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**B29C 39/10** (2006.01)  
**B29C 45/14** (2006.01)  
**B29C 70/80** (2006.01)

(52) UK CL (Edition X ):  
**A5R RFB R6A**  
**B5A AB18 A1R102 A1R214D A1R314C3 A20T14 A20T3**

(56) Documents Cited:  
**GB 2380137 A** **GB 1543326 A**  
**US 4475543 A** **US 3930496 A**  
**US 3782390 A** **US 3631854 A**  
**US 3403676 A** **US 3110307 A**

(58) Field of Search:  
UK CL (Edition W ) **A5R**  
INT CL<sup>7</sup> **A61F**  
Other: **EPODOC, JAPIO, WPI**

(54) Abstract Title: **Splint mould**

(57) A splint mould for supporting and immobilising limbs comprises a sealed twin walled sleeve 7,8 which can be injected with a setting compound 9 to form a rigid cast. The walls of the sleeve are formed from a fabric or fabric like material and may include strengthening ribs. A valve 3 may be provided to allow the setting compound to be injected into the sleeve. The setting compound may be expanding foam, grout or plaster. The sleeve may be pre-filled with a setting compound and then set by applying water or other setting agent. The sleeve can be tailored for specific limbs, e.g. arms or legs, or may be provided in the form of a linear bandage that can be wrapped around irregular or abnormal body parts.

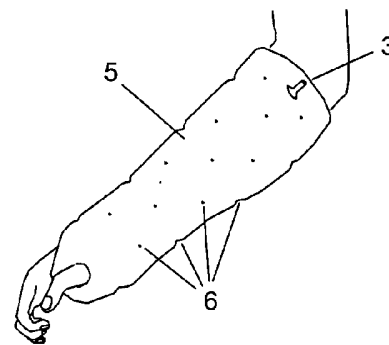


FIGURE 3

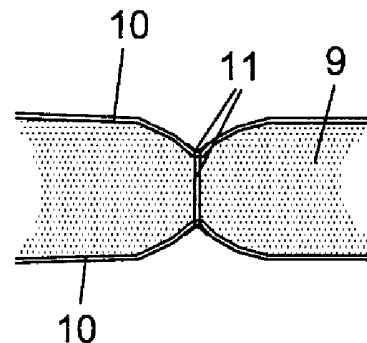


FIGURE 6

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DRAWINGS 1/1

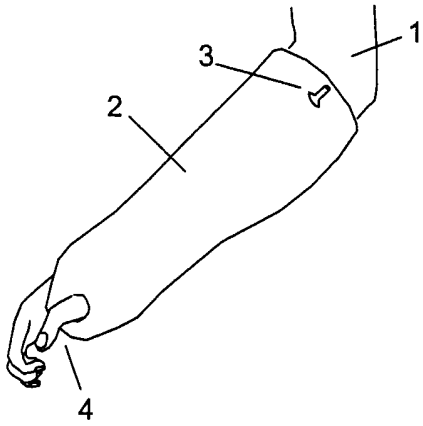


FIGURE 1

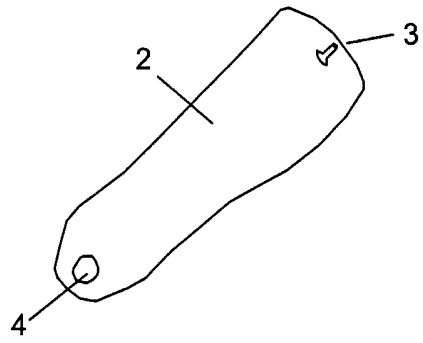


FIGURE 2

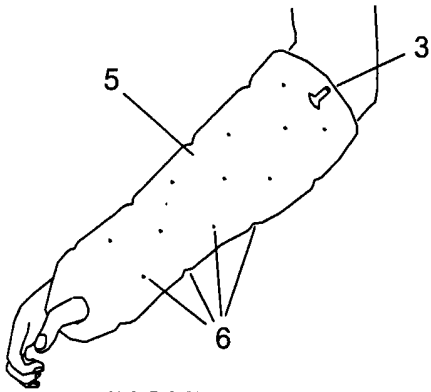


FIGURE 3

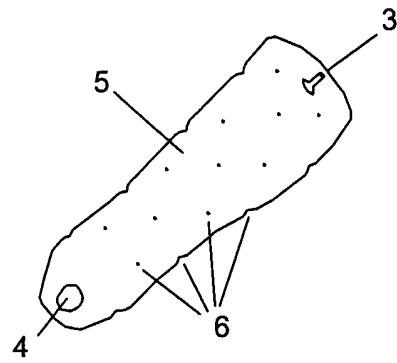


FIGURE 4

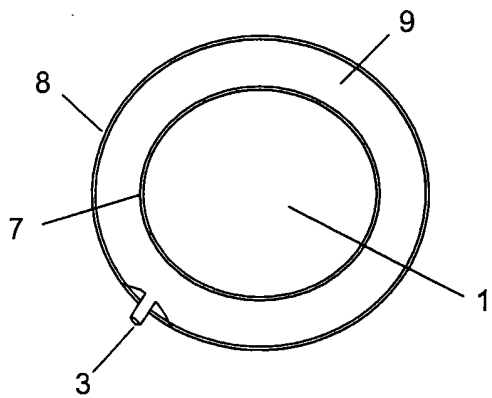


FIGURE 5

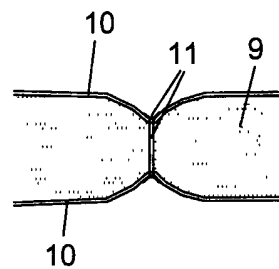


FIGURE 6

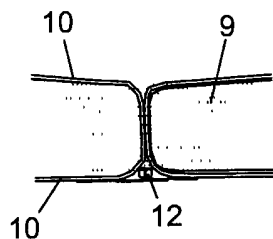


FIGURE 7

## INJECTABLE FABRIC OR FABRIC LIKE MOULD FOR THE FORMATION OF A CAST FOR BROKEN BONES

Traditional plaster casts have been used for many years to support and immobilise broken limbs to enable broken bones to mend. The use of plaster and bandage to form a rigid support, although effective, is however time consuming to form the cast and somewhat messy.

The Invention provides a relatively quick and cleaner means by which a rigid support cast can be formed around a broken limb, whilst providing the same degree of rigidity and support to the broken bone.

Specifically, the Invention consists of a sealed "sandwich" of fabric, or fabric like material (including polyethylene or similar synthetic plastics), which is tailored to form a mould. A small one-way valve or similar, is present into which plaster, grout or similar setting compound can be injected, to fill the mould and form a rigid, supportive cast, once hardened. The use of expanding foam, which sets and hardens, can be used to provide a lightweight cast.

The flexible fabric or fabric like mould provides the means by which the injected plaster, grout or similar setting compound is shaped and retained. Non-setting compounds may be utilised in which case the rigidity of the support cast would be achieved by achieving a positive pressure within the cast, with the use of appropriate valves and impermeable/non porous membranes.

The fabric "skin" is typically, although not exclusively, porous or semi porous or has integrated bleed holes/structures to allow the escape of excess air and moisture, whilst all the while substantially retaining the plaster or similar setting compound within. The flexible fabric or fabric-like mould ultimately forms part of the final cast. Upon successful mending of the broken bones or joint, the complete cast, including the integral mould, is then cut away and disposed of, in the same manor a more traditional plaster/bandage cast would be.

The correct thickness and to some degree shape of the cast upon inflation can be improved by the stitching or linking of the inner and outer "skins" of the mould. Selective, intermittent stitching to the fabric or fabric-like mould, either point stitching or linear stitching, ensures a consistent thickness of the cast. Point stitching typically produces a dimpled "mattress like" surface. Alternatively, or in addition, ribbing can be incorporated into the mould "fabric" to increase the strength of the cast, or improve the shaping and formation of the cast.

The fabric type mould can be tailored to fit specific body parts such as the arm, wrist, ankle or leg, in various sizes, or be formed into a linear or simply shaped "bandage", that will have the advantage of being used to form a cast around irregular, abnormally sized or awkward parts of the body. It could also be used on children or animals for example, and in specific situations tailored moulds manufactured for animal limbs.

As an alternative application the mould can be supplied pre injected/filled with a non-set medium. These would form a ready to use mould and cast, that would be hardened with the application of water or other setting agent. In certain situations, this ready to use application may prove useful.

A preferred embodiment of the invention will now be described with reference to the accompanying drawing in which:

Figure 1 shows an inflatable mould and cast for the immobilisation and support of broken or damaged limbs, in this example a wrist and forearm, although suitably shaped moulds/casts are suitable for all limbs, including animal limbs. In this example, the outer surface of the mould and cast is smooth. The arm, 1, as an example, is protected by a mould and cast, 2, the mould

being inflated with grout, plaster, expanding foam or other hard setting compound, through a valve, 3, to create a rigid protective cast once hardened. The valve, or similar device, can be one way or self sealing to prevent deflation prior to setting and the cast becoming rigid. In this instance, an eye, through which the thumb can be inserted, is included.

Figure 2 shows the inflatable mould and cast in isolation, omitting the arm for clarity, again showing the cast, 2, formed by the mould, valve, 3, and eye, 4.

Figure 3 shows an example of a mould and cast, 5, again shown as an arm cast as an example, which is dimpled, ribbed or patterned in texture, 6, and similarly inflated through valve, or similar, 3. The dimpled appearance of the mould and cast in this instance, is created by internal stitching or joining of the inner and outer layers of the mould, to assist in creating a uniform thickness and in improving the shape of the cast.

Figure 4 shows the mould and cast in isolation.

Figure 5 shows a typical mould and cast in section, where the limb, 1, is surrounded by the mould and cast, incorporating an inner layer, 7, and an outer layer, 8, to create a "sandwich" in which a hard setting compound, 9, is injected into the mould through the valve or similar, 3, to create a cast, 2 or 5 in Figures 1 or 3.

Figure 6 shows an example of a mould and cast where the inner and outer mould material, fabric or similar, is joined together, in this instance using stitching, to assist in controlling the thickness of the filling material, 9, of the final cast.

Figure 7 shows an example of a mould and cast where a zip, 12, or similar joining device, is incorporated into the mould. This allows the mould to be placed around the limb more easily, by way of a zip attachment, for example.

## CLAIMS

1. A fabric or fabric-like mould consisting of a sealed "sandwich" of porous, semi-porous or impermeable flexible membranes that can be injected using plaster, grout or similar hard setting compound to form a rigid cast for the immobilisation of broken limbs or joints.
2. A fabric or fabric-like mould as claimed in 1, where the mould is tailored to specific body parts (human or animal) such as the wrist, forearm, arm, leg or ankle.
3. A fabric or fabric-like mould as claimed in 1, where the mould is untailored, i.e. not shaped to a specific part of the body, in the form of a linear bandage that can be shaped to irregular body parts or abnormal sizes.
4. A fabric or fabric-like mould as claimed in claims 1 and 2 or 1 and 3 incorporating internal ribbing within the mould fabric to increase strength, rigidity or final form.
5. A fabric or fabric-like mould, as claimed in 1, 2, 3 or 4, using a lightweight expanding foam or similar, that sets to form a lightweight cast
6. A fabric or fabric-like mould which is pre-injected/filled forming a non-set ready to use cast which can be fitted, then set with the application of water or a setting agent.
7. A fabric or fabric-like mould as herein described above and illustrated in the accompanying drawings or description.



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Application No: GB0416784.7

Examiner: Barnaby Wright

Claims searched: 1-7

Date of search: 23 November 2004

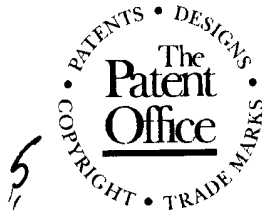
### Patents Act 1977: Search Report under Section 17

#### Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-5 at least	US 3110307 A (HAMILTON) See whole document, especially figs 1-4.
X	1, 2, 4, 5 at least	US 3403676 A (GIBBONS) See whole document, especially figs. 1-3, and col. 2, lines 43-52.
X,Y	X: 1, 2, 5; Y: 4	US 3631854 A (FRYER) See whole document, especially figs. 1-7.
X,Y	X: 1-3, 5; Y: 4	US 3782390 A (JOHNSON) See whole document, especially figs. 1-5, and col. 3, line 1 to col. 4, line 27.
X	1, 2, 4, 5 at least	US 3930496 A (GIBBONS) See whole document, especially figs 1-7.
X,Y	X: 1, 2, 5, 6; Y: 4	US 4475543 A (BROOKS) See whole document, especially figs. 3-6, and col. 3, lines 16-18.
X	1, 6 at least	GB 2380137 A (ALCARE) See whole document, especially figs. 1-6.
Y	4	GB 1543326 A (BLOMER) See especially figs 1-4, and page 2, lines 24-29.

#### Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application



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**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>W</sup> :

A5R

Worldwide search of patent documents classified in the following areas of the IPC<sup>07</sup>

A61F

The following online and other databases have been used in the preparation of this search report

EPODOC, JAPIO, WPI