RECEIVING AND FIXING DEVICE

In a receiving and fixing device for receiving and fixing the position of at least one object, the receiving and fixing device has at least one receiving section for receiving the at least one object, which is formed at least partly of a flexible, contour-enclosing, shape-adaptive and impact-damping material.
Fig. 1
RECEIVING AND FIXING DEVICE

FIELD OF THE INVENTION

[0001] The invention relates to a receiving and fixing device for receiving and fixing the position of at least one object, a container and a frame comprising such a receiving and fixing device as well as to the use thereof for holding and/or supporting at least one object.

BACKGROUND OF THE INVENTION

[0002] Receiving and fixing devices for receiving and fixing the position of at least one object mainly during the transport of the object are known in the state of the art, e.g. in the form of plastic or metal elements, which are formed so as to be adapted to the object and which are inserted in mounting devices or containers and which are fastened therein, so as to receive drives of a vehicle, engine hoods, diverse smaller components of a vehicle or other objects or components, respectively, for example. An individual adaptation of the receiving and fixing device to the respective object, which is to be received, is hereby required, so as to ensure an optimal position fixation during the transport of said object, so that the object is not damaged during the transport.

[0003] Other types of receiving and/or fixing devices are also known in the state of the art. For example, WO 2005/065217 A2 discloses a method and a device for packaging gardening products, in particular cut flowers, for transporting them, wherein one or a plurality of stems are inserted into a flexible foam block, which consists of a material, which has a low density and exerts a low compression force which is arranged in a container opening, so that the foam block is compressed. The compression of the foam leads to a watertight seal around every stem, so that a leakage of water or other liquids, respectively, out of the interior of the container can be prevented during shipping of the gardening products. A rubber-based foam, a vinyl nitrile foam, a polyurethane-based foam as well as a polyethylene-based foam are disclosed as foam material in this publication of the state of the art.

[0004] A mattress or mattress-like device is further known from WO 03/037145 A1, the firmness of which can be adjusted by the user. A polyurethane foam is arranged in the core of the mattress-like device for this purpose within an air-tight casing chamber, wherein a varying low pressure is applied to it. The stiffness of the mattress-like device can be adjusted through this, measured by the impression force deflection or the return force as well as the density.

[0005] Due to the plurality of shapes of objects, which are to be transported, the effort for the production of correspondingly formed receiving and fixing devices, which are adapted to the object, as well as the costs associated with the production thereof is very high.

SUMMARY OF THE INVENTION

[0006] The instant invention is now based on the task of providing a receiving and fixing device for receiving and fixing the position of at least one object, which can be used variably for a variety of objects and which can be adapted thereto such that an optimal protection of the objects can be ensured within the receiving and fixing device and/or a container, support frames or mounting devices, respectively.

[0007] The task for a receiving and fixing device for receiving and fixing the position of at least one object is solved in that the receiving and fixing device encompasses at least one receiving section for receiving the at least one object, which at least partially consists of a resilient, contour-enclosing, shape-adaptive and impact-damping material. Further developments of the invention are defined in the dependent claims.

[0008] Through this, a receiving and fixing device for receiving and fixing the position of at least one object is created, which independently adapts to any shape of the object due to the use of a resilient, contour-enclosing and shape-adaptive material. The term “contour-enclosing” is to be understood such that the material attaches to the contour of the object when in contact with the object, thus encloses it in a form-locking manner. The material in the contact area hereby adapts completely to the shape of the object, is thus shape-adaptive. It is thus no longer necessary to provide for a receiving and fixing device, which is adapted to the respective shape of an object, which is to be received in the receiving and fixing device. Instead, the receiving and fixing device adapts independently to variable shapes of the object, which is supported on it or which is attached to it. Due to the resilience of the material, it initially gives way in response to placing an object on it or against it, yet thereby attaches to the contour of the object, wherein the material of the receiving and fixing device flows around the object, so to speak, adapts to the shape thereof and thus receives it optimally.

[0009] The receiving and fixing device according to the invention makes it possible to protect an object against being damaged, against shifting, the fixation, in particular the separation of a plurality of objects, and can serve as hold-down device and to protect the surfaces, edges and corners as well as impact protection.

[0010] Not only optimal protection of the objects within the receiving and fixing device and/or a container, support frame or mounting device, respectively, is attained by means of the receiving and fixing device according to the invention, but the advantages of the invention can be utilized for any form of transport or storage. This also comprises the use in combination with transport gear, chain conveyor, conveyor belt, handling case, commercial vehicle, industrial truck, shelf, or a lifting or holding device, e.g., also when emptying barrels.

[0011] In addition to the above-mentioned characteristics, the material used for the at least one receiving section of the receiving and fixing device is furthermore impact-damping. Due to an impact-damping effect, damages to the object arranged in or on the receiving and fixing device can be prevented and it can be prevented that impact powers are received by the material of the receiving and fixing device and they are thus kept away from the object. The object is thus received in the receiving and fixing device so as to be protected against impact or is held by it, respectively, and the position thereof is fixed.

[0012] It is not necessary for the entire receiving and fixing device to consist of a material comprising the above-mentioned characteristics. Instead, it is sufficient when the at least one receiving section consists of such a material or if the material of the receiving and fixing device encompasses partially different characteristics, respectively, and only the at least one receiving section encompasses these material characteristics. The at least one receiving section serves to receive or hold, respectively, and to fix the position of the at least one object, which is supported on the receiving and fixing device or which is attached to it.

[0013] In addition, the material can encompass an adhesive surface and/or can be resetting and/or avoid a cutting force
and/or not have a sponge effect or can be hydrophobic and/or weather-resistant and/or temperature-resistant and/or compressible, in particular a foam material, in particular a viscoelastic or elastic material. By advantageously providing for a resetting effect of the material, which is used for the at least one receiving section of the receiving and fixing device, it is possible to use the receiving and fixing device for a variety of objects in chronological order one after the other or to remove an object again, respectively, after first placing it on or attaching it to the receiving and fixing device and to place or attach it again in a different position. Due to its resetting effect, the material returns into its initial position and deforms again subsequently so as to be adapted to the new shape. A variety of objects can thus be received consecutively in time in the same receiving and fixing device, wherein an optimal adaptation is always possible with the same receiving and fixing device. Due to the resetting effect, a shape of the receiving section or, if applicable, of the entire receiving and fixing device, respectively, which adapts optimally to the respective object and to the shape or contour thereof, respectively, is possible again and again.

By providing the at least one receiving section of the receiving and fixing device with an adhesive surface, an undesired movement of the object relative to the receiving and fixing device can be prevented. Even an object, which is only slightly contoured or which has a smooth surface, which is supported on the receiving and fixing device or which is attached thereto, respectively, is thus prevented from carrying out a relative movement to the receiving and fixing device due to the acting adhesion force, so that an anti-shift effect is created. This adhesive effect is much larger than when providing a smooth surface.

Due to the ability of the material to be able to avoid a cutting force, damages caused by sharp-edged metal plates or other sharp-edged objects, which are held or the position of which is fixed by the receiving and fixing device, respectively, can be prevented. Any objects, also such, which are embodied so as to be sharp-edged, can thus be received and held or the position thereof can be fixed, respectively, in the receiving and fixing device.

For further protection against cutting force or the notching of the material of the receiving and fixing device, respectively, in particular in the area of the receiving section for receiving at least one object, at least this area can be provided with or can be or are covered, respectively, with a film material, in particular a polyurethane(PU) film. A polyurethane film encompasses a particularly large breaking strain of approximately 650%, which corresponds approximately to that of foam material. The film material or in particular the film material, respectively, can be connected very well with the surface of the receiving and fixing device. It acts in particular like a foam material and can be applied in a strength of between 50 and 100 μm. The film material prevents a notching in particular of sharp-edged objects, wherein notches do not remain after removing the objects.

With the use of a material, which does not absorb water independently, thus of a material which does not have the effect of a sponge or which is hydrophobic, respectively, it can be ensured that the resilience and shape-adaptivity as well as the impact-damping and contour-enclosing effect of the material also remain in moist or wet environment. A water or liquid absorption otherwise had the effect that an impact-damping effect would decrease and that freezing would take place in particular at sub-zero temperatures, so that the mentioned characteristics of the material could not be ensured any longer. By providing a material, which does not act as a sponge or a hydrophobic material, which thus does not have an independent absorbing effect, its resilience as well as impact-damping, resetting, shape-adaptive and contour-enclosing effect thus also remains at sub-zero temperatures.

Due to a weather resistance and/or temperature resistance of the material, which is used for the at least one receiving section, said material encompasses a UV as well as ozone resistance and is resistant to high and low temperatures. The receiving and fixing device can thus be used for any season and can be subjected to direct solar radiation as well as to very low temperatures, without losing its above-mentioned characteristics, in particular without becoming brittle or without becoming so soft that a sufficient hold for the at least one object supported therein or thereon would no longer be possible.

When providing a compressibility of the material, which is used for the at least one section of the receiving and fixing device, in particular a 60 to 70% compressibility, for example a 65% or 70% compressibility, this material substantially does not give way laterally in particular when a supported object sinks in, but is compressed in sinking direction. The compressibility corresponds to the provided density of the material, which can vary across the extension of the receiving and fixing device. This can be used to predetermine, how far an object, which is to be received on the receiving and fixing device, can sink into it or can penetrate when attaching to the object. The density can be chosen such that the object can sink in completely or only partially.

In particular, it is possible to provide for at least one sinking or penetration limiting device for limiting the sinking or penetration of the object into the receiving and fixing device. As a possibility for such a sinking or penetration limiting device, provision can be made for areas having different hardness or density, respectively, within the receiving and fixing device, wherein the sinking or penetration limiting device can be formed by providing a hardness or density change. A sinking or penetration of the object is possible in the area comprising a lower material hardness or density. The sinking or penetration depth, however, is limited by reaching a threshold to an area comprising a higher density or hardness, respectively. It is also possible to provide for the sinking to a default contour by using an device. The removal layer for a robot, e.g. can be defined through this or a mechanical locking at a fixed point can be made possible.

The receiving and fixing device can at least partially consist of a foam material, in particular of a visco-elastic or elastic foam material, thus of a material comprising a time, temperature and frequency-dependent elasticity, which displays a partially elastic and partially viscous behavior. Provision can be made for a physical foam, which, when a liquid is present, absorbs said liquid after the relief in response to the compression, but which does not display a foam effect, thus absorbs liquid only in response to a tension relief after a compression, but without embedding into the foam material, so that in particular water is given off by evaporation and the resilience or elasticity, respectively, and resetting effect of the foam material as well as the contour-enclosing and shape-adaptive characteristic thereof remains even in response to sub-zero temperatures.

Notches in the material of the receiving and fixing device are thus not prevented by providing a hard surface, but when extremely soft structures give way. As an alternative to
the above-described exemplary embodiments, an extremely hard stable material layer or skin, respectively, or shell can also be provided or back injection molded, respectively, with a very soft material, in particular foam material, so as to attain the desired damping. The cut-resistant material layer or skin, respectively, or shell can be perforated heavily across the surface and/or can be provided with notches and/or grooves, so as to provide for a shape adaptation to the object, which is supported.

To create a further cut protection, the receiving and fixing device can be embodied so as to be embodied at least in the area of the receiving section, thus so as to be provided with a convex surface contour. The object, which is supported on the receiving section, sinks into it, wherein, due to the embossing, the sinking initially takes place to the zero line or neutral line by compressing the material of the curvature, without an expansion in sinking direction, and the material reaches an initial expansion in sinking direction only after falling below the zero line or neutral line or the elastic limit of the material is stressed only from that point on, respectively. Depending on the sinking depth, an expansion thus does not take place, but a material compression remains. Problems caused by overloading, which could otherwise lead to a formation of tears in the material, can be prevented through this. By covering the convex surface contour of the receiving section with a PU film and by forming a solid bond between the surface and the film, an even better cut protection can be created. The film can expand extremely so as to give way to a cutting force.

A further possibility for providing a cut protection is to provide at least a part of the receiving section with conical or burl-shaped elements and/or with a lattice structure. A lattice structure can hereby be created, for example, by means of notches, which are provided at regular or irregular intervals, in the surface in particular of the receiving section. Elements, which project from the surface of at least the receiving section, can furthermore be embodied, for example, as cones or burls. When supporting an object, the elements, which are created in the case of the lattice structure between the notches, or the projecting elements, respectively, give way laterally and downwardly in sinking direction, so that particularly sharp-edged areas of the object can be received on a larger surface.

Undesired notches in the receiving section caused by the sharp-edged areas of the object and thus damages to the receiving and fixing device can be prevented through this. In the event that an embossed or curved surface of the receiving section is provided with such projecting elements, the latter can display an even better effect.

It further turns out to be advantageous when the receiving and fixing device encompasses at least one support element made of an inherently stable material. Such a support element makes it possible to embody at least a part of the receiving and fixing device to be so inherently stable that a fastening of the receiving and fixing device is possible, for example in a container, support frame or mounting device. For this purpose, provision is advantageously made for at least one fastening device for fastening the receiving and fixing device in an accommodation and/or a container and/or a frame, in particular support frame. In particular, the support element is provided with the at least one fastening device. Such a fastening device can be an opening for passing through screws or other fastening means, respectively, for example. Instead of screws, clamping devices, e.g., are also possible for fastening the receiving and fixing device, for example in a support frame or container.

In a particularly advantageous manner, the support element consists of a stable hard material, such as metal, in particular steel, and/or stable plastic material. It can be embodied in the shape of a metal plate, which is incorporated as an insert, in particular foamed, into to the material, which is used in response to the production of the receiving and fixing device. Pipes, welded structures or plates made of metal or plastic, e.g., can serve as insert. The support element and in particular the fastening device(s) can go beyond the extension of at least one receiving section for receiving the object or the objects or can be arranged adjacent thereto. In particular, a layering, thus an arrangement of support element and the receiving section for receiving the objects or one to another is possible, in particular by adding the sinking or penetration limiting device in-between. The support element itself can also serve as sinking limiting device, so that provision is not made between the receiving section of the receiving and fixing device, which allows for a sinking or penetration of the object, and the support element for a further section as sinking or penetration limiting device, which limits a sinking. The support element then advantageously also serves to fasten or to receive fastening devices, respectively.

The receiving and fixing device can consist of different materials or of only one material comprising a different density, wherein the at least one receiving section for receiving the object consists of the material, which has already been described above, or, when providing only one material, the density of the material in the area of the receiving section is chosen such that a resilience and impact-damping as well as the desired ability to enclose contours and to adapt to shapes, is at hand. A division into different sections or zones of the receiving and fixing device can take place in horizontal and/or vertical direction. The receiving and fixing device can thereby encompass any shape. In particular, it can be shaped so as to be round and/or angular. For example, it can encompass the shape of a pillow. A revolving edge area of the receiving and fixing device can be embodied with a larger density as compared to an inner central area, which is surrounded by the outer edge area and which is in particular embodied completely as receiving section, which receives the object.

The material used for the production of the receiving and fixing device can encompass a progressivity in view of the provided material hardness, in particular hardness or density of the used foam material. Based on the advantageously soft material of the receiving section, provision can be made towards the outer side or the edge of the receiving and fixing device, respectively, for a harder material or a larger density, respectively, so as to have an impact-absorbing or impact-damping effect, respectively. In particular when providing a foam material, different foam hardness or foam densities, respectively, can be embodied in response to the foaming of the receiving and fixing device. The support element can hereby be surrounded in particular by a harder or denser foam material, respectively.

The material used for the receiving section, which comes into contact with the object, can be embodied so as to be particularly soft, in particular comprising a hardness of Shore 00. By using such a soft material, a particularly gentle support, attaching and receiving of contours of the objects or parts, respectively, which are to be protected, is possible, as
well as an insertion of objects and components, the dimensions of which were not determined ahead of time, into the receiving and fixing device.

[0031] In addition to the possibly completely free shape of the receiving and fixing device, the latter can also be adapted to the shape of the object, which is to be received, wherein the approximate dimensions of the object can be considered for the shape of the receiving section.

[0032] The receiving and fixing device is suited in particular for receiving objects in transport frames or other types of containers or frames, in particular support frames, baskets and boxes, transport gear, conveying and transport devices as well as warehouses. They are advantageously provided with at least one device for receiving the receiving and fixing device. Such a device can be a cut or recess, for example, but also an alternative device, which allows receiving and in particular fastening of the receiving and fixing device in the container or the frame, respectively, in particular support frame.

[0033] For insertion into small load carriers or standard boxes, respectively, provision can be made for a frame, in particular a transport or insertion frame, which is provided with the receiving and fixing device. In this case, the receiving and fixing device can be embodied in particular in a pillow or mat-like manner. Such a pillow or mat-like receiving and fixing device can be provided, e.g., as insertion set for packaging in particular objects or parts, respectively, in particular for packaging small parts. Instead of the otherwise typical provision of cuts or recesses, which are provided for receiving parts or small parts, respectively, they can be arranged in any order on the surface of the receiving and fixing device. Due to their dead weight, they subsequently sink into the receiving and fixing device, in particular until reaching the sinking limiting device, and are supported therein so as to be protected against impacts and in an optimally positionally fixed manner without the risk of shifting until they are removed. Parts having a large weight and a small support surface can thereby compress the device “completely”, lighter parts sink in until a balance has been reached between weight and reset force.

[0034] Even though not necessary, provision can nonetheless be made for at least one cut or recess for inserting objects into or in the area of the receiving section. The object can be inserted into this at least one cut or recess and can subsequently sink deeper into the material of the receiving and fixing device, wherein the cut or recess advantageously does not correspond to the shape of the object, but is in particular embodied so as to be smaller than said object, so that material of the receiving section of the receiving and fixing device, into which the object can sink at least partially so as to be received securely in a contour-enclosing and shape-adaptive manner in the resilient and impact-damping material of the receiving section, remains on the edge surrounding the cut or recess.

[0035] The receiving and fixing device can thus be inserted into a container or frame or into another receiving device, in particular also as one layer of a plurality of material layers of a stack, wherein the receiving and fixing device is advantageously embodied as outermost layer.

[0036] The receiving and fixing device can furthermore be used as hold-down device or as holder for fixing the position and for a surface-preserving holding and/or separating of objects. Hold-down devices and so-called louver holders are used for fixing them in a support frame or mounting device, in particular for the transport of molded sheet metal parts, in particular engine hoods. The molded objects or parts, which are to be transported, such as engine hoods, in particular, are arranged therebetween, in each case separated from one another. Instead of such louver holders, provision can be made for the receiving and fixing device, which can be embodied in the form of a receiving section or holding section of the hold-down device or as hold-down device. The receiving and fixing device according to the invention is particularly well suited for fixing the position of objects, which are to be held in a surface-preserving manner, because individual segments in the form of louveres do not need to be embodied, so as to create a particular soft, impact-absorbing surface for protecting the objects when forces are applied. In the case of a louver holder, the louveres are for the most part arranged diagonally to the z-axis, so as to make it possible to give way laterally in response to compressive stress and so as to prevent damages to the surface of the objects caused by the louveres themselves, which could typically not be prevented when arranging in z-axis direction. With the louveres, provision is not made for a flat attachment and for a large contact surface on the surface of the objects. A similar effect can be attained by providing a number of burls or similar elements. A buffing of attacking forces and a particularly soft support for the objects is made possible by means of the receiving and fixing device, so that damages to the surfaces of the objects can be prevented. After arranging the objects, which are to be held so as to be positionally fixed, in a transport frame, the receiving and fixing device is lowered to the surface thereof in particular in the area of a corner or edge of the objects, wherein the edge or corner of the respective objects presses into the receiving and fixing device, in particular until a sinking or penetration limiting device has been reached, so that an optimal fixing of the position and an optimal surface-preserving holding of the objects in the desired position is possible. Such a type of fixing the position of objects, which deserve particular protection, is less extensive and cost-saving at the same time, in particular in comparison with the use of louver holders, wherein an even better fixing of the position and stiffer attachment is made possible than with louver holders.

The excellent edge protection, which is attained by means of the receiving and fixing device according to the invention, is also to be emphasized. Due to the reset effect of the material, the receiving and fixing device in a flat or curved shape can also be used in a fixing manner as hold-down device for parts having different heights and contours, without having to be adjusted, even if different contours or heights are located next to one another.

[0037] The invention at hand in particular also refers to the use of a contour-enclosing, shape-adaptive, resilient and impact-damping foam material as receiving and fixing device for supporting and/or holding at least one object. Advantageously, the foam material is furthermore provided with a surface, which displays an adhesive effect, is resetting and gives way to a cutting force and does not act like a sponge, thus does not absorb liquid independently.

[0038] In a particularly advantageous manner, the receiving and fixing device can serve to receive large heavy cast parts, the transport of which is possible only with great difficulty with the known containers and support frames without the risk of damaging the cast parts. Due to the fact that such cast parts can sink into the receiving and fixing device until they reach the sinking limiting device or until they reach a corresponding support element of the receiving and fixing device, respectively, they are received optimally in the receiving and
fixing device, so that an unwanted movement during the transport does not need to be feared.

[0039] Engines and drives for vehicles can furthermore be transported so as to be optimally protected by means of the receiving and fixing device. Due to the resetting material characteristics of the receiving and fixing device or in particular of the receiving section thereof, respectively, engines and drives, e.g., as well as other large and smaller as well as lighter and heavier parts can be received therein universally and in a time sequence. In contrast to the state of the art, a specifically molded part accommodation is thus no longer necessary.

[0040] In addition to the economic advantage of the invention for avoiding the costs for the effort for the production of individually formed receiving and fixing devices, which are adapted to the object, which is to be received, oftentimes in small quantities, a further cost advantage results as compared to the state of the art in that neither a new production nor a retrofitting of a receiving and fixing device according to the invention is necessary so as to be able to continue to use it in response to a contour change or when adding or omitting add-on parts in the case of the object, which is to be received. This is particularly important, e.g., in the case of the automobile production, where additional product alternatives are added or aggregates are changed more and more frequently during the production run.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] To define the invention in more detail, exemplary embodiments thereof will be described below in more detail by means of the drawings:

[0042] FIG. 1 shows a perspective view of a first embodiment of a receiving and fixing device according to the invention.

[0043] FIG. 2 shows a perspective view of a second embodiment of a receiving and fixing device according to the invention.

[0044] FIG. 3 shows a perspective view of a third embodiment of a receiving and fixing device according to the invention.

[0045] FIG. 4 shows a perspective view of a fourth embodiment of a receiving and fixing device according to the invention.

[0046] FIG. 5 shows a perspective view of the receiving and fixing device according to FIG. 4, rotated by 180°.

DETAILED DESCRIPTION OF THE INVENTION

[0047] FIG. 1 shows a receiving and fixing device 1. The receiving and fixing device 1 is U-shaped in the cross sectional view, thus encompasses a middle flat section 10, which is limited on both sides by lateral sections 11, 12, which are embodied so as to be raised relative thereto. An object, which is not shown in FIG. 1, can be supported on the upper side 13 of the receiving and fixing device 1. The area, which is provided for supporting such an object, is identified as receiving section 2 in FIG. 1. As is shown in FIG. 1, the receiving section 2 can extend beyond the entire upper side 13 of the receiving and fixing device 1. It is also possible for the receiving section 2 to only extend beyond a part of the upper side 13 of the receiving and fixing device 1.

[0048] The surface 20 of the receiving section 2 is embodied so as to be adhesive, so as to be able to hold an object, which is supported thereon, particularly well and so as to be able to secure it against shifting. In an embodiment alternative, the surface 20 of the receiving section 2, which is illustrated so as to be smooth in FIG. 1, can be embodied so as to be convex or embossed, respectively, as is shown in FIGS. 2 and 3, so that provision is made for a curvature 21 away from the receiving and fixing device. Said curvature makes it possible for an object, which is supported at that location, to initially only lead to a compression of the material, but not to a tensile stress, so that a formation of tears can be prevented for the most part, in particular when supporting sharp-edged objects.

[0049] As is shown in FIG. 2, it is possible to provide the receiving section 2 with projecting elements, in particular with burl-shaped and/or conical elements 22, so as to be able to also receive in particular sharp-edged objects in an even more secure manner and so as to prevent a notching into the surface 20 of the receiving section 2 by means of the sharp edges of the objects. The conical or burl-shaped elements 22 are formed by means of an even surface 20 of the receiving section 2 by means of grooves 23 provided at that location, which form elements between one another, which gives way as cones or burls when an object is supported and which hereby form a larger receiving surface and which are simultaneously able to protect the receiving section from damages caused by sharp-edged objects. Instead of an even lattice structure, provision can also be made for an uneven lattice structure. Instead of a lattice structure, conical or burl-shaped elements can also be embodied as material protrusions.

[0050] The surface 20 of the receiving section 2 can furthermore be provided with a film 24, in particular a polyurethane film, so as to provide for an even better cut resistance. This is shown in FIG. 3.

[0051] In each alternative according to FIGS. 1 to 3, the receiving and fixing device 1 consists in particular of a viscoelastic foam material or of an elastic foam material, is thus embodied so as to be resilient, contour-enclosing, shape-adaptive and impact-damping. In addition, a foam material is chosen, which does not act like a sponge, so as to prevent the absorption of wear, which could lead to a destruction of the foam material, in particular at low temperatures.

[0052] To limit the sinking depth of an object into the receiving and fixing device 1, provision can be made for a sinking or penetration limiting device. In the embodiment according to FIG. 1, the latter is formed by providing a different density of the used foam material, wherein an upper area 14 consists of a less dense foam material and a lower area 15 consists of a denser foam material, so that a further penetration for the object is prevented when the object sinks into the receiving and fixing device when reaching the denser material. When providing a denser material in the lower area and a less dense material in the upper area, the receiving and fixing device 1 can be produce in one piece, wherein the foam material is compacted more strongly in the lower area 15 of the receiving and fixing device 1 than in the upper area 14.

When using differently hard foam materials, whereby a penetration limit can also be created, the harder material can initially be provided in the lower area 15 in response to the production thereof and the less hard material can be provided thereabove in the upper area 14 of the receiving and fixing device 1.

[0053] To be able to fasten the receiving and fixing device 1 in a container and/ or on a frame, it is provided with a support element 3. The latter is embodied in a plate-shaped manner in FIG. 1 and consists in particular of a metal or of a hard plastic material. In the exemplary embodiment shown in FIG. 1, the
Support element 3 encompasses six screws 30, which are arranged in the four corner areas of the support element as well as in the surface thereof, for fastening in a container or on a frame. As an alternative to screws 30, provision can also be made on the support element 3 for other types of fastening devices, such as ears, hook elements, bolts, etc.

To keep the weight of the support element 3 as low as possible, the latter encompasses a number of perforations or openings 31, respectively. It is thus embodied as a perforated sheet. The openings further serve the purpose that a very good mechanical connection forms between the support element 3 and the foam material when flowing through the foam material.

Instead of embodying the receiving and fixing device 1 in the shape of a pillow, it can also be embodied as a hold-down device of holder for fixing the position and for the surface-preserving holding of objects, for example, and can be fastened to a corresponding frame or container. A plurality of vertically positioned elements, which are to be transported consecutively, such as engine hoods, for example, can be held securely on such a hold-down device or holder for fixing the position in a corresponding frame or container and can be protected against being damaged. One example for such a hold-down device is illustrated in FIGS. 4 and 5. It encompasses a support element 4, which is provided with the receiving section 5. The hold-down device is thus embodied as a hybrid part. The support element 4 consist of a hard material, such as a hard plastic and/or metal material, while the receiving section 5 consists of a soft material, such as the viscoelastic or elastic foam material, which has already been mentioned above for the embodiment alternatives of FIGS. 1 to 3. It is thus embodied so as to be resilient, contour-enclosing, shape-adaptive and impact-damping.

As can be gathered from a comparison of FIGS. 4 and 5, which show a top view and a bottom view of the hold-down device, the receiving section 5 is embodied so as to be u-shaped or v-shaped, respectively, wherein it forms a lower cross web only on one side of the support element (see FIG. 4). The lateral shoulder sections 50, 51, which are formed thereby, and the central section 52 encompass beveled edges 53, 54, 55 herein. On principle, they can also be provided with straight and/or rounded edges. On the opposite side, the lateral shoulder sections 50, 51 are provided with cut protection devices 56. They protect the soft material of the receiving section 5 against cutting damages caused by the objects, which might have sharp edges, which are held by them and which thus come to rest thereon. Such cut protection devices can also be embodied other than shown, and it is also possible to provide a hold-down device without such cut protection devices.

The support element 4 is embodied for fastening by being screwed on and it is accordingly provided with openings 40, through which the screws can engage. It is also possible to provide for a fastening pipe or for a different type of fastening device, which provides for a fastening of the hold-down device in a support frame or mounting device, in particular a fastening according to a folding finger, a foldable arrangement in or on the support frame or mounting device.

As can be gathered from FIG. 4, the support element 4 further encompasses reinforcing ribs 41 in longitudinal and transverse direction as well as reinforcing ribs 42 around the openings 40, which are combined to form a polygon. A sufficiently stable support element, which is protected in particular against being twisted, can be created through this.

In addition to the embodiment alternatives of receiving and fixing devices for receiving and fixing the position of at least one object, which are described above and which are shown in the exemplary embodiments, a large number of further embodiment alternatives can also be formed, in particular also combinations of the above-mentioned exemplary embodiments, in the case of which provision is made for at least one receiving section for receiving the at least one object, which consists at least partially of a resilient, contour-enclosing, shape-adaptive and impact-damping material.

LIST OF REFERENCE NUMERALS

- **[0060]** 1 receiving and fixing device
- **[0061]** 2 receiving section
- **[0062]** 3 support element
- **[0063]** 4 support element
- **[0064]** 5 receiving section
- **[0065]** 10 middle flat section
- **[0066]** 11 lateral section
- **[0067]** 12 lateral section
- **[0068]** 13 upper side
- **[0069]** 14 upper area (less dense material)
- **[0070]** 15 lower area (denser material)
- **[0071]** 20 surface
- **[0072]** 21 curvature
- **[0073]** 22 bulb-shaped or conical element
- **[0074]** 23 groove
- **[0075]** 24 film/PU film
- **[0076]** 30 screws
- **[0077]** 31 opening
- **[0078]** 40 opening
- **[0079]** 41 reinforcing rib
- **[0080]** 42 reinforcing ribs
- **[0081]** 50 lateral shoulder section
- **[0082]** 51 lateral flank section
- **[0083]** 52 central section
- **[0084]** 53 beveled edge
- **[0085]** 54 beveled edge
- **[0086]** 55 beveled edge
- **[0087]** 56 cut protection device

1. A receiving and fixing device for receiving and fixing the position of at least one object, wherein the receiving and fixing device comprises at least one receiving section for receiving the at least one object, which at least partially consists of a resilient, contour-enclosing, shape-adaptive and impact-damping material.

2. The receiving and fixing device according to claim 1, wherein the material additionally has an adhesive surface and/or is resetting and/or avoids a cutting force and/or does not have a sponge effect or is hydrophobic and/or weather-resistant and/or temperature-resistant and/or compressible, in particular a foam material, in particular a visco-elastic or elastic material.

3. The receiving and fixing device according to claim 1, wherein the device has at least one sinking or penetration limiting device for limiting the sinking of the object into the receiving and fixing device.

4. The receiving and fixing device according to claim 3, wherein the receiving and fixing device has areas having
different hardnesses or densities, in particular the sinking limiting device being formed by providing a hardness or density change.

5. The receiving and fixing device according to claim 1, wherein the receiving and fixing device has at least one support element (3, 4) made from an inherently stable material.

6. The receiving and fixing device according to claim 5, further including at least one fastening device for fastening the receiving and fixing device in an accommodation and/or a container and/or a frame, in particular support frame, the support element in particular being provided with the at least one fastening device.

7. The receiving and fixing device according to claim 1, further including at least one cut or recess for inserting an object into the or in the area of the receiving section.

8. The receiving and fixing device according to claim 1, wherein for cut protection, at least the receiving section is provided or covered with a film material, in particular a polyurethane film and/or a stable hard material layer on an outer side.

9. The receiving and fixing device according to claim 8, wherein at least a part of the receiving section is provided with elements, which project from the surface, in particular conical or burl-shaped elements and/or with a lattice structure and/or that the stable, hard material layer is provided with notches and/or grooves and/or a surface perforation.

10. The receiving and fixing device according to claim 1, wherein at least the receiving section is embossed for cut protection.

11. A container comprising the receiving and fixing device according to claim 1, wherein the container has at least one device for receiving the receiving and fixing device.

12. A frame comprising at least one receiving and fixing device according to claim 1.

13. The frame according to claim 12, further including at least one device, in particular for at least one cut or recess, for receiving the receiving and fixing device.

14. A method, comprising the steps of: supporting and/or holding at least one object with a contour-enclosing, shape-adaptive, resilient and impact-damping foam material as a receiving and fixing device.

15. A method for using the receiving and fixing device according to claim 1 comprising the steps of: providing the receiving and fixing device as a hold-down device or as holder for fixing the position and for the surface-preserving holding of objects.