The invention resides in an alignment device able to align substantially vertical starter bars for a masonry block wall, the alignment device comprising a plurality of spacer arms spaced a predetermined distance from each other and a plurality of attachment members attached to respective spacer arms, the attachment members able to be operatively attached to the vertical starter bars.
This invention relates to an alignment device. In particular, the invention relates to an alignment device for starter bars for masonry block walls.

The use of masonry blocks walls in construction is very popular. In order to construct a masonry block wall that has the necessary structural strength, the masonry block wall must be tied to an associated foundation or footing. When the foundation or footing for a masonry block wall is being prepared, reinforcing bars are placed in the footing. These reinforcement bars (known as starter bars) protrude from the concrete footing and are required to engage the masonry block wall. However, the starter bars are often not placed in the correct location in relation to the cavity in the masonry blocks of the masonry block wall.

Misaligned starter bars are a huge problem for a block layer. The block layer is often unable to bend or adjust the incorrectly placed starter bars coming out from the concrete footing. Accordingly, the starter bars are not in their correct position and do not line up with the vertical reinforcing bars that are placed in the masonry block wall. The starter bars being out of position and not aligning with the vertical reinforcing bars in the masonry block wall during wall construction will result in the wall not meeting the structural capacity as detailed in the engineering specification for the wall. In a worst case scenario, the entire wall, including the footing, will need to be demolished and rebuilt at substantial cost.

The majority of reinforced masonry block walls require starter bars (and vertical reinforcing bars) to be generally used at 400mm intervals along the wall. The problem of misaligned starter bars is therefore a considerable inconvenience to the block layer because of the large number of starter bars in each wall construction.
OBJECT OF THE INVENTION

It is an object of the invention to overcome or at least alleviate one or more of the above disadvantages and/or provide the consumer with a useful or commercial choice.

SUMMARY OF THE INVENTION

In one form, although not necessarily the only or broadest form, the invention resides in an alignment device able to align substantially vertical starter bars for a masonry block wall, the alignment device comprising:

- a plurality of spacer arms spaced a predetermined distance from each other; and
- a plurality of attachment members attached to respective spacer arms, the attachment members able to be operatively attached to the vertical starter bars.

Preferably there are at least three or more spacer arms. The spacer arms are normally equally spaced from each other.

The spacer arms may be interconnected by at least one connector rail. Typically, there are two connector rails.

The spacer arms may be removably attached to the at least one connector rail. Alternatively, the spacer arms may be integrally formed with the connector rail.

Typically, the spacer arms are relatively linear. However, it should be appreciated that the spacer arms may be non-linear.

Similarly, the at least one connector rail is relatively linear.

However, it should be appreciated that the at least one connector rail could be non-linear.

The attachment members are preferably in the form of a clip. However, other forms of attachment members may be suitable, such as clasp, buckle, catch, clamp, clench, clinch, fastening, grapple, hook, pin or a snap.

The attachment members may be removably attached or fixed to respective spacer arms.
One or more supports may form part of the alignment device to ensure that the spacer arms are held at a desired position. Typically, there are a plurality of supports. More preferable there are at least three supports. The supports may be connected or tied to a spacer arm and/or a connector rail.

Each support may include a holder and at least one leg. The holder may operatively support the spacer arms. The holder may engage and/or position and/or align a spacer arm and/or a connecting rail. The holder may include holder members to engage and/or align a spacer arm or a connecting rail.

The leg may be removably attached to the holder. The leg may be movable and/or adjustable with respect to the holder. However, it should be appreciated that the leg and holder may be fixed with respect to each other. Accordingly, the leg and holder may be integrally formed.

In another form, the invention resides in a method of aligning substantially vertical starter bars for a masonry block wall; the method including the steps of:

locating a plurality of starter bars at a desired position, each starter bar having at least one attachment member; and

attaching the vertical starter bars to at least some of the attachment members to align the vertical starter bars.

The method may further include one or more of the steps of:

connecting the starter bars to a at least one connection rail;

operatively supporting the starter bars with a support.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment, by way of example only, will be described with reference to the accompanying drawings, wherein:

FIG. 1 is a perspective view of an alignment device being used to support a series of starter bars according to an embodiment of the invention;

FIG. 2 is a side sectional view of an alignment device according to an embodiment of the invention;
FIG. 3 is a perspective view of an alignment device as shown in FIG. 1 according to an embodiment of the invention; and
FIG. 4 is a perspective view of an alignment device incorporating a different spacer arm.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. 1 and 2 show an alignment device 10 that is used to hold a series of starter bars 5 in a desired position in order to ensure the starter bars 5 are positioned correctly within a proposed masonry wall. The alignment device 10 includes a series of spacer arms 20, an associated series of attachment members 30, two connection rails 40 and a number of supports 50.

The spacer arms 20 are used to space starter bars 5 at the correct distance from each other. The spacer arms 20, shown in more detail in FIG. 3, are made from injection moulded plastic. However, it should be appreciated that the spacer arms 20 may be made using other suitable materials. The spacer arms 20 are elongate and rectangular in transverse cross section. However, it should be appreciated that the spacer arms 20 may be of a variety of other transverse cross sections including round, elliptical, square or the like shape. A snap-in clasp 21 is located at each of the ends of each of the spacer arms 20 to connect the spacer arms 20 to respective connection rails 40. The spacer arms 20 may be made of various lengths to suit masonry walls of different sizes.

The attachment members 30 are used to hold respective starter bars 5. The attachment members 30 are removably attached to the spacer arms 20. A person skilled in the art would appreciate that various known forms of removable attachment of the attachment members to the spacer arms may be used. For example, the attachment members may be threaded with a corresponding threaded hole provided in the spacer arm. Alternatively, the attachment members may be snap locked into corresponding holes provided in the spacer arm 20. This enables attachment members 30 of different sizes to be attached to the spacer arms 20 as shown
in FIG. 3 and FIG. 4. However, it should be appreciated that the attachment members 30 may be integrally formed with the spacer arms 20.

The position of the attachment members 30 may be varied according with structural requirements of a masonry wall. For example, the attachment members 30 shown in FIG. 3 are located centrally on the spacer arms 20 whilst the attachment members 30, shown in FIG. 4, is located toward one end of the spacer arm 20. It should be appreciated that the number of attachment members 30 and the position of the attachment members 30 may be varied on the spacer arms 20 depending on requirements. For example, a spacer arm 20 may have two attachment members 30, one attachment member 30 having a position as shown in FIG. 3 and one attachment member 30 as shown in FIG. 4.

The attachment members 30, shown in FIGS. 3 and 4, are in the form of C-shaped clips. The clips are resilient so that a starter bar 5 can be held by the clip. The C-shaped clips may be of different sizes to cater for different sized starter bars 5. It should be appreciated that other forms of attachment members 30 may be used instead of the C-shaped clips to hold the starter bars 5.

The connection rails 40 are used to hold the spacer arms 20. The connection rails 40 are in the form of a C-section 41. Holes 42 are located through and spaced equally along the length of the C-section 41. The holes 42 are used for location of respective snap-in clasps 21 of the spacer arms 20. As an alternative, it should be appreciated that the spacer arms 20 and the connection rails 40 may be permanently fastened to each other. Both the connection rails 40 are of a continuous length. However, it should be appreciated that the connection rails 40 may be formed from sections which are fitted together to form the connection rail 40. A person skilled in the art would readily appreciate how sections are connected together. Further, it should be appreciated that the connection rails may be shaped differently.

The supports 50, shown in detail in FIG. 2, are used to support the connection rails 40 and accordingly the spacer arms 20. Each support 50
is formed from a holder 60 and a leg 70. The holder 60 includes two holding
members 61 which engage and support the connection rails 40. The holder
members 61 are adjustable to align the spacer arms 20 and connection rails
40 above a trench to represent the location of the wall to be built. It should
be appreciated that the holder 60 may be modified to engage and support the
spacer arms 20.

The leg 70 is located at one end of the holder 60 and has a
pointed end 71 for digging into the ground. The leg 70 is movable with
respect to the holder 60.

In order to correctly align a series of starter bars 5, the first step
is to locate each pointed end 71 of the leg 70 of the supports 50 within the
ground and away from and adjacent to (but not within) a trench for forming a
concrete footing. The holders 60 of the supports 50 are then moved with
respect to the leg 70 to locate the holders 60 at a desired height and desired
horizontal location representing the exact position of the block wall to be built.
Next, the attachment members 30 are selected depending on the diameter of
the starter bars 5. The spacer arms 20 are also selected depending on
requirements of the masonry wall such as positioning requirements of the
starter bar 5 and the size of the blocks.

The attachment members 30 and the spacer arms 20 are joined
together (if required). Subsequently, the spacer arms 20 are inserted into the
holes of the connection rails 40 to form a "ladder" arrangement. The spacer
arms 20 are held to the connection rails 40 using the snap-in clasps 21.

Once the starter arms 20 and connection rails 40 are joined
together, the connection rails 40 are placed within holders 60 of the supports
50. The starter bars 5 are then attached to the attachment members 30 to
hold the starter bars 5 in their desired location. When the starter bars 5 are
set plumb, a base of the starter bar 5 can be tied off to a reinforcing cage in
the footing. Accordingly, the footing can then be laid ensuring the starter
bars 5 are in the correct location with respect to the masonry wall to be built.

There are considerable advantages in using the alignment
device 10 to install the starter bars 5 in a precise location when forming the
footing, when pouring the concrete for the footing and when building the
masonry block wall on the top of the footing. The advantages include:

1. Reducing the time taken to set out and accurately tie the starter bars 5 to the reinforcing cage in the footing trench and maintaining the starter bars 5 in vertical alignment.

2. Allowing one person to easily tie the starter bars 5 in the correct location in the footing trench and thereby ensuring the starter bars 5 will be in the correct location in the masonry blocks when the blocks are laid.

3. Providing the correct location for the starter bars 5 for both centrally located and non-centrally located reinforcing steel applications, being typical specifications for reinforced masonry block walls.

4. Ensuring the starter bars 5 are rigidly and securely positioned by the combination of tying the starter bar 5 to the reinforcing cage in the trench and clipping the starter bar 5 to the alignment device 10 at about 500mm above ground level. This two point connection provides the additional security that ensures the starter bar 5 does not move out of place even during the pouring of the concrete for the footing.

5. Providing a simple and effective means of setting and maintaining the starter bars 5 in a vertical position to ensure they line up adjacent to the vertically placed reinforcing steel in the masonry block wall.

6. Providing the longitudinal set out of the starter bars 5 at 400mm centres for the length of the wall or at the centres specified in the engineering specification.

7. Assisting in the containment of the entire reinforcing steel grid of the foundation.

In this specification, the terms "comprise", "comprises", comprising" or similar terms are intended to mean a non-exclusive inclusion, such that a system, method or apparatus that comprises a list of elements does not include those elements solely, but may well include other elements not listed.

It should be appreciated that various other changes and modifications may be made to the invention described without departing from
the spirit or scope of the invention. For example, the alignment device could be manufactured in one piece flat lengths of extruded plastic with the connection rails and spacers arms being integrally formed. The lengths have sufficient strength to adequately support the starter bars above ground level while being flexible enough to be rolled up for convenience between jobs. Accordingly, the starter bars in this instance will be tied to spacer arms using wire as the attachment members.
CLAIMS:
1. An alignment device able to align substantially vertical starter bars for a masonry block wall, the alignment device comprising:
   a plurality of spacer arms spaced a predetermined distance from each other; and
   a plurality of attachment members attached to respective spacer arms, the attachment members able to be operatively attached to the vertical starter bars.
2. The alignment device of claim 1 wherein there are at least three or more spacer arms.
3. The alignment device of claim 1 or claim 2 wherein the spacer arms are equally spaced from each other.
4. The alignment device of any one of the preceding claims wherein the spacer arms are interconnected by at least one connector rail.
5. The alignment device of claim 4 wherein there are two connector rails.
6. The alignment device of anyone of claim 4 wherein the spacer arms are removably attached to the at least one connector rail.
7. The alignment device of claim 4 wherein the spacer arms may be integrally formed with the at least one connector rail.
8. The alignment device of any one of the preceding claims wherein the spacer arms are relatively linear.
9. The alignment device of any one of claims 4, 6 or 7 wherein the at least one connector rail is relatively linear.
10. The alignment device of any one of the preceding claims within the attachment members are in the form of a clip.
11. The alignment device of any one of the preceding claims further including one or more supports to operatively support that the spacer arms are at a desired position.
12. The alignment device of claim 11 wherein each support includes a holder and at least one leg.
13. The alignment device of claim 12 wherein the holder engages with the spacer arm and/or a connecting rail.
14. The alignment device of claim 12 or 13 wherein the leg is movable and/or adjustable with respect to the holder.

15. A method of aligning substantially vertical starter bars for a masonry block wall; the method including the steps of:
   locating an a plurality of starter bars at a desired position, each starter bar having at least one attachment member; and
   attaching the vertical starter bars to at least some of the attachment members to align the vertical starter bars.

17. The method of claim 15 including the step of connecting the starter bars to a at least one connection rail.

18. The method of claim 15 or 16 including the step of operatively supporting the starter bars with a support.
**INTERNATIONAL SEARCH REPORT**

**International application No.**
PCT/AU20 1/00 1505

A. **CLASSIFICATION OF SUBJECT MATTER**

Int. Cl.

**E04B 2/14** (2006.01)  
**E02D 29/02** (2006.01)  
**E04B 2/42** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC.

B. **FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPDOC, WPI: IPC: /EC/IC-E04B2/14/LOW, E04B2/42/low, E02D29/02/ALL, STARTE+, align+, BAR+, ROD+, SHAFT+, VERTICAL+, UPRIGHT+, SPACER+, DISTANCE+, BRIDG+

C. **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>CA 1121613 A1 (HAMPTON) 13 April 1982</td>
<td>1-5, 7-9, 11-13, 14-17, 6, 10</td>
</tr>
<tr>
<td>Y</td>
<td>See figs.2 and 6</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>WO 2009012519 A1 (BLOCKAID PTY LTD) 29 January 2009</td>
<td>1-3, 15-16, 4-14</td>
</tr>
<tr>
<td>Y</td>
<td>See figs. 2a -2c and 5a</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>US 20021 12437 A1 (QUEEN) 22 August 2002</td>
<td>1-3, 15-16, 6, 10</td>
</tr>
<tr>
<td>Y</td>
<td>Sec. figs. 3, 10-1 1</td>
<td></td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C X See patent family annex

* Special categories of cited documents:
  - "A" document defining the general state of the art which is not considered to be of particular relevance
  - "E" earlier application or patent 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
  - "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
  - "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  - "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
  - "A" document member of the same patent family

Date of the actual completion of the international search: 09 January 2012
Date of mailing of the international search report: 29 February 2012

Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaustralia.gov.au
Facsimile No. +61 2 6283 7999

Authorized officer

VARUN MALIK

AUSTRALIAN PATENT OFFICE
(ISO 9001 Quality Certified Service)
Telephone No: +6 12 6283 261 1

Form PCT/ISA/2/10 (second sheet) (July 2009)
This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CA 1121613</td>
<td>CA 1139122</td>
</tr>
<tr>
<td>WO 2009012519</td>
<td>AU 2008280820</td>
</tr>
<tr>
<td></td>
<td>CA 2693890</td>
</tr>
<tr>
<td></td>
<td>EP 2215316</td>
</tr>
<tr>
<td>NZ 581854</td>
<td>US 2010212247</td>
</tr>
<tr>
<td>US 2002112437</td>
<td>US 6571526</td>
</tr>
</tbody>
</table>

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX