Nov. 27, 1962 G. A. WEINGARTNER 3,065,572

STRUCTURAL CURB

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FIG. 1.

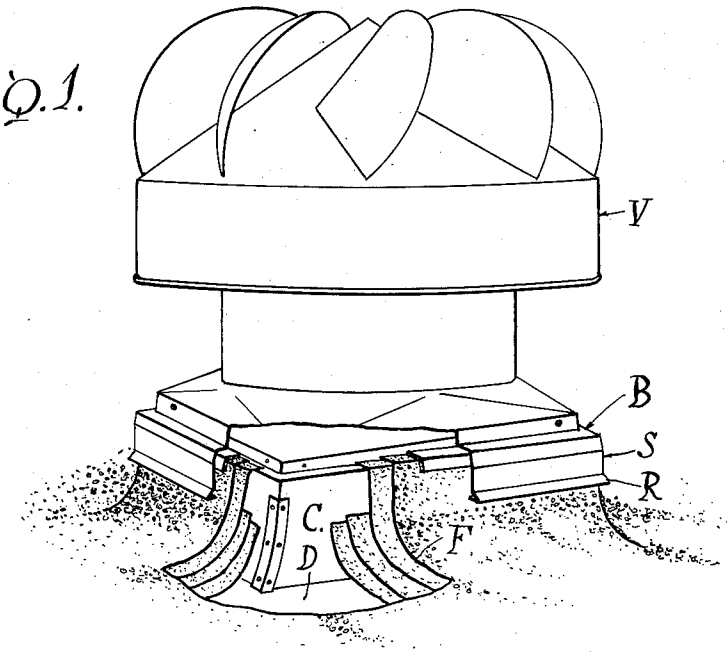


FIG. 3.

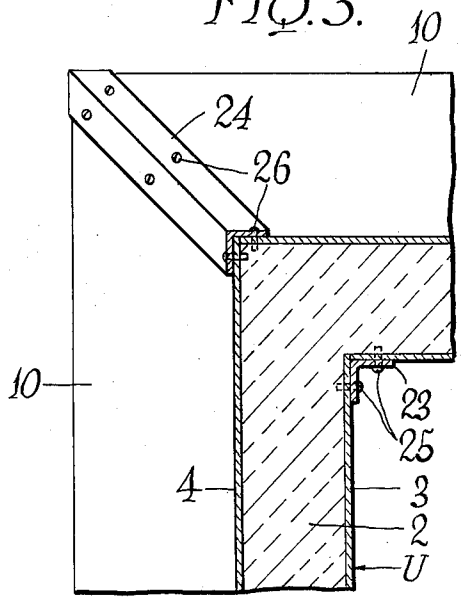
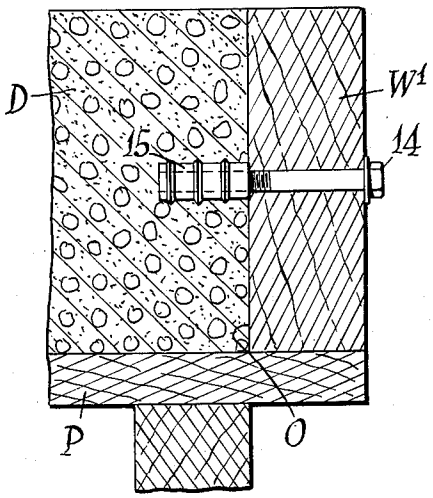


FIG. 5.



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Fig. 6.

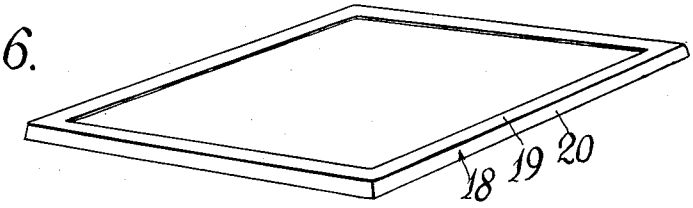


Fig. 2.

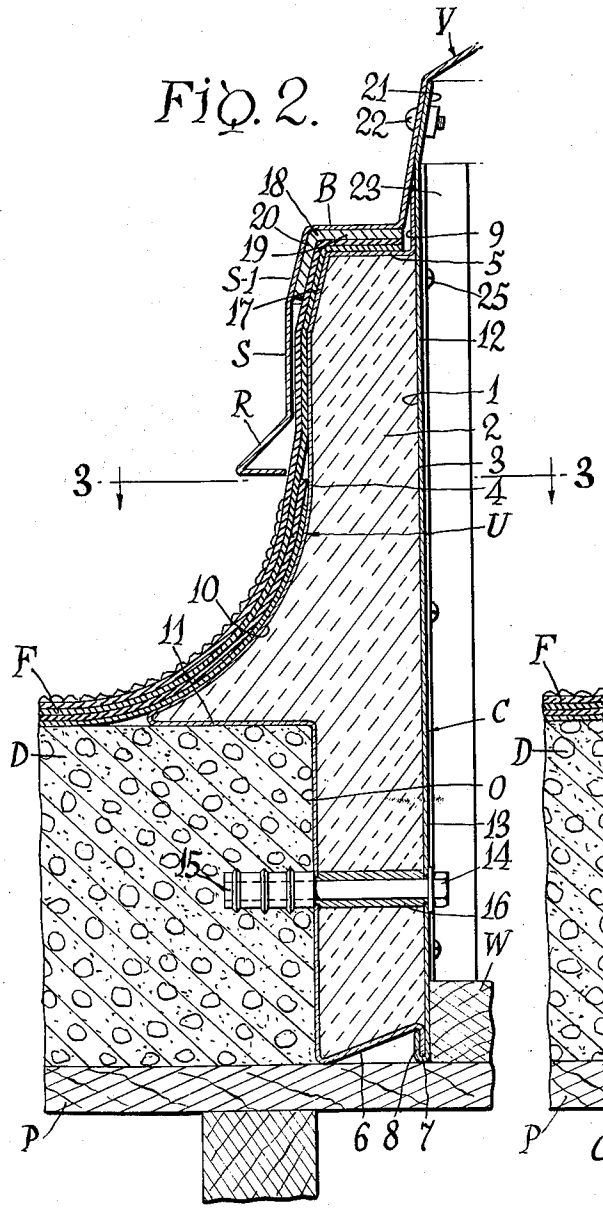
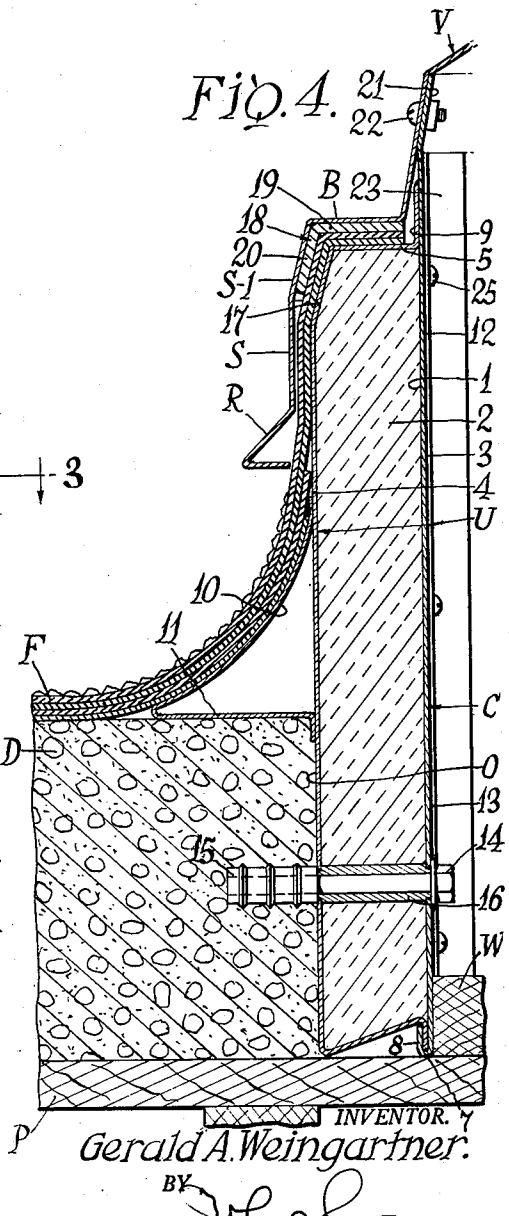


Fig. 4.



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STRUCTURAL CURB

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5 Claims. (Cl. 50—47)

This invention relates to improvements in structural curbs of the type which incorporates a heat insulating chamber provided by a shell having spaced inner and outer vertical walls and horizontal flanges in quadrate relation for the stable support of the curb upon a roof, curbs of this type being shown in the patent to Hirschman No. 2,168,798 of August 8, 1939, and having particular utility in connection with the mounting of ventilators.

The curb of the invention is used in connection with concrete roofs the curb being herein illustrated and described as mounted upon a concrete roof which is poured with the curb supported in its determined position or which may be poured in relation to temporary frames which form openings to provide for the mounting of the curb after the roof is completed.

The objects are: (1) to prevent condensation of moisture throughout the complete extent of the curb, that is to say both the part above the roof and the part which extends through the roof opening provided for the flow of warm air from the room to and through the ventilator; (2) to eliminate sharp bends or angles in the roofing felt or flashing as applied to the curb, thereby to facilitate such application and to avoid any liability of tearing or cracking the flashing, both in application and throughout the period of use; (3) to reduce the extent of outward projection of the supporting flange, without impairment of its supporting function, to a degree such that with a concrete roof the concrete as poured into the space between the supporting flange and the temporary roof supporting boards will completely fill the space with resultant substantial avoidance of air trapping and optimum efficiency in the lateral support of the curb; (4) in connection with the attachment of the curb to a concrete roof, to provide reinforcement of the part of the curb within the roof opening at the several points at which the curb is attached to the roof, thereby to eliminate the liability of any displacement or distortion of the curb or impairment of the security of its connections under the violent storm or wind conditions to which it may be periodically subject; (5) to provide for the construction and location of the fasteners for the attachment of the curb to a concrete roof in such a manner that they are immediately accessible for quick and facile disconnection, thereby to provide for the ready removal of the curb without injury to it or to the roof whenever such removal may, for any purpose, be found desirable; (6) to provide for the attachment of the curb to a concrete roof in such manner and by such means that there is no necessity for curb anchoring devices extending vertically from and below the supporting flange, thereby, when the curb is positioned prior to the completion of the roof, to facilitate and expedite the pouring of the concrete into the space between the supporting flange and the temporary roof supporting boards, and when the roof is completed prior to the mounting of the curb to enable the curb readily to be mounted in registry with the preformed opening in the roof; and (7) to provide a construction having novel features of structure, relation and assembly such that a single panel may be readily and economically made at the factory in a length equivalent to the total circuitous extent of the four sides of the curb, thereby enabling the sides to be cut from the panel at the factory and to be shipped knocked-down, with substantial economy in freight charges, to the place where the ventilator is to be

installed, the assembly of the curb being thereupon readily completed in situ in readiness for its installation.

The several novel features of the invention by which the foregoing objects are attained are as follows: The heat insulating shell extends throughout the depth of the curb and the outer walls are formed to provide base portions in flaring relation which serve as the cant strips and include downwardly extending parts which fit within the opening of the concrete roof, the horizontal supporting flanges being formed as parts of the outer walls, being suitably located at points intermediate thereof and extending between the lower ends of the flared base portions and the upper ends of the downwardly extending parts; the cant strips are of regular and gentle curvature throughout their vertical extent and merge with straight portions of the outer wall; the outer wall has an upper portion which has a slight degree of inward and upward inclination and the inwardly directed horizontal flange which forms the upper wall of the heat insulating chamber is carried by the inclined upper portion of the outer wall and is secured to the inner wall, the frame which holds the flashing having a cross section of obtuse angularity conforming to the angle of the flange and the outer wall; one of the walls of the shell, preferably the inner wall, has an upwardly bent portion along its lower edge which provides a channel and the companion wall has a lower edge portion which fits within the channel, thereby providing for the articulated connection of the two walls adjacent their lower edges and insuring facility and accuracy in the assembly of the walls; the curb is attached to the concrete roof by connections which extend through the parts of the shell within the opening of the roof and include removable bolts, the heads of which are readily accessible from within the shell; and in the space between the walls sleeves are provided which surround the bolts as wall spacers and which also serve as reinforcements of the shell adjacent the points at which it is connected to the concrete roof.

In the drawings:

FIGURE 1 is a perspective view showing a curb in accordance with the invention and a ventilator mounted on the curb, certain parts of the curb being broken away in order better to illustrate the manner in which the roofing felt or flashing is applied.

FIGURE 2 is a fragmentary vertical sectional view of the curb.

FIGURE 3 is a fragmentary horizontal sectional view on the line 3—3 of FIGURE 2.

FIGURE 4 is a view similar to FIGURE 2 showing a colorable variation in the construction of the outer wall of the shell.

FIGURE 5 is a vertical sectional view showing the manner in which the collars for cooperation with the fastening bolts are fitted in position in the concrete roof opening when the roof is completed prior to the positioning of the curb.

FIGURE 6 is a perspective view of the securing frame for the flashing.

The curb shown at C in FIGURE 1 as carried by a concrete roof D is in the form of a rectangular frame. The use selected for illustration is the support of a ventilator which may be of any desired construction, a well-known ventilator V being shown which has the usual base B located over the roof opening and a depending skirt S extending over the flashing applied to sides of the curb and stiffened along its lower edge by the rib R.

The curb includes a heat insulating chamber 1 which extends throughout its vertical depth and its lineal or circuitous dimension. For the provision of the chamber 1 the curb is formed as a shell, that is to say it is of double walled construction vertically and also has top and bot-

tom walls which extend between and are secured to the vertical walls. The vertical, top and bottom walls are preferably imperforate and the chamber **1** thereby, as is preferred, is completely enclosed. The chamber **1** is preferably filled with a suitable heat insulating material **2**, mineral wool being preferred.

The companion inner and outer vertical walls **3** and **4**, respectively, extend along the four sides of the curb. The top and bottom walls **5** and **6**, respectively, project inwardly, as flanges, from the upper and lower edges of the wall **4** with which they are preferably integrally formed, the walls **4**, **5** and **6** thereby being a unit U in the assembly of the heat insulating chamber. The wall **3** is of plate-like form and the connection between it and the bottom wall **6** is preferably of articulated character. For this purpose the wall **3** is formed along its lower edge with an upwardly extending overlapping flange **7** which provides a channel and the wall **6** extends inward and upward at a slight angle and is formed with a downwardly extending terminal flange **8** which seats in the channel.

In assembling the heat insulating shell the insulating material is placed in the unit U which is then positioned with the walls **5** and **6** in abutting relation upon the wall **3** and in such position moved slidably until the flange **8** engages completely under the flange **7**. Such engagement not only establishes an articulated connection but also accurately positions the unit for the attachment, preferably by welding, of the upper wall **5** to the wall **3**. For the purpose of such welding attachment the wall **5** is provided with an upwardly extending flange **9** which adjoins and may be spot-welded to the wall **3**. In the case of the flange **8** welding is not necessary but spot-welding may be resorted to if so desired. The assembly of the heat insulating shell in this manner enables the shell to be economically originally made as a single panel having a length equivalent to the total circuitous extent of the four sides of the curb. The panel may then be cut into sections severally corresponding in dimensions to the four sides of the curb and having their ends suitably mitered to enable them to be assembled at the point of use as a rectangular frame. In this way the frame which provides the curb may be shipped knocked-down to its destination with a resultant substantial economy in freight charges.

The wall **4** carries a downwardly extending and transversely coextensive flared base portion **10** which serves as a "cant strip" for the application of the several layers of flashing F. The flared portion **10** is located approximately midway of the vertical extent of the wall **4** and at its lower edge is connected, preferably integrally, to an inwardly extending horizontal flange **11** connected to that part of the wall **4** which extends downward into and through the roof opening O. The flange **11** is located at an intermediate point of the wall **4**, serves for the support of the curb upon the roof D and, extending inward from the flared base portion, joins the wall **4** at a distance from its lower edge equal to the thickness of the roof. Thereby the heat insulating chamber has a portion **12** extending for a suitable distance above the roof and a portion **13** extending downward through the roof opening O by which the air in the room escapes to and through the ventilator V. As preferred, and as shown in FIGURE 2, the flared portion **10** and the flange **11** are formed integrally with the wall **4**. A colorable variation is shown in FIGURE 4 and consists in making the flared portion **10** and the flange **11** as a part originally separate from the wall **4** and attaching it by welding.

In the mounting of the curb the portion of the wall **4** below the flange **11** abuts the vertical wall of the roof opening O. In the attachment of the curb to the roof the portion **13** of the curb within the opening O is utilized.

FIGURES 2 and 4 assume an instance, in accordance with the more frequent practice, in which the curb is positioned for mounting upon the roof prior to the pouring of the concrete. The concrete, as it is poured, is supported upon a temporary board platform P which rests upon

temporary cross pieces. For the proper location of the curbs wooden frames W are removably secured to the upper face of the platform P, the rectangle defined by the outer vertical faces of the frames W corresponding dimensionally to the rectangle defined by the vertical walls of the curb. The curb is initially placed in its determined location on the roof in surrounding relation to the frames W and thereby held against displacement while the concrete is being poured. The concrete, as poured, flows into and substantially completely fills the space between the flange **11** and the platform P. Since the flange **11** does not extend inward beyond the part of the wall **4** to which it is joined the flange, without impairment of its supporting function, may be of relatively short extent in the radial direction. It is this shortness of the radial extent of the flange which enables the concrete completely to fill the space under the flange **11**, sizeable pockets of trapped air at the corners of the space being thereby avoided. Thus the roof is in abutting relation to the part **13** of the heat insulating chamber, this part being below the flange **11** throughout its vertical extent and providing lateral support for the curb of the most effective character.

The curb is attached to the roof by bolts **14** located at suitable intervals which are tapped into nuts **15** embedded in the concrete and open to the opening O. The bolts **14** extend through the heat insulating chamber with their heads located with the frame defined by the curb and abutting the wall **3**. If for any reason it becomes necessary or desirable to remove the curb all that is required is to unscrew the bolts **14** until they are disconnected from the nuts **15** and lift the curb until its part **13** is removed from the opening O and suitably above the roof. At the time the curb is initially positioned by means of the frame W the bolts **14** and nuts **15** are in connected relation, the nuts projecting radially outward from the wall **4**. When the concrete is poured the nuts become embedded in the concrete. Since the heads of the bolts are located within the opening defined by the curb they are conveniently and immediately accessible when the bolts are to be disconnected. For their secure embedment in the concrete the nuts **15** are preferably somewhat elongated and formed externally with circumferential ribs.

Some contractors prefer the practice of completing the roof in the first instance and thereafter mounting the ventilator. In these cases, as shown in FIGURE 5, a wooden frame W–**1** is placed upon the platform P in the position which the curb is to occupy, this frame having a vertical extent at least equal to the thickness of the roof and an extent, as to its outer faces, equal to the lineal or circuitous extent of the walls of the roof opening O. The bolts **14** and nuts **15** in connected relation are initially carried by the frame W–**1**, the bolt heads abutting the inner vertical faces of the frame and the nuts abutting the outer vertical faces. As in the practice above described the bolts hold the nuts during the pouring of the concrete which in this instance is poured to the desired depth against the outer faces of the frame W–**1**, the frame thus molding the roof opening O. When the concrete has set the bolts **14** are disconnected from the nuts **15**, leaving the nuts embedded in the concrete, and the frame is removed. The curb may now be mounted simply by inserting its part **13** into the roof opening until the flanges **11** engage the roof. The walls **3** and **4** are preformed with alining openings for the bolts **14**, the locations of the pairs of alining openings of course corresponding to the locations of the bolts as carried by the frame W–**1**. When the curb has been placed in position with its part **13** within the roof opening the bolts **14** are inserted through the openings in the walls **3** and **4** and tapped into the nuts **15**, thereby to attach the curb to the preformed roof.

It will, of course, be understood that when the concrete has set the platform P and the temporary cross pieces upon which it rests are removed with the result that the

opening defined by the sides of the curb is an open communication with the interior of the room.

The curb is advantageously reinforced at the several points of its attachment to the roof by enclosed sleeves **16** attached to the wall **4** by welding and extending across the heat insulating chamber in abutting relation to the wall **3**, the bolts **14** being inserted through the sleeves when they are tapped into the nuts **15**. It will be noted that the walls **3** and **4** are mutually braced at three points, namely at the top of the heat insulating chamber by the wall **5**, at the bottom by the wall **6** and at the intermediate points of attachment by the sleeves **16**. Thus the curb, despite the lightness of its structure, is amply secure against distortion and the impairment of its attachment to the roof by violent storms or high wind conditions.

The cant strips **10** are of concave curvature throughout their vertical extent and their upper and lower edges merge with the surfaces of the wall **4** and the roof with resultant avoidance of sharp angles. The layers of flashing follow the contour of the cant strips along lines of gentle curvature and the liability of tearing or cracking is thereby eliminated. The outer wall **4** has an upper portion **17** which is inclined inwardly at a slight degree of angularity and which carries the flange **5** that provides the top wall of the insulating chamber. The outer layers of flashing are laid against the wall **4**, including its upper portion **17**, and the upper terminal portions of the flashing layers are laid upon the flange **5**. The portion **17** forms a re-entrant angle of slight degree with the adjoining vertical portion of the wall **4**. The parts of the flashing which extend along the wall portion **17** form a similar angle with the adjoining vertically extending parts of the flashing and hence may be secured upon the wall portion **17** without any liability of tearing or cracking. The flashing is secured to the curb by a frame **18** which is of angled section corresponding to the angularity of the wall parts **17** and the flanges **5**. The frame **18** includes horizontal legs **19** and downwardly extending legs **20**, the leg **19** clamping the terminal portions of the outer flashing layers upon the flange **5** and the leg **20** clamping the outer flashing layers upon the upper inclined portion **17** of the wall **4**. When the ventilator is mounted upon the curb its base rests upon the legs **19**, the weight of the ventilator serving to hold the frame in the position in which it secures the flashing. The upper portion S–1 of the skirt S preferably has an inclination conformable to that of the frame legs **20** against which it rests, the legs **20** cooperating with the skirt portion S–1 to center the ventilator when it is lowered into position in the curb. The wall **3** extends upward beyond the flange **9** by means of which it is connected to the wall **4**, its upwardly extending portion **21** being inclined inwardly at a suitable angle and serving for the attachment of the curb to the base of the ventilator as by nut and bolt fastenings **22**.

For the assembly of the curb at its point of use corner clips **23** and **24** of angle iron cross section are employed, the clips **23** being arranged along the internal corners and connected to the walls **3** by screws **25** and the clips **24** being arranged along the external corners and connected to the walls **4** by screws **26**. The clips **23** extend from points at or near the lower edges of the wall **3** to points at or near the elevation of the flange **5** and the clips **24** extend from the lower edges of the cant strips **10** to points near the lower edges of the frame legs **20**. As above pointed out the four sides of the curb are conveniently and economically shipped knocked-down and the completion of the assembly of the curb at its point of use may be rapidly and economically effected by means of the clips **23** and **24**.

I claim:

1. A structural curb shaped as a rectangular frame for the support of apparatus over an opening in a roof composed of concrete and comprising a shell as a self-contained unit which provides a heat insulating chamber with its sides each composed of inner and outer spaced vertical walls and top and bottom walls extending between and connected to the vertical walls, a downwardly flared cant strip carried wholly by the outer wall, a horizontal supporting flange extending inward from the cant strip to the outer wall, the flange being connected to the cant strip and the outer wall and being located above the lower edge of the outer wall by a distance equal to the thickness of the roof whereby the insulating chamber has a part which extends above the flange and the roof and a part which extends below the flange and through the opening in the roof in adjoining relation to the walls of the opening, detachable connections between the roof and the part of the heat insulating chamber within the roof opening, the connections consisting of nuts located externally of the outer walls for embedment in the concrete roof as poured and bolts extending through the insulating chamber and tapped into the nuts, the heads of the bolts adjoining the inner vertical walls.

2. A structural curb as set forth in claim 1 wherein reinforcing sleeves are mounted within the heat insulating chamber and surround the bolts, the ends of the sleeves abutting the vertical walls.

3. A structural curb as set forth in claim 1 wherein each outer vertical wall carries the top and bottom walls in inwardly extending relation and with the top and bottom walls forms an originally separate unit for connection by means of its top and bottom walls to the companion inner wall.

4. A structural curb as set forth in claim 3 wherein sleeves are mounted within the heat insulating chamber and surround the bolts, the sleeves being attached by welding to the outer vertical walls.

5. A structural curb as set forth in claim 1 wherein each outer vertical wall carries the top and bottom walls in inwardly extending relation and with the top and bottom walls forms a unit for connection by means of the top and bottom walls to the companion inner vertical wall, each inner vertical wall has an upwardly directed channel along its lower edge, each bottom wall has a downwardly extending terminal flange which fits in the channel of the companion inner wall, each inner wall has a part which is extended upwardly beyond the outer wall, and each outer wall has an upwardly extending flange which adjoins and is connected to the upwardly extending part of the inner wall.

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