Aug. 30, 1949. W. C. HENSEL 2,480,241

DETACHABLE CLIP SUSPENDED WALL

Original Filed July 3, 1944 2 Sheets-Sheet 1

Fig. 2.

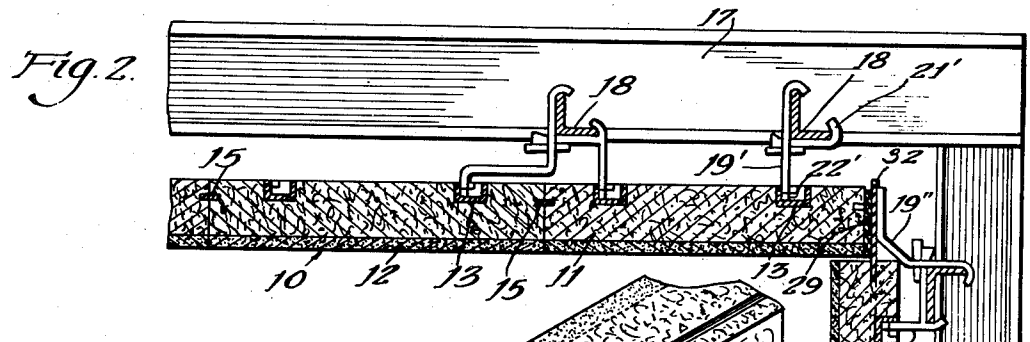
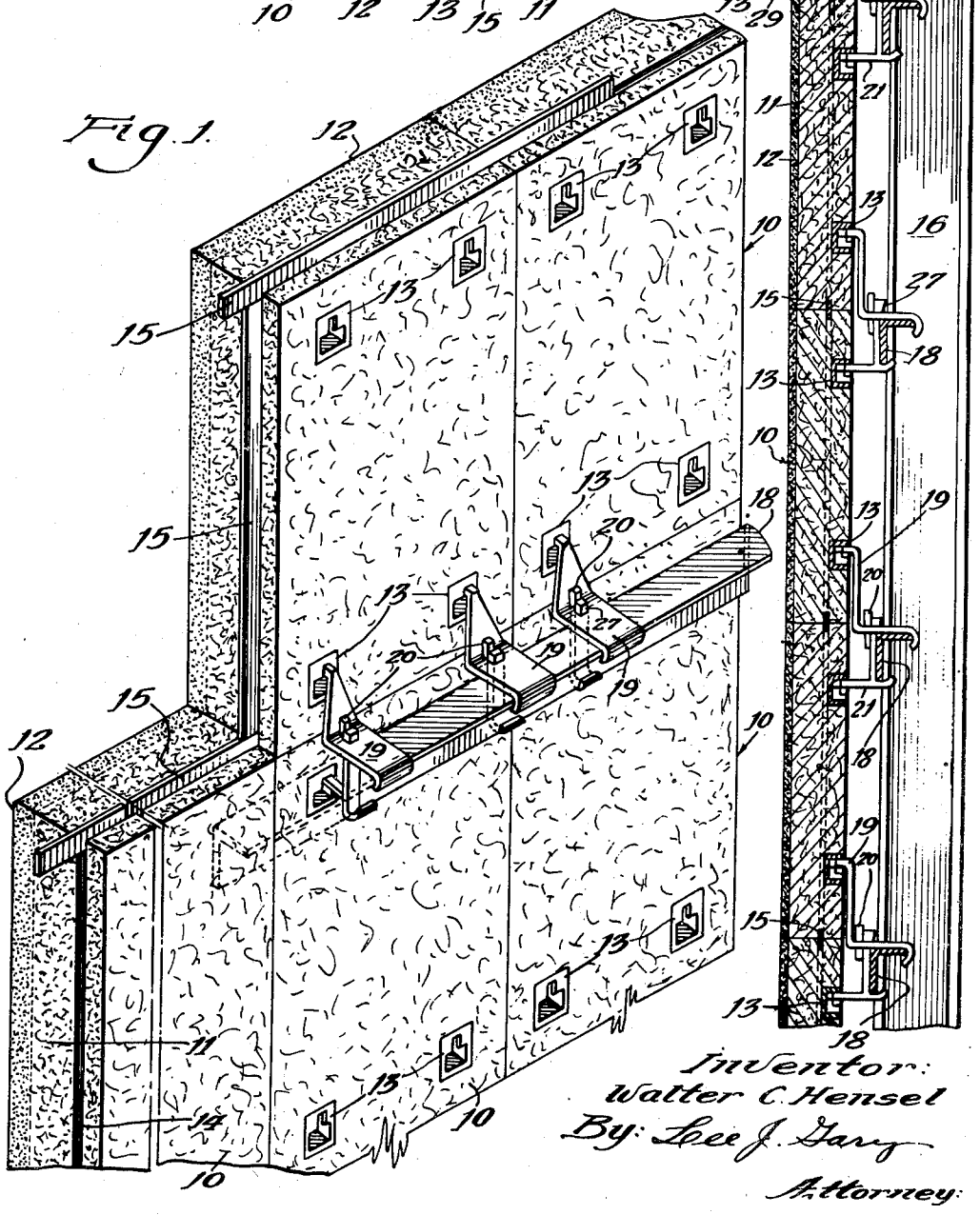



Fig. 1.




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Fig. 3A.

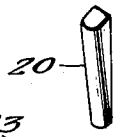



Fig. 3.

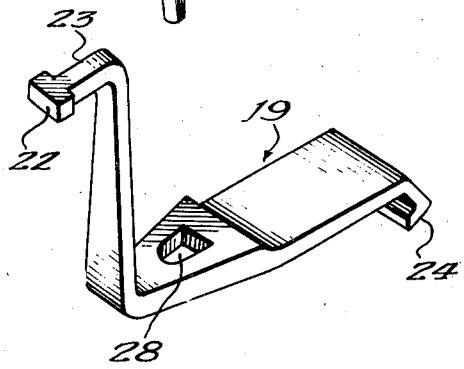



Fig. 4.

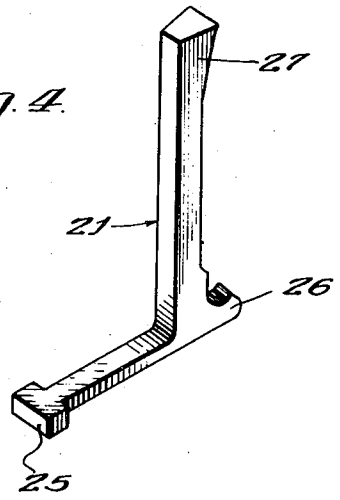
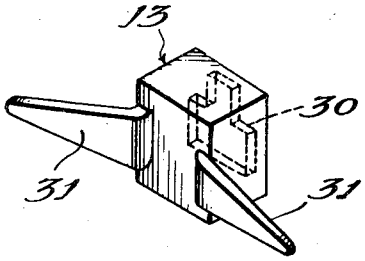



Fig. 5.




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2,480,241

## DETACHABLE CLIP SUSPENDED WALL

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Original application July 3, 1944, Serial No. 543,356. Divided and this application November 29, 1944, Serial No. 565,590

6 Claims. (Cl. 72—101)

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This is a division of my application Serial No. 543,356 filed July 3, 1944, which is a continuation-in-part of my two co-pending applications Serial Number 389,553, filed April 21, 1941 and Serial Number 412,350, filed September 26, 1941, now abandoned, the latter being a division of my application Serial Number 271,901, filed May 5, 1939 and issued as Patent 2,270,297 on January 20, 1942.

Each of the aforementioned parent applications discloses an improved and relatively inexpensive type of wall construction for furnaces, heaters and the like involving the use of prefabricated slabs or sections which form the walls of the heater and comprise a relatively thick layer of heat insulating material covered on one side by a relatively thin layer of denser refractory material.

The present application is more particularly directed to means for suspending the slabs, such as in the walls and/or roof of a heater, and their attachment to a supporting structural framework of metal members or the like. This is accomplished by socket members embedded in and anchored to the insulating material of the slab and detachable clips which secure these anchored socket members to members of the structural framework. The specific means provided for suspending the slabs and securing them to the framework obviates punching or drilling of the latter as would be necessary with the use of tie bolts or the like embedded in the slabs. They are also constructed and arranged to accommodate minor variations or inaccuracies in spacing, size and contour of the framing members to which the slabs are attached, as well as in the spacing or location of the socket members embedded in the slabs.

The unique and advantageous method and means herein provided of supporting the slabs may be employed to advantage with preformed slabs or panels other than those shown. For example, the attaching clips may be employed to support refractory shapes, insulating slabs or panels not provided with a refractory surface, or slabs or panels comprising a mixture of insulating and refractory materials. The invention therefore embraces and specifically contemplates such other uses of the supporting or suspending means which it provides.

The features and advantages of the invention will be more fully explained with reference to the accompanying diagrammatic drawing.

In the drawing Figure 1 is an isometric of an

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assembly of refractory faced insulating slabs or panels such as provided by the invention.

Figure 2 of the drawing is an elevational view, shown principally in cross-section, of a portion of the roof and wall of a heater or the like employing the features of construction provided by the invention.

Figures 3 and 3A, respectively, are enlarged perspective views of one of the attaching clips 19 and one of the wedges 20 shown in Figures 1 and 2.

Figure 4 is an enlarged perspective of one of the attaching clips 21 shown in Figures 1 and 2.

Figure 5 is an enlarged perspective view of a socket member such as the members 13 of Figures 1 and 2.

Referring now particularly to Figures 1 and 2, the slabs or panels which are designated by the reference numerals 10 each comprise a substantial thickness of suitable heat insulating material indicated at 11 and a lesser thickness 12 of suitable refractory material which is applied over the entire surface of the insulating material on one side of the slab and is directly bonded thereto, preferably without any intermediate adhesive layer, mechanical keys, metal ties or the like. Preferably, the slabs are cast or pressed in a suitable form or mold in which both the insulating and refractory layers are placed and the socket members 13 are embedded in and anchored to the insulating layer as the slab is formed. Thus, the entire preformed slab or panel comprises the insulating layer 11, and the refractory layer 12 and the anchored socket members 13. Members 13, as shown in Figure 2, are sufficiently shallow that they leave a substantial thickness of insulating material between the back side of each of members 13 and the refractory layer 10 of the slab.

As shown in Figures 1 and 2, the slabs are assembled in edge to edge relation to form the walls and/or roof of a furnace structure, heater, oven or the like with the refractory face 12 disposed on the inner or hot side of the wall. At a substantial distance from the hot side of each slab a groove, which is indicated at 14 in Figure 1, is formed or cut within the body of the insulating layer 11 about the entire periphery of the slab. In assembling the slabs in the wall, a spline 15 is placed within the grooves 14 and the spline along each edge of adjacent slabs is embedded partly in the groove of one slab and partly in the groove of the other so as to break the joint between the slabs and serve as a seal to prevent the escape of combustion gases or

the like from the heater and to prevent the infiltration of air through the wall.

In constructing the heater a suitable framing of metal I beams or the other structural shapes, such as indicated at 16 and 17 in Figure 2, is erected. Several of the upright members or columns 16 are provided at spaced points along the side walls and are surmounted by the roof beams 17 and suitably attached thereto by welding, bolting, riveting or the like in any convenient manner not illustrated. Metal angles or the like 18 are provided at spaced points along the length of members 16 and 17 running transverse to and extending between the adjacent main framing members 16 and 17. The slabs 10 are then placed inside the structural framework and are securely anchored to members 18 by means of the clips 19 and 21, the wedge-like member 20 and the socket members 13, which latter are embedded in the slabs before their erection.

It will be noted with reference to Figure 1 that, in the particular case illustrated, four of the socket members 13 are provided in each of the slabs 10 and are disposed adjacent the four corners of the slab. These members 13 are substantially aligned in vertical and horizontal rows when the slabs are in place in the wall. In the vertical side walls of the structure the member 19 of each set of clips is secured to one of the members 13 along the bottom edge of a slab which is disposed immediately above the member 13 to which this clip is attached, while clip 21 of this same set is secured in one of the socket-like anchoring members 13 adjacent the top edge of the nearest lower slab.

Clip 19 (Figure 3) has a T-shaped head at one end thereof, formed by the cross-bar 22, which slips into the enlarged lower portion of a keyhole-like opening provided in the outer face of member 13, and the adjacent neck 23 of clip 19 is then slipped upwardly into the narrower or slot-like upper portion of said opening in member 13. The opposite end 24 of clip 19 is substantially hook-shaped and fits over the outer edge of the upper leg of angle 18, as used in a vertical wall.

Clip 21 (Figure 4) is substantially L-shaped having a T-shaped head 25 at the outer end of its horizontal leg (as used in a vertical wall) which is engaged with its companion member 13 in the same manner above described as the T-shaped head 22 of clip 19. A substantially hook-shaped portion 26 is provided on the back side of and at the junction of two legs of clip 21 and engages the under edge of the vertical leg of angle 18. The vertical leg of clip 21 (as used in a vertical wall) has an enlarged substantially wedge-shaped outer end 27 adapted to pass through a substantially wedge-shaped opening 28 provided in the leg of member 19 which runs parallel to the upper leg of angle 18. Wedge 20 (Figure 3A) is forced or driven into the opening 28 of member 19 substantially parallel to and on that side of the vertical leg of member 21 which is opposite the angle 18. Thus, as shown in Figure 2, the wedge-like head 27 of clip 21 is held in place above the upper leg of angle 18 and the hook-like portions 24 and 26 of the respective clips 19 and 21 are kept in engagement with the leg of the angle 18 by the wedge 20.

The roof construction, as illustrated in Figure 2, is similar to the wall construction above described, except that the angles 18 and the clips 19 and 21 are oriented 90°.

Two special clips similar to clip 19 and designated in Figure 2 by the reference numerals 19' and 19'' are employed adjacent the juncture of the side wall and roof. That portion of clip 19' which extends downward from the member 18 is straight instead of being bent at a right angle and is provided with a cross-bar 22' at its lower end which forms a T-shaped section engaging the socket member 13 nearest the juncture of the roof and side wall. A special clip 21' similar to clip 21 is employed in conjunction with the special clip 19' and differs from the members 21 only in that the leg which carries the T-shaped head is eliminated.

The last set of clips for the side wall slab most adjacent the roof comprise one of the regular clips 21 and the special clip 19''. The latter is constructed as shown in Figure 2 to hold in place a relatively narrow sheet 32 of hard pressed asbestos board, metal or the like which fits along its lower edge into the top groove in the uppermost slabs on the side wall and substantially abuts the edge of the adjacent slabs in the roof, preferably with a small space therebetween which may be filled with a suitable mastic, refractory material or the like as indicated at 29.

The socket member 13 which is embedded in the insulating layer of the slab may, as indicated in Figure 5, be of a box-like construction with a keyhole-like opening 30 provided in its front face and with suitable ears 31 extending outwardly from its box-like body to serve as anchors to prevent the socket member from pulling from the insulating material.

I claim as my invention:

1. A clip set comprising a pair of clips, each of the clips comprising legs which form a substantially L-shaped body, a T-shaped portion at the outer end of one leg of each clip, a hook portion at the outer end of the other leg of one of said clips, a hook portion adjacent the junction of the legs on the other clip, a wedge portion at the outer end of one leg of the last-mentioned clip extending through an opening provided through one leg of the companion clip, said set including a separate wedge member disposed in said opening.

2. The combination comprising a pair of interlocking clips detachably engaged with a substantially L-shaped structural member and each having a leg which extends from said member, a T-shaped portion at the outer end of each of said legs and socket members separate from the clips and detachably engaged with the T-shaped end portions of said clip legs.

3. A clip set comprising a pair of clips, each comprising legs forming a substantially L-shaped body, a leg of one of said clips extending through an opening in a leg of the other clip, a T-shaped portion at the outer end of one leg of each clip, a hook portion at the outer end of the other leg of one of said clips, a hook portion adjacent the junction of the legs of said other clip, and means interlocking said clips.

4. A clip set comprising a first clip and a second clip, each comprising legs forming a substantially L-shaped body, one of the legs of said first clip having engaging means at the end thereof and an opening intermediate its ends, a T-shaped portion at the outer end of the other leg of said first clip and at the outer end of one of the legs of said second clip, the other leg of said second clip extending through said opening in the first clip, engaging means adjacent the junction of the legs of said second clip, and means locking said other leg of the second clip in said opening.

5. In combination with a wall construction and

a structural supporting member, socket members embedded in the wall, a pair of substantially L-shaped clips detachably engaged with said supporting member and each of the clips having an end portion detachably retained in one of said socket members, a leg of one of the clips extending through an opening in a leg of the other clip, and means locking the first-mentioned leg in said opening.

6. A clip set comprising a first clip and a second clip, each comprising legs forming a substantially L-shaped body, one of the legs of said first clip having a hook portion at the outer end thereof and an opening intermediate its ends, one of the legs of said second clip extending through said opening in the first clip, means locking the last-mentioned leg of the second clip in said opening, and a hook portion adjacent the junction of the legs of the second clip.

WALTER C. HENSEL.



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