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(54) A levelling gauge

(57) A gauge (10; 110) for levelling a tread (42; 142) of a step (40; 140) made from concrete, the gauge (10; 110) comprising a surface (14; 114) which is, in use, adapted to be drawn across the tread (42; 142) to level same. The gauge (10; 110) also comprises a guide (16; 116) which is shaped and dimensioned to engage an edge (48; 148) of an adjacent step (40; 140) while the surface (14; 114) is being drawn across the tread (42; 142), in order to maintain the correct position of the surface (14; 114) relative to the tread (42; 142) during use. The position of the guide (16; 116) relative to the surface (14; 114) is adjustable in order to allow the gauge (10; 110) to be used with steps of various dimensions.

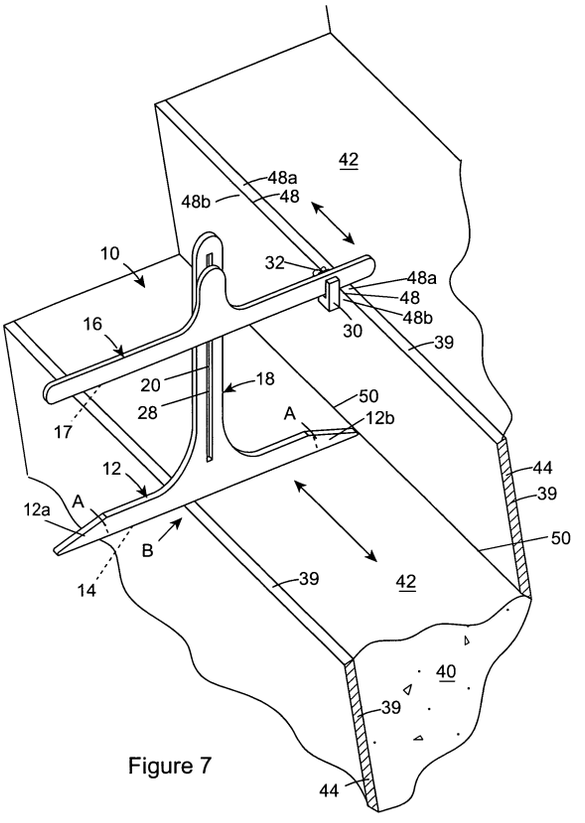

Figure 7

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Description

[0001] The present invention relates to a gauge, in particular an adjustable gauge for levelling concrete steps during construction thereof.

[0002] Steps comprising a plurality of risers and treads are often made from concrete. Formwork using planks of wood, metal and the like, is generally used to form the risers of the steps being constructed, after which wet concrete is laid down. One or more trowels are then used to level the wet concrete forming the treads. Generally, the treads of the steps are levelled one by one. Levelling the treads in this manner requires an experienced labourer to produce accurate results. An apprentice cannot generally carry out this task to the required degree of accuracy. Furthermore, levelling the steps in this way takes a considerable length of time, and therefore makes the construction of the steps more costly.

[0003] It is an object of the invention to mitigate one or more of these problems. It is a further object of the invention to provide a gauge for levelling concrete steps during construction.

[0004] According to the present invention, there is provided a gauge for levelling a tread of a step made from concrete, the gauge comprising a surface which is, in use, adapted to be drawn across the tread to level same; and a guide which is shaped and dimensioned to engage an edge of an adjacent step while the surface is being drawn across the tread, in order to maintain the correct position of the surface relative to the tread during use.

[0005] Preferably, the position of the guide relative to the surface is adjustable in order to allow the gauge to be used with steps of various dimensions.

[0006] Preferably, the gauge includes a slideway; a first member on which the surface is formed, the first member being mounted to the slideway; and a second member forming the guide, the second member being slideably mounted to the slideway.

[0007] Preferably, each of the first and second members is substantially elongate and is mounted substantially orthogonally to the slideway.

[0008] Preferably, the first member is formed integrally with the slideway.

[0009] Preferably, the slideway defines a longitudinal channel along which the second member is moveable.

[0010] Preferably, the second member is releasably secured to the slideway by a coupling, the coupling enabling the second member to be slideably moveable along the length of the slideway.

[0011] Preferably, the coupling comprises a projection protruding, in use, through the longitudinal channel, and which projection is mounted to and extends from a support which is slideable along the length of the longitudinal channel; the projection being adapted for a securing arrangement with the second member, such that movement of the support along the longitudinal channel effects movement of the second member along the longitudinal channel.

[0012] Preferably, the longitudinal channel includes tapered side surfaces such that when the support is in the form of a rod, the rod partially protrudes into the channel by engaging with the tapered side surfaces, such that movement of the support is guided by the engagement of the support with the tapered side surfaces.

[0013] Preferably, the first member has first and second opposed ends, each of which ends tapers substantially to a point. Preferably, the second member further includes at least one clamp mounted thereto, which clamp is shaped and dimensioned to engage the edge of the adjacent step while the surface is being drawn across the tread, thereby acting as a guide.

[0014] Optionally, the second member may include a second slideway to enable the clamp to be moveable along the length of the second member.

[0015] Preferably, the surface of the gauge is substantially tapered along the longitudinal side edges thereof.

[0016] As used herein, the term "gauge" is intended to mean any measuring instrument, implement or device suitable for levelling concrete or any other suitably malleable material.

[0017] As used herein, the term "slideway" is intended to mean any suitable means for enabling relative movement between the first and second members.

[0018] Embodiments of the present invention will now be described with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of a first side of a gauge according to a first embodiment of the present invention;

Figure 2 is an exploded view of a second side of the gauge of Figure 1, illustrating a manner in which a second member of the gauge is releasably secured to a slideway by a coupling;

Figure 3 is a view of the second side of the gauge;

Figure 4 is a view of the first side of the gauge;

Figure 5 is a plan view of the gauge;

Figure 6 is a view of the second side of the gauge, in use, with a plurality of steps shown in cross-section;

Figure 7 is a perspective view of the first side of the gauge and the steps of Figure 6, in use;

Figure 8 is a perspective view of a first side of a gauge according to a second embodiment of the invention;

Figure 9 is an exploded view of a second side of the gauge of Figure 8, illustrating a manner in which a second member of the gauge is releasably secured to a slideway by an alternative coupling;

Figure 10 is a view of the first side of the gauge of Figure 8;

Figure 11 is a view of the second side of the gauge of Figure 8;

Figure 12 is a cross-sectional view taken along the line X-X of Figure 10;

Figure 13 is a cross-sectional view taken along the line Y-Y of Figure 10; and

Figure 14 is a perspective view of the first side of the gauge of Figure 8, in use, with a plurality of steps.

[0019] Referring now to Figures 1 - 7 of the accompanying drawings, there is illustrated a gauge 10 for levelling a tread 42 of a step 40, according to a first embodiment of the present invention. The gauge 10 comprises a first member 12 having a surface 14 which is, in use, adapted to be drawn across the tread 42 to level same. The gauge 10 also comprises a second member 16 preferably spaced apart from and disposed substantially parallel to the first member 12. The gauge 10 is preferably made from mild steel or stainless steel, however it will be appreciated that any other suitable material may be used. The second member 16 is shaped and dimensioned to engage an edge 48 of an adjacent step 40 while the surface 14 is being drawn across the tread 42, in order to maintain the correct position of the surface 14 during use, thereby acting as a guide, as will be described in more detail hereinafter.

[0020] The gauge 10 comprises an elongate member 18 which includes a slideway 20 preferably in the form of a longitudinal channel 28 disposed along the length thereof. The first member 12 is substantially elongate and is preferably mounted substantially orthogonally to the elongate member 18. The first member 12 is also preferably integrally formed with the elongate member 18 so as to form a substantially T-shaped member 12, 18. The first member 12 includes first and second opposed ends 12a, 12b, each of which tapers substantially to a point. Each of the tapered ends 12a, 12b, preferably tapers to an angle A of from 15° to 40°, preferably approximately 30°. The surface 14 of the first member 12 is preferably approximately 8 mm in width, and is the tread-engaging and concrete-engaging surface in use.

[0021] The second member 16 is preferably slideably mounted to the elongate member 18. In this way, the position of the second member 16 relative to the surface 14 is adjustable. Thus, the second member 16 can act as a guide with steps 40 of various dimensions. The second member 16 is releasably locked to the elongate member 18 by a coupling, preferably in the form of first and second screw and wing nut arrangements 24, 26 as shown in Figures 2 and 3. Each of the arrangements 24, 26, includes a respective screw 24a, 26a extending from the second member 16, and a complementary wing nut 24b, 26b. Each of the screws 24a, 26a protrudes, in use, from the second member 16 out through the longitudinal channel 28, and the wing nuts 24b, 26b are then used to lock the gauge 10 in its assembled state.

[0022] The second member 16 is moveable along the length of the channel 28. By unscrewing the screw and wing nut arrangements 24, 26 of the coupling, the second member 16 is slideable along the length of the elongate member 18 to as far as is required. Then, the coupling can be re-tightened in order to lock the gauge 10 in its adjusted position. The second member 16 may optionally be provided with a substantially cuboid projection 34 from which the screws 24a, 26a extend, as shown in Figure 2 for example. In this case, the projection 34 may be adapted for a complementary fit within the longitudinal channel 28. In this way, relative movement between the second member 16 and the elongate member 18 can be guided by means of the projection 34 being guided along the length of the channel 28. This projection 34 also guides the second member 16 to remain positioned orthogonally to the elongate member 18, and positioned substantially parallel to the first member 12.

[0023] The second member 16 is preferably provided with one or two spaced apart U-shaped clamps 30, as shown in Figures 1 - 4 for example. The clamps 30 are releasably locked to the second member 16 by means of any suitable connecting means 32, for example a screw and wing nut or the like. The clamps 30 can be removed and replaced in any desired location along the length of the second member 16, by unscrewing and rescrewing the connecting means 28. Each of the clamps 30 abuts against two sides of the second member 16, in addition to a surface 17 thereof, as shown in Figure 1 for example. Figure 4 illustrates, by means of arrows, the direction of movement of the second member 16 relative to the elongate member 18; and movement of a clamp 30 relative to the second member 16.

[0024] It will be appreciated that formwork 39, preferably comprising elongate pieces of wood, metal such as mild steel or stainless steel, or the like, is constructed and adapted to form the riser 44 of the step 40 being constructed. It will be further appreciated that conventional support struts (not shown) or the like, may also be included to provide support to the form work 39. Such struts may be in the form of elongate members, preferably made of timber, which are present along the length of formwork 39 forming the riser 44. Furthermore, conventional structures such as stringers (not shown) and or further supports (not shown) may also be present to prevent undesirable movement of the formwork 39 and/or the concrete forming the step 40.

[0025] In use, therefore, in order to level the tread 42 of a particular step 40, the gauge 10 may be used as follows.

[0026] Referring to Figures 6 and 7, the gauge 10 is placed on the step 40 such that the surface 14 of the first member 12 contacts the wet and/or malleable concrete used to form the tread 42. In this position, the elongate member 18 generally lies substantially vertical, positioned orthogonally to the first and second members 12, 16, whilst the formwork 39 of the riser 44 is preferably tilted at a slight angle with respect to the vertical, as shown in Figure 6 for example.

[0027] The screw and wing nut arrangements 24, 26 of the coupling are loosened to enable the second member 16 to be slideably adjusted until the surface 17 of the second member 16 engages a top edge portion 48a of an edge 48 of an adjacent riser 44. The clamp 30 is also moved towards the edge 48 until it abuts against a side edge portion 48b of said edge 48, as shown in Figures 6 and 7.

[0028] Once the gauge 10 has been adjusted in this way, the second member 16 is then locked in position. As shown in Figure 6, the distance between the respective surfaces 14, 17 of the first and second members 12, 16, is approximately equal to the height of the riser 44. It will therefore be appreciated that by sliding the second member 16 along the length of the elongate member 18, the distance between the surfaces 14, 17 may be adjusted in order to allow the gauge 10 to be used with steps of various dimensions.

[0029] Once the gauge 10 has been positioned as described above, the gauge 10 is then drawn across the tread 42 of the step 40 in order to level same. As shown in Figure 7, the gauge 10 is slideable along the length of the tread 42 in a direction substantially orthogonal to the longitudinal axis of the first and second members 12, 16. By sliding the gauge 10 in this way, the surface 14 of the first member 12 conveniently levels the wet and/or malleable concrete used to form the tread 42.

[0030] Advantageously, the tapered ends 12a, 12b enable the gauge 10 to reach the join 50 where the tread 42 of the step 40 to be levelled abuts the formwork 39 forming the riser 44 of the adjacent step 40. Thus, the gauge 10 prevents any undesirable build up of concrete in the join 50, and/or any comers (not shown).

[0031] In order to maintain the surface 14 at the correct position on the concrete of the tread 42 (i.e. so the surface 14 does not lift away from the concrete nor push too far down into the concrete, which could cause an uneven finish), the user of the gauge 10 simply has to push down gently on the gauge 10 as the gauge 10 is drawn across the tread 42. In this way, the gauge 10 is prevented, by the user's force, from lifting away from the concrete. The gauge 10 is prevented from being pushed too far down into the concrete since the contact of the surface 17 against the top edge portion 48a of the adjacent step 40 prevents such downward movement. The gauge 10 is also conveniently adapted to prevent the tapered end 12b (Figure 7) from being pushed too far into the concrete adjacent the join 50, by adjusting the clamp 30 until it abuts against the side edge portion 48b.

[0032] Thus, it will be appreciated that the combination of the second member 16 and the clamp 30, in particular, enable the surface 14 to be maintained in the correct position during use, in order to provide a smooth finish to the concrete of the tread. The features of the gauge 10 thereby provide a useful tool for levelling and smoothing concrete steps. In one sweeping movement, the gauge 10 can be used to level a tread 42. This enables accurate levelling to be achieved without a user needing the same skill and expertise as is required using trowels and the like (not shown) of the prior art.

[0033] Referring now to Figures 8 - 14, there is illustrated a gauge 110 for levelling a tread 142 of a step 140, according to a second embodiment of the invention. In this second embodiment, like components have been accorded like reference numerals, and unless otherwise stated, perform like function.

[0034] The gauge 110 essentially functions in the same way as the gauge 10 of the first embodiment. The main difference is that the gauge 110 comprises an alternative coupling for securing the second member 116 to the elongate member 118. The alternative, and generally preferred, coupling of the second embodiment comprises two screws 54a, 56a and complementary turning knobs 54b, 56b, which knobs 54b, 56b may be made from any suitable material such as plastic. The screws 54a, 56a preferably extend substantially orthogonally from a support 58. The screws 54a, 56a (similar to the screws 24a, 26a) are adapted to protrude, in use, through the longitudinal channel 128 of the elongate member 118.

[0035] Referring to Figure 9 in particular, the second member 116 is adapted to receive the screws 54a, 56a protruding through the longitudinal channel 128 through suitably dimensioned apertures provided in the second member 116. Once the second member 116 is in place, and referring now to Figures 8 - 11 for example, the turning knobs 54b, 56b are placed on the respective screws 54a, 56a and tightened to secure the coupling. The knobs 54b, 56b can be loosened and re-tightened as appropriate in order to move the second member 116 along the channel 128 of the elongate member 118.

[0036] The support 58 is preferably in the form of an elongate, preferably cylindrical rod 58 which is slideable along the length of the longitudinal channel 128. Similar to the first embodiment, the screws 54a, 56a, are adapted for a securing arrangement with the second member 116, such that movement of the rod 58 along the longitudinal channel 128 effects movement of the second member 116 along the longitudinal channel 128.

[0037] Referring to Figures 10 and 12, the longitudinal channel 128 preferably includes tapered side surfaces 60a, 60b on at least the first side of the gauge 10, i.e. the side of the channel 128 adapted to receive the rod 58 in use. The rod 58 is therefore shaped and dimen-

sioned to partially protrude into the channel 128 such that rounded sides 58a, 58b of the rod 58 engage the respective tapered side surfaces 60a, 60b for a complementary fit. In this way, movement of the rod 58 is guided by the engagement of the rod 58 with the tapered side surfaces 60a, 60b.

[0038] Referring now to Figure 13 for example, the surface 114 of the first member 112 is preferably tapered to form first and second tapered side surfaces 62a, 62b. The surface 114 is preferably 6 mm in width, and the first and second side surfaces 62a, 62b are approximately 1 mm each in width. However, it will be appreciated that the surface 114 and tapered side surfaces 62a, 62b may have any other suitable width. In use, as the surface 114 is being drawn across the tread 142, the leading tapering side surface contacts the concrete and tends to deflect excess concrete away from the gauge 110. Thus, the leading tapered side surface enables the surface 114 to be drawn across the concrete more easily, as the surface 114 levels the remaining concrete. The surface 114 is advantageously tapered on both sides so that the gauge 110 can be used in either direction.

[0039] It will be appreciated that the invention is not limited to the embodiments described herein. It will be appreciated that the guide described as comprising the second member 16; 116 and the clamps 30; 130, may be adapted in any suitable way. For example, instead of the clamps 30; 130, or in addition thereto, the second member 16; 116 may be provided with a longitudinal channel or recess (not shown), within which a stop (not shown) would be slideable. The stop would preferably have the same function as the clamps 30; 130, and may be similarly shaped and dimensioned. It will be further appreciated that a notch (not shown) may alternatively or additionally be provided in the second member 16; 116 which would engage, in use, the side edge portion 48b; 148b and/or the top edge portion 48a; 148b of the formwork 39; 139 of the adjacent step 40; 140. The notch would therefore provide further means of keeping the gauge 10; 110 accurately aligned with the step 40; 140 being constructed, in particular the tread 42; 142 being levelled, as the surface 14; 114 is drawn across the tread 42; 142.

[0040] It will be further appreciated that although the gauge 10; 110 is shown in Figures 6, 7 and 14 as being adapted to engage an adjacent upper step 40; 140, the gauge 10; 110 may be adapted to engage an adjacent lower step. For example, the first member 12; 112 may include a protrusion (not shown) projecting from the surface 14; 114, which protrusion would engage the edge generally indicated as B in Figures 6, 7 and 14. In this way, the first member 12; 112 may be substantially L-shaped (not shown), in which case the first member 12; 112 would be adapted to guide the surface 14; 114 by contacting the lower step, as the surface 14; 114 is drawn across the tread 42; 142.

[0041] It will be apparent that the elongate member 12; 112 is not limited to defining a longitudinal channel 28; 128 in the form of an aperture, and that the gauge 10; 110 may alternatively include any other suitable slideway (not shown). Alternatively or additionally, the second member 16; 116 may be moveable relative to the elongate member 12; 112 in any other suitable way not previously described herein. Furthermore, the first and/or the second members 12; 112, 16; 116 may also be adapted, in use, to be pivotable about an axis perpendicular to the longitudinal axis of the elongate member 12; 112.

[0042] It will be further apparent that the gauge 10; 110 may be used facing in different directions. For example, Figures 7 and 14 show a first side of the gauge 10; 110 of the respective first and second embodiments in use. In this position, the gauge 10; 110 may be drawn along the concrete in either direction, as shown by the arrows, depending on the user's preference. As previously mentioned herein, the gauge 10; 110 is preferably drawn across the tread 42; 142 using one sweeping movement. Referring to Figures 7 and 14, the tapered end 12b of the first member 12; 112 is shown to abut the join 50; 150. However, it will be appreciated that the gauge 10; 110 may be turned around so that the opposite tapered end 12a abuts the join 50; 150. It will be still further apparent that the angles A of the first and second ends 12a, 12b, are not limited to falling within the range of 15° - 40°, and that any other suitable angles (not shown) may be used.

[0043] Similarly, the gauge 10; 110 may be adapted in size and dimension as required. For example, the second member 16; 116 may, if desired, be only half the length of the second member 16; 116 previously described herein, so that the second member would have a substantial L-shape (not shown), or any other suitable shape (not shown).

[0044] It will be appreciated that the coupling is not limited to comprising screw and wing nut arrangements 24, 26 or a plurality of screws 54a, 56a and knobs 54b, 56b. Although each of the couplings described herein include two spaced apart securing means (e.g. the screws and wing nuts or knobs), the couplings may comprise any other suitable securing means (not shown) such as a single securing means (not shown). As a further alternative, it will be apparent that the screws 54a, 56a may be welded to the second member 116 of the second embodiment once the second member 116 has been placed on the screws 54a, 56a.

[0045] The present invention is not limited to the embodiments described herein which may be amended or modified without departing from the scope of the present invention.

Claims

1. A gauge (10; 110) for levelling a tread (42; 142) of a step (40; 140) made from concrete, the gauge (10;

110) comprising a surface (14; 114) which is, in use, adapted to be drawn across the tread (42; 142) to level same; and a guide (16; 116) which is shaped and dimensioned to engage an edge (48; 148) of an adjacent step (40; 140) while the surface (14; 114) is being drawn across the tread (42; 142), in order to maintain the correct position of the surface (14; 114) relative to the tread (42; 142) during use.

2. A gauge (10; 110) as claimed in Claim 1, wherein the position of the guide (16; 116) relative to the surface (14; 114) is adjustable in order to allow the gauge (10; 110) to be used with steps of various dimensions.

3. A gauge (10; 110) as claimed in Claim 1 or Claim 2, wherein the gauge (10; 110) includes a slideway (18, 20; 118, 120); a first member (12; 112) on which the surface (14; 114) is formed, the first member (12; 112) being mounted to the slideway (18, 20; 118, 120); and a second member (16; 116) forming the guide, the second member (16; 116) being slideably mounted to the slideway (18, 20; 118, 120).

4. A gauge (10; 110) as claimed in Claim 3, wherein each of the first and second members (12; 112, 16; 116) is substantially elongate and is mounted substantially orthogonally to the slideway (18, 20; 118, 120).

5. A gauge (10; 110) as claimed in Claim 3 or Claim 4, wherein the first member (12; 112) is formed integrally with the slideway (18, 20; 118, 120).

6. A gauge (10; 110) as claimed in any one of Claims 3 to 5, wherein the slideway (18; 20, 118; 120) defines a longitudinal channel (28; 128) along which the second member (16; 116) is moveable.

7. A gauge (10; 110 as claimed in any one of Claims 3 to 6, wherein the second member (16; 116) is releasably secured to the slideway (18, 20; 118, 120) by a coupling, the coupling enabling the second member (16; 116) to be slideably moveable along the length of the slideway (18, 20; 118, 120).

8. A gauge (10; 110) as claimed in Claim 7, wherein the coupling comprises a projection (54a, 56a) protruding, in use, through the longitudinal channel (128), and which projection (54a, 56a) is mounted to and extends from a support (58) which is slideable along the length of the longitudinal channel (128); the projection (54a, 56a) being adapted for a securing arrangement with the second member (116), such that movement of the support (58) along the longitudinal channel (128) effects movement of the second member (116) along the longitudinal channel (128).

9. A gauge (10; 110) as claimed in Claim 8, wherein the longitudinal channel (128) includes tapered side surfaces (60a, 60b) such that when the support (58) is in the form of a rod, the rod partially protrudes into the channel (128) by engaging with the tapered side surfaces (60a, 60b), such that movement of the support (58) is guided by the engagement of the support (58) with the tapered side surfaces (60a, 60b).

10. A gauge (10; 110) as claimed in any one of Claims 3 to 9, the first member (12; 112) has first and second opposed ends (12a, 12b; 112a, 112b), each of which ends tapers substantially to a point.

11. A gauge (10; 110) as claimed in any one of Claims 3 to 10, wherein the second member (16; 116) further includes at least one clamp (30; 130) mounted thereto, which clamp (30; 130) is shaped and dimensioned to engage the edge (48; 148) of the adjacent step (40; 140) while the surface (14; 114) is being drawn across the tread (42; 142), thereby acting as a guide.

12. A gauge (10; 110) as claimed in any one of Claims 3 to 11, wherein the second member (16; 116) includes a second slideway to enable the clamp (30; 130) to be moveable along the length of the second member (16; 116).

13. A gauge (10; 110) as claimed in any preceding claim, wherein the surface (14; 114) of the gauge (10; 110) is substantially tapered along the longitudinal side edges thereof.

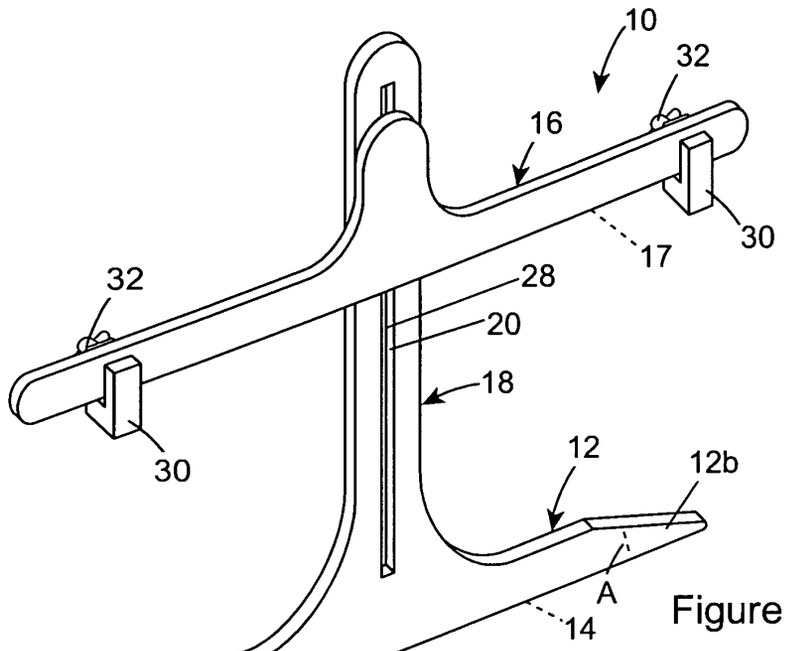

Figure 1

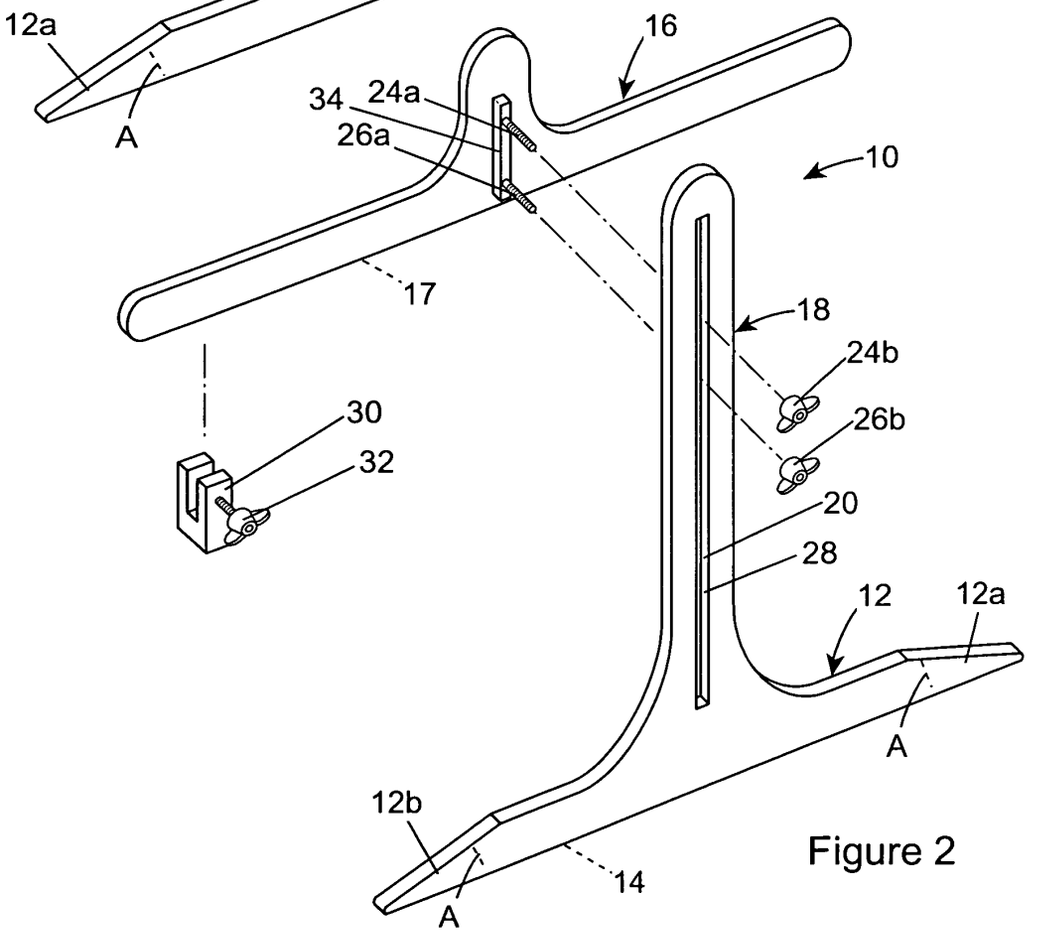

Figure 2

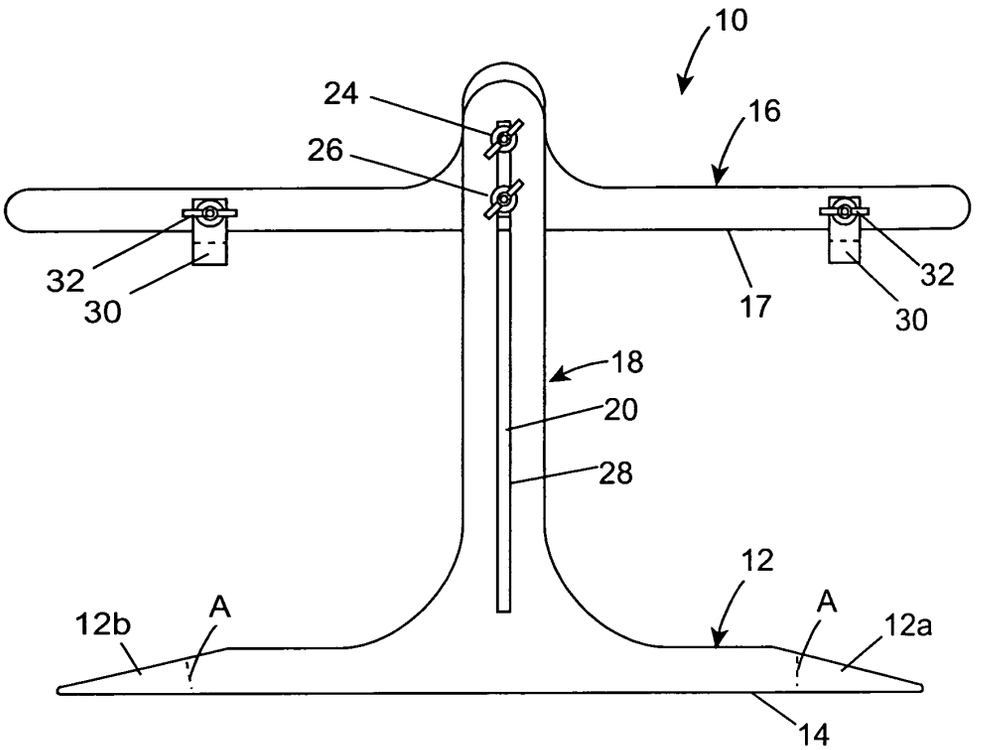

Figure 3

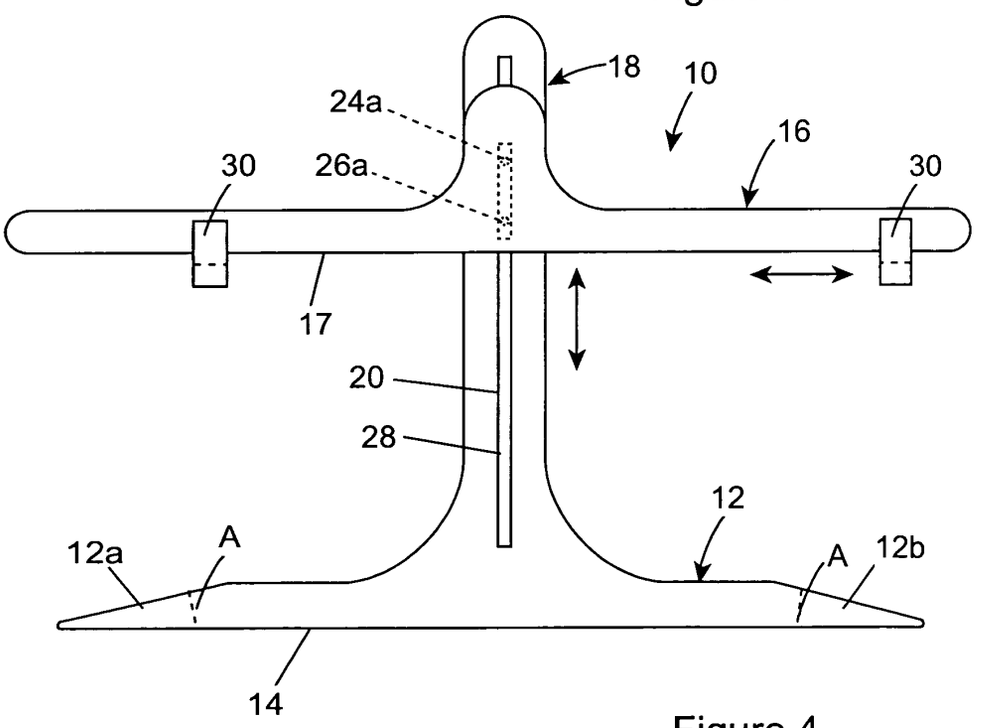

Figure 4

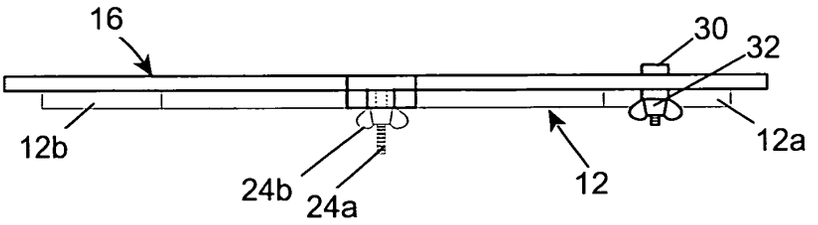

Figure 5

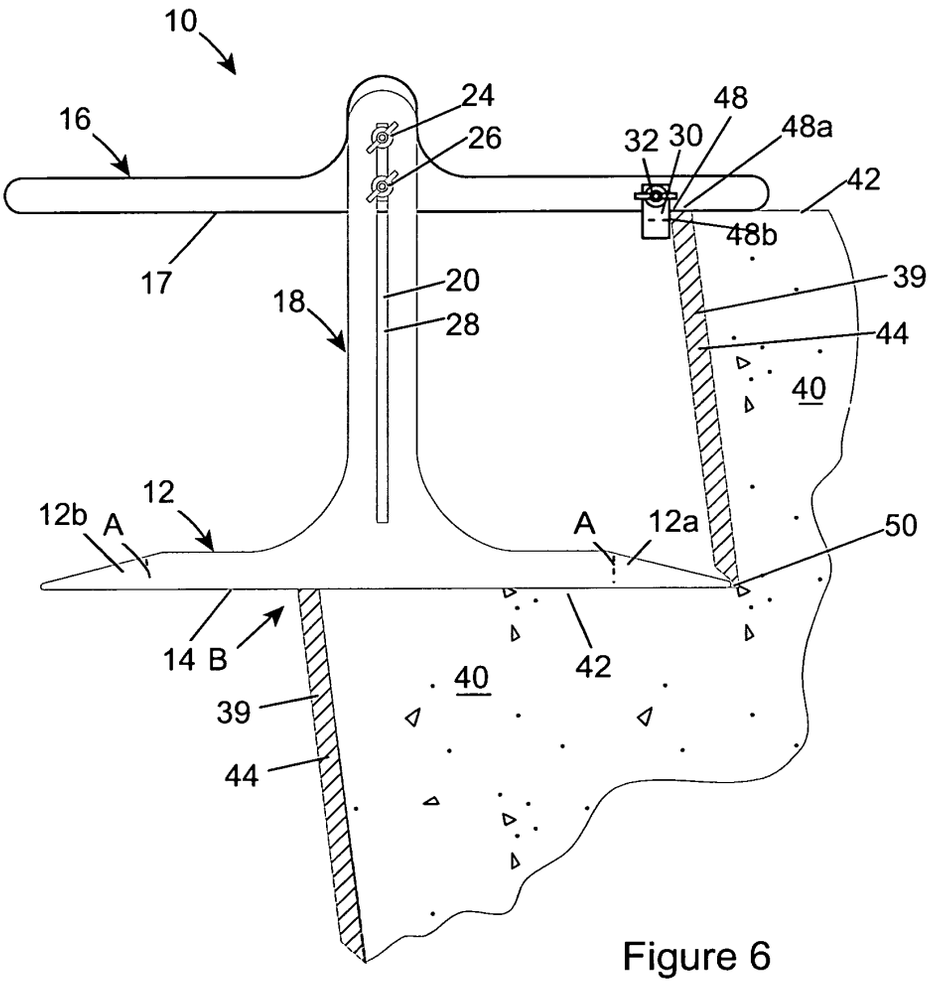

Figure 6

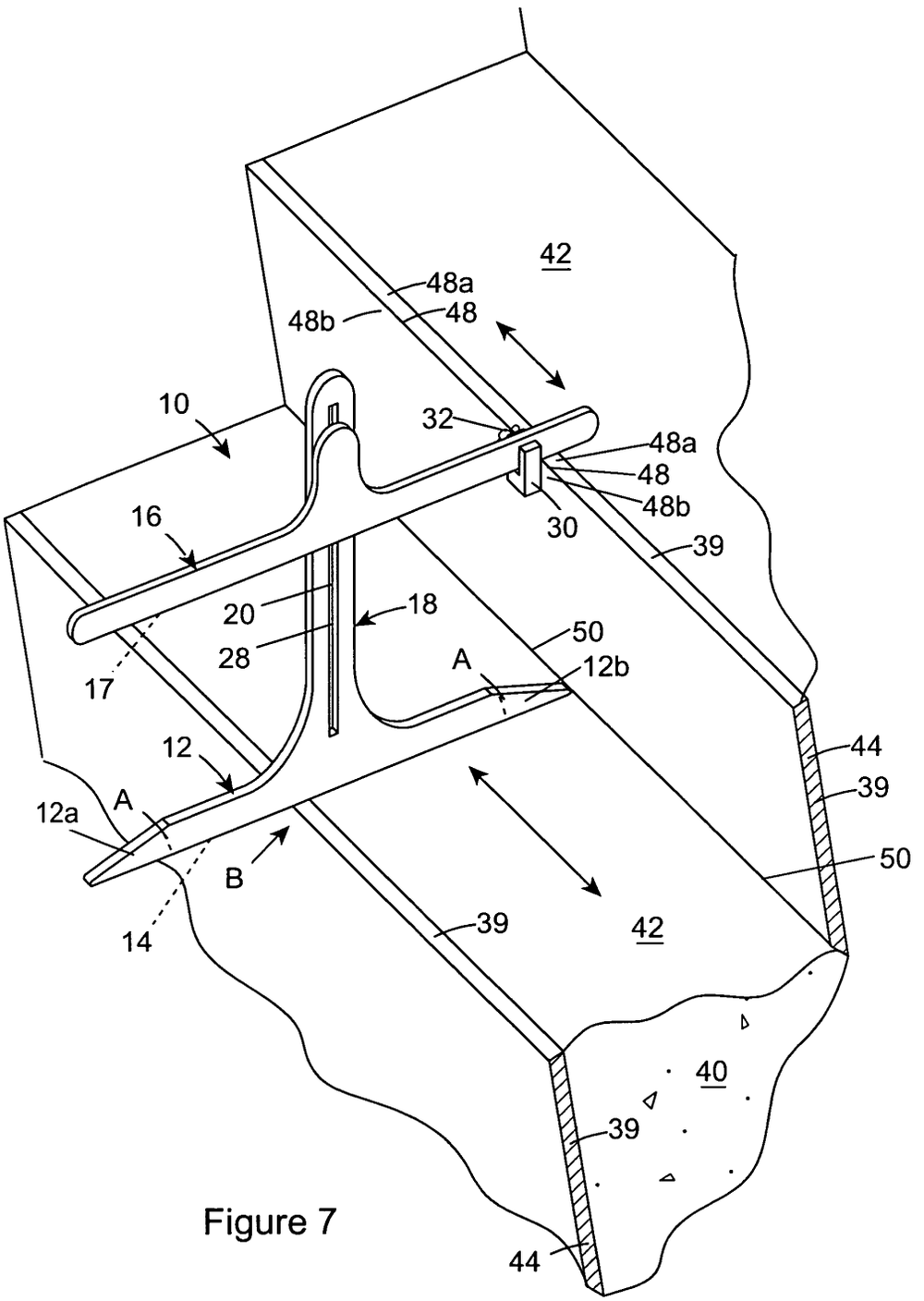
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Figure 7

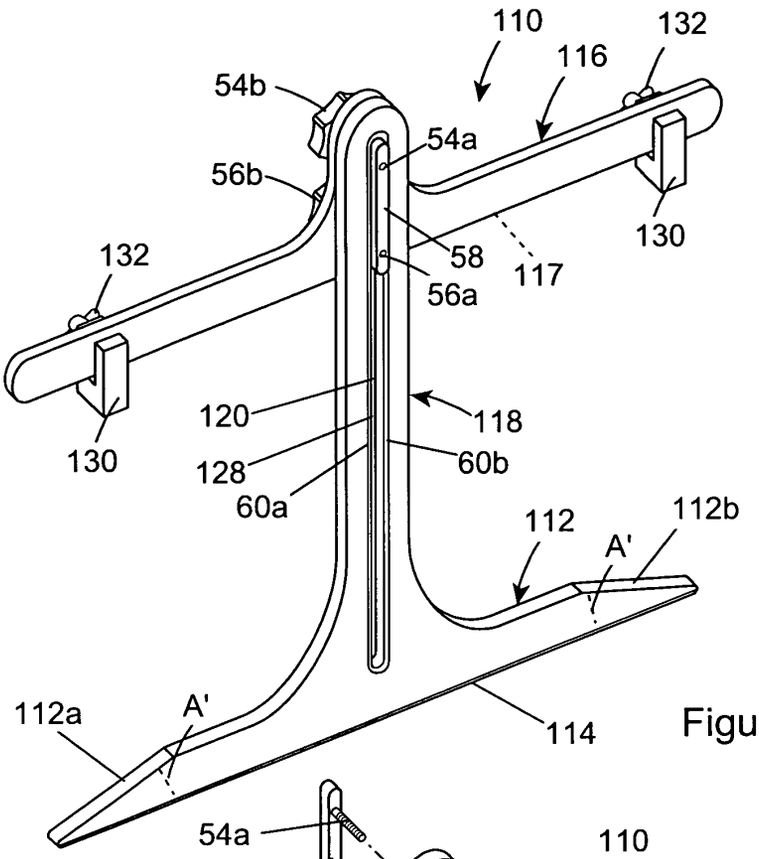


Figure 8

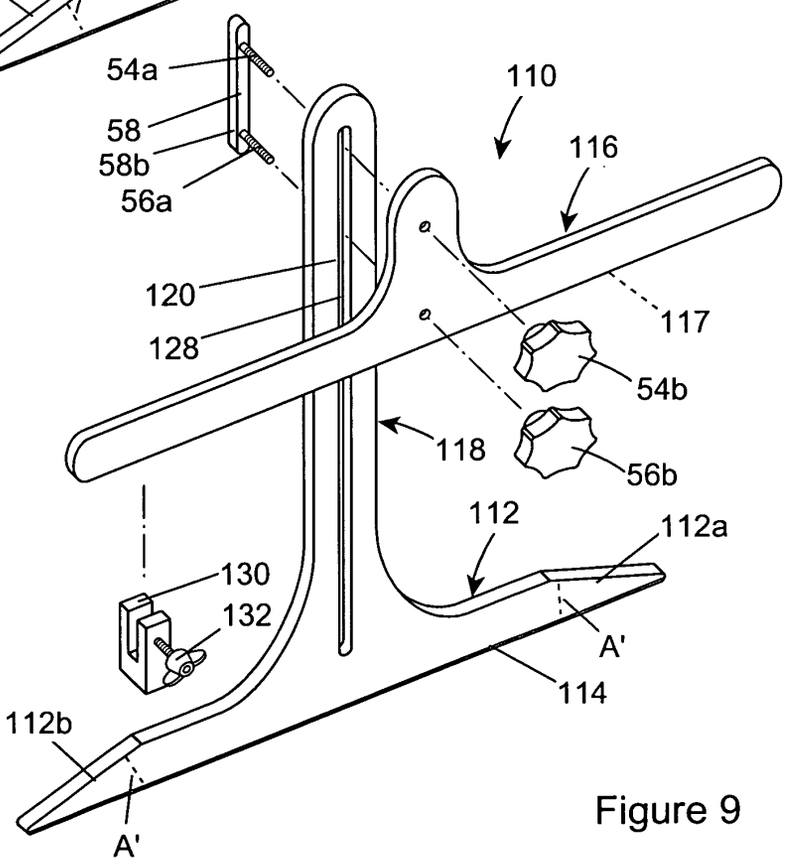


Figure 9

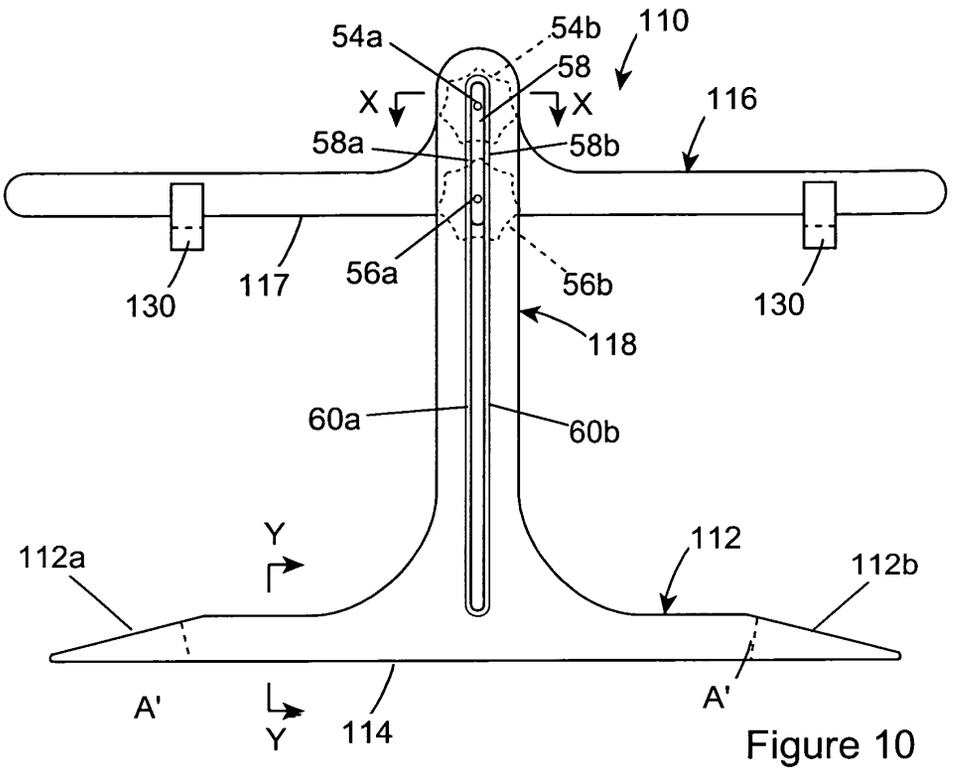


Figure 10

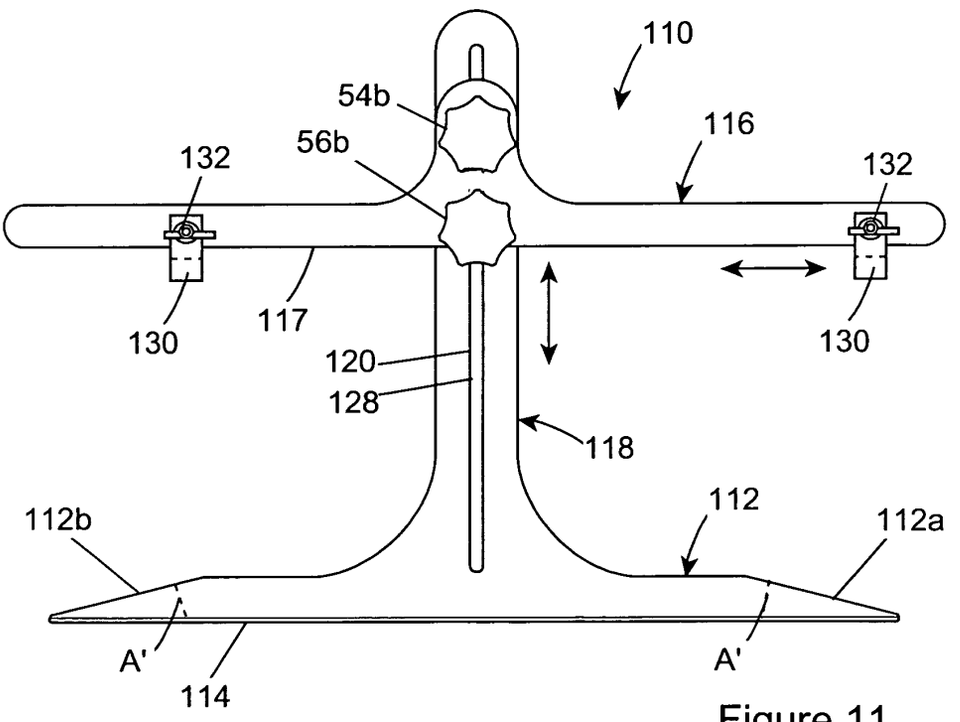


Figure 11

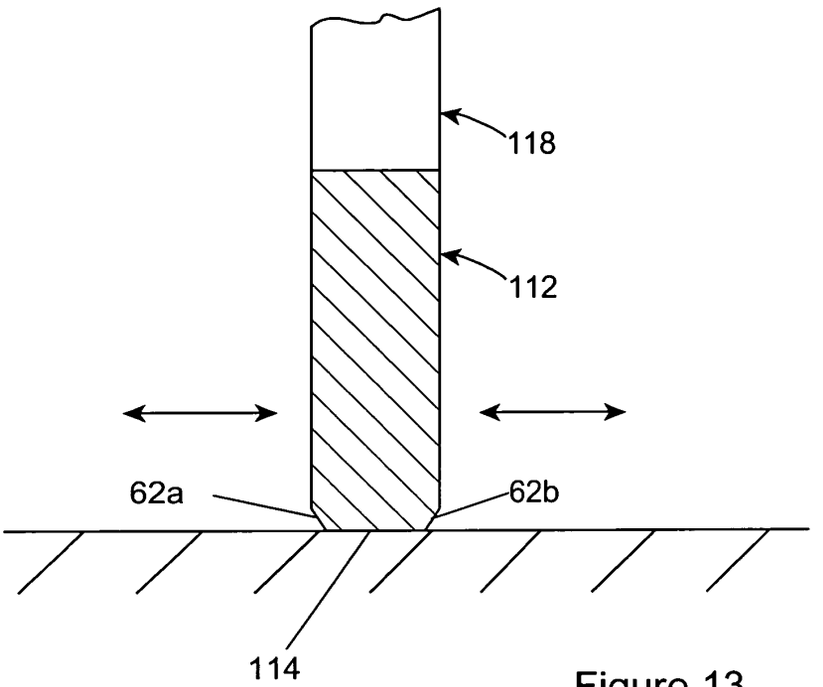


Figure 13

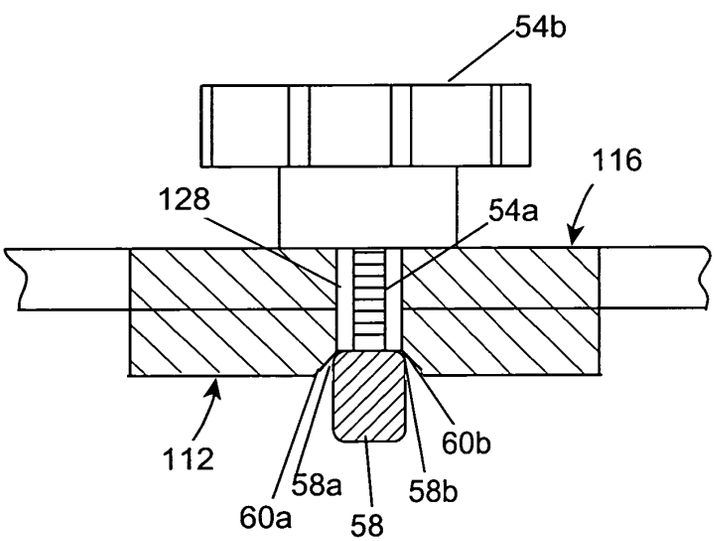
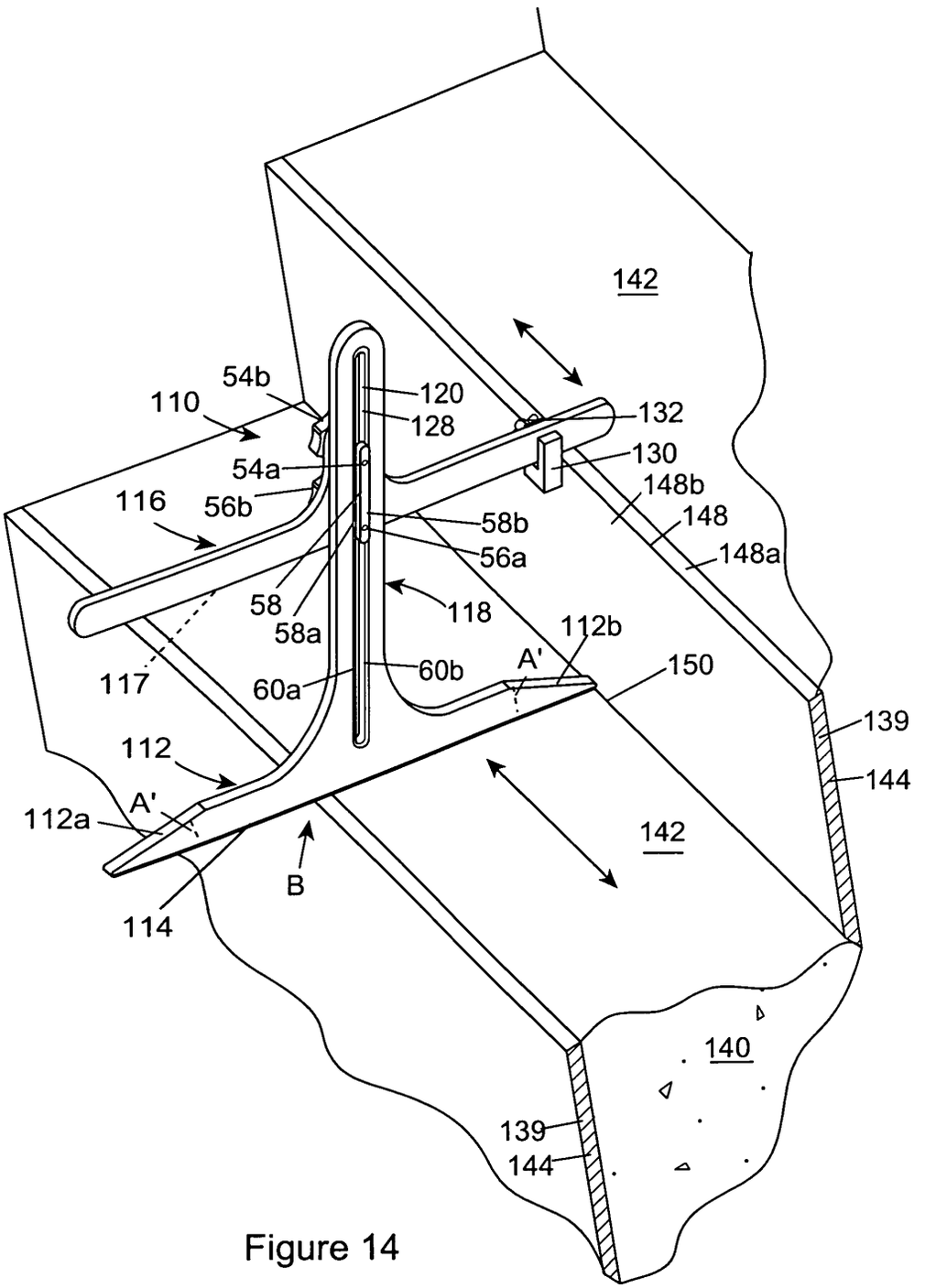


Figure 12


142
54b
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132
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54a
148b
116
56b
58b
148
56a
148a
58
58a
118
112b
A'
117
60a
60b
150
139
112
144
A'
112a
142
B
114
140
139
144

Figure 14