

June 19, 1962

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INSIDE BOLTED SHIELDED ENCLOSURE

3,040,118

Filed March 25, 1960

4 Sheets-Sheet 1

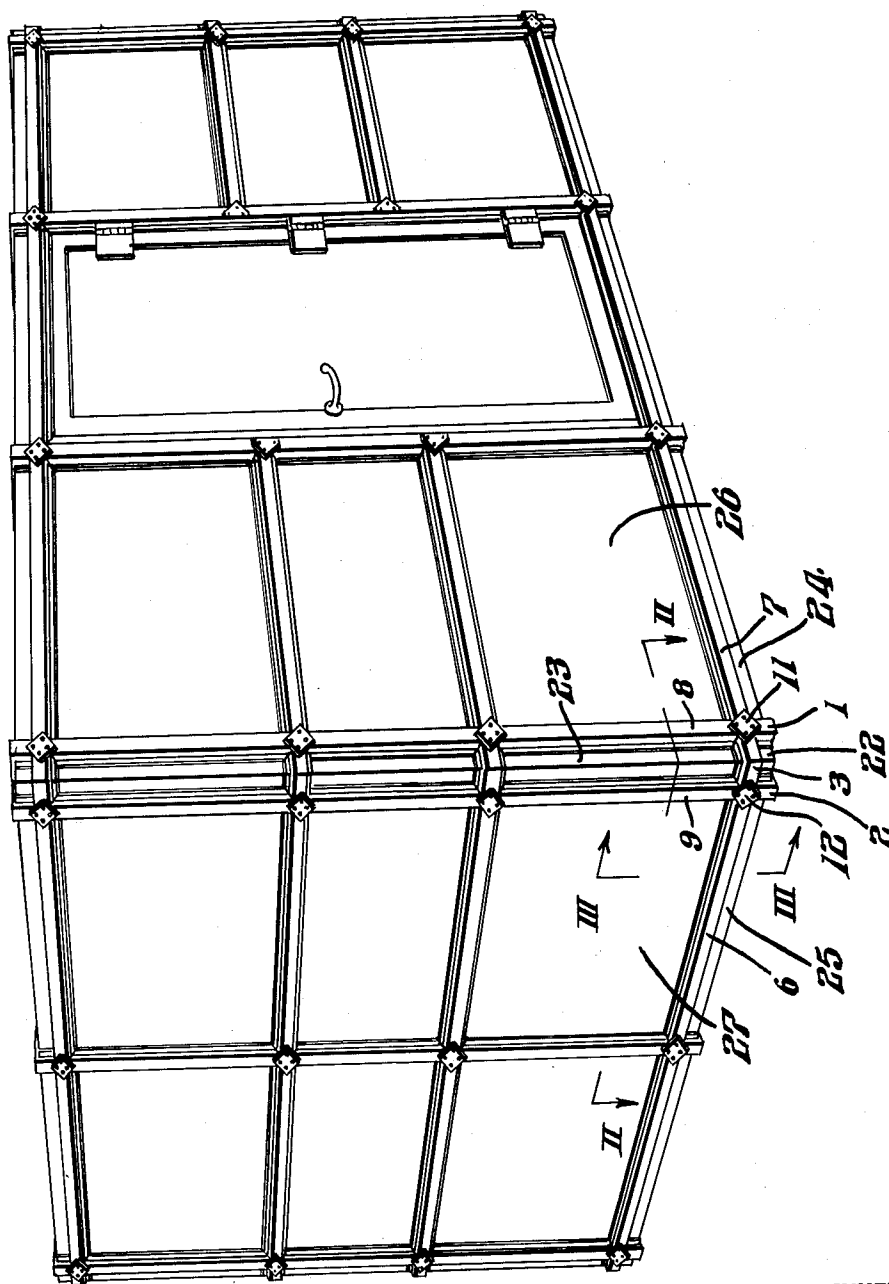


FIG. 1 -

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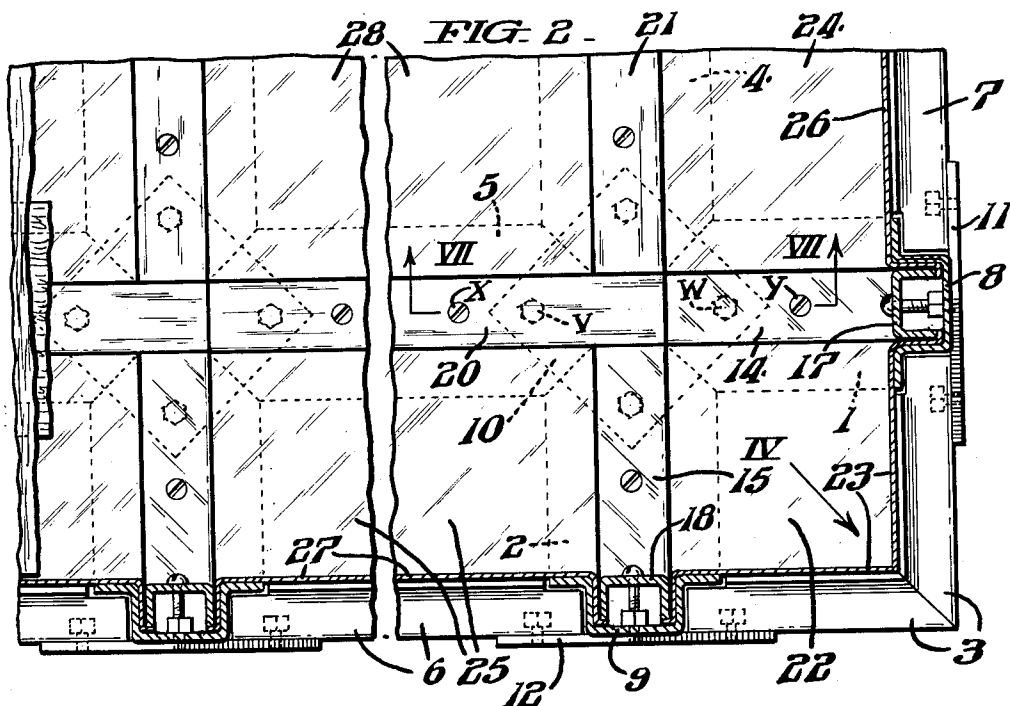
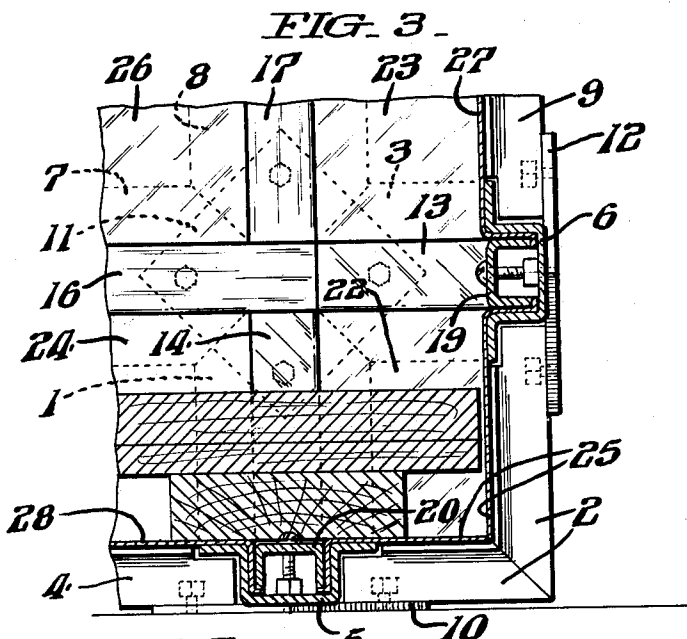
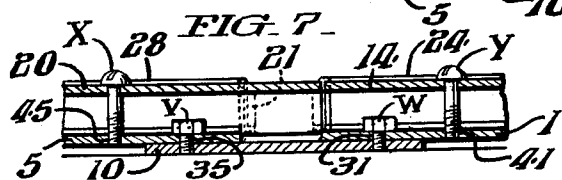
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4 Sheets-Sheet 2



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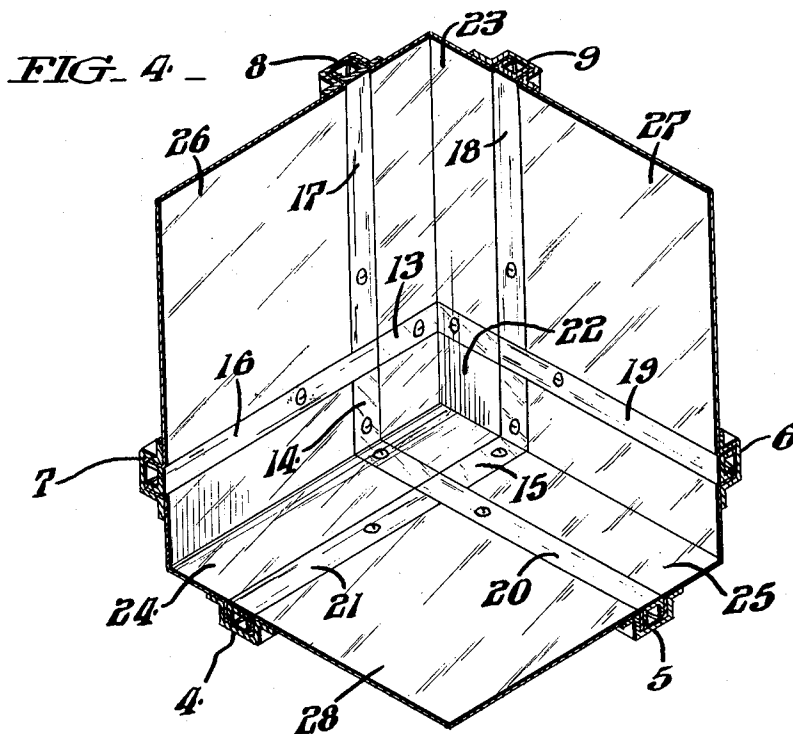
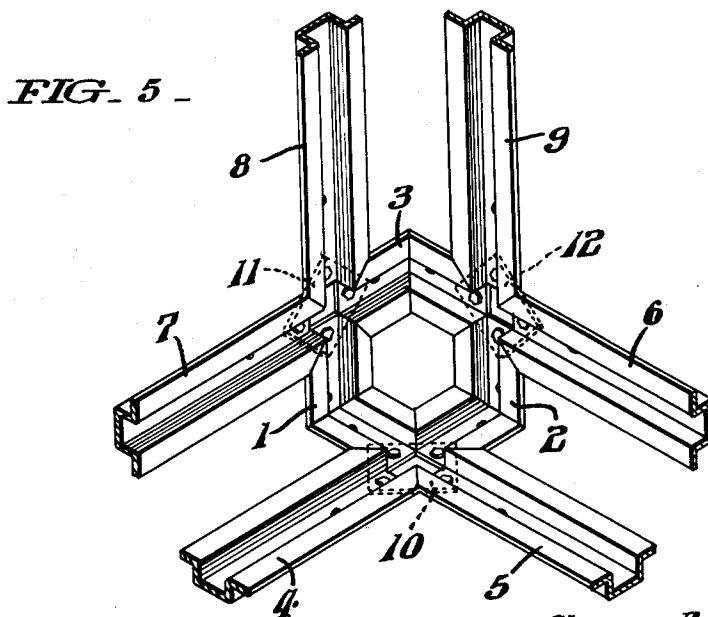
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INSIDE BOLTED SHIELDED ENCLOSURE

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4 Sheets-Sheet 3



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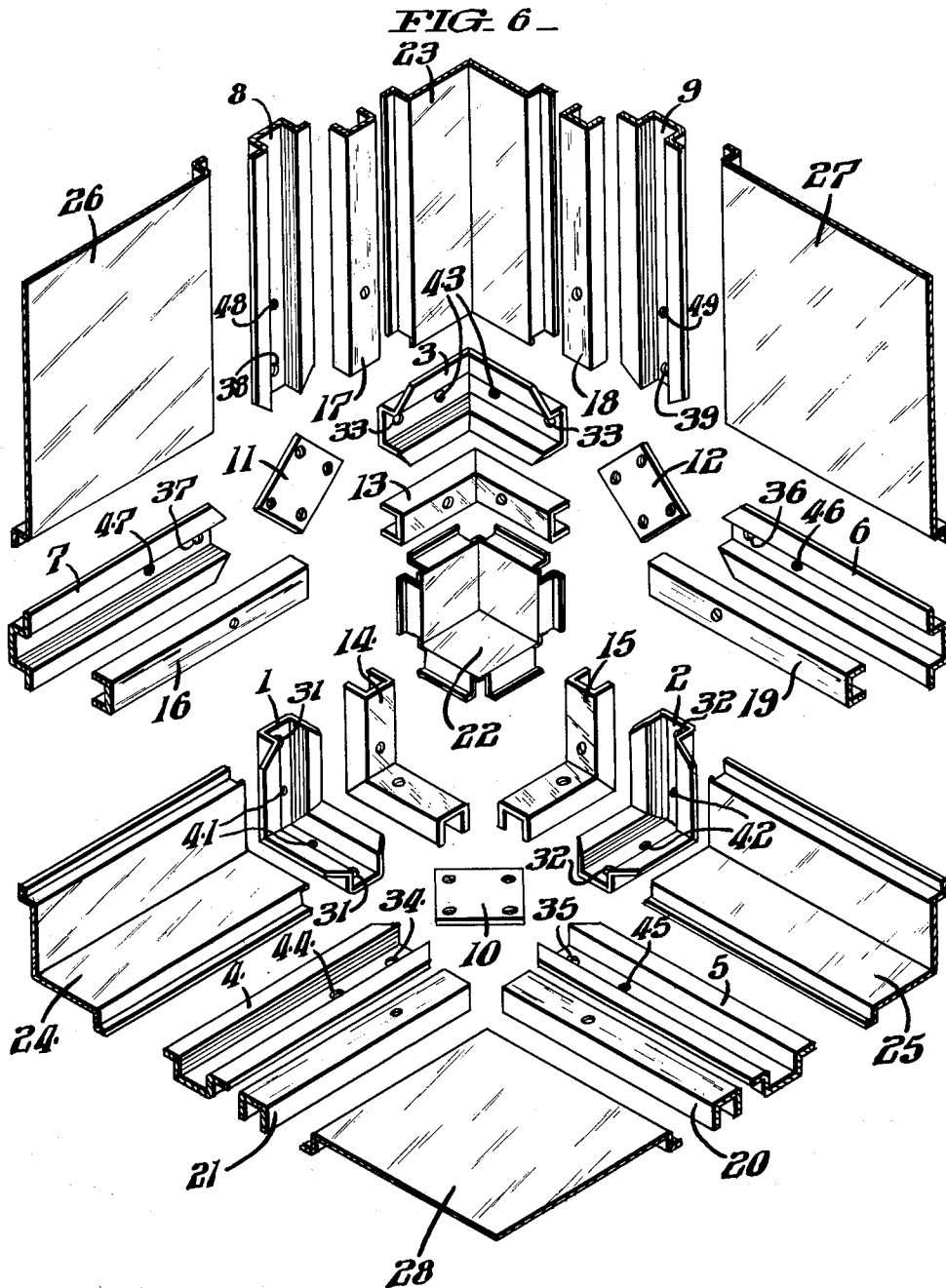
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INSIDE BOLTED SHIELDED ENCLOSURE

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4 Sheets-Sheet 4



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3,040,118

INSIDE BOLTED SHIELDED ENCLOSURE

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7 Claims. (Cl. 174—35)

This invention relates to a shielded enclosure for providing and maintaining optimum shielding to radio frequency (R.F.) energy throughout the radio frequency spectrum.

While the shielded enclosure of my present invention may also be used for outside installation, it is particularly adapted for inside use. The fact that the enclosure is bolted together from the inside makes it especially suited for inside installation, as for example, in a finished room whose dimensions are but little larger than those of the shielded enclosure itself.

The shielded enclosure is made of material having good electrical conducting properties, such as steel, or a non-ferrous material, such as aluminum or copper, and is constructed in such manner that all joints are of low resistance, thus tending to keep inside the enclosure all R.F. energy whose source is inside the enclosure and to keep out of the enclosure all R.F. energy whose source is outside the enclosure.

The shielded enclosure of the present invention represents an improvement over prior art shielded enclosures in that it incorporates an improved corner structure which eliminates the tendency of the prior art structures to lose tension at the corners, thus resulting in points of reduced contact and increased electrical resistance. The improved corner structure of my present invention is stronger mechanically and by maintaining good contacts throughout the life of the enclosure, provides optimum radio frequency shielding.

The present invention will be best understood from a consideration of the following detailed description of a preferred embodiment illustrated in the drawing in which:

FIG. 1 is a perspective illustration of an inside-bolted shielded enclosure using the improved corner structure of the present invention;

FIG. 2 is a top view along the line II—II of FIG. 1 showing a greatly enlarged cross section of the corner structure;

FIG. 3 is a side view along the line III—III of FIG. 1 showing an enlarged cross section of the corner structure;

FIG. 4 is a view looking into the corner structure in the direction indicated by the arrow IV in FIG. 2;

FIG. 5 shows the structural details of the corner structure with the corner panels and panel sheets omitted;

FIG. 6 is an exploded view showing all of the pieces used in the corner structure of FIG. 4; and

FIG. 7 is a view, in section, along the line VII—VII of FIG. 2.

In describing the preferred embodiment of my invention illustrated in the drawing, specific terminology has been resorted to for the sake of clarity. However, it is not my intention to be limited to the specific terms so selected, and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

Referring first to FIG. 6, the corner structure of the present invention as shown in FIGS. 4 and 5, is seen to comprise the following pieces; the U-type channel members 4, 5, 6, 7, 8 and 9; the U-type tensioner members 16, 17, 18, 19, 20 and 21; the L-shaped corner framing members 1, 2 and 3; the L-shaped corner tensioner members 13, 14 and 15; the corner cap 22; the corner panels 23, 24, and 25; the panel sheets 26, 27 and 28; and the diamond shaped plates 10, 11 and 12.

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The corner framing members 1, 2 and 3 and the U-type channel members 4, 5, 6, 7, 8 and 9, which have mitered ends, are assembled and then bolted together in the manner clearly shown in FIG. 5. The diamond shaped plates 10, 11 and 12 are each provided with four tapped holes into which threaded bolts are screwed which are inserted from the inside through holes 34, 35, 36, 37, 38 and 39 in U-channels 4, 5, 6, 7, 8 and 9, respectively, and through holes 31, 32, and 33 in corner framing members 1, 2 and 3, respectively, as clearly shown in FIG. 5.

After the corner frame work has been put together in the manner shown in FIG. 5, the corner cap 22 is inserted, after which the corner panel pieces 23, 24, and 25 are put into position (see FIG. 4). The corner tensioners 13, 14 and 15 are then placed into position and screws are inserted from the inside through the holes in the corner tensioners and into the tapped holes 41, 42, 43 provided in the corner framing members 1, 2 and 3, respectively, for receiving such screws.

The panel sheet pieces 26, 27 and 28 are next placed in position, after which the U-type tensioners 16, 17, 18, 19, 20 and 21 are placed in position and then bolted by placing screws from the inside through the holes provided in the tensioners and into the tapped holes 44, 45, 46, 47, 48 and 49 provided in the U-type channel members 4, 5, 6, 7, 8 and 9, respectively, for receiving such screws. The corner structure is now a completely bolted assembly as seen in FIG. 4 of the drawing, and as shown in cross section in FIGS. 2 and 3.

An examination of the cross-sectional view given in FIG. 2, which looks down on the corner structure, will reveal the close contacts and the resulting continuity of good conductive surface which extends from panel sheet 26 to corner panel 23 by way of U-channel 8, tensioner 17 and diamond shaped plate 11, and which also extends from corner panel 23 to panel sheet 27 by way of U-channel 9, tensioner 18, and diamond shaped plate 12.

Similarly, an examination of the cross-sectional view given in FIG. 3, which is an elevational view looking into the corner structure, will reveal the close contacts and the resulting continuity of good conducting surface which extends from panel sheet 27 to corner panel 25 by way of U-channel 6, tensioner 19 and diamond shaped plate 12, and which also extends from corner panel 25 to panel sheet 28 by way of U-channel 5, tensioner 20 and diamond shaped plate 10.

FIG. 7 is a detailed cross-sectional view along the line VII—VII of FIG. 2 showing the mitered intersection bolted together by diamond shaped plate 10. The hex-headed cap screws V and W secure the U-channel 5 and the corner framing member 1, respectively to the diamond shaped plate 10, while the slotted screws X and Y secure the panel sheet 28 and tensioner 20, and the corner panel 24 and corner tensioner 14 to the U-channel 5 and corner framing member 1, respectively.

Without intending to be limited to the size of the material used, and merely for purposes of illustration, it may be said that the panel sheets may be 24 gauge steel or .030" aluminum, or .022" copper or brass; the U-type channels and U-type tensioners may be .125" steel or .125" extruded aluminum; and the diamond shaped plates may be .125" steel or .125" aluminum.

While the preferred embodiment of my invention has been described in some detail, it will be obvious to one skilled in the art that various modifications may be made without departing from the invention as hereinafter claimed.

Having thus described my invention, I claim:

1. An inside bolted metal shielded enclosure adapted to prevent passage of radio frequency energy there-through, said enclosure comprising six side structures and eight corner structures adapted to be bolted together

from the inside of the enclosure, each side structure having a plurality of rigidly connected U-channel members forming an external framework and rigidly supporting a plurality of flat panel sheets to form a single side of the enclosure; said corner structure comprising: three corner framing members positioned to define a three-faced corner area; a three-faced corner cap fitted into said corner area; six U-channel members fitted against the ends of said three corner framing members; three corner panels positioned between, and each having flanges entering into, the U-channel members which extend in parallel directions and occupy planes perpendicular to each other; and three corner tensioners fitted into and secured to said three corner framing members for securing said three corner panels and said corner cap.

2. An inside bolted metal shielded enclosure adapted to prevent passage of radio frequency energy there-through, said enclosure comprising six side structures and eight corner structures adapted to be bolted together from the inside of the enclosure, each side structure having a plurality of rigidly connected U-channel members forming an external framework and rigidly supporting a plurality of flat panel sheets to form a single side of the enclosure; said corner structure comprising: three L-shaped U-channel corner framing members positioned to define a three-faced corner area; a three-faced corner cap fitted into said corner area, each of the three faces of said cap being located in a plane perpendicular to the planes occupied by the other two faces; six U-channel members fitted against the ends of said three corner framing members; three L-shaped corner panels positioned between, and each having flanges fitted into, the U-channel members which extend in substantially parallel directions and occupy planes substantially perpendicular to each other; three L-shaped corner tensioners fitted into and secured to said three corner framing members for securing said three L-shaped corner panels and said corner cap; three panel sheets each having flanges fitted into the two of said six U-channel members which occupy the same plane; and six U-channel tensioner members fitted into and secured to said six U-channel members for securing the three L-shaped corner panels and the three panel sheets.

3. An inside bolted metal shielded enclosure adapted to prevent passage of radio frequency energy there-through, said enclosure comprising six side structures and eight corner structures adapted to be bolted together from the inside of the enclosure, each side structure having a plurality of rigidly connected U-channel members forming an external framework and rigidly supporting a plurality of flat panel sheets to form a single side of the enclosure; said corner structure comprising: three L-shaped U-channel corner framing members having both ends mitered and positioned to define a three-faced corner area for receiving a three-faced corner cap; a three-faced corner cap fitted into said corner area, each of the three faces of said cap being located in a plane perpendicular to the planes occupied by the other two faces; six U-channel members having mitered ends fitted against the mitered ends of said three corner framing members; three L-shaped corner panels positioned between, and each having flanges fitted into, the U-channel

members which extend in parallel directions and occupy planes perpendicular to each other; three L-shaped corner tensioners fitted into and secured to said three corner framing members for securing said three L-shaped corner panels and said corner cap; three panel sheets each having flanges fitted into the two of said six U-channel members which occupy the same plane; and six U-channel tensioner members fitted into and secured to said six U-channel members for securing the three L-shaped corner panels and the three panel sheets.

4. An inside-bolted metal shielded enclosure adapted to prevent passage of radio frequency energy there-through, said enclosure comprising six side structures and eight corner structures adapted to be bolted together from the inside of the enclosure, each side structure having a plurality of rigidly connected U-channel members forming an external framework and rigidly supporting a plurality of flat panel sheets to form a single side of the enclosure; said corner structure comprising: three L-shaped U-channel corner framing members having both ends mitered and positioned to define a three-faced corner area for receiving a three-faced corner cap; a three-faced corner cap fitted into said corner area, each of the three faces of said cap being located in a plane perpendicular to the planes occupied by the other two faces; six U-channel members having mitered ends fitted against the mitered ends of said three corner framing members; three L-shaped corner panels positioned between, and each having flanges fitted into, the U-channel members which extend in parallel directions and occupy different planes perpendicular to each other; three diamond shaped plates bolted from the inside, each plate securing together the four mitered ends of two corner framing members and two U-channel members; three L-shaped corner tensioners fitted into and bolted from the inside to said three corner framing members for securing said three L-shaped corner panels and said corner cap; three panel sheets each having flanges fitted into the two of said six U-channel members which occupy the same plane; and six U-channel tensioner members fitted into and bolted from the inside to said six U-channel members for securing the three L-shaped corner panels and the three panel sheets.

5. An inside-bolted metal shielded enclosure as claimed in claim 4 further characterized in that said metal is galvanized steel.

6. An inside-bolted metal shielded enclosure as claimed in claim 4 further characterized in that said metal is aluminum.

7. An inside-bolted metal shielded enclosure as claimed in claim 4 further characterized in that said metal is copper.

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