

Access flooring for a scaffolding

The invention relates to an access flooring for a scaffolding having an access door which closes an access opening in the access flooring and which is supported in an opening manner on the access flooring in a state connected to the access flooring.

On a scaffolding, construction workers and/or craftsmen must often change working level within the scaffolding in order to carry out their work. This may be the case, for example, when they have finished their work at one level and wish to continue this work at an adjacent level. This may also be the case when they have to leave their working level temporarily, for example, in order to obtain additional building material. Since ladders which are leant against the scaffolding initially have to be newly orientated in the event of a change of the working level and can further readily fall over, a plurality of known scaffoldings have so-called access floorings. These are working platforms which are securely anchored in the scaffolding and on which the construction workers and/or craftsmen can safely stand and work. Furthermore, portions of those working platforms have access floorings having an access opening. Workers can reach the desired working level via the access openings by means of ladders from a working level which is located above or below. In order to prevent a worker and/or objects from being able to inadvertently fall through an access opening and the worker from injuring himself and/or other workers becoming injured, access floorings are provided with an access door

which is closed after use by the relevant worker. However, workers may forget to close an access door. The personal safety on building sites is greatly impaired by such open access doors, which must be avoided.

EP2102431 B1 discloses an access flooring for a scaffolding which has a flexible hatch type door which is constructed in a self-closing manner in order to increase personal safety. Unlike known access doors, the flexible hatch type door is not in the form of a plate which is flexurally rigid in the direction of the two plane axes thereof but instead comprises a plate which can be deformed in a flexibly resilient manner and which has individual reinforcement inserts. The reinforcement inserts are spaced apart from each other and are countersunk into the flexibly resilient material parallel with each other so that the flexible plate has a plurality of longitudinal segments which are connected to each other in a flexibly resilient manner, that is to say, are articulated to each other resiliently. When the door is completely folded back (opened), complete and automatic closure of the flexible door cannot - not least as a result of the inherent weight of the longitudinal segments thereof - be safely ensured. As a result of the constructive structure thereof, the flexible door further has complex and difficult handling. For instance, the door cannot be opened simply by pressing against any surface portion at the lower side, but instead has to be folded back extensively by means of pressure with a plurality of body parts or a reaching arm movement in order to completely release an access opening closed by the door for the passage of an operator. Furthermore, the access flooring is cost-intensive to produce and involves a risk to the safety of users because damaged or even broken reinforcement

inserts of the flexible door cannot be recognised or cannot readily be recognised from the outer side.

Therefore, an object of the invention is to further increase the personal safety on a scaffolding in connection with access floorings and to further improve the handling of the access door of such an access flooring.

This object is achieved in that, in a region in which the access door is connected to the access flooring, there is arranged at least one resiliently deformable element which becomes deformed when the access door is opened and there is produced by the deformation in the resiliently deformable element a force (= restoring force) which is directed counter to the opening movement of the access door. The force which is produced in the resilient element and which is directed counter to the opening movement of the access door increases according to the invention (during the opening of the door) abruptly at an opening angle near a perpendicular position of the access door. That is to say, if the access door is orientated almost perpendicularly relative to a horizontal orientation, the (restoring) force which is applied by the resilient element to the access door increases with respect to the horizontal orientation of the access door at or from the opening angle of the access door near the perpendicular position thereof by a multiple, for example, by two-fold, three-fold or by an even higher value, with respect to the value of the restoring force which has been produced up to an opening angle near the perpendicular position of the access door. The force may increase in particular in a stepped manner or in a substantially stepped manner in the region of the opening angle of the access door near the perpendicular position thereof. The characteristic line of the resiliently

deformable element has in this case in the region of the opening angle near the perpendicular position of the access door a non-constant extent. An abrupt increase of the force is also present when the force increases from the opening angle of the access door near the perpendicular orientation thereof, with further increasing opening angles of the access door, continuously or exponentially with respect to the value of the restoring force which has been produced up to the opening angle near the perpendicular position of the access door. In the last case mentioned, the resiliently deformable element has a progressive characteristic line. This ensures in a generally advantageous manner that the access door of the access flooring closes automatically in a reliable and rapid manner after opening, that is to say, when no more external force (of an operator) acts on the access door. The (defined/predetermined) opening angle near the perpendicular position of the door is preferably between 75° and 87° , in particular approximately 85° . The force produced in the resiliently deformable element is preferably small up to the opening angle of the access door near the perpendicular position thereof. The access door is preferably constructed in a flexurally rigid manner in the direction of the two plane axes thereof, that is to say, in the direction of the longitudinal axis and in the transverse axis thereof. That is to say, the access door is constructed as a board or plate. It will be understood that the board or plate may have a multi-layered construction or a frame. It is thereby possible, on the one hand, to visually identify in a simplified manner possible damage to the access door, in particular a crack or breakage of the access door. On the other hand, the access door can be readily operated completely by an operator by pressing against any lower-side surface portion in order to completely release the access opening for the passage of the

operator. Consequently, the use of an access flooring according to the invention in a scaffolding increases the personal safety substantially because active closure of the access opening by persons is unnecessary and therefore also cannot be forgotten. The danger that a construction worker may fall through an open access opening of an access flooring and become seriously injured is minimised or may be excluded if the object according to the invention is not defective. Safety provisions often require that the access openings in access floorings automatically close after use. This is readily complied with by the access flooring according to the invention. The access door of the access flooring is particularly simple and safe to handle.

An advantageous embodiment of the invention is characterised in that the region in which the access door is connected to the access flooring extends over an edge side of the access door. The substantially rectangular form of the access door uses the available surface-area of the access flooring to the best possible extent and makes it easier, in conjunction with an access opening which is adapted to the access door, for a person to climb through the access flooring. In accordance with the arrangement of the at least one resiliently deformable element, the access door can be opened either in the longitudinal direction or in the transverse direction relative to the access flooring. Since the resiliently deformable element extends only over an edge side of the access door, the person climbing through the access flooring has the greatest possible freedom of movement and is not impeded by the resilient element during the climbing action.

In a preferred embodiment, the edge of the access opening has an edge formation, in which the access door is inserted, and

wherein the edge formation is constructed in such a manner that the surface of the upper side of the access door forms without any step a plane with the surface of the upper side of the access flooring. Advantageously, when the door is closed, a person cannot remain stuck with his foot or an object to be transported on an edge of the access door and consequently stumble or trip, which further increases the personal safety of the access flooring according to the invention. The edge formation of the access opening further ensures that the inserted access door is carried by the edge of the access opening of the access flooring along a portion of the edge thereof. The inherent weight of the access door in the closed state and optionally an additional weight force of an object located on the access door or a person on the access flooring is discharged and consequently the resilient element is relieved in respect of those weight forces. An embodiment which has the edge formation along the entire edge of the access opening is particularly advantageous since the weight force is transmitted to the access flooring in the most uniform manner possible and the flexible element is no longer loaded when the access door is closed.

In a particularly preferred embodiment, the at least one resiliently deformable element is in the form of an elongate profile-member of a flexibly resilient and/or visco-resilient material. Elongate profile-members of a flexibly resilient and/or visco-resilient material, such as, for example, natural rubber or silicone rubber, can be produced in a cost-effective manner in many different forms. Such profile-members having a respective formulation can be kept for a long time, are rust-resistant and resistant to weather influences and UV radiation. On the basis of the material used and the construction thereof, elongate profile-members

of a flexibly resilient and/or visco-resilient material involve a lower risk of injury owing to becoming jammed, for example, in comparison with helical compression springs. In a further advantageous manner, the resilient restoring force can readily be adjusted by the material selection and/or the cross-sectional shape of the elongate profile-member in the event of the deformation thereof, and therefore the restoring force of the access door in dependence of the opening angle thereof.

In a development of the particularly preferred embodiment, the elongate profile-member has a substantially rectangular cross-section. Such a profile-member can readily be connected, in various manners, both to the access door and to the access flooring. For example, screw type and/or adhesive connections are possible. Rectangular profile-members are available in a very cost-effective manner with extremely different dimensions as bar goods and can readily be adapted to access openings with different dimensions simply by being cut.

In another particularly preferred embodiment of the access flooring according to the invention, the elongate profile-member has an at least partially V-like or W-like or zig-zag-like or wave-like cross-section. Such a cross-section can ensure that the force necessary for opening the access door is small for opening angles until near a perpendicular position of the access door, for example, less than or equal to 80 degrees, and increases abruptly for larger opening angles. The access door of such an access flooring can advantageously be opened with a very small force application by a person climbing through, for example, simply by pressing with his hand or head if the person is climbing upwards from below through the access opening.

According to the invention an additional resiliently deformable element can make it easier to open an access door in accordance with an auxiliary opening means if such an element is compressed as a result of the inherent weight of the access door when the access door is closed and discharges that force stored in the resiliently deformed element again when the access door is opened and consequently the opening of the access door is further facilitated. If the access door is opened in a practically perpendicular manner, the restoring force increases abruptly, which ensures rapid closure of the access door. If elongate profile-members, in particular with an at least partially zig-zag-like or wave-like cross-section, are used, there may also be used to produce those profile-members materials which have only a low level of resilience because, as a result of the use of such cross-sections, the effective path length of the deformable region and therefore the flexibility of the elongate profile-member increases greatly in the transverse direction. However, the outer dimensions of the cross-section profile-member of the resiliently deformable element which is used here increase only slightly.

In a development, the access flooring according to the invention is characterised in that the access door has, along a portion of the edge thereof, a first groove in which the elongate profile-member engages with a first part-region, and in that the access flooring has, along a portion of the edge of the access opening which is opposite the first groove along the portion of the edge of the access door, a second groove in which the elongate profile-member engages with a second part-region, and wherein the elongate profile-member is retained both in the first groove along the portion of the

edge of the access door and in the second groove of the access flooring along the portion of the edge of the access opening. The use of a first groove along the portion of the edge of the access door and a second groove along the portion of the edge of the access opening ensures a very space-saving arrangement of the elongate profile-member. The part-regions of the elongate profile-member which engage in the first and second groove completely disappear in the access door and the access flooring. If the first and/or second groove is/are arranged within a larger groove, additional part-regions of the elongate profile-member which are not retained by the access door or the access flooring can be received in the larger groove, respectively. This results in an additional space saving and the flexible element is further protected from damage by the access door and/or the access flooring.

It is preferable for the elongate planar profile-member to be secured in the first groove along the portion of the edge of the access door and in the second groove of the access flooring along the portion of the edge of the access opening by rivets and/or by screws and/or by adhesive connections and/or by undercuts. The elongate profile-member which is secured both in the first groove and in the second groove thus cannot inadvertently slip out of the first groove and/or the second groove when the access door is opened. If the profile-member is secured in the first groove and the second groove by means of screw connections and/or rivet connections and/or undercuts, it can rapidly be changed in the event of a defect, for example, caused by a fatigue fracture.

A preferred development of the access flooring according to the invention is characterised in that the elongate profile-member is subjected to material deformation when the access

door is opened, and in that one or more cavities are at least partially formed in the region of the material deformation. As a result of cavities in the region of the material deformation, it is possible to influence the force required to open the access door in accordance with the opening angle. If a more rigid material is used to produce the elongate profile-member, the cavities formed in the profile-member can reduce the force required to open the access door. By the number, form and position of the cavities being selected in a suitable manner, for example, it is possible for only a comparatively small force to have to be applied up to almost perpendicular opening of the access door and the restoring force to increase greatly only in the case of a perpendicular position of the access door.

In a development of the last embodiment of the access flooring mentioned, the at least one cavity is closed at least partially in the direction of the longitudinal sides of the elongate profile-member. By means of a cavity which is closed in the direction of the longitudinal sides of the elongate profile-member, dirt, for example, falling stones, sand, mortar or dripping paint, is reliably prevented from being introduced into the cavity and from being able to block it, which could impair the function of the cavity of the elongate profile-member when the access door is opened.

In another development of the access flooring according to the invention, the at least one cavity is at least partially formed by an indentation which extends in the longitudinal direction of the elongate profile-member in the surface of a longitudinal side. As a result of indentations which extend in the longitudinal direction of the elongate profile-member, for example, in the form of notches on a lower side of the

elongate profile-member, it is possible to reduce the application of force necessary to deform the profile-member and consequently to open the access door. In contrast to cavities which are completely or partially closed in the longitudinal direction, it is also possible to bring about indentations at the surface of the profile-member after the production thereof with relatively little complexity.

In a particularly preferred embodiment, the region in which the access door is connected to the access flooring has a flexible cover, which covers the at least one resiliently deformable element. As a result of such a flexible cover, both the resiliently deformable element itself and the connection region between the access door and the access flooring are optimally protected from occurrences of contamination which make it more difficult or impossible to open the access door, or which can damage the hinge of the access door. For example, a hand or a foot of a person in the vicinity of the door is also prevented from becoming jammed, which further improves the safety of the access flooring.

Additional advantages of the invention will be appreciated from the description and the drawings. The features set out above and those set out below may also be used according to the invention individually per se or together in any combination. The embodiments shown and described are not intended to be understood to be a conclusive listing but are instead of exemplary character for describing the invention.

The invention is illustrated in the drawings and is explained in greater detail with reference to embodiments.

In the drawings:

Figure 1 is a perspective view of an access flooring according to the invention;

Figure 2 is a plan view from above of the access flooring from Figure 1;

Figure 3 is a cross-section of Figure 2 in the plane of section III-III indicated in Figure 2;

Figure 4 is an illustration as in Figure 3, but with the access opening open;

Figure 5 is a cross-section of an elongate profile-member with a partially V-like cross-section;

Figure 6 is a cross-section of an elongate profile-member with a partially W-like cross-section;

Figure 7 shows the securing of an elongate profile-member by means of screw connections and undercuts in grooves of the access flooring and the access door;

Figure 8 shows the securing of an elongate profile-member by means of rivets in grooves of the access flooring and the access door;

Figure 9 shows the securing of an elongate profile-member which is inserted in recesses of the access flooring and the access door by means of screw connections;

Figure 10 shows a flexible connection of the access door with respect to the access flooring by means of hinges;

Figure 11 is a cross-section of an elongate profile-member with notches on the lower side thereof;

Figure 12 is a cross-section of an elongate profile-member with cavities at the inner side in the longitudinal direction;

Figure 13 shows a flexible cover of an elongate profile-member with the access door closed;

Figure 14 shows the flexible cover as in Figure 15, but with the access door open;

Figure 15 is a cross-section of a portion of an access flooring, with two resilient elements being arranged in the

region in which the access flooring is connected to the access door.

Figure 1 is a perspective view of an access flooring 10 which is used, for example, in a scaffolding and which is also referred to using the terms "scaffolding platform" or "access board". At the side illustrated on the left in Figure 1, the access flooring 10 has an access opening 12 which can be closed with an access door 14 which is supported on the access flooring 10. The edge 16 of the access opening 12 is constructed by a recess which is open in the direction of the access opening 12 and the access door 14 in such a manner that, when the access door 14 is closed, it is positioned on the access flooring 10 along the edge thereof and the upper edges of the access door 14 are located at the same height as the upper edges of the access flooring 10. In the event that the access opening 12 is closed, consequently, there is not produced an edge at the transition between the access door 14 and access flooring 10. A person who is accessing the access flooring 10 or who is rolling or pushing an object over the access flooring 10 is therefore not at risk of becoming stuck, stumbling or tripping on such an edge. The access door 14 illustrated in Figure 1 has a rectangular form. The access door 14 is connected to the access flooring 10 along one of the longitudinal sides thereof in a region 18 so as to be able to be opened. The connection of the access door 14 to the access flooring 10 is brought about by a resiliently deformable element 20 which extends over the entire longitudinal side of the access door 14. The resilient element 20 is an elongate profile-member 22 having a rectangular cross-section.

Alternatively to Figure 1, a plurality of resilient elements of a different construction type may also be arranged in the region 18. Where applicable, the resilient deformable elements may be arranged with spacing from each other in the region 18. In addition to the elongate profile-member 22, the access door 14 is connected to the access flooring 10 by hinges (not illustrated in Figure 1). In addition to hinges, any types of rotary articulations may also be used. In an embodiment, the resiliently deformable element may also further take over a hinging function. In order to allow simple opening of the access door 14 by means of an opening movement 24, a gripping opening 26 is fitted to the side of the access door 14 opposite the resilient element 20. In place of the gripping through-opening 26, which is illustrated in Figure 1, the access door 14 may also have a recessed grip or a retention strap at the upper side and/or lower side.

Figure 2 is a plan view from above of the access flooring 10. The elongate profile-member 22 in the region 18 is arranged in such a manner that it is possible to open the access door 14 transversely relative to the longitudinal side of the access flooring 10. The flexible connection by means of the elongate profile-member 22 may also be brought about at one of the other sides of the access door 14 (this is the case in any embodiment) so that it can be opened, for example, in the longitudinal direction relative to the access flooring 10. The access flooring 10 is illustrated in Figure 2 with a closed access door 14. As a result of the formation of the edge 16, which formation is indicated in Figure 1 and extends continuously over the entire edge 16 of the access opening 12 of the access flooring 10, the access door 14 is securely retained by the access flooring 10. Occurrences of weight

forces of the closed access door 14 and, where applicable, objects or persons located thereon are discharged by the peripheral formation to the access flooring 10 as uniformly as possible.

Figure 3 is a cross-section of Figure 2 in the plane of section III-III indicated in Figure 2 with the access opening 12 closed. The access door 14 is flexibly connected to the access flooring 10 by the resilient element 20. It can readily be seen in the cross-section in Figure 3 that the resiliently deformable element 20 is in the form of an elongate profile-member 22 having a rectangular cross-section. In order to ensure a safe and strong connection between the elongate profile-member 22 and the access door 14 and the elongate profile-member 22 and the access flooring 10, the elongate profile-member 22 engages with a first part-region in a first groove 28 of the access door 14. The access flooring 10 has a second groove 30 which is opposite the first groove 28 when the access door 14 is closed and in which the elongate profile-member 22 engages with a second part-region. The elongate profile-member 22 is secured both in the first groove 28 and in the second groove 30 by a planar bonded joint. It can clearly be seen in Figure 3 that the access door 14 is inserted in the formation 32 of the edge 16 of the access opening 12 and both the upper edge of the access door 14 and the upper edge of the access flooring 10 are at the same level. The access flooring 10 according to the invention is illustrated in Figure 3 in a simplified manner and not true to scale. In particular, the gaps which are illustrated on the right and left in Figure 3 between the access door 14 and the access flooring 10 and which ensure friction-free opening and closing of the access door 14 have in reality a substantially smaller gap dimension.

The access flooring 10 may further have a ladder (not illustrated) which is secured during transport and storage of the access flooring 10 under the access door 14 and the floor of the access flooring 10 in a releasable and/or pivotable manner. After the access flooring 10 has been fitted in a scaffolding, the ladder can be folded out from the access flooring 10 in order to reach the access flooring 10 from a flooring underneath.

The illustration in Figure 4 corresponds to the illustration set out in Figure 3, but the access door 14 is pivoted open and the access opening 12 can be passed through by a person, for example, a construction worker. Since the elongate profile-member 22 is secured both in the first groove 28 of the access door 14 and in the second groove 30 of the access flooring 10, a material deformation is produced in a region 34 of the elongate profile-member 22 when the access door 14 is pivoted open. The material deformation may be present in some part-regions of the elongate profile-member 22 as a positive extension (expansion) and in other part-regions as a negative extension (compression). In Figure 4, an extension is produced in the region 34 at the lower side of the elongate profile-member 22 and a compression is produced at the upper side. In order to bring about a material deformation in the elongate profile-member 22, a corresponding force has to be applied in the opening direction 24 when the access door is opened. Since the elongate profile-member 22 has resilient properties, the material again attempts to take up its original form after the force is no longer applied or after the deformation has been carried out. The force which this produces and which is directed counter to the opening direction 24 is used to

automatically close the open access opening 12. The resiliently deformable element 20 is constructed in such a manner that the force which is produced by the deformation of the resiliently deformable element 20 and which is directed counter to the opening movement of the access door 14 increases abruptly from an opening angle α near a perpendicular position of the access door 14. In this instance, the opening angle α is approximately 85° but may also be greater than or less than 85° .

Figure 5 is the cross-section of a partially V-like elongate profile-member 40 which is retained in a first groove 42 of an access door 44 and a second groove 46 of an access flooring 48. The edge region of the access door 44 is positioned on the access flooring 48 if the access door 44 is closed. By the access door 44 being opened, the elongate profile-member 40 becomes deformed and attempts, as a result of the resilience thereof, to again take up its original form. There is produced a restoring force which closes the access door 44 if it is not retained in the opened position thereof with a retention force being applied. As a result of the partially V-like cross-section of the profile-member 40, the restoring force occurring has a different dependency with respect to the opening angle of the access door 44 than would be the case in an elongate profile-member having a rectangular cross-section in that the opening angle α of the access door is defined even more precisely near the perpendicular position thereof, from which the restoring force of the resiliently deformable element increases abruptly with the access door 44 being opened to an increasing extent. During opening in the range of small opening angles, the two members of the V-like portion of the profile-member 40 initially move towards each other. Since

the profile-member 40 in the region of the V-like member has a substantially smaller thickness than in the horizontally extending region, only a small force is initially required therefor. From a specific opening angle, however, the two members strike each other and a substantially greater force must be applied in order also to deform the horizontally extending regions of the profile-member 40 and thus to open the access door 44 even further (greater opening angle). Therefore, the access door 44 can be opened by a small application of force only up to a given angle α . If this angle is exceeded, the force required for further opening increases substantially (for example, in a super-proportional manner or exponentially).

The elongate profile-member 50 in Figure 6 has a substantially W-like cross-section instead of a V-like cross-section and is retained in a first groove 52 of an access door 54 and a second groove 56 of an access flooring 58. The angle from which the force required for further opening the access door 54 increases substantially is thereby displaced in comparison with Figure 5 in the direction of greater values. By the cross-section being configured correspondingly and/or by additional V-like regions being fitted, it is possible for the opening angle α , from which the required force increases substantially, to be in a range near 90 degrees.

Figure 7 illustrates a first possibility for securing the resilient element in cross-section. The resiliently deformable element is in the form of an elongate profile-member 80. The profile-member 80 engages with a first part-region in a first groove 82 of an access flooring 84 and is retained in the groove 82 by means of screws 86 which can be

countersunk in the access flooring 84. A second part-region of the elongate profile-member 80, which region is opposite the first part-region, has a T-like cross-section, which acts as an undercut 88, and engages in a correspondingly formed groove 90 of the access door 92 in the transverse direction relative to the elongate profile-member 80 in a positive-locking manner. In order to prevent the elongate profile-member 80 from sliding out of the groove 90 of the access door 92, the profile-member 80 may further be secured in the groove 90 by a bonded joint.

Figure 8 is a cross-section of a permanent securing of an elongate profile-member 94 with respect to an access flooring 100 and an access door 98 by means of rivets 96. As in other embodiments shown, the elongate profile can also take over the hinge function. For fixing, the profile-member 94 engages with a first part-region in a first groove 102 of the access door 98 and with a second part-region in a second groove 104 of the access flooring 100. The profile-member 94 is provided both in the first and in the second part-region with apertures, for example, holes or circular punched portions. The access flooring 100 and the access door 98 have holes which are aligned with the corresponding apertures of the profile-member 94. The first part-region which is inserted into the first groove 102 is now retained on the access door 98 by means of rivets 96 which extend through the holes of the access door 98 and the apertures in the first part-region of the profile-member. The second part-region of the profile-member 94 is retained on the access flooring 100 in a corresponding manner. In addition to solid rivets, hollow rivets or blind rivets are also suitable for fixing.

A possibility for connecting an access flooring 106 to an access door 108 by means of an elongate profile-member 110 having a rectangular cross-section is illustrated in Figure 9. Both the edge of the access flooring 106 along the access opening and the edge of the access door 108 have at the upper side thereof recesses 112, 114 each having a rectangular cross-section. The elongate profile-member 110 is inserted with a part-region in the recesses 112, 114. The depth of the recesses is selected in such a manner that the upper edge of the profile-member 110 terminates in a flush manner with the upper edge of the access door 108 and with the upper edge of the access flooring 106 or the upper edge of the profile-member 110 is located in a lower position in comparison with the upper edge of the access door 108 and the upper edge of the access flooring 106. The elongate profile-member 110 is securely connected by means of screw type connections 116 with a part-region to the access flooring 106 and the access door 108. In accordance with the material used for the access flooring 106 and the access door 108, there are used screws which have a normal thread or which have a self-tapping thread. As a result of the arrangement of the elongate profile-member 110, the gap 118 which exists between the access flooring 106 and the access door 108 is completely covered. Dirt or small objects are reliably prevented from being introduced into the gap. A person is also prevented from inadvertently becoming injured by being jammed in the gap 118 when the access door 108 is opened.

Figure 10 is a cross-section of an access flooring 120 according to the invention. In addition to an elongate profile-member 124 having a double-T-like cross-section, a hinge 126 which is recessed at the upper side of the access flooring 120 and the access door 122 is used for the flexible

connection between the access flooring 120 and the access door 122. In this embodiment, the weight force of the opened access door 122 is transmitted by the hinge 126 to the access flooring 120. The elongate profile-member 124 is retained by means of two undercuts 128 both in a first groove 130 of the access flooring 120 and in a second groove 132 of the access door 122. Both the arrangement of the hinge 126 and the formation of the illustrated cross-section 134 of the access flooring 120 and the corresponding formation of the illustrated cross-section 136 of the access door 122 reliably prevent dirt from being introduced into the region 138, in which the elongate profile-member 124 is located. Inadvertent jamming when the access door 122 is opened is also prevented.

As illustrated in Figure 11 and Figure 12, there may be used to influence the restoring force an elongate profile-member 140; 148 which is flexibly connected to an access door 142; 150 and an access flooring 144; 152 and which has a plurality of cavities 146; 154. The cavities 146; 154 are preferably arranged in a region in which a material deformation occurs when the access door 142; 150 is opened. In Figure 11, the cavities 146 are in the form of open V-like notches at the upper side of the elongate profile-member 140. The notches extend at the upper side substantially centrally in the longitudinal direction of the profile-member 140 and ensure that, when the access door 142 is opened, the region in which the greatest material elongation of the profile-member 140 would otherwise occur is relieved. Therefore, the access door 142 can be opened with a smaller application of force and a premature material fatigue as a result of excessively powerful elongation of the elongate profile-member 140 is prevented.

In a similar manner, as illustrated in Figure 12, an elongate profile-member 148 may be perforated by cavities 154 which extend in the direction of the longitudinal sides of the profile-member 148 completely into the interior thereof. In Figure 12, the cavities 154 have a circular cross-section and are arranged in a region of the profile-member 148 which is compressed when the access door 150 is opened. The occurring restoring force is thereby reduced in the range of small opening angles of the access door 150. Irrespective of the cavities 154 which are shown in the embodiment, those cavities in other embodiments may also have other cross-sectional shapes, such as a triangular shape.

As shown in Figure 13, a flexible cover 164 may be arranged above the elongate profile-member 156 in order to protect an elongate profile-member 156 which is connected to an access door 162 and an access flooring 160. The flexible cover 164 is secured both to the access flooring 160 and to the access door 162 and consequently also protects the connection region 158 which is between the access flooring 160 and the access door 162. The flexible cover 164 is ideally dust-tight and fluid-tight and comprises a very resilient, flexible material which is not sensitive to environmental influences, such as, for example, a plastics film. Dust which occurs, for example, during grinding work on a facade, consequently cannot clog the connection region 158 and thereby impair the function of the elongate profile-member 156. The securing of the cover 164 can advantageously be carried out with the same connection elements which also connect the elongate profile-member 156 to the access flooring 160 and the access door 162. In Figure 15, screws 166 which extend through both the flexible cover 164 and the elongate profile-member 156 were used for this purpose.

Figure 14 shows that the flexible cover 164 is compressed when the access door 162 is opened. If a material having a very high level of flexibility is used for the flexible cover 164, it influences the restoring force produced by the elongate profile-member 156 only to an insignificant degree.

The cover 164 may also be configured in such a manner that the restoring force produced by the elongate profile-member 156 cooperates with a restoring force which is produced by the cover 164. The cover 164 acts counter to an undesirable introduction of contamination, such as, for example, stones or material chips, into the gap formed between the access door 162 and the access flooring 160.

Figure 15 is a cross-section of a region in which an access door 172 is connected to an access flooring 174. The connection between the access door 172 and the access flooring 174 is produced by a stable band 168 which is recessed both into the access door 172 and into the access flooring 174 and which is secured by means of rivets 170. The band may comprise a textile, an elastomer material or a different, suitable material. In the gap between the access flooring 174 and the access door 172, there are arranged above the material band 168 a first resiliently deformable element 176 and below the material band 168 a second resiliently deformable element 178. In this instance, the first resiliently deformable element 176 fills only a portion of the gap region and comprises a flexible and poorly resilient material. The second resiliently deformable element 178 comprises a powerfully resilient and soft material. The second resiliently deformable element 178 is already compressed when the access door 172 is closed, that is to say,

it is pressed in the gap. As a result of the compression thereof, the second resiliently deformable element 178 applies a force to the access door 172 which acts in the direction of an opening movement and consequently reduces the force application which is required to open the access door 172. The first resiliently deformable element 176 is pressed in the gap only at the above-explained opening angle α (not shown) near the access door 172 which is opened almost perpendicularly. As a result of the compression, there is produced a force which is directed counter to the opening movement of the access door 172 and which always presses the access door 172 automatically into a closed position. The two resiliently deformable elements 176, 178 act counter to introduction of contamination, such as, for example, stones or material chips, into the gap formed between the access door 172 and the access flooring 174.

List of reference numerals

Figure 1 to Figure 4

- 10 Access flooring
- 12 Access opening
- 14 Access door
- 16 Edge of access opening
- 18 Region in which the access door is connected to the access flooring
- 20 Resilient element
- 22 Elongate profile
- 24 Opening movement of access door
- 26 Gripping opening
- 28 First groove of access door
- 30 Second groove of access opening
- 32 Formation of the edge of the access opening
- 34 Region of a material deformation of the elongate profile-member
- α Opening angle

Figure 5

- 40 Elongate profile-member with V-like cross-section
- 42 Groove of the access door
- 44 Access door
- 46 Groove of the access flooring
- 48 Access flooring

Figure 6

- 50 Elongate profile-member with W-like cross-section
- 52 Groove of the access door
- 54 Access door
- 56 Groove of the access flooring
- 58 Access flooring

Figure 7

80 Elongate profile-member
82 Groove of the access flooring
84 Access flooring
86 Countersunk screws
88 Undercut
90 Groove of the access door
92 Access door

Figure 8

94 Elongate profile-member
96 Rivets
98 Access door
100 Access flooring
102 Groove of the access door
104 Groove of the access flooring

Figure 9

106 Access flooring
108 Access door
110 Elongate profile-member
112 Recess at the upper side of the access flooring
114 Recess at the upper side of the access door
116 Screw type connections
118 Gap

Figure 10

120 Access flooring
122 Access door
124 Elongate profile-member
126 Hinge
128 Undercuts

- 130 Groove of the access flooring
- 132 Groove of the access door
- 134 Formation of the cross-section of the access flooring
- 136 Formation of the cross-section of the access door
- 138 Region between access door and access flooring

Figure 11

- 140 Elongate profile-member
- 142 Access door
- 144 Access flooring
- 146 Cavities

Figure 12

- 148 Elongate profile-member
- 150 Access door
- 152 Access flooring
- 154 Cavities

Figure 13 and Figure 14

- 156 Elongate profile-member
- 158 Connection region between access door and access flooring
- 160 Access flooring
- 162 Access door
- 164 Flexible cover
- 166 Screws

Figure 15

- 168 Stable material band
- 170 Rivets
- 172 Access door
- 174 Access flooring
- 176 First resiliently deformable element
- 178 Second resiliently deformable element

Patent Claims

1. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) for a scaffolding, having an access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) which closes an access opening (12) in the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) and which is supported in an opening manner on the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) in a state connected to the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174),

wherein, in a region (18) in which the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) is connected to the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174), there is arranged at least one resiliently deformable element (20; 22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) which becomes deformed when the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) is opened,

wherein there is produced in the resiliently deformable element (20; 22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) by the deformation of the resiliently deformable element a force which is directed counter to the opening movement of the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) and

wherein the force increases abruptly from an opening angle near a perpendicular position of the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172).

2. Access flooring according to claim 1, characterised in that the opening angle α near the perpendicular position of the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) is between 75° and 87°, in particular is less than or equal to 80.

3. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to claim 1 or 2, characterised in that the region in which the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) is connected to the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) extends over an edge side of the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172).

4. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to any one of the preceding claims, characterised in that the edge (16) of the access opening (12) has an edge formation, in which the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) is inserted, and wherein the edge formation is constructed in such a manner that the surface of the upper side of the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) forms without any step a plane with the surface of the upper side of the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174).

5. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to any one of the preceding claims, characterised in that the at least one resiliently deformable element (20; 22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) is in the form of an elongate profile-member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) of a flexibly resilient and/or visco-resilient material.

6. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to claim 5, characterised in that the elongate profile-member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) has a substantially rectangular cross-section.

7. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to claim 5 or 6, characterised in that the elongate profile-member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) has an at least partially V-like (40) or W-like (50) or zig-zag-like (60) or wave-like (70) cross-section.

8. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to any one of the preceding claims, characterised in that the at least one resiliently deformable element (20; 22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) is connected, on the one hand, to the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) and, on the other hand, to the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172).

9. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to claim 8, characterised in that the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) has, along a portion of the edge thereof, a first groove (28; 42; 52; 90; 102; 132), in which the elongate profile-member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) engages with a first part-region, and in that the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) has, along a portion of the edge (16) of the access opening (12) which is opposite the first groove (28; 42; 52; 90; 102; 132) along the portion of the edge of the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172), a second groove (30; 46; 56; 82; 104; 130) in which the elongate profile-member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) engages with a second part-region, and wherein the elongate profile-member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156;

176; 178) is retained both in the first groove (28; 42; 52; 90; 102; 132) along the portion of the edge of the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) and in the second groove (30; 46; 56; 82; 104; 130) of the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) along the portion of the edge (16) of the access opening (12).

10. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to claim 9, characterised in that the elongate profile-member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) is secured in the first groove (28; 42; 52; 90; 102; 132) along the portion of the edge of the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) and in the second groove (30; 46; 56; 82; 104; 130) of the access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) along the portion of the edge (16) of the access opening (12) by rivets (96) and/or by screws (86; 166) and/or by adhesive connections and/or by undercuts (88; 128).

11. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to any one of claims 5 to 10, characterised in that the elongate profile-member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) is subjected to material deformation when the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) is opened, and in that one or more cavities (146; 154) are at least partially formed in the region of the material deformation.

12. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to claim 11, characterised in that the at least one cavity (154) is closed at least partially in the direction of the longitudinal sides of the elongate profile-

member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178).

13. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to claim 11 or claim 12, characterised in that the at least one cavity (146) is at least partially formed by an indentation which extends in the longitudinal direction of the elongate profile-member (22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178) in the surface of a longitudinal side.

14. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to any one of the preceding claims, characterised in that the region (18) in which the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172) is connected to the access flooring 10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) has a flexible cover (164), which covers the at least one resiliently deformable element (20; 22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178).

15. Access flooring (10; 48; 58; 84; 100; 106; 120; 144; 152; 160; 174) according to claim 14, characterised in that the cover (164) produces, during the opening movement of the access door (14; 44; 54; 92; 98; 108; 122; 142; 150; 162; 172), a force which cooperates with the restoring force of the resiliently deformable element (20; 22; 40; 50; 80; 94; 110; 124; 140; 148; 156; 176; 178).