

FACADE ASSEMBLY, BUILDING STRUCTURE AND METHOD FOR MOUNTING THE FACADE ASSEMBLY

DESCRIPTION

The invention relates to a facade assembly for a building with at least one facade element, which can be fastened to a wall or a ceiling of the building, and with at least one fire-protection element, which can be mounted between the facade element and the wall. The invention further relates to a building structure using the facade assembly and to a method for mounting such a facade assembly.

Curtain facades comprising individual facade elements, which are fastened to a shell of a building, are frequently used in the building sector. The shell may be manufactured in skeleton form and the facade elements constitute the exterior skin of the building, in which case the facade elements take over the function of a wall construction. The individual facade elements usually have a substructure, for example a framework, by means of which the facade elements are fastened to the shell. These individual facade elements bear only their own weight and have no static functions. However, the facade elements may take over insulating functions as well as stylistic functions for the exterior skin.

On the back side, the facade elements have not only the windows / glass elements, but frequently also a cladding, which consists of metal, such as steel sheet, for example. Joints sealed by insulating material, comprising mineral wool in the prior art, are present between the shell and the facade elements, in order to prevent propagation of fire behind the facade elements in the event of fire. These insulating elements are disposed at the height of the inter-story ceilings, so that spreading of the fire from one story to another story is prevented, in which case the fire-protection

elements are also able to take over further insulating functions, such as sound protection, for example.

Especially for facade elements with a sheet-metal element on the back side, large deformations of the sheet-metal elements and thus of the facade elements may occur in the event of fire. These deformations may cause the joint between the wall or the ceiling and the facade element to grow larger, and so the insulating element of compressed mineral wool is no longer able to fill the joint between the facade element and the wall or the ceiling completely and seal it against fire or smoke.

Certainly the facade elements may be additionally reinforced by introduction of a channel profile on the side facing away from the shell. This reinforcement is intended to prevent deformation of the facade element in the event of fire. Nevertheless, considerable work effort at the height of the inter-story ceiling is necessary for mounting of the channel profiles.

From US 7,856,775 B2, it is known to fix an additional mineral-wool block on the steel sheet underneath the insulating element filling the joint. The additional mineral-wool block is intended to close the gap that develops in the event of fire. However, the attachment of the additional mineral-wool block necessitates tasks at ladder height in the story underneath the insulating element and thus leads to a higher risk of injury as well as additional time requirements.

The object of the invention is to provide a facade assembly that permits better sealing of the joint between facade element and wall or ceiling in the event of fire and thus provides better fire protection and can be mounted with little working effort.

According to the invention, a facade assembly for a building is provided, with at least one facade element, which can be fastened to a wall or a ceiling of a building, and with at least one fire-protection element, which can be mounted between the facade element and the wall or the ceiling. The fire-protection element comprises an insulating layer and an intumescent course, which contains an intumescent material

and which passes through the insulating layer at least in portions in the cross section along the facade element.

The intumescent material foams up under the effect of heat and presses the insulating layer of the fire-protection element outward in the direction of the facade element, so that, in the event of fire, a gap that forms or is already present between facade element and wall or ceiling is filled once again. Thereby reliable protection is provided against propagation of fire or smoke into the adjoining rooms or stories. Since the intumescent material has very low volume in the non-activated condition, the inventive fire-protection element can be used even for joints that in the regular installation condition are very narrow between facade element and wall or ceiling.

The fire-protection element or the intumescent course can be advantageously installed at the floor level of the story in which the joint to be sealed between facade element and inter-story ceiling runs. Thereby there is no need for work at ladder height, which means not only increased time requirements but also the risk of injury for the installers. Since the intumescent course in its non-activated condition may be integrated into the insulating layer, the use of prefabricated fire-protection elements, which can be mounted with even less work effort, is advantageously also possible.

It is possible to provide the intumescent course in predetermined portions in the insulating layer, in longitudinal direction of the insulating layer, substantially parallel to the facade element. For example, intumescent strips may be cut to the appropriate length and inserted through longitudinal slits passing through the insulating layer. It is also possible to form the intumescent course continuously in longitudinal direction of the insulating layer. The insulating layer is then formed from two parts that enclose the intumescent course in sandwich relationship.

The facade element is known in principle from the prior art. Preferably the facade element is designed as a curtain facade, with a frame construction, preferably of steel or aluminum, an outer covering, which is joined to the frame construction and can be formed from glass, ceramic, metal or natural stone. Cladding, preferably formed from steel sheet, is provided on the back side of the covering, which in the

installed condition faces the building. A deadening or insulating layer, for example of mineral wool or foam, can be provided between the exterior covering and the cladding.

The insulating layer is preferably a mineral-wool insulating layer, particularly preferably a compressed mineral-wool insulating layer. The insulating layer is able to establish sealing of the joint in the regular installation condition, i.e. when the intumescent material has not foamed up, and so the quantity of the intumescent material, i.e. the thickness of the intumescent course can be reduced. In addition, the insulating layer is able to prevent or reduce penetration of smoke or fire before the intumescent material swells up, so that even better protection against propagation of fire and smoke is provided. The insulating layer is preferably designed such that the fire-protection element fills and seals the joint in the regular installation condition.

The intumescent course preferably comprises chemically or physically intumescent material. Such materials are known in the prior art and commercially available and, for example, may contain an acid-forming agent, such as ammonium polyphosphate, a propellant such as melamine or melamine derivatives and an ash-forming material such as polyhydroxy compounds and/or expanded graphite. The invention is not limited to the use of particular intumescent materials. All materials known to the person skilled in the art may be used. Preferably the intumescent course is a fiber-reinforced intumescent course. Particularly preferably, the intumescent course is reinforced with glass fibers or with a glass-fiber fabric. Such fiber-reinforced intumescent courses are particularly structurally stable and may be integrated more easily into the insulating layer and fastened there. In the event of fire, or after heating and subsequent cooling, the glass fibers harden and form a stable retaining structure for the intumescent course, which is also able to withstand larger forces, for example when impacted by firefighting water.

The portion of the intumescent course passing through the insulating layer forms a web, which preferably is disposed at a spacing from the facade element and particularly preferably approximately centrally the insulating layer. The central arrangement of the intumescent course has proved favorable for mounting of the

intumescent course. Moreover, in this way a sufficient part of the insulating layer is available to seal a gap that develops in the facade element in the event of fire.

A free end of the intumescent course passing through the insulating layer, at least in portions, preferably projects at the bottom side of the insulating layer and extends into the joint between facade element and inter-story ceiling. With this configuration, particularly rapid and effective input of heat into the intumescent course is ensured in the event of fire.

The intumescent course may be fastened on the insulating layer, in which case any desired chemical or mechanical types of fastening are possible, for example adhesive bonding or fastening with additional fixation elements such as rivets or screws.

According to a preferred embodiment, a free end of the intumescent course rests on the top side of the insulating layer, which in the installed condition runs approximately perpendicular to the facade element or the edge of the inter-story ceiling or to the outer edge of a wall of a story. Preferably the top side of the insulating layer is disposed on the floor level of the story in which the fire-protection element will be installed. With the free end of the intumescent course resting on the top side of the insulating layer, secure fastening of the intumescent course on the insulating layer can be achieved.

Particularly preferably, the intumescent course has a T-shaped cross-sectional profile. The transverse part or the flange of the T-shaped profile then rests on the top side of the insulating layer, while the web of the T-shaped profile passes through the insulating layer, at least in portions. In this way a stable connection between intumescent course and insulating layer is created.

The web of the T-shaped profile may project beyond the bottom side of the insulating layer and extend into the joint between facade element and inter-story ceiling or wall.

According to a further embodiment, the intumescent course may have a cross-shaped cross-sectional profile. In this embodiment also, the web of the cross-shaped profile passing through the insulating layer at least in portions may project

beyond the bottom side of the insulating layer and extend into the joint between facade element and inter-story ceiling or wall. The part of the cross-shaped profile running in transverse direction between facade element and inter-story ceiling is preferably disposed approximately centrally in the insulating layer, but may also be located close to the top side or bottom side of the insulating layer.

In the event of activation, the expansion of the intumescent course then does not lead to a force acting on the insulating layer in the direction of the facade element. To the contrary, the regions adjoining the gap are also sealed against the penetration of fire and smoke by the expanding insulating layer. Moreover, a particularly stable connection between intumescent course and insulating layer can be created. The described embodiment is therefore particularly suitable for prefabricated fire-protection elements.

According to a further embodiment, the intumescent course comprises a web passing through the insulating layer and along the facade element and an end portion, which exits from the insulating layer and rests on the bottom side of the insulating layer. The bottom side of the insulating layer is then disposed in the joint between facade element and inter-story ceiling or wall and runs substantially transversely relative to the facade element. The end portion of the intumescent course preferably extends in the direction of the facade element and may be fastened to the bottom side of the insulating layer, for example by adhesive bonding or mechanical means.

Preferably the end portion of the intumescent course is formed in such a way that a free end of the end portion is disposed between the insulating layer and the facade element, i.e. directly on the facade element. In this embodiment, the end portion of the intumescent course engages around part of the insulating layer. When the facade element becomes deformed and shifts away from the wall or ceiling in the event of fire, it is additionally sealed against the insulating layer by the expanding intumescent material, and so penetration of fire and smoke can be prevented, even if the gap developing between facade element and insulating layer is disproportionately wide.

Moreover, in this embodiment, the intumescent course may be additionally fastened to the facade element, for example mechanically, by screws, tacks or nails, or chemically by adhesive bonding. However, the free end of the intumescent course disposed between facade element and insulating layer can also be held in position by clamping between insulating layer and facade element. Furthermore, the intumescent course may have, at its end opposite the end portion, a transverse part, which rests on the top side of the insulating layer and may be fastened there mechanically or chemically. The transverse part may comprise a single leg or may be of double-legged shape, depending on the type of T-shaped profile. Such an intumescent course can be securely fastened to the insulating layer and, in the event of fire, ensures effective heat input into the intumescent course, which adjoins the respective spaces both on the top side and bottom side of the insulating layer.

According to a further embodiment, the intumescent course comprises a portion passing through the insulating layer and an end portion, which rests on the bottom side of the insulating layer and extends in the direction of the facade element, wherein a free end of the end portion is disposed directly on the facade element and extends away from the insulating layer. In this embodiment, the end portion of the intumescent course is able to additionally brace the part of the insulating layer disposed on the facade element, and so further fastening elements may be dispensed with. The free end of the intumescent course is then fastened directly on the facade element before the insulating layer is mounted, and then the insulation layer is installed. In this way, all tasks necessary for mounting the fire-protection element can be performed at floor level of the respective story.

In order to prevent damage to the fire-protection element during mounting or during construction of the building, a protective layer that at least partly covers the fire-protection element is optionally provided. As an example, this protective layer may consist of an elastic material such as a curable acrylic dispersion, which is able to compensate for the temperature-induced expansions of the building or of the facade assembly.

Further subject matter of the invention is a building structure, with at least one wall and/or one inter-story ceiling and at least one facade element, which is fastened to a wall or an inter-story ceiling, wherein a joint is formed between the facade element and the wall or the inter-story ceiling, and with at least one fire-protection element, which is mounted in the region of the joint between the facade element and the wall or the inter-story ceiling. The fire-protection element comprises an insulating layer and an intumescent course, which contains an intumescent material and which passes through the insulating layer at least in portions in the cross section along the facade element.

The facade element and the fire-protection element form the above-described facade assembly to which reference is made.

The object is further solved by a method for mounting a facade assembly for a building, with at least one facade element, which is fastened to a wall or a ceiling of the building and is mounted with at least one fire-protection element, which is mounted between the facade element and the wall or the ceiling, wherein the fire-protection element has at least one insulating layer and an intumescent course, which contains an intumescent material, with the following steps:

attachment of the facade element to the wall or the inter-story ceiling of the building, wherein a joint is formed between the facade element and the wall or the inter-story ceiling, attachment of the fire-protection element to the facade element and/or to the wall or the inter-story ceiling of the building in the region of the joint, so that the insulating layer directly adjoins the facade element at least partly and the intumescent course passes through the insulating layer at least in portions, in the cross section along the facade element.

At least one insulating layer, especially a mineral-wool insulating layer, is mounted as part of the fire-protection element between the facade element and the wall or ceiling, wherein the intumescent course passes through the insulation layer at least in portions. Thus the intumescent course may be formed as intumescent strips, which run in longitudinal direction of the insulating layer and divide the insulating

layer into two halves, at least in portions. The intumescent strips may be inserted in corresponding hollows or slits in the insulating layer and be fastened to the insulating layer.

If a continuous intumescent strip is used, the insulating layer may be formed in two parts. A first part of the insulating layer may be fastened directly to the facade element or optionally to the inter-story ceiling or wall. After the intumescent strip has been inserted and fastened, the second part of the insulating layer is then introduced into the remaining joint and optionally fastened on the facade element or the inter-story ceiling or wall. Depending on configuration of the intumescent strip, for example as a T-shaped profile, additional fastening may also be carried out between the intumescence strip and the second part of the insulating layer.

Preferably the insulating layer is compressed, so that it is able to expand upon a slight deformation of the facade element and at least partly close the resulting gap.

In order to protect the fire-protection element and to seal it against propagation of smoke, a protective layer, especially of an elastic material, is preferably applied, wherein the protective layer covers the fire-protection element at least partly, preferably completely.

It is particularly advantageous when all tasks for mounting of the inventive facade assembly can be performed on one building level, especially at floor height.

Further advantages and features will become obvious from the description hereinafter in conjunction with the attached drawings, which, however, are not to be understood in a restrictive sense. In the drawings:

Fig. 1 shows a sectional view through a building with a facade assembly according to the prior art,

Fig. 2 shows a sectional view through a building with a first embodiment of an inventive facade assembly,

Fig. 3 shows a sectional view through a building with a second embodiment of an inventive facade assembly,

Fig. 4 shows a sectional view through a building with a third embodiment of an inventive facade assembly,

Fig. 5 shows a sectional view through a building with a fourth embodiment of an inventive facade assembly, and

Fig. 6 shows a sectional view through a building with a fifth embodiment of an inventive facade assembly.

Fig. 1 shows a section of a building 10' with an inter-story ceiling 12'. A facade assembly 14' is hung in curtain style on the exterior of building 10'. Facade assembly 14' consists of a facade element 16' as well as a fire-protection element 18', which is disposed in a joint 20' between inter-story ceiling 12' and facade element 16'. Fire-protection element 18' consists here of an insulating layer 19', for example of mineral wool.

Facade element 16' forms an exterior wall construction or the facade of building 10' and has a substructure, not illustrated in detail here, for example a framework, on which the individual elements of the exterior facade, for example wall elements, windows as well as insulating layers, are retained. The substructure serves for fastening of facade elements 16' on building 10'.

Facade assembly 14' serves stylistic purposes and/or protection of building 10', wherein exterior side 22' of such a facade element 16' can be configured in any desired manner, especially as a function of viewpoints related to style and/or building physics. As an example, exterior side 22' may have elements of glass, ceramic, metal or other suitable materials.

Facade assembly 14' or facade elements 16' bear only their own weight and have no static function for building 10'.

On back side 24' facing building 10', cladding is provided, which may be part of the interior wall of building 10' and consists here of steel sheet 26'. This steel sheet 26' may be part of the substructure or may form merely the interior closure of the facade element.

By virtue of fire-protection element 18' provided between inter-story ceiling 12' and facade element 16' penetration of smoke and fire from a region below inter-story ceiling 12' into the region above inter-story ceiling 12' in the event of fire is prevented, and so the propagation of a fire can be prevented or at least slowed.

Due to the high temperatures occurring during a fire, however, deformation of facade element 16', especially of steel sheet 26', may occur (see dashed line in Fig. 1). This deformation may cause a gap 30', through which penetration of smoke or fire is possible, to develop between fire-protection element 18' and facade element 16'. This means that fire-protection element 18' is not able to fulfill its fire-protection function completely if facade element 16' becomes badly deformed.

In order to eliminate this disadvantage, facade assembly 14 shown in Fig. 2 is provided. The basic design of building 10 with an inter-story ceiling 12 as well as curtain-type facade element 16 corresponds substantially to the design shown in Fig. 1.

As a supplement to insulating layer 19, however, fire-protection element 18 additionally has a fire-protection course 32, which consists of an intumescent material. In the embodiment shown here, intumescent course 32 is disposed approximately centrally in insulating layer 19 and passes through the insulating layer at least in portions in the cross section along facade element 16.

In this and all other embodiments, intumescent course 32 may be formed as a fiber-reinforced intumescent course. Particularly preferably, intumescent course 32 is reinforced with glass fibers or with a glass-fiber fabric. In the event of fire, or after heating and subsequent cooling, the glass fibers harden and form a stable retaining structure for intumescent course 32, which is also able to withstand larger forces, for example when impacted by firefighting water.

In the embodiment shown here, insulating layer 19 is fastened at least to inter-story ceiling 12, while intumescent course 32 may be fastened to insulating layer 19, in which case the fastening may have the form of a frictional, interlocking and/or substance-to-substance joint respectively, obtained by mechanical or chemical

types of fastening, for example. Both insulating layer 19 and intumescent course 32 are disposed at the height of inter-story ceiling 12.

In the event of fire, the intumescent material of intumescent course 32 swells up, and so increases its volume. Thereby the part of insulating layer 19 disposed between intumescent course 32 and facade element 16 can be forced in the direction of the facade element. Thereby gap 30, which is formed between insulating layer 19 and facade element 16, can be closed, so that reliable fire protection is ensured even if facade element 16 becomes deformed.

As can be seen in Fig. 2, intumescent course 32 projects at bottom side 34 of insulating layer 19 and extends into joint 20 between facade element 16 and inter-story ceiling 12. Due to heat generation in the fire situation, therefore, intumescent course 32 is directly exposed to the rising heat, and so foaming-up of intumescent course 32 is able to take place without further delay, for example even before a gap 30 is formed.

A second embodiment of an inventive facade assembly 14 is shown in Fig. 3. In this embodiment, a free end 36 of the intumescent course 32 rests on top side 38 of insulating layer 19, which in the installed condition runs approximately perpendicular to facade element 16 or edge 40 of the inter-story ceiling or to the outer edge of a wall of a story. Top side 38 of insulating layer 19 is then disposed on the floor level of the story in which fire-protection element 18 will be installed. Intumescent course 32 may be fastened chemically or mechanically to insulating layer 19 with free end 36 resting on top side 38 of insulating layer 19.

Intumescent course 32 shown in Fig. 3 has a T-shaped cross-sectional profile, wherein the transverse part or the flange of the T-shaped profile forms free end 36 and rests on top side 38 of insulating layer 19, while web 42 of the T-shaped profile passes through insulating layer 19, at least in portions. Web 42 of the T-shaped profile may project beyond bottom side 34 of insulating layer 19 and extend into joint 20 between facade element 16 and inter-story ceiling 12 or wall.

For mounting of fire-protection element 18, insulating layer 19 may first be fastened to inter-story ceiling 12 and/or facade element 16. Then intumescent course 32 is inserted with web 42 into prepared slits in the insulating layer, which slits pass through the insulating layer and run in longitudinal direction of the insulating layer, approximately parallel to the facade element. Intumescent course 32 may be fastened to insulating layer 19 with free end 36 resting on the insulating layer, for example the transverse part of a T-shaped profile. Alternatively, an already prefabricated fire-protection element 18 with insulating layer 19 and intumescent course 32 inserted therein may be cut to appropriate size on site and fastened in joint 20.

In the third embodiment shown in Fig. 4, intumescent course 32 has a cross-shaped cross-sectional profile. In this embodiment also, web 42 of intumescent course 32 passing through insulating layer 19 along the facade element projects beyond bottom side 34 of insulating layer 19 and extends into joint 20 between facade element 16 and inter-story ceiling 12 or wall. In the shown embodiment, part 44 of the cross-shaped profile running in transverse direction between facade element and inter-story ceiling or wall is disposed approximately centrally in insulating layer 19, but may also be located close to top side 38 or bottom side 34 of insulating layer 19.

In the event of fire, intumescent course 32 foams up due to the effect of heat and forces insulating layer 19 in the direction of facade element 16. In addition, due to part 44 of intumescent course 32 running transversely in insulating layer 19, parts of the insulating layer are also forced upward or downward, and so the regions adjoining gap 30 are also sealed against the penetration of fire and smoke by expanding insulating layer 19. Moreover, part 44 of the intumescent course running in transverse direction permits a stable connection between intumescent course 32 and insulating layer 19. In particular, such an already prefabricated fire-protection element 18 may be provided together with an insulating layer 19, for example of mineral wool, and intumescent course 32 inserted therein.

Fig. 5 shows a fourth embodiment of inventive facade assembly 14. In this embodiment, intumescent course 32 comprises a web 42 passing through insulating layer 19 in the cross section along the facade element and an end portion 46, which exits from insulating layer 19 and rests on bottom side 34 of the insulating layer, which is disposed in joint 20 between facade element 16 and inter-story ceiling 12 or wall. In the embodiment shown here, end portion 46 of intumescent course 32 extends in the direction of facade element 16 and may be fastened to bottom side 34 of insulating layer 19, for example by adhesive bonding or mechanical means. In an alternative embodiment, it is also possible to lay the end portion in the direction of inter-story ceiling 12 on the bottom side of insulating layer 19. End portion 46 of intumescent course 32 resting on the bottom side of insulating layer 19 ensures effective heat input in the event of fire.

As can be further seen in Fig. 5, end portion 46 of intumescent course 32 is able to engage with its free end 48 around insulating layer 19 and be disposed between insulating layer 19 and facade element 16, especially directly on facade element 16.

In this embodiment, intumescent course 32 may therefore be additionally fastened to facade element 16, for example mechanically, by screws, tacks or nails, or chemically by adhesive bonding. Alternatively, free end 48 of intumescent course 32 between facade element 16 and insulating layer 19 may also be held in position by clamping.

Furthermore, intumescent course 32 may rest, at its free end 36 opposite end portion 46, on top side 38 of insulating layer 19 and be fastened there mechanically or chemically. End 36 may comprise a single leg or may be of double-legged shape, depending on the type of T-shaped profile.

In the event of fire, such a fire-protection element 18 ensures effective heat input into intumescent course 32, which adjoins the respective spaces both on top side 38 and bottom side 34 of insulating layer 19. When facade element 16 becomes deformed and shifts away from the wall or ceiling in the event of fire, it is additionally sealed against insulating layer 19 by the expanding intumescent material disposed directly on the facade element, whereby reliable sealing of the entire joint 20 against

penetration of smoke or fire is achieved, even if gap 30 developing between facade element 16 and insulating layer is disproportionately wide.

In the fifth embodiment shown in Fig. 6, end portion 46 emerging at bottom side 34 of insulating layer 19 is also disposed with its free end 48 directly on facade element 16. In this case, however, in contrast to the embodiment according to Fig. 5, free end 48 is not disposed between insulating layer 19 and facade element 16, but extends away from insulating layer 19 into joint 20. In this embodiment, therefore, end portion 48 of intumescent course 32 additionally braces the part of insulating layer 19 disposed on facade element 16. Thus further fastening elements for insulating layer 19 on the facade element 16 may be dispensed with.

In this embodiment, for mounting of fire-protection element 18, free end 48 of intumescent course 32 is fastened directly on facade element 16, and then insulating layer 19 is introduced into joint 20. In this way, all tasks necessary for mounting fire-protection element 18 can be performed at floor level of the respective story.

In all embodiments, a protective layer (not shown) may be optionally provided, in order to prevent damage to the fire-protection element during mounting or during construction of the building. As an example, this protective layer may consist of an elastic material such as a curable acrylic dispersion, which is able to compensate for the temperature-induced expansions of the building or of the facade assembly, and which may additionally have fire-protection properties.

CLAIMS

1. A facade assembly (14) for a building (10), with at least one facade element (16), which may be fastened to a wall or an inter-story ceiling (12) of the building (10) and with at least one fire-protection element (18), which may be mounted between the facade element (16) and the wall or the inter-story ceiling (12), characterized in that the fire-protection element (18) comprises an insulating layer (19) and an intumescent course (32), which contains an intumescent material, passing through the insulating layer (19) at least in portions, in the cross section along the facade element (16).
2. A facade assembly according to claim 1, characterized in that the insulating layer (19) is a mineral-wool insulating layer.
3. A facade assembly according to claim 1 or 2, characterized in that the intumescent course (32) is disposed approximately centrally in the insulating layer (19).
4. A facade assembly according to one of the preceding claims, characterized in that the intumescent course (32) is fiber-reinforced.
5. A facade assembly according to one of the preceding claims, characterized in that the intumescent course (32) has a free end (36), which rests on a top side (38) of the insulating layer (19).
6. A facade assembly according to one of the preceding claims, characterized in that the intumescent course (32) has a web (42), which passes through the insulating layer in the cross section along the facade element (16) and projects at a bottom side (34) of the insulating layer (19).
7. A facade assembly according to one of the preceding claims, characterized in that the intumescent course (32) has a T-shaped cross-sectional profile.

8. A facade assembly according to one of claims 1 to 6, characterized in that the intumescent course (32) has a cross-shaped cross-sectional profile.
9. A facade assembly according to claim 8, characterized in that a part (44) of the cross-shaped cross-sectional profile of the intumescent course (32) running in transverse direction relative to the facade element (16) is disposed approximately centrally in the insulating layer (19).
10. A facade assembly according to one of claims 1 to 5, characterized in that the intumescent course (32) comprises a web (42), which passes through the insulating layer (19) in the cross section along the facade element (16) and an end portion (46), which emerges from the insulating layer (19) and rests on a bottom side (34) of the insulating layer.
11. A facade assembly according to claim 10, characterized in that the end portion (46) of the intumescent course (32) extends in the direction of the facade element (16).
12. A facade assembly according to claim 10 or 11, characterized in that the end portion (46) of the intumescent course (32) has a free end (48), which is disposed between the insulating layer (19) and the facade element (16).
13. A facade assembly according to claim 10 or 11, characterized in that the end portion (46) of the intumescent course (32) has a free end (48), which is disposed directly on the facade element (16) and extends away from the insulating layer (19).
14. A building structure using the facade assembly according to one of claims 1 to 13, wherein the building structure comprises at least one wall and/or an inter-story ceiling (12) and at least one facade element (16), which is fastened to the wall or inter-story ceiling (12) of the building (10), wherein a joint (20) is formed between the facade element (16) and the wall or inter-story ceiling (12), and comprises at least one fire-protection element (18), which is mounted in the region of the joint (20) between the facade element

(16) and the wall or the inter-story ceiling (12), characterized in that the fire-protection element (18) comprises an insulating layer (19) and an intumescent course (32), which contains an intumescent material, running through the insulating layer (19) at least in portions, in the cross section along the facade element (16).

15. A method for mounting a facade assembly (14) for a building (10) according to one of claims 1 to 13, with at least one facade element (16), which is fastened to a wall or an inter-story ceiling (12) of the building (10) and with at least one fire-protection element (18), which is mounted between the facade element (16) and the wall or the inter-story ceiling (12), wherein the fire-protection element (18) has at least one insulating layer (19) and an intumescent course (32), which contains an intumescent material, with the following steps:
 - attachment of the facade element (16) to the wall or the inter-story ceiling (12) of the building, wherein a joint (20) is formed between the facade element (16) and the wall or the inter-story ceiling (12),
 - attachment of the fire-protection element (18) to the facade element (16) and/or to the wall or the inter-story ceiling (12) of the building in the region of the joint (20), so that the insulating layer (19) directly adjoins the facade element (16) at least partly and the intumescent course (32) passes through the insulating layer (19) at least in portions, in the cross section along the facade element (16).
16. A method according to claim 15, characterized in that the insulating layer (19) is provided with slits running along the facade element and passing through the insulating layer, and the intumescent course (32) is inserted into the slits.
17. A method according to claim 15, characterized in that an at least two-part insulating layer (19) is used, wherein a first part of the insulating layer is optionally fastened directly to the facade element (16) or to the inter-story ceiling (12) or wall, the intumescent course (32) is inserted and fastened to the first part of the insulating layer (19), and then the second part of the

insulating layer is introduced into the joint (20) and optionally fastened to the facade element (16) or the inter-story ceiling (12) or wall.