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(54) **Two-piece heating device**

(57) A two-piece warming oven (1) includes a base (2), a heat-conducting unit (3), and a heating unit (4) for heating the conducting member (33). The base (2) includes a supporting plate (21), and a plurality of spaced-apart upright supporting rods (22) disposed around the supporting plate (21) and having lower end portions connected fixedly to an outer periphery of the supporting plate (21) to define an accommodating space (27) above the supporting plate (21) and among the supporting rods (22). The heat-conducting unit (3) is connected removably to the base (2), and is convertible between a used position, where the heat-conducting unit (3) is disposed above the accommodating space (27), and a storage position, where the heat-conducting unit (3) is inverted and extends into the accommodating space (27).

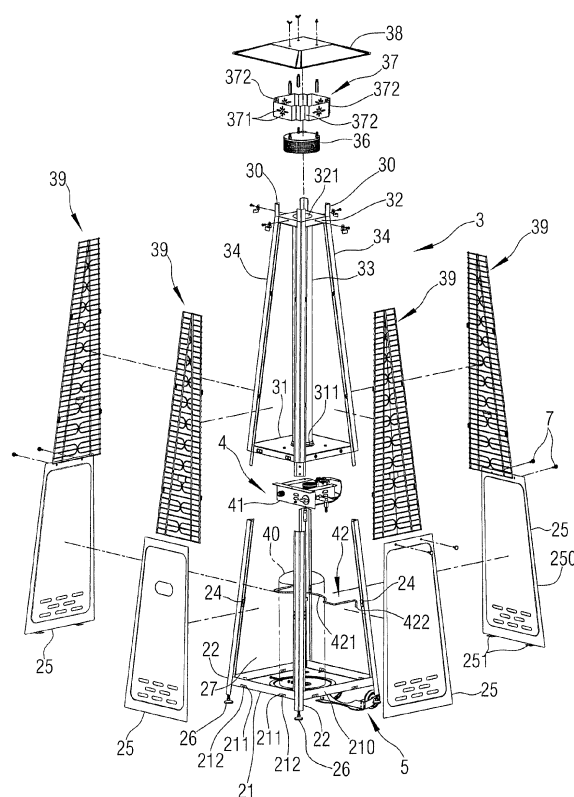


FIGURE 3

Description

[0001] This invention relates to a warming oven, and more particularly to a two-piece warming oven including two pieces, one of which is invertible to reduce the total volume and length of the warming oven for storage and transportation.

[0002] In a warming oven disclosed in Chinese Patent Application No. 200730048740.3, heat is generated by a heating unit disposed within a base, and is transmitted upwardly through a heat-conducting tube for increasing the surrounding temperature. During generation of the heat, a fire flame occurs in the heat-conducting tube to have a better decorating effect. To comply with safety regulation, such a warming oven must have a height of at least two meters, thereby resulting in inconvenience during storage and transportation of the warming oven.

[0003] The object of this invention is to provide a warming oven that is convenient to store and transport.

[0004] According to this invention, a two-piece warming oven includes a base, a heat-conducting unit, and a heating unit for heating the conducting member. The base includes a supporting plate, and a plurality of spaced-apart upright supporting rods disposed around the supporting plate and having lower end portions connected fixedly to an outer periphery of the supporting plate to define an accommodating space above the supporting plate and among the supporting rods. The heat-conducting unit is connected removably to the base, and is convertible between a used position, where the heat-conducting unit is disposed above the accommodating space, and a storage position, where the heat-conducting unit is inverted and extends into the accommodating space.

[0005] An assembly of the base and the heating unit acts as one of the two pieces, and the heat-conducting unit acts as the other of the two pieces. When the heat-conducting unit is disposed at the storage position, since a major portion thereof extends into the accommodating space to reduce significantly the total volume and length of the warming oven, the warming oven is convenient to store and transport.

[0006] These and other features and advantages of this invention will become apparent in the following detailed description of a preferred embodiment of this invention, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of the preferred embodiment of a warming oven according to this invention; Fig. 2 is a side view of the preferred embodiment; Fig. 3 is an exploded perspective view of the preferred embodiment; Fig. 4 is a fragmentary exploded perspective view of the preferred embodiment; Fig. 5 is a schematic view of the preferred embodiment, illustrating a used position of a heat-conducting unit; and

Fig. 6 is a side view of the preferred embodiment, illustrating a storage position of the heat-conducting unit.

[0007] Referring to Figs. 1 and 2, the preferred embodiment of a two-piece warming oven 1 according to this invention includes a base 2, a heat-conducting unit 3 connected removably to the base 2, a heating unit 4 (see Fig. 3) for heating the heat-conducting unit 3, and a roller unit 5 disposed on a lateral side of the base 2. In this embodiment, an assembly of the base 2, the heating unit 4, and the roller unit 5 acts as one of the two pieces, and the heat-conducting unit 3 acts as the other of the two pieces.

[0008] With further reference to Figs. 3 and 4, the base 2 includes a supporting plate 21, a plurality of spaced-apart upright supporting rods 22 of L-shaped cross-section disposed around the supporting plate 21 and having lower end portions connected fixedly to an outer periphery of the supporting plate 21, a plurality of first coupling members 23 connected respectively and fixedly to top ends of the supporting rods 22 and each formed with two threaded holes 231, two engaging rings 24 disposed respectively and fixedly on two adjacent ones of the supporting rods 22, a plurality of stop plates 25 each connected between two adjacent ones of the supporting rods 22, and a plurality of height-adjustable supports 26 connected to and disposed under bottom ends of the supporting rods 22, respectively. The supporting plate 21 cooperates with the supporting rods and the stop plates 25 to define an accommodating space 27 above the supporting plate 21 and among the supporting rods 22 and the stop plates 25. In this embodiment, the supporting plate 21 is square, and has four upright side plate portions 210 disposed respectively at four sides thereof. Each of the side plate portions 210 is formed with an inverted U-shaped slot 211 therethrough that has a horizontal slot section and two upright slot sections extending respectively and downwardly from two ends of the horizontal slot section to define a projecting plate portion 212 among the horizontal slot section and the upright slot sections. Each of the stop plates 25 has a plate body 250 and two retaining rings 251 welded to the plate body 250. Since each of the retaining rings 251 is sleeved on the corresponding plate portion 212, and since each of the lateral side surfaces of each of the stop plates 25 is in intimate contact with the corresponding supporting rod 22, the stop plates 25 can be positioned relative to the supporting plate 21 and the supporting rods 22.

[0009] The heat-conducting unit 3 includes: a positioning plate 31 defining a top end of the accommodating space 27 and having a first aperture 311; a top plate 32 spaced apart from and disposed above the positioning plate 31 and having a second aperture 321; a conducting member 33 configured as an upright quartz glass tube, connected between the positioning plate 31 and the top plate 32, and in fluid communication with the first and second apertures 311, 321; a plurality of upright connect-

ing rods 34 disposed around the conducting member 33, connected fixedly to outer peripheries of the positioning plate 31 and the top plate 32, locked respectively and removably on the supporting rods 22 by a plurality of first lock bolts 6 (see Fig. 4); a plurality of second coupling members 35 connected respectively and fixedly to the connecting rods 34 and having bottom ends disposed below the connecting rods 34; a fireproof net 36 disposed on and above the top plate 32 and around the second aperture 321; a windproof shield 37 disposed around the fireproof net 36 and having a plurality of vent holes 371; a top cover 38 disposed fixedly on and above the fireproof net 36; a plurality of net plates 39 each connected fixedly between two adjacent ones of the connecting rods 34; and a plurality of zigzag retaining plates 30 located around the windproof shield 37 and disposed fixedly on and extending respectively and upwardly from top ends of the connecting rods 34. The windproof shield 37 further has a plurality of zigzag plate portions 372 abutting respectively against the zigzag retaining plates 30, so as to prevent movement of the windproof shield relative to the zigzag retaining plates 30. The cross-section shape of each of the connecting rods 34 is the same as that of each of the supporting rods 22, such that bottom end surfaces of the connecting rods 34 abut respectively against top end surfaces of the supporting rods 22. Each of the second coupling members 35 is configured as a flat plate, and has two through holes 351 formed there-through.

[0010] With further reference to Fig. 5, the heating unit 4 includes a fuel source 40 configured as a gas barrel and placed on the top surface of the supporting plate 21, a heater 41 that is heated by the fuel source 40, that is attached to and disposed under the positioning plate 31 of the heat-conducting unit 3, and that is aligned with the first aperture 311, and a position-limiting member 42 hooked removably on two adjacent ones of the supporting rods 22 for positioning the fuel source 40 within the accommodating space 27 in the base 2. The heater 41 is used for heating the conducting member 33 of the heat-conducting unit 3. The position-limiting member 42 has a curved intermediate section 421 for contact with the fuel source 40, and two L-shaped ends 422 inserted respectively into the engaging rings 24.

[0011] In this embodiment, the roller unit 5 is attached to a side of the supporting plate 21.

[0012] The heat-conducting unit 3 is convertible between a used position shown in Fig. 5, where the heat-conducting unit 3 is connected fixedly to and disposed above the base 2, and a storage position shown in Fig. 6, where the heat-conducting unit 3 is inverted and received partially within the accommodating space 27 in the base 2. At the used position, the heat-conducting unit 3 is disposed above the accommodating space 27, the connecting rods 34 are connected respectively to the supporting rods 22 by the first lock bolts 6 extending respectively through the through holes 351 in the second coupling members 35 and engaging respectively the

threaded holes 231 in the first coupling member 23, and each of the stop plates 25 is connected fixedly to the positioning plate 31 by two second lock bolts 7 (see Fig. 3), such that the fuel source 40 can be placed on the supporting plate 21. When the heat-conducting unit 3 is at the used position and when it is desired to move the two-piece warming oven 1 from one place to another place, the two-piece warming oven 1 is reclined in a direction (A) (see Fig. 5) until the roller unit 5 comes into contact with the ground. Hence, the two-piece warming oven 1 acts as a wheeled device, and can be pushed easily and conveniently. When the wheeled device is moved, since the curved portion 421 of the position-limiting member 42 is concave away from the fuel source 40, as shown in Figs. 3 and 5, the fuel source 40 can be supported stably by the curved portion 421 of the position-limiting member 42.

[0013] When use of the two-piece warming oven 1 is intended, the height adjustable supports 26 are first adjusted so as to allow the two-piece warming oven 1 stand stably. Next, the heater 41 is operated so that a fire flame is produced in the quartz glass tube 33 and goes upwardly out of the quartz glass tube 33 through the second aperture 321. Hence, the quartz glass tube 33 is heated so that the surrounding temperature arises. During heating, the fireproof net 36 and the windproof shield 37 disposed above the quartz glass tube 33 cooperate to prevent the fire flame to go out laterally, and the vent holes 371 in the windproof shield 37 permit supplementation of fresh air into the quartz glass tube 33 therethrough to prevent incomplete combustion due to lack of oxygen gas.

[0014] When a reduction in the total volume or total length of the two-piece warming oven 1 is desired, e.g., for a manufacturer to transport the two-piece warming oven 1 to a distributor, the first lock bolts 6 are first removed so that the heat-conducting unit 3 can be removed from the base 2. Next, the fuel source 40, the position-limiting member 42, the top cover 38, the windproof shield 37, the fireproof net 36, and the second lock bolts 7 are removed. Subsequently, the heat-conducting unit 3 can be inverted and inserted into the accommodating space 27 until the intermediate portions of the connecting rods 34 come into contact with the top ends of the supporting rods 22, so that the heat-conducting unit 3 is disposed at the storage position. At the storage position, the two-piece warming oven 1 can also be changed to a wheeled device for convenience of transportation. During such a transportation, since the zigzag structure of the connecting rods 34 and the supporting rods 22, the connecting rods 34 can be supported stably by the supporting rods 22.

[0015] It should be noted that, the number and shape of each of the connecting rods 34 and the supporting rods 22 can be changed according to actual needs.

[0016] As such, since the base 2 is connected removably to the heat-conducting unit 3, the two-piece warming oven 1 is convenient to store and transport. Thus, the

object of this invention is achieved. Furthermore, the fuel source 40 is supported stably by the position-limiting member 42. Further, since the windproof shield 37 can be positioned by the zigzag retaining plates 30, no positioning means is required to maintain the position of the windproof shield 37 relative to the top plate 32.

Claims

1. A two-piece warming oven (1) **characterized by:**

a base (2) including a supporting plate (21) having a top surface, and a plurality of spaced-apart upright supporting rods (22) disposed around said supporting plate (21) and having lower end portions connected fixedly to an outer periphery of said supporting plate (21) to define an accommodating space (27) above said supporting plate (21) and among said supporting rods (22); a heat-conducting unit (3) connected removably to said base (2) and convertible between a used position, where said heat-conducting unit (3) is disposed above said accommodating space (27), and a storage position, where said heat-conducting unit (3) is inverted and extends into said accommodating space (27), said heat-conducting unit (3) including a conducting member (33); and

a heating unit (4) disposed on said base (2) for heating said conducting member (33) when said heat-conducting unit (3) is at said used position; wherein, when said heat-conducting unit (3) is at said storage position, at least one portion of said heat-conducting unit (3) is removed from the remaining portion of said heat-conducting unit (3), and at least one portion of said heating unit (4) is removed from said base (2).

2. The two-piece warming oven (1) as claimed in Claim 1, **characterized in that** said heat-conducting unit (3) further includes a positioning plate (31) that defines a top end of said accommodating space (27) in said base (2) when at said used position, a top plate (32) disposed above said positioning plate (31), and a plurality of connecting rods (34) that are disposed around said conducting member (33), that are connected fixedly to outer peripheries of said positioning plate (31) and said top plate (32), and that are locked respectively and removably on said supporting rods (22) of said base (2), said conducting member (33) being configured as an upright quartz glass tube connected between said positioning plate (31) and said top plate (32).

3. The two-piece warming oven (1) as claimed in Claim 1, **characterized in that** each of said supporting rods (22) of said base (2) and said connecting rods

(34) of said heat-conducting unit (3) has an L-shaped cross-section, such that top end surfaces of said supporting rods (22) abut against bottom end surfaces of said connecting rods (34) when said heat-conducting unit (3) is at said used position, and such that intermediate portions of said supporting rods (22) abut respectively against top ends of said supporting rods (22), said base (2) further including a plurality of first coupling members (23) connected respectively and fixedly to said supporting rods (22), each of said first coupling members (23) being formed with a plurality of threaded holes (231), said heat-conducting unit (3) further including a plurality of second coupling members (35) connected respectively and fixedly to said connecting rods (34), each of said second coupling members (35) having a plurality of through holes (351) that are formed therethrough and that are disposed below a corresponding one of said connecting rods (34), said two-piece warming oven (1) being further **characterized by** a plurality of lock bolts (6) extending respectively through said through holes (351) in said second coupling members (35) and engaging respectively said threaded holes (231) in said first coupling members (23), so that said connecting rods (34) are locked respectively and removably on said supporting rods (22).

4. The two-piece warming oven (1) as claimed in Claim 2, wherein said heating unit (4) includes a fuel source (40) placed on said top surface of said supporting plate (21), a heater (41) that is heated by said fuel source (40) and that is attached to and disposed under said positioning plate (31), and a position-limiting member (42) hooked removably on two adjacent ones of said supporting rods (22) for positioning said fuel source (40) within said accommodating space (27) in said base (2), said fuel source (40) and said position-limiting member (42) constituting two said portions of said heating unit (4).

5. The two-piece warming oven (1) as claimed in Claim 4, further **characterized in that** said base (2) further includes two engaging rings (251) disposed respectively and fixedly on said two adjacent ones of said supporting rods (22), said position-limiting member (42) having two L-shaped ends (422) inserted respectively into said engaging rings (251).

6. The two-piece warming oven (1) as claimed in Claim 5, further **characterized in that** said fuel source (40) is configured as a gas barrel, and said position-limiting member (42) further has a curved intermediate section (421) for contact with said gas barrel.

7. The two-piece warming oven (1) as claimed in Claim 4, further **characterized in that** said positioning plate (31) has a first aperture (311), and said top

plate (32) has a second aperture (321), said heater (41) being aligned with said first aperture (311), said quartz glass tube being in fluid communication with said first and second apertures (311, 321).

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8. The two-piece warming oven (1) as claimed in Claim 9, further **characterized in that** said heat-conducting unit (3) further includes a fireproof net (36) disposed fixedly on and above said top plate (32) and around said second aperture (321), a windproof shield (37) disposed fixedly on and above said top plate (32), surrounding said fireproof net (36), and having a plurality of vent holes (371); and a top cover (38) disposed fixedly on and above said fireproof net (36), said fireproof net (36), said windproof shield (37), and said top cover (38) constituting three said portions of said heat-conducting unit (3). 10
9. The two-piece warming oven (1) as claimed in Claim 8, further **characterized in that** said heat-conducting unit (3) further includes a plurality of zigzag retaining plates (30) located around said windproof shield (37) and disposed respectively and fixedly on and extending upwardly from top ends of said connecting rods (34), and said windproof shield (37) has a plurality of zigzag plate portions (372) abutting respectively against said zigzag retaining plates (30), so as to prevent movement of said windproof shield (37) relative to said zigzag retaining plates (30). 15 20 25 30
10. The two-piece warming oven (1) as claimed in Claim 2, further **characterized in that** said supporting plate (21) is polygonal, and said two-piece warming oven (1) being further **characterized by** a roller unit (5) disposed on a side of said supporting plate (21). 35
11. The two-piece warming oven (1) as claimed in Claim 2, further **characterized in that** said heat-conducting unit (3) further includes a plurality of net plates (39) each connected fixedly between two adjacent ones of said connecting rods (34). 40
12. The two-piece warming oven (1) as claimed in Claim 1, **characterized in that** said base (2) further includes a plurality of stop plates (25) each connected between two adjacent ones of said supporting rods (22) for confining said fuel source (40) within said accommodating space (27). 45
13. The two-piece warming oven (1) as claimed in Claim 1, **characterized in that** said base (2) further includes a plurality of height-adjustable supports (26) connected to and disposed under bottom ends of said supporting rods (22), respectively. 50 55

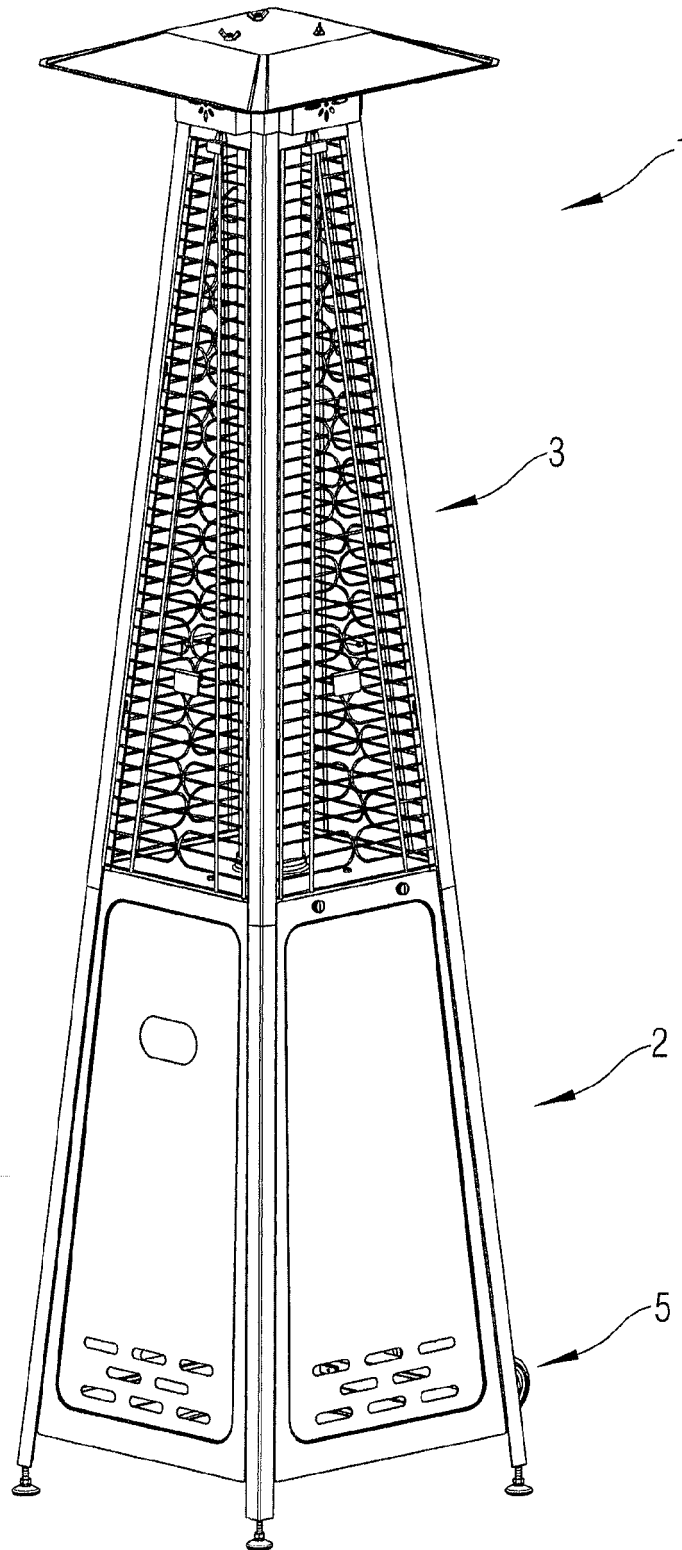


FIGURE 1

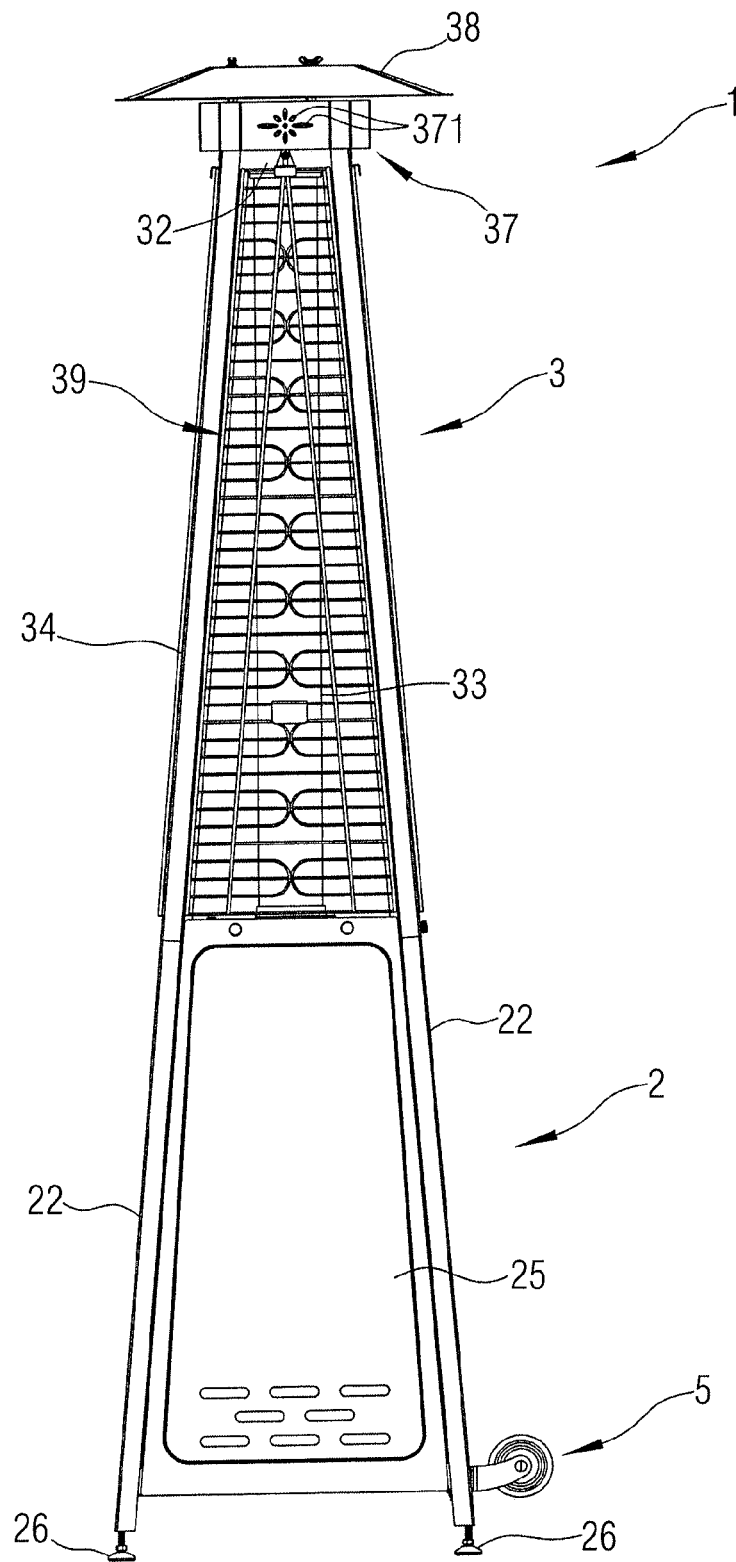


FIGURE 2

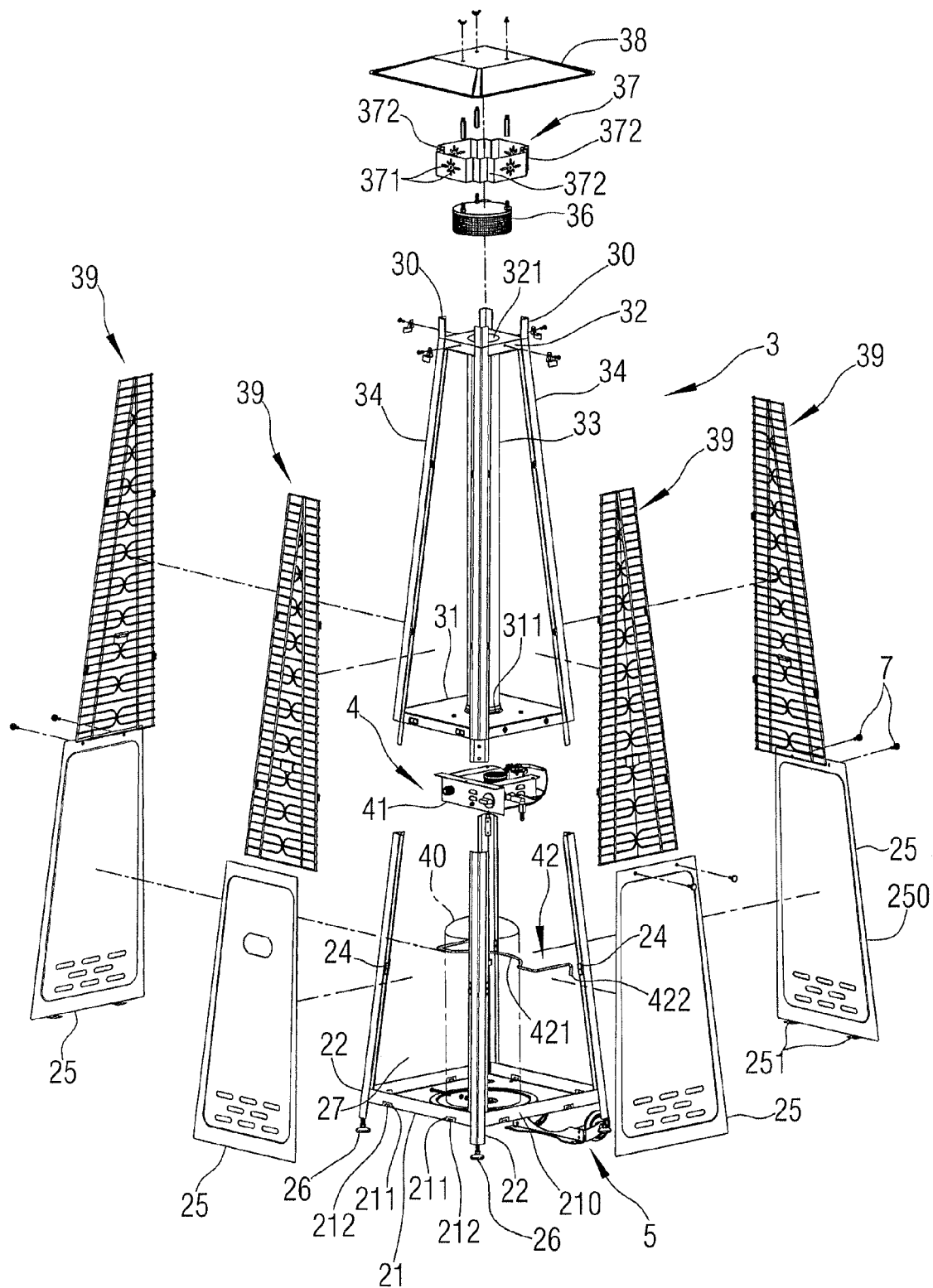


FIGURE 3

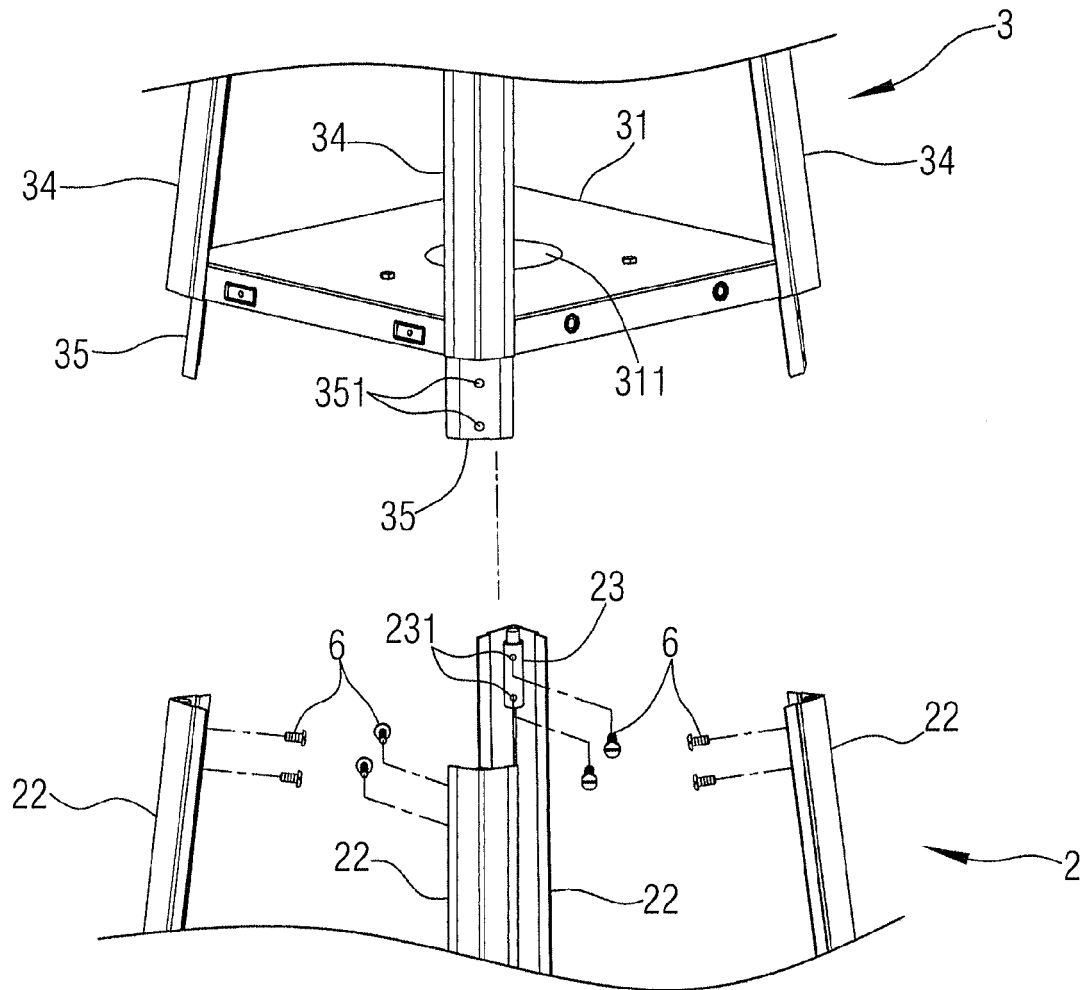


FIGURE 4

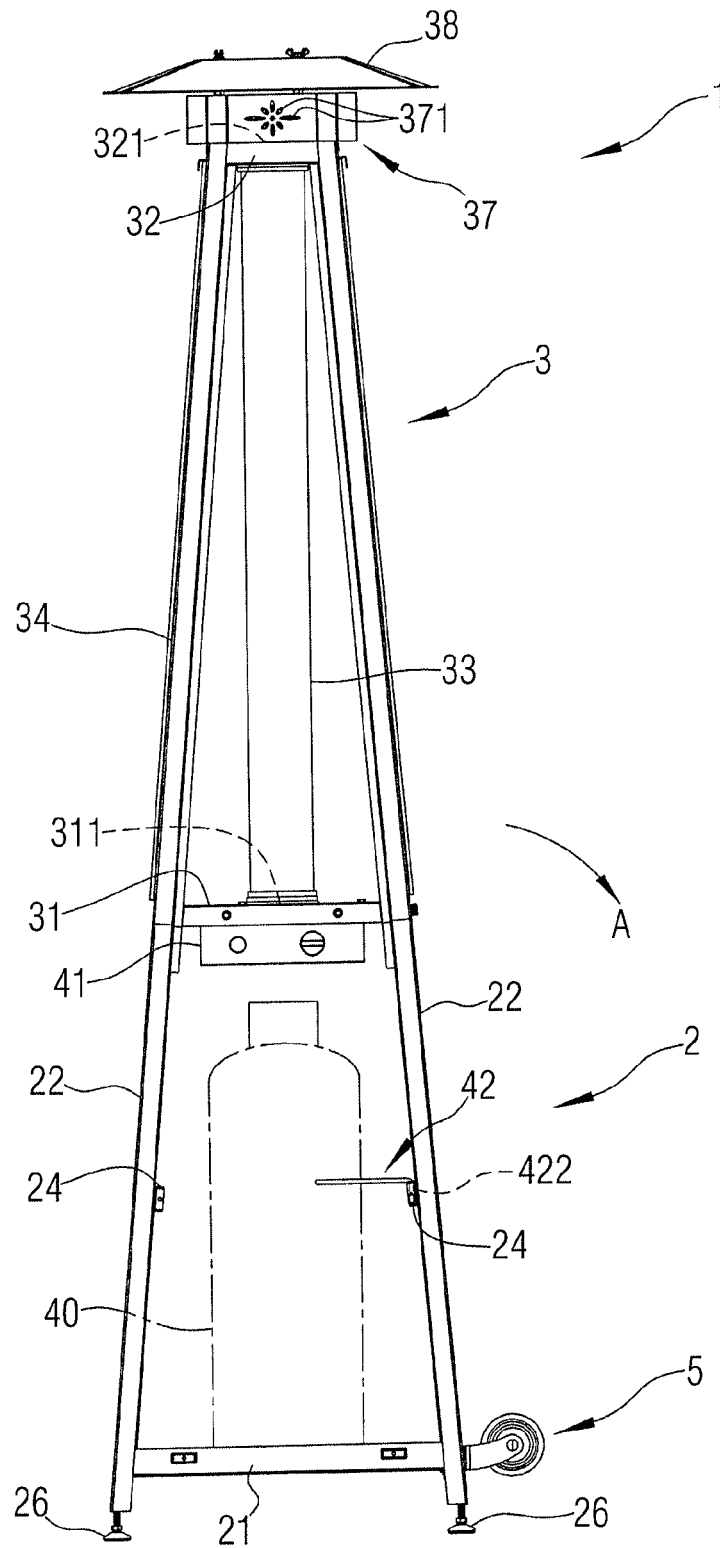


FIGURE 5

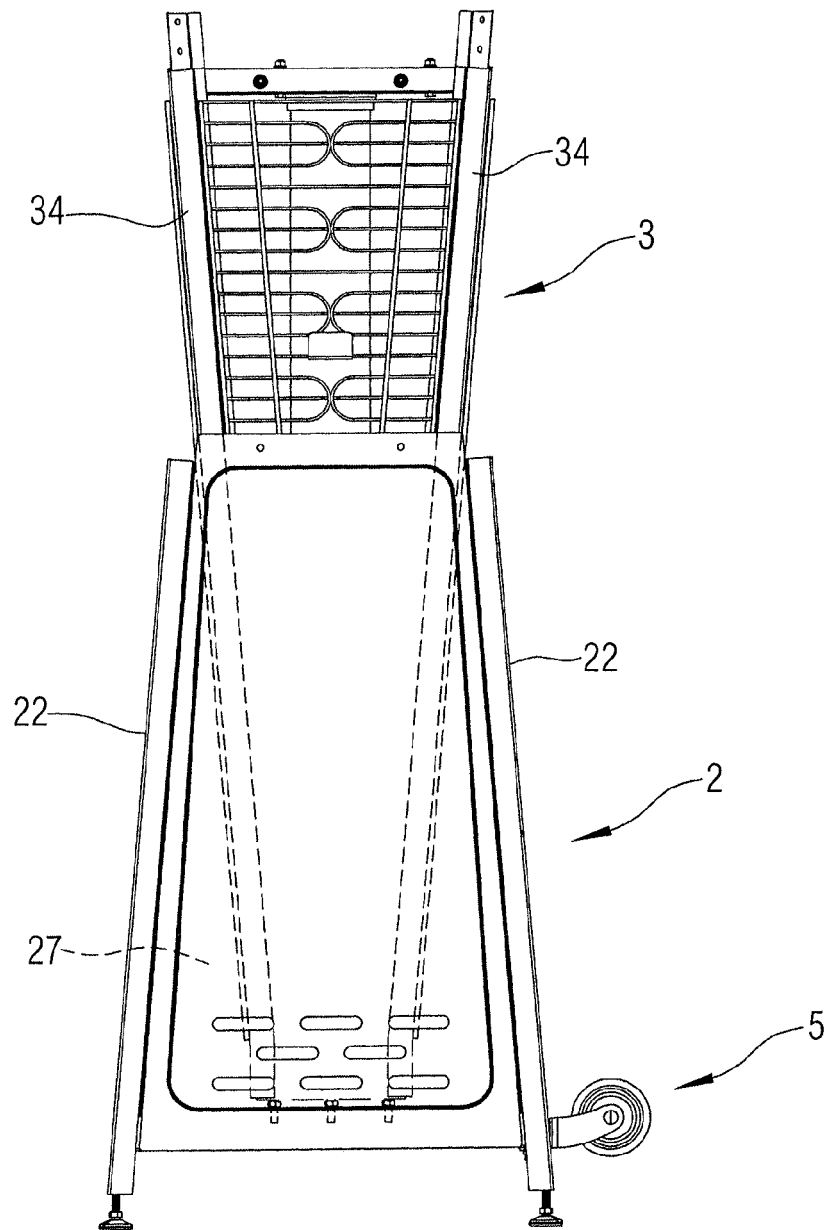


FIGURE 6



EUROPEAN SEARCH REPORT

Application Number
EP 12 16 9268

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 April 2013	Examiner Verdoodt, Luk
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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