The protective bumper case represents a two-component movable frame configured to secure and protect portable electronic devices of every sort and kind from mechanical harm (bumps, dings, scratches, etc.). The bumper case consists of the front and back protective pieces able to be rotated but connected by a pair of hinges on the top and to provide a robust cohesion within the entire structure when assembled on the relevant electronic device due to the coupled magnets inserted into the bottom side sections of the case frame components. The said bumper case can be executed in various designs employing different materials (a metal material (steel, aluminium, titanium, etc.), a thermoplastic material, resin-based material, or the like) and decorative elements (precious metals, strasses, diamonds, holes for straps or charms, etc.).
PROTECTIVE BUMPER CASE
CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is related to and claims the priority under 35 USC §119(e) to U.S. Provisional Patent Application No. 61699290, filed Sep. 11, 2012, entitled PROTECTIVE BUMPER CASE, the contents of which are hereby incorporated by reference in their entirety.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] (NOT APPLICABLE)

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISC APPENDIX

[0003] (NOT APPLICABLE)

BACKGROUND OF THE INVENTION

[0004] The present invention relates to protective cases for electronic devices.

[0005] In today’s advanced technologically equipped world, owning different types of electronics is a staple in many homes and business environments. Electronics like multifunctional cellular phones (so called ‘smart’ phones), tablet computers, laptop computers, electronic book readers, GPS, portable video game devices, etc. are owned by many professionals as well as the average users. In fact, many electronic manufactures are continually building devices, multipurpose, but still fragile in their nature.

[0006] For modern personal electronic devices the trend is to assume a thin housing and a touch-sensitive user interface. Such devices contain delicate electronics, therefore being subject to physical abuse and risks of damages from handling of the devices. It is important for everyone to protect not only the information contained in their electronic devices but the exterior and its aesthetics as well.

[0007] Though most of such devices are provided with a built-in housing for protection from scratches, dents, shocks, etc., it is more frequent that these protection facilities are not enough and it is reasonable to use some supplementary tools to provide more physical safety to an electronic device. To keep a portable appliance in a good condition there are a lot of protective devices, mostly cases made of various materials and designed in different ways.

[0008] Existing protective cases (particularly bumper cases) effective principle is based on wrapping around electronic devices or framing them. Such bumper cases protect both sides of a smart phone as well as of other touch screen devices even from the top to the bottom thereof as it encapsulates the entire device with its protection. A modern bumper case has a ‘lay on table’ design so that the glass front and the back surface of a phone or other electronic device does not come into contact with any surface when you would put your cellular phone laid down.

[0009] Normally the earlier proposals comprise upper and lower protecting elements. The lower protecting element envelopes the bottom and sides of the electronic device to be protected. The upper one covers the front of the device and the sides thereof. The protecting elements may optionally have or have not openings for access to the sensitive display, functional keys, power jack, etc. The protecting elements, when assembled on an electronic device, can be put together by means of numerous grooves and indentations provided on the side parts thereof, or by means of tight fit of one or both protecting elements to the body of the electronic device, or by way of placing the electronic device into the lower protecting element further integrated with the upper one with the help of the grooves thereon. The main difficulty of the protective cases of such a kind is the loose grip of the protecting elements with each other and with the electronic device to be protected.

[0010] Among other disadvantages of most of the auxiliary bumper cases are that they increase the bulk of the devices, adding to their weight, and are not so convenient in use as they are to be, often preventing a user’s easy approach to the screen, numerous functional ports, sockets and slots on the top or sides of the devices. There exist such protective cases which prevent the user from connecting a smart phone to any docking device as it has been covered entirely by the bumper case, bearing no entry points for them. Therefore, it is necessary to take a protective case off the device to make the interfaces available for the user every time as required. One-component bumper cases can, on the one hand, fit the device not quite tough (thus flop around thereon), on the other hand, when a case fits too tight to the device it is troublesome therefor to be dismantled.

[0011] Nowadays there are a number of bumper cases representing a two-piece design having a front and back cover held together by screws. For this purpose a protective case needs to be accompanied with a screwdriver that is definitely a burden for a user.

[0012] Consequently, the most crucial disadvantages of all existing bumper cases are loose grip with the protected device and their inconvenience in assembling and disassembling thereon.

[0013] It is therefore desirable to have an aesthetically attractive protective bumper case with high protective characteristics, durable, convenient in use, supporting full functionality of the protected electronic device and easy in (dis-) assembling.

SUMMARY OF THE INVENTION

[0014] The present invention is directed to a protective bumper case for electronic devices with high protective qualities, secures fastening and improved assembling (disassembling) characteristics.

[0015] In accordance with the present invention, the body of the bumper case consists of the front and back protective frames (pieces). The two pieces make a hollow frame the shape and inner dimensions whereof match the shape and outer dimensions of the relevant electronic device. The frame pieces are joined with the help of a pair of joint pins (hinges) on the top and two pairs of magnets inserted into the bottom side sections of the case components opposite each other thereby creating an interlocking structure. It is practically possible for the invention to employ any kind of hinge mechanism, enabling the two parts of the bumper case to rotate about a fixed axis of rotation. The joint pins (hinges) provide up to 90° opening of the two frame pieces relative to each other. Another embodiment of the invention comprises two more pairs of the magnets in place of the hinges to provide the entire structure to be, on the one hand, a separable unit, but, on the other hand, still capable of keeping as a single whole. The frame tightly grips the relevant electronic device by hemming its edges and corners throughout the perimeter thereby com-
pletely protecting the device. The front and the entire back of the device are left not obstructed thereby unless a piece of any due material (like metal, soft textile, leather, PU, PVC, etc.) is additionally included to cover the entire (or a part of) front or back, or both, of the electronic device. The frame is additionally equipped with a vinyl damper, framing the interior of the both sections, functioning in two ways: as a means to improve safety of the electronic device edges and corners and to provide firmer fixation of the bumper case on the electronic device. Openings are provided in the bumper case to allow for user interaction with the device, including unimpeded access to the functional ports, buttons, sockets and jacks provided on the electronic device without taking the bumper case there from.

Since the bumper case is shaped as a frame supposed to be executed of metal or other hard material, it may not affect the normal use of the protected electronic device and make the device have the same feel as the device without any extra protection.

Among other purposes, the bumper case may perform an aesthetical function, being decorated with inserts of precious metals, precious stones, engravings and the like.

The resultant closed structure defines a robust protective bumper case for a portable electronic device which provides high protective characteristics, durability, convenience in use, full functionality and easy assembling on and disassembling off the relevant electronic device.

BRIEF DESCRIPTION OF DRAWINGS

The above-mentioned and other features and objects of this invention and the manner of accomplishing them will become more apparent and the invention itself will be better understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, in which corresponding parts are identified by corresponding reference characters. There can be as many embodiments of the invention as many relevant electronic devices exist. For the below description it is the bumper case for iPhone 4S that is referred to as one of the embodiments thereof.

FIG. 1 and FIG. 2 are general views of the sensitive screen electronic device as held in the invented bumper case according to one embodiment.

FIG. 3 is a general view of the fully opened bumper case holding an electronic device therein.

FIG. 4 is a general view of the half-opened bumper case holding an electronic device therein.

FIG. 5 is a general perspective view of the bumper case not holding an electronic device therein.

FIG. 6 is a front view thereof.

FIG. 7 is a rear view thereof.

FIG. 8 is a left-side view thereof.

FIG. 9 is a right-side view thereof.

FIG. 10 is a plane view thereof.

FIG. 11 is a bottom view thereof.

FIG. 12 is a partial enlarged view of the front and back frame pieces hinged by the joint pins (hinges).

FIG. 13 is a cross-sectional view of the front and back frame pieces hinged by the joint pins (hinges).

FIG. 14 is a longitudinal view of the front and back frame pieces hinged by the joint pins (hinges).

FIG. 15 is a partial enlarged view showing the principle of attachment of the front and back frame pieces by the magnets.

FIG. 16 is a cross-sectional view of the front and back frame pieces attached by the magnets.

FIG. 17 is a longitudinal view of the front and back frame pieces attached by the magnets.

FIG. 18 is a cross-sectional view of the invention as closed showing the damper and openings for functional ports on the sides of the electronic device to be protected.

DETAILED DESCRIPTION OF DRAWINGS

In accordance with FIGS. 1-18 the illustrated embodiment of the invention comprises the front frame section 1 and the back frame section 2, attached to configure an integral hollow frame to secure and protect the electronic device 3 from unwanted elements such as scratchings, dents, splits, cracks, etc. resulted from mechanical impacts or improper handling. The frame (FIG. 1, FIG. 2) can be executed of any suitable hard material securing high durability and not preventing proper functionality of the protected device 3, e.g. a metal material (steel, aluminium, titanium, etc.), a thermoplastic material, resin-based material, or the like. Other materials for the protective bumper case are also accepted.

The internal perimeter of the frame sections 1 and 2 as assembled exactly matches the outer contour of the electronic device to be protected 3. In the present embodiment the outer shape of both frame sections 1 and 2 is rectangular with chamfered angles (FIG. 6, FIG. 7), though can be various depending on a preferred design unless the outer configuration hampers proper rotation and opening of the frame pieces 1 and 2.

The frame sections 1 and 2 are joined together by means of a pair of hinges 4 (showed in details on FIG. 12-14) providing the entire structure to be movable but nonseparable. FIG. 3 and FIG. 4 depict the positions of the frame protective elements as the bumper case being assembled on (disassembled from) the electronic device. Referring to FIG. 3 and FIG. 4 the frame sections can be up to 90° opened relative to each other that secures an unimpeded positioning of the electronic device 3 between the frame sections 1 and 2 and allows for the bumper case to be easily assembled on the device 3 and disassembled thereof.

The configuration of the joint points of the bumper case is showed on FIG. 12-14. The mode of interlocking of the frame sections 1 and 2 is based on the principle of uni-axial rotation. The cylindrically shaped joint pins (hinges) 4 fixed by way of prick-punching are hidden inside the top brim 5 (FIG. 5, FIG. 10) thereof in a way that enables the frame sections 1 and 2 to rotate maximally expanding an angle of 90° (FIG. 3) wherein the hinges 4 act as the axis of rotation. Thus, using the joint pins (hinges) 4 enables the whole construction to be movable but unseparable. The in-between position of the hinges 4 is conducive to making the junction hidden from view thus more aesthetically appealing as depicted on FIG. 2.

The cohesion of the frame sections 1 and 2 is provided by two pairs of magnets 6 located across each other on the lower (bottom) side thereof (FIG. 3, FIG. 4, FIG. 15-17). Location of the magnets 6 spatially opposed to the location of the hinges 4 (FIG. 2, FIG. 3). The magnets 6 are entirely inserted in the side parts of both frame sections 1 and 2 opposite, with the upper faces thereof left opened for contacting each other respectively as the frame sections 1 and 2 attach (FIG. 15). The magnets 6 are in a shape of a parallelepiped with dimensions of about 1*3*10 mm according to
the present embodiment, anyway ought to be enough for solid cohesion of the frame pieces 1 and 2 (FIG. 1, FIG. 2, FIG. 15-17).

[0042] As FIGS. 1-5, 8-10, 11 and 18 show, on the parts of both frame sections 1 and 2 corresponding to the location of the functional parts, buttons, sockets and jacks 9 of the electronic device meant to be protected 3, there are symmetrical grooves 7 making openings 8 for easy access to the interfaces thereof as the bumper case assembled thereon. To simplify pressing the power button 10 situated on the right top of the electronic device 3 as regards the present embodiment there is a concave hollow 11 on the adjoining part of the frame section 2 (FIGS. 1, 7, 10).

[0043] According to FIG. 18 all around the inner periphery of the frame sections 1 and 2 there is a damper 12 serving as a means to improve safety of the electronic device 3 edges and corners and to provide a stronger grip of the bumper case with the electronic device 3. The damper 12 may be executed of vinyl or any other material with similar features (as for softness and resilience).

[0044] It is to be understood that the form of the invention, herewith shown and described, is to be taken as a preferred embodiment, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or the scope of the claims below.

What is claimed as new is:

1. a protective bumper case for protection of portable electronic devices of every sort and kind, representing a hollow frame comprising the front and back frame pieces supposed to cover the periphery thereof, joined together to be movable but firmly connected by a pair of hinges on the top and to provide robust cohesion within the entire structure when assembled on the relevant electronic device due to the coupled magnets inserted into the lower parts of the side sections of the bumper case frame pieces. The inside perimeter of both frame pieces is equipped with a damper functioning as a means to improve safety of the electronic device edges and corners and to provide better fitting of the bumper case to the electronic device.

2. the mode of fastening of the frame pieces (protective elements) by means of magnets inserted therein providing robust cohesion within the entire structure (magnet locking).

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