Disclosed is an adhesive mat (1) for attaching objects, comprising a smooth-surface adhesive layer (2) designed to releasably adhere to smooth surfaces. In order to be able to quickly, conveniently, and inexpensively attach objects having a smooth or metal surface, the adhesive mat (1) has an additional adhesive layer (3) which is connected in a planar manner to the smooth-surface adhesive layer (2) and which develops a releasable attachment effect on textile fabrics or on a magnetizable surface.
ADHESIVE MAT AND DEVICE FOR ATTACHING OBJECTS

[0001] The invention concerns an adhesive mat for attaching objects, comprising a smooth-surfaced layer designed to releasably adhere to smooth surfaces.

[0002] The invention further concerns a device for the fixation and alignment of objects, all with a smooth surface, with a working cushion which on its surface provides a textile surface structure.

[0003] An adhesive mat as described above is, for example, known from the disclosure of DE 2 02008 005 552 U1. The adhesive mat disclosed there consists of a single-piece foam-layer made of polyurethane. By pressing the foam onto a smooth surface the adhesive effect is achieved. The adhesive effect is achieved in both surfaces of the adhesive mat, so that objects with smooth surfaces, such as mobile telephones, spectacles, cigarette boxes and the like can be affixed to essentially the equally smooth surface of a vehicle dashboard.

The adhesive effect of the known adhesive mat is provided exclusively between smooth surfaces.

[0004] DE 20 3020404 897 U1 discloses a specific working cushion embodied in a wedge shape to hold support and align computers, notebooks, tablet PCs and the like. For this purpose there are hook and loop fastener tapes embodied on the working cushion to serve as a form-stable support, on which, for example a laptop may be secured in the desired angle. This form-stable support device, however, is bulky and can only provide sufficient attachment properties only by means of additional fastening of attachment means.

[0005] Document DE 20 2009 016 480 U1 also discloses a working cushion comprising a form-fast fitting, which results in the aforementioned disadvantages.

[0006] A further retention device for notebooks and similar objects is disclosed in document GB 772 300.

[0007] The subject matter of this invention is the provision of an adhesion mat and providing a device with the aforementioned properties to provide rapid, convenient and simultaneously cost-efficient attachment of objects with a smooth surface.

[0008] On the basis of the adhesion mat referred to in the introduction, this invention solves the problem by providing such an additional adhesive layer with the capacity to releasably adhere to a textile surface composition.

[0009] According to the invention an adhesive mat is provided, with which various objects characterized by smooth surfaces can be releasably attached to textile surface structures or magnetizable surfaces, and that they can be fastened to these with sufficient attachment strength. For this purpose, the adhering mat as disclosed in this invention with the additional adhesion layer is only placed on a textile surface or a magnetizable surface. Likewise this applies to a smooth surface where the smooth surface adhesion layer affects its adhesion properties. Within the scope of this invention is therefore the feature of an adhesion mat with two layers, including the smooth surface adhesion layer, consisting of two different layers, wherein the two layers, i.e. the smooth surface adhesion layer and the additional adhesion layer are connected by gluing or similarly by other connection or joining methods. According to the preferred embodiment the smooth surface adhesion layer and the additional adhesive layer are joined by means of sealing.

[0010] For the sake of expedience the smooth surface adhesion layer as well as the additional adhesive layer can be bent. Especially the smooth surface adhesion layer is preferably elastic and may be reversibly reshaped.

[0011] The design of the smooth surface adhesion layer is in principle variable, as long as the smooth surfaces have the releasable adhesive properties towards the objects to be held.

[0012] According to the preferred design of the invention the smooth surface adhesive layer is composed of an elastic foam material. The foam material is designed so that the pores open to the surface a vacuum is created when pressure is exerted on the layer. Pressing will compress the foam material, which will reduce the volume of said pores and atmospheric air is pressed out of the pores. Due to its elasticity the foam material will return to its original shape after compression, causing the pores to expand. Because however the foam material is sealed by the smooth surface directly in contact, atmospheric air can not flow back into the expanding open pores. This results in a negative pressure against the ambient atmosphere in the open pores and creates the desired releasable adhesive effect.

[0013] For the sake of expedience the smooth surface adhesive layer is composed of polyurethane and especially polyurethane foam has been found to be a particularly expedient adhesive material. Polyurethane adhesive mats are available on the market.

[0014] According to a variant of this invention different from the above the smooth surface adhesive layer has an adhesive layer on the back of the additional adhesive layer. This adhesive layer has the properties that it may be repeatedly adhesively attached to a smooth surface.

[0015] In one variant of the invention the additional adhesive layer is magnetic and suitable for being attached to magnetizable surface. Flexible magnetic materials, such as magnetic plastics, are known to persons skilled in the art, so that it is not necessary to discuss them any further.

[0016] According to the preferred variant of the invention the additional adhesive layer is however a hook and loop layer. A hook and loop layer has an adhesive effect on textile fabric object surfaces.

[0017] According to the preferred embodiment of the invention the hook and loop layer forms fibres or protrusions which have ends averted from the smooth surface adhesive layer in the shape of hooks or mushrooms. If the adhesive mat is placed on the textile fabric object surface the fibres or protrusions will hook into fibres, threads or meshes of the textile fabric object with the free ends, thereby creating a mechanical fastening.

[0018] It is advantageous if the adhesive mat has a thickness between 0.3 cm and 2 cm, a width between 3 cm and 20 cm, as well as a length between 5 cm and 30 cm. Said dimensions have been found to be especially expedient to provide a sufficient adhesion effect and, on the other hand, be sufficiently small to be used in a motor vehicle, for example.

[0019] According to one variant of the invention, the smooth surface adhesive layer comprises at least two smooth surface adhesive layer sections, which are connected by a single piece additional adhesive layer. The additional adhesive layer has, for the sake of expedience, an adhesive back, and hook and loop fibres or protrusions with the free ends in the shape of hooks or mushrooms fixed onto the adhesive back. On the back, i.e. the side averted from the fibres or protrusions the adhesive back is joined to an additional adhesive layer with two smooth surface sections. This way the adhesive mat can be folded together so that the smooth sur-
face adhesion sections face each other and are thereby protected against external soiling.

[0020] It is advantageous to provide locking means to secure the adhesive mat according to this invention in a folded position, with the smooth surface adhesive sections facing each other. The locking means prevent an unintentional opening of the folded adhesive mat, for example during transport.

[0021] The device according to the invention for the fixing and positioning of objects comprises an adhesive mat according to the invention, whereby the adhesive mat is provided with a hook and loop layer. The adhesive mat is placed with its hook and loop layer onto the textile fabric object of the working cushion, so that between the adhesive mat and the working cushion a solid releasable mechanical connection is provided.

[0022] The smooth surface of an object to be held can be pressed onto the smooth surface adhesive layer of the adhesive mat inducing an adhesion effect, in a way that the object with the smooth surface is attached to the working cushion in a sufficiently fast manner.

[0023] It is particularly advantageous if the textile fabric object is embodied as a hook and loop tape either on one side of the working cushion or around the circumference of the entire working cushion. The hook and loop tape of the working cushion provides meshes, eyelets or similar devices, which are complementary hooking medium to the hook and loop section of the adhesive mat, whereby an especially fast mechanical interlocking system is provided between the hook and loop tape on the cushion and the hook and loop layer on the adhesive mat.

[0024] On a system as described above, for example, electronic devices such as portable computers, tablet PCs, E-readers or the like can be conveniently placed and viewed and looked at when lying down.

[0025] For the sake of expedience the working cushion is shaped like a wedge or, in other words, has a triangular cross-section from one side. A wedge-shaped working cushion has been found to be particularly user-friendly. In addition it is beneficial of the working cushion is fitted with a pocket to store the objects to be fixed.

[0026] Further expedient embodiments and advantages of the invention are the subject matter of the following description of implementation examples for the invention with respect to the figures of the drawing, whereby identical references relate to components with the same function, and whereas the following figures show:

[0027] FIG. 1 an implementation example of the adhesive mat according to the invention in a side view,
[0028] FIG. 2 the adhesive mat according to FIG. 1 in a perspective view,
[0029] FIG. 3 the adhesive mat according to FIG. 1 in an enlarged cross-sectional view,
[0030] FIG. 4 another implementation example of the adhesive mat according to the invention in a side view,
[0031] FIG. 5 a further implementation example of the adhesive mat according to the invention in a side view,
[0032] FIG. 6 the adhesive mat according to FIG. 5 in a top view,
[0033] FIG. 7 an implementation example of the device according to the invention.
[0034] FIG. 1 shows an implementation example of the adhesive mat 1 according to the invention in a schematic side view. It is clear that the adhesive mat 1 consists of a smooth surface adhesive layer 2 and a hook and loop layer 3. The smooth surface adhesive layer consists of polyurethane foam. When a smooth surface such as the underside of a notebook, net book, tablet PC, E-reader or the like is manually pressed onto the smooth surface adhesive layer 2 the adhesion effect is induced. For this purpose the smooth surface adhesive layer 2 is pressed manually against said surface. While it is pressed the polyurethane is deformed, whereby the open pores in the polyurethane foam facing the smooth surface of the device to be attached are compressed. The polyurethane foam is embodied in a highly elastic and flexible manner. After the pressing the foam returns to its original shape. At this point the foam is in direct sealing contact with the smooth surface, so that in the open pores facing the smooth surface a negative pressure is created against the ambient atmosphere. Due to this pressure difference there is a suction adhesion of the smooth surface adhesive layer, for example, to the bottom side of a tablet PC.

[0035] The hook and loop layer 3, however, develops its adhesion force on textile fabric surfaces, for example the seat covers of a motor vehicle, so that the object to be attached and fixed, for example the tablet PC, can be simply and releasably attached to a car seat.

[0036] FIG. 2 shows the adhesive mat 1 according to FIG. 1 in a perspective view, which will make especially the expedient dimensioning of the adhesive mat 1 clear. When seen in top view the adhesive mat 1 has a rectangular shape with rounded corners. The adhesive mat 1 has an elongated shape so that especially mobile telephones or the like can be held over their entire surface. The dimensioning shown in FIG. 2 is, however, only an example. In principle, all design implementations are possible according to this invention.

[0037] FIG. 3 shows the adhesive mat 1 according to the invention in an enlarged cross-sectional view, making especially the embodiment of the hook and loop layer 3 clear. The hook and loop layer 3 has an adhesive back 4 fitted with extruding single-hook, multiple-hook or mushroom-shaped protrusions or fibres 5, which are shown in FIG. 3 only schematically as simple hooks. The adhesive back 4 is firmly glued to the smooth surface adhesive layer 2, thereby providing a firm composite material. The hook and loop layer 3 can also be considered either the hook part or hook section of a hook and loop interlocking system. The textile fabric surface 6 is then the complementary part of the hook and loop interlocking system, namely the counter-piece for the hooks by providing the loops or slings created by the fibres or threads. The textile fabric object can, however, also be a non-woven fabric. In this case the fibres or protrusions 5 will hook into the fibres or threads of the non-woven fabric.

[0038] FIG. 4 shows a further embodiment of the adhesive mat 1 according to the invention. It is clear that the smooth surface adhesive layer 2 consists of two smooth surface adhesive layers 6 and 7, which are completely and over their entire extent and firmly affixed to the adhesive back 4, which is only shown schematically, of the hook and loop layer 3. Thereby between the smooth surface adhesive layer sections 6 and 7 a folding gap is created. The folding gap facilitates an easy folding of the adhesive mat 1 in such a manner that the smooth surface adhesive layers 6 and 7 are folded together to face each other with the sides averted from the hook and loop layer 3. This way the adhesive mat 1 can be easily transported and there is no risk of soiling the smooth surface adhesive layer 2, which would possibly reduce the adhesive effect on smooth surface.
FIG. 5 shows a further example of the embodiment of the adhesive mat 1 according to the invention, whereby the smooth surface adhesive layers 6 and 7 are chamfered on the edges facing each other, so that the folding gap 8 of the adhesive back 4 is widened towards the surface of the smooth surface adhesive layers 6 and 7. This widening makes the folding of the adhesive mat 1 even easier. In addition each of the smooth surface adhesive layers 6 and 7 is fitted with a part 9 respectively 10 of a mechanical locking system. This can be, for example, be a hook section 9 and a loop section 10 of a hook and loop locking system.

FIG. 6 shows the embodiment example according to FIG. 5 in a top view in which the hook section 9 and loop section 10 of the mechanical locking system are clearer. The mechanical locking system 9, 10 serves for the securing the smooth surface adhesive layers 6 and 7 in the folded closed position.

FIG. 7 shows an embodiment example of the device 11 according to the invention with the working cushion 12 having a textile fabric structure 13 and the adhesive mat 1. The adhesive mat 1 has, in this example, a single-piece smooth surface adhesive layer 2 and a hook and loop layer 3 joined firmly over the entire area.

The working cushion 12 is, in the example shown, filled with a cover made of leather or synthetic leather, whereby the textile fabric structure 13 in the form of a ribbon is applied running around the working cushion 12 in the middle of said cushion. In the embodiment example of the device according to the invention shown in FIG. 7 the hook and loop layer 3 of the adhesive mat 1 and the ribbon-shaped textile fabric structure 13 of the working cushion 12 for the respectively complementary parts of a hook and loop locking system. Therefore the ribbon-shaped textile fabric structure 13 functions as the loop part described above in more detail. The hook and loop layer 3 functions as the shape-complementary hook part. This way a firm and releasable mechanical attachment between the adhesive mat 1 and the working cushion 12 is achieved, whereby a smooth surface adhesive layer 2 is provided and firmly attached to the working cushion 12.

The smooth surface adhesive layer 2 can now also be used to firmly attach objects with a smooth surface, such as, for example so-called tablet PCs, notebooks, e-readers and the like, to the working cushion 12. In this manner a convenient positioning, storage and fixing of said object is possible. This will make the handling and operating of the respective device easier.

The device according to the invention is in the whole flexible and comprises no form-stable or stiff sections, areas or the like. Any damage to the attached object is therefore certainly prevented. For the sake of expediency the working cushion is filled with foam or polystyrene balls.

1. Adhesive mat (1) for affixing and attaching objects with a smooth surface adhesive layer (2), which is designed to the releasable adhesion to smooth surfaces, characterized in that an additional adhesive layer (3), joined over its whole area with the smooth surface adhesive layer (2) and providing a reasonable adhesion effect on textile fabric structures or magnetizable surfaces.

2. Adhesive mat (1) according to claim 1, characterized in that the smooth surface adhesive layer (2) consists of elastic foam plastic.

3. Adhesive mat (1) according to claim 1, characterized in that the smooth surface adhesive layer (2) consists of polyurethane.

4. Adhesive mat (1) according to claim 3, characterized in that the smooth surface adhesive layer (2) has an adhesive layer on the surface averted from the additional adhesive layer (3).

5. Adhesive mat (1) according to claim 4, characterized in that the additional adhesive layer (3) is magnetic and adheres to magnetizable surfaces.

6. Adhesive mat (1) according to claim 1, characterized in that the additional adhesive layer (3) is a hook and loop layer (3), which adheres to textile fabric surfaces.

7. Adhesive mat (1) according to claim 1, characterized in that the thickness is between 0.5 and 5 cm, the width is between 3 and 20 cm and the length is between 3 and 30 cm.

8. Adhesive mat (1) according to claim 1, characterized in that the smooth surface adhesive layer (2) comprises at least two smooth surface adhesive sections (6, 7) joined to a single-piece additional adhesive layer (3).

9. Adhesive mat (1) according to claim 8, characterized in that a smooth joint gap (8) is located between the two smooth surface adhesive layers (6, 7).

10. Adhesive mat (1) according to claim 8, characterized in that a locking system (9, 10) suitable for securing the adhesive mat (1) in the folded state, whereby the smooth surface adhesive layer sections (6, 7) face each other with the surfaces averted from the additional adhesive layer (3).

11. Device (11) for holding and positioning of objects with a smooth surface with a working cushion (12), which is provided with a textile fabric structure (13) on its surface, characterized in that an adhesive mat (1) according to claim 1, which releasably adheres to the textile fabric structure (12).

12. Device (11) according to claim 11, characterized in that the working cushion (12) has the shape of a wedge.

13. Device (11) according to claim 11, characterized in that the working cushion (12) has a pocket to hold said objects.