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(56) Documents Cited:
GB 1604527 A **EP 0052563 A1**
FR 002243861 A1 **IT 001168464 B**
JP 610054383 A **JP 2000302084 A**
SU 000498200 A1 **US 5564357 A**
US 5006087 A

(58) Field of Search:
UK CL (Edition X) **B7A**
INT CL **B63B**
Other: **EPODOC, WPI**

(54) Abstract Title: **An inflatable boat with a protective shell attached to its underside**

(57) A boat 10 includes at least one inflatable section 12 to at least part of which a shell 18 is secured, the shell 18 extending beneath at least part of the underside of the boat 10. The shell may be formed as a single piece, or may be formed of several pieces to protect different parts of the boat. The shell may be generally the same shape as the underside of the boat. The shell may be provided with keel and/or strake or other formations. The shell may be provided with cut-outs or apertures through which parts 20 of the boat may be exposed, while the shell may be secured to the boat with straps (22, fig 3) secured to fixing points in the boat.

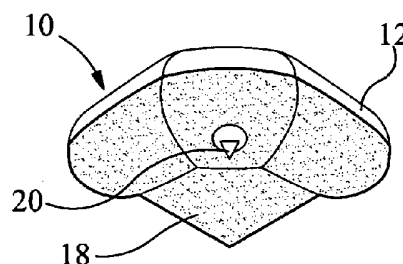


Figure 2

GB 2 457 504 A

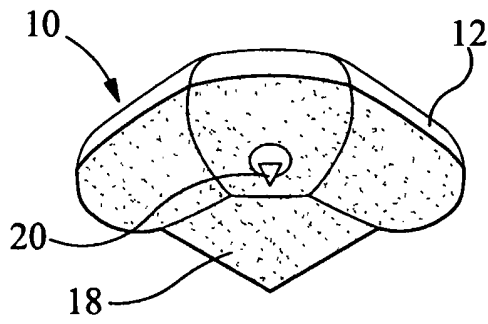
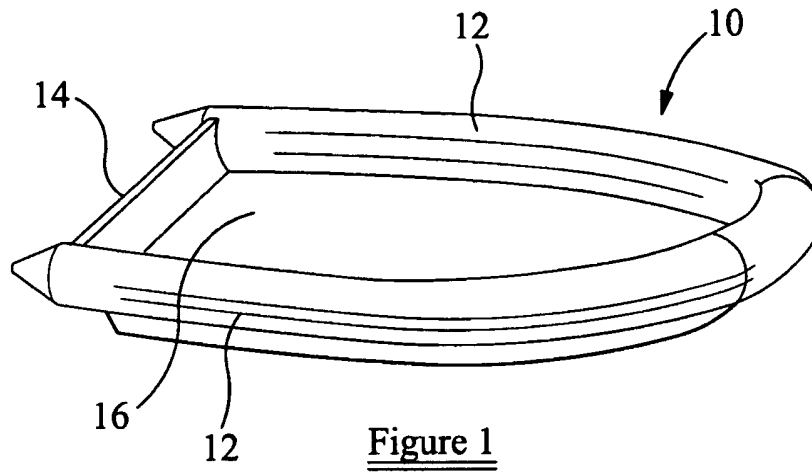


Figure 2

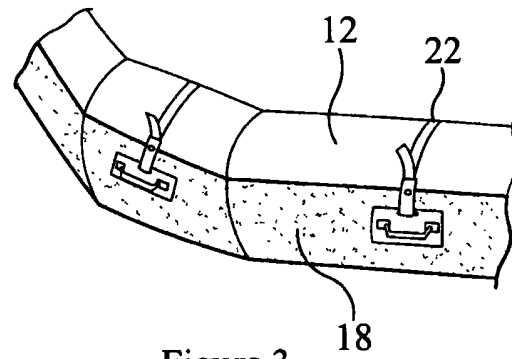


Figure 3

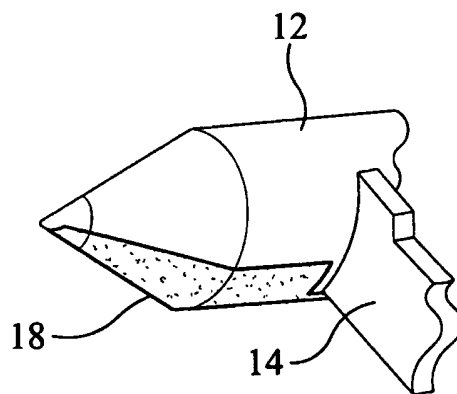
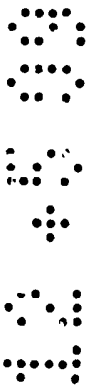


Figure 4



Boat

This invention relates to a boat, or craft and in particular to a boat or craft of relatively lightweight form.

5 Inflatable boats are in widespread use both for leisure purposes and also by the military, law enforcement, rescue and other agencies. They are advantageous in that they are suitable for use in a range of applications, and are relatively easy to transport. However, although the skins forming the hulls of such boats are fairly robust, there is the risk of puncture or cutting of the skins in some conditions which, obviously, is
10 undesirable as it can result in a loss of performance or even in catastrophic failure. In such conditions, rather than use an inflatable boat, it may be necessary to deploy a hard hulled craft despite such craft being more difficult and cumbersome to deploy and less suitable for use in some conditions.

15 In many applications, inflatable boats are stored in a fully inflated condition rather than being deflated for storage.

It is an object of the invention to provide a boat of simple and convenient form suitable for use in a wide range of applications.

20

According to one aspect of the invention there is provided a boat including at least one inflatable section and to at least part of which a shell is secured, the shell extending beneath at least part of the underside of the boat.

It will be appreciated that the shell serves, in use, to protect the boat from damage, thereby increasing the range of applications in which the boat can be used.

The shell may be of one-piece construction, or alternatively may comprise
5 several pieces to protect different parts of the boat.

Conveniently, the shell is of generally the same shape as the underside of the boat. However, this need not always be the case and arrangements are envisaged in which a keel formation and/or strake or other formations are provided.
10

The shell may be provided with cut-outs or apertures through which parts of the boat are exposed, for example to provide access to handles and other fixtures.

Preferably, the shell is secured to the boat using straps secured to fixing points
15 provided in the boat.

The invention also relates to a shell adapted for use with the boat as described hereinbefore.

20 The invention will further be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a diagrammatic view of a boat with which the invention may be used;
and

Figures 2 to 4 are views illustrating parts of the boat.

Referring to the drawings there is illustrated a boat 10 including a pair of inflatable tubes or sponsons 12 interconnected with one another at the bow area of the boat 10. The sponsons 12 are further interconnected, towards the stern of the boat 10, by a transom 14, the design of which is such as to permit one or more motors to be mounted thereto to drive the boat 10, in use.

Secured between the sponsons 12 and the transom 14 is located a hull component 16. The hull component 16 may be of soft skinned form, and may incorporate inflatable tubes or pockets (not shown) which can be inflated to enhance the rigidity of the hull component 16. An inflatable or solid, for example wooden, keel or other formation may be provided, if desired.

It will be appreciated that the inflatable boat 10 of the type described hereinbefore is substantially conventional form.

As illustrated in Figures 2 to 4, in accordance with the invention a shell 18 is provided. The shell 18 is shaped to conform with the shape of the underside of at least part of the boat 10 and is designed to be secured to the underside of the boat 10. The shell 18 is constructed of a material which is able to protect the adjacent parts of the sponsons 12 and hull component 16 from grazing damage or the penetration of objects which could otherwise result in damage or puncturing of the craft. The material of the shell 18 is preferably of lightweight form and is preferably sufficiently flexible to allow

relatively easy fitting and some ride cushioning in the event that the boat 10 is used in turbulent waters. The design of the shell 18 is such that it conforms with the shape of the adjacent part of the boat 10. However, the shell 18 may, if desired, be shaped to incorporate features not present on the associated boat. For example, it may include a
5 deepened keel formation towards the bows and also may be provided with strakes to improve performance, handling and ride.

In the arrangement illustrated, the shell 18 is of one-piece construction and covers substantially the entire underside of the sponsons 12 and the hull component 16.
10 The shell 18 extends above the water-line, wrapping around parts of the sponsons 12. It will be appreciated that such an arrangement provides a good level of protection for the boat 10.

Although in the illustrated arrangement the shell 18 is of one-piece construction,
15 it will be appreciated that depending upon the use to which the invention is to be put, it may be preferred to provide two or more separate shell components, each of which is arranged to provide protection for a specific part of the boat. The shell components of such an arrangement may be interconnected with one another or alternatively may be entirely separate, and they may be positioned, in use, to protect, for example, the most
20 vulnerable parts of the boat.

As illustrated in the accompanying drawings, the shell 18 is preferably provided with cut-out formations or openings 24 to allow fixtures and fittings provided on the boat to project through the shell 18 to permit them to be used in the usual manner. For

example, as illustrated in Figure 2, the bow area of the shell 18 is conveniently provided with a cut-out to 24 allow a bowline 'D'ring 20 provided on the boat 10 to be accessed and used in the normal way. Further, as shown in Figure 4, parts of the shell 18 may be cut away or provided with openings 24 to permit carrying handles provided on the
5 sponsons 12 to be accessed to assist in handling of the craft.

In order to secure the shell 18 to the boat 10, a series of fixing straps 22 are used. The fixing straps 22 are secured to the shell 18, for example at the locations at which the cut-outs 24 used to provide access to the carrying handles are formed. The
10 straps 22 are further connected to fixing points (not shown) in the form of internal 'D' rings provided in the boat 10 in the normal manner.

It will be appreciated that the provision of a shell 18 on a boat 10 as described hereinbefore has a number of advantages. First, the provision of the shell 18, provides
15 protection to the boat, increasing the range of applications in which the boat can be used without risk of damage thereto. The risk of puncture or catastrophic failure of the boat, both when on the water and during transportation or storage is reduced, and the performance of the boat can be improved by the shaping of the shell. It will be appreciated that the operational or working life of the boat can be increased by the
20 provision of the shell, and that the boat will remain operational even when several of the inflation cells thereof are damaged or deflated. The design of the shell is such that the shells can be stacked one inside or upon another for storage or transportation, and the shells are of relatively lightweight and so are easy to handle. The design is such that passengers can still sit upon the sponsons during use and the interior space of the craft is

not significantly obstructed. It will be appreciated that a number of the advantages of hard hulled craft can be achieved using the shell of the invention without losing many of the advantages of an inflatable craft.

- 5 Although the description and drawings hereinbefore relate to a specific design of inflatable boat, it will be appreciated that the invention is applicable to a wide number of designs.

CLAIMS

1. A boat including at least one inflatable section and to at least part of which a shell is secured, the shell extending beneath at least part of the underside of the boat.
- 5 2. A boat according to Claim 1, wherein the shell is of one-piece construction.
3. A boat according to Claim 1, wherein the shell comprises several pieces to protect different parts of the boat.
- 10 4. A boat according to any of the preceding claims, wherein the shell is of generally the same shape as the underside of the boat.
5. A boat according to any of the preceding claims, wherein a keel formation and/or strake or other formations are provided on the shell.
- 15 6. A boat according to any of the preceding claims, wherein the shell is provided with cut-outs or apertures through which parts of the boat are exposed.
7. A boat according to any of the preceding claims, wherein the shell is secured to
20 the boat using straps secured to fixing points provided in the boat.
8. A boat substantially as hereinbefore described with reference to the accompanying drawings.

9. A shell adapted for use with a boat as claimed in any of the preceding claims.

9

Application No: GB0802920.9

Examiner: Richard Collins

Claims searched: 1 to 9

Date of search: 22 May 2008

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	1,2,4,7,9	FR2243861 A1 (ANGEVINIERE) see the figures and abstract.
X	1,2,4,5,9	JP61054383 A (TAKEUCHI) see the figures and abstract.
X	1,2,4,6,9	US5006087 A (PETERSON) see figures 1 and 2 especially.
X	1,2,4,9	JP2000302084 A (YAMAGUCHI) see the figures and abstract.
X	1,2,4,9	US5564357 A (PETERSON) see the whole document.
X	1,2,4,9	SU498200 A1 (GAVRILOV) see the figures and abstract.
X	1,2,4,9	EP0052563 A1 (OREFICE) see shell 1 in figure 1.
X	1,2,4,9	IT1168464 B (DIONISI) see the figures and abstract.
X	1,3,9	GB1604527 A (GORDON) see shell 30 in figure 2.

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

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

B7A

Worldwide search of patent documents classified in the following areas of the IPC

B63B

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

EPODOC, WPI

International Classification:

Subclass	Subgroup	Valid From
B63B	0007/08	01/01/2006
B63B	0059/02	01/01/2006