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Description

Technical area

- 5 The invention relates to a water craft such as a ship, a cruiser, a yacht, a boat or the like, with a glass pane arrangement arranged thereon and/or therein, with a fire-proof glazing.
- 10 Fire-protection regulations require special fire-proof glazing on yachts or ships. However, special frames are provided for these. Although such frame structures fulfil the regulations, but because of its substantial restrictions with respect to the exterior design of the yacht have to be accepted. For such
- 15 frames which are clearly visible on the outside do not for example allow so-called ribbon windows which act like a continuous strip-shaped glass front which are in high demand from customers and the preferred choice of designers.

20 Prior art

From DE 44 17 496 C4 a pane structure for a fire-proof insulation glazing is known. Between the two outer panes a pane of transparent glass ceramic is arranged.

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DE 20 2008 016 781 U1 shows and describes a fire-proof glazing in the form of a window with two parallel spaced glass panes. To this end, a holder with a holding element, a spacer, a counter-plate and fixing means are employed.

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FR 25 41 359 A1 describes a glass pane arrangement for marine use. The arrangement comprises a first glazing, which is an outer glazing, and comprises a second glazing, which is embodied in inner glazing and as fire-proof glazing. The

35 inner glazing fulfils fire-protection requirements so that a combined double glazing is present, the inner glazing comprising a fire-proof frame. The first glazing is mounted in a chassis.

US 393 5681 A1 discloses a glass pane arrangement with two panes, which are both described as fire-proof glazings. A first pane is a fire-proof glazing, a second pane is said to be likewise fire-resistant. Both panes are held by a frame. A chamber with fire protection material is to provide fire protection in the event of a fire here.

US 411 3904 A1 discloses an arrangement with two panes which are held in a common frame.

Presentation of the invention: object, solution, advantages

The invention is based on the object of finding a water craft which comprises a glass pane arrangement with which on the one hand a fire-protection standard is fulfilled and which on the other hand satisfies designer and customer wishes.

This object is solved through a water craft with the features stated in Claim 1.

The glass pane arrangement according to the invention is a combined outer glazing with a fire-proof glass. It is employed in particular in ships and the like.

The invention is based on the idea of providing a first glazing which takes into account the designer wishes. This is an outer glazing and greatly forms the design of the ship. However, this glazing is embodied without fulfilling fire-proof requirements. In order to fulfil the wishes of the safety engineers, a second glazing is arranged behind it. The arrangement therefore has a second glazing which is embodied as inner glazing and as fire-proof glazing. The second glazing fulfils fire-proof requirements or fire-protection standards in marine construction. The advantage of the invention is that the fire-proof design is hardly perceptible from the outside.

The invention lies in a special combined double glazing with the bonded outer pane.

However, the solution has further surprising advantages. If
5 the inner fire-proof glazing is destroyed, so that only the outer glazing is present, the intact outer pane protects like an emergency glazing, which offers wind and water protection.

Even if the outer glazing is destroyed, so that only the inner
10 glazing is intact, a wind and water protection is achieved.

Pending a repair, the provisional window can offer good services.

15 The glazing according to the invention can be a combined outer glazing of FORMGLAS SPEZIAL[®] with fire-proof glass, preferentially A0 or A60. Fire-proof glazings preferentially A0 or A60 in marine construction can thus be realized with framed window in compliance with standards.

20 A glazing is described as fire-proof glazing when the legal or standards corresponding to the specifications by way of tests are fulfilled. In the case of a fire-proof glazing A0, the outer pane (the pane facing away from the fire) may be heated
25 without limit without being destroyed in the process. It is possible with the help of sprinklers or water mists to reduce the temperature increase on the outer pane. Thus, an A60 glazing is achieved. An A60 glazing alone has to be constructed so that without a sprinkler or water mist system
30 the temperature rises only to a limited degree. This serves to prevent that people gathering in front of an A60 glass do not catch fire with their clothing. The fundamental test conditions for A0 and A60 are almost comparable. These are standards or legal regulations. The particular inventive idea
35 is the combination of the outer glazing with the fire-proof glazing.

For the glazing on ships and yachts as well as special ships

and special designs in marine construction, designer wishes for an outer glazing that is uniform in appearance can be fulfilled. These can be fire-proof glazings with "normal" outer panes (mono-composite, double-composite or multiple composite glazing). For the fireproof glazing, special frames have to be used. By way of the invention, fireproof glasses, preferentially A0 or A60 prescribed in shipbuilding and in the industry, can be inserted into fireproof frames. The invention solves the problem that these frames are visible and interrupt the glass or window ribbon. A visually uniform outer glazing is possible through the double design according to the invention. The arrangement can be a combined mono-composite, double-composite or multiple composite glazing. It can be embodied flat or curved and is employed combined with the industrial fire-proof glazing with frames according to the applicable regulations and specifications. Combined in this case is to mean joining a fire-proof glass with the outer glazing, which must have the required strength according to classification regulations. The combination of the individual glass panes is achieved through flame resistant inter-layer.

With the invention, not only the aesthetics of the outer contour are changed but in addition to this an improved heat and sound protection and increased protection against static and dynamic pressure is achieved as well.

The glass structure of the outer glazing in the case of the combined fire-proof glazing according to the invention is dependent on the operating conditions and the regulations, so that mono-composite, double-composite and multiple composite glass is also employed.

The outer pane(s) can be bonded as hardened single, double-composite or multiple composite with a special adhesive to the inner structure according to the invention. The necessary expansion joints between frame structure and glass (composite glass) can be taken into account, just like an insulation composite with fire-proof glass preferentially A0 or A60.

The frames of the inner fire-proof glazing according to the invention, which is preferentially embodied with fire-proof glass A0 or A60, can be welded, bonded or screwed on the ship's hull without problems. An installation of the outer pane as single pane or as double-composite or multiple composite unit can be temperature-resistantly and permanently bonded as insulating window either at the factory or onboard.

In order to achieve certain requirements, a gas-tight connection and a temperature-resistant bonding between outer and fire-proof glazing preferentially in A0 or A60 can be taken into account, which additionally corresponds to the aesthetic requirements of the designers.

In particular, the invention is a combination of a yacht fire-proof glazing with safety glazing. Towards the outside, only the visually attractive framed safety glazing should be visible. Thus, the outer glazing is a safety glazing. From the inside, a fire-proof glazing is joined behind in order to satisfy the fire-protection regulations.

It is provided that the inner glazing comprises a fire-proof frame. In the event of a fire there is a stable mechanical connection of the fire-proof pane by way of the frame. The frame solution has greatly proved itself in the event of a fire.

It is also provided that the inner glazing in a frame structure is connected to a ship's hull in a fire-proof manner or screwed to the same.

In order to give the outer pane the modern look in appearance, the outer glazing comprises a pane that is bonded to a carrier.

In order to simplify the fastening structure at least one pane of the outer glazing is bonded to the fire proof frame so that

the frame at least partly serves as carrier of the outer glazing. An additional carrier part for the outer glass can thus be omitted.

- 5 It is provided, furthermore, that the outer glazing is embodied as ribbon window. The ribbon window visually appears as a single long glass part.

10 It is also provided that the outer glazing bridges two indirectly or directly adjacent fire-proof frames. This creates a stable fire protection structure on the one hand and a unitary ribbon window design on the other hand.

15 Further advantageous configurations of the invention are characterized in the subclaims.

20 With a further advantageous embodiments of the invention, the inner glazing comprises fire-proof glasses preferentially according to A0 or A60. Standards can thus be fully complied with.

25 A further very decisive improvement with respect to energy saving is achieved in that the outer glazing is embodied as mono-composite, double-composite or multiple composite glass and/or comprises a thermal insulating window.

30 "Windowless" regions of the ship can also be rendered highly interesting when a flat outer glazing is present so that only a part region of the area is provided with the fire-proof glazing while the remaining part of the area is provided with a non-transparent ship's wall. Load-bearing walls and the likes can thus be embodied in the ribbon window design.

Brief description of the drawings

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Exemplary embodiments are explained in more detail by way of the drawings, wherein further advantage further developments of the invention and advantages of the same are described.

They are:

Fig. 1 shows a representation of a glass pane arrangement for
5 a yacht,

Fig. 2 shows a representation of a second embodiment glass
pane arrangement,

10 Fig. 3 shows a third embodiment of the glass pane
arrangement, and

Fig. 4 shows a further embodiment of the invention.

15 In the figures, same parts are marked with the same reference
characters.

Best way for carrying out the invention

20 Fig. 1 shows a glass pane arrangement 100 for a yacht. The
same comprises a first glazing 10, which is arranged or
embodied as outer glazing. The first glazing is a safety
glazing without special fire protection or without fire-proof
embodiment. The outer glazing does not fulfil any fire
25 protection requirements according to a standard.

The glass pane arrangement 100 is provided with a second
glazing 11, which is embodied as inner glazing and as fire-
proof glazing. The same fulfils fire protection requirements
30 and therefore has fire-proof glasses preferentially according
to A0 or A60 and a fire-proof frame 12.

The inner and outer glazing 10, 11 produce a combined double
glazing with different fire-proof characteristics.

35

Since the inner glazing in a frame structure 13 is to be
screwed to a ship's hull 14, a flat, first frame part 15 or a
carrier blade is fixed to the ship's body 14 by way of a screw

connection 16. The screw connection 16 has a screw bolt 18 and a connecting nut 20, which connect the first frame part 15 to a wall section 21.

- 5 On the first frame part 15, an L-profile that is preassembled with screws 22 is employed as second frame part 23, which together with the first frame part 15 produces a U-shaped frame holder as illustrated in Fig. 1.
- 10 The frame parts 15 and 23 consist of heat-resistant metal. In the U-shaped frame holder a U-shaped sealing element 24 or a sealing compound, which are suitable for fire protection, are located. In the frame, two panes 25 and 26 with a spacer element 27 located in between are located. The inner pane 25
15 is an A0 component while the pane 26 located in front of the former is a carrier pane.

On the frame or the second frame part 23 a composite pane or the outer glazing 10 is bonded, wherein an adhesive compound
20 28 and a spacer element 29 are visible. By way of a joint 30 or a further outer glazing 10', the outer glazing is extended in the manner of a ribbon window, as shown by Fig. 1.

The example according to Fig. 1 thus illustrates that the
25 outer glazing 10 comprises a pane bonded to a carrier 23 and that at least one pane of the outer glazing 10 is bonded to the fire-proof frame 12, so that the frame 23 at least partly serves as carrier of the outer glazing 10. The outer glazing 10 can be embodied as mono-composite, double-composite or
30 multiple composite glass and/or comprise a thermal insulating window, wherein the outer glazing 10, 10' is embodied as ribbon window. With combined individual glass panes for forming the outer glazing 10, the glass panes 10a, 10b are joined by flame resistant inter-layer 10c, in particular of
35 cast resin.

In the case of the first embodiment according to Fig. 1, only a part region of the area (region of the glazing 10) is

provided with the fire-proof glazing while the remaining part of the area (region of the glazing 10') is provided with a non-transparent ship's wall 32.

- 5 The arrangement of Fig. 2 differs from the embodiment according to Fig. 1 in that the outer window front ends in an end region 33 on a part of a ship's hull 34. Otherwise, the embodiment is comparable to the aforementioned example.
- 10 In Fig. 3, an arrangement or a dimensioning example that is comparable to Fig. 2, however with A60 glazing 11, is shown. The glazing 11 is provided with a seal 35, butyl material, an alternative screw connection 37 and frame structure. The dimensions can be (specified in millimetre) L1 = 100 -110, L2 = 80 - 90, L3 = 8 -12, L4 = 8 -12, L5 = 6 - 8, L6 = 30 - 40, 15 = 180 - 220, L8 = 6 - 10, L9 = 3 - 5; L10 = 40 - 48 (the middle values for example L1 = 105 are preferred).

Fig. 4 illustrates a structure with two frames lying next to one another or a fire protection 38 with A60 glass for the inner glazing 11, 11'.

20

The outer glazing 10" bridges two indirectly or directly adjacent fire proof frames 12a, 12b as shown by Fig. 4. The outer pane in this case is embodied as a joint less ribbon window.

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The invention is not restricted to this example so that special ships or other water craft can be equipped with the glazing according to the invention. Features or examples of the description, of the drawings can be combined with one another as required, for example an A0 glazing according to Fig. 1 with an outer pane structure according to Fig. 4.

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List of reference numbers

	100	Glass pane arrangement
	10, 10', 10"	First glazing
5	10a	Pane
	10b	Pane
	10c	Interlayer
	11	Second glazing
	12	Fire-proof frame
10	13	Frame structure
	14	Ship's hull
	15	First frame part
	16	Screw connection
	17	-
15	18	Screw bolt
	19	-
	20	Connecting nut
	21	Wall section
	22	Screws
20	23	Second frame part (L-profile)
	24	special seal
	25, 26	Panes
	27	Spacer element
	28	Adhesive compound
25	29	Spacer element
	30	Joint
	32	Ship's wall
	33	End region
	34	Part of ship's hull
30	35	Seal
	36	Butyl seal
	37	Screw connection
	38	Fire protection

Patentkrav

1. Vandfartøj (14) såsom et skib, en krydser, en yacht, en
båd eller lignende med et derpå og/eller deri anbragt
5 glastrudearrangement (100) med et første glasparti (10), der er
anbragt som udvendigt glasparti, og med et andet glasparti
(11), der er udført som indvendigt glasparti og som
brandsikringsglasparti, således at der er et kombineret
dobbelt glasparti, hvor det indvendige glasparti (11) omfatter
10 en ildfast brandbeskyttelsesramme (12), kendetegnet ved, at
det udvendige glasparti (10) omfatter en på en bærer (23)
fastklæbet rude, at i det mindste en rude i det udvendige
glasparti (10) er fastklæbet på brandbeskyttelsesrammen (12),
at rammen (12) på den ene side i det mindste delvist tjener
15 som bærer for det udvendige glasparti (10), og på den anden
side det udvendige glasparti (10) er båret uden en yderligere
bærerdel, og at det indvendige glasparti (11) er fastsvejet
eller fastskruet i en rammekonstruktion (13) på et skibsskrog
(14), at det udvendige glasparti (10) er udført som
20 vinduesbånd, og at det udvendige glasparti (10) danner bro
over to direkte eller indirekte tilstødende
brandbeskyttelsesrammer (12).

2. Vandfartøj (14) ifølge krav 1, kendetegnet ved, at det
25 udvendige glasparti (10) er udført som enkelt, dobbelt eller
flerdobbelt lamineret glas og/eller omfatter et termisk
isoleringsvindue, hvor der fortrinsvis ved kombinerede
glaspartier af to ruder (10a, 10b) mellem ruderne (10a, 10b)
er anbragt et mellemlæg (10c), især af svært antændelig
30 støbeharpiks.

3. Vandfartøj (14) ifølge krav 1 eller 2, kendetegnet ved,
at der er et fladt udvendigt glasparti (10), således at kun et
delområde af fladen er forsynet med brandsikringsglas, mens
35 den øvrige del af fladen er forsynet med en ikke-transparent
skibsvæg.

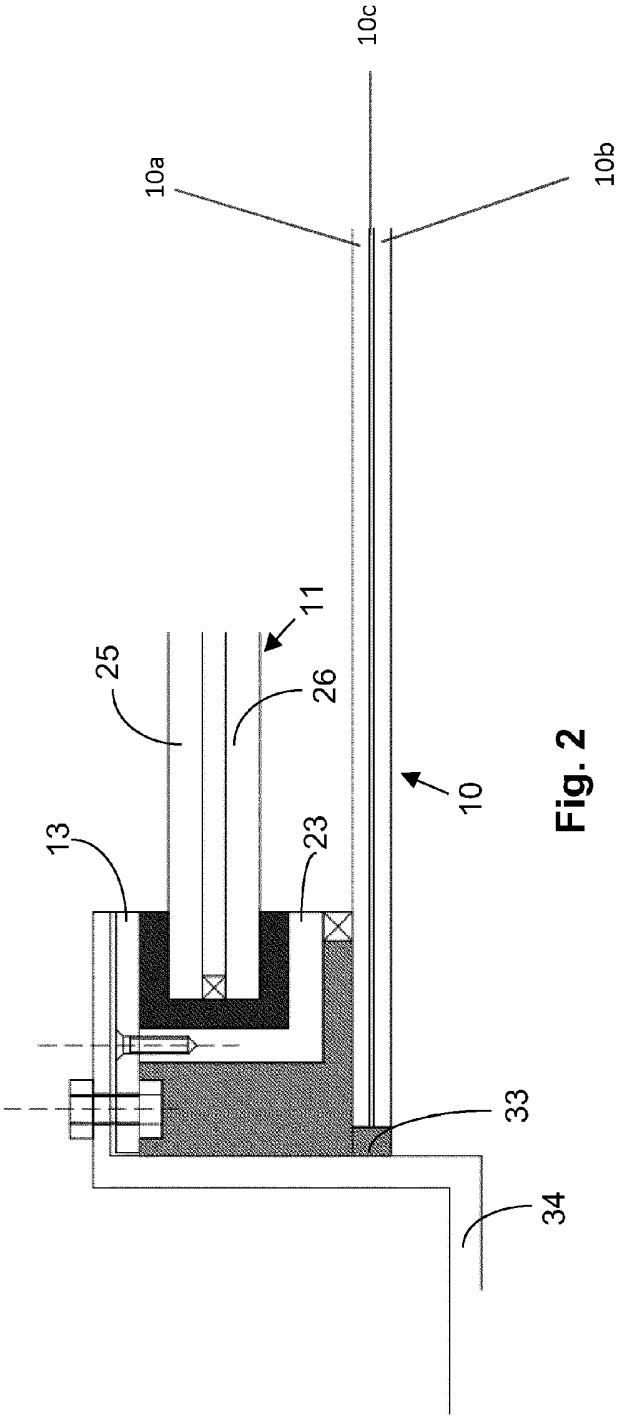


Fig. 2

