(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 September 2016 (22.09.2016)

WIPO | PCT

(10) International Publication Number
WO 2016/148564 A1

(51) International Patent Classification:
B26D 7/27 (2006.01) *A61K 8/02* (2006.01)
B26D 7/10 (2006.01) *B29C 59/02* (2006.01)
B26F 1/44 (2006.01) *A61F 13/15* (2006.01)
B26F 1/40 (2006.01) *B26F 1/38* (2006.01)

(21) International Application Number:
PCT/NL2016/050005

(22) International Filing Date:
5 January 2016 (05.01.2016)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2014455 13 March 2015 (13.03.2015) NL

(71) Applicant: **VMI HOLLAND B.V.** [NL/NL]; Gelriaweg 16, 8161 RK EPE (NL).

(72) Inventor: **DE GOOIJER, Gerrit**; Munnikenweg 131c, 3905 MG Veenendaal (NL).

(74) Agent: **MELCHIOR, Robin**; Octrooibureau Vriesendorp & Gaade B.V., Koninginnegracht 19, 2514 AB Den Haag (NL).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(54) Title: PUNCHING DEVICE FOR MANUFACTURING PADS

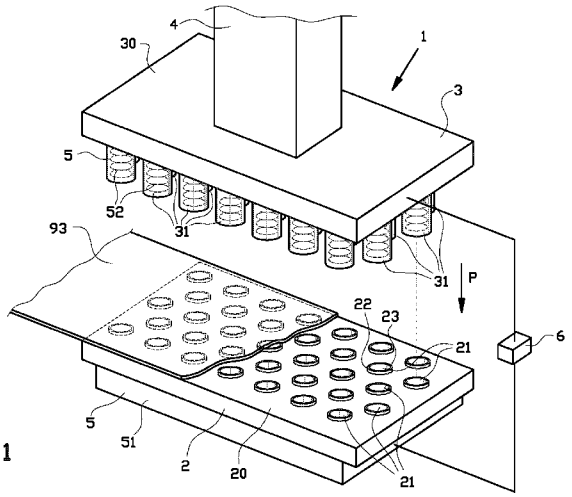

FIG. 1

(57) Abstract: The invention relates to a punching device (1) and a method for manufacturing pads (9), wherein the punching device (1) comprises a female die (2) and a male die (3) which are movable towards each other in a punching direction, wherein the male die (3) comprises a punching element (31) and the female die (2) comprises an orifice (21) that is aligned with the punching element (31) in the punching direction, wherein the female die (2) is provided with a first cutting portion (22) and a first pinching portion (23), wherein the male die (3) is provided with a second cutting portion (32) and a second pinching portion (33), wherein the punching device (1) is further provided with at least one heating element (5) for heating at least the first pinching portion (23) or the second pinching portion (33).

WO 2016/148564 A1

Punching device for manufacturing pads

BACKGROUND

The invention relates to a punching device for manufacturing pads, in particular cosmetic or medical pads.

Known cosmetic and medical pads are typically made fully out of cotton. The circumferential edges of the known pads are compressed with a punching device to stitch or seal the layers of the pad together and to form a circumferential stitch or seal. This has worked fine for full cotton pads for many years. Recently however, there has been in an increase in pads manufactured with alternative materials, such as synthetic fibers or a mixture of cotton and synthetic fibers. These pads have a relatively high shape memory or resilience to deformation, such that after compression, the circumferential stitch or seal is not permanent and thus unreliable. The quality and consistency of the pads can no longer be ensured. Although in some cases a significant increase in the compression force (overloads to 120% of the normal compression force) still provides a reliable seal, this is generally not favorable to the lifespan of the punching device and its associated tooling.

It is an object of the present invention to provide a punching device for manufacturing pads, in particular cosmetic or medical pads, wherein the reliability of the circumferential seal of the pads can be increased.

SUMMARY OF THE INVENTION

According to a first aspect, the invention provides a punching device for manufacturing pads, in particular cosmetic or medical pads, wherein the punching device comprises a female die and a male die which are movable towards each other in a punching direction to punch out the pads, wherein the male die comprises a punching element and the female die comprises an orifice that is aligned with the punching element in the punching direction for receiving said punching element, wherein the female die is provided with a first cutting portion and a first pinching portion surrounding the orifice, wherein the male die is provided with a second cutting portion and a second pinching portion at the punching element, wherein the first cutting portion and the second cutting portion are opposite to each other in the punching direction and are arranged to interact in said punching direction for cutting out the pad and for forming a circumferential edge of the pad, wherein the first pinching portion and the second pinching portion are opposite to each other in the punching direction and are arranged to interact in said punching direction for compressing the cut-out pad to form a circumferential seal at or near the circumferential edge of the cut-out pad, wherein the punching device is further provided with at least one heating element for heating at least the first pinching portion or the second pinching portion.

By heating the region of the cut-out pad where the circumferential seal is formed, the shape memory or resilience to deformation of the material of the cut-out pad can be reduced, thereby improving the reliability of the circumferential seal. Although this may have advantages when sealing full cotton pads, the invention is particularly useful when the pads comprise alternative, non-cotton material, such as synthetic fibers. The bonds between the long-chain polymer molecules in the fibers can be effectively loosened by the heating. As the fibers cool

down, they can hold their new shape, thereby reducing the memory effect of the fibers.

In an embodiment the at least one heating element comprises a first heating element for heating the first pinching portion surrounding the orifice in the female die. The cut-out pad can thus be heated from at least the side of the female die.

In an embodiment thereof the first heating element is arranged in thermal contact with the first pinching portion. The first pinching portion can be heated by the first heating element, e.g. through direct contact with the first heating element.

In an alternative embodiment thereof the female die comprises a plate, wherein the orifice is positioned in the plate, wherein the first heating element is arranged in thermal contact with the plate for indirectly heating the first pinching portion of the orifice of the female die. By heating the plate, at least part of the heat transferred from the first heating element into the plate can be conductively transferred to the first pinching portion.

In an embodiment the at least one heating element comprises a second heating element for heating the second pinching portion of the punching element of the male die. The cut-out pad can thus be heated from at least the side of the male die.

In an embodiment the second heating element is arranged in direct thermal contact with the second pinching portion. The second pinching portion can be heated by the second heating element, e.g. through direct contact with the second heating element.

In a highly efficient embodiment the female die comprises a plurality of orifices, each with a first cutting portion and a first pinching portion, and wherein the male die comprises a plurality of punching elements, each with a second cutting portion and a second pinching portion, wherein each of the plurality of punching elements is aligned above and interacts with one of the plurality of

orifices in the punching direction, wherein the at least one heating element is arranged for heating at least the first pinching portions of the female die or the second pinching portions of the male die. The punching device according to this embodiment can simultaneously punch out a plurality of pads in a single stroke in the punching direction.

In an embodiment thereof the at least one heating element comprises a plurality of first heating elements that are arranged in thermal contact with the first pinching portions surrounding the orifices of the female die for heating said first pinching portions. The plurality of first heating elements can individually heat the first pinching portions.

In an alternative embodiment thereof the female die comprises a plate, wherein the plurality of orifices are positioned in the plate, wherein the at least one heating element comprises a first heating element that is arranged in thermal contact with the plate for indirectly heating the first pinching portions surrounding the orifices of the female die. The first heating element can indirectly heat all of the first pinching portions in the plate.

In an embodiment the at least one heating element comprises a plurality of second heating elements that are arranged in thermal contact with the second pinching portions of the plurality of punching elements of the male die for heating said second pinching portions. The plurality of second heating elements can individually heat the second pinching portions.

In an embodiment the punching device comprises a control unit that is operationally connected to the at least one heating element for setting the temperature of said at least one heating element. The heating element can thus be controlled through manual or autonomous operation of the control unit.

In an embodiment the control unit is operationally connected to both the first heating element and the second heating element for heating the first pinching portion and

the second pinching portion simultaneously. By heating the cut-out pad from the side of the female die and the side of the male die simultaneously, the distribution of the heat transferred into the cut-out pad between the first pinching portion and the second pinching portion can be more uniform.

In an embodiment the control unit is arranged for setting the temperature of the at least one heating element to a level at which the pad in use is heated to a temperature in the range of 40 to 200 degrees Celsius between the first pinching portion and the second pinching portion. The aforementioned heat range can reduce the shape memory or resilience to deformation of the material of the cut-out pad, in particular in the event of the material comprising synthetic fibers.

Alternatively the control unit is arranged for setting the temperature of the at least one heating element to a level at which the pad in use is heated to a temperature of at least 200 degrees Celsius between the first pinching portion and the second pinching portion. The aforementioned temperature can cause the synthetic fibers in the cut-out pad to change structure, melt and/or fuse together to form a more homogenous material at the circumferential seal.

In an embodiment the at least one heating element is a heating element of the electrical heater type or the fluid filled heat exchanger type. These types of heaters have proven to be particularly effective at transferring heat into the first pinching portion and the second pinching portion.

According to a second aspect, the invention provides a method for manufacturing pads, in particular cosmetic or medical pads, with the use of the aforementioned punching device, wherein the method comprises the step of heating at least the first pinching portion or the second pinching portion.

By heating the region of the cut-out pad where the circumferential seal is formed, the shape memory or

resilience to deformation of the material of the cut-out pad can be reduced, thereby improving the reliability of the circumferential seal. Although this may have advantages when sealing full cotton pads, the invention is particularly useful when the pads comprise alternative, non-cotton material, such as synthetic fibers. The bonds between the long-chain polymer molecules in the fibers can be effectively loosened by the heating. As the fibers cool down, they can hold their new shape, thereby reducing the memory effect of the fibers.

In an embodiment the method further comprises the step of simultaneously heating the first pinching portion and the second pinching portion. By heating the cut-out pad from the side of the female die and the side of the male die simultaneously, the distribution of the heat transferred into the cut-out pad between the first pinching portion and the second pinching portion can be more uniform.

In an embodiment the method comprises the step of heating the pad to a temperature in the range of 40 to 200 degrees Celsius between the first pinching portion and the second pinching portion. The aforementioned heat range can reduce the shape memory or resilience to deformation of the material of the cut-out pad, in particular in the event of the material comprising synthetic fibers.

In an embodiment the method comprises the step of heating the pad to a temperature of at least 200 degrees Celsius between the first pinching portion and the second pinching portion. The aforementioned relatively high temperature can cause the synthetic fibers in the cut-out pad to melt and fuse together to form a more homogenous material at the circumferential seal.

In a preferred embodiment the pad comprises cotton, synthetic fibers or a combination of cotton and synthetic fibers. As mentioned before, the punching device and method according to the invention are effective in reducing the shape memory and/or resilience to deformation of pads of full cotton, but can be particularly effective

when used in combination with pads comprising synthetic fibers.

According to a third aspect, the invention provides a pad, in particular a cosmetic or medical pad, comprising a main body that is delimited by a circumferential edge, wherein the pad comprises a circumferential seal at or near the circumferential edge, wherein the material of the pad at the circumferential seal is at least partly fused. The pad, which can be obtained by operating the aforementioned punching device in accordance with the steps of the aforementioned method, can be reliably sealed by fusing the material at the circumferential seal. Hence, the reliability of the circumferential seal of the resulting pad can be improved.

In an embodiment, the pad comprises synthetic fibers. The fusing can be particularly effective when the pad comprises synthetic fibers, which have long-chain polymer molecules, the bonds of which are loosened when subjected to heat. After the molecules have cooled down, they will hold their new shape, thereby reducing the memory effect of the fibers.

The various aspects and features described and shown in the specification can be applied, individually, wherever possible. These individual aspects, in particular the aspects and features described in the attached dependent claims, can be made subject of divisional patent applications.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be elucidated on the basis of an exemplary embodiment shown in the attached schematic drawings, in which:

figure 1 shows an isometric view of a punching device for manufacturing pads according to the invention, with a male die and a female die;

figure 2 shows one of the pads manufactured with the punching device according to figure 1; and

figure 3 shows a cross section of the male die and the female die according to the line III – III in figure 1.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 shows a punching device 1 for manufacturing pads 9, in particular cosmetic or medical pads, according to an exemplary embodiment of the invention.

One of the pads 9 is shown in more detail in figure 2. Each pad 9 is provided with a main body 90 comprising one or more plies or layers of cotton for the absorption and/or application of liquid or semi-solid substances. The main body 90 is delimited by a circumferential edge 91. In this exemplary embodiment, the main body 90 of the pad 9 is disc-shaped, thus resulting in a substantially circular circumference at the circumferential edge 91. The scope of the invention is however not limited to the disc-shaped pads 9. The punching device 1 according to the invention can also be used to manufacture pads with oval, square, rectangular circumferences or even specials, e.g. so as to resemble geometrical or non-geometrical shapes.

The layers of the main body 90 are compressed by the punching device 1 at or near the circumferential edge 91 to form a stitch print or a circumferential seal 92. The seal 92 can either be continuous (e.g. through stitching) or intermittent (e.g. through perforation), depending on the tooling that is used. Known cosmetic and medical pads are typically made fully out of cotton. The pad 9 as shown in figure 2 however can be full cotton or, as in this example, may comprises an alternative material, for example synthetic fibers or a mixture of cotton and synthetic fibers. The pads 9 made of the alternative material, in particular of the synthetic fibers or the mixture of cotton and synthetic

fibers, have an even greater shape memory or resilience to deformation than the full cotton pads. As a result the compression of the layers at the circumferential edge 91, which would normally permanently seal the pad 9 at high compression force, is not permanent at a lower compression force and will eventually loosen or even detach. The punching device 1 according to the invention aims at reliably sealing the layers of these pads 9 at a relatively low compression force.

The punching device 1 comprises a female die 2, a male die 3 and an actuator 4 for moving the female die 2 and the male die 3 towards each other in a punching direction P. The male die 3 is arranged to interact with the female die 2 to stamp out or punch out the individual pads 9 from a number of superimposed sheets 93 (only partly shown in figure 1) that after the punching form the layers of the pads 9. The female die 2 comprises a plate 20 for supporting the sheets between the female die 2 and the male die 3 in the punching direction P and a plurality of orifices 21 in the plate 20 facing towards the male die 3 for passively receiving the male die 3 in the punching direction P. At each of the orifices 21, the female die 2 is provided with a first cutting portion 22 and a first pinching portion 23 surrounding the respective orifice 21. The first cutting portion 22 is provided with a circumferential first cutting edge 24 corresponding to the desired circumferential edge 91 of the pad 9 to be manufactured. The first pinching portion 23 is provided with a first pinching surface 25 extending circumferentially and radially within the first cutting edge 24 at the desired position of circumferential seal 92 of the pad 9 to be manufactured.

The male die 3 comprises a support member 30 and a plurality of punching elements 31 mounted to and suspended from the support member 30 in the punching direction P above the plurality of orifices 21 in the plate 20 of the female die 2. Each of the plurality of punching elements 31 is aligned above and actively interacts with one of the

plurality of orifices 21 in the punching direction P to cut out and pinch the pads 9 in a single stroke in the punching direction P. In this particular example, the actuator 4 is arranged for actively moving the male die 3 towards the female die 2, while the female die 2 remains stationary. The actuator 4 may be an eccentric drive (not shown and known per se) that reciprocally moves the male die 3 back and forth in the punching direction P with respect to the female die 2. Each of the punching elements 31 comprises a second cutting portion 32 and a second pinching portion 33. The second cutting portion 32 is provided with a circumferential second cutting edge 34 corresponding to the desired circumferential edge 91 of the pad 9 to be manufactured. The second pinching portion 33 is provided with a second pinching surface 35 extending circumferentially within the second cutting edge 34 at the desired position of circumferential seal 92 of the pad 9 to be manufactured.

The cutting portions 22, 32 of the female die 2 and the male die 3 are arranged directly opposite to each other in the punching direction P and interact in said punching direction P to cut-out the pads 9 and to form the desired circumferential edge 91. The pinching portions 23, 33 of the female die 2 and the male die 3 are arranged directly opposite to each other in the punching direction P and interact in said punching direction P to compress a region of the layers of the cut-out pad 9 at or near the circumferential edge 91 to form the circumferential seal 92.

As shown in cross section in figure 3, the punching device 1 is provided with one or more heating elements 5 for heating the first pinching portions 23 of the female die 2 or the second pinching portions 33 of the male die 3, or both. The one or more heating elements 5 are preferably of the electrical heater type or the fluid filled heat exchanger type. In this exemplary embodiment, the one or more heating elements 5 comprise a first heating element 51 that is arranged in a heat-exchange relationship or thermal contact with the plate 20 of the female die 2 for

indirectly and/or conductively heating the plate 20, including all of the first pinching portions 23, to a set temperature. To effectively and uniformly heat the entire plate 20 of the female die 2, the first heating element 51 is preferably plate-like and/or is in thermal contact across a substantial part or the entire surface area of the plate 20. Alternatively, the punching device 1 may be provided with a plurality of first heating elements (not shown) which are arranged in thermal contact or direct thermal contact with the first pinching portions 23 for individually heating the first pinching portions 23. The punching device 1 further or alternatively comprises a plurality of second heating elements 52 which are arranged in thermal contact with the second pinching portions 33 for individually heating the second pinching portions 33 to a set temperature. In this example, the second heating elements 52 are coil-shaped electrical or fluid filled heating elements extending on the inside of the punching elements 31 and arranged in direct contact with second pinching portions 33 of the respective punching elements 31.

As shown in figure 1, the punching device 1 is provided with a control unit 6 that is operationally connected to each of the one or more heating elements 5 to control the temperature of the first pinching portions 23 or the second pinching portions 33, or both. The control unit 6 may be manually operated and/or can be arranged to operate autonomously based on a set of given parameters.

With the aforementioned punching device 1 according to the invention, it is possible to transfer heat into the compressed regions of the cut-out pad 9 between the pinching portions 23, 33 to effectively loosen the bonds between the long-chain polymer molecules in the fibers of the alternative material of the pad 9. As the fibers cool down, they will hold their new shape, thereby reducing the memory effect of the fibers. The control unit 6 is arranged for setting the temperature of the one or more heating elements 5 to a level at which the pad 9 is heated to a

temperature in the range of forty (40) degrees Celsius and two-hundred (200) degrees Celsius. Alternatively, the control unit 6 can be arranged for setting the temperature of the one or more heating elements 5 to a level at which the pad 9 is heated to a temperature of at least two-hundred (200) degrees Celsius, or a temperature at which the synthetic fibers in the pad 9 will start to meld, thereby fusing the fibers together to form a more homogenous circumferential seal 92.

In this particular example, the control unit 6 is arranged for heating both the female die 2 and the male die 3 simultaneously to transfer heat into the pad 9 from both the side of the female die 2 and the male die 3. This generates a more uniform distribution of the transferred heat through the layers of the pad 9 in the punching direction P. Alternatively, the control unit 6 can be arranged for activating the one or more first heating elements 51 in the female die 2 or the plurality of second heating elements 52 in the male die 3 only, thus transferring heat into the pads 9 only from the side of the female die 2 or the side of the male die 3, respectively.

The transfer of heat into the pads 9 reduces or eliminates the need to increase or overload the compression force of the punching device 1 in the punching direction P. The pads 9 can be compressed between the pinching portions 23, 33 with a normal or even less than normal compression force, while still obtaining pads 9 with a reliable circumferential seal 92. The punching device 1 and its tooling will thus have a longer lifespan and require less maintenance.

It is to be understood that the above description is included to illustrate the operation of the preferred embodiments and is not meant to limit the scope of the invention. From the above discussion, many variations will be apparent to one skilled in the art that would yet be encompassed by the spirit and scope of the present invention.

In summary, the invention relates to a punching device 1 and a method for manufacturing pads 9, wherein the punching device 1 comprises a female die 2 and a male die 3 which are movable towards each other in a punching direction P, wherein the male die 3 comprises a punching element 31 and the female die 2 comprises an orifice 21 that is aligned with the punching element 31 in the punching direction P, wherein the female die 2 is provided with a first cutting portion 22 and a first pinching portion 23, wherein the male die 3 is provided with a second cutting portion 32 and a second pinching portion 33, wherein the punching device 1 is further provided with at least one heating element 5 for heating at least the first pinching portion 23 or the second pinching portion 33.

C L A I M S

1. Punching device for manufacturing pads, in particular cosmetic or medical pads, wherein the punching device comprises a female die and a male die which are movable towards each other in a punching direction to punch out the pads, wherein the male die comprises a punching element and the female die comprises an orifice that is aligned with the punching element in the punching direction for receiving said punching element, wherein the female die is provided with a first cutting portion and a first pinching portion surrounding the orifice, wherein the male die is provided with a second cutting portion and a second pinching portion at the punching element, wherein the first cutting portion and the second cutting portion are opposite to each other in the punching direction and are arranged to interact in said punching direction for cutting out the pad and for forming a circumferential edge of the pad, wherein the first pinching portion and the second pinching portion are opposite to each other in the punching direction and are arranged to interact in said punching direction for compressing the cut-out pad to form a circumferential seal at or near the circumferential edge of the cut-out pad, wherein the punching device is further provided with at least one heating element for heating at least the first pinching portion or the second pinching portion.

2. Punching device according to claim 1, wherein the at least one heating element comprises a first heating element for heating the first pinching portion surrounding the orifice in the female die.

3. Punching device according to claim 2, wherein the first heating element is arranged in thermal contact with the first pinching portion.

4. Punching device according to claim 2, wherein the female die comprises a plate, wherein the orifice is

positioned in the plate, wherein the first heating element is arranged in thermal contact with the plate for indirectly heating the first pinching portion of the orifice of the female die.

5. Punching device according to any one of the preceding claims, wherein the at least one heating element comprises a second heating element for heating the second pinching portion of the punching element of the male die.

6. Punching device according to claim 5, wherein the second heating element is arranged in direct thermal contact with the second pinching portion.

7. Punching device according to claim 1, wherein the female die comprises a plurality of orifices, each with a first cutting portion and a first pinching portion, and wherein the male die comprises a plurality of punching elements, each with a second cutting portion and a second pinching portion, wherein each of the plurality of punching elements is aligned above and interacts with one of the plurality of orifices in the punching direction, wherein the at least one heating element is arranged for heating at least the first pinching portions of the female die or the second pinching portions of the male die.

8. Punching device according to claim 7, wherein the at least one heating element comprises a plurality of first heating elements that are arranged in thermal contact with the first pinching portions surrounding the orifices of the female die for heating said first pinching portions.

9. Punching device according to claim 7, wherein the female die comprises a plate, wherein the plurality of orifices are positioned in the plate, wherein the at least one heating element comprises a first heating element that is arranged in thermal contact with the plate for indirectly heating the first pinching portions surrounding the orifices of the female die.

10. Punching device according to any one of claims 7-9, wherein the at least one heating element comprises a plurality of second heating elements that are arranged in

thermal contact with the second pinching portions of the plurality of punching elements of the male die for heating said second pinching portions.

11. Punching device according to any one of the preceding claims, wherein the punching device comprises a control unit that is operationally connected to the at least one heating element for setting the temperature of said at least one heating element.

12. Punching device according to claims 2, 5 and 11, wherein the control unit is operationally connected to both the first heating element and the second heating element for heating the first pinching portion and the second pinching portion simultaneously.

13. Punching device according to claim 11 or 12, wherein the control unit is arranged for setting the temperature of the at least one heating element to a level at which the pad in use is heated to a temperature in the range of 40 to 200 degrees Celsius between the first pinching portion and the second pinching portion.

14. Punching device according to claim 11 or 12, wherein the control unit is arranged for setting the temperature of the at least one heating element to a level at which the pad in use is heated to a temperature of at least 200 degrees Celsius between the first pinching portion and the second pinching portion.

15. Punching device according to any one of the preceding claims, wherein the at least one heating element is a heating element of the electrical heater type or the fluid filled heat exchanger type.

16. Method for manufacturing pads, in particular cosmetic or medical pads, with the use of a punching device according to claim 1, wherein the method comprises the step of heating at least the first pinching portion or the second pinching portion.

17. Method according to claim 16, wherein the method further comprises the step of simultaneously heating the first pinching portion and the second pinching portion.

18. Method according to claim 16 or 17, wherein the method comprises the step of heating the pad to a temperature in the range of 40 to 200 degrees Celsius between the first pinching portion and the second pinching portion.

19. Method according to claim 16 or 17, wherein the method comprises the step of heating the pad to a temperature of at least 200 degrees Celsius between the first pinching portion and the second pinching portion.

20. Method according to any one of claims 16-19, wherein the pad comprises cotton, synthetic fibers or a combination of cotton and synthetic fibers.

21. Pad, in particular a cosmetic or medical pad, comprising a main body that is delimited by a circumferential edge, wherein the pad comprises a circumferential seal at or near the circumferential edge, wherein the material of the pad at the circumferential seal is at least partly fused.

22. Pad according to claim 21, wherein the pad comprises synthetic fibers.

-o-o-o-o-o-o-o-o-

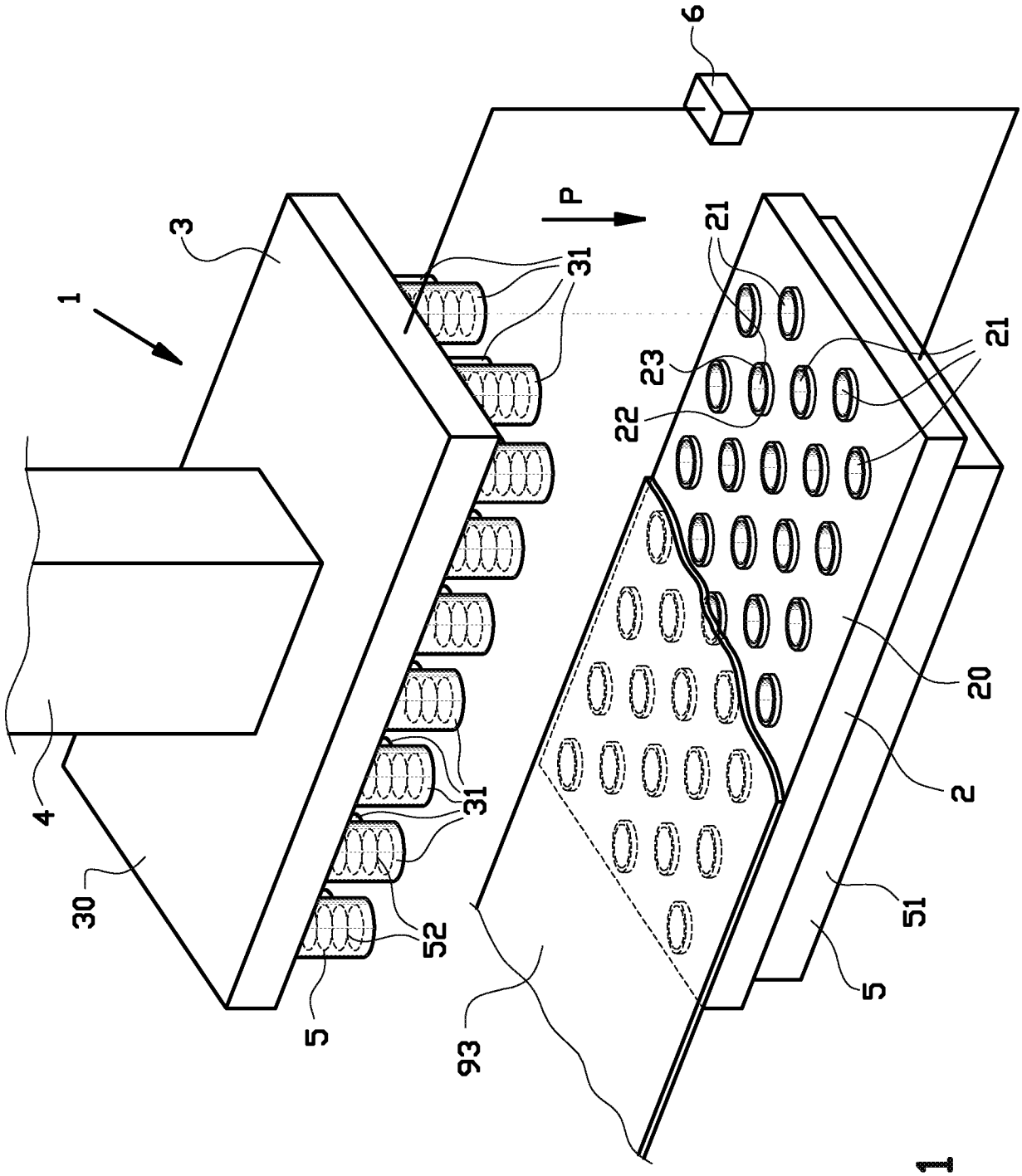

FIG. 1

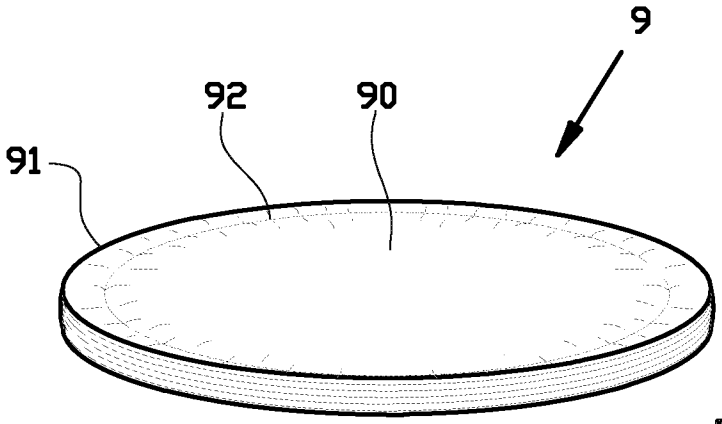

FIG. 2

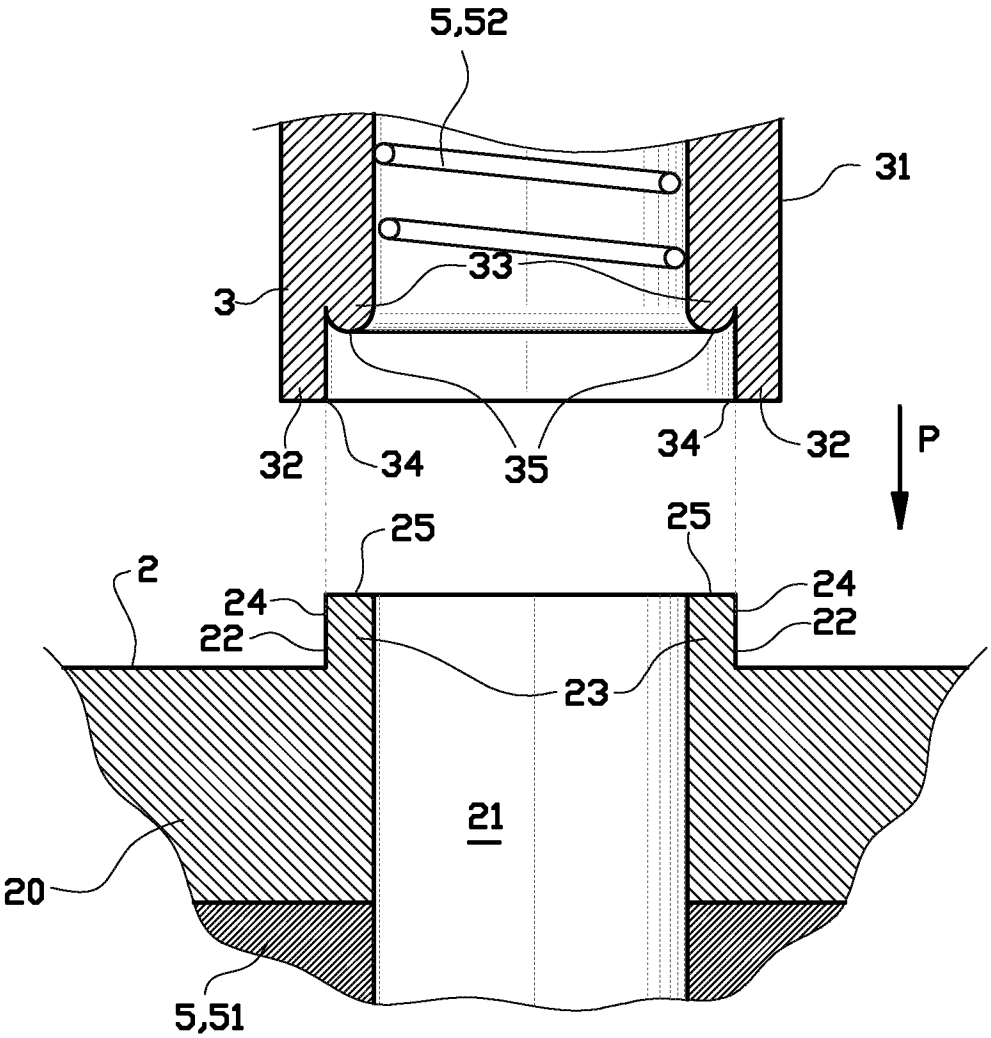

FIG. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2016/050005

A. CLASSIFICATION OF SUBJECT MATTER
INV. B26D7/27 B26D7/10 B26F1/44 B26F1/40 A61K8/02
B29C59/02 A61F13/15 B26F1/38
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B26D B26F A61K B29C A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2009/035316 A1 (EBM TECHNIEK BV [NL]; MEIJERS PIETER CORNELIS [NL]; VAN LAAR GERARDUS) 19 March 2009 (2009-03-19) page 1 - page 2 page 8, line 27 - page 9, line 32; figures 1-6	1-22
A	EP 2 586 578 A1 (ROWEG HOLDING AG [CH]) 1 May 2013 (2013-05-01) paragraph [0001] - paragraph [0010] paragraph [0049] - paragraph [0052] paragraph [0063] - paragraph [0070]; figures 2,3a,4	1-22

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 June 2016	29/08/2016

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Maier, Michael

1

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2016/050005

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 228 853 A2 (I L P R A S P A [IT]) 7 August 2002 (2002-08-07) paragraph [0049] - paragraph [0052] paragraph [0001] - paragraph [0014]; figure 1 -----	1,16
A	GB 1 086 220 A (ICI LTD) 4 October 1967 (1967-10-04) page 1, line 1 - page 2, line 55; claim 1; figures 1-4 -----	1,16

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/NL2016/050005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009035316 A1	19-03-2009	NONE	
EP 2586578 A1	01-05-2013	CH 705663 A2	30-04-2013
		EP 2586578 A1	01-05-2013
		US 2013098219 A1	25-04-2013
EP 1228853 A2	07-08-2002	EP 1228853 A2	07-08-2002
		IT MO20010013 A1	06-08-2002
GB 1086220 A	04-10-1967	NONE	