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(54) **ELECTRIC RADIATOR**

(57) This invention relates to an electric radiator which can overcome the disadvantage of the prior art which heat area is limited and heat speed is slow and the structure is complicated. The radiator has a reflecting plate and flow deflectors. A part in room space can

be heated rapidly by the radiation of the reflecting plate. The temperature in whole room space is increased by vertical convection caused by flow deflectors. This invention has simple and compact structure, lighter weight, and lower cost.

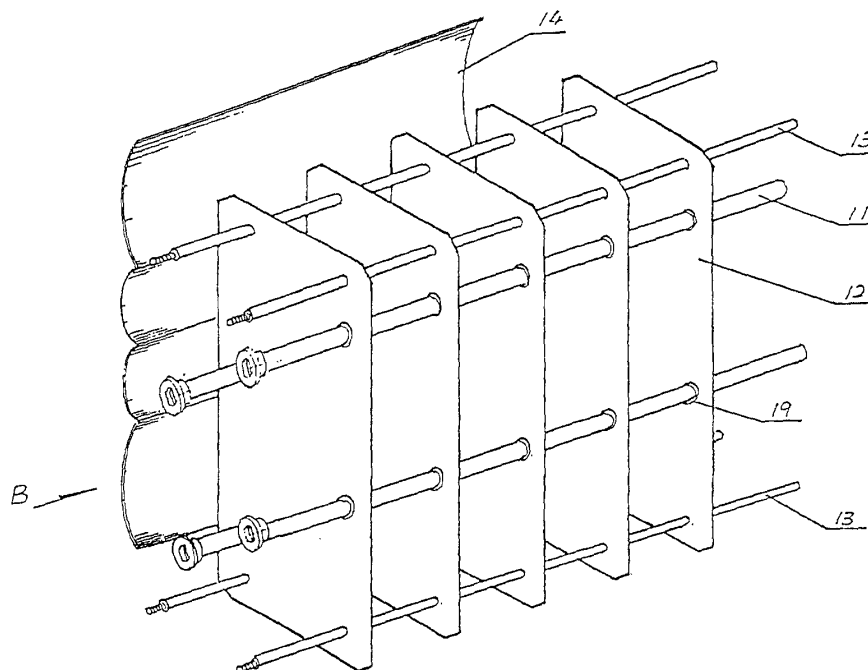


Fig 2

EP 1 367 337 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to heating equipment, and in particular to an electrical heater for indoor use.

BACKGROUND TO THE INVENTION

[0002] With people's living standard steadily improving, more and more families are using electrical heaters. The existing electrical heaters comprise a case and heating elements with two major kinds of structures.

[0003] One has a reflecting plate located in the case, which radiates heat produced by heating elements to heat and warm a limited space. Some electrical heaters of this kind have a fan in the case. The electrical heaters of this structure can only raise the temperature of a partial space. After the heaters have been switched on for some time, even the temperature of the partial space rises very high, temperature of the other parts in the same room is raised little. People will still feel cold when they leave the heated space for the other part of the room. The electrical heaters of this structure can only heat a limited space and a lot of heat energy is wasted with low effect.

[0004] Another kind of heater is equipped with radiator in its case, in which there are hollow columns. The hollow columns are filled with thermal conducting oil. When the oil is heated, it floats up. The heat produced by heating elements will make the heat circulate in the columns. A large quantity of heat will spread to the air indoor to raise the temperature of the whole room by convection of the radiator via the top of it. But the heater of this structure increases temperature slowly. People can feel warm only after it has been switched on for a long time. The structure of the heater is complicated, bulky and too heavy to move easily. And the cost of the heater is also comparatively higher for it is filled with thermal conducting oil and then strict hermetic seal is required.

SUMMARY TO THE INVENTION

[0005] The present utility model is to provide a heater with simple and compact structure, lighter weight and lower cost, which not only raises the temperature of the partial space rapidly by radiation but also raises the temperature of the whole room by convection.

[0006] The present utility model, thus, relates to an electrical heater, which comprised of a casing, heating elements and a reflecting plate whose reflecting face directly towards the heating elements, wherein the heating elements are ranked at a distance and passed through the aligned apertures on the heating conducting plates made of heat-resistant materials in the case.

[0007] Because there is a reflecting plate in the

present utility model, by the radiation of the reflecting plate, the present utility model can heat partial space quickly. Based on the principle that the air ascends when heated and descends when refrigerated, the radiant conductive sheets made of strong heat-resistant material will make the air in the electrical heater convect vertically. The room temperature will rise by continuous cycling of heat. As the radiant conductive sheets do not require hollow columns and thermal conducting oil, the heater has the advantage of simple and compact structure, lighter weight and lower cost.

[0008] The invention is described in great detail as follows with reference to the attached figures and exploiting examples.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG.1 is a perspective view of an electrical heater according to the utility model.

FIG2 is the structure of the utility model inside.

FIG.3 is a B way view of FIG.2

FIG4 is a cross-section view along the line A-A in FIG.1.

FIGS illustrates an embodiment of the radiant conductive sheets connecting with joint rods.

FIG.6 illustrates an embodiment of the aligned apertures opened in the radiant conductive sheets.

FIG.7 illustrates another embodiment of the aligned apertures (slots) opened in the radiant conductive sheets.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Example 1 of exploitation

[0010] The present utility model relates to an electrical heater, which comprises a case 1, in which heating elements 11 and a reflecting plate 14 are located. The heating elements 11 can be infrared heating elements, halogen heating elements or other elements that can transform electricity energy into heat. The case 1 comprises left side cover 2, right side cover 3, upper cover 4, and lower cover 5. The reflective surface of the reflecting plate 14 is located towards the heating elements. There are radiant conductive sheets 12 manufactured with heat-resistant material in the case. The heat-resistant material can be stainless steel, copper, aluminum or other nonmetal heat-resistant material. The joint rods 13 pass through the radiant conductive sheets 12, as shown in FIG.5, and the two ends of the joint rods 13 are bolted with left side cover 2 and right side cover 3. Therefore the radiant conductive sheets 12 are fixed on the case 1, as shown in FIG.3 and FIG4. The heating elements 11 rank at a distance, and pass through the aligned apertures 19 opened in the radiant

conductive sheets 12. The inner diameter of the aligned apertures 19 is bigger than the outer diameter of the heating elements 11. There is always a space of about 0.5mm-5mm between inner edge of the aligned apertures 19 and outer edge of the heating elements 11. The space between the aligned apertures 19 and the heating elements 11 not only makes the heating elements 11 operate normally, avoiding the damage caused by the hot and expanding radiant conductive sheets, but also produce enough vertical convection. The radiant conductive sheets 12 can be either rectangle or other shape fitted with the shape of the case 1, even irregular shape. There can be various diversion grooves and corrugations on the radiant conductive sheets 12 to strengthen heat radiation and vertical convection.

[0011] There is also a metal protecting mesh 18 as shown in FIG.1 and FIG.4 to prevent the user from touching high-temperature heater carelessly.

Example 2 of exploitation

[0012] There are grooves on the case 1. The radiant conductive sheets 12 pass through the open aligned apertures in the reflecting plate 14 and are inserted in the grooves on the case 1. So the radiant conductive sheets are fixed in the case 1 without joint rods 13. The other structures are the same as example 1.

Example 3 of exploitation

[0013] The aligned apertures 19 opened in the radiant conductive sheet 12 can be sealed as circular ones or non-sealed slots. The other structures are the same as example 1 of exploitation.

Claims

1. An electrical heater is comprised of a casing (1), heating elements (11) and a reflecting plate (14) whose reflecting face directly towards the heating elements (11), wherein the heating elements(11) are ranked at a distance and passed through the aligned apertures (19) on the heating conducting plates (12) made of heat-resistant materials in the case (1).
2. An electrical heater according to claim 1, wherein the apertures (19) on the heating conducting plates (12) are dimensioned such that there is a space between the inner track of the apertures (19) and the periphery of the heating elements (11).
3. An electrical heater according to claim 1, wherein each heating element(11) is selected from infra red heating elements, halogen heating elements or any other elements that can transform electricity energy into heat.

4. An electrical heater according to claim 1, wherein the apertures (19) on the heating conducting plates (12) are sealed or non-sealed opening.

5. An electrical heater according to claim 1, wherein the mounting means comprises space grooves in the casing (1) for receiving edge portion of the heating conducting plates (12) passed the opening of the reflecting plates (14).

6. An electrical heater according to claim 1, wherein the mounting means is that the heating conducting plates (12) are connected by connecting rods (13) secured in the casing.

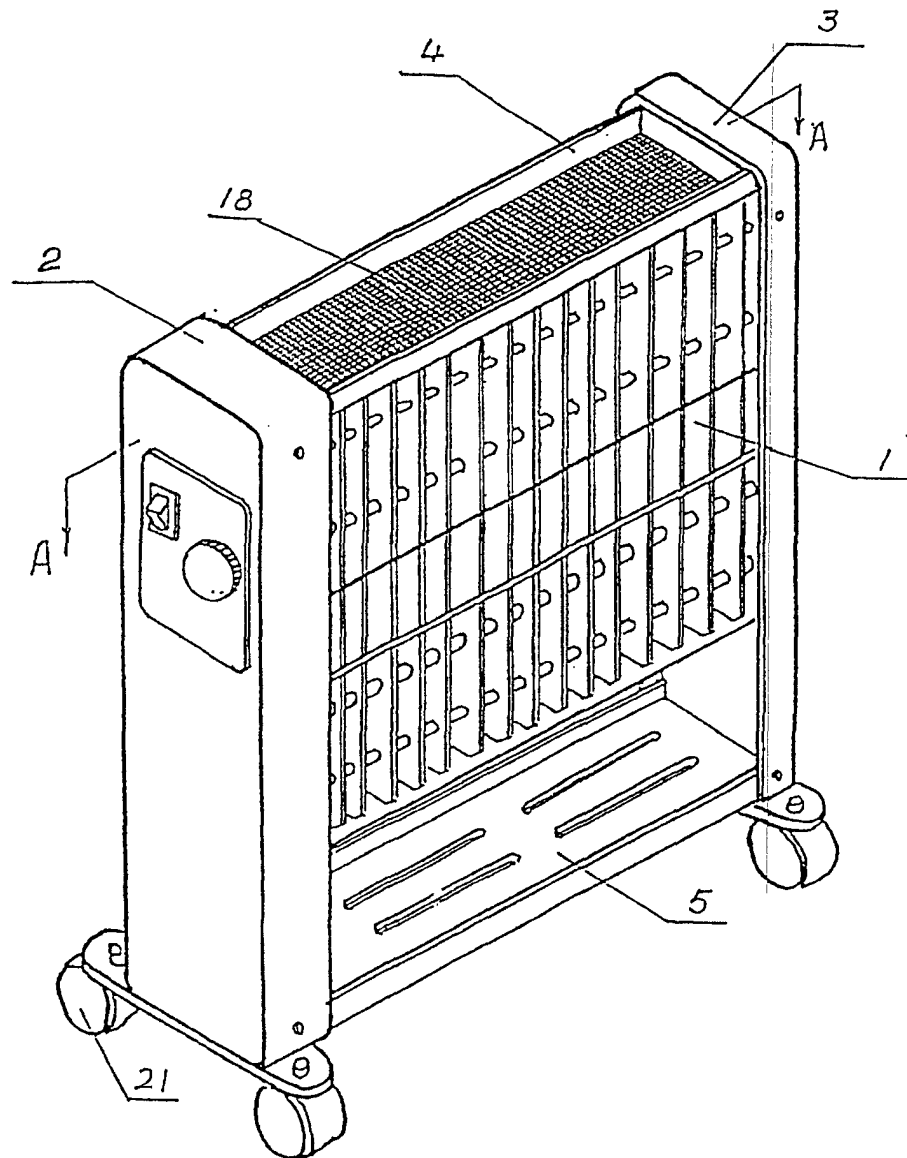


Fig 1

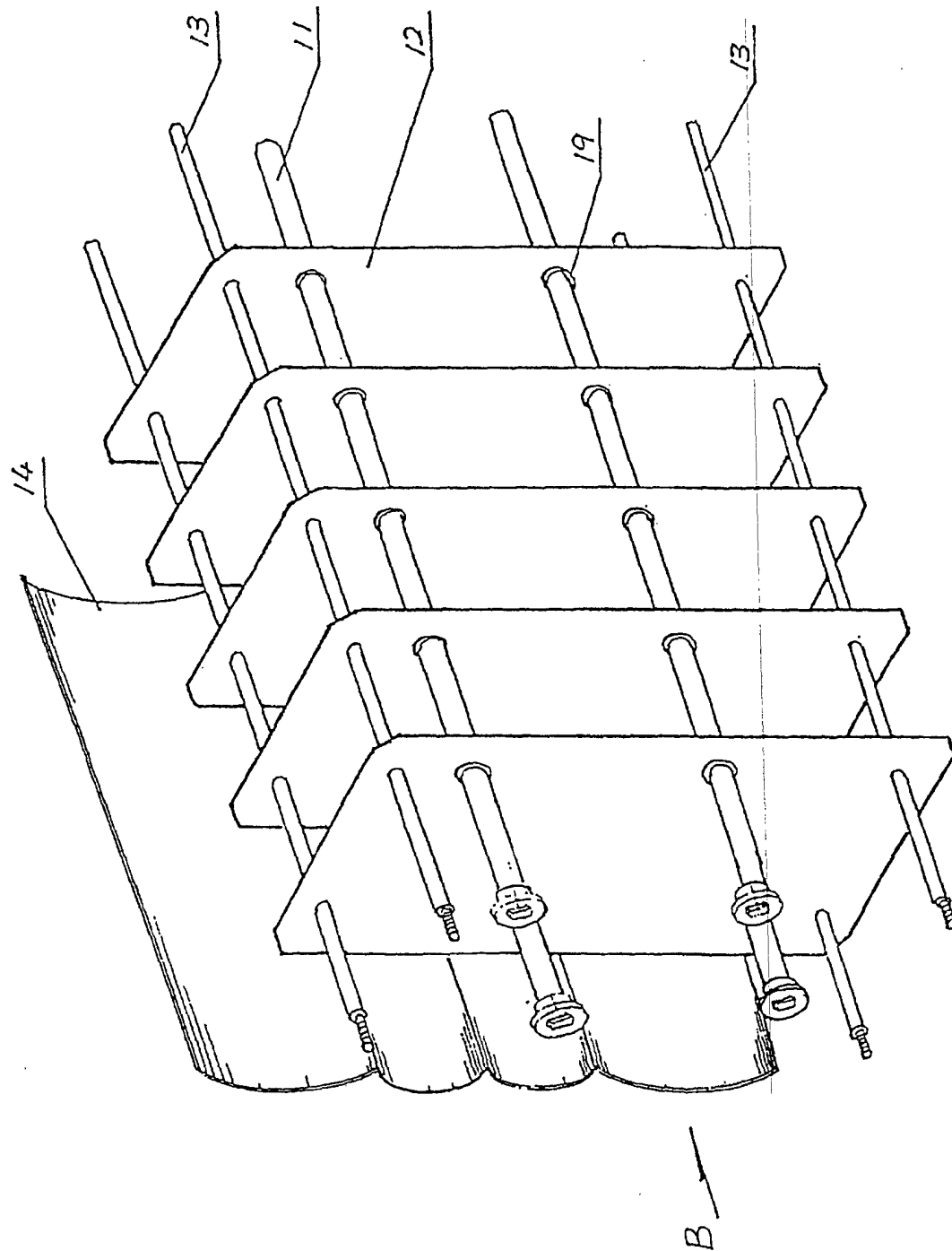


Fig 2

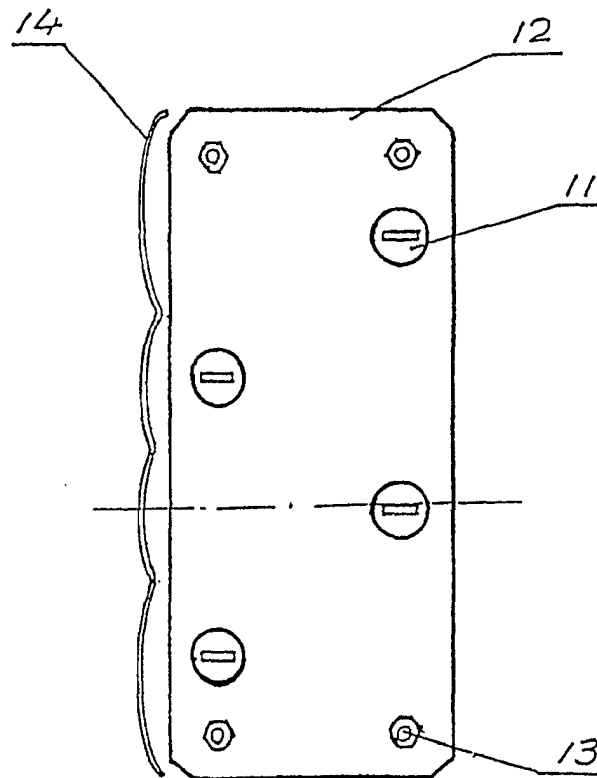


Fig 3

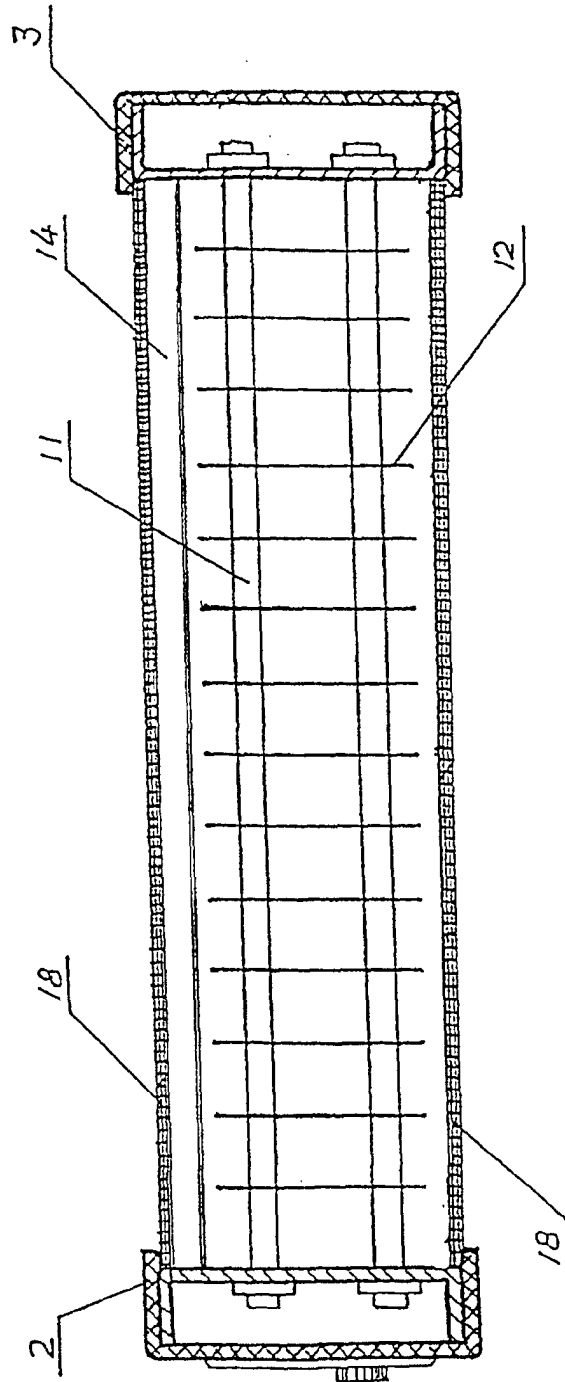


Fig 4

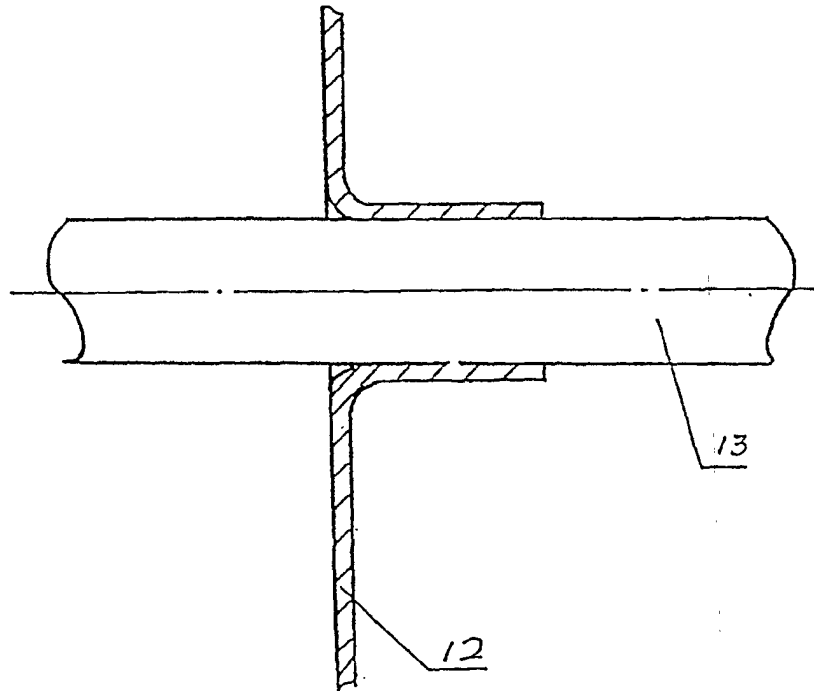


Fig 5

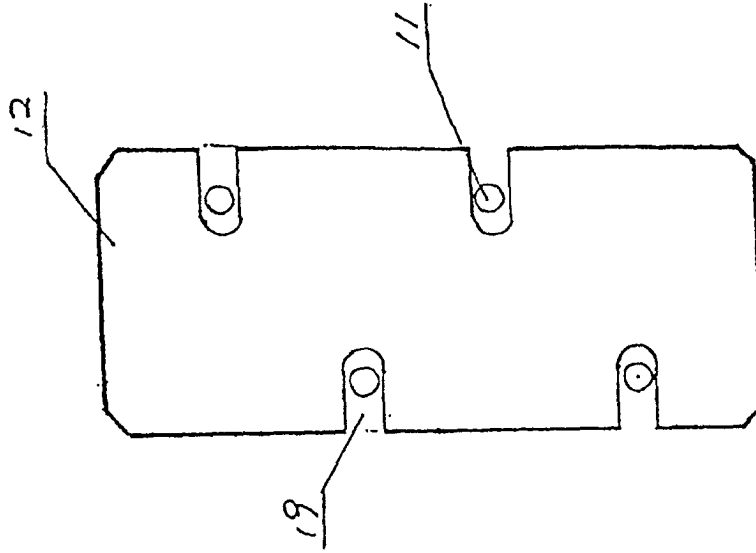


Fig 7

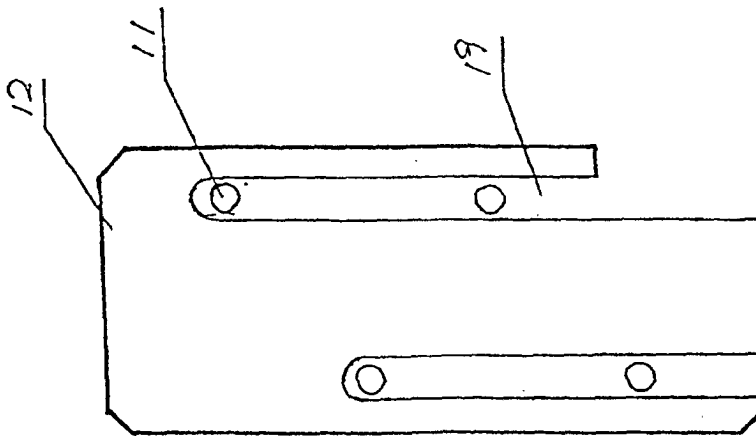


Fig 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN 01/00976

A. CLASSIFICATION OF SUBJECT MATTER		
IPC ⁷ F24H 3/04		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC ⁷ F24H 3/04, 3/00, F28D 1/02, 1/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Chinese Patent Document		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
EPOQUE, CNPAT		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN,Y,2356271 (Hou Xiwu) 29. Dec. 1999 (29.12.99) whole document	1,4-6
Y	CN,U,2099951 (Haerbin Architectural Engineering College) 25. Mar. 1992 (25.03.92) whole document	1,4-6
Y	CN,Y,2179683 (Hangzhou Safety factory) 12. Oct. 1994 (12.10.94) whole document	2,3
Y	CN,Y,2371500 (Xu Huijiu) 29. Mar. 000 (29.03.00) whole document	2,3
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
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Name and mailing address of the ISA/CN 6 Xitucheng Rd., Jimen Bridge, Haidian District, 100088 Beijing, China Facsimile No. 86-10-62019451		Authorized officer XU, Niankang Telephone No. 86-10-62093963

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