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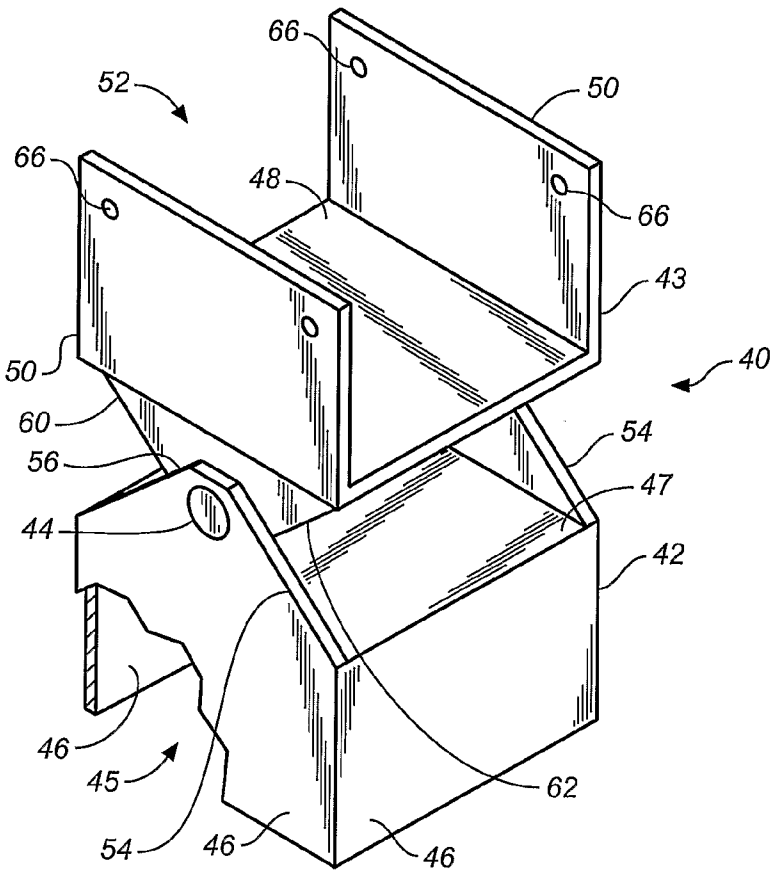
(54) **Title:** ARTICULATED SHORING CUP



(57) **Abstract:** An articulated shoring cup comprises a cup member (42) having a recess (45) for receiving the upper shore member of a shore, and a channel member (43) joined in pivoting relation to the cup member (42), the channel member having a channel (52) for capturing the bottom stringer member of falsework to be supported at an oblique angle.

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ARTICULATED SHORING CUP

TECHNICAL FIELD

[001] This invention relates to shoring devices, and in particular to an articulated shoring cup which fits on the top or bottom of one of the shoring members used to construct a shore.

BACKGROUND ART

[002] Shoring is generally erected as a temporary support structure for falsework during construction of a structure such as a concrete building or parking garage. Falsework generally consists of a horizontal structure used for support of workers and equipment or as a form for concrete work, or an inclined structure for construction of ramps or staircases. Shores are usually vertical, or nearly vertical, members which support the falsework. A typical shore is constructed of timbers comprising a lower shore member and an upper shore member of equal size, but perhaps different lengths, connected by two shore clamps. In a common practice, the lower shore member is first positioned on a support surface. Then two shore clamps, such as those available from the Ellis Manufacturing Company, known as Ellis® shores, are attached to the upper portion of the lower shore member. A shore clamp typically comprises two plates sized to fit the dimension of the timber selected, connected by two sturdy lengths of steel rod. One plate is attached to the lower shore member with the lengths of steel rod extending obliquely downward across the member. Next, the upper shore member is slipped between the steel rods inside the other plate and lifted up until its top is brought into contact with the falsework above, leaving a lower portion of the upper shore member in sliding engagement with an upper portion of the lower shore member. Since the plate on the upper shore member is lower than the plate on the lower shore member, downward pressure on the upper member increases inward pressure on the plates, thereby pressing the upper and lower shore members firmly together along their overlapping surfaces.

[003] Finally, the top of the shore is generally affixed to a bottom stringer member of the falsework with a cleat, the bottom portion of the cleat being nailed to the upper shore member, and the upper part of the cleat being nailed to the stringer. If the

falsework is being used for construction of a concrete stair, necessarily the falsework will be built according to the incline of the stair. Therefore, the shore will meet either the support surface or the falsework at an oblique angle. In this circumstance, it is considered good practice to supplement the connection between the shore and the stringer with a wooden block inserted in the angular gap between the top of the upper shore member and the stringer as an extra measure to guard against slippage of the shore and to ensure tight support of the falsework by the shore.

[004] Construction of a proper shore at an angle to the falsework is time consuming and occasionally dangerous. Typical erection of a shore at an angle to falsework involves one, or, more likely, two workers to hold the lower shore member in position on the supporting surface while raising the upper shore member to bring it into contact with the falsework. Then one worker must usually ascend a ladder to nail the cleat in place and wedge and nail the block in position. Many construction situations do not easily lend themselves to placement of a ladder, as, for example, when building the upper levels of a stairway.

[005] Erection of shoring was eased with the availability of shoring cups, which are useful when erecting shoring beneath horizontal falsework. In normal usage, the shoring cup is attached to the falsework at a desired spacing before raising the falsework into place. Thereafter, the upper shore member can be raised into the shoring cup, obviating the need for a cleat. The shoring cup, however, does not lend itself to shoring when the shore is built at an angle to the falsework or the supported surface.

DISCLOSURE OF THE INVENTION

[006] An articulated shoring cup according to the invention is comprised of a cup member and a channel member joined in pivoting relation. A recess defined by the cup member is sized for receiving the upper end of an upper shore member. The channel member defines a channel for capturing the bottom stringer member of supported falsework. The articulated relationship between the cup member and the channel member thus facilitates shoring up falsework being erected at an oblique angle.

BRIEF DESCRIPTION OF DRAWINGS

[007] Fig. 1A is a perspective view of a prior art shoring cup positioned on a shore

in support of a horizontal falsework stringer.

[008] Fig. 1B is a perspective view of the prior art shoring cup shown in Fig. 1A.

[009] Fig. 2A is a perspective view of an articulated shoring cup according to the invention.

[010] Fig. 2B is a perspective view of an second embodiment of an articulated shoring cup according to the invention with a removable pivot pin.

[011] Fig. 2C is a perspective view of an third embodiment of an articulated shoring cup according to the invention wherein the channel of the channel member is turned ninety degrees relative to the orientation of the channel shown in Fig. 2A.

[012] Fig. 2 is an elevation view of a prior art shore on the left, and a shore using an articulated shoring cup according to the invention on the right, both in support of inclined falsework.

[013] Fig. 3 is an elevation view of two shores, one extending obliquely from a supporting surface and one vertically, both in support of horizontal falsework.

[014] Fig. 4A is a perspective view of a third embodiment of an articulated shoring cup according to the invention.

[015] Fig. 4B is an exploded perspective view of the articulated shoring cup shown in Fig. 4A.

[016] Fig. 5 is a sectional elevation view taken along lines 5-5 of the articulated shoring cup shown in Fig. 4A.

BEST MODE FOR CARRYING OUT THE INVENTION

[017] A typical shore is generally indicated by numeral 10 in Fig. 2, and comprises a lower shore member 12 and an upper shore member 14 joined together with two shore clamps 16. Each shore clamp 16 comprises an upper plate 18 and a lower plate 20 joined together by steel rods 22. In Fig. 2, the shore is being used to shore up inclined falsework 24 such as would be used in the construction of a concrete stairway. In normal building practice, the lower shore member 12 is placed on a supporting surface 26, and the upper shore member 14 is slid inside the shore clamps 16 upward until it is brought into contact with the falsework 24. Depending on the situation, this can usually be accomplished by one or two workers. A worker then must nail a cleat 28 to the upper end of the upper shore member 14 and to the bottom stringer member 23 of the falsework 24 to secure the shore 10 to the

falsework 24. Usually a block 30, such as a scrap of a two-by-four board, is driven into the angular space between the top of the upper shore member 14 and the lower edge of the falsework 24. The block 30 is then nailed in place to create a snug fit between the upper shore member 14 and the falsework 24. A prior art shoring cup, indicated generally at 2 in Figs. 1A and 1B, is useful in making a secure connection between the shore 10 and horizontal stringer 23. The prior art shoring cup 2 comprises four walls 3 defining a cavity 4. In typical use two tapered upper flanges 5 are positioned around the stringer 23 and nailed in place through nail holes 6. Once the falsework is erected, the upper shore member 14 is inserted into cavity 4, preventing lateral movement of the shore and supporting the stringer 23.

[018] An articulated shoring cup according to the invention, indicated generally at numeral 40, is illustrated in Fig. 2A. The invention comprises a cup member 42 and a channel member 43 joined in articulating relation via pivot pin 44. The cup member 42 has a recess 45 defined by four walls 46 and a bottom plate 47. The channel member 43 includes two side walls 50 extending upwardly from opposing edges of a base plate 48 to define a channel 52. Upwardly extending flanges 54 of the cup member 42 are tapered to form a narrow upper portion 56 in each of which are provided apertures 58 for receiving the ends of pivot pin 44. Downwardly extending flanges 60 depend from the base plate 48 of the channel member 43 and taper downwardly to a narrow lower portion 62, in which are provided cooperating apertures 64 for receiving pivot pin 44. In the embodiment shown in Fig. 2A, the upper portion 56 of the upwardly extending flanges 54 overlap on the outside with the lower portions 62 of the downwardly extending flanges 60 for concentric alignment of apertures 58 and cooperating apertures 64, into which pivot pin 44 is received to form the articulating relationship between cup member 42 and channel member 43. The tapered sides of the flanges 54, 60 permit the cup and channel members 42, 43 to articulate mutually by approximately 45° in either direction. Although preferably the pivot pin 44 is welded to apertures 58 in the upwardly extending flanges 54 of the cup member 42, the invention could be assembled by welding the pivot pin 44 to the cooperating apertures 64 in the downwardly extending flanges 60 in the channel member 43, leaving the pivot pin 44 freely rotatable in the apertures 58 of the upwardly extending flanges 54 of the cup

member 42. Finally, nail holes 66 are provided in the upper ends of side walls 50 of channel member 43 for receiving nails as further discussed below.

[019] A second embodiment of the invention, similar to that seen in Fig. 2A, is shown in Fig. 2B. A cup member 42 is pivotally joined to channel member 43 but with a removable pivot pin 32. Pivot pin 32 comprises a shank 34 and head 36, the shank having a hole 38 at the end opposite the head 36, through which is fitted cotter pin 39. Fully assembled, pivot pin 32 is inserted into apertures 58 and cooperating apertures 64 with head 36 and cotter pin 39 disposed outside of upwardly extending flanges 54 of cup member 42. The removable pivot pin provides a significant advantage by allowing the user to select an appropriate match between a cup member sized for particular shores and a channel member of an appropriate dimension to capture the bottom stringer member of the falsework to be supported.

[020] With reference again to Fig. 2, the articulated shoring cup 40 is shown being applied to help shore up inclined falsework 24. In normal usage, the channel member 43 of the device will be fixed to the falsework 24 before it is lifted into position. The device is intended to be supplied in several sizes conforming to standard lumber dimensions. Therefore, a channel member 43 may be selected having a spacing between side walls 50 which will allow it to slip snugly over the lower member of the falsework 24. When the falsework is still at the work site level, it is considerably easier to attach the shoring cup 40 rather than nailing a cleat 28 in place at an elevation above the available work surface. The channel member 43 is fixed in the selected position by nailing through nail holes 66 in side walls 50 on each side of the stringer such that a more positive connection is made than with a single cleat 28. According to the span of the falsework to be supported, a plurality of articulated shoring cups according to the invention will be attached at a spacing familiar to those skilled in the art, such as every four feet. Once the selected number of articulated shoring cups are affixed, the falsework 24 is then lifted into its desired position, and initially supported on each end with a single shore 10. Thereafter, intermediate shores are placed. Each shore is erected in the usual fashion, except that the upper shore member 14 may be inserted into cup member 42 and elevated firmly into place without need for a worker to ascend to the juncture between the upper shore member 14 and falsework 24 to complete the attachment.

It will be readily understood that the shoring cup selected must match the size of lumber used for the upper shore member. It should be noted that by fully encasing the top end of the upper shore member between the four walls 46 and bottom plate 47 of the cup member 42, the shore member is prevented from splitting even under the tremendous stresses brought to bear on it from supporting the falsework.

[021] The advantage heretofore enjoyed by use of shoring cups applicable only for supporting horizontal falsework is thus now available by use of an articulated shoring cup when erecting shores at an angle to falsework. Moreover, the articulating relationship between the channel member 43 and cup member 42 permits placement of the lower end of the lower shore member 12 on an uneven surface with ease and eliminates the requirement that a worker clamber up a ladder to complete the attachment of the shore to the falsework. This allows the lower shore member 12 to be positioned in locations where it may be difficult to place a ladder, such as on a stair of an elevated stairway. It is not necessary to nail the upper shore member 14 into the cup member 42 because the upward force of the upper shore member 14, once inserted into the cup member 42, will prevent its lateral displacement out of the cup member 42. It will be appreciated that demolition of the shore is made much easier by use of the invention in that the upper shore member 14 need merely be lowered until it clears the cup member 42. The shore 10 may then be lowered and disassembled and the articulated shoring cup can be removed after the falsework is taken down.

[022] It is seen in Fig. 3 that the embodiment of the articulated shoring cup illustrated in Fig. 1A may be used in two similar situations, designated by arrows A and B, in both of which the shoring cup is being used to support horizontal falsework 68. In situation A, the shore has been erected at an oblique angle such that, while the channel member 43 is attached to falsework 68 with its base plate in horizontal alignment with the falsework, the cup member 42 is disposed at an angle to the channel member 43. A representative edge form 70 on top of the falsework 68 is in position for construction of another low wall such as wall 94 which is supporting the lower shore member 12 of the shore 10 in situation A. Obliquely angled shoring, such as that shown in Fig. 3, is commonly used to support cantilevered falsework so that it does not flex under the load of workers, equipment and additional falsework.

In situation B, the falsework has been erected vertically such that cup member 42 is in vertical alignment with channel member 43. It should be noted that an existing art shoring cup, that is, a non-articulating shoring cup, would be appropriate to use in situation B. Therefore, as seen in Figs. 2 and 3, the articulated shoring cup can be used in traditional situations, e.g. situation B, and in other situations calling for orientation of the shore at an angle to the falsework, e.g., situation A.

[023] With reference now to Fig. 2C, a third embodiment of an articulated shoring cup according to the invention is indicated generally at numeral 80. This embodiment is similar to that illustrated in Fig. 1A except that the side walls 82 of the channel member 84 extend upwardly from the two edges of the base plate 86 that are in parallel alignment with pivot pin 96, that is, at right angles to the side walls 50 in the embodiment illustrated in Fig. 1A. Accordingly, the cup member 88 articulates about a pivot axis parallel to the channel 90 of the channel member 84, rather than perpendicularly as shown in the embodiment illustrated in Fig. 2A. Nail holes 92 are provided in channel member 84 for securing it to the supporting structure or to falsework as discussed above. This embodiment is depicted in use in Fig. 3 on top of a low wall 94, such as a concrete "crash" wall, with the channel member 84 disposed on top of the wall 94, and the cup member 88 disposed obliquely relative to the channel member 84 about pivot pin 96 to support the inclined shore 10. Optional nail holes 98 are provided in cup member 88 if for any reason it is felt to be prudent to secure further the lower retaining member 12 in the cup member 88.

[024] A fourth embodiment of the invention is illustrated in Figs. 4A, 4B and 5, and is generally indicated at numeral 100 in Fig. 4A. A cup member 102 has four walls 104 and a bottom plate 106 forming a recess 108 for receiving the end of a shore member as discussed above. A channel member 110 is formed from a base plate 112 and downwardly extending side walls 114 forming channel 116. Nail holes 118 are provided in the lower margins of side walls 114 for secure attachment of channel member 110 to the intended falsework.

[025] With particular reference to Fig. 5, a rigid ball 120 is firmly attached to channel member 110 via neck 122. A proximate end 123 of neck 122 is preferably welded to channel member 110 at welding beads 124 and ball 120 is attached to the distal end 125 of neck 122. A threaded stanchion 126 securely attached to the

bottom plate 106 of the cup member 102 includes a centrally disposed, downwardly facing socket 128 having a concave curvature conforming to the convex outer surface of the ball 120. A collar 130 has interior threads 132 matching exterior threads 134 of the stanchion 126. Threaded engagement of collar 130 with stanchion 126 draws collar 130 up onto stanchion 126 until the annular upper rim 136 is brought into contact with the bottom plate 106. A lower portion of the collar 130 includes inwardly curved surface 138 having an annular concave curvature conforming to the convex outer surface of ball 120. When collar 130 is fully engaged with stanchion 126, the socket 128 of stanchion 126 aligns with the inwardly curved surface 138 of collar 130, forming a capturing socket around ball 120, as best seen in Fig. 5. This ball-and-socket arrangement has several advantages. First, it joins cup member 102 and channel member 110 permitting selection of different sized cup members and channel members according to the shore being used and the falsework being supported. Second, it allows the cup member 102 to turn about central axis Z with respect to the channel member in any direction. Third, it allows the cup member 102 to swivel out of parallel alignment with respect to the channel member 110 to limits indicated by the lines L about a vertical axis Z. Oblique annular surface 140 engages with neck 122 when cup member 102 is swiveled, as seen by the broken lines in Fig. 5, thereby limiting the extent to which the cup member 102 can articulate with respect to channel member 110. Similarly, outwardly facing angled surface 142 engages the top of base plate 112 further defining limit of the swiveling action of cup member 102.

[026] An articulated shoring cup according to the invention reduces the need for labor, makes a more positive connection to the falsework, eliminates the need to connect the upper shore member to the falsework with cleats and blocks at a height requiring a ladder, and makes demolition easier and safer. Thus, the invention makes erection of shores at an angle to falsework easier, substantially faster, and safer.

[027] There have thus been described certain preferred embodiments of an articulated shoring cup. While preferred embodiments have been described and disclosed, it will be recognized by those with skill in the art that modifications are within the true spirit and scope of the invention. The appended claims are intended

to cover all such modifications.

CLAIMS

I claim:

1. An articulated shoring cup for use with a shore for supporting falsework, the shore having an upper shore member and a lower shore member, and the falsework having a bottom stringer member, the articulated shoring cup comprising:

a cup member having a recess for receiving the upper shore member, and

a channel member joined in pivoting relation to said cup member, said channel member having a channel for capturing the stringer member, said channel and said recess facing generally in opposite directions.

2. The articulated shoring cup of claim 1 wherein:

said cup member has a bottom plate and four walls extending generally perpendicularly from said bottom plate, said bottom plate and said walls forming said recess,

and said channel member having a base plate and two generally parallel side walls extending upwardly from said base plate, said base plate and side walls forming said channel.

3. The articulated shoring cup of claim 2 wherein:

said channel member is joined with said cup member about a pivot pin, said pivot pin forming a pivot axis,

said channel disposed in perpendicular relation to said pivot axis.

4. The articulated shoring cup of claim 2 wherein:

said channel member is joined with said cup member about a pivot pin, said pivot pin forming a pivot axis,

said channel disposed in parallel relation to said pivot axis.

5. The articulated shoring cup of claim 1 wherein:

said cup member has at least two upwardly extending flanges, each said upwardly extending flange tapered to form a narrow upper portion, each said upper portion having an aperture,

said channel member has at least two downwardly extending flanges, each said downwardly extending flange tapered to form a narrow lower portion, each said lower portion having a cooperating aperture, and

a pivot pin is inserted in said apertures of said upwardly and downwardly extending flanges forming a pivot axis about which said channel member and said cup member move in pivoting relation.

6. The articulated shoring cup of claim 5 wherein:

said pivot pin is removably inserted in said apertures.

7. The articulated shoring cup of claim 6 wherein:

said pivot pin comprises a head, a shank, and a fastener, said head having a diameter larger than one of said apertures, said shank having a first end and a second end opposite said first end, said head affixed to said first end of said shank, said shank inserted in said apertures, said fastener removably affixed to said second end, and said apertures disposed between said head and said fastener.

8. An articulated shoring cup for use with a shore for supporting falsework, the shore having an upper shore member and a lower shore member, and the falsework having a bottom stringer member, the articulated shoring cup comprising:

a cup member having a bottom plate and four walls extending generally perpendicularly from said bottom plate, said bottom plate and said walls forming a recess for receiving the upper shore member, said cup member further having at least two flanges extending upwardly from said bottom plate, each said flange tapered to form a narrow upper portion, each said upper portion having an aperture, and

a channel member joined in pivoting relation to said cup member, said channel member having a base plate and two generally parallel side walls extending upwardly from said base plate, said base plate and side walls forming a channel for capturing the stringer member, said channel member further having at least two cooperating flanges extending downwardly from said base plate, each said cooperating flange tapered to form a narrow lower portion, each said lower portion having a cooperating aperture, said lower portions of said cooperating flanges in

overlapping parallel alignment with said flanges of said upper portions, and

a pivot pin inserted in said apertures forming a pivot axis about which said channel member and said cup member move in pivoting relation.

9. The articulated shoring cup of claim 8 wherein:

said pivot pin is freely movable in said cooperating apertures of said lower portions of said cooperating flanges.

10. The articulated shoring cup of claim 8 wherein:

said pivot pin is freely movable in said apertures of said upper portions of said flanges.

11. The articulated shoring cup of claim 8 wherein:

said side walls of said channel member are disposed in parallel relation to said pivot axis.

12. The articulated shoring cup of claim 8 wherein:

said side walls of said channel member are disposed in perpendicular relation to said pivot axis.

13. The articulated shoring cup of claim 1 further comprising:

a ball and socket mechanism joining said cup and channel members in pivoting relation.

14. The articulated shoring cup of claim 1 further comprising:

a neck, said neck having proximal and distal ends, said proximal end attached to said base plate of said channel member,

a rigid ball secured to said distal end of said neck, said ball having a convex curvature, said neck and said ball defining a central axis,

a stanchion securely attached to said bottom plate of said cup member, said stanchion having a lower surface having a concave curvature conforming to said convex curvature of said ball,

a collar removably attached to said stanchion, said collar having a lower

portion having an inwardly facing annular surface, said annular surface having a concave curvature conforming to said convex curvature of said ball, said annular surface together with said lower surface of said stanchion defining a socket capturing said ball, said ball freely movable in said socket such that said cup member is rotatable about said central axis with respect to said channel member, and so that said cup member pivots with respect to said channel member about said ball.

15. The articulated shoring cup of claim 14 wherein:

said stanchion has exterior threads, and said collar has cooperating interior threads.

16. The articulated shoring cup of claim 14 wherein:

said cup member is movable with respect to said channel member between an axially aligned position and a fully pivoted position, and

said lower portion of said collar has an oblique annular surface, in said fully pivoted position said oblique annular surface in abutting engagement with said neck thereby limiting further pivoting motion of said cup member.

17. The articulated shoring cup of claim 16 wherein:

said lower portion of said collar has an outwardly facing angled surface, in said fully pivoted position said outwardly facing angled surface in abutting engagement with said base plate of said channel member thereby further limiting pivoting motion of said cup member.

18. An articulated shoring cup for use with a shore for supporting falsework, the shore having an upper shore member and a lower shore member, the falsework having a bottom stringer member, the articulated shoring cup comprising:

a cup member having a recess for receiving the upper shore member,

a channel member joined in pivoting relation to said cup member, said channel member having a channel for capturing the stringer member of the falsework, said channel and said recess facing generally in opposite directions,

a neck, said neck having proximal and distal ends, said proximal end

attached to said base plate of said channel member,

a rigid ball secured to said distal end of said neck, said ball having a convex curvature, said neck and said ball defining a central axis,

a stanchion securely attached to said bottom plate of said cup member, said stanchion having a lower surface having a concave curvature conforming to said convex curvature of said ball,

a collar removably attached to said stanchion, said collar having a lower portion having an inwardly facing annular surface, said annular surface having a concave curvature conforming to said convex curvature of said ball, said annular surface together with said lower surface of said stanchion defining a socket capturing said ball, said ball freely movable in said socket such that said cup member is rotatable about said central axis with respect to said channel member, and so that said cup member pivots with respect to said channel member about said ball.

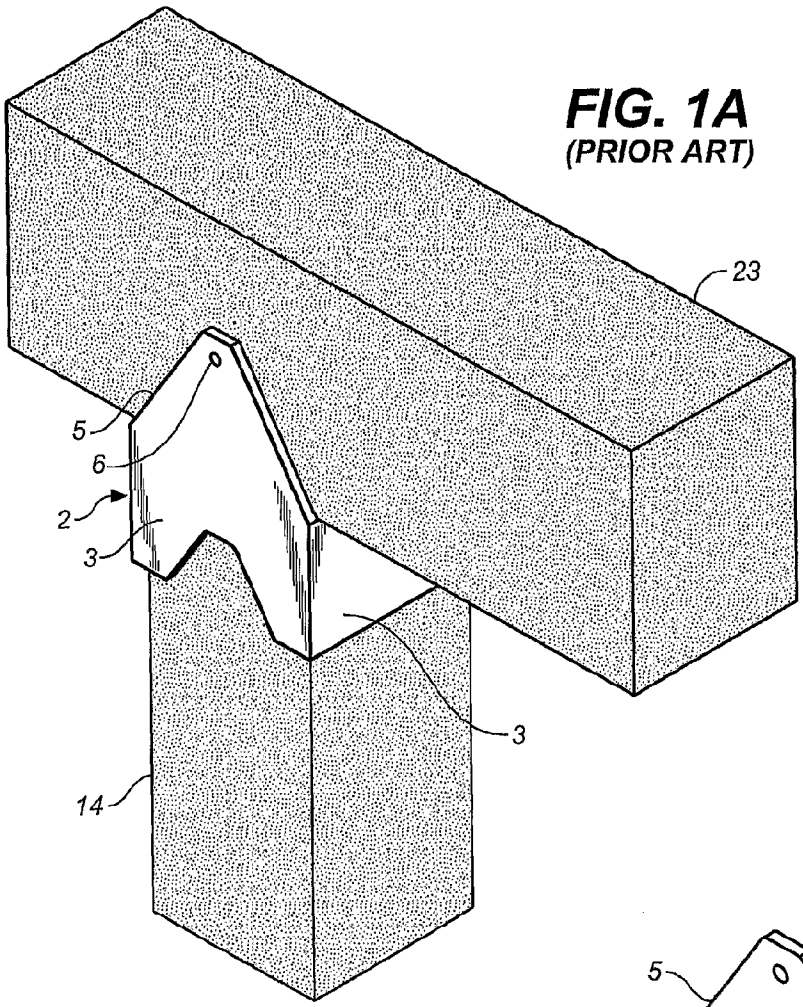

FIG. 1A
(PRIOR ART)

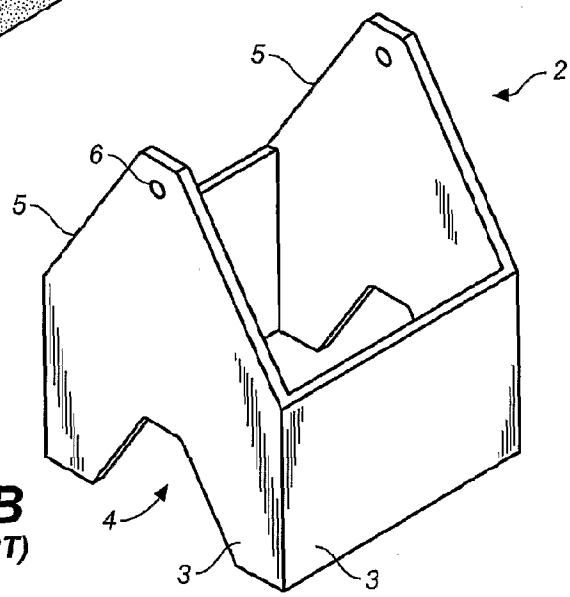

FIG. 1B
(PRIOR ART)

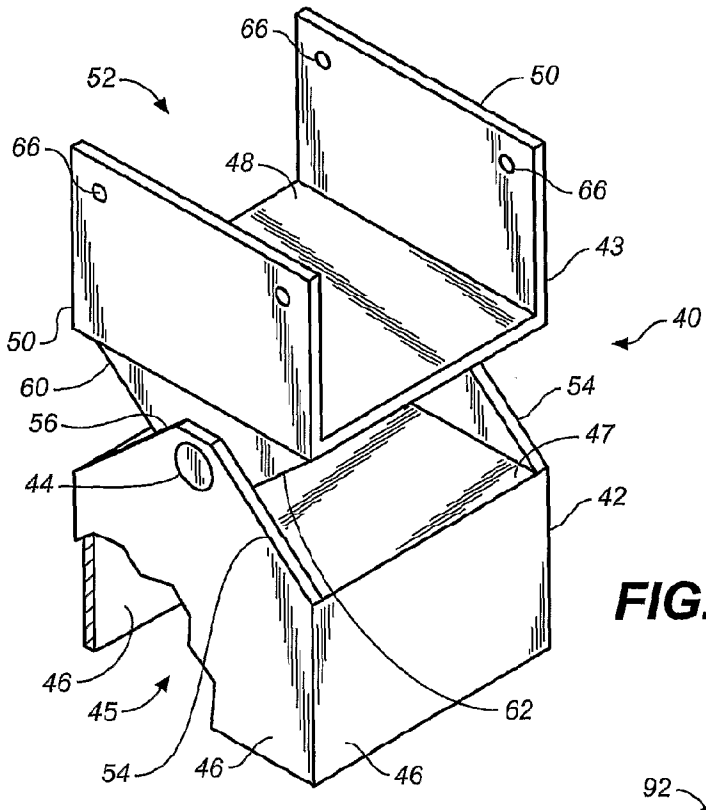
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FIG. 2A

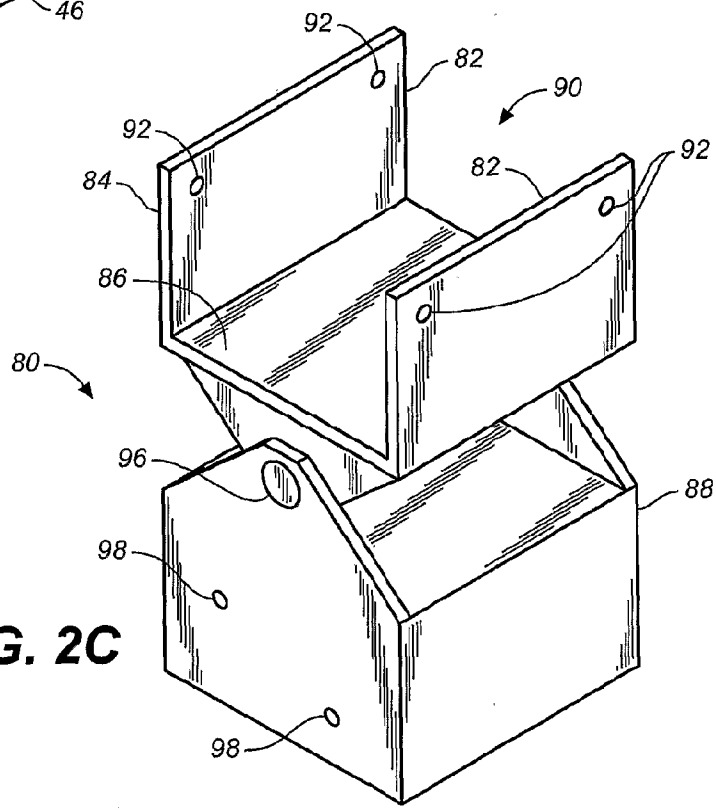
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FIG. 2C

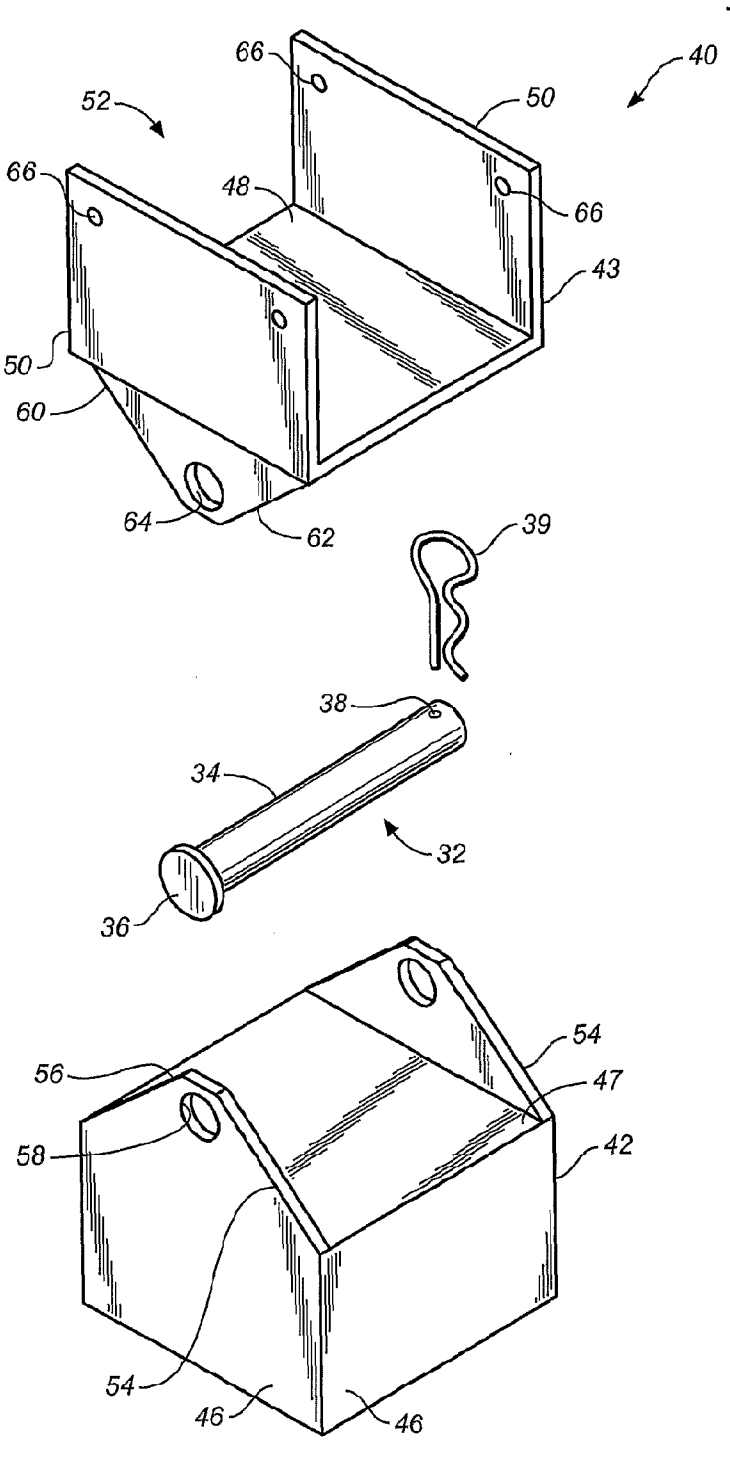
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FIG. 2B

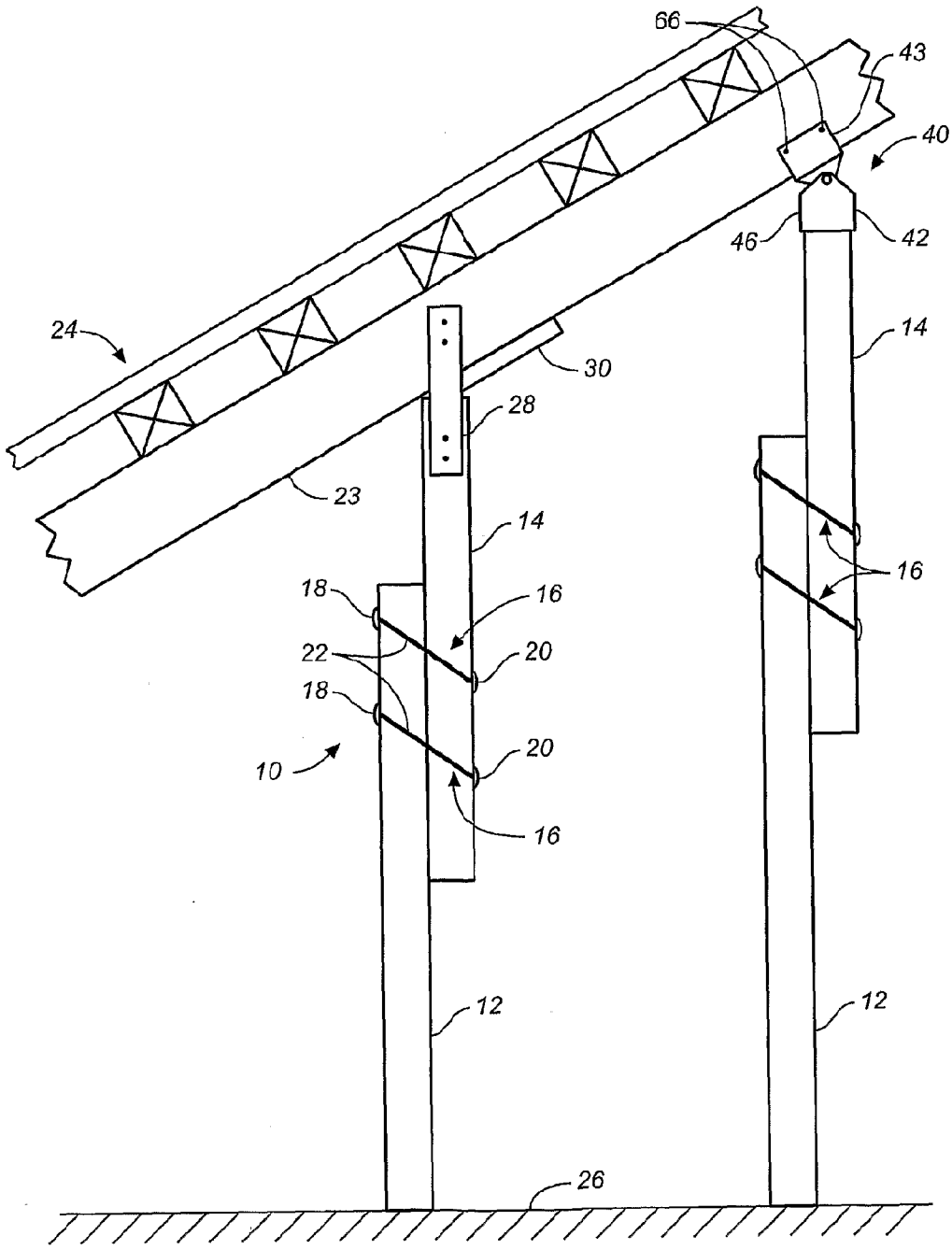

FIG. 2

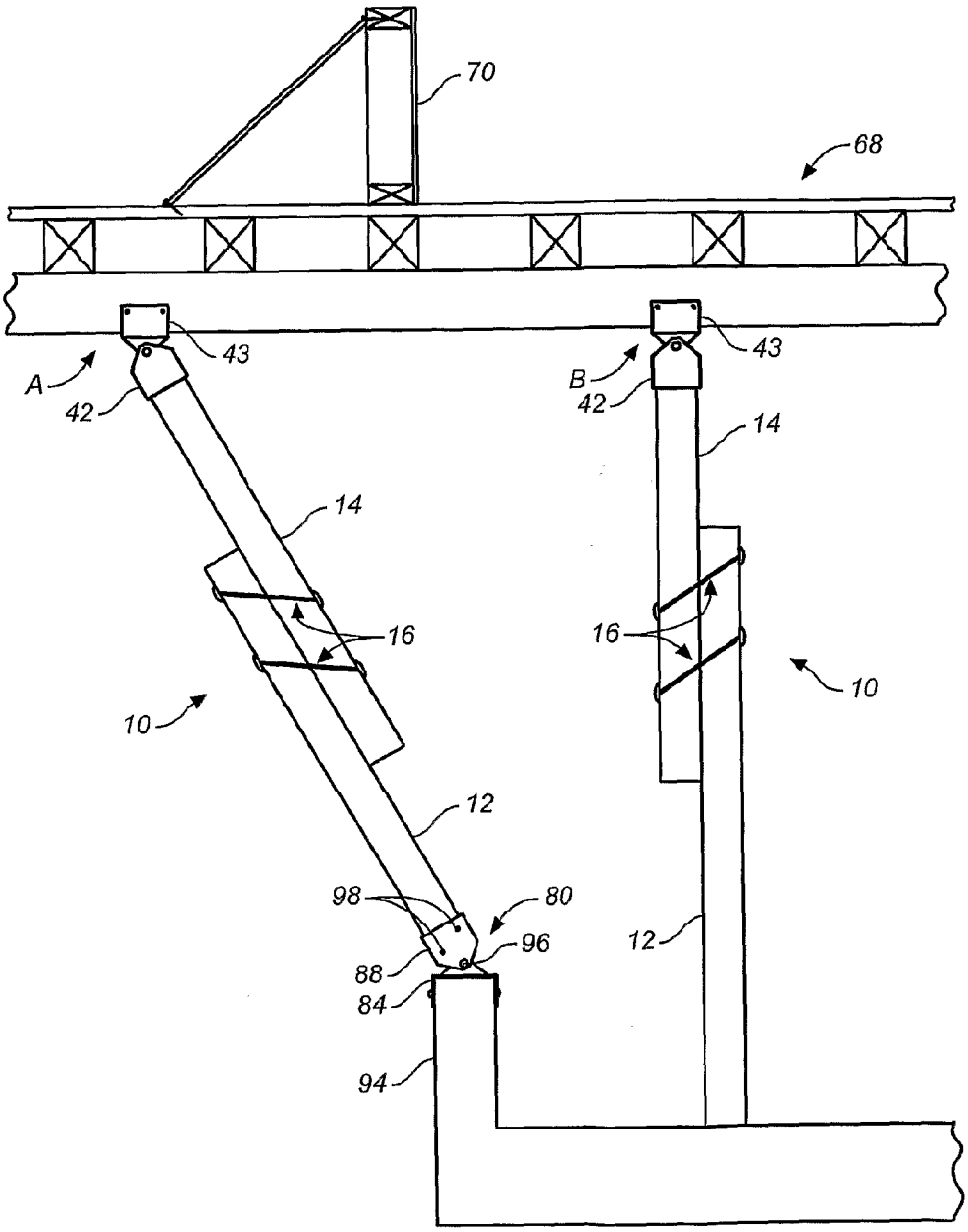

FIG. 3

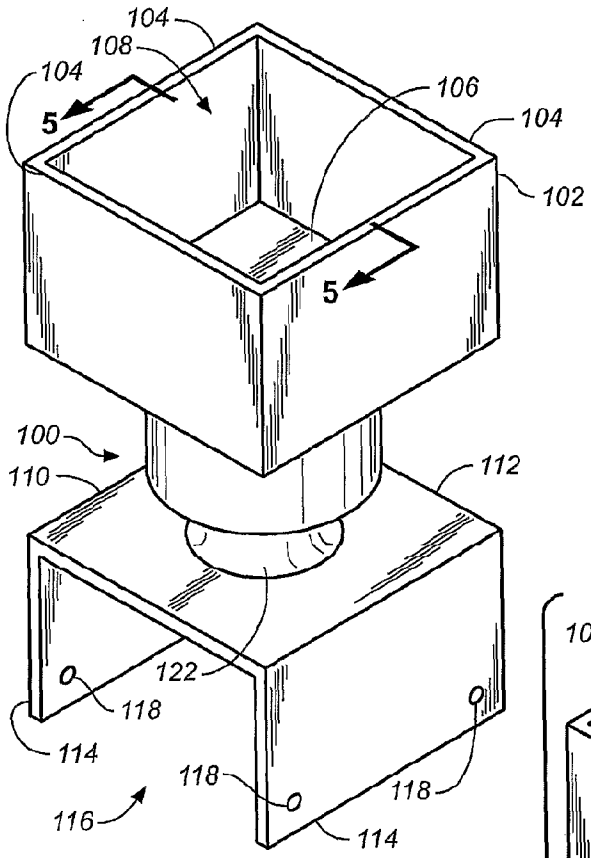
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FIG. 4A

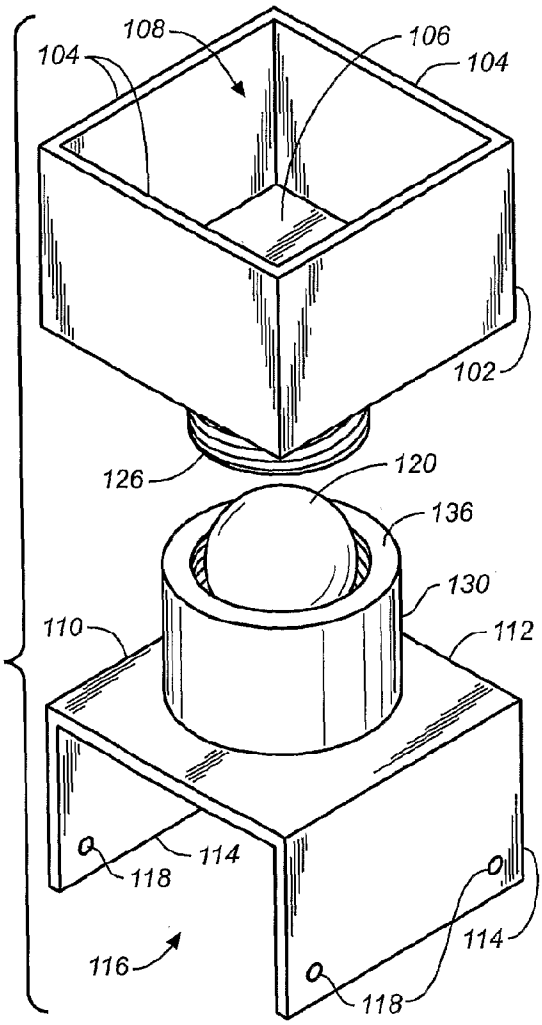
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FIG. 4B

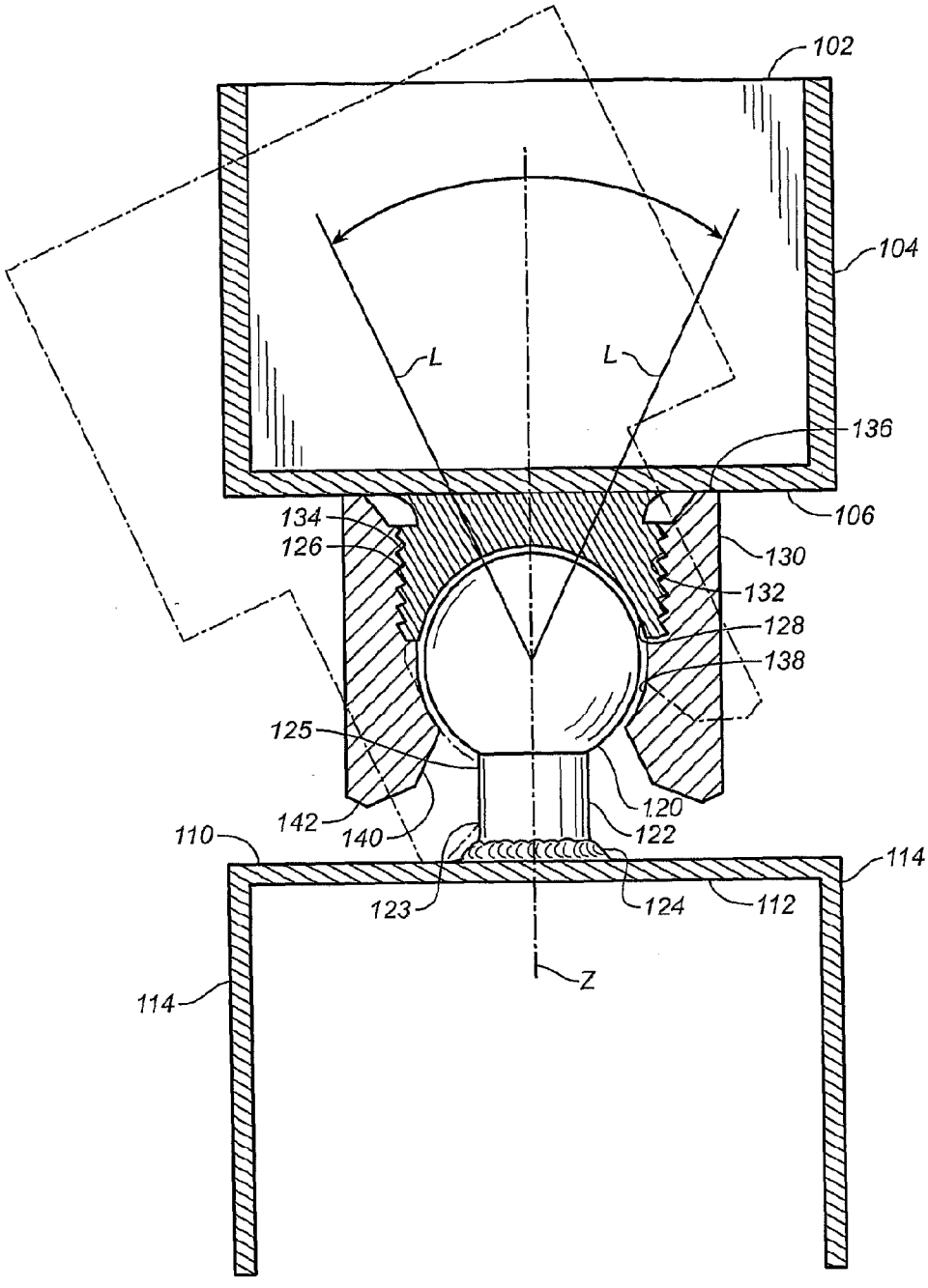
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FIG. 5