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71 Applicant: GAMMA S.p.A.
 Via Auxilia, 1/C
 I-29022 Bobbio Piacenza(IT)

72 Inventor: Losini, Franco
 Lagobisione
 I-29022 Bobbio Piacenza(IT)

74 Representative: Riccardi, Sergio
 Riccardi & Co. Via Macedonio Melloni, 32
 I-20129 Milano(IT)

54 Electrical resistances for axial flow fanheaters, constructed from undulated resistance wire.

57 Electrical resistances for axial flow fanheaters, in which the undulated resistance wire is uniformly distributed over a polygonal configuration being fixed to step-shaped mica blades and arranged radially in a star configuration on a metal support in such a way as to have uniform flows of air and temperatures in the various conditions of use.

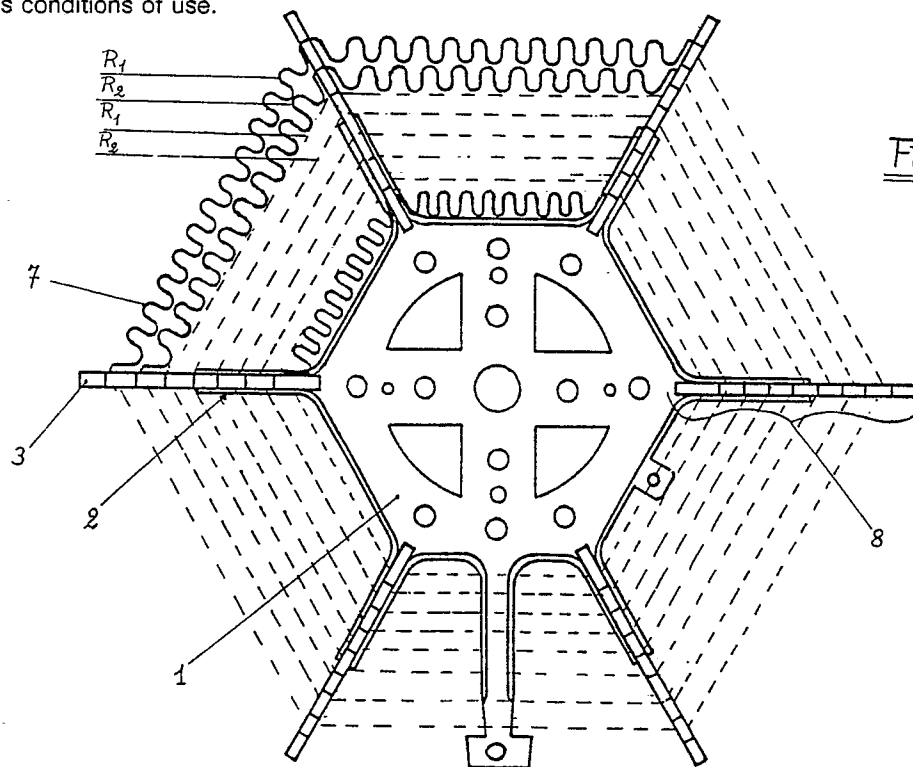


Fig. 1

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"ELECTRICAL RESISTANCES FOR AXIAL FLOW FANHEATERS, CONSTRUCTED FROM UNDULATED RESISTANCE WIRE"

The invention relates to an electrical resistance for axial flow fanheaters, using undulated resistance wire, which constitutes a considerable technical advance compared to the types which currently exist.

At present, electrical resistances for fanheaters whose airflow is axially orientated are constructed using the two following systems.

The first system consists of the formation of a spiral of resistance wire of the length desired, the winding of the said spiral being wound manually on continuous mica supports, arranged radially and attached to another support of iron or plastic.

Using the second system, a resistance tape or wire is bent into an undulation (with a depth of 3 - 4 cm) and this is rivetted onto the external circumference of a continuous mica ring which is, in turn, attached to another support of iron or plastic.

Both these systems have been widely used for a long time but, nevertheless, they are not completely satisfactory, particularly with regard to the uniformity of the airflow since, as a result as the manner in which the resistances are arranged, zones are created in which the airflow is reduced and/or the air is not heated to the same temperature and this is particularly evident in resistances with two or more capacities where these unbalances are highly evident.

These disadvantages of the axial flow electrical resistances which currently exist are eliminated by the original form of the invention as claimed which permits uniform airflows and temperatures to be obtained under the various conditions of use.

The problems previously referred to are in fact brilliantly solved by the electrical resistance of this invention, characterised by the fact that the undulated resistance wire is uniformly distributed to form a polygonal layout, being attached to step-shaped mica blades and arranged radially in a star-shaped conformation on a metal support in such a way as to produce uniform airflows and temperatures under the various conditions of use.

These and other advantages, characteristics and scopes of the electrical resistance of this invention will be made more clear and evident by the following detailed description of one preferential embodiment, given as a non-limiting illustrative example and referring to the figures of the attached schematic drawings, in which:

Figure 1 is a general front view showing the scheme of the axial flow heating element of the invention as claimed;

Figure 2 is a side view showing the mica blade on which the undulated resistance wire is mounted; and

Figure 3 is partial front view showing a detail of the cross-section of the attachment of the mica blade to the support.

Referring now to the various figures in the attached drawings, the structure of the heating element and the technology which was designed especially for the production of these resistances for axial fan heaters, will now be described in detail.

The heating element comprises a metal support 1 which forms an overall polygon shape, with grooved support section 2 extending radially from the apexes into which are slotted the continuous mica blades 3 which have a special stepped configuration 4 and which are fixed in position with a punching system which creates protruberances 5 which lock into corresponding hollows 6.

The heating part of the element is constructed from undulating resistance wire 7, with a depth of undulation which can vary according to requirements, and this resistance wire is wound onto the continuous mica blades 3 arranged on the steps 4, so that the electrical resistance has the overall configuration of a stepped pyramid with a polygonal base, thus producing an excellent implementation of uniform distribution 8 of the resistance wire 7 over the whole surface of the element over which the air flows with the objective of ensuring that the airflows are not at different temperatures.

When the heating element comprises, as is commonly the case, two or more resistances which can function simultaneously in parallel or singly, these resistances R_1 , R_2 are wound in alternate turns, thus creating an alternation between one winding and the next of the two resistance elements which dissipate the heat, always with the objective of obtaining the maximum possible airflows and uniform temperatures under the various working conditions.

Thus it is obvious that the heating element of the invention as claimed fully achieves the pre-set scopes and objectives and that numerous modifications, additions, replacements and/or variations to the heating elements can be made while still remaining within the scope of the invention and the scope of its protection as defined in the claims attached hereto.

Claims

1. Electrical resistance for axial flow fan heaters characterised by the fact that it consists of a heating element in which the undulated resistance wire is uniformly distributed forming a polygonal configuration, being fixed to step-shaped continuous mica blades arranged radially in a star shape on a metal support, in such a way as to obtain uniform airflows and temperatures under the various working conditions. 5 10

2. Electrical resistance according to claim 1, characterised by the fact that the metal support has a polygonal form, with grooved support sections extending radially from the apexes into which the continuous mica blades are inserted. 15

3. Electrical resistance according to claim 2, characterised by the fact that the continuous mica blades are fixed into the grooved support sections by a punching system which creates protruberances which lock into corresponding hollows. 20

4. Electrical resistance according to claims 1 - 3, characterised by the fact that the undulated resistance wire is wound onto the continuous mica blades and arranged on the relative steps in such a way that the electrical resistance takes on the overall configuration of a stepped pyramid with a polygonal base, thus implementing a uniform distribution of the resistance wire over the whole surface of the element over which the air flows, with the objective of obtaining uniform airflows and temperatures. 25 30

5. Electrical resistance according to one or more of the preceding claims, characterised by the fact that the resistances can function simultaneously in parallel or singly, that they are wound in alternate turns, that is to say creating an alternation, between one turn and the next of the two resistance elements which dissipate the heat, in order to obtain maximum uniformity of airflows and temperature. 35 40

6. Electrical resistance according to one or more of the preceding claims, characterised by the fact that the depth of the undulation of the resistance wire can vary according to the requirements. 45

7. Electrical resistance for axial flow fan heaters, constructed with undulated resistance wire, substantially as described above and illustrated in the various figures of the attached drawings, for the objectives specified here above. 50

Fig. 1

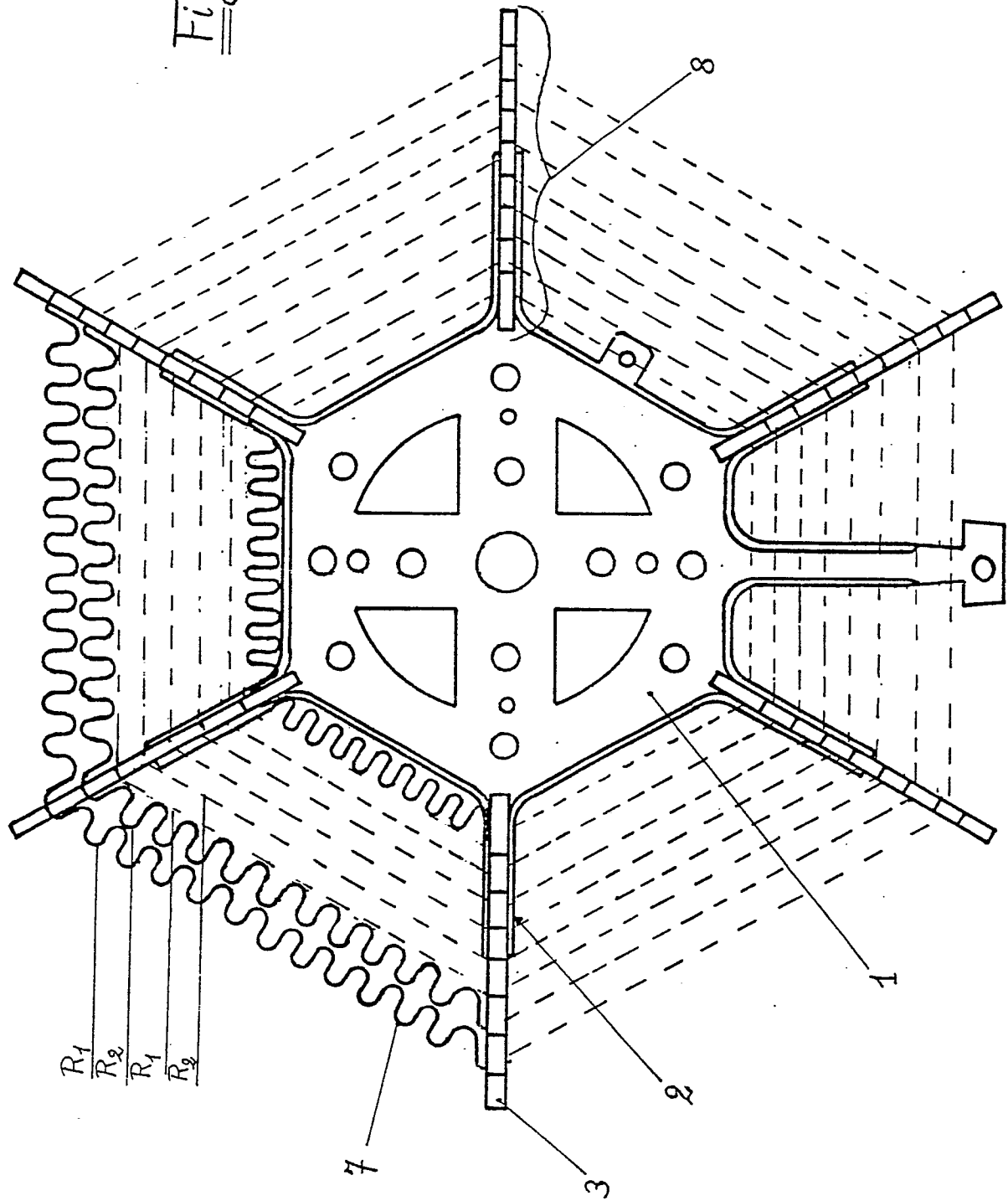


Fig. 3

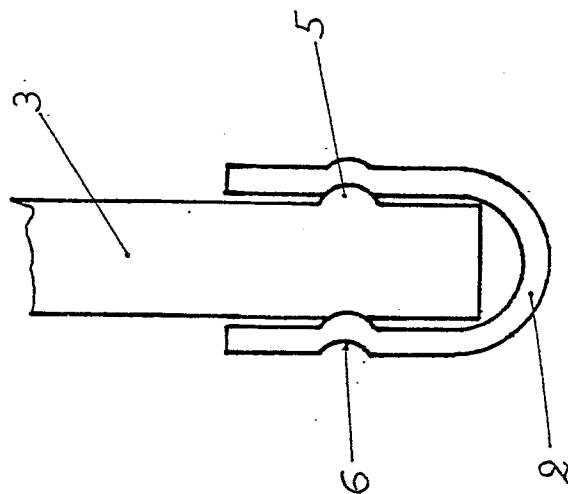
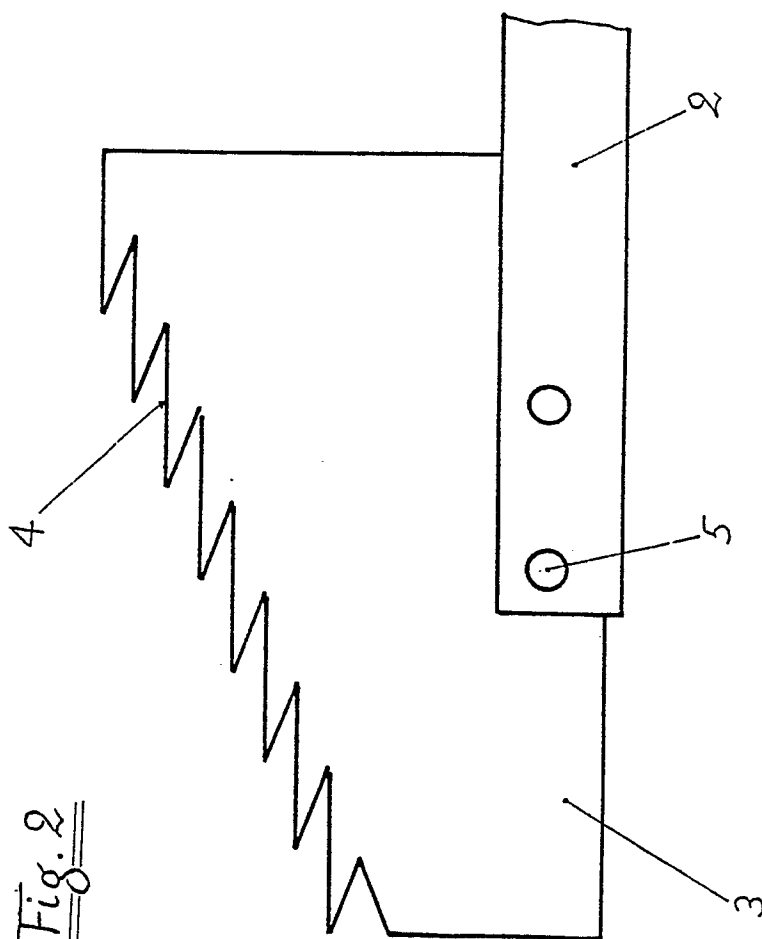


Fig. 2





EP 88 20 1100

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	GB-A-2 174 900 (BRISTOL-MYERS) * Page 2, lines 39-76; figures 2,4 * ----	1-4,7	H 05 B 3/16
A	DE-A-1 540 731 (EICHENAUER) * Page 7, paragraph 2; figures 1,2,4 * ----	1,2,4,7	
A	DE-A-2 407 588 (EICHENAUER) * Page 5, line 11 - page 6, line 13; figure 1 * ----	1-4,7	
A	EP-A-0 219 916 (NORTH AMERICAN PHILIPS) * Page 13, line 3 - page 14, line 12; figures 5-9 * ----	1,2,4,5 ,7	
A	FR-A-2 441 986 (EICHENAUER) * Page 6, line 2 - page 7, line 9; figures 1,2 * ----	1,2,5-7	
A	EP-A-0 038 414 (BRAUN AG) ----		
A	DE-A-2 849 258 (EICHENAUER) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			H 05 B 3/00
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22-08-1988	Examiner RAUSCH R.G.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	