

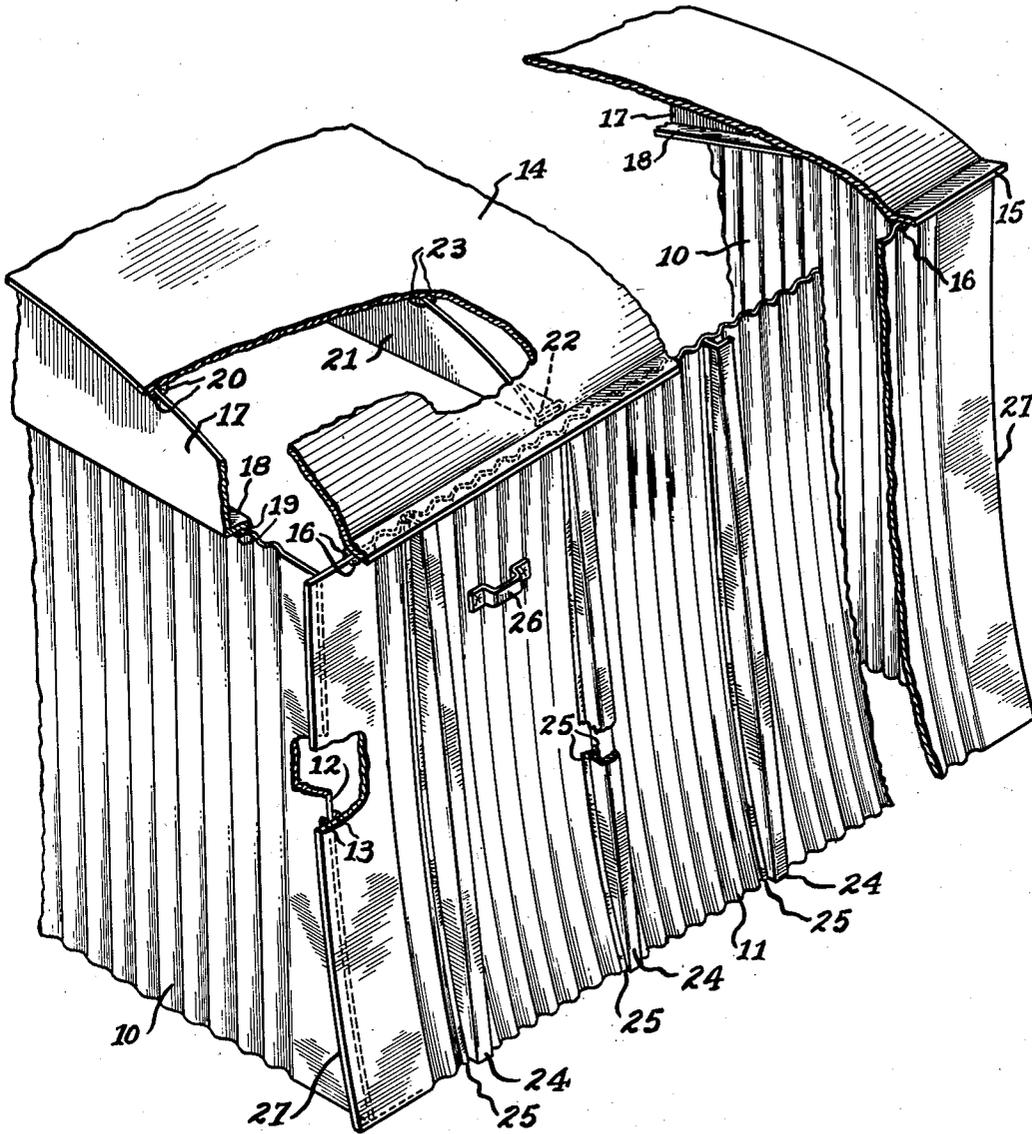
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2,183,785

ANNEALING COVER

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# UNITED STATES PATENT OFFICE

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## ANNEALING COVER

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This invention relates to annealing covers such as are used for protecting metal objects, for instance stacks of sheets or coils, while they are being heat treated. More particularly this invention relates to the contour of the side or end members, and has for its principal object the provision of a rigid light weight cover which will not lose its shape in continued heating and cooling.

Those skilled in the art will be familiar with the phenomenon encountered in connection with annealing covers in which the side walls and end walls bulge outwardly from the center or away from the stack of sheets. This may be explained by the fact that the bulge takes place in the direction of the hotter heating medium which is outside the cover. Furthermore the pressure within the cover is greater than outside and this also contributes toward the outward bulging. The reason for higher pressure within the annealing cover in the case where gases are introduced for the purpose of controlling the atmosphere therein is readily understandable. When no gas pressure is introduced, the stack of sheets or coils being heated gives off a considerable quantity of hydrogen and carbon monoxide. It will be understood, of course, that the bulging of the sides and ends of the annealing cover in a relatively short period of time renders the annealing cover useless.

Heretofore, it has been the practice to secure sufficient strength at elevated temperatures by casting the annealing cover and using sufficiently large side wall sections. With the advent of new methods of steel manufacture carrying with them lower prices and the need for greater speed, new types of furnaces have been built. Since an annealing furnace is no better than the annealing cover which protects the metal from the action of the flames or from combustion products, the construction of the covers has taken on an added importance.

In building an annealing cover, therefore, lightness is of great importance and the question of rigidity must be satisfactorily handled on account of the rough usage to which such covers are subjected in crane handling and the like. Lightness is also important from the point of view of high heat transfer efficiency.

Early attempts to construct a light gauge box cover have not been wholly successful because of the deformation of the box, as outlined above. Later attempts to guard against the aforementioned defect included an inclining of the side and end walls so that the annealing cover would have the shape of a frustrum of a pyramid, as

disclosed, for example, in a patent to E. N. Millan, 2,074,093. This practice has been successful in small boxes and at medium temperatures; but in large boxes the inclination of the side is limited on account of the loss in width at the top of the cover.

According to my invention I prefer to take advantage of the known superiority of rolled sections over cast sections, and I overcome the aforementioned defects by preshaping the side and/or end walls in manufacture, so that any tendency of the walls to bulge will have the effect of straightening out the sides. The curvature of the walls will vary somewhat in boxes of different sizes and different shapes and will depend upon the material used in their construction. Generally speaking, I have found that a curvature approximating a circle of large diameter is sufficient. Preferably the annealing cover will be made of high heat resisting alloys in cases where temperature requirements necessitate such usage.

Other objects of my invention therefore include the provision of a relatively light weight yet rigid annealing cover which will be inexpensive to manufacture and which will be so constructed that the curved side and/or end walls will be braced, and whereby the maximum bracing effect will be provided in the region of the greatest stress.

These and other objects of my invention which will be set forth hereinafter, or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts of which I shall describe certain exemplary embodiments.

Reference is now made to the drawing forming part hereof in which I have shown a fragmentary perspective view of an annealing cover according to my invention.

In the figure I have shown the end walls as being straight and the side walls curved, but it is to be understood that while this construction may be practicable with a long, narrow cover in cases where the cover is more nearly square it may be desirable to curve the end walls also.

Generally speaking, the construction of the annealing cover is quite similar to that disclosed in the Millan patent above mentioned, and reference may also be made to Millan patents Nos. 2,069,768 and 2,078,718.

Briefly, in the practice of my invention, I provide a cover comprising four walls, the end walls being indicated at 10 and the side walls (only one of which appears in the drawing) at 11. The lateral edges of the end walls will be curved as

indicated at 12, and will be welded as indicated at 13, to the inner faces of the side walls adjacent the ends. A roof arch indicated generally at 14 has horizontally disposed lips 15 which are welded as indicated at 16, to the tops of the side walls 11. End pieces 17 formed to correspond to the curvature of the roof arch are provided with flanges 18 and, as shown in the figure, the flanges 18 are welded, as indicated at 19, to the tops of the end walls, and the curved portions of the members 17 are welded to the roof arch as indicated at 20. Intermediate the ends I provide one or more bracing sections indicated at 21, which may be flanged in any desired manner, as indicated at 22, and which are welded to the roof arch as shown at 23.

The curved side walls 11 are braced by means of the angle sections 24 as seen in the figure. One arm of the angle braces 24 is curved to conform to the curvature of the side walls 11 and is welded thereto as shown at 25. It will be clear that the number of members 24 will be determined by the exigencies of the use to which the particular cover is to be put. In order to facilitate crane handling, I may weld to the side walls the handle members 26, any number of which may be provided in any desired location.

It will be understood that in the event it is desired that the end walls also of the annealing cover be curved the only difference will be that the curvature at 12 will have to be altered so as to define the intersection of two curved surfaces. Furthermore, the edges 27 of the side walls 11 will have to flare outwardly at the base generally on a curvature corresponding to the curvature of the end walls 10.

It will be understood that I do not intend to limit myself to an annealing cover having only curved side walls, or an annealing cover in which all sides are curved, nor to an annealing cover made from any particular material, nor to any particular degree of curvature, except as pointed out in the claims which follow, since it will be understood that modifications may be made without departing from the spirit of my invention.

Having now fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. An annealing cover comprising vertically corrugated side walls of plate metal, and vertically corrugated end walls of plate metal, an arc shaped top of plate metal welded to said side walls and arch members welded to said end walls and to said arc shaped top to close the ends of the cover above said end walls, at least one of said walls being curved throughout its vertical extent to flare outwardly at the bottom.

2. An annealing cover comprising vertically corrugated side walls of plate metal, and vertically corrugated end walls of plate metal, an arc shaped top of plate metal welded to said side walls and arch members welded to said end walls and to said arc shaped top to close the ends of the cover above said end walls, at least one of said walls being curved throughout its vertical extent to flare outwardly at the bottom, and braced members comprising structural shapes vertically disposed and conforming to the curvature of said wall members and welded thereto.

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