grated opening 25 in the plate 10, which is provided with any suitable means, such as a sliding shutter, for controlling the air supply. The outer ends of the I-beams 8 are carried by

the angle bar 9 rigidly attached to the front plate 10. It will thus be seen that the air passes through the ducts 23 and is discharged into the fire chamber at a point most suitable for the introduction of a supplementary supply of air.

In Fig. 7 is shown that portion of the fire brick construction corresponding to the feed spout opening in the top plate 14. This construction comprises a plurality of sections consisting in the present embodiment of the sections 28, 29, 30 and 31. These sections are provided with notches 26 and grooves 27 similar to those already referred to in connection with the bricks 37 and 38, thus adapting them to be assembled with said bricks 37 and 38 to form the furnace lining. Certain additional features, however, have been embodied in the construction of the sections 28, 29, 30 and 31, with a view to obviating the use of structural steel or cast iron framing which has formerly been necessary for supporting fire blocks around the oven feed spout. For this purpose the feed spout is composed only of sections which are each supported by direct engagement with one of the supporting beams and which are in direct abutment one against the other. The feed spout thus constructed is made to conform with the opening 15 and can be made of great strength, for which purpose sections 28, 29 could be made integral while the sections 30 and 31 could also be made integral. Preferably, however, to facilitate the installation and removal of the feed spout, it is made of four sections, as shown, which after some of the adjacent sections of fire brick have been removed, permit the sections 28, 29, 30 and 31 to be slid along the flanges 21 or 22 for removing them out of abutment with each other, after which they may be removed laterally from the bent flanges.

Referring to Fig. 6 of the drawings, one of the double fire bricks provided for the inner end of each of the I-beams 8, is shown as comprising sections 32, 33, which sections when fitted together are adapted by the peculiar formation of recesses formed therein to provide a socket 34 of substantially the same cross section as the I-beam with an additional space therebelow corresponding to the area of the air duct 23. Within this double fire brick comprising sections 32 and 33 is also provided an air discharge duct 35 which conducts the air directly into the fire box. The socket 34 is made of such depth as will insure the sections 32 and 33 when placed together over the end of an I-beam being maintained on the end of said I-beam by gravity. In other words, when said bricks are forced together by means of wedges to be presently described, the center of gravity of the combined sections 32 and 33 will be over the end of the I-beam.

In Fig. 10 is shown a wedge-shaped fire brick 36, the inclined faces of which are adapted to fit between correspondingly inclined faces of the sections 32 and 33 to hold said sections in rigid abutment one with another in pairs over the ends of said I-beams.

Fig. 9 shows a half section fire brick 37 of the same general form as the fire brick 38 shown in Fig. 8.

In Figs. 11 and 12 are shown full section and half section wedge-shaped key bricks 39 and 40, which are adapted to fit with their inclined edges against the correspondingly inclined edges of the fire bricks shown in Figs. 8 and 9.

After having suspended the bricks of the several designs shown in Figs. 6, 7, 8 and 9 in the positions in which they are adapted to fit, the wedge-shaped key bricks shown in Figs. 11 and 12 are introduced between the laterally inclined edges of the former. In this way means is provided for forcing the former together to form a compact lining. By an inspection of Fig. 3 it will be seen that some shapes of bricks are made in half sections and full sections for the purpose of breaking the joints between the adjacent series whereby a more compact fire tight lining is secured. Suitably mounted in the upper end of each of the wedge-shaped key bricks 36, 39 and 40, is provided a notch 41 for receiving a handle which greatly facilitates the manipulation of said bricks.

What I claim is—

1. In a furnace, the combination with the wall of a furnace having an inlet for air, of a plurality of rigidly supported beams provided each with upwardly-hooked flanges, a furnace roof comprising fire blocks provided with hook-shaped notches for suspending them from said flanges and formed to leave a wedge-shaped space between adjacent bricks of different beams, said notches being enlarged below to provide air ducts below the beams in communication with said air inlet and the interior of the furnace, and wedge-shaped bricks for filling said wedge-shaped space.

2. A flat top oven having a pair of beams provided with upwardly hooked flanges, of a plurality of fire bricks provided with hook-shaped notches whereby they may be suspended from said flanges independently of each other, said bricks being in abutment with each other and suitably shaped to form a feed spout opening and adapted by their shape to be moved out of abutment to be removed transversely from said hooked flanges.

3. A flat top oven having a feed spout made in a plurality of abutting fire brick sections, said sections being provided with notches, and flanged supports engaging said notches, said sections being adapted by their

shapes to be moved on said supports out of abutment with each other and to be removed separately from said supports.

4. In a furnace, the combination with a plurality of rigidly supported beams provided each with upwardly hooked flanges, of fire bricks provided with hook-shaped notches whereby said bricks are suspended from said flanges and held thereon against lateral displacement, said bricks being formed to leave a wedge-shaped space between the bricks suspended from adjacent flanges of adjacent beams, wedge-shaped bricks for filling said space, and a removable cover plate mounted on said beams upon the removal of which said wedge-shaped bricks may be drawn out to permit the hooked bricks to be removed separately.

5. In a furnace, the combination with parallelly disposed beams having hooked projections, of fire bricks provided with notches whereby they are removably suspended from said projections and held against lateral displacement, the oppositely disposed fire bricks on adjacent edges of adjacent beams being provided with angularly disposed faces forming a wedge-shaped space therebetween, wedge-shaped bricks for filling said space, and a cover plate resting upon the tops of said beams, said cover plate being removable to permit the separate removal of said wedge-shaped and notched bricks.

6. In a top wall for a furnace embodying a fire box, the combination with parallelly disposed beams each of which is provided with two parallel flanges, fire bricks provided with notches adapting them to be suspended in series along said flanges, said fire bricks being suitably proportioned to cover the beams on the side toward the fire box and to provide a wedge-shaped space between the bricks suspended from adjacent flanges of adjacent beams, and wedge-shaped key bricks adapted to fit said spaces.

7. A flat top oven having a feed spout comprising a plurality of abutting fire brick sections, each of said sections being provided with a notch and a groove in the wall of said notch, and a flanged support engaging in said groove, said notch permitting each section to be raised to remove the flange from the groove, and said bricks being movable relatively to each other along said flanges to remove the bricks out of abutment with each other, whereby they are enabled to be removed laterally.

8. In a furnace, the combination with adjacently disposed beams, each of said beams being provided with hooked projections, of fire bricks provided with hook-shaped notches adapting them to be independently mounted on the opposed projections of adjacent beams, said fire bricks being provided with adjacent edges disposed angularly

with reference to each other to form a wedge-shaped space and adapted by said notches to be raised and removed laterally from said projections, and a wedge shaped
5 brick adapted to fill the wedge-shaped space and to force the oppositely mounted bricks into close engagement with said projections.
In testimony whereof I have signed my

name to this specification, in the presence of two subscribing witnesses, on this 26th 10 day of August A. D. 1909.

ROY E. ASHLEY.

Witnesses:

H. D. HANSEN,
B. A. PARKS.