United States Patent

[11] **3,560,709**

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[21] Appl. No. **765,104**
[22] Filed **Oct. 4, 1968**
[45] Patented **Feb. 2, 1971**

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[54] **ELECTRICAL FURNACE FOR HEATING A METALLIC SLEEVE**
8 Claims, 1 Drawing Fig.

[52] **U.S. Cl.** **219/406,** 29/447, 219/214, 13/25
[51] **Int. Cl.** **F27d 11/02**
[50] **Field of Search** ..... 219/391-—393, 386, 389, 390, 523, 535, 530, 214, 424, 406—408; 13/25, 22, 21, 20, 31; 279/2; 126/; 263/4—5; 29/447, 421

[56] **References Cited**

UNITED STATES PATENTS

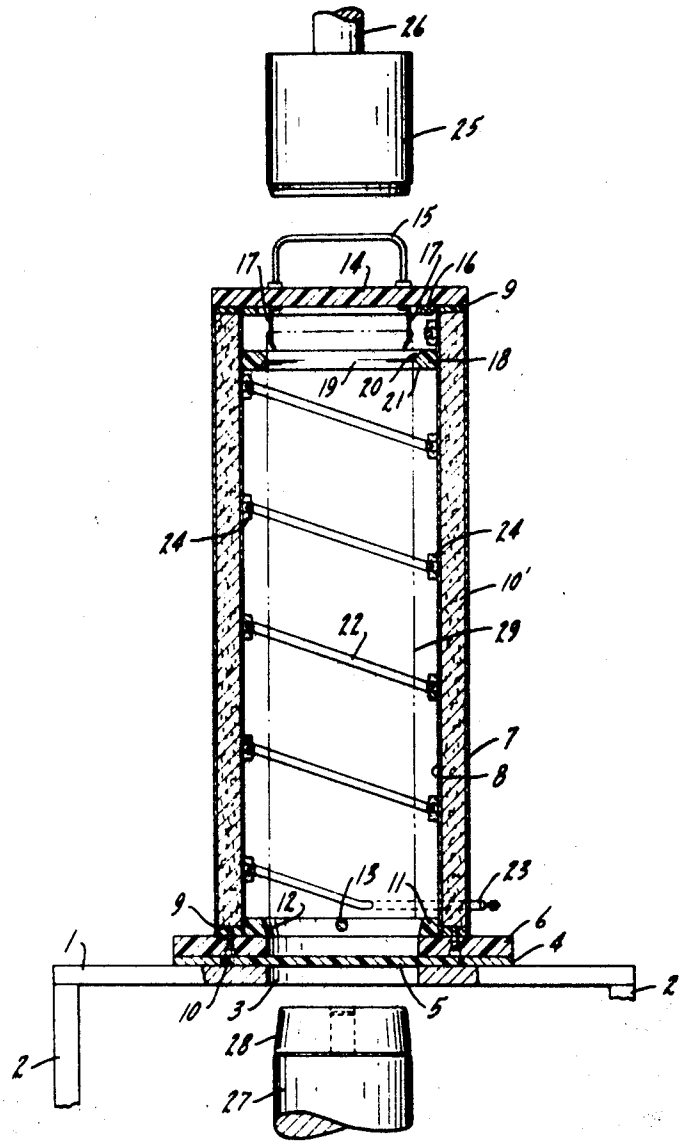
1,540,401	6/1925	Kelly et al.	219/406
2,908,791	10/1959	Torino et al.	219/214
3,030,483	4/1962	Rudolph et al.	219/214
3,345,732	10/1967	Brower	29/447X
3,361,863	1/1968	Lang	13/25
3,406,275	10/1968	Pedrotti	219/406
3,436,525	4/1969	Stanford	219/385

FOREIGN PATENTS

895,821	5/1962	Great Britain	219/390

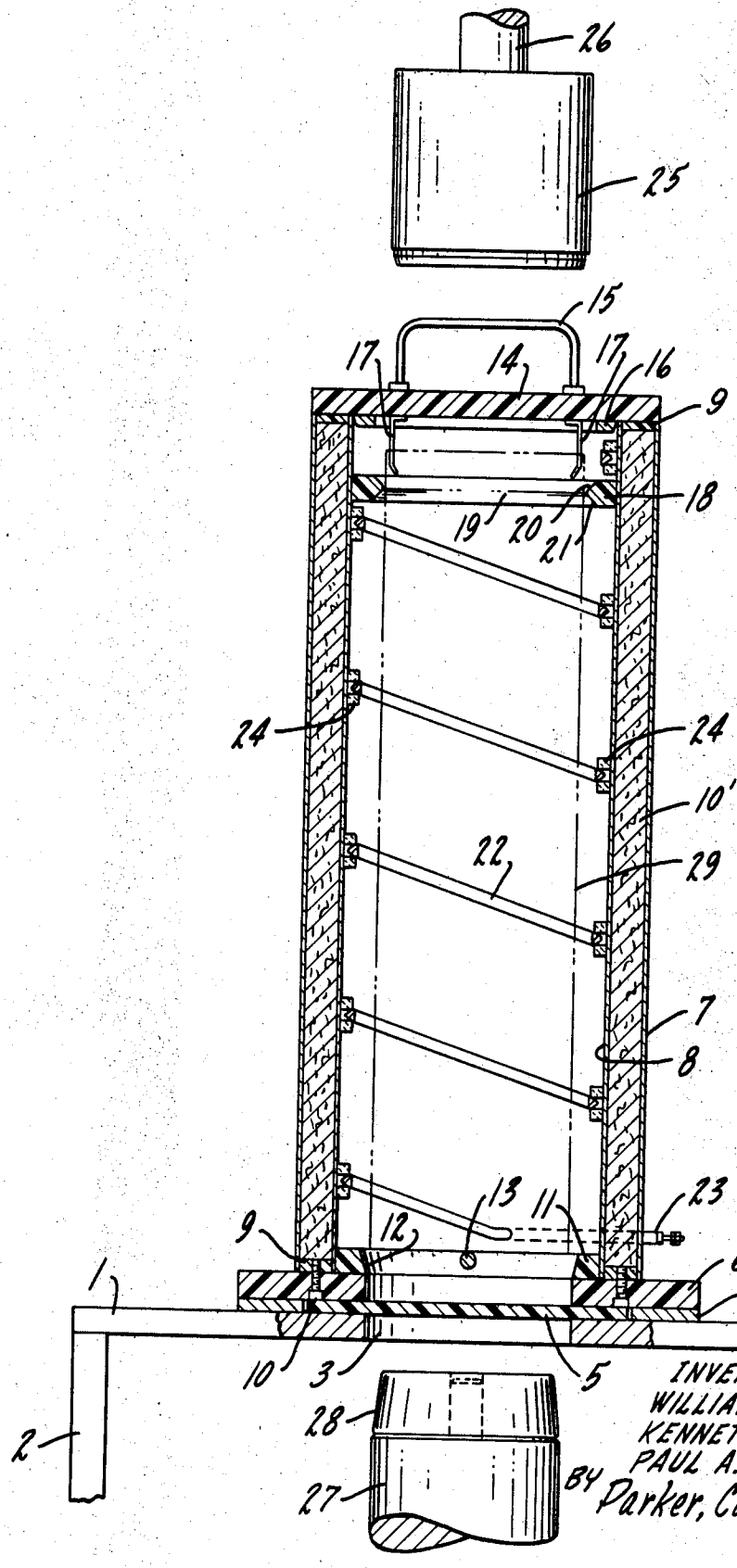
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ABSTRACT: An assembly for heat shrinking a metal sleeve or tube upon a metal arbor. The assembly comprises an electrically heat oven or furnace and means for retaining a tube or sleeve in the oven during heating. The total assembly also includes means for moving the heated tube onto an arbor upon which it is to be shrunk into final position.



PATENTED FEB 2 1971

3,560,709



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ELECTRICAL FURNACE FOR HEATING A METALLIC SLEEVE

This invention relates to a method and to an apparatus by means of which a tube or sleeve is heated and thereafter placed upon an arbor while hot so that it may be shrunk upon the arbor for use with the arbor as a unit.

It has for one object, therefore, to provide a suitable oven or furnace provided with heating means and means for retaining a tube in suitable position in the oven.

It has for another object to provide a total assembly comprising a furnace, tube retaining means, an arbor positioned adjacent said furnace and a ram positioned adjacent said furnace and adapted to be actuated to move the heated sleeve from the furnace and to move or force it upon a suitably positioned arbor.

An object is, therefore, to provide an assembly for carrying out a method of heating a sleeve and thereafter positioning it upon an arbor.

Other objects will appear from time to time in the following description and claims.

The invention is illustrated diagrammatically in the DRAWING which is a vertical sectional view through the furnace or oven of the invention with a ram and an arbor shown in elevation.

Like numerals will be used to designate like parts in the following description of the DRAWING.

As shown, a support **1** is carried upon legs **2** and the furnace is positioned upon it. The support **1** is provided with an opening **3** through which a sleeve may be moved. A spacing member **4** is provided upon the part **1** and is arranged to support the furnace and is also arranged to provide a track or guide in which a sliding member **5** is positioned. This member is formed of insulating material. A base **6**, formed of insulating material, rests upon the part **4** and is secured thereto as well as to the member **1** by means whose details form no part of the present invention and are not illustrated.

The furnace comprises an outer shell **7** which may be formed of metal such as galvanized iron or other suitable material. The furnace is also provided with an inner shell or liner **8** which may be formed of stainless steel, aluminized steel or other suitable heat resistant material. The liner **8** and the outer shell **7** are spaced apart by a ring **9** which is positioned between them and is held by screws **10** to the member **6**. At their upper end, the shell **7** and the liner **8** are spaced by a similar ring **9**. **10'** indicates insulation.

A ring **11**, of insulating material, is positioned within the liner and rests upon the member **6**. The ring **11** is preferably tapered, as at **12**, and is perforated to receive a sliding sleeve supporting pin **13** which may be removed to permit insertion and removal of the sleeve which is to be heated.

A cover **14**, formed of insulating material, is adapted to close the upper end of the furnace and may be provided with a handle **15**. It is provided with a spacing or centering ring **16** on its inner face. It preferably carries a plurality of sleeve centering members **17** on its inner face. These penetrate within a sleeve when the latter is in the furnace and thus center the sleeve. Two or more members **17** may be present.

A positioning ring **18** is fixed to the liner **8** and is provided with a central opening **19** which is preferably tapered above, as at **20**, and below, as at **21**.

A heating element **22** is provided within the furnace and it is preferable in the form of a helix. A terminal **23** extends outwardly of the furnace for connection to a source of electrical current. The heating element is positioned upon insulating supports **24** fixed to the liner **8**. These supports may be ceramic or of other suitable heat and electrical insulating material.

A ram **25** is positioned above the furnace and preferable in axial alignment with it. It is carried by a shaft **26**. Preferably air cylinder pressure means are provided for moving the ram downwardly into the furnace to discharge the sleeve after heating.

A arbor **27** is positioned beneath the furnace when a sleeve is to be applied to it. The arbor preferably carries a pilot or guide member **28** by means of which a heated sleeve is guided onto the arbor when heating is completed and the sleeve is carried downwardly by the ram.

A sleeve in the position for heating is indicated in dot-dash line and has been numbered **29**. To illustrate the sleeve **29** in full line either in elevation or in section would obstruct the showing of the furnace. Hence it has been illustrated in its proper relationship in dot-dash line only.

The use and operation of the invention are as follows:

When the furnace or oven is to be used, it is positioned upon a support and is connected to a source of electricity. A sleeve is inserted into the furnace. It may be inserted from either end. If it is to be inserted from above, the lid or cover **14** is removed. The ram **25** may be moved aside and the sleeve is inserted into the furnace and rests upon the pin or rod **13**. The furnace is thereafter closed. The heating element is energized and the sleeve is brought to a predetermined temperature.

Thereafter the furnace is opened by removal of the slide **5** and of the cover **14**. The pin or rod **13** is moved out of its supporting position and the ram **25** is caused to descend to carry the sleeve onto the arbor **27**. The ram is connected through the shaft **26** with a suitable source of power which may conveniently be pneumatic and it is sufficient to force the sleeve **29** onto the arbor **27**.

Thereafter the sleeve is permitted to cool and is thus shrunk upon the arbor.

When the sleeve has cooled, the arbor and the sleeve are moved to a point of use. For example, the arbor carrying the sleeve may be put into a machine or assembly for planing, finishing or grinding any article which is to be treated.

We claim:

1. An oven comprising in combination:
- a tubular housing;
- said housing including a metallic outer shell, a metallic inner shell and thermal insulation between said shells;
- an electric heating unit within said housing;
- electrical insulators positioned on the inner shell of said housing and supporting said heating unit;
- a positioning ring unit within said housing for positioning a tube and shaped to hold said tube out of contact with said heating unit;
- a cover for said housing formed of insulating material and dimensioned to close said housing at one end;
- a removable support projecting across said housing and adapted to support a tube in said housing; and
- an insulated removable closure for the bottom of said housing.

2. The combination of claim **1** further characterized by the fact that said heating unit is formed in a helix.

3. The combination of claim **2** characterized by the fact that said insulators are ceramic.

4. The combination of claim **1** further characterized by the fact said cover for said housing is provided with means for centering it on said housing.

5. The combination of claim **4** characterized by the fact that said cover is provided on its inner face with means to center a tube and project thereinto.

6. The combination of claim **5** further including a base and an opening therethrough.

7. The combination of claim **6** further characterized by the fact that: said oven is adapted to be positioned adjacent a ram;
- said ram is positioned to push a tube from said housing and onto an arbor;
- said ram is axially aligned with said housing and of suitable size to pass therethrough;
- the electrical heating unit is formed in a helix;
- said insulators are ceramic;
- said tubular housing is positioned avoce and in axial alignment with said opening in said base.

8. The combination of claim **7** characterized by the fact that said furnace is adapted to be positioned in combination with an arbor beneath and axially aligned with it and said ram above and axially aligned with it.