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US-B1- 6 569 374

The invention relates to a method for producing an adhesive fastener part made of at least one plastic material, wherein a backing part with a plurality of projecting stem parts is connected to individual head parts such that in at least
5 some of said stem parts the free ends of the latter are in contiguous or embedded contact with a contact side of the respectively assignable head part, during the process of connecting the stem parts and the assignable head parts the latter still being at least in the partially liquid or partially plasticised state and the head parts only being completely cured after connection. The
10 invention relates furthermore to an apparatus for producing an adhesive fastener part by means of the method.

These adhesive fastener parts, which also include mechanical fastening elements, form, with complementarily made adhesive fastener parts, a
15 fastener which can be repeatedly opened and closed, hooks or mushroom-like fastener parts interacting with loop-like fastener elements of another adhesive fastener part such as to form the adhesive fastener. Solutions are also known in which the same adhesive fastener elements of two different adhesive
20 fastener parts interact with one another (hermaphroditic fastener). US 2003/0126724 A1 discloses an adhesive fastener part with a surface-like backing part and a plurality of stem parts which are arranged as projections over the backing part and are each composed of a soft, elastically flexible resin material and a hard, solid resin material. Here the shaft of the stem part can be made of the hard resin or plastic material and its upper part can be
25 made of the soft resin or plastic material.

Furthermore, DE 699 22 264 T2 discloses supplying a belt-like backing part with a plurality of projecting stem parts to a moulding gap between heatable
30 moulding rolls, into which gap an additional moulding belt of plastic material can be supplied by an extruder device, which moulding belt, as the actual moulding tool with mould recesses, shapes the hot stem ends of the stem parts into head parts so as to thus obtain a mushroom-like adhesive fastener part. Since the aforementioned head parts in the known solution are formed from the plastic material of the stem parts, the head parts are of small

dimensions due to the low material charging in the free and so projecting head surface available for interlocking, and this adversely affects the required adhesion forces.

5 In contrast, US 6 180 205 B1 proposes a production method using a moulding roll in which a belt-like backing part can be connected to a plurality of hook fastener elements which can be given relatively large dimensions. For this purpose the moulding roll has on its outer periphery hook-shaped mould
10 recesses into which plastic material is pressed to fill the mould by means of a first extruder device. Excess plastic material on the outer peripheral side of the moulding roll is removed by a cutting removal device, technically called a doctor blade. By means of a second extruder device located downstream in the production direction, the backing part material is then applied and securely connected to the hook-shaped fastener parts during the cooling process of the
15 roll. A stripper roll then removes the finished fastener part from the moulding device. Due to the hook geometry, difficulties can arise here during the mould removal process and, furthermore, a relatively high proportion of plastic scrap is formed in the production process due to the use of the aforementioned doctor blade.

20

Furthermore, WO 2006/099000 A2 discloses spraying a belt-like conveyor device on its upper strand side with droplets of plastic material, the plastic material being moulded due to its surface tension into hemispherical shell bodies which are then securely connected on their arching upper side to a
25 belt-like backing part such as to form the adhesive fastener part. In a development of this solution it is also possible, in the manner of thickened stem parts, to supply a belt-like backing part which on its upper side already bears grain-shaped agglomerates as the stem parts onto which the half shell-shaped head parts can then be placed. The adhesive fastener part produced
30 in this way, and which is intended to be used in particular as a fastener for babies' nappies and incontinence pads, is however made relatively stiff and leaves much to be desired with respect to the fastener characteristics. US 2006/0220271 A1 discloses a comparable solution which makes provision, however, for a moulding tool in the form of a moulding roll with corresponding

mould recesses instead of a belt for the production of the half shell-shaped fastener elements. In this respect, stem parts between the head parts and the backing part are not produced with this known solution.

5 American Patent 5 785 784 discloses a production method for producing a belt-like backing part on which a plurality of projecting stem parts are located. In a downstream production step the free stem ends are heated and then thicken due to the surface tension of the plastic material, in particular into a hemispherical head part. If, in a continuation of the known solution, the head
10 parts which can be produced in this way are reshaped by means of a so-called calander rolling method, widened head part geometries are formed which, with respect to the low material charge however, are still made with relatively small dimensions and are only widened in the direction of the earlier rolling.

15

A method of the type specified at the start is disclosed by US 2004/0134045 A1. In the known method for producing an adhesive fastener part with a plurality of interlocking means made integrally with a backing in the form of stem parts that have interlocking heads at the end, the interlocking heads are
20 each provided at least partially with an additional head part made from an additional material. Since the respective additional head part is formed from a duroplastic moulded mass as an additional material, an adhesive fastener system is created which on the one hand can withstand high temperatures and mechanical stresses, and on the other hand, with an appropriate
25 configuration, leads to better adhesive and peel strength values.

The interlocking means produced in the conventional manner consist of individual stem parts at the free ends of which there are plate-like interlocking heads. The materials forming the additional head parts are applied to the
30 interlocking heads by means of an applicator roll. The typically used acrylate material has a consistency and viscosity similar to honey and forms a type of application bath between the applicator roll and a counter roll and can be passed on successively here from the applicator roll to the adhesive fastener part. The surface tension of the acrylate material is chosen such that a type

of drop formation is achieved with the consequence that the head parts form hemispherical caps on the interlocking heads. In order to cure the additional material forming the additional head parts energy is advantageously supplied to the interlocking heads, for example in the form of UV radiation and/or in the
5 form of heat.

On the basis of this prior art it is the object of the invention to further improve the known solutions while retaining their advantages, and in particular to devise a functionally reliable adhesive fastener with low production costs, and
10 the fastening characteristics of which can be adjusted within broad ranges. This object is achieved by a method having the features of Claim 1 and an apparatus having the features of Claim 4.

The method according to the invention serves to produce an adhesive
15 fastener part, preferably made of at least one plastic material, which is characterised in that the head part material is prepared in a moulding tool that has a plurality of individual mould recesses configured according to the respective head geometry and that the free ends of the stem parts come into contact with the still at least partially liquid or partially plasticised contact sides
20 of the head parts and/or are embedded in the head part material when moved towards or introduced into the mould recesses.

By subsequently placing separately produced head parts on the free end side of the assignable stem parts, different material components of the stem parts
25 can be combined with head parts in very wide ranges, and likewise, different geometries for head parts and/or stem parts can be defined. Due to the plurality of possible combinations a plurality of technical parameters can thus be set in the adhesive fastener part produced in this way. The method according to the invention is moreover reliable in application and can be
30 produced economically.

An apparatus proven to be especially economical for carrying out the method has for the individual head parts a moulding tool with a plurality of mould recesses corresponding to the respective head geometry, and a supply device

for the already finished backing part with the stem parts the free ends of which can be inserted into the mould recesses by means of the supply device.

5 A particularly serviceable and mechanically durable adhesive fastener part is produced if the stem parts and head parts are made of plastic materials which are different from one another, in particular if the stem parts are formed from a thermoplastic and the head parts are made of acrylate material. The relatively hard acrylate material for the respective head part permits resistant hooking underneath for the loops of a corresponding adhesive fastener part so that an
10 adhesive fastener structured in this way enables very high adhesive and peeling strength values.

Further advantageous embodiments of the solution according to the invention are the subject matter of the other sub-claims.

15

In the following the solution according to the invention will be described in more detail by means of an exemplary embodiment according to the drawings. These show in principle and not to scale as follows:

20 Fig. 1 part of the production apparatus according to the invention; and

Figs. 2 and 3 a side view of different embodiments of the adhesive fastener part that can be produced.

25 In the following the method according to the invention will be described in more detail by means of the production apparatus according to Fig. 1. The method according to the invention is used to produce an adhesive fastener part identified as a whole by 10 wherein a belt-like backing part 12 is connected to a plurality of projecting stem parts 14 with individual head parts
30 16 such that at least for some of said stem parts 14 their free ends 18 come into contiguous or embedded contact with a contact side 20 of the respectively assignable head part 16. When using the method according to the invention provision is made such that in the actual process of connecting stem parts 14 to the assignable head parts 16, the latter are still at least in the partially liquid

or partially plasticised state and the head parts 16 are only completely cured after the connection. Therefore, the free ends 18 of the stem parts 14 touch the still at least partially liquid contact sides 20 of the head parts 16 or are preferably embedded in the material of the head part so as to thus be able to
5 ensure the connection in the subsequently cured state of the head parts 16.

For the moulding of the individual head parts 16 a moulding tool 22, identified as a whole by 22, is provided with a plurality of individual mould recesses 24 corresponding to the respective head geometry in terms of its configuration.
10 The mould recesses 24 are a component of a moulding belt 26 revolving in the manner of a conveyor belt, the mould recesses 24 of the upper strand being filled with plastic material, and the lower strand essentially guiding the empty mould recesses 24. The mould recesses 24 are in turn repeatedly present in a regular or irregular distribution in the transverse and longitudinal
15 direction of the moulding belt 24.

Furthermore, a supply device, identified as a whole by 28, is provided for the already finished backing part 12 with the stem parts 14 the free ends 18 of which can be inserted into the mould recesses 24 by means of the supply
20 device 28. For this purpose the supply device 28 has a type of storage roll 30 from which the stem part fastener material can be unwound. By means of corresponding deflection rolls 32 the belt material can be supplied to the moulding tool 22 and the complete adhesive fastener product can be wound up at the end onto a feed roll identified by 34 for onward conveyance. For the
25 sake of simpler illustration the individual conveyance and guide devices have been omitted; likewise, the heating and cooling devices for the production apparatus are not shown. The conveyance direction of the moulding tool 22 and the supply device 28 is however indicated by the arrow 36.

30 As the illustration of Fig. 1 also shows, the mould recesses 24 are open to the outside, i.e. they are freely accessible from here, for filling the mould recesses 24 of the moulding tool 22 a filling device 38 being used which, without being specified in detail, can be a conventional extruder application device, preferably however a droplet application apparatus that does not completely

fill the mould recesses 24 up to the free edge with plastic material without the mould recesses 24 overflowing. However, the filling device 38 can also be made in the manner of a doctor device for the plastic material, excess plastic material being able to be removed from the top of the belt by the so-called
5 doctor blade device (not shown).

In order to establish the secure connection between the stem parts 14 and the head parts 16, in turn a curing device 40, not specified any further, is used and is preferably located at the end of the connecting process, specifically a
10 short distance in front of the point, as viewed in the direction of the arrow 36, before the finished adhesive fastener product is removed from the moulding tool 22 and is carried away in the direction of the feed roll 34. Depending on the respectively used plastic material, the curing device 40 can be a conventional heat source, but also a UV radiator and the like. If an acrylate
15 material is used for the head parts 16, the curing device 40 is preferably a UV radiation source.

Adhesive fastener parts produced according to the illustrated method using the described apparatus are shown, enlarged, in Figs. 2 and 3, the head parts
20 16 according to the illustration of Fig. 2 being made essentially flat towards their free end side, and this means that they can be made very narrow- or thin-lipped relative to their surrounding edge. This is in contrast to the fastener solution according to Fig. 3 in which the top of the head part 16 shown is convexly curved so that this head part 16 extends towards the
25 enclosing edge 42 with a thicker wall than the solution according to Fig. 2 described above. It is common to both solutions that the head part 16 is made of an acrylate material, whereas the stem part is preferably made of a thermoplastic material, in particular polyamide, polypropylene or polyethylene. Other material combinations are possible here.

30

It is surprising to an average person skilled in the art in the field of fastener technology that for mushroom-head fastener systems he can connect any head parts 16 to any stem part material 14 here so as to thus be able to offer functional adhesive fasteners in a wide range of applications. As shown in

particular by Fig. 2, not all stem parts 14 need be provided with a head part 16, and in particular applications it would also be possible to provide two and more stem parts 14 with just one head part 16 on the end side (not shown). Furthermore, it would be possible, depending on the design of the mould
5 recesses 24, to devise fastener systems, for example, combining the head geometries of the fastener elements of Fig. 2 and Fig. 3 according to pre-definable patterns. Moreover, it has been shown that with the method according to the invention very smooth and hard head parts 16 can be obtained, and this protects the fastener as a whole and leads to very long-
10 lived adhesive fastener part systems.

Depending on the depth of the mould recesses 24 of the moulding tool 22 used, different lengths for the stem parts 14 can also optionally be implemented so that then the head parts 16 end at different level heights
15 relative to the belt-like backing part 12. The backing part 12 itself can be a multi-extrusion layer arrangement or can have a film-like, elastically stretchable character. As viewed from above, the aforementioned head parts 16 can form spherical shell bodies which are smooth to the outside; implementations in polygonal form, in particular in a hexagonal shape, are
20 also possible here however. By using acrylate material for the head parts 16 they also form a type of edge protection toward their surrounding edge 42, and this in turn benefits the service life of the overall fastener.

Patentkrav

1. Fremgangsmåde til fremstilling af en burrelåsdel (10), bestående af mindst et kunststofmateriale,

5 - hvor en bærerdel (12) med en flerhed af udragende stilkdele (14) forbindes med enkeltvis hoveddele (16) på en sådan måde, at ved i det mindste en del af de pågældende stilkdele (14) deres frie ender (18) kommer i berørende eller indgribende kontakt med en anlægsside (20) af den i hvert tilfælde pågældende hoveddel (16), som de kan tilordnes til,

10 - hvor, ved processen med at forbinde stilkdele (14) og hoveddele (16), der kan tilordnes dertil, disse foreligger i en stadig i det mindste delflydende eller delplastificeret tilstand, og hoveddelene (16) først hærder fuldstændig efter forbindelsen,

- **kendetegnet ved, at** hoveddelmateriale tilvejebringes i et formværktøj (22) med en flerhed af enkeltvis formudsparinger (24), der er udformet svarende til den pågældende hovedgeometri, og

15 - at de frie ender (18) af stilkdelene (14) ved fremføring til eller indføring i formudsparingerne (24) berører de stadig i det mindste delflydende eller delplastificerede anlægssider (20) af hoveddelene (16) og/eller griber ind i hoveddelmateriale.
20

2. Fremgangsmåde ifølge krav 1, **kendetegnet ved, at** stilkdelene (14) og hoveddelene (16) består af forskellige kunststofmaterialer.

25

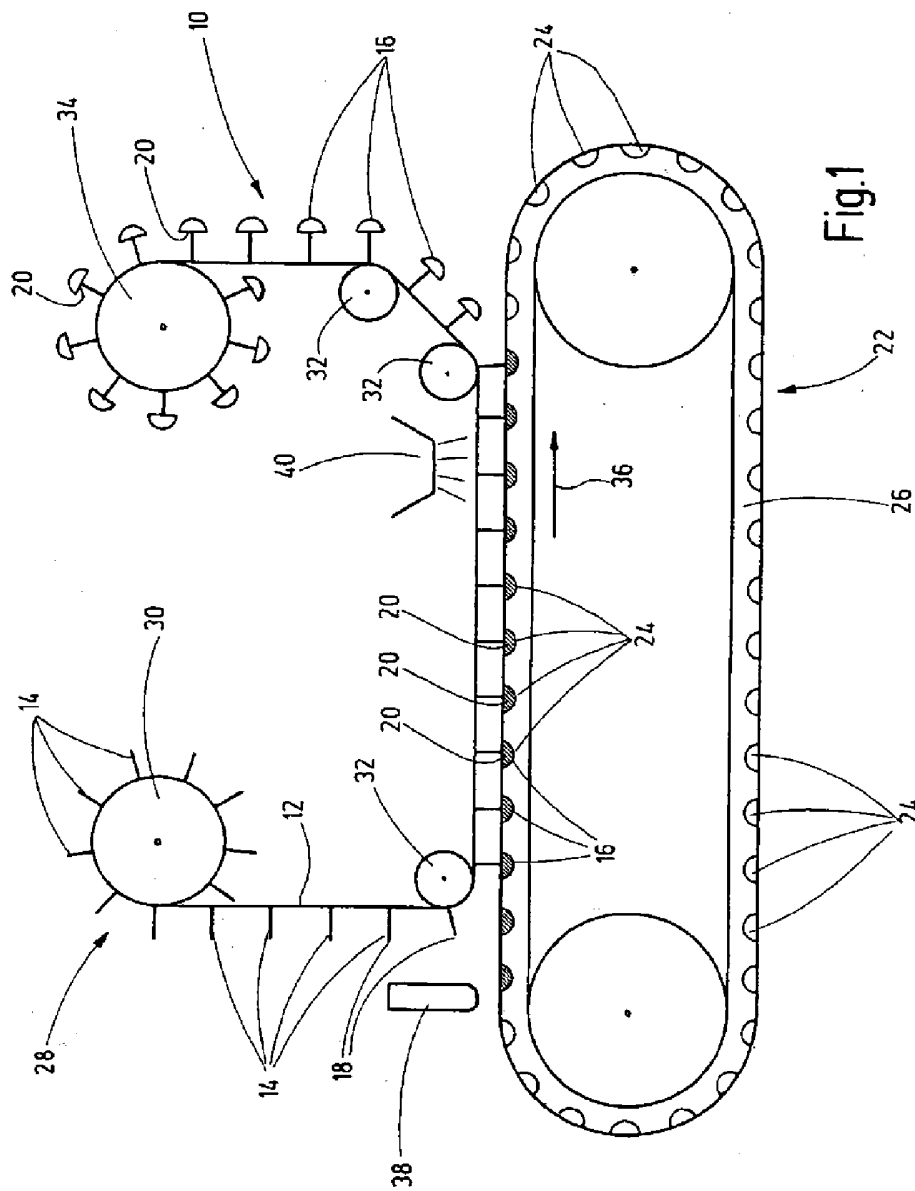
3. Fremgangsmåde ifølge krav 2, **kendetegnet ved, at** stilkdelene (14) dannes af termoplastisk kunststof, og hoveddelene (16) består af acrylatmateriale.

30 4. Indretning til fremstilling af en burrelåsdel med en fremgangsmåde ifølge et af kravene 1 til 3, hvor en bærerdel (12) med en flerhed af udragende stilkdele (14) kan forbindes med enkeltvis hoveddele (16) på en sådan måde, at ved i det mindste en del af de pågældende stilkdele (14) deres frie ender (18) kommer i berørende eller indgribende kontakt med en anlægsside (20) af den i hvert tilfælde pågældende hoveddel (16), som de kan tilordnes til,
35 og hvor, ved processen med at forbinde stilkdele (14) og hoveddele (16), der

kan tilordnes dertil, disse foreligger i en stadig i det mindste delflydende eller delplastificeret tilstand, og hoveddelene (16) først kan hærdes fuldstændig med en hærdeindretning (40) efter forbindelsen,

5 **kendetegnet ved, at** hoveddelsmateriale kan tilvejebringes med en fyldeindretning (38) i et formværktøj (22) med en flerhed af enkeltvise formudsparinger (24), der er udformet svarende til den pågældende hovedgeometri, at, ved fremføring til eller indføring i formudsparingerne (24), de stadig i det mindste delflydende eller delplastificerede anlægssider (20) af hoveddelene (16) kan berøres med de frie ender (18) af stilkdelene (14), og/eller de frie
10 ender (18) af stilkdelene (14) kan indføres i hoveddelsmaterialet, og at formværktøjet (22) er tilvejebragt til de enkeltvise hoveddele (16) med flerheden af formudsparinger (24), der svarer til den pågældende hovedgeometri, og med en tilførselsindretning (28) til den allerede færdige bærerdel (12) med stilkdelene (14), hvis frie ender (18) kan indføres i formudsparingerne (24)
15 ved hjælp af tilførselsindretningen (28).

5. Indretning ifølge krav 4, **kendetegnet ved, at** formværktøjet (22) er dannet af et omløbende formgivningsbånd (26), der indeholder formudsparingerne (24), der er frit tilgængelige udefra.



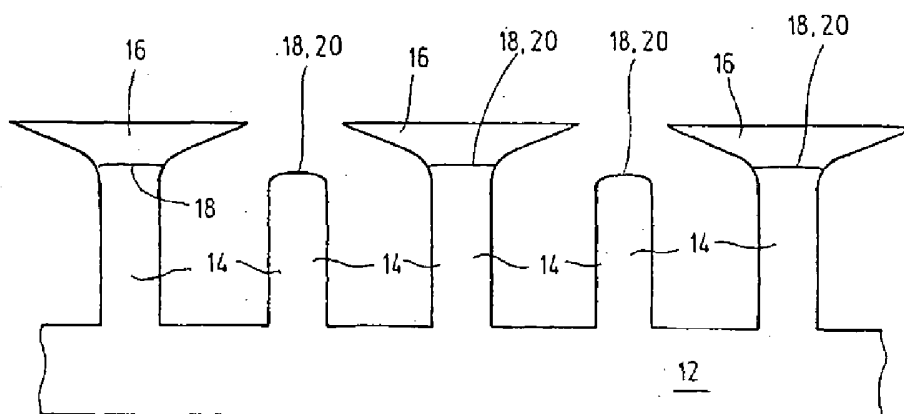


Fig.2

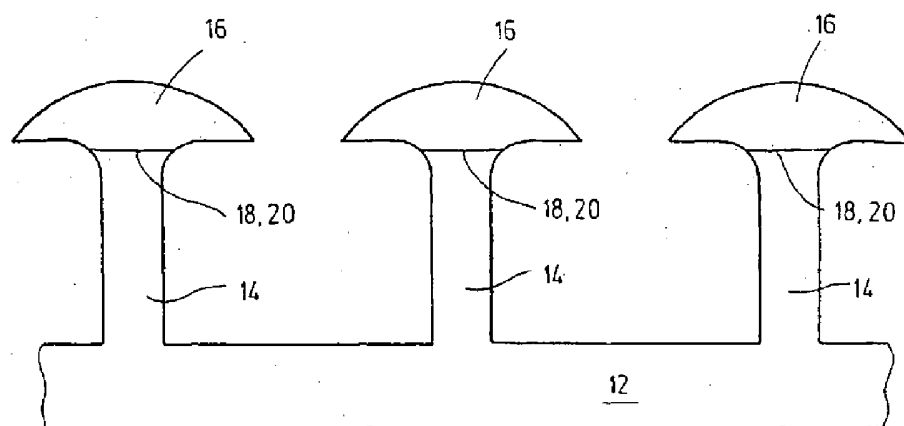


Fig.3