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(54) **SET AND PROCESS TO OBTAIN TRANSFERABLE SUPPORTS OF RHINESTONES**

(57) A set and a process to obtain transferable supports (48) of rhinestones (10) allows an effective arrangement of rhinestones on intermediate supports already aligned and arranged with a complex pattern, previously to the application of the adhesive tape tract of the transferable support and without dispersing rhinestones in the procedure, and it provides the use of a plurality of intermediate supports (5) for rhinestones (10) of modular type, each one formed by a perforated plate (6) with predefined sizes, with a plurality of recesses (9) arranged according to a predefined pattern, wherein the cross sizes of the recess (9) allow to insert the base (2) of the rhinestones (10) in the recess (9), and wherein the depth

of the recess (9) is lower than the height of the head (1) of the rhinestone (10); means for composing a complex pattern of rhinestones comprising a ruler-like element (20) allowing to arrange a number of intermediate supports (5) on a flat surface in a predefined position; and a re-closable tubular container apt to cooperate with said means for composing a complex pattern of rhinestones to determine, inside the tubular container, two communicating spaces separated from said ruler-like element (20) acting as partitioning septum: a first space (38) acting as reserve of rhinestones and a second space (39) for inserting rhinestones wherein the bottom thereof is formed by said intermediate supports (5).

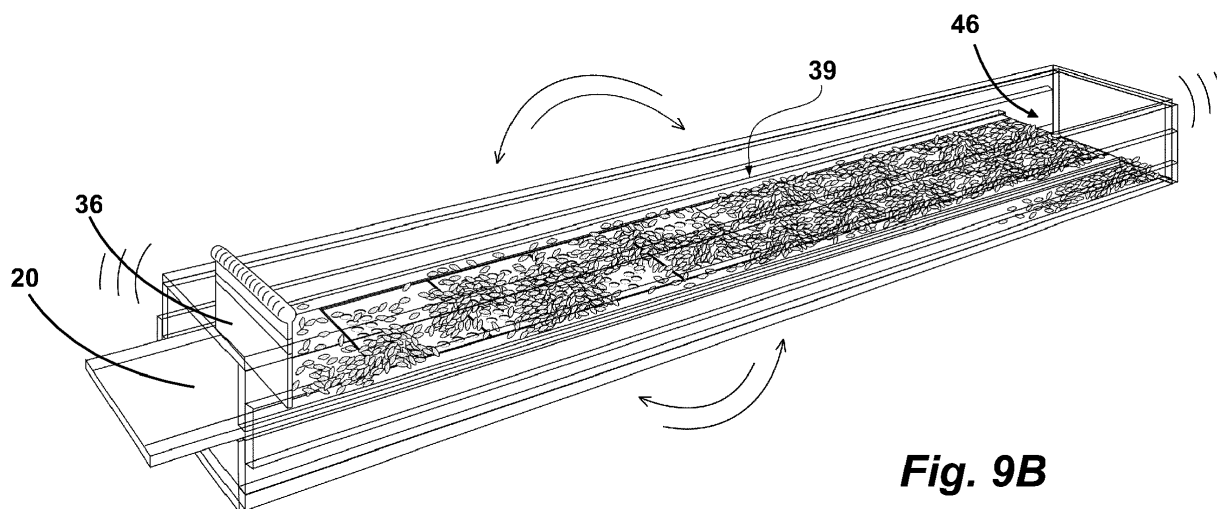


Fig. 9B

Description

[0001] The present invention relates to a set and a process to obtain transferable supports of rhinestones, known in the art even as rhinestone paper, and a transferable rhinestone support obtained thanks to the above-mentioned process, that is by means of the use of said set.

[0002] Here and hereinafter under rhinestones all elements with small sizes are meant which are suitable to be applied on tissues, threads or nets to obtain chromatic and brightness effect; the term rhinestone is herein used to designate also glitters, paillettes, beads, flints, metal plates, tesserae and so on.

[0003] Therefore, hereinafter the term rhinestone has to be considered equivalent to glitter, paillette, bead, flint, metal plate, tesserae and so on. The rhinestone ("strass") receives its own name from that of its own inventor.

[0004] The application of rhinestones and the like is well known in textile field, it allows to obtain embellished garments of great value thanks to the optical brilliance, light refraction and reflection they allow. The rhinestones are used in particular for haute couture dresses, inserts to be applied on dresses, dresses' portions, evening bags and so on, but they can even be used to transfer inscriptions, patterns or drawings on any garment at artisan or domestic level, in case to renew the aspect of one's own garment, even a simple T-shirt.

[0005] The refinement given to the garment is mostly linked to preciousness of the applied elements: they can be made of precious material such as crystals of various nature and colour, pearly or metallic materials imitations of precious stones, ambers and so on.

[0006] In order to allow a quicker application both at industrial level and at artisan level, rhinestones have been devised having a base whereon a layer of thermo-adhesive glue is applied, that is which softens by applying heat and, upon cooling, it adheres to the surface thereto it is applied. These rhinestones or stones often assume the designation of *hotfix element*, *hotfix rhinestone*, to designate the presence of a hot adhesive fixing.

[0007] Two examples of rhinestones are herein described with reference to figures 1A, 1B, 2A and 2B.

[0008] Figures 1A, 1B show a stud-like shaped rhinestone, that is a crystal 10 or a pearl with a hemispherical shape wherein a head 1 and a base 2 are distinguished, which is the element of rhinestone 10 having the maximum diameter, that is the maximum extension in width. A reflecting coating, called *foiling*, which increases the crystal brightness, can be applied on the rhinestone.

[0009] The base 2 then has a flat application surface whereon a first layer 3 of primer is deposited, that is a gripping material to reinforce the link between the subsequent second layer of glue 4 and *foiling*. The second layer 4 is formed by a transparent glue, specific to adhere to textile fibres, and it can be hot-activated, with the application of a modest pressure and temperature indicatively ranging between 130°C and 180°C.

[0010] Figures 2A and 2B show a strass 10 with a head 1 of faceted type, and a circular base 2 on the flat surface thereof the first layer 3 of primer and the second layer 4 of hot adhesive are applied.

5 [0011] In both above-shown examples, in particular the cross sizes of the base 2, that is the diameter of the circular base, the overall height of the rhinestone 10 and the height of the head 1 with respect to the base 2 are all standard sizes, well known to the rhinestones' producers and users.

10 [0012] However, it is necessary to specify that the present invention is not limited to the application of the rhinestones of *hotfix* type, that is which use a layer of glue layer, which can be hot-activated, spread on the base of the rhinestone, but it even relates to the rhinestones which have no adhesive, as it is possible that the adhesive is already arranged on the receiving surface or that it is added to the rhinestones in a step immediately preceding their application.

15 [0013] Generally, at industrial level, huge amounts of rhinestones already composed according to patterns and drawings are applied on tissues by means of transfer from a transferable support thereto the head of the rhinestones is connected, usually thanks to a not permanent adhesive.

20 [0014] Then, it is to be meant that, by applying the adhesive transferable support to the target surface of the rhinestones, for example a tissue, the rhinestones then are with the base adhering to the tissue and the head in the correct position, and at this point it is sufficient to activate the adhesive.

25 [0015] A transferable adhesive support of the above-described type is disclosed by US patent application No. 2005/0076998 A1, and another example of these supports is described in German patent application No. DE 10 2013 102 743 A1, which describes a grid to compose patterns of rhinestones of any shape.

30 [0016] US patent application No. 2015/0199923 A1 describes another adhesive support, suitable to the application of rhinestones to the solid surface of an object made of glass.

35 [0017] In the above-mentioned examples, the preliminary application of the rhinestones on an intermediate support grid, preceding their adhesion on a flexible adhesive support, can be implemented manually with great time expenditure, or it can be implemented, on a large scale, by automatized systems of considerable complexity.

40 [0018] US patent application No. 2012/0234482 A1 describes a set and a process for arranging rhinestones according to predefined patterns, which reproduce letters, number or repetitive patterns, and provides the use of perforated plates with holes having predefined size, that is with a larger diameter than that of the base of the rhinestones, in order to arrange quickly the rhinestones in their correct position according to said pattern which is reproduced by the perforation of the perforated plates, which can be constituted by modular elements.

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[0019] In this way, it is possible to obtain an adhesive support with an arrangement of rhinestones which is obtained directly by the arrangement of the holes, and which then does not require a one-by-one arrangement of the rhinestones in their target position.

[0020] However, this mode is not exempt from drawbacks: the rhinestones are made to move on a plane and inserted in the holes with suitable spatulas or brushes, this with the purpose of putting them in a correct and not overturned position, and not to disperse the rhinestones which, due to their shape, tend easily to roll away. Then, even with the help of intermediate supports, perforated according to predefined patterns, the application of the rhinestones occurs with a complexity perceived as a drawback, an obstacle in adopting this system.

[0021] The technical problem underlying the present invention is to provide a set and a process for applying the rhinestones on a transferable support allowing to obviate the drawback mentioned with reference to the known art.

[0022] Such problem is solved by a set as specified above, which is characterized in that it comprises:

- a plurality of intermediate supports for rhinestones of modular type, each one formed by a perforated plate with predefined sizes, with a plurality of recesses arranged according to a predefined pattern, wherein the cross sizes of the recess allow to insert the base of the rhinestones in the recess, and wherein the depth of the recess is lower than the height of the head of the rhinestone;
- means for composing a complex pattern of rhinestones comprising a ruler-like element allowing to arrange a number of intermediate supports on a flat surface in a predefined position;
- a re-closable tubular container apt to cooperate with said means for composing a complex pattern of rhinestones to determine, inside the tubular container, two communicating spaces separated from said ruler-like element acting as partitioning septum: a first space acting as reserve of rhinestones and a second space for inserting rhinestones wherein the bottom thereof is formed by said intermediate supports.

[0023] The same problem is further solved by a process as specified above, comprising the steps of:

- providing a plurality of intermediate supports for rhinestones of modular type, each one formed by a perforated plate with predefined sizes, with a plurality of recesses arranged according to a predefined pattern, wherein the cross sizes of the recess allow to insert the base of the rhinestones in the recess, and wherein the depth of the recess is lower than the height of the head of the rhinestone;

- aligning a number of intermediate supports on a flat surface of a ruler-like element;
- providing a re-closable tubular container, wherein said ruler-like element is inserted to act as partitioning septum by determining two communicating spaces: a first space acting as reserve of rhinestones, which has been previously filled-up with rhinestones to be arranged on a transferable support, and a second space for inserting rhinestones wherein the bottom thereof is formed by said intermediate supports;
- re-closing said tubular container and transferring, by moving suitably the tubular container, an amount of rhinestones from said first space to said second space;
- moving said tubular container by causing the insertion of the rhinestones in the recesses of the intermediate supports;
- extracting from the tubular container said ruler-like element, and applying, on said intermediate supports whose recesses include rhinestones, a tract of adhesive tape, provided with a layer of not permanent adhesive on one face thereof, to obtain a transferable support of rhinestones.

[0024] The main advantage of the set and of the process according to the present invention lies in the fact of allowing an effective arrangement of rhinestones on intermediate supports already aligned and prearranged with a complex pattern, previously to the application of the adhesive tape tract of the transferable support, and without dispersing rhinestones in the procedure.

[0025] Additional details of the invention will be described with reference to a preferred embodiment example thereof, provided by way of example and not for limitative purposes with reference to the enclosed drawings wherein:

* figures 1A and 1B show a side view and a plan elevated view of a first type of rhinestone, respectively;

* figures 2A and 2B show a side view and a plan elevated view of a second type of rhinestone, respectively;

* figure 3 shows a perspective view of a pair of modular intermediate supports for applying rhinestones to a transferable support according to the invention;

* figure 4 shows a plan view of a plurality of intermediate supports of figure 3, having impressed shapes and drawings different therebetween;

* figure 5 shows a perspective view of a first element

of the set according to the present invention;

* figures 5A and 5B show enlarged perspective views of the ends of the first element of figure 5, respectively

* figure 6 shows a perspective view of the first element of figure 5 illustrating the use thereof;

* figure 7 shows a perspective view of a second element of the set according to the present invention;

* figure 7A shows an enlarged perspective view of an end of the second element of figure 7;

* figure 8 shows an exploded perspective view of the second element of figure 7;

* figures 9A and 9B show respective perspective views of a set according to the invention and they illustrate the use thereof in two different steps of the process;

* figures 10A and 10B show an enlarged side view illustrating the way in which a rhinestone arranges in the set according to the invention;

* figure 11 shows a perspective view of the first element of figure 7 and illustrates a final step in which a transferable support for rhinestones is obtained; and

* figure 12 illustrates the application of the rhinestones by means of the transferable support of figure 11.

[0026] With reference to figure 3, an intermediate support 5 for rhinestones 10 of modular type is illustrated; it is formed by a perforated plate 6 with predefined sizes, in particular its height, so that the distance between a pair of lower 7 and upper 8 edges is constant regardless of the width.

[0027] The perforated plate 6 has a plurality of recesses 9 arranged according to a predefined pattern, for example letters, numbers, repetitive patterns or drawings. Figure 4 illustrates a variety of letters, numbers, patterns and drawings but it is meant that there are no limitations in the possibility of reproducing any shape.

[0028] In the present embodiment example, the recesses 9 are through-holes. They have a circular shape and a predefined diameter, larger than that of the circular base 2 of a rhinestone 10.

[0029] Generally, the cross sizes of the recess 9 are larger than those of the extension of the base 2 of the rhinestones 10, that is they are so as to facilitate the insertion of the base 2 of the rhinestones 10 in the recess 9.

[0030] Another fundamental parameter is the depth of

the recess 9 which has to be lower than the height of the head 1 of the rhinestone 10, so that not only the flat surface but the whole base 2 is outside the recess should the rhinestone 10 be inserted therein overturned (figure 10B): the correct position of the rhinestone 10 in the recess is with the base 2 inserted in the recess 9 and the head 1 exposed, in particular with said second hot adhesive layer (figures 1A and 2A) put onto the bottom of the recess 9, that is on the surface of the ruler, that is with the head 1 of the rhinestone 10 faced upwards.

[0031] It is to be noted that if the recesses 9 are through-holes, their depth T corresponds to the thickness of the respective perforated plate 6 (figures 10A and 10B).

[0032] With reference to figures 5 to 6 an first element 20 of the set to obtain a transferable support of rhinestones is described, which constitutes means for composing a complex pattern of rhinestones, wherein under complex pattern any set of letters, numbers, symbols, drawings, repetitive patterns according to a predefined pattern and so on are meant. The complex pattern is obtained by placing side by side a certain number of intermediate supports 5 on at least one line.

[0033] The hereinafter described configuration relates to one single line, but it will be easily understood that the same element, in case with different width, could be used to compose complex patterns formed by several lines of intermediate supports 5.

[0034] Therefore, said first element 20 has a shape like a ruler, formed by an elongated plate having, on one face thereof, a central groove 21 defined by a pair of side tracks 22 formed at the two longitudinal edges 23 of the first element 20.

[0035] Said groove 21 has a cross size so as to receive said intermediate supports 5 inside thereof (figure 5B), with the above-mentioned lower and upper edges 7, 8 inserting in said tracks 22.

[0036] On the surface of the ruler face with the groove 21, it is possible to compose complex shapes, complex patterns and writings by composing suitably any number of perforated plates 6. Not perforated plates could be inserted as spacers. It is further meant that the sizes shown in figure 5A are exemplifying the embodiment example, but they have no limiting purposes.

[0037] The tracks 22 have a respective first insertion slot 24 and can be implemented by elastic foils 25 so that the insertion and the sliding of the perforated plates 6 can take place by forcing the sliding thereof in the groove 21 and in the slots 23, overcoming a friction force which tends to keep the perforated plates in the position wherein they have been arranged.

[0038] With reference to figures 7 to 8 a second element 30 of the set to obtain a transferable support of rhinestones is described, which has an elongated box-like shape, formed by a bottom wall 31, a top wall 32, a pair of side walls 33 assembled to form substantially a tubular container with a closed end 34 and an open end 35, re-closable by means of a mobile wall 36 which, in

the present example, can be inserted in a cross through slot 45, implemented in the top wall 32 at said open end 35 (figure 7A), but which can be fastened removably or hinged in any other way.

[0039] The tubular container and the means for composing a complex pattern of rhinestones cooperate to determine, inside the tubular container, two communicating spaces: a first space acting as reserve of rhinestones and a second space for inserting rhinestones wherein the bottom is implemented by said intermediate supports 5. By reclosing said open end, communicating with said first space of rhinestone reserve to feed the tubular container with new rhinestones or for extracting the not-used rhinestones, a closed environment is determined therefrom the rhinestones cannot go out while the correct positioning of the rhinestones in the intermediate supports 5 is performed.

[0040] Inside, the second element 30 has respective opposite longitudinal grooves 37 which allow the insertion therein of the side edges 23 of the first ruler-like element 20, the external width thereof is substantially equal to the distance between said longitudinal grooves 37.

[0041] Even the length of the first element 20 is not higher than the longitudinal extension of the second element 30, therefore, once the first element 20 is inserted inside the second element 30, the first element acts as partitioning septum, which divides the above-said tubular container into two separate chambers 38, 39, which are both closed by said mobile wall 36 and which correspond to said first space of rhinestone reserve - the lower chamber 38 - and second space for inserting rhinestones - upper chamber 39.

[0042] With reference to figure 8, a particular implementation version of the second element 30 is shown, by pure way of example and not for limiting purposes, wherein the side walls 33 are formed each one by a first pair of flat foils 41 arranged parallelly, with said longitudinal through slots 37 formed longitudinally on their centre line. The first foils 41 are connected to a respective second flat foil 42, glued thereto externally to close from outside of the tubular container said longitudinal slots 37.

[0043] Moreover, said closed end 34 is obstructed by a first closing plate 43, whereas the open end 35 is only partially obstructed by a second closing plate 44, extending from the bottom of the second element 30 at the height of the longitudinal slots 37, thus delimiting said lower chamber 38 which, when the partitioning septum is inserted, remains closed.

[0044] The movable wall 36 is inserted in a cross through slot 45, implemented through the top wall 32 at said open end 35. By inserting and extracting said mobile wall 36, then, it is possible to close and open the second element 30, in particular to fill it up with an amount of rhinestones, or to extract the not used ones and replace them with others, even of other type.

[0045] With reference to figures 9A and 9B then the operation of the above-described set is described, that is the process to obtain a transferable support.

[0046] The second element 30 is filled up with an amount of rhinestones which accumulate onto the bottom of the tubular container, in said first chamber 38.

[0047] According to the present embodiment example, the longitudinal grooves 37 extend from said open end 35 but interrupt at a certain distance from said closed end, to leave an open transfer passage 46.

[0048] In this way, once inserted the first element 20 as partitioning septum in the longitudinal slots 37 and the movable wall 36 in the cross slot 45, two communicating chambers 38, 39 are obtained, one thereof includes the rhinestones, whereas the perforated plates 6 in the first element 20 are included in the other chamber.

[0049] By moving suitably the so-assembled set, it is possible to transfer a certain amount of rhinestones from the lower chamber 38 to the upper chamber 39 through the passage 46.

[0050] At this point, the rhinestones 10 which have been transferred will arrange in the recesses 9 of the perforated plates 6 as illustrated in figures 10A and 10B: some rhinestones 10 will arrange correctly (figure 10A) with the base 2 of the rhinestone 10 inserted in the recess 9 and with the projecting head 1, whereas it could happen (figure 10B) that some rhinestones 10 insert overturned in the target recess 9. In this case, however, the base 2 wholly projects from the recess, and the interference with the other rhinestones 10 which move freely determines the outgoing thereof, but this interference does not act on the rhinestones inserted correctly.

[0051] By moving the rhinestones 10 with alternate motions, it is possible to fill in all recesses 9 of the first element 20, and the exceeding rhinestones can be made to slide through the passage 46 by simply tilting slightly the set.

[0052] At this point, the first element 20 can be extracted with the exact number of rhinestones 10 already placed in the right positions. At this point, it is sufficient to arrange on the rhinestones 10 of the first element a tract of adhesive tape 48, provided with a layer of not permanent adhesive on one face thereof, to obtain a transferable support of rhinestones 50, which could be protected by arranging a layer of protection, for example, made of silicone paper, on the adhesive face with the rhinestones already arranged in the correct manner, that is with the base 2 and with the second adhesive layer 4 exposed and ready to be placed on a textile support S (figure 12).

[0053] At this point the transfer can be obtained easily by passing a hot plate, for example the one of a flat iron H, on the adhesive tape of the transferable support 50, to fasten the rhinestones (figure 12).

[0054] To the above-described set and process to obtain transferable supports of rhinestones a person skilled in the art, with the purpose of satisfying additional contingent needs, could introduce several additional modifications and variants, all however comprised within the protective scope of the present invention, as defined by the enclosed claims.

Claims

1. A set to obtain transferable supports (50) of rhinestones (10), the rhinestone having a base (2) and a head (1) with predefined height, comprising:
 - a plurality of intermediate supports (5) for rhinestones (10) of modular type, each one formed by a perforated plate (6) with predefined sizes, with a plurality of recesses (9) arranged according to a predefined pattern, wherein the cross sizes of the recess (9) allow to insert the base (2) of the rhinestones (10) in the recess (9), and wherein the depth of the recess (9) is lower than said height of the head (1) of the rhinestone (10);
 - means for composing a complex pattern of rhinestones comprising a ruler-like element (20) allowing to arrange a number of intermediate supports (5) on a flat surface in a predefined position;
 - a re-closable tubular container apt to cooperate with said means for composing a complex pattern of rhinestones to determine, inside the tubular container, two communicating spaces separated from said ruler-like element (20) acting as partitioning septum: a first space (38) acting as reserve of rhinestones and a second space (39) for inserting rhinestones wherein the bottom thereof is formed by said intermediate supports (5).
2. The set to obtain transferable supports (50) of rhinestones (10) according to claim 1, wherein said recesses (9) are formed by through-holes.
3. The set to obtain transferable supports (50) of rhinestones (10) according to claim 1, wherein said ruler-like element (20) is formed by an elongated plate having, on one face thereof, a central groove (21) defined by a pair of side tracks (22) formed at the two longitudinal edges (23), said groove (21) having a cross size so as to receive said intermediate supports (5) inside.
4. The set to obtain transferable supports (50) of rhinestones (10) according to claim 3, wherein said tracks (22) have a respective first insertion slot (24) and they are implemented by elastic foils (25) so that the insertion and the sliding of the perforated plates (6) can take place by forcing the sliding thereof in the groove (21) and in the slots (23), overcoming a friction force which tends to keep the perforated plates in the position wherein they have been arranged.
5. The set to obtain transferable supports (50) of rhinestones (10) according to claim 1, wherein said tubular container has an elongated box-like shape, and the open end thereof (35) is re-closable through a mobile wall (36).
6. The set to obtain transferable supports (50) of rhinestones (10) according to claim 5, wherein the tubular container has respective opposite longitudinal grooves (37), allowing to insert therein side edges (23) of the ruler-like element (20), the external width thereof is substantially equal to the distance between said longitudinal grooves (37).
7. The set to obtain transferable supports (50) of rhinestones (10) according to claim 6, wherein said ruler-like element (20) is inserted in said longitudinal grooves (37), which leave, at a closed end (34) opposite to said open end (35), a passage to allow the communication between the first space (38) acting as reserve of rhinestones and the second space (39) for inserting rhinestones.
8. A process to obtain transferable supports (50) of rhinestones (10), the rhinestone having a base (2) and a head (1) with predefined height, comprising the steps of:
 - providing a plurality of intermediate supports (5) for rhinestones of modular type, each one formed by a perforated plate (6) with predefined sizes, with a plurality of recesses (9) arranged according to a predefined pattern, wherein the cross sizes of the recess (9) allow to insert the base (2) of the rhinestones (10) in the recess (9), and wherein the depth of the recess (9) is lower than said height of the head (1) of the rhinestone (10);
 - aligning a number of intermediate supports (5) on a flat surface of a ruler-like element (20) ;
 - providing a re-closable tubular container, wherein said ruler-like element (20) is inserted to act as partitioning septum by determining two communicating spaces (38, 39): a first space (38) acting as reserve of rhinestones, which has been previously filled-up with rhinestones to be arranged on a transferable support, and a second space (39) for inserting rhinestones, wherein the bottom thereof is formed by said intermediate supports (5);
 - re-closing said tubular container and transferring, by moving suitably the tubular container, an amount of rhinestones from said first space (38) to said second space (39);
 - moving said tubular container by causing the insertion of the rhinestones in the recesses (9) of the intermediate supports (5);
 - extracting from the tubular container said ruler-like element (20), and applying, on said intermediate supports (5) whose recesses include rhinestones, a tract of adhesive tape (48), provided with a layer of not permanent adhesive on

one face thereof, to obtain a transferable support (50) of rhinestones.

9. The process to obtain transferable supports (50) of rhinestones (10) according to claim 8, wherein the exceeding rhinestones are made to slide through the passage (46) by tilting the tubular container.

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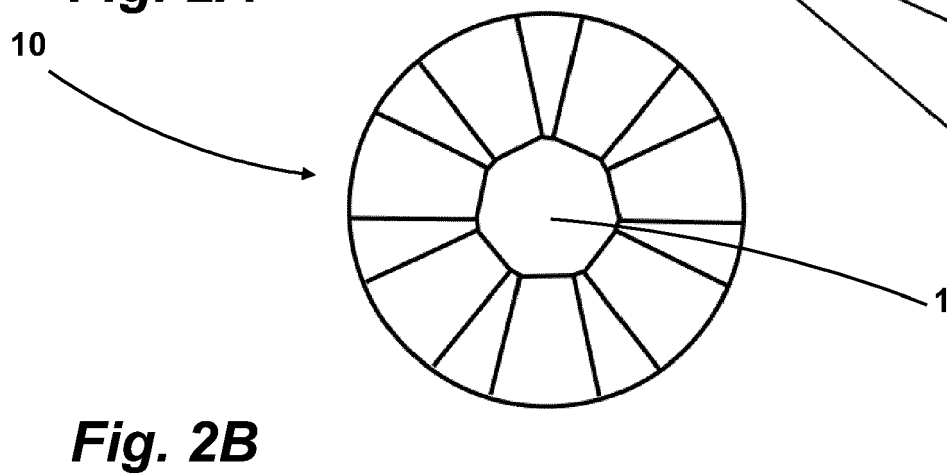
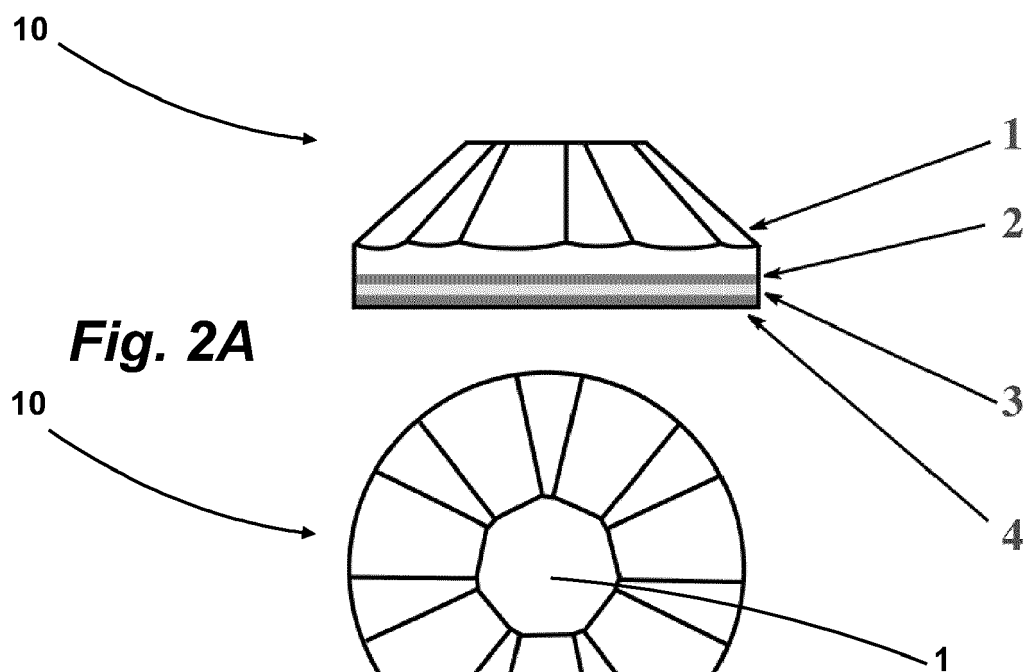
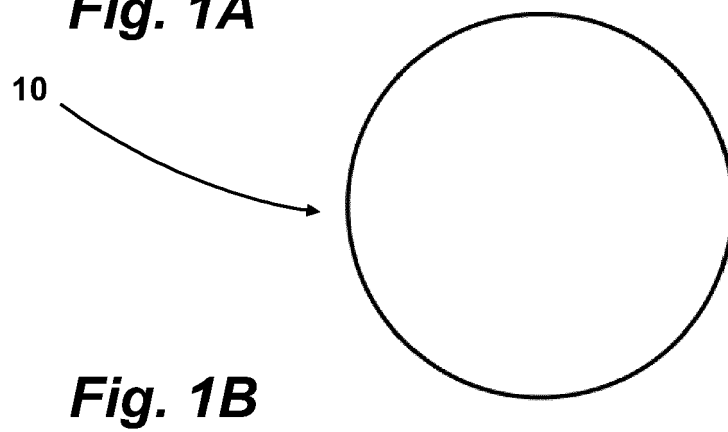
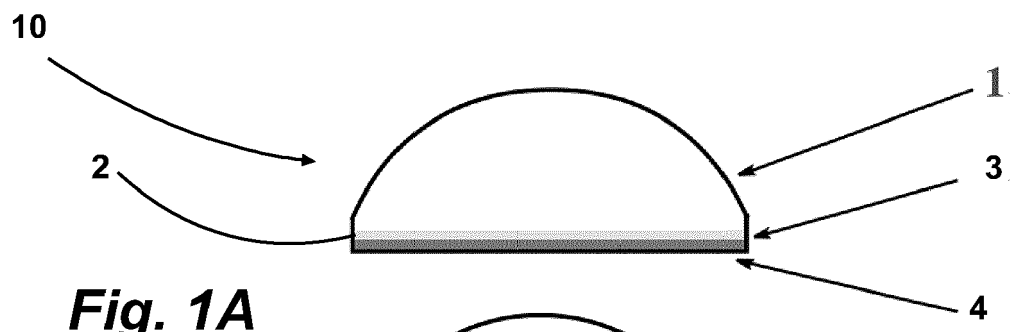


Fig. 3

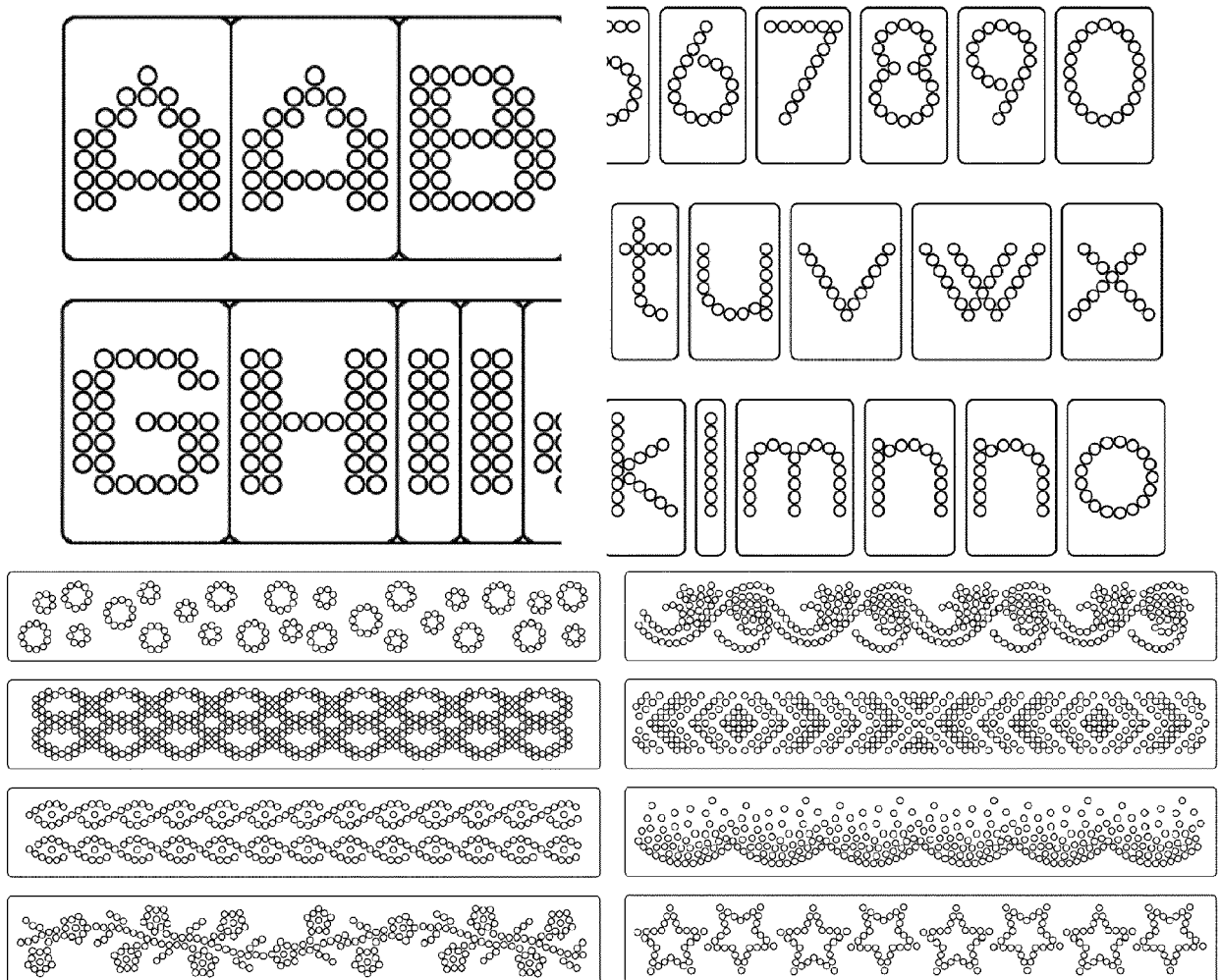
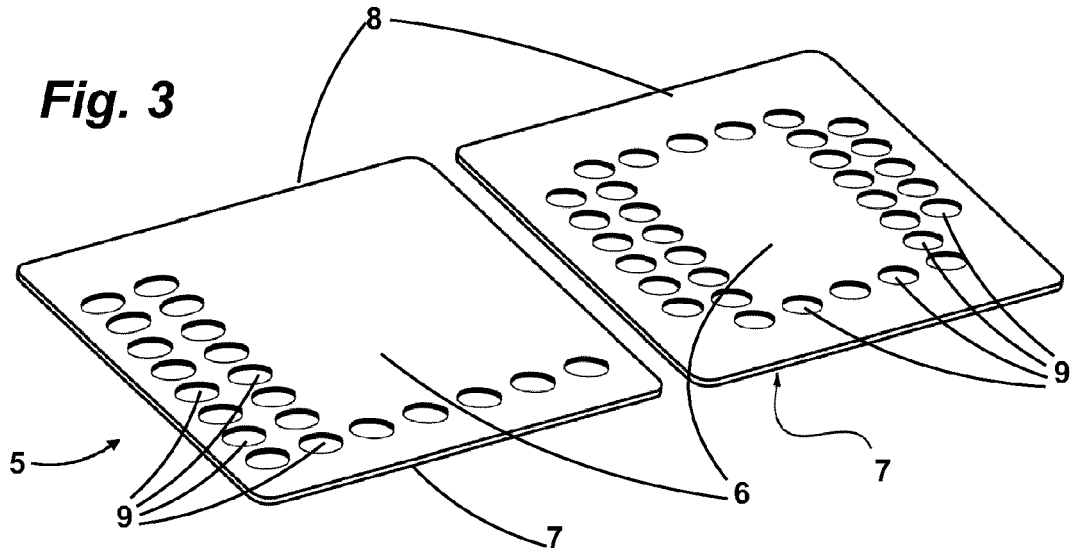


Fig. 4

Fig. 5

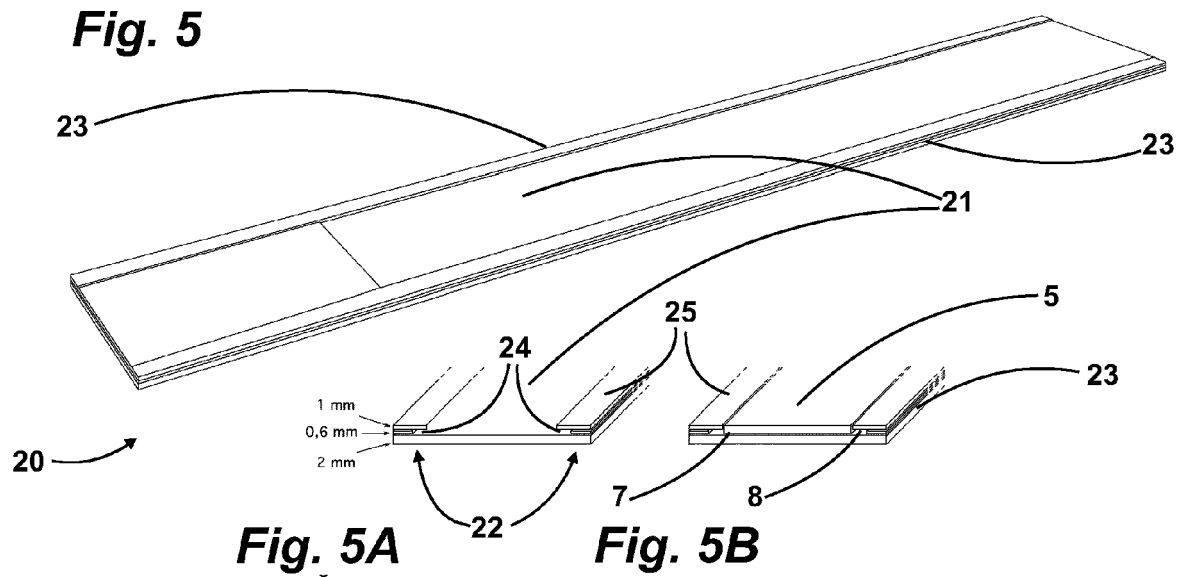


Fig. 5A

Fig. 5B

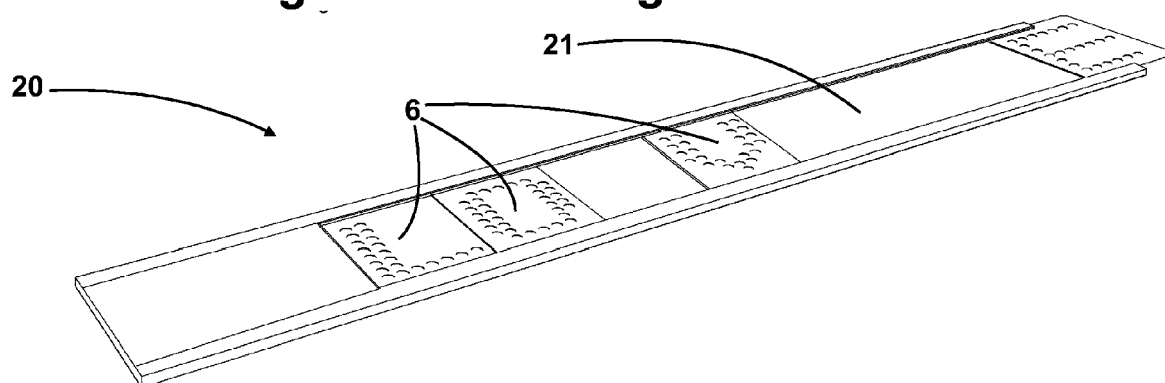


Fig. 6

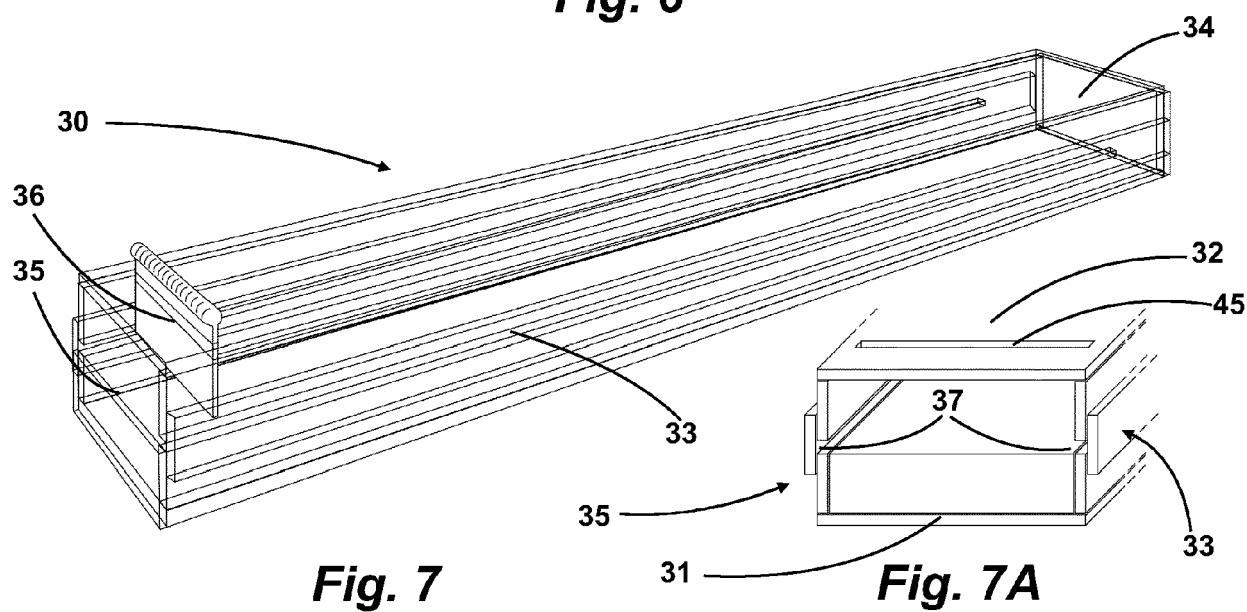


Fig. 7

Fig. 7A

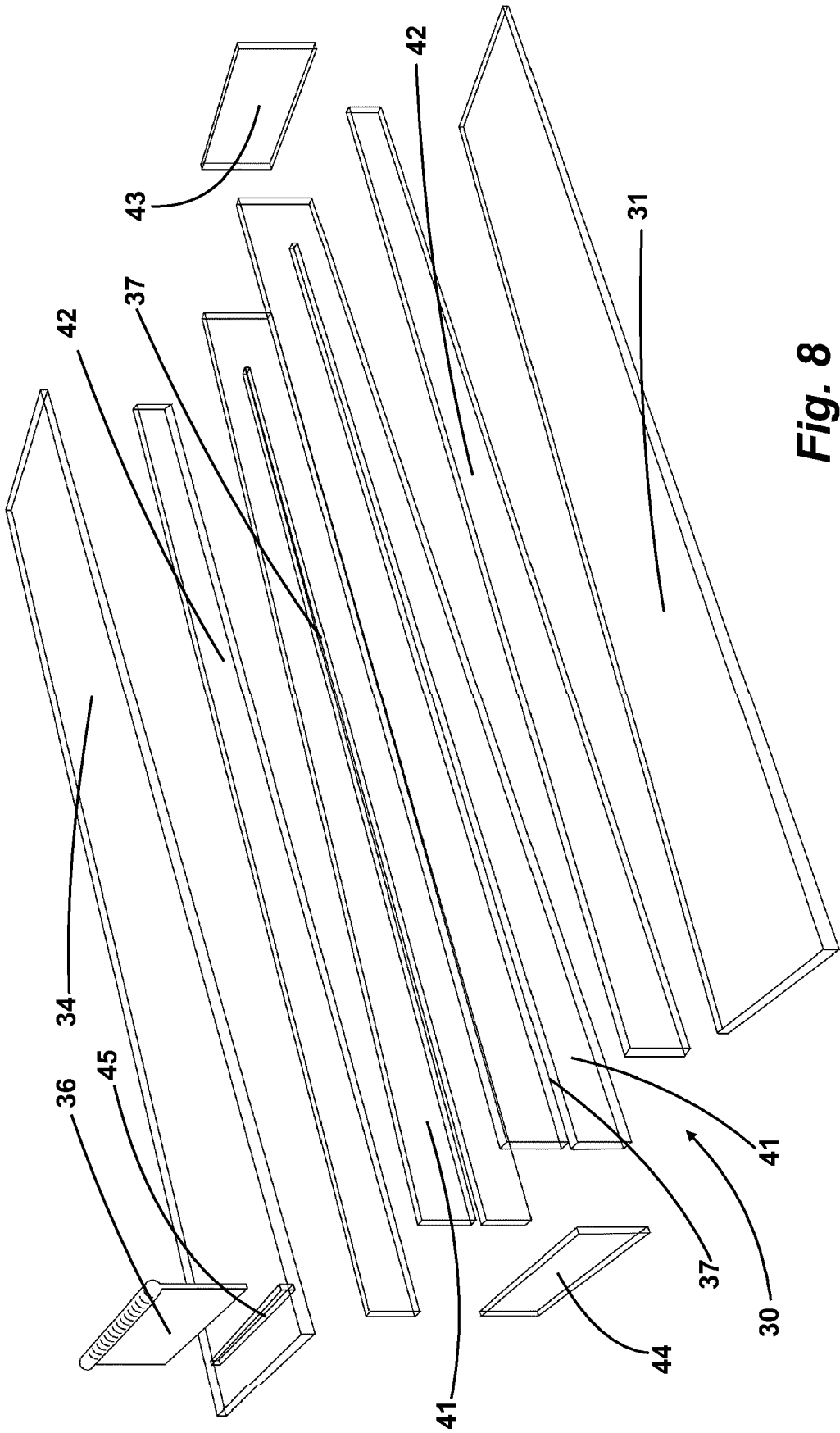
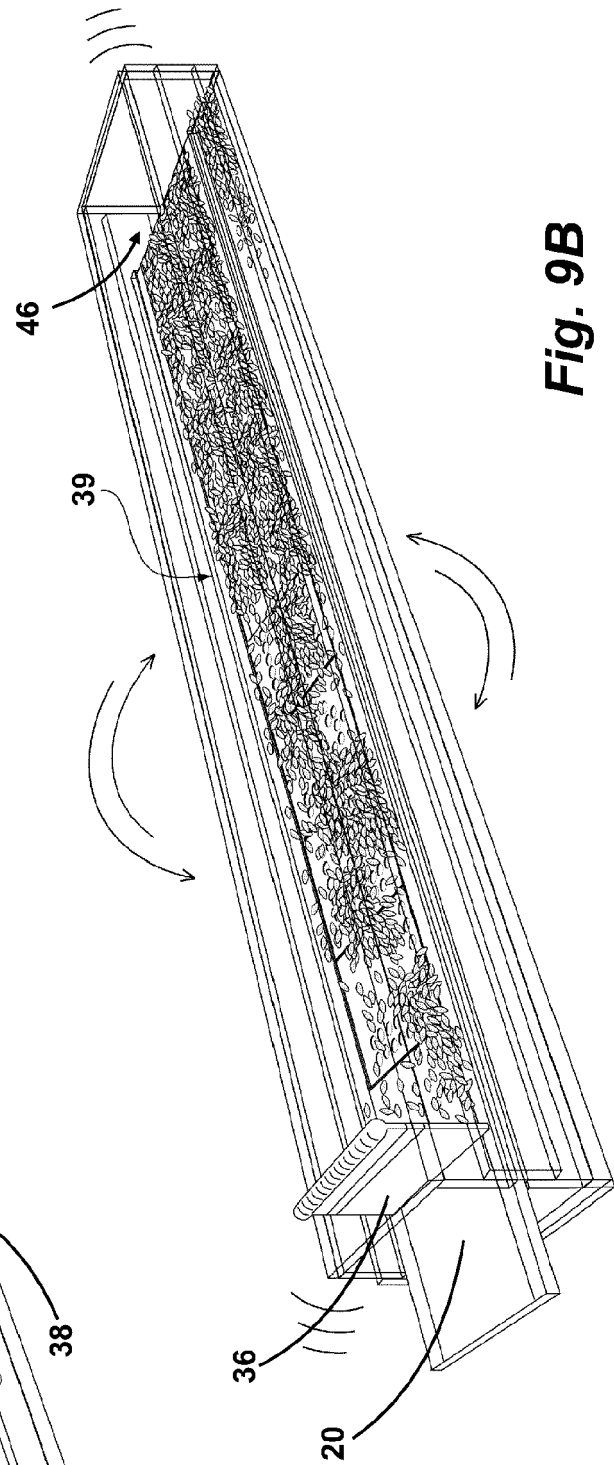
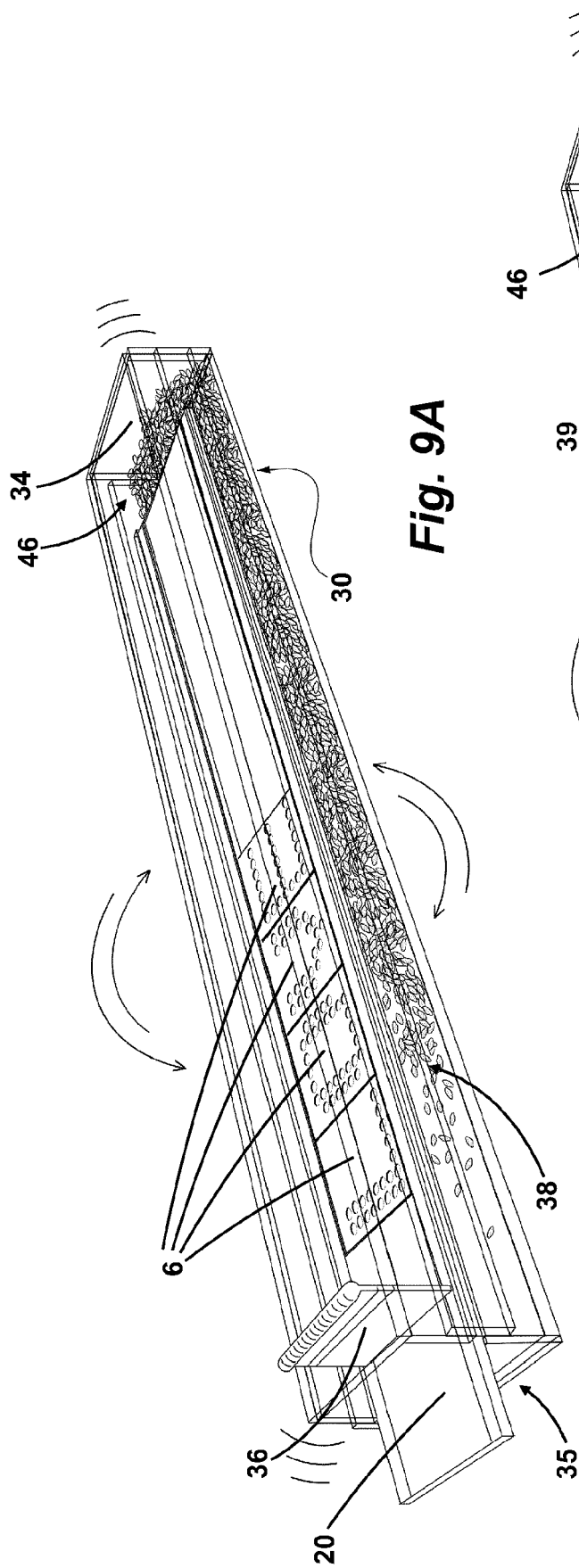
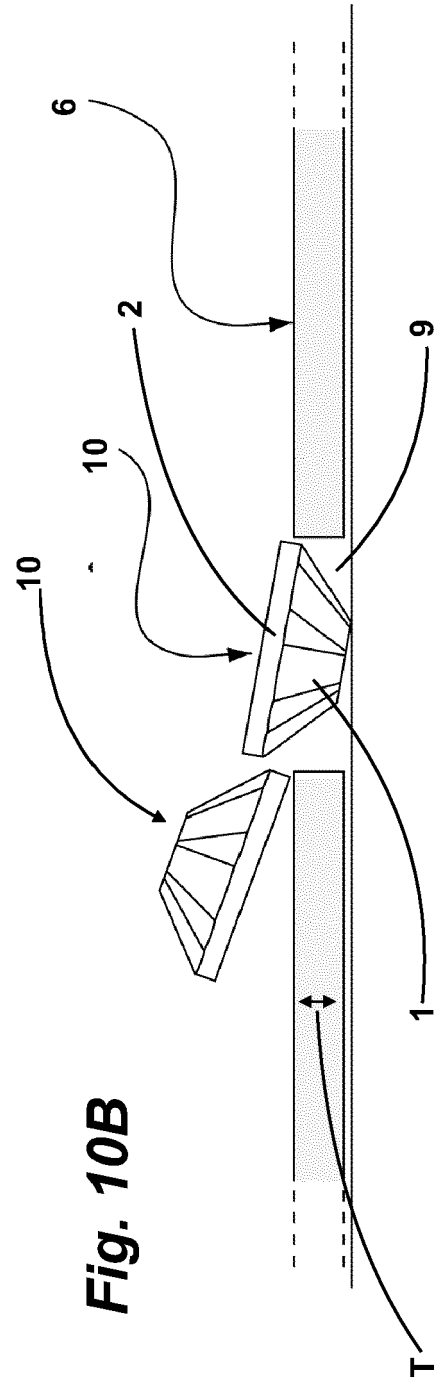
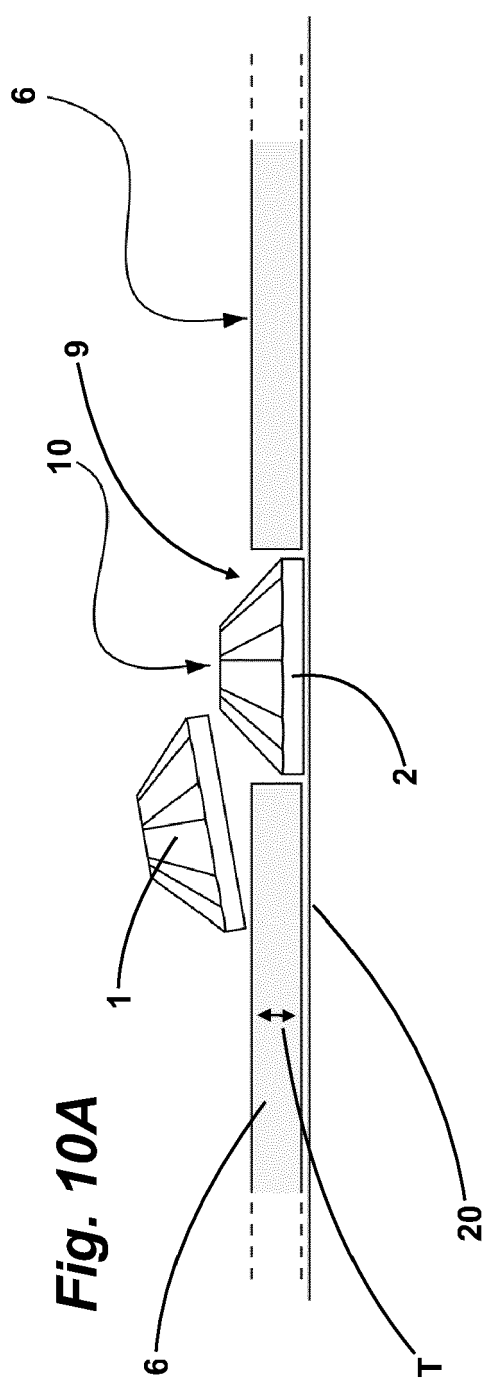
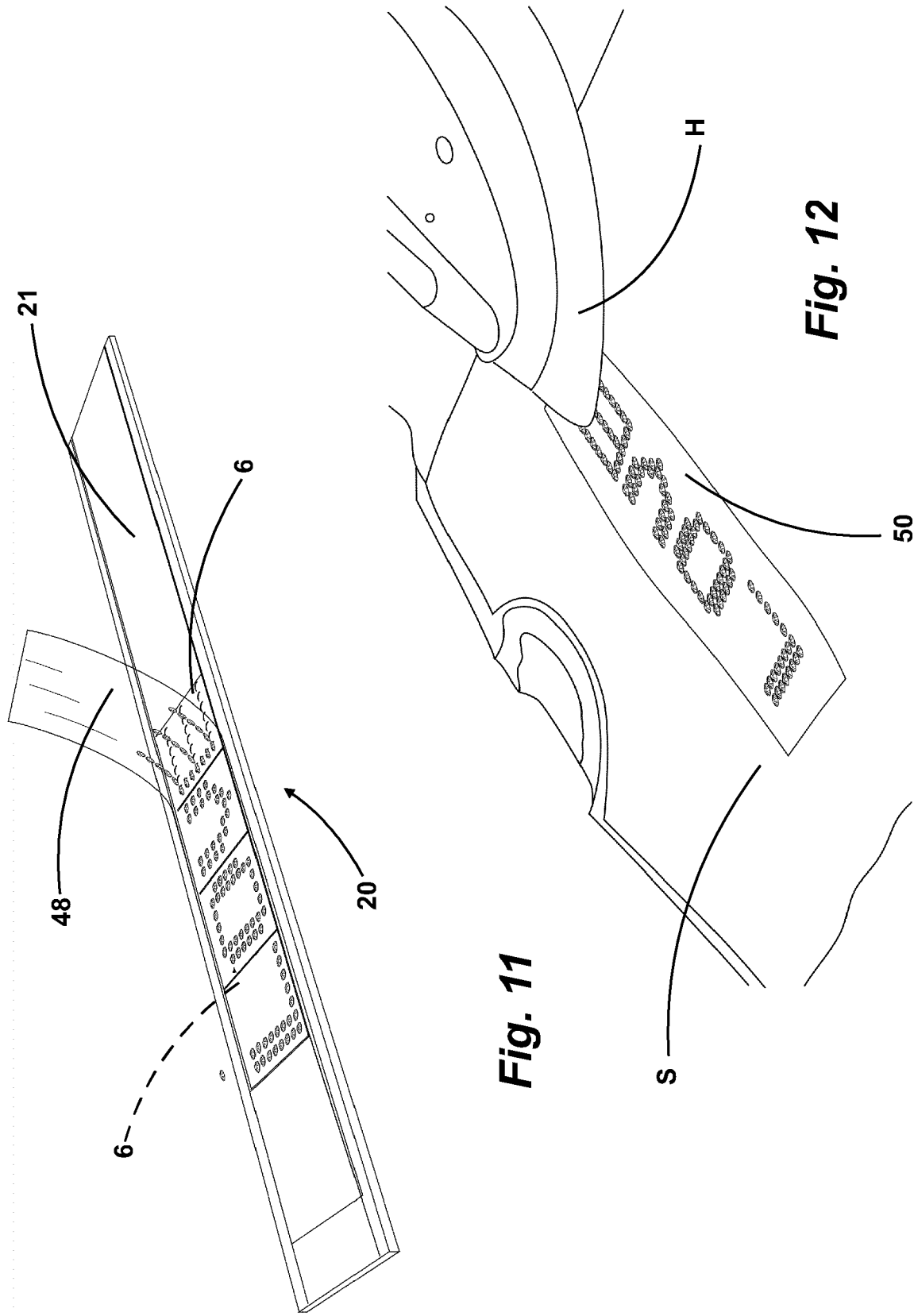


Fig. 8









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