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(54) Title: ROD CLIP STAND

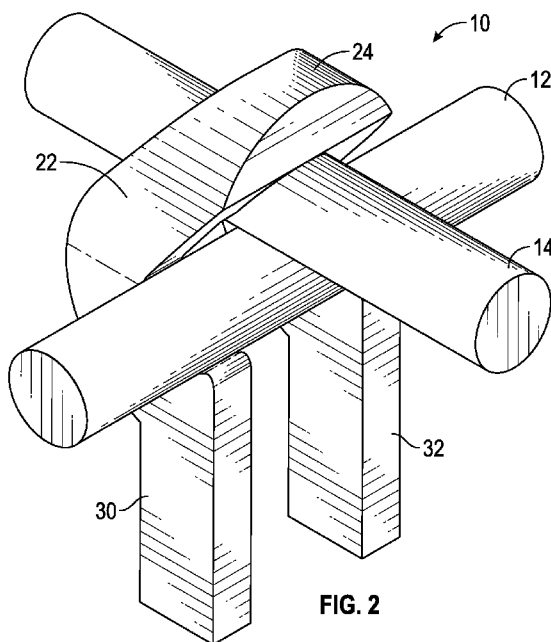


FIG. 2

(57) Abstract: A rod clip stand is disclosed which is configured to releasably secure and retain a pair of rods in a perpendicular orientation. The rod clip stand has a cradle portion supporting a first rod and an arched portion supporting a second rod. The rod clip stand is particularly well suited for fabricating a rebar grid used to reinforce concrete flatwork.



ROD CLIP STAND

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/957,921, filed July 15, 2013, and U.S. Provisional Application No. 61/959,623, filed August 29, 2013. The disclosures of these provisional applications are expressly incorporated by reference herein.

FIELD OF THE INVENTION

[0002] The present invention generally relates to a means for arranging cylindrical elements in a grid or lattice configuration, and more particularly relates to a rod clip stand configured to releasably secure and retain a pair of rods in a perpendicular orientation, and optionally to locate the rods a distance spaced from an adjacent support surface. The present invention is particularly well suited for fabricating a rebar grid used to reinforce concrete flatwork.

BACKGROUND OF THE INVENTION

[0003] In certain construction or fabrication applications, it is necessary to assemble a grid or lattice structure from a set of cylindrical element on the job site. One such application is for concrete construction. In particular, reinforcement bar or rebar for short is used as a tension device in reinforced concrete and reinforced masonry structures, to strengthen and hold the concrete in compression. The surface of the rebar may be patterned to form a better bond with the concrete. In concrete flatwork, the rebar is often assembled into grid generally the dimension of the area to be formed with concrete. It is important that the rebar grid be elevated from the existing surface. In addition, it is beneficial to interconnect the individual rebar elements together so that they remain in the desired location as concrete is poured over the grid. Lastly, it is critical that the concrete be able to flow through and around the rebar grid to ensure the absence of any air pockets, voids or other defects that could weaken the final concrete structure.

[0004] It is common for the concrete contractor to assemble this rebar grid on the job site. To do so, the contractor must first join the rebar elements together at the nodes of the grid. In other words at the point where two rebar elements intersect. This may be done by welding or alternately with some sort of fastening element such as wire, cable ties or the like. Once

assembled in a grid, the rebar must be supported in an elevated position, typically on stands placed in spaced relation beneath the rebar elements. Alternately, the rebar may be supported in an elevated position first then wire tied, welded, etc. This process of fabricating a rebar grid can be time consuming in that it involves multiple steps, and thus costly from a labor cost standpoint. In addition, this process of fabricating a rebar grid requires that the contractor have an inventory of several parts, namely rebar, fasteners and stands, and thus costly from a material and storage cost standpoint. Accordingly, it is desirable to provide a simple, cost-effective means for fabricating a rebar grid with a minimum of components. In addition, it is desirable to provide a compact coupling element in the form of a rod clip stand which functions to interconnect a pair of rebar element and to elevate the rebar elements above the ground. Furthermore, other desirable features and characteristics of the present invention will become apparent from the subsequent detailed description of the invention and the appended claims, taken in conjunction with the accompanying drawings and this background of the invention.

BRIEF SUMMARY OF THE INVENTION

[0005] The present disclosure provides a clipping system for connecting, elevating and protecting cylindrical elements. The clipping system includes a rod clip stand for assembling a pair of cylindrical elements. The rod clip stand includes a cradle portion having a first cradle with a first concave surface formed therein and a second cradle laterally spaced from the first cradle with a second concave surface formed therein. The cradle is configured to receive a first cylindrical element such as a rebar element. The rod clip stand also includes an arched portion interconnecting the first and second cradles in a spaced relationship. The arched portion has a third concave surface formed at a crown of the arched portion and configured to receive a second cylindrical element such as another rebar element. The third concave surface is generally perpendicular to the first and second concave surface such that the rebar elements are arranged in a generally perpendicular manner. The clipping system may be used in various applications including but not limited to assembling and supporting rebar when fabricating concrete structures.

[0006] The present disclosure also provides an assembly forming a rebar grid with a plurality of rebar elements connected with a rod clip stand at the nodes of the grid. The rod clip stand includes a cradle portion having a first cradle with a first concave surface formed therein and a second cradle laterally spaced from the first cradle with a second concave

surface formed therein. A first rebar element is supported in the first and second concave surfaces. An arched portion interconnects the first and second cradles in a spaced relationship. The arched portion has a third concave surface formed at a crown of the arched portion. The third concave surface is generally perpendicular to the first and second concave surface axis and supports a second rebar element. A leg extends from the cradle portion opposite the arched portion. The leg preferably includes a first leg extending from the first cradle and a second leg extending from the second cradle. The rod clip stand couples the first rebar element to the second rebar element is generally perpendicular to on another.

[0007] The simple unitary design of the rod clip stand is lightweight and significantly reduces the amount of material compared to that used in conventional rebar support chairs. The rod clip stand can be a plastic molded part arranged in chains of 16 units. These chains can be nested and stacked such that over 7000 units fit into a standard 2ft x 2ft x 2ft box, thereby reducing storage volume and shipping cost. One or more chains can be carried on a belt so that a reinforcing ironworker or rod buster can quickly and efficiently fabricate a lattice or grid structure using these rod clip stands.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The present invention will hereinafter be described in conjunction with the following drawing figures, wherein like numerals denote like elements, and:

[0009] FIG. 1 is a perspective view of a rod clip stand in accordance with the present disclosure;

[0010] FIG. 2 shows the rod clip stand illustrated in FIG. 1 supporting two rods in a generally orthogonal orientation;

[0011] FIG. 3 is a front elevation of the rod clip stand shown in FIG. 1;

[0012] FIG. 4 is a rear elevation of the rod clip stand shown in FIG. 1;

[0013] FIG 5 is a left side elevation of the rod clip stand, it being understood that the right side elevation is a mirror image thereof;

[0014] FIG. 6 is a top plan view of the rod clip stand;

[0015] FIG. 7 is a bottom plan view of the rod clip stand;

[0016] FIG. 8 is a top plan view showing a lattice of rod elements with a rod clip stand at each intersection forming a node;

[0017] FIG. 9 is a perspective view showing 16 rod clip stands interconnected to form a chain; and

[0018] FIG. 10 is a top plan view showing 14 chains of rod clip stands nested together for packaging and shipping.

DETAILED DESCRIPTION OF THE INVENTION

[0019] The following detailed description of the invention is merely exemplary in nature and is not intended to limit the invention or the application and uses of the invention. Furthermore, there is no intention to be bound by any theory presented in the preceding background of the invention or the following detailed description of the invention.

[0020] With reference now FIGS. 1-7, a rod clip stand 10 is illustrated which interconnects and supports a pair of rod elements 12, 14 in a generally orthogonal or perpendicular arrangement. As seen in FIG. 8, a plurality of rod clip stands 10 can be used to assemble a lattice or grid of rod elements 12, 14. In this regard, a rod clip stand 10 couples the rod elements 12, 14 together at each node, or in other words at each point where the rod elements 12, 14 intersect. The rod elements 12, 14 may be reinforcing bars or rebar used to support and strengthen concrete structures. The rod clip stand 10 may have utility in other applications such as pipe, conduit, etc. for fabricating a lattice or grid structure.

[0021] Referring again to FIGS. 1-7, the rod clip stand 10 includes a cradle portion 16 having a first cradle 18 defined by a first concave surface 18s and second cradle 20 is laterally spaced from the first cradle 18. The second cradle 20 is defined by a second concave surface 20s. As best seen in figure 2, the cradle portion 16 is configured to receive rod element 12. The rod clips stand 10 also includes an arched portion 22 interconnecting the first and second cradles 18, 20 in a spaced relationship. The arched portion 22 includes a third concave surface 24s formed at a crown 24 of the arched portion 22. As best seen in FIG. 2, the arched portion 22 is configured to receive the rod element 14. The rod clips stand 10, and in particular the generally perpendicular orientation of the third concave surface 24s with respect to the first and second concave surface 18s, 20s, orients the rod elements 12, 14 in a generally perpendicular manner. The centroid 26 of the first concave surface and the centroid 28 of the second concave surface lie in a common plane defined by the X-Z axes shown in FIGS. 3-5.

[0022] Rod clip stand 10 further includes leg portions 30, 32 extending from the first and second cradles 18, 20. A centerline of the leg portions 30, 32 lie in a common plane with the

centroid 26 of the first and second concave surface 18s, 20s and the centroid 28 of the third concave surface 24s as best seen in FIG. 5. Similarly, the centroid 28 of the third concave surface bisects the distance between the first and second leg portions 30, 32 as best seen in FIGS. 3 and 4. In this way, any load on the rod elements 12, 14 is transferred through the rod clips stand 10 in a balanced manner.

[0023] The spaced relationship of the first concave surface 18s and second concave surface 20s ensures that the rod clip stand 10 has at least two points of contact with rod element 12. As presently preferred, the third concave surface 24s is also configured to have at least two points of contact with rod element 14. Various structural features may be included in the third concave surface 24s to provide for at least two points of contact. For example, as shown in FIG. 7, a plurality of protrusions 34 (shown in broken lines) may be formed on and extend from the third concave surface 24s. A local feature such as protrusions 34 insures that the rod clip stand 10 contacts of the rod element 14 at more than one point. For example, on rods that have ribs, such as rebar, the protrusions may rest in between the ribs making a stable contact. The protrusions may also function as a spring or biasing element for generating a clamping force on the rod elements as further described below. While the present disclosure describes and illustrates, the protrusions as being formed on the third concaved surface 24s, one skilled in the art will appreciate that the protrusions may be form on the first concaved surface and/or the second concaved surface in addition to or in place of the protrusions on the third concaved surface.

[0024] The dimensions of the rod clip stand 10 are configured to releasably secure rod elements 12, 14 together. In this regard, the height h as shown in FIG. 5 is equal to or slightly less than the sum of the diameters of rod elements 12, 14 for providing interference fit into the rod clip stand 10. As such, the rod clips stand 10, and more particularly the cradle portion 18 and the arch portion 20, generate a clamping force that acts to hold rod elements 12, 14 together. The rod clip stand 10 may further include a retaining element, which is configured to engage one or both rod elements 12, 14 and securely couple the rod clip stand thereto. As best seen in FIGS. 1 and 5, the first and second cradles 18, 20 have a cam surface 36, 38 formed on an edge leading to the first and second concave surfaces 18s, 20s that define a retaining element. During assembly, the rod clips stand 10 is rotated clockwise (as seen in FIG. 5) so that rod element 12 engages the cam surfaces 36, 38 causing the rod clip stand to elastically deformed. Once the rod element 12 clears the cam surfaces 36, 38, the rod clip

stand 10 returns to its undeformed state and captures the rod element 12 within the cradle portion 16.

[0025] With reference now to FIGS. 9 and 10, the rod clip stand 10 may be a plastic part preferably fabricated using an injection molding process. The rod clip stand 10 is shown in the figure as a solid plastic part. One skilled in the art will readily recognize that the rod clip stand 10 may be molded to have certain voids or pockets to reduce weight and material necessary for its fabrication. In this regard, the rod clip stand 10 must have sufficient strength to support the rod elements 12, 14 and any load imparted thereon. One skilled in the art will also recognize that a plurality of the rod clip stands 10 may be molded at the same time and arranged in a chain 40 of rod clip stands 10 as shown in FIG. 9. Adjacent rod clip stands 10 in the chain 40 are interconnected by sprues 42 as best seen in FIG. 10. With continued reference to FIG. 10, individual chains 40 may be nested together to form a sheet 44 of rod clip stands 10. Multiple sheets 44 of rod clip stands 10 may be readily stacked together and packaged for storage and shipping.

[0026] The simple unitary design is lightweight, using about significantly less material of conventional rebar support chairs. While the number of rod clip stands 10 in a chain 40 may vary, it is presently preferred to include sixteen (16) individual rod clip stands 10 in a chain 40. These chains 40 can be nested into a sheet 44. Multiple sheets 44 may be stacked on top of one another to form a cube for compact storage and reduced shipping cost. For example, over 450 chains or more than 7200 rod clip stands may be nested and stacked so as to fit into a standard 2ft x 2ft x 2ft box. One or more chains 40 can be carried on a belt so that a reinforcing ironworker or rod buster can quickly and efficiently fabricate a lattice or grid structure using these rod clip stands.

[0027] In this configuration, the rod clip stand 10 can be used in a quick and efficient manner. For example, the reinforcing ironworker or rod buster may secure one to several chains 40 of rod clip stands 10 to a belt or other garment. Once a rebar grid is laid out, the rod buster simply breaks off a rod clip stand 10 and drops it down on top of rod element 14 so that it sits in the third concaved surface 24s of the arched portion 22. Next, rod element 12 is held up against rod element 14 and the rod clip stand 10 is slid into engagement with rod element 12 and rotated clockwise as shown in FIG. 5) so that it captures rod element 12 in the first and second concaved surfaces 18s, 20s of the cradle portion 16 for securing rod elements

12, 14 together. So secured, the rod elements 12, 14 can be positioned on leg portions 30, 32 in a spaced relationship from a floor or other support surface.

[0028] While at least one exemplary embodiment has been presented in the foregoing detailed description of the invention, it should be appreciated that a vast number of variations exist. In addition, one skilled in that art will appreciate that the shape and size of the embodiment may be varied to accommodate different types of rod elements. It should also be appreciated that the exemplary embodiment or exemplary embodiments are only examples, and are not intended to limit the scope, applicability, or configuration of the invention in any way. Rather, the foregoing detailed description will provide those skilled in the art with a convenient road map for implementing an exemplary embodiment of the invention, it being understood that various changes may be made in the function and arrangement of elements described in an exemplary embodiment without departing from the scope of the invention as set forth in the appended claims and their legal equivalents.

CLAIMS

What is claimed is:

1. A rod clip stand for assembling a pair of cylindrical elements comprising:
a cradle portion having a first cradle with a first concaved surface formed therein and a second cradle laterally spaced from the first cradle with a second concaved surface formed therein, wherein the cradle portion is configured to receive a first cylindrical element; and
an arched portion interconnecting the first and second cradles in a spaced relationship, the arched portion having a third concaved surface formed at a crown of the arched portion and configured to receive a second cylindrical element, wherein the third concave surface is generally perpendicular to the first and second concave surface.
2. The rod clip stand of claim 1 wherein the centroids of the first, second and third concave portions lie in a common plane.
3. The rod clip stand according to any of claims 1 to 2 further comprising a leg portion extending from at least one of the arched portion and the cradle portion.
4. The rod clip stand of claim 3 wherein the leg portion comprises a first leg extending from the first cradle and a second leg extending from the second cradle.
5. The rod clip stand of claim 3 wherein a centerline of the leg portion and the centroids of the first, second and third concave surfaces lie in a common plane.
6. The rod clip stand according to any of claims 1 to 5 wherein the third concave surface comprises at least two points of contact configured to engage the second cylindrical element.
7. The rod clip stand of claim 6 wherein each of the at least two points of contact comprises a protrusion extending from the third concave surface.
8. The rod clip stand according to any of claims 1 to 7 further comprising a retaining element formed on at least one of the first and second cradles opposite the arched portion configured to capture the first cylindrical element within the cradle portion.

9. The rod clip stand according to any of claims 1 to 8 wherein the first and second concave surfaces are spaced apart from the third contact surface by a distance which is less than a sum of the heights of the first and second cylindrical elements to provide an interference fit.

10. A rebar assembly comprising:

a rod clip stand comprising a cradle portion having a first cradle with a first concaved surface formed therein and a second cradle laterally spaced from the first cradle with a second concaved surface formed therein; an arched portion interconnecting the first and second cradles in a spaced relationship, the arched portion having a third concaved surface formed at a crown of the arched portion, wherein the third concave surface is generally perpendicular to the first and second concave surface; and a leg portion extending from the cradle portion opposite the arched portion, the leg portion including a first leg extending from the first cradle and a second leg extending from the second cradle;

a first rebar element received in the arched portion and supported by the third concave surface; and

a second rebar element received in the cradle portion and supported by the first and second concave surfaces such that the first rebar element is general perpendicular to the second rebar element.

11. The rebar assembly of claim 10 wherein a centerline of the leg portion and the centroids of the first, second and third concave surfaces lie in a common plane.

12. The rebar assembly according to any of claims 10 to 11 wherein the third concave surface comprises at least two points of contact on the first rebar element.

13. The rebar assembly according to any of claims 10 to 12 wherein each of the at least two points of contact comprises a protrusion extending from the third concave surface.

14. The rebar assembly according to any of claims 10 to 13 further comprising a retaining element formed on at least one of the first and second cradles opposite the arched portion to capture the second rebar element within the cradle portion.

15. The rebar assembly according to any of claims 10 to 14 wherein the first and second concave surfaces are spaced apart from the third contact surface by a distance, which

is less than a sum of the heights of the first and second rebar elements to provide interference fit.

16. A rebar assembly comprising:
 - a plurality of rebar elements arranged in a grip and defining a node at each location where a pair of rebar elements intersect;
 - a plurality of rod clip stands including a rod clip stand disposed at each node and operable for coupling first and second rebar elements, each rod clip standing including:
 - a cradle portion supporting the first rebar element and having a first cradle with a first concaved surface formed therein and a second cradle laterally spaced from the first cradle with a second concaved surface formed therein;
 - an arched portion interconnecting the first and second cradles in a spaced relationship, the arched portion having a third concaved surface formed at a crown of the arched portion, wherein the third concave surface is generally perpendicular to the first and second concave surface and supports the second rebar element; and
 - a leg portion extending from the cradle portion opposite the arched portion, the leg portion including a first leg extending from the first cradle and a second leg extending from the second cradle.

17. The rebar assembly of claim 16 wherein a centerline of the leg portion and the centroids of the first, second and third concave surfaces lie in a common plane.

18. The rebar assembly according to any of claim 16 to 17 wherein the third concave surface comprises at least two points of contact on the first rebar element.

19. The rebar assembly according to any of claims 16 to 18 further comprising a retaining element formed on at least one of the first and second cradles opposite the arched portion to capture the second rebar element within the cradle portion.

20. The rebar assembly according to any of claims 16 to 19 wherein the first and second concave surfaces are spaced apart from the third contact surface by a distance, which is less than a sum of the heights of the first, and second rebar elements to provide interference fit.

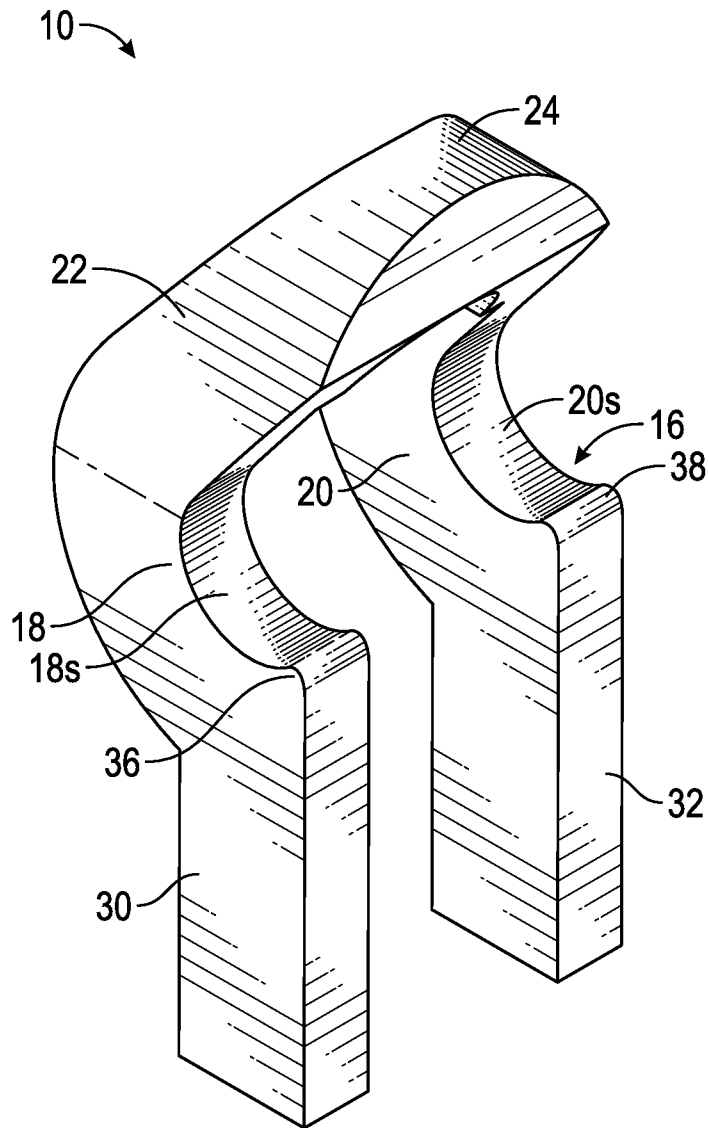


FIG. 1

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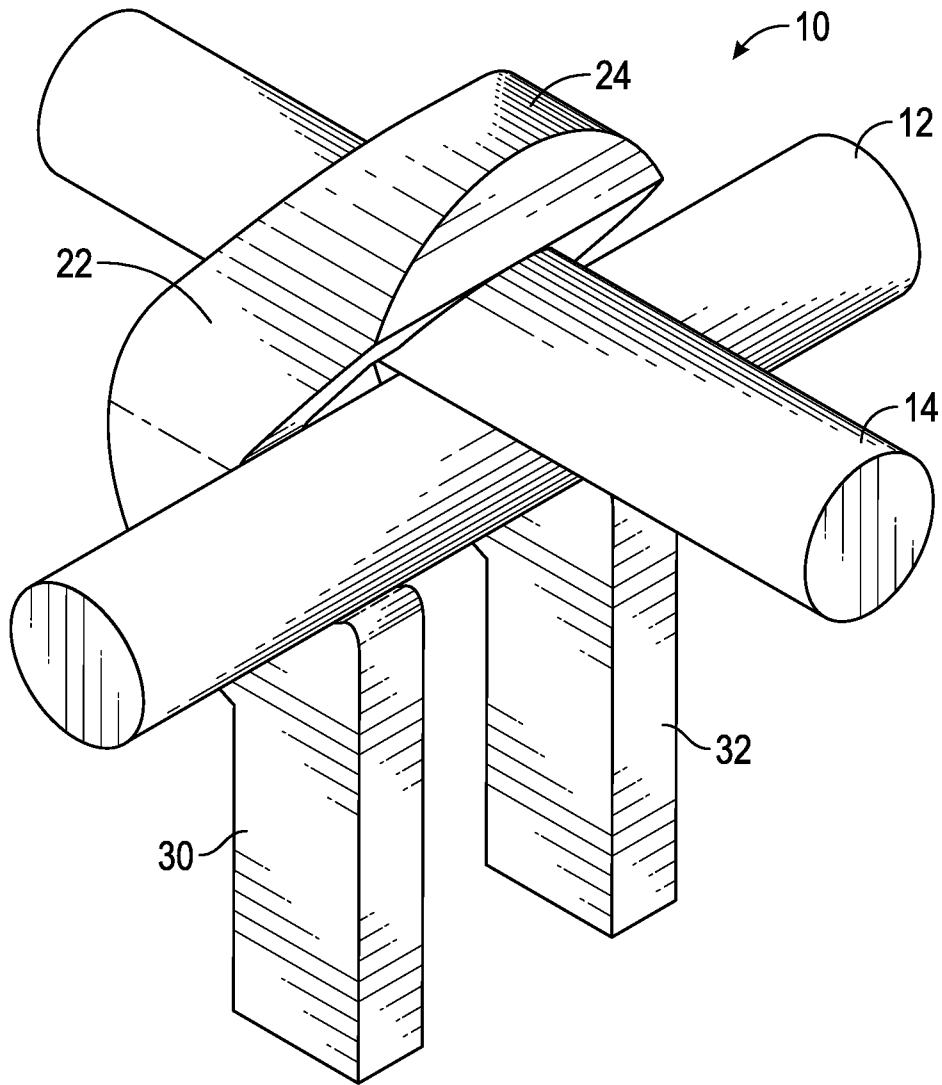


FIG. 2

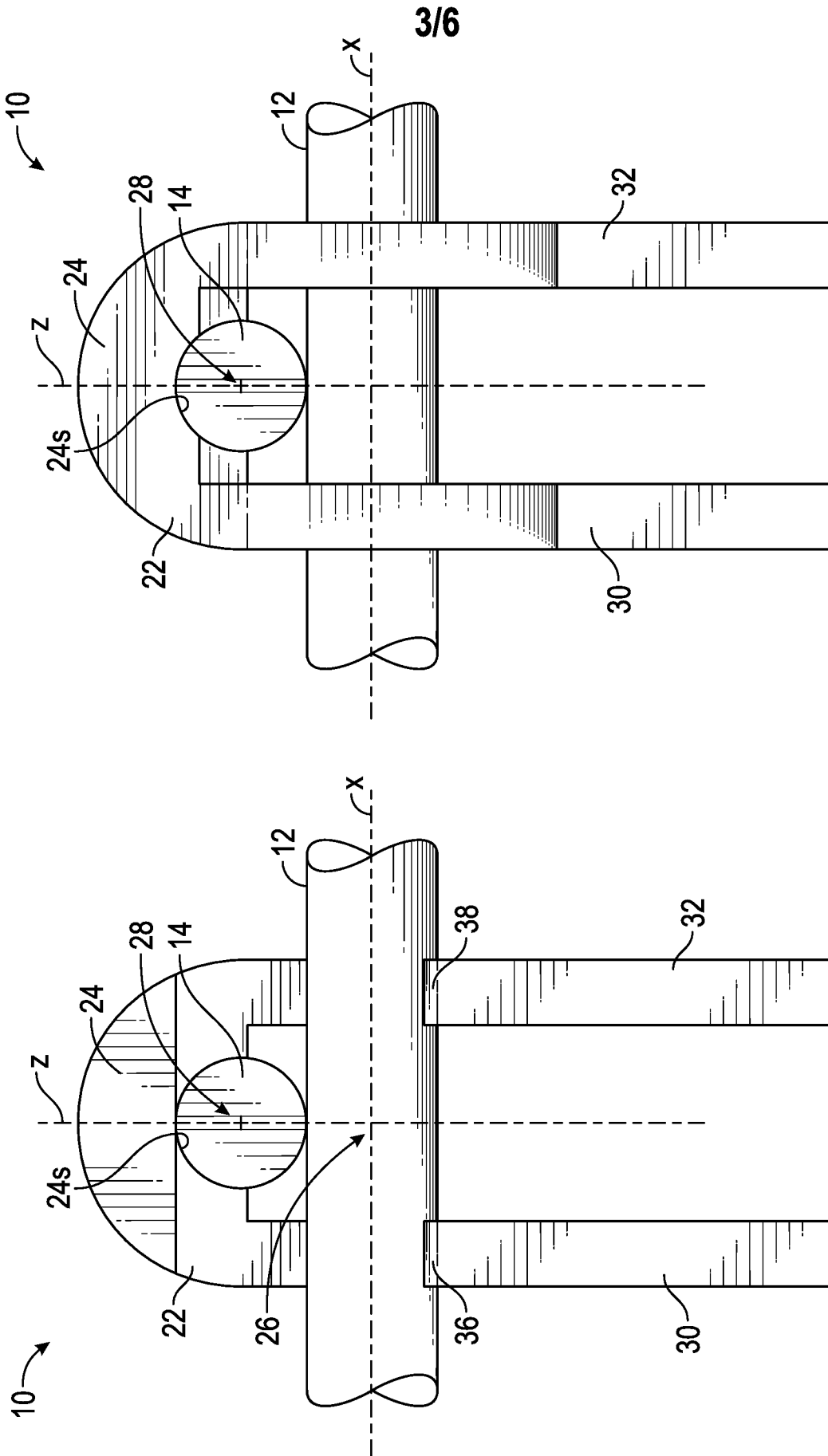


FIG. 4

FIG. 3

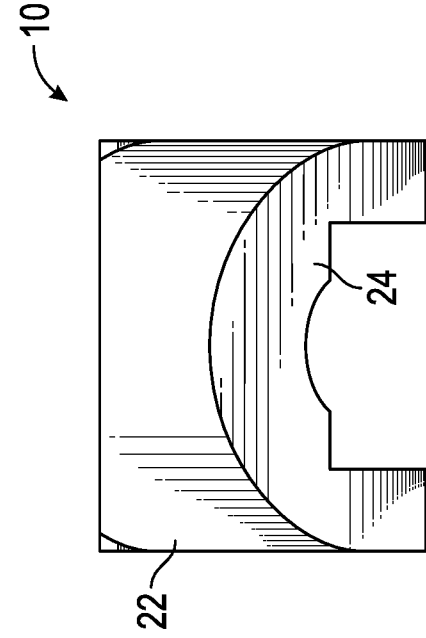


FIG. 6

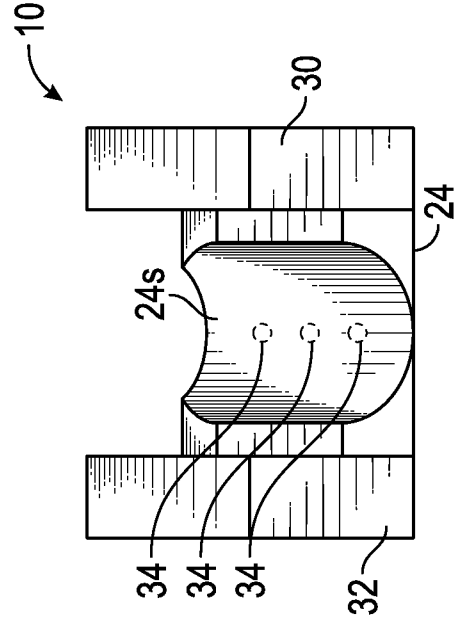


FIG. 7

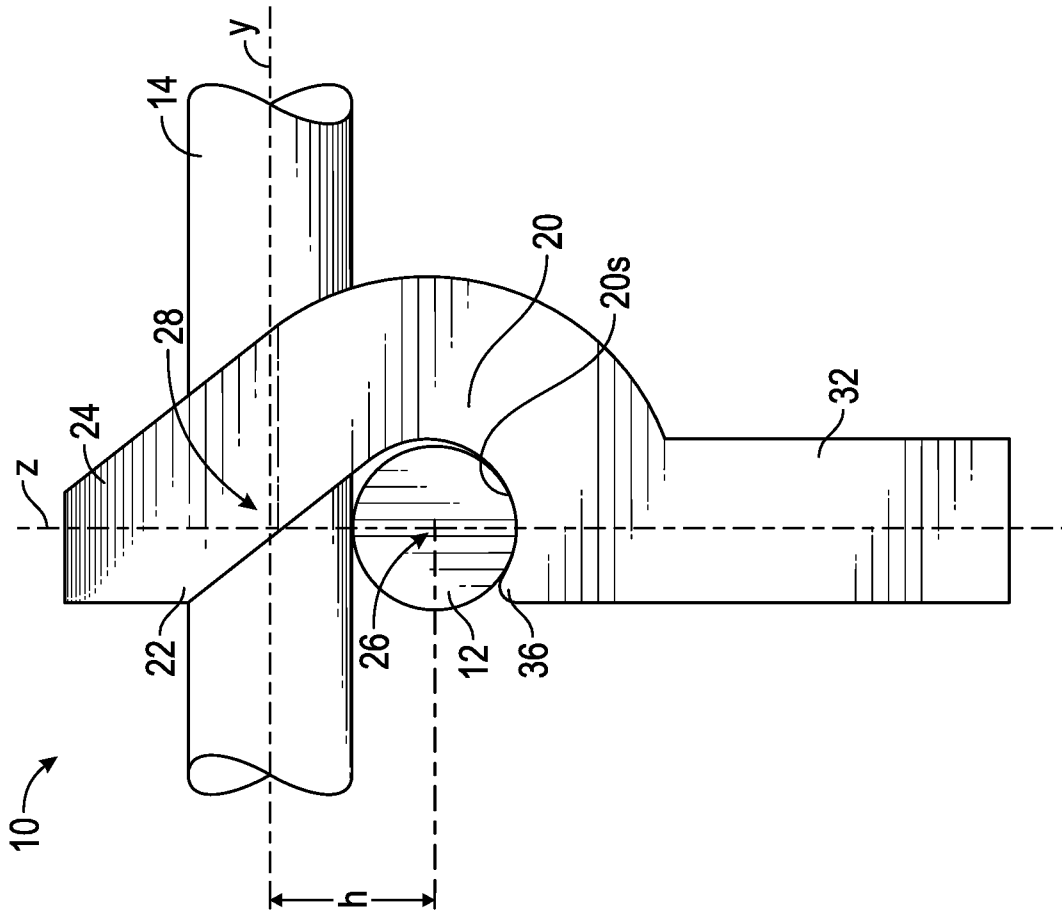


FIG. 5

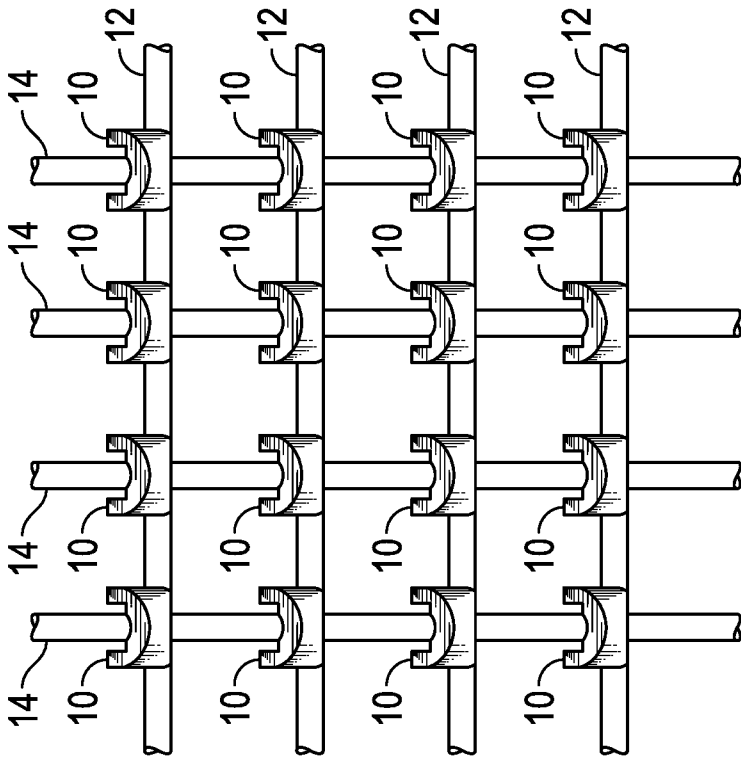


FIG. 8

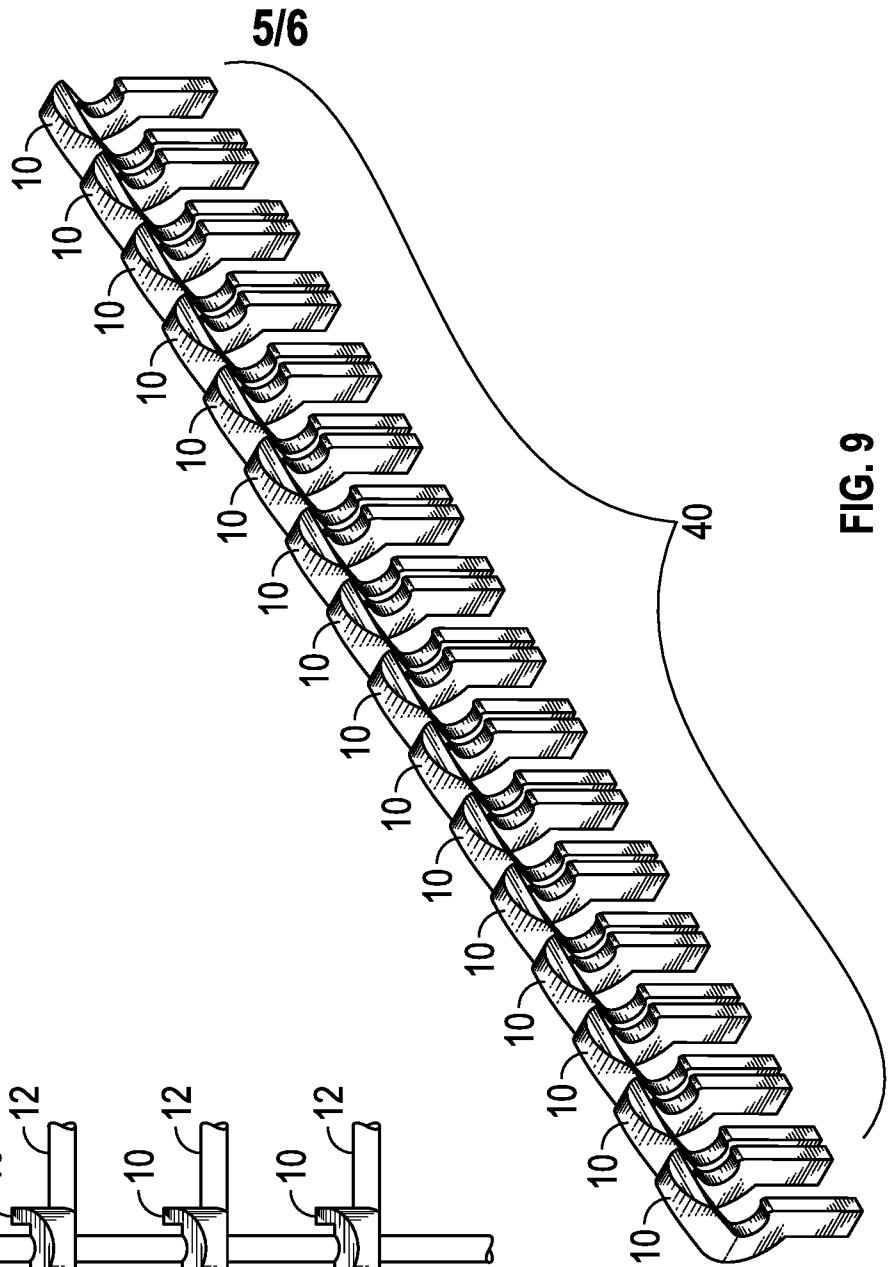


FIG. 9

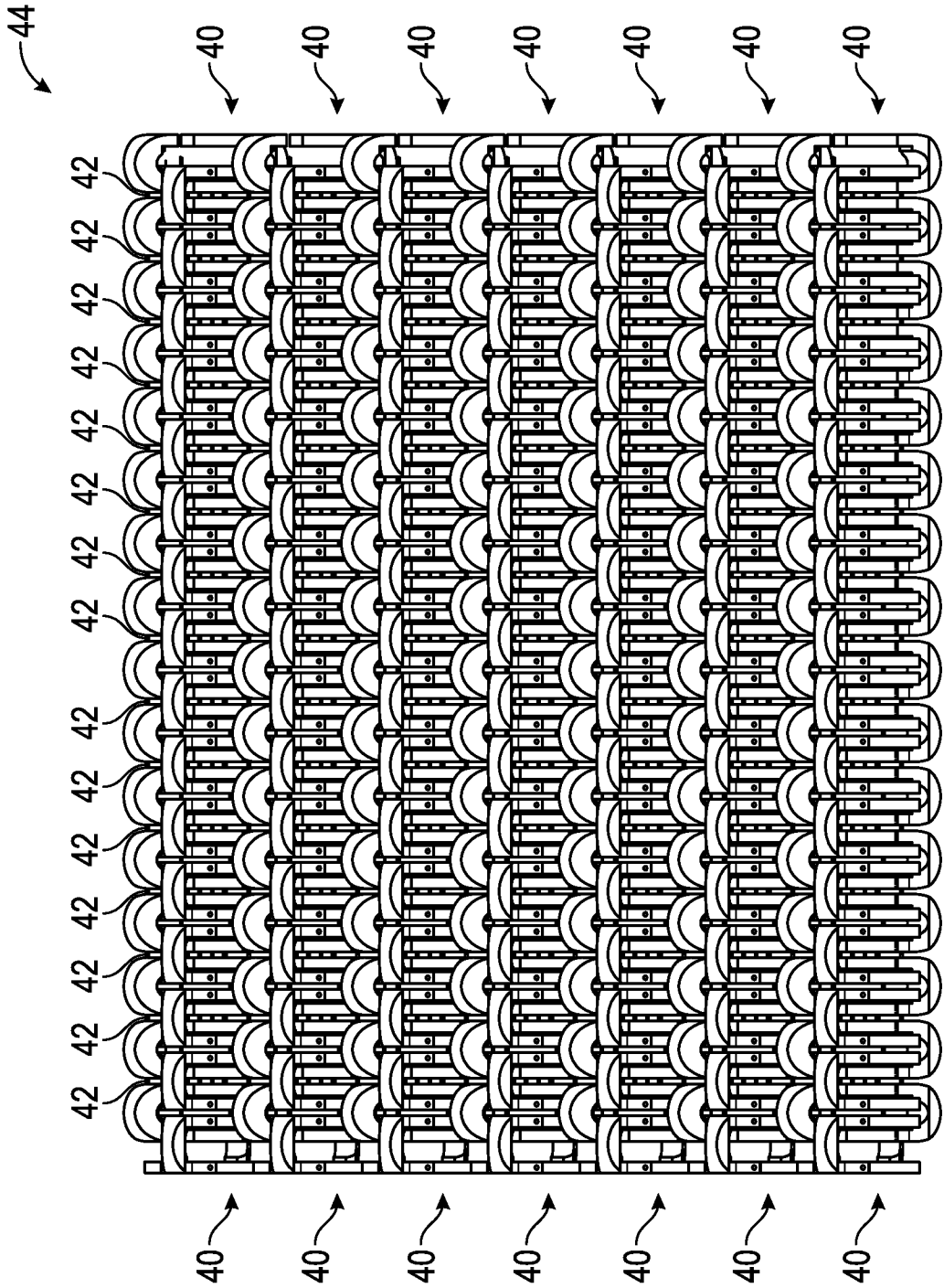


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/046707**A. CLASSIFICATION OF SUBJECT MATTER****E04C 5/16(2006.01)i, E04G 21/12(2006.01)i**

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

B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
E04C 5/16; E04C 5/20; E04C 5/18; E04F 21/00; E04G 21/12Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility modelsElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: rebar assembly, rod clip stand, cradle portion, arched portion, leg portion, and concaved surface**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2010-0098946 A (CHOONG SAN HYFIX CO., LTD.) 10 September 2010 See paragraphs [0002],[0007]-[0011] and figures 1-2,4.	1-5, 10-12, 16-18
A	US 3694988 A (SKOLD, MATS FOLKE) 03 October 1972 See column 3, lines 7-31 and figure 5.	1-5, 10-12, 16-18
A	US 3916593 A (SKOLD, MATS FOLKE) 04 November 1975 See column 5, lines 1-30 and figures 7-8.	1-5, 10-12, 16-18
A	US 2011-0308192 A1 (KODI, JON R.) 22 December 2011 See paragraphs [0047]-[0053] and figures 1,6.	1-5, 10-12, 16-18
A	US 2008-0115449 A1 (KODI, JON R.) 22 May 2008 See paragraphs [0041]-[0043] and figure 2.	1-5, 10-12, 16-18

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

* Special categories of cited documents:

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"&" document member of the same patent family


Date of the actual completion of the international search

05 November 2014 (05.11.2014)

Date of mailing of the international search report

05 November 2014 (05.11.2014)

Name and mailing address of the ISA/KR

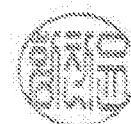

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2014/046707

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