S. PEACOCK.

ELECTRIC FURNACE.

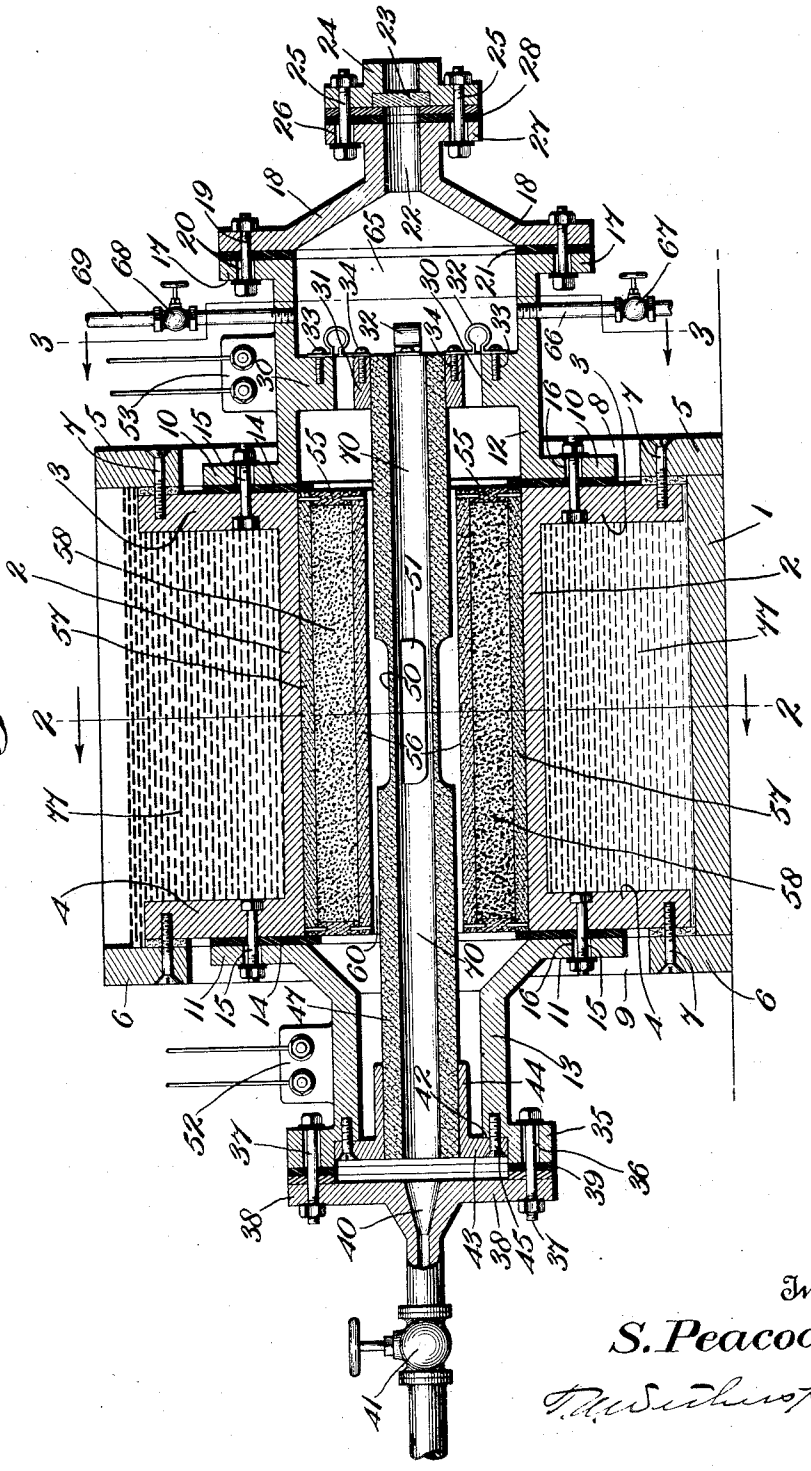
APPLICATION FILED MAR. 1, 1918.

1,279,146.

Patented Sept. 17, 1918.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

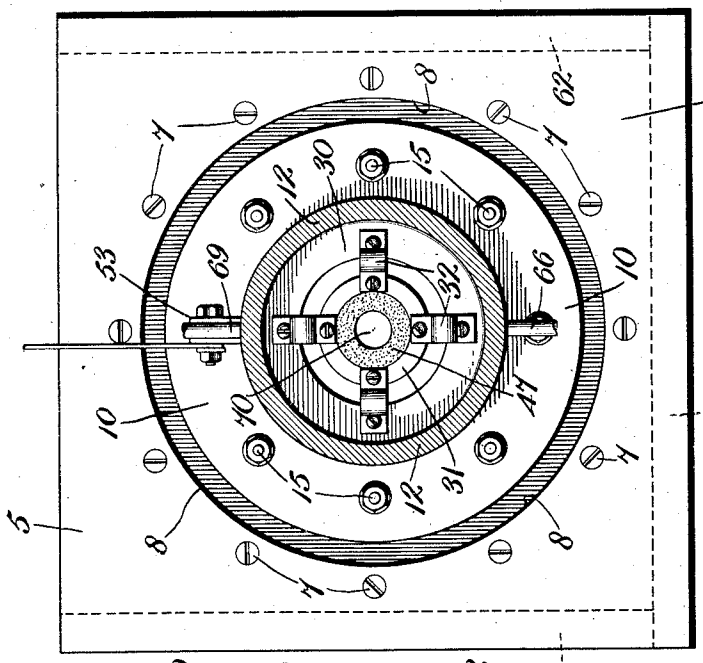
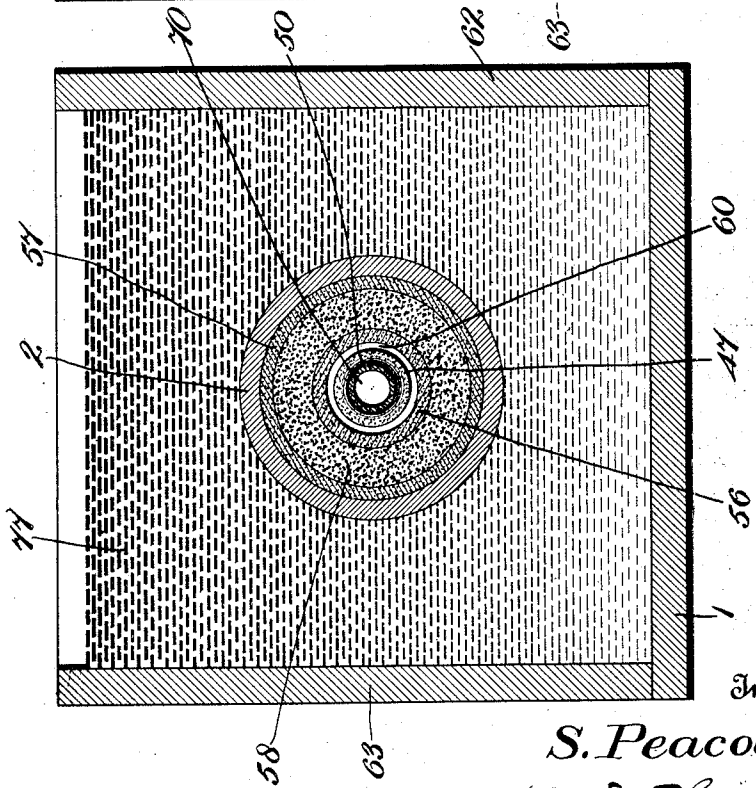


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTRIC FURNACE.

1,279,146. Specification of Letters Patent. Patented Sept. 17, 1918.

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To all whom it may concern:

Be it known that I, SAMUEL PEACOCK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to electric furnaces especially adapted for laboratory and other uses, and has for its object to provide a furnace of this nature which will be easy to repair, comparatively inexpensive to construct, and more efficient in action than those heretofore proposed.

With these and other objects in view, the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—

Figure 1 is a longitudinal sectional view of a furnace made in accordance with this invention;

Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1, looking in the direction of the arrows; and

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1, looking in the direction of the arrows.

1 indicates any suitable casing or bottom piece, 2 a tubular member constituting a chamber provided with the annular flanges 3 and 4 to which the end pieces 5 and 6 are preferably fitted flush with the bottom piece 1, and may be conveniently made of wood or other heat insulating material. Said pieces 5 and 6 are hollowed out respectively, as at 8 and 9, to accommodate respectively the flanges 10 and 11 of the end members 12 and 13. Said flanges 10 and 11 are insulated from the flanges 3 and 4, as by means of insulating ring like material 14, and said flanges 10 and 11 are also secured to the flanges 3 and 4 respectively by means of bolts 15, passing through holes 16 in said flanges 10 and 11, which holes are made larger than their respective bolts in order to aid in insulating said bolts from said flanges 10 and 11.

The end member 12 is provided with an outer flange 17 and an end closure 18 fitted to said flange 17 as by means of the bolts 19 passing through the holes 20 which are larger than said bolts 19 and insulating material 21 passes through said end closure 18 from the flange 17 as shown. Said end closure is provided with a sighting bore or opening 22 closed by a suitably colored glass 23 held in a cap 24 secured to said end closure as by the bolt 25 passing through the holes 26 in the flange 27 surrounding said sight opening 22. Insulating material 28 separates said cap 24 from said flange 27 as will be clear from the drawings.

Said end member 12 is further provided with the inwardly projecting ring like member 30 from which is suspended a ring or collar 31, as by means of the curved spring holding members 32 secured to said ring like member 30 as by the screws 33 and secured to said ring like member 31 as by the screws 34.

The oppositely disposed end member 13 is provided with the flange 35 having the holes 36 larger than the bolts 37 passing therethrough, and which secure to said flange 35 the cap closing member 38 as shown. Separating said member 38 from the flange 35 is the insulating material 39 and leading from about the center of the closure 38 is the cone shaped opening or passage 40 controlled by the cock 41. On the interior of the end member 13 is a shoulder 42 to which fits the flange 43 of a holding member 44, and to which said flange 43 is secured, as by means of the screw 45. Supported by the ring like member 13 and the holding member 44 is the hollow carbon tube like member 47 cut away at its center as indicated at 50 to form a relatively high resistance which will be raised to a high temperature when current passes. Inside said reduced portion 50 of the carbon rod 40 may be placed a boat or other receptacle 51 adapted to contain the materials to be experimented upon.

52 represents one terminal of a source of current and 53 the other terminal thereof. Surrounding the central portion 50 of the carbon member 47 is the heat insulating shield 55 preferably formed of a carbon

tube 56 surrounded by an outer carbon tube 57, and having the granulated or finely divided carbon material 58 between said tubes 56 and 57. Said outer tube 57 may be conveniently fitted with the outer tubular member 2 and the inner carbon tubular member 56 may be conveniently made slightly larger than the carbon resistance member 47 in order to leave an air or gas space 60 as shown.

Between the bottom member 1, the flanges 3 and 4, and the side members 62 and 63 (see Fig. 2) is a space which may be conveniently filled with water or other jacketing material to absorb and carry off the heat, and entering the space 65 inside the end member 12 is the pipe 66 controlled by cock 67 which may conveniently lead into said space 65, and into the working chamber of the furnace, any suitable or desired gas or gaseous products. Also leading from said space 65 is the pipe 69 controlled by the cock 68 which may be conveniently connected to a vacuum or apparatus for the purpose of exhausting the space 65 and the interior of the spaces communicating with the working chamber of the furnace.

The operation of this improved furnace will be clear from the foregoing but may be briefly summarized as follows:—

Any material which it is desired to heat is conveniently placed in the boat 51, and the boat inserted into the bore 70 of the tube 47 as by unscrewing the bolts 37 and removing the end member 38 and shoving said boat 51 into place at the reduced portion 50 of said tube 47.

The end closure 38 is now secured back in place and if it is desired to conduct the experiment in a vacuum all cocks are closed except the cock 68, and the air or gas within the furnace is exhausted by means of a vacuum apparatus not shown, but connected to the pipe 69. On the other hand, if it is desired to heat the material in the boat 51 in an inert atmosphere, gas may be readily admitted through the cock 67 and pipe 66. If it is desired to continuously blow gas through the bore 70 of the resistor 47, the cock 68 may be closed, and the cock 41 opened, whereupon a slight pressure will cause gas to continuously pass over and around the boat 51 while it is being heated.

Current being turned on it may enter the terminal 52 for example, pass along the end member 13, through the supporting member 44, through the resistor, out the other end of said resistor to the ring 31, across the supporting springs 32 to the ring member 30, to the end member 12, and out the terminal 53 back to its source. The supporting springs 32 being curved as shown, they readily allow for the expansion of the parts without causing the carbon resistor 47 to break.

If the heat insulating shield 55 is employed, a considerable portion of the heat generated in the tube 47 will be prevented from reaching the water jacket 77, and therefore, the temperature of the reduced portion 50 may be carried very high indeed. In fact, it is feasible with this construction to raise the temperature almost to that of the carbon arc for very short intervals of time.

On the other hand, if the temperature to be employed is not so high then the heat insulating shield 55 may be dispensed with and the water jacket 77 will of itself take care of the heat. While the heat is going on the boat 51 may be observed through the sight glass 23. Should the carbon rod 47 break, as it will in use, it is only necessary to take off the end closures 18 and 38 whereupon the screws 33, 34 and 42 may be readily removed and thereupon parts may be taken from the furnace and readily replaced.

On the other hand, if the heat shield 55 is to be removed, then the entire end member, such as 13 or 12, and its insulation 14, should be removed whereupon the heat shield 55 slides out of place. The parts 2, 12 and 13 are conveniently made of bronze or other suitable metal, while the remaining parts can be made of any suitable material desired.

It is obvious that those skilled in the art may vary the details of the construction as well as the arrangement of parts without departing from the spirit of the invention, and therefore, I do not wish to be limited to the above disclosure except as may be required by the claims.

What I claim is:—

1. In an electric furnace the combination of a tubular open ended inner member; a water jacket surrounding said member; end members supported from said inner member; readily detachable resistor holders supported by said end members; a resistor carried by said holders; and electric terminals carried by said end members, substantially as described.

2. In an electric furnace the combination of a tubular open ended inner member; provided with outwardly extending flanges; a water jacket located between said flanges and surrounding said member; end members supported from said inner member; readily detachable resistor holders electrically connected to and supported by said end members; a resistor carried by said holders; and electric terminals carried by said end members, substantially as described.

3. In an electric furnace the combination of an open ended tube provided with outwardly extended flanges to form a portion of the walls of a cooling jacket; readily detachable end pieces secured to said flanges and provided with open chambers communicating with said tube; a resistor element detachably connected with said end

pieces; and closing members detachably connected with said end pieces adapted to seal said chambers, substantially as described.

4. In an electric furnace the combination of an open ended tube provided with outwardly extended flanges to form a portion of the walls of a cooling jacket; members secured to said flanges to complete the walls of said jacket; readily detachable end pieces secured to said flanges and provided with open chambers communicating with said tube; means communicating with said chambers to exhaust the same of air; means communicating with said chambers to fill the latter with inert and other gases; a resistor element detachably connected with said end pieces; and closing members detachably connected with said end pieces adapted to seal said chambers, substantially as described.

5. In an electric furnace the combination of an open ended tube provided with outwardly extended flanges to form a portion of the walls of a cooling jacket; members secured to said flanges to complete the walls of said jacket; readily detachable end pieces secured to said flanges and provided with open chambers communicating with said tube; means communicating with said chambers to exhaust the same of air; means communicating with said chambers to fill the latter with inert and other gases; a resistor element detachably connected with said end pieces; a heat screen through which said resistor passes comprising concentric tubes spaced from each other and spaced from said resistor, located in said tube; and closing members detachably connected with said end pieces adapted to seal said chambers, substantially as described.

6. In an electric furnace the combination of an open ended tube; a hollow resistor located in said tube; readily detachable supports for said resistor; readily detachable means carrying said supports secured to said tube and providing open ended chambers communicating with the interior of said resistor; readily detachable means for closing said chambers; means to exhaust said chambers and resistor of air; a heat shield located in said tube surrounding said resistor; and a water jacket located around the outside of said tube, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL PEACOCK.

Witnesses:
WM. G. ANDES,
E. A. ANDES.