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(54) **TRAILER WHEEL WITH BUILT-IN CENTER CAP**

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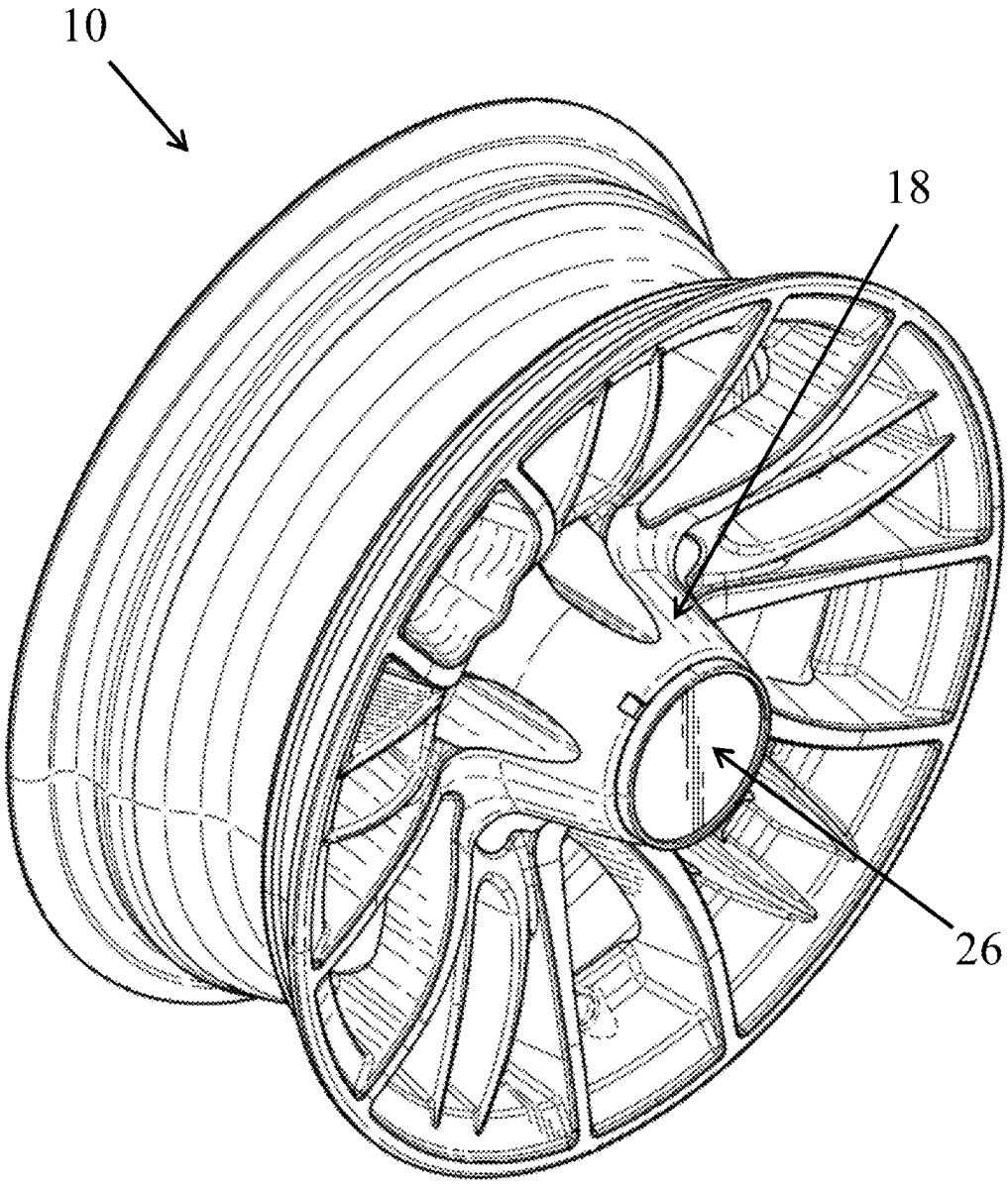
(57) **ABSTRACT**

A trailer wheel includes a built-in center cap integral with the trailer wheel. The trailer wheel further includes an opposing pair of circular outer edges with a tire-receiving body therebetween, and a plurality of spokes having first ends generally extending from one of the circular outer edges toward the built-in center cap and second ends extending to respective bottom portions of the built-in center cap. The respective bottom portions of the built-in center cap can extend in a curved manner to a body portion of the built-in center cap.



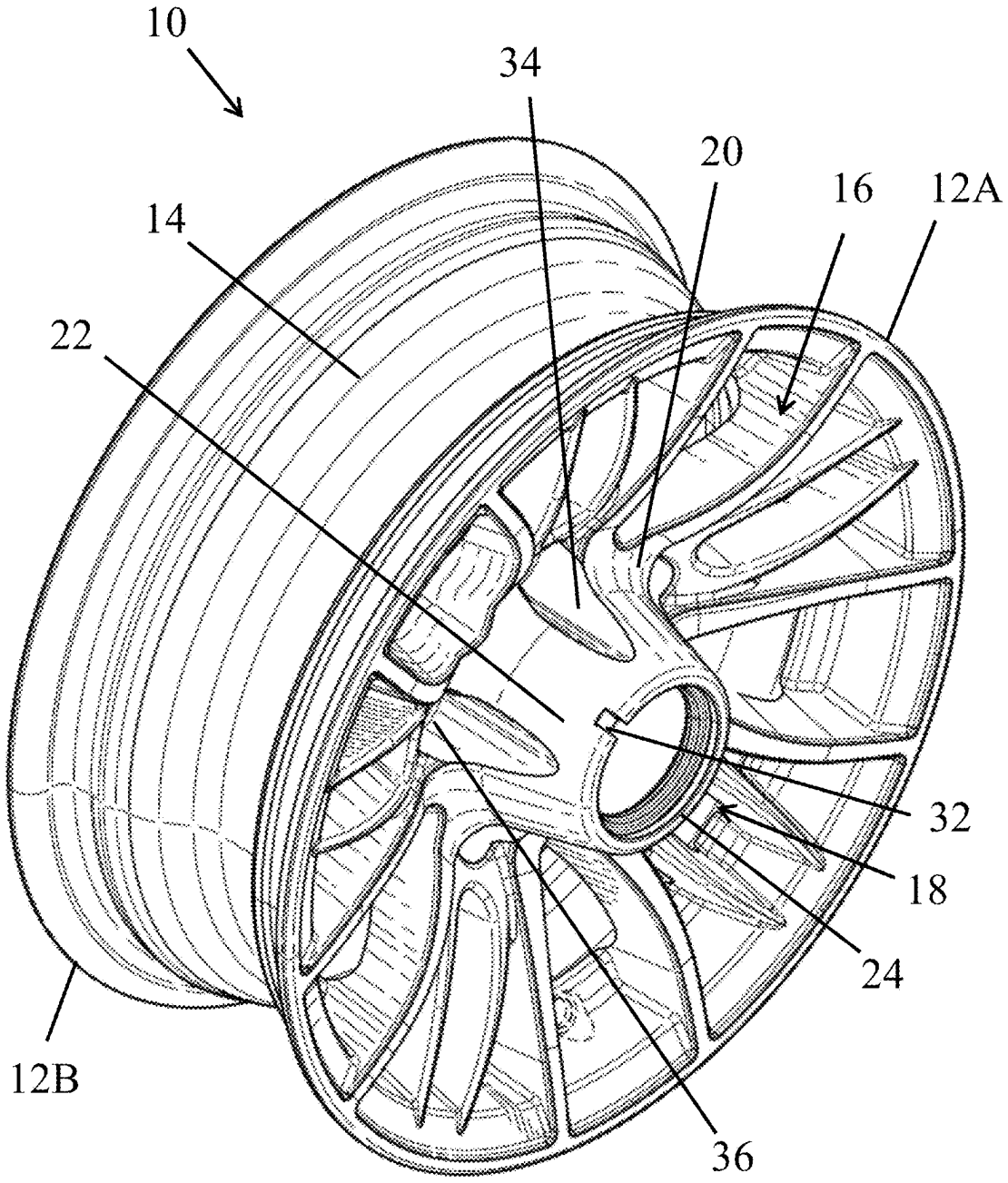


FIG. 1

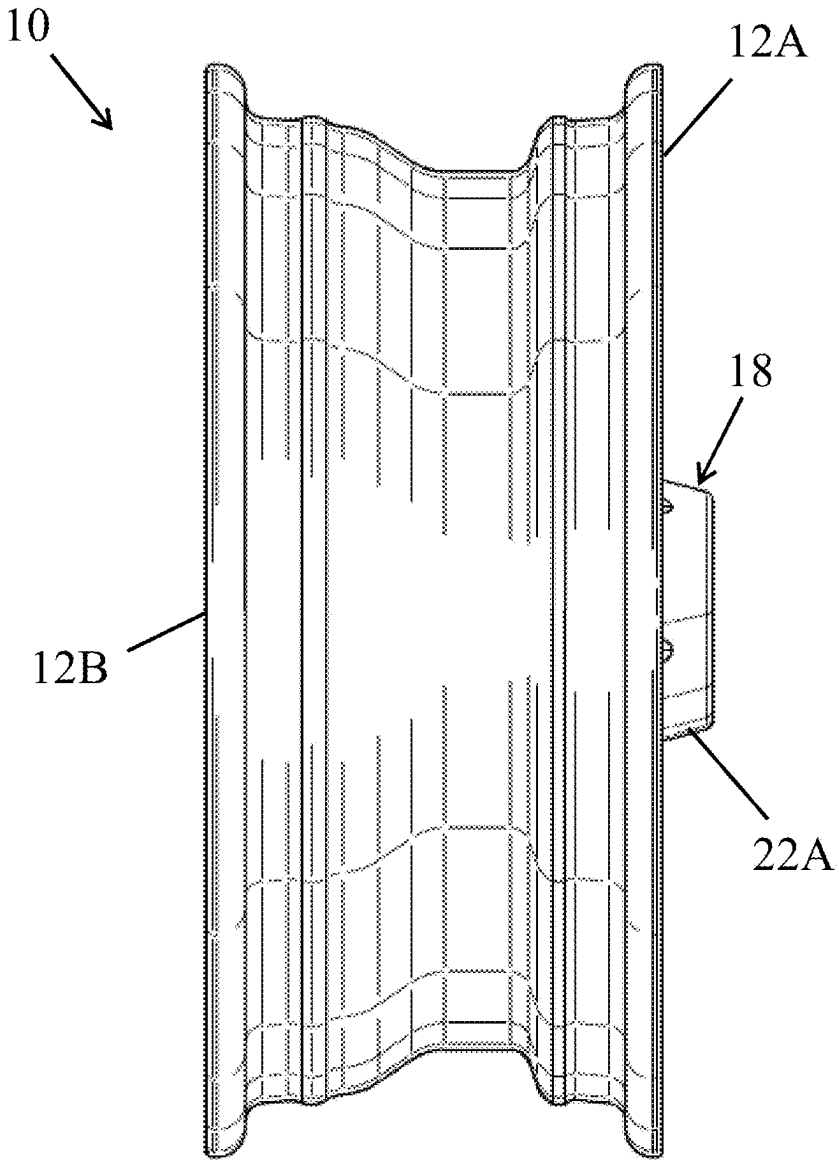


FIG. 2

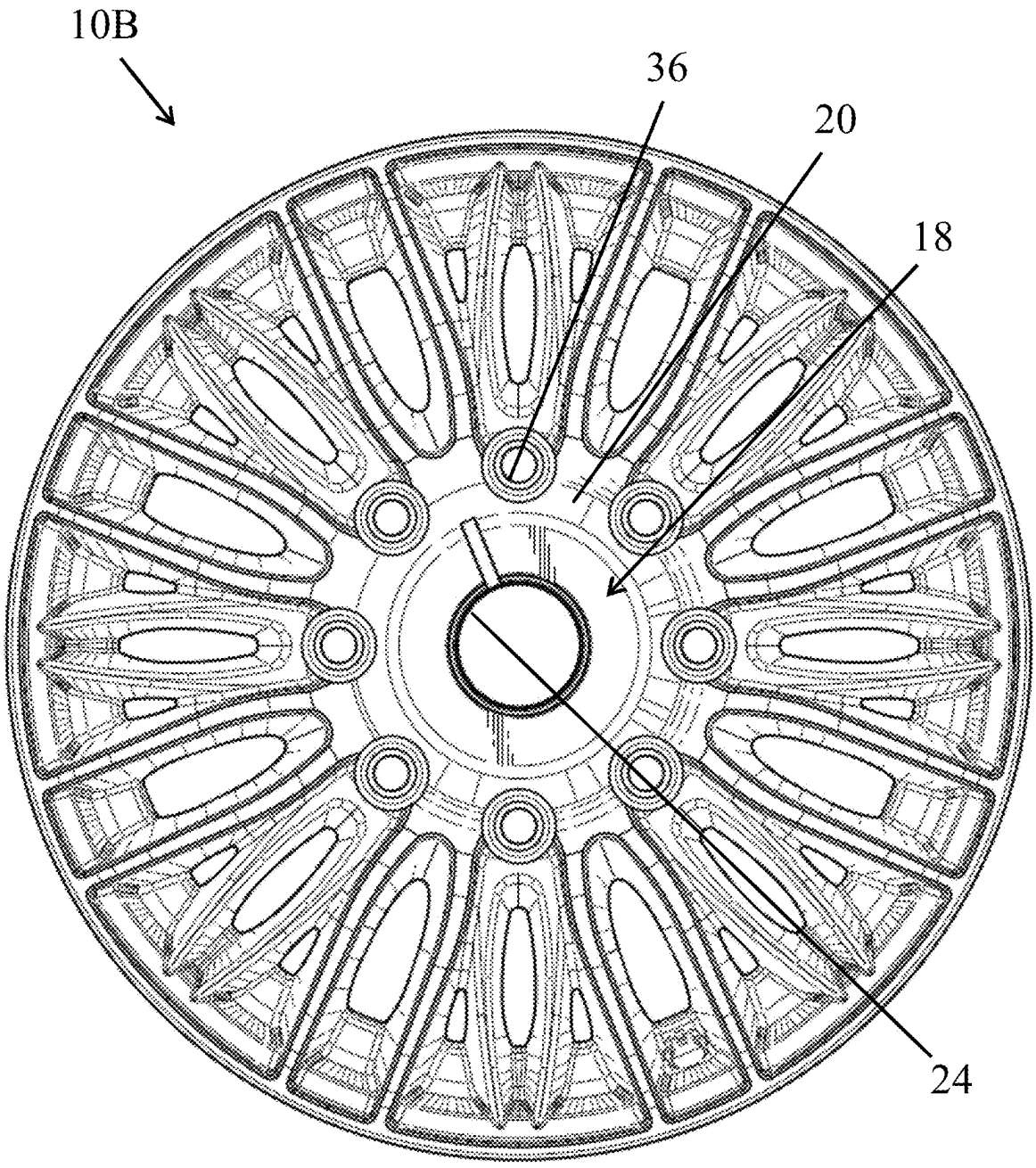


FIG. 3

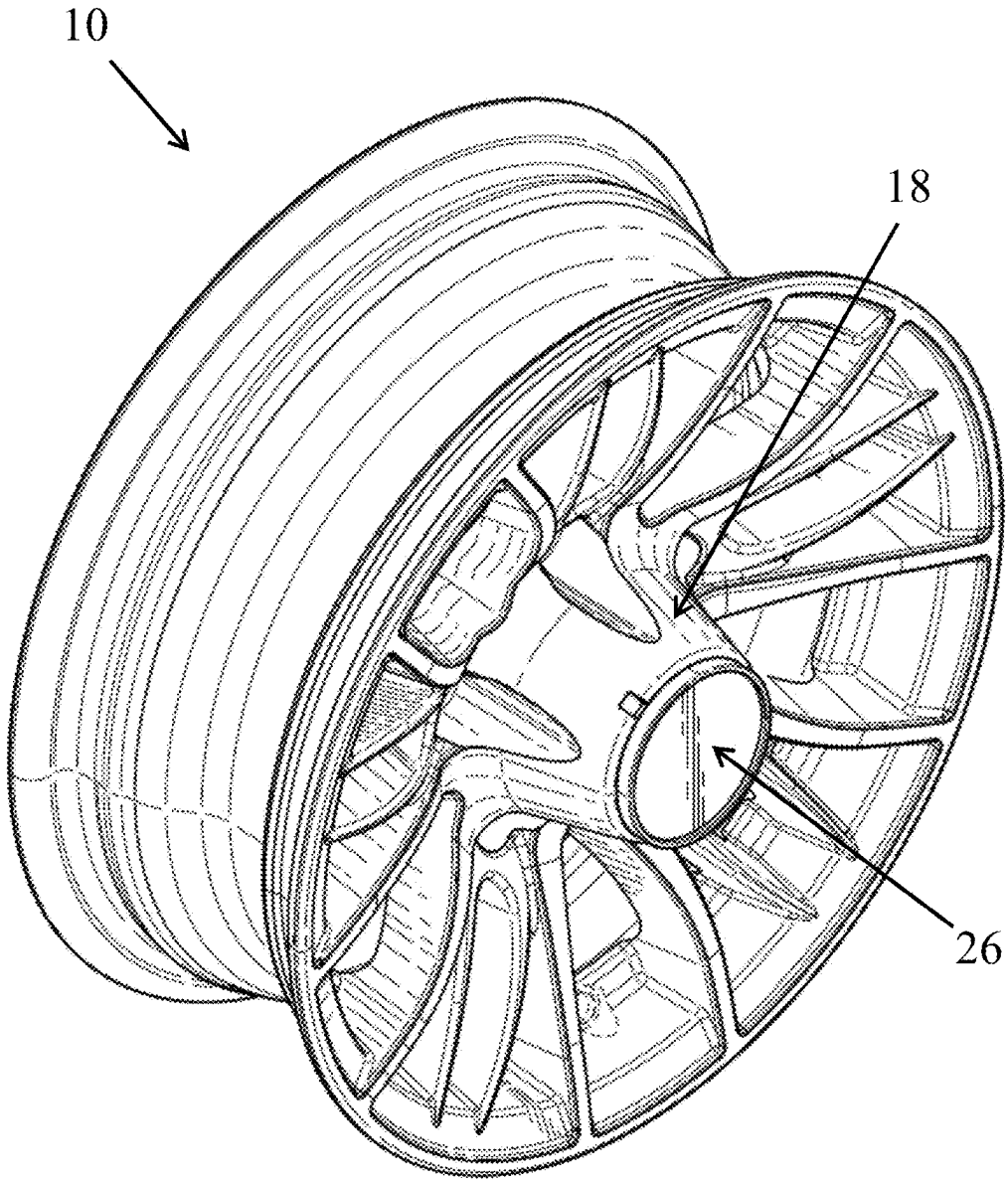


FIG. 4

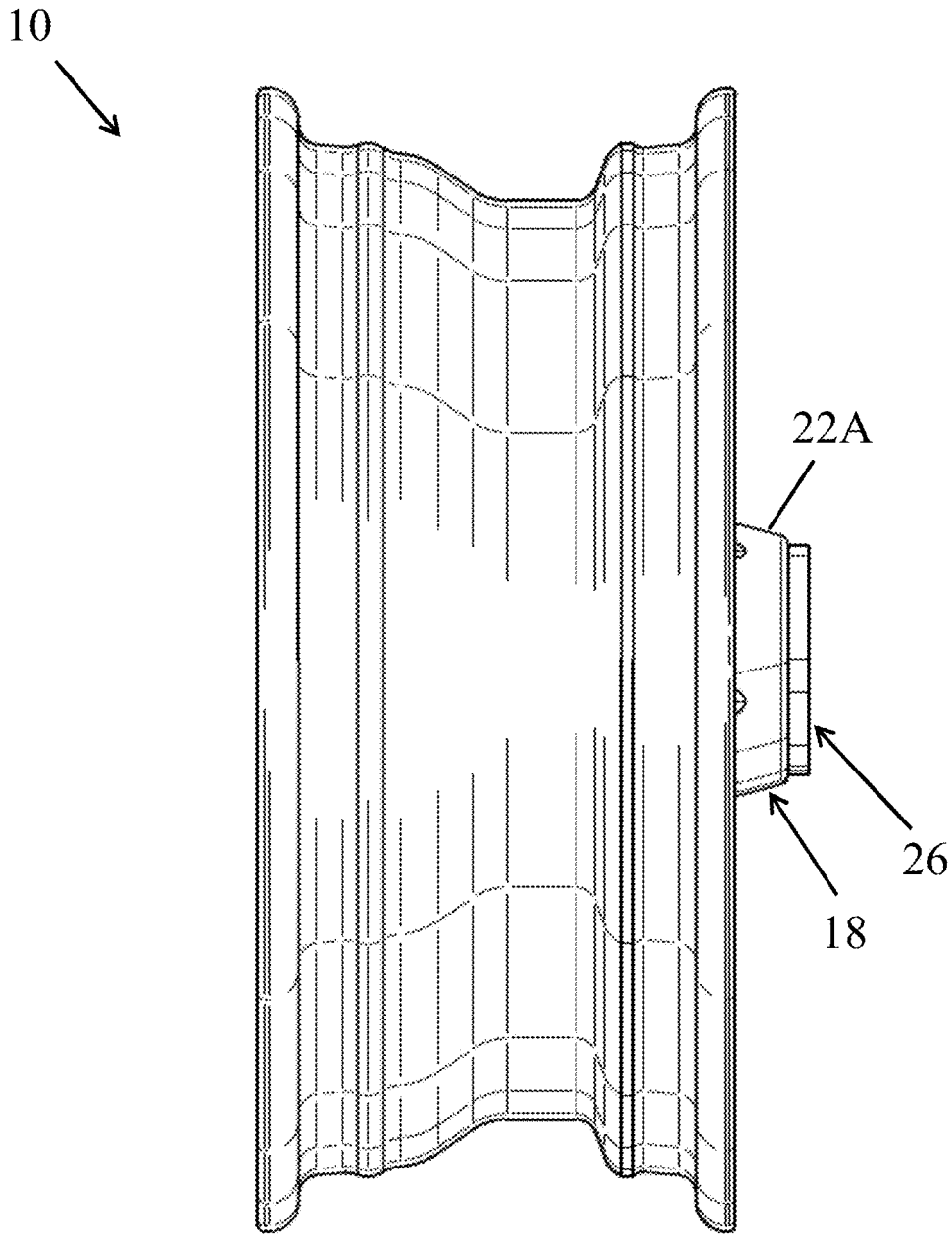


FIG. 5

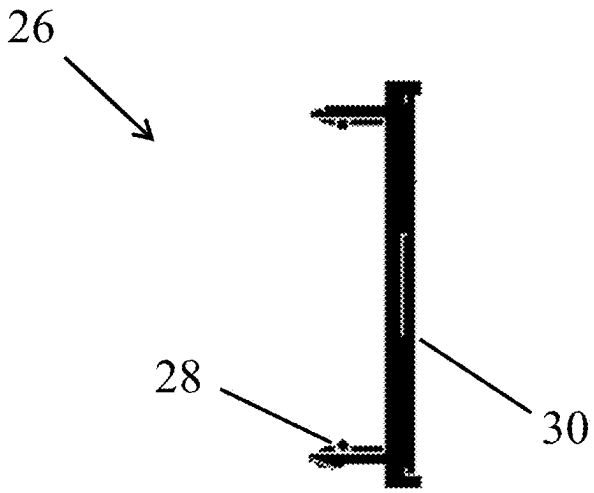


FIG. 6

TRAILER WHEEL WITH BUILT-IN CENTER CAP

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. provisional patent application Ser. No. 63/552,336, filed Feb. 12, 2024, which is incorporated by reference herein.

FIELD OF THE INVENTION

[0002] One or more embodiments of the present invention relate to a trailer wheel with a built-in center cap.

BACKGROUND OF THE INVENTION

[0003] Trailer wheels can include center caps which cover a central portion of the wheel. These center caps are conventionally separate components from the trailer wheel and are typically either inserted through a back central opening of the trailer wheel or snapped onto the face of the trailer wheel by some means. The center caps are generally made of a material (e.g., steel) different from the material of the wheel (e.g., aluminum). This material difference can cause galvanic corrosion, especially where the trailer wheels are used in marine applications.

[0004] There remains a need in the art for an improved trailer wheel.

SUMMARY OF THE INVENTION

[0005] In one or more embodiments, the present invention provides a trailer wheel with a built-in center cap. The built-in center cap is integral with the trailer wheel. The trailer wheel further includes an opposing pair of circular outer edges with a tire-receiving body therebetween, the opposing pair of circular outer edges including an external circular outer edge and an internal circular outer edge; and a plurality of spokes having first ends generally extending from the external circular outer edge and a portion of the tire-receiving body toward the built-in center cap, and having second ends extending to respective bottom portions of the built-in center cap. The respective bottom portions of the built-in center cap can extend in a curved manner to a body portion of the built-in center cap. The body portion can be shaped as a generally frustoconical hollow body. The trailer wheel can have an outer diameter of from about 13 inches to about 18.5 inches. The trailer wheel is suitable for use with a tire with a tire pressure rating of from 50 psi to 125 psi.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. **1** is a perspective view of a wheel with a built-in center cap, shown without a plug;

[0007] FIG. **2** is a side view of the wheel of FIG. **1**;

[0008] FIG. **3** is a front view of an alternate wheel with a built-in center cap, with an alternate amount of lug holes, and shown without a plug;

[0009] FIG. **4** is a perspective view of the wheel of FIG. **1**, shown with a plug shown in the form of a snap-in cap;

[0010] FIG. **5** is a side view of the wheel of FIG. **4**; and

[0011] FIG. **6** is a side view of the snap-in cap of FIG. **4**.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0012] One or more embodiments of the present invention relate to a wheel, such as for a trailer, with a built-in center cap. Advantageously, embodiments of the present invention avoid the need for a center cap which is a separate component than the wheel. Since the built-in center cap will be made from the same material as the rest of the trailer wheel, the built-in center cap will advantageously lead to reduced corrosion and ease of installation of the trailer wheel onto a trailer or other vehicular assembly designed to be hauled.

[0013] With reference to the Figures, a trailer wheel according to one or more embodiments is shown with the numeral **10**. Trailer wheel **10**, which may be referred to as wheel **10**, includes an opposing pair of circular outer edges **12**A, **12**B, which may also be referred to as rims **12**A, **12**B or outer lips **12**A, **12**B, where the term outer is used here as being relative to the wheel **10** itself. The pair of rims **12**A, **12**B includes an external rim **12**A, which may be referred to as an outer rim **12**A, and an internal rim **12**B, which may be referred to as an inner rim **12**B, where the terms external/outer and internal/inner are used here relative to the configuration of the wheel when positioned on a trailer or other vehicular assembly.

[0014] Rims **12**A, **12**B have a tire-receiving body **14** in between, which may be referred to as barrel **14**. A plurality of spokes **16** are positioned in a face of the trailer wheel **10** and generally extend from outer rim **12**A and/or from at least a portion of barrel **14** and toward a built-in center cap **18**, which may also be referred to as an integral center cap **18**. More specifically, first ends of the spokes **16** generally extend from outer rim **12**A and/or from at least a portion of barrel **14** toward second ends of the spokes **16** that are proximate to the center cap **18**.

[0015] Top portions of the second ends of the spokes **16** extend to a bottom portion **20** of the built-in center cap **18**. The bottom portion **20** of the built-in center cap **18** extends in a curved manner to a body portion **22** of the built-in center cap **18**. The body portion **22** is hollow as to receive and fit an axle hub nose (not shown) therewithin. The body portion **22** can be coaxial with external rim **12**A. As best seen in FIG. **2** and FIG. **5**, the body portion **22** of the built-in center cap **18** can partially extend beyond external rim **12**A as an extension portion **22**A. The amount of extension of extension portion **22**A can be characterized relative to the distance between rims **12**A, **12**B, which may be referred to as thickness of the tire-receiving body **14**. The extension of extension portion **22**A beyond external rim **12**A may be from about 5% to about 20%, or from about 5% to about 15%, or from about 8% to about 12%, or from about 5% to about 10%, or from about 10% to about 15%, or about 5%, or about 10%, of the distance between rims **12**A, **12**B.

[0016] As shown in the Figures, the body portion **22** can be a generally frustoconical hollow body. In other embodiments, the body portion **22** might be a cylindrical hollow body or other suitable shape. The angle from the bottom portion **20** to an outermost portion **24** and the inner diameter of body portion **22** (i.e., the generally frustoconical hollow shape) can be sized as to receive and fit the axle hub nose within the body portion **22**.

[0017] Outermost portion **24**, which can be generally circular, is adapted to receive a plug **26**, which may also be referred to as a snap-in cap **26**. Plug **26** includes one or more legs **28** extending from a base **30** (FIG. **6**). The one or more

legs **28** will be positioned within body portion **22** in the installed position such that base **30** provides a protective covering. Plug **26** can be snapped-in or utilize a spring/tension securement. Plug **26** is removable in order to allow access to internal components, such as to grease bearings in an axle. Suitable materials for plug **26** include rubber, plastic, and metal, where suitable metals include metals matching the same material as the rest of the wheel **10**. Outermost portion **24** can include a notch **32** for assistance with receiving plug **26** therein and/or with installation and removal of plug **26**.

[0018] Body portion **22** includes external shaped hole portions **34** (FIG. **1**) which extend into lug holes **36** (FIG. **3**). In this way, a corresponding tool can be inserted into the external shaped hole portions **34** for securing lug nuts to the axle bolts/studs. Wheel **10** includes five lug holes **36**, and wheel **10**B includes eight lug holes **36**, and other amounts of lug holes **36** will be suitable, such as six lug holes **36**.

[0019] As mentioned above, built-in center cap **18** is advantageously integrally formed with the rest of the wheel **10**, which should include built-in center cap **18** being made of the same material as the rest of the wheel **10**. An exemplary material for wheel **10** is an aluminum alloy, which can be A356 aluminum alloy. Aluminum alloys, such as A356, can provide superior strength and eliminate the need for steel inserts at lug holes **36**, which can also be referred to as stud holes **36**, for installation of wheel **10**. This similarity of materials of the built-in center cap **18** and the rest of the wheel **10** can result in reduced corrosion, especially where the wheels **10** are used in marine applications.

[0020] Installation of wheel **10** on a vehicle, such as a trailer, can also avoid the need to insert a separate center cap through the back of a wheel, and can avoid the need to attach a separate center cap to a face of a wheel, such as by spring clips or another fastener. Manufacturing of wheel **10** can also be done in a single mold, rather than needing to manufacture a center cap separately from a wheel.

[0021] As mentioned above, wheel **10** can be particularly suitable for use with a trailer. Tires for trailers generally require a higher pressure load (e.g., 50 psi to 125 psi) than passenger automobiles (e.g., 30 psi to 35 psi). That is, in one or more embodiments, wheel **10** is adapted to be used for a tire with a tire pressure rating of from 50 psi to 125 psi, or from 60 psi to 125 psi, or from 60 psi to 100 psi, or from 50 psi to 80 psi, or from 50 psi to 65 psi.

[0022] Wheel **10**, particularly the outer edges **12**A, **12**B thereof, can be sized with a diameter of from about **13** inches to about **18.5** inches. In one or more embodiments, trailer wheel **10**, particularly the outer edges **12**A, **12**B thereof, can be sized with a diameter of about 13 inches, or about 14 inches, or about 15 inches, or about 16 inches, or about 18.5 inches.

[0023] As shown in the Figures, wheel **10** can be designed with zero wheel offset. That is, the hub mounting surface, which may also be referred to as the mounting pad, (i.e., ends of lug holes **36**) can be in line with a centerline of the wheel. In other embodiments, wheel **10** can be designed with positive wheel offset. That is, the hub mounting surface can be in front (i.e., forward or toward the curbside) of the centerline of wheel **10**.

[0024] Wheel **10** can be designed to be lug centric, which means wheel **10** would be centered on a corresponding vehicle using lug holes **36**. That is, a center bore of the wheel **10** can be slightly larger than a corresponding vehicle hub. Where wheel **10** is lug centric, a hub ring can be utilized with the installation to fill the gap between the bore and the hub. In other embodiments, wheel **10** can be designed to be hub centric, where the center bore of the wheel **10** would be sized to match with the corresponding vehicle hub.

[0025] In light of the foregoing, the present invention advances the art by providing an improved trailer wheel. While particular embodiments of the invention are disclosed herein, the invention is not limited thereto or thereby inasmuch as variations will be readily appreciated by those of ordinary skill in the art. The scope of the invention shall be appreciated from the claims that follow.

What is claimed is:

1. A trailer wheel with a built-in center cap, the trailer wheel comprising the built-in center cap, which is integral with the trailer wheel;

an opposing pair of circular outer edges with a tire-receiving body therebetween, the opposing pair of circular outer edges including an external circular outer edge and an internal circular outer edge;

a plurality of spokes having first ends generally extending from the external circular outer edge and a portion of the tire-receiving body toward the built-in center cap, and having second ends extending to respective bottom portions of the built-in center cap;

the respective bottom portions of the built-in center cap extending in a curved manner to a body portion of the built-in center cap, where the body portion is shaped as a generally frustoconical hollow body;

wherein the trailer wheel has an outer diameter of from about 13 inches to about 18.5 inches; wherein the trailer wheel is suitable for use with a tire with a tire pressure rating of from 50 psi to 125 psi.

2. The trailer wheel of claim **1**, the body portion including a portion of the built-in center cap partially extending beyond the external circular outer edge, where the partially extending portion extends beyond the external circular outer edge a distance of from about 5% to about 20% of a distance between the opposing pair of circular outer edges.

3. The trailer wheel of claim **2**, where the partially extending portion extends beyond the external circular outer edge a distance of from about 5% to about 10% of the distance between the opposing pair of circular outer edges.

4. The trailer wheel of claim **2**, where the partially extending portion extends beyond the external circular outer edge a distance of about 10% of the distance between the opposing pair of circular outer edges.

5. The trailer wheel of claim **1**, the body portion of the built-in center cap including external shaped hole portions extending into lug holes.

6. The trailer wheel of claim **1**, where the trailer wheel is made of an aluminum alloy.

7. The trailer wheel of claim **1**, where the trailer wheel has zero wheel offset and is lug centric relative to a corresponding vehicle hub.

8. The trailer wheel of claim **1**, the body portion of the built-in center cap extending to an outermost portion which receives a snap-in cap.

9. The trailer wheel of claim **8**, the outermost portion including a notch for assistance with installation and removal of the snap-in cap.

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