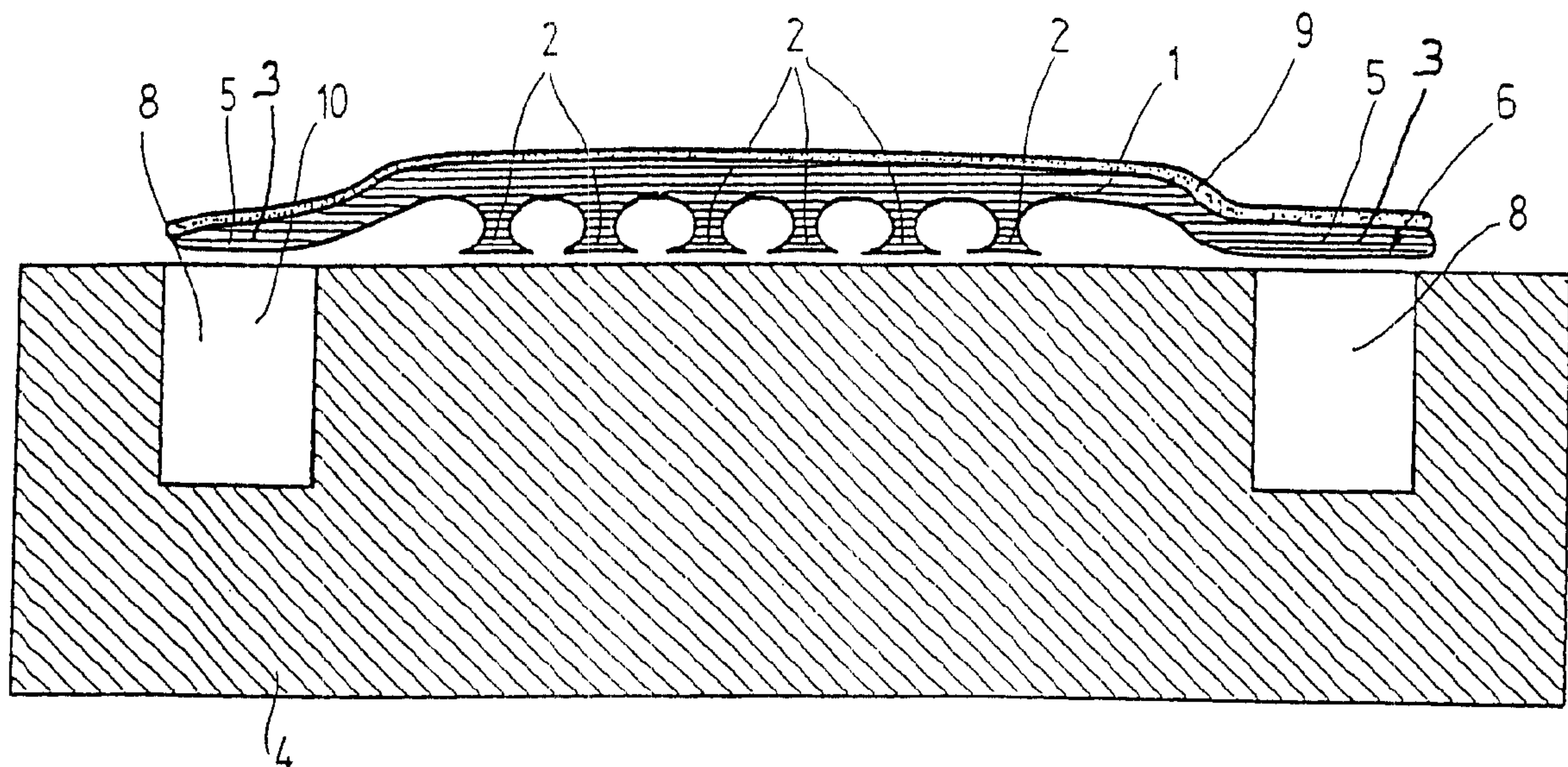




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(54) Title: PROCESS FOR PRODUCING FOAMED ARTICLES, ESPECIALLY FOAMED ARTICLES FOR
UPHOLSTERING CAR SEATS



(57) Abrégé/Abstract:

The invention relates to a process for producing foamed articles, especially foamed articles for upholstering car seats. Said foamed articles comprises at least an adhesive closing part (1) having adhesive elements (2) which are incorporated into the foaming mold (4) generating the foamed article and which are covered by a foam-protecting cover (3). The adhesive closing part (1) itself constitutes the cover (3). A lateral cover (5) of the adhesive closing part whose width can be chosen overlaps the surface area on which the adhesive elements are arranged and is releasably attached to the foaming mold (4) by means of a fixing device (6). This design simplifies the foaming process and keeps production costs low.



ABSTRACT

The invention relates to a process for producing foamed articles, especially foamed articles for upholstering car seats. Said foamed articles comprises at least an adhesive closing part (1) having adhesive elements (2) which are incorporated into the foaming mold (4) generating the foamed article and which are covered by a foam-protecting cover (3). The adhesive closing part (1) itself constitutes the cover (3). A lateral cover (5) of the adhesive closing part whose width can be chosen overlaps the surface area on which the adhesive elements are arranged and is releasably attached to the foaming mold (4) by means of a fixing device (6). This design simplifies the foaming process and keeps production costs low.

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A process for producing foamed articles, especially foamed
articles for upholstering car seats

The invention relates to a process for production of a foam component, a foam upholstery component for a motor vehicle seat in particular, a component provided with at least one adhesive sealing element containing adhesive elements which, covered by a foam retaining cover with ferromagnetic properties, are introduced into a foam injection mold producing the foam component, with the cover being in the form of the adhesive sealing component itself, which is mounted with a variable-width edge cover projecting over the area having the adhesive elements and with a retaining mechanism brought into in separable contact with the foam injection mold.

Foam upholstery components with injected foam adhesive sealing elements are used by preference for foam upholstery components for seat elements, seat backs, or head restraints, especially such elements for motor vehicle seats. The adhesive elements of the injected foam adhesive sealing elements are generally used in this process for fastening cover materials provided with adhesive sealing components with suitable adhesive elements on the foam upholstery component concerned.

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In order to ensure functional efficiency of the adhesive sealing elements it is of essential importance to protect the adhesive elements from penetration by the foam material during the foam injection process by means of a foam retaining cover, so that cementing of the adhesive elements is prevented. This can be accomplished by employing a conventional process in such a way that the front side of the adhesive sealing element, on which the adhesive elements are exposed, is fully covered by a covering element in the form of a layer of a sealing compound, an element which may be removed after the foam injection molding process in order to expose the adhesive elements again.

In the case of an adhesive sealing component illustrated in EP 0 612 485 A1 a thermoplastic material is used which may be fused and reused after removal.

Despite use of a recyclable sealing compound, this procedure is very costly because of the additional operating steps for application of the sealing elements, removal, and the measures required for reuse.

A generic process is known from US-A-5,654,070. In the generic process for production of a foam component, the cover consists of two lengthwise ferromagnetic strips, which are cemented onto the edge of the underside of the adhesive sealing element. The edge cover strips may then be brought in contact with the magnetic mechanism of the foam component such that foam-sealing adhesive elements may be appointed in a recess of the foam injection mold. To ensure that the state-of-the-art adhesive sealing element does not separate from the foam

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injection mold during the foam injection process, ferromagnetic retaining clips in addition are arranged at variable length from each other gripping the approximate center of the adhesive sealing element such that it combines its action with an additional retaining magnet of the foam injection mold arranged below the recess. Based on the high degree of cleanliness required during foam injection, the foam injection mold itself is to be cleaned after a predetermined number of foam injection processes. Cleaning of the recess within the foam injection mold, based on it being recessed from the otherwise flush surfaces, is time-consuming and consequently very costly, because the foam injection mold is not immediately available for reuse in the production process.

A comparable process is known from WO-A-86/03164, in which a magnetic strip as a ferromagnetic adhesive element is ultrasonically fused into an adhesive seal constructed of multiple layers. When this state-of-the-art adhesive sealing element is arranged in a recess within the foam injection mold, the metal strip is held by the magnetic and retaining mechanisms arranged in the center of the recess and the state-of-the-art adhesive sealing element with its edge cover is supported on each side of the mold recess in the foam injection mold on the top surface in the wall of the mold and is supported and projects over this top surface in the wall of the mold. The actual sealing elements of the adhesive sealing element, which are to be kept free of foam material to ensure later trouble-free contact with the corresponding material of the adhesive sealing element of the upholstery material or the like, again, as described in the state of the art described above, are arranged within the recess and the loop elements on the back of the adhesive sealing

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element, the loop elements being arranged extending all the way through, to allow improved contact of the foam material and concomitantly improved hold of the adhesive sealing element with the foam component to be produced. The increased cleaning requirements of this solution is disadvantageous as well with respect to the recess provided in the foam injection mold.

Based on this state of the art, the invention is based on the problem of developing a process which permits relatively simpler and more cost-effective production of foam components with injection-molded adhesive elements.

It is claimed for the invention that this problem is solved by means of a process as described above characterized in that the adhesive elements are mounted in one plane with the edge cover of the adhesive sealing component in contact with the foam injection mold and that the ferromagnetic components are constructed as integrated parts of the adhesive sealing element or are applied as layers on the front and/or back of the adhesive sealing element. This permits construction of the foam injection mold without a recess, because the adhesive elements are contact-mounted in one plane of the foam injection mold with the edge cover of the adhesive sealing element. When cleaning the foam injection mold, there is no need for the costly cleaning of the mold recesses at all and the foam injection mold is promptly available for the actual production process. Since the ferromagnetic components, even in the shape of applied layers, widen the adhesive sealing element only minimally, the edge cover also structurally builds up minimally and permits direct contact with the retaining elements of the foam injection mold generating magnetic fields.

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Accordingly, in one aspect, the invention provides a process for producing a foamed part which has at least one adhesive closing part with adhesive elements which are held in a foaming mould generating the foamed part covered by a foam-protecting cover with ferromagnetic components, whereby the cover is constituted by the adhesive closing part itself with a lateral cover, the width of which can be chosen to suit, overlapping the surface area on which the adhesive elements are arranged and are in releasable contact with the foaming mould, wherein the adhesive elements are arranged on one plane with the lateral cover of the adhesive closing part in contact with the foaming mould the ferromagnetic components are in the form of an integral part of the adhesive closing part or are applied as layers on its front or back.

In another aspect, the invention provides an adhesive closing part for using in the process as previously described, whereby the adhesive closing part has adhesive elements covered by a foam-protecting cover with ferromagnetic components, which forms a lateral cover overlapping the surface area on which the adhesive elements are arranged, wherein, with the detachable contact between the adhesive closing part and the foaming mould achievable by the interaction of the ferromagnetic properties of the cover and the foaming mould, the adhesive elements are in one plane with the lateral cover, and in that the ferromagnetic components are formed as an integral part of the adhesive closing part or as layers applied to its front or back.

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The invention is explained in detail in what follows with reference to the drawing, in which

Figures 1 and 2 present a diagrammatically simplified front view of the foam injection mold with adhesive sealing component to be injected into the mold.

The adhesive sealing component 1 in question as shown in the figures serves the purpose in particular of foam injection in production of upholstered parts of motor vehicle seats (not shown). The strip-type adhesive sealing component 1, but also one which may have a different two-dimensional geometry, has on one side adhesive elements 2 for joining to corresponding adhesive elements of another adhesive sealing component (not shown) to form a conventional adhesive seal. In this way cushions and cushion upholstering materials may then be separably

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secured in position on the foamed motor vehicle seat by way of the respective adhesive seal.

The adhesive sealing component 1 shown in the figures is produced by a conventional process, such as one specified in DE 196 46 318.1. The adhesive elements 2, according to Figure 1 shown in the form of mushroom-like stalks the free ends of which spread out in the form of plates. The adhesive elements 2 may, however, also consist, as is illustrated in Figure 2, of conventionally produced loops serving the purpose of engagement of hook-shaped adhesive elements (not shown) of the corresponding adhesive sealing component to produce an adhesive seal.

As the figures also show, the particular adhesive sealing component 1 with its adhesive elements 2 covered by a foam restraining cover 3 is received into a foam injection mold 4 producing the foamed component (not shown), a mold of which only more or less one-half is shown in the figures as part of a molding box. It is claimed for the invention that the cover 3 is in the form of the adhesive sealing component 1 itself, which is mounted to extend, together with a variable-width edge cover 5, to form a sealing surface over the surface area having the adhesive elements 2, and is brought, together with a retaining mechanism identified as a whole as 6, into separable contact with the foam injection mold 4.

As is to be seen from the figures, the adhesive elements 2 are mounted in one plane with the edge cover 5 of the adhesive sealing component 1 in contact with the foam injection mold 4 so that the surface area with the adhesive elements 2 curves upward as viewed in the line of sight to the figures. The planes in

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question relate to the frontal contact surface of adhesive sealing components 1 with their adhesive elements 2.

At the minimum the edge cover 5 of the adhesive sealing component 1, but preferably the entire width and length of the adhesive sealing component, have ferromagnetic components, and are used as one part of the retaining mechanism 6 the other part of which belonging to the foam injection mold 4 is in the form of retaining elements 8 mounted on it to generate a magnetic field, ones on which the edge cover 5 is retained during the foam injection process to form a foam barrier or sealing lip. The edge cover 5 is made up at the minimum of two lengthwise edges of the adhesive sealing component 1 which, free of the adhesive elements 2 between them are provided with a surface area having adhesive elements 2. Preferably, however, the edge cover 5, entirely rectangular in shape, includes the surface area with adhesive elements 2 in all directions.

The ferromagnetic components claimed may be applied as an integral part of the adhesive sealing component or as layers applied to the front and/or back of the component. The coating in question is preferably obtained by a sol-gel process or from an adhesive base material.

A sol-gel process suitable for production of adhesive sealing components 1 is described in PCT/EP 98/03055. The layer 9 obtained by way of the sol-gel process has a nanocompository structure, the sol-gel based on SiO_2 and/or TiO_2 modified SiO_2

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being selected. In order for the layer 9 in question to possess ferromagnetic properties, the sol-gel is mixed with ferrite or a material containing ferrite with the structure $\text{Fe}_x \text{O}_y$. Magnetite may also be precipitated to obtain a ferromagnetic sol-gel. The layer 9 may be applied by padding, dipping, spraying, perfusion, vacuum metallizing, lamination, or wiping and pasting on the adhesive sealing component 1.

The layer 9 in question may, however, also consist of an adhesive base material of resorcin and/or at least one of its derivatives. In particular the layer in question of an adhesive base material may be represented by a polyurethane layer containing a ferromagnetic, the polyurethane being represented, for example, by the polyurethane SU 9182 made by the Stahl company. A suitable adhesive base is described in PCT/EP 98/02886.

The retaining elements 8 of the foam injection mold 4 generating the magnetic fields are in the form of permanent magnets, for example ones in the form of magnetic strips 10 or bar magnets (not shown) introduced into the foam injection mold 4 or parts of the latter (pipes). The magnetic force of the retaining elements 8 used holds the adhesive sealing components 4 with their ferromagnetic properties or layers of them used for the purpose together in firm contact and in position inside the foam injection mold 4 during the foam injection process; the relevant cover 3 forms a sealing surface or foam barrier in the area of the relevant edge cover 5 reliably preventing harmful penetration of the foam material into the adhesive elements 2. This dispenses with the need for any coverings on the back of the adhesive sealing component 1 or ones in the form of a sealing

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compound used directly for the adhesive elements 2. As is to be seen from the figures, the edge coverings 5 end in the area of the magnetic strips 10 or they extend beyond this area to form an extended sealing length. The layers 9 claimed may in addition improve the foam injection process so that reliable injection of the adhesive sealing component 1 into the polyurethane foam material of the vehicle upholstery element is ensured, especially if the layers 9 are applied to the back of the relevant adhesive sealing component 1 facing away from the injection mold 4.

The adhesive sealing component 1 consists in particular of a polyamide or of a polyolefin material. In the case of the conventional production process described in DE 196 46 318 A1, in production of the adhesive sealing component 1 with its plurality of one-piece adhesive elements 2 in the form of stalks with thickened areas a thermoplastic material in plastic or liquid state is delivered to a gap between a press roller and a section roller, the section roller being provided with cavities opening outward and inward and both rollers being driven in opposite directions. The section roller has a screen the openings in which are produced by etching or by means of a laser, the adhesive sealing elements resulting exclusively from the circumstance that the thermoplastic material hardens in the openings in the screen. The thickened areas of the individual stalks in question are in the form of mushroom heads flattened or having concave recesses.

Other state-of-the-art processes may be applied in order to produce loops as adhesive elements 2 as illustrated in Figure 2. In any event, the section rolling process claimed may be applied to produce very small individual adhesive elements 2 whose size

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may fall entirely in the nanometer range. In place of the plastic material claimed, the adhesive sealing component 1 may also be made of textile or other plastic materials, for example by applying conventional knitting techniques. Should these materials have to be provided with ferromagnetic coatings, a sealing foam barrier may also be obtained. After the foam injection process has been completed, the foamed part, an upholstery element in particular, along with the injected foam adhesive sealing component 1 in it, can be immediately removed from the foam injection mold 4 by overcoming the retaining forces of the retaining elements 8 installed in the foam injection mold. The foam injection mold 4 is then available for repetition of the foam injection process. The adhesive elements 2 of the injected-foam adhesive sealing component 1 are then in any event free in the direction of the environment and contain no foam material which might impair their functional efficiency.

In sealing by means of the adhesive sealing component 1 itself from the foam material, no additional materials or additional sealing elements, such as added sealing lips or the like, are required; sealing is rather accomplished exclusively by plane-parallel contact of the adhesive sealing strip with corresponding contact surfaces of the foam injection mold. The edge cover 5 of the adhesive sealing component 1 which effects sealing may be in the form of a foil or at least very thin sheet material.

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The embodiments of the present invention in which an exclusive property or privilege is claimed are defined as follows:

1. A process for producing a foamed part which has at least one adhesive closing part with adhesive elements which are held in a foaming mould generating the foamed part covered by a foam-protecting cover with ferromagnetic components, whereby the cover is constituted by the adhesive closing part itself with a lateral cover, the width of which can be chosen to suit, overlapping the surface area on which the adhesive elements are arranged and are in releasable contact with the foaming mould, wherein the adhesive elements are arranged on one plane with the lateral cover of the adhesive closing part in contact with the foaming mould the ferromagnetic components are in the form of an integral part of the adhesive closing part or are applied as layers on its front or back.
2. A process according to claim 1, wherein at least the lateral cover of the adhesive closing part has ferromagnetic components and is used as a part of the fixing device, the other part of which associated with the foaming mould is formed by the holding elements generating magnetic fields at which the lateral cover is held during the foaming process.
3. A process according to claim 1 or 2, wherein the lateral cover is formed by two longitudinal edges of the adhesive closing part which having no adhesive elements between them are provided with the surface area with the adhesive elements.

4. A process according to any one of claims 1 to 3, wherein the respective layer is obtained by the Sol-Gel method or is formed of an adhesive primer.
5. A process according to any one of claims 2 to 4, wherein the holding elements of the foaming mould are made of permanent magnets for example in the form of magnetic bars or bar magnets inserted into the foaming mould or its parts.
6. A process according to any one of claims 1 to 5, wherein the adhesive closing part is made of a polyamide or polyolefin material or at least partly of textile materials.
7. A process according to any one of claims 1 to 6, wherein the product is a foamed upholstery part for a car seat.
8. An adhesive closing part for using in the process according to one of the claims 1 to 7, whereby the adhesive closing part has adhesive elements covered by a foam-protecting cover with ferromagnetic components, which forms a lateral cover overlapping the surface area on which the adhesive elements are arranged, wherein, with the detachable contact between the adhesive closing part and the foaming mould achievable by the interaction of the ferromagnetic properties of the cover and the foaming mould, the adhesive elements are in one plane with the lateral cover, and in that the ferromagnetic components are formed as an integral part of the adhesive closing part or as layers applied to its front or back.

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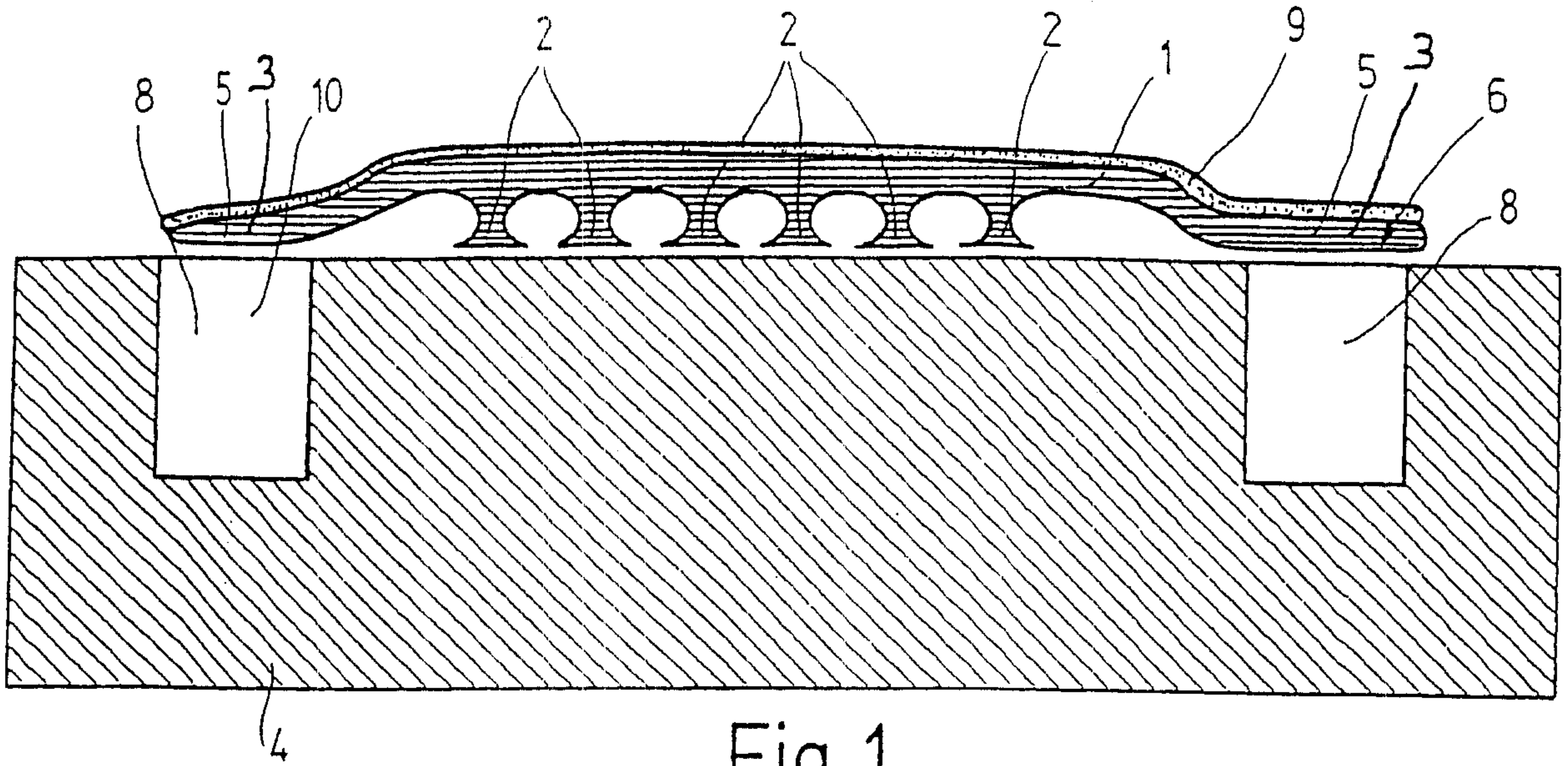


Fig. 1

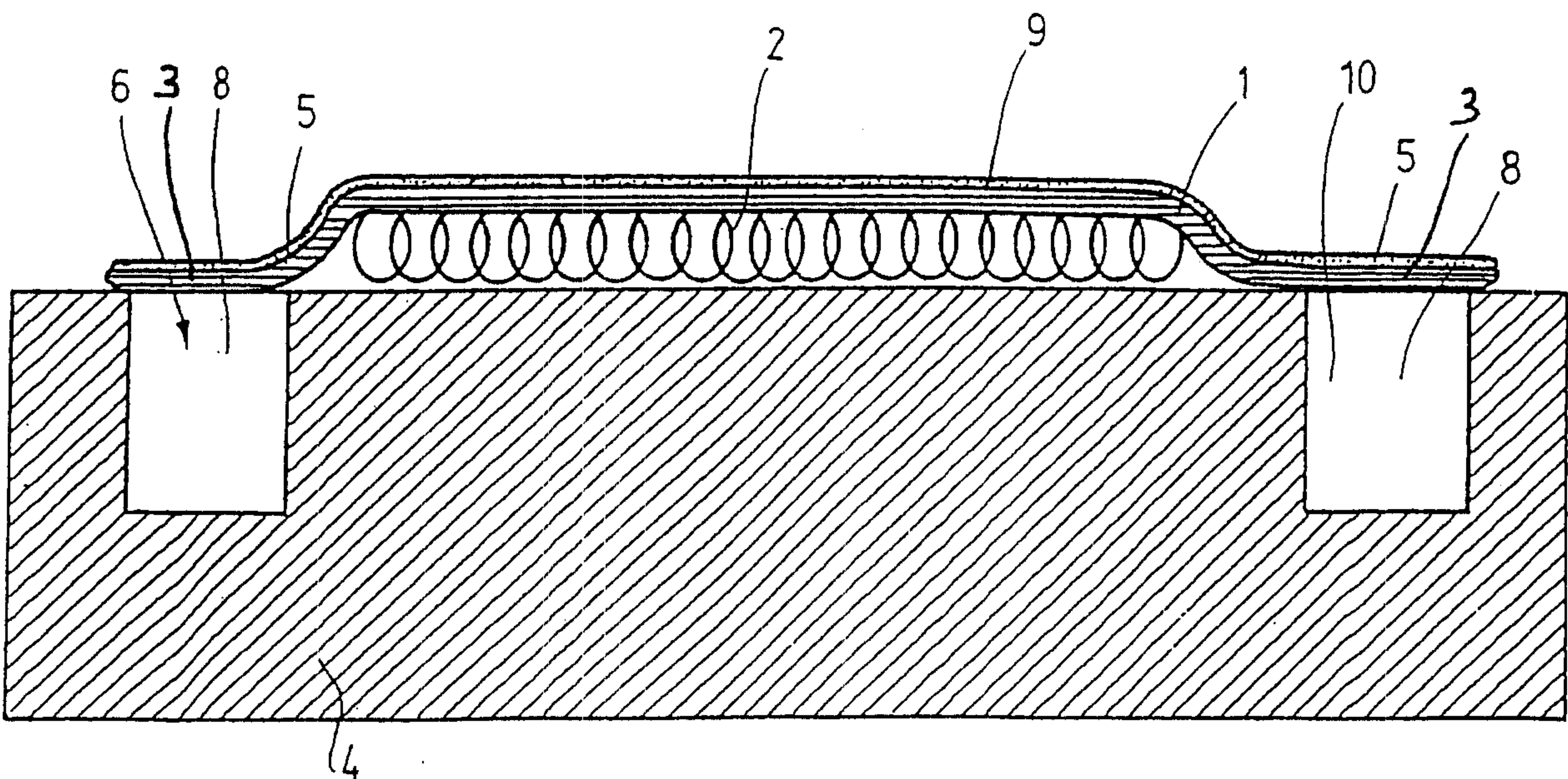


Fig. 2

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