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(54) Title of the Invention: **Construction tool**
Abstract Title: **Bricklaying alignment tool**

(57) This invention relates to a construction tool 1 and a method of using the construction tool. The construction tool 1 has a block 10, and a pole 20 which extends from a corner region of the block wherein, in use, the pole is vertical and rigidly supported in the block. The pole 20 supports a string line (27, Fig 4). Preferably, the block is a housing with internal portions which can contain dense material, to weight the block. In the method aspect of the invention, two construction tools 1 of the present invention are placed at opposing ends of a wall to be built, and a string line is attached between the poles of each construction tool. The height of the string line provides a reference for the level of a course of bricks. According to another aspect of the invention, there is provided a string line support, which comprises a supporting member to frictionally engage a pole, where the support member includes an elastic member adapted to receive a string line (Figs 10-12).

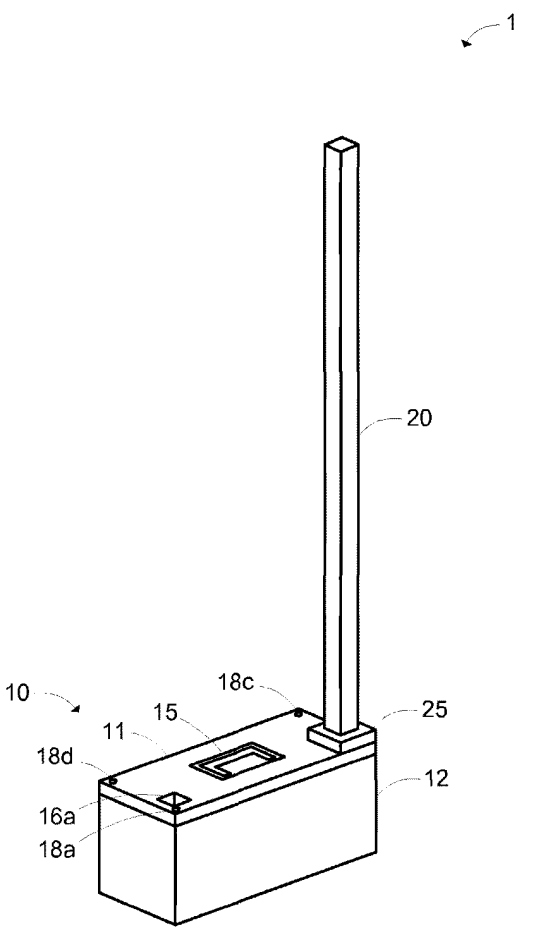

Figure 1

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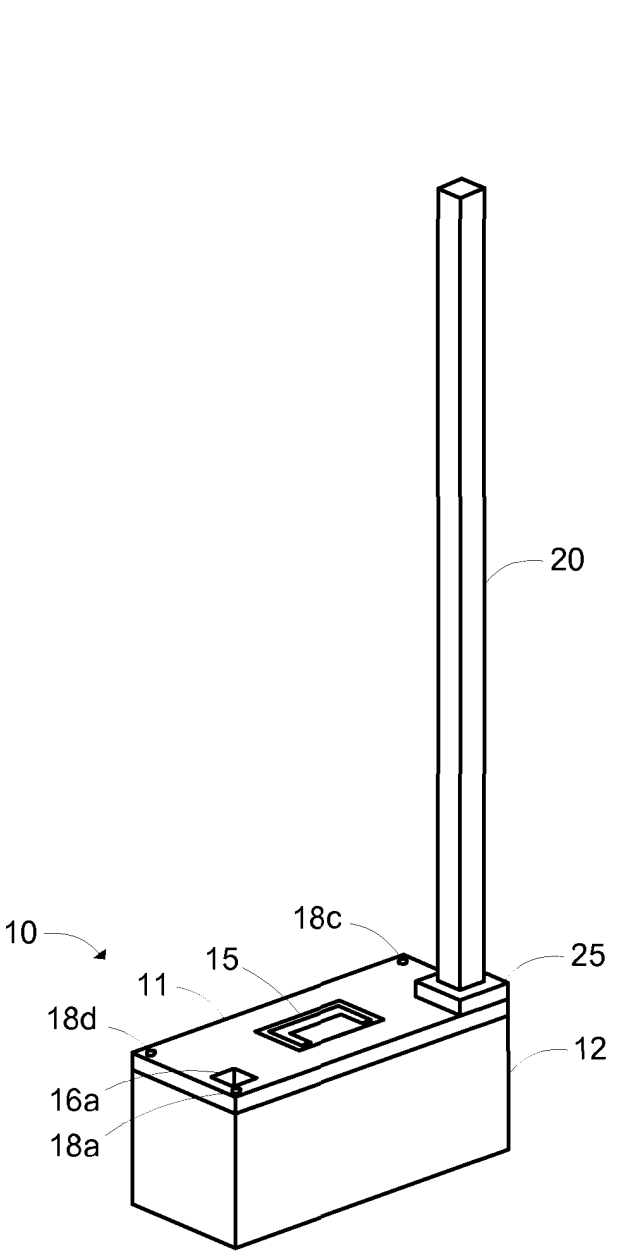

Figure 1

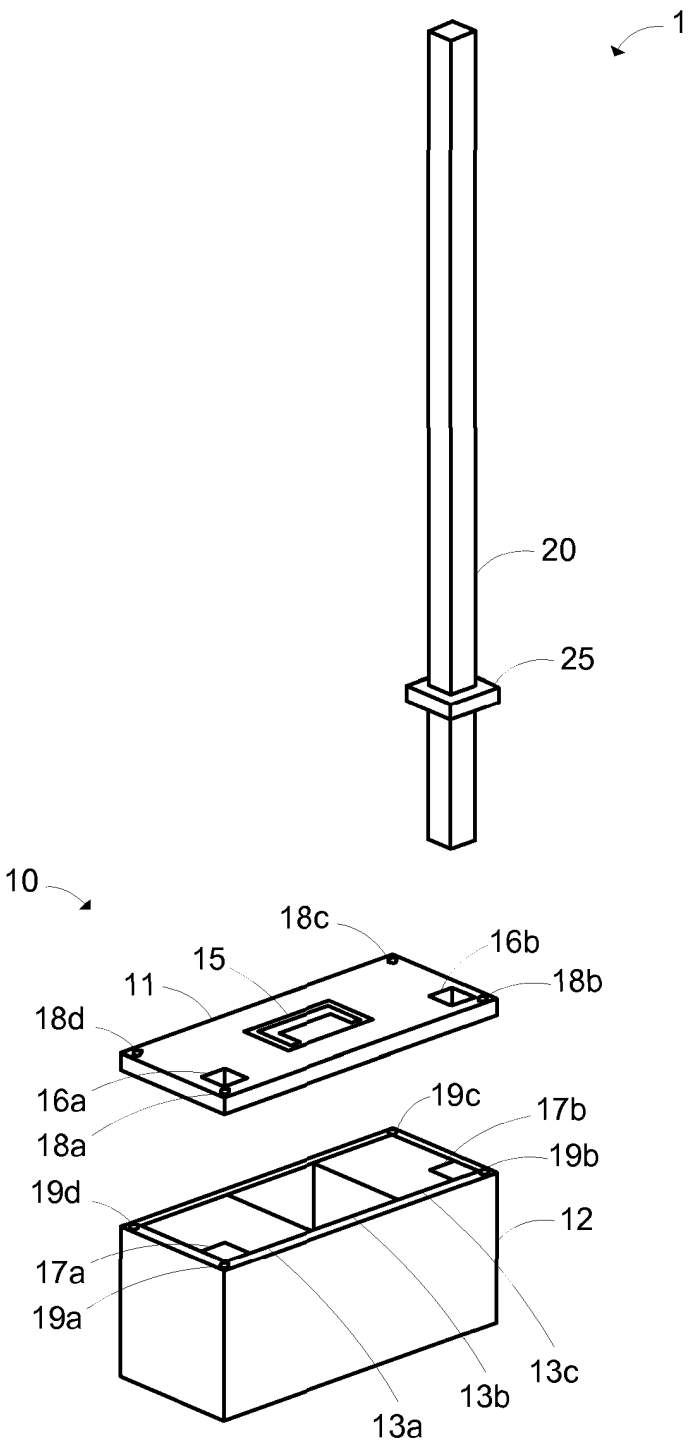
1
20
25
10
18c
16b
15
18b
11
18d
16a
18a
19c
17b
19b
19d
12
17a
19a
13c
13b
13a

Figure 2

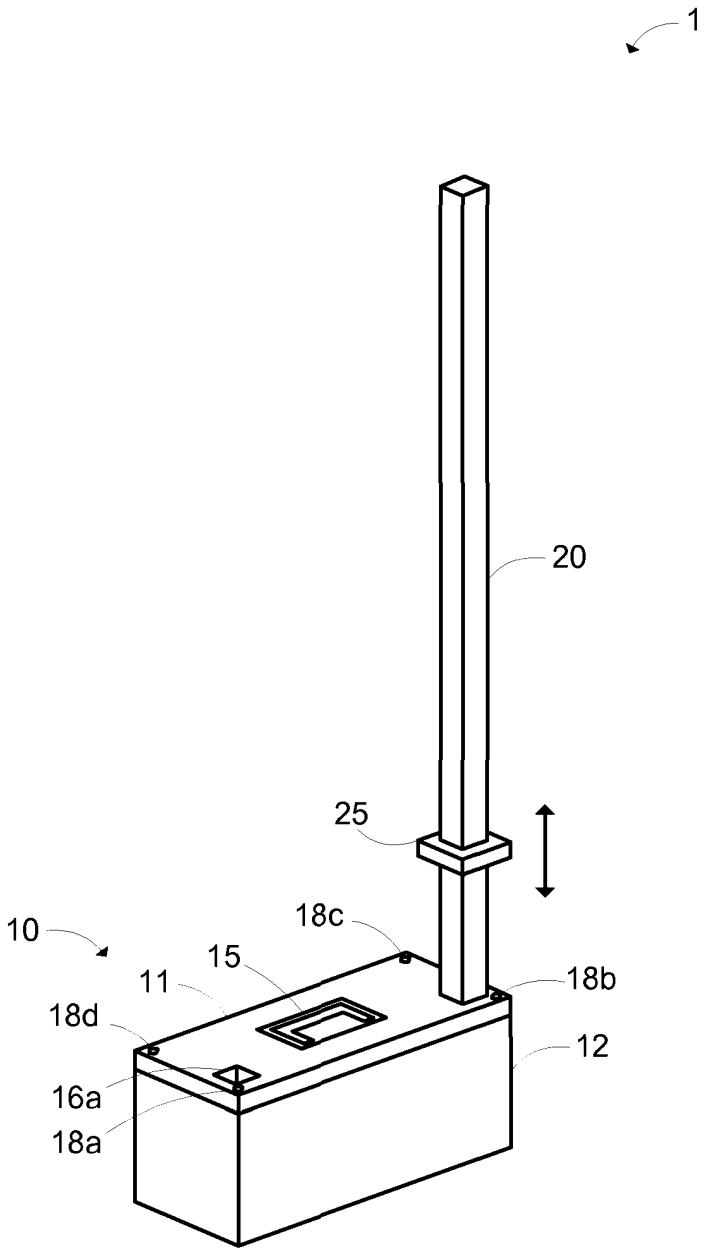

Figure 3

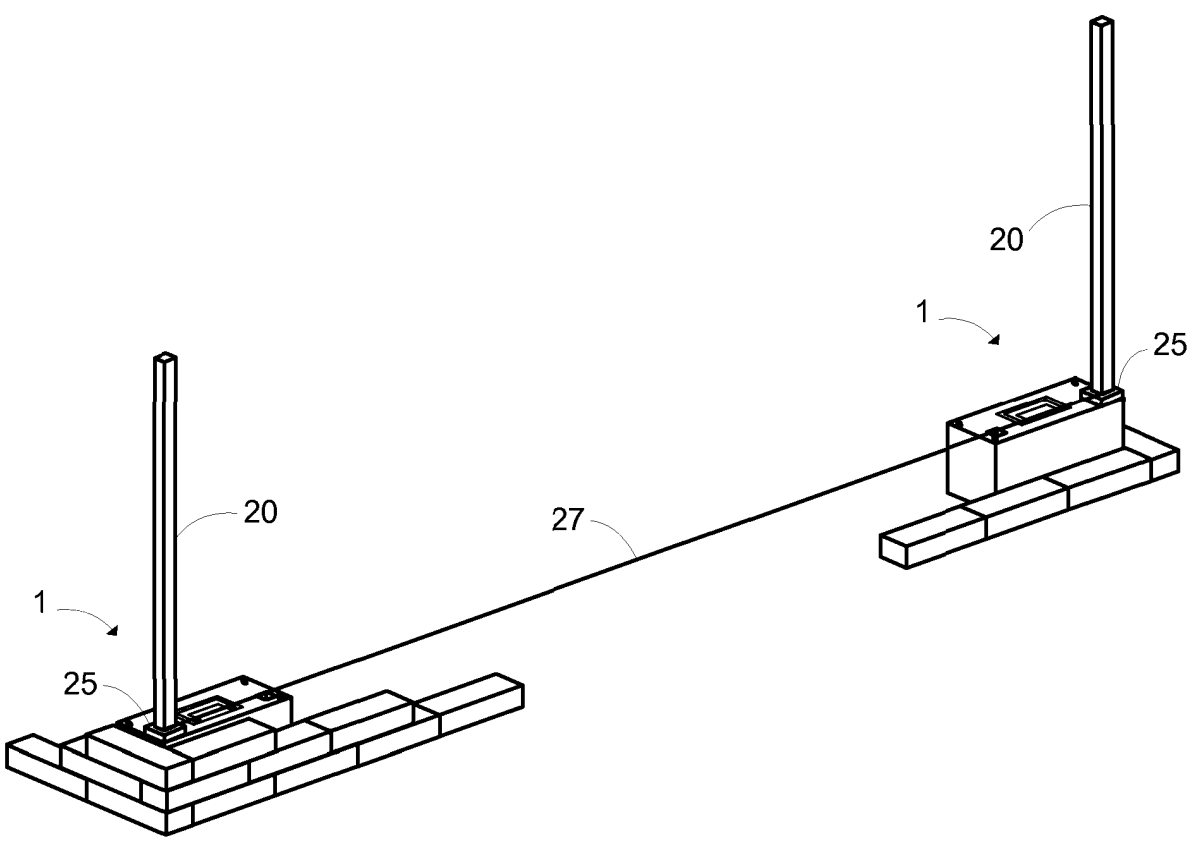

Figure 4

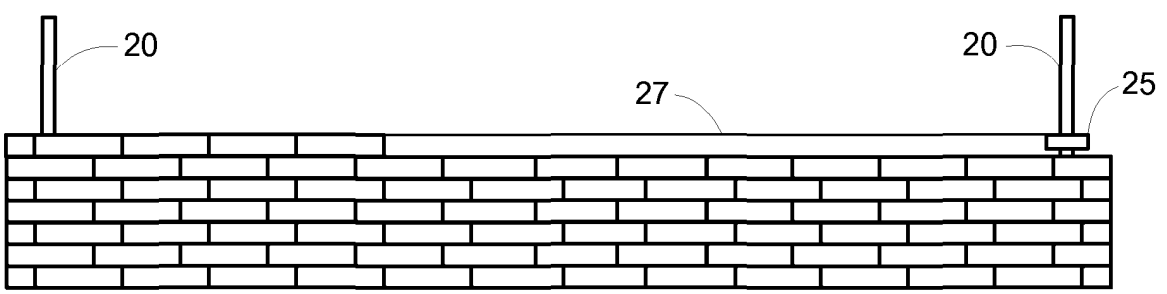

Figure 5

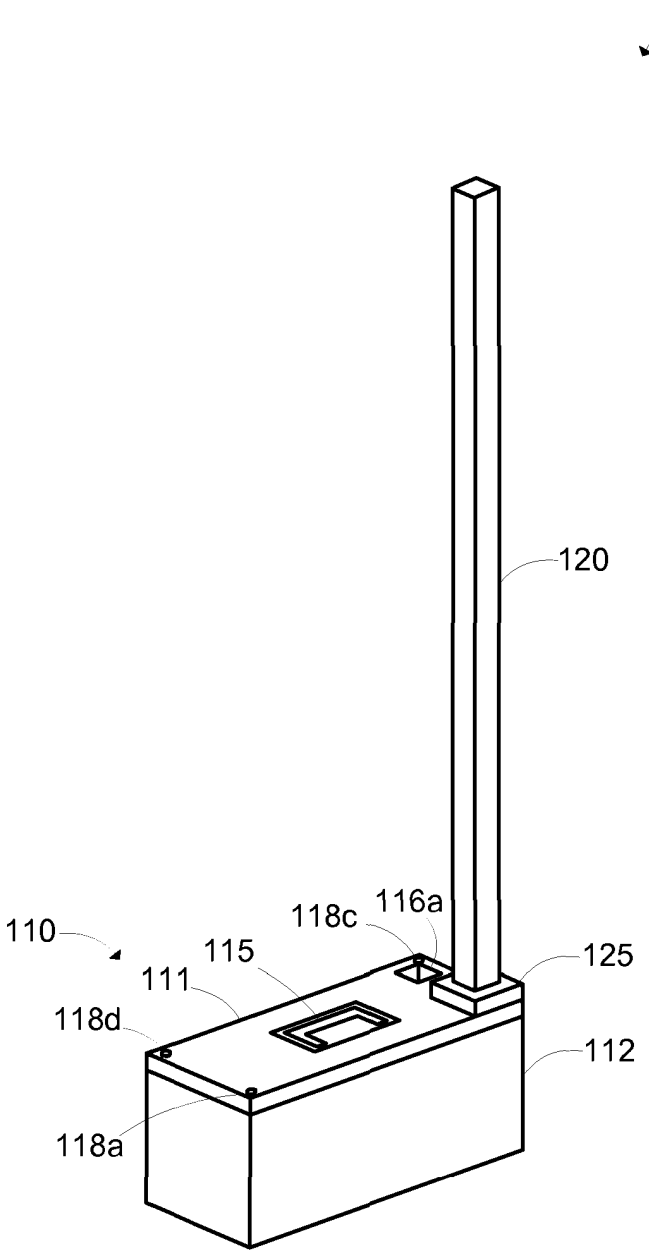

Figure 6

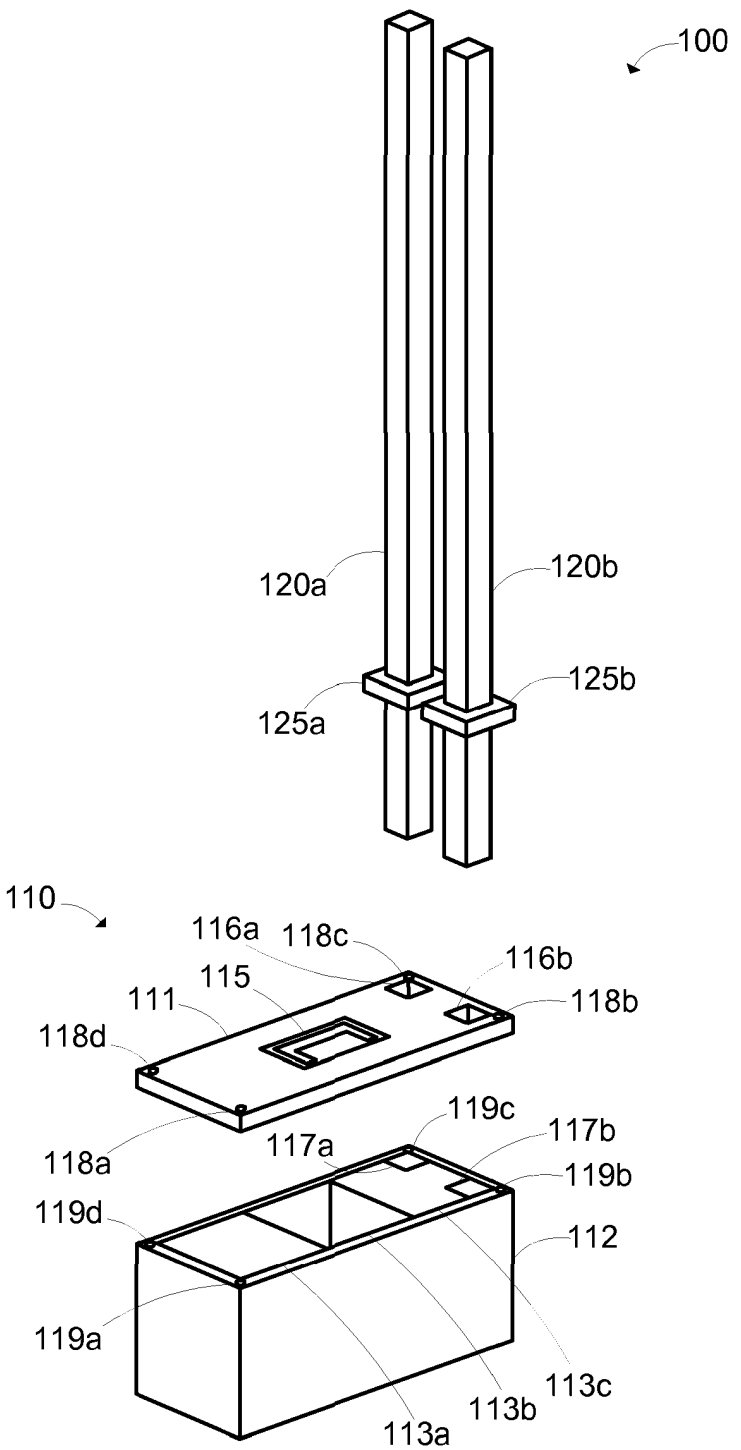
100
120a
120b
125a
125b
110
116a
118c
116b
115
111
118b
118d
119c
117b
118a
117a
119b
119d
112
119a
113c
113b
113a

Figure 7

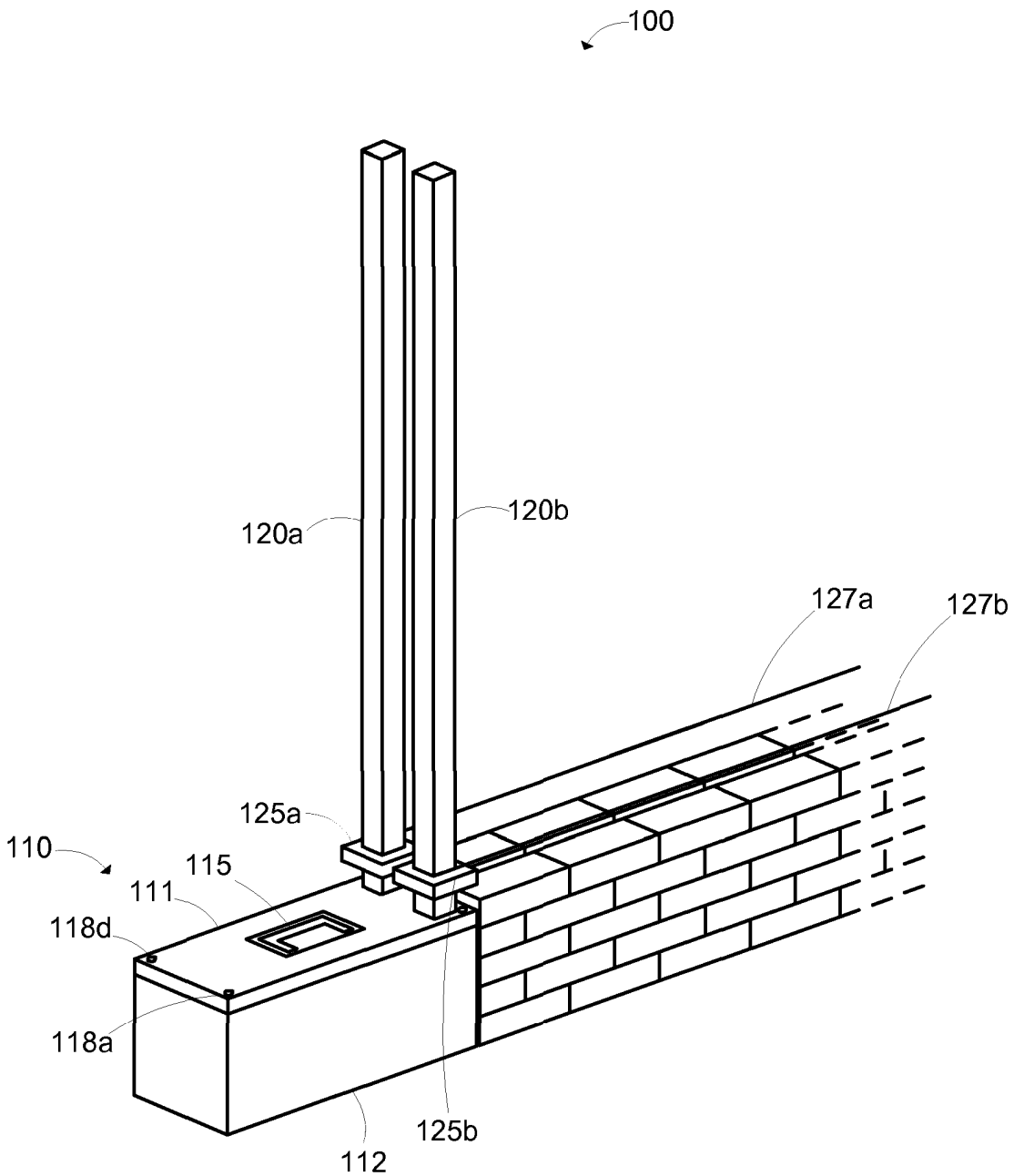

Figure 8

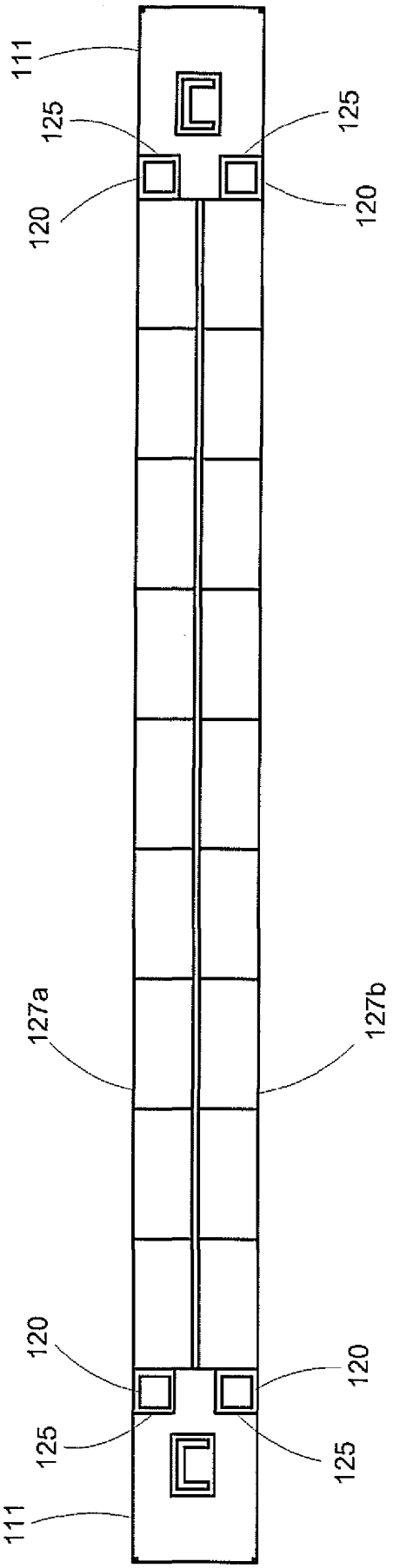

Figure 9

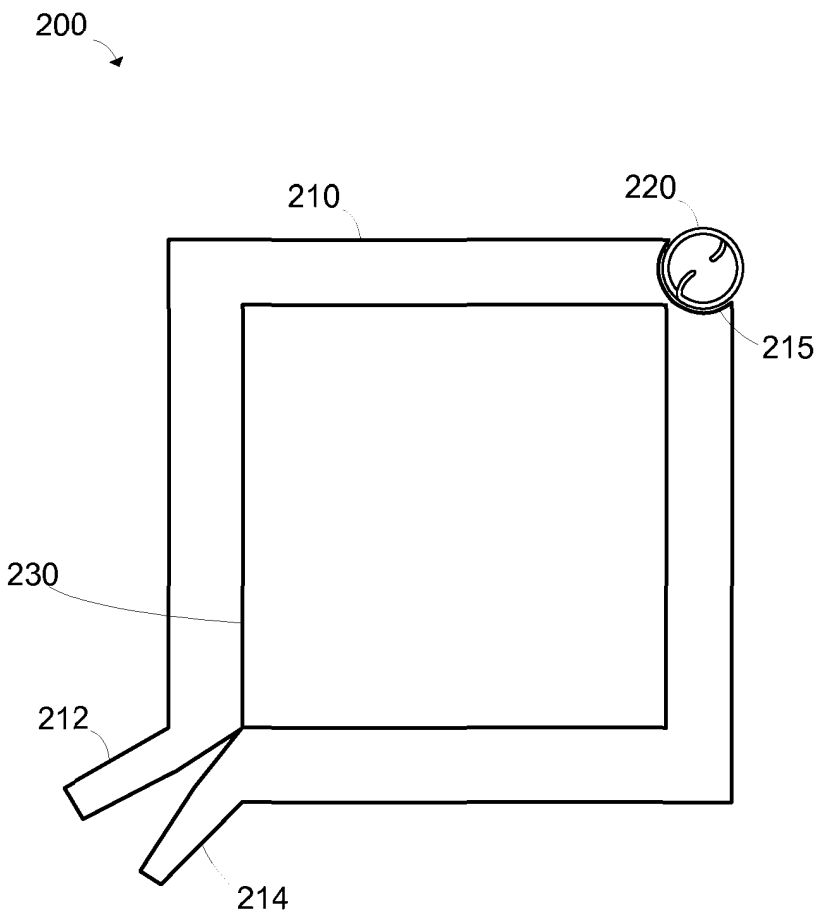

Figure 10

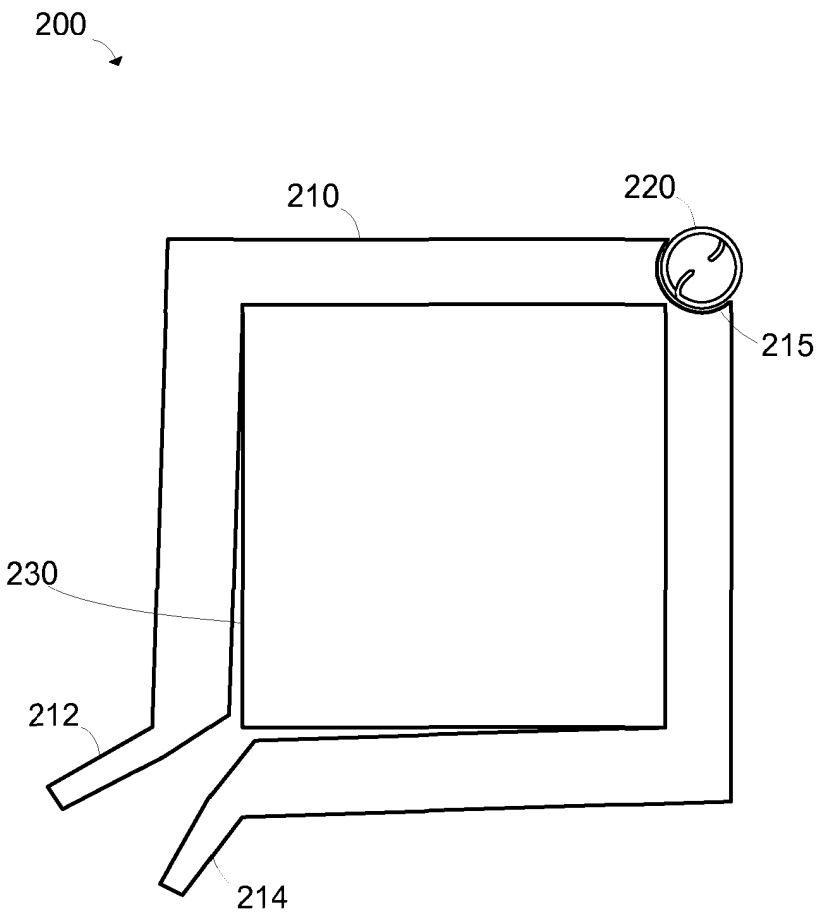

Figure 11

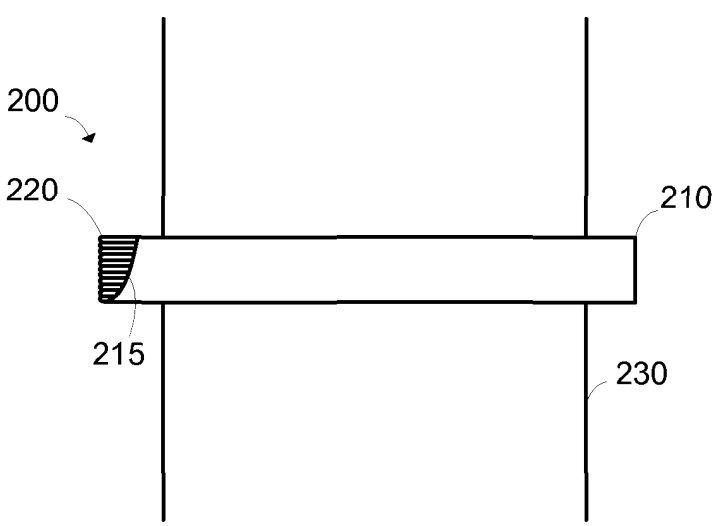

Figure 12

CONSTRUCTION TOOL

This invention relates to a construction tool.

In construction, an architect produces a building plan, illustrating a number of walls that need to be constructed by a bricklayer. On site, once foundations have been laid, the bricklayer will begin constructing the walls by initially building the corner portions. It is important to ensure the corner portions are level and plumb (traditionally using a spirit level), as the remainder of the wall is constructed with reference to the corner portions.

Once two opposing corner portions of a wall have been constructed to a certain height, a profile (such as a 'Blakes' (TM) profile) is attached to an external corner on each corner portion of the wall. A string line is attached between two profiles on the two opposing corner portions. The string line provides an accurate way of measuring the height of a course of bricks between the two corner portions, thus allowing the bricklayer to ensure the course of bricks are being laid level.

There is a problem with the above construction method. The bricklayer must first construct multiple corner portions before he/she may attach the profile and start laying the course of bricks. Therefore, the corner portions must be constructed, and left to dry (typically overnight) before the bricklayer can return and attach the profile. This wastes time, which can ultimately add to the cost of constructing the building.

There is also a problem with the Blakes profile. The string line is attached to the Blakes profile at a desired height either by simply tying the string line around the profile, or by using

a clip. However, in both systems, the string line is likely to move away from the desired height due to e.g. being knocked by a construction worker.

It is therefore desirable to alleviate some or all of the above problems.

According to a first aspect of the invention, there is provided a construction tool, for aligning a course of bricks, comprising a mass; and a rigid, elongate pole, for supporting a string line, the pole configured to extend from a corner region of the mass, such that, in use, the pole is rigidly supported in a vertical position by the mass.

Therefore, the construction tool of the present invention may be placed at a first end of a wall (as designated in a building plan) and a second construction tool of the present invention may be placed at a second end of the wall (as designated in the building plan), and a string line may then be attached between the two poles. Thus, the bricklayer may start laying a course of bricks, the level of the course of bricks corresponding to the height of the string line, without having to wait for a portion of the wall to set so he/she can attach a profile. Thus, the bricklayer may continue to construct the wall, by moving the string line up the pole to set a new height for the level of the next course of bricks, reducing the overall construction time and cost of the build.

The mass, which may be between 10kg and 20kg, or more preferably around 15kg, makes it unlikely for the construction tool to move (due to, for example, being kicked by a construction worker) out of alignment with the wall. Furthermore, the pole is rigidly supported in a vertical position (that is, orthogonal to the construction tool when placed on the horizontal foundations) by the mass. Thus, when a string line is attached between two poles on two

construction tools, the string line is less likely to be disturbed due to accidental forces on the construction tools or poles.

Preferably, the construction tool further comprises a string line supporting member, configured to frictionally engage the pole at a point along its longitudinal axis.

The string line supporting member provides a simple way of adjusting the height of the string line, whilst frictionally engaging the pole to ensure that the height of the string line does not change.

Preferably, the mass includes a housing member, containing a material having a density between 1000 $kg \cdot m^{-3}$ and 3000 $kg \cdot m^{-3}$, wherein the pole is configured to extend from a corner region of the housing member, such that, in use, the pole is rigidly supported in the vertical position by the material.

The housing member may include a first housing portion and a second housing portion, the second housing portion including a plurality of internal portions, wherein internal portions on either side of the housing member are for containing the material.

Therefore, the mass of the housing member may be adjusted by adjusting the relative volumes of the internal portions, whilst the centre of gravity is kept in the centre of the housing member by only filling the internal portions on either side of the housing member.

Preferably, the mass is between 10kg and 20kg. Therefore, with this mass, the housing member has a satisfactory inertia against external forces due to, for example, being kicked by a construction worker.

More preferably, the mass is around 15kg. This mass offers increased inertia against external forces, without being too cumbersome for the bricklayer to manoeuvre.

According to a second aspect of the invention, there is provided a method of constructing a wall, the wall having a first end portion and a second end portion according to a building plan, the method comprising the steps of: placing a first construction tool, having a first mass, and a first rigid, elongate pole, for supporting a string line, the first pole configured to extend from a corner region of the first mass, such that, in use, the first pole is rigidly supported in a vertical position by the first mass, at the first end portion of the wall; placing a second construction tool, having a second mass, and a second rigid, elongate pole, for supporting the string line, the second pole configured to extend from a corner region of the second mass, such that, in use, the second pole is rigidly supported in a vertical position by the second mass, at the second end portion of the wall; attaching the string line between the first pole and a second pole; and laying a course of bricks, the level of the course of bricks corresponding to the height of the string line.

According to a third aspect of the present invention, there is provided a string line support comprising a supporting member, wherein the supporting member is configured to move between a first state, wherein the supporting member is adapted to frictionally engage a pole, and a second state, the supporting member including an elastic member adapted for receiving a string line.

The string line support may be placed onto a pole and rigidly retained at a desired height by virtue of the frictional engagement thereto. In use, the elastic member, e.g. a spring, may be moved from a first state such that a gap appears in the elastic member, and the string line may then be placed in the gap before the elastic member moves under its own bias back towards the first state. The string line is thus rigidly retained on the string line support, which is rigidly held at the desired height on the pole.

The string line support of the present invention therefore offers an easy to use, quick and reliable way of securing the string line to the pole (which may be, for example, a pole on a Blakes profile or a pole of the first aspect of the invention), such that the string line does not move on the pole.

Embodiments of the invention will now be described, by way of example, and with reference to the drawings in which:

Figure 1 is a perspective view of a construction tool of a first embodiment of a first aspect of the present invention;

Figure 2 is an exploded view of the construction tool of Figure 1;

Figure 3 is a perspective view of the construction tool of Figure 1, showing a string line support at a predetermined height;

Figure 4 is a perspective view of a wall being built using two construction tools of Figure 1, the wall at an early stage of construction;

Figure 5 is a front view of the wall of Figure 4, at a later stage of construction.

Figure 6 is a perspective view of a construction tool of a second embodiment of the first aspect of the present invention;

Figure 7 is a perspective view of the construction tool of Figure 6, showing a first and second string line at a predetermined height;

Figure 8 is a plan view of the construction tool of Figure 6, showing the first and second string line at a predetermined height;

Figure 9 is a plan view of a string line support of a third aspect of the present invention, showing a supporting member in a first state;

Figure 10 is a plan view of the string line support of Figure 9, showing the supporting member in a second state; and

Figure 11 is a side view of the string line support of Figure 9.

A construction tool 1 of a first embodiment of a first aspect of the present invention will now be described with reference to Figures 1 to 3. The construction tool 1 includes a block 10 and a pole 20, wherein the pole 20 is configured to extend substantially vertically from a corner region of the block 10.

As shown in the exploded view of Figure 2, the block 10 includes a first housing portion 11 and a second housing portion 12. The first housing portion 11 includes a handle 15 in a central region thereof. In this embodiment, the handle 15 is positioned in a recess and is biased towards a parallel state (as shown in Figure 2). The first housing portion 11 also includes a first hole 16a and a second hole 16b, in a first and second opposing corner region of a major axis thereof. In this embodiment, the first and second holes 16a, 16b are of square form.

The second housing region 12 includes a first, second and third internal portion 13a, 13b, 13c. In this embodiment, the first internal portion 13a and the third internal portion 13c are partially filled with cement, such as to define a first and second cavity 17a, 17b in a corner region of the first internal portion 13a and the third internal portion 13c respectively. In this embodiment, the first cavity 17a and the second cavity 17b are of square form.

The first hole 16a and the second hole 16b of the first housing portion 11 are configured to align with the first cavity 17a and second cavity 17b of the second housing portion 12, when the first housing portion 11 is fixed to the second housing portion 12.

In this embodiment, the first housing portion 11 is attached to the second housing portion 12 by screws, through a first set of threaded screw holes 18a, 18b, 18c, 18d in the first housing portion 11 and a corresponding second set of threaded screw holes 19a, 19b, 19c, 19d in the second housing portion 12. Hereinafter, when the first housing portion 11 and the second housing portion 12 are attached, the cavity formed by the combination of the first and second holes 16a, 16b and cavities 17a, 17b will be described as “a first pole supporting cavity” and “a second pole supporting cavity” respectively.

The pole 20 is of elongate, rigid, square form. The cross-sectional dimensions of the pole 20 are substantially identical to the dimensions of the first and second pole supporting cavities, such that the pole 20 may be inserted into either pole supporting cavity and be rigidly supported therein.

The pole 20 also includes a string line support 25. As shown in Figure 3, the string line support 25 is adapted to frictionally engage the pole 20, but may slide along the pole’s

longitudinal axis when forced. In this embodiment, the string line support 25 is constructed out of an elastomer to provide the necessary friction to engage the pole 20.

In an optional embodiment, the pole 20 includes a plurality of markings along its length, indicative of a predetermined height.

A method of using the construction tool of the first embodiment of the present invention will now be described with reference to Figures 4 to 5.

Prior to using the construction tool, the foundations are laid. A bricklayer then places a first construction tool 1 of the present invention at a designated first end of a wall according to a building plan, and a second construction tool 1 of the present invention at a designated second end of the wall according to the building plan. Generally, the wall would be connected to other walls, so the first and second ends are part of first and second corners, respectively. A first and second corner portion of the wall are then constructed using traditional techniques, that is, ensuring the bricks are laid level and plumb using a spirit level.

In this method, as shown in Figure 5, the bricklayer adjusts the height of a string line 27 between the poles 20 on the first and second construction tools 1. This provides a reference for a height of a next course of bricks. The bricklayer may then lay the next course of bricks, with reference to the string line 27, which ensures that the bricks are laid level.

When the bricklayer finishes a course of bricks, the height of the string line 27 on the poles 20 is raised, and the next course of bricks are laid. This method is repeated until the desired height of the wall is reached.

Therefore, unlike the prior art method, once the corner portions have been built, the bricklayer does not need to wait for the corner portions to set before he/she attaches a profile for the string line 27. The bricklayer can continue to build the wall, by using the string line 27 on the construction tool 1 as a reference. The method of the present invention therefore reduces the time taken for the bricklayer to build a wall, which reduces the construction cost of the building.

Furthermore, the construction tool 1 of the present invention could be used in conjunction with a profile. That is, whilst the bricklayer builds a wall according to a method of the present invention, a lower portion of the wall will have time to set. Thus, the profile may then be attached to the set portion of wall, and the profile may then be used in the traditional manner.

Therefore, the construction tool 1 of the present invention may be used to start building the wall, with the profile being used subsequently. The construction tool 1 therefore allows the bricklayer to continue building the wall where, in the prior art method, the bricklayer would have had to wait for the corner portion to set.

A construction tool 100 of a second embodiment of the present invention will now be described with reference to Figures 6 and 7. The construction tool 100 is substantially similar to that in the first embodiment described above.

The construction tool 100 includes a block 110, having a first housing portion 111 and a second housing portion 112. The first housing portion 111 includes a handle 115, positioned

in a recess in a central region of the first housing portion 111, a first set of threaded screw-holes 118a, 118b, 118c, 118d, and a first and second hole 116a, 116b. In this embodiment, the first and second hole 116a, 116b are positioned in opposing corners of a minor axis of the block 110.

The second housing portion 112 includes first, second and third internal portions 113a, 113b, 113c and a second set of screw holes 119a, 119b, 119c, 119d. Again, the first and third internal portion 113a, 113c are filled with cement. However, in this embodiment, only the third internal portion 113c is partially filled such as to define a first and second cavity 117a, 117b therein. The first and second cavity 117a, 117b are configured to align with the first and second holes 116a, 116b when the first housing portion 111 is attached to the second housing portion 112 via the first and second set of screw holes 118a, 118b, 118c, 118d, 119a, 119b, 119c, 119d.

Therefore, in this embodiment, the first and second cavities 117a, 117b and the first and second holes 116a, 116b form first and second pole supporting cavities. The pole supporting cavities are provided in opposing corners of the minor axis of the block 110. In this embodiment, a first pole 120a (having a first string line supporting member 125a) extends out of the first pole supporting cavity, and a second pole 120b (having a second string line supporting member 125b) extends out of the second pole supporting cavity. This arrangement is particularly useful in constructing an outer wall, as described below.

A method of using the construction tool 100 of the second embodiment of the present invention will now be described with reference to Figures 8 and 9.

Again, prior to using the construction tool 100, the foundations are laid. A bricklayer then places a first construction tool 100 of the second embodiment of the present invention at a designated first end of the wall according to a building plan, and a second construction tool 100 (Figure 9) of the present invention at a designated second end of the wall according to the building plan. The bricklayer then lays a first and second parallel course of bricks (leaving a gap in between for, e.g. insulation) using traditional techniques, that is, ensuring that they are laid level and plumb using a spirit level.

In this method, the bricklayer adjusts the height of the string lines 127a, 127b between the poles 120a, 120b on the first and second construction tools 100. This provides a reference for a height of a next course of bricks. The bricklayer may then lay the next course of bricks, with reference to the string lines 127a, 127b, which ensures that the bricks are laid level.

The skilled reader will understand that the purpose of the cement in the first and third internal portions of the block of the first and second embodiment of the construction tool is to give the block a large mass, of at least 10kg, thus increasing the frictional engagement with the foundations and therefore being less likely to move out of alignment with the wall due to, for example, a kick. Thus, the present invention is not limited to cement. Rather, other dense materials may be used, e.g. sand. Preferably, the density of the material is between 1000 $kg \cdot m^{-3}$ and 3000 $kg \cdot m^{-3}$. Furthermore, a bottom face of the block (that is, the face to be in contact with the foundations) may be constructed out of a material with a relatively large coefficient of friction, e.g. an elastomer.

The skilled reader will also understand that any one of the first, second or third internal portions may be filled with the dense material, or indeed the second housing portion may not

be partitioned at all, but directly filled with the dense material. Furthermore, the block need not have a housing member for containing a dense material, but may instead be constructed as a single member out of the dense material.

The skilled reader will also understand that it is not necessary for the pole or pole supporting cavities to be of square form. Rather, they need to have similar shapes and dimensions such that the pole may be received and rigidly supported in the pole supporting cavities. Furthermore, the skilled reader will understand that the pole need not be removeably received within the pole supporting cavities. Rather, the pole may permanently extend from a corner portion of the block. However, having a removeable pole makes the construction tool easier to store.

In the above embodiments, the block includes two pole supporting cavities. However, the skilled person will realise that any number of pole supporting cavities may be provided, preferably in the corner regions of the block.

Furthermore, in the above embodiments, the string line supporting member may include a garter spring to increase the frictional engagement to the pole.

A method of manufacturing the construction tool will now be described. For the purposes of this description, a method of manufacturing the construction tool 1 of the first embodiment of the invention will be described. However, the skilled person will understand how the method may be adapted for the construction tool 100 of the second embodiment.

A first housing member 11 has a first and second hole 16a, 16b cut out of a first and second corner region, respectively, and a recessed handle 15 is fixed to a central region thereof.

A second housing member 12 (which includes a first, second and third internal portion 13a, 13b, 13c) is placed on a horizontal surface. A pole 20 is inserted into a corner region of the first internal portion 13a, such that it is vertical and aligned with the first hole 16a when the first housing member 11 is placed on top of the second housing member 12.

The first internal portion 13a is then filled with concrete mix, which surrounds the pole 20 in the corner region of the first internal portion 13a. Once the concrete mix has hardened to a point where it no longer flows, but is not completely set, the pole 20 is removed, leaving a first cavity 17a in the first internal portion 13a.

The pole 20 is then inserted into a corner region of the third internal portion 13c, such that it is vertical and aligned with the second hole 16b when the first housing member 11 is placed on the top of second housing member 12. Then, the third internal portion 13c is filled with concrete mix, which surrounds the pole 20 in the corner region of the third internal portion 13c. Again, the pole 20 is removed when the concrete mix has partially set, leaving a second cavity 17b in the third internal portion 13c.

The first housing portion 11 is then screwed onto the second housing portion 12, via a first set of threaded screw holes 18a, 18b, 18c, 18d and a second set of threaded screw holes 19a, 19b, 19c, 19d.

The skilled person will understand that the pole 20 may be coated with a release agent in order to ease its removal from the partially set concrete. The skilled person will also understand that other manufacturing methods are possible.

Furthermore, the pole supporting cavities may be lined with plastic (such as to create a 'plastic pocket'), which will increase the integrity of the cavity (which would otherwise be likely to erode). In this case, the draft angle of a plastic molding to create the plastic pocket must be minimal to ensure the pole is rigidly supported therein.

Also, the skilled person will understand that the block need not include a housing member filled with a dense material. That is, the block may be constructed as a concrete cast (or out of any other similarly dense material) out of a suitably shaped form.

A string line support 200 of an embodiment of a second aspect of the invention will now be described with reference to Figures 10 to 12.

The string line support 200 has a supporting member 210, having internal dimensions corresponding to that of a pole 230 (e.g. a pole of a construction tool of the first aspect of the invention).

The supporting member 210 is configured to move from a first state (as shown in Figure 10) to a second state (as shown in Figure 11). The supporting member 210 is elastically biased such that it moves towards the first state and such that an inner surface of the supporting member 210 frictionally engages the pole 230 when in the first state. Therefore, in the first state, the supporting member 210 is configured to remain at a constant position on the pole

230, that is, it will not move up or down the pole 230 under at least its own weight. In this embodiment, the support member 210 is constructed out of an elastomer for a relatively large coefficient of friction.

The supporting member 210 includes a first protrusion 212 and a second protrusion 214. Therefore, the supporting member 210 may move from the first state to the second state as the first and second protrusion 212, 214 are separated. In the second state, (as shown in Figure 11) the supporting member 210 no longer frictionally engages the pole 230 and the supporting member may move up and down it.

In this embodiment, the supporting member 210 is of square form to correspond with a square pole 230.

The supporting member 210 further comprises tapered blind hole 215. In this embodiment, a tension spring 220 is provided in the blind hole 215 (and retained therein by virtue of the taper), and first and second ends of the spring 220 extend towards a central region thereof. The skilled person will understand that as the spring 220 is extended, gaps will appear between the spring's 220 coils.

In use, the supporting member 210 is moved to a desired position on the pole 230 by separating the protrusions 212, 214 (such that it is in the second state) and moving it to the desired position. The protrusions 212, 214 may then be released, such that the supporting member 210 moves to the first state and frictionally engages the pole 230. A string line is then forced against a point between two coils, urging the two coils apart such that the string line moves into the gap. The spring 230 then contracts and captures the string line.

The skilled person will understand that the supporting member 210 need not be of square form. That is, the shape of the supporting member 210 should be complimentary to the shape of pole 230, to ensure that the inner surface of the supporting member 210 contacts the pole and is frictionally engaged thereto.

The skilled person will also understand that the present invention is not limited to the use of a spring 220. That is, the spring may be replaced by any other suitable member for retaining the string line. However, an elastic member is particularly suitable for this invention.

The skilled person will understand that any combination of features is possible without departing from the scope of the invention, as claimed.

CLAIMS

1. A construction tool, for aligning a course of bricks, comprising

a mass; and

a rigid, elongate pole, for supporting a string line, the pole configured to extend from a corner region of the mass, such that, in use, the pole is rigidly supported in a vertical position by the mass.

2. A construction tool as claimed in Claim 1, further comprising a string line supporting member, configured to frictionally engage the pole at a point along its longitudinal axis.

3. A construction tool as claimed in any preceding claim, wherein the mass includes a housing member, containing a material having a density between 1000 $kg \cdot m^{-3}$ and 3000 $kg \cdot m^{-3}$, wherein the pole is configured to extend from a corner region of the housing member, such that, in use, the pole is rigidly supported in the vertical position by the material.

4. A construction tool as claimed in Claim 3, wherein the housing member includes a first housing portion and a second housing portion, the second housing portion including a plurality of internal portions, wherein internal portions on either side of the housing member are for containing the material.

5. A construction tool as claimed in any preceding claim, wherein the mass is between 10kg and 20kg.

6. A construction tool as claimed in any preceding claim, wherein the mass is around 15kg.

7. A construction tool substantially as herein described with reference to and as shown in any one of the accompanying drawings.

8. A method of constructing a wall, the wall having a first end portion and a second end portion according to a building plan, the method comprising the steps of:

placing a first construction tool, having a first mass, and a first rigid, elongate pole, for supporting a string line, the first pole configured to extend from a corner region of the first mass, such that, in use, the first pole is rigidly supported in a vertical position by the first mass, at the first end portion of the wall;

placing a second construction tool, having a second mass, and a second rigid, elongate pole, for supporting the string line, the second pole configured to extend from a corner region of the second mass, such that, in use, the second pole is rigidly supported in a vertical position by the second mass, at the second end portion of the wall;

attaching the string line between the first pole and a second pole; and

laying a course of bricks, the level of the course of bricks corresponding to the height of the string line.

9. A method as herein described with reference to and as shown in any one of the accompanying drawings.

10. A string line support comprising

a supporting member, configured to move between a first state, wherein the supporting member is adapted to frictionally engage a pole, and a second state, the supporting member including an elastic member adapted for receiving a string line.

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11. A string line support as herein described with reference to and as shown in any one of the accompanying drawings.

INTELLECTUAL PROPERTY OFFICE

Application No:	GB1111078.0	**Examiner:**	Mrs Judith Peake
Claims searched:	1-9	**Date of search:**	15 June 2012

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1, 3, 5, 6 and 8	GB2134580 A (BURKE) See Figures 1, 4 , 5 and 6 showing base 3 supporting pole 4 with string line, wherein base is weighted with blocks 45 for ballast.
X	1, 2, 8	DE19753796 A1 (BAUMANN VERWERTUNGS GMBH) See WPI Abstract Accession Number 1999-338803 [29] and Figures 1 and 2 showing base 7 and pole 7 and frictionally engaging string line support 34
A,P	1, 3, 5, 6 and 8	US8141830 B1 (HUDSON) See especially Figures 1-8 and 24, showing alignment tool comprising base 100 and rigid, elongate pole 400 extending from a corner of the base with string line 850 supported from pole.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

E04G

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC, TXTUS0, TXTUS1, TXTUS2, TXTUS3, TXTEP1, TXTGB1, TXTWO1, TXTAU1

International Classification:

Subclass	Subgroup	Valid From
E04G	0021/18	01/01/2006