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(72) Inventor: **van Paassen, Adrianus Gerardus Maria**
6705 AK Wageningen (NL)

(74) Representative: **Prins, Adrianus Willem et al**
Vereenigde,
Nieuwe Parklaan 97
2587 BN Den Haag (NL)

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(71) Applicant: **VBI ONTWIKKELING B.V.**
NL-6851 AJ Huissen (Gld) (NL)

(54) **Trimmer construction for a floor built up from plate-shaped elements, and a trimmer accessory to be used therewith**

(57) A trimmer construction for a floor built up from plate-shaped elements which rest on supporting walls, the construction being provided with a trimming joist (5), which is provided with at least one bearing surface for at least one trimmed plate-shaped element (7). The bearing forces applied by a trimmed plate-shaped element (7) to the trimming joist (5) are transmitted to a supporting wall by a trimmer accessory (21). The trimmer accessory (21) comprises the trimming joist (5) and,

at at least one of its extremities, a longitudinal girder (8) abutting in T-shape, having, each time, a bearing end (9) and a supporting end (10) bearing a stop element (11), directed substantially towards the trimming joist, with a stop surface for a trimmed plate-shaped element (7). A trimmed plate-shaped element (7) rests on the bearing surface by an edge area of a first plate side, and, at a distance from that edge area, abuts against the stop surface of the stop element (11) by a second plate side opposite the first plate side.

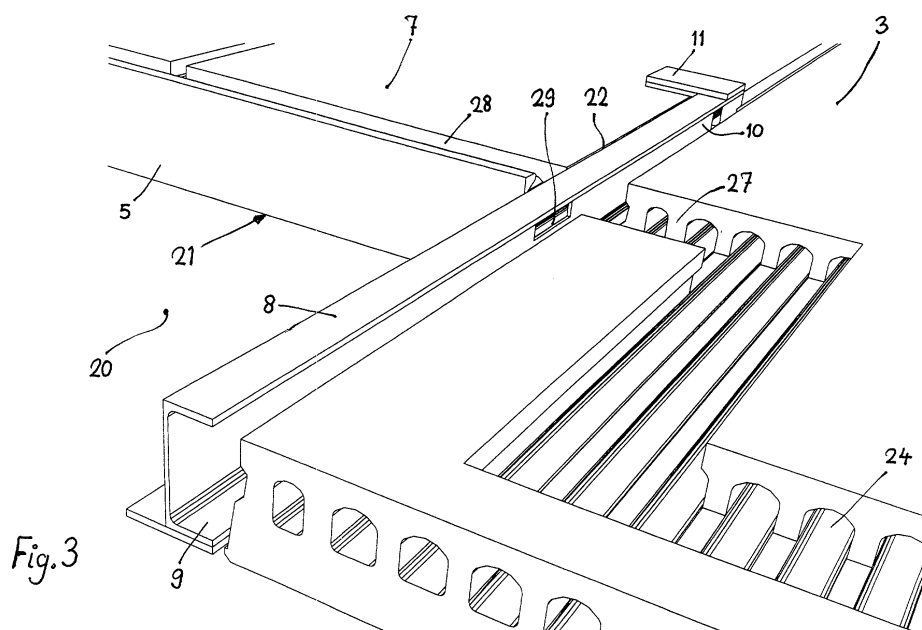


Fig. 3

Description

[0001] The invention relates to a trimmer construction for a floor which is built up from plate-shaped elements which rest on supporting elements, such as supporting walls, the construction being provided with a trimming joist which is provided with at least one bearing surface for at least one trimmed plate-shaped element and which transmits bearing forces applied thereto by a trimmed plate-shaped element to a support element.

[0002] With such a known trimmer construction for, for instance, providing a stairwell in a floor, the trimming joist is lengthened at its two ends with, each time, a bearing element with a supporting surface, while each supporting surface is laid on the upper side of an adjoining plate-shaped element, the trimming joist, and thus the trimming joist forms, as it were, a suspended bridge, serving as a bearing part for at least one trimmed plate-shaped element, i.e. a plate-shaped element which is shorter than the span. The bearing forces applied by the trimmed plate-shaped element to the trimming joist are transmitted to the supporting wall via the adjoining trimmed plates on which the bearing elements rest. In particular with large openings to be provided in a floor, such a trimmer construction may lead to forces on the trimmed plates such that to that end, particularly heavily constructed trimmed plates must be used.

[0003] It is an object of the invention to enable the trimmed plates to be made of relatively light design, also when relatively large openings are to be provided in a floor.

[0004] This is achieved according to the invention when the trimming joist is provided, at at least one of its extremities, with a longitudinal girder, abutting in T-shape, having, each time, a bearing end resting on a supporting element and a supporting end which is provided with a stop element, directed substantially towards the trimming joist, with a stop surface, while a trimmed plate-shaped element rests on the bearing surface by an edge area of a first plate side, and, at a distance from that edge area, abuts against the stop surface of the stop element by a second plate side opposite the first plate side. Due to these features, a self-supporting construction is obtained which is independent of adjoining plate-shaped elements and therefore does not load them. This is effected by designing the longitudinal girder, as it were, as two aligned lever arms which are fixedly connected to the trimming joist functioning as the rotary axis, while the trimming joist is prevented from pivoting downwards by the pressing down of the plate-shaped elements resting thereon, by the stop surfaces of the stop elements contacting the upper side of the trimmed plates. In this manner, a relatively simple and light but reliably supporting trimmer construction is obtained, while further not only the trimmed edge is formed by a profile, viz. by the trimming joist, but also the contiguous edges of the opening formed in the floor, viz. by the longitudinal girders. This latter holds when the trim-

ming joist is provided with two longitudinal girders abutting against it in T-shaped configuration, which design will generally be preferred. However, it is also conceivable to provide the trimming joist on one side with a known bearing or suspending element as discussed hereinabove. In particular, such a solution could be opted for when a side edge of the opening to be formed adjoins a transverse wall on which the bearing or suspending element can rest.

[0005] As the trimmer construction no longer rests on an adjoining trimmed plate, this could even be omitted entirely. When an adjoining trimmed plate is indeed present, in a further advantageous manner, without problems, a weakening such as a longitudinal groove can be provided in the area of the trimmed plate where, in the known construction, the bearing elements rested on the trimmed plate. This also holds for transverse grooves, provided that the trimmed plate is constructed to that end in a suitable manner by giving, for instance, in accordance with a previous proposal of the present applicant, the reinforced lower shell of a hollow-core plate a thickness such that the transverse forces and bending forces to be absorbed by the lower shell at the location of the grooves can be transmitted to the supporting wall without problems. Thus, with the trimmer construction according to the invention, in contrast with the earlier discussed known construction, pipes to be concealed in the floor can be laid around and adjacent to the opening provided in that floor.

[0006] Floors as referred to are often formed from standard prefab elements such as hollow-core plates. The desired width of a stairwell will often not correspond to a width-size defined by one or a number of prefab elements. In order to obtain the desired size, it is known to form an opening which is wider than the desired opening and to reduce the thus obtained opening to the desired size by providing a filling piece in the opening in a more or less floating manner. With such a trimmer construction having a width which is smaller than the total of the widths of the trimmed plate-shaped elements, it is proposed according to a further embodiment of the invention, that the trimming joist has a length which corresponds to the width referred to, and at least one of the trimmed plates adjoining a longitudinal girder is reduced in width over at least the length over which the longitudinal girder extends along that plate, the arrangement being such that the total of the then remaining widths of the trimmed plates at the location of the trimmer construction is substantially equal to the length of the trimming joist, while a space between the longitudinal girder and an adjacent non-trimmed plate-shaped element is filled up. This can be done by, for instance, a filling piece. This construction has the further advantage that the filling piece can be included in a surrounding frame and thus can be better fitted and secured all around. Also, the edges of the opening formed in the floor then remain bounded by smooth profiles.

[0007] The trimmer construction according to the in-

vention further makes it possible, in an advantageous manner, to provide an opening which is not contiguous to a supporting wall, but is provided at a distance therefrom in the floor surface. According to a further embodiment of the invention, this can be realized when the bearing end is fixedly connected to a second bearing end forming part of a second longitudinal girder, abutting, T-shaped, against a second trimming joist with a second bearing surface and having a second supporting end opposite the second bearing end, which supporting end is provided with a second stop element, directed substantially towards the second trimming joist, with a second stop surface, while a second trimmed plate-shaped element rests on the second bearing surface by an edge area of a first plate side, and, at a distance from that edge area, abuts against the second stop surface of the second stop element by a second plate side located opposite the first plate side. Thus, a double-design construction is obtained, while two trimmed plates in alignment with each other with, between them, the double-design construction, form, so to speak, a continuous floor plate with an opening situated at a distance from both ends. Here, again, it is possible to situate the trimmer construction along a sidewall extending in the direction of the plate, thus enhancing the design flexibility when constructing standard prefab elements, since an opening which is independent of the walls supporting the floor and independent of the direction in which the plates extend can be provided with the advantages associated with the invention. In this construction too, in a similar manner to that described hereinabove, it is possible to have the width of the opening deviate from the total of the widths of the trimmed plates.

[0008] Although two longitudinal girders, with or without an accessory profile, can be mutually coupled and fixedly connected, so that the starting point could be two equal elements, it is further preferred, with such a construction, that the first and the second longitudinal girder consist of a one-piece, continuous girder.

[0009] The invention also relates to a trimmer accessory to be utilized with a trimmer construction as described hereinabove and provided with a trimming joist with a bearing surface for at least one plate-shaped element, the trimming joist being equipped at at least one of its extremities with provisions for attaching a longitudinal girder, abutting, in T-shape, having, each time, a bearing end and a supporting end with provisions for fastening a stop element, directed substantially towards the trimming joist, with a stop surface for a trimmed plate-shaped element. These provisions can have any suitable form and design and be industrially fitted and form a permanent connection, for instance be welding connections, or consist of an industrially or otherwise prepared connection to be fitted on the building site and which is detachable, for instance mountable coupling means. Naturally, welding can also take place on the building site or the respective connection can be provided in a different manner. Further, as a rule, it will be pre-

ferred that the trimming joist supports a longitudinal girder at both ends. When a longitudinal girder is present at one end of the trimming joist only, then, preferably, the other end of the trimming joist is provided with provisions for supporting the trimming joist, through provisions suitable to that end, such as a bearing element or a suspension lug, on an adjacent element, such as a side wall or a plate.

[0010] As already noted, the trimmer construction according to the invention does not need to rest on an adjacent floor plate. However, in order to obtain a good abutment between the trimmer construction and the adjacent floor plate, it may be preferred according to a further embodiment of the invention, that the longitudinal girders consist of U-profiles, having their open U-side facing away from the trimming joist. This construction also has its advantages when using filling pieces, as discussed hereinabove.

[0011] In order to, on the one hand, place a trimmed plate on the bearing surface of the trimming joist without many problems and, on the other hand, to provide a bending-stiff trimming joist, it is proposed, according to a further embodiment of the invention, that the trimming joist be formed by an L-shaped profile of which one leg forms the bearing surface and the other leg is provided with a reinforced head.

[0012] When mounting the trimmer construction, first, the trimmer accessory can be placed and supported before the trimmed plate-shaped element is provided. If, however, according to a further embodiment of the invention, at least one of the longitudinal girders carries a locking element at its supporting end, at a distance from the stop element, the trimmer accessory can first be slid onto the trimmed plate-shaped element, i.e. between stop element and locking element as far as on the bearing surface of the trimming joist, and thereupon this structure can be placed on the supporting walls in the manner of a non-trimmed plate-shaped element. The locking element can then be fitted in such a way that it can be removed after the trimmed plate with the trimmer accessory slipped onto it has been placed, because this locking element is only an assembling accessory and has no more function in the final construction.

[0013] When an opening in a floor built up from plates is not to be arranged in a manner so as to be contiguous to a supporting wall, but at a distance therefrom, this can be realized with a trimmer accessory according to the invention when a bearing end is connected to a bearing end of a second trimmer accessory, of mirror-symmetrical design, with the longitudinal girders of both trimmer accessories extending in line and functioning as one whole or being designed as one whole. Thus, a trimmer accessory can be formed which, in fact, consists of two longitudinal girders connected by two trimmed girders for determining the opening to be created in the floor, while the parts of the longitudinal girders extending beyond the trimmed girders ensure the desired strength and stability by means of the stop elements resting on

the trimmed plates. When, for instance, abutment against a sidewall is involved, a longitudinal girder suffices which extends along both trimmed girders, which are further provided with fastening provisions for resting on a neighboring element such as a sidewall.

[0014] With reference to embodiments represented in the Figures, the trimmer construction and the trimmer accessory according to the invention will presently be further elucidated, albeit exclusively by way of non-limitative example. In the drawing:

Fig. 1 schematically shows, in perspective, an elevational view of a first embodiment of the trimmer construction according to the invention;

Fig. 2 schematically shows a cross section of the trimmer construction according to Fig. 1;

Fig. 3 schematically shows, in perspective, a detailed view of the trimmer construction of Fig. 1 with grooves provided in the floor for pipes, ducts and the like; and

Fig. 4 schematically shows, in perspective, a further variant embodiment of the trimmer construction according to the invention.

[0015] In Fig. 1, a trimmer construction 1 is represented with which it is possible to create an opening 20 in a floor 2 for, for instance, the provision of a stairwell. Generally, the floor is formed by prefabricated plate-shaped elements 3 laid side by side, resting, by extremities 3a and 3b on supporting walls (not shown). Preferably, the plate-shaped elements 3, as shown, are designed as hollow-core plates manufactured from concrete.

[0016] The opening 20 is formed by three trimmed plate-shaped elements 7, deviating from the plate-shaped element 3 only in that they have been shortened over the required length for forming the opening 20. At the location of the opening 20, the front edges of the trimmed plate-shaped elements 7 are covered by a trimming joist 5. As shown in Fig. 2, the trimming joist 5 is in the form of a substantially L-shaped profile with a leg 6 forming a bearing surface for the trimmed plate-shaped elements 7, and a leg 17 provided with a reinforced head 18. The reinforced head 18 gives the profile rigidity, but also allows the trimmed plate-shaped element 7 to be positioned on the leg 6 without much maneuvering, the element 7 then resting with the plate side 14, the bottom side, on the leg 6 of the trimming joist 5.

[0017] Further, at its two extremities, the trimming joist 5 is connected to longitudinal girders 8 extending transversely thereto, which, thus, each abut, T-shaped, against the trimming joist 5 and which, as shown in Fig. 1, substantially consist of a U-profile, whose open U-side faces away from the trimming joist 5. The connection between the trimming joist 5 and the longitudinal girders 8 is not shown in detail but can be realized in any suitable manner. For instance, a welding connection can be considered, or detachable coupling means. The

longitudinal girders 8 each have a bearing end 9 for resting on a supporting wall and a supporting end 10 provided with a plate-shaped stop element 11. With its plate surface, the plate-shaped stop element 11 extends substantially at right angles to the longitudinal girder 8 and parallel to the leg 6, and is further situated such that it stops against the plate side 15, the upper side, of a trimmed plate-shaped element 7, when this is borne on the leg 6 of the trimming joist 5. The stop element 11 can be connected to the supporting end fixedly as well as detachably. The whole of trimming joist 5 and longitudinal girders 8 with stop elements 11 forms a trimmer accessory 21.

[0018] When the trimmer accessory 21 has been fitted, with the longitudinal girders 8 resting by their bearing ends 9 on the supporting walls and the trimmed plate-shaped elements 7 resting on the trimming joist 5, the force applied by the trimmed plate-shaped elements 7 to the trimming joist, which force wants the trimmer accessory 21 to pivot downwards about its which force wants the trimmer accessory 21 to pivot downwards about its bearing ends 9, is absorbed by the stop elements 11 contacting against the plate side 15, so that the trimmed plate-shaped elements 7 together with the trimmer accessory 21 in the fitted condition continue to form a rigid horizontal arrangement. Thus, with the aid of the trimmer accessory 21, a self-supporting trimmer construction 1 is obtained which is independent of the plate-shaped elements 3 adjoining the trimmer construction 1. Further, the plate edges bounding the opening 20 are smoothly finished with profiles.

[0019] As the trimmer construction 1 is independent of the adjoining plate-shaped element 3, i.e. for absorbing the forces, no use needs to be made of those adjoining plate-shaped elements 3, when designing these latter, it does not need to be taken into account whether a trimmer construction 1 is present or not. These elements can therefore be designed in a standard manner and be equipped in the usual manner with provisions such as grooves for accommodating pipes to be concealed in the floor 2, more in particular also in the direct proximity of the opening 20 provided in the floor 2 with the trimmer construction 1, as shown in the exemplary embodiment represented in Fig. 3. Here, the adjoining plate-shaped element 3 is provided with a recess in the shape of a cross groove 24 near the end edge, which, at the location of the opening 20, merges into a longitudinal groove 25, to which a cross groove 27 is contiguous, terminating in the longitudinal edge at the location of the trimming joist 5, all this in a manner such that a cross groove 28 provided in the end edge of the trimmed plate-shaped element 7 is situated in alignment with the cross groove 27 as also shown in Fig. 2. Thus, by providing a suitable passage 29 in the body part of the longitudinal girder 8, a pipe channel extending all around the opening 20 can be formed.

[0020] It is noted that in the exemplary embodiments represented a trimmed plate-shaped element 7 along

which a longitudinal girder 8 extends, is provided over its length with a recess 22 for receiving the longitudinal girder 8, which, hence, comes to lie with its top surface in the upper plane of the floor 2. By opting for a differently designed longitudinal girder or by selecting the U-shape of the longitudinal girder such that it can be slid onto the plate-shaped element, if desired, the required space can be designed such that the provision of a recess in a plate-shaped element can be dispensed with.

[0021] On the other hand, this recess can also be enlarged, thus creating the possibility to obtain an opening 20 having a width smaller than the total of the widths of a number of trimmed plate-shaped elements 7, as will be further elucidated with reference to Fig. 4. The length of the trimming joist 5 is then geared to the desired width of the opening 20, which is larger than the total of the widths of the two trimmed plate-shaped elements 7 but smaller than the total of the widths of the three trimmed plate-shaped elements 7. By now providing one of the trimmed plate-shaped elements 7 with a recess 22 of a width substantially equal to the difference between the total of the widths of the three trimmed plate-shaped elements 7 and the length of the trimming joist 5, the trimmer accessory 21 can be placed in the manner proposed by the invention with its longitudinal girders 8 along the edges of the trimmed plate-shaped elements 7. The thus created space 30 between a longitudinal girder 8 and an adjoining plate-shaped element 3 can then be filled by, for instance, pouring concrete or placing a prefab element.

[0022] Additionally, it is noted here that also a recess can be provided in the other trimmed plate-shaped element 7 placed in the other extremity of the trimming joist 5. This, in turn, gives more freedom in positioning the opening 20 in a floor built up from standard elements according to a fixed pattern.

[0023] For realizing the trimmer construction 1, the trimmer accessory 21 can be placed at the location provided to that end with its bearing ends 9 on the supporting wall and further be horizontally supported or shored-up, whereupon the trimmed plate-shaped element 7 can be laid on the one side on the supporting wall and on the other side on the trimming joist 5. Due to the stop element 11 contacting against the top surface of the trimmed plate-shaped element 7, a stable construction is obtained, whereupon the support or shore can be removed. Providing a support or shore can be dispensed with when at least one of the longitudinal girders 8 is provided at its supporting end 10 with a plate-shaped locking element 12, represented in Fig. 2, extending parallel to the stop element 11 and connected to the U-leg of the longitudinal girder 8 located opposite the U-leg bearing the stop element 11. The trimmer accessory 21 can then be slid onto the trimmed plate-shaped element 7 until the front edge of that trimmed plate-shaped element 7 rests on the leg 6 of the trimming joist 5. Hereafter, the trimmed plate-shaped element 7 with slid-on trimmer accessory 21 can be taken up in the manner of

a non-trimmed plate-shaped element and be laid on the provided place on the supporting walls, whereupon the trimmer construction 1 can be finished without a shore or support being necessary.

[0024] In the exemplary embodiments, providing an opening adjoining a supporting wall and at a distance from a sidewall is represented. In the event an opening is contiguous to a sidewall, at that location, the longitudinal girder can be dispensed with and be replaced with a suspending or bearing provision on the trimming joist, with which it bears on or against this sidewall. When the opening is not situated contiguous to the wall, this can be realized by designing the construction doubly, in a mirror symmetrical manner. In that situation, Fig. 1 or Fig. 4 could be viewed as a cross section halfway the opening provided in the floor at a distance from the supporting wall. Naturally, such an opening can again be contiguous to a sidewall, while, then, one of the longitudinal girders can be dispensed with through replacement by bearing or suspending provisions on the, in that case, two trimming joists.

[0025] It is self-evident that, within the framework of the invention as defined in the accompanying claims, the exemplary embodiments discussed hereinabove and represented in the drawings can be modified and varied in many ways. For instance, both the stop element and the locking element can be designed differently, for instance L-shaped or Z-shaped, while then, the longitudinal girder could consist of an L-profile, whose horizontal leg could extend below the adjoining plate-shaped part. Also, several stop elements can be provided on a longitudinal girder, which, if desired, could form a long, one-part continuous covering plate. What can be considered, further, is to connect the generally H-shaped trimmer accessory between the bearing ends forming the extremities by a further profile, so that the opening in the floor would be surrounded entirely by smooth profiles. In addition, it could be considered to replace two oppositely located stop elements with a plate-shaped strip extending over the full width of the trimmer accessory.

Claims

1. A trimmer construction for a floor which is built up from plate-shaped elements, which rest on supporting elements, such as supporting walls, the construction being provided with a trimming joist, provided with at least one bearing surface for at least one trimmed plate-shaped element and which transmits bearing forces applied thereto by a trimmed plate-shaped element to a supporting element, **characterized in that** the trimming joist is provided at at least one of its extremities with a longitudinal girder abutting in a T-shape, with, each time, one bearing end resting on a supporting element and one supporting end, which is provided

with a stop element with a stop surface, directed substantially towards the trimming joist, while a trimmed plate-shaped element rests on the bearing surface by an edge area of a first plate side, and, at a distance from that edge area, abuts against the stop surface of the stop element by a second plate side located opposite the first plate side.

2. A trimmer construction according to claim 1, **characterized in that** with a trimmer construction having a width which is smaller than the total of the widths of the trimmed plate-shaped elements, the trimming joist has a length which corresponds to the width referred to, and at least one of the trimmed plates adjoining a longitudinal girder is reduced in width over at least the length along which the longitudinal girder extends along said plate, the arrangement being such that the total of the widths of the trimmed plates then remaining at the location of the trimmer construction is substantially equal to the length of the trimming joist, while a space between the longitudinal girder and an adjoining, non-trimmed plate-shaped element has been filled up.
3. A trimmer construction according to claim 1 or 2, **characterized in that** the bearing end is fixedly connected with a second bearing end which forms part of a second longitudinal girder abutting in T-shape against a second trimming joist having a second bearing surface and, located opposite the second bearing end, a second supporting end which is provided with a second stop element with a second stop surface, directed substantially towards the second trimming joist, while a second trimmed plate-shaped element rests on the second bearing surface by an edge area of a first plate side and at a distance from that edge area, abuts against the second stop surface of the second stop element by a second plate side located opposite the first plate side.
4. A trimmer construction according to claim 3, **characterized in that** the first and the second longitudinal girder consist of a one-part continuous girder.
5. A trimmer accessory to be utilized in a trimmer construction according to any one of the preceding claims and provided with a trimming joist with a bearing surface for at least one plate-shaped element, **characterized in that**, at at least one of its extremities, the trimming joist is equipped with provisions for fastening a longitudinal girder abutting in the form of a T, having, each time, a bearing end and a supporting end with provisions for fastening a stop element, directed substantially towards the trimming joist, with a stop surface for a trimmed plate-shaped element.

6. A trimmer accessory according to claim 5, **characterized in that**, at both extremities, the trimming joist is provided with provisions for fastening a longitudinal girder abutting in the form of a T, having, each time, a bearing end and a supporting end with provisions for fastening a stop element, directed substantially towards the trimming joist, with a stop surface for a trimmed plate-shaped element.

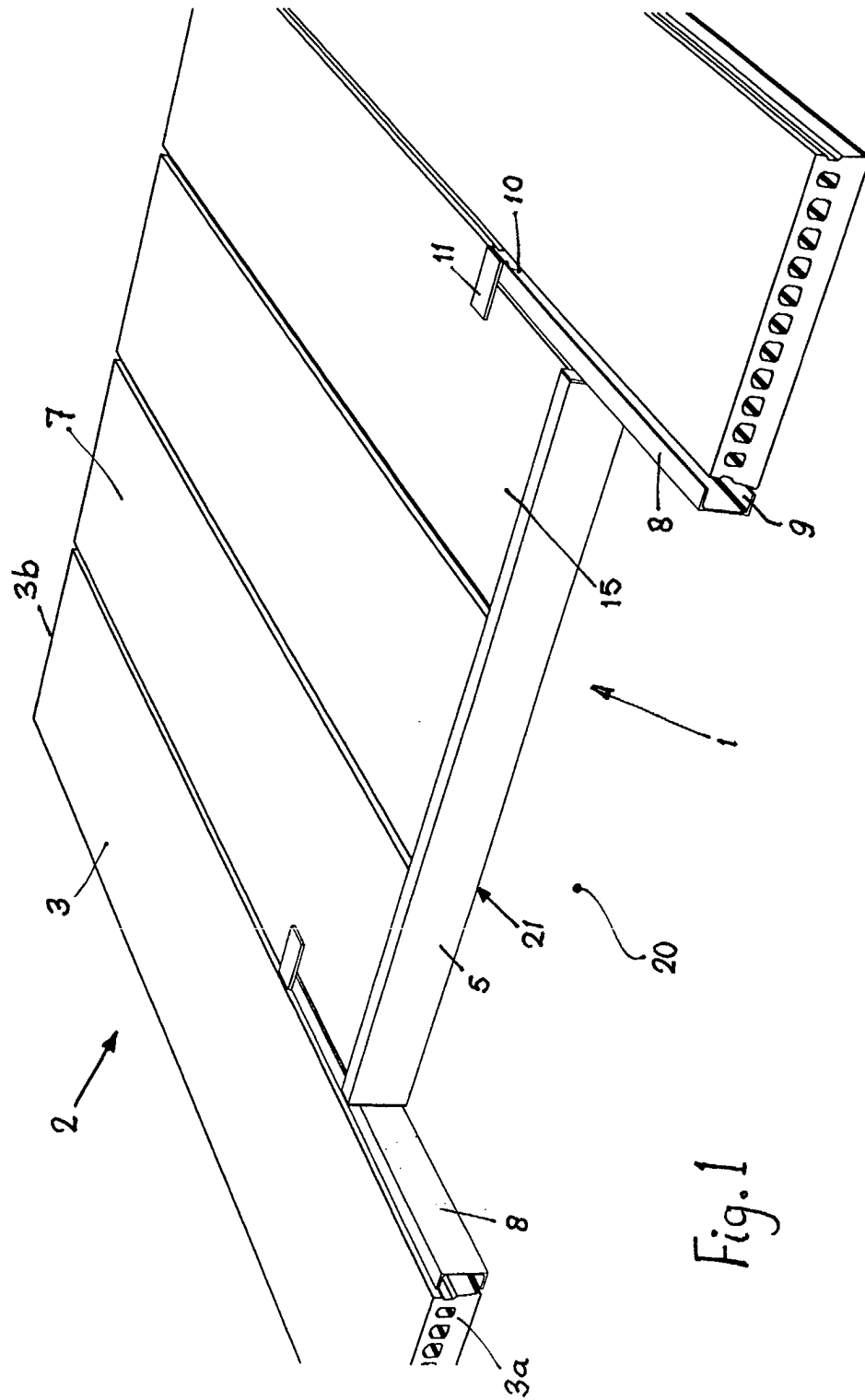
7. A trimmer accessory according to claim 5 or 6, **characterized in that** the provisions consist of previously provided and/or prepared welding connections and/or mountable coupling means.

8. A trimmer accessory according to any one of claims 5 - 7, **characterized in that** the longitudinal girders consist of U-profiles having their open U-side facing away from the trimming joist.

9. A trimmer accessory according to any one of claims 5 - 8, **characterized in that** the trimming joist is formed by an L-shaped profile whose one leg forms the bearing surface and whose other leg is provided with a reinforced head.

10. A trimmer accessory according to any one of claims 5 - 9, **characterized in that** at least one of the longitudinal girders, at its supporting end, bears a locking element at a distance from the stop element.

11. A trimmer accessory according to any one of the preceding claims, **characterized in that** a bearing end is connected to a bearing end of a second trimmer accessory of mirror-symmetrical design, while the longitudinal girders of both trimmer accessories extend in line with each other and function as one whole or are designed as one whole.



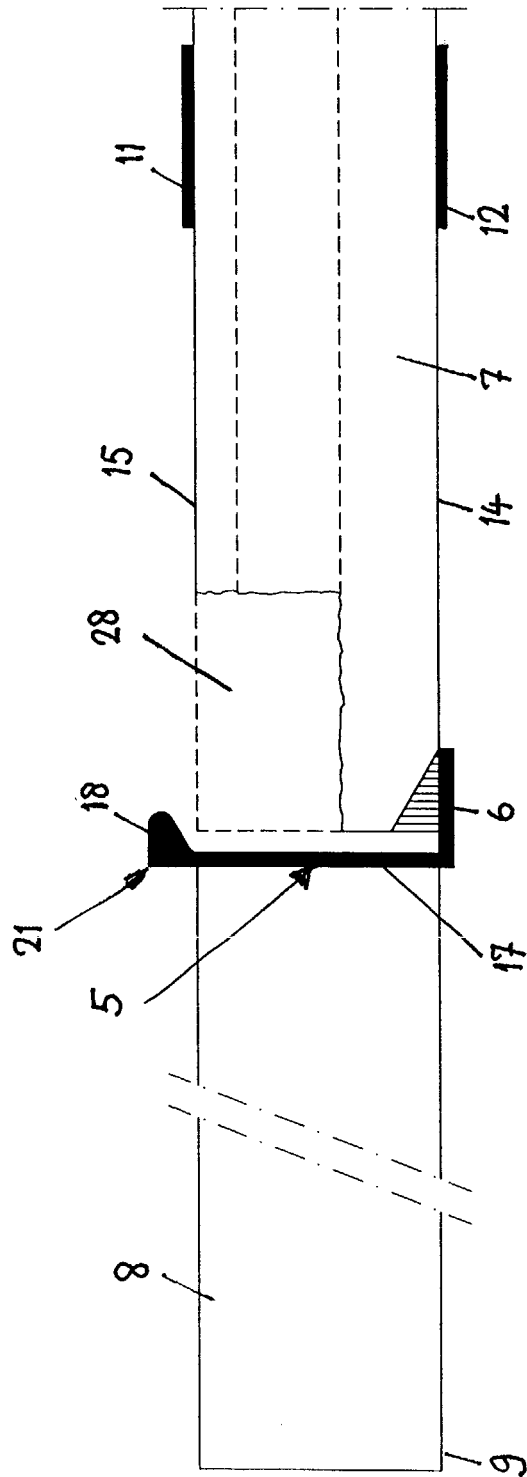


Fig. 2

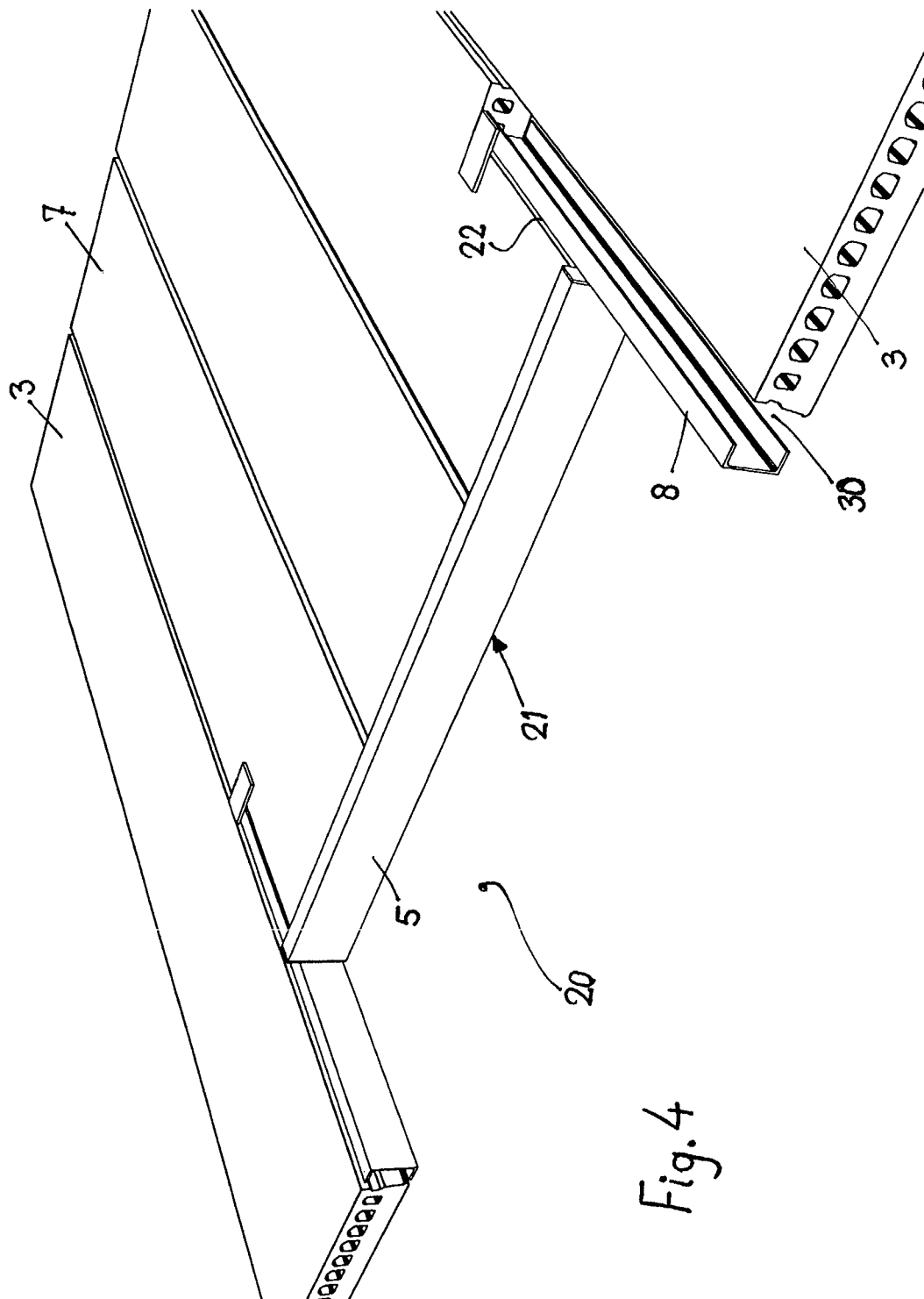


Fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 07 7154

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	DE 19 61 036 A (ELLNER KARL ERIK OLOF TAGE) 18 June 1970 (1970-06-18) * claim 1; figures 1-4 * ---	1,5	E04B5/02 E04B5/43 E04B5/14
A	US 3 613 327 A (HALL HERBERT LYNWOOD) 19 October 1971 (1971-10-19) * figures 1,2,4 * ---	1,5	
A	US 5 660 020 A (REAY ALAN MICHAEL) 26 August 1997 (1997-08-26) * column 2, line 20 - column 2, line 54 * * figures 1,2 * ---	1,5	
A	GB 410 982 A (KRISTIAN HINDHEDE) 31 May 1934 (1934-05-31) * figure 3 * -----	1,5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E04B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 October 2003	Examiner Hendrickx, X
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 07 7154

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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14-10-2003

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 1961036	A	18-06-1970	SE DE	322889 B 1961036 A1	20-04-1970 18-06-1970

US 3613327	A	19-10-1971	NONE		

US 5660020	A	26-08-1997	NZ AU AU	264317 A 684196 B2 3015795 A	29-01-1997 04-12-1997 07-03-1996

GB 410982	A	31-05-1934	NONE		

EPO FORM P0459

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