(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
26 October 2017 (26.10.2017)

WIPO | PCT

(10) International Publication Number
WO 2017/181229 A1

(51) International Patent Classification:
B25H 1/00 (2006.01) *F16M 11/00* (2006.01)

(21) International Application Number:
PCT/AU2017/050349

(22) International Filing Date:
19 April 2017 (19.04.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2016901457 19 April 2016 (19.04.2016) AU

(71) Applicant: **JP COMPOSITES PTY LTD** [AU/AU]; C/- Level 32, 239 George Street, Brisbane, Queensland 4000 (AU).

(72) Inventors: **MACDONALD, Brian**; C/- Level 32, 239 George Street, Brisbane, Queensland 4000 (AU). **DOW, Matthew**; C/- Level 32, 239 George Street, Brisbane, Queensland 4000 (AU). **HINCHEY, Michael**; C/- Level 32, 239 George Street, Brisbane, Queensland 4000 (AU).

(74) Agent: **CULLENS**; Level 32, 239 George Street, Brisbane, Queensland 4000 (AU).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) **Title:** A LIGHT WEIGHT JACK STAND

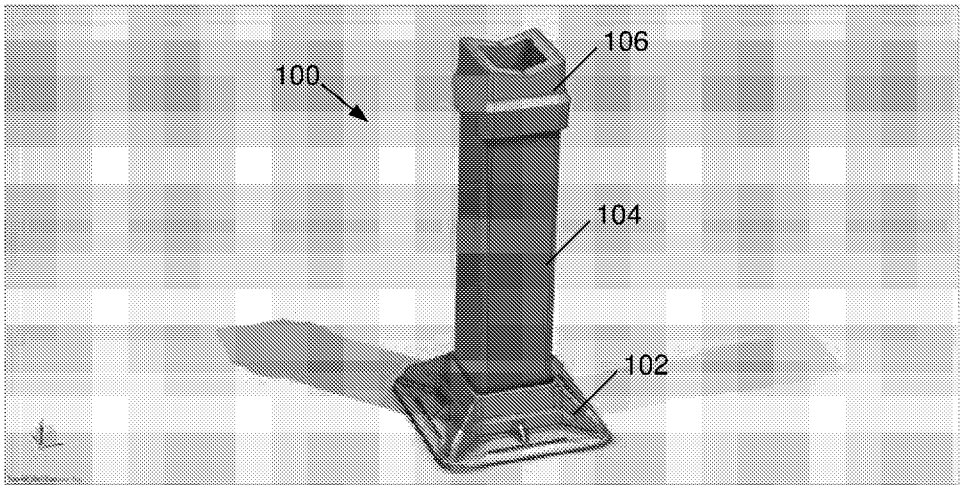


Figure 1

(57) **Abstract:** The present invention relates to a jack stand. The jack stand includes a base. A post, including composite material, extends from the base. The jack stand also includes a top for topping the post and for engaging with a load. Advantageously, the post may be lightweight (typically less than 12kg) enabling the jack stand to be conveniently moved by a single person without exposing the person to significant risk of injury. The jack stand may be moved as a whole, or in parts.

WO 2017/181229 A1

A LIGHT WEIGHT JACK STAND

TECHNICAL FIELD

[0001] The present invention relates to a light weight jack stand. The present invention has particular, although not excusive application to heavy-duty industrial jack stands for supporting vehicles, equipment, machinery and other like heavy loads (up to at least 30 tonne) in the earthmoving, trucking, mining and construction fields.

BACKGROUND

[0002] The reference to any prior art in this specification is not, and should not be taken as an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge.

[0003] Jack stands are commonly used to safely support heavy mining trucks that have been raised by a jack, or other means, for maintenance.

[0004] Known jack stands are formed from metal parts such as steel to sustain the weight of the trucks. In turn, the jack stands themselves are very heavy which makes them cumbersome to move around. In practice, multiple persons are required to safely lift and position the jack stands in place which undesirably presents an injury risk. Alternatively, forklifts or loaders are used to lift and position the jack stands which is safer, but often less convenient, more expensive, slower and less productive.

[0005] There is a need for a light weight jack stand that can be manually moved in a safe and convenient manner, but which can still safely support the required applied loads.

SUMMARY OF THE INVENTION

[0006] According to one aspect of the present invention, there is provided a jack stand including:

a base;

a post including composite material and for extending from the base; and

a top for topping the post and for engaging with a load.

[0007] Advantageously, the post may be lightweight (typically less than 12kg) enabling the jack stand to be conveniently moved by a single person without exposing the person to significant risk of injury. The jack stand may be moved as a whole, or in parts.

[0008] The composite material may include polymeric resin material and high strength fibres. The fibre material may include glass fibre, carbon fibre, and aramid fibre. The composite material may be formed via the pultrusion process. The composite material may include a matting to align fibers in orientations other than longitudinally along the post to improve compressive strength. The composite material may further include reinforcing fibres wound around the post to improve compressive strength. The reinforcing fibres may be separately wound in both clock-wise and anticlockwise directions along the post to further improve compressive strength.

[0009] The post may be tubular. The post may be rated to up to at least 12 tonne. The post may have a single wall. The post may be rated up to 12 tonne. Alternatively, the post may have two or more walls. The post may be rated up to 30 tonne. The walls may be bonded together. The post may include a curved (e.g. circular) wall and a quadrilateral (e.g. square) wall.

[00010] The base may be wider than the post to distribute weight of the load. The base may define a receptacle for receiving the post. The receptacle may include an outer wall and an inner wall of different shape and for forming a complementary fit with the post. The base may include a plate from which the receptacle extends. The base may further include one or more strengthening fillets extending between the receptacle and the plate.

[00011] The top may define a receptacle for receiving the post. The top may define a cradle for cradling and contacting the load. The top may include a cap for capping the post.

[00012] The base and/or top may include metal material, preferably steel or metal alloy.

[00013] The jack stand may include a handle fastened to the post.

[00014] According to another aspect of the present invention, there is provided a jack stand assembly including:

at least one jack stand; and

at least one upright extending from a respective jack stand; and

an accessory supported by the upright.

[00015] The upright may be adjustable. The upright may include a pair of tubes that can slide relative to each other. The assembly may include a fastener for fastening the tubes together.

[00016] The upright may be received in a post of the jack stand. The assembly may include a fastening arrangement for fastening the upright to a base of the stand. The fastening arrangement may include a retainer for inserting into the base and a threaded fastener for passing through the retainer and engaging with a thread of the upright. The retainer may include a plate from which one or more ledges extend into the base. The upright may include a floor defining the thread.

[00017] The assembly may include a rotation inhibitor for inhibiting rotation of the upright in the stand. The inhibitor may include a pin passing through the stand and the upright. The accessory may include a fastener for fastening to the upright.

[00018] The accessory may include a platform for supporting cables or hoses. The accessory may include one or more rollers for supporting material being fed to a machine. The accessory may include a holder for holding a object. The holder may include a pair of angled rollers for holding the hull of a boat.

[00019] According to another aspect of the present invention, there is provided a jack stand post including composite material.

[00020] According to another aspect of the present invention, there is provided a method of manufacturing a jack stand, the method involving:

forming a post including composite material.

[00021] The step of forming may involve pultruding with fibres and liquid polymeric resin material in a heated die to form the composite material.

[00022] The step of forming may involve introducing a matting to align fibers of the composite material in orientations other than longitudinally along the post to improve compressive strength.

[00023] The step of forming may involve winding reinforcing fibres around the post to improve compressive strength. The reinforcing fibres may be separately wound in both clock-wise and anticlockwise directions along the post to further improve compressive strength.

[00024] Any of the features described herein can be combined in any combination with any one or more of the other features described herein within the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[00025] Preferred features, embodiments and variations of the invention may be discerned from the following Detailed Description which provides sufficient information for those skilled in the art to perform the invention. The Detailed Description is not to be regarded as limiting the scope of the preceding Summary of the Invention in any way. The Detailed Description will make reference to a number of drawings as follows:

[00026] Figure 1 is a perspective view of a 12 tonne jack stand in accordance with an embodiment of the present invention;

[00027] Figure 2 is a sectional perspective view of the jack stand of Figure 1;

[00028] Figure 3 is a sectional perspective view of a 30 tonne jack stand in accordance with another embodiment of the present invention;

[00029] Figure 4 is a perspective top view of a base of the jack stand of Figure 3;

[00030] Figure 5 is a perspective view of a jack stand assembly including the jack stand of figure 3;

[00031] Figure 6 is a sectional perspective view of a portion of the jack stand assembly of figure 5;

[00032] Figure 7 is a lower perspective view showing assembly of the jack stand assembly of figure 5; and

[00033] Figure 8 is a perspective view of a jack stand and accessory mounting bracket.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[00034] According to an embodiment of the present invention, there is provided an industrial heavy-duty twelve-tonne (12t) jack stand 100 as shown in Figure 1. The stand 100 includes a base 102 for resting on the ground. A post 104 including composite material is provided and extends upwardly from the base 102. The jack stand 100 further includes a top 106 for topping the post 104 and for engaging with a vehicle (load).

[00035] Advantageously, the post 104 is lightweight (typically less than 12kg) enabling the jack stand 100 to be conveniently moved by a single person without exposing the person to significant risk of injury. The jack stand 104 can be moved as a whole, or in parts.

[00036] Turning to Figure 2, the post 104 has a square and tubular single wall 201, although is still comfortably rated to hold up to 12 tonne (with a safety factor of 3x).

[00037] The base 102 is wider than the post 104 to distribute weight of the vehicle and to provide stability relative to the height of the post. Furthermore, the base 102 defines a receptacle 200, in the form of an endless square channel, for complementarily receiving a lower end of the post 104. The base 102 also includes a flat plate 202 from which the receptacle 200 extends. Strengthening fillets 204 extend between the receptacle 200 and the plate 204.

[00038] The top 106 also defines a receptacle 206 for receiving the top end of the post 104. In effect, the top 106 defines an annular cap for snugly capping the post 104. In addition, the top 106 defines a topside cradle 208 for cradling an axle of the vehicle. The top 106 may also be of a flat section, for use on flat undersides of vehicles/machines or on their chassis rails.

[00039] The base 102 and top 106 are cast from metal material, preferably steel or metal alloy.

[00040] The composite material of the post 104 is pultruded, and includes polymeric resin material and fibres. The composite material also includes a matting to align fibers in orientations other than longitudinally along the post to improve compressive strength. The composite material further includes reinforcing fibres wound around the post to improve compressive strength. The reinforcing fibres can be separately wound in both clock-wise and anticlockwise directions along the post 201 to further improve compressive strength. The foregoing construction provides a lightweight jack stand 100 that is strong enough to sustain heavy-duty industrial loads.

[00041] A method of manufacturing the jack stand 100, with the post 104 including the light weight and strong composite material, is now briefly described.

[00042] The post 104 is formed by pultruding fibres and polymeric material to form the composite material. Pultrusion is a continuous moulding process whereby reinforcing fibres are saturated with a liquid polymer resin and then carefully formed and pulled through a heated die to form a uniform composite part. The manufacturing of parts or components by pultrusion results in straight constant cross section parts of virtually any desired length. The liquid polymer resin can be added to the matrix of structural fibres either before or during forming in the heated die.

[00043] Conventional pultrusion processes usually utilise very long reinforcing fibres or braided strands. The reinforcing fibres may include glass fibre, carboin fibre or aramid fibre. The strands are unfurled from coiled rolls (often called rovings) and longitudinally drawn into the preforming, resin impregnation and stationary die system.

[00044] Composite materials manufactured by the foregoing pultrusion process have exceptional strength to weight properties in resisting tensile loads but relatively poor strength to weight properties in resisting compressive loads. This is due to the exceptional tensile load bearing material properties of the reinforcing fibres contained within the composite structural matrix.

[00045] The forming of the post 104 involves introducing a woven reinforcing fibre matting in the structural fibre matrix of the resultant post 104 to align fibers of the

composite material in orientations other than longitudinally along the elongate post 104 to improve compressive strength. The resulting product has an increased ability to resist compressive forces as compared to products that do not have any form of other than longitudinal fibre orientation, as these fibres are to a greater or lesser degree placed under some form of tensile load. The matting is introduced either within the body of the composite material and/or as a surfacing material, to bind and surround the matrix of structural fibres in the pultrusion process. The surfacing material contributes the structural ability of the product but more importantly ensures a smooth acceptable finish is achieved for the finished part.

[00046] The forming of the post 104 further involves winding reinforcing fibres around the composite material to improve compressive strength. The additional reinforcing fibres are axially wound around the composite material along the longitudinal axis of the post 104, and hence around the longitudinal fibres and the woven mat, which can significantly increase the ability of the post 104 to resist compressive loads.

[00047] The reinforcing fibres may be separately wound in both clock-wise and anticlockwise directions along the post 104 to further improve compressive strength. The windings are laced into the matrix to provide comprehensive tensile load capacity in multiple axes of load.

[00048] Winding of the reinforcing fibres into the pultruded fibre matrix can be undertaken with large rotating frames holding the coiled reinforcing fibre rovings. Each roving rotates at a desired rotational speed relative to the longitudinal pultrusion process flow rate, and rotates in the rotational direction to achieve desired axial windings and density of fibre construction. Successive rotating frames can be counter-rotating to achieve the differential orientation of the windings.

[00049] Manufacturing pultruded composite products in such a manner exhibits a substantially improved capability to resist compressive loads when compared to conventionally manufactured products that are not manufactured in this manner. Such products can be of any form or shape, including round, square, rectangular or angular, and of differing dimensions.

[00050] The manufacturing of pultruded composite products that can achieve an adequate level of compressive load resistance offers significant opportunities for

industrial uses, given the product's inherent properties of light weight relative to its load bearing capacity. When compared to existing steel or metal allow products, the incorporation of pultruded composite products as the primary load bearing support element may offer significant advantages.

[00051] According to another embodiment of the present invention, there is provided an industrial heavy-duty thirty-tonne (30t) jack stand 300 as shown in Figure 3. The light-weight jack stand 300 is of similar construction to the jack stand 100 of Figure 1.

[00052] However, the upright post 302 has two walls 304, 306, and is safely rated up to 30 tonne (with a factor of safety of 3x). In particular, the post includes a circular (i.e. curved) inner wall 304 and a square (i.e. quadrilateral) outer wall 306. The walls 304, 306 are bonded together along their length. Advantageously, the post 104 is lightweight (typically less than 15kg) enabling the jack stand 100 to still be conveniently moved by a single person.

[00053] Figure 4 shows the base 400 of the jack stand 300. The base 400 defines a receptacle 402 with a circular inner wall 404 and square outer wall 406 to form a complementary fit with the post 302. The post walls 304, 306 fit snuggly between the receptacle walls 404, 406.

[00054] A jack stand assembly 500 including a pair of jack stands 300 is shown in Figure 5. Each jack stand includes a handle 502 fastened to the post 302. The jack stand assembly 500 includes two adjustable and extendable uprights 504 extending from the top of respective jack stands 300. A platform accessory 506 is supported by the uprights 504.

[00055] Each upright 504 includes a pair of tubes 508a, 508b that can slide relative to each other to adjust the overall length. The assembly 500 further includes a screw fastener 510 for fastening the tubes 508a, 508b together at a fixed length.

[00056] As can best be seen in figure 6, the upright 504 is received in the post 302 of the jack stand 300. The assembly 500 further includes a bottom fastening arrangement 600 for fastening the tubular upright 504 to the base 400 of the stand 300. The fastening arrangement 600 includes a retainer 602 for inserting into the base 400 (see figure 7).

The fastening arrangement 600 also includes a threaded screw fastener 604 for passing through the retainer 602 and engaging with a floor thread of the upright 504. The retainer 602 includes a plate from which one or more ledges extend into the base 400. The upright 504 includes a floor 606 defining the floor thread.

[00057] The assembly 500 further includes a rotation inhibitor 608 for inhibiting rotation of the upright 504 in the stand 300. The inhibitor 608 includes a pin passing through the stand 300 and the upright 504. A collar 610 surrounds the upright 504 and forms a stop for abutting the jack top 106.

[00058] Figure 8 shows a stand mounting bracket 800 for mounting the stand 300 along with a variety of accessories which can be used in conjunction with the stand 300. One accessory 506 includes a platform for supporting cables or hoses. Another accessory 802 includes one or more rollers for supporting metal strip material being fed to a cutting machine. Yet another accessory 804 includes a boat holder including a pair of angled rollers for holding the hull of a boat. Each accessory includes a bottom fastening receptacle 806 for fastening to the upright 504.

[00059] The jack stand assembly 500 may similarly be formed using jack stands 100.

[00060] A person skilled in the art will appreciate that many embodiments and variations can be made without departing from the ambit of the present invention.

[00061] In compliance with the statute, the invention has been described in language more or less specific to structural or methodical features. It is to be understood that the invention is not limited to specific features shown or described since the means herein described comprises preferred forms of putting the invention into effect.

[00062] Reference throughout this specification to 'one embodiment' or 'an embodiment' means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, the appearance of the phrases 'in one embodiment' or 'in an embodiment' in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more combinations.

The claims defining the invention are as follows:

1. A jack stand including:
a base;
a post including composite material and for extending from the base; and
a top for topping the post and for engaging with a load.

2. A jack stand as claimed in claim 1, wherein the post is less than 12kg enabling the jack stand to be conveniently moved by a single person without exposing the person to significant risk of injury.

3. A jack stand as claimed in claim 1, wherein the jack stand can be moved in parts.

4. A jack stand as claimed in claim 1, wherein the composite material includes polymeric resin material and fibres.

5. A jack stand as claimed in claim 4, wherein the fibres include any one or more of glass fibres, carbon fibres, and aramid fibres.

6. A jack stand as claimed in claim 1, wherein the composite material is formed via a pultrusion process.

7. A jack stand as claimed in claim 1, wherein the composite material includes a matting to align fibers in orientations other than longitudinally along the post to improve compressive strength.

8. A jack stand as claimed in claim 1, wherein the composite material includes reinforcing fibres wound around the post to improve compressive strength.

9. A jack stand as claimed in claim 8, wherein the reinforcing fibres are separately wound in both clock-wise and anticlockwise directions along the post to further improve compressive strength.

10. A jack stand as claimed in claim 1, wherein the post is tubular.

11. A jack stand as claimed in claim 1, wherein the post is rated up to at least 12 tonne or 30 tonne.

12. A jack stand as claimed in claim 1, wherein the post has a single wall or two or more walls that are bonded together.

13. A jack stand as claimed in claim 1, wherein the post includes a curved wall and a quadrilateral wall.

14. A jack stand as claimed in claim 1, wherein the base is wider than the post to distribute weight of the load.

15. A jack stand as claimed in claim 1, wherein the base defines a receptacle for receiving the post.

16. A jack stand as claimed in claim 15, wherein the receptacle includes an outer wall and an inner wall of different shape and for forming a complementary fit with the post.

17. A jack stand as claimed in claim 15, wherein the base includes a plate from which the receptacle extends.

18. A jack stand as claimed in claim 17, wherein the base further includes one or more strengthening fillets extending between the receptacle and the plate.

19. A jack stand as claimed in claim 1, wherein the top defines a receptacle for receiving the post.

20. A jack stand as claimed in claim 1, wherein the top defines a cradle for cradling and contacting the load.

21. A jack stand as claimed in claim 1, wherein the top includes a cap for capping the post.

22. A jack stand as claimed in claim 1, wherein the base and/or top include metal material, preferably steel or metal alloy.

23. A jack stand as claimed in claim 1, further including a handle fastened to the post.

24. A jack stand assembly including:
at least one jack stand; and
at least one upright extending from a respective jack stand; and
an accessory supported by the upright.

25. A jack stand assembly as claimed in claim 24, wherein the upright is length adjustable.

26. A jack stand assembly as claimed in claim 24, wherein the upright is received in a post of the jack stand.

27. A jack stand assembly as claimed in claim 24, further including a fastening arrangement for fastening the upright to a base of the stand.

28. A jack stand assembly as claimed in claim 24, including a rotation inhibitor for inhibiting rotation of the upright relative to the stand.

29. A jack stand assembly as claimed in claim 24, wherein the accessory includes any one of a platform, rollers or a holder.

30. A jack stand post including composite material.

31. A method of manufacturing a jack stand, the method involving:
forming a post including composite material.

32. A method as claimed in claim 31, wherein the step of forming involves pultruding with fibres and liquid polymeric resin material in a heated die to form the composite material.

33. A method as claimed in claim 31, wherein the step of forming involves introducing a matting to align fibers of the composite material in orientations other than longitudinally along the post to improve compressive strength.

34. A method as claimed in claim 31, wherein the step of forming involves winding reinforcing fibres around the post to improve compressive strength.

35. A method as claimed in claim 34, wherein the reinforcing fibres are separately wound in both clock-wise and anticlockwise directions along the post to further improve compressive strength.

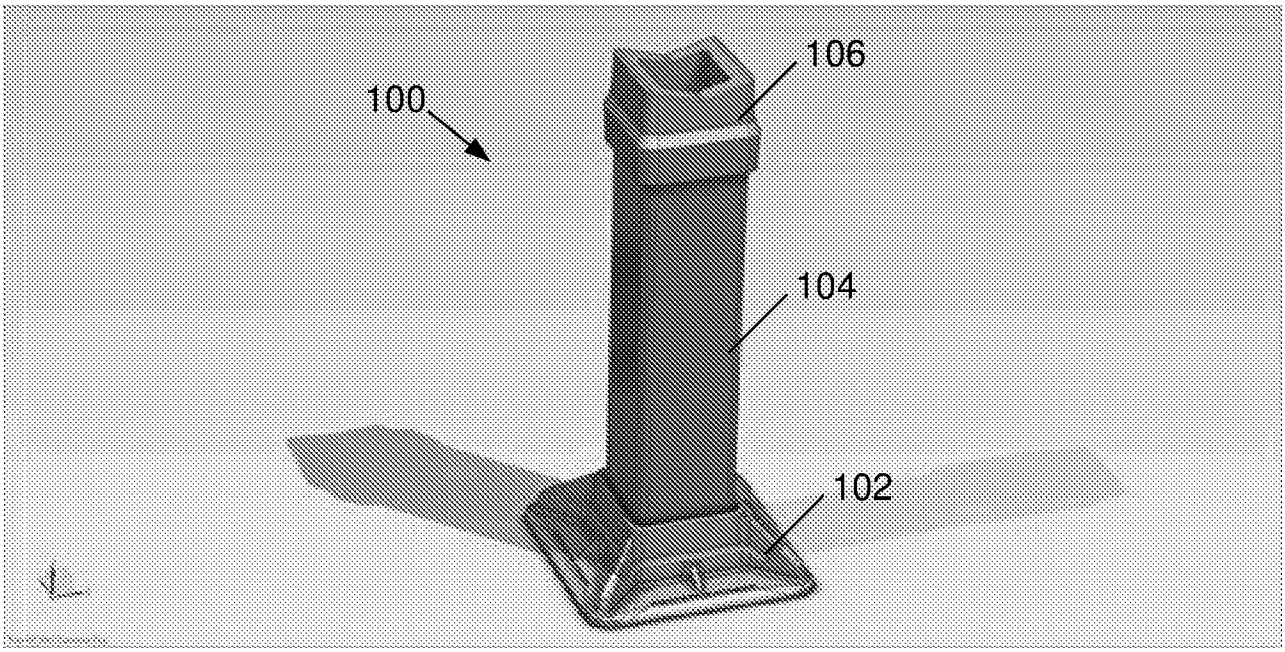


Figure 1

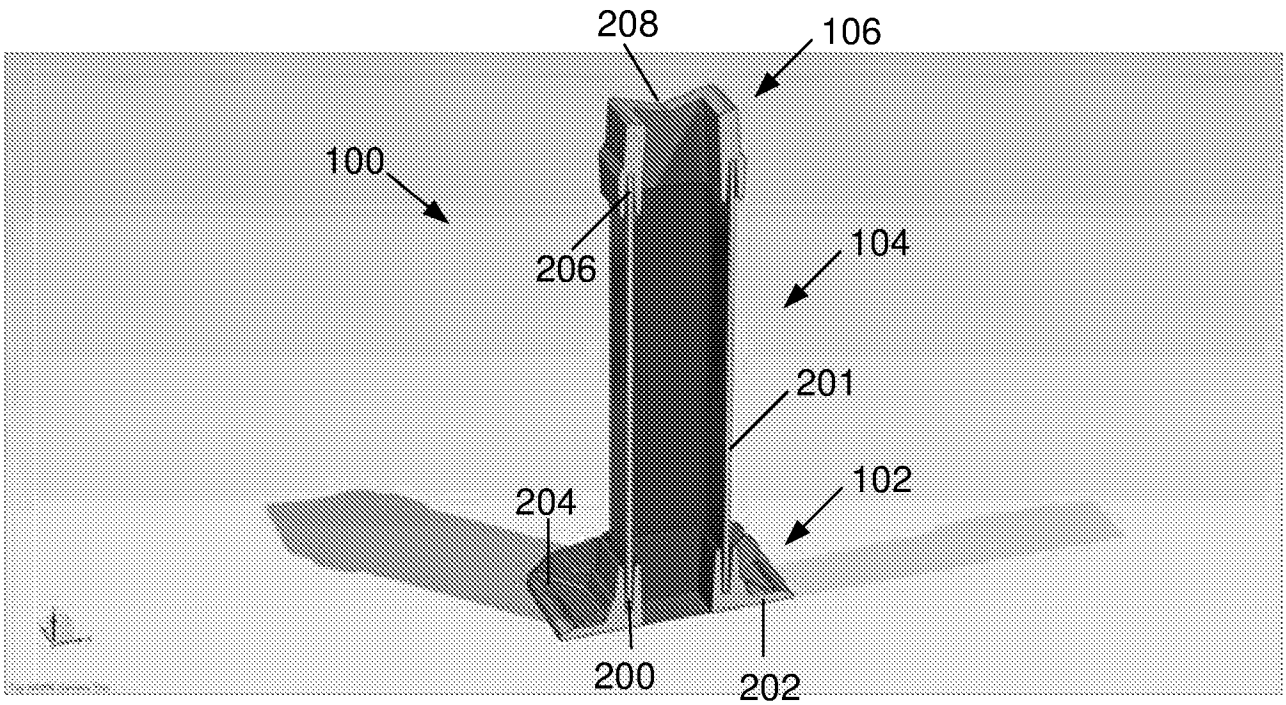


Figure 2

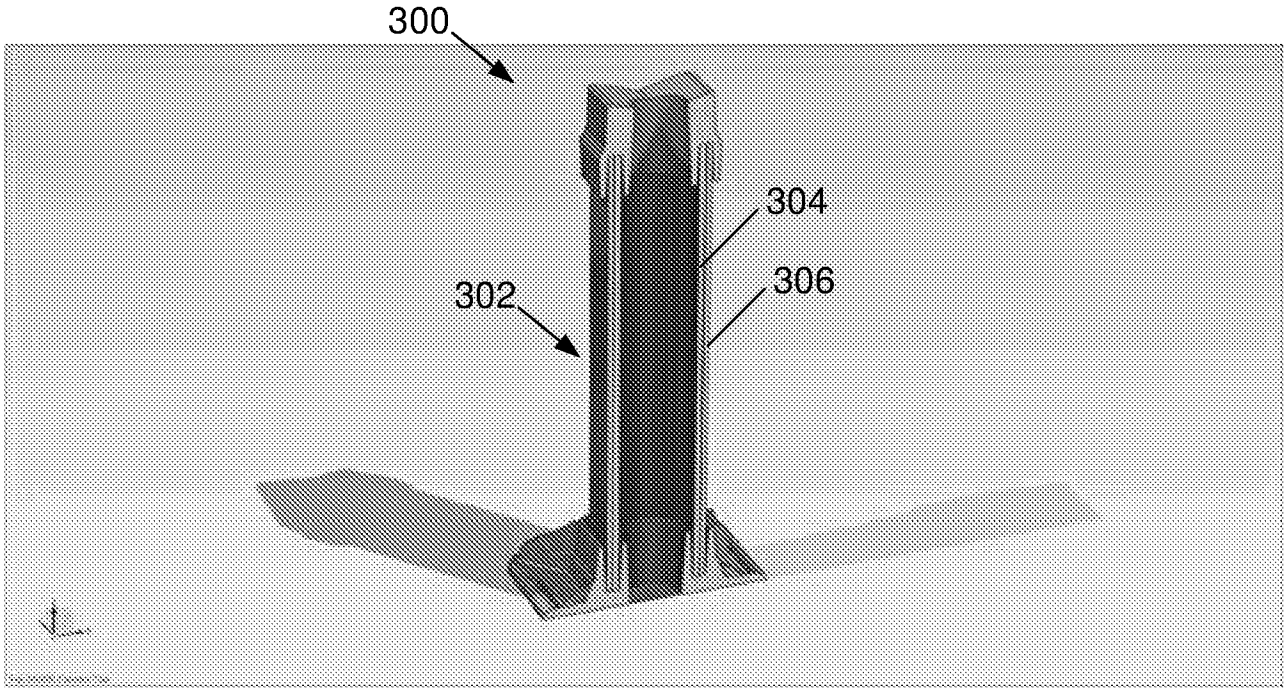


Figure 3

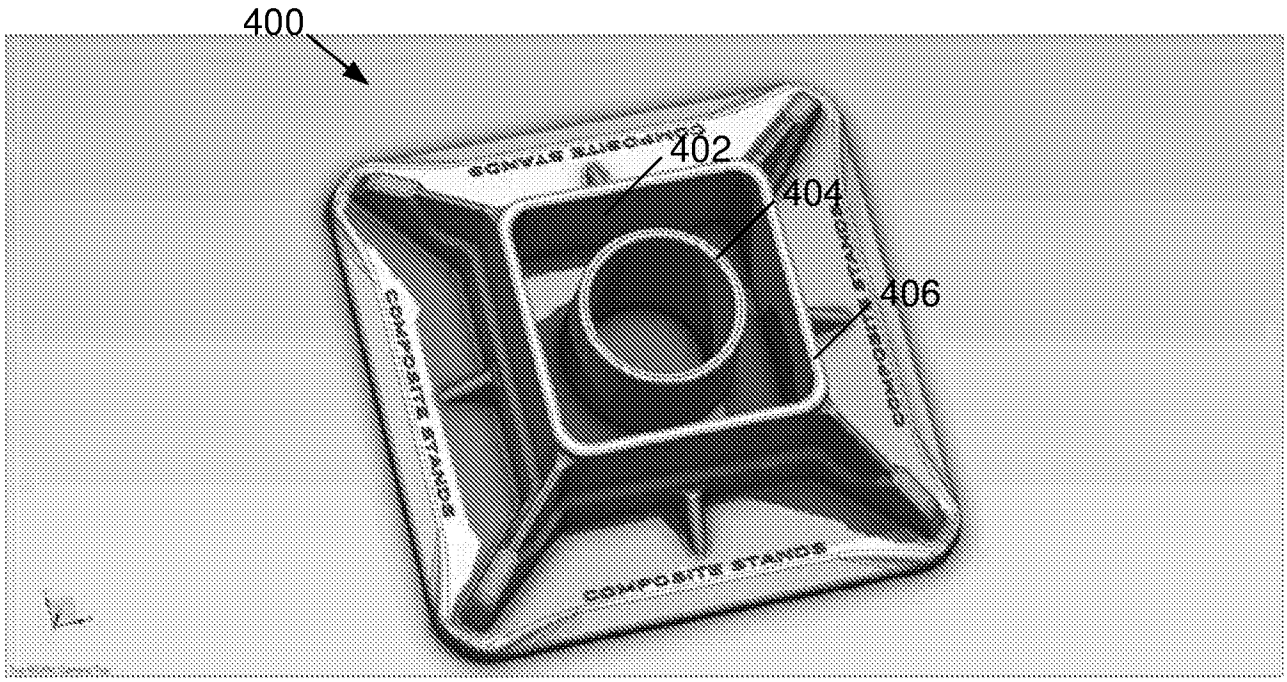


Figure 4

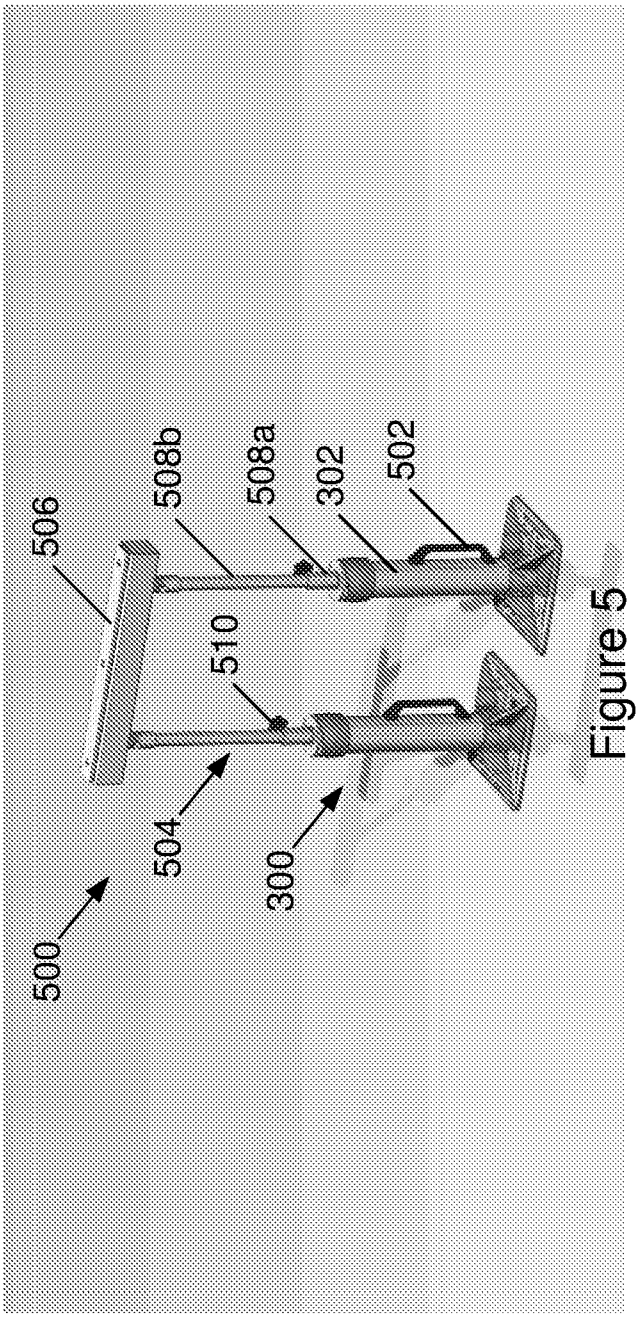


Figure 5

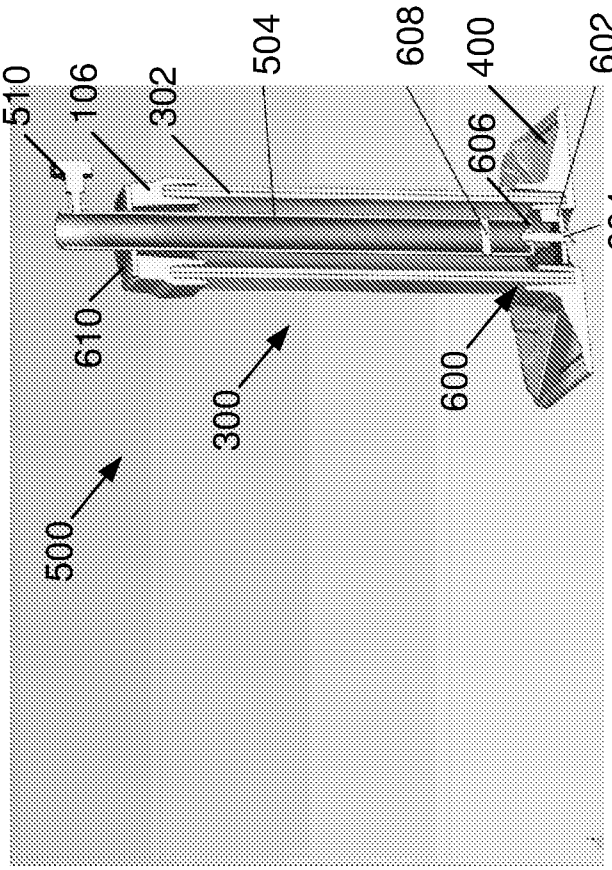


Figure 6

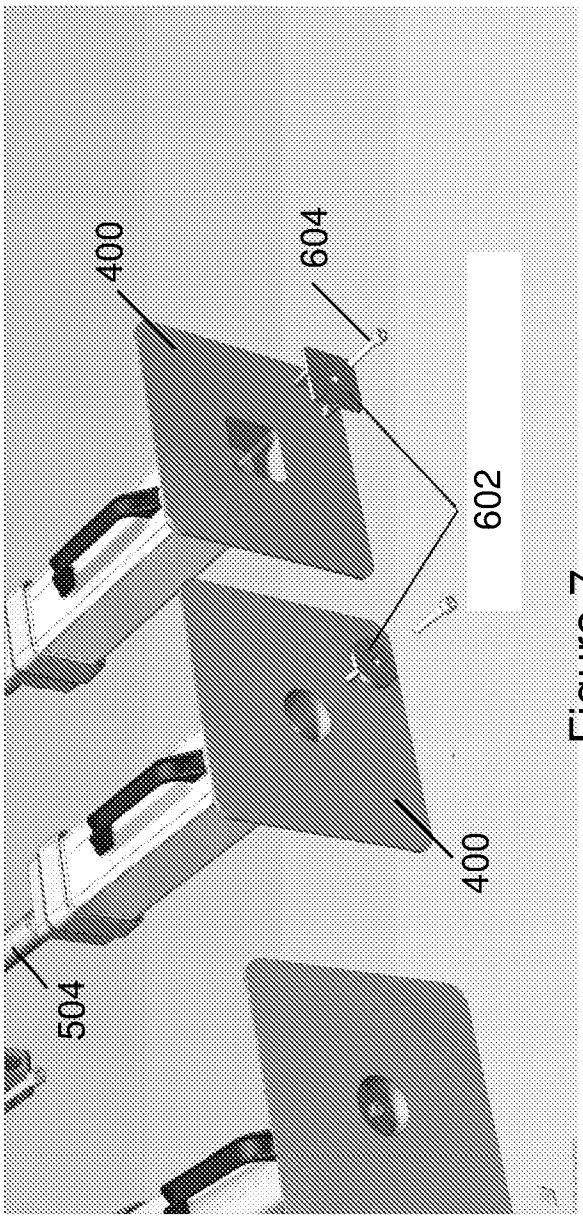


Figure 7

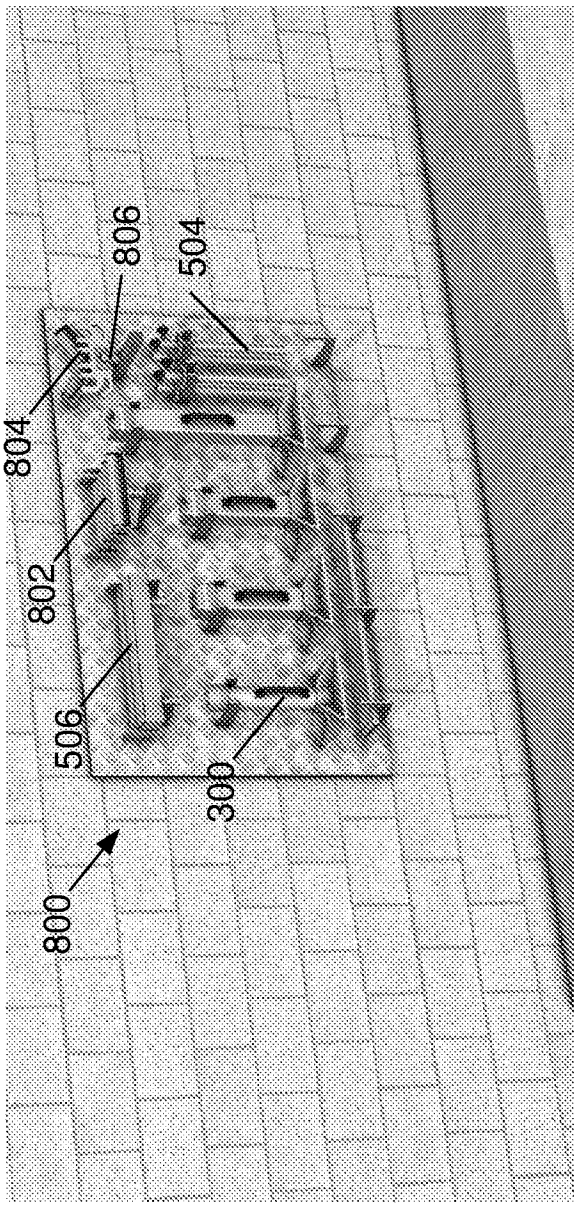


Figure 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2017/050349

A. CLASSIFICATION OF SUBJECT MATTER

B25H 1/00 (2006.01) F16M 11/00 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PATENW: IPC/CPC (B25H1/0007, B66F1/00/LOW, B66F3/00/LOW, F16M11/20/LOW, B63C5/04, E21D15/02/LOW, E21D15/14/LOW, F16M11/22, F16M2200/08) and keywords (jack, vehicle, car, trailer, stand, support, composite, fibreglass, reinforce, fibre, light weight, column, tube, post) and like terms.

Google Patents

Applicant and Inventor search in PATENW, AUSPAT and IP Australia internal databases.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 July 2017	19 July 2017
Name and mailing address of the ISA/AU	**Authorised officer**
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustralia.gov.au	Paul Newman AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61399359659

INTERNATIONAL SEARCH REPORT C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		International application No. **PCT/AU2017/050349**
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5575591 A (VANDERKLAAUW) 19 November 1996 col 3 line 66 - col 4 line 8, col 4 lines 57-64, col 8 lines 6-22, col 5 lines 49-54, col 12 lines 41-50, figs 2-3, 8a, 20, 36-37	1-18, 20-23, 30-35
X	US 2014/0145044 A1 (FRANK CARMEL CERAVOLO) 29 May 2014 para 0002, 0041-0045, 0055-0056, 0062-0068, figs 1-2, 6	1-12, 14, 19-23, 30-35
X	US 2009/0200528 A1 (SEBER et al.) 13 August 2009 para 0026-0027, figs 1-2	1-7, 11-18, 20, 22-23, 30-33
X	US 2005/0211868 A1 (SCOTT) 29 September 2005 para 0003, 0010, 0024-0025, figs 1-4	1-7, 11-12, 14-15, 19, 21-23, 30-33
X	US 2009/0179122 A1 (INZERO) 16 July 2009 para 0003, 0022-0023, 0049-0052, 0062-0063, 0069, figs 3-4, 10-13	1-5, 7-9, 11-12, 14-15, 23, 30-31, 33-35
X	US 7487576 B2 (BARATTA et al.) 10 February 2009 col 1 lines 16-17, 40-53, col 2 lines 53-56, col 5 lines 8-17, col 5 line 64 - col 6 line 7, col 6 line 33 - col 7 line 63, figs 1, 3-4, 6, 12-13	1-10, 12-22, 30-35
X	US 5611514 A (OLIVER et al.) 18 March 1997 col 2 line 24 - col 3 line 48, figs 1-3, 6-7	1-10, 12, 14-19, 21, 30-35
A	US 5048441 A (QUIGLEY) 17 September 1991 col 1 line 6 – col 3 line 7	4-5, 7-9, 31, 33-35
A	US 5946880 A (MORRISON, III et al.) 07 September 1999 col 2 line 36 – col 3 line 3, col 4 lines 56-65	4-5, 7-9, 31, 33-35
A	US 6189285 B1 (MOCKRY) 20 February 2001 col 1 lines 6-27, col 2 lines 24-41, col 3 lines 24-25, figs 2, 6	4-6, 31-32

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2017/050349

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:

because they relate to subject matter not required to be searched by this Authority, namely:

the subject matter listed in Rule 39 on which, under Article 17(2)(a)(i), an international search is not required to be carried out, including

2. ☐ Claims Nos.:

because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos:

because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See Supplemental Box for Details

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-23, 30-35

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Supplemental Box

Continuation of: **Box III**
This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

This Authority has found that there are different inventions based on the following features that separate the claims into distinct groups:

- **Claims 1-23, 30** and **31-35** are directed to a jack stand, a jack stand post, and a method of manufacturing a jack stand. The feature of a post including composite material, is specific to this group of claims.

- **Claims 24-29** are directed to a jack stand assembly. The feature of at least one upright extending from at least one jack stand, and an accessory supported by the upright, is specific to this group of claims.

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

When there is no special technical feature common to all the claimed inventions there is no unity of invention.

In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. The only feature common to all of the claimed inventions is a jack stand. However it is considered that this feature is generic in this particular art.

Therefore this common feature cannot be a special technical feature. Hence there is no special technical feature common to all the claimed inventions and the requirements for unity of invention are consequently not satisfied *a priori*.

INTERNATIONAL SEARCH REPORT Information on patent family members	International application No. **PCT/AU2017/050349**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document/s Cited in Search Report		**Patent Family Member/s**	
Publication Number	**Publication Date**	**Publication Number**	**Publication Date**
US 5575591 A	19 November 1996	US 5575591 A	19 Nov 1996
		AU 5552496 A	18 Nov 1996
		CA 2217124 A1	31 Oct 1996
		WO 9634152 A1	31 Oct 1996
US 2014/0145044 A1	29 May 2014	US 2014145044 A1	29 May 2014
		US 9080722 B2	14 Jul 2015
		US 9335001 B1	10 May 2016
		US 9573796 B1	21 Feb 2017
		US 2014191093 A1	10 Jul 2014
US 2009/0200528 A1	13 August 2009	US 2009200528 A1	13 Aug 2009
		US 8585018 B2	19 Nov 2013
		CN 102066232 A	18 May 2011
		CN 102066232 B	10 Sep 2014
		EP 2247524 A1	10 Nov 2010
		WO 2009102801 A1	20 Aug 2009
US 2005/0211868 A1	29 September 2005	US 2005211868 A1	29 Sep 2005
US 2009/0179122 A1	16 July 2009	US 2009179122 A1	16 Jul 2009
US 7487576 B2	10 February 2009	US 2005214084 A1	29 Sep 2005
		US 7487576 B2	10 Feb 2009
		EP 1599301 A2	30 Nov 2005
		EP 1846185 A2	24 Oct 2007
		JP 2007524524 A	30 Aug 2007
		TW 200420400 A	16 Oct 2004
		US 2004151552 A1	05 Aug 2004
		US 7214007 B2	08 May 2007
		WO 2004069454 A2	19 Aug 2004
		WO 2006078533 A2	27 Jul 2006
US 5611514 A	18 March 1997	US 5611514 A	18 Mar 1997
US 5048441 A	17 September 1991	US 5048441 A	17 Sep 1991
		AU 5968590 A	08 Jan 1991
		EP 0487549 A1	03 Jun 1992
		EP 0487549 B1	10 Sep 1997

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

INTERNATIONAL SEARCH REPORT Information on patent family members	International application No. **PCT/AU2017/050349**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	**Publication Date**	**Publication Number**	**Publication Date**
		EP 0733469 A2	25 Sep 1996
		EP 0733469 B1	18 Apr 2001
		JP H05508115 A	18 Nov 1993
		JP 3376455 B2	10 Feb 2003
		US 5188872 A	23 Feb 1993
		WO 9015712 A1	27 Dec 1990
US 5946880 A	07 September 1999	US 5946880 A	07 Sep 1999
		US 5555696 A	17 Sep 1996
		US 5692351 A	02 Dec 1997
US 6189285 B1	20 February 2001	US 6189285 B1	20 Feb 2001

End of Annex

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.