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10 The invention relates to a frame for form panels according to the preamble of patent claim 1.

Such a frame is known from DE-A 34 29 304. In that reference, the recess for the engagement of a crowbar is arranged in that corner area of the hollow section which is composed by
15 the outer side faces and the face averted from the forming surface, hence by an end web spaced away from the forming surface and the edge web. If such a form panel is set with one side of the frame upon a base, the panel can be raised a little by a crowbar applied to the recess and can be shifted
20 or aligned.

Hollow sections are used as frames for form panels above all if and when the panels are very heavy. If a crowbar is applied to the recess mentioned situated in an outer corner
25 of the hollow section, the forces emanating therefrom are also largely introduced into and therefore are liable to lead to deformation of the edge web serving as a stop and joint to a neighbouring form panel. Therefore unevennesses and the like are apt to be formed and there is even less assurance of
30 tightness when such form panels are joined, at least after they have been aligned and shifted several times with the aid of a crowbar.

The object underlying the invention is therefore to provide a
35 form panel with a frame of the kind mentioned at the outset,

enabling the form panel to be raised with a crowbar without damaging the edge web.

This object is accomplished by the features and measures
5 recited in patent claim 1.

Through this solution, the reaction forces of the crowbar can be kept away from the edge web, because the recess is no longer provided in the corner area but only in the end web
10 and therefore the edge web remains unencumbered by the recess. Hence, instead of providing a depressed and recessed corner area of the hollow section for the application of a jemmy, the corner areas of the hollow section are preserved according to the invention and the recess is arranged between
15 these corner areas and above the corner area at that edge of the edge web which is averted from the forming surface. Therefore this edge web can retain its full width and shape, not that the width of the entire hollow section would have to be enlarged to allow for a recess.

20 Therefore an almost box-shaped hollow section is possible which, at its edge averted from the forming surface, also has corners or like conformations to increase the stiffness. The recess or recesses can be arranged between these, so that the
25 reaction forces applied to the recess(es) can be introduced particularly into the web portion situated above the recess in the position of use and also into the holding web lying above. Particularly if there is a slight elastic flexibility of these web arrangements, the actual edge web remains
30 virtually unencumbered by the reaction forces and does not undergo any permanent deformation. Therefore, even after a crowbar or jemmy has been applied several times, the edge web still butts well against a neighbouring one and affords good tightness therewith.

Developments of the frame with regard to the holding web and recess form the subject matter of claims 2 and 3.

5 The recess or recesses may be bordered and stiffened by an outwardly open recess section which is arranged at an opening of the end web and projects into the interior of the hollow section and the recess section may have a U-shaped, rectangular, trapezoidal, rounded or V-shaped cross section. Hence a crowbar or jemmy finds, in a manner of speaking, a
10 pocket-like recess between the webs of the hollow section which depart at right angles from the forming surface and are approximately horizontal when a crowbar is applied. The forces emanating from this crowbar can be sustained correspondingly well.

15 The recess section may be integrally connected to the web portions and preferably also to the webs of the hollow section or be subsequently welded together with them.

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At the end web provision may be made for a plurality of recesses which are arranged in spaced relationship to one another and are in each case of limited length, or one recess running over the entire length of the respective side of the frame. In the former instance greater stiffness results, in the latter instance simpler production is possible.

Developments of the frame, hollow section and particularly of the recess section as well as the recess itself, form the subject matter of claims 7 to 13. Hence a multitude of possibilities follow as to how to configure the recesses and the webs composing them in such a way that on the one hand the hollow section composing the frame is stable and stiff and on the other hand good engagement for a crowbar is ensured, without the edge web having to be shortened for this purpose and being exposed to strong forces which might permanently deform it in the course of time. Mention is made that the slight distance, which is present between an edge web resting on the ground or on a base and the abutment area in the recess to be acted upon by a jemmy, can be bridged by the selection of an appropriately shaped jemmy or crowbar or by a spacer to be laid next to the edge web, under the crowbar.

Above all the measures of claims 8 and 9 improve the introduction of the forces emanating from a jemmy into the end web and holding web. Particularly stiffening corrugations and the like in the area of the recesses may contribute towards a stiffening better capable of withstanding the forces emanating from a crowbar.

Instead of the recess section lining the recess except for the opening thereof extending outwardly for the insertion of the crowbar, a solution is also possible in which the recesses at the end web are composed by openings traversing this web and passing through into the interior of the hollow section, wherein at least the edge facing the holding web, preferably the entire periphery or all the edges may be reinforced. Through the inner lining of the recess being missing the frame in this manner becomes lighter and more moderate in price.

A frame for formwork panels - to which frame a jemmy can be applied without any difficulty and with protection to the actual edge web when aligning the formwork panel, and wherein additionally the edge web can in an advantageous way retain its maximum width in relation to the overall dimension of the hollow section - results above all from the above-described features and measures being combined singly or severally. Since the reaction forces emanating from the jemmy are introduced particularly into the holding web situated parallel to the edge web, the danger is virtually ruled out of permanent deformation being caused to the edge web of major significance for the tightness of the entire formwork.

The invention with its leading features is described more closely below with reference to the drawing.

The single Figure shows in schematic representation a cross section through one side of a frame of a formwork panel resting on the ground, in that area of the hollow section which is averted from the forming surface the hollow section having above the edge web a recess receding relative to the latter for the application of a jemmy, but the edge

web having its width corresponding to the largest dimension of the hollow section transversely to the forming surface.

A formwork panel designated altogether 1, shown with its lower edge area in cross section, has at the edges of its forming surface 2 a frame designated altogether 3, the individual sides of the frame being composed by a hollow section 4 having a closed cross section. The outermost edge web 5 of this hollow section 4 runs approximately at right angles to the forming surface 2 and in each case composes a stop for the frame 3 or stop of a neighbouring formwork panel or of another formwork element to be adjoined, such as a formwork corner or the like. The edge web 5 is hence to be as level as possible and to be provided with a straight-sided cross section and in the interest of butting well and affording good stiffness it is also to have as great as possible a cross sectional length.

In the exemplified embodiment, one side of the frame is set with this edge web 5 on a base 6 or the like to compose formwork. In order that in this position the formwork panel 1 may be shifted slightly for alignment, in that area of the hollow section 4 which is averted from the forming surface 2 the hollow section 4 has at least one recess 7 which projects into its cross section and serves for the application of a crowbar 8.

The drawing clearly illustrates that this recess 7 is provided adjacent to the outermost edge web 5 in an end web 9 running transversely to the latter, and in relation to that edge or extremity 5a of the edge web 5 which is averted from the forming surface 2 is directed into and recedes into the interior of the hollow section 4.

Consequently the crowbar 8 can engage the recess 7 at a boundary web 10 thereof at the top in this position of use, i.e. the edge web 5 and its edge 5a remain unencumbered by the working end of the crowbar 8. The danger of deformation of the edge web 5 is therefore avoided and the edge web 5 can have its maximum expanse corresponding to the cross sectional width of the hollow section 4.

The hollow section 4 is provided with the edge web 5 and a holding web 11 arranged in spaced relationship thereto, in the exemplified embodiment parallel thereto, and the recess 7 is arranged at or inwrought in the end web 9 of the hollow section 4, the end web 9 running transversely - in the exemplified embodiment at right angles - to these webs 5 and 11. At those opposed extremities or edges 5a, 11a of the edge web 5 and holding web 11, respectively, which are remote from the forming surface 2, the end web 9 has web portions 9a in each case composing corners, the confronting edges 9b of the web portions defining the recess 7.

In the exemplified embodiment, the recess 7 is bordered and stiffened by an outwardly open recess section 12 which is arranged at an opening of the end web 9 and projects into the interior of the hollow section 4. This recess section 12 has a U-shaped and rectangular cross section. However it might also be of trapezoidal, rounded or V-shaped configuration.

In the exemplified embodiment, the recess section 12 is integrally connected to the web portions 9a of the end web 9 and hence also to the remaining webs of the hollow section 4, in a manner appropriate for good transfer of force. The recess section 12 might however also be subsequently welded together with them.

In the exemplified embodiment, the frame 3 is provided with a recess 7 running over the entire length of the respective side of the frame. This configuration lends itself best to being realized with the aid of a recess section 12. However it is also possible that the end web 9 be provided with a plurality of recesses 7 which are arranged in spaced relationship to one another and are in each case of limited length. If these recesses are likewise to be lined with a recess section 12, the latter is to be welded in and provided with end covers or to be formed in by deep-drawing.

The area of the recess section 12 facing the holding web 11 takes the form of a web 10 running in spaced relationship to the holding web 11, in the exemplified embodiment parallel thereto. The clearance between the holding web 11 and this web 10 of the recess section 12 may be equal to or greater than the cross sectional thickness of the webs, e.g. may approximate double the thickness of the webs. Hence, at the edge 11a of the holding web 11 a U shape of cross section is produced, offering a desirably high resistance to the engagement of the crowbar 8 and having a high degree of stiffness in order to be able to sustain the forces arising, without the danger of deformation particularly to the edge web 5.

Since in the exemplified embodiment the recess 7 is arranged centrally and symmetrically between the holding web 11 and the edge web 5, an analogous, approximately groove or U shape of cross section is also produced at the edge 5a of the edge web 5, increasing the stiffness here as well and hence further reducing the danger of deformation.

The stiffness of these edge areas 5a and 11a also depends a little on how long the web 10 of the recess section 12 is. The

greater the length, the more likely are deformations above all to the recess section 12. In the exemplified embodiment, the depth of the recess 7, relative to the end web 9 and the edges 5a and 11a averted from the forming surface 2, is therefore approximately half as large or even a little less than the distance between holding web 11 and edge web 5. In the exemplified embodiment, this depth of the recess 7 approximates a third of the distance between holding web 11 and edge web 5.

The clearance between the holding web 11 and the web 10 adjacent thereto of the recess section 12 might be filled at least in areas. By way of example, stiffening webs or stiffening corrugations might be provided at one or both webs 10 and 11. Knob-like deformations might also bring about a mutual support of webs 10 and 11 and hence a stiffening of the edge area 11a acted upon by the crowbar 8.

In the exemplified embodiment, the cross sectional length of the edge web 5, starting from the back of the forming surface 2, hence without the portion extending over the narrow cant of the forming surface 2, is equal to the cross sectional length of the holding web 11. The two corner areas of the hollow section 4 which are situated at the edges or extremities 5a, 11a of these webs 5 and 11, respectively, are hence arranged equidistantly from the forming surface 2. Owing to the recess 7 being arranged independently of the edge web 5, however, it would even be possible that this cross sectional length of the edge web 5 be made larger than that of the holding web 11 and then the corner area formed with the edge web 5 is at a greater distance from the forming surface 2 than the corner area at the holding web. Therefore in any case the edge web 5 can be furnished with a width or cross sectional length such as is desirable for

tight and accurate butting against a neighbouring formwork panel or against another formwork element to be adjoined. Nevertheless, it is possible for such a formwork panel 1 having an edge web 5 standing on a base 6 to be aligned without any difficulty with the aid of a jemmy 8, it being avoided that this jemmy 8 engages the edge web 5 owing to the recess 7 then situated at a higher level in the position of use.

Mention is made that at least one of the corner areas, hence the transition from the holding web 11 to the end web 9 and/or the transition from the edge web 5 to the end web 9, may be bevelled or rounded off, if this were to be necessary for reasons of stability or for other reasons such as the attachment of appropriate clamps when joining the frames 3 of adjacent formwork panels or the like.

Furthermore, an altogether rounded transition from the holding web 11 and/or edge web 5 into the recess section 12 may be provided, i.e. the end web 9 or portions 9a thereof may be of arch-shaped configuration.

Finally, a further development or modification would be possible to the effect that the recess section 12 is missing and the recesses 7 at the end web 9 are composed by openings which traverse this web and pass through into the interior of the hollow section 4, i.e. through holes, wherein at least the edge 9b facing the holding web 11, but preferably the entire periphery or all the edges might be reinforced, e.g. by welded on additional webs. Reinforcing webs engaged inwardly might also bound and stiffen such an inwardly open recess 7.

The frame 3 of a formwork panel 1 is composed by a hollow section 4 preferably having a closed cross section, the cross section of this hollow profile 4 essentially corresponding approximately to a rectangle. Adjacent to the outermost edge web 5 of this hollow section 4, but without detracting from the length or width of this edge web 5, there is at least one recess 7 provided at a portion of the section or at an end web 9 running transversely to this edge web 5, to which recess a jemmy 8 can be applied when the edge web 5 is standing on a floor area 6 or the like. Hence, in spite of the hollow section 4 having such a recess 7 serving for engagement of a jemmy 8, the edge web 5 can be of its maximum width and is optimally protected against deformation by the jemmy 8. Therefore, even after lengthy use, the edge web 5 is preserved as an essentially level and undeformed stop for a neighbouring formwork element.

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CLAIMS:

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1. A frame (3) for form panels (1), the frame (3) being composed by hollow sections (4) which run along the edges of a forming surface (2) or form panel, the outermost edge web (5) thereof running approximately at right angles to the forming surface (2) and in each case composing a stop for the frame (3) or stop of a neighbouring form panel (1) or the like, wherein in that area of the hollow section (4) of the frame (3) which is averted from the forming surface (2) the hollow section (4) has at least one recess (7) which projects into its cross section, the recess(es) (7) of the hollow section (4) is (are) provided adjacent to the outermost edge web (5) in an end web (9) running transversely to said edge web (5), and in relation to that edge or extremity (5a) of the edge web (5) which is averted from the forming surface (2) is (are) directed into or recede(s) into the interior of the hollow section (4), wherein the hollow section (4) has a closed cross section and the recess (7) or recesses for the application of a crowbar (8) or the like is (are) bordered and stiffened by an outwardly open recess section (12) which is arranged at an opening of the end web (9) and projects into the interior of the hollow section (4), and wherein provision is made for the edge web (5) and a holding web (11) arranged in spaced relationship thereto, .



characterized in that the recess(es) (7) is (are) arranged or is (are) incorporated on or in the end web (9) of the hollow section (4), said end web (9) running transversely to said webs (5, 11), that at those opposed extremities or edges (5a, 11a) of the edge web (5) and holding web (11) which are remote from the forming surface (2) the end web (9) has corner forming web portions (9a), the confronting edges (9b) of said web portions defining the recess(es) (7).

2. A frame as claimed in claim 1, characterized in that the holding web (11) is arranged parallel to the edge web (5).
3. A frame as claimed in claim 1 or claim 2, characterized in that the recess(es) (7) run at right angles to said holding webs and edge webs (5, 11).
4. A frame as claimed in any one of claims 1 to 3, characterized in that the recess (7) or recesses are bordered and stiffened by an outwardly open recess section (12) which is arranged at an opening of the end web (9) and projects into the interior of the hollow section (4) and the recess section (12) has a U-shaped, rectangular, trapezoidal, rounded or V-shaped cross section.
5. A frame as claimed in any one of claims 1 to 4, characterized in that the recess section (12) is integrally connected to the web portions (9a) and preferably also to the webs of the hollow section (4) or is subsequently welded together with them.
6. A frame as claimed in any one of claims 1 to 5, characterized in that at the end web provision is made for a plurality of recesses which are arranged in spaced relationship to one another and are in each case of



limited length, or one recess (7) running over the entire length of the respective side of the frame.

7. A frame as claimed in any one of claims 1 to 6,
5 characterized in that the area of the recess section (12) facing the holding web (11) takes the form of a web (10) running in spaced relationship to the holding web (11), particularly parallel thereto, and that the clearance between the holding web (11) and said web (10) of the
10 recess section (12) is equal to or greater than the thickness of the webs, e.g. approximates double the thickness of the webs.
8. A frame as claimed in any one of claims 1 to 7,
15 characterized in that the recess(es) is (are) arranged centrally and preferably symmetrically between the holding web (11) and the edge web (5).
9. A frame as claimed in any one of claims 1 to 8,
20 characterized in that the depth of the recess (7), relative to the end web (9) and those edges (5a, 11a) of the edge web (5) and/or of the holding web (11) which are remote from the forming surface (2), approximates half or a third of the distance between holding web (11) and edge
25 web (5).
10. A frame as claimed in any one of claims 1 to 9,
characterized in that the clearance between the holding web (11) and the web (10) adjacent thereto of the recess
30 section (12) is filled at least in areas, e.g. by stiffening webs, stiffening corrugations or the like of one of the two or of both webs.
11. A frame as claimed in any one of claims 1 to 10,
35 characterized in that the cross sectional length of the



edge web (5), starting from the back of the forming surface (2), is equal to or greater than the cross sectional length of the holding web (11) and the two corner areas of the hollow section (4) which are situated at the edges or extremities (5a, 11a) of said webs (5, 11) are arranged equidistantly from the forming surface (2) or the corner area formed with the edge web is at a greater distance from the forming surface than the corner area at the holding web.

12. A frame as claimed in any one of claims 1 to 11, characterized in that at least one of the corner areas, hence the transition from the holding web (11) to the end web (9) and/or the transition from the edge web (5) to the end web (9) is bevelled or rounded off.

13. A frame as claimed in any one of claims 1 to 12, characterized in that a rounded transition from the holding web and/or edge web (5) into the recess section (12) is provided.

14. A frame as claimed in any one of the preceding claims, characterized in that the recesses (7) at the end web (9) are composed by openings which traverse said web and pass through into the interior of the hollow section, wherein at least the edge facing the holding web (11), preferably the entire periphery or all the edges may be reinforced.



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