A CAST

FIELD

The present invention relates to a cast, in particular, a self-moulding cast conformable to any desired shape. Specifically, the cast may be used as an orthopaedic cast.

BACKGROUND

An orthopaedic cast is a medical device to immobilize a portion of the body, usually a limb, to facilitate union of a broken bone (or bones). Conventional orthopedic casts are commonly made either from cotton bandage embedded with plaster of Paris that hardens with the addition of water, or fiberglass bandage impregnated with polyurethane. To achieve a comfortable fit, these casts are manually moulded by a skilled orthopedic technician to conform to the patient's body before setting.

Due to the thickness of the bandage used and the fabric bandage being sealed with the binding agent (the plaster of Paris or polyurethane), they result in an opaque and non-breathable cast. These properties of the cast may cause difficulties and complications in the healing process. The opacity of the cast makes inspection of the wound difficult and may require destruction of the cast and subsequent recasting. The non-breathability of the cast may cause complications arising from the environment, including itching, rashes, and infections. Additionally, there is typically an additional bandage and/or stockinette padding layer between the patient's skin and the cast that is not waterproof and may cause issues when it gets wet. It also prevents the washing of the body portion enclosed by the cast.

Moreover, manual moulding of these casts requires skilled expertise, which can lead to errors in fit if improperly performed. The process can be time-consuming, as the practitioner must carefully shape the material, which can slow down the application process, making it less desirable in emergency situations. Manual moulding also introduces the potential for inconsistency in the fit, as it relies on the practitioner's technique, which may vary from case to case. Furthermore, manual moulding can lead to discomfort if pressure points are not carefully managed, as the material is shaped directly by hand.

SUMMARY

According to an example of the present disclosure, there is provided a cast as claimed in an independent claim and a method of casting as claimed in the claims. Some optional features are defined in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Examples in the present disclosure will be better understood and readily apparent to one skilled in the art from the following written description, by way of example only and in conjunction with the drawings, in which:

FIG. 1 shows a distinctive lattice structure for a cast according to an example of the present disclosure.

FIG. 2 shows detachable connectors (or locking mechanisms) according to an example of the present disclosure to secure ends of a cast.

FIG. 2A shows an exploded view of a cast that incorporates detachable connectors (or locking mechanisms) designed to join two cast modules, forming an enclosure, according to an example of the present disclosure.

FIG. 3 shows a side view of a cast according to an example of the present disclosure in its collapsed state or flat shape.

FIG. 4 shows a top view of a cast according to an example of the present disclosure in its collapsed state or flat shape.

FIG. 5 illustrates a buckle system according to an example of the present disclosure that may be used for securing ends of a cast.

FIG. 6 shows a collapsed or flat state of a cast according to an example of the present disclosure having side release buckles.

FIG. 7 shows a collapsed or flat state of a cast according to an example of the present disclosure having centre release buckles.

FIG. 8 shows a cast according to an example of the present disclosure as applied to the forearm of an individual.

DESCRIPTION

Examples of the present disclosure include a cast, which can be defined as a device that shapes itself without external intervention (hereinafter referred to as "self-moulding" or "self-mould", as applicable) shortly (e.g. within seconds/minutes) upon receiving a stimulus. In particular, the stimulus refers to heat. Materials made up of thermoplastic with self-moulding properties, particularly shape-memory thermoplastics, can change their shape and stiffness upon heating, and revert (via contraction) to a pre-set shape upon cooling and become rigid again. Such materials are used for the cast as these properties allow them to self-conform to the shape of an object under low stiffness.

The cast of an example of the present disclosure may serve to immobilise body parts of a subject (e.g. a living thing) and be used as an orthopaedic cast. Other applications of the cast may include its use to support and/or reinforce other objects, such as fragile or non-durable objects, or objects requiring support to be in a desired shape.

The cast according to the example of the present disclosure may have a lattice structure. The lattice structure may have a sparse mesh geometry, with for example, 0.1 to 1 openings per cm^2, or more preferably, 0.5 to 0.8 openings per cm^2. This means the opening (or aperture) size of the lattice structure may range from, for example, 1 to 100 cm^2 per opening, or more preferably, 25 to 64 cm^2 per opening. The sizes of the openings may differ in different parts of the cast, for instance, larger openings at areas requiring lesser support and smaller openings at areas requiring better support.

When used as an orthopaedic cast, the wearer of the cast is expected to have enhanced comfort due to the breathability and/or conformability of the cast described in the present disclosure. Additionally, the device or cast applicant (i.e. a person or machine forming the cast) is expected to benefit from an easier and faster application process.

The cast of the example described above can be collapsible and can be stored in a flat, compact and/or collapsed state before it is put to use and activated with heat to conform to a desired shape. Therefore, the cast is highly portable. When used as an orthopaedic cast, the cast shows excellent potential to be used outside of clinical settings as a first-aid product due to its high portability.

1) Material composition

In one example, the cast comprises more than one layer. Specifically, a first layer for contacting an exterior or external surface of an object, for example, the skin of a subject (e.g. living thing) or an exterior surface of a non-living thing. A second layer for acting as a reinforcement structure and/or support. A third layer that is exposed to surroundings and acts as a protective cover material.

Generally, the first layer may be made of plastic, particularly a polymer foam, or it may be a fabric material. Optionally, the first layer may contain anti-microbial substance (e.g. anti-microbial silver) to prevent bacterial growth and infection. Additionally, the first layer may be configured to be a breathable material, such as one that is porous to allow quicker heat dissipation during cast application. The porosity also aids "breathability", allowing for evaporation of moisture from the skin of a subject, which may occur throughout the subject's daily activities, and/or the evaporation of condensed water vapour residing on the exterior surface of an object subject to casting. Preferably for orthopaedic use, the first layer may be made of a material that is gentle to human skin i.e. skin safe and biocompatible.

Examples of materials that are skin safe and biocompatible may include individually or in combination, synthetic polymers (e.g. Polyvinyl alcohol (PVA)), synthetic and natural fabrics (e.g. those suitable for making clothes such cotton, cotton-polymer blends, silk, etc.), and chitosan. Biocompatible and mechanically stable porous hydrogels, such as those made from polyvinyl alcohol (PVA), can be considered as well.

The second layer may serve as the main support structure, which comprises of a thermoplastic material with self-moulding properties. This self-moulding property may be driven by a shape-memory mechanism, whereby the thermoplastic material remains rigid at room temperature,

and is able to soften and becomes pliable at elevated temperatures (e.g. above 50 Degrees Celsius), and then gradually reverts (via contraction) to a pre-set shape as it cools and becomes rigid again. For example, the thermoplasticity of the shape-memory material may be as follows:

(a) At room temperature, the material possesses stiffness characterised by a Young's modulus of approximately 2.0 GPa.

(b) Upon heating, the material begins to soften in the temperature range of 50°C to 55°C.

(c) By 60°C, the Young's modulus is reduced by at least an order of magnitude, achieving stiffness of approximately 10 times lower than its initial value.

(d) At 65°C, the Young's modulus is reduced by at least two orders of magnitude, achieving stiffness of approximately 100 times lower than its initial value.

To achieve a shape-memory material exhibiting the aforementioned thermoplasticity parameters, any suitable materials and methods known in the art may be used. For example, a composition comprising 85 to 95 wt% of polylactic acid ("PLA") and 5–15 wt% of a plasticizer.

The third layer is optional. The third layer may be made of plastic or other materials suitable for acting as a protective and/or impact cushioning layer for padding the cast structure from impact. The third layer may be a good thermal insulator for helping to retain heat during application of the cast so that the cast can stay soft and pliable for a longer period, allowing it to conform more effectively to the shape of the object before setting. It is optional for the third layer to be porous. If it is porous, it will help with cushioning.

The second layer may be disposed between the first layer and the third layer. The first layer maybe adhered to the second layer via a suitable adhesive or through other means, for example, by stitching them together via threads. In one example, the third layer may be coated on the first layer and the coated first layer is adhered to the second layer. More layers may be added for better cushioning, (thermal/electrical) insulation, reinforcement or support, and/or protection as required.

2) Geometric design of the cast

The cast may have a lattice structure comprising entirely of serpentine-shaped lines, for example, sinusoidal lines. Such serpentine-shaped lines may also be meandering or winding and not perfectly sinusoidal. These serpentine-shaped lines may be interlaced by connecting the crests of each serpentine-shaped line to the troughs of an adjacent serpentine-shaped line, forming an interconnected network of serpentine springs. The openings formed by the connected crests and troughs of the serpentine-shaped lines are each curvilinear in shape. For example, they may resemble curved diamonds (e.g. a diamond shape bounded by curved lines) especially after the openings are expanded over a limb of an individual wearing the cast.

The lattice structure may be placed around a part of a target object and can accommodate various sizes and shapes of different objects. For orthopaedic use, the geometric design of

the cast facilitates optimal shaping of a patient's limbs and a wide range of limb (e.g. forearm) sizes can be accommodated.

3) Cast application method

The cast's unique material composition and geometric design described above enables a unique application method wherein upon heating, the cast, in particular, the second layer, would begin to soften. The softened cast can be placed on and/or stretched over a part of a target object. When heat is removed, the softened cast will gradually harden, while simultaneously contracting and self-mould around the part of the target object to be casted. The application method can be said to be the creation of a 4-dimensional (4D) printed cast, which adapts to its environment (e.g. a part of a subject or object such as a patient's limb shape) without extensive external intervention. A 3D printer may be used in the creation of the cast.

4) Locking mechanism (also called detachable connector)

Examples of the cast described in the present disclosure may include integrated locking mechanisms (or detachable connectors). In the case of orthopaedic use, these mechanisms enable ends of the cast or cast module (as described below) to be connected together to secure the cast on a patient and enables the ends to be disconnected to remove the cast. Hence, the mechanisms are configured for detachable connection of ends of the cast. Furthermore, the integrated locking mechanisms of the cast described in the present disclosure may be of a type that supports a modular design of the cast, as described below.

Each of the mechanisms may include a locking tab with a physical indicator of lock or unlock status. The locking tab is preferably low-profile, which means that it has a height substantially similar or lesser than the height of the lattice structure of the cast. A locking mechanism with such physical indicator includes a buckle connector (in short, buckle). The locking tab prevents accidental unlocks and is designed for easy unlock when intended.

5) Modular Design

The cast may be modular in design. This means that the cast may be supplied in pieces, sections or segments and each piece, section or segment is a module. Each module may be configured to have connectable ends for joining together. More than one modules may be connected together to form a cast. Connectors such as the locking mechanism described above may be provided at the ends of each modules. This modular design allows the cast, as described in the present disclosure, to be customized for different body parts or objects with varying surface areas or sizes. The opening size in each module may be of different sizes. The connectors of different modules should be made compatible for connecting to one another to enable different modules, which may have different size and/or different opening size, to connect together.

In the case of orthopaedic use, the cast with modular design can be regarded as a multi-purpose orthopedic device, which has the ability to interchangeably convert itself into a

backslab, splint, and/or expand its length and width. For example, modules or modular segments may be provided to cast larger or smaller limb areas. In the case of legs and thighs, larger modules may be used and in the case of fingers, small modules may be used, so as to better conform the resulting cast to the shape of the limbs. The same concept of using larger modules for larger objects and smaller modules for smaller objects also applies for non-orthopaedic use. Such modules can be easily added or removed.

Specifically, to address problems arising from conventional plaster of Paris and fiberglass casts and to go beyond their basic functions, an orthopaedic cast according to an example of the present disclosure may have the features as follows:

(a) A system leveraging on 4D-printing principles to provide support to a body area

The system comprises of a lattice structure that can be softened upon at elevated temperatures. The structure has a sparse mesh geometry that features a network of serpentine springs interlaced longitudinally (with respect to the length of the cast) at a plurality of junctions, where each junction is where a crest of a serpentine-shaped line and a trough of a serpentine-shaped line meet. This forms a lattice structure that can conform to the unique contours of differing sizes of body areas when softened.

When softened and applied on a body area, the network of serpentine springs contract upon cooling and becomes rigid again. This process allows the structure to self-conform without extensive external intervention, adapting to the unique contours of the body area with the ideal pressure needed for supporting the body area.

Besides 4D printing, other suitable methods for making the cast structure include injection moulding and die casting. These methods involve heating the cast material until it becomes soft or pliable. The heated material is then injected into a mould in the case of injection moulding or poured into a die in the case of die casting, The mould or die has the shape of the desired cast. Once the material fills the mould or die, it is allowed to cool and harden, forming the cast. These methods allow for precise control over the shape and thickness of the cast.

The lattice structure comprises of 3 layers:

(a) A bottom layer of the lattice structure that is configured to contact the body area when in use. It is preferably made of skin safe and biocompatible material that is soft to provide comfort during use and preferably such material should pass the ISO 10993 compatibility test. Optionally, it may contain anti-microbial particles to prevent bacterial growth and infection. Optionally, it may be engineered to be porous to facilitate moisture evaporation and heat dissipation during application.

(b) A middle layer of the lattice structure that is rigid at room temperature, softens at elevated temperatures, and gradually contracts as it cools and becomes rigid again.

(c) A top layer of the lattice structure that is soft and is configured to pad the lattice structure from external impact and retain heat during application.

Besides the lattice structure, the system also comprises of more than one connectors (or locking mechanisms), which may be buckles. There may be for example, ten buckles, integrated or embedded into the middle layer of the lattice. Such connectors are meant for securing the cast onto a body area during use. They are also meant to connect multiple lattice structures (i.e. modules) together, forming a larger cast that can fit a larger body part with a correspondingly larger surface area.

The buckles have a low profile locking tab with a physical indicator of lock status, and are designed for easy unlock when intended and prevents accidental unlocks. The buckles also enhance comfort and aesthetic appeal of the lattice structure.

(b) A method of forming a support for application to a body area

The method of application comprises of heating the lattice structure, placing the softened structure around the body area, allowing the structure to self-conform onto the unique contours of the body area, securing the structure using connectors (i.e. the buckles), then allowing the softened structure to harden through cooling (e.g. natural cooling or induced cooling).

(c) A system to allow modularity in a cast structure, which provides support to a body area

The cast may be modular in design and each module is a lattice structure connectable to other modules. Leveraging on the connectors (i.e. the buckles) integrated into the middle layer of the lattice structure, the system can be interchangeably attached to and removed from other modular lattice structures to conform to other body areas, and/or to extend the coverage of cast over the body area to be supported. The versatility of the cast is greatly increased as more use cases are possible for providing support to different body areas of varying sizes or surface area.

FIG. 1 displays a distinctive lattice structure of a cast 100 according to an example of the present disclosure that can be softened at elevated temperatures. The lattice structure 100 comprises entirely of serpentine-shaped lines, which are interlaced by connecting the crests of each serpentine-shaped line to the troughs of an adjacent line. For clarity, two adjacent serpentine-shaped lines, designated as 1a and 1b, are indicated by their boundaries using dotted lines, as shown in FIG. 1. The troughs 1d of line 1a is connected to the crests 1c of the adjacent line 1b, forming an interlocking lattice arrangement. The openings 1e formed by the interconnection of crests and troughs are approximately shaped like curved diamonds, especially after the openings 1e are expanded over a limb of an individual wearing the cast 100.

FIG. 2 shows a cast 200 according to an example of the present disclosure that incorporates the lattice structure of cast 100, and which is designed to form an enclosure using locking mechanisms 2a secured at the ends of the cast modules 2b and 2c. The interface between

cast modules 2b and 2c is demarcated using dotted lines in FIG. 2. Specifically, the locking mechanisms in the example of Fig. 2 are buckles.

FIG. 2A shows an exploded view of cast 200, which has cast modules 2b and 2c. The locking mechanisms 2a comprise more than one pairs of interconnectable parts residing at securing ends of cast modules 2b and 2c, which are disconnected in this figure.

FIG. 3 shows a side view of a cast 300, which corresponds to cast 200 in its collapsed state or flat shape before activation for use as an orthopaedic cast. The locking mechanisms 2a are connected.

FIG. 4 shows a top view of the cast 300, which corresponds to cast 200 in its collapsed state or flat shape before activation for use as an orthopaedic cast.

FIG. 5 illustrates a pair of connectors 502 of the locking mechanisms 2a described in FIG. 2, 2A and 3. In particular, the pair of connectors 502 are parts of a buckle system, that may be used for securing ends of a cast i.e. cast 100, 200 or 300 described in earlier figures. One of the connectors has a loop end 5a with an opening and the other connector has a receiving end 5b with a catch that can snap fit into the opening of the loop end 5a when the loop end is engaged into the receiving end 5b. With regard to the connector with the loop end 5a, there are two connection ends, designated as 5c and 5d, extending in opposite directions from each other for connecting to the lattice structure of the cast. With regard to the connector having the receiving end 5b with the catch, there are two connection ends, designated as 5e and 5f, extending in opposite directions from each other for connecting to the lattice structure of the cast.

FIG. 6 shows a collapsed (or flat) state of a cast module 600 according to an example of the present disclosure. Items 6a to 6c in FIG. 6 correspond to the bottom, middle and top layers respectively of the lattice structure described earlier with reference to earlier figures. Item 6d in FIG. 6 is a buckle system (snap lock buckle system) with a different design from the buckle system shown in Fig. 5. The buckle system 6d comprises a plurality of buckles, each buckle comprising a receiving (female) portion and a protruding (male) portion for insertion into the receiving portion to provide a snap fit. Specifically, the buckles in FIG. 6 are side release buckles. FIG. 6 shows a row of receiving portions on one side of the cast 600 and protruding portions on an opposite side of the cast 600. Each receiving portion and each protruding portion are tied to different parts of the lattice structure via a fastener 6e to engage respective protruding portion and receiving portion of another module to be used to form a larger cast comprising more than one modules, or to engage the respective protruding portion and receiving portion located at the opposite side of the cast module 600.

FIG. 7 illustrates a collapsed (or flat) state of a cast module 700 according to an example of the present disclosure. Items 7a to 7c corresponds to the bottom, middle and top layers respectively of the lattice structure described earlier with reference to earlier figures. Item 7d is a buckle system (snap lock buckle system) with the same design as the buckle system shown in FIG. 5. The two connection ends of each of the connector, with the loop end and the connector having the receiving end with the catch, are integrated or embedded within the

lattice structure. Such integration / embedment is marked out as 7e in FIG. 7. The buckle system 7d comprises a plurality of buckles, each buckle comprising a receiving (female) portion and an protruding (male) portion for insertion into the receiving portion to provide a snap fit. Specifically, the buckles in FIG. 7 are centre release buckles. Each receiving portion and each protruding portion are integrated or embedded to different parts of the lattice structure for engaging respective protruding portion and receiving portion of another module of the cast or to engage the respective protruding portion and receiving portion located at an opposite side of the cast module 700.

FIG. 8 shows a cast 800 according to an example of the present disclosure as applied to the forearm 8e of an individual. The cast 800 comprises two cast modules 8g and 8h configured to form an enclosure to support the forearm 8e. The two cast modules 8g and 8h are secured to each other through locking mechanisms 8f disposed at the ends of the two cast modules 8g and 8h. The locking mechanisms 8f are configured in the same way as the buckle system shown in FIG. 5.

The cast 800 has a lattice structure comprising of serpentine-shaped lines 8a and 8b, for example, sinusoidal lines. Such serpentine-shaped lines 8a and 8b may also be meandering or winding and not perfectly sinusoidal. These serpentine-shaped lines 8a and 8b may be interlaced by connecting the crests of each serpentine-shaped line to the troughs of an adjacent serpentine-shaped line, forming an interconnected network of serpentine springs. Specifically, FIG. 8 shows the crest 8c of serpentine-shaped line 8a connected to the trough 8d of the adjacent serpentine-shaped line 8b. When the cast 800 is expanded over the forearm 8e of the individual, the openings formed by the connected crests and troughs of the serpentine-shaped lines 8a and 8b are each curvilinear in shape. In the present example, they resemble curved diamonds (e.g. a diamond shape bounded by curved lines) after the openings are expanded over the forearm 8e.

Examples of the present disclosure can provide advantages over existing solutions in the following areas.

(i) The use of the elastic properties of thermoplastics for limb immobilisation. This control is achieved through the combination of shape-memory thermoplastic material and geometric design, whereas existing solutions typically only utilise the moldability of thermoplastics.

(ii) The unique modularity of the cast according to examples of the present disclosure does not rely on external connectors . As illustrated in FIG. 6 and 7, the connectors used in the present invention are fastened, integrated or embedded to the cast or cast module, allowing the cast to be converted into a splint or combined into a larger cast using two or more cast modules, etc. This modularity is enabled by specially designed internal clips or buckles, such as the buckle system described with reference to the figures of the present disclosure.

(iii) The securing of a limb immobilisation device (i.e. cast) on a patient's limb using in-built (i.e. fastened, integrated or embedded) clips after heating, and the removal process of a limb immobilisation device using in-built clips.

Examples of the present disclosure may have the following features. The relevant reference numerals in the figures of the present disclosure are indicated as examples of the elements of the stated features.

A cast (e.g. 100, 200, 300, 600, 700) for casting over (or on a surface of) an object, wherein the cast comprises:

- a first layer (e.g. 6a, 7a) comprised of a breathable material for contacting an exterior surface of an object; and
- a second layer (e.g. 6b, 7b) for acting as a support (or reinforcement) structure, wherein the second layer is activatable upon application of a stimulus to soften for self-moulding to a desire shape over and/or for conforming to contours of the exterior surface of the object.

The first layer may be porous.

The first layer may be made of skin safe and biocompatible material.

The first layer may contain anti-microbial substance (or material).

The second layer may be made of shape-memory thermoplastic that is rigid at room temperature, and softens when heated to a temperature of 55 Degrees Celsius or higher. The second layer may gradually contract as it cools and becomes rigid again.

The cast may comprise of a third layer (e.g. 6c, 7c) acting as a protective cover.

The third layer may be made of plastic.

The cast may have a lattice structure.

The lattice structure may be a network of serpentine springs (e.g. 100).

The serpentine springs may comprise serpentine-shaped lines (e.g. 1a, 1b) interlaced at a plurality of junctions, wherein each junction is where a crest (e.g. 1c) of a serpentine-shaped line and a trough (e.g. 1d) of another serpentine-shaped line meet.

The lattice structure may have a mesh geometry with 0.5 to 0.8 openings per cm^2.

The cast may be collapsible into a collapsed state (e.g. 300) to provide portability.

The cast may include one or more fastened, integrated or embedded detachable connectors (or locking mechanism) (e.g. 2a, 6d, 6e, 7d) for detachable connection of ends of the cast.

The one or more detachable connectors may include a locking tab with a physical indicator of lock or unlock status (e.g. a buckle clearly shows lock/unlock status). For instance, the buckle systems shown in FIG. 5 and FIG. 6 are able to clearly show lock/unlock status.

The locking tab may have a height equal or lesser than the height of the lattice structure.

The cast may be modular in design and formed by connecting more than one modules together.

The cast may be an orthopaedic cast.

A method of casting (or applying) the cast on an object, wherein the method comprises:
heating the cast to soften parts of it;

- placing the softened cast around the object;
- allowing the cast to contract and conform to contours of the object; and
- allowing the softened cast to harden through cooling.

The method may comprise securing the cast using one or more detachable connectors.

The method may comprise securing more than one modules of the cast using the one or more detachable connectors.

In the present disclosure, unless the context clearly indicates otherwise, the term "comprising" has the non-exclusive meaning of the word, in the sense of "including at least" rather than the exclusive meaning in the sense of "consisting only of". The same applies with corresponding grammatical changes to other forms of the word such as "comprise", "comprises" and so on.

While the invention has been described in the present disclosure in connection with a number of examples, embodiments and implementations, the invention is not so limited but covers various obvious modifications and equivalent arrangements, which fall within the purview of the claims relating to the invention. Although features of the invention are expressed in certain combinations among the claims relating to the invention, it is contemplated that these features can be arranged in any combination and order.

CLAIMS

1. A cast for casting over an object, wherein the cast comprises:

a first layer comprised of a breathable material for contacting an exterior surface of an object; and

a second layer for acting as a support structure,

wherein the second layer is activatable upon application of a stimulus to soften for self-moulding to conform to contours of the exterior surface of the object.

2. The cast as claimed in claim 1, wherein the first layer is porous.

3. The cast as claimed in claim 1 or 2, wherein the first layer is made of skin safe and biocompatible material.

4. The cast as claimed in any one of the preceding claims, wherein the first layer contains anti-microbial substance.

5. The cast as claimed in of any one of the preceding claims, wherein the second layer comprises of shape-memory thermoplastic that is rigid at room temperature, softens when heated to a temperature of 55 Degrees Celsius or higher.

6. The cast as claimed in any one of the preceding claims, wherein the cast comprises of a third layer acting as a protective cover.

7. The cast as claimed in any one of the preceding claims, wherein the cast has a lattice structure.

8. The cast as claimed in claim 7, wherein the lattice structure is a network of serpentine springs.

9. The cast as claimed in claim 8, wherein the network of serpentine springs comprises serpentine-shaped lines interlaced at a plurality of junctions, wherein each junction is where a crest of a serpentine-shaped line and a trough of another serpentine-shaped line meet.

10. The cast as claimed in any one of claims 7 to 9, wherein the lattice structure has a mesh geometry with 0.5 to 0.8 openings per cm^2.

11. The cast as claimed in any one of the preceding claims, wherein the cast is collapsible into a collapsed state to provide portability.

12. The cast as claimed in any one of the preceding claims, wherein the cast comprises one or more fastened, integrated or embedded detachable connector for detachable connection of ends of the cast.

13. The cast as claimed in claim 12, wherein the one or more detachable connectors comprise a locking tab with a physical indicator of lock or unlock status.

14. The cast as claimed in claim 13, wherein the cast has the lattice structure of any one of claims 7 to 10, and the locking tab has a height equal or lesser than the height of the lattice structure.

15. The cast as claimed in any one of the preceding claims, wherein the cast is modular in design and formed by connecting more than one modules together.

16. The cast as claimed in any one of the preceding claims, wherein the cast is an orthopaedic cast.

17. A method of casting the cast described according to any one of the preceding claims on an object, wherein the method comprises:
heating the cast to soften parts of it;
placing the softened cast around the object;
allowing the cast to contract and conform to contours of the object; and
allowing the softened cast to harden through cooling.

18. The method according to claim 17, wherein the method comprises:
securing the cast using one or more detachable connectors.

19. The method according to claim 18, wherein the method comprises:
securing more than one modules of the cast using the one or more detachable connectors.