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(71) Applicants:
- **De Smecht, John**
  **8691 Beveren aan de Ijzer (BE)**
- **Roussel, Nadine**
  **8691 Beveren aan de Ijzer (BE)**

(72) Inventors:
- **De Smecht, John**
  **8691 Beveren aan de Ijzer (BE)**
- **Roussel, Nadine**
  **8691 Beveren aan de Ijzer (BE)**

(74) Representative: **Cardoen, Annelies Andréa C. et al**
**KOB NV**
**President Kennedypark 31c**
**8500 Kortrijk (BE)**

## (54) ELECTRIC FIREPLACE

(57) Electric fireplace (1) comprising a projection space (2) in which flames are projected, wherein said projection space (2) is at least visible from a front side of the electric fireplace (1), and comprising a first image-generating element (3) for displaying a first image comprising flames, and comprising a projection element (4) for projecting the first image as an upright projection image (8) in the projection space (2), wherein the projection element (4) is displaceable between at least two positions, namely a use position, in which the projection element (4) is configured to project the first image as said projection image (8), and a rest position, in which the projection element (4) is virtually invisible from the front side of the electric fireplace (1).

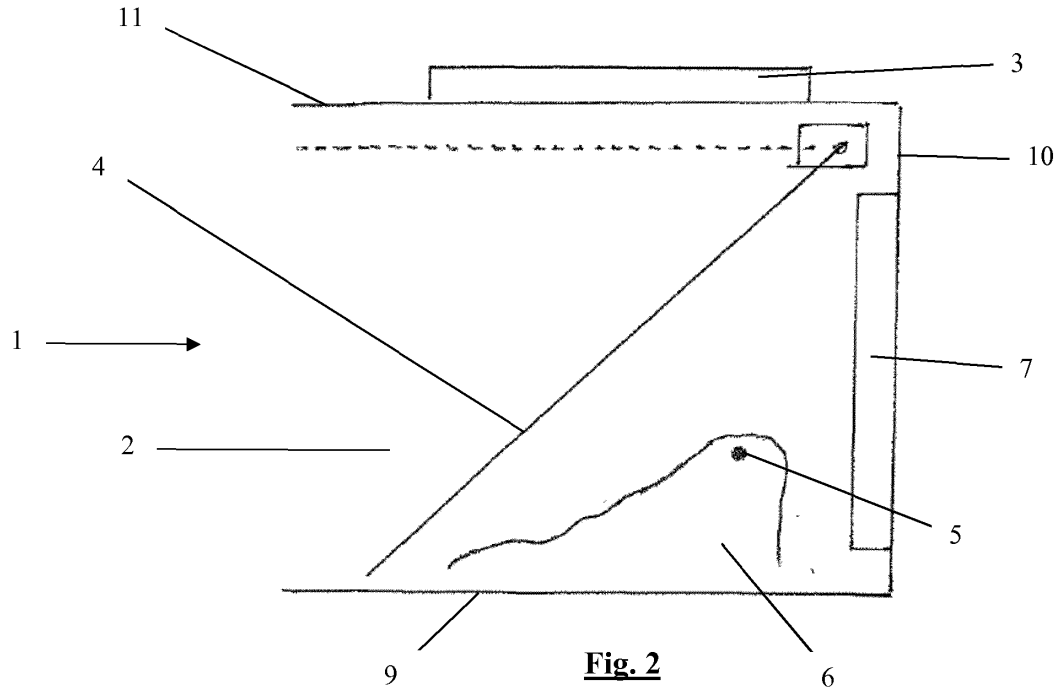


**Fig. 2**

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## Description

**[0001]** The present invention relates to an electric fireplace comprising a projection space in which flames are projected, wherein said projection space is at least visible from a front side of the electric fireplace, comprising a first image-generating element for displaying a first image, wherein said first image displays flames, and comprising a projection element for projecting the first image as an upright projection image in the projection space.

**[0002]** Conventional fireplaces that use, for example, wood and/or coal are perceived by many to be very atmospheric. However, a conventional fireplace also entails many drawbacks. For instance, a conventional fireplace needs to be regularly cleaned, the fuel, for example the wood and/or the coal, needs to be placed in the fireplace and such a fireplace produces a large amount of dust and dirt. An electric fireplace is installed to emulate the atmosphere of a conventional fireplace, but does not have the above-mentioned drawbacks of a conventional fireplace. The term conventional fireplace is used here to refer to, for example, a wood burner (open fireplace and/or a closed wood burner), a coal stove and/or a multi-fuel stove.

**[0003]** The electric fireplace may be configured to radiate heat, in which case the electric fireplace also serves as a fully operational heating element in addition to its atmosphere-creating function. The electric fireplace may, however, also be configured to radiate no heat, or only a certain amount of atmospheric heat, in which case the electric fireplace is used primarily as an element to create an atmosphere. Especially in energy-efficient dwellings such as passive houses, for example, it is no longer necessary for the electric fireplace to actually give off much heat.

**[0004]** Existing electric fireplaces often use a projection element, by means of which an image is projected from an image-generating element. Thus there are electric fireplaces comprising a 2D screen that displays flames, wherein this 2D screen forms a top wall of the electric fireplace and wherein this electric fireplace further comprises a transparent plate which projects the image of this 2D screen onto the imitation fuel bed. In this case, the transparent plate then forms the projection element. An electric fireplace of this type is shown in WO 2013/110674. The drawback here is that the projection element is visible when the electric fireplace is not in use and the appearance of the electric fireplace is thus disrupted. It is thus immediately apparent that it is not a conventional fireplace. In addition, if the projection element is a partially transparent plate, such as a glass plate or a plastic plate, this plate may, for example, cause undesired reflection of the components of the electric fireplace or the area surrounding the electric fireplace when the fireplace is not in use. When the electric fireplace is not in use, the projection element is therefore regarded as an undesirable feature.

**[0005]** It is therefore an object of the invention to produce an electric fireplace, the appearance of which when the electric fireplace is not in use shows more similarities with that of a conventional fireplace, so that the appearance of the electric fireplace is also considered to be aesthetically pleasing when the electric fireplace is not being used.

**[0006]** This object is achieved by providing an electric fireplace comprising a projection space in which flames are projected, wherein said projection space is at least visible from a front side of the electric fireplace, comprising a first image-generating element for displaying a first image comprising flames and a projection element for projecting the first image as an upright projection image in the projection space, wherein the projection element is displaceable between at least two positions, namely a use position, in which the projection element is configured to project the first image as said projection image, and a rest position, in which the projection element is virtually invisible from the front side of the electric fireplace.

**[0007]** The flames in a conventional fireplace are also at least visible from the front side of the fireplace. It is therefore logical that the projection space must be visible from the front side of the electric fireplace, so that the project image is also visible from said front side.

**[0008]** In this case, when it is desired not to use the electric fireplace temporarily, it is possible to place the projection element into its rest position. As the projection element is virtually invisible in its rest position, it therefore cannot have a negative effect on the appearance of the electric fireplace when the fireplace is not in use.

**[0009]** Furthermore, in a specific embodiment the projection element can have two or more use positions, meaning that it is possible to select where the projection image will appear. In the rest position, the projection element may, for example, be placed against the top wall, the bottom wall, the rear side or a side wall of the electric fireplace. The projection element may, however, also be placed in an optionally sealable cavity of the electric fireplace so that the projection element is less visible, if at all.

**[0010]** Preferably, the projection element is configured to project the first image as an upright projection image. In many embodiments, the projection space will comprise a flat base, wherein the electric fireplace is then configured to be arranged in a space such that this base extends virtually horizontally. Preferably, the projection image then extends virtually vertically.

**[0011]** The projection element is preferably a plate and more preferably a partially transparent plate. With the aid of such a plate, it is easy to reflect and thus project the first image in the projection space. This plate may, for example, be a glass plate, but may also, for example, be a plastic plate. Preferably and in said use position, this partially transparent plate forms an angle with a horizontal plane of between 30° and 60°. If the first image-generating element comprises a screen that at least partially forms a top wall of the projection space, this is an ideal configuration. The projection element may, however, al-

so comprise several plates and/or have an irregular form. Thus, the projection element may comprise several mirrors that extend in such a way during use that they are able to form an upright projection image of the first image. The first image-generating element may comprise a screen, wherein said screen, for example, forms a top wall of the projection space. However, the first image-generating element may, for example, also be a projector.

**[0012]** Preferably, the projection element is configured to project the first image onto one location in the projection space.

**[0013]** However, there may also be embodiments in which the projection element is able to display the projection image in different locations in the projection space. This is due to the fact that the projection element can assume several use positions and/or the first image-generating element can assume different positions.

**[0014]** Preferably, the projection image is a 2D image that extends along an upright plane. In that case, it is thus possible, for example, to provide a simple first image-generating element that displays a 2D image, for example a first image-generating element comprising a 2D screen. It is simple for a projection element to project a 2D image as a 2D projection image.

**[0015]** In a preferred embodiment, the electric fireplace comprises an imitation fuel bed which is arranged in the projection space and the projection element is configured to project the projection image onto the imitation fuel bed. The imitation fuel bed may, for example, comprise imitation logs and/or imitation coal. In a specific embodiment, the imitation fuel bed may also comprise pebbles. As a result of the fact that the image is projected onto the imitation fuel bed, it is possible to create the effect that the flames are located in the imitation fuel bed.

**[0016]** In certain embodiments, the projection space will be delimited at the top by a top wall, delimited at the bottom by a base and delimited at the rear by a rear wall, wherein the projection space will then be visible from the front side. In these embodiments, the imitation fuel bed is preferably arranged on the base. In conventional fireplaces, the logs and/or coal are also arranged on the base, as a result of which these embodiments therefore strongly resemble conventional fireplaces.

**[0017]** Preferably, the first image-generating element comprises a screen that at least partially forms a top wall of the projection space. This screen may, for example, be a 2D screen such as an LCD screen. Screens are commonly available and it is possible to provide an energy-efficient screen. The existing screens are also readily able to display high-quality images and are thus extremely suitable for displaying an image of flames and also optionally for additionally displaying smoke. Said first image-generating element may also comprise several screens. These several screens may then be provided to together display said first image. However, these several screens may also be configured to display the first image and one or more additional images.

**[0018]** In another specific embodiment, the first image-generating element may adjoin said top wall.

**[0019]** Further preferably, the projection element is pivotably displaceable. It can thus be provided so as to be pivotable about a hinge pin which is configured to extend horizontally and also, for example, additionally extends parallel to the rear wall if this is present. The projection element may, for example, be pivotable with the aid of one or more wheels and one or more guides for the displacement of the wheels. For instance, if the projection element is a plate which is configured to be arranged virtually at an angle of 45° to a horizontal plane when the fireplace is in use, it is possible to provide two guides that extend against the respective side walls of the projection space at the location of the top wall of the fireplace and two wheels that are each arranged displaceably in the respective guides.

**[0020]** The projection element is preferably a partially transparent plate. With the aid of such a plate, it is easy to reflect and thus project the first image in the projection space. Such a plate is barely visible during use of the electric fireplace, as the plate is partially transparent. This plate may, for example, be a glass plate, but may also, for example, be a plastic plate.

**[0021]** Further preferably, the projection element, in said use position, forms an angle with a horizontal plane of between 30° and 60°. At such an angle, the projection element is readily able to project the first image into the projection space as an upright projection image.

**[0022]** Also further preferably, the projection element, in the rest position of the projection element, virtually adjoins the top wall. The visibility of the projection element is minimal in this case, as a result of which the projection element is virtually invisible in practice. In this case, the projection element will, for example, virtually adjoin the first image-generating element when the image-generating element extends, for example, near the top wall and/or at least partially forms the top wall. As it is only the intention for the projection image to be visible and thus not the first image-generating element, the projection element will also be virtually invisible when it is arranged in the vicinity of the image-generating element.

**[0023]** The present invention will now be explained in more detail by means of the following detailed description of a preferred embodiment of an electric fireplace according to the present invention. The sole aim of this description is to give purely illustrative examples and to indicate further advantages and particulars, and can therefore by no means be interpreted as a limitation of the area of application of the invention or of the patent rights defined in the claims.

**[0024]** In this detailed description, reference numerals are used to refer to the attached drawings, in which

- ***Figure* 1** diagrammatically shows a perspective view of an electric fireplace according to the invention, in which the walls are shown as transparent so that the projection space is clearly visible;

- ***Figure 2*** diagrammatically shows a cross section through the electric fireplace shown in Figure 1, perpendicular to the width direction;
- ***Figure 3*** shows a perspective view of a base of the electric fireplace shown in Figures 1 and 2, on which the imitation fuel bed is placed and the projection image is displayed.

**[0025]** The electric fireplace (1) shown in the figures is in the shape of a cuboid and comprises a projection space (2) which is delimited by a top wall (11), a base (9), a rear wall (10) and two side walls (12). An imitation fuel bed (6) is arranged on the base (9), wherein this imitation fuel bed (6) comprises imitation logs, light-generating red/orange LEDs which are placed inside the logs and an LED strip (5).

**[0026]** The electric fireplace (1) further comprises a first image-generating element (3) which comprises a 2D LCD screen, wherein this LCD screen partially forms said top wall (11). The fireplace (1) also comprises a second image-generating element (7) which comprises a 2D LCD screen, wherein this LCD screen adjoins said rear wall (10). Furthermore, this fireplace (1) comprises a displaceable projection element (4), namely a partially transparent plate. This projection element (4) is pivotable between a use position, in which this projection element (4) is arranged in the projection space (2) such that this plate forms an angle of virtually 45° with the base (9) and is located in front of the imitation fuel bed (6), seen along the front side of the electric fireplace (1), and a rest position in which the projection element (4) adjoins the top wall (11).

**[0027]** The rest position in Figures 1 and 2 is shown using dashed lines and the projection element (4) in Figures 1 and 2 is in the use position. The front side is not delimited by a wall, as a result of which the projection space (2) can be seen from the front side of the fireplace (1).

**[0028]** The electric fireplace (1) further comprises two heat mats that are provided in order to create atmospheric heat.

**[0029]** The screen of the first image-generating element (3) displays a video of an image of flames, wherein this image of flames is obtained by combining several images of single flames. This image of flames is also accompanied in each case by an image of smoke, thus resulting in the illusion of real flames. The screen of the second image-generating element (7) displays flames and logs.

**[0030]** During use of the electric fireplace (1), the projection element (4) is located in the use position and the two screens display their video. Due to the position of the first image-generating element (3) and the position of the projection element (4), the 2D image which is displayed by the first image-generating element (3) is projected onto the imitation fuel bed (6) as an upright 2D projection image (8) at a distance from the real wall (10). Said LED strip (5) extends in the plane of the projection image (8) and is thus able to embellish this projection image (8). The image of the first image-generating element (3) is thus projected onto the imitation fuel bed (6) at the location of the LED strip (5).

**[0031]** This LED strip (5) is further configured to emit yellow light along light beams whose main axes extend virtually parallel in the plane of the projection image (8). Due to this yellow light, the displayed flames of the projection image (8) are enhanced and this yellow light will also extend alongside this plane, thus resulting in the illusion of 3D flames. The flames come out of the imitation fuel bed (6), as it were.

**[0032]** The light-generating red/orange LEDs provide a glowing effect of the imitation fuel bed (6).

**[0033]** When the electric fireplace (1) is not in use, the projection element (4) is placed into its rest position. The projection element (4) is then virtually invisible and will thus also not negatively affect the appearance of the electric fireplace (1).

## Claims

1. Electric fireplace (1) comprising a projection space (2) in which flames are projected, wherein said projection space (2) is at least visible from a front side of the electric fireplace (1), and comprising a first image-generating element (3) for displaying a first image comprising flames, and comprising a projection element (4) for projecting the first image as an upright projection image (8) in the projection space (2), **characterized in that** the projection element (4) is displaceable between at least two positions, namely a use position, in which the projection element (4) is configured to project the first image as said projection image (8), and a rest position, in which the projection element (4) is virtually invisible from the front side of the electric fireplace (1).

2. Electric fireplace (1) according to Claim 1, **characterized in that** the projection element (4) is pivotably displaceable.

3. Electric fireplace (1) according to Claim 1 or 2, **characterised in that** the projection space (2) comprises a top wall (11) and **in that** the projection element (4), in the rest position of the projection element (4), virtually adjoins the top wall (11).

4. Electric fireplace (1) according to one of the preceding claims, **characterized in that** the first image-generating element (3) comprises a screen that at least partially forms a top wall (11) of the projection space (2).

5. Electric fireplace (1) according to one of the preceding claims, **characterized in that** the projection element (4) is a plate, preferably a partially transparent

plate.

6. Electric fireplace (1) according to one of the preceding claims, **characterized in that** the projection space (2) is delimited at the top by a top wall (11), delimited at the bottom by a base (9) and delimited at the rear by a rear wall (10), wherein the projection space (2) will then be visible from the front side.

7. Electric fireplace (1) according to one of the preceding claims, **characterized in that** the projection element (4), in the use position, forms an angle with a horizontal plane of between 30° and 60°.

8. Electric fireplace (1) according to one of the preceding claims, **characterized in that** the first image-generating element (3) is configured to display a 2D image, and **in that** the projection image (8) provided is a 2D image that extends upright.

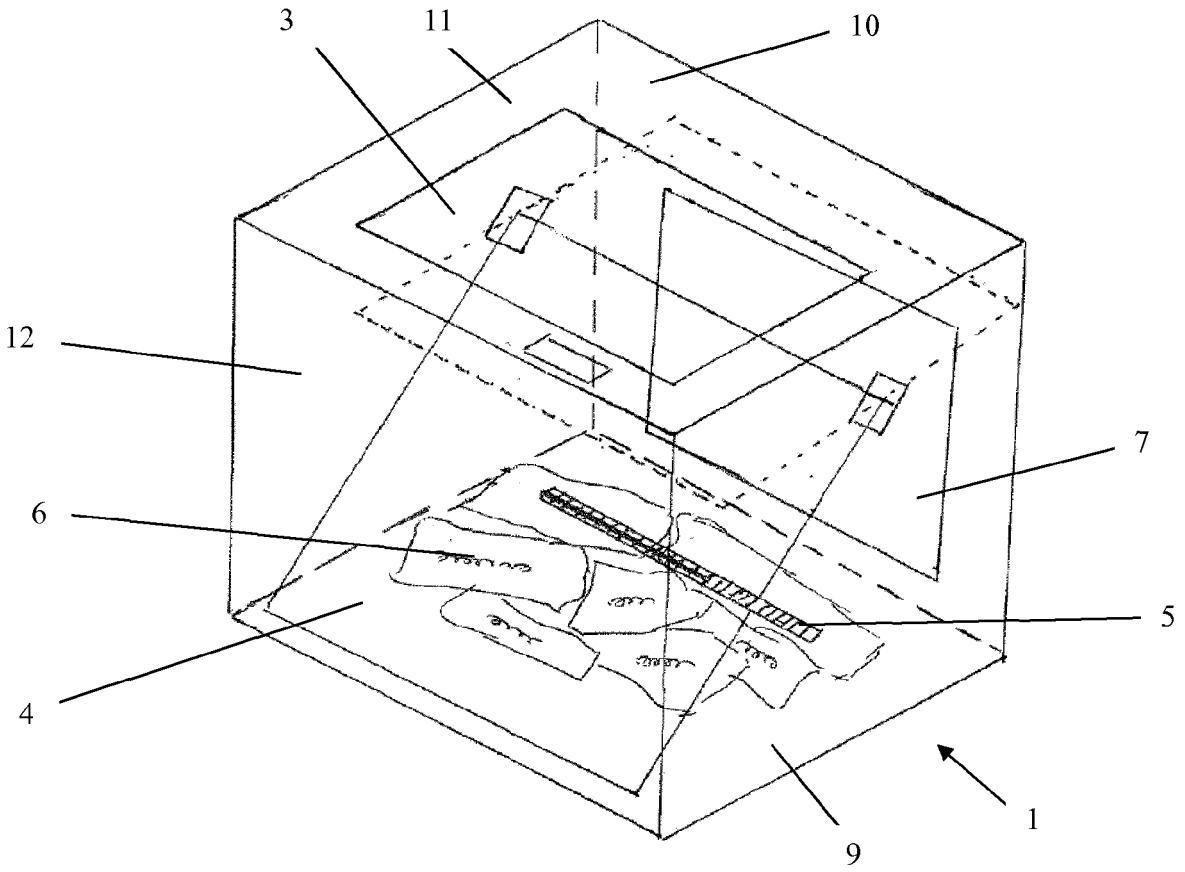


Fig. 1

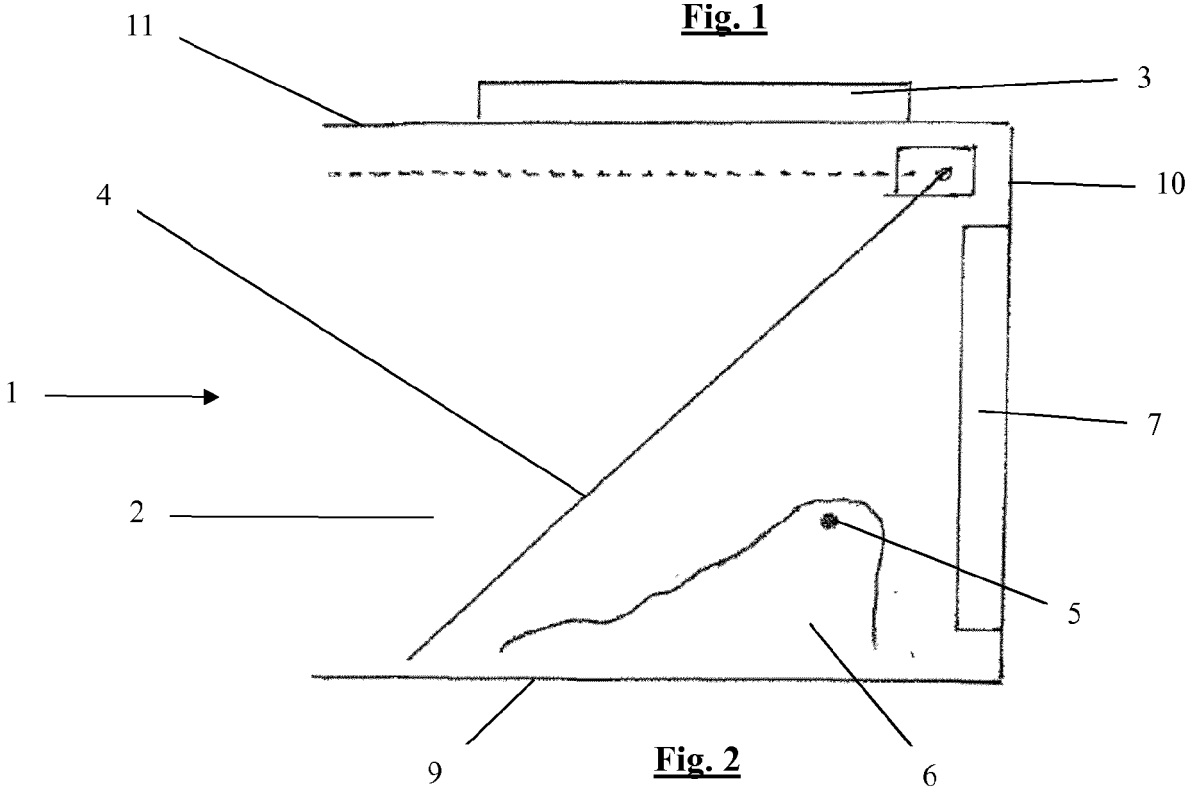


Fig. 2

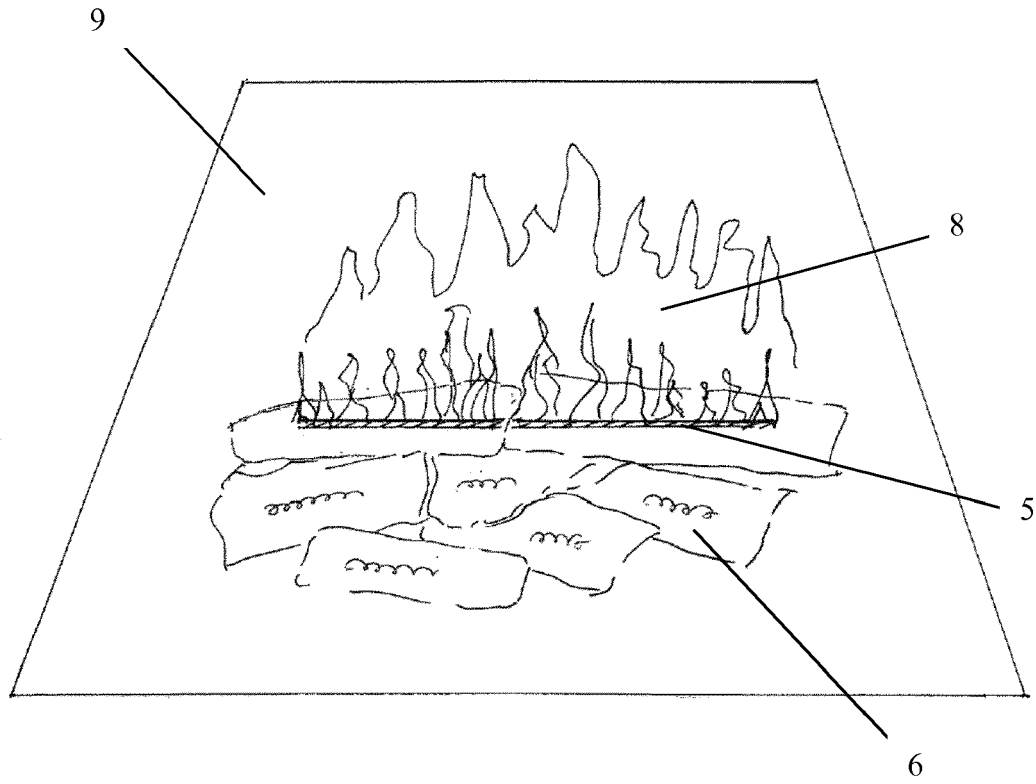


**Fig. 3**

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Application Number
EP 18 20 1942

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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
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| The Hague | 18 December 2018 | Jalal, Rashwan |

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# EUROPEAN SEARCH REPORT

Application Number
EP 18 20 1942

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