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(54) **A SYSTEM OF MOUNTING FACADE PANELS**

SYSTEM ZUR MONTAGE VON FASSADENTAFELN

SYSTEME DE MONTAGE DE PANNEAUX DE FAÇADE

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(56) References cited:
EP-A2- 1 233 118 EP-A2- 1 310 612
CH-A5- 690 967 DE-A1- 2 702 459
DE-A1- 3 215 392

EP 1 513 992 B1

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Description

[0001] The invention relates to a system of mounting different coatings enabling straightening, prevention of crumbling and heat insulation of building walls, in which system on the mounting surface vertical rails and horizontal rails are fitted the and facade panels into the horizontal rails.

[0002] Previously known is, among other things, from US patent 5,379,561 a system, where on the wall plate rails are fixed hardly increasing the wall thickness, then horizontal rails are fitted onto them forming a grid. The plate rails have a profile fold both upwards and downwards in the rail front edge, whereby bricks, stones or other facing panels with grooves on both flanks can be shifted sideways between horizontal rails into place, with the profile edges being in the grooves of bricks or corresponding tiles.

[0003] The disadvantage of such a system is that the straightening of wall is difficult, since the vertical rails are not rigid in the necessary direction with respect to the straightening. Straightening must be carried out for instance adding filling under the vertical rails. Fitting of elements is also complicated threading and shifting sideways.

[0004] As discussed above, also publication DE 27 02 459 A1 discloses a mounting system for facade panels comprising horizontal and vertical rails. The horizontal rails have been first fixed to the wall and the vertical rails after that on the horizontal ones. Wall straightening has not been shown at all. Fixing work of the facade panels on the vertical rails is difficult because the distances of the mutual fixing points on the vertical rails must be very accurately adjusted. According to the present invention the mounting of the panels is very easy on the horizontal rails.

[0005] By means of the mounting system of facade panels according to the invention, where wall straightening, possibility of heat insulation and also prevention of crumbling of former coating remaining on the underside or dropping of crumbs are taken notice of, the problems presented in the following are solved and the system is characterized in that the vertical rails are arranged as straightening rails, whereby they are fitted on the mounting surface by means of adjustable brackets arranged at a distance from each other, the fixing holes portion between said vertical rail and the adjustable brackets including an adjustable distance towards and from the mounting face and so forth and the vertical rails including at chosen spacing of distances fixing holes for fitting of the horizontal rail, and that the horizontal rails are U-profiles and include at chosen spacing of distances fixing holes for fitting in the vertical rails.

[0006] The greatest advantage of the invention is the straightening of walls, which can be done in the new way of mounting vertical rails. A wanted wall surface is easily achieved adjusting the horizontal rails, for instance by means of serrated oblong holes directly before tightening.

Brackets to be fixed on the mounting the surface have ready-made oblong holes through which they are fitted into place and fixed on the wall, and a screw fixing hole, by means of which the straightening rail is fixed to the bracket. Additional insulation of different thickness can be used, a proper level of elevation is achieved increasing the height of brackets. By means of a special facade panel fixed on vertical rails the dropping of bits from the facade remaining on the underside is prevented. The horizontal rail is separate or it can be joined to the facade panel, it has horizontal serrated oblong holes enabling an always proper fixing spot. Different kinds of brackets can be fixed on the facade plate backside, on glass and other thin panels, for instance by gluing. In natural stones, panels of casting concrete and similar, wooden panels and brick panels mounting can be done pressing the bracket into an oblique groove on panel backside.

[0007] By means of the invention the facade panels are easily fitted into proper plane. On fitting no measuring as to the bracket positions is needed, since when the lowest row of adjustable brackets is fitted directly in horizontal plane, other brackets can be screwed into place without measuring. Thanks to the invention the coating stays put on the wall without mechanical fastening directly on the wall. The different thermal motions of building frame works with respect to the face material require contraction joints. A facade panel fitted by fixing rails rests by its weight on the fixing rail, for instance through the groove, and receives thermal motions without breaking the coating or the framework. By means of the invention it is possible, among other things, to prevent demolition of building facades with a coating of concrete, when the facades start to crumble. Especially in sky scrapers crumbling is increasing and dropping of loose blocks from them are prevented with a fixing panel.

[0008] Using this system the walls can be heat insulated without any leaks of thermal heat worth mentioning. The disadvantages of known techniques is that the supporting rails are usually made of a wood or metal as high as the wall and the space just at their sides is without heat insulation, which causes thermal leaks.

[0009] The fitting system as per the invention makes it possible that for instance a facade panel with tiling is not directly in fitting contact with the wall frame work but is hanging behind the tile panels from a fixing tongue at each tile attached to the fixing rail. The fitting system enables building of a so called differentiated facade, which facade moves freely by impacts of heat changes on it. The fixing panel/horizontal panel takes care of facade airing by means of their openings.

[0010] Further, the disadvantage of known techniques is that all coatings must be fitted with separate individual brackets, which makes the use of multifaceted coatings difficult on same faces. In addition, the borings of brackets in them are made in the coatings, which weakens their durability and ever greater material thickness is needed with respect to this mounting system.

[0011] In the following the invention is disclosed with reference to the enclosed drawing, where

Fig. 1 shows, partly cut, a wall covered with facade panels.

Fig. 2 shows an adjustable bracket.

Fig. 3 shows a portion of the vertical rail.

Fig. 4 shows a portion of the horizontal rail.

Fig. 5 shows a bracket to be pressed into the groove

Fig. 6 shows a tongue as fastener that can be glued, screwed etc. pressed out from a sheet.

[0012] In figure 1 a lower sheet 6 is at first fitted on the wall and onto it accurately in horizontal plane the lower adjustable bracket 11 fixed on the wall through holes 13. Also the fixing perforation 16 of horizontal rail 4, which comes as the lowest, determines exactly the distance of the adjustable brackets 11 when they are fitted. With the lower brackets 11 in place, the vertical rail 2, for instance the one closest to the corner, is fitted upright exactly horizontally in the direction of the wall plane, for instance using a plumb-line. Under it adjustable brackets 11 are fitted at fixed distances, since the vertical rail 2 has ready-made oblong holes 9 among which the wanted spacing is chosen.

[0013] When this rail 2 is upright on brackets 11, the brackets 11 can already be screwed on the wall permanently through holes 13. However, the screws through vertical rail 2 holes 9 to the threaded holes 14 of the brackets are kept loose till the vertical rail in the corner has been by means of a plumb-line levelled in other direction, i.e. in the downright plane with respect to the wall plane. When the flank of holes 9 is serrated, creased or pitted the vertical rail 2 stays put supported by the screw secured in threaded hole 14 in the oblong hole 9 even if the screw is loose on finding proper straightness for it. When the straightness is found vertical rail 2 is secured by screws in threaded holes 14 in adjustable brackets 11. Then furnishing the whole wall with vertical rails 2 and horizontal rails 4 is easily done through fixing holes 9 and 15 at fixed distances. Only each vertical rail 2 is to be adjusted only with respect to straightening, e.g. in a plane downright with respect to the wall plane.

[0014] If no heat insulation 3 and no fixing panel 5 is mounted on the horizontal rails a facing panel 12 is mounted, on the back of which there are brackets 7 as per figure. Then a groove 21 is made for the fold in panel 12. Also as fixing means a bracket 23, as per figure 6, glued on the back of the panel, can be used.

[0015] If the heat insulating panels 3 are mounted as in the brick panel portion in the figure, they are fitted between vertical rails 2 directly against the wall. If the wall has no tendency to crumble, no fixing panel 5 is needed, and then vertical rails 4 are mounted in the vertical rails with wanted spacing and the facial panels 25 are mounted on horizontal rails 4.

[0016] If the wall shows tendency to crumble, a corrugated fixing panel 5 is mounted in vertical rails possibly

also using horizontal rails 4. The facing panel presses the wall via heat insulating panel 3 and blocks or crumbles that have got loose from the wall cannot drop down. Facing panel 5 can be mounted to press the wall directly.

[0017] Figure 4 horizontal rail 4 has serrated holes 9 through which horizontal rail 4 is fixed by screw 18 in threaded hole 15 of vertical rail 2. There is in the U-profile of the horizontal rail holes 17 so that screw 18 is tightened through the openings. The bottom of horizontal rail 4 profile has also holes, possibly the area of holes is more than half of the bottom part area so that airing through these holes would be effective in a vertical air space.

[0018] Projecting parts possibly used as ornamentation on the wall can simply be formed adding on these parts on the horizontal rail 4 one or more additional horizontal rails to raise the facade panel outward in this part. The projected portions are relatively narrow, for instance a sector of 30 cm in the corner of the building from below up in both window jambs etc.

Claims

1. A system of mounting a facade panel (12);(25), the system including a mounting surface, vertical rails (2) and horizontal rails (4) and facade panels, in which system the vertical rails (2) are fitted on the mounting surface and horizontal rails (4) on the vertical rails (2) and the facade panels are fitted on the horizontal rails, the vertical rails (2) are L-profiles and fitted as straightening rails of the mounting surface, wherein they are fixed to the mounting surface by means of adjusting brackets (11) arranged at a distance from each other, the fixing holes portion (9), (14) between said vertical rail and the adjustable bracket including an adjustable distance towards and from the mounting face and the vertical rails (2) including at chosen spacing of distances fixing holes (15) for fitting of the horizontal rail (4) and the horizontal rails (4) are U-profiles and include at chosen spacing of distances fixing holes (9) for fixing in the vertical rails (2).
2. A system according to claim 1 **characterized in that** the hole fixing includes between vertical rail (2) and adjusting bracket (11) at least one oblong hole (9) with a serrated flank.
3. A system according to claim 1 **characterized in that** the area of adjustable bracket 11 flank (26) overlapping the vertical rail (2) is arranged to be under 10 per cent of the counter flank (27) of vertical rail (2) in order to minimise a cold bridge between wall and vertical rail.
4. A system according to claim 1 **characterized in that** the system includes a heat insulating panel (3) fitted

under facade panel (12),(15) at first against the mounting face.

5. A system according to claim 1 **characterized in that** the system includes a fixing panel (5) pressing either heat insulating panel (3) against the mounting face pressing directly against the mounting face in order to prevent crumbling of the mounting face or options of loosened crumbling blocks.
6. A system according to claim 1 **characterized in that** horizontal rail (4) is a profile, the profile portion striving away from the wall, as the profile bottom, is furnished with airing holes (19).
7. A system according to claim 1 **characterized in that** the facade panels (12);(25) include on their back side brackets (7);(23), by means of which said panels can be fitted onto horizontal rails (4).
8. A system according to claim 1 **characterized in that** brackets (7);(23) are mounted in the panel (12);(25) by gluing, pressing mechanically into the panel groove (21) or the bracket is folded out off the panel.
9. A system according to claim 2 **characterized in that** the serrated oblong hole (9) is in vertical rail (2) and in horizontal rail (4).
10. A system according to claim 1 **characterized in that** it is possible to form in the facade panel projecting portions by fitting one or more horizontal rail portions one on top of another in order to heighten the intended portion and the increase distance of the facade plate that comes on it from the mounting face.

Patentansprüche

1. Ein System für die Installation von Fassadenpaneelen (12);(25), wobei das System eine Befestigungsfläche, senkrechte Schienen (2) sowie waagerechte Schienen (4) und Fassadenpaneelen umfasst, wobei die senkrechten Schienen (2) an der Befestigungsfläche befestigt werden und die waagerechten Schienen (4) an den senkrechten (2), und die Fassadenpaneelen werden an den waagerechten Schienen befestigt, die senkrechten Schienen (2) sind L-Profile und sie sind als Begradigungsschienen der Befestigungsfläche angepasst, wobei sie an der Befestigungsfläche mit verstellbaren Haltewinkeln (11), die voneinander entfernt angeordnet sind, befestigt werden, der Befestigungslochabschnitt (9; 14) zwischen der erwähnten Schiene und zwischen dem verstellbaren Haltewinkel umfasst eine verstellbaren Abstand zu der Befestigungsfläche und von ihr weg,

die senkrechten Schienen (2) umfassen Befestigungslöcher (15) in einem bestimmten Abstand für die Befestigung der waagerechten Schiene (4) und die waagerechten Schienen (4) sind U-profile und haben Befestigungslöcher (9) in bestimmten Abstand voneinander für die Befestigung der senkrechten Schienen (2).

2. Ein System gemäss Patentanspruch 1 **gekennzeichnet dadurch, dass** die Lochbefestigung zwischen der senkrechten Schiene (2) und dem verstellbaren Haltewinkel (11) mindestens ein längliches Loch (9), dessen Flanke gezahnt ist, umfasst.
3. Ein System gemäss Patentanspruch 1 **gekennzeichnet dadurch, dass** die Fläche der Flanke (26) des verstellbaren Haltewinkels (11), die die senkrechte Schiene (2) überlappt, angepasst ist auf unter 10 Prozent der Fläche der Gegenflanke (27) der senkrechten Schiene (2), um die Kältebrücke zwischen der Wand und der senkrechten Schiene zu minimieren.
4. Ein System gemäss Patentanspruch 1 **gekennzeichnet dadurch, dass** zu dem System eine Wärmeisolierplatte (3) gehört, die als erstes unter die Fassadenpaneelen (12);(15) an der Befestigungsfläche installiert wird.
5. Ein System gemäss Patentanspruch 1 **gekennzeichnet dadurch, dass** zu dem System eine Befestigungspaneel (5) gehört, die entweder die Wärmeisolierplatte (3) gegen die Befestigungsfläche drückt oder direkt gegen die Befestigungsfläche drückt, um Abbröckeln der Befestigungsfläche zu verhindern oder um die Bewegung von sich gelösten bröckelnden Teilen zu verhindern.

6. Ein System gemäss Patentanspruch 1 **gekennzeichnet dadurch, dass** der von der Wand weg strebende Teilbereich der waagerechten U-Profil-schiene (4), wie der Boden des Profils, mit Lüftungslöchern (19) ausgestattet ist.
7. Ein System gemäss Patentanspruch 1 **gekennzeichnet dadurch, dass** die Fassadenpaneelen (12);(25) an ihrer Rückseite mit Halterungen (7);(23) ausgestattet sind, mit denen die erwähnten Paneelen an den waagerechten Schienen (4) angebracht werden können.
8. Ein System gemäss Patentanspruch 1 **gekennzeichnet dadurch, dass** die Halterungen (7);(23) an der Paneelen (12);(25) angebracht wurden durch Kleben, indem sie mechanisch in die Kerbe (21) der Paneelen gedrückt wurden oder die Halterung ist aus der Paneelen gebogen worden.

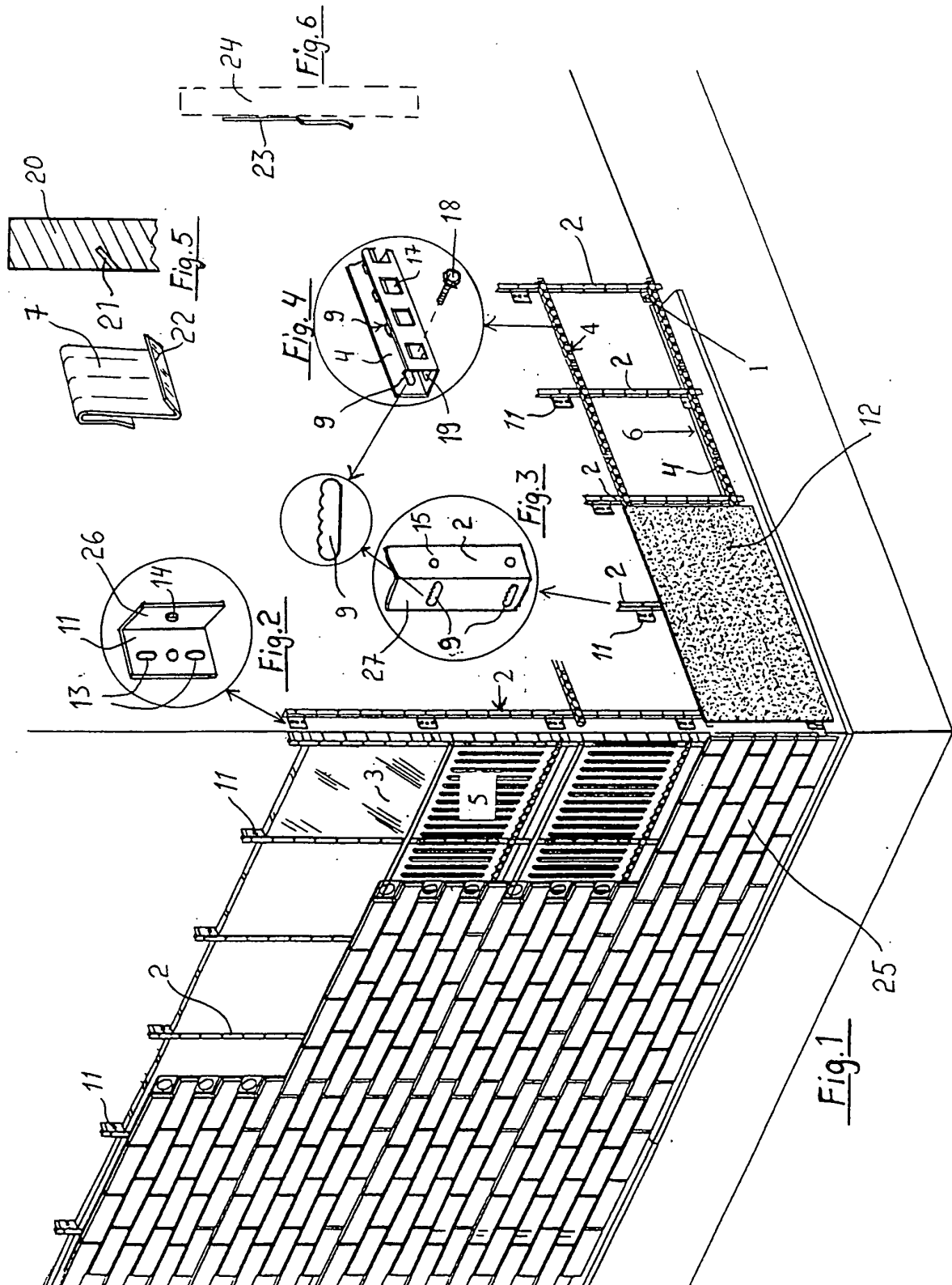
9. Ein System gemäss Patentanspruch 1 **gekennzeichnet dadurch, dass** ein längliches sägegezahntes Loch (9) in der senkrechten Schiene (2) und der waagerechten Schiene (4) ist.
10. Ein System gemäss Patentanspruch 1 **gekennzeichnet dadurch, dass** es möglich ist, in die Fassade Vorsprünge zu formen, indem ein oder mehrere waagerechte Schienenteile (4) übereinander befestigt werden um den beabsichtigten Vorsprung zu erhöhen und um den Abstand der darauf kommenden Fassadenpaneele zur Befestigungsfläche zu vergrössern.

Revendications

1. Un système pour le montage de panneaux de façade (12) ; (25) comprenant la surface de montage, les rails verticaux (2), les rails horizontaux (4) ainsi que les panneaux de façade, dans lequel système les rails verticaux (2) sont fixés sur la surface de montage et les rails horizontaux (4) sur les rails verticaux (2) et les panneaux de façade sur les rails horizontaux, et les rails verticaux (2) présentant un profilé en L assumant le rôle de rails de redressement pour la surface de montage et sont, par conséquent, fixés par l'intermédiaire des équerre de fixation réglables (11) situées à une distance l'une de l'autre sur la surface de montage, la partie de trous de fixation (9), (14) entre ledit rail et l'équerre de fixation incluant une distance réglable pour rapprocher et éloigner de la surface de montage, et les rails verticaux (2) comprennent les trous de fixation (15) situés à une distance choisie l'un de l'autre pour pouvoir fixer le rail horizontal (4), et les rails horizontaux sont des rails en U et comprennent les trous de fixation (9) situés à une distance choisie l'un de l'autre pour les fixer sur les rails verticaux (2).
2. Un système selon la revendication 1, **caractérisé en ce que** les trous de fixation entre le rail vertical (2) et l'équerre de fixation réglable (11) comprennent au moins un trou oblong (9), dont le bord a été denté.
3. Un système selon la revendication 1, **caractérisé en ce que** la superficie de celui des côtés (26) de l'équerre de fixation réglable (11) qui passe sur le rail vertical (2) est calculée de façon à être moins que 10 pour cent de la superficie du côté de contact (27) du rail vertical (2), ceci pour minimiser le pont thermique entre le mur et le rail vertical.
4. Un système selon la revendication 1, **caractérisé en ce qu'il** comprend un panneau d'isolation ther-

mique (3) installé tout premier contre la surface de montage sous le panneau de façade (12), (15).

5. Un système selon la revendication 1, **caractérisé en ce qu'il** comprend un panneau de fixation (5) pressant le panneau thermique (3) soit contre la surface de montage ou directement contre la surface de montage pour empêcher la surface de montage de s'effriter ou pour empêcher que les blocs en détachés ne bougent.
6. Un système selon la revendication 1, **caractérisé en ce que** le rail horizontal en U (4) est un profilé dont la partie perpendiculaire au mur, comme le fond du profilé, est munie de trous d'évent (19).
7. Un système selon la revendication 1, **caractérisé en ce qu'il** y a, sur le côté arrière des panneaux de façade (12) ; (25), des fers de support (7) ; (23) à l'aide desquels lesdits panneaux peuvent être placés sur les rails horizontaux (4).
8. Un système selon la revendication 1, **caractérisé en ce que** les fers de support (7) ; (23) sont collés sur le panneau (12) ; (25) ou pressés mécaniquement dans l'encoche (21) du panneau, ou le fer a été plié hors du panneau.
9. Un système selon la revendication 2, **caractérisé en ce que** le trou oblong denté (9) est situé dans le rail vertical (2) et dans le rail horizontal (4).
10. Un système selon la revendication 1, **caractérisé en ce qu'il** est possible de munir le panneau de façade de portions en saillie en fixant une ou plusieurs portions de rails horizontaux (4) l'une sur l'autre afin de rendre plus haute la portion déterminée et d'augmenter la distance entre le panneau de façade y posé et la face de montage.



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5379561 A [0002]
- DE 2702459 A1 [0004]