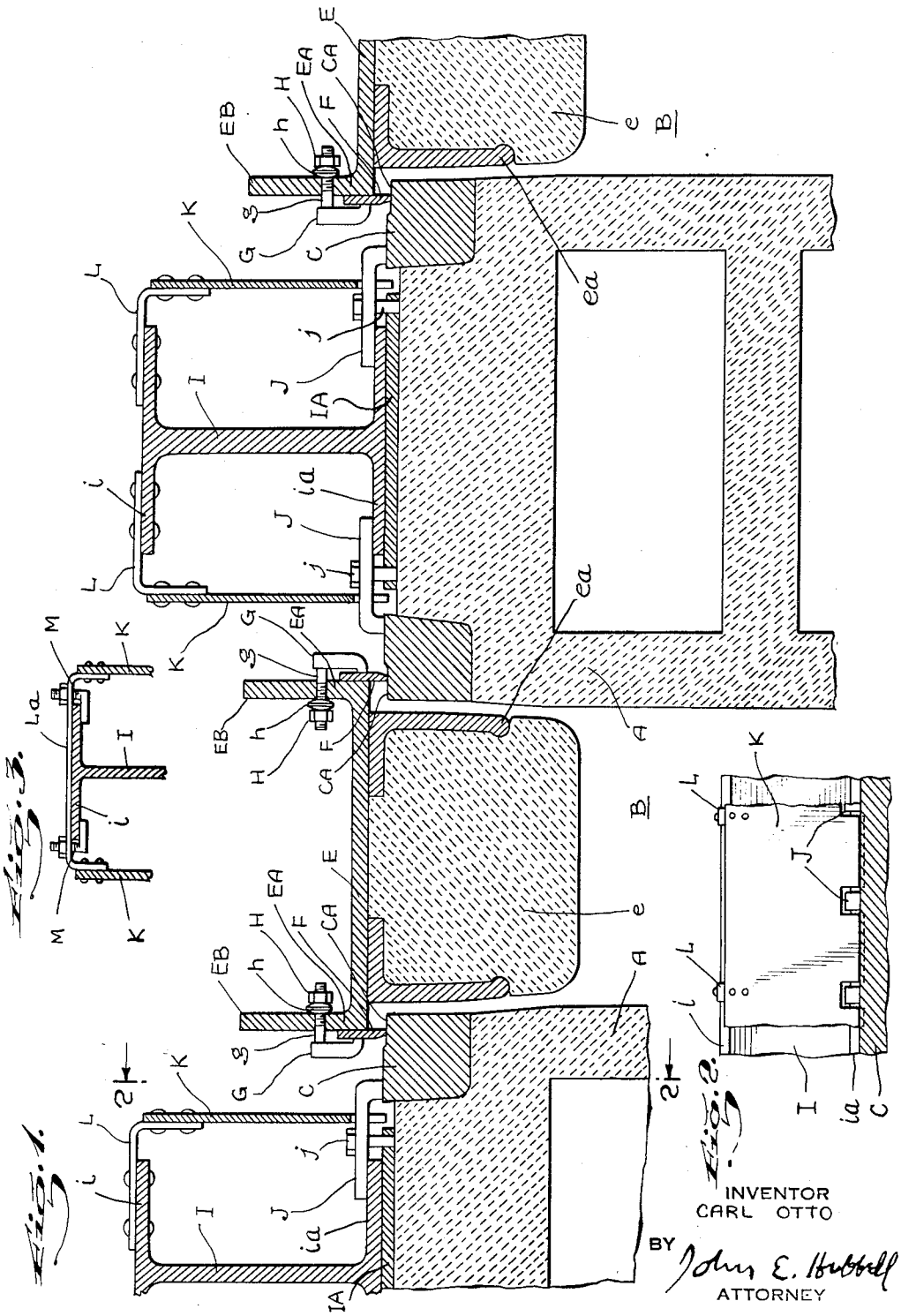
Jan. 22, 1957 C. OTTO 2,778,783

MEANS PROTECTING BUCKSTAYS AGAINST OVERHEATING

Filed May 26, 1953



United States Patent Office 2,778,783 Patented Jan. 22, 1957

2,778,783

MEANS PROTECTING BUCKSTAYS AGAINST OVERHEATING

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Application May 26, 1953, Serial No. 357,582

3 Claims. (Cl. 202—239)

The present invention relates to the construction of horizontal coke oven batteries of the general type now customarily employed in the production of metallurgical coke. In such coke oven batteries, horizontally elongated heating walls alternate with coking chambers along the length of the battery, and vertical metallic buckstays which engage the heating wall ends directly, or through flash plates, oppose the horizontal elongation of the heating walls.

The general object of the present invention is to provide simple and effective means for protecting the end wall buckstays from overheating. Each buckstay is in position to receive heat radiating from each coke oven door adjacent the buckstay, and from the usual door frame surrounding the mouth of each adjacent coking chamber end. Each buckstay is also subject to a heating effect as a result of the leakage of hot gas from an adjacent oven chamber into contact with or in unduly close proximity to the buckstay.

In accordance with the present invention, I interpose a heat shield between each vertical side of the buckstay and the adjacent portion of the coke oven structure which might otherwise transmit an undesirably large amount of heat to the buckstay.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, its advantages, and specific objects attained with its use, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described a preferred embodiment of the invention.

Of the drawings:

Fig. 1 is a cross section through a portion of a coke oven battery of conventional type, except for its inclusion of buckstay protection against overheating;

Fig. 2 is a small scale elevation in section on the line 2—2 of Fig. 1, of a portion of a buckstay and associated heat shield shown in Fig. 1; and

Fig. 3 is a view illustrating a modification of a portion of the apparatus shown in Fig. 1.

In the form of the invention shown in the drawings by way of example, parallel horizontally elongated heating walls A alternate with parallel horizontally elongated coking chambers B along the length of a coke oven battery structure of conventional type. The vertical corners of the brick work surrounding each coking chamber mouth is recessed to receive a metallic door frame member C surrounding the mouth or end portion of the corresponding coking chamber B. The mouth of each coking chamber is normally closed by a coke oven door D. As shown, the door D is of known type comprising an outer metallic structure E and an inner or plug section *e*. The latter consists mainly of non-metallic refractory material held in place by metallic brackets *ea* attached to the outer door structure E and securing the door sections E and *e* in fixed relation to one another. As shown, each metallic

outer door section E comprises a plate-like portion EA transverse to the door axis, and having a peripheral rim portion EB which is parallel to the door axis. In the normal closed position of the door, the rim portion EB is transverse to and overlaps a portion of the outwardly facing sealing surface CA of the door frame C.

In the construction shown, the joint between each door B and associated door frame C is normally sealed by a sealing element F in the form of a thin metallic band. The outer portion of the band F surrounds and is pressed against the peripheral door portion EB by clamping elements G secured to said portion EB. The inner portion of the sealing element F extends inwardly from the inner side of the door structure E and thus overlaps portions of the metallic brackets *ea*. Each door frame C is anchored in place by clamping elements J shown as of known type. Each clamping element J has one end in engagement with the outer side of the adjacent portion of the base flange *ia* of a buckstay I, and has its other end in engagement with the outer face of the adjacent door frame C. As shown, a flash plate IA is interposed between the base flange *ia* of the corresponding buckstay I and the end surface of the adjacent heating wall A. The flash plates IA are wider than the buckstay flanges *ia*, and each flash plate side edge projects outwardly away from the adjacent edge of the flange *ia*. Each clamping element J is directly connected to the corresponding flash plate *ia* by a bolt *j* which extends through an intermediate portion of the element and has its inner ends attached as by a welding or threaded engagement to the plate IA. Each member *j* has a nut or a head portion bearing against the outer side of the corresponding element J. Insofar as above described, the construction illustrated in Fig. 1 includes nothing claimed as novel herein.

As indicated in Fig. 2, each heat shield K extends longitudinally of the adjacent buckstay across all or most of the space between the adjacent inner and outer buckstay flanges *i* and *ia*, respectively. Ordinarily and as shown, each heat shield K is mechanically connected to and supported by the I-beam I which it protects. Thus, as shown, the outer edge portion of the heating shield K and the adjacent outer edge portion of the flange *i* are connected by elbow-shaped bracket elements L. Each bracket element L has one end alongside and bolted or otherwise attached to the adjacent buckstay flange *i*, and has its other end alongside and bolted, riveted or otherwise attached to the adjacent portion of the shield K. The inner edge of the shield K is not attached to the buckstay flange *ia*, but is formed with open ended slots or notches K*a* through which pass the hook portions of the corresponding clamping parts J. As shown, the outer edge of each heat shield K is spaced away from the adjacent buckstay flange *i* so that hot air may readily pass out of, and cooler air may pass into, the vertical channel defined by the heat shield K, the adjacent buckstay flanges *i* and *ia* and the main central web portion of the adjacent buckstay.

In accordance with the present invention, a heat shield K is advantageously used to protect each buckstay I against overheating by the heating action of each coke oven door and door frame alongside the buckstay. Thus in the case of all but the end buckstays of the battery, a separate heat shield K is advantageously provided at each side of each buckstay. With a modern coke oven structure including door frames C of the type shown, and outer metallic door parts E, EB and F, the heat radiation from the door and door frame parts to buckstays at each side of each coke oven door, is substantial and increases the advantages obtained by the use of the heat shields K.

At times gas may leak through the joint between the heating wall masonry and the side of the door frame C remote from the door portion *e* surrounded by the door

frame. Such leakage may be sufficient to result in flame jets extending away from the side of the battery. However, such flame jets if of sufficiently large magnitude and length to have a substantial heating effect, will ordinarily be too large and have too much velocity to pass into the space between the main web portion of the buckstay and the shield K.

As will be apparent, the manner in which the heat shields K are attached to and supported by the oven structures may be varied. While it is not essential that each shield K should be connected to and supported by the buckstay which it protects, such connection is practically desirable. As shown, the connecting elements L are simple and effective. When those elements are relatively thin and flexible as they may be, they are well adapted to prevent objectionable distortion or displacement of the shield members K in the event that the buckstays are bowed as a result of the expansion of the coke oven masonry. Thus for example, the supporting member L shown in Fig. 1 may be replaced by the member L*a* shown in Fig. 3. The member L*a* is in the form of a yoke having its body portion transverse to and in engagement with the outer side of the outer flange *i* of the I-beam I. The transverse ends or leg portions of the member L*a* bear against the inner sides of the corresponding shields K as do the leg portions of the member L shown in Fig. 2. In the arrangement shown in Fig. 3, each member L*a* is clamped to the edge portions of the outer I-beam flange *i* by hook members M which have their body portions extending through the body portion of the member A threaded for engagement by clamping nuts which normally bear against the outer side of the body portion of the member L*a*. At its inner end, each member M is formed with a hook portion arranged to engage the inner side of the adjacent edge portion of the flange *i*. With the construction shown in Fig. 3, the I-beam flange *i* is not weakened by rivet holes. Furthermore, relative warpage or deformation of the flange *i* and the shields K may be compensated for if and when necessary, by the use of washers or shims interposed between the flange *i* and the hook ends of the members M or between said flange and the nuts threaded on the body portions of said members.

Each oven buckstay I may have its upper and lower ends anchored to the battery structure in the conventional manner illustrated, for example, in my Patent 2,199,510, granted May 7, 1940. As shown in that patent, the upper ends of the buckstays at the opposite ends of a heating wall are connected by a tie rod and spring washers on the tie rod which yield as the battery masonry expands. In said prior patent, the lower end of each buckstay is anchored in the masonry at the underside of the battery structure proper, as my means of anchor bolts extending into the masonry.

While in accordance with the provisions of the statutes, I have illustrated and described the best form of embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit of my invention as set forth in the appended claims and that in some cases certain features of my invention may be used to advantage without a corresponding use of other features.

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

1. In a coke oven battery structure comprising horizontal coking chambers, heating walls alternating with the coking chambers along the length of the battery, end walls having openings therein to provide access to said coking chambers, and vertical buckstays anchored to the battery structure and bearing against the ends of the heating walls, the combination with said buckstays of vertical heat shields each interposed between a buckstay and the coke oven opening adjacent the buckstay and in position to substantially restrict the transfer of heat to the buckstay from said adjacent oven opening, said heat shield being fixedly operatively secured at one edge and being free at its opposite edge.

2. In a coke oven battery structure comprising horizontal coking chambers, heating walls alternating with the coking chambers along the length of the battery, end walls having openings therein to provide access to said coking chambers, and vertical buckstays anchored to the battery structure and bearing against the ends of the heating walls, the combination with said buckstays of vertical heat shields each interposed between a buckstay and coke oven openings adjacent the buckstay and in position to substantially restrict the transfer of heat to the buckstay from said adjacent oven opening, said heat shield being fixedly operatively secured at one edge to the outer portion of said buckstay and the other edge thereof being free and unsecured.

3. In a coke oven battery structure comprising horizontal coking chambers, heating walls alternating with the coking chambers along the length of the battery, end walls having openings therein to provide access to said coking chambers, and vertical buckstays anchored to the battery structure and bearing against the ends of the heating walls, the combination with said buckstays of vertical heat shields each interposed between a buckstay and the coke oven opening adjacent the buckstay and in position to substantially restrict the transfer of heat to the buckstay from said adjacent oven opening, said shield being in the form of a thin metal strip fixedly operatively secured at its outer edge to the outer portion of said buckstay and having its other edge free and unsecured, said other edge of said strip being provided with vertically displaced openings for the passage of elements operative to connect the buckstay to an adjacent door frame element and anchor the latter in the battery structure.

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