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A Clamp for Connecting Formwork Panels

5 The invention relates to a clamp for connecting
formwork panels which are arranged side by side in a
plane and have peripheral edge sections, particularly
10 hollow sections, the clamp including two gripping jaws
which are adapted to be swivelled against and urge
together the longitudinal faces of the abutting edge
sections facing away from one another, and further
including an actuating member for swivelling said
gripping jaws, the gripping jaws in each case having, at
15 the end away from their clamping point an adjusting arm
oriented at an angle thereto, said adjusting arms of the
two gripping jaws being directed towards one another and
both gripping jaws being swivel-mounted on a bracket
approximately in the corner region of the two adjusting
arms of said jaws.

20 Such clamps for connecting in particular large
formwork panels are known in various embodiments.
German Patent Specification No. 27 59 966 shows a clamp
in which the clamping arms can be drawn towards each
other and braced not in a swivelling manner but by a
25 member traversing both the adjusting arms.

A clamp of the kind mentioned at the outset is
known from European specification No. 0 201 887, in
which the two gripping jaws have a common joint and the
two adjusting arms are adapted to be swivelled relative
30 to one another by a bolt traversing them. The joint is
disposed in a corner at the transition of one gripping
jaw to the adjusting arm thereof. Therefore, when being
adjusted, the two gripping jaws are subjected to
different lever arms and a uniform transfer of force
35 which can be utilized for aligning the two edge sections
to be connected is not ensured. It is true that this
prior publication also presents a solution with
symmetrically disposed clamping jaws each having a
swivel joint of its own, however the adjustment is
40 provided for by way of a nut adjustable through a bolt.
Apart from the unwanted use of a thread in the region of
concrete placement, this also leads to friction and wear
at the adjusting arms and additionally to increased
manufacturing expenditure during assembly. In addition
45 to this the use of a thread for adjusting the clamping
arms signifies increased expenditure of time until a
sufficiently large adjusting path and a clamping force
of sufficient magnitude have been produced.

The invention has, therefore, the object of
50 providing a clamp of the kind mentioned at the outset,
which is simple in design, enables the formwork panels
to be aligned at the same time as they are connected and
can be positioned for use and removed again very
quickly. It must nevertheless be possible for the
55 clamping forces and above all the adjusting movements to
be applied as uniformly as possible to the two gripping

jaws, substantially symmetrically to the dividing line between the two formwork panels.

5 This object is accomplished in that the ends of the two adjusting arms overlap and that in the region of their overlap the two adjusting arms are both jointly engaged by an eccentric, the pivot and swivel bearing of the latter being slidable perpendicular to the forming surface. If the common eccentric is twisted, the adjusting arms are hence swivelled and at the same time
10 a corresponding reactive force is applied in the direction of the elongate hole, hence perpendicular to the forming surface. Therefore the bracket is simultaneously urged against the outsides of the edge sections and can align them to one another. It is of
15 advantage that a single rotary motion of the eccentric is sufficient immediately to achieve the desired bracing or, conversely, release motion. This is effected most suitably by the eccentric being connected, preferably integrally connected, to an actuating lever. A
20 twistable spindle with a corresponding pivot bearing and adjustable nut or similar elaborate machine parts are avoided in a simple way.

It is of advantage for the desired alignment of the two formwork panels if the bracket for accommodating the
25 adjusting or swivel arms and the joints as well as the eccentric, has a stop surface directed towards the sections to be braced, said stop surface extending parallel to the forming surface and to the webs of the hollow sections facing away from the forming surface.
30 It is particularly convenient if this cross member accommodating the bearings or joints of the gripping jaws has a U-shaped cross section, the crossbar of the U facing the edge sections to be connected and aligned, and forming the stop and alignment surface. The U-shape
35 has the advantage that the adjusting arms can be arranged in the interior of this cross member and their swivel joints can be mounted on the two sides of the U, hence at both sides. In addition, a good rigidity and stability of this bracket is thereby produced, the
40 latter performing the triple function of accommodating the swivel bearings for the clamping jaws and adjusting arms, enabling the mounting of the eccentric in an elongated hole and forming an alignment surface for the edge sections.

45 Developments of the invention form the subject matter of further claims.

An eccentric clamp in which the eccentricity of a single eccentric disc is utilized to swivel two separately swivel-mounted clamping jaws simultaneously and uniformly by a single rotary motion of the
50 eccentric, without elaborate bolted connections being necessary, is due above all to the combination of individual or several of the features and steps described above and recited in the further claims. It
55 is furthermore of advantage that the reactive force present at the mounting of the eccentric during the

swivel motion into the clamping position can be utilized for aligning the formwork panels.

The invention with its essential features is described in more detail below in one exemplified embodiment, with the aid of the drawings in which, in

Fig. 1 is a top view of a clamp according to the invention, the clamp being in the open position but prepared for bracing two abutting, hollow, edge sections of two coplanar formwork panels (not shown),

Fig. 2 is a view corresponding to Fig. 1, after the clamp has been closed and braced, and

Fig. 3 is a rear view of the clamp according to arrow A in Fig. 2.

A clamp denoted altogether as 1 serves to connect formwork panels which are arranged side by side in a plane and have peripheral edge sections 2, in the exemplified embodiment hollow sections, Figs. 1 and 2 showing only these hollow sections 2 without the forming surfaces to be applied to them.

The clamp 1 has in each case two gripping jaws 3 which are adapted to be swivelled against and urge together the longitudinal faces 2a of the abutting edge sections 2 which face away from one another, and an actuating member yet to be described for this swivel motion of the gripping jaws 3. The gripping jaws 3 in each case have at the end away from the clamping point 3a, an adjusting arm 4 oriented at an angle thereto, the adjusting arms 4 of the two gripping jaws 3 being directed towards each other. Both gripping jaws 3 are swivel-mounted on a common bracket 5 approximately in the corner area at the transition to their arms 4. The swivel joints 6 are clearly visible above all in Figs. 1 and 2.

It becomes clear with reference to Fig. 3 that the ends of the two adjusting arms 4 overlap, these arms 4 in each case being formed by superposed flat elements 4a capable of engaging into and over one another. In the region where the two adjusting arms 4 overlap, both are jointly engaged by an eccentric 7 with the aid of its pivot pin 7a which is slidable in an elongate hole 8 in the bracket 5 perpendicularly to the forming surface (not shown). The eccentric disc 7 proper is supported as it twists against the bracket 5 and against a cross bar 5a yet to be described.

The gripping jaws 3 and their adjusting arms 4 are in each case approximately at right angles to each other and the adjusting arms 4 are oriented approximately in the direction in which the bracket 5 extends. The bracket 5 serving to accommodate the adjusting or swivel arms 4 and the joints 6 as well as the eccentric 7, has a stop surface 9 directed towards the sections 2 to be

braced, the stop surface extending parallel to the forming surface and to the webs 2b of the hollow sections 2 facing away from the forming surface, and in the exemplified embodiment is disposed on the outside of the cross bar 5a.

In order to form the clamping points 3a, the gripping jaws 3 have projections fitting into corresponding depressions 10 of the hollow sections 2, which projections and depressions 10 have angular surfaces for drawing the stop surface 9 of the cross member 5 and of its cross bar 5a against the hollow sections 2 in a manner known per se. Bracing the clamp 1 therefore also brings about in an advantageous way an exact alignment of the edge webs or edge brackets 2 of the formwork panels to be connected and forming surfaces thereof.

According to Fig. 3, the cross member 5 accommodating the swivel bearings 6 of the gripping jaws 3 has a U-shaped cross section, the cross bar 5a of the U facing the edge sections 2 to be connected and forming or presenting the stopping and aligning surface 9.

It is evident in all three Figures that the eccentric 7 is connected - in the exemplified embodiment integrally so - to an actuating lever 11. It is therefore possible for the entire clamp to be very simply operated by swinging this actuating lever 11 from the position evident in Fig. 1 into that shown in Fig. 2.

When the gripping jaws 3 are open (Fig. 1), this actuating lever 11 disposed on the eccentric disc 7 is situated approximately parallel to the forming surface and approximately at right angles to the gripping jaws 3, while the area of the greatest eccentricity of the eccentric disc 7 is arranged on a line extending approximately at right angles to the actuating lever 11 and also roughly in the direction in which the elongate hole 8 is oriented.

The length of the elongate hole 8 for the bearing pin 7a of the eccentric 7 corresponds at least to the greatest eccentricity of the eccentric 7, in order that the forced shift of its bearing pin 7a as the eccentric disc 7 twists and thereby the swivel motion of the adjusting arms and clamping jaws 3 can take place in an unhindered way. The eccentricity of the eccentric disc 7 and the length of the elongate hole 8 for the swivel pin 7a of the eccentric 7 are dimensioned such that in the closed position (Fig. 2) the two adjusting arms 4 of the gripping jaws 3 together form an obtuse angle between that side of said arms which faces the forming surface, while in the open position such an obtuse angle is formed exactly to the other side. Therefore during bracing a dead centre is passed and self-locking of the closed position is achieved.

Given the highly accurate, symmetrical application of force, which not only urges together but also aligns the two edge sections 2, the entire operation of the

clamp can nevertheless be carried out very simply and above all quickly, both when fixing and releasing it.

5 The configuration and arrangement, according to the invention of the clamp 1, the joints 6 thereof and the eccentric having its bearing pin 7a in a slidable condition disposed centrally inbetween and parallel to the two joints 6 has a further advantage. This advantage consists in that the path of swing of the eccentric lever lies in an area of a circular segment away from the formwork and the edge webs 2 and in a plane extending perpendicularly to the formwork. Therefore this movement of the eccentric lever 11 takes place very conveniently and without hindrance due to the formwork, both when closing and when opening the clamp 1.

15 Mention is made that the swivel pin 7a of the eccentric 7 does not necessarily have to be guided in an elongate hole 8, but is already guided exactly enough transversely to the direction of the forming surface through the attachment to the two adjusting arms 4 in their overlapping area. It is of importance only that the eccentric 7 with its swivel pin 7a or suchlike shaft engages both adjusting arms 4 in the region of overlap and the outer periphery of the eccentric rests against that side of the cross bar 5a of the bracket 5 which faces away from the hollow sections 2. Through the increasing distance of the outer periphery of the eccentric 7 from its swivel pin 7a, the movement of the swivel pin 7a relative to the cross bar 5a and thereby the swivel motion of the adjusting arms 4 is thus brought about by the twisting of the eccentric 7.

Claims

1. A clamp (1) for connecting formwork panels which are arranged side by side in a plane and have peripheral edge sections (2), particularly hollow sections or the like, the clamp (1) including two gripping jaws (3) which are adapted to be swivelled against and urge together the longitudinal faces (2a) of the abutting edge sections (2) facing away from one another, and further including an actuating member (7, 11) for swivelling said gripping jaws (3), the gripping jaws (3), in each case, having at the end away from their clamping point (3a) an adjusting arm (4) oriented at an angle thereto, said adjusting arms (4) of the two gripping jaws (3) being directed towards one another and both gripping jaws (3) being swivel-mounted on a bracket (5) approximately in the corner region of the two arms (4) of said jaws, c h a r a c t e r i z e d in that the ends of the two adjusting arms (4) overlap and that in the region where the two adjusting arms (4) overlap both are jointly engaged by an eccentric (7), the pivot and swivel bearing (7a) of the latter being slidable perpendicular to the forming surface.
2. A clamp according to claim 1, characterised in that the adjusting arms are in each case formed by superposed flat elements (4a) in each case engaging over and under one another in the overlapping area.
3. A device according to claim 1 or 2, characterised in that the gripping jaws (3) and adjusting arms (4) thereof are approximately at right angles to one another and the adjusting arms (4) are oriented approximately in the direction in which the bracket (5) extends.
4. A clamp according to any one of claims 1 to 3, characterised in that the bracket (5) serving to accommodate the adjusting or swivel arms (4) and the joints (6) as well as the eccentric (7), has a stop surface (9) directed towards the sections (2) to be braced, said stop surface extending parallel to the forming surface and to the webs (2b) of the hollow sections (2) facing away from the forming surface and in particular being disposed on the outside of a cross bar (5a).
5. A clamp according to any one of claims 1 to 4, characterised in that the gripping jaws (3) have projections fitting into corresponding depressions (10) of the hollow sections (2), and that said projections and the depressions (10) preferably have angular surfaces for drawing the stop surface (9) of the cross member (5) of the clamp against the hollow sections (2).
6. A clamp according to any one of claims 1 to 5, characterised in that the cross member (5) accommodating



the swivel bearings (6) of the gripping jaws (3) has a U-shaped cross section, the cross bar (5a) of the U facing the edge sections (2) to be connected and forming the stopping and aligning surface (9).

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7., A clamp according to any one of claims 1 to 6, characterised in that the eccentric (7) is connected, preferably integrally connected, to an actuating lever (11).

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8. A clamp as claimed in any one of claims 1 to 7, characterised in that when the gripping jaws (3) are open the actuating lever (11) disposed on the eccentric disc (7) is arranged approximately parallel to the forming surface and approximately at right angles to the gripping jaws (3) and that the area of the greatest eccentricity of the eccentric disc (7) is arranged on a line extending approximately at right angles to the actuating lever (11).

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9. A clamp according to any of claims 1 to 8, characterised in that the pivot and swivel bearing (7a) is guided in an elongate hole (8) arranged in the bracket (5) and the length of the elongate hole (8) for the bearing pin (7a) or the like of the eccentric (7) preferably corresponds at least to the greatest eccentricity of the eccentric (7).

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10. A clamp according to any one claims 1 to 9, characterised in that the eccentricity of the eccentric disc (7) and the length of the elongate hole (8) for the swivel pin (7a) of the eccentric (7) are of such a size that in the closed position the two adjusting arms (4) of the clamping jaws (3) together form an obtuse angle on that side of said arms which faces the forming surface.

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11. A clamp according to any one of the preceding claims, characterised in that the eccentric (7) with its swivel pin (7a) or suchlike shaft engages both adjusting arms (4) in the region of overlap and the outer periphery of said eccentric rests against or is operative at that side of the cross bar (5a) of the bracket (5) which faces away from the hollow sections (2).

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