March 29, 1960 G. H. JOHNSON 2,930,825

ANNEALING FURNACE

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FIG. 1.

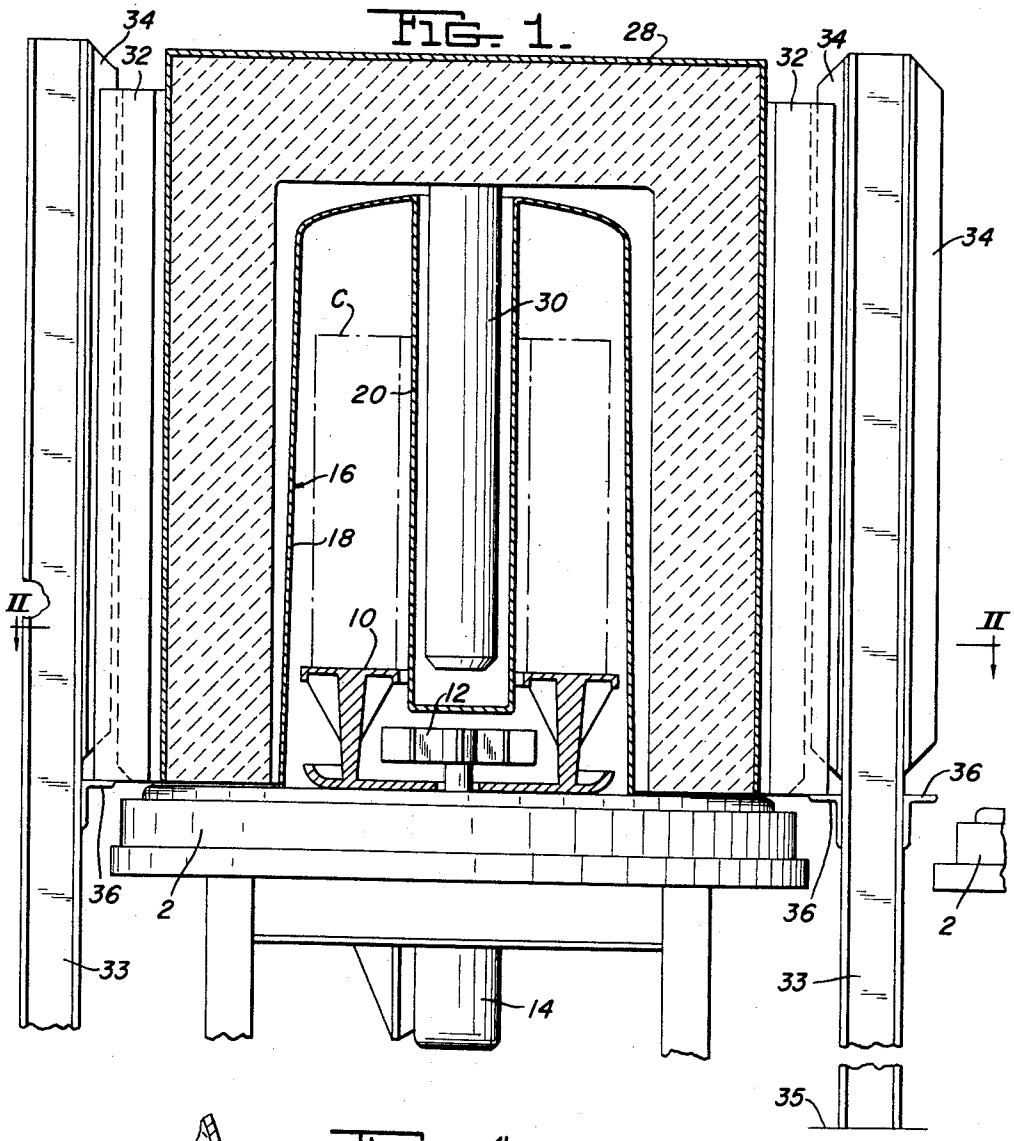
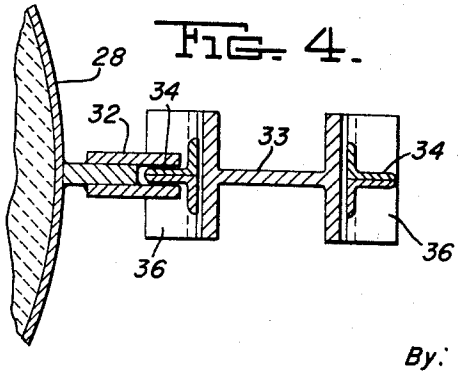


FIG. 4.



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FIG. 2.

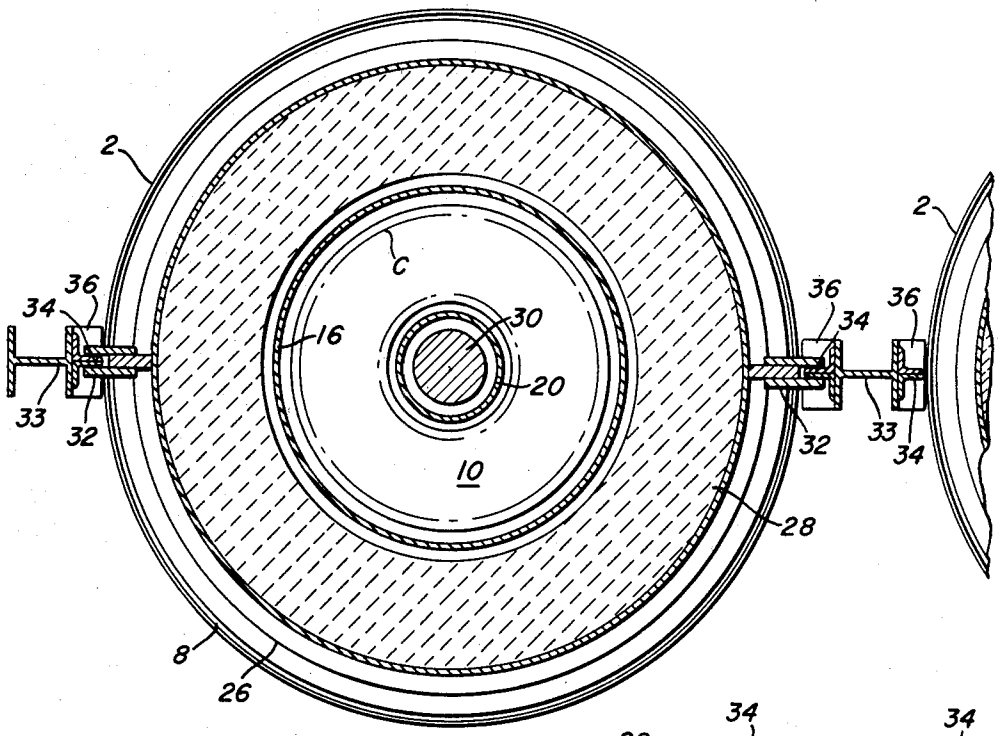
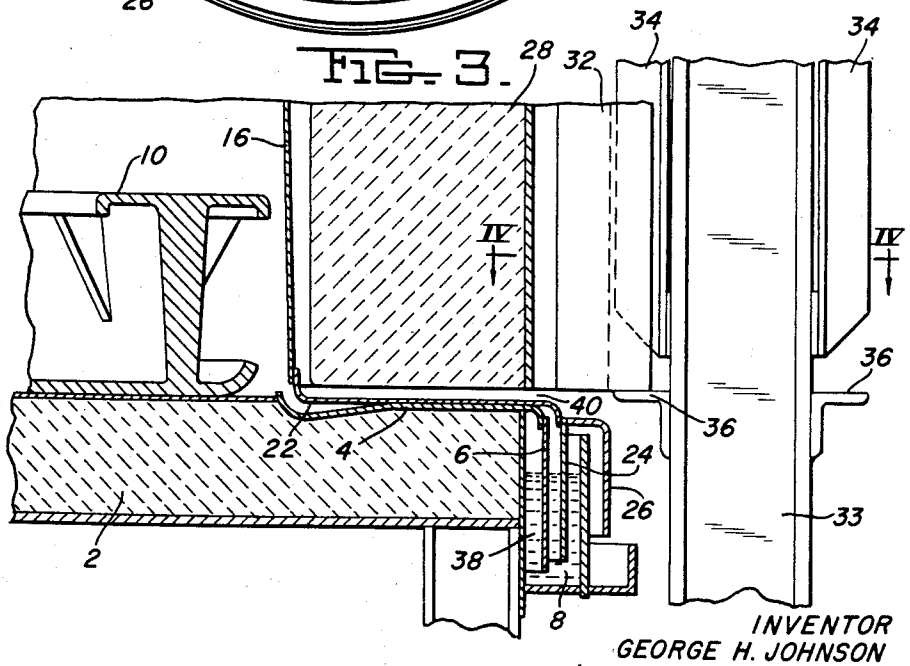


FIG. 3.



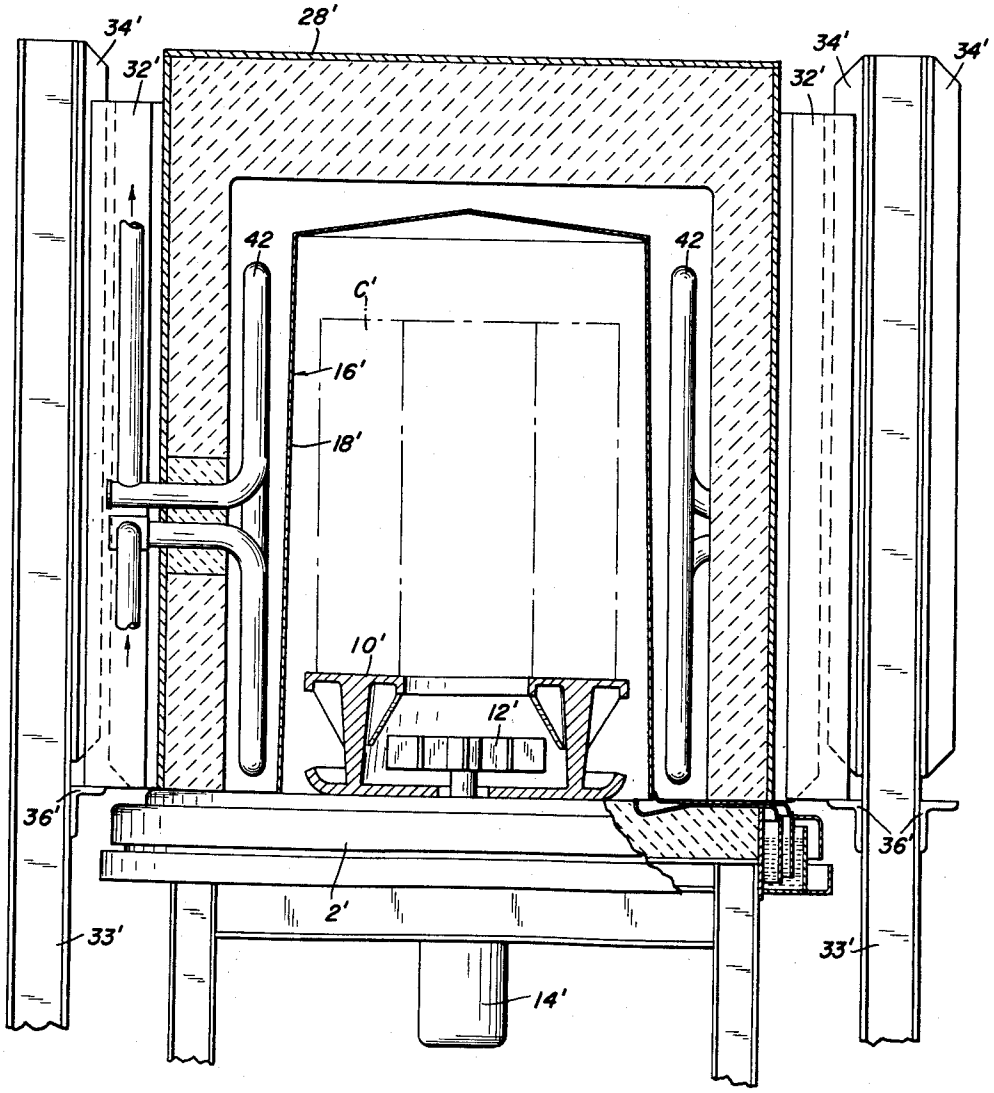
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FIG. 5



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ANNEALING FURNACE

George H. Johnson, Holden, Mass., assignor to United States Steel Corporation, a corporation of New Jersey

Application July 30, 1957, Serial No. 675,082

4 Claims. (Cl. 13—20)

This invention relates to an annealing furnace and more particularly to that type in which the material being annealed is placed within an inner cover having a horizontal section on which an outer cover rests. The outer cover carries the heat producing means which may be a central electrical heating element suspended from the top of the cover or gas tubes around the periphery of the outer cover. In the electric furnace type the inner cover is provided with a well for receiving the heating element. Prior to my invention the inner cover developed cracks around its base to such an extent that in a fair size shop it required the almost exclusive services of a welder to keep the covers in condition to be used. At times so many of the inner covers would be out of use that loss of production resulted because of the lack of inner covers. Cracks in the cover also caused loss of the required pressure of the annealing atmosphere within the inner cover, thus resulting in rejections of the material being annealed. I have found that the base on which the inner cover rests is often uneven and that the weight of the outer cover resting on the inner cover puts strain on the inner cover causing cracks in the bottom portions thereof. This uneven condition of the base also caused damage to the center heating element because the outer cover was at an angle to the vertical and when the center heating element becomes red hot it hangs vertically which causes it to contact the walls of the well in the inner cover with resultant damage. Thereafter when used on other bases the condition was aggravated. This resulted in frequent repair of the outer covers so that there was loss of production.

It is therefore an object of my invention to provide an annealing furnace in which the outer cover does not rest on the base nor on the inner cover.

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

Figure 1 is a vertical sectional view showing the inner and outer covers in place on a base;

Figure 2 is a view taken on the line II—II of Figure 1;

Figure 3 is an enlarged sectional view of a segment of Figure 1;

Figure 4 is a view taken on the line IV—IV of Figure 3; and

Figure 5 is a view, similar to Figure 1, showing my invention as incorporated in a gas fired furnace.

Referring more particularly to the drawings, reference numeral 2 indicates the furnace base. If desired the top of the furnace base may be formed from a steel plate 4 to which is attached a vertical ring 6. A reservoir 8 surrounds the base 2 for a purpose which will appear later. A stool 10 rests on the center part of the base 2. A fan 12 driven by a motor 14 circulates the annealing atmosphere within an inner cover 16. The inner cover 16 is preferably made of stainless steel and includes a vertical wall 18, a center wall 20, a horizontal bottom portion 22 and downwardly extending annular portions

24 and 26 fastened to the outer end of the portion 22. An outer cover 28 carries a central electrical heating member 30 extending downwardly from the top thereof. A pair of vertical female guides 32 are fastened to the outside of the cover 28 on diametrically opposite sides thereof. Vertical columns 33 carrying guides 34 extend upwardly from the floor 35 adjacent and between bases 2. The parts so far described are conventional. According to my invention I provide supports 36 for supporting the outer cover 28. As shown, these supports 36 are angles welded to the columns 33 in a horizontal position.

The operation of my device is as follows:

Coils of steel strip or other material C are placed on stool 10 and the inner cover 16 is placed thereover in the position shown with the portion 22 resting on the base 2 and the ring 24 extending downwardly in the channel 8 which is filled with oil 38 to prevent escape of atmosphere from within the inner cover 16 or leakage of air into the inner cover. Other sealing material may be used in place of the oil 38. The outer cover 28 is then placed over the inner cover 16 with the heating element 30 received in the well 20 and the female guides 32 sliding over the male guides 34. The male guides terminate above the supports 36 and the outer cover 28 slides downwardly until its bottom rests on the supports 36 which are placed at such an elevation that clearance 40 is provided between the outer cover 28 and the portion 22 of the inner cover 16. Thus no part of the weight of the outer cover rests on the inner cover so that the life of the inner cover is greatly increased and the services of the welder are seldom required. Also, the outer cover 28 will rest with its axis vertical so that when the heating element 30 becomes hot it will not move out of position.

Figure 5 shows my invention as incorporated in a gas fired furnace. In this case the inner cover 16' does not include a well 20 and burner tubes 42 such as shown in Blackman Patent No. 2,815,197 are substituted for the electrical heating member 30. The parts otherwise are similar to those shown in Figure 1 and like parts are indicated by priming the reference numerals.

While two embodiments of my invention have 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. An annealing furnace comprising a base, an inner cover having a generally horizontal portion resting on said base, an outer cover surrounding said inner cover, guides on said outer cover, guides supported exteriorly of said outer cover for cooperation with said first named guides, and a support for said outer cover for carrying the weight thereof and suspending the bottom of said outer cover above said generally horizontal portion of said inner cover during the heating of the charge in said furnace.

2. An annealing furnace comprising a base, an inner cover having a generally horizontal portion resting on said base, an outer cover surrounding said inner cover, guides on said outer cover, columns extending upwardly adjacent said base, a guide on each of said columns for cooperation with said first named guides, and a horizontal support mounted on each of said columns for carrying the weight of said outer cover, said supports being arranged at such elevation that the bottom of said outer cover is suspended above said generally horizontal portion of said inner cover.

3. An annealing furnace comprising a base, an inner cover having a generally horizontal portion resting on said base and a well in the top thereof, an outer cover surrounding said inner cover, a heating element suspended from the center of the top of said outer cover and so constructed and arranged that it can be received in

said well, guides on said outer cover, guides supported exteriorly of said outer cover for cooperation with said first named guides, and a support for said outer cover for carrying the weight thereof and suspending the bottom of said outer cover above said generally horizontal portion of said inner cover during the heating of the charge in said furnace.

4. An annealing furnace comprising a base, an inner cover having a generally horizontal portion resting on said base and a well in the top thereof, an outer cover surrounding said inner cover, a heating element suspended from the center of the top of said outer cover and so constructed and arranged that it can be received in said well, guides on said outer cover, columns extending upwardly adjacent said base, a guide on each of said columns for cooperation with said first named guides,

and a horizontal support mounted on each of said columns for carrying the weight of said outer cover, said supports being arranged at such elevation that the bottom of said outer cover is suspended above said generally horizontal portion of said inner cover.

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