(No Model.)

# W. MITCHELL.

## ELECTRICALLY HEATED OVEN.

No. 457,745. Patented Aug. 11, 1891.

Fig. 1.

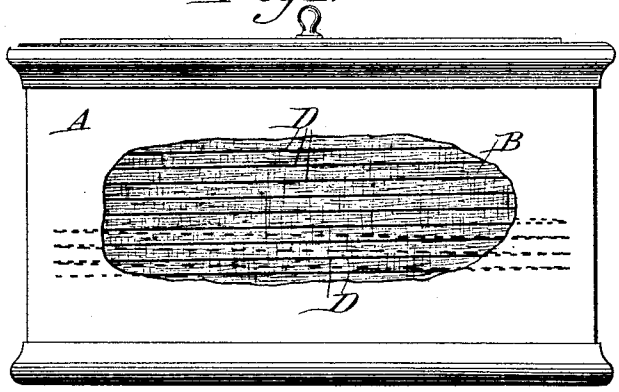



Fig. 2.

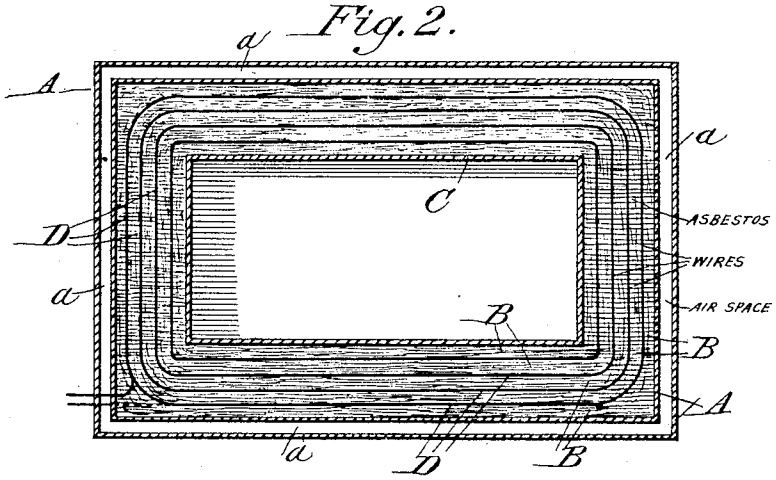



Fig. 3.

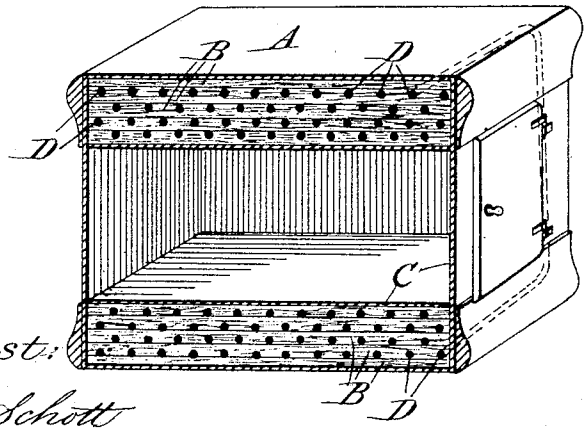
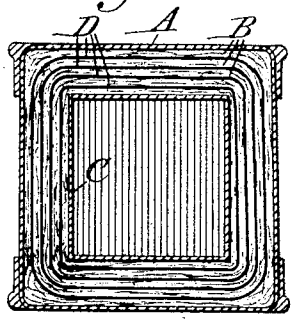



Fig. 4.




Attest:

F. H. Schott

W. Harvey Muzzy

Inventor

Willis Mitchell

by

Wm. H. Babcock

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

WILLIS MITCHELL, OF MALDEN, MASSACHUSETTS.

## ELECTRICALLY-HEATED OVEN.

SPECIFICATION forming part of Letters Patent No. 457,745, dated August 11, 1891.

Application filed November 29, 1890. Serial No. 373,090. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIS MITCHELL, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electrically-Heated Ovens; 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 has for its objects to increase the efficiency of electrically-heated ovens and to protect and insulate the heating-wires more effectually and easily than hithereto. For these purposes I construct the bottom, top, and sides of my oven, or some, if not all, of these, with successive layers of asbestus or other insulating material, the heating-wires being wound around the interior space of said oven in successive coils or layers which are interposed between said layers and practically embedded therein. The winding may be either vertical or horizontal, and the wire in each spiral of each layer is so far separated from every other spiral of every layer as to give the best heating effect.

In the accompanying drawings, Figure 1 represents a side elevation, partly broken away, of an oven embodying my invention, the said oven having vertical layers, as above stated, at its ends and sides and the wires being wound horizontally. Fig. 2 represents a horizontal longitudinal section of the same. Fig. 3 represents a perspective view, with one side removed, of an oven having its top, bottom, and sides only provided with such layers, those of the top and bottom being, of course, horizontal, and the wire being wound vertically, as stated; and Fig. 4 represents a transverse central vertical section through this latter oven.

A designates the metallic outer casing or outer walls of the oven. As shown in Fig. 1, parallel vertical layers B, of asbestus or other insulating material, are arranged within the sides and ends of this casing, their number depending on the space conveniently available and the amount of wire to be used. The inner face of the innermost layer is covered by a thin lining C of sheet metal.

D designates the heating-wire which forms part of an electric circuit. In producing or preparing the oven I place the first layer of asbestus against the outside of the inner lining C. I then wind the wire D nearly horizontally thereon, the successive wire coils or spirals being considerably separated. In practice I find it best to have the wire everywhere in a space about ten or twelve times its own width. I then apply the second row of asbestus plates or layers and wind similarly thereon. This is continued until the coils of wire are sufficient to effect my purpose. I then apply the outer layer of asbestus and the external casing, and the oven is complete.

As shown in Fig. 3, the layers B may be omitted at the ends of the oven and supplied at top and bottom thereof instead. The arrangement of the insulating-layers of the oven will then be partly vertical and partly horizontal, those of the top and bottom taking the latter position. The putting together and winding are as before, except that the wire is wound approximately in vertical planes around the top, bottom, and sides of the oven instead of being wound approximately in horizontal planes, as before, around the sides and ends. Of course the winding may be about the top, bottom, and ends equally well, the layers being supplied to the ends and omitted from the sides, everything being in other respects as shown in Fig. 2. It is not deemed necessary to illustrate this, it being at most a trivial change of arrangement and not amounting to a modification.

Whichever way wound the coils or spirals of each wire layer are practically embedded in the softer insulating material as they are drawn rather tightly on the layer of asbestus within them, and the next outer layer is pressed on them exteriorly either by the drawing of the outer wire layers, or, in the case of the outermost layer, by the weight and tight fitting of the outer casing A itself. This tight fitting is not necessary, however. Either with or without it the asbestus or other soft material substituted therefor will hold each spiral of wire in its appropriate place and thoroughly insulate it. The oven will be as easily taken apart as put together, and very efficient, simple, and compact.

I do not depend largely on the heat of resistance, as when the wires become red-hot

the meat or other article which is undergoing baking will be overcooked on the outside and left raw within. Such at least is the tendency of heating by this method; but when wound as I have stated and at intervals such as described, the current through the wire produces an equable cooking effect throughout the mass of meat, the heat being apparently greatest at the center. I am not able to explain the hidden causes of this action, but the fact is continually demonstrated.

In the outer casing A, I form by preference an air-space *a*, dividing it into a double wall; but this is not indispensable.

Of course the construction hereinbefore described may be applied to general heating as well as cooking uses.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An oven or heater provided with successive layers of non-conducting material, and a wire which forms part of an electric circuit and is wound in successive layers between said non-conducting layers, for the purpose set forth.

2. An oven or heater provided with successive layers of non-conducting material, and a wire which forms part of an electric circuit and is wound between said layers and embedded therein, substantially as set forth.

3. An oven or heater provided with successive layers of asbestus or other non-conducting material arranged about it, and a wire forming part of an electric circuit and wound between said non-conducting layers about said oven so as to form successive layers of wire having each coil or spiral insulated and separated by the material in which it is embedded, substantially as set forth.

4. An oven or heater provided with successive layers of wire surrounding it and forming part of an electric circuit, said wire being coiled in spirals, each of which is sufficiently separated from all the others to heat the interior of the oven without depending on the heat produced by the resistance of the wire, substantially as set forth.

5. The combination of a wire wound spirally in layers and forming part of an electric circuit, with layers of non-conducting material interposed between said layers of wire and holding the spirals thereof in place, an outer casing A, and an interior lining C, the whole constituting an electrically-heated oven, substantially as set forth.

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

WILLIS MITCHELL.

Witnesses
WILLIAM WALDEN,
W. P. CUTLER.