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2,401,170

MOLTEN METAL SEAL FOR ANNEALING FURNACES

Filed Nov. 2, 1942

2 Sheets-Sheet 1

Fig. 1.

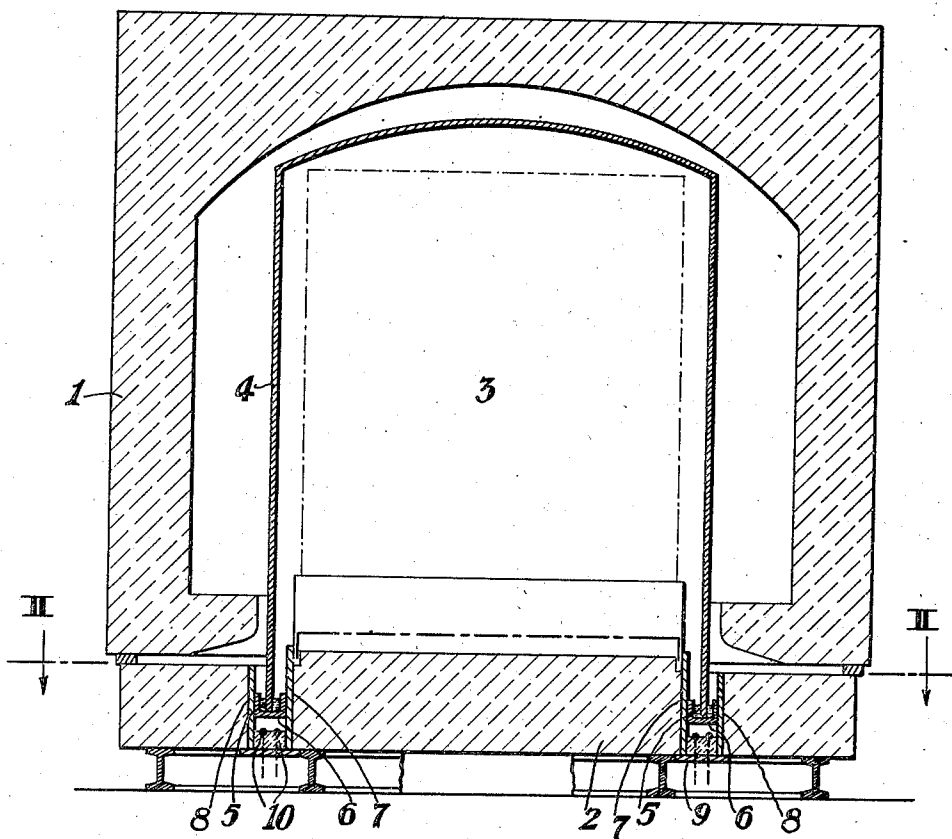
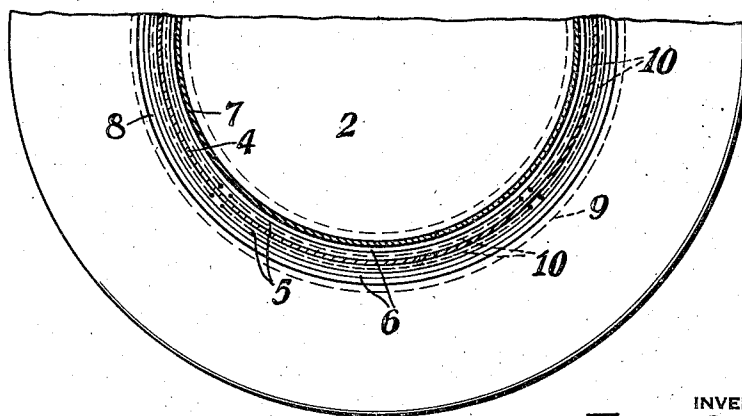


FIG. 2.



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2 Sheets-Sheet 2

FIG. 3.

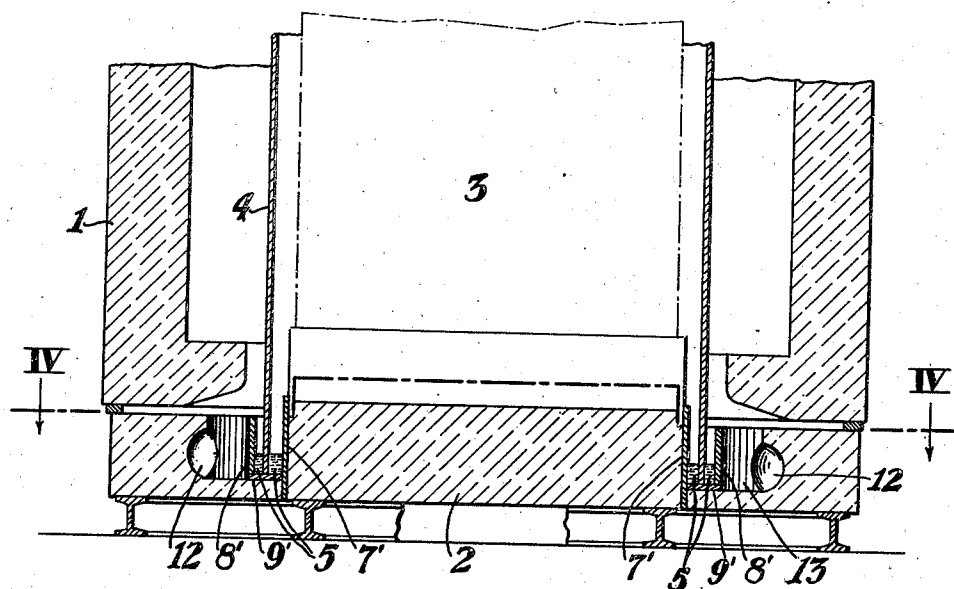
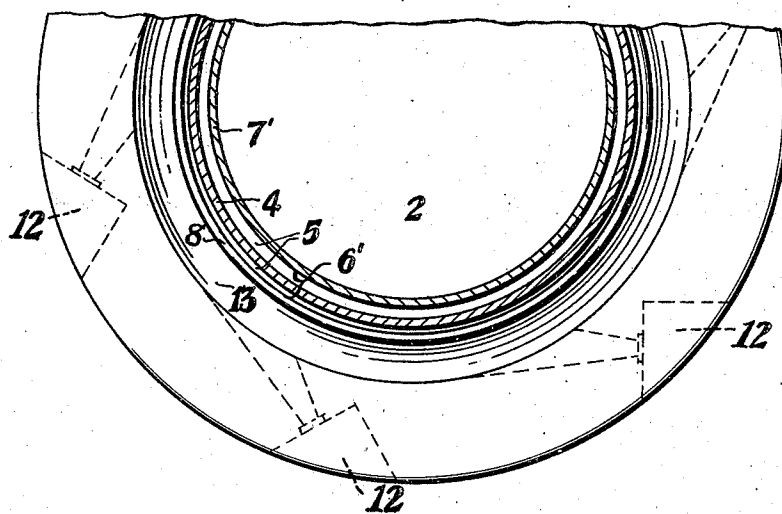


FIG. 4.



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UNITED STATES PATENT OFFICE

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MOLTEN METAL SEAL FOR ANNEALING
FURNACES

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5 Claims. (Cl. 263—10)

This invention relates to molten metal seals and more particularly to such a seal that is used for retaining atmosphere under annealing covers. Commonly sand or oil seals are used, but the sand seals are objectionable because of leakage of gas through the seal and also because of the fine dust particles which cause scratching of bright surfaces. The oil seal is gas tight but requires special flange construction on the inner cover to effect a seal at a point where the oil will remain sufficiently cool to prevent ignition thereof. The oil has also been kept below the ignition temperature by the use of cooling water, but this scheme results in loss of heat. There is also the danger of serious burns to operators from burning oil which is sprayed about by protective atmosphere explosions. Another disadvantage is the dripping of the oil from the inner annealing covers.

An object of this invention is to provide a gas tight seal which will not ignite during annealing.

Another object is to provide a metallic seal in which the metal is retained in a molten state until the cover is removed.

The foregoing and other objects will be more apparent after referring to the following specification and attached drawings in which

Figure 1 is a sectional view of one embodiment of the invention;

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

Figure 3 is a fragmental view similar to Figure 1, but showing a second embodiment of the invention; and

Figure 4 is sectional view taken on the line IV—IV of Figure 3.

Referring more particularly to Figures 1 and 2 of the drawings, reference numeral 1 indicates a heating furnace of any conventional design. Within the furnace is a base 2 upon which a charge of steel 3 is placed. An inner cover 4 with straight vertical sides protects the steel and extends down into the molten metal seal 5. The sealing metal may be any metal having a low melting point such as lead, solder, or Rose's metal. The seal may be shallower than the usual sand or oil seal, and is confined in a metal channel 6 which is supported by spaced rings 7 and 8, connected by a plate 9. In the opening between channel 6 and plate 9 are the electrical heating elements 10 which may be applied in multiple in order to give flexibility of operation. These heating means may be thermostatically controlled to cut off at predetermined temperatures. The seal metal is not heated to a point of volatilization. It is understood that the metal is well insulated in order to prevent loss of heat.

In operation the inner cover is placed over the steel charge 3 and its open end extends into the molten metal seal 5, thus preventing leakage of air into the steel and also preventing the escape of any special atmosphere from the cover. The metal of the seal is kept in a molten state by means of the electrical heating elements until the inner cover is removed.

Figures 3 and 4 illustrate a second embodiment of the invention. The metal channel 6' for the seal is formed by two spaced rings 7'—8' connected by means of the plate 9'.

As best shown in Figure 4, a plurality of gas burners 12 are located around the periphery of the outer ring, and the flames are directed into the combustion chamber 13. It will be understood that other fuels, such as oil, may be substituted for the gas. These burners may be thermostatically controlled to cut off at predetermined temperatures for economy and control of operations.

While two embodiments of the invention have been described, it will be apparent to one skilled in the art that other modifications and adaptations may be made while remaining within the scope of the following claims.

I claim:

1. A metallic seal of the class described comprising a base for receiving a charge to be heated, a channel surrounding said base, a low melting point sealing metal therein, an open ended cover adapted to be placed over the charge with its open end extending into the sealing metal and means located in the base for keeping the sealing metal molten as long as the cover remains therein.

2. A metallic seal of the class described comprising a base for receiving a charge to be heated, a channel surrounding said base for receiving a sealing metal, and means located in the base for heating the sealing metal.

3. A metallic seal of the class described comprising a base for receiving a charge to be heated, a channel surrounding said base for receiving a sealing metal, the level of said sealing metal being below the top of said base, and means located in the base for keeping the sealing metal molten.

4. A metallic seal of the class described comprising a base for receiving a charge to be heated, a channel surrounding said base for receiving a sealing metal, and electrical means located in the base for heating the sealing metal.

5. A metallic seal of the class described comprising a base for receiving a charge to be heated, a channel surrounding said base for receiving a sealing metal, and a flame located in the base for heating the sealing metal.

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