

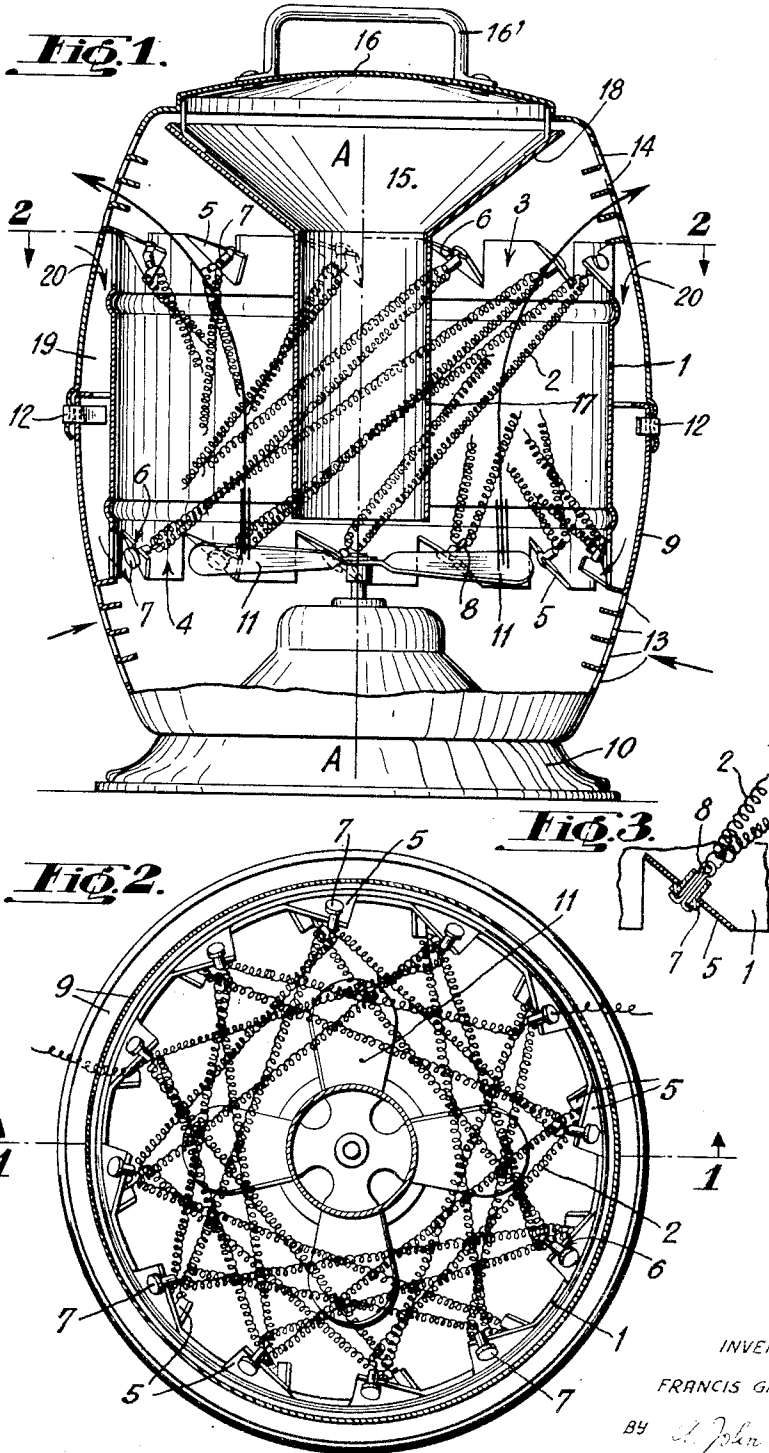
June 28, 1955

F. GALLAY

2,712,053

ELECTRIC HEATING APPARATUS

Filed Jan. 6, 1953



INVENTOR:
FRANCIS GALLAY
BY *L. Jean Michel*
ATTORNEY

1

2,712,053

ELECTRIC HEATING APPARATUS

Francis Gallay, Collonge-Bellerive, Switzerland, assignor to Intertherm A.-G., Fabrik fur elektrische Apparate (Intertherm S. A., Fabrique d'appareils electriques), Zurich, Switzerland, a corporation of Switzerland

Application January 6, 1953, Serial No. 329,816

Claims priority, application Switzerland January 15, 1952

6 Claims. (Cl. 219—39)

The present invention concerns an electric heating apparatus destined to be used for the heating of rooms.

In the apparatus used up to now the elements of the heating body are usually formed by a helically coiled resistance wire, and, in most cases, are arranged in a plane or parallel to a surface of revolution such as a cylinder.

It has been noticed that heating bodies of this kind are often damaged and put out of action owing to the formation of danger zones in which certain points are overheated, especially in cases where a fan destined to send a stream of air through the said elements accidentally stops. This disadvantage is mainly due to the fact that when the elements are arranged, inadequate use is made of the space available for the heating body, so that the elements do not heat the air in a homogeneous fashion.

The object of the present invention is to remedy these disadvantages, and in view of this, the heating apparatus according to the invention is fitted with a heating body comprising at least one electric wire resistance composed of heating elements having a generally rectilinear shape, the apparatus comprising, in addition, a chimney the ends of which are fitted with fastening means for the said elements and which forms a support for the same, the said elements being arranged inside the said chimney and extending from one end of the chimney to the other in directions which are oblique in relation to the axis of the chimney, the projections of the said elements on a plane perpendicular to the axis of the chimney forming at least one star-shaped polygon.

The accompanying drawings show, by way of example, an embodiment of the heating apparatus according to the invention.

Fig. 1 shows a sectional elevation of this example through 1—1 in Fig. 2.

Fig. 2 shows a cross-section through 2—2 in Fig. 1; and

Fig. 3 is an enlarged view of a detail.

The heating apparatus shown is fitted with a heating body comprising a support 1 for the heating elements 2 of an electric wire resistance, for instance made with a nickel-chrome wire, helically wound so as to form a cylindrical coil. The support 1 is formed by a metallic drum which is open at both ends and which is destined to form a chimney through which flows a current of air, as will be fully described further on.

Each of the edges 3 and 4 of the drum is slit from place to place for a height of from 2 to 3 cms. so as to allow the sheet metal of the drum to be bent inwards to form triangular lugs 5. These lugs 5 are each provided with a slot 6 in which is inserted an insulator 7 through which passes a cotter pin 8 to which the heating elements 2 are hooked (Fig. 3). Other means for fastening the elements 2 might be provided instead of the cotter pins. In particular one could use hooks fixed to the insulators in an appropriate manner. The height of the slits in the edges of the drum and the width of the lugs are such that the plane of each lug is approximately perpendicular to

2

the bisector of the angle formed by the two elements hooked to the said lug.

The electric resistance coil is hooked to the insulators 7 and passes from an insulator of the upper edge 3 to an insulator of the lower edge 4 which is situated about 90° further along that edge, to return to the next insulator on the upper edge. The rectilinear elements 2 are thus arranged inside the chimney, and extend from one end to the other of the said chimney in directions which are oblique in relation to the axis A—A of the chimney. As will be seen in Fig. 2, the projections of the elements 2 on a plane perpendicular to the axis A—A, and the trace of which coincides with the line 2—2 in Fig. 1, form a star-shaped polygon.

Instead of being provided with bent lugs, the edges 3 and 4 of the drum 1 could be provided with slots into which the means to which the heating elements are hooked would be directly inserted.

The heating body described above is mounted in a casing 9, the general shape of which is ovoid and which is supported on a base 10 forming the casing of a fan motor 11. The casing 9 is in two parts which fit into one another at their greatest diameter and which are assembled by means of spring catches, placed at intervals along the circumference and engaging in slots of the inner and outer parts, as shown in Fig. 1. The catches can be brazed or fixed in any other appropriate manner to the lower half of the casing 9. The air drawn in by the fan 11 enters by openings 13 in the lower half of the casing 9, flows through the chimney formed by the supporting drum 1 of the heating body and escapes in a heated state through the openings 14. No openings are provided in the central portion of the casing 9, comprising about 1/3 of its height. A deflector 15 is fixed centrally under the bottom 16 of the upper half of the casing and comprises a cylindrical tube 17 extending to within a short distance of the centre of the fan, and surmounted by a truncated cone the largest diameter of which is adjacent to the bottom 16. This deflector is destined to canalize the flow of air as shown by the arrows in Fig. 1 and to prevent the bottom 16 and the carrying handle 16' from becoming unduly hot.

The metallic drum forming the aforementioned chimney constitutes the inner wall of a space 19 formed between this chimney and the casing 9. The casing 9 is provided with openings 20 at the upper part of the space 19, so that the suction created by the fan at the lower end of the space 19 causes cold air to flow downwards through this space in the direction indicated by the arrows and to cool the wall of the casing 9.

The principal advantage of the heating apparatus described above, is that, in case of an accidental stoppage of the fan, dangerous zones with overheated points do not appear in the heating body. It is to be noted that the heating elements are arranged to form an annular mesh which enables the air flowing through the drum to be heated in a more even manner than if the heating elements were arranged in a cylindrical surface according to the usual practice in apparatus of this type.

The apparatus described above has the additional advantage of being very sturdy and is very simple and cheap to build. In the example of the heating body described above, the heating elements of the single resistance consist of a single continuous wire, so that only two connexion leads are required. It would also be possible to use two or more heating resistances dovetailed into one another and staggered, and arranged to function singly, in parallel or in series, according to the mode of heating desired. In that case the projections on a plane perpendicular to the axis of the heating body of the heating elements of the various resistances would form two or more star-shaped polygons.

3

What I claim is:

1. An electric heater comprising a sleeve forming an air flue, at least one electrical resistance wire composed of generally rectilinear heating elements, and fastening means at both ends of said sleeve for supporting said heating elements, all of said elements extending obliquely inside the sleeve from one end thereof to the other and each element crossing a plane through the axis of the sleeve, the projection of said elements on a plane perpendicular to the axis of the sleeve forming at least one star-shaped polygon.

2. An electric heater as defined in claim 1, wherein said fastening means comprises a plurality of substantially evenly spaced insulated fasteners at each end of the sleeve, and the electrical resistance wire is so arranged on said fasteners that one end of each heating element is attached to a fastener at one end of the sleeve and the other end of the heating element is attached to a fastener at the other end of the sleeve which is staggered a predetermined circumferential distance from the fastener at the one end.

3. An electric heater as defined in claim 2, wherein said predetermined circumferential distance is determined by an angle of 90°.

4. An electric heater comprising, in combination, a generally ovoid outer casing including a base; a fan mounted on said base; a metallic sleeve forming an air flue mounted in said casing above said fan; the sleeve and the casing forming a space therebetween and the casing being provided with openings at the upper end of the space, rotation of the fan causing air entering from the outside through the openings into said space to flow in a stream from top to bottom of the space to cool the sleeve and casing walls; at least one electrical resistance wire

4

composed of generally rectilinear heating elements; and fastening means at both ends of said sleeve for supporting said heating elements, all of said heating elements extending obliquely inside said sleeve from one end thereof to the other and each element crossing a plane through the axis of the sleeve, the projection of said elements on a plane perpendicular to the axis of the sleeve forming at least one star-shaped polygon.

5. In an electric heater comprising at least one electrical resistance wire composed of generally rectilinear heating elements supported by a surrounding sleeve; an arrangement of the heating elements wherein each element crosses obliquely a plane through the axis of the sleeve and the projection of said elements on a plane perpendicular to the axis of the sleeve forms at least one star-shaped polygon.

6. An arrangement of heating elements as defined in claim 5, wherein the electrical resistance wire is so arranged that one end of each heating element is attached at one end of the sleeve and the other end of the heating element is attached at the other end of the sleeve a predetermined circumferential distance staggered from the attachment at the one end.

References Cited in the file of this patent

UNITED STATES PATENTS

813,113	Pratt	Feb. 20, 1906
1,416,601	Boone	May 16, 1922
1,444,621	Lynn et al.	Feb. 6, 1923
1,795,002	Wolcott	Mar. 3, 1931
2,133,188	Conforti	Oct. 11, 1938