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WO 2012/074151 A1 US 20140202899 A1  
US 20140008248 A1 US 20130032617 A1  
US 20100300909 A1 US 20090283184 A1

(58) Field of Search:  
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Other: WPI, EPODOC

(54) Title of the Invention: **Improvements in or relating to cases**  
Abstract Title: **Protective case for portable electronic devices**

(57) A case for a portable electronic device such as a mobile telephone or portable computer comprises a trough component having a base and circumferentially extending side walls 4 adapted to enclose the portable electronic device while leaving a surface of the device exposed. The trough is formed with a transverse flexible hinge 5 which divides the trough component into two sections, whereby the first section 2 can be displaced to allow insertion of the device into the second section 3 whereupon the first section can be placed around the portable electronic device to hold it securely within the case. The trough shaped component may be manufactured from two relatively hard sections overmoulded with a flexible material so that the flexible material provides the flexible hinge 5 between the two sections.

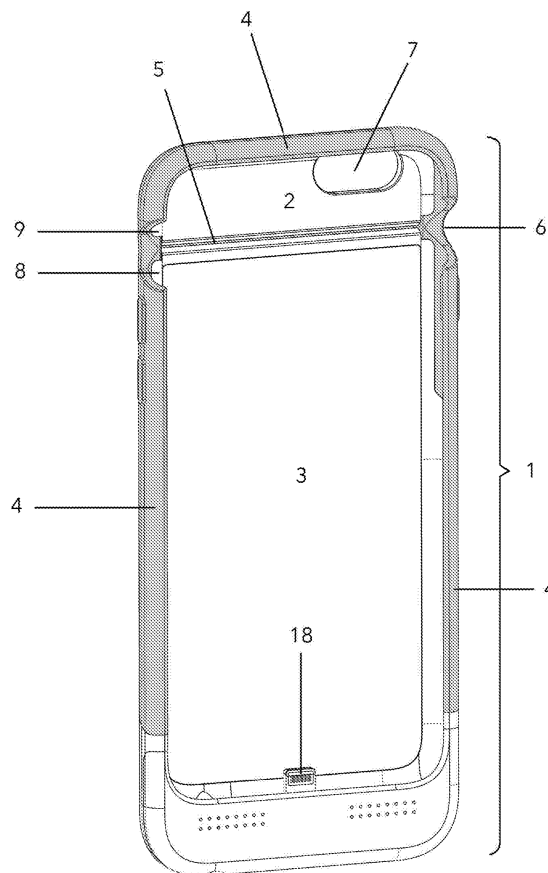


FIGURE 1

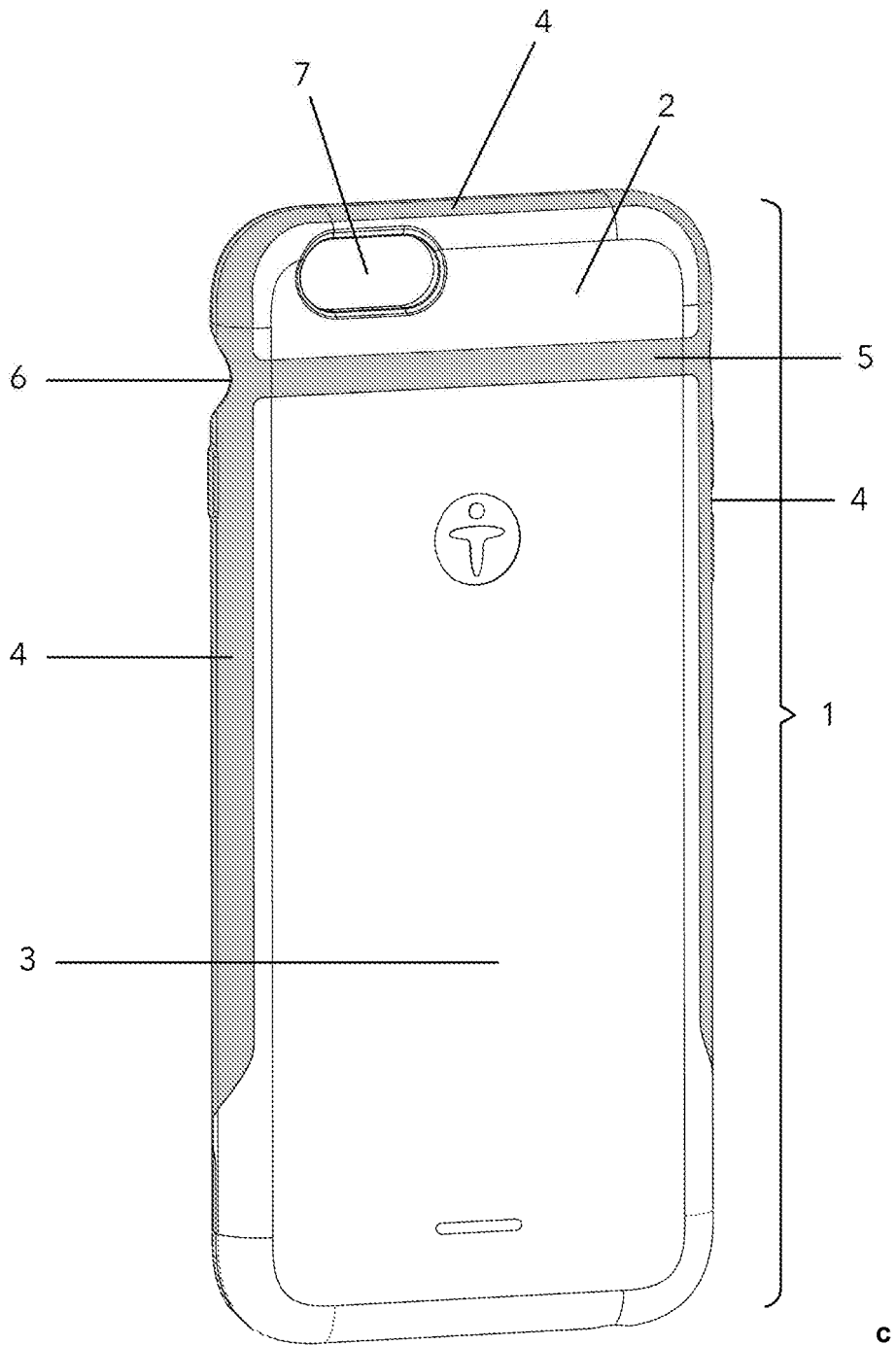


FIGURE 2

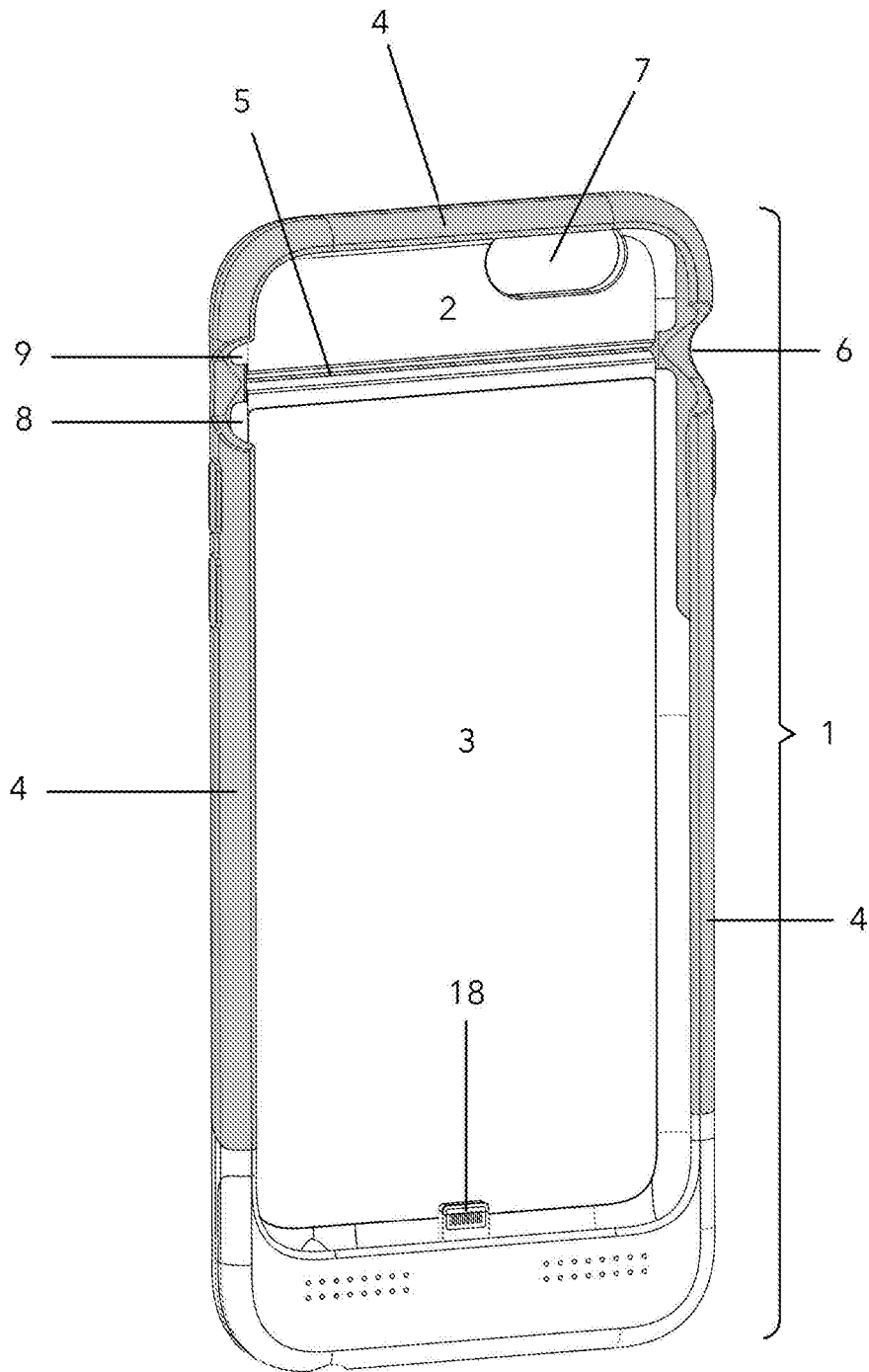


FIGURE 3

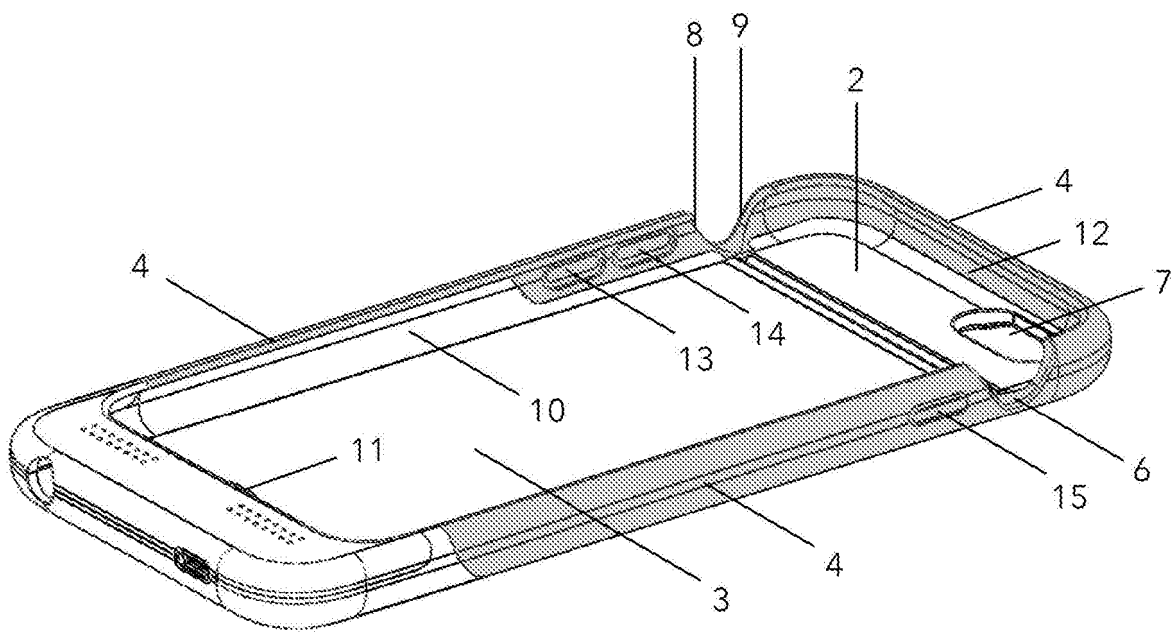


FIGURE 4 & 5

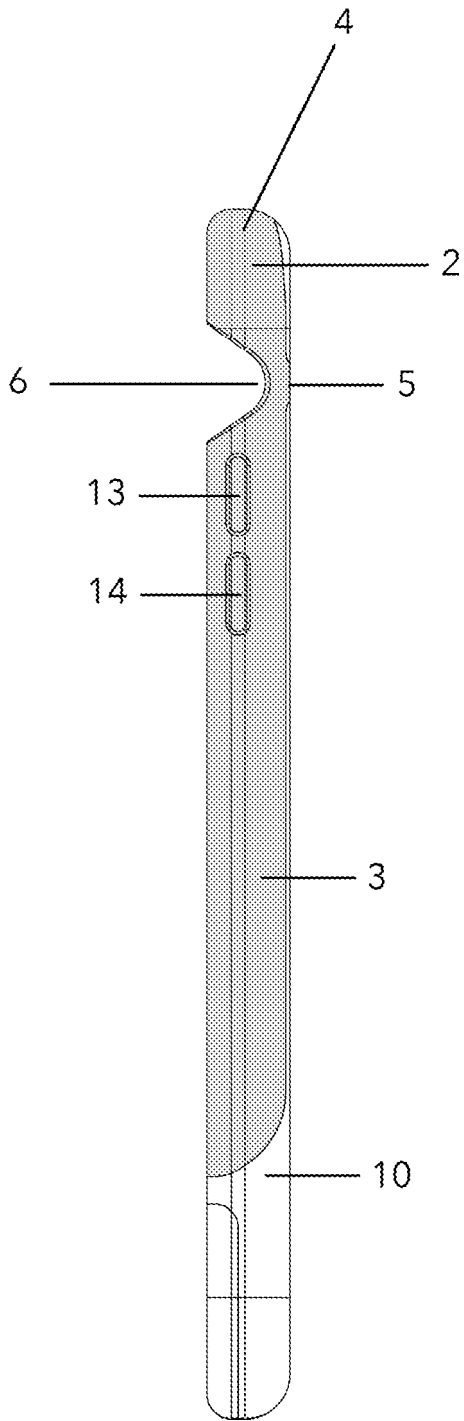


FIGURE 4

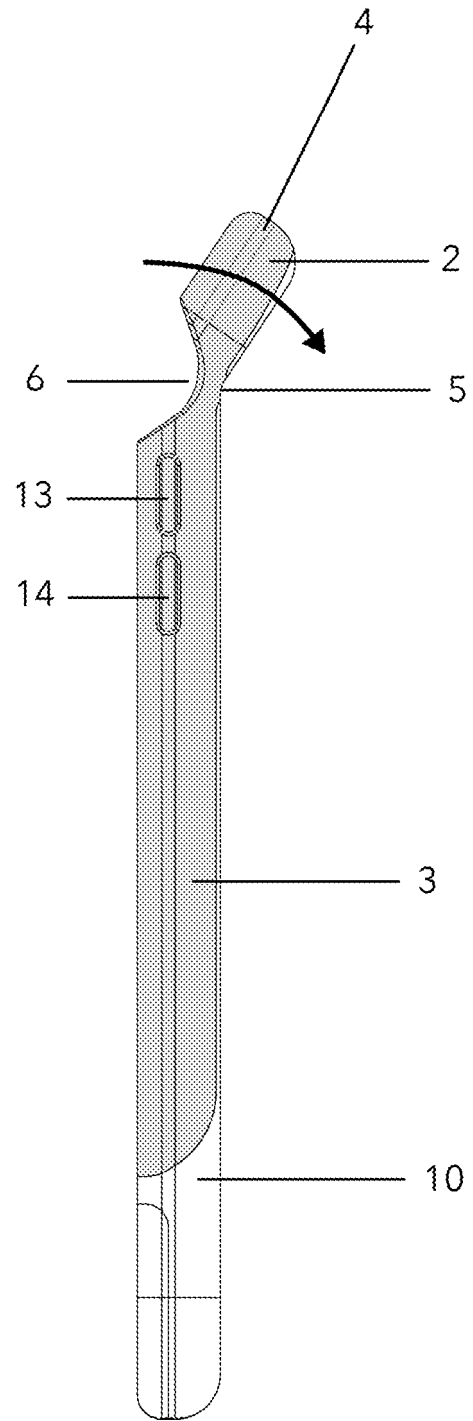


FIGURE 5

FIGURE 6

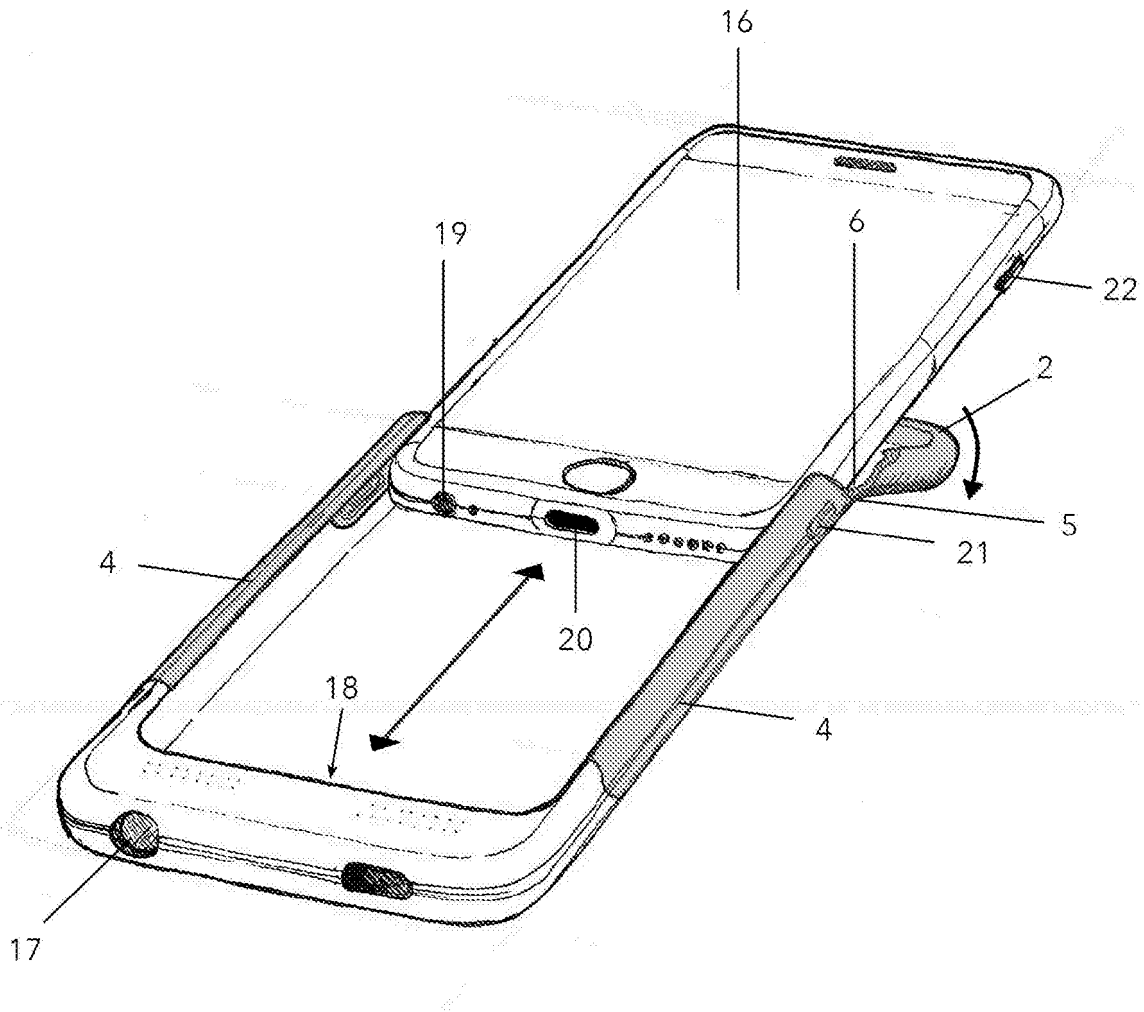


FIGURE 7 & 8

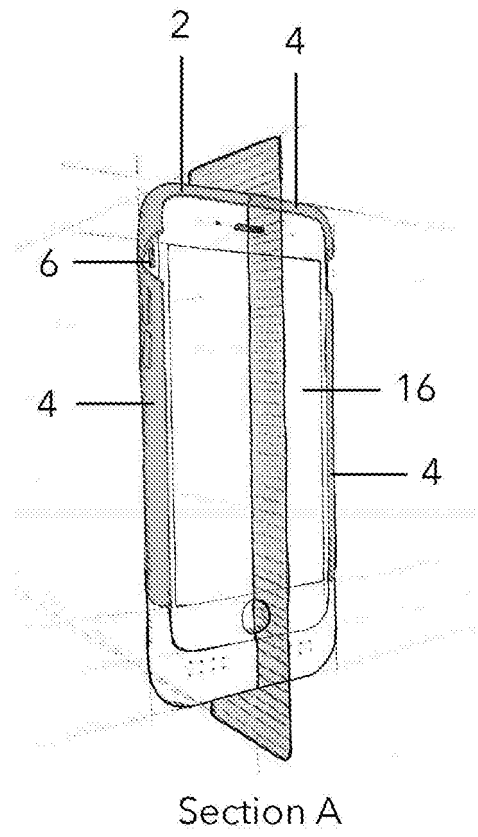
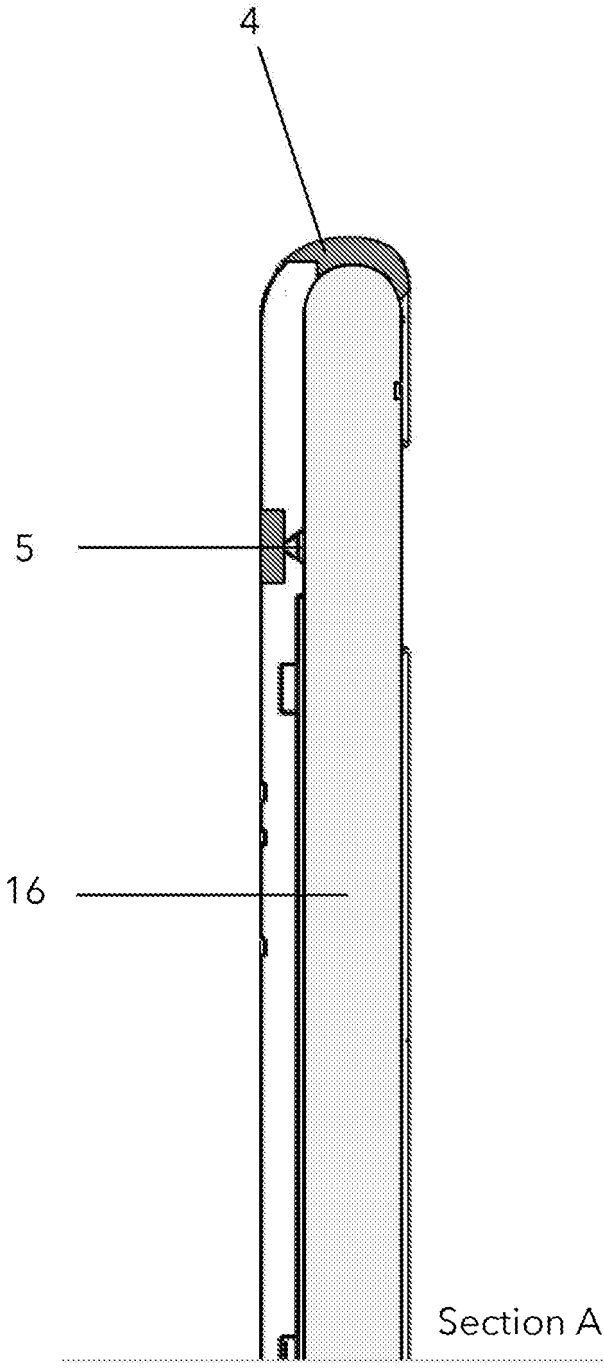


FIGURE 7

FIGURE 9 & 10

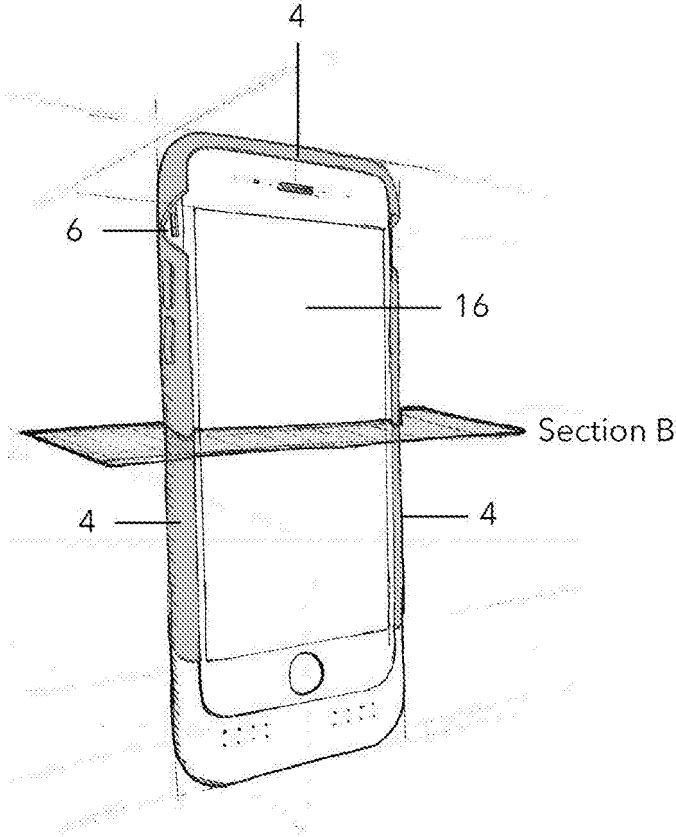


FIGURE 9

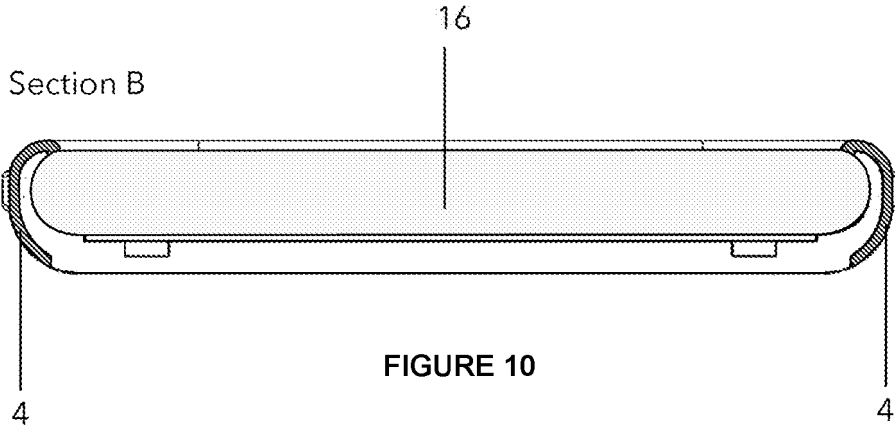


FIGURE 10



## IMPROVEMENTS IN OR RELATING TO CASES

The present invention relates to improvements in or relating to cases that are used to tightly contain portable devices such as mobile telephones and portable computers.

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Cases for mobile telephones are well known and are known to have certain requirements. They need to be a tight fit around the telephone, they need to allow easy insertion and removal of the telephone into and from the case while also ensuring a secure fit. They need to provide impact protection for the telephone in case it is knocked or dropped. Additionally they need to allow connections such as chargers, headphones and the like to be connected to the telephone. They need to be lightweight and small in order to be readily held in use and carried easily such as in a pocket or a handbag. Finally they need to have a low surface coefficient of friction so that the telephone within the case can be readily placed in and removed from a receptacle such as a users pocket.

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Examples of such cases may be found in European Patent Publication Number 2393731. Additionally the case needs to be simple, easy to make and economic.

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The present invention provides a case which satisfies these requirements and provides a case which allows a portable telephone to slide in and out of the case, provides access to the ports of the telephone and which allows the portable telephone to be secured and protected within the case.

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According to the present invention the case comprises a trough component comprising a base and circumferentially extending side walls adapted to enclose a portable electronic device while leaving a surface of the device exposed, the trough being formed with a transverse flexible hinge which divides the trough component into two sections, whereby the first section can be displaced to allow insertion of the telephone into the second section whereupon the first section can be placed around the portable electronic device to hold it securely within the case. This design of case, which allows the phone to be slid in and out of the case while remaining a single piece case, is especially useful when applied to cases that physically connect with the ports of the phone. An example of this type of case is a case that contains a battery and must connect to the power port to provide additional power to a phone.

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The hinge in the trough component may be formed in any suitable manner. For example, the trough shaped component may be in two sections which are overmoulded with a flexible

material so that the flexible material provides a flexible join line comprising a hinge between the two sections. Alternatively the hinge may be formed in the base of the trough itself. However the hinge is formed cut outs should be provided in the walls of the trough at the location at the ends of the join line to enable the first section to be displaced relative to the second section about the hinge line. Alternatively a more flexible elastomeric material could be used allowing the first section to be displaced relative to the second section by simply stretching the elastomeric material. The optimum position of the hinge will depend upon the telephone with which the case is to be used. We prefer however that it be positioned closer to the end of the case opposite to the end which connects with the ports of the portable telephone. Where ports are positioned on numerous faces the hinge is preferably opposite the power and syncing port. This ensures that the telephone can be removed from or inserted into the case while remaining parallel to the case which will protect the connection ports of the telephone from damage. We prefer that the hinge line is positioned at a location that is between 10% and 50% of the length of the case from the top of the case. More preferably from 12% to 25% of the length of the case.

In a preferred embodiment at least parts of the trough shaped element of the case may be overmoulded with an elastomeric material which provides protection for the case and the portable telephone within the case in the event of an impact. In particular the side walls and the perimeter of the first section may be overmoulded. The elastomeric material can provide a softer material for holding the telephone in use and also to provide a non-slip surface. The elastomeric material can also provide a flexible bond line between the two sections of the trough component that together constitute the trough component of the case thereby providing the hinge between the two sections of the trough component.

Both the walls of the trough component and any elastomeric covering can be provided with through holes that can align with the ports of the telephone when it is positioned within the case so that the telephones ports such as a lightning connector, micro USB ports, audio jacks, chargers and the like can be accessed to provide a necessary communication to the telephone while it is within the case. It is preferred that the first section of the case which can be displaced about the hinge does not contain such through holes as the hinging activity may eventually lead to misalignment of the through holes and any ports in the telephone. In some instances however the positioning of the features of a phone may require that holes also be in the first section.

The inner trough component of the case is preferably of a hard, substantially rigid material. It is preferred that it be of a substantially rigid plastic such as a olefin polymer or copolymer

such as polypropylene or ethylene/propylene copolymers, polyamides such as the various nylon grades, polyesters such as polyethylene terephthalate or polybutylene terephthalate, thermoplastic polyurethanes or styrene/butadiene copolymers. The plastic may be filled with a filler such as glass or carbon fibre to provide additional strength. Where the trough component comprises two sections it is preferred that the sections are produced from the same material. In a further preferred embodiment the trough component of the case is made by injection moulding. The side walls of the trough component must be provided with cut outs or end at positions on both sides of the trough component where the sections meet at both ends of the hinge line to enable the upper first section to be displaced about the hinge line relative to the lower second section.

An elastomeric material may be provided on the trough component by any suitable technique, overmoulding, heat bonding and adhesive bonding are preferred methods. Overmoulding being the preferred technique. The elastomeric material may be natural or synthetic material, synthetic elastomers such as styrene/butadiene rubbers optionally containing acrylonitrile being particularly useful. The elastomeric material should be provided around the perimeter of the top first section of the trough component so that when it is replaced after insertion of the portable telephone into the bottom second section it will stretch over and secure the telephone within the trough component of the case. Elastomeric material may also be provided on the back of the trough component to provide a softer feel and to hide the hinge mechanism if that is desired.

The top of the walls of the trough component are preferably provided with an inwardly projecting lip so that the telephone can slide between the base of the trough and the inwardly projecting lip at the top of the walls of the trough component so that the portable telephone is held firmly in place by the base, side walls and inwardly projecting lip of the trough component.

The present invention may be used to provide cases for any mobile communications device. The length and depth of the trough component of the case being selected according to the size and shape of the device with which it is to be used. The elastomeric covering material, when used, is preferably from 0.5 to 2 mm thick, more preferably 0.75 to 1.75 mm thick. The elastomeric layer preferably is provided on the exterior of at least part of the longitudinal sides of the trough component and also on the exterior of the wall at the top of the trough component including the inwardly projecting lip when used. Although not essential the elastomeric material may be provided over positions on the case which allow access to button controls of the portable telephone. In this way the buttons may be operated by

pressing on the elastomeric material at the appropriate location. Alternatively or additionally ports can be provided in the elastomeric material and/or walls of the trough component to allow access to the operating buttons of the portable telephone. Where an elastomeric material is employed on the side walls of the trough component gaps should be provided in the elastomeric material at the ends of the hinge line to allow operation of the hinge to  
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displace the first section to allow the insertion of the portable telephone into the second section of the case.

In a further embodiment of the invention the case can be shaped to accept accessories and components for the telephone such as, for example batteries, coils to provide remedial  
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signals as is specified in our copending Patent Application GB 1504742.6.

In our preferred design the elastomeric section of the case appears only on the exterior of the case so that when it provides the hinge the hinge resides on the exterior of the case.  
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The present invention is illustrated but in no way limited by reference to the accompanying Figures in which

Figure 1 is a rear view of a case for a portable telephone according to the invention.  
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Figure 2 is a front view of the case shown in Figure 1.

Figure 3 is an isometric view of the front side of the case shown in Figure 2.

Figure 4 is a side view of the case shown in Figure 1 with the upper first section in the position aligned with the lower second section.  
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Figure 5 is the side view of Figure 4 showing the upper first section displaced from alignment with the lower second section along the hinge line to allow insertion of a portable telephone.  
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Figure 6 illustrates how a portable telephone may be inserted into the case illustrated in Figure 5.

Figure 7 shows a telephone mounted within the case shown in Figures 1 to 6.  
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Figure 8 is a cross section along Section A of the telephone mounted within the case as shown in Figure 7.

Figure 9 shows the same telephone mounted in the same way as in Figure 7.

5 Figure 10 is a cross section along Section B of the telephone mounted within the case as shown in Figure 9.

Like reference numerals in these Figures indicate the same element of the case and the portable telephone to which the invention relates.

10 Figure 1 is a rear view of a case according to this invention comprising a rigid trough component (1) divided into two sections, an upper smaller first section (2) and a lower larger second section (3). The sides of the trough component are not shown although the case is shown to be provided with an overmoulded elastomeric material (4). The elastomeric material also provides a transverse strip (5) across the back of the case which secures the  
15 sections (2) and (3) together and provides a hinge whereby the upper first section (2) can be displaced relative to the lower second section (3). The elastomeric material is cut away at point (6) at the end of the line (5) to allow the hinge (5) to operate. The upper first section of the case (2) is provided with a view finder (7) to enable photographs to be taken.

20 Figure 2 is a front view of the case (1) shown in Figure 1 showing the cutaways (8) and (9) that are provided in the elastomeric material at the opposite end of the hinge line (5) from the cutaway portion (6).

Figure 3 is a plan view of the case shown in Figure 3 showing the side walls of the trough  
25 section (10), (11) and (12), (10) and (12) being overmoulded with elastomeric material. Figure 3 also shows how ports (13), (14) and (15) can be provided in the side walls of the second section (3) of the case (1) so that pressure can be applied to buttons on the telephone when inserted into the case to control operation of the telephone.

30 Figure 4 is a side view of the case shown in Figure 3 and Figure 5 shows the top first section (2) of the case shown in Figure 4 displaced relative to the lower second section (3) in order to allow insertion of a portable telephone into the lower second section (3).

Figure 6 shows a portable telephone (16) being inserted into the case with the upper first  
35 section (2) in the displaced position and shows how the ports in the case (17) and (18) can be located to correspond to the location of the connections (19) and (20) in the telephone. Similarly it shows how the flexible material (4) can be provided with a marking (21) to

correspond to the position of a side button (22) which can be used to operate the portable telephone.

5 Figure 7 shows the portable telephone (16) securely held within the case (1) with the upper first section (2) replaced around the top of the portable telephone (16).

Figure 8 is a cross section along line A of Figure 7.

10 Figure 9 shows the same telephone as in Figure 7 and Figure 10 is the cross section view along line B of Figure 9.

## CLAIMS

1. A case for a portable electronic device comprising a trough component comprising a base and circumferentially extending side walls adapted to enclose the portable electronic device while leaving a surface of the device exposed, the trough being formed with a transverse flexible hinge which divides the trough component into two sections, whereby the first section can be displaced to allow insertion of the telephone into the second section whereupon the first section can be placed around the portable electronic device to hold it securely within the case.
2. A case according to Claim 1 in which the portable electronic device is a portable telephone.
3. A case according to Claim 1 or Claim 2 wherein the trough shaped component is in two sections which are overmoulded with a flexible material so that the flexible material provides a flexible join line comprising a hinge between the two sections.
4. A case according to Claim 1 or Claim 2 wherein the hinge is formed in the base of the trough itself.
5. A case according to any of the preceding claims wherein cut outs are provided in the walls of the trough at the location at the ends of the join line to enable the first section to be displaced relative to the second section about the hinge line.
6. A case according to any of the preceding claims in which the hinge is positioned closer to the end of the case opposite to the end which connects with the ports of the portable telephone, primarily the power and syncing port.
7. A case according to Claim 6 wherein the hinge line is positioned at a location that is between 10% and 50% of the length of the case from the top of the case.
8. A case according to any of the preceding claims wherein at least parts of the hard trough shaped element of the case are overmoulded with an elastomeric material.
9. A case according to Claim 8 wherein the elastomeric material provides a flexible bond line between the two sections of the trough component that together constitute

the trough component of the case thereby providing the hinge between the two sections of the trough component.

5 10. A case according to Claim 8 or Claim 9 wherein the walls of the trough component and any elastomeric covering are provided with through holes that can align with the ports of the telephone when it is positioned within the case.

11. A case according to any of the preceding claims in which the inner trough component of the case is of a hard, substantially rigid material.

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12. A case according to Claim 11 in which the material is substantially rigid plastic selected from an olefin polymer or copolymer such as polypropylene or ethylene/propylene copolymers, polyamides, thermoplastic polyurethanes and styrene/butadiene copolymers.

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13. A case according to any of the preceding claims wherein the top of the walls of the trough component are provided with an inwardly projecting lip so that the telephone can slide between the base of the trough and the inwardly projecting lip.





**Application No:** GB1505909.0

**Examiner:** Mr Paul Makin

**Claims searched:** 1-13

**Date of search:** 6 August 2015

**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	1-5,8,9,10,13	US 2014/202899 A1 (MURCHISON) whole document
X	1,2,4,6,7,11,12,13	US 2013/0032617 A1 (ADELMAN) whole document
X	1,2,4,6,7,11,12,13	US 2014/0008248 A1 (THONI) whole document
X	1,2,4,6,7,11,12,13	WO 2012/074151 A1 (SANGSINEDP) whole document
X	1,2,4,6,7,13	US 2009/0283184 A1 (HAN) whole document
X	1,2,4,11,12,13	US 2010/0300909 A1 (HUNG) whole document

**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<sup>X</sup> :

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

A45C; B65D; H04B; H04M

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

WPI, EPODOC



**International Classification:**

<b>Subclass</b>	<b>Subgroup</b>	<b>Valid From</b>
None		