Pat. No. 6,085,122 by Manning entitled "End-of-Vector Laser Power Control in a Selective Laser Sintering System," which expired 2017 May 30, and U.S. Pat. No. 6,215,093 by Meiners et al. entitled "Selective Laser Sintering at Melting Temperature," which expired 2017 Oct. 27. The expiration of these patents is creating a greater supply of metal 3D printers in the market, including laser-sintering and laser-melting printers. This offers more opportunities for end-product design and manufacturing using these printers.

SUMMARY OF THE INVENTION

The objective of this invention is to fabricate a ring that has two bands, wherein one band is securely interlinked around the other seamlessly, designed to permit one band to revolve around the other. This assembly is accomplished not by the bending or contorting of one band around another, but by the complete and simultaneous materialization of one band around the other. To interlink the two bands, annular channels and protrusions on the complementary sides of the bands prevent separation.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a first embodiment.

FIG. **2** is a side view of the embodiment of FIG. **1**.

FIG. **3** is a cross-sectional side view of the embodiment of FIG. **1**.

FIG. **4** is an exploded perspective view of the embodiment of FIG. **1**.

FIG. **5** is a cross-sectional side view of a second embodiment.

FIG. **6** is an exploded perspective view of the embodiment of FIG. **5**.

FIG. **7** is a cross-sectional side view of the embodiment of FIG. **5** on supports.

FIG. **8** is a cross-sectional side view of the embodiment of FIG. **5** on the four supports closest to the cross-section plane.

FIG. **9** is a bottom view of the embodiment of FIG. **5** on 3D printing supports.

FIG. **10** is a cross-sectional side view of a third embodiment, partially completed.

FIG. **11** is a cross-sectional side view of a FIG. **10** with ball bearings, partially completed.

FIG. **12** is a cross-sectional side view of FIG. **10** with ball bearings, after materialization is complete.

DETAILED DESCRIPTION

FIGS. **1-4**—First Embodiment

FIGS. **1** and **2** show an embodiment of a ring with two bands, an inner band **101** and an outer band **102**.

FIGS. **3** and **4** show the inner band **101** with an annular protrusion **103** and outer band **102** with a complementary annular channel **104**. Both the protrusion **103** and the channel **104** are inherent in their original materialized designs. The protrusion **103** and the annular channel **104** have two 45° angle inclines in relation to the bottom of the ring. There is a gap between the inner band **101** and the outer band **102**, there is no fusion between them.

DETAILED DESCRIPTION

FIGS. **5**, **6**—Second Embodiment

FIGS. **5** and **6** show a second embodiment of a ring with two bands, an inner band **201** and an outer band **202**. The inner band **201**, inherent in its original materialized design, has two annular protrusions **203** or lips to form an annular channel **204**. The outer band **202**, also inherent in its original materialized design, has an annular protrusion **205**, complementary to the channel **204**. Both the annular protrusions **203** (and consequently the channel **204**) and the annular protrusion **205** have a 60° angle incline in relation to the bottom of the ring. There is a gap between the inner band **201** and the outer band **202**, there is no fusion between them.

FIGS. **7**, **8**, and **9** show the second embodiment's inner band **201** and outer band **202** tilted at a 10° angle relative to the horizontal with supports **206** as an example of how both embodiments would be printed in a 3D printer. FIG. **8** shows only the supports **206** closest to the section-plane to demonstrate how the inner band **201** and the outer band **202** can be printed as two separate units.

DETAILED DESCRIPTION

FIGS. **10**, **11**, **12**—Third Embodiment

FIG. **10** shows a third embodiment of a ring with two bands, a partially materialized inner band **301** and a partially materialized outer band **302**. The inner band **301** has an annular channel **303**, which is aligned to an annular channel **304** of the outer band **302**. Both the annular channels **303** and **304** have at most 60° angle inclines in relation to the bottom of the ring. FIG. **11** shows a plurality of ball bearings **305** inserted into the aligned channels **303** and **304**. The materization of the ring then continues, FIG. **12** shows the bearings **305** now trapped between a completed inner band **305** and a completed outer band **306**.

A Method of Fabrication

FIGS. **1-4**—First Embodiment

In order to process the materialization of the outer band **102** around the inner band **101**, this embodiment will be 3D printed using the laser-sintering or laser-melting methods, and so its design must respect the tolerances of the printer that relate to the necessity of using support material for overhanging surfaces. Typically, a printer has a tolerance of about 30° relative to the horizontal that can materialize an ascending protruding layer without the need of support material. Therefore, the protrusion's **103** and channel's **104** protruding inclines will be able to print without the need for supports.

Printer manufacturers recommend that any object be tilted about 10° to avoid printing defects along the bottom surface. If the bands **101** and **102** are tilted 10° in preparation for printing, then the bands' inclines and declines have a 35° angle to the horizontal within the recommended minimum 30° tolerance of the printer. After the ring is materialized, all support material is removed and discarded. In its finished stage, the inner band **101** and outer band **102** will be securely interlinked together by the design of the inner band's **101** annular protrusion **103** and the complementary design of the outer band's **102** annular channel **104**, but allowing the outer band **102** to revolve around the inner band **101**, as the inner band **101** and outer band **102** are not fused together.

A Method of Fabrication

FIGS. **5-9**—Second Embodiment

In order to process the materialization of this embodiment, printer angle tolerances have been considered for this