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FIRE RETARDANT GLAZING WITH WOODEN DOOR

The invention relates to a fire resistant glazing to avoid the passage of fire and smoke in the case of a fire from one room into another with a flush-mounted door leaf, an upper screen and on both sides of the door leaf and the upper screen framelessly disposed glass surfaces as lateral solid elements.

A generic fire resistant glazing is known from the German utility model DE 20 2011 106 510 U1. Here, a fire resistant glazing is disclosed having a plurality of glass surfaces made of fire protection panes disposed next to one another, into which a glass door is integrated flushly without profile. This is substantially facilitated in that the fire protection panes have two glass panes distanced in a parallel manner from one another by means of an edging compound and the space, enclosed by the edging compound, between the glass panes is filled with a fire protection gel, wherein the edging compound of the fire protection panes in the region of the abutting edges which abut directly on the glass door is offset inwardly forming a groove, and in the region of the lateral and/or upper abutting edges of the glass door the first of the glass panes of the glass door is set back to form a stepped rabbet. By means of the formation of the abutting edges of the glass door on the one hand and the formation, corresponding thereto, of the abutting edges of the lateral fixed elements, an abutment region is created which facilitates the flush enclosure of the glass door in the fire resistant glazing. In addition, this abutment region can by means of the groove provided in the abutting edges be provided with still further functionalities, such as with a smoke seal and/or further fire protection measures, without there being any requirement for the use of a jamb.

DE 20 2011 106 510 U1 discloses a fire resistant glazing in the case of which a glass door is held pivotably profile-free directly at least partially on the lateral fixed element and fire protection panes have two fire-proof glass panes distanced from one another in a parallel fashion by means of an edging compound, and the space between the fire-proof glass panes enclosed by the edging compound is filled with a fire protection gel, wherein the edging compound of the glass door and the edging compound of the fire protection panes is offset to the inside in the region of the abutting edges, which abut directly on the glass door forming a groove, and in the region of the lateral and/or upper abutting edges of the glass door the first of the glass panes of the glass door is set back in relation to the second to form a stepped rabbet.

AT 505 141 A1 discloses a wall system of monoblock elements with parallel side parts on an internal frame system, on the end faces of which assigned to one another are formed holding systems for fastening elements, sealing elements and beater bars. Here each end face of the monoblock elements finishes substantially flushly with the outer edges of the side parts and in each end surface are provided two parallel grooves which extend at the same distance to the edge parts for the reception of the fastening elements, sealing elements and beater bars, wherein after the construction of the monoblock elements the outer edges of the side parts are openly visible.

It is a disadvantage that commercially available wooden doors cannot be fitted flushly into a fire resistant glazing of this sort, since their door leaves are hung on a frame. To this end, different frame shapes and materials are known, for example door frames made of wood, casing frames or steel frames. These have an optically disturbing effect in a fire resistant glazing, since they break the desired unbroken flat impression of the glazing and destroy the clear simple design character. However, in modern architecture, it is precisely the minimalistic design principle, which embodies elementary values and can be made visible, which is of immense importance.

In view of these facts, the task upon which the invention is based is the improving of a fire resistant glazing of the initially mentioned art such that also wooden door leaves can be integrated without frame and without visible hinges flushly into the glass environment, without compromising the fire protection properties.

The task is solved according to the invention by the combination of the following characteristics on a fire resistant glazing of the initially mentioned sort:

– each glass surface consists of a fire protection pane, which has glass panes spaced apart in parallel from each other by means of an edging compound, wherein the space enclosed by the edging compound between the glass panes is filled with a fire protection gel,

– the edging compound of the fire protection panes is offset inwards while forming a groove in the area of the abutting edges which are directly adjacent to the door leaf,

– in the area of the lateral abutting edges of the door leaf, the one of the glass panes of the fire protection panes is set back with respect to the other one to form a stepped rabbet,

– the door leaf is made of wood and/or wooden materials and is provided with corresponding strip-shaped stop profiles that correspond to the stepped rabbets formed on the glass surfaces,

– the door leaf is arranged on the floor by means of fittings that are arranged in a covered manner (floor door closer) and mounted on the upper part in a pivoting manner and

– the groove of the edging compound of the fire protection panes, which groove is provided on the side of the abutting edges, is provided with a stuck in lath made of wood and/or calcium silicate, in which lath a recess in the form of a stepped rabbet that corresponds to the stop profile is provided.

It has been shown, surprisingly, that in spite of the comparatively thin door leaf the frameless flush fitting into a fire resistant glazing is facilitated by the combination of the above characteristics without compromising the fire protection. According to the invention, the groove of the edging compound of the fire protection panes is provided on the abutting edges with a stuck in lath made of wood and/or calcium silicate, in which a recess in the form of a stepped rabbet that corresponds to the stop profile is provided. Here, for improving the fire protection, according to an embodiment of the invention it can be advantageous to equip the lath and/or the door leaf on the abutting edges with an intumescent material, which in the case of a fire closes gaps present between fixed element and movable element of the fire resistant glazing.

In the preferred embodiment of the invention, the upper screen consists also of wood, in order to facilitate a covered reception of the upper pivot bearing of the door leaf in a simple manner. For holding the upper screen on the lateral fixed elements made of fire protection panes, it is provided to design more broadly the lath, disposed on the side of the abutting edges in the groove of the edging compound, in the region of the upper screen, to provide a corresponding groove in the upper screen and to connect the upper screen by means of a tongue-groove connection with the lateral fixed elements in a manner that on the one hand is flush and on the other hand is not visible from the outside. For sealing gaps in case of fire, it can be provided to equip also the upper screen with intumescent material in the area of the abutting edge towards the door. In general, intumescent materials, which are used to increase fire protection, can be equipped in each case respectively with a sealing groove into which a sealing is set, in particular a lip seal. Such an arrangement offers the advantage of an improved smoke seal in particular at the beginning of a spreading fire. At this time point, the trigger temperature of the intumescent material is frequently not yet reached. At the same time, such a seal damps also the door leaf when closing it.

Further details, characteristics and advantages of the invention result from the following description of the associated drawing, in which a fire resistant glazing with integrated solid wood door is shown. In the drawing:

figure 1 shows a fire resistant glazing according to the invention in a top view,

figure 2 shows the fire resistant glazing of figure 1 in a horizontal cut view according to line I – I,

figure 3 shows a cut view according to line II - II in enlarged representation and

figure 4 shows the cut view according to line I – II also in enlarged representation.

In figure 1 of the drawing is shown in top view a fire resistant glazing 1 according to the invention for avoiding the passage of fire and smoke in the case of fire from one room into another. The fire resistant glazing 1 has two glass surfaces A and C, consisting of fire protection panes 2 and disposed spaced next one another, between which is disposed an inner surface B with a solid wood door 3, above which is disposed an upper fixed element 4 (upper screen), also made of wood. The solid wood door 3 has a door leaf 5, which is held pivotably on the upper screen 4 by means of an internally-positioned and therewith invisible pivot bearing 7, and in the floor 6 by means of an internally-positioned and therewith invisible floor door closer 8. The pivotal axis of the solid wood door thus extends centrically internally in the door leaf, as can be seen in particular in figure 3 and 4.

The solid wood door 3 is furthermore equipped with a lock case 9, which interacts with a closing mechanism (not shown in the drawing) in the glass surface A, such that the solid wood door 3 can be closed or opened by operating the handle 10.

Figure 2 shows a horizontal cut through the fire resistant glazing along the line I – I according to figure 1. As can be seen here, each fire protection pane 2 consists of two glass panes 11, 12 or 19, 20, made of single pane safety glass, spaced parallel from one another by means of an edging compound 13 made of polyurethane. The space enclosed by the glass panes 11, 12 or 19, 20 and the edging compound 13 is filled with a fire protection gel 14. The glass panes 11, 12 or 19, 20 are in each case 8 mm thick, wherein the spacing of the inner surfaces from one another is 28 mm. The thickness of each fire protection pane 2 is 44 mm, measured from outer surface to outer surface.

The fire protection gel 14 is manufactured as hydrogel from a $NaCl/MgCl_2$ salt solution with the addition of polymerisable compounds and a polymerisation accelerator in water either prior to the filling between the glass panes 11, 12 or 19, 20 or generated in situ between the glass panes 11, 12 or 19, 20, in that the above-mentioned components are mixed together

and injected directly into the cavity between the glass panes 11, 12 or 19, 20. The polymerisation to form hydrogel then takes place in the cavity, now filled with the mixture, between the glass panes 11, 12 or 19, 20.

In figure 3 of the drawing, a horizontal cut II – II can be seen through the fire protection glazing 1 in the site accordingly labelled in figure 1, viewed downwards. It can be seen in particular that the solid wood door 3 is a hinged door, which, on the right-hand side in the drawing, is hung centrically above the floor door closer 8 and the pivot bearing 7 interacting with the upper screen 4, wherein on the door leaf 5 on the right and left abutting edge in each case a stop profile 15 or 16 is formed integrally with the door leaf in the form of a stepped rabbet. The stop profile 15 or 16 extends in each case over the entire length of the abutting edge. By reason of the centrical arrangement of the rotational axis, the lath-shaped stop profiles 15, 16 are disposed on the front side and back side diagonally to one another, such that in the closed condition on the door both the left and the right abutting edge are sealed. For increasing the sealing effect, the stop profiles 15 and 16 are equipped on the inside in each case with a sealing arrangement 17 or 18 extending across the entire length.

With the stop profiles 15 and 16 formed by the stepped rabbet of the door leaf 5 of the solid wood door 3, in closed condition corresponding stepped rabbets interact on the fire protection panes 2 located on both sides of the door. To this end, it is provided that in the area of the lateral abutting edges the one of the glass panes 11 or 19 forming the fire protection pane is set back with regard to the second glass pane 12 or 20 to form a stepped rabbet and is accordingly offset inwards on the abutting edge side of the edging compound 13 forming a groove. In the groove, formed thus, of the fire protection panes 2 disposed to the left and to the right of the solid wood door 3 is anchored in each case a wood lath 21 extending across the entire length, which by means of a stepped rabbet forms the counter stop for the stop profiles 15 and 16 of the solid wood door 3 in closed condition. In this regard, the surface, oriented towards the door gap, of the wood laths is equipped with an intumescent profile strip 22, which in the case of fire closes the door gap.

The dimensional design of the above described arrangement is selected such that the solid wood door 3 extends flush to the fire protection panes 2, disposed on the left and the right, of the fire resistant glazing and therewith an overall appearance is achieved which conveys a clear functional aesthetic impression without annoying fittings or protruding parts.

The horizontal cut shown in figure 4 of the drawing according to line I – I in enlarged representation shows in turn the principle described in connection with figure 3 of the

integration of the solid wood door 3 into a fire resistant glazing, wherein it can additionally be seen that also in the area of the door lock are provided intumescent profile strips which are effective in case of fire, which close door gaps there present in the case of fire by means of the foaming process.

List of reference signs

A glass surface
B inner surface
C glass surface
1 fire resistant glazing
2 fire protection panes
3 solid wood door
4 upper fixed element (upper part)
5 door leaf
6 floor
7 pivot bearing
8 floor door closer
9 lock case
10 handle
11 glass pane
12 glass pane
13 edging compound
14 fire protection gel
15 stop profile
16 stop profile
17 sealing arrangement
18 sealing arrangement
19 glass pane
20 glass pane
21 wooden lath
22 strip of intumescent material

Patentkrav

1. Brandsikringsglas til at forhindre ild og røg i at trænge fra et rum ind i et andet i tilfælde af brand med en flush-tilpasset dørplade, en derover indrettet overdel og glasoverflader monteret uden rammer som fastgjorte sideelementer på begge sider af dørpladen og overdelen,
omfattende kombinationen af følgende kendetegn:

1.1 hver glasoverflade består af en brandsikringsrude (2), som omfatter glasruder (11, 12 eller 19, 20) anbragt parallelt med hinanden med afstand ved hjælp af en kantforbindelse (13), idet området omgivet af kantforbindelsen (13) mellem glasruderne (11, 12 eller 19, 20) er fyldt med en brandsikringsgel (14),

1.2 kantforbindelsen (13) af brandsikringsruderne (2) er forskudt indad, hvilket danner en not i området af samlingskanterne, som støder direkte op til dørpladen (5),

1.3 i området af dørpladens (5) laterale samlingskanter er den ene af glasruderne (11 eller 19) af brandsikringsruderne (2) rykket tilbage i forhold til den anden (12 eller 20) for at danne en trindelt fals,

1.4 dørpladen (5) er ved hjælp af skjult indrettede beslag (8 eller 7) i gulvet, især ved hjælp af en gulvdørlukker, og på overdelen (4) monteret drejeligt, **kendetegnet ved** følgende kendetegn:

1.5 dørpladen (5) er fremstillet af træ og/eller træmaterialer og er forsynet med tilsvarende listeformede anslagsprofiler (15, 16), som svarer til de trindelte fals dannet på glasoverfladerne (A, C), og

1.6 noten af kantforbindelsen (13) på brandsikringsruderne (2), idet noten er tilvejebragt på siden af samlingskanterne, er forsynet med en påklæbet liste (21) fremstillet af træ og/eller kalciumsilikat, på hvilken en fordybning i form af en trindelt fals, som svarer til anslagsprofilen (15 eller 16), er tilvejebragt.

2. Brandsikringsglas ifølge krav 1, **kendetegnet ved, at** trælisten (21) og/eller dørpladen (5) er forsynet med et opsvulmende materiale (22) ved samlingskanterne.

3. Brandsikringsglas ifølge krav 1 eller krav 2, **kendetegnet ved, at** overdelen (4) er fremstillet af træ og/eller træmaterialer.

4. Brandsikringsglas ifølge krav 3, **kendetegnet ved, at** listen (21) indrettet i noten af kantforbindelsen (13) på siden af kantsamlingerne er gjort bredere i området af overdelen (4), og at en tilsvarende not er udformet i overdelen, således at overdelen kan forbindes med brandsikringsruderne (2) ved hjælp af en not-/ferforbindelse.

5. Brandsikringsglas ifølge et af kravene 1 til 4, **kendetegnet ved, at** overdelen (4) er forsynet med en strimmel (22) af opsvulmende materiale i området af samlingskanten i retning af dørpladen (5).

6. Brandsikringsglas ifølge krav 5, **kendetegnet ved, at** der i strimlen (22) af opsvulmende materiale er tilvejebragt en tætningsnot, i hvilken en læbetætning kan indsættes.

Fig. 1

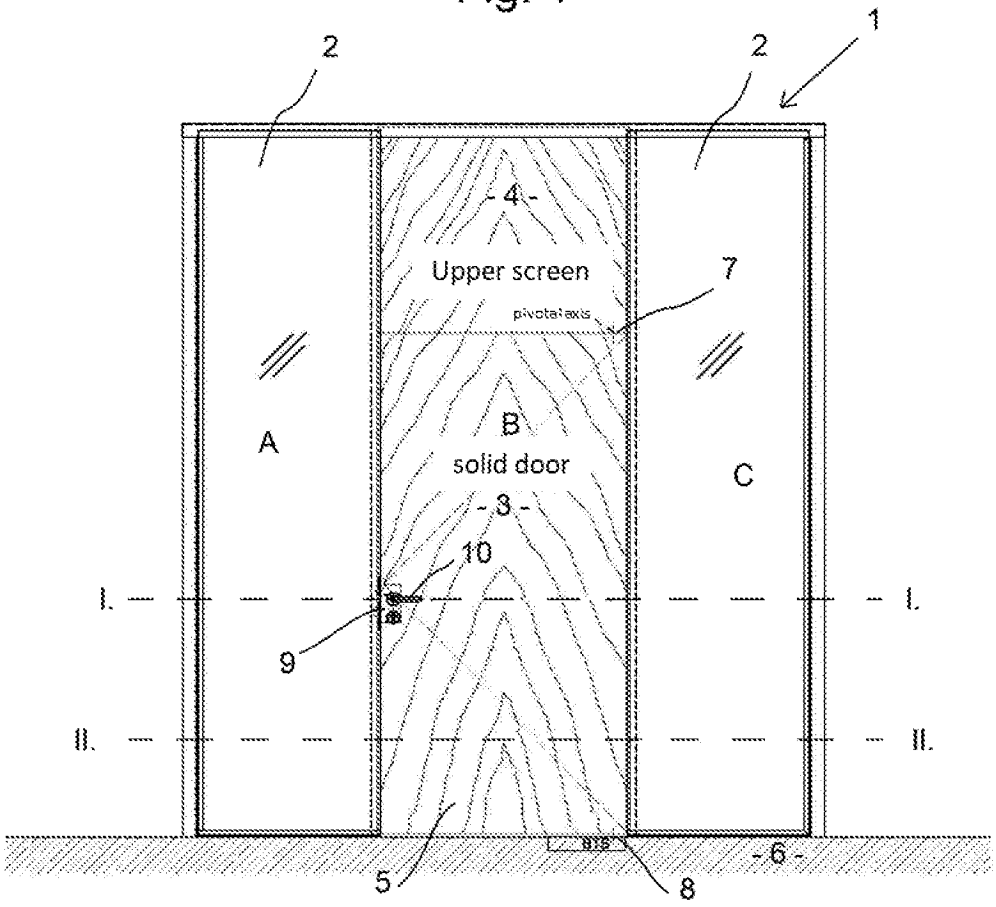

1
2
2
- 4 -
Upper screen
pivotal axis
7
A
B
solid door
C
- 3 -
10
I.
I.
9
II.
II.
- 6 -
5
8

Fig. 2

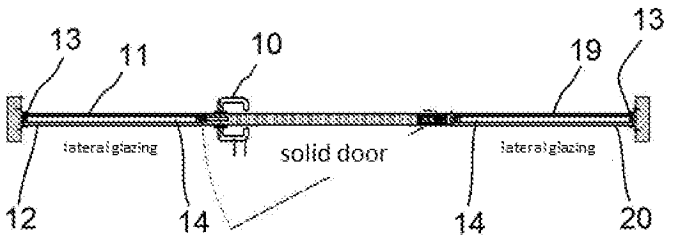

13
11
10
19
13
lateral glazing
solid door
lateral glazing
12
14
14
20

Fig. 3

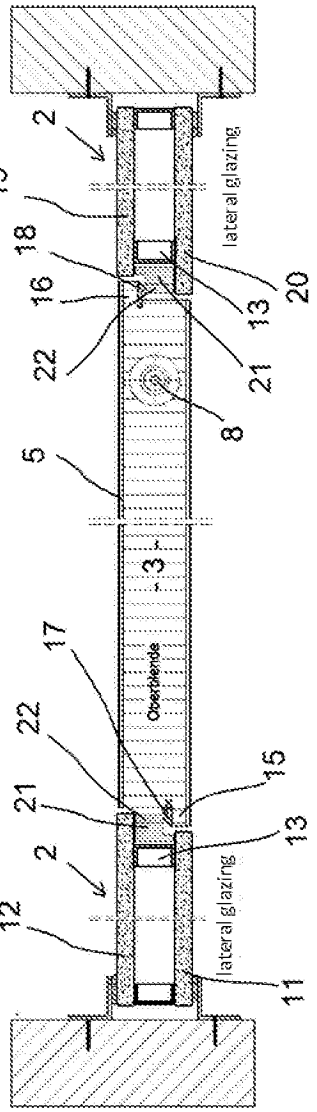
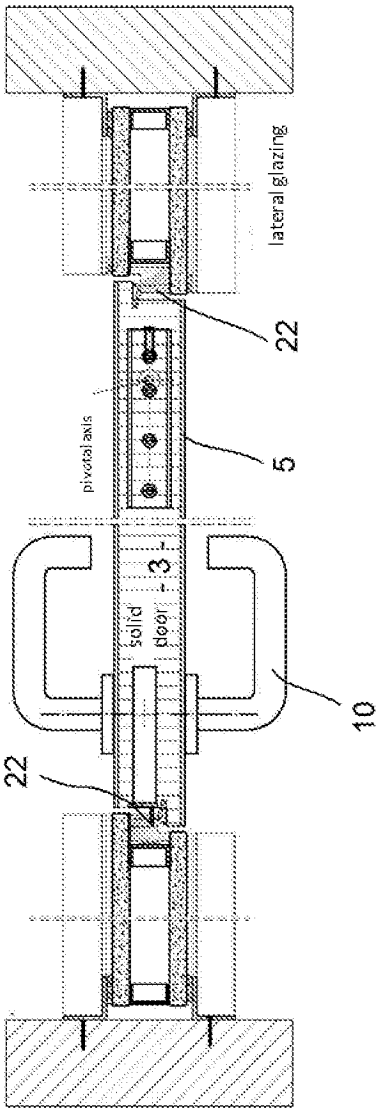

2
19
18
16
22
lateral glazing
20
13
21
8
5
3
Oberblende
17
22
15
21
13
2
12
lateral glazing
11

Fig. 4


lateral glazing
22
pivotal axis
5
3
solid door
10
22