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(54) **JOINT FOR ABOVE GROUND POOL FRAME**

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CPC ***F16B 7/14*** (2013.01); ***A63C 19/02*** (2013.01); ***E04H 4/0056*** (2013.01); ***E04H 4/14*** (2013.01); ***F16B 7/042*** (2013.01); ***F16B 7/0446*** (2013.01)

(58) **Field of Classification Search**
CPC F16B 7/17; E04H 4/0056
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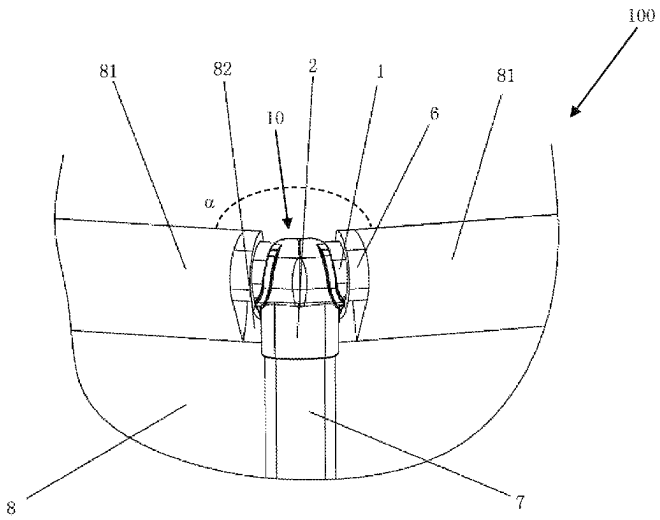
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(57) **ABSTRACT**

A frame pool is disclosed including a frame assembly and a pool liner, the frame assembly including horizontal frame members and a vertical frame member coupled together via a T-shaped joint. The T-shaped joint may be constructed of plastic to facilitate attachment and detachment to the adjacent frame members and to resist galling and corrosion. The T-shaped joint may also be relatively small to improve the appearance and water containment of the frame pool.

29 Claims, 4 Drawing Sheets



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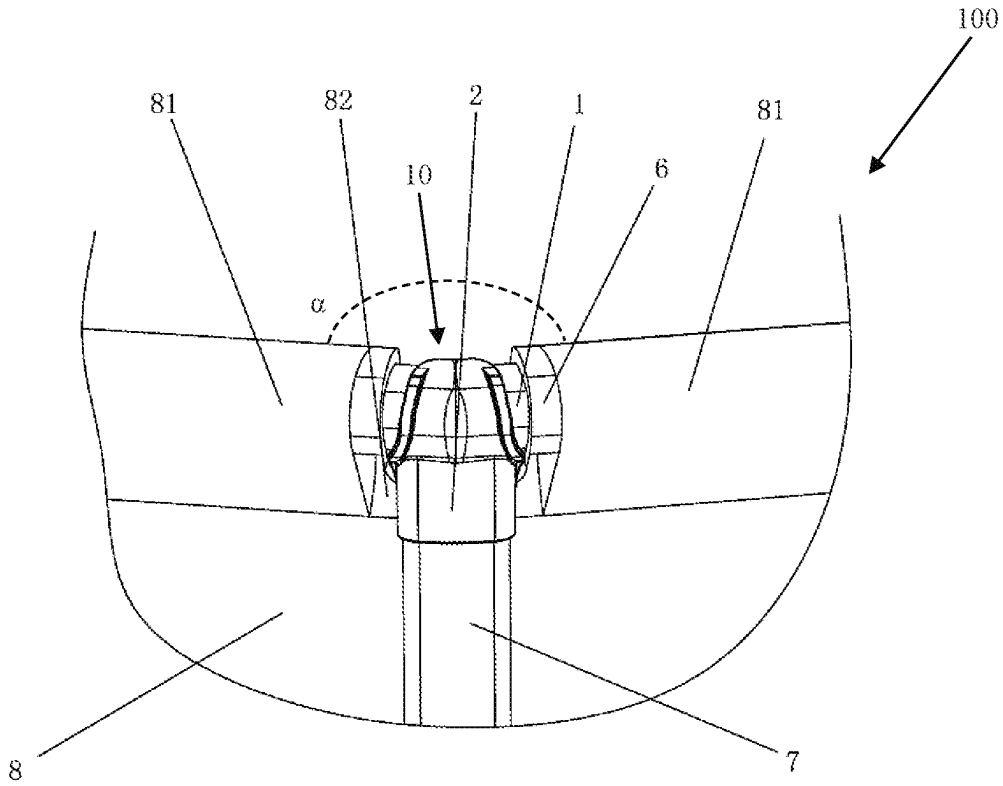


FIG. 1

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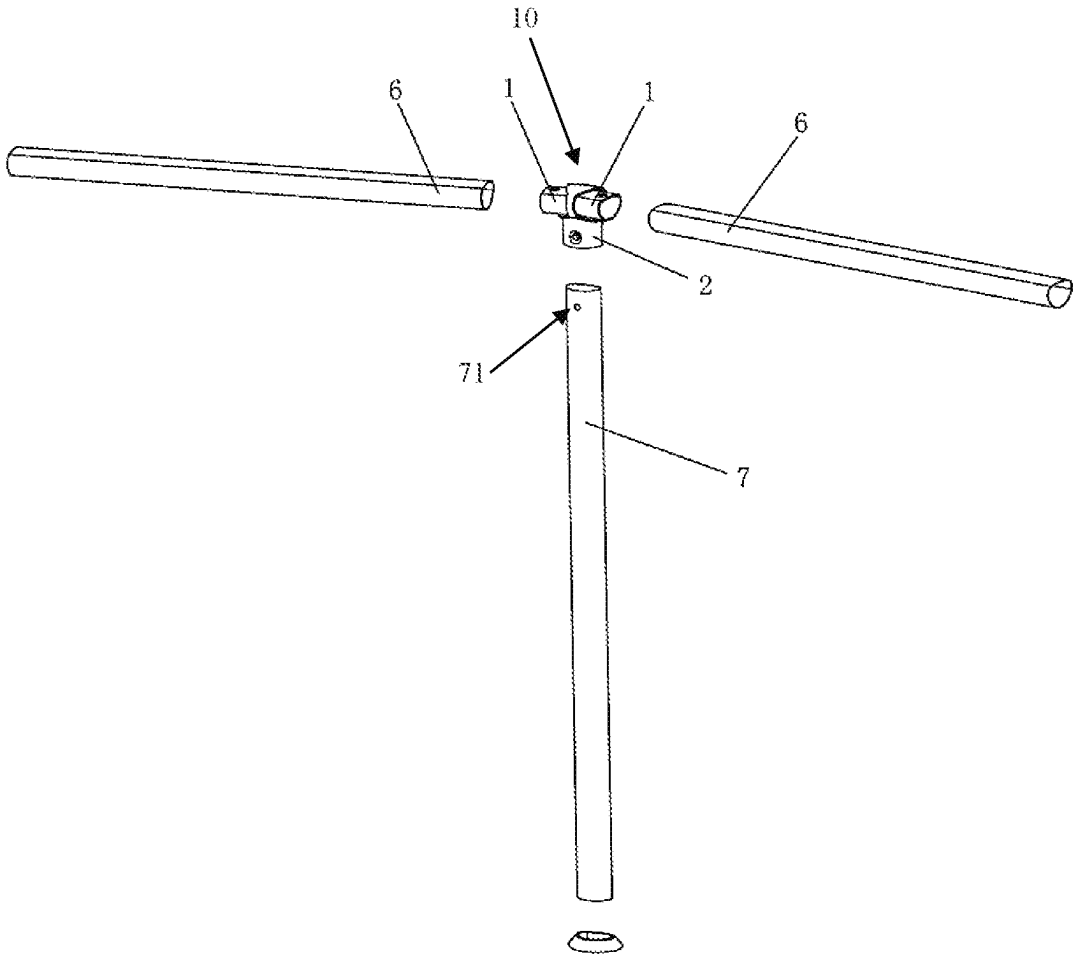


FIG. 2

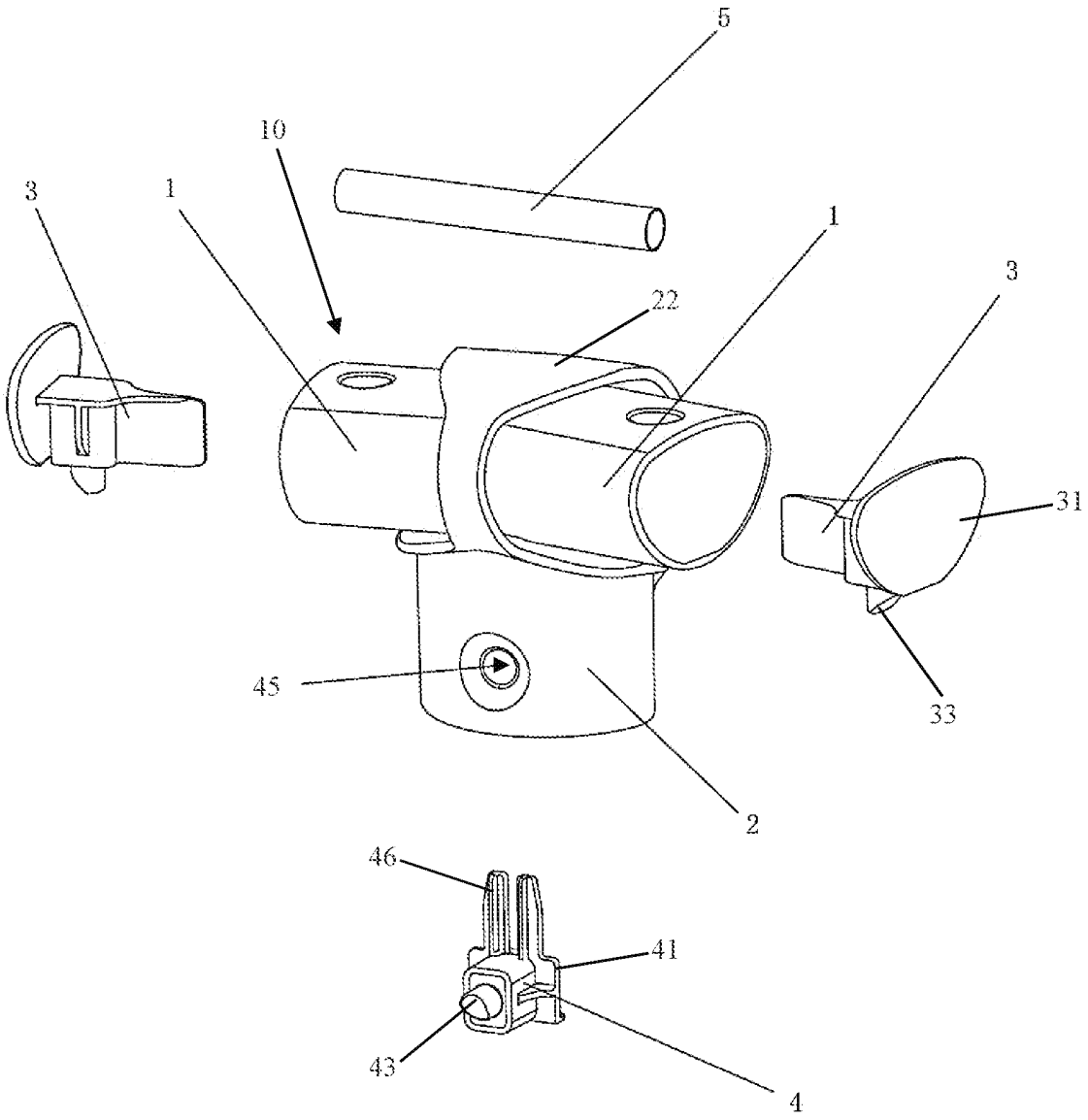


FIG. 3

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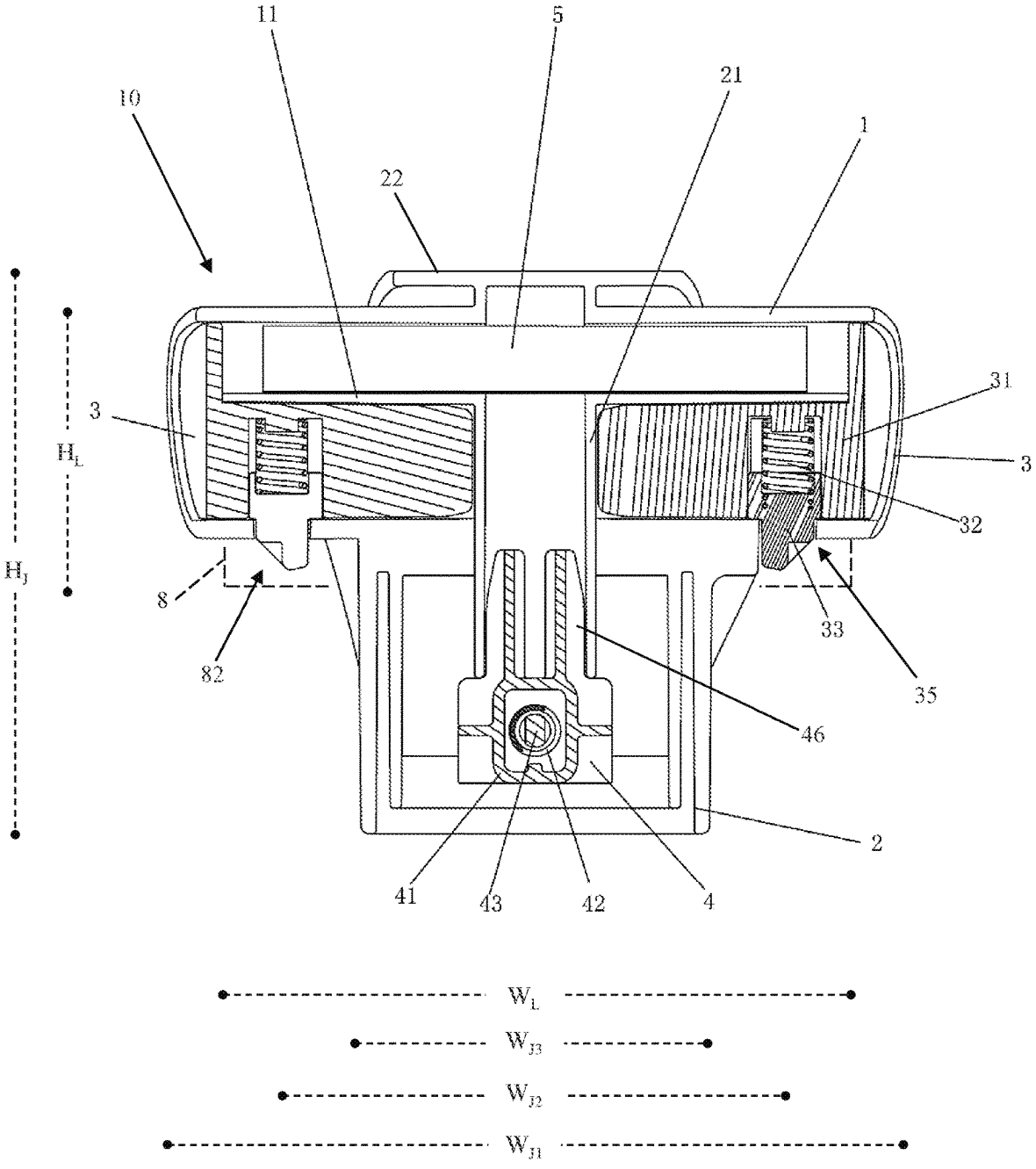


FIG. 4

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JOINT FOR ABOVE GROUND POOL FRAME

CROSS REFERENCE TO RELATED APPLICATIONS

The present application claims priority to the following Chinese patent applications, the disclosures of which are hereby expressly incorporated by reference herein in their entirety:

Application No.	Filing Date
CN 201620598406.9	Jun. 17, 2016
CN 201630270359.0	Jun. 22, 2016
CN 201621039473.3	Sep. 6, 2016

FIELD OF THE DISCLOSURE

The present disclosure relates to an above ground pool. More particularly, the present disclosure relates to a joint for an above ground pool, and to a method for using the same.

BACKGROUND OF THE DISCLOSURE

A frame pool may include a frame assembly and a pool liner supported by the frame assembly to form a water cavity of the pool. The frame assembly may include one or more horizontal frame members (e.g., horizontal pipes) that form an upper rim of the pool and one or more vertical frame members (e.g., vertical pipes) that extend downward from the horizontal frame members to the ground. To allow the frame assembly to be disassembled for storage and assembled for use, the horizontal frame members and the vertical frame members may be removably coupled together via a plurality of T-shaped joints. Existing T-shaped joints are formed of metal, which may be susceptible to galling and corrosion, especially as any protective coating on the metal becomes worn or damaged. Also, existing T-shaped joints are relatively wide, so existing pool liners may require wide holes or gaps to accommodate such T-shaped joints, which may impact the pool's appearance and ability to contain water.

SUMMARY

The present disclosure provides a frame pool including a frame assembly and a pool liner, the frame assembly including horizontal frame members and a vertical frame member coupled together via a T-shaped joint. The T-shaped joint may be constructed of plastic to facilitate attachment and detachment to the adjacent frame members and to resist galling and corrosion. The T-shaped joint may also be relatively small to improve the appearance and water containment of the frame pool.

According to an embodiment of the present disclosure, a frame joint is disclosed for an above ground pool frame having a first horizontal frame member, a second horizontal frame member, and a vertical frame member. The frame joint includes: a first horizontal joint portion including a first coupling assembly configured to couple with the first horizontal frame member; a second horizontal joint portion including a second coupling assembly configured to couple with the second horizontal frame member; and a vertical joint portion fixedly coupled to the first and second horizontal joint portions and configured to couple with the vertical frame member; wherein a width of the vertical joint portion accounts for at least 50% of a width between the first and second coupling assemblies of the first and second horizontal joint portions.

According to another embodiment of the present disclosure, a frame joint is disclosed for an above ground pool frame having a first horizontal frame member, a second horizontal frame member, and a vertical frame member. The frame joint includes: a first horizontal joint portion configured to couple with the first horizontal frame member, the first horizontal joint portion being constructed of plastic; a second horizontal joint portion configured to couple with the second horizontal frame member, the second horizontal joint portion being constructed of plastic; and a vertical joint portion fixedly coupled to the first and second horizontal joint portions and configured to couple with the vertical frame member, the vertical joint portion being constructed of plastic.

According to yet another embodiment of the present disclosure, a method is disclosed for assembling an above ground pool. The method includes: coupling a first horizontal joint portion of a frame joint to a first horizontal frame member with a first coupling assembly; coupling a second horizontal joint portion of the frame joint to a second horizontal frame member with a second coupling assembly; and coupling a vertical joint portion of the frame joint to a vertical frame member, wherein a width of the vertical joint portion accounts for a majority of a width between the first and second coupling assemblies of the first and second horizontal joint portions.

BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned and other features and advantages of this disclosure, and the manner of attaining them, will become more apparent and will be better understood by reference to the following description of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

FIG. **1** is a partial perspective view of a frame pool including a frame assembly and a pool liner, the frame assembly including horizontal frame members and a vertical frame member coupled together via an exemplary T-shaped joint of the present disclosure;

FIG. **2** is an exploded perspective view of the frame assembly of FIG. **1**;

FIG. **3** is an exploded perspective view of the T-shaped joint of FIG. **1**; and

FIG. **4** is an assembled cross-sectional view of the T-shaped joint of FIG. **3**.

Corresponding reference characters indicate corresponding parts throughout the several views. The exemplifications set out herein illustrate exemplary embodiments of the invention and such exemplifications are not to be construed as limiting the scope of the invention in any manner.

DETAILED DESCRIPTION

A portion of an exemplary frame pool **100** is shown in FIGS. **1** and **2**. The illustrative portion of the frame pool **100** includes two adjacent horizontal frame members **6** (e.g., horizontal pipes) that cooperate to form an upper rim of the frame pool **100** and a vertical frame member **7** (e.g., vertical pipe) that extends downward from the horizontal frame members **6** to support the frame pool **100** on the ground. Although not shown in FIGS. **1** and **2**, similar frame members **6** and **7** may be provided around the remaining

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perimeter of the frame pool **100**. The frame pool **100** may vary in size and shape. For example, the frame pool **100** may be rectangular, circular, elliptical, or other suitable shapes.

Referring still to FIGS. **1** and **2**, a T-shaped joint **10** may be used to removably couple the two adjacent horizontal frame members **6** to the adjacent vertical frame member **7**. Although a single T-shaped joint **10** is shown in FIGS. **1** and **2**, similar T-shaped joints **10** may be provided around the remaining perimeter of the frame pool **100**. Each T-shaped joint **10** illustratively includes two horizontal joint portions **1** configured to couple to the horizontal frame members **6** and a vertical joint portion **2** configured to couple to the vertical frame member **7**. To form the T-shape, the vertical joint portion **2** is centered between and perpendicular to the two horizontal joint portions **1**. The orientation of the horizontal joint portions **1** determines the orientation of the adjacent horizontal frame members **6**. In the illustrated embodiment of FIG. **1**, for example, the horizontal joint portions **1** define an obtuse angle α therebetween, so the horizontal frame members **6** define the same angle α therebetween. In another embodiment, the horizontal joint portions **1** may be collinear with each other, so the horizontal frame members **6** would also be collinear with each other. In another embodiment, the horizontal joint portions **1** may be perpendicular to each other, so the horizontal frame members **6** would also be perpendicular to each other, such as along a corner of a rectangular frame pool **100**.

Some or all components of the frame assembly, including the horizontal frame members **6**, the vertical frame members **7**, and/or the T-shaped joints **10**, may be constructed of a polymer, specifically plastic, such as by injection molding. Compared to metallic components, the plastic components may be smooth and elastic to facilitate assembly and disassembly of the frame assembly. Also, the plastic components may be more resistant to galling and corrosion to promote extended use. With respect to the T-shaped joint **10**, in particular, the horizontal joint portions **1** and the vertical joint portion **2** may be integrally formed as a single piece of plastic. Alternatively, the horizontal joint portions **1** and the vertical joint portion **2** may be formed as multiple pieces of plastic and then fixedly coupled (e.g., adhered, welded) together. The upper end of the T-shaped joint **10** may include a raised rim **22** (FIG. **3**) to give the appearance that the vertical joint portion **2** wraps around the horizontal joint portions **1**.

The illustrative frame pool **100** of FIG. **1** also includes a pool liner **8** supported by the frame members **6** and **7** to form an interior water cavity for swimming and/or bathing. The pool liner **8** may be wrapped and secured around the horizontal frame member **6** to form a loop or fold **81**. The fold **81** of the pool liner **8** may also define a gap or hole **82** to expose the T-shaped joint **10**, as described further below.

The illustrative T-shaped joint **10** is described in more detail with reference to FIGS. **3** and **4**.

The horizontal joint portions **1** of the illustrative T-shaped joint **10** are configured to couple with the adjacent horizontal frame members **6** (FIG. **2**). The horizontal joint portions **1** may be configured to fit within the adjacent horizontal frame members **6** in a sleeved manner. Thus, the external cross-section of the horizontal joint portions **1** may match the internal cross-section of the horizontal frame members **6**. In the illustrated embodiment of FIG. **3**, the external cross-section of the horizontal joint portions **1** is generally triangular with rounded edges to resist rotation between the horizontal joint portions **1** and the horizontal frame members **6**. It is also within the scope of the present disclosure for the external cross-section to be circular, rectangular, elliptical, or another suitable shape to match the internal cross-section of the horizontal frame members **6**.

Each horizontal joint portion **1** of the T-shaped joint **10** includes a coupling assembly **3** for removable attachment to the adjacent horizontal frame member **6** (FIG. **2**). As shown in FIGS. **3** and **4**, each coupling assembly **3** includes a base **31** received in the horizontal joint portion **1**, a helical spring **32** held in place by the base **31**, and a pin **33** extending radially outward (e.g., downward) through a hole **35** in the horizontal joint portion **1**. Each horizontal joint portion **1** may include an internal horizontal reinforcing rib **11** and/or an internal horizontal support member **5** to help support base **31** within the T-shaped joint **10**. In an assembled or locked state, spring **32** may bias pin **33** radially outward through hole **35** to engage a corresponding recess or hole (not shown) of the horizontal frame member **6** (FIG. **2**). In a disassembled or unlocked state, a user may press pin **33** radially inward to compress spring **32** and disengage the horizontal frame member **6** (FIG. **2**).

The vertical joint portion **2** of the illustrative T-shaped joint **10** is configured to couple with the adjacent vertical frame member **7** (FIG. **2**). The vertical joint portion **2** may be configured to fit within the adjacent vertical frame member **7** in a sleeved manner. Thus, the external cross-section of the vertical joint portion **2** may match the internal cross-section of the vertical frame member **7**. In the illustrated embodiment of FIG. **3**, the external cross-section of the vertical joint portion **2** is generally triangular with rounded edges to resist rotation between the vertical joint portion **2** and the vertical frame member **7**. It is also within the scope of the present disclosure for the external cross-section to be circular, rectangular, elliptical, or another suitable shape to match the internal cross-section of the vertical frame member **7**.

The vertical joint portion **2** of the T-shaped joint **10** includes a coupling assembly **4** for removable attachment to the adjacent vertical frame member **7** (FIG. **2**). As shown in FIGS. **3** and **4**, each coupling assembly **4** includes a base **41** received in the vertical joint portion **2**, a helical spring **42** held in place by the base **41**, and a pin **43** extending radially outward (e.g., rearward) through a hole **45** in the vertical joint portion **2**. The vertical joint portion **2** may include one or more internal vertical reinforcing ribs **21** to help support base **41** within the T-shaped joint **10**, such as by compressing fingers **46** of base **41** together within the T-shaped joint **10**. In an assembled or locked state, spring **42** may bias pin **43** radially outward through hole **45** to engage a corresponding recess or hole **71** of the vertical frame member **7** (FIG. **2**). In a disassembled or unlocked state, a user may press pin **43** radially inward to compress spring **42** and disengage the hole **71** of the vertical frame member **7** (FIG. **2**).

According to an exemplary embodiment of the present disclosure, and as shown in FIG. **4**, the size of the T-shaped joint **10** may be minimized such that the size of the corresponding hole **82** in the pool liner **8** (shown in phantom) may also be minimized. The small hole **82** in the pool liner **8** may improve the appearance and water containment of the frame pool **100** (FIG. **1**) while still leaving the coupling assemblies **3** and **4**, specifically the pins **33** and **43** of the coupling assemblies **3** and **4**, accessible for subsequent disassembly.

The width of the T-shaped joint **10** may be minimized such that the width of the corresponding hole **82** in the pool liner **8** may also be minimized. For example, the total width W_{J1} of the T-shaped joint **10** may be about 5 inches to about 7 inches, specifically about 5¾ inches, the width W_{J2} between the pins **33** of the coupling assemblies **3** may be about 3 inches to about 5 inches, specifically about 3 13/16

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inches, and the width W_{J3} of the vertical joint portion **2** may be about 1 inches to about 3 inches, specifically about 2⅜ inches. In the illustrated embodiment of FIG. **4**, the width W_L of the hole **82** in the pool liner **8** is greater than both the width W_{J3} of the vertical joint portion **2** and the width W_{J2} between the pins **33** to expose the pins **33** of the coupling assemblies **3** for subsequent disassembly while being less than the total width W_{J1} of the T-shaped joint **10**. For example, the width W_L of the hole **82** in the pool liner **8** is about 3 inches to about 7 inches, specifically about 4½ inches.

To help minimize the size of the T-shaped joint **10**, the pins **33** of the coupling assemblies **3** may be positioned close to the vertical joint portion **2**. Due to this close positioning, the width W_{J3} of the vertical joint portion **2** may account for a majority of the width W_{J2} between the pins **33** of the coupling assemblies **3**. For example, the width W_{J3} of the vertical joint portion **2** may account for 50%, 60%, 70%, 80%, or more of the width W_{J2} between the pins **33** of the coupling assemblies **3**. In the illustrated embodiment of FIG. **4**, in particular, the width W_{J3} of the vertical joint portion **2** accounts for about 70% of the width W_{J2} between the pins **33** of the coupling assemblies **3**. The width W_{J3} of the vertical joint portion **2** may also account for a significant portion of the total width W_{J1} of the T-shaped joint **10**. For example, the width W_{J3} of the vertical joint portion **2** may account for 40%, 50%, 60%, 70%, or more of the total width W_{J1} of the T-shaped joint **10**. In the illustrated embodiment of FIG. **4**, in particular, the width W_{J3} of the vertical joint portion **2** accounts for about 50% of the of the total width W_{J1} of the T-shaped joint **10**.

Additionally, the height of the T-shaped joint **10** may be minimized such that the height of the corresponding hole **82** in the pool liner **8** may be minimized. For example, the total height H_J of the T-shaped joint **10** may be about 3 inches to about 5 inches, specifically about 3⅞ inches. Because the pin **43** of the coupling assembly **4** may be accessible in front of the pool liner **8** and behind the T-shaped joint **10**, the hole **82** in the pool liner **8** need not extend downward beneath the pin **43**. Thus, in the illustrated embodiment of FIG. **4**, the height H_L of the hole **82** in the pool liner **8** is less than the total height H_J of the T-shaped joint **10** while still allowing access to the pin **33** of the coupling assembly **3** and the pin **43** of the coupling assembly **4** for subsequent disassembly.

While this invention has been described as having exemplary designs, the present invention can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.

What is claimed is:

1. A frame joint for an above ground pool frame having a first horizontal frame member, a second horizontal frame member, and a vertical frame member, the frame joint comprising:

a first horizontal joint portion including a first coupling assembly including a pin configured engage a corresponding recess of the first horizontal frame member to couple with the first horizontal frame member;

a second horizontal joint portion including a second coupling assembly including a pin configured engage a corresponding recess of the second horizontal frame member to couple with the second horizontal frame member;

a vertical joint portion fixedly coupled to the first and second horizontal joint portions and configured to couple with the vertical frame member; and

a liner positioned around the first and second horizontal frame members, the liner defining a hole that is sized to expose the first and second coupling assemblies;

wherein a width of the vertical joint portion accounts for at least 50% of a width between the pins of the first and second coupling assemblies of the first and second horizontal joint portions.

2. The frame joint of claim **1**, wherein the width of the vertical joint portion accounts for at least 40% of a total width of the frame joint.

3. The frame joint of claim **2**, wherein the width of the vertical joint portion accounts for about 50% of the total width of the frame joint.

4. The frame joint of claim **1**, wherein each of the first and second coupling assemblies further comprises a base and a helical spring supported by the base, the pin of each of the first and second coupling assemblies being biased outward through a hole in the respective horizontal joint portion by the helical spring to engage the corresponding recess of the respective horizontal frame member.

5. The frame joint of claim **1**, wherein the width of the vertical joint portion accounts for about 70% of the width between the pins of the first and second coupling assemblies.

6. The frame joint of claim **1**, wherein a width of the frame joint exceeds a width of the hole in the liner.

7. The frame joint of claim **1**, wherein a height of the frame joint exceeds a height of the hole in the liner.

8. The frame joint of claim **1**, wherein:

the first horizontal joint portion is constructed of plastic;

the second horizontal joint portion is constructed of plastic; and

the vertical joint portion is being constructed of plastic.

9. The frame joint of claim **1**, wherein the vertical joint portion is centered between the first and second horizontal joint portions to form a T-shaped frame joint.

10. The frame joint of claim **1**, wherein the first and second horizontal joint portions cooperate to form an obtuse angle.

11. The frame joint of claim **1**, wherein the vertical joint portion is integrally formed with the first and second horizontal joint portions as a single piece.

12. A method of assembling an above ground pool the method comprising:

coupling a first horizontal joint portion of a frame joint to a first horizontal frame member with a first coupling assembly including a pin configured to engage a corresponding recess of the first horizontal frame member;

coupling a second horizontal joint portion of the frame joint to a second horizontal frame member with a second coupling assembly including a pin configured to engage a corresponding recess of the second horizontal frame member;

coupling a vertical joint portion of the frame joint to a vertical frame member; and

positioning a liner around the first and second horizontal frame members with a hole exposing the first and second coupling assemblies;

wherein a width of the vertical joint portion accounts for a majority of a width between the pins of the first and second coupling assemblies of the first and second horizontal joint portions.

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13. The method of claim 12, wherein:

an external cross-section of the first horizontal joint portion matches an internal cross-section of the first horizontal frame member;

an external cross-section of the second horizontal joint portion matches an internal cross-section of the second horizontal frame member; and

an external cross-section of the vertical joint portion matches an internal cross-section of the vertical frame member.

14. The method of claim 12, wherein the first horizontal joint portion, the second horizontal joint portion, and the vertical joint portion are constructed of plastic.

15. The method of claim 12, wherein:

coupling the first horizontal joint portion to the first horizontal frame member comprises depressing the pin of the first coupling assembly into the first horizontal joint portion and releasing the pin into engagement with the first horizontal frame member; and

coupling the second horizontal joint portion to the second horizontal frame member comprises depressing the pin of the second coupling assembly into the second horizontal joint portion and releasing the pin into engagement with the second horizontal frame member.

16. The method of claim 12, wherein a width of the hole in the liner exceeds a width between the first and second coupling assemblies.

17. The method of claim 12, wherein the vertical joint portion of the frame joint is coupled to the vertical frame member with a third coupling assembly, and wherein a height of the hole in the liner is less than a distance between the first and third coupling assemblies.

18. The frame joint of claim 1, wherein the vertical joint portion includes at least one internal vertical reinforcing rib.

19. The frame joint of claim 1, wherein at least one of the first horizontal joint portion and the second horizontal joint portion includes an internal horizontal reinforcing rib.

20. The frame joint of claim 1, wherein at least one of the first horizontal joint portion and the second horizontal joint portion includes an internal horizontal support member.

21. A frame joint for an above ground pool frame having a first horizontal frame member, a second horizontal frame member, and a vertical frame member, the frame joint comprising:

a first horizontal joint portion including a first coupling assembly to couple with the first horizontal frame member;

a second horizontal joint portion including a second coupling assembly to couple with the second horizontal frame member;

a vertical joint portion fixedly coupled to the first and second horizontal joint portions and configured to couple with the vertical frame member; and

a liner positioned around the first and second horizontal frame members, the liner defining a hole that is sized to expose the first and second coupling assemblies;

wherein a width of the vertical joint portion accounts for at least 50% of a width between the first and second coupling assemblies of the first and second horizontal joint portions; and

wherein the first horizontal joint portion comprises a first external cross-section, the first external cross-section being generally triangular.

22. The frame joint of claim 21, wherein the first external cross-section comprises rounded edges.

23. A frame joint for an above ground pool frame having a first horizontal frame member, a second horizontal frame member, and a vertical frame member, the frame joint comprising:

a first horizontal joint portion including a first coupling assembly to couple with the first horizontal frame member;

a second horizontal joint portion including a second coupling assembly to couple with the second horizontal frame member;

a vertical joint portion fixedly coupled to the first and second horizontal joint portions and configured to couple with the vertical frame member; and

a liner positioned around the first and second horizontal frame members, the liner defining a hole that is sized to expose the first and second coupling assemblies;

wherein a width of the vertical joint portion accounts for at least 50% of a width between the first and second coupling assemblies of the first and second horizontal joint portions; and

wherein the vertical joint portion comprises a second external cross-section, the second external cross-section being generally triangular.

24. The frame joint of claim 23, wherein the second external cross-section comprises rounded edges.

25. The frame joint of claim 1, wherein the first and second coupling assemblies are accessible from an exterior side of the liner through the hole defined in the liner.

26. The frame joint of claim 1, wherein the first and second coupling assemblies are accessible from an exterior side of the liner through the hole defined in the liner and the first and second coupling assemblies are accessible from an interior side of the liner through the hole defined in the liner, the interior side of the liner being opposite the exterior side of the liner.

27. The frame joint of claim 1, wherein the hole of the liner simultaneously exposes the first coupling assembly and the second coupling assembly.

28. The frame joint of claim 1, wherein the hole of the liner exposes the first coupling assembly and the second coupling assembly in a resting position.

29. The frame joint of claim 1, wherein the first coupling assembly and the second coupling assembly are actuatable from an exterior of the frame joint along a vertical direction.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 11,692,572 B2
APPLICATION NO. : 16/220484
DATED : July 4, 2023
INVENTOR(S) : Hua Hsiang Lin and Yaw Yuan Hsu

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

Claims 1 and 8 should be amended to read as follows:

1. A frame joint for an above ground pool frame having a first horizontal frame member, a second horizontal frame member, and a vertical frame member, the frame joint comprising: a first horizontal joint portion including a first coupling assembly including a pin configured to engage a corresponding recess of the first horizontal frame member to couple with the first horizontal frame member; a second horizontal joint portion including a second coupling assembly including a pin configured to engage a corresponding recess of the second horizontal frame member to couple with the second horizontal frame member; a vertical joint portion fixedly coupled to the first and second horizontal joint portions and configured to couple with the vertical frame member; and a liner positioned around the first and second horizontal frame members, the liner defining a hole that is sized to expose the first and second coupling assemblies; wherein a width of the vertical joint portion accounts for at least 50% of a width between the pins of the first and second coupling assemblies of the first and second horizontal joint portions.

8. The frame joint of claim 1, wherein: the first horizontal joint portion is constructed of plastic; the second horizontal joint portion is constructed of plastic; and the vertical joint portion is constructed of plastic.

Signed and Sealed this
Eighth Day of August, 2023

Katherine Kelly Vidal

Katherine Kelly Vidal
Director of the United States Patent and Trademark Office

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