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(54) **ADJUSTABLE REBAR CAGE TOOL**

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(57) **ABSTRACT**

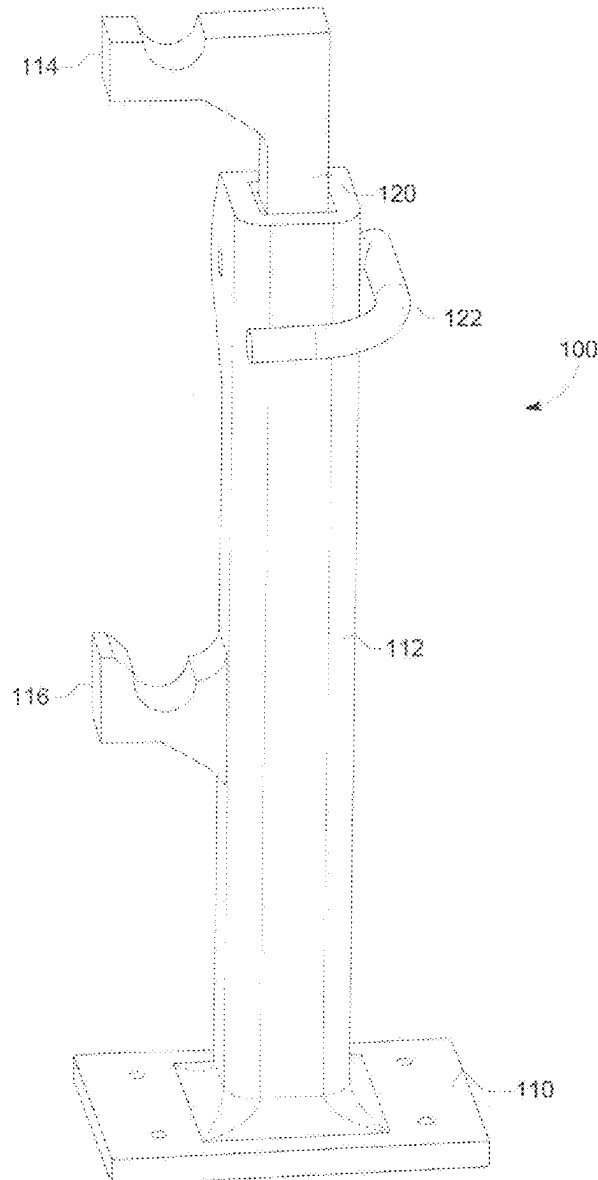
An adjustable rebar cage tool comprising a functional base, an exterior housing, an internal latching mechanism having a latch release arm, a latch tooth and an adjustable arm, the internal latching mechanism being disposed within the exterior housing, an upper U-bracket member and a lower U-bracket member, the U-bracket members capable of holding a rebar rod. The adjustable rebar cage tool is portable, lightweight and can be carried by a single individual. After assembly of a rebar cage, the rebar cage tool is removed from the assembly and can be reused.

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Related U.S. Application Data

(60) Provisional application No. 63/460,594, filed on Apr. 19, 2023.



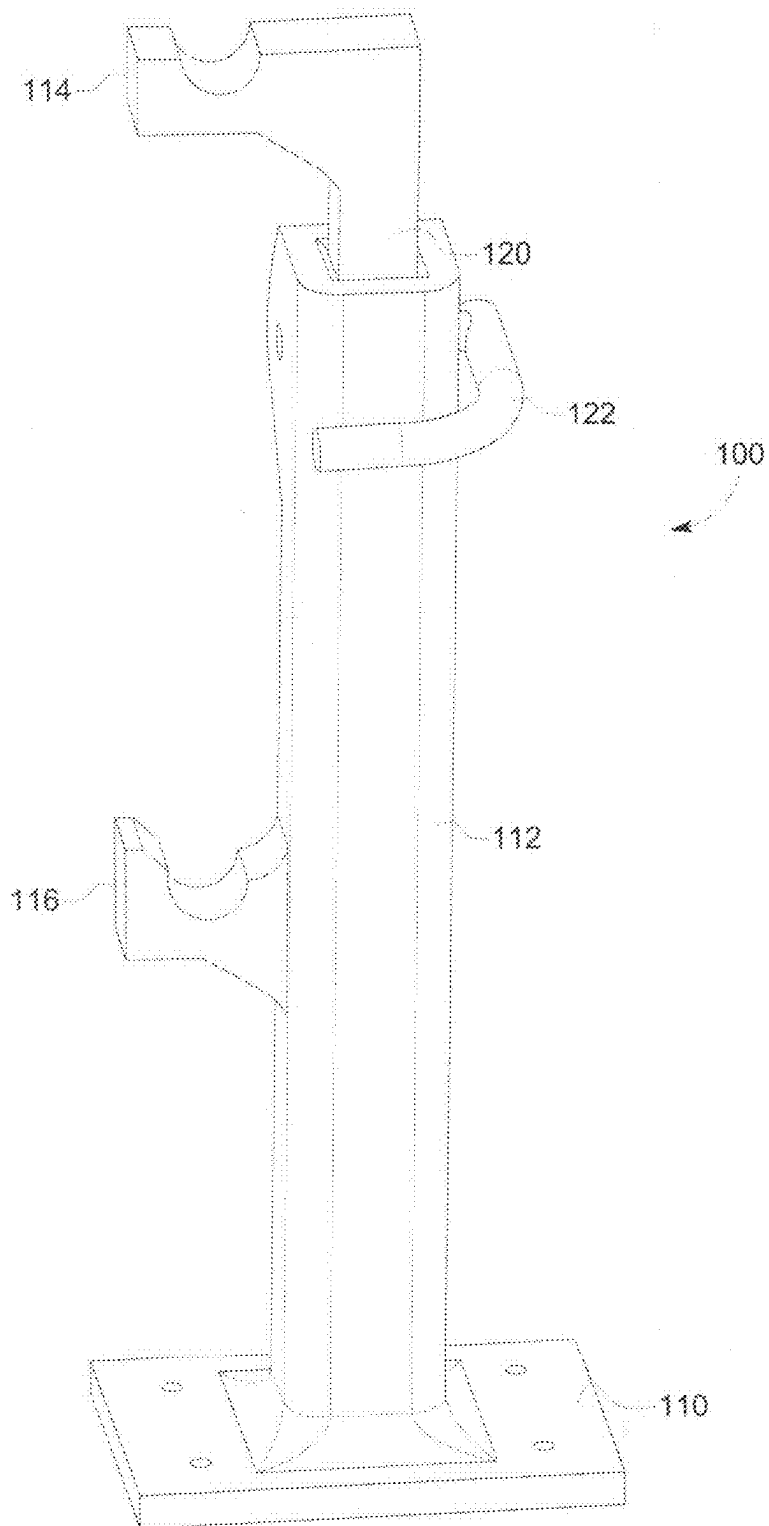


FIG. 1

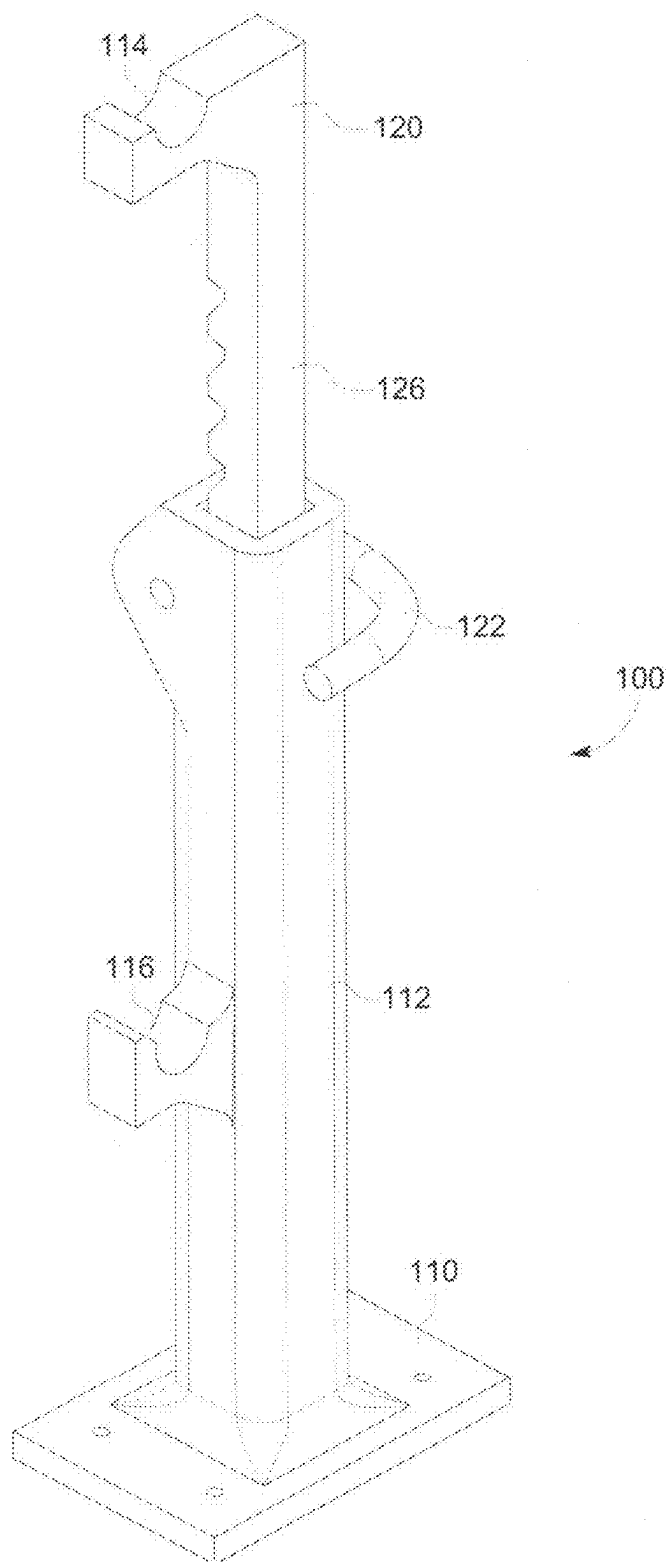


FIG. 2

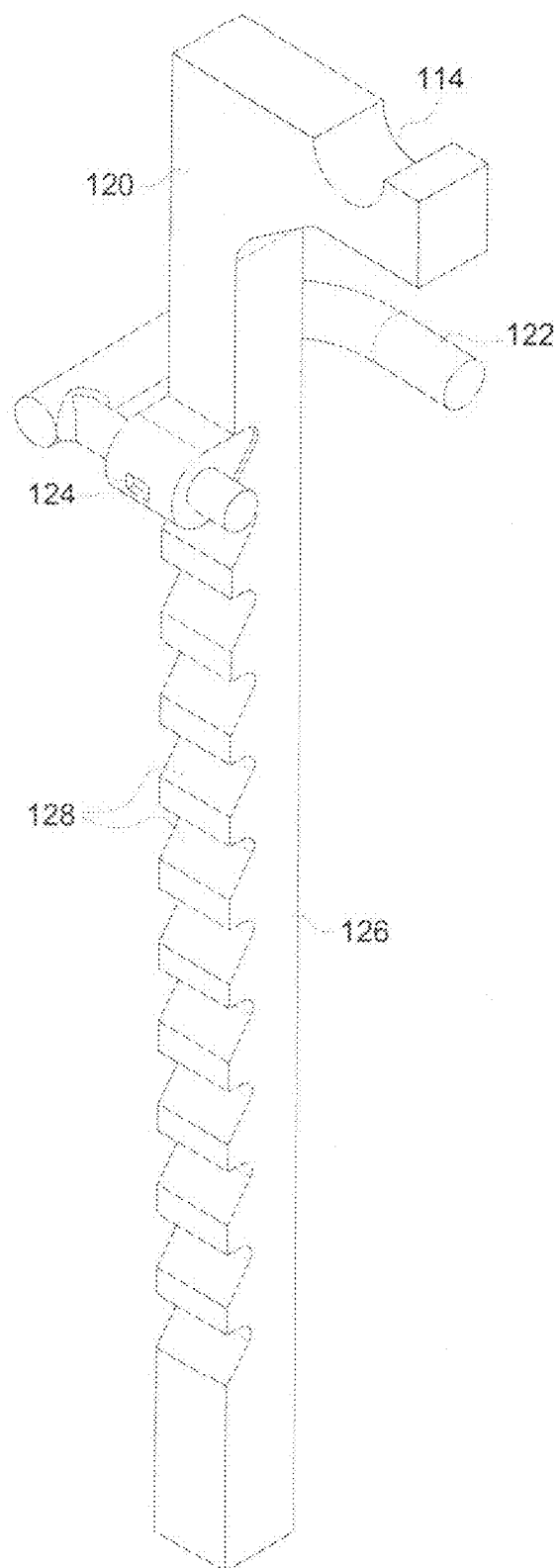


FIG. 3

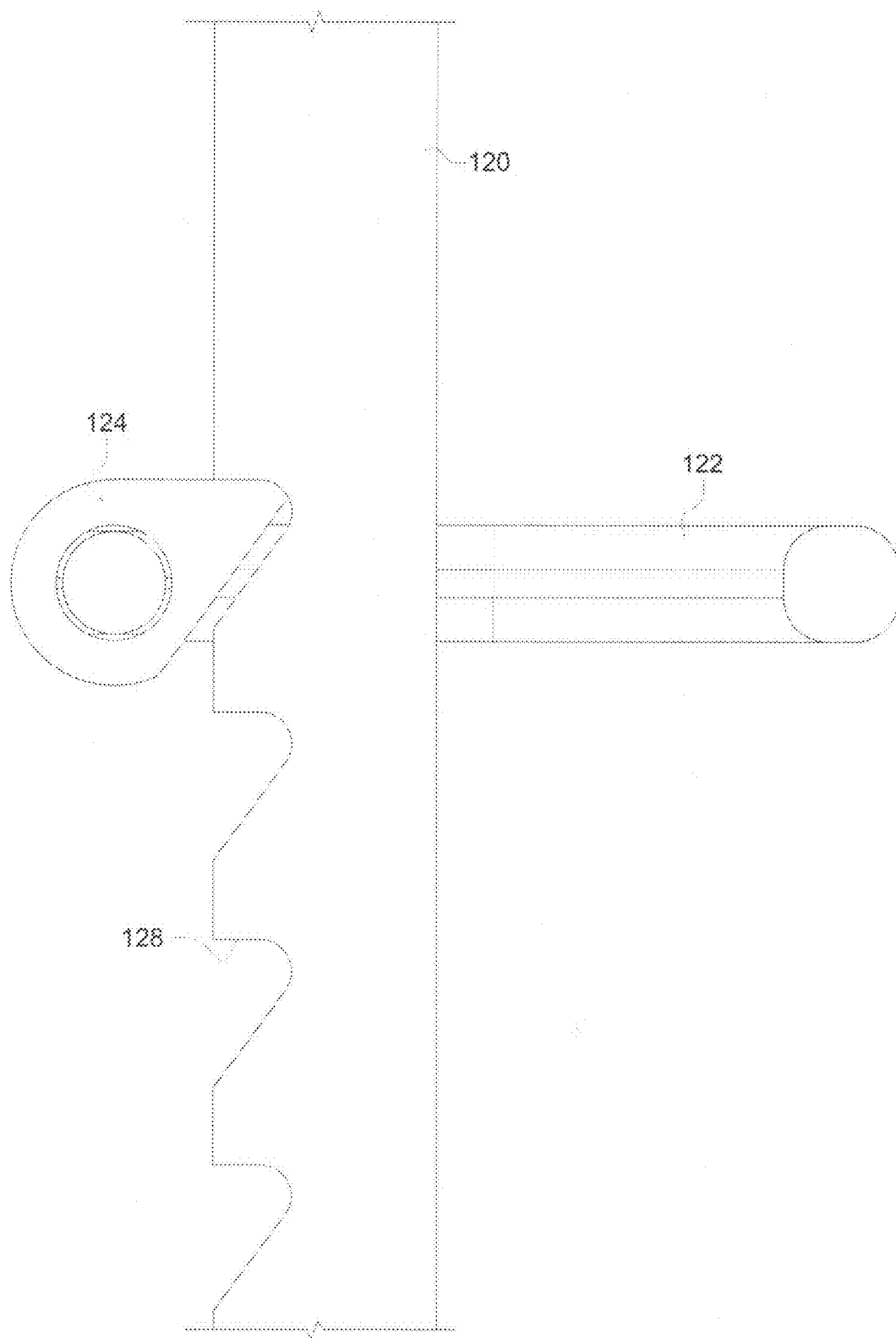


FIG. 4

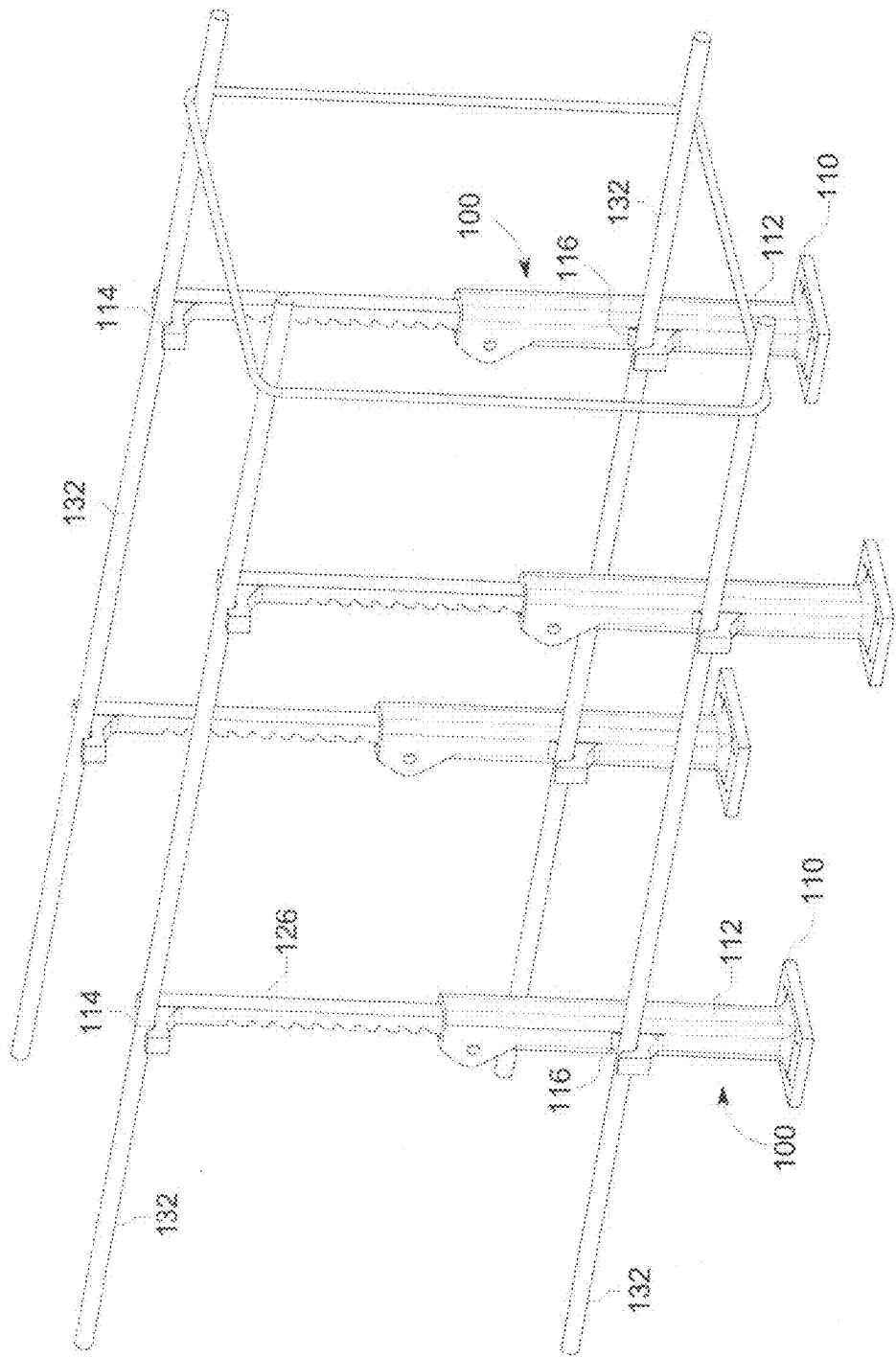


FIG. 5

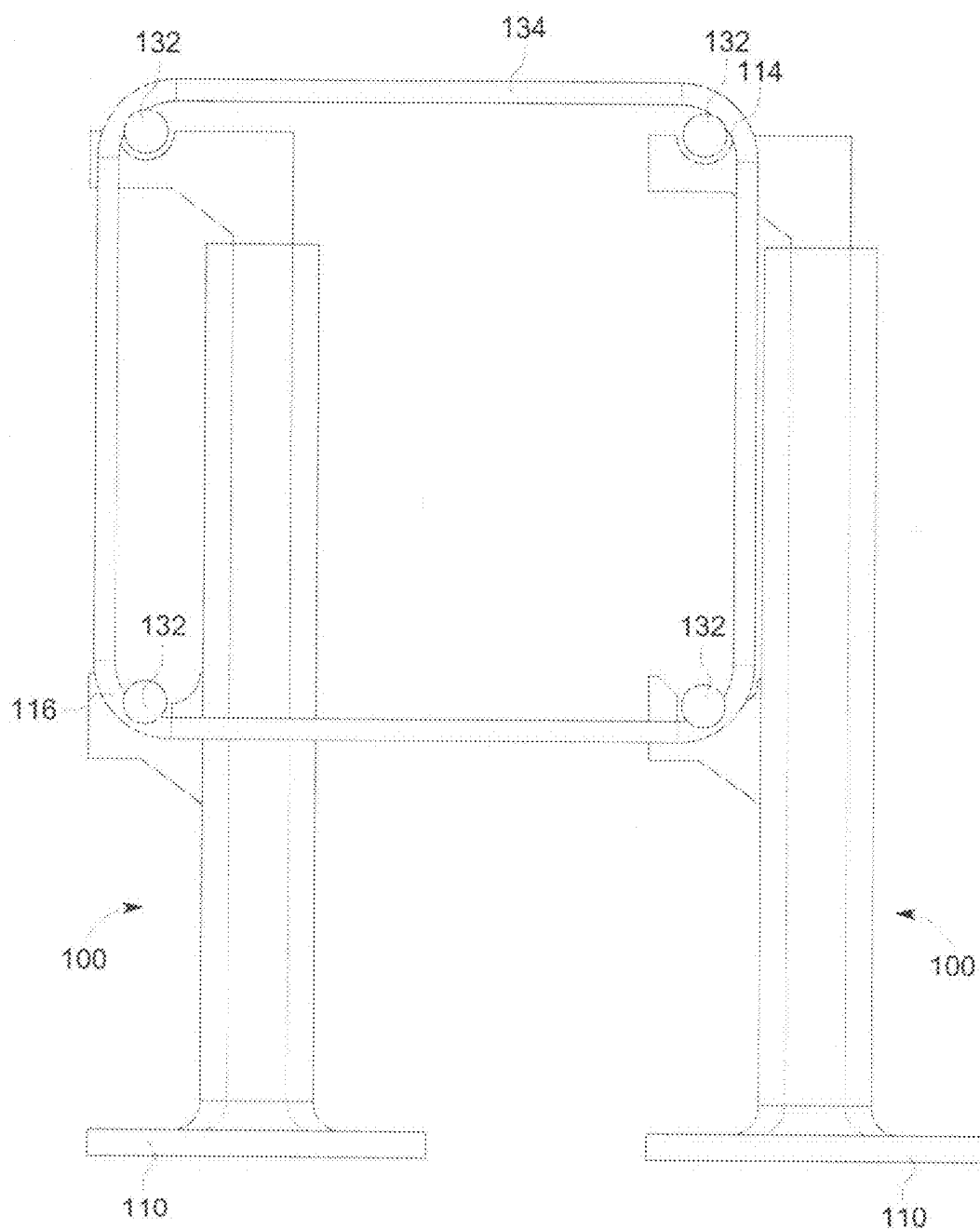


FIG. 6

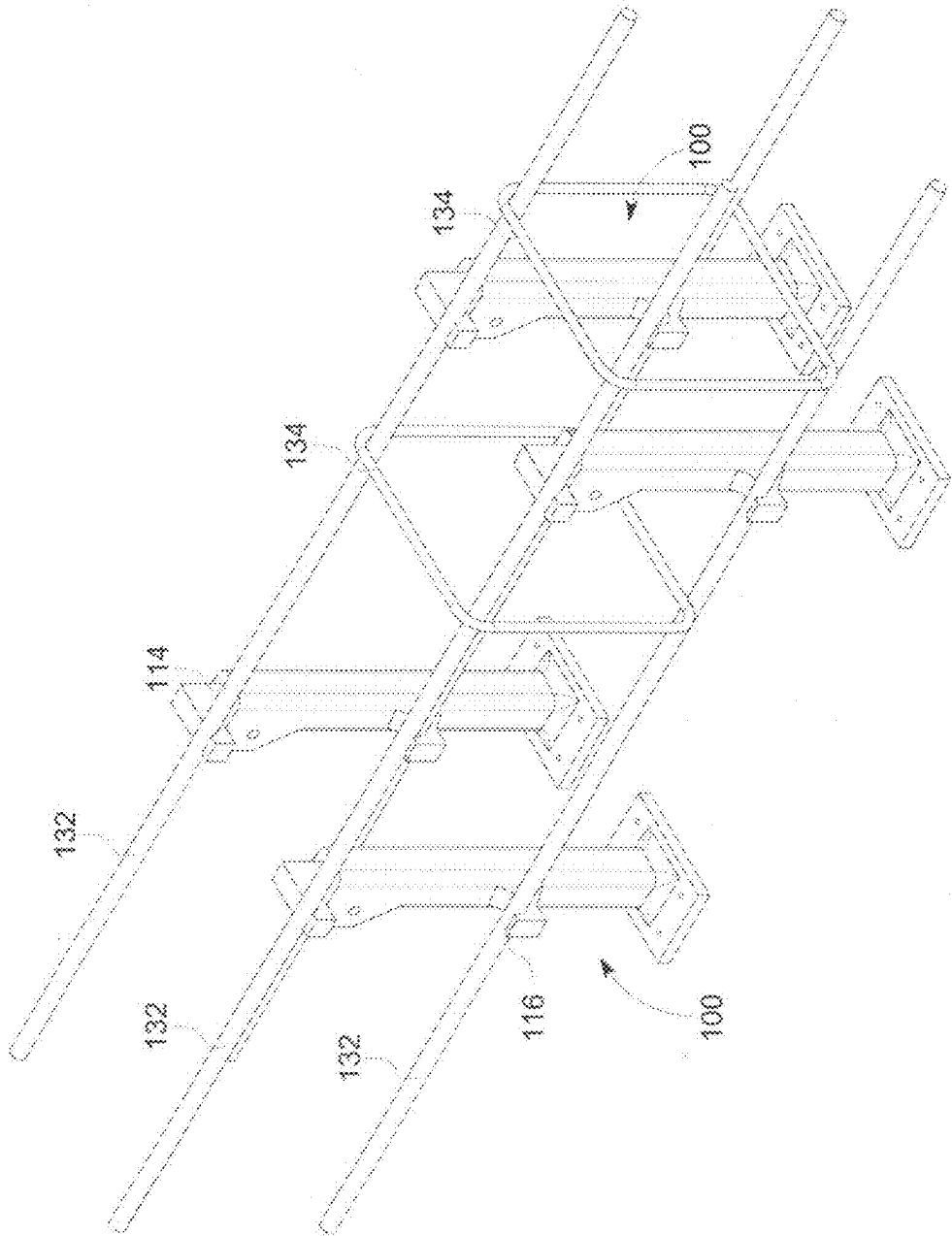


FIG. 7

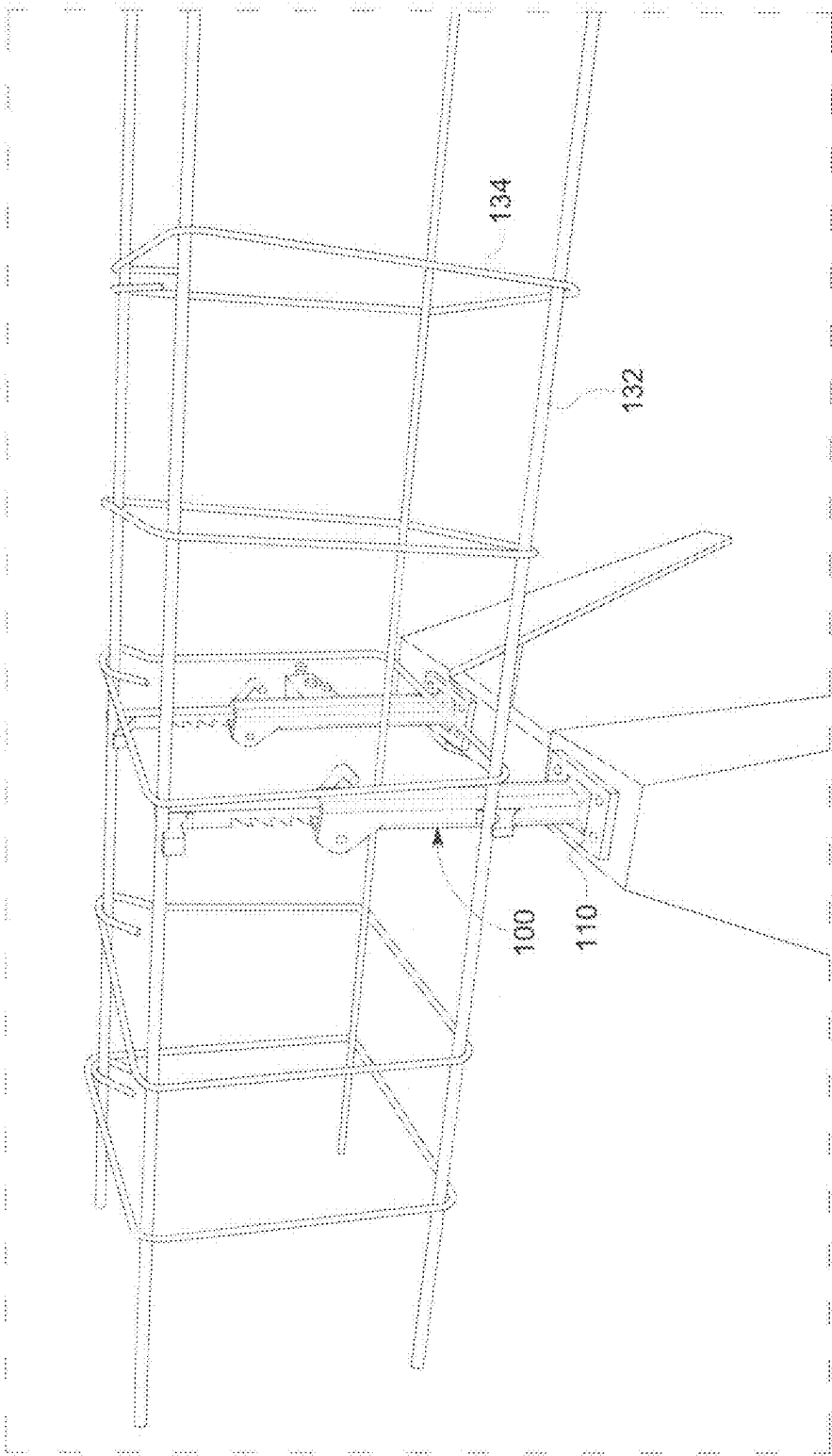


FIG. 8

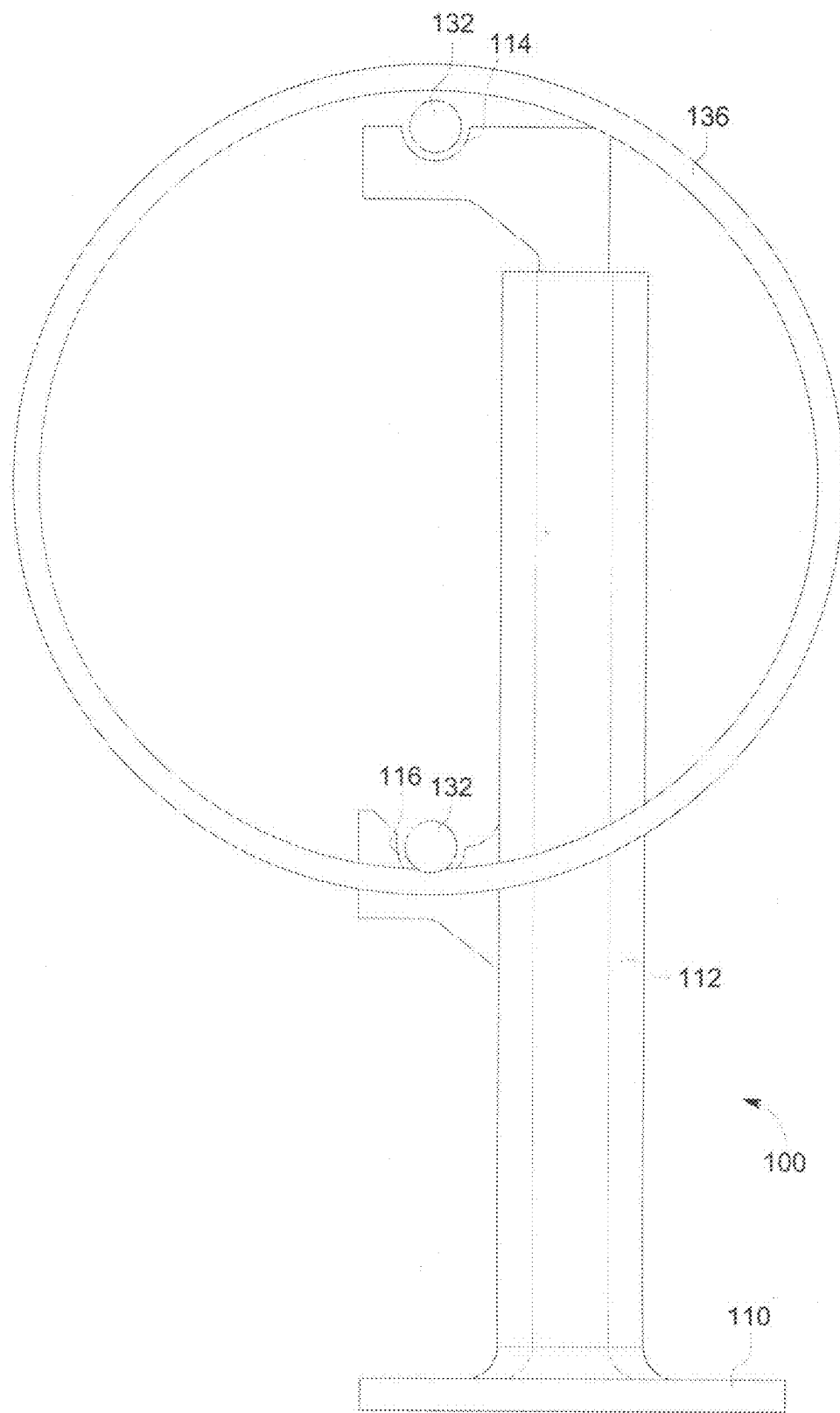


FIG. 9

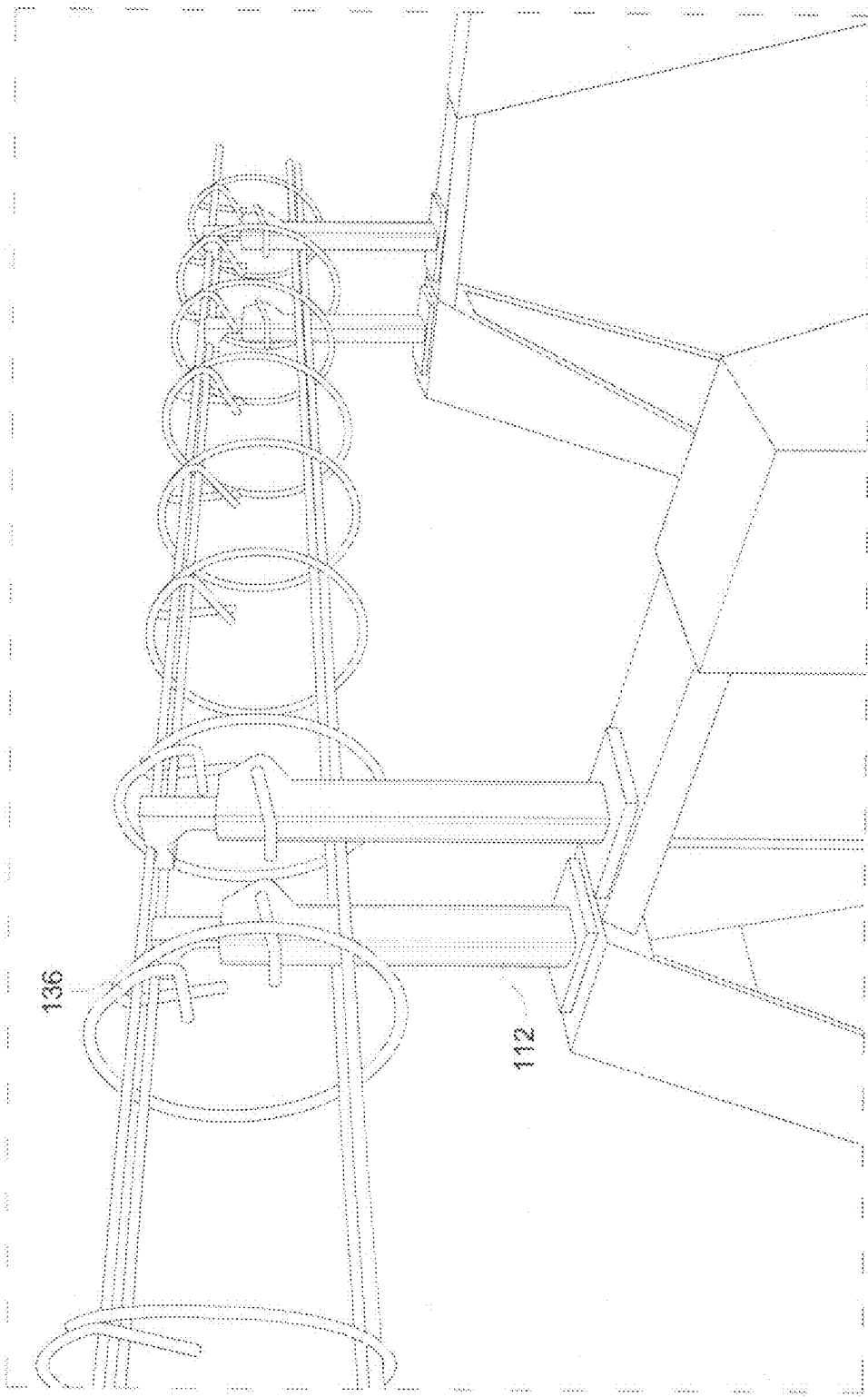


FIG. 10

ADJUSTABLE REBAR CAGE TOOL**CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] This application claims priority from U.S. Provisional Application 63/460,594, filed Apr. 21, 2023.

FIELD OF INVENTION

[0002] The present invention relates to an adjustable rebar cage tool for supporting the assembly of rebar cages. In particular, the adjustable rebar cage tool is lightweight, portable and can be carried by single individual.

BACKGROUND OF THE INVENTION

[0003] A rebar cage is assembled from rebar rods and rebar rings. As is well known in the art, rebar is a steel rod with ridges which is used to reinforce concrete. The rebar rods are used as the main framework of the rebar cage. The rebar rings are positioned on the outsides of the rebar rods at a consistent spacing to assemble a structural framework. The rebar rings are tied to the rebar rods using metal wire to ensure that the rings stay in the desired position. Once all the rebar rings are tied to the rebar rods, the rebar cage is completely assembled and can be used for its intended purpose.

[0004] Rebar cages are used widely in construction, including for example, individual homes, large commercial buildings, transportation, and freeway construction. Concrete is poured to fully enclose and surround the rebar cage, thereby creating a load bearing structural member, such as a square or circular reinforced concrete column, the rebar cage being the reinforcement. The rebar cage reinforced concrete columns typically are placed in a strategic manner to carry the structural load of the system.

[0005] Typically, there are two ways to manufacture rebar cages. The first method is within a manufacturing facility which utilizes large and expensive machinery to construct the rebar cages. The second method is to manufacture the rebar cage at the jobsite. Various techniques are used to create a rebar cage on the jobsite. Typically, a 2×4 piece of wood is cantilevered off a sawhorse and the rebar rods are placed perpendicular to the 2×4 piece of wood. The rebar rings then are positioned along the rebar rods and fastened together to create the rebar cage. This technique not only is labor intensive, generally requiring two or more workers, but also is time consuming. In addition, this technique can lead to an inaccurate assembly. More significantly, there are safety concerns with this method which can result in injury to the workers who are bent over and kneeling for extended periods of time.

PRIOR ART

[0006] The prior art is replete with systems and methods for forming rebar cages, examples of which include U.S. Pat. No. 6,112,494, EP U.S. Pat. No. 3,866,996, Chinese Patents 206722220U, 105537898A, 203429641U, 202644519U and 209907967U, and Japanese Patent 4311625B2. In addition, numerous patent publications disclose different assemblies, method and tools used in the formation of rebar cages including US 2022/0299133, US 2004/0088942, US 2005/0133684, US 2022/0268024, US 2009/0100784, JP 2007/182742A, and JP 2009/299380A. However, a simple adjustable rebar cage tool which has a

functional base, secondary support that can create an accurate and operational rebar cage has not been developed.

SUMMARY OF THE INVENTION

[0007] The invention of the present subject matter relates to an adjustable rebar cage tool for use in the assembly of rebar cages which is portable, lightweight and can be carried by a single individual.

[0008] Accordingly, it is an object of the present subject matter to provide an adjustable rebar cage tool which can be used in the assembly of rebar cages.

[0009] It is another object of the present subject matter to provide an adjustable rebar cage tool that is lightweight, portable and can be carried by a single individual.

[0010] It is a yet another object of the present subject matter to provide an adjustable rebar cage tool that can be used in the field, at a jobsite or in a warehouse or manufacturing facility.

[0011] It is still another object of the present subject matter to provide an adjustable rebar cage tool that can create an accurate and operational rebar cage.

[0012] It is a further object of the present invention to provide an adjustable rebar cage tool that is easy to use and reusable.

[0013] It is yet a further object of the present invention to provide an adjustable rebar cage tool that can be utilized in the making of rebar cages in the range of twelve inches (12") to twenty-four inches (24").

[0014] It is still a further object of the present invention to provide an adjustable rebar cage tool that can be modified to assemble rebar cages smaller than twelve inches (12") and great than twenty-four inches (24").

[0015] greater than 24 inches.

[0016] It is an additional object of the present subject matter to provide an adjustable rebar cage tool that can be manually adjusted.

[0017] It is another object of the present invention to provide an adjustable rebar cage tool that can be modified with pneumatic or hydraulic capabilities to enhance the assembling larger and heavier rebar cages.

[0018] It is a yet another object of the present subject matter to provide an adjustable rebar cage tool that can lessen the risk of injury to workers constructing a rebar cage.

[0019] These and other objects of the present subject matter are accomplished by providing an adjustable rebar cage tool comprising a functional base, an exterior housing, an internal latching mechanism having a latch release arm, a latch tooth and an adjustable arm, the internal latching mechanism being disposed within the exterior housing, an upper U-bracket member and a lower U-bracket member, the U-bracket members capable of holding a rebar rod.

BRIEF DESCRIPTION OF DRAWINGS

[0020] FIG. 1 is a side perspective view of the adjustable rebar cage tool of the present subject matter in a fully retracted position.

[0021] FIG. 2 is a side perspective view of the adjustable rebar cage tool of the present subject matter in a partially extended position.

[0022] FIG. 3 is a perspective view of the internal latching mechanism of the adjustable rebar cage tool of the present subject matter.

[0023] FIG. 4 is a perspective view of the latching release arm of the adjustable rebar cage tool of the present subject matter.

[0024] FIG. 5 is a side perspective view of multiple adjustable rebar tools of the present subject matter in use holding rebar rods and a rebar square ring.

[0025] FIG. 6 is a frontal view of two of the adjustable rebar cage tools of the present subject matter holding rebar rods and a rebar square ring.

[0026] FIG. 7 is a top perspective view of multiple adjustable rebar cage tools of the present subject matter in use holding rebar rods and rebar square rings.

[0027] FIG. 8 is a side perspective view of the assembly of a rebar cage in the form of a square column utilizing multiple adjustable rebar cage tools of the present subject matter holding a plurality of rebar rods and a plurality of rebar square rings wrapped together to create a rebar cage in the form of a square column.

[0028] FIG. 9 is a side perspective view of the adjustable rebar cage tool of the present subject matter holding rebar rods and a rebar circle ring.

[0029] FIG. 10 is a side perspective view of the assembly of a rebar cage in the form of a circular column utilizing multiple rebar rods and a plurality of rebar circle rings wrapped together to create a rebar cage in the form of a circular column.

DETAILED DESCRIPTION OF THE INVENTION

[0030] In the following description, like reference numbers are used to identify like elements. Furthermore, the drawings are intended to illustrate major features of exemplary embodiments in a diagrammatic manner. The drawings are not intended to depict every feature of every implementation nor relative dimensions of the depicted elements and are not drawn to scale. In the following description, numerous specific details are set forth to clearly describe various specific embodiments disclosed herein. One skilled in the art, however, will understand that the presently claimed invention may be practiced without all the specific details discussed below. In other instances, well known features have not been described so as not to obscure the invention.

[0031] Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of the terms "including", "comprising", "having", and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items.

[0032] Further, it is to be understood that the terms "adjustable rebar cage tool", "rebar cage tool", "rebar tool", and derivatives and variations thereof as used throughout the specification are interchangeable and all refer to the adjustable rebar cage tool of the present subject matter.

[0033] The present subject matter is directed to a hand tool that supports the onsite construction and assembly of rebar cages. The adjustable rebar cage tool is adjustable and supports various sizes of rebar cage construction ranging from about twelve inches (12") to about twenty-four inches (24"). The rebar cage tool can be modified into additional sizes for smaller and larger rebar cage construction. Further, the rebar cage tool can be utilized for assembling rebar cages of different shapes including square, rectangle, circle, and the like.

[0034] As shown in FIG. 1, FIG. 2 and FIG. 3, the adjustable rebar cage tool 100 comprises a base 110, an exterior housing 112, an internal latching mechanism 120 having at a latch release arm 122, a latch tooth 124 and an adjustable arm 126, the internal latching mechanism being disposed within the exterior shell, an upper U-bracket member 114 and a lower U-bracket member 116. Referring particularly to FIG. 3, the adjustable arm 126 of the internal latching mechanism 120 comprises a plurality of ratchet grooves 128 which are configured to engage the latch tooth 124. Preferably, each of the ratchet grooves are spaced apart from each other in one-inch (1") increments. With this design, the rebar cage tool is adjustable in height from about twelve inches (12") when the adjustable arm is fully retracted to about twenty-four inches (24") when the arm is fully extended. However, as will be obvious to those skilled in the art, the adjustable arm can be designed for construction of smaller rebar cages as well as larger rebar cages. For example, the adjustable rebar cage tool of the present subject matter can be modified to create a four-inch (4") rebar cage, a thirty-inch (30") rebar cage etc.

[0035] In the embodiment shown, particularly in FIG. 4, the adjustable rebar cage tool is manually adjustable by extending the adjustable arm 126 to the desired height using the latch release arm 122 and engaging the latch tooth 124 into the proper ratchet groove 128. In this manner, the rebar cage tool can be extended to lift the rebar cage and retracted to lower the rebar cage during the assembly process without the need to remove the cage and adjust the height of the tool. It is contemplated that the adjustable rebar cage tool of the present subject matter can be modified to include pneumatic or hydraulic capabilities. The addition of pneumatic or hydraulic capability would not alter the actual rebar cage tool, but would enhance the construction of larger and heavier tool rebar cages.

[0036] The base 110 of the rebar cage tool 100 can be mounted to any flat surface to support and facilitate the assembly of the rebar cage. In a preferred embodiment, the base 110 is bolted to the top surface of a standard saw horse as shown in FIG. 9.

[0037] The assembly of a rebar cage will require the use of a plurality of rebar cage tools. Referring to FIG. 5, four (4) adjustable rebar tools are shown for the assembly of a rebar cage. In this illustration, the rebar tools are positioned in such a manner that rebar rods 132 can be held by the lower U-bracket members 116 and the upper U-bracket members 114. In FIG. 5, each of the adjustable arms are fully extended such that the distance between the lower U-bracket members and the upper U-bracket members is twenty-four inches (24") such that a twenty-four-inch (24") rib cage can be assembled. Once the rebar rods are positioned in the U-bracket members, a plurality of rebar rings are positioned over the rebar rods. The rebar ring shown in FIG. 6 is a square ring 134 which is positioned on the outside of the rebar rods. In assembling the rebar cage, a plurality of rebar rings is positioned as shown in FIG. 7 and FIG. 8. In this embodiment, the rebar cage being assembled is for the construction of a square rebar reinforced cement column. Once the rebar rings have been positioned over the rebar rods, they can be secured to the rods with metal wire. When all the rebar rings are positioned accurately over the rebar rods and tied thereto with metal wire, the assembly of the rebar cage is completed.

[0038] The adjustable rebar cage tool of the present subject matter also can be utilized to assemble a circular rib cage for the construction of a circular reinforced cement column. Referring to FIG. 8, an adjustable rebar cage tool 100 is shown having a rebar rod 132 held by the upper U-bracket member 114 and another rebar rod 132 lower U-bracket member 116. A rebar circle ring 136 is positioned on the outside of the rebar rods. As illustrated in FIG. 10, the assembly of a circular rib cage is illustrated having multiple adjustable rebar cage tools each holding rebar rods and rebar circles.

[0039] While several illustrative embodiments of the invention have been shown and described, numerous variations and alternative embodiments will occur to those skilled in the art. Such variations and alternative embodiments are contemplated and can be made without departing from the scope of the invention as defined in the appended claims.

1. An adjustable rebar cage tool comprising a base, an exterior housing, an internal latching mechanism having a latch release arm, a latch tooth, and an adjustable arm, said internal latching mechanism being disposed with said exterior housing, an upper U-bracket member, and a lower U-bracket member wherein each of said upper U-bracket member and said lower U-bracket member is capable of holding and retaining a rebar rod.

2. The adjustable rebar cage tool in accordance with claim 1, wherein said internal latching mechanism is capable of manual adjustment by extending and retracting said adjustable arm.

3. The adjustable rebar cage tool in accordance with claim 1, wherein said adjustable arm comprises a plurality of ratchet grooves which are configured to engage said latch tooth.

4. The adjustable rebar cage tool in accordance with claim 3, wherein the engagement of said latch tooth with one of said plurality of ratchet grooves prevents the retraction of said adjustable arm.

5. The adjustable rebar cage tool in accordance with claim 1, wherein said adjustable rebar cage tool is adjustable in height from about twelve inches (12") when said adjustable

arm is fully retracted to about twenty-four (24") when said adjustable arm is fully extended.

6. The adjustable rebar cage tool in accordance with claim 5, which can be utilized to assemble a rebar cage sized from about twelve inches (12") to about twenty-four (24").

7. The adjustable rebar cage tool in accordance with claim 1, wherein the height of said adjustable rebar cage tool can be modified to assemble a cage bar sized at about four inches (4") to a cage bar sized at about thirty inches (30").

8. The adjustable rebar cage tool in accordance with claim 1, wherein said base can be mounted to a flat surface.

9. The adjustable rebar cage tool in accordance with claim 1, further comprising pneumatic means to adjust said internal latching means.

10. The adjustable rebar cage tool in accordance with claim 1, further comprising hydraulic means to adjust said internal latching means.

11. The adjustable rebar cage tool in accordance with claim 1, wherein a rebar cage can be assembled by utilizing a plurality of adjustable rebar cage tools positioned in such a manner that a first set of rebar rods can be held and retained by said lower U-bracket members and a second set of rebar rods can be held and retained by said upper U-bracket members and wherein a plurality of rebar rings are positioned over the outside of the rebar rods and secured thereto by metal wire, thereby assembling said rebar cage.

12. The adjustable rebar cage tool in accordance with claim 11, wherein said plurality of rebar rings are in the form of square rings and wherein the assembled rebar cage is in the form of a square rebar cage.

13. The adjustable rebar cage tool in accordance with claim 11, wherein said plurality of rebar rings are in the form of circular rings and wherein the assembled rebar cage is in the form of a circular rebar cage.

14. The adjustable rebar cage tool in accordance with claim 11, wherein each of the plurality of adjustable rebar cage tools utilized in the assembling of a rebar cage can be removed from the rebar cage once it is assembled.

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