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(54) **SWIMMING POOL LADDER**

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E04H 4/00	(2006.01)
E06C 7/08	(2006.01)
E06C 7/00	(2006.01)

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CPC ***E04H 4/14*** (2013.01); ***E04H 4/00*** (2013.01); ***E06C 7/00*** (2013.01); ***E06C 7/08*** (2013.01)

(58) **Field of Classification Search**
CPC E04H 4/144; E06C 7/08; E06C 7/081
USPC 182/118, 228.4
See application file for complete search history.

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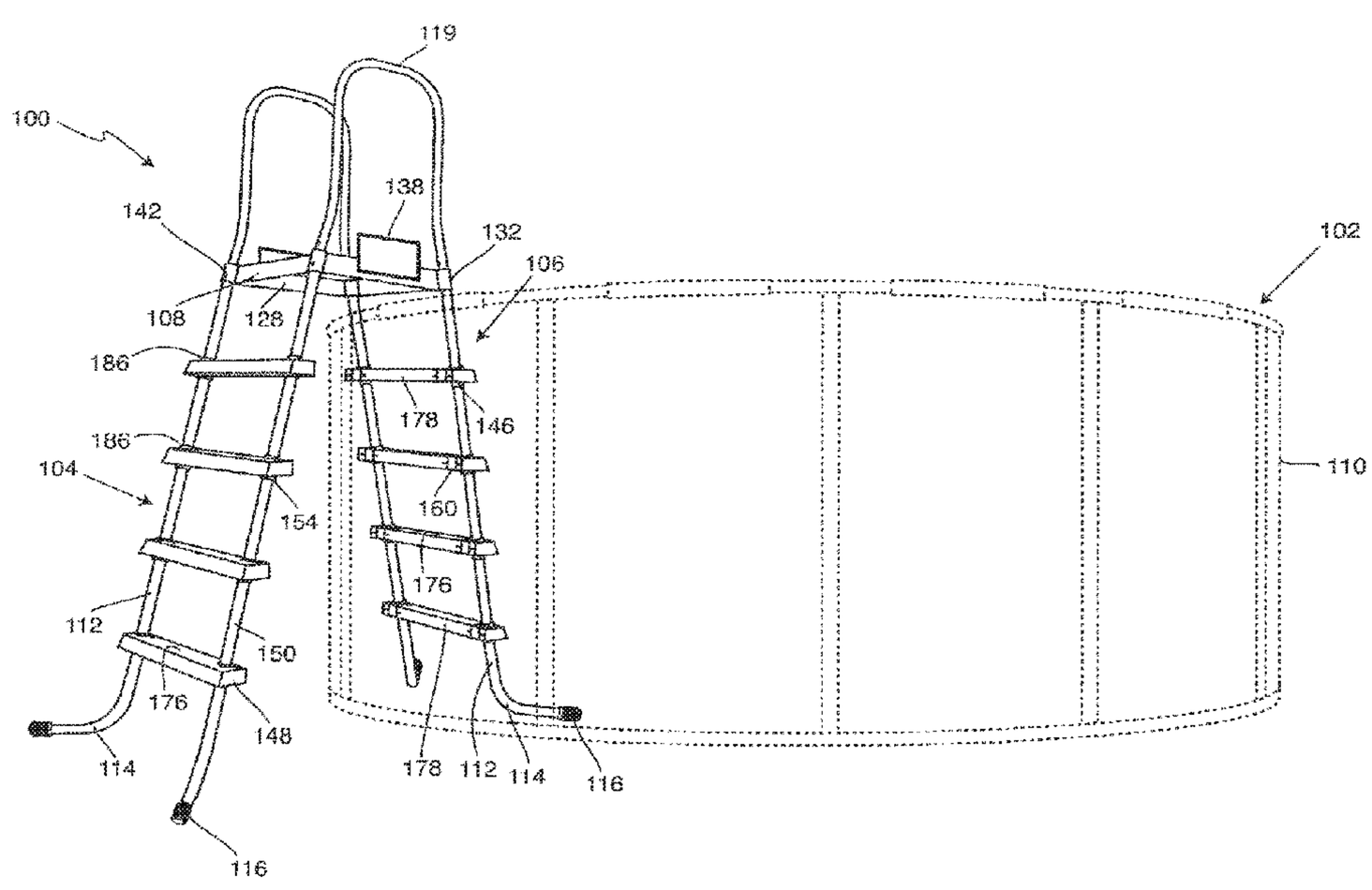
(57) **ABSTRACT**

A swimming pool ladder typically utilized with a large capacity swimming pool for enabling bathers to conveniently enter and exit the pool. In its most fundamental embodiment, the swimming pool ladder includes a first ladder section connected to a second ladder section by a top platform. Each ladder section includes a pair of J-shaped side rails for providing a ladder frame. A plurality of rung anchors are mounted upon each of the side rails for supporting a plurality of rungs. Each of the rung anchors includes a load bearing flange. Further, each of the rungs includes a pair of U-shaped openings and a pair of grooves formed within the U-shaped openings for receiving and cooperating with one of the run anchors and the corresponding load bearing flange. Finally, a plurality of retainer pins are provided for removably securing the rungs to the rung anchors.

18 Claims, 9 Drawing Sheets



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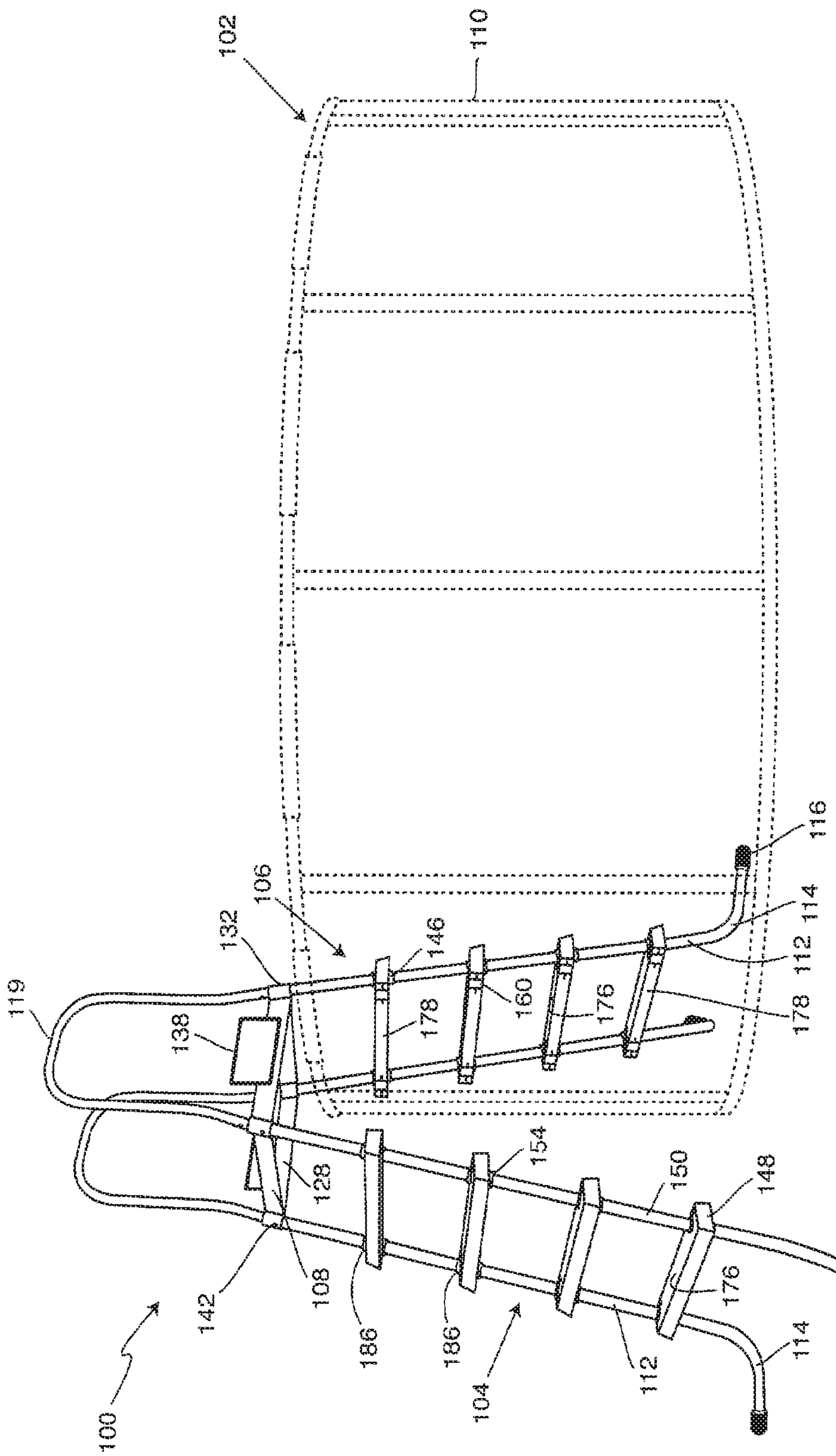
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FIG. 1

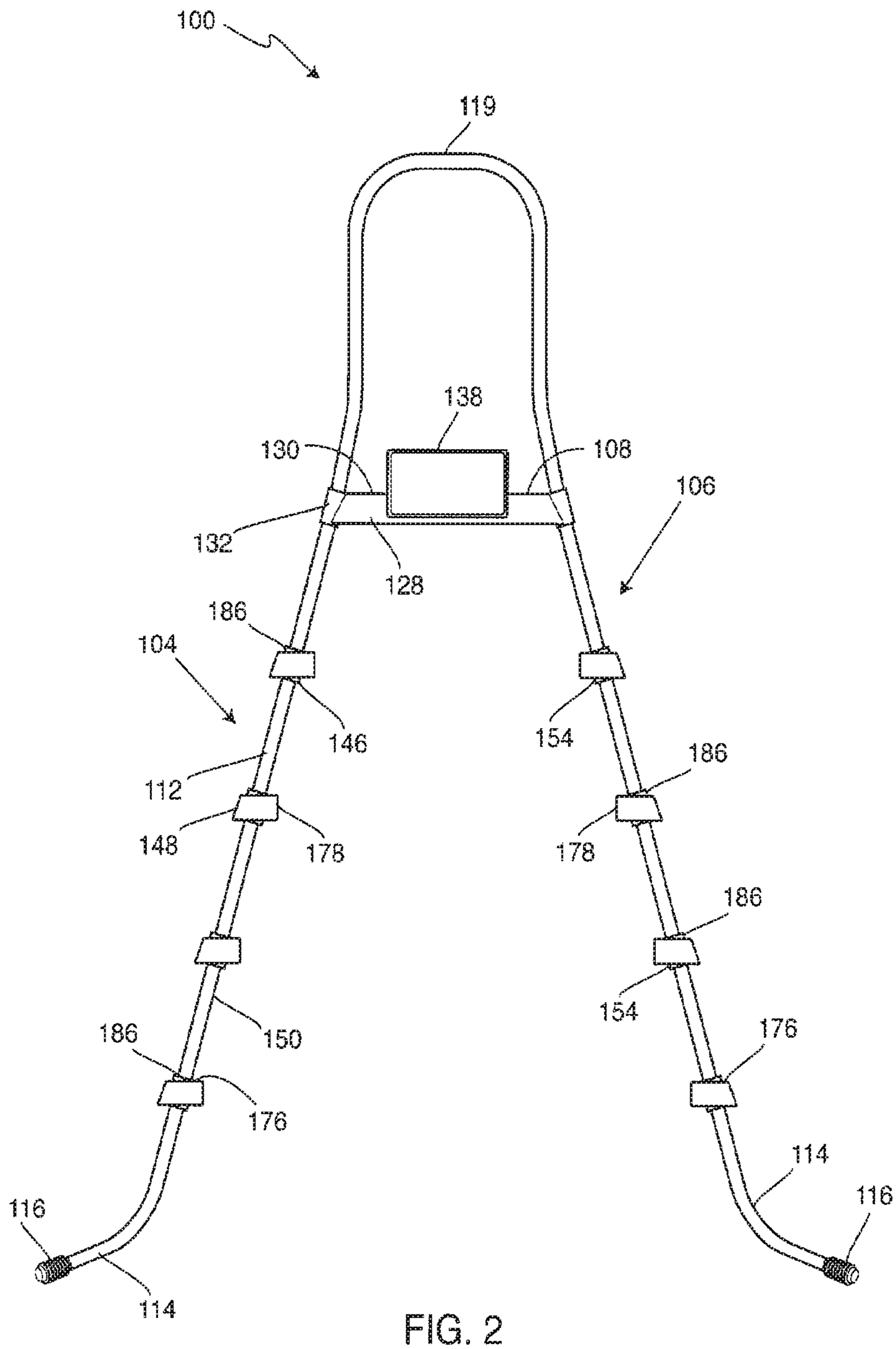
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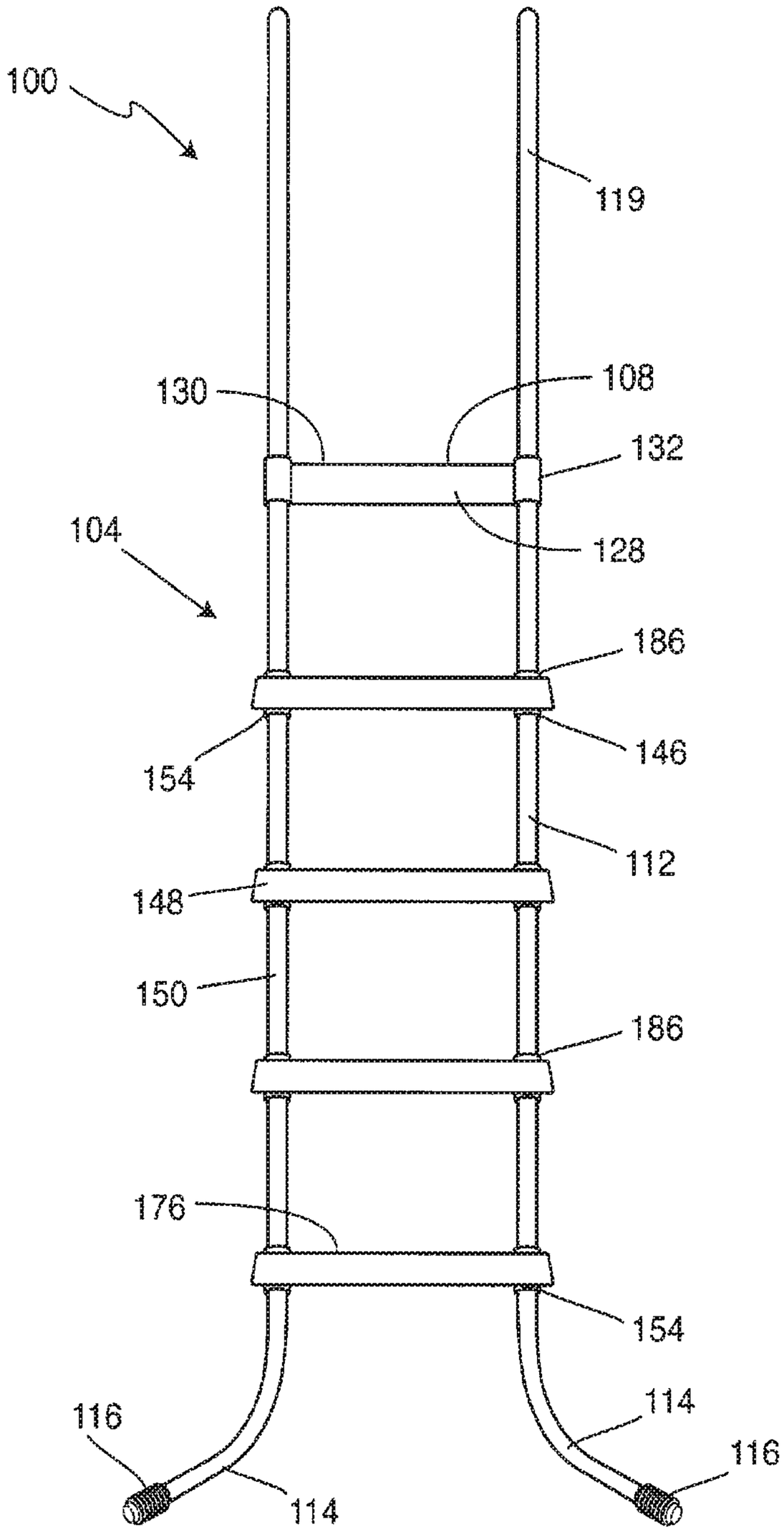
FIG. 2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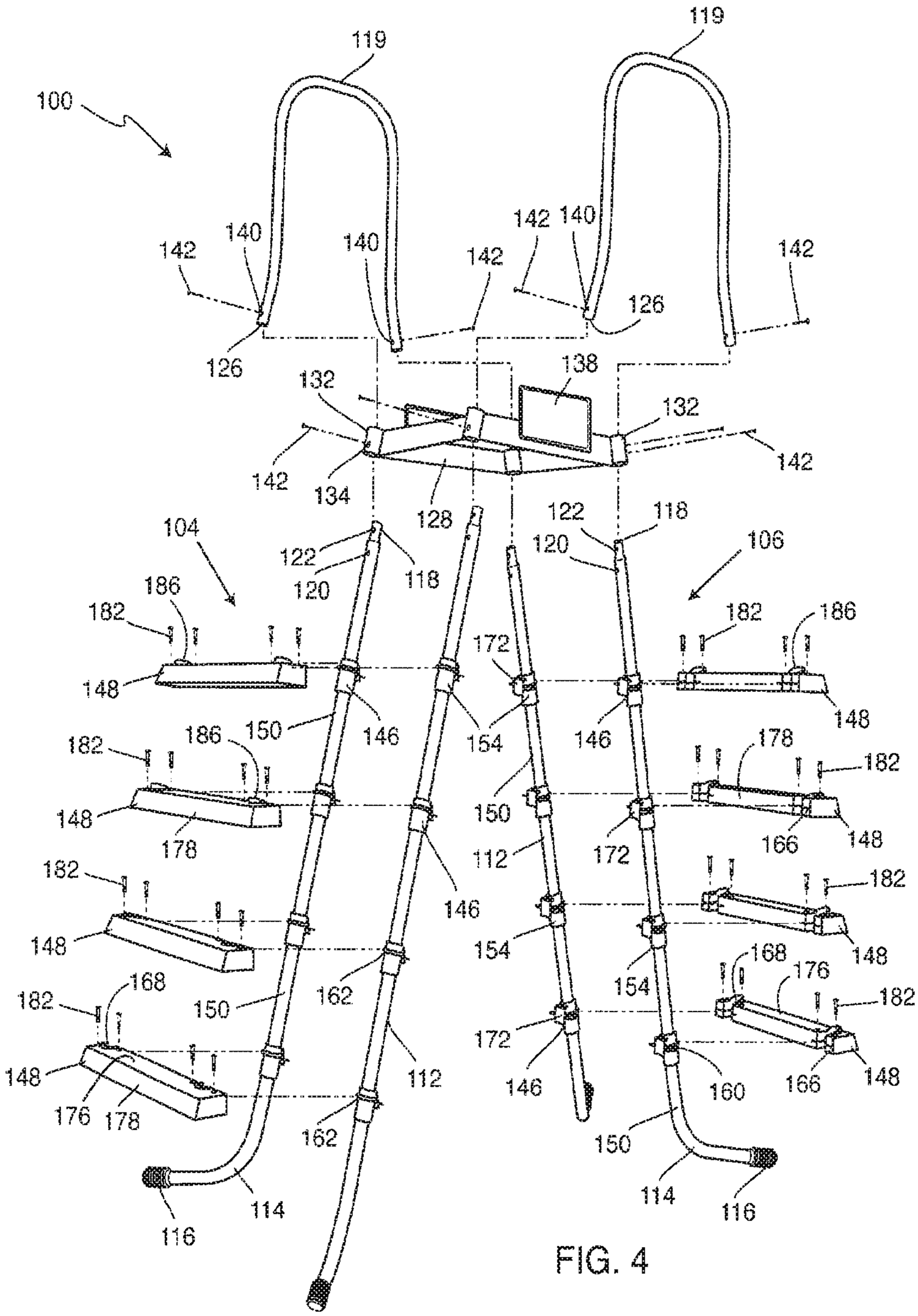
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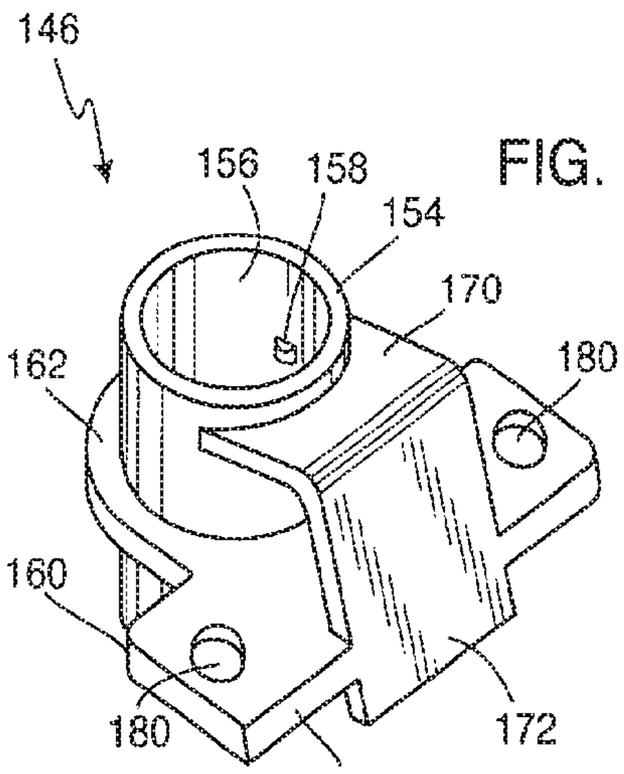
FIG. 4



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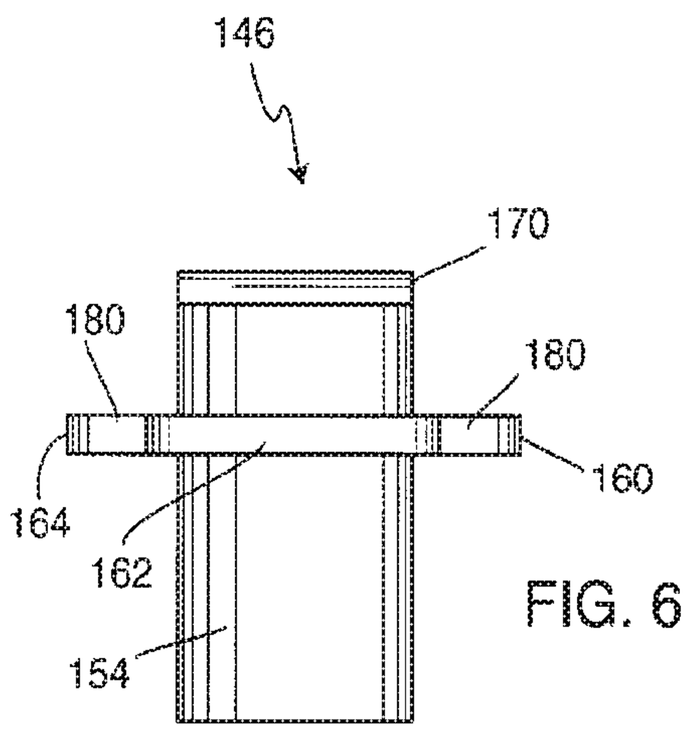

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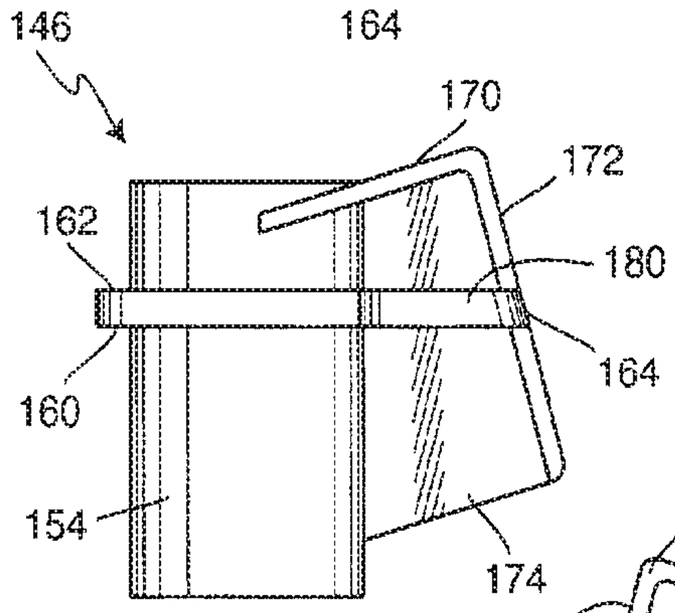

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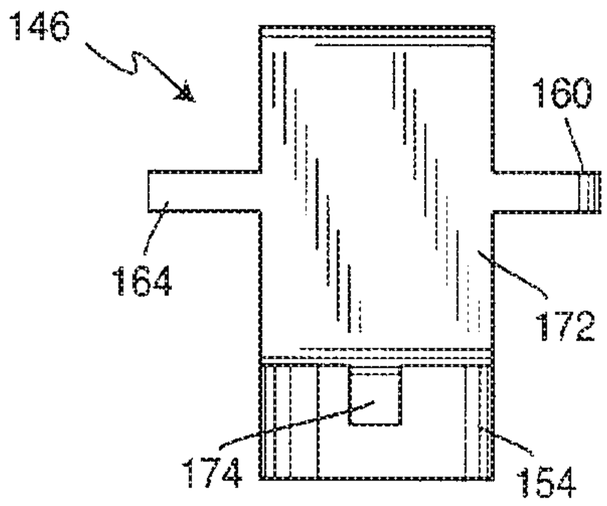

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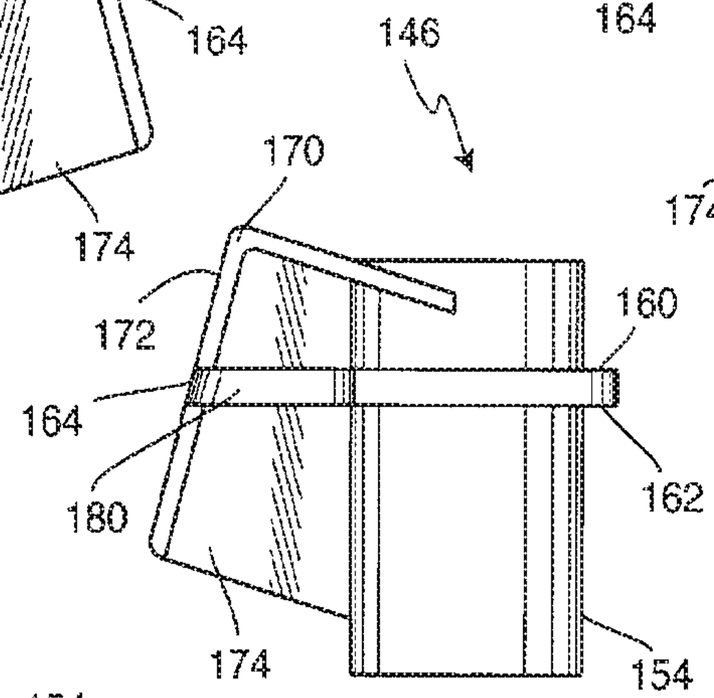

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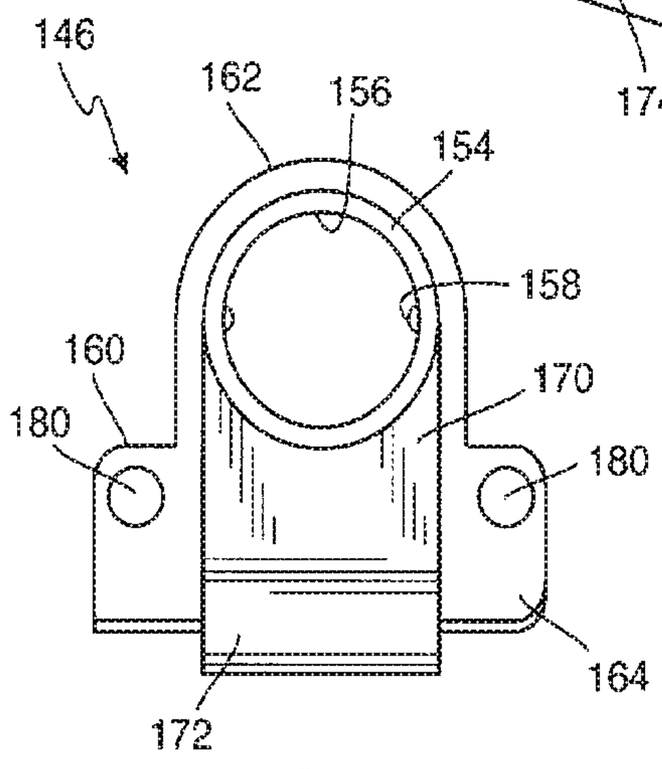
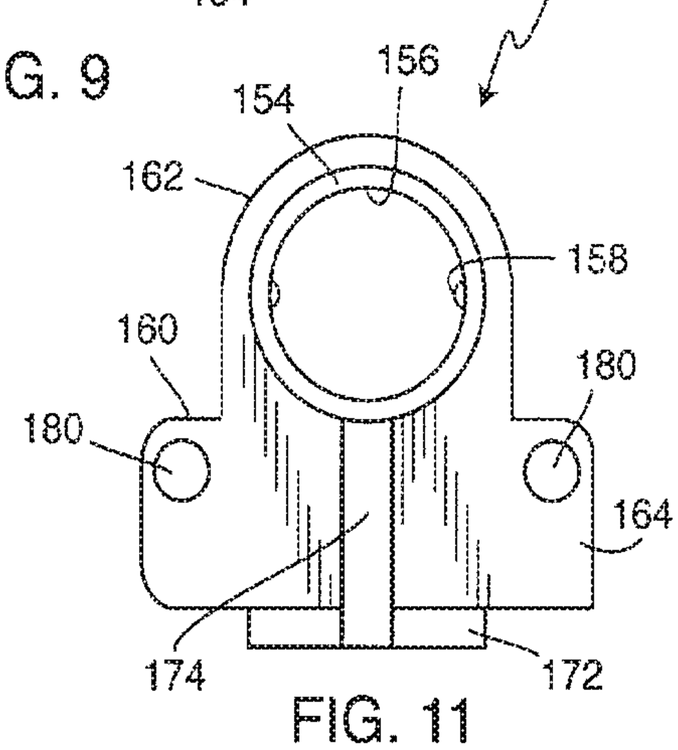


FIG. 10



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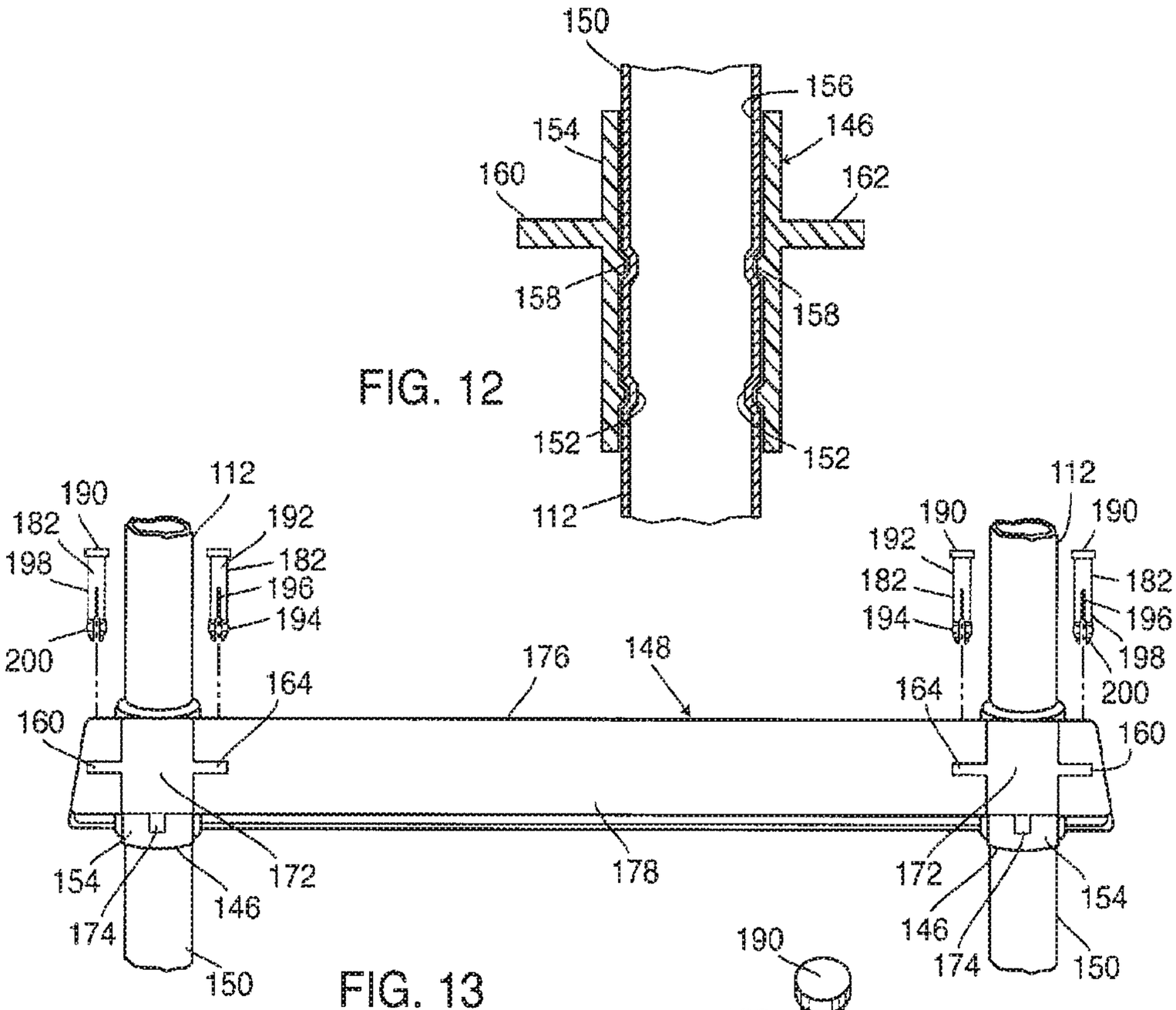

FIG. 12

FIG. 13

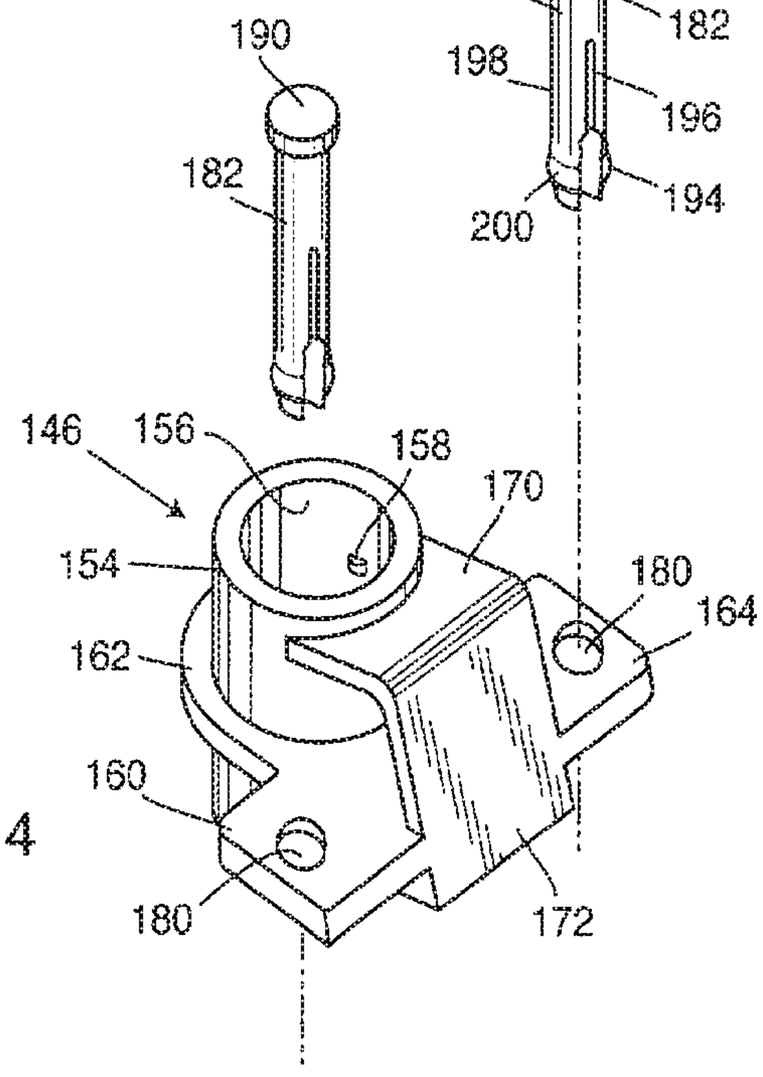

FIG. 14

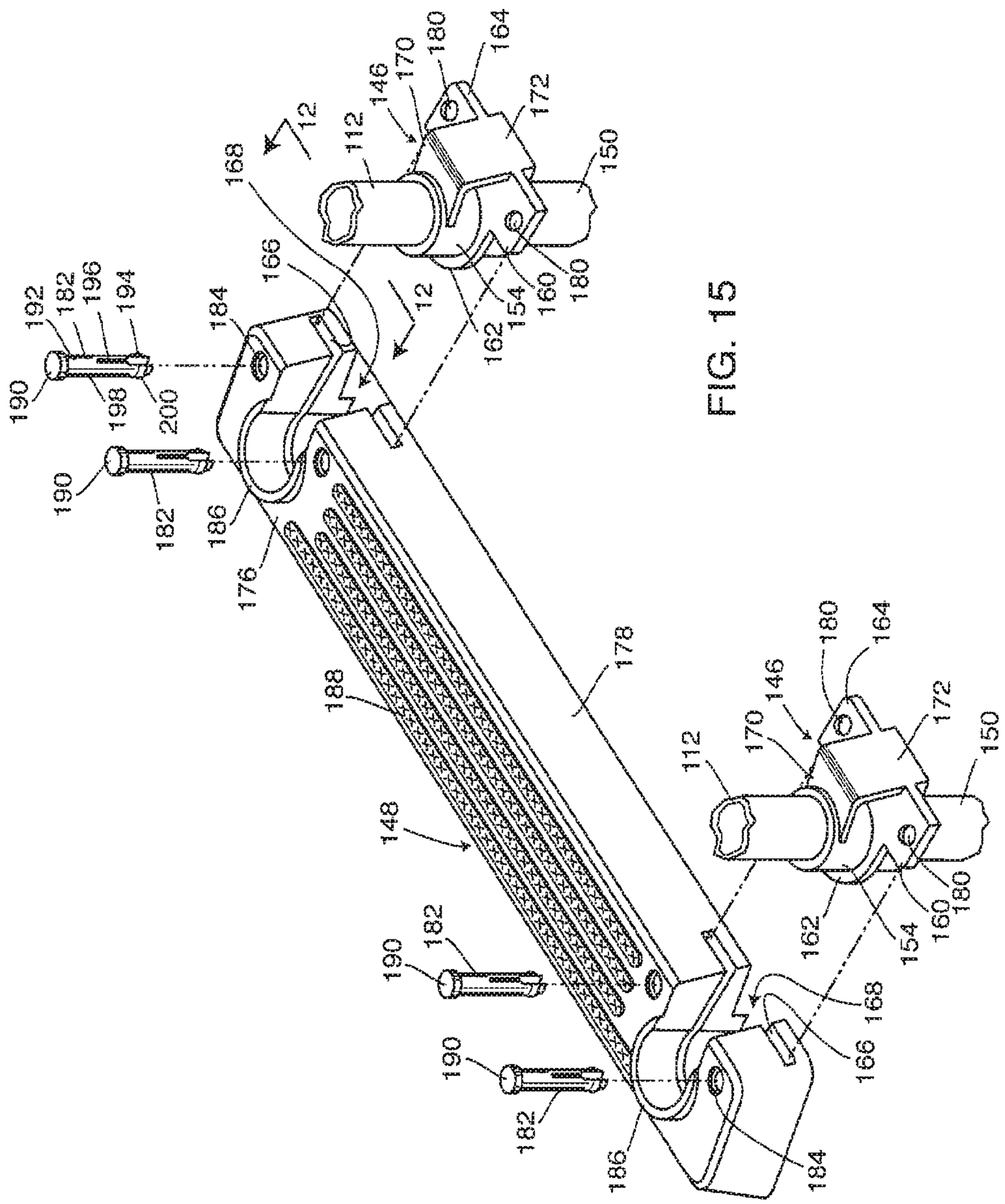
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FIG. 15

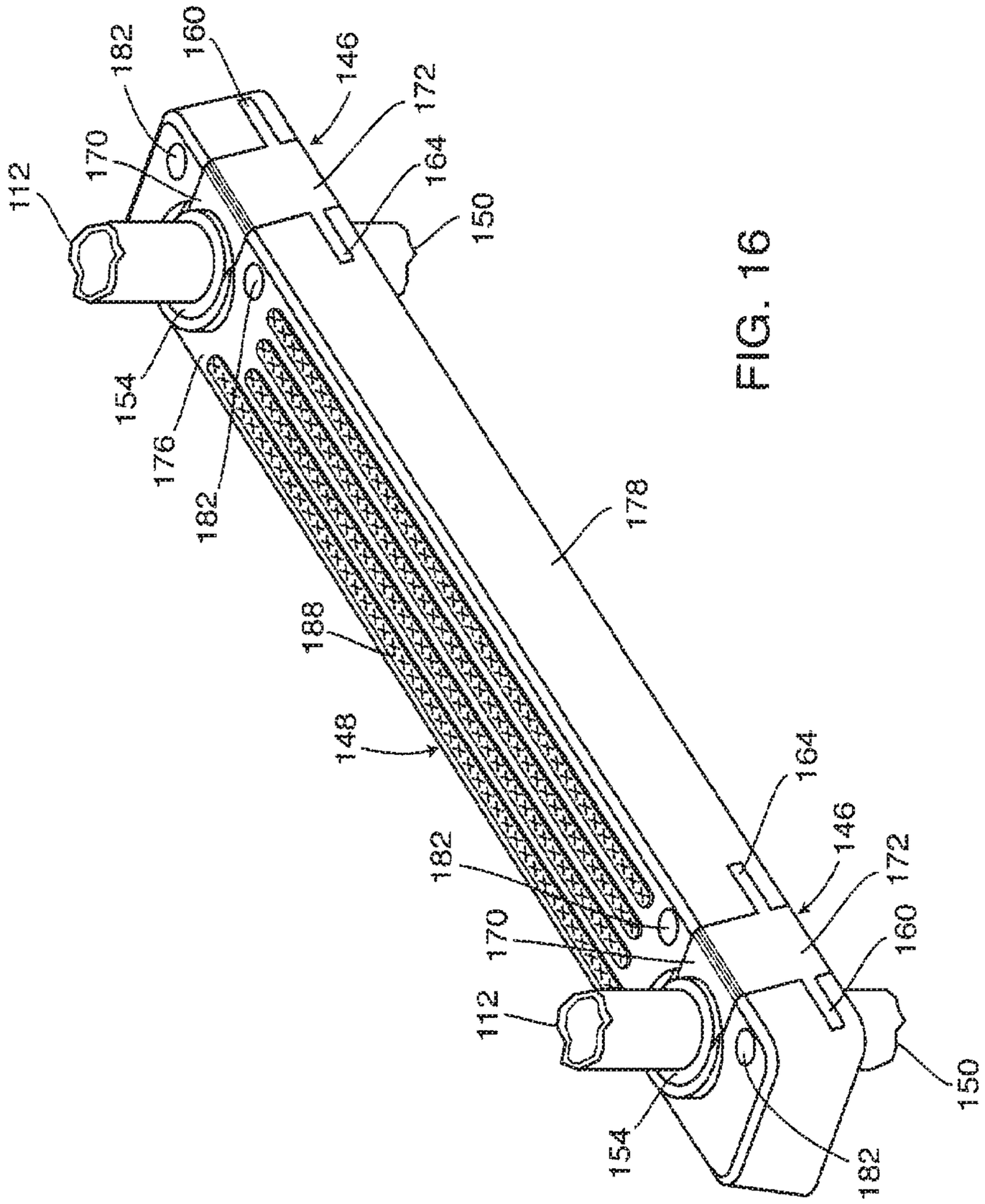
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FIG. 16

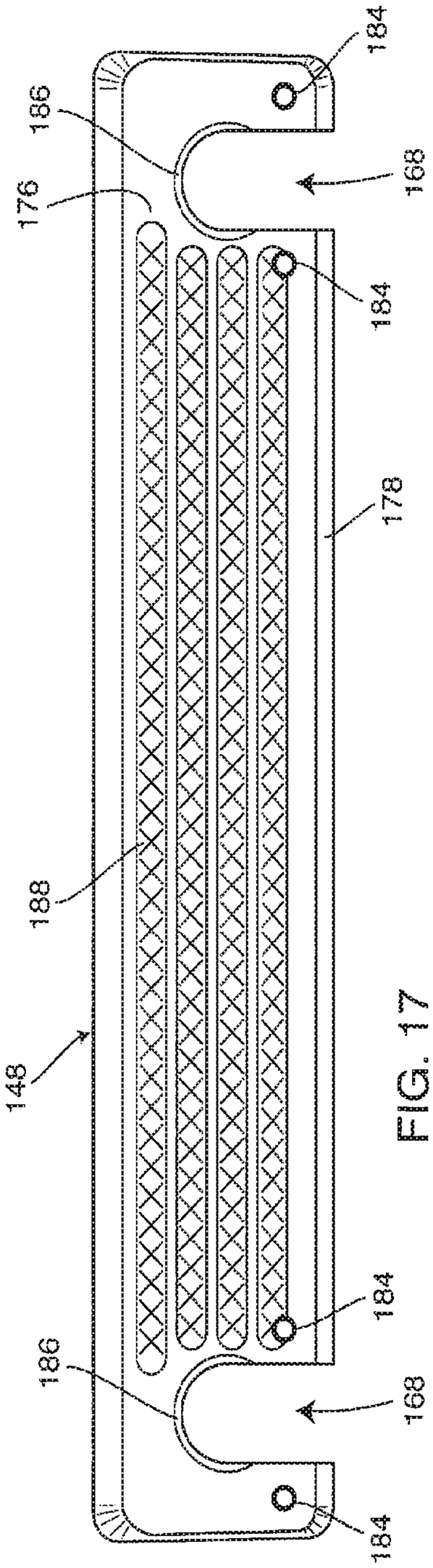
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FIG. 17

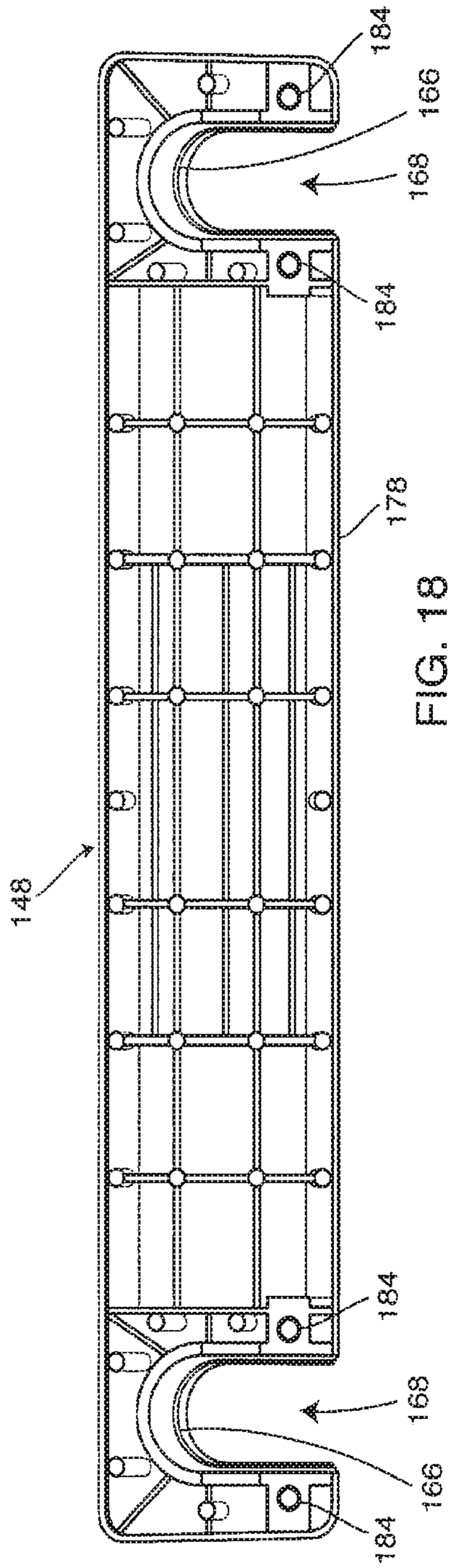
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FIG. 18

SWIMMING POOL LADDER

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to swimming pool apparatus. More specifically, the present invention relates to methods and apparatus for a swimming pool ladder having a plurality of rung anchors permanently affixed onto a pair of parallel side rails for mounting rungs thereon and intended to support the body weight of bathers climbing into and out of a large capacity above-the-ground swimming pool.

2. Background Art

The prior art is directed to methods and apparatus for ladders typically used in large capacity above-the-ground swimming pools for facilitating entry into and egress from the swimming pool.

Above-the-ground swimming pools for use by adults and children alike have become very popular in recent years. These pools are typically erected, for example, in the back yard of a residence and typically have the capacity to hold over one-thousand gallons of water. Above-the-ground swimming pools of this size typically can accommodate several adults and children at any one time. Several types of above-the-ground large capacity swimming pools are known in the art. For example, one style of older swimming pool is comprised of a circular metal boundary or wall that requires reinforcing to withstand the lateral component of force caused by the water volume. Another type of an above-the-ground swimming pool is one that utilizes a circular frame comprised of spaced rigid stanchions employed for supporting a plastic polymer liner, such as polyvinylchloride, utilized to contain the volume of water. A third type of swimming pool is one that includes single or multiple inflated air chambers that vertically support the sidewall of a plastic polymer liner as the swimming pool is filled with water.

Each of these large capacity above-the-ground swimming pools requires a means for conveniently entering and exiting the swimming pool so as not to damage the support structure or sidewall of the swimming pool. The method employed in the prior art to enter and exit the pool has been a ladder designed for such use. These ladders can be comprised of metallic supports and plastic components, be lightweight and high strength. This type of ladder typically used in a swimming pool has been known in the past. An example of this type of ladder includes a pair of uprights having a means for attaching a plurality of rungs there between.

In the example being described, a pair of metallic uprights each have a recess on their edges at the location where the step rungs are to be attached. This task is achieved by press drawing the uprights resulting in two opposite and arched recesses separated by two opposite ridges. Two plastic split sleeves are attached on the uprights in each opposite recess by hand threading them onto the uprights. The sleeves are open on one of their generating lines and the opposite generating line has a reduction in thickness. This design creates a plastic hinge affect which allows the sleeve to open to attach it crossways to the upright. In the threading

operation of the split sleeve onto the upright (at the location of the recess formed on the upright), a protrusion is fitted in the split sleeve which matches the inside of the split sleeve to the recess on the uprights. This feature enables the split sleeve to achieve a grip (as well as proper location) which prevents coaxial displacement of the split sleeve on the metallic upright and ensures that all rungs will be parallel to each other.

A rung of the ladder is supported and held on the split sleeve by and at its ends. The rung includes two tubular sleeves or tunnels having uninterrupted inner surfaces on these ends which rest on a lower flange of the outer edge of the split sleeve. This attachment in turn keeps the sleeve tightly applied against the upright. To prevent accidental upward displacement of the rung once it is attached, an elastic finger finished with an outer conical rib has been fitted on the edge of the sleeve. The conical rib catches on the edge of the tubular sleeve of the rung to prevent upward displacement of the rung.

This ladder typically designed for use with a swimming pool is characteristic of the current state of the art. Notwithstanding the above described rung sections of the ladder can be assembled without use of tools and fasteners, it is noted that each individual split sleeve must be hand threaded along the entire length of the corresponding metallic upright and positioned over the corresponding recess formed in the upright. Thereafter, each metallic upright with the split sleeves attached thereto must be passed through each corresponding tubular sleeve on each rung in order to assemble the ladder. This results in a time consuming process requiring some physical exertion and patience to achieve assembly.

Thus, there is a need in the art for a swimming pool ladder typically used with a large capacity above-the-ground swimming pool and having a first ladder section and a second ladder section where the second ladder section is inserted into the swimming pool, each ladder section including two pairs of J-shaped side rails each having a plurality of rung anchors permanently affixed thereto, the rung anchors each comprising coplanar surfaces and a load bearing flange each of which corresponds to and cooperates with the construction of each corresponding rung, each rung being conveniently assembled to and disassembled from the corresponding rung anchor with a plurality of slotted retainer pins, the ladder further including a top platform and safety handrails for use by a bather.

DISCLOSURE OF THE INVENTION

Briefly, and in general terms, the present invention provides a new and improved swimming pool ladder for use with large capacity above-the-ground swimming pools. The inventive swimming pool ladder includes a first ladder section and a second ladder section which are connected by a top platform having a pair of safety handrails. The first ladder section is securely positioned on the ground side while the second ladder section is inserted into the swimming pool to enable bathers to conveniently enter and exit the swimming pool.

In a preferred embodiment, the swimming pool ladder includes a first ladder section and a second ladder section with each ladder section having a pair of J-shaped side rails for providing a ladder frame. Each of the pair of side rails includes a plurality of rung anchors permanently affixed to the side rails for supporting a plurality of rungs which in turn support the body weight of the bather climbing the ladder. Each of the rung anchors comprise a load bearing flange and

a cylinder body upon which the load bearing flange is formed. Each rung includes a pair of U-shaped openings for receiving the cylinder body of each of a corresponding pair of rung anchors mounted on each of a corresponding pair of side rails. Each U-shaped opening of each rung further includes a groove for receiving the load bearing flange of each of the pair of corresponding rung anchors mounted on the pair of corresponding side rails in a tongue and groove construction.

Each rung anchor also includes a pair of coplanar surfaces which correspond to and cooperate with the construction of each corresponding rung. A first coplanar surface of each rung anchor aligns with a top surface of the corresponding rung while a second coplanar surface of each rung anchor aligns with a rear surface of the corresponding rung. Consequently, when a particular rung is mounted upon the corresponding rung anchor, the U-shaped openings formed in each rung are closed. This feature eliminates any possibility of accidental tripping by a bather while climbing the inventive swimming pool ladder. Finally, each of the rungs is conveniently assembled to and disassembled from the corresponding rung anchor mounted on the side rails by employing a plurality of slotted retainer pins. The retainer pins are inserted into a plurality of penetrations formed in the top surface of each rung and in the load bearing flange of each rung anchor. When assembled, the penetrations formed in each rung are aligned with the penetrations formed in each corresponding rung anchor.

The cylinder body of each of the rung anchors includes a plurality of protuberances formed therein. Additionally, each of the J-shaped side rails includes a corresponding plurality of compression indentations formed therein. The protuberances formed on the inside of the cylinder body cooperate with the compression indentations formed on the side rails to maintain the rung anchors in position on the side rails. Additionally, each of the rung anchors are ultrasonically welded to the corresponding side rail. The J-shaped side rails and the safety hand rails are each comprised of cylindrical metal tubing. However, the rungs, rung anchors and top platform are comprised of high strength plastic. Each of the rungs includes a heavy duty construction having a reinforced lattice structure in the under surface thereof. Each of the rung anchors exhibit a construction that exceeds the industry accepted strength requirements.

The present invention is generally directed to a swimming pool ladder typically utilized with a large capacity swimming pool for enabling bathers to conveniently enter and exit the swimming pool. In its most fundamental embodiment, the swimming pool ladder for use with a large capacity swimming pool exhibits a construction having a first ladder section connected to a second ladder section by a top platform. This ladder construction provides an entry and an exit to the large capacity swimming pool. Each of the ladder sections includes a pair of J-shaped side rails for providing a ladder frame. A plurality of rung anchors are mounted upon each of the side rails for supporting a plurality of rungs. Each of the rung anchors includes a load bearing flange. Further, each of the rungs includes a pair of U-shaped openings and a pair of grooves formed within the U-shaped openings for receiving and cooperating with one of the rung anchors and the corresponding load bearing flange. Finally, a plurality of retainer pins are provided for removably securing the rungs to the rung anchors.

These and other objects and advantages of the present invention will become apparent from the following more

detailed description, taken in conjunction with the accompanying drawings which illustrate the invention, by way of example.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a swimming pool ladder of the present invention showing a first ladder section and a second ladder section, a connecting fop platform, safety hand rails, and a plurality of rungs suspended between J-shaped side rails, where the ladder is shown straddling a sidewall of a large capacity above-the-ground swimming pool.

FIG. **2** is a side elevation of the swimming pool ladder of FIG. **1** showing the ends of the plurality of rungs connected to the J-shaped side rails, top platform and a safety hand rail.

FIG. **3** is a front elevation of the swimming pool ladder of FIG. **1** showing the pair of J-shaped side rails having the plurality of rungs suspended there between, top platform and top hand rail.

FIG. **4** is an exploded prospective view of the swimming pool ladder of FIG. **1** showing the first ladder section and the second ladder section including two sets of the J-shaped side rails with a plurality of rung anchors and retainer pins mounted thereon, the plurality of rungs and the top platform and handrails.

FIG. **5** is a perspective view of the rung anchor of the swimming pool ladder of FIG. **4** showing a cylinder body including a protuberance formed therein, a load bearing flange having a pair of penetrations formed therein, a first coplanar surface and a second coplanar surface.

FIG. **6** is a front elevation of the rung anchor of FIG. **5** showing the cylinder body and load bearing flange.

FIG. **7** is a rear elevation of the rung anchor of FIG. **5** showing the cylinder body, load bearing flange, second coplanar surface, and a support member.

FIG. **8** is a left side elevation of the rung anchor of FIG. **5** showing the cylinder body, load bearing flange, first coplanar surface, second coplanar surface and the support member.

FIG. **9** is a right side elevation of the rung anchor of FIG. **5** showing the cylinder body, load bearing flange, first coplanar surface, second coplanar surface and the support member.

FIG. **10** is a top plan view of the rung anchor of FIG. **5** showing the cylinder body including a pair of the protuberances formed therein, load bearing flange including the pair of penetrations formed therein, first coplanar surface and second coplanar surface.

FIG. **11** is a bottom plan view of the rung anchor of FIG. **5** showing the cylinder body including the pair of protuberances formed therein, load bearing flange including the pair of penetrations, second coplanar surface, and support member.

FIG. **12** is a cross-sectional view of a rung anchor mounted on a J-shaped side rail taken along line **12-12** of FIG. **15** showing the side rail having a pair of compression indentations formed thereon, the cylinder body of the rung anchor including the load bearing flange and the plurality of protuberances.

FIG. **13** is a rear elevation of the swimming pool ladder of FIG. **3** showing the rung anchors mounted on the J-shaped side rails and the rung mounted upon the rung anchors with the retainer pins and supported by the load bearing flange.

FIG. **14** is a perspective view of the rung anchor of FIG. **5** showing the protuberance formed on the inside of the

cylinder body and the slotted retainer pins aligned with the penetrations formed in the load bearing flange.

FIG. **15** is a perspective view of the swimming pool ladder of FIG. **1** showing a rung with a pair of the rung anchors exploded away and the slotted retainer pins aligned with the corresponding penetrations in the rung.

FIG. **16** is another perspective view of the swimming pool ladder of FIG. **1** showing the rung with the pair of rung anchors assembled and the slotted retainer pins installed.

FIG. **17** is a top planar view of one of the plurality of rungs of FIG. **1** with the rung anchors removed and showing the non-skid surface on the top of the rung.

FIG. **18** is a bottom planar view of one of the plurality of rungs of FIG. **1** showing the high strength plastic lattice structure.

DETAILED DESCRIPTION OF THE INVENTION

The present invention is a swimming pool ladder **100** for use with a large capacity above-the-ground swimming pool **102** typically erected in the out-of-doors as is shown in FIG. **1**. The inventive swimming pool **100** includes a first ladder section **104** and a second ladder section **106** which are both mechanically connected to a top platform **108** as best shown in FIGS. **1**, **2**, and **4**. Once assembled and ready for use, the first ladder section **104** is mounted on, for example, the ground side, i.e., mounted external to the swimming pool **102**. However, the second ladder section **106** is mounted within the swimming pool **102**. Thus, the swimming pool ladder **100** straddles a sidewall **110** of the swimming pool **102**. As shown in FIG. **1**, the assembled swimming pool ladder **100** enables a bather to conveniently enter and exit the swimming pool **102**. The construction of the swimming pool ladder **100** resembles an A-frame as is best shown in FIGS. **1** and **2**. The invention will now be described in more detail.

In a preferred embodiment, the swimming pool ladder **100** includes the first ladder section **104** and the second ladder section **106** as shown in FIGS. **1** and **2**. It is noted that each of the ladder sections **104** and **106** are identical, i.e., the first ladder section **104** is a mirror image or duplicate of the second ladder section **106** and vice versa. Consequently, description of the components of structure of the first ladder section **104** applies equally to the components of structure of the second ladder section **106** and vice versa.

Referring now to the first ladder section **104** (and also to the identical ladder section **106**), a pair of J-shaped side rails **112** are employed to form a ladder frame. In other words, each of the first and second ladder sections **104** and **106**, respectively, includes the pair of J-shaped side rails **112** which forms the basic framework of the inventive swimming pool ladder **100**. The J-shaped side rails **112** are comprised of rigid cylindrical metal tubing and can be comprised of, for example, aluminum or other suitable metal. The length of each J-shaped side rail **112** is a function of the height of the swimming pool ladder **100** which is dependent upon the size of the swimming pool **102** shown in phantom in FIG. **1**. The large capacity, out-of-doors, above-the-ground swimming pool **102** typically has the capacity to hold over one-thousand gallons of water and can accommodate several adults and children at any one time. Different size swimming pools **102** can vary in height. Since the height of the swimming pool sidewall **110** can vary, the length of the corresponding J-shaped side rails **112** can vary for different size swimming pools **102**. Notwithstanding, the length of the typically J-shaped side rail **112** can be, for example, approximately 68"-70" when fully assembled which includes the top platform **108**.

The bottom end **114** of each side rail **112** is fanned out so that the cylindrical metal tubing exhibits somewhat less than a ninety degree turn so that it appears to be J-shaped as shown in FIGS. **1-4**. This design broadens the bottom end **114** of each of the J-shaped side rails **112** to provide lateral stability and support to the first and second ladder sections **104** and **106**. This feature is in compliance with the guidelines of the American National Standards Institute (ANSI) as it relates to swimming pool ladders in general. Additionally, mounted on the bottom end **114** of each of the J-shaped side rails **112** is a foot cap **116** as shown in FIGS. **1-4**. The foot cap **116** is typically comprised of a plastic polymer such as, for example, polyvinylchloride and is employed to improve the footing of each of the J-shaped side rails **112**. The plastic polymer that forms each foot cap **116** is corrugated and thus is able to improve the footing by increasing the friction between each J-shaped side rail **112** and the surface upon which it is mounted. Additionally, the plastic polymer of the foot cap **116** mounted on the bottom end **114** of the J-shaped side rails **112** of the second ladder section **106** is not likely to tear the bottom plastic liner (not shown) of the swimming pool **102**.

A top end **118** of each of the J-shaped side rails **112** exhibits a reduction in diameter for interfacing with the top platform **108** and a pair of safety hand rails **119** as is clearly shown in the exploded view of FIG. **4**. Just below each of the top ends **118** in each of the side rails **112** is a first penetration **120**. Likewise, a second penetration **122** is formed in the top end **118** of each of the J-shaped side rails **112** as shown in FIG. **4**. The first penetration **120** and the second penetration **122** formed in each of the J-shaped side rails **112** are to be employed for fastening or connecting each of the side rails **112** respectively to the top platform **108** and to the pair of safety hand rails **119** mounted above the top platform **108** as shown in FIG. **4** and described herein below.

The top platform **108** is rectangular in shape and is comprised of a heavy duty plastic polymer such as Acrylonitrile Butadiene Styrene (ABS) or Polyvinylchloride (PVC). One of the functions of the top platform **108** is to serve as a passageway between the first ladder section **104** and the second ladder section **106**. This is possible since the pair of J-shaped side rails **112** of the first ladder section **104** and the pair of J-shaped side rails **112** of the second ladder section **106** each connect to the top platform **108**. The top platform **108** also serves to enable the top end **118** of each of the J-shaped side rails **112** to connect to a corresponding one of a plurality of hollow terminal ends **126** of the pair of safety hand rails **119**. The top platform **108** also includes a downward extending skirt **128** on each side of a non-slip rectangular top surface **130**.

At each corner of the top platform **108** defined by the intersection of the rectangular top surface **130** and a pair of the downward extending skirts **128**, a cylindrical channel **132** is formed. The cylindrical channel **132** formed in each corner of the top platform **108** is set at an angle somewhat greater than ninety degrees. Each of the four cylindrical channels **132** further includes a third penetration **134** on the outer surface Of the channel **132** and a slot **136** (not shown) formed on the inner surface of the channel **132**. Each of the third penetrations **134** is aligned with the corresponding slot **136** to enable the passage of a fastener there through. Additionally, the platform **108** includes a pair of vertical signboards **138** attached to opposing downward extending

skirts **128** with plastic fasteners (not shown). The signboards **138** are utilized to post safety and warning messages to bathers.

The pair of safety hand rails **119** are shown mounted above the top platform **108** is FIGS. **1-3** and also shown exploded away from the platform **108** in FIG. **4**. The pair of safety hand rails **119** are shaped so that the hollow terminal ends **126** are downward extending. Further, each of the hollow terminal ends **126** includes a fourth penetration **140** formed there through. During assembly, the top end **118** of each of the J-shaped side rails **112** is extended through the corresponding cylindrical channel **132** of the top platform **108**. The top platform **108** settles on that portion of the side rail **112** below the top end **118**. The first penetration **120** in the side rail **112** is then aligned with the third penetration **134** formed in the cylindrical channel **132** of the platform **108**. One of a plurality of fasteners **142**, such as, for example, a threaded bolt and nut is then passed through the third penetration **134** of the platform **108** and the first penetration **120** of the side rail **112**. The end of the bolt of the fastener **142** is then passed through the slot **136** (not shown) underneath the top platform **108** so that the nut can be applied.

After this task is accomplished, the top end **118** of the side rail **112** is extending above the cylindrical channel **132** of the platform **108**. One of the hollow terminal ends **126** of each of the safety hand rails **119** is placed over the top end **118** of the corresponding side rail **112**. Thereafter, the fourth penetration **140** of the corresponding safety hand rail **119** is aligned with the second penetration **122** formed in the top end **118** of the corresponding side rail **112** and one of the plurality of fasteners **142** is passed there through. Once each of the fasteners **142** is secured, the platform **108** is attached to and stabilized by the J-shaped hand rails **112** and the safety hand rails **119** are secured to the top platform **108**. Disassembly is achieved by the reverse of this procedure.

Each of the pair of J-shaped side rails **112** for both the first ladder section **104** and the second ladder section **106** includes a plurality of rung anchors **146** permanently affixed to the side rails **112** as is clearly shown in FIG. **4**. The primary function of the rung anchors **146** is to support a corresponding plurality of rungs **148** which in turn support the body weight of the bather climbing the inventive swimming pool ladder **100**. When the J-shaped side rails **112** are assembled with the remainder of the components of each of the first ladder section **104** and the second ladder section **106**, the rung anchors **146** are already installed, i.e., the rung anchors **146** are pre-attached during the manufacturing stage. The method of attachment of each of the rung anchors **146** to the side rails **112** is illustrated in the cross-sectional view of FIG. **12**. Each of the J-shaped side rails **112** includes an outer surface **150**. Further, the outer surface **150** of each of the side rails **112** includes a plurality of compression indentations **152** which are formed into the side rails **112** typically at **180** mechanical degrees during the manufacturing stage. The compression indentations **152** can be formed in the side rails **112** in pairs in close proximity and the pairs of compression indentations **152** are typically positioned along the side rails **112** at into rails of approximately 8"-10" from the bottom end **114** to the top end **118**. The positioning of the compression indentations **152** along the length of the side rails **112** is indicated by the position of the rung anchors **146** in FIG. **4**. Likewise, the positioning of the rung anchors **146** occurs at the locations of the corresponding rungs **148**.

Each of the plurality of step anchors **146** includes a cylinder body **154** that encloses a portion of the corresponding side rail **112**. Thus, an inner surface **156** of the cylinder body **154** of each of the rung anchors **146** is in physical contact with outer surface **150** of the side rails **112**. The inner surface **156** of the cylinder body **154** of each of the plurality of rung anchors **146** includes a pair of protuberances **158** formed thereon. The situs of each of the pair of protuberances **158** correspond to and cooperate with the location of the corresponding compression indentations **152** formed on the outer surface **150** of each of the side rails **112**. Consequently, each of the plurality of rung anchors **146** is mechanically attached to the outer surface **150** of the corresponding J-shaped side rail **112**.

In addition to the mechanical connection between each of the rung anchors **146** and the corresponding side rail **112**, each of the rung anchors **146** is also ultrasonically welded to the corresponding side rail **112**. Ultrasonic welds are well known in the art and includes the use of sound waves to create kinetic energy which in turn generates heat. The generation of heat results in the melting of components in contact to form a bonded joint. Each of the plurality of rung anchors **146** is an injection molded part that can be comprised of a plastic polymer, for example, nylon or in the alternative another high strength plastic. By the use of ultrasonic welding, each of the rung anchors **146** is welded directly to the corresponding J-shaped side rail **112** as is shown in FIG. **4**. Thus, the mechanical connection comprising the pair of protuberances **158** seated within the compression indentations **152** in combination with the ultrasonic welds serve to maintain each of the rung anchors **146** in position along the corresponding J-shaped side rail **112**. The attachment of each of the rung anchors **146** is robust since each rung anchor **146** is capable of supporting in excess of six-hundred pounds of weight. This design criteria exceeds the relevant American National Standards Institute (ANSI) recommendations.

Each of the plurality of rung anchors **146** includes a load bearing flange **160** formed upon an exterior surface of the cylinder body **154** as is clearly shown in FIGS. **5-11**. The load bearing flange **160** is injection molded directly onto the exterior surface of the cylinder body **154** and thus is normally comprised of the same plastic polymer. The load bearing flange includes a forward portion **162** and a rearward portion **164** best shown in FIGS. **5** and **6**. The function of the forward portion **162** of the load bearing flange **160** is to be received by a groove **166** formed in a U-shaped opening **168** on a rear surface **178** of each of the plurality of rungs **148** as is shown clearly in FIGS. **15** and **18**. The forward portion **162** of the load bearing flange **160** expands into the rearward portion **164** having a broader surface area. The overall function of the load bearing flange **160** is to provide support to the corresponding rung **148** to which it is connected. This is accomplished by designing the load bearing flange **160** to be entirely received by the groove **166** formed in the U-shaped opening **168** of each rung **148**. Thus, the entire load placed on any particular rung **148** is transferred to and carried by the load bearing flange **160**. It is anticipated that the body weight placed on each rung **148** will be supported because the polymer structure of the load bearing flange **160** does not begin to deform until the weight exceeds 600 pounds. This weight surpasses the American National Standards Institute (ANSI) recommendation of 400 pounds.

Each of the rung anchors **146** also includes a pair of coplanar surfaces including a first coplanar surface **170** and a second coplanar surface **172**. The first coplanar surface **170** is also injection molded to the cylinder body **154** and extends upward at a slight angle from the horizontal. The second coplanar surface **172** is injection molded to the first

coplanar surface **170**, load bearing flange **160**, and to a support member **174**. The support member **174** is injection molded to the cylinder body **154**, load bearing flange **160**, and first coplanar surface **170** in addition to the second coplanar surface **172**. The function of the support member **174** is to provide rigidity and strength to each of the rung anchors **146**. The first coplanar surface **170** and the second coplanar surface **172** correspond to and cooperate with the construction of each corresponding rung **148**.

The first coplanar surface **170** of each rung anchor **146** aligns with a top surface **176** of the corresponding rung **148**. Thus, the first coplanar surface **170** is a surface that is planar (i.e., occurs in the same plane) with the top surface **176** of the corresponding rung **148**. Additionally, the second coplanar surface **172** of each rung anchor **146** aligns with a rear surface **178** of the corresponding rung **148**. Consequently, the second coplanar surface **172** is a surface that is planar (i.e., occurs in the same plane) with the rear surface **178** of the corresponding rung **148**. Therefore, when a rung **148** is mounted upon a corresponding rung anchor **146** on a side rail **112**, the U-shaped opening **168** formed in each rung **148** is closed as is shown in FIG. **16**. In other words, the first coplanar surface **170** and the second coplanar surface **172** of each rung anchor **146** causes the top surface **176** and the rear surface **178**, respectively, of each rung **148** to be continuously smooth. Additionally, the broad surface area of the rearward portion **164** of the load bearing flange **160** includes a pair of penetrations **180**. Each of the penetrations **180** serves to receive and pass one of a plurality of slotted retainer pins **182** as shown in FIGS. **13-16** but particularly in FIG. **14**.

Each of the plurality of rungs **148** is generally rectangular in shape as shown in FIGS. **15-17** and is comprised of a plastic polymer such as, far example, Acrylonitrile Butadiene Styrene (ABS) or Polyvinylchloride (PVC). The top surface **176** of each of the rungs **148** comprises a non-slip surface design and includes a plurality of four penetrations **184** that vertically pass there through as shown in FIGS. **15**, **17** and **18**. The pair of U-shaped openings **168** are clearly visible in the view of the top surface **176** of each of the rungs **148**. The groove **166** formed in the U-shaped opening **168** of each of the rungs **148** is clearly visible in FIGS. **15**, **16** and **18**. The groove **166** is sized to accommodate the entire load bearing flange **160** formed on each of the rung anchors **146** mounted on the side rails **112** as is shown in FIGS. **13** and **16**. Thus, the groove **166** of each U-shaped opening **168** cooperates with the corresponding load bearing flange **160** in a tongue and groove fashion as is shown in FIG. **15**.

Each of the U-shaped openings **168** also includes a raised collar **186** which rises above the top surface **176** of each of the rungs **148**. The raised collar **186** as part of the structure of each of the rungs **148** assists in securing the cylinder body **154** of the rung anchor **146** in the U-shaped opening **168**. In particular, the raised collar **186** provides more surface area in the U-shaped opening **168** of each of the rungs **148** to more securely grasp the cylinder body **154** of the rung anchor **146**. The underneath of each of the rungs **148** of the inventive swimming pool ladder **100** is illustrated in FIG. **18**. The U-shaped openings **168** and the corresponding grooves **166** are clearly shown. Additionally, the four penetrations **184** formed vertically through each of the rungs **148** are visible. Further, the underneath of each of the rungs **148** includes a lattice structure **188** for increasing the structural integrity of each rung **148** as is clearly shown in FIG. **18**.

Each of the plurality of slotted retainer pins **182** serves to enable the convenient assembly and disassembly of each rung **148** to and from the corresponding rung anchor **146**. Each retainer pin **182** is also comprised of a suitable plastic polymer, such as nylon, and is shown clearly in FIGS. **14** and **15**. Each retainer pin **182** includes a fiat head **190**, a slotted cylindrical shaft **192**, and a slotted bulbous tip **194**. A slot **196** formed in the cylindrical shaft **192** provides a spring action between a pair of legs **198** that form the cylindrical shaft **192** as shown in FIG. **14**. The pair of legs **198** that form the cylindrical shaft **192** become a pair of bulb portions **200** that form the bulbous tip **194**. The spring action between the pair of legs **198** and consequently between the pair of bulb portions **200** allow the slotted retainer pins **182** to pass through the four penetrations **184** in each of the rungs **148** and the corresponding penetrations **180** formed in the load bearing flange **160**. Once inserted, the pair of bulb portions **200** separate, i.e., expand, and lock the retainer pins **182** in position. The flat head **190** of each of the retainer pins **182** lay flush with the top surface **176** of the corresponding rung **148**. Upon forcing the bulb portions **200** of the slotted bulbous tip **194** together with finger pressure, the retainer pins **182** can be easily removed.

During assembly of the swimming pool ladder **100** of the present invention, the load bearing flange **160** of each of the rung anchors **146** is aligned with the groove **166** of the U-shaped opening **168** of the corresponding rung **148**. By utilizing hand pressure, the load bearing flange **160** is entirely inserted into the groove **166** of the corresponding U-shaped opening **168**. Once the rung **148** is mounted upon the corresponding rung anchor **146**, the penetrations **184** vertically formed through each rung **148** align with the corresponding penetrations **180** formed through the rearward portion **164** of the load bearing flange **160** as shown in FIGS. **15** and **16**. Thereafter, the slotted retainer pins **182** can be inserted through the penetrations **184** in the rungs **148** and the penetrations **180** in the load bearing flange **160** to lock the rung **148** to the rung anchor **146**. This procedure is followed until each of the rungs **148** is installed on the corresponding pairs of J-shaped side rails **112** of the first ladder section **104** and the second ladder section **106**.

Thereafter, the top platform **108** is installed on the first ladder section **104** and subsequently on the second ladder section **106**. Once the top platform **108** is installed on the first ladder section **104**, the corresponding safety hand rail **119** is installed. Next, the top platform **108** is installed on the second ladder section **106** and the corresponding safety hand rail **119** is installed. Once the components are assembled, the first penetrations **120** in the side rails **112** are aligned with the third penetrations **134** of the top platform **108**. The plurality of fasteners **142** are then installed and secured. Next, the second penetrations **122** in the top ends **118** are aligned with the fourth penetrations **140** in the safety hand rails **119**. Thereafter, the plurality of fasteners **142** are then installed and secured. The second ladder section **106** is then positioned within the large capacity, out-of-doors, above-the-ground swimming pool **102** and the first ladder section **104** is positioned on the ground side external to the swimming pool **102**. The swimming pool ladder **100** is now ready for use. Reversing the order of this procedure enables the swimming pool ladder **100** to be disassembled.

The present invention provides novel advantages over other swimming pool ladders known in the prior art. A main advantage of the swimming pool ladder **100** for use with large capacity, out-of-doors swimming pools **102** of the present invention is that it comprises a simple yet robust design particularly in relation to attaching the rungs **148** to the corresponding rung anchors **146**. Further, the swimming pool ladder **100** is easy and time efficient to assembly and

disassemble, is lightweight and transportable, and is easily stored in a small space. Additionally, once assembled, there are no sharp edges or corners to cause injury to children in a swimming pool environment. The design of the swimming pool ladder **100** of the present invention enables adults as well as children to enter and exit the swimming pool **102** in a convenient and safe manner. Further, the ladder design of the present invention eliminates many of the articulated and mechanical components present in prior art pool ladders which made assembly, use and disassembly difficult and inconvenient.

While the present invention is described herein with reference to illustrative embodiments for particular applications, it should be understood that the invention is not limited thereto. Those having ordinary skill in the art and access to the teachings provided herein will recognize additional modifications, applications and embodiments within the scope thereof and additional fields in which the present invention would be of significant utility.

It is therefore intended by the appended claims to cover any and all such modifications, applications and embodiments within the scope of the present invention.

What is claimed is:

1. A swimming pool ladder for use with a large capacity swimming pool comprising:

a first ladder section connected to a second ladder section by a top platform for providing an entry and an exit to a large capacity swimming pool;

each ladder section comprising:

a pair of J-shaped side rails for providing a ladder frame;

a plurality of rung anchors welded to said side rails for supporting a plurality of rungs, each of said rung anchors including a load bearing flange molded to an exterior surface of a cylinder body of said rung anchors, and each of said rungs having a pair of U-shaped openings formed at a rear surface of said rungs and a pair of grooves formed within said U-shaped openings for receiving and cooperating with one of said rung anchors and said corresponding load bearing flange; and

a plurality of retainer pins for removably securing said rungs to said rung anchors.

2. The swimming pool ladder of claim **1** wherein each of said rungs is comprised of a high strength plastic polymer.

3. The swimming pool ladder of claim **1** wherein each of said rung anchors is comprised of a high strength plastic.

4. The swimming pool ladder of claim **1** wherein said top platform further includes a pair of safety hand rails.

5. The swimming pool ladder of claim **1** wherein each of said side rails is comprised of metal tubing.

6. The swimming pool ladder of claim **1** wherein each of said side rails further includes a foot cap.

7. The swimming pool ladder of claim **1** wherein each of said retainer pins is a slotted retainer pin having a slotted bulbous tip, said pins comprised of plastic.

8. The swimming pool ladder of claim **1** wherein said cylinder body includes a plurality of protuberances formed therein for cooperating With a corresponding plurality of compression indentations formed on said side rails for securing said rung anchors to said side rails.

9. The swimming pool ladder of claim **1** wherein each of said rung anchors further includes a first coplanar surface for aligning with a top surface of a corresponding one of said rungs.

10. The swimming pool ladder of claim **9** wherein each of said rung anchors further includes a second coplanar surface for aligning with a rear surface of a corresponding one of said rungs.

11. The swimming pool ladder of claim **1** wherein each of said rung anchors further includes a support member for supporting said load bearing flange.

12. The swimming pool ladder of claim **1** wherein said load bearing flange of each of said rung anchors further includes a pair of penetrations for receiving said plurality of retainer pins.

13. The swimming pool ladder of claim **1** wherein each of said rungs further includes a plurality of penetrations formed vertically through said rungs for receiving said plurality of retainer pins.

14. The swimming pool ladder of claim **1** wherein each of said rungs includes an under surface having a reinforced lattice structure.

15. A swimming pool ladder for use with a large capacity swimming pool comprising:

a first ladder section connected to a second ladder section by a top platform for providing an entry and an exit to a large capacity swimming pool;

each ladder section comprising:

a pair of J-shaped side rails for providing a ladder frame;

a plurality of rung anchors welded to said side rails for supporting a plurality of rungs, each of said rung anchors including a load bearing flange molded to an exterior surface of a cylinder body of said rung anchors, and each of said rungs having a pair of U-shaped openings formed at a rear surface of said rungs and a pair of grooves formed within said U-shaped openings for receiving and cooperating with said cylinder body and said load bearing flange of one of said rung anchors; and

a plurality of retainer pins for removably securing said rungs to said rung anchors.

16. The swimming pool ladder of claim **15** wherein each of said rung anchors further includes a first coplanar surface for aligning with a top surface of a corresponding one of said rungs.

17. The swimming pool ladder of claim **16** wherein each of said rung anchors further includes a second coplanar surface for aligning with a rear surface of a corresponding one of said rungs.

18. A swimming pool ladder for use with a large capacity swimming pool comprising:

a first ladder section connected to a second ladder section by a top platform for providing an entry and an exit to a large capacity swimming pool;

each ladder section comprising:

a pair of J-shaped side rails for providing a ladder frame;

a plurality of rung anchors welded to said side rails for supporting a plurality of rungs, each of said rung anchors including a load bearing flange molded to an exterior surface of a cylinder body of said rung anchors, a first coplanar surface for aligning with a top surface of a corresponding one of said rungs, and a second coplanar surface for aligning with a rear surface of a corresponding one of said rungs, each of said rungs having a pair of U-shaped openings formed at a rear surface of said rungs and a pair of grooves formed within said U-shaped openings for

receiving and cooperating with one of said rung anchors and said corresponding load bearing flange; and

a plurality of retainer pins for removably securing said rungs to said rung anchors.

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