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(54) **SELF-SUPPORTING CONSTRUCTION OF FORWARD OPENING DOOR FOR COVERING OF OPENINGS IN A WALL**

(57) Self-supporting construction of forward opening door for covering of openings in a wall, where a pivotal swinging element is provided between the wall and the door, wherein it includes a frame (2) with lateral support base (3), on which one end of an upper and a lower hinged arm (7, 8) and a support element (21) of the door, respectively the plate with the decoration which forms it, is arranged, wherein the support element (21) is rotatably arranged at the other end of the upper and lower arm (7, 8) and the upper arm and the lower arm connected by connecting rod.

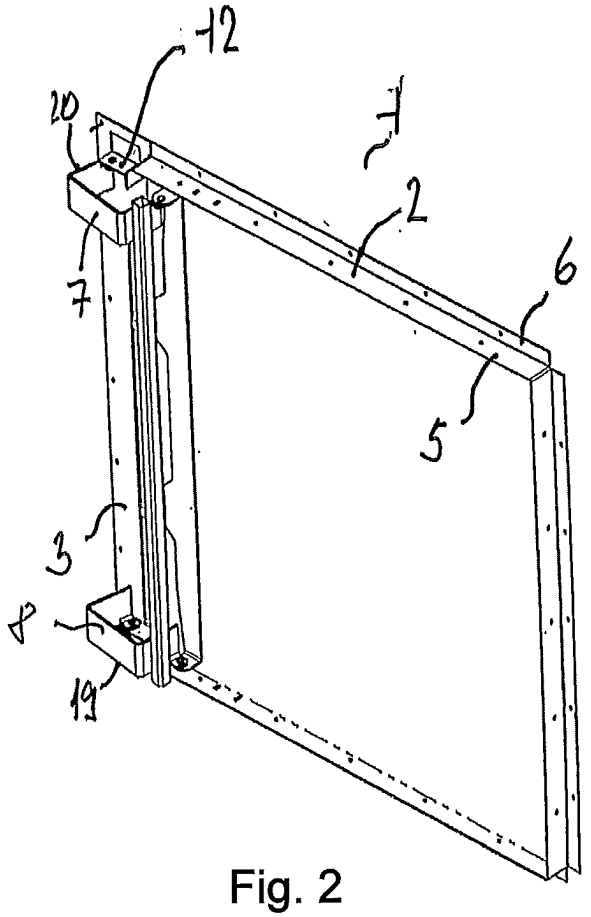

Fig. 2

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Description

Technical field

[0001] The invention relates to a forward opening door for covering of openings in a wall, especially for openings covered with tiled surfaces, which are provided for the revision and for access to piping, water meters, and to other technical networks, where the door is also provided with tiles and in a closed state it coincides with tiles of surrounding wall.

Background art

[0002] In each building or in each residential unit there is at least one access point for revision and checking of technical networks. Checking opening is almost always in toilets or in bathrooms, where it is possible to close the faucet for water distribution to the flat, so that it is not necessary to close the water supply completely in the house during repairs etc. The neighbour surfaces are often covered with tiles and therefore it is necessary to ensure, that the doors of checking openings are also covered with tiles, which coincide with surrounding aesthetic relief and which does not spoil the aesthetic impression of the overall wall tiling.

[0003] The document CZ 8335 U1 discloses a door for covering of the wall opening, where on a support wall, which is generally of plasterboard, a strip with hinges is placed from inside, and on these hinges the door provided with tiles is hinged.

[0004] The problem of the accurate fitting of the tiles on the walls and on doors is solved by so called forward opening door, for instance according to the document CZ 10050 U1. The solution is that the door hinge is not fastened to the frame on the wall but on the edge of the swinging arm, whose second edge is hinged in a hinge arranged at the rear face of the wall at a certain distance from the opening.

[0005] From the document CZ 305131 B1 a door is known which has a control arm provided with a recess, whereas in the space of the recess an angle bracket with one of its arm is mounted on the wall, on the opposite side of the door, and on its second arm, which is perpendicular to inner face of the wall, a push lock is mounted with a push protrusion which is oriented to the door, when it is closed. This solves hidden opening, however the control arm has to be massive with large gripping surfaces on the door baseplate with tiles. First, the board has to be mounted and then the tiles are placed on it, which is difficult, because steel arms are already mounted on the board.

[0006] The aim of this invention is to introduce a forward opening door for covering of openings in the wall of the above mentioned type, but which would have a lightweight construction, which would enable simplified, versatile and effective filling of the door space from the front and which would allow the door to be easily seated in the wall.

Summary of the invention

[0007] The above mentioned deficiencies are eliminated by the forward opening self-supporting construction of forward opening door for covering of openings in the wall according to the invention, which is characterised by the fact that it includes a frame with lateral support base, on which one end of an upper and a lower hinged arm and a support element of the door, respectively the plate with the decoration which forms it, is arranged, wherein the support element is rotatably arranged at the other end of the upper and lower arm the upper arm and the lower arm connected by connecting rod.

[0008] In a preferred embodiment the frame has a shape of a frame window and it is placeable with its horizontal frame strips into the opening in the wall, whereas perpendicularly to frame strips covering strips on the front side of the frame window are arranged, whereas a lateral support base, which is a part of the frame has a L-shaped cross-section and it is formed by a front face and by a lock surface, which is perpendicular on it and inwardly oriented into the frame and into the interior of the opening in the wall, the lock surface is provided with an upper recess and with a lower recess and from the front surface protrude inwardly into the opening in the wall an upper bearing flange and a lower bearing flange, which are provided with openings for corresponding pins for a pivoting connection with the rear wings of the upper arm and of the lower arm, which are also provided with openings, whereas the support element has on its periphery perpendicular support surfaces with openings, through which it is pivotably connected by pins with the front wings of the upper arm and of the lower arm, which are also provided with openings.

[0009] In another preferred embodiment is the support element is created as a strip, which has on its peripheries perpendicular support surfaces with openings and protrusions for increasing of the contact surface and simultaneously placing of a an upper lock element whereas a lower lock element is on the perpendicular lock surface.

[0010] In further preferred embodiment is the upper lock element made as a hook and lower lock element is made as spring loaded roller.

[0011] In further preferred embodiment is one wall of the arms, which is in closed state oriented into the frame of the construction and tilted at an angle into inside of the arm and the connecting rod is then attached to these walls.

[0012] In further preferred embodiment are the upper arm and the lower arm mutually joined into one compact arm.

Brief description of drawings

[0013] The invention will be further described using drawings, where Fig.1 is a perspective view of the door

according to the invention without covering plate with tiles, Fig. 2 is a perspective view of the door from a different view, Fig. 3 is a schematic cross-section of the door, Fig. 4 is a detail of the support base, Fig. 5 shows a support strip, provided as a support element for a covering strip, Fig. 6 shows the upper arm in perspective view, Fig. 7 shows a side view of the upper arm, Fig. 8 shows the lower arm in perspective view, Fig. 9 shows the connecting rod in axial view, Fig. 10 is a perspective view of another embodiment of the door with an upper arm and a lower arm joined to a single compact arm and Fig. 11 is an alternative embodiment of the flanges.

Preferred embodiments of the invention

[0014] In Fig.1 and 2 it can be seen in a perspective view, that the self-supported construction 1 of a forward opening door for covering of openings in the wall contains a frame 2 consisting of a support base 3 and of a frame window 4 connected to it. The frame window 4 has frame strips 5 and with them connected and perpendicular to them arranged covering strips 6. The whole frame 2 is fixed firmly to the wall, which is usually plasterboard, using suitable screws. There are holes for fastening means on the periphery of the frame 2. The cover strips 6 eliminate the need for the filler strips in gaps between the tiles which are otherwise used.

[0015] This rigid structure of the frame 2 is accompanied by movable elements which bear a not shown plate, on which the tiles are affixed so as to visually match with the surrounding tiles and the consumer does not even notices that the door is there.

[0016] In Fig. 3, these movable elements are visible, namely the swinging upper arm 7 and the swinging lower arm 8, and these are connected by a connecting element, in this case with a hollow rod 9.

[0017] In Fig. 4 there is a detail of the support base 3. This support base 3 has a L-shaped cross-section, whereas a front face 10 can be seen from the outside and a lock surface 11, which is perpendicular to the front face 10, is directed into the wall and is not visible in the closed state of the structure 1 or the door. In the front face 10, at the edges of the support base 3, support flanges are provided, oriented towards the structure of the wall, namely an upper support flange 12 and a lower support flange 13. Both flanges 12, 13 are provided with holes 24.

[0018] In the lock surface 11 a recesses are provided, namely an upper recess 14 and the a recess 15. Swinging arms 7, 8 are rotatably mounted on the support flanges 12, 13.

[0019] How, it will be seen in Fig. 6, which shows a perspective view of the upper arm 7, and Fig. 7, which shows the front view of this upper arm 7 and in Fig. 8, in which the lower arm 8 is shown in detail in perspective view.

[0020] The arrangement of the arms 7, 8 on the flanges 12, 13 can be best seen in Fig. 2. On each of the arms 7, 8, which have a box-like structure with one open side, that is, essentially in the U-shaped cross-section, there are at both of the two free ends 16 rear wings 17 and front wings 17' always arranged on one side, both provided with openings 18. After assembly, the wings 17, 17' of the arms 7, 8 are the most distant from each other. This is because that at the upper arm 7 the wings 17, 17' are provided on the upper edge 20, seen after assembly, whereas at the lower arm 8, the wings 17, 17' are provided on the lower edge 19, again seen after assembly of the door.

[0021] In Fig. 7, it is best to see that one wall 30 of the arms 7, 8 is tilted at an angle inwardly in the arm 7, 8 and it is a wall 30 which is in the closed state of the door oriented into the frame 2 and the connecting rod 9 is then fastened to these walls 30. This is advantageous due to the optimal swinging of the arm 7, 8 when the door is opened.

[0022] Fig. 5 shows a support strip 22 as a support element 21 for the door plate having at its both ends bent support surfaces 23 in one direction and provided with flat shaped protrusions 24 on one side. On the support strip 22 a not shown support plate for tiles, known from the state of the art, is fixed

[0023] The door is assembled of the above mentioned components as follows: The arms 7, 8 are applied from inside to the support flanges 12, 13 by their rear wings 17. Both the rear wings 17 of the arms 7, 8 and the flanges 12, 13 are provided with openings 18 and 24, respectively. Through these holes, a pin is put through to ensure a mutually movable connection so that the arms 7, 8 can rotate relative to the stationary support flanges 12, 13 and thus to the frame 2.

[0024] On the front wings 17' of the arms 7, 8 the support strip 22 with its bent support surfaces 23 is then laid. Both the front wings 17' of the arms 7, 8 and the support surfaces 23 of the strip 22 are provided with openings 18 and 25, respectively. Through these openings a pin is put through which ensures the mutually movable connection of the arms 7,8 and the strip 22. The strip 22 with glued or otherwise fixed plate with a decor, e.g. tiles, can be swung away after forward opening in front of the wall due to the arms 7,8. In order to allow the swinging of the arms 7,8 in the maximum range, the upper recess 14 and the lower recesses 15 are provided in the lock surface 11.

[0025] On the outer surface 26 of the support strip 22 shown in Fig. 1, the plate for tiles is fixed, whereas the upper lock element 28, which is schematically shown in Fig. 5, is placed on the inner surface 27 and especially on the protrusions 24 and the lower lock element 29, which is on the perpendicular lock surface 11, is again shown schematically in Fig 4. The upper locking element 28 is preferably made as a hook and the lower locking element 29 is made as a spring loaded roller at the end of the longitudinal beam fixed to the locking surface 11. The hook pushes the roller and the roller then returns. The lock ensures that the tiles on the door are fitted with the surrounding tiles after closing the door. Fig. 9 shows

a connecting rod 9 which is preferably made as a hollow square profiled rod 9. This rod 9 is fixing the arms 7, 8 in the desired position.

[0026] Fig. 10 is a perspective view of a door from inside in an embodiment where the upper arm 7 and the lower arm 8 are joined together into one compact arm 31. This is advantageous when the connecting rod 9 is too long and then the structure is not rigid enough. Such compact arm 31 is provided at its ends with analogous wings 17, 17'. In this case, the locking surface 11 need not be present or is not functional because the lock is made elsewhere. The length of the compact arm 31 can be shortened so that the flanges 14, 15 are not cut out from the support base 3, but the L-profiles 32 can be welded to the inner side of the support base 3 to form the flanges, see Fig 11.

[0027] The present structure of the forward opening door for covering the openings in the wall is revolutionary in a comparison with the known systems as the self-supporting swinging arm is not pivotably arranged with one end on the inner side of the wall behind the opening and with the other end on the rear surface of the door or plate which carries the decorative element, generally tiles. The present invention has two pivot arms 7, 8 connected by the rod 9 and self-supporting construction is enabled by the frame 2 with a lateral support base 3 on which one end of the upper and lower arms 7, 8 and of the support element 21 for the door or the plate with decoration, which is a support strip 22 which is pivotally arranged at the other end of the upper and lower arms 7, 8. This enables an easy assembly of the whole structure together including the door outside of the wall and then the entire frame 2 with the door is inserted into the wall opening and it is fixed there. Arrangement of the arms 7, 8 and of the support element 21 and ensuring of their rotation is due to the pins placed in the respective openings very simple and operationally safe.

[0028] A solid metal frame construction enables easy opening and closing, rigidity of the entire construction and high service life. It enables easier mounting into the plasterboard or brick walls. It is also resistant for transport, suitable for various tile sizes and for their multiples. It can be used even for only one tile.

Claims

1. Self-supporting construction of forward opening door for covering of openings in a wall, where a pivotal swinging element is provided between the wall and the door **characterised in that** it includes a frame (2) with lateral support base (3), on which one end of an upper and a lower hinged arm (7, 8) and a support element (21) of the door, respectively the plate with the decoration which forms it, is arranged, wherein the support element (21) is rotatably arranged at the other end of the upper and lower arm (7, 8) and that the upper arm (7) and the lower arm (8) are connected by connecting rod (9).

2. Self-supporting construction of forward opening door according to claim 1, **characterised in that** the frame (2) has a shape of a frame window (4) and it is placeable with its horizontal frame strips (5) into the opening in the wall, whereas perpendicularly to frame strips (5) covering strips (6) on the front side of the frame window (4) are arranged, whereas a lateral support base (3), which is a part of the frame (2) has a L-shaped cross-section and it is formed by a front face (10) and by a lock surface (11), which is perpendicular on it and inwardly oriented into the frame (2) and into the interior of the opening in the wall, the lock surface (11) is provided with an upper recess (14) and with a lower recess (15) and from the front surface (10) protrude inwardly into the opening in the wall an upper bearing flange (12) and a lower bearing flange (13), which are provided with openings (24) for corresponding pins for a pivoting connection with the rear wings (17) of the upper arm (7) and of the lower arm (8), which are also provided with openings (18), whereas the support element (21) has on its periphery perpendicular support surfaces (23) with openings (25), through which it is pivotably connected by pins with the front wings (17') of the upper arm (7) and of the lower arm (8), which are also provided with openings (18).

3. Self-supporting construction of forward opening door according to claims 1 and 2, **characterised in that** the support element (21) is created as a strip (22), which has on its peripheries perpendicular support surfaces (23) with openings (25) and protrusions (24) for increasing of the contact surface and simultaneously placing of a an upper lock element (28) whereas a lower lock element (29) is on the perpendicular lock surface (11).

4. Self-supported construction of forward opening door according to claim 3, **characterised in that** the upper lock element (28) is made as a hook and lower lock element (29) is made as spring loaded roller.

5. Self-supported construction of forward opening door according to claims 1, 2 and, **characterised in that** one wall (30) of the arms (7, 8), which is in closed state oriented into the frame (2) of the construction (1) and tilted at an angle into inside of the arm (7, 8) and the connecting rod (9) is then attached to these walls (30).

6. Self-supported construction of forward opening door according to claim 1 and 2, **characterised in that** the upper arm (7) and the lower arm (8) are mutually joined into one compact arm (31).

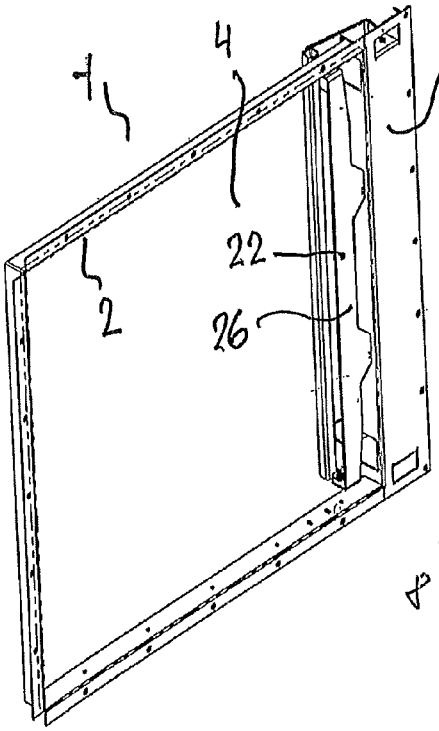

Fig. 1

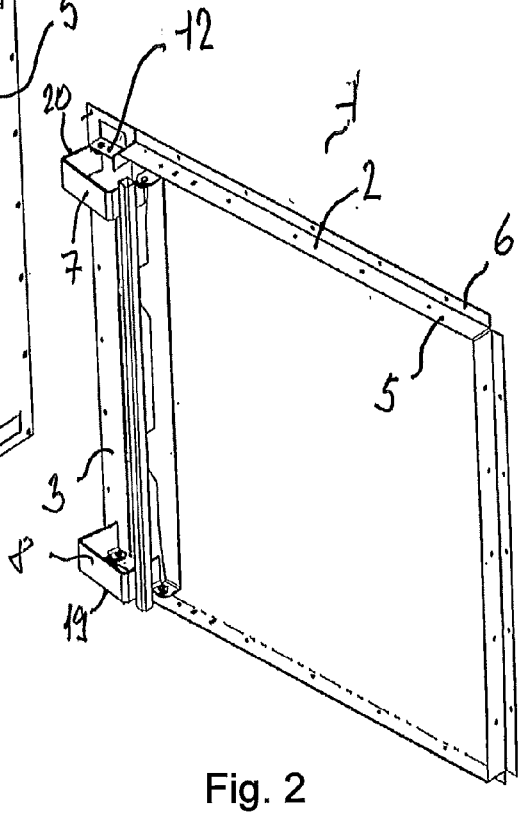

Fig. 2

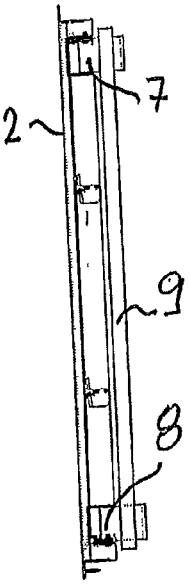

Fig. 3

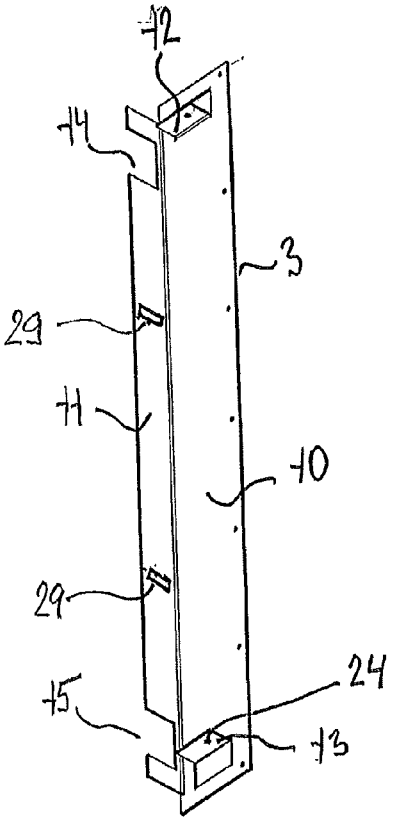

Fig. 4

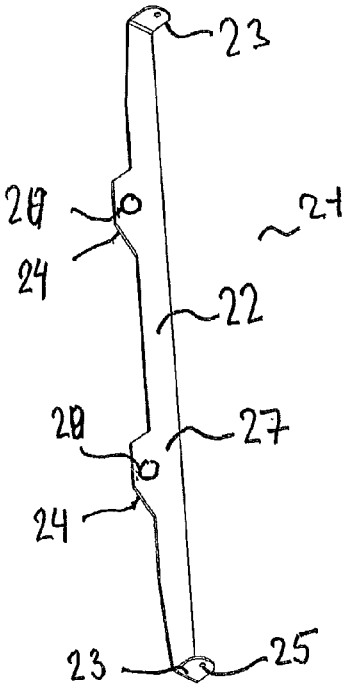

Fig. 5

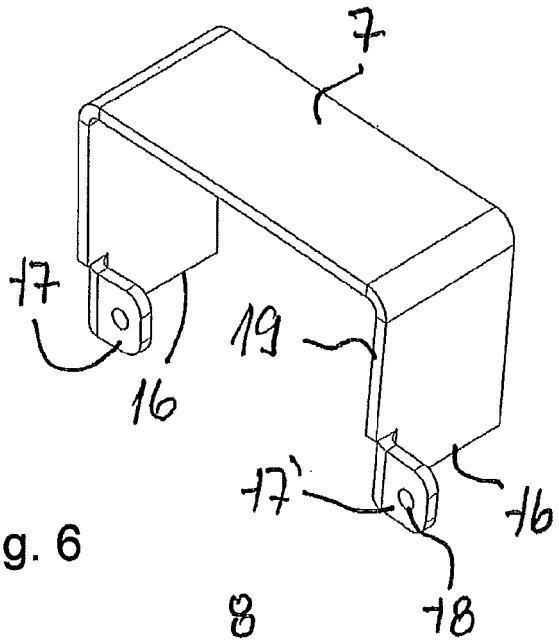

Fig. 6

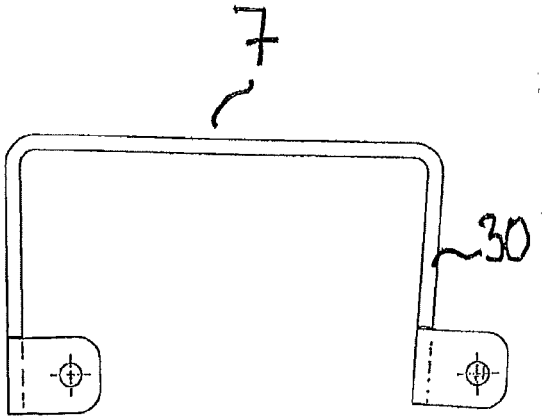

Fig. 7

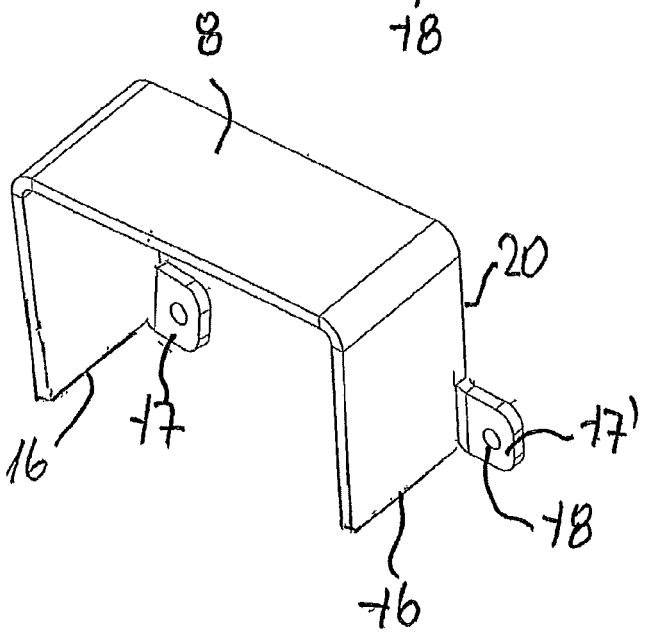

Fig. 8

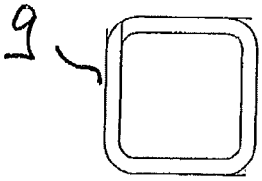

Fig. 9

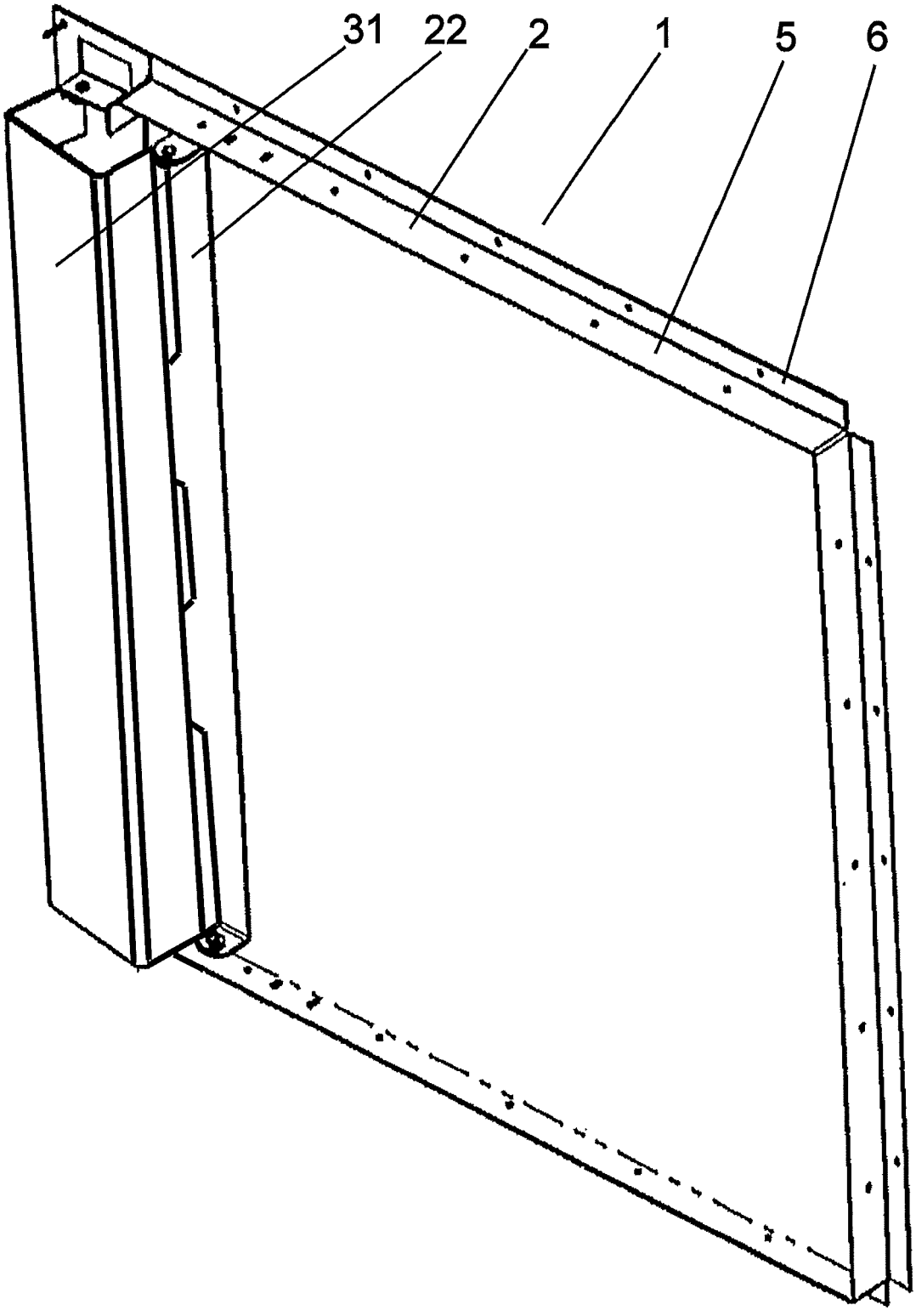

Fig. 10

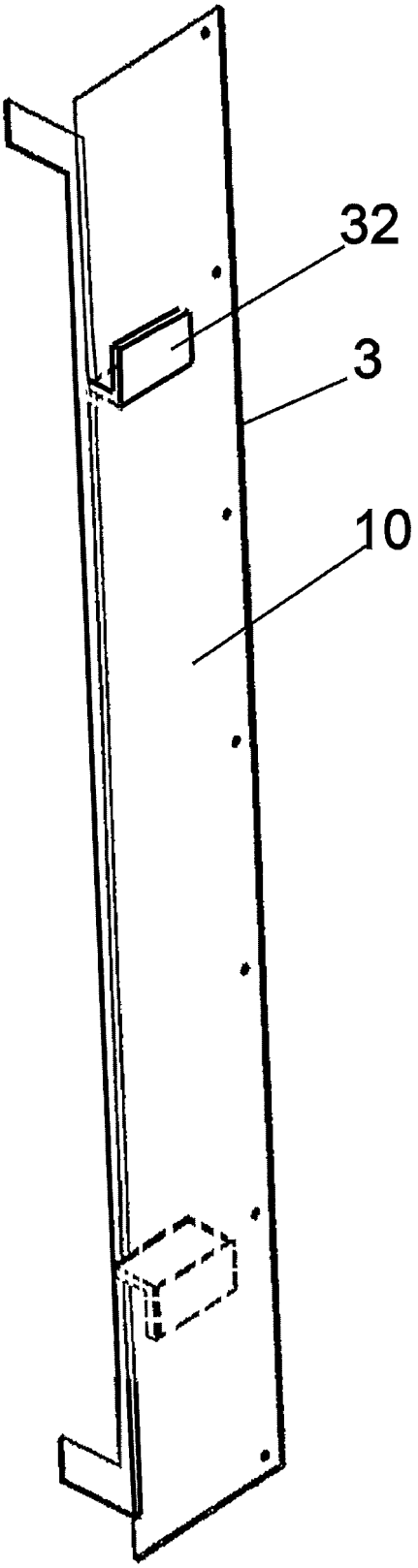

Fig. 11

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EUROPEAN SEARCH REPORT

Application Number
EP 17 17 5271

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2 822 041 A (BLANKENSHIP HOWARD C) 4 February 1958 (1958-02-04) * the whole document * -----	1-6	INV. E06B3/32 E05D3/00 E04B9/00
X	US 284 117 A (BYAR L.N.) 28 August 1883 (1883-08-28) * the whole document * -----	1-6	E06B5/02 E04F19/08 ADD. E05D3/02

TECHNICAL FIELDS SEARCHED (IPC)
E06B E05D E04B E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 August 2017	Topcuoglu, Sadik Cem

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08-08-2017

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US 2822041 A	04-02-1958	NONE	
US 284117 A	28-08-1883	NONE	

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- CZ 8335 U1 **[0003]**
- CZ 10050 U1 **[0004]**
- CZ 305131 B1 **[0005]**