Nov. 23, 1937. A. R. SMITH 2,099,829

CASING WALL CONSTRUCTION FOR BOILERS

Filed July 23, 1936

Fig. 1

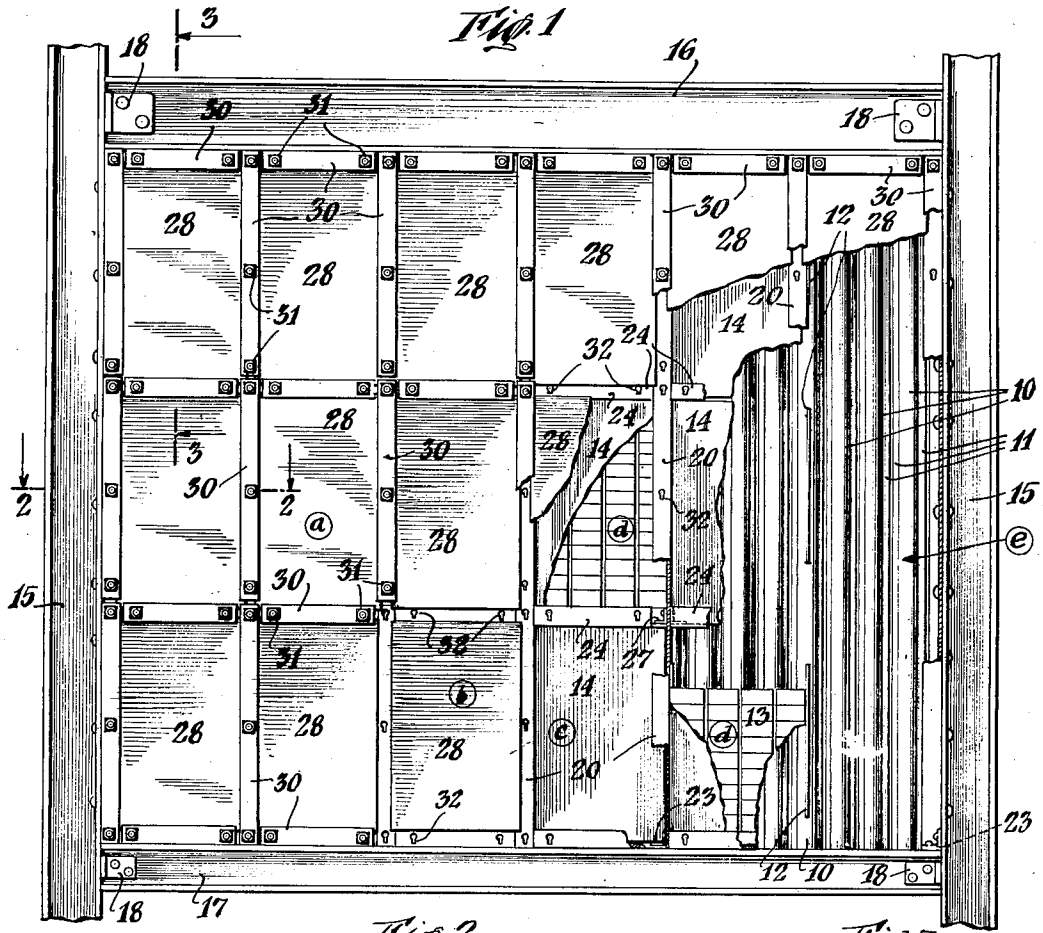


Fig. 2

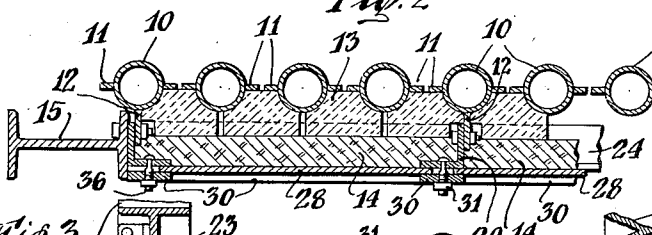


Fig. 5

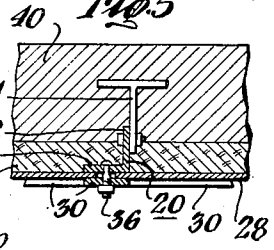


Fig. 3

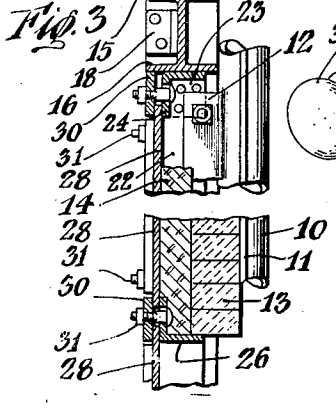
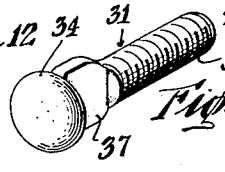


Fig. 6



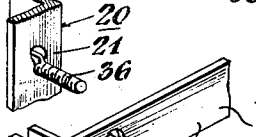


Fig. 4

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UNITED STATES PATENT OFFICE

2,099,829

CASING WALL CONSTRUCTION FOR BOILERS

Alfred R. Smith, Forest Hills, N. Y., assignor to Combustion Engineering Company, Inc., New York, N. Y.

Application July 23, 1936, Serial No. 92,075

1 Claim. (Cl. 122—235)

The present invention relates to boilers and particularly to an improved wall construction for encasing boilers or like apparatus.

In carrying out the invention a grid work of structural members, such as angle irons, is erected at the side of the boiler which it is desired to enclose. The angle irons are disposed so that the outer surface of one leg of each angle iron lies in a plane parallel to the side of the boiler. Panels partially overlapping these leg portions of adjacent angle irons cover the areas defined thereby and are held in place by bars lying over the marginal edges of adjacent panels and secured to the angle irons. A panel fastening member is engaged with the angle irons after their erection and when so engaged is locked in position in such manner that it is prevented from turning with reference to the angle irons or becoming inadvertently disengaged therefrom.

The casing wall of the invention is simple in construction, may be easily and quickly erected with a reduction of attendant costs and may be cheaply manufactured as a consequence of avoidance of necessity for extreme accuracy in manufacture in order to assure that the parts fit together properly.

The foregoing and other features and advantages of the invention will become apparent upon consideration of the following detailed description and appended claims when read in conjunction with the accompanying drawing in which

Fig. 1 is an elevational view of a casing wall embodying the invention and illustrating its application in a boiler to a side wall, or portion therefor, which is cooled by fluid circulating tubes;

Fig. 2 is a horizontal sectional view on the line 2—2 in Fig. 1;

Fig. 3 is a vertical sectional view through the casing wall on the line 3—3 of Fig. 1;

Fig. 4 is a perspective view on an enlarged scale and illustrates the manner in which the angle irons are interconnected and the fastening members engage therewith;

Fig. 5 is a fragmentary horizontal sectional view illustrating the application of the invention to a side wall construction for a boiler or the like of a type different from that illustrated for example in Fig. 2; and

Fig. 6 is an enlarged perspective view of the novel fastening device employed to secure the panel-retaining bars to the angle irons.

Fig. 1 may be considered as representing part of a side wall of a boiler such as that portion of the wall at one side of the combustion chamber. This wall portion is illustrated as being cooled by the circulation of fluid through tubes 10 having fins 11 at the rear side of which brick or tile 13 covered by insulating material 14 is mounted to form an outer side wall of the furnace chamber or other portion of the boiler. The vertical beams 15 shown in Fig. 1 may be beams which are ordinarily provided for supporting parts of the boiler structure. These beams are interconnected at the top and bottom of the side of the boiler by cross beams 16, 17 secured thereto by clip angles 18 fastened to the beams in any suitable manner. A grid work of angle irons is erected between these beams and consists of a number of spaced vertically disposed angle irons 20 secured to the beams 16, 17 by angles 23. The angle irons 20 are disposed so that the outer faces of one leg 21 of each angle iron are all located in a common plane parallel to that of the side of the boiler. The grid work is completed by several series of alined angle irons 24 spanning the intervals between the vertical angle irons 20 and secured thereto by suitably attached angles 27. The outer surfaces of the legs 25 of the angle irons 24 are disposed flush with the outer surfaces of the legs 21 of the angle irons 20 to which the angle irons 24 are attached. To further support and rigidify the grid work the other legs of the angle irons 20, which extend inwardly, are secured to lugs 12 on certain of the tubes 10 which are located opposite the angle irons 20. If desired, lugs 12 may be continuous, like fins. The other legs 26 of the angle members 24 also extend inwardly and form shelves or ledges supporting tiers of the tile 13 at the back of the tubes.

Panels 28 of suitable material such as steel, transite, asbestos mill board, etc. partially overlap the leg portions 21 and 25 which define each open area of the grid work and cover such areas. Bars 30 overlie the marginal edges of adjacent panels 28 and are secured to the angle irons by bolts 31 for holding the panels in place.

The casing wall may be made gas and air tight either by the use of a sealing cement or gaskets applied between the bars 30 and panels 28 and/or between the latter and the underlying leg portions of the angle irons.

The bolts 31 are attached to the legs 21 and 25 of the angle irons 20 and 24, respectively, by engaging them in keyhole-like apertures 32 in these legs. The bolts and apertures are mutually adapted to facilitate easy engagement of the bolts with the angle irons, to prevent turning of the latter so that nuts may be applied to the bolts without holding the latter and also so that the

bolts are securely held against dropping out and may not inadvertently be pushed out of place when securing to the angle irons the bars 30 which retain the panels 28. As may be seen in Fig. 4 the apertures 32 as illustrated therein consist of a round opening 32a having a narrower slot-like extension 32b at one side thereof, the extension preferably extending downwardly. As shown in Fig. 6, the bolts 31 have an enlarged head 34 joined to the threaded portion 36 of the shank thereof by a neck portion 37, the neck portion 37 being formed by reducing the diametrical thickness of this part of the shank in one direction, with consequential enlargement in the direction at right angles thereto. The head 34 of the bolt is of a size to permit it to be passed through the circular portion 32a of the aperture 32 from the front side of the grid work after erection of the latter against the side of the boiler. The head 34 and major portion 36 of the shank both have diameters greater than the width of the extension 32b of an aperture 32. The neck portions 37 of the bolts are of a size to fit closely in the extensions 32b of the apertures.

A bolt 36 may be engaged with the apertured leg of an angle iron from the front side thereof by passing the head of the bolt through the part 32a of the aperture and dropping the bolt into place to engage its neck 37 in extension 32b with its head 34 disposed closely adjacent the rear face of the leg of the angle iron and the inner end of shank portion 36 disposed closely adjacent the outer face of the leg of angle iron. Due to the fact that the diameter of the head 34 and shank 36 of the bolt are greater than the width of the extension 32b of the aperture, the bolt cannot inadvertently be pushed or drawn out of engagement with the angle iron. The neck portion 37 of the bolt fitting closely in the extension 32b of the aperture prevents turning of the bolt when a nut is being applied in fastening a bar 30 to the angle iron.

The boiler wall as represented in Fig. 5 is of more or less solid construction and may consist of bricks 40 or the like, the legs 22 of the angle irons 20 being secured to the anchor members 41 imbedded in the wall structure.

In Fig. 1 the area designated by the encircled *a* illustrates the finished appearance of the casing wall. The areas marked with encircled letters *b* and *c* show the casing wall as it appears before application of the bars 30 and panels 28, respectively; in the areas marked with an encircled *d* the several stages in the construction of the casing wall have been illustrated by breaking away various parts or layers thereof.

From the foregoing description it may be seen that in fabrication of the wall parts no operations are required on the panels 28 other than to cut them to size. The angle irons 24 and bars 30 require only that they be furnished in appropriate lengths and that the apertures 32 in the angle irons and corresponding holes in the bars 30, through which the bolts pass, be formed therein so that they register upon assembly. Consequently, the cost of manufacture, as compared to other casing wall constructions, is considerably lessened since the necessity for accurate shop work is minimized while at the same time the wall parts are suited to each other. Due to the simplicity of the construction the erection of a casing wall is facilitated and the effort and time required for erection are reduced inasmuch as the parts may readily be fitted together despite minor inaccuracies in fabrication.

Access to any desired portion of the enclosed boiler may readily be obtained upon removal of one or more of the panels 28. It should be noted that upon removal of a panel the tile or brick behind the latter remains supported on the legs 26 of the horizontal angle irons 24 so that they do not fall out as is apt to occur upon removal of portions of boiler casings of types employed heretofore.

Although an illustrative embodiment of the invention has been described in detail herein, it is to be understood that there are many changes and variations which may be made without departing from the invention, and therefore, it is desired and intended to include all such changes and variations within the scope of the following claim.

What I claim is:

In a boiler or the like having a wall including a row of fluid circulating tubes; a plurality of angle irons spaced at intervals along said wall with one leg of each angle iron disposed in a common plane parallel to the plane of the outer surface of said wall and the other leg of each angle iron extending toward one of said tubes; members attached to certain of said tubes located at intervals along said wall corresponding to the spacing of said angle irons and projecting outwardly therefrom toward the latter; means connecting the projecting members on said certain tubes to the inwardly extending legs of correspondingly positioned angle irons for supporting the latter; a plurality of series of aligned angle irons spanning the intervals between said first mentioned angle irons and each disposed with one leg thereof flush with the coplanar legs of said first mentioned angle irons; panels covering the areas between and defined by contiguous portions of said angle irons; and means fastening said panels to said angle irons.

ALFRED R. SMITH.