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(54) DEVICE AND METHOD FOR APPLYING STUDS WITH RIVETS OR NAILS

(57) A device (1) for applying studs (6) on straps of material (S) comprises: a die (5) comprising a plurality of housings (52) intended to receive the body (60) of said studs, a lid (9) comprising a plurality of housings (92) intended to receive the head (82) of rivets (8), holding means disposed in said housings (92) of the lid to hold the heads (82) of the rivets in the housings of the lid, an intermediate plate (7) intended to be disposed between said die (5) and said lid (9); said intermediate plate (7) comprising a plurality of housings (52) intended to receive the stem (80) of said rivets. When the die (5), the intermediate plate (7) and the lid (9) are overlapped, the housings (52, 72, 92) of the die (5), the intermediate plate (7) and the lid (9), respectively, are in mutual register.

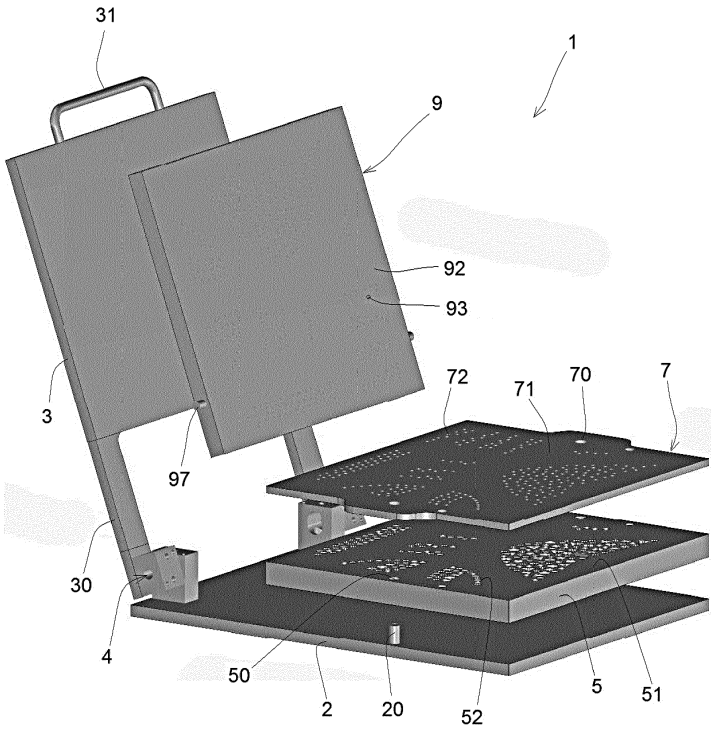

FIG. 1

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Description

[0001] The present patent application for industrial invention relates to a device and a method for applying studs with rivets or nails on straps or sheets of different types of material, such as for example leather, fabric, cloth and the like, to obtain different types of products, such as shoes uppers, bags, accessories, clothing items, furnishings and the like.

[0002] As it is known, decorative studs with different size and shape, which are generally made of metal, are often used to decorate leather.

[0003] The ordinary studs that are applied on leather are composed of only one piece, which is provided with a holding part defined as "claw" that perforates the leather and is folded over in order to hold the stud.

[0004] The studs are applied with a mold that is provided with housings to receive the body of the studs in such manner to let the claws protrude. When the mold is closed, the claws of the studs perforate the leather and are folded over on the back of the leather.

[0005] This operation is carried out very quickly. The studs are thrown in the mold and distributed with the hands, in such manner to make them fall in the housings of the mold with the claws upwards. The studs in excess are removed. The leather is disposed on the claws of the studs. The mold is closed and the claws are anchored to the leather by means of a press.

[0006] However, this type of one-piece studs are impaired by the fact that the attachment of the claws to the leather is not reliable because the claws may break and also because they can bend, thus weakening the attachment.

[0007] In order to solve such a drawback, a new type of studs is known on the market, which is made of two pieces:

- the body of the stud with a female connector consisting in a hole obtained in the base of the body of the stud, and
- a male connector consisting in a rivet (which also defined as nail) that perforates the leather and is coupled in the female connector of the stud. The rivet has an enlarged head in order to hold the stud.

[0008] The application of this type of studs is made manually for each stud, possibly using pliers to press the body of the stud and the rivet one against the other. It is often necessary to make holes in the leather where to insert the rivet.

[0009] Evidently, such a manual application of the studs is time-consuming, is expensive in terms of labor costs and depends on the operator's skills. In fact, the leather must be perforated in advance and the operator must refer to a drawing in order to position the studs with different size and shape correctly.

[0010] The purpose of the present invention is to eliminate the drawbacks of the prior art by providing a device and a method for applying studs with rivets that are practical, reliable, versatile, inexpensive and easy to make and use.

[0011] These purposes are achieved according to the invention with the characteristics of the independent claims 1 and 8.

[0012] Advantageous embodiments of the invention appear from the dependent claims.

[0013] The device of the invention is suitable for applying studs on straps of material, wherein each stud has a body, a base and a hole obtained in the base. The hole of the stud is intended to be coupled with a stem of a rivet provided with a head.

[0014] The device of the invention comprises:

- a first mold-holder plate,
- a second mold-holder plate arranged in such manner to be pressed towards said first mold-holder plate,
- a die mounted on said first mold-holder plate; said die comprising a plurality of housings intended to receive the body of said studs in such manner that the hole of the studs is accessible,
- a lid mounted on said second mold-holder plate; said lid comprising a plurality of housings intended to receive said head of the rivets,
- holding means disposed in said housings of the lid in order to hold the heads of the rivets in the housings of the lid, and
- an intermediate plate intended to be disposed between said die and said lid; said intermediate plate comprising a plurality of housings intended to receive the stem of said rivets.

[0015] When the die, the intermediate plate and the lid are overlapped, the housings respectively of the die, the intermediate plate and the lid are in mutual register.

[0016] The method of the invention comprises the following steps:

- loading the rivets on the intermediate plate in such manner that the stem of the rivets penetrates the housings of the intermediate plate and the head of the rivets remains accessible,
- lowering the lid onto the intermediate plate in such manner that the head of the rivets is held in the housings of the lid,
- lifting the lid in such manner that the rivets are extracted from the intermediate plate and removal from the intermediate plate,
- loading the studs on the die in such manner that the body of the studs penetrates the housings of the die and the holes of the studs remain accessible,
- placing at least one strap of material on said die, onto said studs, and
- lowering the lid on the die in such manner that the stem of the rivets perforates the strap of material and is coupled inside the hole of the studs.

[0017] The advantages of the device and of the method of the invention are evident.

[0018] It must be noted that the studs can have a different shape and size and can be simultaneously loaded on the die. The peculiarity of the device of the invention is that such a device allows for applying two-piece (stud+ rivet) studs rapidly and similarly to the application of one-piece studs.

[0019] Another important characteristic of the invention is represented by the fact that the lid is provided with holding means, such as for example a vacuum extraction system, by means of which the rivets are extracted from the intermediate plate, while remaining positioned in the lid, without the operator's intervention.

[0020] Furthermore, with the device of the invention, it is not necessary to perforate the leather as it normally happens in the manual process because the leather is automatically perforated by the stem of the rivet; moreover, it not necessary to have a drawing in order to position the studs correctly because the studs enter the housings of the die automatically.

[0021] Finally, the application process of the studs with the device of the invention is rapid and guarantees excellent repeatable results.

[0022] Further characteristics of the invention will appear clear from the detailed description below, which refers to merely illustrative, not limiting, embodiments, illustrated in the attached drawings, wherein:

Fig. 1 is an exploded perspective view of the device used for applying studs with rivets according to the invention;

Fig. 2 is a perspective view of the device of Fig. 1 in assembled condition;

Fig. 3 is a top view of a case of a die of the device of Fig. 1;

Fig. 4 is a sectional view taken along the sectional plane IV-IV of Fig. 3, showing an exploded view of a stud;

Fig. 5 is a top view of an intermediate plate of the device of Fig. 1;

Fig. 6 is a sectional view taken along the sectional plane VI-VI of Fig. 5, showing an exploded view of a rivet;

Fig. 7 is a bottom view of a lid of the device of Fig. 1;

Fig. 8 is a sectional view taken along the sectional plane VIII-VIII of Fig. 7, showing an exploded view of a rivet;

Fig. 9 is a top view of the lid of Fig. 7;

Fig. 9A is an enlarged view of the detailed enclosed in circle A of Fig. 9;

Figs. 10 to 14 are five diagrammatic sectional views showing the sequential steps of the process used for applying studs with rivets according to the invention.

[0023] With reference to Figs. 1 to 9 the device used for applying studs according to the invention is disclosed, which is generally referred to with numeral (1).

[0024] Referring now to Figs. 1 and 2, the device (1) comprises a first mold-holder plate (2) and a second mold-holder plate (3) intended to be pressed on the first mold-holder plate (2).

[0025] The second mold-holder plate (3) comprises at least one bracket (30) revolvingly connected to the first mold-holder plate (2) by means of a hinge. In view of the above, by rotating around the axis of the hinge (4), the second mold-holder plate (3) is pressed against the first mold-holder plate (2).

[0026] The second mold-holder plate (3) has a handle (31) arranged in distal position with respect to the hinge (4) in order to be held by an user to actuate the device (1).

[0027] Although the figures show a manually actuated device wherein the mold-holder plates (2, 3) are mutually hinged in order to be opened and closed in book configuration, the device (1) can be also mechanically actuated by means of any type of electrical, magnetic, pneumatic or oleo dynamic actuator. Moreover, instead of being hinged to the first mold-holder plate, the second mold-holder plate (3) may be mounted in a traditional vertical or horizontal press.

[0028] The first mold-holder plate (2) comprises centering pins (20) that protrude upwards from it.

[0029] The device (1) comprises a die (5) provided with centering holes (50). The die (5) is disposed on the first mold-holder plate (2) in such manner that the centering pins (20) of the first mold-holder plate are engaged in the centering holes (50) of the die and protrude upwards from the die.

[0030] Referring to Figs. 3 and 4, the die (5) has an upper surface (51) wherein a plurality of housings (52) is obtained and intended to receive studs (6). The housings (52) are disposed according to specific patterns that may have different shapes.

[0031] The studs (6) have a body (60) that can have different shapes, such as for example, conical, hemispherical, pyramidal with square or with triangular base, etc. For this reason, the housings (52) obtained in the upper surface (51) of the die have a shape and a size that are complementary to the body (60) of the stud. Therefore the housings (52) of the die may have a different shape and size to receive studs of different shape and size. In any case, the housings (52) of the die have a flared shape with decreasing dimensions going downwards for an easier insertion of the body (60) of the studs.

[0032] The stud (6) has a base (61) with a substantially smooth surface. The base (61) of the stud is provided with a blind hole (62) having a diameter of approximately 1-4 mm. When the stud (6) is disposed in its housing (52), the base (61) of the stud is substantially flush to the upper surface (51) of the die.

[0033] Going back to Figs. 1 and 2, the mold (1) comprises an intermediate plate (7) provided with centering holes (70). The intermediate plate (7) is disposed on the die (5) in such manner that the centering pins (20) of the first mold-holder plate are engaged in the centering holes

(70) of the intermediate plate.

[0034] Referring to Figs. 5 and 6, the intermediate plate (7) has an upper surface (71) opposite to the die (5). A plurality of housings (72) intended to receive rivets (8) is obtained in the upper surface of the intermediate plate (7). The housings (72) have a funnel-shaped flared section (73) for an easier insertion of the rivet (8).

[0035] The rivet (8) has a stem (80) with a diameter that is substantially identical to the diameter of the blind hole (62) of the stud. At least one collar (81) is provided in the stem (80) of the rivet, radially protruding from the stem. The external diameter of the collar (81) of the rivet is slightly higher than the diameter of the blind hole (62) of the stud, in such manner that the stem (80) of the rivet can be forcedly inserted in the blind hole (62) of the stud, generating a pressure-coupling of irreversible type between stud and rivet.

[0036] The rivet comprises an enlarged head (82) with higher diameter than the external diameter of the collar (81) of the rivet.

[0037] The housings (72) of the intermediate plate have a higher diameter than the external diameter of the collar (81) of the stem of the rivet. The housings (72) have a lower diameter than the head (82) of the rivet. In this way the stem (80) of the rivet is easily received in the housings (72) of the intermediate plate and the head (82) of the rivet is stopped against the upper surface (71) of the intermediate plate.

[0038] The housings (72) of the intermediate plate must be in register with the center of the housings (52) of the die. To that end, advantageously, the intermediate plate has a slightly higher thickness than the length of the stem (80) of the rivet and the housings (72) are through holes that cross the intermediate plate. In this way, a perfect alignment between the housings (52) of the die and the housings (72) of the intermediate plate is provided.

[0039] Referring to Figs. 1 and 2, the die (1) comprises a lid (9) shaped as a plate intended to be fixed to the second-mold holder plate (3).

[0040] As shown in Figs. 7, 8, 9 and 9A, the lid (9) has an internal surface (91) intended to be faced towards the second mold-holder plate (3) and an external surface (92) intended to be faced outwards.

[0041] A plurality of recessed housings (93), which are intended to receive the head (82) of the rivet, is obtained in the external surface (92) of the lid.

[0042] The recessed housings (93) must be in register with the housings (72) of the intermediate plate when the lid (9) is closed on the intermediate plate (7).

[0043] Each recessed housing (93) of the lid communicates with a hole (94) in communication with a channel (95) obtained in the internal surface (91) of the lid.

[0044] As shown in Figs. 9 and 9A, a plurality of holes (94) can communicate with a single channel (95) according to the arrangement of the housings (93). Moreover, a plurality of channels (95) flows to a manifold channel (96) obtained in the internal surface (91) of the lid. The manifold channels (96) flow to one or more suction channels (97) connected to a pneumatic system intended to generate a depression by means of suction.

[0045] In this way, a depression is generated in the recessed housings (93) of the lid, firmly attracting the head (82) of the rivets. It must be noted that the coupling between the second mold-holder plate (2) and the lid (9) is an air tight coupling, in such way to guarantee air tightness in the channels (95, 96, 97) obtained in the internal surface (91) of the lid.

[0046] It must be considered that, if the head (82) of the rivet is made of a magnetic metal material, instead of the pneumatic system, and instead of the system made of holes and channels (94, 95, 96, 97) obtained in the lid (9), magnets can be applied in the recessed housings (93) of the lid in order to attract and hold the heads (82) of the rivets.

[0047] Alternatively to magnets, other holding means, such as adhesive or mechanic holding means, as reversible couplings, may be used in the recessed housings (93) to hold the heads (82) of the rivets.

[0048] The operation of the device (1) is described below with reference to Figs. 10 to 14.

[0049] As shown in Fig. 10, in the initial step the second mold-holder (3) is open and the intermediate plate (7) is positioned on the die (5). A large number of rivets (8) is thrown on the intermediate plate (7) and distributed with the hands. Evidently, an automatic system with a doctor knife can be used to distribute the rivets.

[0050] Because of the flared section (73) of the housings (72) of the intermediate plate, the stems (80) of the rivets penetrate the housings (72) and the rivets in excess are removed.

[0051] As shown in Fig. 11, the second mold-holder plate (3) is closed and the suction of the pneumatic system is actuated. In view of the above, the rivets (8) are attracted by the air, creating a strong vacuum retention against the housings (93) obtained in the lid (9).

[0052] As shown in Fig. 12, the second mold-holder plate (3) with the lid (9) is opened and the rivets (8) that are attached to the lid are extracted from the intermediate plate. Now the intermediate plate (7) is removed from the die (5) in order to free the space above the die. The removal of the intermediate plate (7) can be made either manually or automatically by means of an actuator. It must be noted that during this step the rivets (9) remain anchored to the lid (9) because the vacuum suction is still in operation.

[0053] As shown in Fig. 13, the studs (6) are inserted in the housings (52) of the die in the same way in which the rivets (8) were inserted in the housings (72) of the intermediate plate. In other words, the studs (6) are thrown in large number on the die (5) and distributed with the hands or with a doctor knife. Because of the flared shape of the housings (52) of the die, the bodies (60) of the studs penetrate the housings (52) and the studs in excess are removed. Successively, a strap of material (S), for example leather or the like, is positioned on the

studs (6).

[0054] As shown in Fig. 14, the second mold-holder plate (3) is closed together with the lid (9) that holds the rivets (8). Then the press is actuated in order to press the second mold-holder plate (3) towards the first mold-holder plate (2). The strap of material (S) is closed in sandwich configuration between the lid (9) and the die (5). Consequently, the stems (80) of the rivets perforate the strap of material (S) and penetrate the holes (62) of the studs, thus getting blocked inside the holes (62) of the studs.

[0055] Finally, the second mold-holder plate (3) is opened and the strap of material (S), where the studs (6) are applied and blocked in position by the rivets (8), is extracted. The strap of material (S) with the studs (6) applied based on specific patterns according to the layout of the housings (52) of the die, can be used to make different types of products, such as shoes uppers, accessories, furnishings and the like.

[0056] Numerous variations and modifications can be made to the present embodiment of the invention, which are within the reach of an expert of the field, while still falling in the scope of the invention.

Claims

1. Device (1) for applying studs (6) on straps of material (S), each stud having a body (60), a base (61) and a hole (62) obtained in the base, intended to be coupled with a stem (80) of a rivet (8) provided with a head (82), the device (1) comprising:

    - a first mold-holder plate (2),
    - a second mold-holder plate (3) arranged in such manner to be pressed towards said first mold-holder plate (2),
    - a die (50) mounted on said mold-holder plate (2); said die (50) comprising a plurality of housings (52) intended to receive the body of said studs in such manner that the hole (62) of the studs is accessible,
    - a lid (9) mounted on said second mold-holder plate (2); said lid (9) comprising a plurality of housings (93) intended to receive the head (82) of the rivets (8),
    - holding means disposed in said housings (93) of the lid to hold the heads (82) of the rivets in the housings of the lid, and
    - an intermediate plate (7) intended to be disposed between said die (5) and said lid (9); said intermediate plate (7) comprising a plurality of housings (52) intended to receive the stem (80) of said rivets, wherein, when the die (5), the intermediate plate (7) and the lid (9) are overlapped, the housings (52, 72, 93) of the die (5), the intermediate plate (7) and the lid (9), respectively, are in mutual register.

2. The device (1) of claim 1, wherein said intermediate plate (7) is removably mounted on the die (5) in order to be:

    - in an operating position wherein the rivets (8) are loaded on said intermediate plate (7) and the lid (9) is lowered on the intermediate plate to hold the rivets, and
    - in a non-operating position wherein the intermediate plate is extracted from the die (5) and the lid is lowered on the die.

3. The device (1) of claim 1 or 2, wherein said housings (72) of the intermediate plate are through holes.

4. The device (1) of any one of the preceding claims, wherein said housings (72) of the intermediate plate have a flared portion (73) that facilitates the insertion of the stems (80) of the rivets and sad housings (52) of the die have a flared shape that facilitates the insertion of the body (60) of the studs.

5. The device (1) of any one of the preceding claims, wherein said holding means disposed in said housings (93) of the lid comprise a pneumatic system (94, 95, 96, 97) intended to suck air and create a depression in the housings (93) of the lid.

6. The device (1) of claim 5, wherein said pneumatic system comprises holes (94) obtained in said lid and communicating with said housings (93) of the lid, said holes (94) being in communication with channels (95) obtained in an internal surface (91) of the lid facing towards said second mold-holder plate (3); said channels (95) communicating with manifold channels (96) that flow to at least one suction channel (97) connected to a pneumatic installation; the manifold channels (96) and the suction channel (97) being obtained in said internal surface (91) of the lid.

7. The device (1) of any one of claims 1 to 4, wherein said holding means disposed in said housings (93) of the lid comprise a magnetic or mechanical system intended to magnetically or mechanically hold the heads (82) of the rivets.

8. Method for applying studs (6) on straps of material (S), each stud having a body (60), a base (61) and a hole (62) obtained in the base, intended to be coupled with a stem (80) of a rivet (8) provided with a head (82), the method comprising the following steps:

    - loading the rivets (8) on an intermediate plate (7) in such manner that the stem (80) of the rivets penetrates the housings (72) of the intermediate plate and the head (82) of the rivets remains accessible,

- lowering a lid (9) on the intermediate plate (7) in such manner that the head (82) of the rivets is held in housings (93) of the lid,
- lifting the lid (9) in such manner that the rivets are extracted from the intermediate plate and removal from the intermediate plate,
- loading the studs (6) on a die (5) in such manner that the body (60) of the studs penetrates the housings (52) of the die and the holes (62) of the studs remain accessible,
- provision of at least one strap of material (S) on said die, onto said studs (6), and
- lowering the lid (9) on the die (5) in such manner that the stem (80) of the rivets perforates the cloth strap (S) and is coupled inside the hole (62) of the studs.

9. The method of claim 8, wherein said intermediate plate (7) is:

- in an operating position wherein the rivets (8) are loaded on said intermediate plate (7) and the lid (9) is lowered on the intermediate plate to hold the rivets, and
- in a non-operating position wherein the intermediate plate is extracted from the die (5) and the lid is lowered on the die.

10. The method of claims 8 or 9, comprising a step wherein a depression is created in the housings (93) of the lid in such manner to hold the head (82) of the rivets.

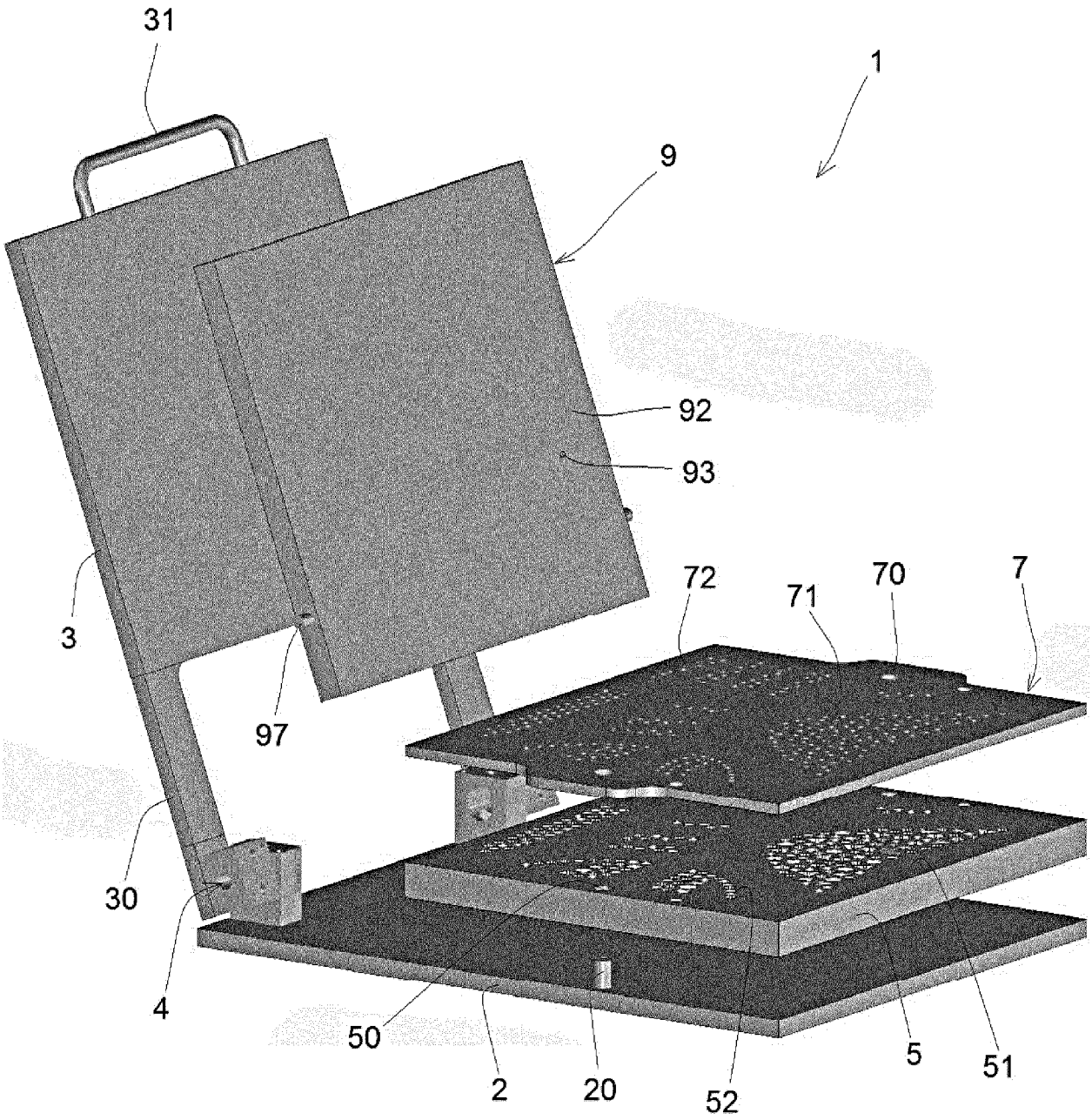

FIG. 1

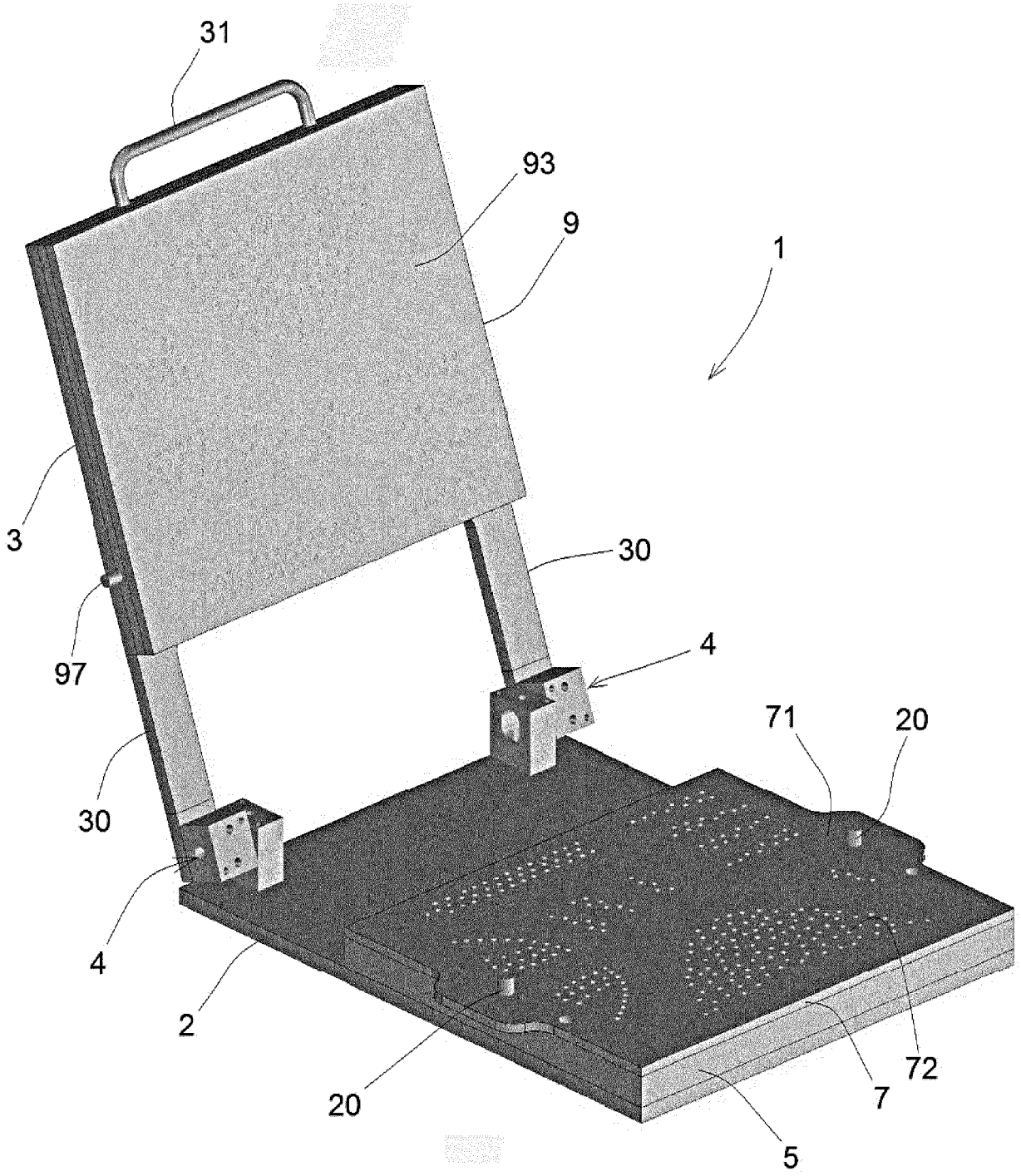

FIG. 2

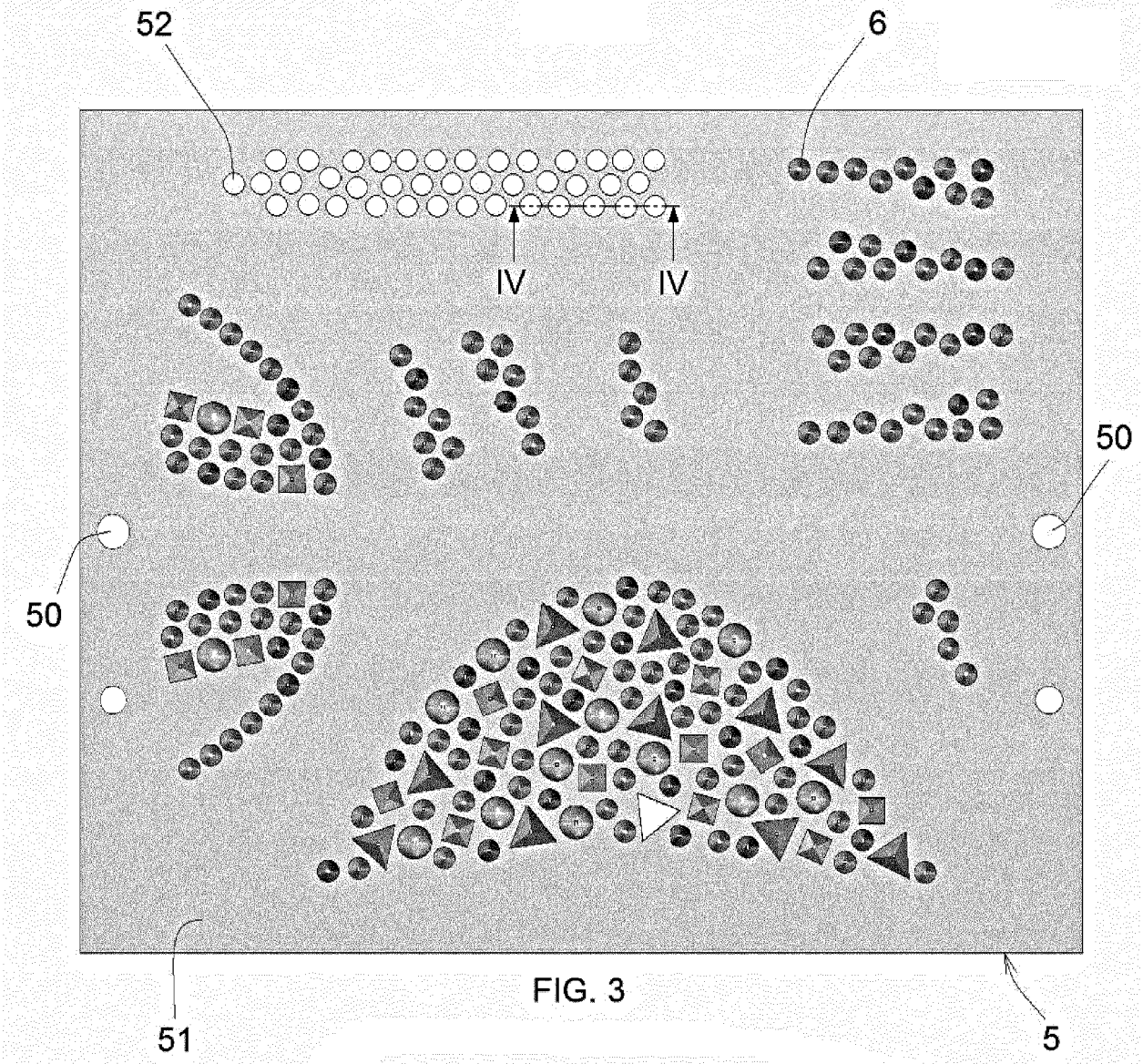

FIG. 3

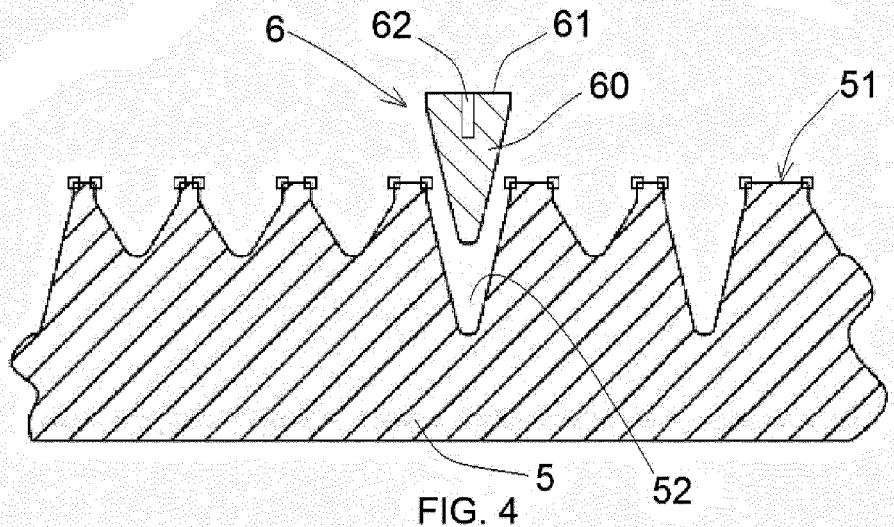

FIG. 4

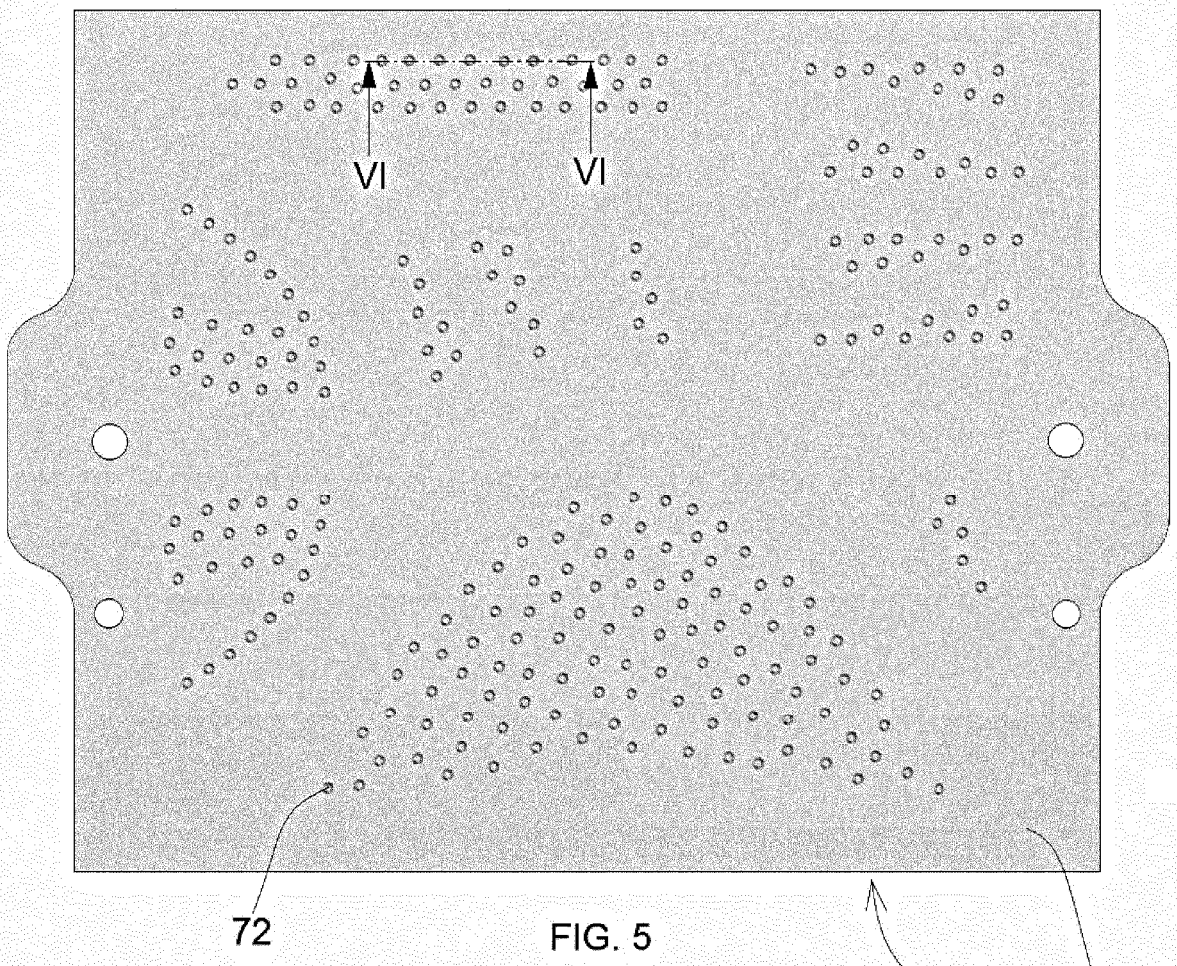

FIG. 5

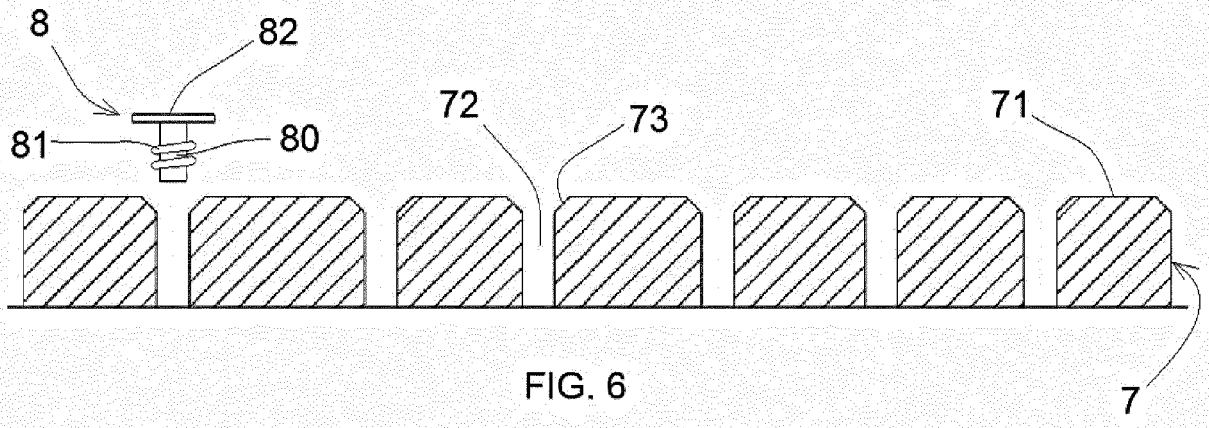

FIG. 6

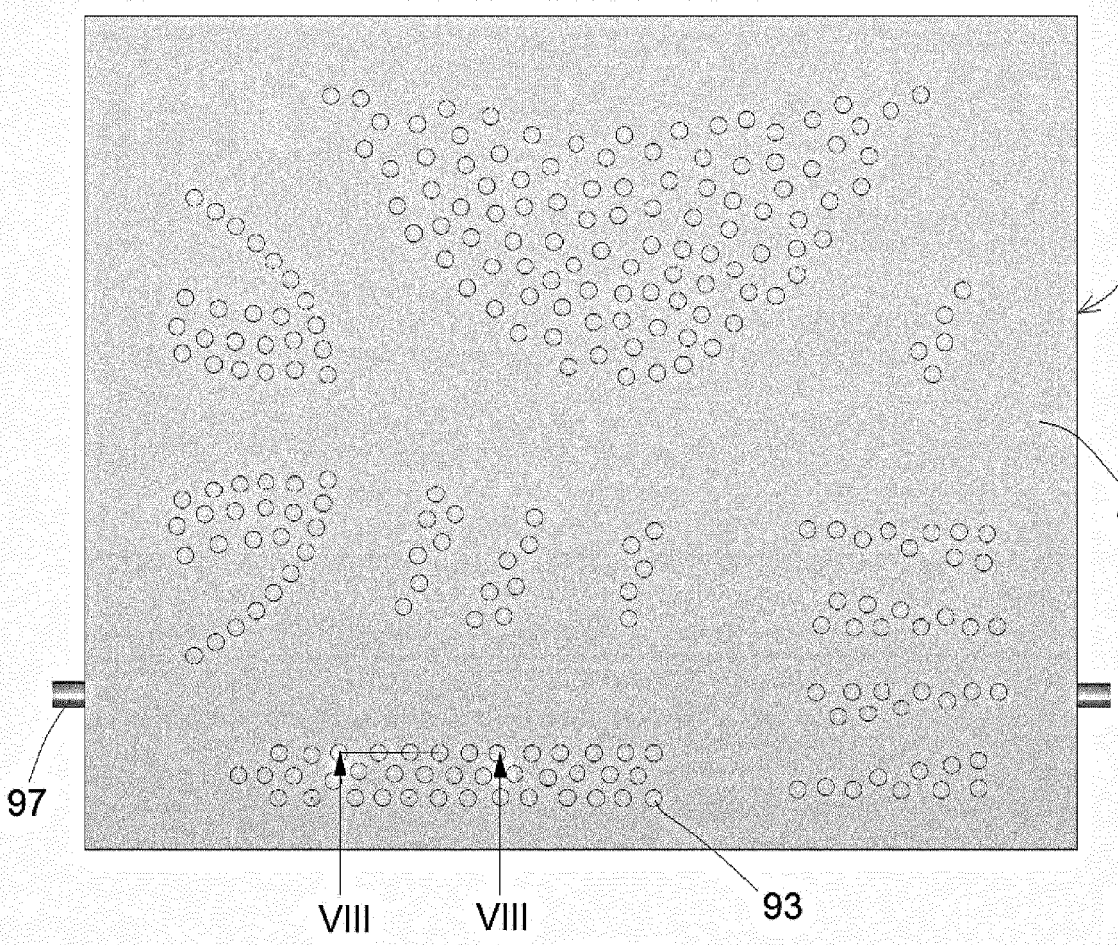

FIG. 7

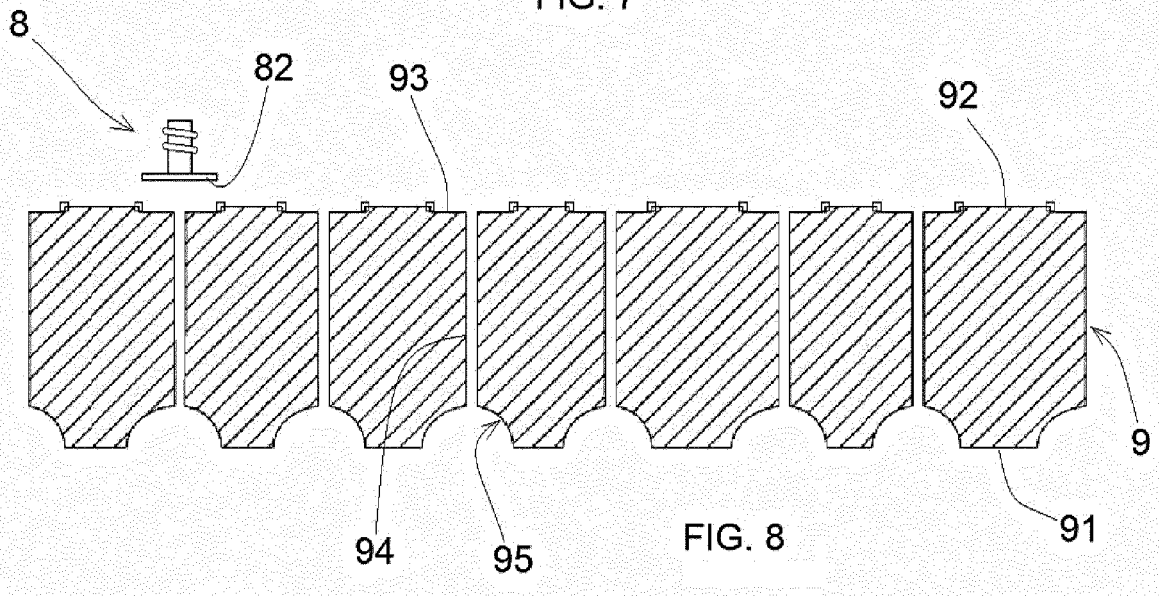

FIG. 8

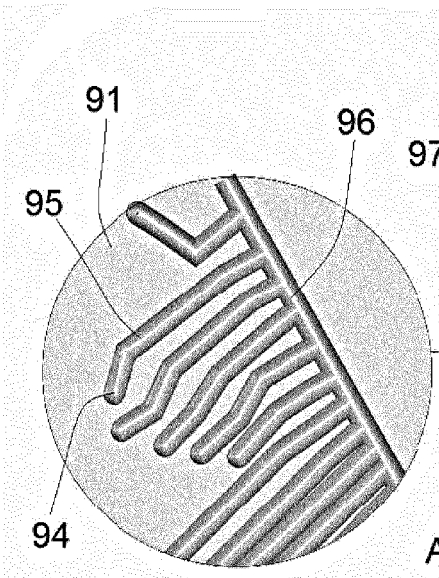

FIG. 9A

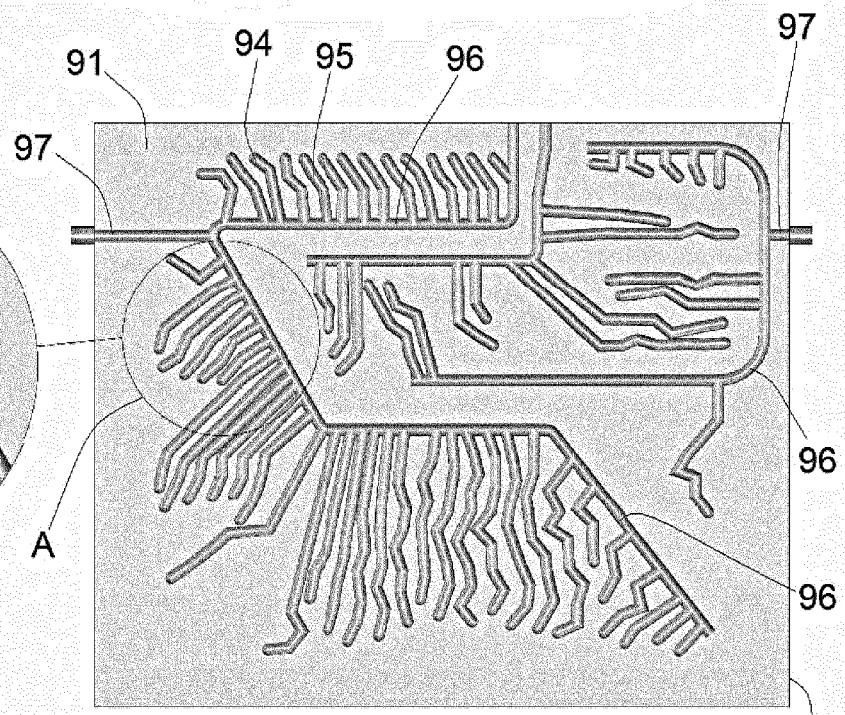

FIG. 9

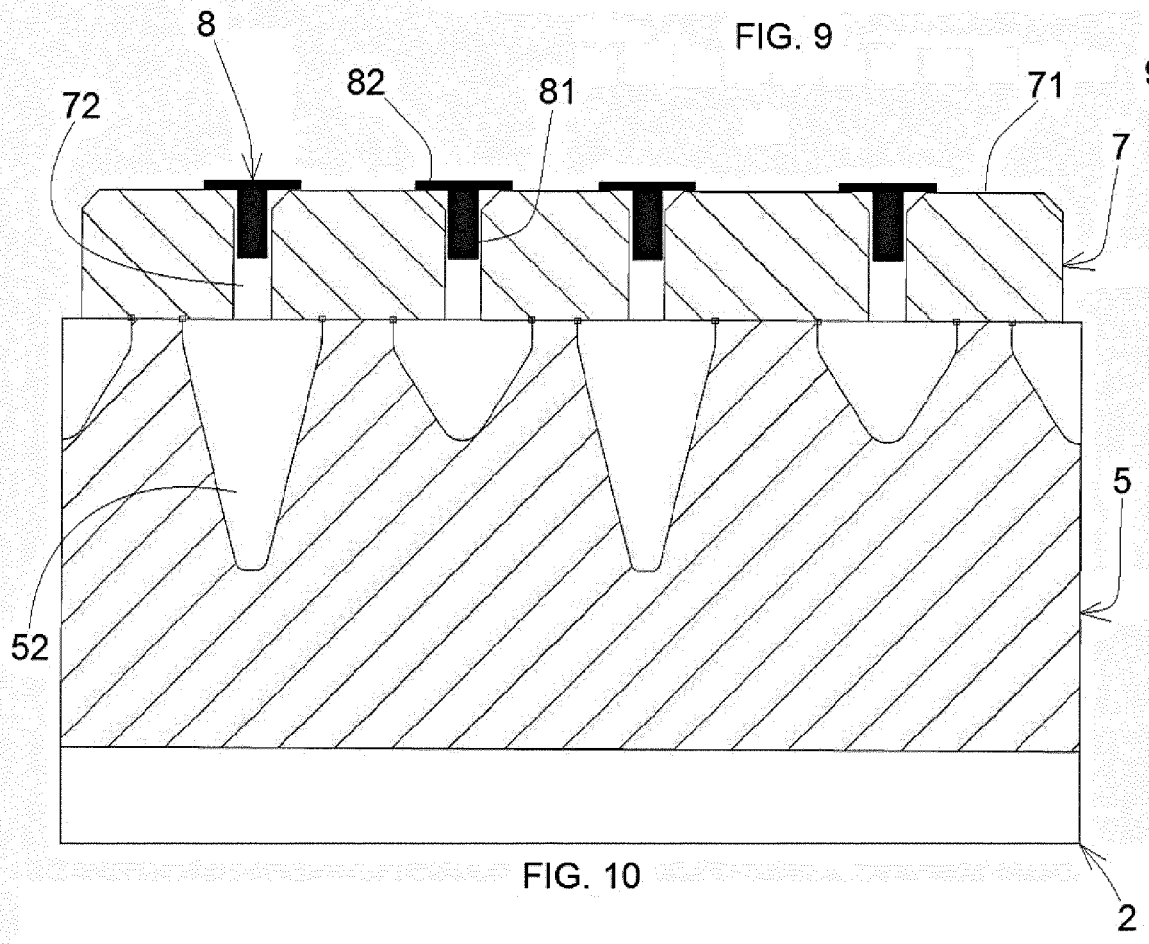

FIG. 10

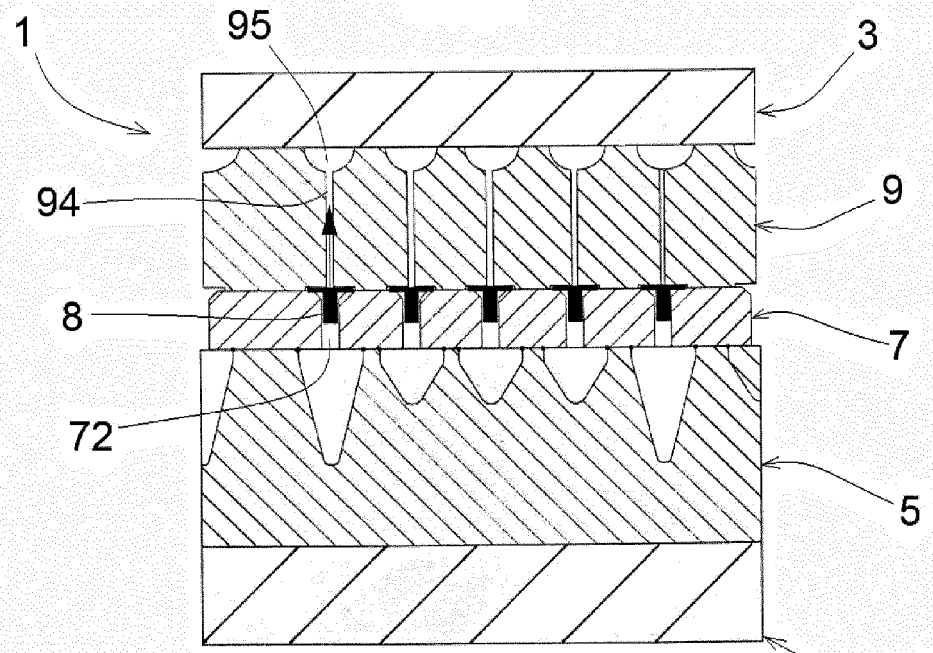

FIG. 11

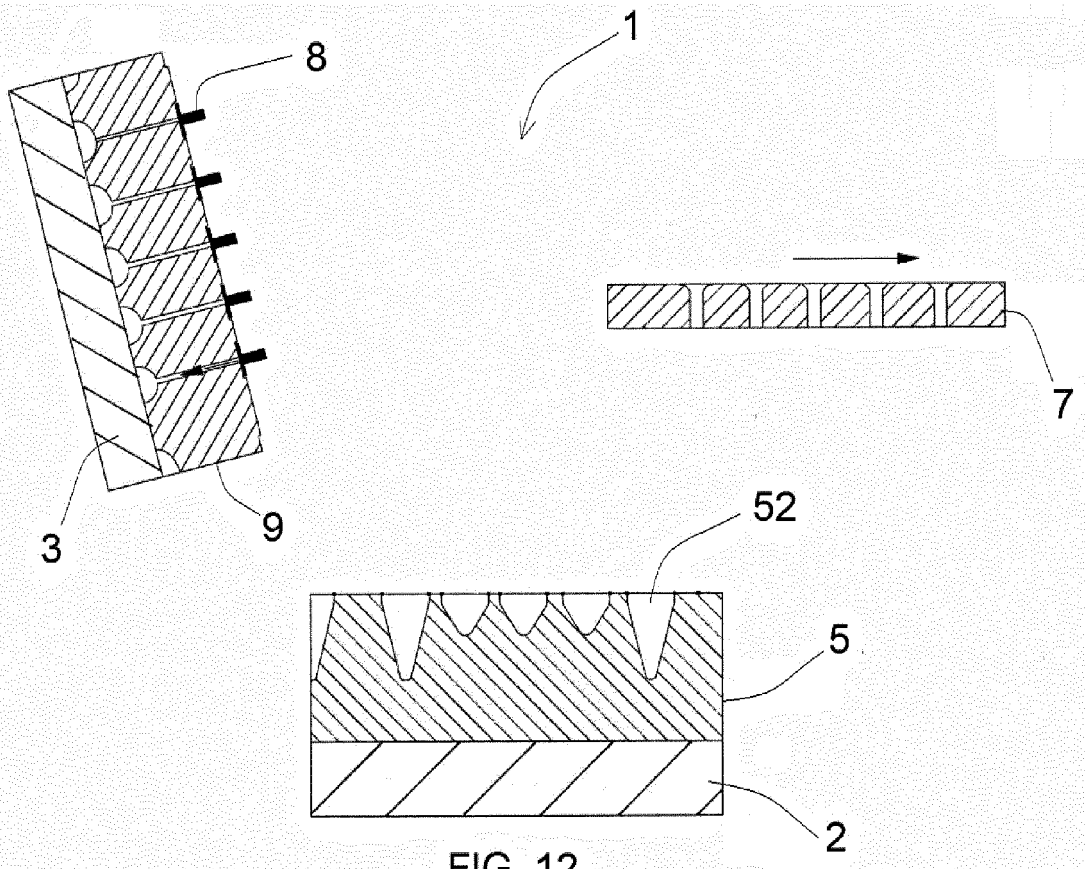

FIG. 12

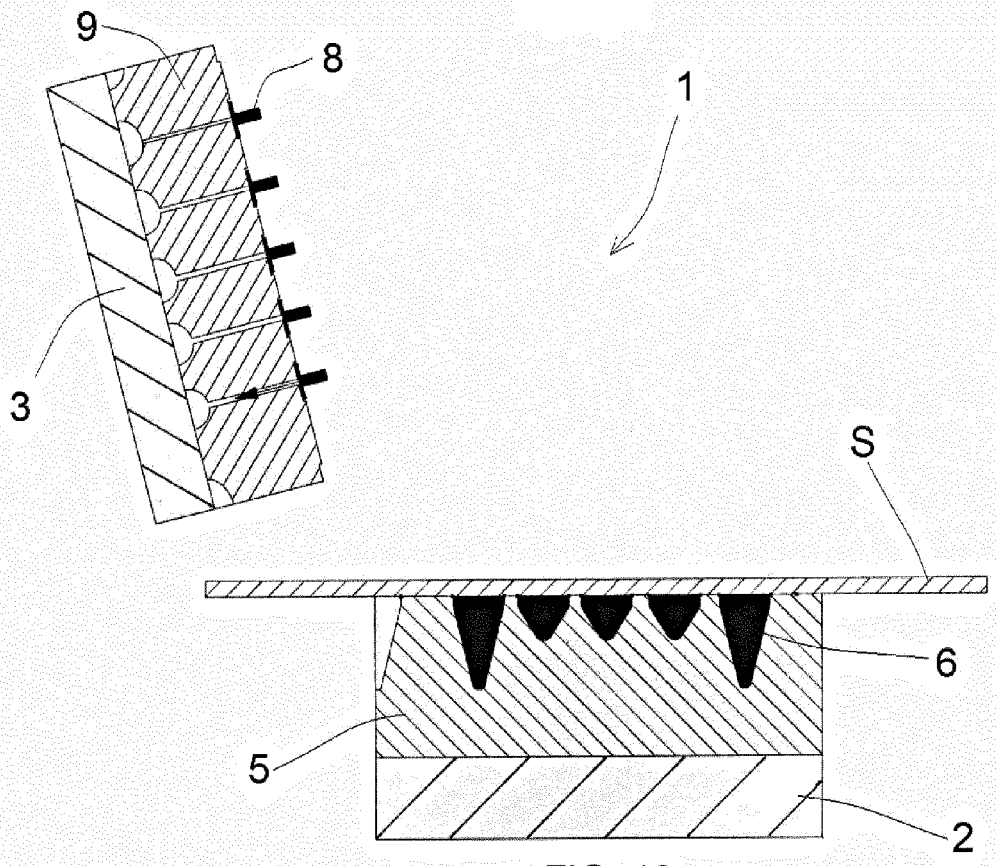

FIG. 13

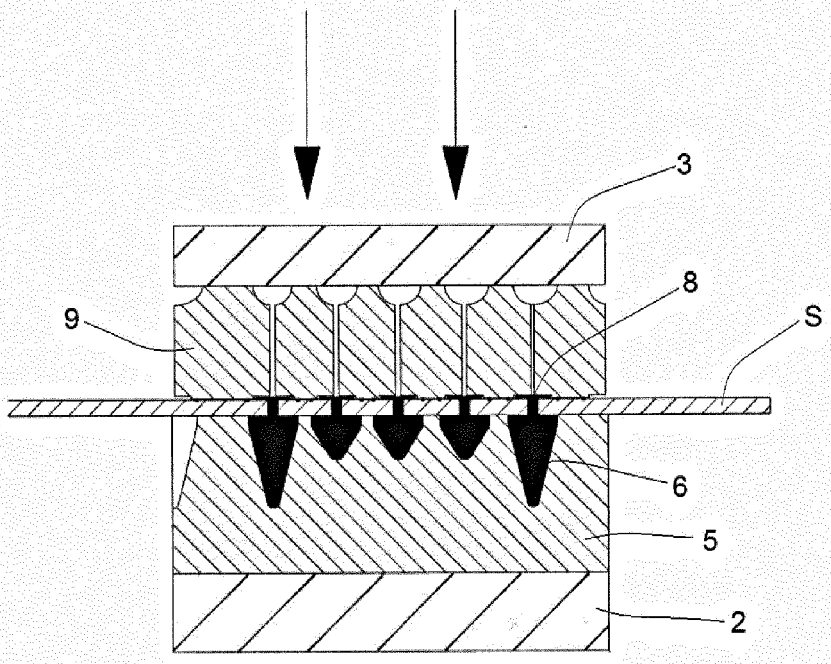

FIG. 14

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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 4836

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 July 2016	Augé, Marc

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