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Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

(54) Title: RECEPTACLE FOR A SPIRIT LEVEL OR STRAIGHT EDGE TOOL

(57) Abstract: The present invention relates to a receptacle for seating at least a portion of a spirit level, straight edge tool or other hand tool. The present invention also relates to a receptacle in which at least a portion of a spirit level, straight edge tool or other hand tool is seated and to a method for temporarily seating a spirit level, straight edge tool or other hand tool by placing at least a portion of the spirit level, straight edge tool or other hand tool into the receptacle. The receptacle can be prepared by injection moulding or 3-D printing.

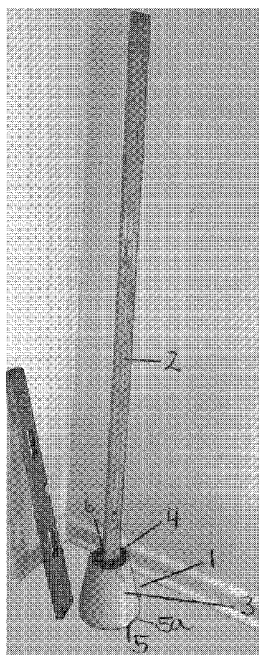


FIGURE 1



**Published:**

- *with international search report (Art. 21(3))*
- *with amended claims and statement (Art. 19(1))*

**Title of the Invention: Receptacle for a Spirit Level or Straight Edge Tool****Technical Field**

[01] The present invention relates to a receptacle for a spirit level, straight edge tool or other hand tool.

**Background of the Invention**

[02] A spirit level is an everyday item and designed to indicate whether a surface is horizontal or vertical. A spirit level typically includes a curved glass vial filled with a liquid (such as alcohol). The position of an air bubble in the liquid in the vial determines whether or not the surface is perfectly level. In the building trade, particularly in construction, spirit levels are an essential tool. They are typically provided in the form of a robust elongated stick containing at least one of the curved glass vials. A problem with spirit levels is that they can be expensive, cumbersome and bulky. When temporarily not in use at a worksite, spirit levels are typically leant up against walls, placed on the ground or on another surface (which may be unstable or uneven). Where a spirit level is placed can lead to accidents or damage at the worksite and/or damage or breakage to the spirit level (particularly the glass vial). There have been multiple occasions where this has occurred, for example, a spirit level placed against a painted wall which has slipped and damaged the wall, a spirit level placed on a surface where it has been knocked off breaking a glass window and a spirit level being bumped, hitting and injuring a tradesman. Another problem is that sometimes tradesmen forget where they placed the spirit level or place it in a place which is not readily accessible, for example, a vehicle parked off-site. Many of these problems also apply to straight edge tools and other hand tools.

[03] It would be desirable to provide a device which allows a spirit level, straight edge tool or other hand tool to be temporarily housed at a worksite while it is in use and enabling it to be readily accessible, or provide a suitable alternative.

[04] It is to be appreciated that any discussion of documents, devices, acts or knowledge in this specification is included to explain the context of the present invention. Further, the discussion throughout this specification comes about due to the realisation of the inventor and/or the identification of certain related art problems by the inventor. Moreover, any discussion of material such as documents, devices, acts or knowledge in this specification is included to explain the context of the invention in terms of the inventor's knowledge and experience and, accordingly, any such discussion should not be taken as an admission that any of the material forms part of the prior

art base or the common general knowledge in the relevant art in Australia, or elsewhere, on or before the priority date of the disclosure and claims herein.

### **Brief summary of the invention**

[05] In a first aspect, the present invention provides a receptacle for seating at least a portion of a spirit level, straight edge tool or other hand tool.

[06] In a second aspect, the present invention provides a receptacle in which at least a portion of the spirit level, straight edge tool or other hand tool is seated.

[07] In a third aspect, the present invention provides a method for temporarily seating a spirit level, straight edge tool or other hand tool by placing at least a portion of the spirit level, straight edge tool or other hand tool into a receptacle for seating at least a portion of the spirit level, straight edge tool or other hand tool.

[08] In a fourth aspect, the present invention provides a method of preparing a receptacle for seating at least a portion of a spirit level, straight edge tool or other hand tool according to the first or second aspect wherein the receptacle is prepared by injection moulding or 3D printing.

### **Brief description of the Drawings**

[09] The invention will now be described with reference to the following non-limiting drawings.

[10] Figure 1 is a photograph of a receptacle in accordance with one embodiment of the present invention in which a spirit level is seated.

[11] Figure 2 is a drawing of the top view of the receptacle of Figure 1;

[12] Figure 3 is a drawing of the side view of the receptacle of Figure 1 including internal details;

[13] Figure 4A is a drawing of the top view of a receptacle in accordance with another embodiment of the invention;

[14] Figure 4B is a cross-section of the receptacle of Figure 4A taken along the line A-A; and

[15] Figure 4C is a side view of the receptacle of Figure 4A.

### **Detailed description of the Invention**

[16] The present invention relates to a receptacle for seating at least a portion of a spirit level, straight edge tool or other hand tool. The present invention also relates to a receptacle in which at least a portion of a spirit level, straight edge tool or other hand tool is seated and to a method for temporarily seating a spirit level, straight edge tool or other hand tool by placing at least a portion of the spirit level or straight edge tool into a receptacle for seating at least a portion of the spirit level,

straight edge tool or other hand tool. The present invention also relates to a method of preparing a receptacle for seating at least a portion of a spirit level, straight edge tool or other hand tool according to the first or second aspect wherein the receptacle is prepared by injection moulding or 3D printing.

[17] In one or more embodiments the spirit level is suitably any spirit level used in the building and/or construction industry such as an i-beam (girder) level, box beam level, torpedo level or scaffold level. In one or more embodiments the straight edge tool is a ruler, block plane or square and suitably similar in size to a spirit level but typically longer. In one or more embodiments the other hand tool is one or more of an awl, broom, chisel, file, gimlet, hammer, knives, mallet, pincers, pliers, punch, rake, rasp, ratchet, screwdriver, saw, scissors, snip, spanner, or wrench or other suitable tool such as any tool with a seatable portion. In one or more embodiments the spirit level or straight edge tool suitably has a rectangular cross-section, although the receptacle can be modified to accommodate any spirit level, straight edge tool or other hand tool as required. For example, the receptacle can be modified to accommodate tools with circular, ovoid, square, triangular or other cross-sections.

[18] In one or more embodiments the receptacle suitably includes a body having a base and an upper surface, the upper surface including an opening for receiving the spirit level, straight edge tool or other hand tool and providing access to an internal space provided in the body for seating at least a portion of the spirit level, straight edge tool or other hand tool. In one or more embodiments the body has a cylindrical or conical shape although any suitable shape can be used including a rectangle, polygonal, triangle, square, ovoid (egg-shape) shape or other suitable shape. In one or more embodiments the body is a semi sphere or dome shape. In one or more embodiments the body is suitably tapered from the upper surface to the base. In one or more embodiments the body is suitably weighted towards the base. In one or more embodiments the body includes a solid base. In one or more embodiments approximately 40 to 60 percent or more (for example 40, 45, 50, 55 or 60 percent) of the total weight of the receptacle is distributed at the base to ensure stability. In one or more embodiments the body suitably includes a rebated handle. In one or more embodiments the rebated handle includes lip defining a recessed portion suitably for accommodating a finger or thumb. In one or more embodiments the base includes a substantially flat portion (suitably for resting or sitting flat on a level surface), although the base can be designed so that it will sit on a non-flat surface if required. In one or more embodiments the receptacle body, suitably the base may include one or more recesses or mounts for seating or mounting one or more wheels, typically a roller wheel. Provision of at least one wheel in the receptacle body/base suitably enables the receptacle (containing or not containing the spirit level, straight edge tool or other hand tool) to be rocked onto the wheel(s) and moved within and outside the worksite.

[19] In one or more embodiments the upper surface suitably includes a substantially flat portion and suitably the opening is centred in that portion, although the opening can be provided off-centre if desired. In one or more embodiments the opening and/or internal space has a shape complementary to the spirit level, straight edge tool or other hand tool to be seated. For example suitably the opening has a shape which substantially matches a cross-section of the portion of the spirit level, straight edge tool or other hand tool to be seated in the receptacle. In one or more embodiments the opening is suitably rectangular in shape although any suitable shape can be used including a circular, polygonal, triangular, square, ovoid (egg-shape) shape or other suitable shape. In one or more embodiments the internal space is suitably a channel or passageway. Suitably the internal space has a shape which substantially matches the portion of the spirit level, straight edge tool or other hand tool to be seated in the receptacle although any suitable shape can be used including a circular, rectangular, polygonal, triangular, square, ovoid (egg-shape) shape or other suitable shape which can accommodate at least a portion of the spirit level, straight edge tool or other hand tool. In one or more embodiments the internal space has a rectangular shape. In one or more embodiments the opening in the upper surface is located opposite the base and the channel or passageway is directed substantially vertically from the opening towards the base (it will be appreciated that the channel or passageway could also be angled from the opening if desired - particularly if the opening is not centred in the upper surface). In one or more embodiments, suitably where the opening to the internal space is too wide for a particular spirit level/straight edge tool, the opening to the internal space may be provided with a threaded rod and stop end which can be manipulated (suitably by turning) to close the gap in the opening, the stop end suitably abutting against the spirit level/straight edge tool and suitably thereby keeping the spirit level/straight edge tool as upright as possible.

[20] In one or more embodiments the receptacle may be made from any suitable material including clay, glass, rubber, elastomers, metal, plastic (including photopolymers, thermoplastics or thermosetting polymers) or a blend thereof. In one or more embodiment the receptacle may be provided with a coloured exterior coating (for example fluoro yellow paint) for visibility. In one embodiment the receptacle is prepared by injection moulding or 3D printing.

[21] The invention will now be described in non-limiting embodiments with reference to the drawings. Like reference numerals are used throughout the drawings to depict like or similar elements of the receptacle.

[22] With reference to Figure 1, one embodiment of a receptacle 1 for seating a spirit level 2 is shown. The receptacle 1 is in the form of a cone having a body 3 (in this case conical), an upper surface 4 and a base 5. The base has a flat portion 5a enabling the user to place it on a flat surface. An opening 6 is provided in the upper surface 4 for receiving the

spirit level 2 and providing access to an internal space (not shown) for seating at least a portion of the spirit level 2. The body 3 is tapered from the upper surface 4 to the base 5.

[23] Figure 2 shows a top view of the receptacle 1. The upper surface 4 includes a relatively flat portion 8 suitably having a diameter of about 140mm and in which the opening 6 is suitably centred. In this embodiment, the spirit level 2 has a rectangular cross section so in order to accommodate the spirit level 2 the opening 6 is also rectangular in shape. Suitably the opening has dimensions of 68mm length and 33mm width so as to accommodate a standard commercially available spirit level 2. The opening 6 provides access to an internal space 7 which in this embodiment is also suitably rectangular in shape having similar dimensions to the opening and forming a channel 7a. Suitably the channel has a depth of about 225mm. Note that in this Figure, the channel is not located in the position as shown. The channel 7a is directed vertically from the opening towards the base 5. The body 3 from the edge of the substantially flat portion 8 of the upper surface 4 to the base 5 suitably has a length from top to bottom of about 275mm. The base 5 suitably has a diameter of about 280mm. Suitably the total weight of the receptacle 1 is about 7 kilograms so that it has weight to accommodate large spirit levels as well as small spirit levels in the upright (or a substantially upright) position (see Figure 1).

[24] Figure 3 shows a cross sectional view of the receptacle 1. Suitably the receptacle 1 includes a rebated handle 9 for ease of carrying/lifting. The handle may be 100mm wide, 30mm long and 30mm deep. The body 3 includes a solid base suitably having a depth of about 50mm.

[25] It will be appreciated that the measurements referred to above can be varied. In one or more embodiments the dimensions may vary within the range (although dimensions outside these ranges could also be used):

- diameter of the relatively flat portion – 100mm to 225mm;
- dimensions of the opening – 50mm to 100mm length and 20 to 50mm width;
- channel depth range – 200 to 400mm;
- length from the edge of the substantially flat portion to the base – 250 to 500mm;
- diameter of the base – 200 to 500mm;
- total weight of the receptacle – 2kgs to 15kgs;
- handle rebate range – 70mm to 120mm wide, 15mm to 40mm depth and height; and
- solid base depth – 10 to 150mm.

[26] Figures 4A, 4B and 4C show another embodiment of a receptacle 1 for seating a spirit level, straight edge tool or other hand tool. In this embodiment the receptacle 1 is in the form of a dome having a semi spherical body 3, an upper surface 4 and a base 5. The base has a flat portion 5a enabling the user to place it on a flat surface. In this embodiment the receptacle has a diameter of 280mm, a radius of curvature of about 140mm and a height from top to base of about 131mm (prior to applying the opening 6 –see Figure 4C), A rectangularly shaped centred opening 6 is provided in

the upper surface 4 for receiving the spirit level 2 and providing access to a rectangularly shaped internal space 7 in the form of a channel 7a (shown in ghosting in Figure 4c) having similar dimensions to the opening 6 for seating at least a portion of a spirit level, straight edge tool or other hand tool. In this embodiment there is about 10mm between the bottom of the channel 7a and the base 5. Suitably the opening has dimensions of 70mm length and 32mm width so as to accommodate a standard commercially available spirit level 2. The channel 7a is directed vertically from the opening towards the base 5. In this embodiment the body 3 includes a rebated handle 9 for ease of carrying/lifting and includes a lip 10 defining a recessed portion 11 (shown in ghosting in Figure 4B). Suitably the rebated handle is located about 70mm from the base and has a width of about 80mm, a height of about 30mm but an increased depth of about 80mm forming an about 16mm recessed portion defined by lip 10. The dimensions of the receptacle can vary as set out above suitably by a margin (plus or minus) 30%.

[27] In one or more embodiments the invention has the advantage that it can temporarily house or store a spirit level, straight edge tool or other hand tool at a worksite safely but is easily and quickly accessible and is readily portable so that it can be easily moved within the worksite and from site to site. In this regard it is possible to place the receptacle right next to a working area. Further in one or more embodiments by using a bottom heavy design it is possible to keep the spirit level, straight edge tool or other hand tool upright or substantially upright when not in use. Another advantage is that it can be easily stored in a tool box when taken offsite and the spirit level, straight edge tool or other hand tool is easily locatable.

[28] Whilst this invention has been described with respect to building and construction industry where it may be used for example by carpenters, plasterers, brick layers, landscapers, the receptacle can be used for seating a spirit level, straight edge tool or other hand tool in other industries where spirit levels, straight edge tools or other hand tools are used, for example, DIY, agriculture and machine spare parts manufacture.

[29] From the foregoing, it will be observed that numerous modifications and variations can be effected without departing from the true spirit and scope of the novel concept of the present invention. It is to be understood that no limitation with respect to the specific embodiment illustrated herein is intended or should be inferred. The disclosure is intended to cover, by the appended claims, all such modifications as fall within the scope of the claims.

30] Throughout this specification and the claims that follow, unless the context requires otherwise the words "comprise", "comprises", "comprising" will be understood to mean the inclusion of the stated integer, step or group of integers or steps but not the exclusion of any of other integer, step or group of integers or steps.

**Claims**

1. A receptacle for seating at least a portion of a spirit level, straight edge tool or other hand tool.
2. A receptacle in which at least a portion of a spirit level, straight edge tool or other hand tool is seated.
3. The receptacle according to claim 1 or claim 2, wherein the receptacle includes a body having a base and an upper surface, the upper surface including an opening for receiving the spirit level, straight edge tool or other hand tool and providing access to an internal space provided in the body for seating at least a portion of the spirit level, straight edge tool or other hand tool.
4. The receptacle according to claim 3, wherein the body has a cylindrical, conical, rectangle, triangle, square, ovoid (egg-shape) shape, semi sphere, dome or other shape.
5. The receptacle according to claim 3 or claim 4, wherein the body is tapered from the upper surface to the base.
6. The receptacle according to any one of claims 3 to 5, wherein the body is weighted towards the base.
7. The receptacle according to claim 6, wherein 50 percent or more of the total weight of the receptacle is distributed at the base.
8. The receptacle according to any one of claims 3 to 7, wherein the body includes a rebated handle.
9. The receptacle according to claim 8 wherein the rebated handle include a recessed portion defined by a lip.
10. The receptacle according to any one of claims 3 to 9, wherein the base includes a substantially flat portion.
11. The receptacle according to any one of claims 3 to 10, wherein the upper surface includes a substantially flat portion and the opening is provided centred or off-centred in that portion.
12. The receptacle according to any one of claims 3 to 11, wherein the opening and/or internal space has a shape complementary to the spirit level, straight edge tool or other hand tool to be seated.
13. The receptacle according to claim 12, wherein the opening and/or internal space is rectangular in shape.
14. The receptacle according to any one of claims 3 to 13, wherein the internal space is a channel or passageway.

15. The receptacle according to any one of claims 3 to 14, wherein the receptacle body includes one or more recesses or mounts for seating or mounting one or more wheels
16. The receptacle according to any one of claims 3 to 15, where the opening is provided with a threaded rod and stop end which can be manipulated to close any gap between the spirit level or straight edge tool and the opening.
17. A method for temporarily seating a spirit level, straight edge tool or other hand tool by placing at least a portion of the spirit level, straight edge tool or other hand tool into a receptacle for seating at least a portion of the spirit level or straight edge tool.
18. A method of preparing a receptacle for seating at least a portion of a spirit level, straight edge tool or other hand tool according to any one of claims 1 to 16 wherein the receptacle is prepared by injection moulding or 3D printing.

**AMENDED CLAIMS**  
**received by the International Bureau on 16 December 2021 (16.12.2021)**

**Claims**

- [Claim 1] A receptacle for seating at least a portion of a spirit level, straight edge tool or other hand tool, wherein the receptacle includes a body having a base and an upper surface, the upper surface including an opening for receiving the spirit level, straight edge tool or other hand tool and providing access to an internal space provided in the body for seating at least a portion of the spirit level, straight edge tool or other hand tool, and wherein the body is weighted towards the base..
- [Claim 2] A receptacle according to claim 1 in which at least a portion of a spirit level, straight edge tool or other hand tool is seated.
- [Claim 3] The receptacle according to claim 1, wherein the body has a cylindrical, conical, rectangle, triangle, square, ovoid (egg-shape) shape, semi sphere, dome or other shape.
- [Claim 4] The receptacle according to claim 1, wherein the body is tapered from the upper surface to the base.
- [Claim 5] The receptacle according to claim 1, wherein 50 percent or more of the total weight of the receptacle is distributed at the base.
- [Claim 6] The receptacle according to claim 1, wherein the body includes a rebated handle.
- [Claim 7] The receptacle according to claim 6 wherein the rebated handle includes a recessed portion defined by a lip.
- [Claim 8] The receptacle according to claim 1, wherein the base includes a substantially flat portion.
- [Claim 9] The receptacle according to claim 1, wherein the upper surface includes a substantially flat portion and the opening is provided centred or off-centred in that portion.
- [Claim 10] The receptacle according to claim 1, wherein the opening and/or internal space has a shape complementary to the spirit level, straight edge tool or hand tool to be seated.
- [Claim 11] The receptacle according to claim 10, wherein the opening and/or internal space is rectangular in shape.
- [Claim 12] The receptacle according to claim 1, wherein the internal space is a channel or passageway.
- [Claim 13] The receptacle according to claim 1, wherein the receptacle body include one or more recesses or mounts for seating or mounting one or more wheels
- [Claim 14] The receptacle according to claim 1, where the opening is provided

with a threaded rod and stop end which can be manipulated to close any gap between the spirit level or straight edge tool and the opening.

[Claim 15]

A method for temporarily seating a spirit level, straight edge tool or other hand tool by placing at least a portion of the spirit level, straight edge tool or other hand tool into a receptacle according to claim 1.

[Claim 16]

A method of preparing a receptacle for seating at least a portion of a spirit level, straight edge tool or other hand tool according to claim 1 wherein the receptacle is prepared by injection moulding or 3D printing.

**Statement under Article 19(1)****IA Number:**

PCT/US2021/050781

**International Filing Date:**

20 July 2021

**Date of Submission:**

16 December 2021

Pursuant to Article 19(1) of the PCT we respectfully seek an amendment to the claims.

The principle amendment to the claims is the inclusion of the subject matter of claims 3 and 6 into claim 1 and the amendment to state that the device is portable (which is supported by paragraph [27] of the specification). It is respectfully submitted that these amendments are limitations to the broadest embodiment of the invention and do not extend beyond the disclosure in the international application as originally filed.

It is respectfully submitted that the present claims have been amended to limit to:

- (a) The device being portable;
- (b) wherein the receptacle includes a body having a base and an upper surface, the upper surface including an opening for receiving the spirit level, straight edge tool or other hand tool and providing access to an internal space provided in the body for seating at least a portion of the spirit level, straight edge tool or other hand tool, and
- (c) wherein the body is weighted towards the base.

**Box No. VII – defects**

The multiple dependencies have been removed from the claims.

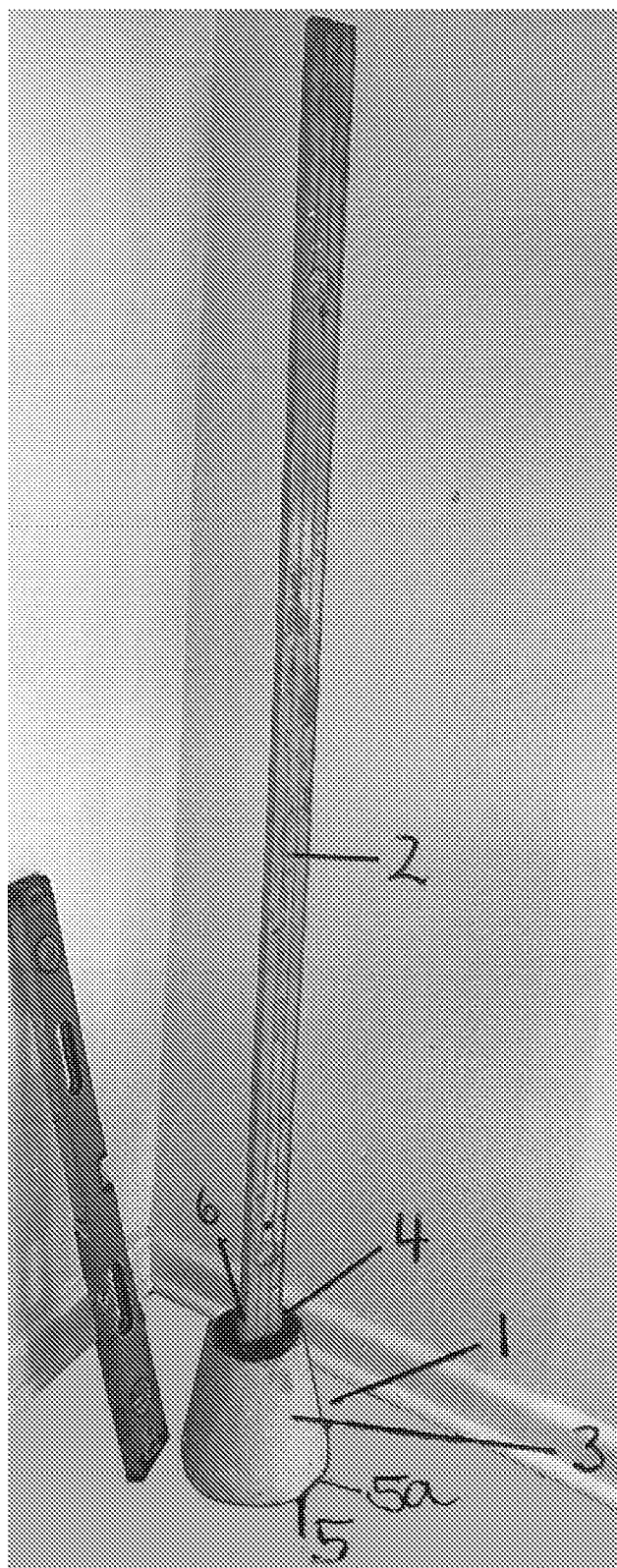


FIGURE 1

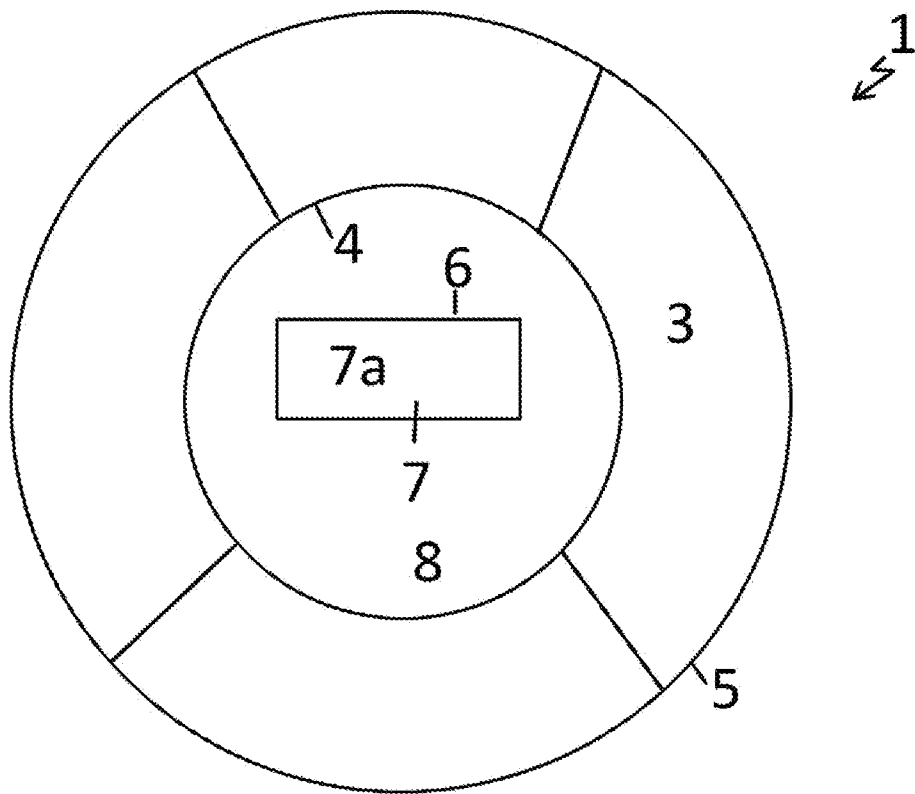


FIGURE 2

3/5

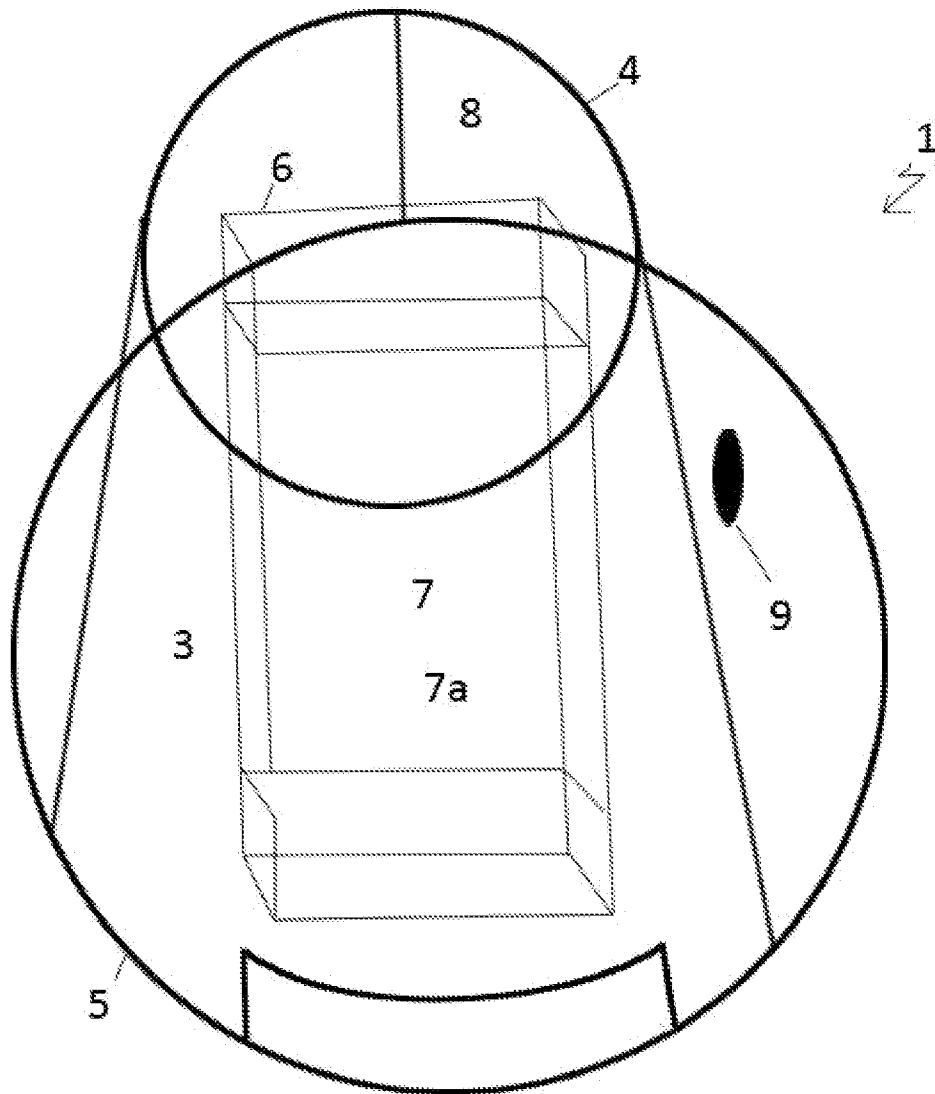


FIGURE 3

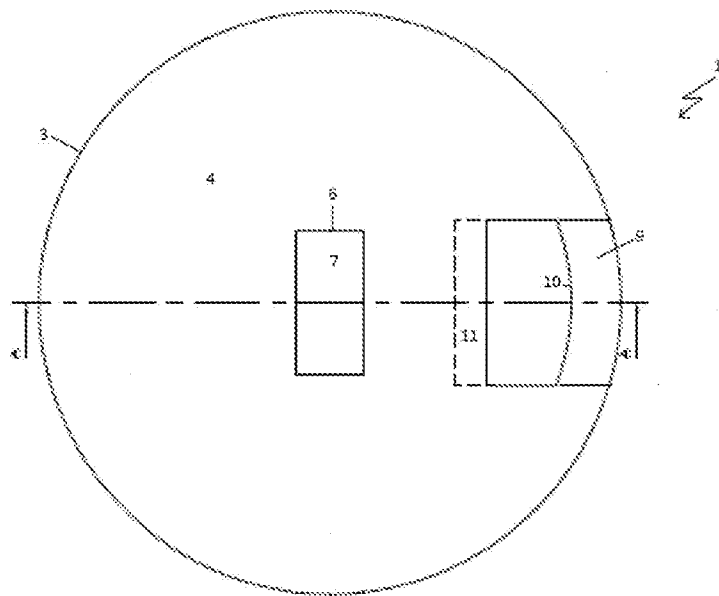


FIGURE 4A

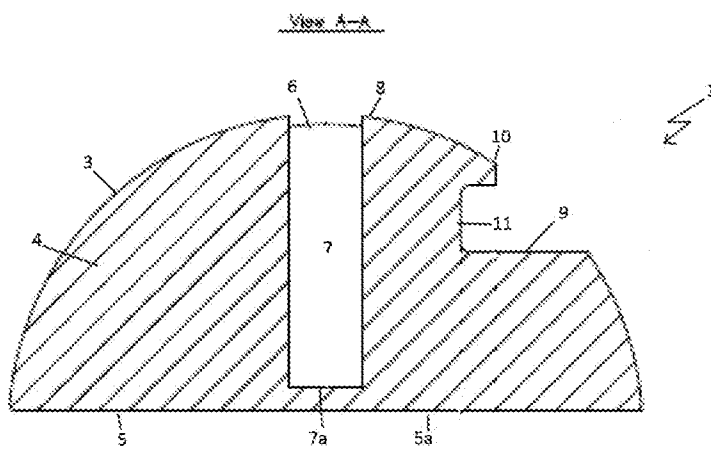


FIGURE 4B

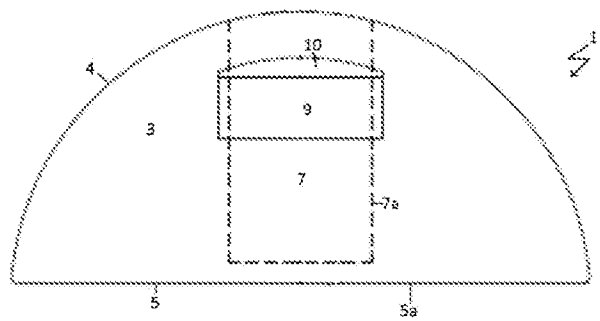


FIGURE 4C

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2021/050781

| <b>A. CLASSIFICATION OF SUBJECT MATTER</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                            |                                                                                 |
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| B65D 81/02(2006.01)i; G01C 9/24(2006.01)i; G01C 9/28(2006.01)i; G01C 9/32(2006.01)i; G01D 11/30(2006.01)i                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                            |                                                                                 |
| According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                            |                                                                                 |
| <b>B. FIELDS SEARCHED</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                            |                                                                                 |
| Minimum documentation searched (classification system followed by classification symbols)<br>B65D 81/02(2006.01); A45B 17/00(2006.01); E04H 12/22(2006.01); G01C 5/00(2006.01); G01C 9/28(2006.01)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                            |                                                                                 |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched<br>Korean utility models and applications for utility models<br>Japanese utility models and applications for utility models                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                            |                                                                                 |
| Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)<br>eKOMPASS(KIPO internal) & Keywords: receptacle, spirit level, straight edge tool, hand tool, handle, injection molding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                            |                                                                                 |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                            |                                                                                 |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Citation of document, with indication, where appropriate, of the relevant passages                                                                                         | Relevant to claim No.                                                           |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CN 208536831 U (FOSHAN NANLI ENGINEERING SUPERVISION CO., LTD.) 22 February 2019 (2019-02-22)<br>paragraphs [0034], [0037], [0040]-[0041], claims 1, 4, 8, and figures 1-5 | 1-4,10-14,17                                                                    |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                            | 5-9,15-16,18                                                                    |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | EP 0818594 A1 (HELDENS, RONALD STEFANUS) 14 January 1998 (1998-01-14)<br>column 3, line 46 - column 4, line 12, column 5, lines 13-20 and figures 1, 3                     | 5-9,15                                                                          |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | KR 20-1998-0063749 U (LEE, SANGSUN) 25 November 1998 (1998-11-25)<br>claim 1 and figures 1-2                                                                               | 16                                                                              |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | US 6729089 B1 (SPRAGG, ROBERT J.) 04 May 2004 (2004-05-04)<br>column 2, lines 48-53 and figures 1-4                                                                        | 18                                                                              |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CN 203569958 U (YANG, ZHOUYUAN) 30 April 2014 (2014-04-30)<br>claims 1-3 and figures 1-2                                                                                   | 1-18                                                                            |
| <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                            |                                                                                 |
| * Special categories of cited documents:<br>"A" document defining the general state of the art which is not considered to be of particular relevance<br>"D" document cited by the applicant in the international application<br>"E" earlier application or patent but published on or after the international filing date<br>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)<br>"O" document referring to an oral disclosure, use, exhibition or other means<br>"P" document published prior to the international filing date but later than the priority date claimed<br>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention<br>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone<br>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art<br>"&" document member of the same patent family |                                                                                                                                                                            |                                                                                 |
| Date of the actual completion of the international search<br><b>21 October 2021</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                            | Date of mailing of the international search report<br><b>21 October 2021</b>    |
| Name and mailing address of the ISA/KR<br><b>Korean Intellectual Property Office<br/>189 Cheongsa-ro, Seo-gu, Daejeon<br/>35208, Republic of Korea</b><br>Facsimile No. +82-42-481-8578                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                            | Authorized officer<br><b>BAHNG, Seung Hoon</b><br>Telephone No. +82-42-481-5560 |

## INTERNATIONAL SEARCH REPORT

International application No.

**PCT/AU2021/050781**

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                        | Relevant to claim No. |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| PX        | AU 2020-101521 A4 (O`MEARA, JAMES) 03 September 2020 (2020-09-03)<br>claims 1-16 and figures 1-3<br>(* The above document is a publication of the earlier application whose priority has been claimed in this international application.) | 1-18                  |

**INTERNATIONAL SEARCH REPORT**  
**Information on patent family members**

International application No.

**PCT/AU2021/050781**

| Patent document<br>cited in search report |                 |    | Publication date<br>(day/month/year) | Patent family member(s) | Publication date<br>(day/month/year) |
|-------------------------------------------|-----------------|----|--------------------------------------|-------------------------|--------------------------------------|
| CN                                        | 208536831       | U  | 22 February 2019                     | None                    |                                      |
| EP                                        | 0818594         | A1 | 14 January 1998                      | NL 1003494              | C2 07 January 1998                   |
| KR                                        | 20-1998-0063749 | U  | 25 November 1998                     | None                    |                                      |
| US                                        | 6729089         | B1 | 04 May 2004                          | None                    |                                      |
| CN                                        | 203569958       | U  | 30 April 2014                        | None                    |                                      |
| AU                                        | 2020-101521     | A4 | 03 September 2020                    | None                    |                                      |