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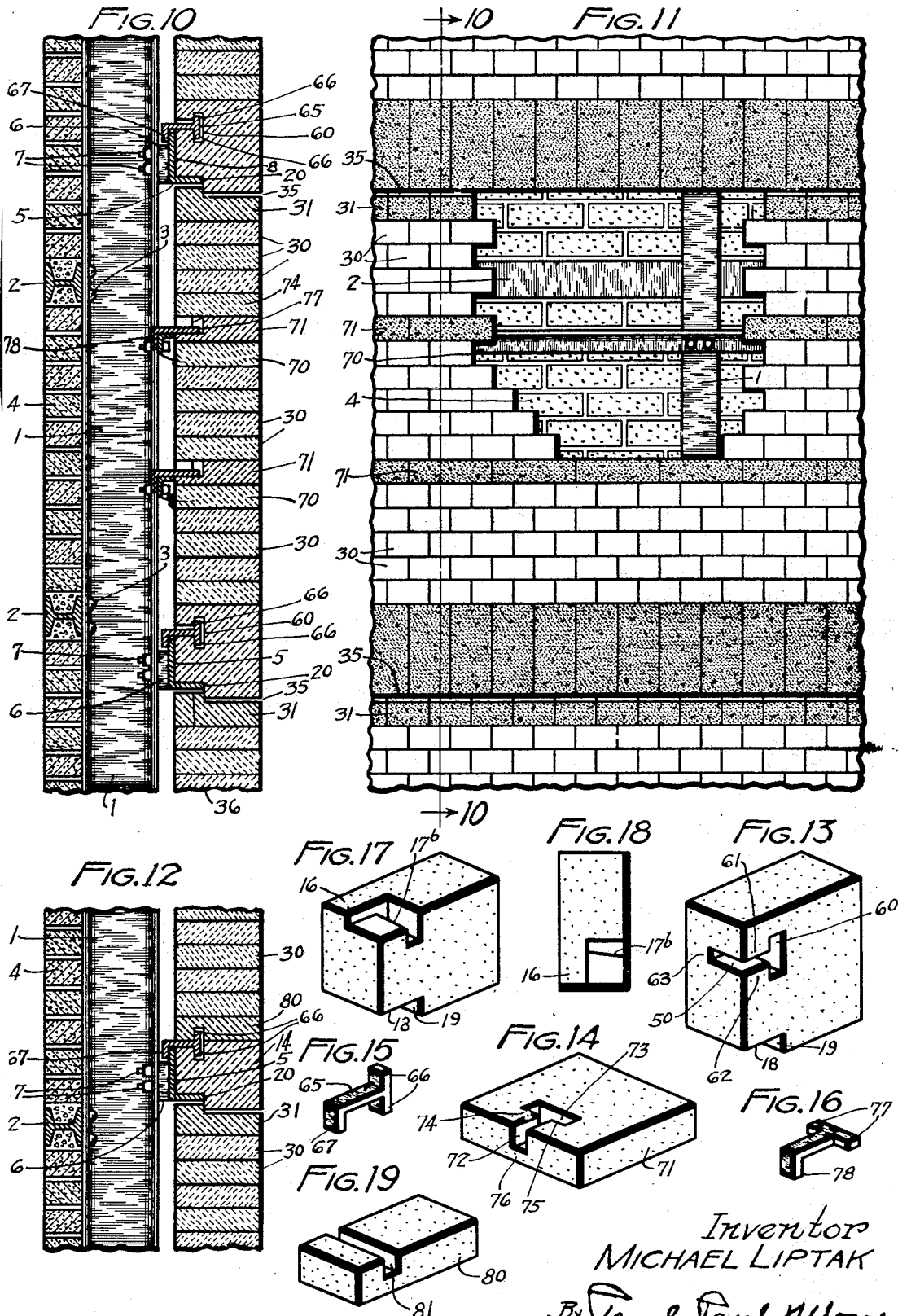
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FIRE WALL

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FIRE WALL

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20 Claims. (Cl. 72—101)

This invention relates to improvements in fire walls and has, among its objects, to provide a very cheap and very efficient construction. An important feature relates to the construction of the permanent wall from metal elements including ordinary or standard angle irons which act as supports for shelf headers, and in which the shelf headers are supported on one flange and in which means for connecting and holding the headers in place are attached to the other flange of the irons. Another feature relates to the utilization of the bottom horizontally disposed flange as a header support, and the top or vertically disposed flange as part of the anchoring means. Another feature is the specific manner of facing the angle irons. Another feature relates to the construction of the permanent wall which includes horizontal metal elements attached to both sides of upright metal elements, the metal elements forming the supports for an outer facing wall, as well as an inner replaceable wall. Another feature relates to an arrangement whereby the connectors can be applied by a motion lengthwise of the wall and/or by motions lengthwise or vertically. Other features include the details of construction shown, along with the ventilating structures.

Objects, features and advantages of the invention will be set forth in the description of the drawings forming a part of this application, and in said drawings

Figure 1 is a perspective view showing one form of wall, constructed in accordance with the teachings of this invention, certain of the bricks being removed to more clearly illustrate the construction;

Figure 2 is a plan section further illustrating the invention;

Figure 3 is a vertical transverse section taken approximately on line 3—3 of Figure 2;

Figure 4 is a sectional view similar to Figure 3 but taken approximately on line 4—4 of Figure 2;

Figure 5 is a detail perspective of that form of header which is adapted to be attached to the angle-iron shelf at points intermediately of the vertical I-beams of the permanent wall;

Figure 6 is a perspective view of a form of header which is recessed to receive the bolts which secure the angle irons to the I-beams;

Figure 7 is a perspective view illustrating one of the top-course inter-header bricks shaped to cooperate with a shoulder of a header to prevent gas leakage and allow vertical expansion;

Figure 8 is a perspective view of one form of connector;

Figure 9 is a perspective view of one of the spacers, interposed between the angle iron and the I-beam;

Figure 10 is a vertical transverse section taken approximately on line 10—10 of Figure 11 showing a modification in which certain of the inter-header bricks are anchored, and illustrating a modified form of header socket;

Figure 11 is a face view of the wall shown in Figure 10 with certain bricks removed to show the permanent wall portion in the background;

Figure 12 is a vertical transverse section of another modification, illustrating a modification in which the shouldered socket of the header is formed by separable elements;

Figure 13 is a perspective view of that form of header shown in Figure 10;

Figure 14 is a perspective view of one of the inter-header key bricks, illustrated in Figure 10;

Figure 15 is a perspective view of a modified form of connector of the kind used in Figure 10;

Figure 16 is a perspective view of a form of inter-header brick connector used in Figure 10;

Figure 17 is a perspective view showing a modified form of header;

Figure 18 is a plan view of the header of Figure 17;

Figure 19 is a perspective view of the separable socket-forming element of Figure 12; and

Figure 20 is a perspective view illustrating a modification adapted to prevent outward movement of those bricks which cooperate with the headers to prevent transverse gas leakage.

The permanent wall can be very cheaply constructed and is composed of vertically arranged, longitudinally spaced I-beams 1, cross-connected at the outer side by horizontal I-beams 2, suitably riveted or bolted as at 3 to the vertical I-beams 1. The I-beams 2 are also vertically spaced and are adapted to support an outer facing wall composed of bricks 4. To the inner flanges of the vertical I-beams 1 are secured a series of vertically spaced horizontally arranged angle irons indicated at 5, having their concave sides facing upwardly and inwardly toward the fire box. The vertical flanges of these irons are spaced horizontally inwardly from the corresponding faces of the I-beams 1, the spacing in this instance being obtained by the insertion of spacer plates 6. The plates are secured by the bolts 7 (see Figure 3) which secure the angle irons to the I-beams, and the heads of the bolts engage the inner side of the vertical flange 8 of each iron. The nuts 9 engage the flanges of the I-beams. This spacing provides a recess 10, so that the connectors or

anchors 24 can be dropped into place in opposition to the I-beams, as shown at the left of Figure 2.

Upon each angle iron 5 is laid a course of headers of refractory material, these headers forming part of the replaceable wall portion. The headers, of which there are four forms, are shown in perspective in Figures 5, 6, 13, 17 and 18. Referring to Figure 5, this form of header is provided in its upper surface with an open-top corner-socket 15 extending inwardly from the rear and one side of the block, but of less width than the corresponding dimension of the block in a direction longitudinally of the wall to provide a block-reinforcing portion 16 which is an important feature of this invention. This socket is provided with a vertical shoulder 17 which extends (when the header is operatively positioned) longitudinally of the wall or substantially parallel with the long dimension of the angle iron.

By the use of the corner-socket which opens only on the top, rear and one side face of the header, reinforcement is provided which reduces header breakage. By reinforcing the shoulder-forming portion of the block, there is less liability of breakage along lines A, either when the block is in use or during shipment and handling. Moreover, in this manner the header can be manufactured by use of a hydraulic press, as distinguished from hand molding. This is considered an important feature from the economic standpoint. The block of Figure 13 is about ten inches high by four and one-half inches thick in a direction lengthwise of the wall.

The headers 14 are supported by and project inwardly beyond the horizontal flanges of the angle irons, and project above and below the irons as well shown in Figure 3. Each shelf header is recessed at the rear and upwardly from the bottom, as indicated at 18, to provide a shoulder 19, the vertical height of which is greater than the thickness of the bottom flange 20 of the angle iron. The shoulder 19 may or may not engage the inner edge of the flange 20. It may be spaced slightly outwardly therefrom, when the rear face 21 of the block engages the inner vertical face of the vertical flange 8 of the angle iron 5. A clearance may even be provided between the face 21 and the face of the flange 8.

I believe myself the first to use any kind of an angle iron composed only of two flanges or to use a "standard" angle iron for my purpose, and to utilize one flange as a support for the headers, and the other flange as a point of connection for the anchors, and also to apply the connectors or anchors over the upper edges of these irons. This provides a very cheap construction, facilitating assembly and disassembly, resultant in large economic gain.

Connectors are provided for securing the headers in operative position and against motion transversely of the wall. In this instance, each connector (see Figure 8) is provided with a body portion 24 and with abutment portions 25—26, the general form being U-shaped or channel shaped in side view, see Figures 3 and 8. The connectors can be applied by dropping into place over the upper edges of the flanges 8 of the angle irons, or by motions from a point laterally of the block into operative position, see Figure 13. The abutment portions of the connector respectively engage the shoulder 17 and the rear face of the flange 8. The thickness of the abutment 26 is ordinarily less than the distance between the shoulder 17 and the opposed vertical face 17^a

(see Figure 5) of the socket to provide for ventilation, and the thickness of the body 24 is generally less than the depth of the socket above surface 17^c for the same purpose. It will be further noted that the width of the connector in a direction lengthwise of the wall is considerably less than the corresponding dimension of the sockets and shoulders, see Figures 1 and 2, so that air can enter and circulate substantially entirely around the connector for ventilating purposes. This is a valuable feature.

Courses of fire brick are laid between and supported by the shelf headers, and in this instance these bricks are laid as headers and have the same transverse dimension as the shelf headers 14. These inter-header bricks are generally indicated at 30. The members of the uppermost course of these bricks are specially formed, see Figure 7, and are generally indicated at 31. Each is recessed downwardly from the top as shown to provide a shoulder 32 which cooperates with the shoulder 19 of the under-cut 18 of the corresponding header to form a seal to prevent outward escape of heat and gases, and yet permit vertical expansion. Ordinarily, when the bricks are laid, spaces 35—36 (see Figures 3 and 20) are provided to allow for this vertical expansion, and the space 36 additionally provides for ventilation between the upper surfaces of the bricks 31 and the lower surfaces of the flanges 20 of the angle irons. At a point below the horizontal flange 20 of the angle iron, a part of each brick 31 may be cut away on an angle downwardly and rearwardly, to increase this ventilation space.

Those shelf headers 14^a which are disposed in opposition to the vertical I-beams are additionally recessed as at 37, see Figures 3 and 6, to allow proper assembly of the brick on the iron, and yet provide a ventilating space 38 for the heads of the bolts 9. Otherwise, these elements 14^a are substantially identical in construction with the header elements 14.

A modification of header element is shown in Figures 17 and 18 in which the shoulder 17^b is so slanted that when the header is in operative position the shoulder diverges from the long axis of the angle iron, or is non-parallel therewith, see Figure 18. This compensates for roughness and variations in spacing between the abutments 25 and 26, when these elements are cast, and also compensates for roughness of the brick shoulders, and provides means whereby a wedging action can be obtained, if desired to draw the headers tightly against the irons.

The expression "substantially parallel" as used to describe the relation of the shoulders of the headers to the header supporting irons is meant to include either the inclined or the substantially parallel relation of the shoulders respectively illustrated in Figures 17 and 18, 5 and 6.

Another feature relates to means for preventing "push-outs" in case of explosion, at the same time not interfering with the introduction or removal of the bricks by manipulation from the outer side of the wall. This construction is illustrated in Figure 20. The irons have projections indicated by the numerals 39, and their outer surfaces are coplanar with the outer surface of the vertical flanges 8 of the irons. The projections are spaced so that every other brick of the upper course of the inter-header bricks will engage a projection. The spacing may, of course, be varied. In addition, the vertical flanges have perforations or openings 40 for ventilating purposes. The open space between consecutive pro-

jections 39 is about one and one-half times the width of the brick, so that by removing one top-course brick by rearward or outward motion, between the projections, the others, which are
 5 abutting the projections, can be moved in direction longitudinally of the iron to a position facilitating like removal.

Sometimes it is necessary to introduce the bricks for the replaceable wall from the outside, because of boiler tubes which prevent working
 10 from the inner side. In some cases, metal plates are used instead of the bricks 4 for forming the outside wall, and in such cases when repair of the inner fire wall is necessary, these plates are
 15 simply removed so that repair can be accomplished from the outer side. With the I-beam and angle iron construction, this can be easily accomplished. Moreover, ventilating space or a hollow wall construction is provided by the spaced relation of facing wall 4 and the replaceable wall.
 20 Also, each belt of headers and inter-header bricks can be replaced independently of any other.

In Figures 10 and 11 is illustrated a form of the invention which is applicable when it is desired to use fewer angle irons and fewer shelf-header courses, and this feature of the invention relates to the tying of the interheader courses and to certain modifications of the shelf-headers, and of the connecting means therefor. In this form
 25 of the invention, see Figure 13, each shelf-header is provided with a T-shaped socket opening from one side of the header and from the back of the header or, in other words, a corner-socket which opens only on two vertical sides which are right-
 30 angularly related to one another. Viewed from the side of the header, the socket is T-shaped. The horizontal or body portion of the T-shaped socket is indicated at 50 and the vertical or head portion is indicated at 60. Upper and lower
 35 shoulders respectively indicated at 61—62 are provided. The horizontal width of this socket is less than the corresponding dimension of the block to provide a lateral reinforcing portion 63 (a feature). The header is also provided with the
 40 shoulder 19 and in respects other than those mentioned, is substantially the same as that form shown in Figure 5. Figure 10 shows a vertical section in which this form of header is used. In
 45 this case, a T-shaped connector 65 is used which has abutments 66 for engagement with the shoulders 61—62, and a portion 67 for engagement over and with the angle irons 5. In this instance, the
 50 header also extends above and below the angle iron. Inasmuch as the socket opens laterally, the iron can be inserted in the socket and into locking relation by horizontal movement and before the
 55 header is applied to the iron. This is a very strong header.

In the form of the invention shown in Figure 10, one or more angle irons 70 are provided between consecutive irons 5. The concave faces of these irons face downwardly and inwardly. With each iron is associated a course of special inter-header bricks, one of which is shown in
 60 detail in Figure 14, and is numbered 71. This brick is provided in its upper face with a centrally disposed open-top socket of T-shaped configuration, the socket opening only at the top and at the back of the block by a channel portion
 65 indicated at 72. The cross portion is indicated at 73 and provides the shoulders 74—75. It is to be noted that this vertical socket does not extend entirely through the block but only part way, leaving a bottom-reinforcing portion 76.
 70 The same is true of the socket for the other

blocks previously described. A T-shaped connector has shoulders 77 which engage the shoulders 74—75 of the brick, and also a shoulder 78 which engages over and with the angle iron 70. Bricks 30 are interposed between the bricks
 75 71, and between these bricks 71 and the shelf-headers. Blocks 31 are also employed at the top and interlock with the shelf-headers in the manner previously described. It will be noted (see Figure 11) that the dimension of the block
 80 71 in direction lengthwise of the wall is greater than the corresponding dimension of the bricks 30—31.

Another modification is shown in Figure 12 in which a recessed brick 80 cooperates with a header 14 to form a T-shaped socket analogous to the
 85 socket 60 of Figure 13. The block 80, see Figure 19, is cross-slotted as at 81, in this instance upwardly from its lower face (in Figure 19 the brick is reversed). Bricks 30 are arranged on top
 90 of the brick 80 and the topmost bricks of the kind indicated at 31 are used. In this instance, the connector can be dropped into place, and then the brick 80 is applied as shown in Figure 12.

A very important feature of this invention is the utilization of ordinary or "standard" angle
 95 irons arranged to support a row of shelf-forming headers, and so that the means (connectors) for securing the headers in operative position and against movement transversely of the wall overlie
 100 and engages the upper outer edge of the iron. Another important feature is the arrangement whereby the connectors can be applied either by a motion lengthwise of the angle irons from one
 105 side of each block, or can be dropped into position.

I claim as my invention:

1. A fire wall comprising a permanent portion including inwardly upwardly faced angle irons, and a replaceable portion formed of headers supported upon the horizontal flanges of the irons,
 110 means by which the headers are detachably secured to the irons and including connectors which overlie and engage the upper edge of the vertical flange of the irons, fire bricks filling the spaces between and supported by the headers to complete the replaceable portion, one course of the
 115 inter-header bricks and headers having shoulders which co-operate to form a seal to permit vertical expansion, but prevent transverse passage of gases through the wall, the bricks of the uppermost course of the inter-header bricks being
 120 spaced from the horizontal flanges of the header-supporting irons to allow entry of air for cooling the flange of the angle iron, and the irons having projections one for every second brick of said
 125 topmost course, to prevent "push-out" in case of explosion, and spaced to permit introduction or removal of at least one of said upper course bricks from the outer side of the wall.

2. A fire wall comprising, a permanent portion including inwardly upwardly faced angle irons and a replaceable portion formed of headers supported upon the horizontal flanges of the irons,
 135 means by which the headers are secured to the irons including connectors which overlie and engage the upper edge of the vertical flanges of the irons and which enter open top shoulder-forming sockets in the headers which sockets are of less
 140 depth than the vertical height of the headers, and fire bricks filling the spaces between and supported by the headers to complete the replaceable portion.

3. A fire wall comprising, a permanent portion formed of spaced upright elements cross-connected by spaced horizontally disposed angle
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- irons having their concave sides facing upwardly and away from the uprights, and a replaceable portion formed of headers supported by the horizontal flanges of the irons, said headers having shouldered sockets, connectors overlying and engaging the upper edges of the vertical flanges of the irons and having abutments engaged with said flanges and header shoulders to prevent motion of the headers transversely of the wall, the sockets being open at the sides of the headers so that the connectors can be operatively positioned or withdrawn by motion lengthwise of the angle irons and from one side of the header, and courses of fire brick filling the spaces between and supported by the headers to complete the replaceable portion.
4. A fire wall comprising a permanent portion formed of spaced upright elements cross-connected by vertically spaced horizontally disposed angle irons having their concave sides facing upwardly and away from the uprights having their vertical flanges spaced from the said uprights, and a replaceable portion formed of headers supported by the horizontal flange, each header having a shouldered socket, connectors overlying and engaging the upper edges of the vertical flanges of the angle irons and having abutments engaged with said flanges and shoulders to prevent motion of the headers transversely of the wall, each socket being open at one side so that the connector can be introduced or withdrawn by a motion lengthwise of the angle irons and from one side of the header, and courses of fire brick filling the spaces between the rows of headers to complete the replaceable portion.
5. A fire wall comprising a permanent portion formed of upright elements cross-connected by angle irons, and a replaceable portion formed of headers supported by horizontal flanges of the irons, said headers having open top shouldered sockets, connectors overlying and engaging the upper edges of the vertical flanges of the irons and having abutments engaged with said flanges and header shoulders to prevent motion of the headers transversely of the wall, the sockets being also open at the sides so that the connector can be introduced or withdrawn by a motion lengthwise of the angle irons and from one side of the header, and said sockets being of such dimension that ventilating space is provided between the socket walls and the connectors, and courses of fire brick filling the spaces between the rows of headers to complete the replaceable portion.
6. In a fire wall, a permanent wall portion including angle irons and a replaceable portion formed of headers supported by the irons, and having shouldered sockets in their upper faces opening only on the top, rear and one side face of the headers, connectors overlying the upper edge of one flange of the irons and having abutment portions respectively engaging the shoulders and outer faces of the irons, and bricks laid between and supported by the headers, one course of the inter-header bricks and the headers having shoulders which cooperate to form a seal which permits vertical expansion but prevents passage of gases transversely through the wall.
7. A permanent wall comprising spaced vertical I-beams cross-connected at one side by horizontally disposed vertically spaced angle irons having their concave sides facing upwardly and toward the inner side of the furnace, said irons being spaced inwardly from the vertical faces of the I-beams, I-beams horizontally cross-connecting the vertical I-beams at the opposite side and a facing wall composed of bricks arranged between and supported by the horizontal I-beams, headers supported upon the horizontal flanges of the angle irons, means by which the headers are detachably secured to the irons, and fire bricks filling the spaces between and supported by the headers to complete the wall.
8. A permanent wall comprising spaced vertical I-beams cross-connected at one side by horizontally disposed vertically spaced angle irons having their concave sides facing upwardly and toward the inner side of the furnace, said irons being spaced inwardly from the vertical faces of the I-beams, I-beams horizontally cross-connecting the vertical I-beams at the opposite side and a facing wall composed of bricks arranged between and supported by the horizontal I-beams, headers supported upon the horizontal flanges of the angle irons, means by which the headers are detachably secured to the irons, said headers projecting above and below the irons and the said connecting means being arranged within open top sockets of the headers and overlying and abuttingly engaging the upper edge of the vertical flanges of the irons, the headers extending above and below the corresponding irons, fire bricks filling the spaces between and supported by the headers to complete the replaceable portion, the said irons having projections against which certain of the bricks of the topmost course of inter-header bricks engage to prevent push-out in case of explosion, the said projections being spaced to permit introduction or removal of at least one brick.
9. A permanent wall comprising spaced vertical I-beams cross-connected at one side by horizontally disposed vertically spaced angle irons having their concave sides facing upwardly and toward the inner side of the furnace, said irons being spaced inwardly from the vertical faces of the I-beams, I-beams horizontally cross-connecting the vertical I-beams at the opposite side and a facing wall composed of bricks arranged between and supported by the horizontal I-beams, headers supported upon the horizontal flanges of the angle irons, means by which the headers are detachably secured to the irons, said headers projecting below the irons and the said connecting means being arranged within open top sockets of the headers and overlying and abuttingly engaging the upper edge of the vertical flanges of the irons, the headers extending below the corresponding irons, fire bricks filling the spaces between and supported by the headers to complete the replaceable portion, the said irons having projections against which certain of the bricks of the topmost course of inter-header bricks engage to prevent push-out in case of explosion, the said projections being spaced to permit introduction or removal of at least one brick between them, and the upper faces of the bricks of the topmost course of the inter-header bricks and the lower faces of the headers having shoulders which cooperate to prevent passage of gases transversely through the wall, the said members of the topmost course being spaced downwardly from the angle iron flange to permit ventilation.
10. A permanent wall including spaced vertical I-beams cross-connected on one side by horizontally disposed vertically spaced angle irons having their concave sides facing upwardly and away from the vertical elements, refractory headers supported by the irons and having in their

upper faces open-top sockets having shoulders substantially parallel with the long axes of the angle irons, connectors overlying the angle irons and having abutment portions respectively engaging the shoulders and upper edges of the corresponding irons, said headers extending below the irons and the upper surfaces of the connectors being substantially coplanar with the upper surface of the headers, the dimension of the connectors in a direction lengthwise of the wall being less than the corresponding dimension of the sockets, courses of bricks laid between and supported by the header courses and capping the sockets, the bricks of the uppermost course of the inter-header bricks and the surfaces of the headers having shoulders which cooperate to form a seal permitting vertical expansion but preventing escape of heat and gas in a direction toward the permanent wall, said irons having projections arranged rearwardly of certain of the bricks of said uppermost course of inter-header bricks to prevent push-out in case of explosion and yet permit introduction or removal of the bricks of that course from the outer side.

11. In a fire wall, a permanent wall portion including angle irons and a replaceable portion formed of headers supported by the irons, and having shouldered sockets in their upper faces each socket opening only on the top, rear and one side face, connectors overlying the upper edge of one flange of the irons and having abutment portions respectively engaging the shoulders and outer faces of the irons, and bricks laid between and supported by the headers.

12. A fire wall comprising a permanent wall including a plurality of horizontally disposed vertically spaced irons, rows of special shelf-forming fire brick resting upon and projecting beyond the irons, said bricks having in their upper faces open top shoulder-forming sockets extending only part way vertically through the bricks and providing shoulders which are parallel with the irons, horizontal connectors lying only on the top of the irons and bricks, and having abutments respectively engaging the outer side of the irons and the shoulders of the bricks to prevent substantial motion of the bricks transversely of the irons, and courses of common fire brick laid between and supported by the special shelf-forming brick to form therewith a replaceable wall structure.

13. A fire wall comprising a permanent portion including irons, and a replaceable portion formed of fire bricks supported upon the irons and forming shelves, means by which the headers are secured to the irons against motion transversely, comprising transversely extending connectors which overlie the irons and abuttingly engage the outer edges thereof, said bricks having sockets in their tops providing shoulders, the sockets and shoulders only extending part way vertically through the blocks, and the sockets extending inwardly from one side and only part way horizontally across the block so that the connectors can be introduced from the side of the header by motion lengthwise of the irons and bricks, and courses of fire bricks filling the space between and supported by the shelf-bricks to complete the replaceable portion.

14. In a fire wall, a permanent wall portion including irons, a replaceable portion formed of fire bricks supported by the irons and forming shelves, means for securing the bricks against transverse motion comprising connectors having abutments respectively engaging with shoulders

of the bricks and with the irons, said bricks extending below the irons, courses of fire bricks laid between and supported by the bricks, the topmost course having shoulders facing toward the inner side of the wall cooperative with outwardly faced shoulders of the bottoms of the headers to form a gas seal, the top surface of the top course and the bottom surface of the shelf-forming bricks being vertically spaced to permit vertical expansion of the replaceable wall, the arrangement of the shoulders therefore being such that the top elements of the course can be introduced into operative position from the outside of the wall.

15. A fire wall comprising a permanent portion including irons and a replaceable portion formed of fire bricks supported upon the irons and forming shelves, means by which the headers are secured to the irons and courses of bricks filling the space between and supported by the shelf bricks, said irons having projections against which certain bricks of the top course of the last mentioned bricks engage to prevent push-out in case of explosion.

16. A fire wall comprising a permanent portion including irons and a replaceable portion formed of fire bricks supported upon the irons and forming shelves, means by which the headers are secured to the irons and courses of bricks filling the space between and supported by the shelf bricks, said irons having projections against which certain bricks of the top course of the last mentioned bricks engage to prevent push-out in case of explosion, the said projections being spaced to permit introduction or removal of at least one brick.

17. In a fire wall, a permanent wall portion including horizontal vertically spaced irons, a replaceable wall portion formed of fire brick supported by the irons and forming shelves, said bricks extending below the irons, means for securing the bricks against transverse motion of the irons, courses of fire bricks laid between and supported by the shelf bricks, certain bricks of the topmost course of said bricks having inwardly faced shoulders cooperative with outwardly faced shoulders of the bottoms of the corresponding shelf bricks to form a gas seal, whereby the bricks of the topmost courses of the shelf-supported bricks can be introduced into operative position from the outside of the wall.

18. In a fire wall, a permanent wall portion including horizontal vertically spaced irons, and a replaceable wall portion formed of fire brick supported by the irons and having shoulders, connectors having abutments engaging the shoulders of the fire bricks and the irons to prevent disengagement of the fire bricks in a transverse direction, and bricks laid between and supported by said first mentioned bricks, certain bricks of the bottom-most course of the last mentioned bricks also having shoulders, and said connectors having means engageable with these shoulders to prevent transverse movement of said bottom-most bricks.

19. In a fire wall, a permanent wall portion including horizontally arranged vertically spaced angle irons having their concave sides facing outwardly and their horizontal flanges at the bottom, a replaceable portion formed of fire bricks one course supported by each horizontal flange of each iron to form shelves, certain of the bricks having open top shouldered sockets, horizontal link connectors overlying the irons and bricks and each having short vertical abutments re-

spectively engaged with the shoulders of the sockets and with the outer face of the vertical flanges of the irons, the sockets being of such depth that the connectors lie below the upper
 5 surfaces of the bricks, and courses of fire bricks laid between and supported by the shelf bricks to complete the replaceable wall portion and capping the sockets.

20. In a fire wall, a permanent wall portion including horizontal irons spaced a substantial distance apart vertically and a replaceable wall
 10 portion formed of special fire bricks, a course for each iron, and having shoulders, connectors having abutments engaging the shoulders of the

fire bricks and the irons to prevent disengagement of the fire bricks in a transverse direction, common fire bricks laid between and supported
 by the said special fire bricks to complete the replaceable wall portion, additional irons between the first mentioned irons, certain of said
 80 common fire bricks having shoulders, and connectors having abutments engaging said shoulders and said last mentioned irons to prevent transverse motion of said bricks, and therefore
 85 to prevent bulging of said relatively high common brick portion of the replaceable wall.

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