FORM CLAMP TO JOIN PANELS, IN PARTICULAR, CEMENT CASTING FORMS

Form clamp to join panels in particular for cement casting forms, of the type comprising a stout structure equipped with means of hooking to the respective extremities of the form panels, involving clamping means which tend to bring together the respective hooking means and including a small partial ledge block (1') for at least one surface of the panels to be clamped (B, B'), arranged near a said hooking means (1).
<table>
<thead>
<tr>
<th>Code</th>
<th>Country</th>
<th>Code</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>Austria</td>
<td>ES</td>
<td>Spain</td>
</tr>
<tr>
<td>AU</td>
<td>Australia</td>
<td>FI</td>
<td>Finland</td>
</tr>
<tr>
<td>BB</td>
<td>Barbados</td>
<td>FR</td>
<td>France</td>
</tr>
<tr>
<td>BE</td>
<td>Belgium</td>
<td>GA</td>
<td>Gabon</td>
</tr>
<tr>
<td>BF</td>
<td>Burkina Faso</td>
<td>GB</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>BG</td>
<td>Bulgaria</td>
<td>HU</td>
<td>Hungary</td>
</tr>
<tr>
<td>BJ</td>
<td>Benin</td>
<td>IT</td>
<td>Italy</td>
</tr>
<tr>
<td>BR</td>
<td>Brazil</td>
<td>JP</td>
<td>Japan</td>
</tr>
<tr>
<td>CA</td>
<td>Canada</td>
<td>KP</td>
<td>Democratic People's Republic</td>
</tr>
<tr>
<td>CF</td>
<td>Central African Republic</td>
<td>KR</td>
<td>Republic of Korea</td>
</tr>
<tr>
<td>CG</td>
<td>Congo</td>
<td>LI</td>
<td>Liechtenstein</td>
</tr>
<tr>
<td>CH</td>
<td>Switzerland</td>
<td>LK</td>
<td>Sri Lanka</td>
</tr>
<tr>
<td>CM</td>
<td>Cameroon</td>
<td>LU</td>
<td>Luxembourg</td>
</tr>
<tr>
<td>DE</td>
<td>Germany, Federal Republic of</td>
<td>MC</td>
<td>Monaco</td>
</tr>
<tr>
<td>DK</td>
<td>Denmark</td>
<td>MG</td>
<td>Madagascar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ML</td>
<td>Mali</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR</td>
<td>Mauritania</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MW</td>
<td>Malawi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NL</td>
<td>Netherlands</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO</td>
<td>Norway</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RO</td>
<td>Romania</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>Sudan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SE</td>
<td>Sweden</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SN</td>
<td>Senegal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SU</td>
<td>Soviet Union</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TD</td>
<td>Chad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TG</td>
<td>Togo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US</td>
<td>United States of America</td>
</tr>
</tbody>
</table>
Form clamp to join panels, in particular, cement casting forms

The subject of the present invention is a form clamp to join panels, in particular, cement casting forms.

Clamps to join panels for cement casting forms are known, and generally consist of a bar equipped with hooking means at the respective extremities having opposed pegs on corresponding crosspiece on the form panels, comprising clamping means which tend to "pull" the respective hooking orthogonally with the evident inconvenience of necessitating further means of clamping to unite the respective form panels at the edges.

These types of clamps further present the following disadvantages:

(1) imperfect adaption to the form panels because:
- either they are in complete contact and therefore internal cocking occurs if the panels are not perfectly flat or are not of regular thickness as the same ledge of the clamp determines an external alignment instead of an internal one;
- or they are not in contact, and therefore the clamping may take place in an alignment position which is not desired.

(2) the impossibility of a valid solution for internal and external corner jointings.

The scope of the present invention is to eliminate the above-mentioned inconveniences.

The present invention, as per the characteristics given in the attached claims, solves the problem with a clamp of the type
having a straight, curved or angled support bar, comprising two
opposed pairs of fork-type hooking plates on respective opposed
pegs of a crosspiece of each panel to be connected to make up a
form, where:

- the said pair of fork-type plates presents a hollow configuration
so as to determine a slanted reaction, not orthogonal converging to
an apex between the two pairs of forks, in order to also realize a
respective opposed effect parallel to the panels to be clamped;

- at least one fork can be moved by clamp against the opposed one;

- said support bar is equipped with partial ledge contact means for
at least one surface of the panels to be clamped, arranged near one
of said fork-type hooking means.

The advantages obtained with this innovation consist
essentially in that a perfect alignment of the respective internal
surface (form surface) is possible, even though ledges for both the
panels to be clamped are available.

According to the invention, the respective clamps
conveniently present a straight, curved or an internal or external
angle configuration (e.g. internal or external right angle),
according to the alignment condition required. The advantage of
being able to make any type of panel connection is thus obtained.

In accordance with the characteristics of the invention, said
hooking means consist in:

- a first pair of hooking plates which protrude transversally and
are directly fastened to an extremity in a fixed position on the stout
structure supporting the clamp;
- a second pair of hooking plates which protrude transversally, freely balanced and pivoted at the opposite extremity of the stout structure supporting the clamp, in such a manner that a part of the hook protrudes from the same side as the first ones and a part from the opposite side where they are pivoted on a screw head, the threaded part of which passes through a drilled hole in a plate fixed to the adjacent side of said stout supporting structure.

This solution has the advantage of realizing a highly reliable clamping system which is effective, of simple and dependable conception as well as being economical and easily realized in the various straight, curved or internal or external angle configurations, depending on the respective alignments required.

In an alternative solution, the movement of at least one fork is obtained by cuneiform means of shifting which substitutes said screw means.

In another alternative form of realization, the movement of at least one fork is obtained without hinge constraint through fastening blocks for the respective shifting into position.

The invention is hereafter explained in more detail with assistance of the drawings showing the preferential solutions for realization, the execution details of which are not to be held as limiting but only as examples.

Figure 1 gives a prospect view of the connection system for two panels with a clamp for straight line connection.
Figure 2 gives a prospect view of the connection system for two panels with a clamp for right-angled, external connection.

Figure 3 gives a prospect view of the connection system for two panels with a clamp for right-angled, internal connection.

As can be seen from the above-mentioned figures, the clamps are indicated by A and the panels to be joined by B,B'. Each clamp presents a stout, straight (Fig. 1), curved (not illustrated), or right-angled structure with hookings orientated inwards (Fig. 2), or with hookings orientated outwards (Fig. 3). The stout structures present at least one supporting block (1") on a respective panel to be joined (B,B') and; the external end part of the pair to the hooking is pivoted on the head (4) of a "T"-shaped screw (5), which while a pair of hooking plates is fixed and welded (1) at a respective extremity of the clamp's stout structure for corresponding pegs (b) of the panel of the form (B,B'), an end plate with a drilled hole (1') is welded at the other extremity. A pair of oscillating, balance-type hooking plates (2) is pivoted (3) near this end plate (1'); the external end part of the pair to the hooking is pivoted on the head (4) of a "T"-shaped screw (5), which passes through said hole of said end plate (1') to be stretch-clamped by wing nut (6).
CLAIMS

1. Form clamp to join panels in particular for cement casting forms, of the type having a support bar and comprising two opposed pairs of fork-shaped hooking plates on respective opposed pegs on a crosspiece of each panel to be connected to make up a form, characterized by the fact that:
- said opposed pairs of fork-shaped hooking plates (1,2) present a hollow configuration in order to realize a slanted reaction, not orthogonal converging to an apex between the two pairs of forks so as to also realize a respective opposed effect parallel to the surface of the panels to be clamped (B);
- at least one fork is movable by clamp against the opposed one (2)
- said support bar or stout structure (A) is equipped with partial ledge contact means (1") on at least one surface of the panels to be clamped (B,B'), arranged near one of said fork-type hooking means (1,2).

2. Form clamp to join panels in particular for cement casting forms, as per claim 1, characterized by the fact that the respective clamps comprise a straight, stout, supporting structure (A).

3. Form clamp to join panels in particular for cement casting forms, as per claim 1, characterized by the fact that the respective clamps comprise a curved, stout, supporting structure (A).

4. Form clamp to join panels in particular for cement casting forms, as per claim 1, characterized by the fact that the respective clamps comprise an angled, stout, supporting structure (A) with corresponding hooking means orientated inwards.
5. Form clamp to join panels in particular for cement casting forms, as per claim 1, characterized by the fact that the respective clamps comprise an angled, stout, supporting structure (A) with corresponding hooking means orientated outwards.

6. Form clamp to join panels in particular for cement casting forms, as per claim 1, characterized by the fact that the respective clamps comprise:

- a stout, supporting structure (A);
- a first pair of hooking plates which protrude transversally fixed directly to an extremity in fixed position on the stout, supporting structure of the clamp (1);
- a second pair of hooking plates which protrude transversally (2), freely balanced and pivoted at the opposite extremity of the stout, supporting structure of the clamp (3), in such a manner that a part of the hook protrudes from the same side as the first ones, and a part from the opposite side where they are pivoted on a screw head (4), the threaded part of which passes through a drilled hole in a plate fixed to the adjacent side of said stout, supporting structure (1').

7. Form clamp to join panels in particular for cement casting forms, as per claim 1, characterized by the fact that the respective clamps comprise:

- a stout structure which presents at least one supporting block (1") on a respective panel to be joined (B,B') and while a pair of hooking plates is fixed and welded (1) at a respective extremity of the clamp's stout structure for corresponding pegs (b) of the panel
of the form (B,B'), an end plate with a drilled hole (1') is welded at
the other extremity. A pair of oscillating, balance-type hooking
plates (2) is pivoted (3) near this end plate (1'); the external end
part of the pair to the hooking is pivoted on the head (4) of a "T"-
shaped screw (5), which passes through said hole of said end plate
(1') to be stretch-clamped by wing nut (6).

8. Form clamp to join panels in particular for cement casting
forms, as per claim 1, characterized by the fact that said mobile,
fork-shaped hooking means (2) are moved by wedge-shaped
moving means.

9. Form clamp to join panels in particular for cement casting
forms, as per claim 1, characterized by the fact that said mobile,
fork-shaped hooking means are both mobile.

10. Form clamp to join panels in particular for cement casting
forms, as per claim 1, characterized by the fact that said fork-
shaped hooking means are mobile by sliding along the respective
support bar (A) without pivoting means and fixed thereto by
opposed blocks.
**INTERNATIONAL SEARCH REPORT**

**I. CLASSIFICATION OF SUBJECT MATTER**

According to International Patent Classification (IPC) or to both National Classification and IPC

**IPC**

| B 28 B 7/00, E 04 G 17/04 |

**II. FIELDS SEARCHED**

<table>
<thead>
<tr>
<th>Classification System</th>
<th>Classification Symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPC</td>
<td>B 28 B, E 04 G</td>
</tr>
</tbody>
</table>

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched

**III. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of Document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to Claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>EP, A, 0201887 (HUNNEBECK GmbH) 20 November 1986 see the whole document</td>
<td>1-4</td>
</tr>
<tr>
<td>Y</td>
<td>US, A, 2526529 (A. ARRIGHINI) 17 October 1950 see the whole document, esp. figure 4</td>
<td>5,8-10</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>6,7</td>
</tr>
<tr>
<td>X</td>
<td>DE, U, 8514233 (HUNNEBECK GmbH) 10 April 1986 see the whole document</td>
<td>1-4</td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td>5,8-10</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>6,7</td>
</tr>
<tr>
<td>Y</td>
<td>FR, A, 2527254 (J. RICARD) 25 November 1983 see the whole document</td>
<td>5,8-10</td>
</tr>
</tbody>
</table>

---

* Special categories of cited documents:
- **X** document defining the general state of the art which is not considered to be of particular relevance
- **A** document defining the general state of the art which is not considered to be of particular relevance
- **E** earlier document but published on or after the international filing date
- **L** document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- **O** document referring to an oral disclosure, use, exhibition or other means
- **P** document published prior to the international filing date but later than the priority date claimed

**IV. CERTIFICATION**

Date of the Actual Completion of the International Search: 26th June 1989

Date of Mailing of this International Search Report: 20. 07. 89

International Searching Authority

**EUROPEAN PATENT OFFICE**

Signature of Authorized Officer

**P.C.G. VAN DER PUTTE**
This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 11/07/89. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DE-A- 3517307</td>
<td></td>
</tr>
<tr>
<td>US-A- 2526529</td>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>DE-U- 8514233</td>
<td>27-02-86</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>FR-A- 2527254</td>
<td>25-11-83</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>DE-A- 3609498</td>
<td>24-09-87</td>
<td>DE-A- 3545426</td>
<td>02-07-87</td>
</tr>
<tr>
<td>US-A- 1538496</td>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>DE-A- 3517304</td>
<td>20-11-86</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>DE-A- 3530854</td>
<td>05-03-87</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>DE-A- 3545273</td>
<td>25-06-87</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>DE-A- 2816082</td>
<td>25-10-79</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>US-A- 1454502</td>
<td></td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

For more details about this annex: see Official Journal of the European Patent Office, No. 12/82