April 24, 1962 G. A. DEMING 3,030,737

CASING STRUCTURE FOR FURNACE

Filed June 29, 1959 2 Sheets-Sheet 1

FIG. 1

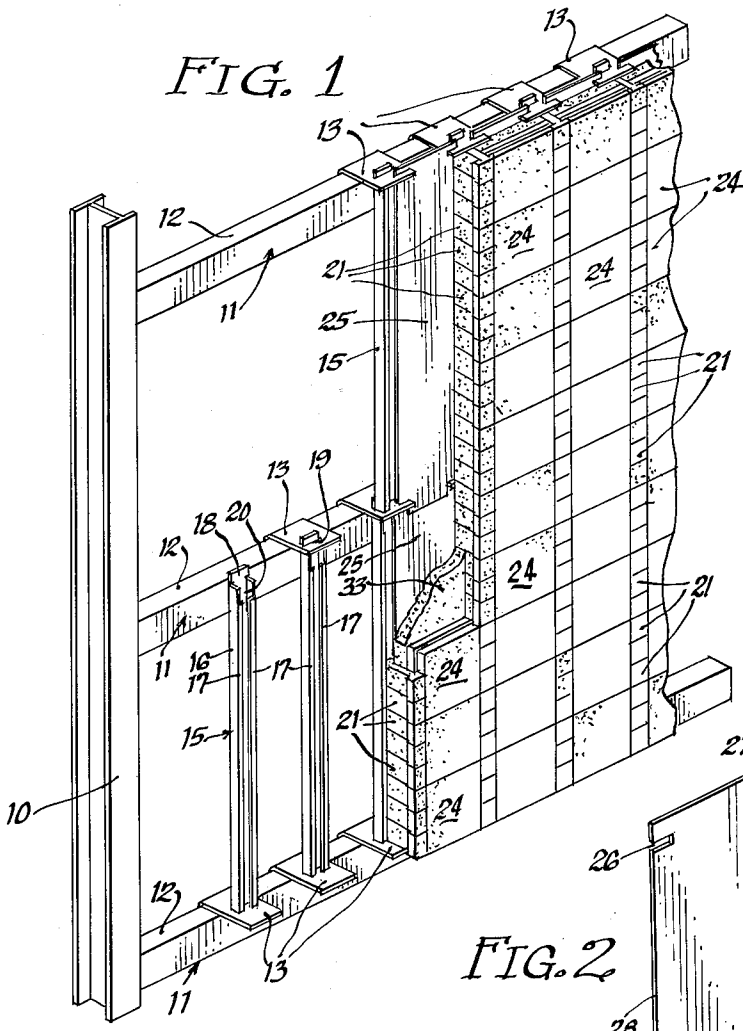


FIG. 2

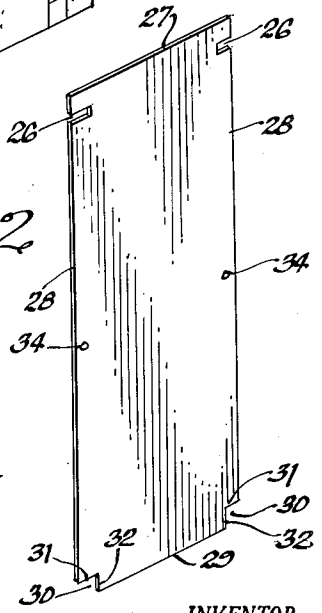
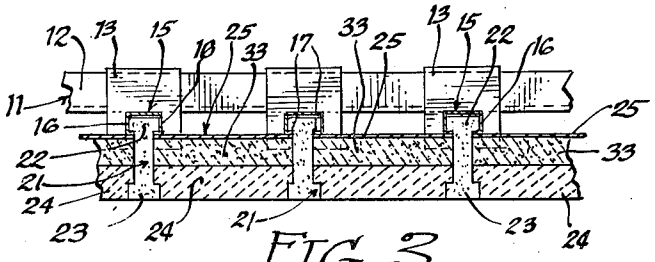


FIG. 3



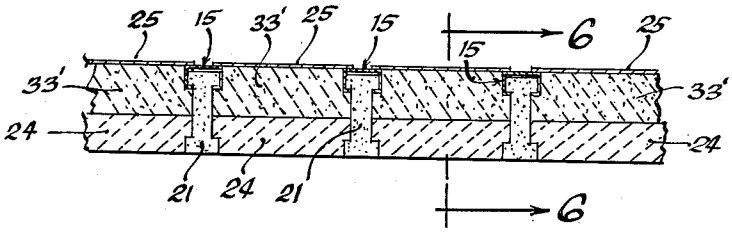
INVENTOR.
George A. Deming
BY
Zabel, Baker, York, Jones & Dithmar
Attorneys

April 24, 1962 G. A. DEMING 3,030,737

CASING STRUCTURE FOR FURNACE

Filed June 29, 1959 2 Sheets-Sheet 2

FIG. 4



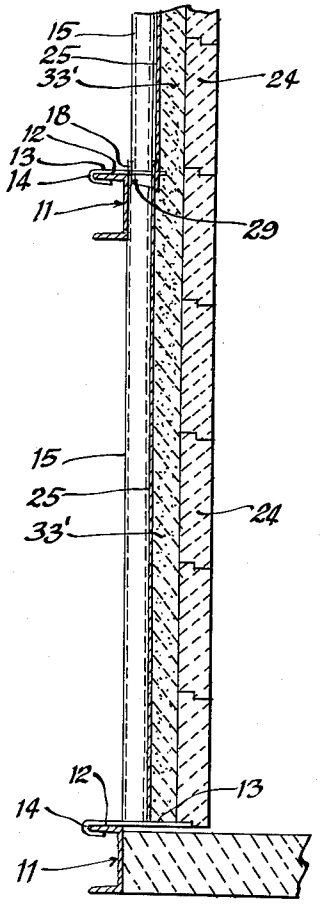


FIG. 5

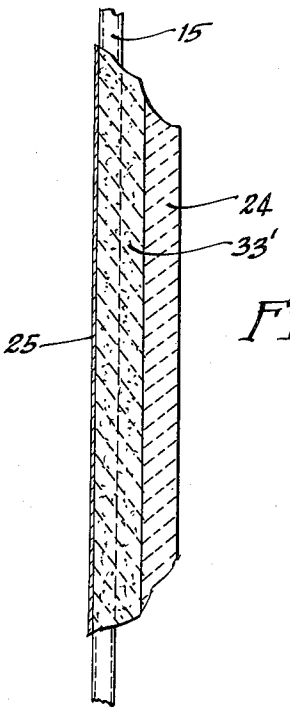


FIG. 6

INVENTOR.
George A. Deming
BY
Zabel, Baker, York, Jones & Dithmar
Attorneys

United States Patent Office 3,030,737
Patented Apr. 24, 1962

3,030,737

CASING STRUCTURE FOR FURNACE

George A. Deming, Chicago, Ill., assignor to Chicago Fire Brick Company, Chicago, Ill., a corporation of Illinois

Filed June 29, 1959, Ser. No. 823,407
3 Claims. (Cl. 50—391)

My invention relates to casing structures for furnaces, and more particularly to a metal casing or sheathing for a light refractory wall for heat enclosures.

One of the principal purposes of my invention is to provide a metal sheathing or casing for furnace structures that embody a light weight refractory wall structure, such as disclosed in my co-pending application Serial No. 674,070, filed July 25, 1957, on Fire Brick Wall Structure in which the use of a heavy casing structure as means for anchoring the refractory members is avoided and a relatively light weight sheet metal casing or sheathing structure is capable of being used instead of such a heavy metallic casing structure.

This purpose of my invention is accomplished by providing a casing or sheathing structure that is made up of light weight sheet metal panels that are supported entirely by the metallic structure that is provided for anchoring and supporting the refractory members that make up the wall, and which metallic supporting and anchoring means is in turn mounted upon a metallic framework. Since the sheet metal panels do not support any refractory members, the same can be made of very light gauge sheet metal as compared with the heavy plate-like casing members that have been previously used in structures in which these are relied on to act as a supporting means for the metallic anchoring members for the refractories that are mounted in the wall.

The casing or sheathing structure that I have developed is particularly adaptable for use in a wall structure, such as shown and described in my co-pending application, Serial No. 674,070, filed July 25, 1957, on Fire Brick Wall Structure. When the casing structure utilizing the light gauge sheet metal panels is applied to a wall structure that is supported and retained in the manner described in my aforementioned co-pending application, the sheet metal panels are mounted on shelf-like members that support the refractory retaining members that are provided in said wall structure and are held in position thereby. However, in order to mount the metallic structure, including the sheet metal panels, outwardly of the heat insulating material provided in such a wall, the retaining bricks or refractories are made of greater length from the inner heat exposed end to the outer anchoring end thereof than in the structure illustrated in said co-pending application.

Another important purpose of my invention is to provide a wall structure in which all of the metallic structure is exposed to the outer atmosphere and lies outwardly from the heat insulating facing that is provided on the wall to thus provide for cooling of the metallic parts as well as preventing undue heating thereof, as the only portions of the wall that will transfer heat to the metallic structure are the retainer tiles or bricks that have the portions thereof that are engaged with the metallic retainer members extending outwardly beyond the heat insulating material.

It is a further purpose of my invention to so mount the sheet metal panel members that form the casing or sheathing structure, that said panel members along with the metallic retainer members, in the form of channel bars, completely enclose the wall with a metallic facing, or backing. This is accomplished by providing an overlap along the vertical side edges of the panels between said panels and said metallic retainer bars and to provide an overlap at the bottom and top of each of the panels between the adjacent panel members. By providing a cast filling of heat insulating material, the wall is made substantially gas tight.

It is a further purpose of my invention to provide a casing or sheathing for a wall of the above mentioned character, in which said panel members serve as means for confining the fill heat insulation during the casting operation, the said heat insulating material being confined between the refractory retainer members of the wall, the wall forming refractories held in position by said retainer members and the sheet metal panel members.

Other objects and advantages of my invention will appear as the description of the drawings proceeds. I desire to have it understood, however, that I do not intend to limit myself to the particular details shown or described, except as defined in the claims.

In the drawings:

FIG. 1 is a fragmentary perspective view of a portion of a wall made in accordance with my invention.

FIG. 2 is a perspective view of one of the sheet metal panel members.

FIG. 3 is a fragmentary horizontal section through the wall.

FIG. 4 is a fragmentary horizontal section of a modification.

FIG. 5 is a fragmentary vertical section through the wall shown in FIG. 1, and

FIG. 6 is a fragmentary sectional view taken on the line 6—6 of FIG. 4.

Referring to FIGS. 1, 2, 3 and 5, a supporting framework is shown, including the vertical frame member **10** and the horizontal frame members **11**. While said members **10** are shown as I-beams, and the members **11** as channel members, any suitable horizontal frame member **11** can be utilized that is provided with an upper flange **12**. Mounted on the framework comprising the members **10** and **11** are shelf-like members **13**, which have reversely bent portions **14** thereon that form hook flanges that engage the flanges **12** of the horizontal frame members **11**. Extending between the shelf-like members **13** are retainer bars **15**, which are in the form of channel members that have parallel side flanges **16** that terminate in inwardly directed flanges **17**.

Said flanges **16** are cut away at the ends of said retainer bars **15** to provide flat end portions **18** on said retainer bars **15**, that are received in slots **19** in the shelf-like members **13**, the retainer bars **15** and the supporting shelf-like members **13** are thus interlocked so that said retainer bars **15** will be held firmly in position. In order to permit the insertion of the retainer refractories to be described below, the inturned flanges **17** are cut away to provide openings **20** at the upper ends of each of said bars **15** for insertion of the retaining refractories in position.

Mounted on the shelf-like members **13** and interlocked with the retainer bars **15** are the retainer refractories **21**, which have head portions **22** that are engaged with the bars **15**, as will be obvious from FIG. 3, and head portions **23**, which cooperate with the relatively thin wall forming refractory blocks or tiles **24** to hold the same in position in the wall. The slots **19** in the plate-like members are of sufficient width that a flat end portion **18** on the lower end of a channel bar **15** and an upper end portion **18** of the next lower channel bar can be inserted in the same slot of a shelf-like member **13**.

One of the sheet metal panel members **25** is shown in FIG. 2, and it will be noted that said panel member has a pair of transversely aligned slots **26** adjacent the upper end **27** thereof, but spaced slightly from said upper end and extending inwardly from each of the side edges **28** thereof the same distance. The opposite or lower end **29** of said wall panel has corner notches or cut away portions **30** in said end thereof providing a pair of horizontal

shoulders 31 and a pair of vertical shoulders 32 at said end, the vertical shoulders 32 being substantially in alignment with the inner ends of the slots 26.

The panels 25 are assembled with the wall structure shown in FIGS. 1 to 3, and FIG. 5, by supporting the panels 25 by means of the lower shoulders 31 thereon, on a pair of shelves 13 that are horizontally spaced from each other on the frame member 12, at the lower end thereof, and slipping these into position on a pair of shelf-like members 13 immediately above said pair of shelf-like members 13 on which the shoulders 31 are supported, by passing the slotted portions 26 over the shelf-like members 13. Said panel members 25 are pushed outwardly into such a position that the marginal portions of the panels 25 adjacent the vertical edges 28 thereof will be in position against the inturned flanges 17 of the channeled retainer bars 15 with the edge portions 28 substantially in engagement with the web portions of the refractory retainer members 21. Preferably the insertion of the sheet metal panel members 25 in this manner begins at the bottom of the wall and proceeds upwardly so that the top marginal edge 27 of a lower panel 25 will overlap the bottom marginal edge 29 of the next higher panel 25, in the manner shown in FIG. 5. Any of the spaces between a pair of columns of refractory retainer members 21 and back of a similar column of wall forming refractories 24 and between said wall forming refractories and a sheathing or casing panel 25 can be filled with castable heat insulating material 33, as an opening is provided at the top of such a space for pouring in the heat insulating material. The refractories and the sheet metal casing panels 25 thus serve as a mold for the castable heat insulating fill material 33.

It will be noted that with the heat insulating material 33 in position, the wall panels 25 will be firmly held in position between said heat insulating material 33 and the inturned flanges 17 of the retainer bars 15. It will also be noted that because of the thinness of the material of the casing panels 25, if heat insulating blocks are inserted back of the refractory members 24 and between the retainer refractories 21 in such a manner as is shown in FIG. 3. The sheet metal panel members 33 can be readily positioned between the flanges of the metallic retainer members 15 and the heat insulating material.

It will be noted upon reference to FIG. 2 that the panel members 25 are also provided with a pair of openings 34 adjacent the vertical marginal edges 28 thereof substantially mid-way between the top and bottom edges 27 and 29 of said panel members. These openings are provided, so that should it be desired to utilize said light gauge sheet panel structure for a casing or sheathing for a thicker refractory wall in which the refractory retainer members 21 are utilized, the sheet metal panel members 25 can be secured by suitable headed fastening elements to the web portions of the channel members 15 in the position shown in FIG. 4, with the castable or block heat insulating material 33' partly enclosing the metallic retainer members 15. In this form of the invention the panel members 25 sufficiently overlap the metallic channel bars 15 to provide a complete metallic enclosure for the wall, just as in the form of the invention shown in FIGS. 1 to 3, and FIG. 5.

What I claim is:

1. A light refractory wall for heat enclosures comprising a supporting framework, refractory wall tiles, refractory retaining members for said wall tiles, metallic mounting means for said retaining members comprising shelf-like members and vertically extending retaining channels mounted on said framework, said shelf-like members being vertically and horizontally spaced and vertically and horizontally aligned, sheet metal sheathing panels supported on said shelf-like members, each of said panels having slots receiving a pair of horizontally spaced shelf-like members and having shoulders seated on a pair of horizontally spaced shelf-like members below said first pair, and heat insulating material between said panels and said wall tiles, the vertical marginal portions of said panels being confined between said retaining channels and said insulating material.

2. A light refractory wall for heat enclosures comprising a supporting framework, refractory wall tiles, refractory retaining members for said wall tiles, metallic mounting means for said retaining members comprising shelf-like members mounted on said framework in vertically spaced relation and sheet metal sheathing panels supported on said shelf-like members, each of said panels having a pair of slots adjacent one end thereof each receiving a shelf-like member and having corner recesses at the other end thereof providing shoulders seating on the pair of shelf-like members located below the shelf-like members received in said slots.

3. A light refractory wall for heat enclosures comprising a supporting framework, refractory wall tiles, refractory retaining members for said wall tiles, metallic mounting means for said retaining members comprising shelf-like members mounted on said framework in vertically spaced relation and sheet metal sheathing panels supported on said shelf-like members, each of said panels having a pair of slots adjacent one end thereof each receiving a shelf-like member and having corner recesses at the other end thereof providing shoulders seated on the pair of shelf-like members located below the shelf-like members received in said slots, each of said shelf-like members having said shoulders of a panel seated thereon being engaged in the slots of a next lower panel to hold said lower panel in overlapping relation to said first panel.

References Cited in the file of this patent

UNITED STATES PATENTS

1,868,171	Keeler	July 19, 1932
2,170,233	Burnet	Aug. 22, 1939
2,174,871	Davey	Oct. 3, 1939
2,222,576	Schauble	Nov. 19, 1940
2,235,740	Fixman	Mar. 18, 1941
2,264,551	Rateau	Dec. 2, 1941
2,275,933	Werner	Mar. 10, 1942
2,622,433	Jones	Dec. 23, 1952
2,660,050	Hosbein et al.	Nov. 24, 1953
2,762,217	Barr et al.	Sept. 11, 1956
2,854,842	Hosbein et al.	Oct. 7, 1958
2,870,624	Sampson	Jan. 27, 1959