R. F. VENNER.

HEATING AND COOKING APPARATUS.

APPLICATION FILED SEPT. 27, 1913.

1,133,073 Patented Mar. 23, 1915.

Fig. 1.

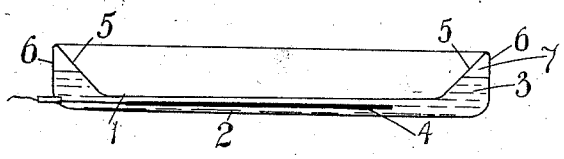


Fig. 2.

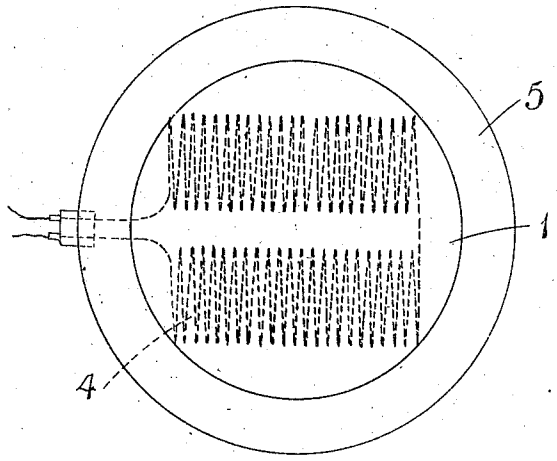
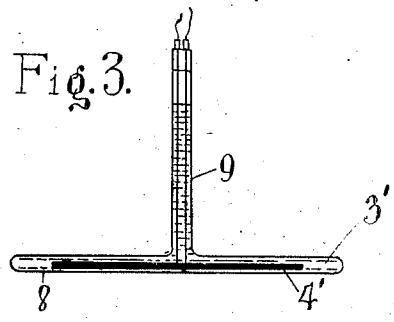


Fig. 3.



WITNESSES:

John C. Sanders

H. B. Cottrell

INVENTOR:

Robert Francis Venner

BY Wallace White

ATTY

UNITED STATES PATENT OFFICE.

ROBERT FRANCIS VENNER, OF LONDON, ENGLAND.

HEATING AND COOKING APPARATUS.

1,133,073. Specification of Letters Patent. Patented Mar. 23, 1915.

Application filed September 27, 1913. Serial No. 7[illegible],087.

To all whom it may concern:

Be it known that I, ROBERT FRANCIS VENNER, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in Heating and Cooking Apparatus, of which the following is a specification.

This invention relates to electric heating and cooking apparatus of the kind in which resistance conductors are employed and has for its object to provide an improved construction and arrangement of such apparatus embodying various novel features for the purpose of improving its efficiency and convenience in operation.

The invention contemplates, as has previously been proposed, the employment of a heat transferring medium which surrounds the resistance conductor and is composed of an electrically non-conducting liquid material such as oil or the like.

According to the present invention, the improved heating and cooking apparatus comprises a heating element consisting of a resistance conductor surrounded by a substantially horizontal sheet or layer of liquid material of relatively large area and uniform small transverse thickness, thus enabling a minimum amount of liquid heat transferring material to be employed under conditions of maximum efficiency as regards convection by establishing the shortest possible paths between the surface of the resistance conductor and the surface to be heated.

The invention is illustrated in the accompanying drawings, Figure 1 of which is a view in sectional elevation illustrating the invention as embodied in a grilling or frying vessel; Fig. 2 being a plan view of the same. Fig. 3 is a view in sectional elevation illustrating a form of heating element embodying the invention and adapted to be immersed in liquid or semiliquid material to be heated.

Referring now to Figs. 1 and 2, the cooking vessel illustrated therein comprises a hollow pan of circular, oval, or other form containing a quantity of oil surrounding a resistance conductor, which is suitably supported and insulated from the vessel if desired. The vessel is constituted by a hollow shell comprising two parallel closely adjacent plates 1, 2 separated by a relatively thin sheet or layer of oil indicated at 3. A resistance conductor 4 is located within the layer of oil between the plates 1 and 2 and may be arranged in any suitable form so as to insure proper distribution of heat. A hollow flange constituted by the upturned edges 5, 6 of the plates 1 and 2 is provided so as to inclose an annular space 7 which not only serves to provide the necessary space to permit the expansion of the oil 3, but also constitutes a wall or rim for the vessel, the material to be heated or cooked being placed upon the upper plate 1 in the usual manner.

Referring now to Fig. 3 and which illustrates an immersion heating element, the resistance conductor 4′ is, as in the construction illustrated in Figs. 1 and 2, arranged in the interior of a flat hollow casing or shell 8 containing a thin sheet or layer of oil 3′ completely surrounding the resistance conductor 4′. The casing 8 is provided with a hollow central stem 9 by means of which the heating element may, if required, be removed and placed in position within the liquid to be heated, the upper part of the stem 9 constituting a space for permitting the expansion of the oil 3′, as will be easily understood without further description.

It should be noted that the term "sheet" or "layer" as hereinabove employed is intended to convey the idea of a mass of liquid of considerable area and a relatively small uniform transverse thickness, as the essential feature of the invention consists in the distribution of the heat transferring medium in this manner as opposed to other distributions formerly proposed, and it will be understood that while one manner of carrying the invention into practice has been described and illustrated in the drawing, the invention is not limited thereto but includes other modifications and applications of the essential principle of the invention above described.

What I claim is:—

1. In electric heating or cooking apparatus, a resistance conductor laterally distributed within a relatively thin extended and substantially horizontal layer of liquid electrically insulating material.

2. In electric heating or cooking apparatus the combination with a substantially horizontal resistance conductor of a layer of oil surrounding said conductor, said layer being of relatively large area and small substantially uniform transverse thickness.

3. In electric heating or cooking appa-

ratus the combination with a substantially horizontal plane layer of liquid electrically insulating material, of a resistance conductor of extended form located approximately in a horizontal plane coinciding with the middle plane of said layer.

4. In electric heating or cooking apparatus the combination with a flat horizontal resistance conductor of extended form, of a layer of liquid electrically insulating material completely surrounding said conductor, the upper and lower surfaces of said layer being approximately equidistant from the plane in which the conductor is located.

5. In electric heating or cooking apparatus the combination with a flat hollow casing, a resistance conductor of extended form located within said casing, a body of liquid electrically insulating material occupying the interior of said casing, and means for permitting the expansion of said liquid material when heated.

6. In electric heating or cooking apparatus the combination with a hollow flat horizontal casing, of a hollow annular upwardly extending projection on said casing constituting a rim for the upper surface thereof, a flat resistance conductor of extended form located symmetrically within the interior of said casing, and a body of oil completely filling the interior of said casing and partly extending within said hollow projection.

7. In an electric heating or cooking apparatus, the combination with a horizontal casing having a hollow upwardly extending projection, of a resistance conductor of extended form located within the interior of said casing, and a liquid body in said casing and partly extending within said hollow projection.

8. In an electric heating or cooking apparatus, the combination with a flat horizontal casing having a hollow upwardly extending projection, of a flat resistance conductor of extended form located within the interior of said casing, and a liquid body in said casing and partly extending within said hollow projection.

9. In an electric heating or cooking apparatus, the combination with a flat horizontal casing having a hollow upwardly extending projection, of a flat resistance conductor of extended form located symmetrically within the interior of said casing, and a body of oil in said casing, and partly extending within said hollow projection.

10. In electric heating or cooking apparatus, the combination of a hollow flat horizontal casing having a hollow upwardly extending projection constituting a rim thereof, a flat resistance conductor of extended form located within said casing, and a body of oil in said casing and partly extending within said hollow projection.

11. In an electric heating or cooking apparatus, the combination of a hollow flat horizontal casing having a hollow annular upwardly extending projection constituting a rim thereof, a flat resistance conductor of extended form located in the interior of said casing, and a body of oil in said casing and partly extending within said hollow projection.

In witness whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT FRANCIS VENNER.

Witnesses:
H. A. Cope,
A. A. Bergin.