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 [73] Assignee **United States Steel Corporation**

1,961,221 6/1934 Hunter et al. 263/49
 FOREIGN PATENTS
 469,229 11/1950 Canada 263/47
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[54] **INNER COVER AND METHOD OF MAKING THE SAME**
8 Claims, 8 Drawing Figs.

[52] U.S. Cl. **263/49 R**
 [51] Int. Cl. **F27d 5/00**
 [50] Field of Search **263/47 R, 49 R**

[56] **References Cited**
UNITED STATES PATENTS
 3,097,837 7/1963 Jacob 263/49

ABSTRACT: An annealing inner cover is formed of a plurality of arcuate plates having outwardly flared flanges along their vertical edges. The plates are connected by welds along adjacent vertical edges to form a circular shell having a plurality of spaced triangular projections formed by the flanges. A plurality of steel bands encircle the shell at several locations and bear against the apices of the projections. The bands are held in place by U-shaped clips having the ends of their legs welded to the shell. A dome or roof is welded to the top of the shell. All welds are gastight.

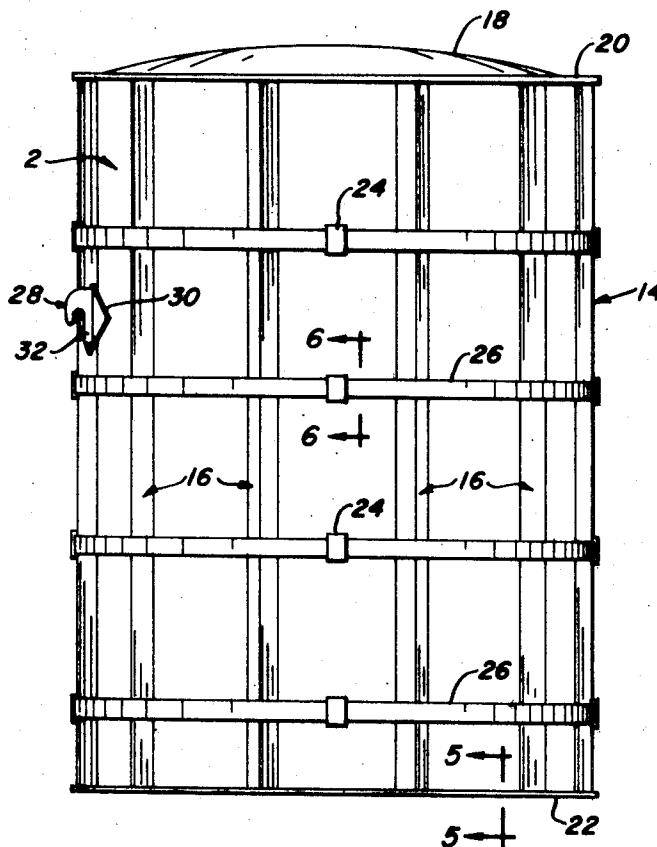


FIG. 3

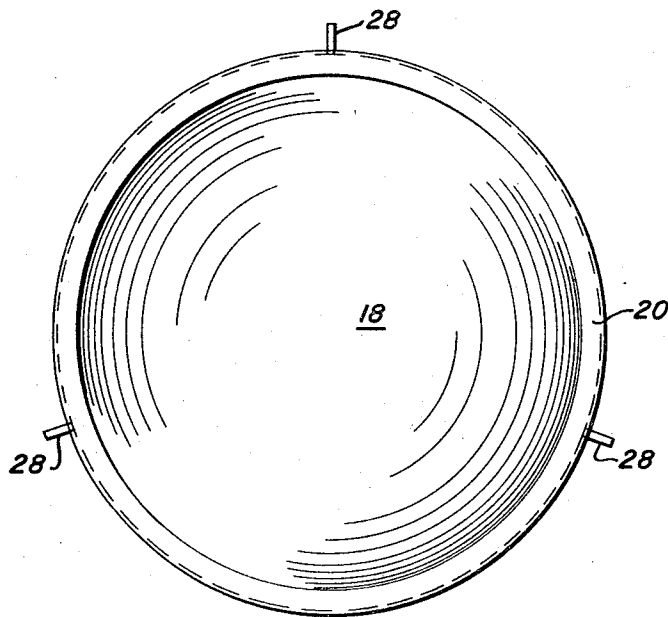


FIG. 5

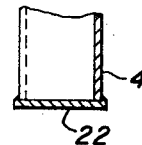


FIG. 1

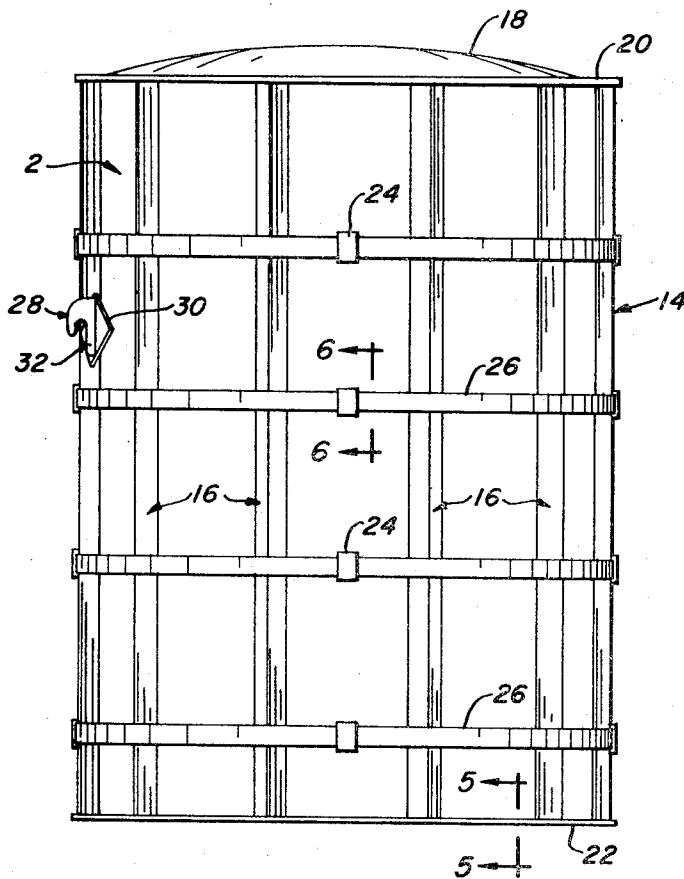
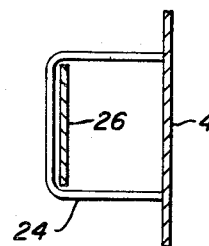


FIG. 6



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FIG. 2

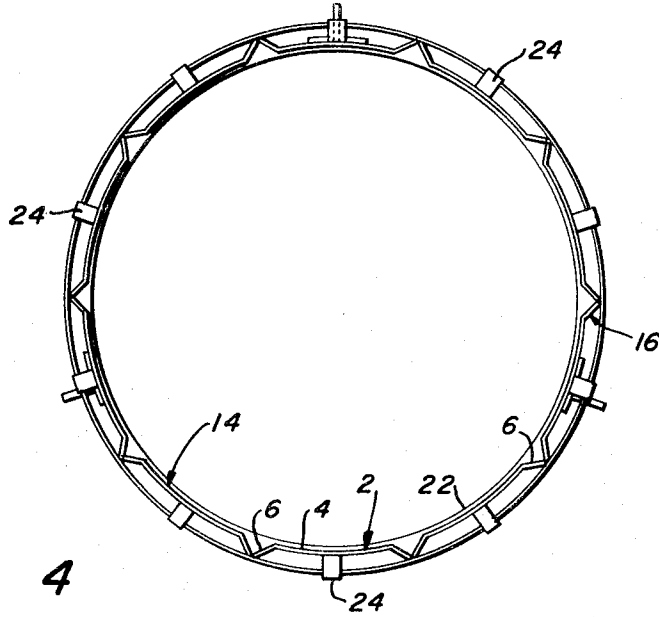


FIG. 4

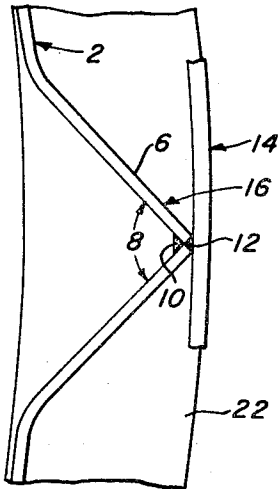


FIG. 8

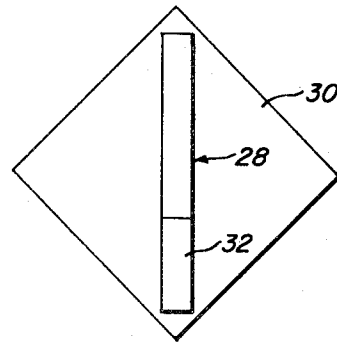
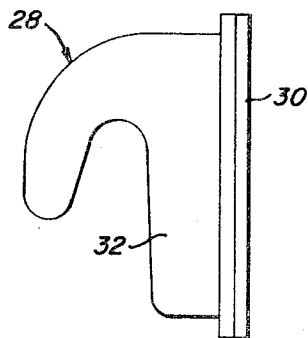


FIG. 7



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INNER COVER AND METHOD OF MAKING THE SAME

This invention relates to an inner cover and to a method of making the same and more particularly to an inner cover for use in annealing coils of strip. The inner covers of which I have knowledge are made of steel plates and are either plain cylindrical, or corrugated with the corrugations running vertically as in Jacob U.S. Pat. No. 2,529,609 dated Nov. 14, 1950. The straight sided, while cheaper to make than the corrugated covers, are not as strong as the corrugated covers. Also, if made of too heavy plates, they will buckle. The corrugated covers require a costly continuous corrugating sequence involving multiple handling of the steel plates or sheets. Also because of the difficulty in corrugating the thickness of the plates is limited.

It is therefore an object of my invention to provide an inner cover which has a maximum strength for the weight of the material used.

Another object is to provide such a cover which has a relatively low cost and can be used at elevated temperatures such as in annealing silicon strip.

Still another object is to provide a simple method of making an inner cover.

These and other objects will be more apparent after referring to the following specification and attached drawings, in which:

FIG. 1 is an elevation of the inner cover of my invention;

FIG. 2 is a plan view of the inner cover of FIG. 1 with the roof removed;

FIG. 3 is a top plane view with the roof in place;

FIG. 4 is an enlarged fragmentary view showing the connection between plates making up the inner cover and their connection to the bottom ring;

FIG. 5 is a view taken on the line V—V of FIG. 1;

FIG. 6 is a view taken on the line VI—VI of FIG. 1;

FIG. 7 is an enlarged view of a lifting lug; and

FIG. 8 is a view looking toward the left side of FIG. 7.

Referring more particularly to the drawings, reference numeral 2 indicates the metal plates forming the sides of the inner cover. Depending upon the service to which the inner cover is to be subjected the plates may be made of stainless steel, plain carbon steel, or other types of steel. As best shown in FIG. 2 the plates 2 have a main arcuate portion 4 and a flange 6 along each vertical edge for the full length thereof. Flanges 6 are preferably straight and preferably flare outwardly at an angle of 135° so that angle 8 formed by the connection of flanges of adjacent sections is 90°. As best shown in FIG. 4 the ends of the flanges of adjacent plate sections 2 are positioned in substantial abutting arrangement and are connected by means of inner and outer welds 10 and 12 which are continuous so as to form a gastight joint. When all the plate sections are joined together they form a substantially cylindrical shell 14 reinforced by triangular projections 16 formed by the flanges 6.

A dome 18 has a circumferential flat section 20 of such width as to extend from the inner diameter of the shell to a slight distance beyond the apices of the projections 16. The dome 18 is welded to the shell 14 to provide a gastight connection. As best shown in FIGS. 4 and 5 a flat bottom ring 22 is welded to the bottom of the shell 14 and extends from the inner periphery of the plates to the apices of projections 16. U-shaped clips 24 are welded to the outside of shell 14 at various elevations around the periphery thereof. As shown the clips are welded at each arcuate portion 4 at four elevations. The legs of the clips are of such length that, when the ends of their legs are welded to portion 4 of the plates 2, the base thereof will extend beyond the diameter formed by the apices of the projections 16. At each elevation a metal band 26 surrounds the periphery of the shell 14 with its inner surface bearing against the apices of projections 16 and its outer sur-

face bearing against the inner side of the base of clips 24. Three lifting lugs 28 are attached at shell 14 above the middle thereof. As best shown in FIGS. 7 and 8 each lifting lug 28 consists of a baseplate 30 welded to one of the plates 2 and a hook plate 32 welded to the plate 30 normal thereto.

It will be seen that the plates 2 are easily mated together in such a manner that the joint is readily accessible for welding. Also because the plates 2 only require cylindrical forming of the main portion and bending outwardly therefrom of the flanges 6 the thickness of the plates may be made greater than when using corrugated sheets. The projections 16 add considerable structural strength to the inner cover and in addition provides additional heat transfer area. The bands 26 through the clips 24 prevent the convex surfaces 4 from sagging inwardly and also perform the usual function of bands which is to resist outward buckling.

While one embodiment of my invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. A metal inner cover comprising a plurality of vertically extending arcuate plates having outwardly flared flanges along each vertical edge, gastight welds connecting the ends of the flanges of adjacent plates to form a generally circular shell having a plurality of projections formed by said flanges, a plurality of vertically spaced apart bands surrounding said shell in contact with the apices of said projections and in spaced relationship with the remainder of the shell, said bands being free to move with respect to said apices, and a roof dome attached to the top of said plates.

2. A metal inner cover according to claim 1 including a plurality of spaced-apart U-shaped clips having the end of their legs welded to the arcuate portion of said plates between said apices with the inner side of their bases spaced from the plates a distance slightly greater than the height of said projections, said bands being received in said U-shaped clips.

3. A metal inner cover according to claim 1 including a flat bottom ring welded to the bottom of said plates and extending from the inner periphery of said plates to the apices of said projections.

4. A metal inner cover according to claim 3 including a plurality of spaced-apart U-shaped clips having the ends of their legs welded to the arcuate portion of said plates between said apices with the inner side of their bases spaced from the plates a distance slightly greater than the height of said projections, said bands being received in said U-shaped clips.

5. The method of making a metal inner cover having spaced-apart projections which comprises providing a sufficient number of arcuate plates to form a cylinder, each having a flange at each end flaring outwardly along each longitudinal edge, arranging said arcuate plates side by side with the longitudinal edges of adjacent plates in substantial abutment, welding the longitudinal edges of adjacent plates together in gastight relationship, welding a roof dome to the top of said plates, and placing a plurality of bands around said welded together plates in spaced-apart relationship in contact with the apices of said projections and in spaced relationship with the remainder of the plates.

6. The method of claim 1 which includes welding a plurality of spaced-apart U-shaped clips to the arcuate portion of said plates between said apices for supporting said bands.

7. A metal inner cover according to claim 1 in which said arcuate plates are free of internal connections at the base of said projections.

8. A metal inner cover according to claim 2 in which said arcuate plates are free of internal connections at the base of said projections.

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