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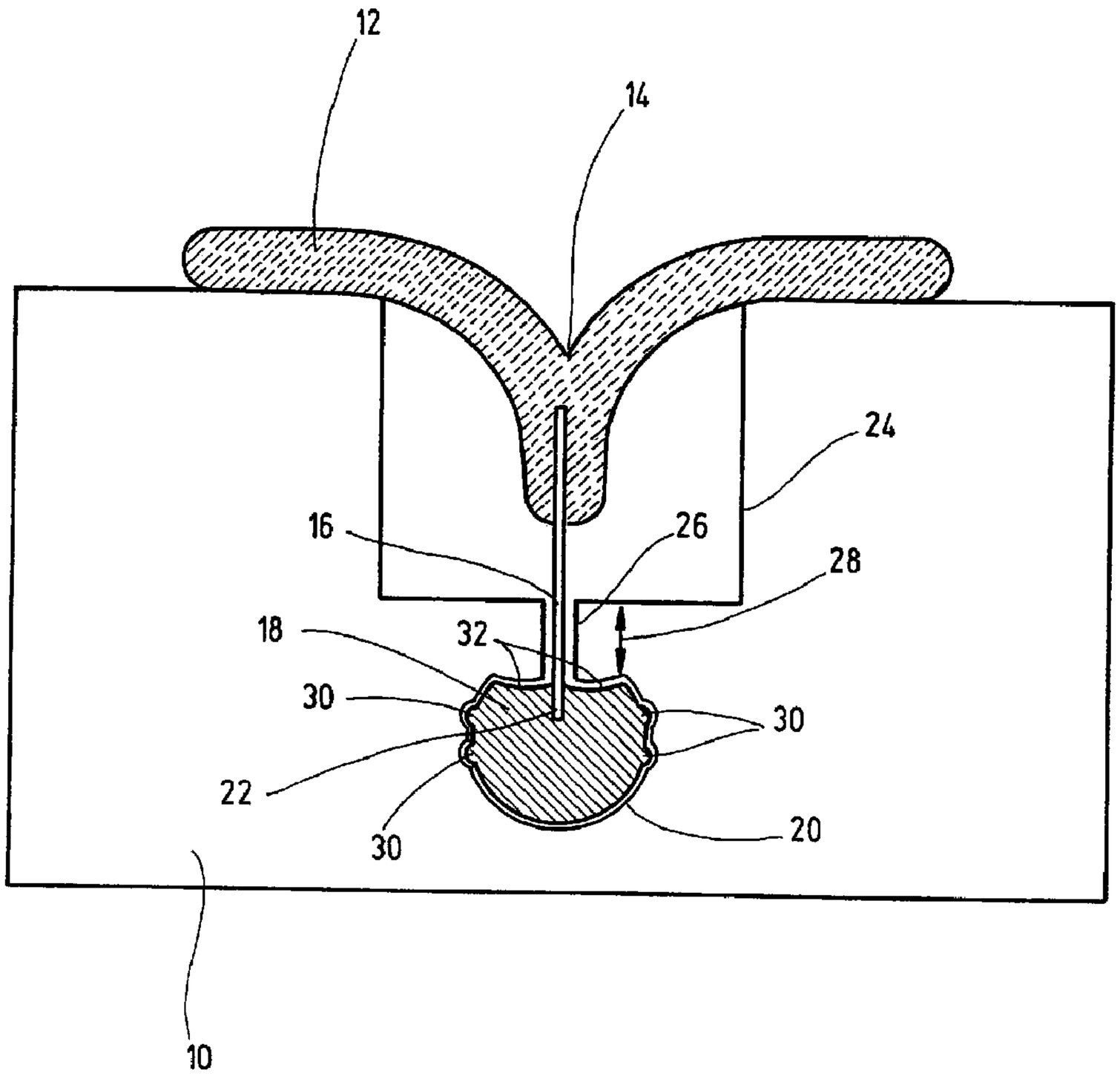
(54) Titre : PROCEDE DE FABRICATION D'UNE BAGUETTE PROFILEE SOUPLE
(54) Title: METHOD FOR PRODUCTION OF A FLEXIBLE SHAPED STRIP



(57) Abrégé/Abstract:
The invention relates to a method for the production of a flexible shaped strip (18), which is made of plastic, for a fixing system. Said fixing system serves to fix a cushion cover (12) to a cushion component (10), which consists of a foam material and comprises a

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(57) Abrégé(suite)/Abstract(continued):
longitudinal channel (20), for insertion of the shaped strip (18), with, at least partly, a slip preventer to increase the tear resistance from the cushion component (10). The invention is further characterised by a method for production of a shaped strip with clearly greater tear resistance than for conventional methods, whereby the anti-slip component is made of a plastic softer then that used for the shaped strip (18) and the anti-slip component is, at least partly, arranged around the outer surface of the shaped strip.

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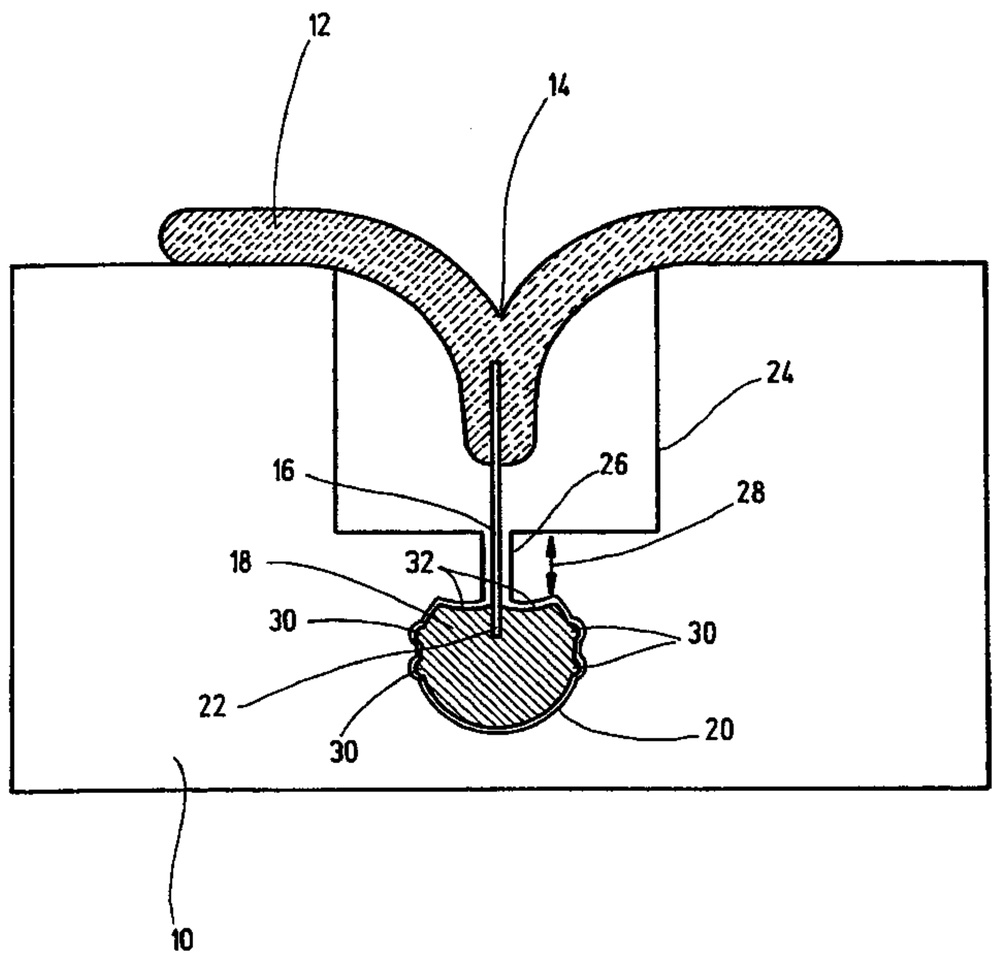
[Fortsetzung auf der nächsten Seite]

(54) Title: METHOD FOR PRODUCTION OF A FLEXIBLE SHAPED STRIP

(54) Bezeichnung: VERFAHREN ZUM HERSTELLEN EINER FLEXIBLEN PROFILLEISTE



(57) Abstract: The invention relates to a method for the production of a flexible shaped strip (18), which is made of plastic, for a fixing system. Said fixing system serves to fix a cushion cover (12) to a cushion component (10), which consists of a foam material and comprises a longitudinal channel (20), for insertion of the shaped strip (18), with, at least partly, a slip preventer to increase the tear resistance from the cushion component (10). The invention is further characterised by a method for production of a shaped strip with clearly greater tear resistance than for conventional methods, whereby the anti-slip component is made of a plastic softer then that used for the shaped strip (18) and the anti-slip component is, at least partly, arranged around the outer surface of the shaped strip.

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METHOD FOR PRODUCTION OF A FLEXIBLE SHAPED STRIP

The invention concerns a method for the producing of a flexible moulding of plastic for a fixing system for holding an upholstery cover.

According to a method described in DE 198 08 995 C1 a longitudinal channel equalling the form of the relevant moulding is inserted into an upholstery part, whereby the same incorporates recesses in a longitudinal direction, into which hook elements affixed to the moulding engage. The known method further incorporates the insertion of the foam material in such a way that the upholstery part directly encloses the moulding, so that a good engagement of the hooks of the moulding with the upholstery part can be achieved. The adhesive force of the moulding within the upholstery part are created substantially by the adhesion force between the surface of the moulding and the associated foam material. The known solution further suggests an anti-slip construction of the moulding in order to increase the pull-out force of the same; this will however lead to relatively soft mouldings, where the desired increase of the pull-out force is not achieved. A further possibility is based on the fact that the pull-out forces can be increased when harder foam is chosen for the construction of the upholstery part. The manufacturing of such a harder foam is usually relatively easy with the aid of variations of the polyol and the hardener as well as their percentage composition. A harder foam will however lead to a reduction in seating comfort, which is not desirable.

DE-A-198 15 838 offers a generic method where an anchoring element of the type of a hollow moulding is formed from two different components, whereby the first component consists of a fixed elastic plastic and forms a barb as well as two barb arms and associated film hinges. The second component consists of an elastic rubber plastic and forms a material strip, with which the cover of the upholstery part can be connected with the anchoring element, as well as two cross profile sections which follow the barb arms. The known anchoring element is formed with the aid of co-extrusion of the two different plastic types, whereby a convex arcing of the two barb arms facilitates an easier insertion into a groove within the upholstery foam of an upholstery part. The plastic utilised for the manufacture of the barb arms is further relatively smooth, so that the outside of the barb arms incorporate a low friction surface which can glide along the groove surface with little resistance. The cross profile sections however incorporate a

concave arcing, whereby the cross profile sections meet the ends of the barb arms almost at right angles, whereby a moulding edge is created within the two transition areas.

The elastic rubber plastic from which the cross profile sections are manufactured, and which is softer than the fixed elastic plastic of the barb arms and the barb shaft, provides substantial adhesion to the foam material of the upholstery part, so that the adhesion forces between the anchoring element, which are substantially due to the form fit of these two elements, are supported by the friction fit within this area. Even though the known solution provides sufficiently high pull-out forces it consists of a substantial geometric form. The fact that the centrally located bridge-like barb shaft especially is constructed from a fixed elastic plastic means that seating comfort for the seat user will be reduced.

Based on this prior art it is the purpose of the invention to offer a method for the producing of a flexible moulding, with which very high pull-out forces can be achieved for the flexible moulding within the upholstery part without a reduction in the seating comfort. This task is solved in accordance with an embodiment of the invention which provides a method of producing a flexible moulding of plastic for a fixing system for holding an upholstery cover to an upholstery part consisting of a foam material and provided with a longitudinal channel for the flexible moulding to engage in, the flexible moulding comprising, at least partly, an anti-slip device to increase the pull-out force from the upholstery part; said method comprising applying the anti-slip device, at least partly, on the outside of the flexible moulding by means of an extrusion process or a coating process, wherein the anti-slip device comprises a plastic material softer than the plastic of the moulding.

The fact that the anti-slip device is at least partially affixed around the outer circumference of the flexible moulding, and that this is effected with the aid of an extrusion or coating process, represents a modification of the surface consistency of the moulding, whereby measurements have shown that the pull-out forces are substantially higher than those of comparable processes without anti-slip coatings. Due to the envisaged anti-slip device it is possible to use hard plastic materials such as high density polyethylene for the moulding, as the anti-slip characteristic is incorporated into the moulding with the aid of an extrusion or coating process.

Especially high pull-out forces can be created as long as a plastic material whose Shore A hardness is preferably smaller than 150, and more preferably 30 to 60, and especially 60, is utilised for the anti-slip device for method of this invention.

An especially preferred embodiment of the method of this invention incorporates the anti-slip plastic material, which is affixed to the plastic moulding with the aid of an extrusion process, and especially a co-extrusion process. The use of EPDM rubber has proven itself to be especially suitable here.

Another preferred embodiment of the method of this invention incorporates the anti-slip plastic material, which is affixed to the plastic moulding with the aid of a hot coating process. The coating may especially consist of weakly adhering adhesives based on synthetic rubber.

A further preferred embodiment of the method of this invention incorporates the anti-slip plastic material, which is affixed to the plastic moulding with the aid of a spray coating process. With this aforementioned process very thin layers are affixed to the moulding one after the other through spraying, and the coating material preferably consists of a one-component adhesive based on nitrile rubber made from an organic solution.

A further preferred embodiment of the method of this invention incorporates the anti-slip plastic material, which is affixed with the aid of a conventional coating or rotogravure process, whereby the applied coating is cured with the aid of ultraviolet light and/or with the aid of an electron ray source. The viscosity of the anti-slip material can be adjusted with the aid of a reactive thinner in this way.

The method of this invention will now be described in more detail.

The single enclosed drawing shows a principle illustration of a section of a seat part, which is not to scale.

The fixing system illustrated on this drawing serves for the vehicle seat, whereby the description vehicle seat also includes airplane seats. The vehicle seat incorporates at least one upholstery part (10), for example within the area of the seat surface or the back rest. The upholstery part (10) consists of a foam material, especially a PU foam. The aforementioned foam incorporates fine pores. An upholstery cover (12) is provided for the covering of the upholstery part (10) on the side that faces in an outward direction towards the surrounding area, whereby the same is represented only schematically on the drawing and may for example consist of a suitable fabric or leather material. The

upholstery cover (12) is stretched with the aid of a decorative or stretch seam (14) towards the upholstery part (10) and is further equipped with a flexible moulding (18) serving as an anchoring mechanism via a sewing tab (16) of material, fleece, metal mesh, plastic material or similar.

The foam material of the upholstery part (10) incorporates a longitudinal channel (20) for the engaging of the flexible moulding (18), which engages the flexible moulding (18). The flexible moulding (18) is flexible at least in a longitudinal direction and constructed from a plastic material, for example from a soft PVC of the type 740012 available from the company Decelith, or from a harder high density polyethylene HDPE, for example of the type 65428 available from the company Schulmann. The flexible moulding (18) incorporates an insertion slot (22) into which the sewing tab (16) is inserted in a bridge-like fashion. The upholstery cover (12) is firmly connected to the other end of the sewing tab (16) with the aid of a sewing or an adhesive process. Otherwise the sewing tab (16), especially in the direction of application, takes a longitudinally elastic form.

An expansion (24) is envisaged for the insertion of the decorative seam (14) with the sewing tab (16) into the foam material of the upholstery part (10), whereby the same opens out into the surrounding area towards the outside and into a bridge-like profile recess (26) towards the inside, whereby the same serves as a projection for the sewing tab (16), and whereby the same further opens out into the longitudinal channel (20) with its other end. The foam material is compressible within predictable areas, and the flexible moulding (18) can therefore be inserted gradually by hand, and also removed again in a similar fashion from the relevant longitudinal channel (20) if a change of cover material, a repair, or similar measures are required.

The possible insertion depth (28), which is indicated by the double arrow on the drawing, can no longer be varied as desired with modern vehicle seats, as the upholstery parts (10) are now constructed quite thinly, which results in the fact that a very thin profile cross-section must also be chosen for the flexible moulding (18) in order to avoid that an uncomfortable seating sensation is created by the quite hard flexible profile during the use of the seat. As the cross-sections of the flexible moulding (18) will then necessarily be of a quite weak dimension, i.e. as they can no longer be chosen as large as desired, it is necessary to anchor the flexible moulding (18) safely within the foam material despite the low profile strength, so that an unintentional pulling out is avoided,

which would in turn lead to a loosening of the upholstery cover (12). In order to increase the pull-out forces it is also possible to equip the outer circumference of the flexible moulding (18) with hook elements (30) as additional anti-slip devices, whereby the same would engage the foam material, and whereby the foam material would preferably incorporate corresponding groove-like recesses. Details concerning a fixing system of the aforementioned type are listed in DE 198 08 995 C1.

In order to increase the pull-out resistance of the solid moulding (18), which can also take the form of a hollow chamber profile (not illustrated here), anti-slip coatings are applied onto the said moulding (18). The layer thickness of the aforementioned anti-slip material is so low that it has not been illustrated within the simplified drawing. Especially suitable for this anti-slip device are synthetic materials whose Shore A hardness is smaller than 150, preferably 30 to 60, and especially 60. This soft synthetic material incorporates a better adhesion of the foam material to the coated moulding (18). The extremely soft plastic is preferably applied with the aid of the co-extrusion process within the rear undercut (32), which supportingly engages the vane-like extensions on the upper surface of the longitudinal channel (20). A further suitable plastic type consists for example of EPDM rubber available from the company Macromas. EPDM rubber is created through the terpolymerisation of ethylene and large parts of propylene as well as a certain percentage of a rubber created with a third monomer with a diene structure, where the diene monomer provides the double connections necessary for the subsequent sulphur vulcanisation.

A further possibility of applying an anti-slip coating is represented by the heat melt coating process, for example with a weakly adhering adhesive based on a synthetic rubber, which is available under the trade name "Lunatack AS 3916" from the company H.B. Fuller amongst others. The material is applied with the aid of nozzles or rollers at 150 to 175°C. The viscosity at 175°C will be approximately 14,000 mPas, whereby the melting point will be approximately 117°C. The viscosity is determined according to DIN 53018, and the melting point according to DIN 52011.

A further method envisages a spray application, whereby very thin layers are created upon the moulding (18). This method preferably utilises a one-component special adhesive based on nitrile rubber made from an organic solution, for example of the type 1475 available from the company Bostik. The aforementioned special adhesive consists of a type which can also be utilised as a two-component adhesive. This adhesive

incorporates a nitrile rubber basis, and ketones or ester are preferred solvents. The viscosity is approximately 3100 mPas.

A further coating method utilises a UV curable composition, for example 85% Ebecryl 4835 as a reactive oligomer diluted with 15% Ebecryl 111 as a reactive thinner for the adjustment of the viscosity of the anti-slip synthetic material. The aforementioned products are available from the company UCB.

The above mentioned application methods make it possible to equip the flexible mouldings of conventional fixing systems with substantially higher pull-out forces, so that a safe anchoring of the moulding (18) within the foam material is guaranteed. Despite the increased adhesive forces the moulding (18) can be easily removed from the foam material, which would not be possible if the moulding (18) were glued firmly into the foam material. Depending on the chosen material combination the aforementioned fixing system can also be disposed of or recycled in an environmentally friendly way.

A further preferred embodiment of the present invention provides a method wherein the anti-slip plastic material is applied with the aid of a dip coating process. This involves the application of a coating material, which preferably consists of a one-component adhesive based on nitrile rubber made from an organic solution. If desired the moulding can be routed to a further dip basin during the so-called evaporation period, whereby the same contains flakes of mostly PU foam of fibres. These flakes enter into a permanent connection with the moulding to form an anti-slip layer.

arranged to receive the passage of sewn-on seat fastening clip 16 and which with its other end in turn is opened into longitudinal passage 20. Since the foam material is compressible within a predeterminable range, shaped strip 18 can be inserted manually in steps and also can be removed repeatedly from the associated longitudinal passage 20, insofar as material exchange, repair or the like is required.

The possible depth 28 at which the construction is built in, which is indicated in the drawing with a double arrow, with modern vehicle seats can no longer be varied optionally, since cushion components 10 are configured to be quite thin, with the result that a very thin cross section must also be selected for the shaped strip 18, in order during use to avoid the discomfort of sitting down on and feeling the shaped strip which in and of itself is hard. Since the cross sections for shaped strip 18 must then be of small dimensions and can no longer be selected to be of any optional desirable dimensions, therefore it is necessary, despite the narrowness of shaped strip 18, to anchor said strip securely in the foam material, in order to prevent an undesirable tearing out, which would lead to destruction of cushion covering 12. To increase the tear resistance, interlocking configurations 30 can also be provided on the exterior periphery of shaped strip 18, as further slip

prevention elements which engage in the foam material, whereby preferably in this case the foam material is accessible through corresponding channel-like cutouts. Individual features of such a fastening system can be obtained from DE 198 08 995 C1.

In order to increase the tear resistance for such a solid shaped strip 18, which also can be configured profiled as a hollow chamber, which is not shown, coatings of anti-slip components which are applied to shaped strip 18 serve to provide this function. The layer thickness of such an anti-slip components material is quite thin, so that for simplified representation it has simply been deleted from the drawing. Particularly plastic materials have been proven as favorable for use as anti-slip components, forming materials of which the Shore hardness is lower than 150, preferably between 30 and 60, and particularly preferably is 60. Improved adherence of the foam material to shaped strip 18 having the coating is obtained when soft plastic material is used for the coating. Preferably then the extremely soft plastic is applied by coextrusion in the area of the undercut 32, where the soft plastic engages and from below supports the wing-like widened areas on the top of longitudinal passage 20. As another plastic type, for example EPDM rubber of Firma Macromas can be used. By EPDM rubber is to be understood the

terpolymerization of ethylene and greater portions of propylene as well as a few percentage points of a third monomer rubber with diene structure, in which the diene-monomer provides the required double bonds for a subsequent sulfur vulcanization.

Another possibility for the application of anti-slip components coating is obtained by a hot melt coating method, for example using a weakly adhering adhesive on a base of synthetic rubber, which is widely available but particularly under the mark 'Lunatack AS 3916' from the H. B. Fuller Company. The processing occurs then through a spray-nozzle or roll application in an atmosphere of 150 to 175° C. The viscosity at 175° C is approximately 14,000 mPas, whereby the softening point is at about 117° C. The viscosity is then determined in terms of DIN 53018 and the softening point in terms of DIN 52011.

Another method provides a spray coating, whereby very thin layers are generated on shaped strip 18. Preferably in this case a one-component special adhesive material on nitrile-rubber-base from an organic solvent is used, for example Type 1475 of Firma Bostik. The aforementioned special adhesive is an adhesive of the type which can also be used as a two-

component adhesive. The adhesive is formed on nitrile rubber base and preferably ketones or esters serve as solvent medium. The viscosity is 3100 mPas.

With one further coating method, a UV-hardenable composition is used, for example 85% Ebecryl 4835 as reactive oligomer, with 15% Ebecryl 111 added thereto as reactive diluting medium for adjustment of the viscosity of the anti-slip components plastic material. The resulting products can be obtained from Firma UCB.

With the aforementioned application method the shaped strips can provide conventional fixing systems having remarkably higher tear resistance, so that a secure anchoring of shaped strip 18 in the foam material is guaranteed. Despite increased interlocking forces, shaped strip 18 without any further manipulation can be repeatedly detached from the foam material, which would not be possible if shaped strip 18 were securely cemented in the foam material. Dependent upon the selected combinations of materials, the resulting fixing system can also be disposed of in an environmentally compatible manner or can be recycled.

In the case of one further preferred embodiment of the method of the invention, the anti-slip components plastic material is applied by means of a dipping coating method. In this case the coating material being used is preferably a one-component adhesive nitryl rubber base out of an organic solution. Optionally during the so-called flash-off periods of time, the profile is fed through an additional dipping trough, which contains flakes or clots, consisting primarily of polyurethane foam or of fibers. Thus a tight connection of the flakes or clots with the profile is generated for the formation of an anti-slip layer.

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

1. A method of producing a flexible moulding of plastic for a fixing system for holding an upholstery cover to an upholstery part consisting of a foam material and provided with a longitudinal channel for the flexible moulding to engage in, the flexible moulding comprising, at least partly, an anti-slip device to increase the pull-out force from the upholstery part; said method comprising applying the anti-slip device, at least partly, on the outside of the flexible moulding by means of an extrusion process or a coating process, wherein the anti-slip device comprises a plastic material softer than the plastic of the moulding.

2. A method according to claim 1, wherein the plastic material used for the anti-slip device has a Shore A hardness of less than 150.

3. A method according to claim 2, wherein the Shore A hardness is in a range of 30 to 60.

4. A method according to claim 3, wherein the Shore A hardness is 60.

5. A method according to any one of claims 1 to 4, wherein the extrusion process applied is a co-extrusion process.

6. A method according to any one of claims 1 to 4, wherein the coating process is a hot coating process.

7. A method according to any one of claims 1 to 4, wherein the coating process is a spray coating or a dip coating process.

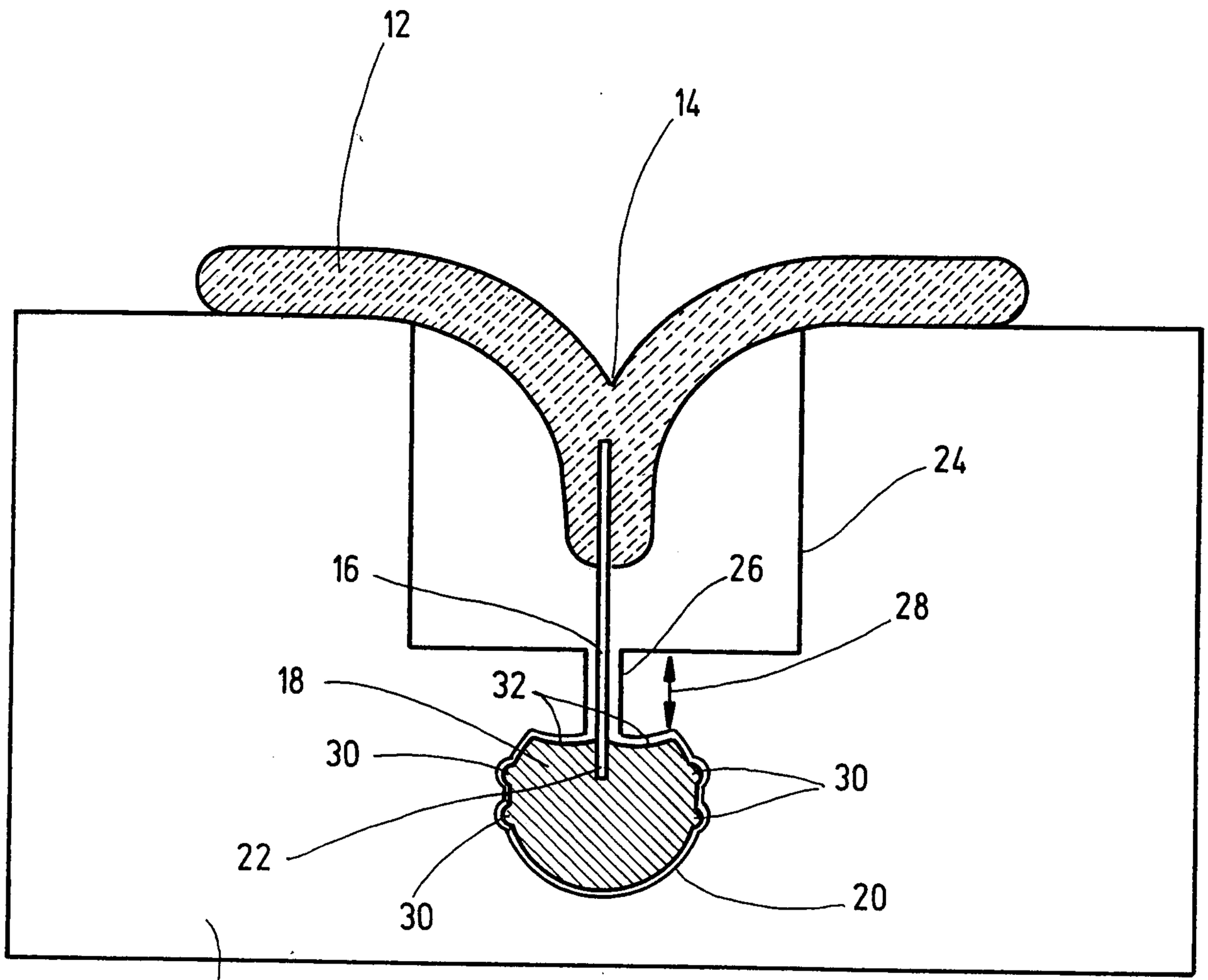
8. A method according to any one of claims 1 to 4, wherein the coating applied is cured by means of ultraviolet light and/or by means of an electron ray source.

9. A method according to any one of claims 1 to 8, wherein the plastic material is a rubber material.

10. A method according to any one of claims 1 to 9, wherein the plastic material is placed in an area of an undercut between the moulding and the foam of the upholstery part.

11. A method according to any one of claims 1 to 10, wherein the moulding is a round or T-profile section or a profile shape of the fastening wedge or a fastening anchor type.

12. A method according to any one of claims 7 and 9 to 11, wherein the plastic material is flocked onto the moulding in a dip coating operation.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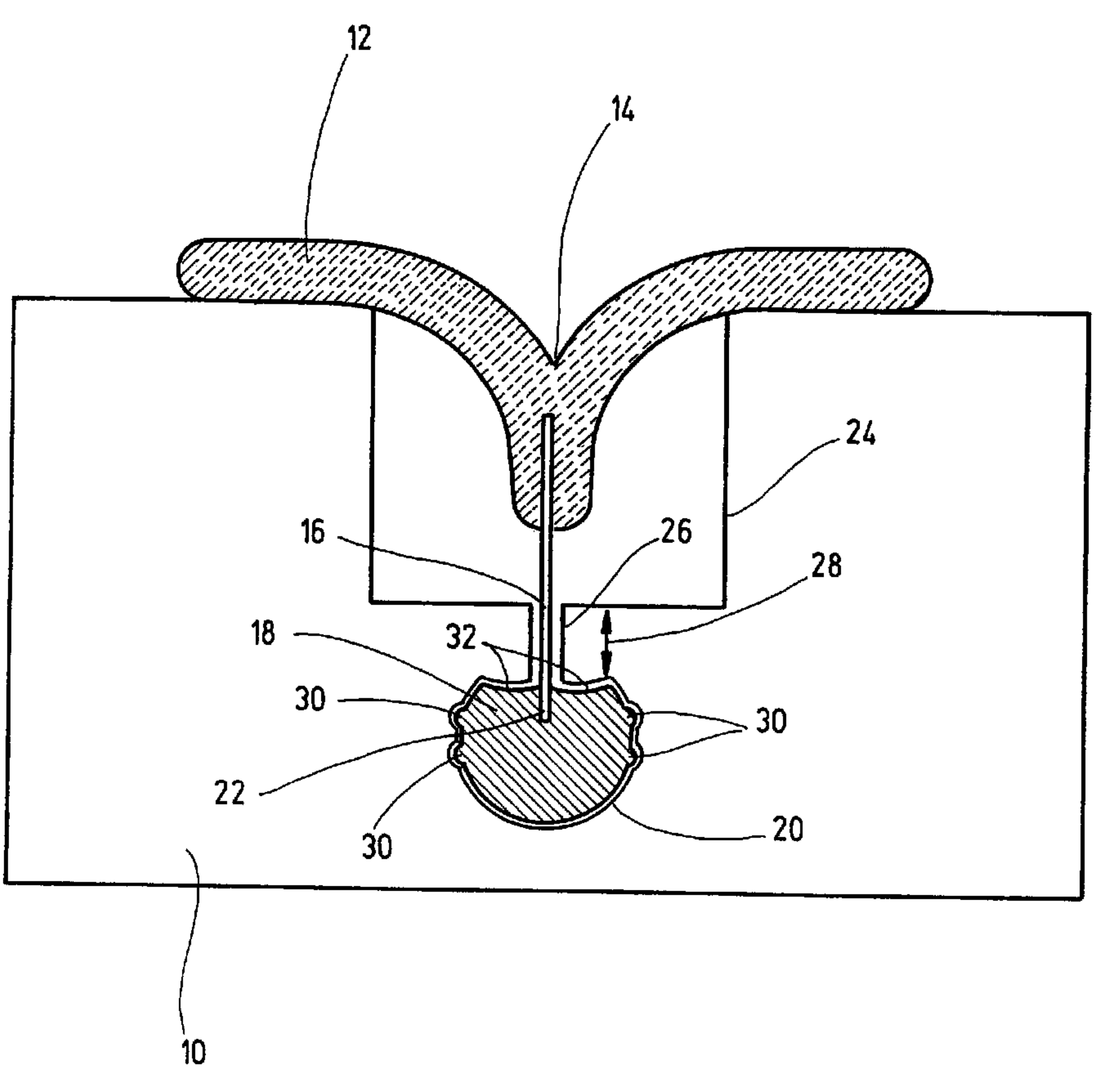
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