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(54) **Mosquito net for arc-like opening**

(57) A mosquito net (1) is described which is mobile between a completely open position and a completely closed position for openings (2) comprising arc portions (11), undercuts, bevellings or similars, comprising a net (100) having a fixed extremity (9) integer to a first portion (8) of a frame (10) delimiting said opening (2) and a mobile extremity (5) associated to a mobile hollow vertical upright (3) slidably associated to a first guide (13) and housing a rod (14) vertically slidable whose superior extremity (15) is slidably associated to a second guide (16) and supports a tensioning cable (21) suitable to run inside said mobile upright (3) and inside said second guide (16) until it attaches itself to a compensating spring (25) whose fixed extremity is integer to a second portion (12) of the frame (10). (Fig.4).

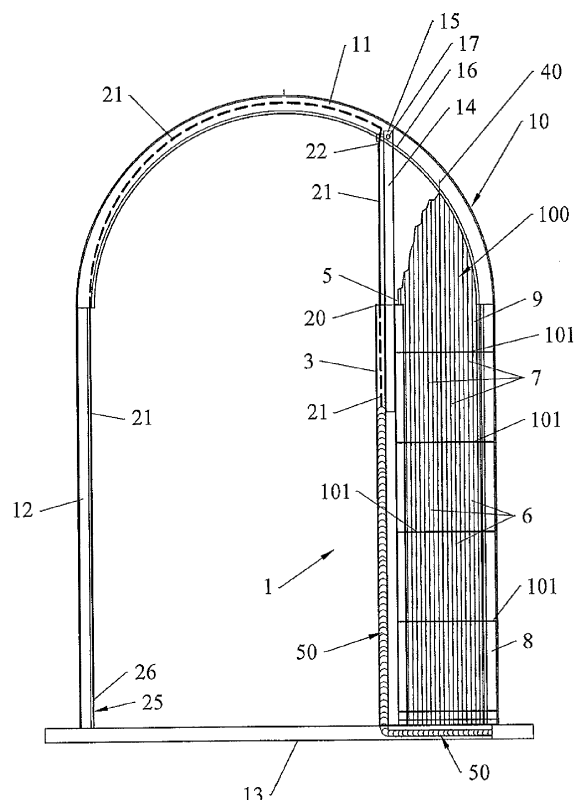


FIG.4

Description

[0001] The present invention relates to a mosquito net for arc-like opening.

[0002] Buildings for residential and commercial use have a plurality of openings which are usually closed by windows or French windows. Arc-like opening refers to a type of opening which provides an arched upper portion supported by vertical lateral uprights. In architecture, various types of arcs are known: rounded, ogival or lowered, as well as particular curvatures depending on the taste of the architect and the structural complexity of the building.

[0003] Mobile mosquito nets are known for rectangular openings consisting of a close-meshed net associated to the window frame. The net provides lateral slides adapted to engage lateral guides integral with the edge of the window, so as to be mobile between an open position, in which the net, for example, is rolled around a cylinder, and a closed position, in which the net is completely extended to prevent the entry of mosquitoes. The guides are usually lateral and therefore closing occurs from top to bottom. However, it is possible to provide horizontal guides which close from right to left or vice versa.

[0004] The mosquito net may also be of the pleated type, i.e. it may fold up like an accordion or fan in the open position.

[0005] In the case of arc-type openings, it is necessary to provide a first portion of fixed mosquito net which covers the light of the opening delimited by the arc, and a second mobile portion in accordance with what is described above.

[0006] A similar situation happens in the case of non-rectangular and non-square polygonal openings: buildings are known with bevelled openings and with windows equipped with cross bars. Finally, small openings are known such as rounded portholes or triangular openings.

[0007] Every time an irregular opening occurs, i.e. one with a non-square and non-rectangular edge, one is forced to provide a mosquito net with at least one fixed portion.

[0008] The object of the present invention is to provide a mobile mosquito net for irregular building openings, i.e. with arc portions, undercuts, diagonal bevellings or similar.

[0009] In accordance with the invention, this object is achieved with a mosquito net mobile between a completely open position and a completely closed position for openings comprising arc portion, undercuts, bevellings or similars, characterized in that it comprises a net having a fixed extremity integer to a first portion of a frame delimiting said opening and a mobile extremity associated to an mobile hollow vertical upright slidably associated to a first guide and housing a rod vertically slidable whose superior extremity is slidably associated to a second guide and supports a tensioning cable suitable to run inside said mobile upright and inside said second

guide until it attaches itself to tension compensating means whose fixed extremity is integer to a second portion of the frame.

[0010] These and other features of the present invention will become more apparent from the following detailed description of practical embodiments thereof, shown by way of non-limiting examples in the accompanying drawings, in which:

figure 1 shows a frontal view of a mosquito net in an open position;

figure 2 shows an enlarged scale view of a tension return spring in a low position and a high position;

figure 3 shows an enlarged scale view of a cable sheath tube;

figure 4 shows a frontal view of the mosquito net in a first position of partial closure;

figure 5 shows a front view of the mosquito net in a second position of partial closure subsequent to the one in figure 4;

figure 6 shows a frontal view of the mosquito net in a closed position;

[0011] A mosquito net 1 for arc-type opening 2 comprises a mobile hollow vertical upright 3 equipped with a handle 4 and supporting a mobile extremity 5 of said mosquito net 1.

[0012] Said mosquito net 1 is of the pleated type, i.e. it is constituted by a series of strips 6 of close-meshed net, adapted to prevent the passage of mosquitoes, connected to each other by means of slim vertical poles 7 so as to close like an accordion as will be made clearer below.

[0013] Mosquito net 1 comprises a fixed extremity 9 integer to a first upright 8 of the external structure or frame 10 of opening 2, said frame 10 further providing an arc 11 which connects said first upright 8 to a second vertical upright 12.

[0014] Mobile vertical upright 3 runs along a horizontal base guide 13 and houses a vertically sliding rod 14 and whose superior extremity 15 is slidably associated to a guide 16 housed in said arc 11 and following said arc-shaped profile. One or more casters 17 allow said sliding coupling between rod 14 and guide 16 of arc 11.

[0015] Pleated net 100 further provides a slim central pole 40 slidably associated above to guide 16 so that net 100 does not fold in an orthogonal direction to opening 2, e.g. by means of a caster 17.

[0016] Within the mobile upright 3 may be housed an articulated means or "snake" 50, to one extremity of which 51 is fixed an extremity 20 of tensioning cable 21 developing first inside a small tube 22 (figure 3) integer to superior extremity 15 of rod 14, then along guide 16, then following the second upright 12 to attach itself to one extremity of a tension compensating or return spring 25 in its turn integer to the base of the upright 12 (figure 2).

[0017] Said articulated coupling means 50 comprises a series of small bells 52, connected to each other so as

to allow reciprocal rotation in any direction by at least 90°, and develops within mobile upright 3, continuing with a 90° curve within horizontal base guide 13 until it fixes itself substantially in correspondence of the first upright 8. The functionality of said articulated means 50 in combination with cable 21 will be made clearer below.

[0018] Small tube 22 is attached to a plate 28 integer to rod 14 at the superior extremity 15 (figure 3).

[0019] Net 100 is elastic in both a vertical and horizontal direction in order to compensate the variations in height during sliding, and comprises horizontal cable 101 adapted to help in keeping net 100 vertical.

[0020] Functionally, the closing of mosquito net 1 takes place in the following way.

[0021] Let us consider figure 1 as the starting position, i.e. with the mosquito net completely open. Net 100 cannot be seen as it is completely folded like an accordion within a compartment 81 of first upright 8 and contained above in a portion of an extremity of a compartment 82 of arc 11. Articulated means 50 is completely contained in mobile upright 3 as cable 21 runs the whole length of arc 11.

[0022] By taking hold of handle 4, the user moves upright 3 to the left (looking at figure 1) bringing mosquito net 1 to the position in figure 4. During this movement, rod 14 exits telescope-like from vertical upright 3 pulling cable 21 which in turn pulls spring 25, the superior mobile extremity of which 26 moves upwards (figure 2, from low position P1 to high position P2) in order to compensate the rise of telescopic rod 14. Articulated means 50 pulls cable 21, occupying base guide 13 and partially leaving mobile upright 3. Net 100 begins to open and also stretches vertically thanks to the sliding constraint 41 of central pole 40.

[0023] Proceeding to the left, the position in figure 5 is reached, beyond the median line M of the opening. When rod 14 passes the median line M, the extremity 15 thereof begins to be lowered, reducing the pull on cable 11 which therefore causes the extremity 26 of spring 25 to move towards the low position P1. Articulated means 50 increasingly occupies base guide 13.

[0024] Figure 6 shows mosquito net 1 completely closed, with net 100 which completely closes the arc-like opening 2, therefore preventing the passage of mosquitoes. Rod 14 is completely contained in mobile upright 3 and articulated means 50 completely occupies base guide 13, leaving only cable 21 in mobile upright 3, which therefore compensates arc 11 which is no longer occupied. In figure 6, spring 25 cannot be seen as it is covered by mobile upright 3. It should be emphasized that, whatever the position of the mosquito net, the length of cable 21 and articulated means 50 is constant. The length of articulated means 50 substantially corresponds to the length of horizontal guide 13 and mobile upright 3.

[0025] Advantageously, it was possible to close an arc-like opening 2 with a single mobile mosquito net 1, without any fixed areas.

[0026] Frame 10 may have various shapes, in partic-

ular, an oblique linear section connecting the two fixed uprights 8, 12 of different height may be provided in place of arc 11.

[0027] In the case of a circular-shaped frame 10 ("port-hole"), base guide 13 is not a horizontal line but rather a concave curve. The principle of operation does not change, articulated means 50 being able to adapt to any shape of its housing.

[0028] In place of the compensating spring 25, it is possible to provide other tension compensation means such as counterweights, clutches or similar.

[0029] Advantageously, instead of a single mobile upright 3 which pulls a single net 100, it is possible to provide two mobile uprights 3 with respective nets 100 fixed to opposite fixed uprights 8, 12 which meet at the median line M. In this case, the whole tensioning apparatus is doubled (two cables 21, two springs 25, two articulated means 50, etc.) and specular with respect to the median line M.

Claims

1. Mosquito net (1) mobile between a completely open position and a completely closed position for openings (2) comprising arc portions (11), undercuts, bevellings or similars, **characterized in that** it comprises a net (100) having a fixed extremity (9) integer to a first portion (8) of a frame (10) delimiting said opening (2) and a mobile extremity (5) associated to an mobile hollow vertical upright (3) slidably associated to a first guide (13) and housing a rod (14) vertically slidable whose superior extremity (15) is slidably associated to a second guide (16) and supports a tensioning cable (21) suitable to run inside said mobile upright (3) and inside said second guide (16) until it attaches itself to tension compensating means (25) whose fixed extremity is integer to a second portion (12) of the frame (10).
2. Mosquito net (1) according to claim 1, **characterized in that** the frame (10) provides a base guide (13) for the horizontal sliding of the mobile hollow vertical upright (3), a first (8) and a second upright (12) both fixed and an arc (11) joining said two fixed uprights (8, 12), inside the mobile upright (3) being housable articulated means (50) to one extremity of which (51) is fixed an extremity (20) of the tensioning cable (21) developing first inside a small tube (22) integer to the superior extremity (15) of the rod (14) slidably associated to the arc (11) by means of said second guide (16), then along said second arc guide (16), then again it follows the second upright (12) to attach itself to one extremity (26) of a tension compensating spring (25) in its turn integer to the second fixed upright (12), said articulated means (50) developing inside said mobile upright (3) and continuing then with a turn inside the horizontal base guide (13) until

it fixes itself substantially in correspondence with the first fixed upright (8).

3. Mosquito net (1) according to claim 2, **characterized in that** the small tube (22) is attached to a plate (28) integer with the rod (14) in correspondence with its superior extremity (15). 5
4. Mosquito net (1) according to any one of the pre-ceeding claims, **characterized in that** said net (100) is pleated, in a position of complete closure it has a shape similar to the aperture (2) and in position of complete opening it folds itself like an accordion in correspondence of said first fixed upright (8). 10 15
5. Mosquito net (1) according to claim 4, **characterized in that** the net (100) comprises a vertical slim central pole (40) whose extremity (41) is slidingly associated to said second guide (16). 20
6. Mosquito net (1) according to any one of the pre-ceeding claims, **characterized in that** it provides two nets (100) for two mobile uprights (3) suitable to meet in correspondence with the median line (M), tensioning means (21, 25, 50) being double and specular in respect of the median line (M). 25 30
7. Mosquito net (1) according to any one of the pre-ceeding claims, **characterized in that** said tension compensating means (25) comprise clutches or counterweights. 35 40 45 50 55

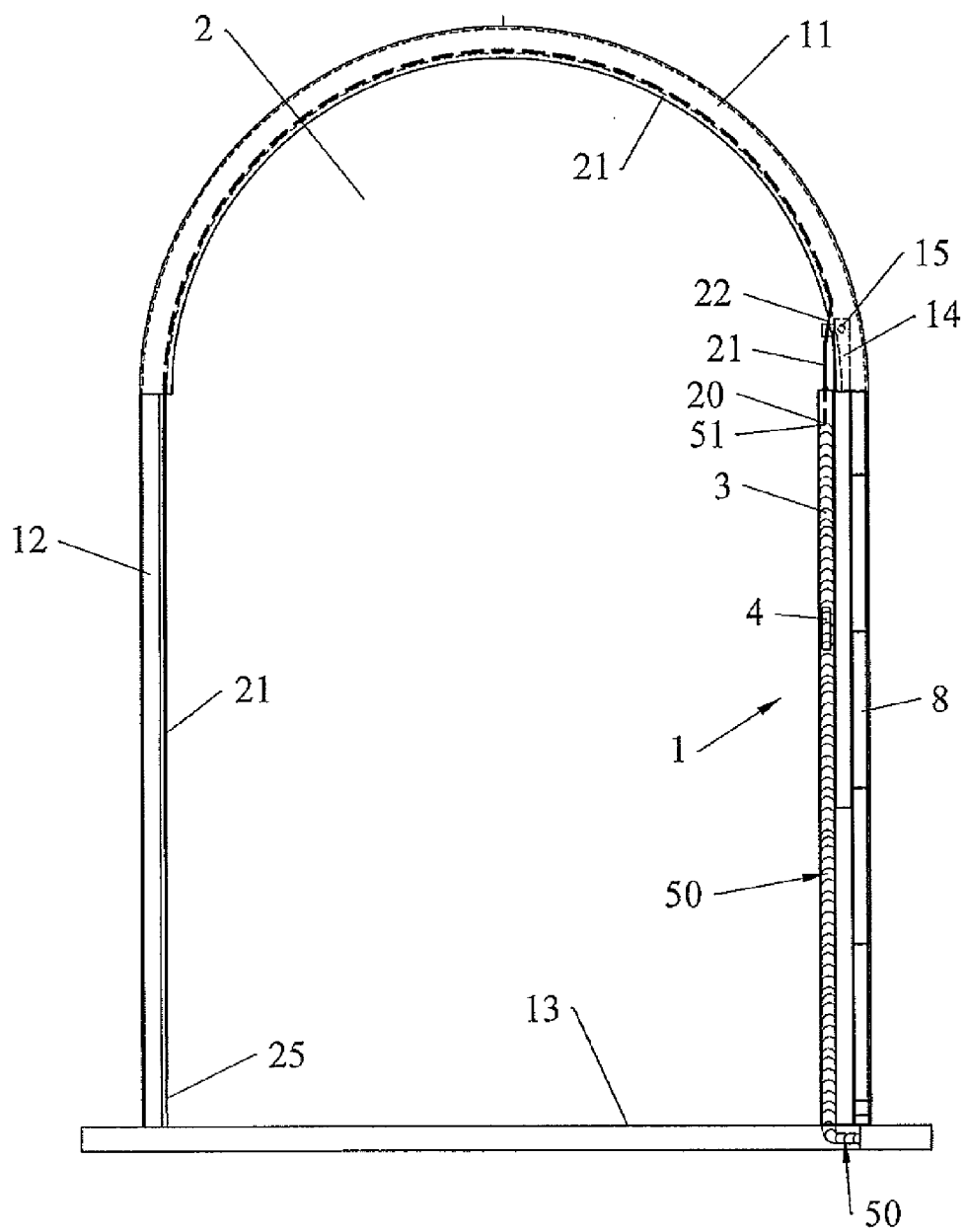
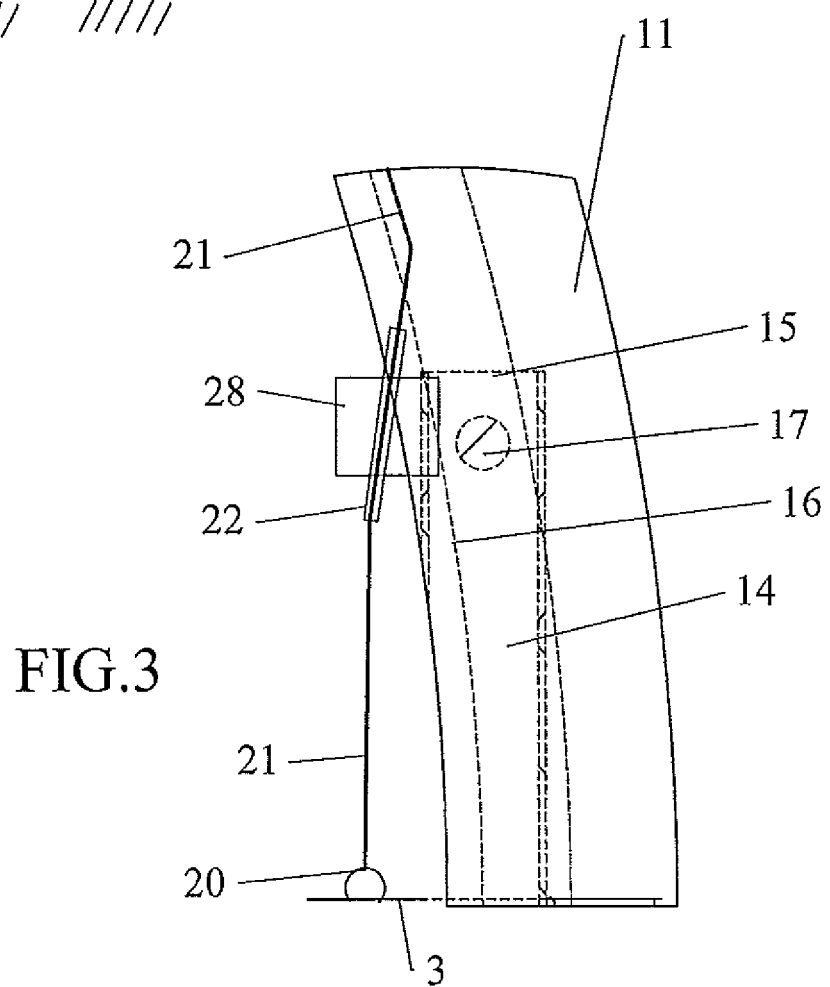
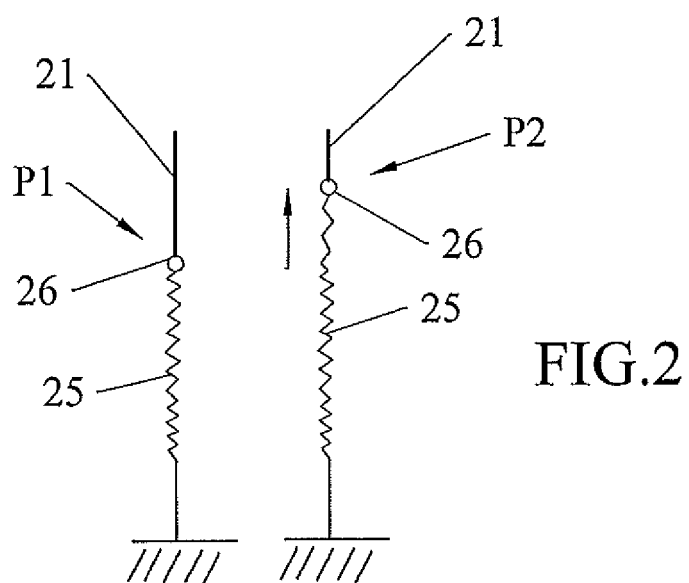


FIG.1



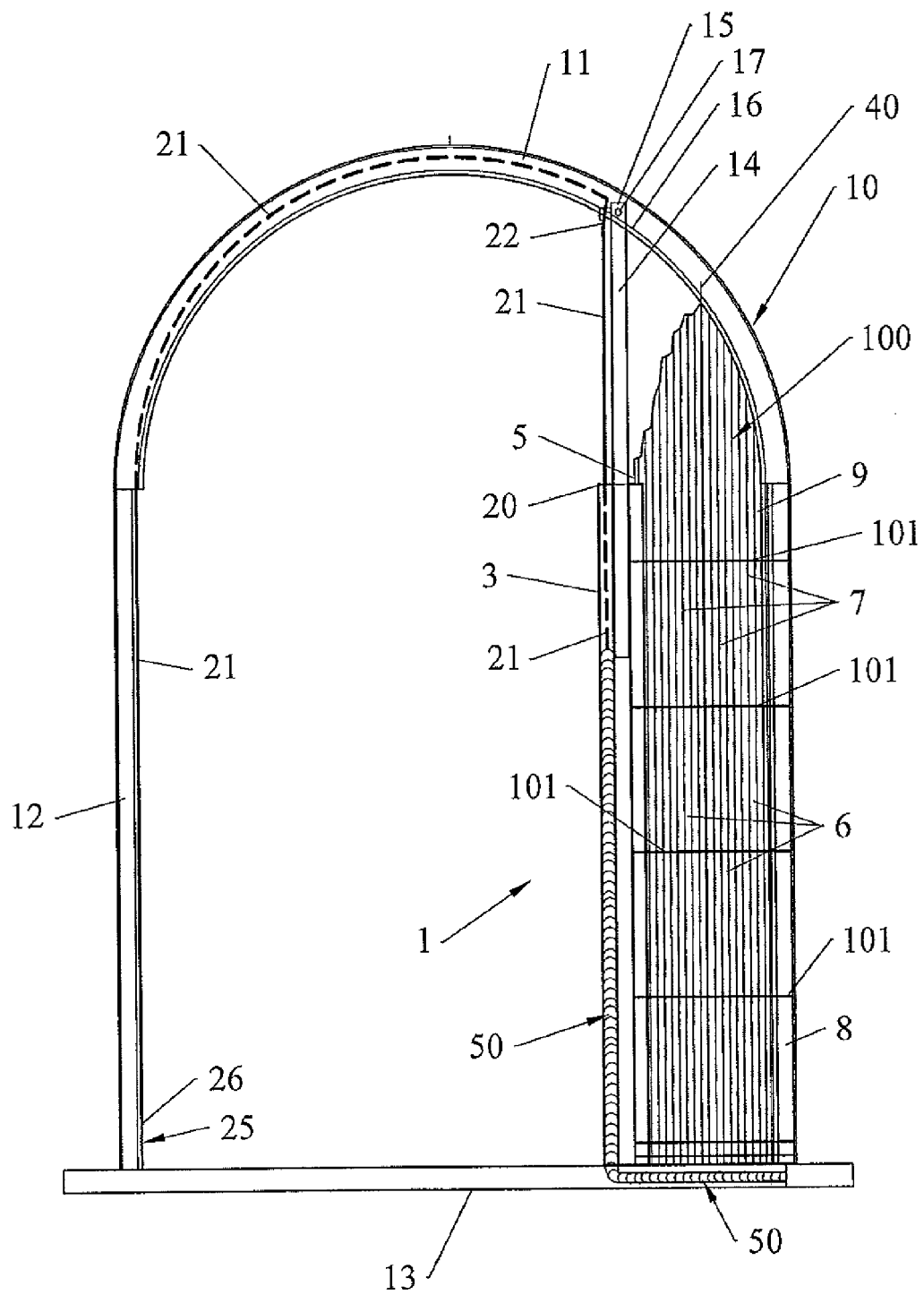


FIG.4

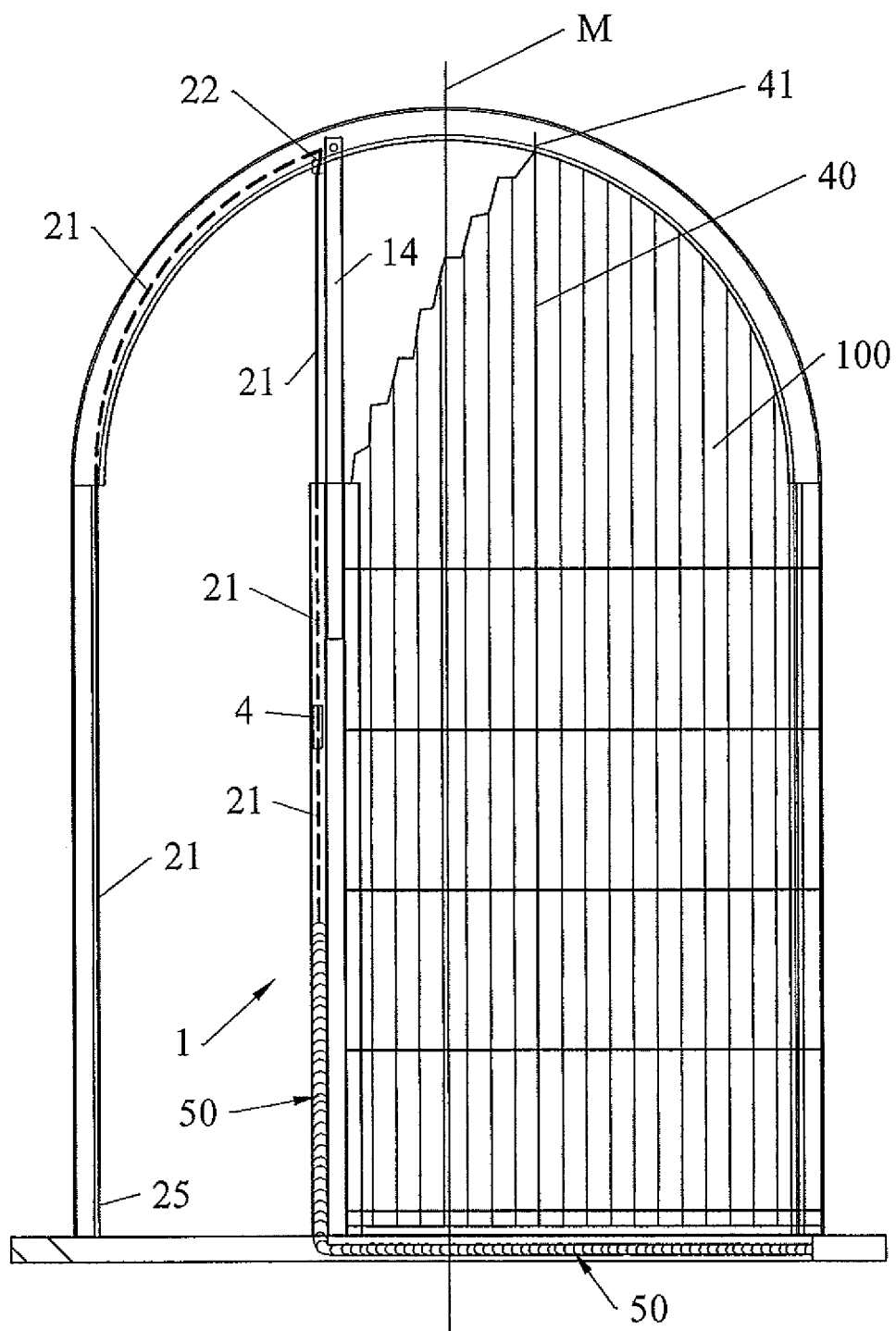


FIG.5

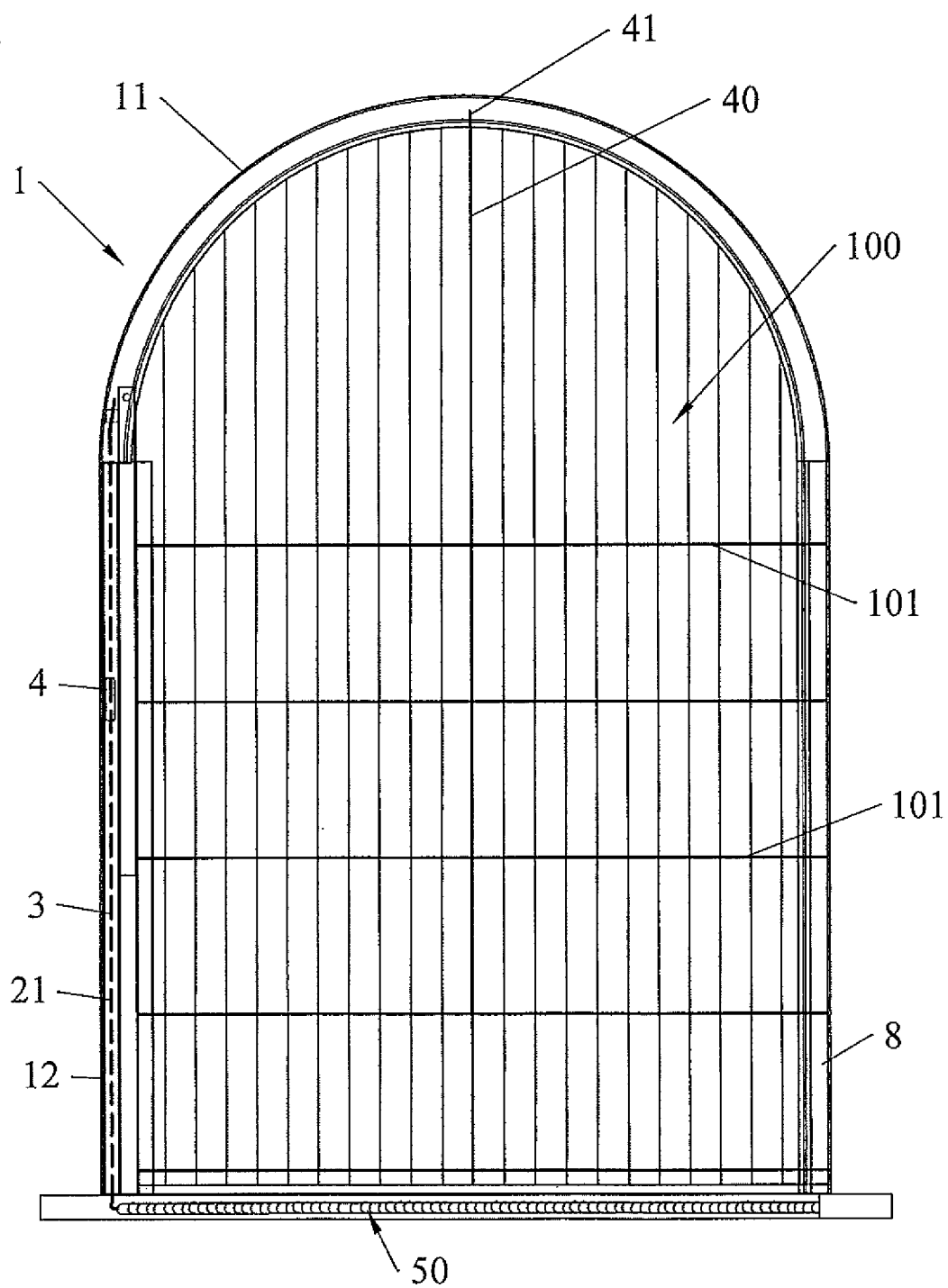


FIG.6



EUROPEAN SEARCH REPORT

Application Number
EP 11 17 1014

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 4 August 2011	Examiner Knerr, Gerhard
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