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(54) WATERPROOF BLADE TYPE CONNECTOR

WASSERDICHTER FLACHSTECKER

CONNECTEUR DE TYPE LAME ÉTANCHE À L'EAU

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(56) References cited:
TW-U- M 485 522 US-A- 5 438 160
US-A1- 2010 317 239 US-A1- 2013 171 887
US-A1- 2013 344 729 US-A1- 2015 200 485
US-B1- 6 491 536 US-B2- 9 397 431

EP 3 579 351 B1

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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a connector used for connection to a circuit, especially to a waterproof blade type connector with features of easy assembly and effective waterproofing.

Description of Related Art

[0002] In order to connect various electronics to a variety of circuits such as a power circuit, signal circuit, etc., a male connector and a female connector are fixed on the electronic device and the power source/or circuit respectively. The electrical connection is formed therebetween by the male connector being plugged into the female connector. However, the connector is easy to get out of order once being exposed to water or moisture compared with other parts of the electronic device. A lot of electronic devices are used outdoors, in the environment with humidity and dramatic temperature fluctuations, or even in motion so that connectors with high waterproof performance are required. A stable electrical connection is also one of the main requirements. Thus waterproof connectors have been developed by vendors. Generally, a gasket or packing ring is arranged at the connection area between a housing and a cap of the waterproof connector. Thereby a gap formed on the connection area is sealed for preventing water/moisture outside from entering the connector. Yet the conventional structure mentioned above has certain shortcomings. The gasket or the packing ring is mounted into the connector firstly and then the cap is fastened onto the housing by screwing. Thus, the gasket or the packing ring is held tightly by the cap in combination with the housing. However, during fastening of the cap, the gasket or the packing ring is not mounted and held in the connector evenly and smoothly owing to difference in the force applied between the application point and non-application points. A gap generated due to uneven distribution of the gasket/packing ring reduces water resistance of the connector. Moreover, even the connector meets the requirements for the waterproof property while being tested after the assembly process, elastic fatigue or shrinkage of the connector after long term use, thermal expansion or contraction may still result in loss of water resistance. At the same time, the assembly process of the connector with many steps is complicated. The position of the gasket/packing ring with respect to the connector is difficult to be fixed while being assembled so that the defective rate is increased and the water resistance is reduced. The conventional connectors have assembling difficulties and insufficient waterproofing for quite some time.

[0003] In order to overcome the shortcomings mentioned above, there is a room for improvement and there

is a need to provide a novel waterproof connector.

[0004] Patent specification US 6491536 B1 discloses an electrical connector having the feature of the preamble of claim 1.

SUMMARY OF THE INVENTION

[0005] Therefore, it is a primary object of the present invention to provide a waterproof blade type connector in which a cover plate is mounted in a frame firmly while being assembled. Moreover both easy sealing and effective waterproofing are to be achieved.

[0006] In order to achieve these objects, the present invention provides a waterproof blade type connector having the features of claim 1. Further embodiments are subject-matter of the dependent claims.

[0007] The frame and the cover plate of the connector according to the invention are fixed in place by locking blocks of the cover plate being locked into the locking grooves of the frame. A hot melt adhesive layer in liquid form is flowing along a path between the frame and the cover plate to fill up a first packing groove. A gap between the frame and the cover plate is further filled up with the hot melt adhesive layer while the space around pins is also filled with and sealed by the hot melt adhesive layer. The hot melt adhesive layer is processed only once so that the processing of the hot melt adhesive layer is simplified.

[0008] With the waterproof blade type connector according to the invention a projecting piece on a base is not only connected to a frame to reinforce the frame but also processed to form the locking groove. The formation of the locking groove is not limited by the thickness of the frame due to the projecting piece. Thus the locking groove formed does not penetrate the frame and waterproofing at the position of the locking groove is achieved without additional sealing. Moreover, the projecting piece is further used for mounting an internally-threaded insert so that the internally-threaded insert and the base are connected securely. The projecting piece can be used for forming the locking groove and mounting the internally-threaded insert. This is a substantial breakthrough in the structure design of the connector.

[0009] A waterproof blade type connector according to the present invention includes a first connecting member and a second connecting member. A plurality of first terminals is disposed on the first connecting member and a connecting base is formed on one end of the second connecting member. A plurality of L-shaped slots is arranged at the connecting base and the second terminals are fixed in the L-shaped slots respectively. The first terminals and the second terminals are connected so that the first connecting member and the second connecting member are electrically connected. A base is disposed on the other end of the second connecting member, opposite to the end thereof with the connecting base. A joining surface is located on one side of the base facing the connecting base while an assembly surface is formed

on the other side of the base opposite to the side with the joining surface. A frame is disposed on the assembly surface while a mounting space is enclosed by the frame and communicating with the L-shaped slot. Two locking grooves are symmetrically formed on two opposite sides of the frame respectively. A pin is extended from the second terminal toward the mounting space, abutting against the frame and projecting beyond the base. The second connecting member further includes a cover plate formed in the mounting space. Two locking blocks are symmetrically arranged at two ends of the cover plate respectively. The pins are held tightly between the frame and the cover plate by the locking blocks locked into the locking grooves securely. A first packing groove is formed on the periphery of the cover plate and is filled with a hot melt adhesive layer. The space around the pins is also filled and sealed by the hot melt adhesive layer.

[0010] A second packing groove is formed on an inner edge of the frame of the second connecting member. The pin is enclosed by the second packing groove together with the first packing groove. Thus, the thickness of the hot melt adhesive layer applied around the pin is equal to the total groove depth of the first packing groove and the second packing groove.

[0011] Preferably, a limiting notch is formed between the two adjacent pins of the second connecting member while a plurality of pressing blocks is disposed on the edge of the cover plate and the first packing groove spanning the edge of the respective pressing block. The pressing blocks are engaged in the limiting notches respectively so as to hold the pin between the two adjacent pressing blocks. All the pins are inserted in the same surface of the cover plate being filled with the hot melt adhesive layer in the way that all the pins pass through the same surface.

[0012] Preferably, a partition is disposed between the two adjacent L-shaped slots of the connecting base and a bottom part is formed by extension of the partition into the mounting space. A mounting groove is formed on one side of the cover plate facing the mounting space and is extended to the pressing blocks. A waterproof gasket is arranged at the mounting groove. The waterproof gasket is brought to abut against the bottom parts of the partitions and the pin is enclosed by the waterproof gasket.

[0013] Preferably, two projecting pieces are arranged at the assembly surface of the base and are connected to the frame to reinforce the frame. The projecting piece can also be processed to form the locking groove so that the locking groove formed does not penetrate the frame.

[0014] Preferably, two internally-threaded inserts are mounted in the base. One end of the internally-threaded insert is open on the joining surface of the base while the other end thereof is extended into the projecting piece. Thus a secure connection between the internally-threaded insert and the base is achieved by the projecting piece.

[0015] Preferably, a sealing member is integrated into the first connecting member. A plurality of insertion holes is formed on the sealing member and a C-shaped lateral

block is disposed on the sealing member. The first terminals are inserted in the insertion holes and pass through them respectively. In conjunction with the lateral block, the sealing member abuts against the L-shaped slots when the first terminals and the second terminals are connected with each other.

[0016] Preferably, a gasket is mounted on the connecting base of the second connecting member in the way that it abuts against the joining surface of the base. When the base of the second connecting member is assembled with other components, the gasket is held tightly therebetween for waterproofing.

[0017] Preferably, an annular groove is formed on the joining surface of the base. A protruding ring is formed on an inner edge of one side of the gasket and mounted in the annular groove while an annular part is arranged at the other side of the gasket, opposite to the side with the protruding ring. While being assembled, the annular part is squeezed so that the protruding ring is expanded and pressed tightly against the annular groove.

[0018] The second terminal further includes a bracket and two clip branches. The bracket is bent inward and the clip branches are arranged at the bracket symmetrically. The second terminal is fixed in the L-shaped slot by the bracket. A fixed end of the clip branch is connected to the bracket and located close to the opening of the L-shaped slot while a free end thereof is located near the mounting space. Thereby a lower portion of the first terminal is held tightly by the two clip branches.

[0019] As to other functions and features of the present invention, please refer to the following embodiments with details and the related figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein:

Fig. 1 is a perspective view of an embodiment according to the present invention;

Fig. 2 is an explosive view of an embodiment according to the present invention;

Fig. 3 is another explosive view of an embodiment according to the present invention;

Fig. 4 is a perspective view of a section of a second connecting member in an embodiment according to the present invention;

Fig. 5 is a schematic drawing of an embodiment before filling of a hot melt adhesive layer according to the present invention;

Fig. 6 is a schematic drawing of an embodiment after a hot melt adhesive layer being applied according to the present invention;

Fig. 7 is a sectional view of an embodiment after filling of a hot melt adhesive layer according to the

present invention;

Fig. 8 is a schematic drawing showing an embodiment in use according to the present invention;

Fig. 9 is another schematic drawing showing an embodiment in use according to the present invention;

Fig. 10 is an explosive view of another embodiment according to the present invention; and

Fig. 11 is a sectional view of another embodiment according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] Refer to Fig. 1, Fig. 2, Fig. 3 and Fig. 4, a waterproof blade type connector according to the present invention includes a first connecting member 10 and a second connecting member 20. The first connecting member 10 consists of a plurality of first terminals 11 and a sealing member 12. A plurality of insertion holes 121 is arranged at the sealing member 12 and a C-shaped lateral block 122 is formed on the sealing member 12. The first terminals 11 are inserted in the insertion holes 121 the pass through them respectively. The second connecting member 20 is composed of a connecting base 21 on one end thereof, a plurality of second terminals 22, a base 23, a frame 24, a cover plate 25, and a hot melt adhesive layer 26. A plurality of L-shaped slots 211 is arranged at the connecting base 21 and the second terminals 22 are fixed in the L-shaped slots 211 respectively. The first terminals 11 and the second terminals 22 are connected with each other so as to form electrical connection between the first connecting member 10 and the second connecting member 20. The sealing member 12 together with the lateral block 122 abuts against the L-shaped slots 211 when the first terminals 11 and the second terminals 22 are connected with each other. The base 23 is formed on the other end of the second connecting member 20, opposite to the end thereof with the connecting base 21. A joining surface 231 is located on one side of the base 23 facing the connecting base 21 while an assembly surface 232 is arranged at the other side of the base 23 opposite to the side with the joining surface 231. The frame 24 is disposed on the assembly surface 232 of the second connecting member 20. The frame 24 includes a mounting space 241 communicating with the L-shaped slots 211, two locking grooves 242 symmetrically arranged at two opposite sides thereof respectively and a second packing groove 243 disposed on an inner edge thereof. The mounting space 241 is enclosed by the frame 24. Two projecting pieces 233 are arranged at the assembly surface 232 of the base 23 and connected to the frame 24 to reinforce the frame 24. The projecting piece 233 can also be processed to form the locking groove 242. Thus the locking groove 242 with sufficient strength does not penetrate the frame 24 and waterproofing at the position of the locking groove 242 is further provided. Two internally-threaded inserts 234 are mounted in the base 23. One end of the internally-

threaded insert 234 is open on the joining surface 231 of the base 23 while the other end thereof is extended into the projecting piece 233. Thus the internally-threaded insert 234 and the base 23 are connected securely by the projecting piece 233. The projecting piece 233 is not only processed to form the locking groove 242 but also used for mounting the internally-threaded insert 234. A pin 221 is extended from the second terminal 22 toward the mounting space 241, abutting against the frame 24 and projecting beyond the base 23. The cover plate 25 is mounted in the mounting space 241 of the second connecting member 20 and is composed of two locking blocks 251 disposed on two ends thereof respectively, and a first packing groove 252. The locking blocks 251 are locked into the locking grooves 242 respectively so as to hold the pins 221 between the frame 24 and the cover plate 25. The first packing groove 252 is formed on the periphery of the cover plate 25 while the hot melt adhesive layer 26 is used to fill the first packing groove 252. The space around the pin 221 is also filled with and sealed by the hot melt adhesive layer 26. The second packing groove 243 is arranged at the inner edge of the frame 24 of the second connecting member 20 while the pin 221 is enclosed by the second packing groove 243 in combination with the first packing groove 252, as shown in Fig. 4 and Fig. 5. Thus the thickness of the hot melt adhesive layer 26 filled in the space around the pin 221 is equal to the total groove depth of the first packing groove 252 and the second packing groove 243. The second terminal 22 further includes a bracket 222 and two clip branches 223. The bracket 222 is bent inward and the clip branches 223 are arranged at the bracket 222 symmetrically. The second terminal 22 is fixed in the L-shaped slot 211 by the bracket 222. The clip branch 223 consists of a fixed end and a free end thereof. The fixed end of the clip branch 223 is connected to the bracket 222 and located close to the opening of the L-shaped slot 211 while the free end thereof is located near the mounting space 241. Thereby a lower portion of the first terminal 11 is held tightly by the two clip branches 223. Thus the first terminal 11 and the second terminal 22 will not get loose easily.

[0022] While being assembled, refer from Fig. 2 to Fig. 7, the second terminal 22 is mounted into the second connecting member 20 through the end of the second connecting member 20 with the mounting space 241 and then is fixed in the L-shaped slot 211 by the bracket 222. The pin 221 of the second terminal 22 is extending along the frame 24 and protruding out of the frame 24. Then the cover plate 25 is mounted in the mounting space 241 and the locking block 251 of the cover plate 25 is locked into the locking groove 242 of the frame 24 so that the mounting space 241 is covered by the cover plate 25. The position of the frame 24 relative to the cover plate 25 is fixed securely by the locking blocks 251 being locked in locking grooves 242. Thereby the cover plate 25 is mounted in the frame 24 firmly while being assembled. The hot melt adhesive layer 26 in liquid form is

flowing along a path between the frame 24 and the cover plate 25 to fill up the first packing groove 252 and the second packing groove 243 while a gap between the frame 24 and the cover plate 25 is further filled up with the hot melt adhesive layer 26. A space around the respective pin 221 is also filled up with the hot melt adhesive layer 26. It should be noted that the area around the pin 221 is depressed due to the first packing groove 252 and the second packing groove 243. Thus the hot melt adhesive layer 26 can flow automatically to fill up the gaps and the grooves, without being applied circularly around the pin 21. Thereby the thickness of the hot melt adhesive layer 26 filled in the space around the pin 221 is equal to the total groove depth of the first packing groove 252 and the second packing groove 243. The hot melt adhesive layer 26 is applied to fill and seal only a single surface. Thus not only the processing of the hot melt adhesive layer 26 is simplified, easy sealing and effective waterproofing are also achieved. Moreover, the projecting piece 233 on the base 23 is connected to the frame 24 to reinforce the frame 24. The projecting piece 233 is also used for the processing of the locking groove 242. The formation of the locking groove 242 is performed independent of the thickness of the frame 24 due to the projecting piece 233 and the locking groove 242 formed does not penetrate the frame 24. Thus no additional sealing is required and waterproofing at the position of the locking groove 242 is achieved. The projecting piece 233 is further used for mounting the internally-threaded insert 234 to achieve a stable connection between the internally-threaded insert 234 and the base 23. Thereby, the screwable length of the internally-threaded insert 234 is also significantly increased. The internally-threaded insert 234 can be made from metals. The screwing strength of the second connecting member 20 can be dramatically increased by the internally-threaded insert 234 in combination with the projecting piece 233 while the second connecting member 20 is connected to other components. To sum up, the projecting piece 233 can be used not only for the formation of the locking groove 242 but also for the assembly of the internally-threaded insert 234. The second connecting member 20 further includes a gasket 27 mounted on the connecting base 21 thereof. The gasket 27 is abutting against the joining surface 231 of the base 23. When the base 23 of the second connecting member 20 is assembled with other components, the gasket 27 is held tightly therebetween for preventing water from entering therein. An annular groove 235 is formed on the joining surface 231 of the base 23. A protruding ring 271 is disposed on an inner edge of one side of the gasket 27 and mounted in the annular groove 235 while an annular part 272 is arranged at the other side of the gasket 27, opposite to the side with the protruding ring 271.

[0023] While in use, refer to Fig. 8 and Fig. 9, the first connecting member 10 is screwed on a first component 30 while the first terminals 11 and the lateral block 122 are arranged at one end of the first component 30. The

second connecting member 20 is screwed on a second component 40 by means of the internally-threaded inserts 234 from inside out so that the connecting base 21 is exposed at one end of the second component 40. While the second connecting member 20 is assembled with the second component 40, the annular part 272 is squeezed so that the protruding ring 271 is expanded and pressed against the annular groove 235. The waterproofing between the second component 40 and the second connecting member 20 is further enhanced. Then the first terminals 11 of the first connecting member 10 are inserted into the L-shaped slots 211 of the second connecting member 20 respectively so that the first terminal 11 is held tightly by the two clip branches 223 of the second terminal 22. Thus, the first connecting member 10 and the second connecting member 20 are electrically connected with each other. The sealing member 12 together with the lateral block 122 is abutting against the L-shaped slot 211 to achieve waterproofing at the connection between the first component 30 and the second component 40. Furthermore, the fixed end of the clip branch 223 connected to the bracket 222 is located close to the opening of the L-shaped slot 211. That means the two clip branches 223 provides the maximum holding force at the position close to the L-shaped slot 211. Thus the second terminal 22 holds the lower portion of the first terminal 11 tightly. Therefore both the first terminal 11 and the second terminal 22 will not get loose easily.

[0024] Refer to Fig. 10 and Fig. 11, another embodiment is revealed. A limiting notch 236 is located between the two adjacent pins 221 of the second connecting member 20 while a plurality of pressing blocks 253 is formed on the edge of the cover plate 25 and the first packing groove 252 is spanning the edge of each pressing blocks 253. The pressing blocks 253 are engaged in the limiting notches 236 respectively so that the pin 221 is held between the two adjacent pressing blocks 253. That means all the pins 221 pass through the same surface of the cover plate 25 filled with the hot melt adhesive layer 26. Thereby both easy assembly and effective waterproofing are provided. A partition 212 is arranged between the two adjacent L-shaped slots 211 of the connecting base 21 and is extended into the mounting space 241 to form a bottom part 213. A mounting groove 254 is formed on one side of the cover plate 25 facing the mounting space 241 and is extended to the pressing blocks 253. A waterproof gasket 28 is disposed on the mounting groove 254. While being assembled, the waterproof gasket 28 is brought to directly abut against the bottom parts 213 of the partitions 212 and the pin 221 is enclosed by the waterproof gasket 28. Thereby the water resistance at the position of the pins 221 is enhanced by both the waterproof gasket 28 and the hot melt adhesive layer 26.

Claims

1. A waterproof blade type connector comprising:

a first connecting member (10) that is provided with a plurality of first terminals (11); and a second connecting member (20) that includes a connecting base (21) formed on one end of the second connecting member (20) and having a plurality of L-shaped slots (211) arranged thereat;

a plurality of second terminals (22) that are fixed in the L-shaped slots (211) respectively and are connected to the first terminals (11) respectively to form electrical connection between the first connecting member (10) and the second connecting member (20);

a base (23) disposed on the other end of the second connecting member (20), opposite to the end of the second connecting member (20) with the connecting base (21), and composed of a joining surface (231) located on one side thereof facing the connecting base (21), and an assembly surface (232) formed on the other side thereof opposite to the side with the joining surface (231);

a frame (24) that is disposed on the assembly surface (232) and having a mounting space (241) enclosed thereby and communicating with the L-shaped slots (211), and two locking grooves (242) symmetrically arranged at two opposite sides thereof respectively; a pin (221) being extended from the second terminal (22) toward the mounting space (241), abutting against the frame (24) and projecting beyond the base (23);

a cover plate (25) that is set in the mounting space (241) of the frame (24) and is composed of a locking block (251) arranged at each of two ends thereof and locked into the locking groove (242) for holding the pin (221) between the frame (24) and the cover plate (25), and

characterised in that

a first packing groove (252) is located on the periphery of the cover plate (25); and

the waterproof blade type connector further comprises a hot melt adhesive layer (26) that is used to fill and seal the first packing groove (252) and a space around the pin (221),

wherein a second packing groove (243) is arranged at an inner edge of the frame (24) of the second connecting member (20); the pin (221) is enclosed by the second packing groove (243) in conjunction with the first packing groove (252) so that a thickness of the hot melt adhesive layer (26) filled in the space around the pin (221) is equal to the total groove depth of the first packing groove (252) and the second packing groove (243).

2. The connector as claimed in claim 1, wherein a limiting notch (236) is formed between the two adjacent

pins (221) of the second connecting member (20) while a plurality of pressing blocks (253) is disposed on an edge of the cover plate (25) and the first packing groove (252) is spanning the edge of the respective pressing block (253); the pressing blocks (253) are engaged in the limiting notches (236) respectively to hold the pin (221) between the two adjacent pressing blocks (253); the pins (221) are inserted in the same surface of the cover plate (25) being filled with the hot melt adhesive layer (26) in the way that the pins (221) pass through the same surface.

3. The connector as claimed in claim 2, wherein a partition (212) is disposed between the two adjacent L-shaped slots (211) of the connecting base (21) and is extended into the mounting space (241) to form a bottom part (213); a mounting groove (254) is formed on one side of the cover plate (25) facing the mounting space (241) and is extended to the pressing blocks (253); a waterproof gasket (28) is mounted at the mounting groove (254) and is abutting against the bottom parts (213) of the partitions (212) while the pin (221) is enclosed by the waterproof gasket (28).

4. The connector as claimed in claim 1, wherein two projecting pieces (233) are arranged at the assembly surface (232) of the base (23) and are connected to the frame (24) to reinforce the frame (24); the projecting piece (233) is processed to form the locking groove (242) so that the locking groove (242) does not penetrate the frame (24).

5. The connector as claimed in claim 4, wherein two internally-threaded inserts (234) are mounted in the base (23); one end of the internally-threaded insert (234) is open on the joining surface (231) of the base (23) while the other end thereof is extended into the projecting piece (233) so that a secure connection between the internally-threaded insert (234) and the base (23) is achieved by the projecting piece (233).

6. The connector as claimed in claim 1, wherein a sealing member (12) is integrated in the first connecting member (10); a plurality of insertion holes (121) is disposed on the sealing member (12) and a C-shaped lateral block (122) is formed at the sealing member (12); the first terminals (11) are inserted in the insertion holes (121) and pass through them respectively while the sealing member (12) in conjunction with the lateral block (122) abuts against the L-shaped slots (211) when the first terminals (11) and the second terminals (22) are connected with each other.

7. The connector as claimed in claim 1, wherein a gasket (27) is mounted on the connecting base (21) of the second connecting member (20) and is abutting

against the joining surface (231) of the base (23); the gasket (27) is firmly held for waterproofing while the base of the second connecting member (20) is assembled.

8. The connector as claimed in claim 7, wherein an annular groove (235) is arranged at the joining surface (231) of the base (23); a protruding ring (271) is formed on an inner edge of one side of the gasket (27) and is mounted in the annular groove (235) while an annular part (272) is arranged at the other side of the gasket (27), opposite to the side with the protruding ring (271); while being assembled, the annular part (272) is squeezed so that the protruding ring (271) is expanded and pressed against the annular groove (235) during assembly.
9. The connector as claimed in claim 1, wherein the second terminal (22) further includes a bracket (222) bent inward and two clip branches (223) disposed on the bracket (222) symmetrically; the second terminal (22) is fixed in the L-shaped slot (211) by the bracket (222); a fixed end of the clip branch (223) connected to the bracket (222) is located close to an opening of the L-shaped slot (211) while a free end thereof is located near the mounting space (241); thereby a lower portion of the first terminal (11) is held tightly by the two clip branches (223).

Patentansprüche

1. Wasserdichter messerartiger Verbinder, umfassend:

ein erstes Verbindungselement (10), welches mit einer Vielzahl von ersten Anschlüssen (11) versehen ist, und

ein zweites Verbindungselement (20), welches eine Verbindungsbasis (21) enthält, die an einem Ende des zweiten Verbindungselements (20) ausgebildet ist und eine Vielzahl von L-förmigen Schlitten (211) aufweist, die daran angeordnet sind,

eine Vielzahl von zweiten Anschlüssen (22), welche entsprechend in den L-förmigen Schlitten (211) befestigt sind und entsprechend mit den ersten Anschlüssen (11) verbunden sind, um eine elektrische Verbindung zwischen dem ersten Verbindungselement (10) und dem zweiten Verbindungselement (20) herzustellen, eine Basis (23), welche an dem anderen Ende des zweiten Verbindungselements (20) gegenüber dem Ende des zweiten Verbindungselements (20) mit der Verbindungsfläche (231),

die sich auf einer Seite davon befindet, welche

der Verbindungsbasis (21) zugewandt ist, und einer Montagefläche (232), welche auf der anderen Seite gegenüberliegend der Seite mit der Verbindungsfläche (231) ausgebildet ist, besteht,

einen Rahmen (24), welcher auf der Montagefläche (232) angeordnet ist und einen von ihm umschlossenen und mit den L-förmigen Schlitten (211) in Verbindung stehenden Montage-raum (241) aufweist, sowie zwei symmetrisch an zwei gegenüberliegenden Seiten davon angeordnete Verriegelungsnuten (242) aufweist, einen Stift (221), welcher sich von dem zweiten Anschluss (22) in Richtung des Montage- raums (241) erstreckt, an den Rahmen (24) anstößt und über die Basis (23) hinausragt, eine Abdeckplatte (25), welche in den Montage- raum (241) des Rahmens (24) eingesetzt ist und aus einem Verriegelungsblock (251) besteht, der an jedem seiner beiden Enden angeordnet ist und in der Verriegelungsnut (242) verriegelt ist, um den Stift (221) zwischen dem Rahmen (24) und der Abdeckplatte (25) zu halten, und

dadurch gekennzeichnet, dass

eine erste Dichtungsnut (252) am Umfang der Abdeckplatte (25) angeordnet ist und der wasserdichte messerartige Verbinder ferner eine Heißschmelzklebstoffschicht (26) umfasst, welche verwendet wird, um die erste Dichtungsnut (252) und einen Raum um den Stift (221) herum zu füllen und abzudichten, wobei eine zweite Dichtungsnut (243) an einem inneren Rand des Rahmens (24) des zweiten Verbindungselements (20) angeordnet ist, wobei der Stift (221) von der zweiten Dichtungsnut (243) in Verbindung mit der ersten Dichtungsnut (252) eingeschlossen ist, so dass eine Dicke der Heißschmelzklebstoffschicht (26), die in den Raum um den Stift (221) gefüllt ist, gleich der gesamten Nuttiefe der ersten Dichtungsnut (252) und der zweiten Dichtungsnut (243) ist.

2. Stecker nach Anspruch 1, bei welchem zwischen den beiden benachbarten Stiften (221) des zweiten Verbindungselements (20) eine Begrenzungskerbe (236) ausgebildet ist, während eine Vielzahl von Pressblöcken (253) an einem Rand der Abdeckplatte (25) angeordnet ist und die erste Dichtungsnut (252) den Rand des jeweiligen Pressblocks (253) überspannt, wobei die Pressblöcke (253) jeweils in die Begrenzungskerben (236) eingreifen, um den Stift (221) zwischen den beiden benachbarten Pressblöcken (253) zu halten, wobei die Stifte (221) in die gleiche Oberfläche der Abdeckplatte (25), welche mit der Heißschmelzklebstoffschicht (26) gefüllt ist, in der Weise eingesetzt werden, dass die Stifte (221) durch die gleiche Oberfläche hindurchgehen.

3. Stecker nach Anspruch 2, bei welchem eine Trennwand (212) zwischen den beiden benachbarten L-förmigen Schlitten (211) der Verbindungsbasis (21) angeordnet ist und in den Montagerraum (241) hinein verlängert ist, um ein Bodenteil (213) zu bilden, wobei eine Montagenut (254) an einer Seite der Abdeckplatte (25), welche dem Montagerraum (241) zugewandt ist, ausgebildet ist und sich bis zu den Pressblöcken (253) erstreckt, wobei eine wasserfeste Dichtung (28), an der Montagenut (254) angebracht ist und an den Bodenteilen (213) der Trennwände (212) anliegt, während der Stift (221) von der wasserfesten Dichtung (28) umschlossen ist. 5
4. Stecker nach Anspruch 1, bei welchem zwei vorstehende Stücke (233) an der Montagefläche (232) der Basis (23) angeordnet und mit dem Rahmen (24) verbunden sind, um den Rahmen (24) zu verstärken, wobei das vorstehende Stück (233) so bearbeitet ist, dass es die Verriegelungsnut (242) bildet, so dass die Verriegelungsnut (242) den Rahmen (24) nicht durchdringt. 10
5. Stecker nach Anspruch 4, bei welchem zwei Innengewindeeinsätze (234) in der Basis (23) angebracht sind, wobei ein Ende des Innengewindeeinsatzes (234) an der Fügefläche (231) der Basis (23) offen ist, während das andere Ende desselben in das vorstehende Teil (233) hinein verlängert ist, sodass eine sichere Verbindung zwischen dem Innengewindeeinsatz (234) und der Basis (23) durch das vorstehende Teil (233) erreicht wird. 25
6. Stecker nach Anspruch 1, bei welchem ein Dichtungselement (12) in das erste Verbindungselement (10) integriert ist, wobei eine Vielzahl von Einstecklöchern (121) an dem Dichtungselement (12) angeordnet ist und ein C-förmiger seitlicher Block (122) an dem Dichtungselement (12) ausgebildet ist, wobei die ersten Anschlüsse (11) in die Einstecklöcher (121) eingeschmolzen sind und jeweils durch sie hindurchgehen, während das Dichtungselement (12) in Verbindung mit dem Seitenblock (122) an den L-förmigen Schlitten (211) anliegt, wenn die ersten Anschlüsse (11) und die zweiten Anschlüsse (22) miteinander verbunden sind. 30
7. Stecker nach Anspruch 1, bei welchem eine Dichtung (27) an der Verbindungsbasis (21) des zweiten Verbindungselements (20) angebracht ist und an der Verbindungsfläche (231) der Basis (23) anliegt, wobei die Dichtung (27) für die Wasserdichtheit festgehalten ist, wenn die Basis des zweiten Verbindungselements (20) montiert ist. 35
8. Stecker nach Anspruch 7, bei welchem eine ringförmige Nut (235) an der Verbindungsfläche (231) der Basis (23) angeordnet ist, wobei ein vorstehender 40

Ring (271) an einem inneren Rand einer Seite der Dichtung (27) ausgebildet ist und in der ringförmigen Nut (235) montiert ist, während ein ringförmiges Teil (272) an der anderen Seite der Dichtung (27) gegenüber der Seite mit dem vorstehenden Ring (271) angeordnet ist, wobei während des Zusammenbaus der ringförmige Teil (272) zusammengedrückt wird, so dass der vorstehende Ring (271) während des Zusammenbaus aufgeweitet und gegen die ringförmige Nut (235) gedrückt wird. 45

9. Stecker nach Anspruch 1, bei welchem der zweite Anschluss (22) ferner eine nach innen gebogene Klammer (222) und zwei an der Klammer (222) symmetrisch angeordnete Clipzweige (223) aufweist, wobei der zweite Anschluß (22) in dem L-förmigen Schlitz (211) durch die Klammer (222) fixiert ist sowie ein festes Ende des mit der Klammer (222) verbundenen Clipzweigs (223) nahe einer Öffnung des L-förmigen Schlittens (211) angeordnet ist, während ein freies Ende desselben in der Nähe des Montagerraums (241) angeordnet ist, wodurch ein unterer Abschnitt des ersten Anschlusses (11) durch die beiden Clipzweige (223) festgehalten wird. 50

Revendications

1. Connecteur de type lame imperméable comprenant: 55
 - un premier élément de raccordement (10) qui est doté d'une pluralité de premières bornes (11); et
 - un second élément de raccordement (20) qui inclut
 - une base de raccordement (21) formée sur une extrémité du second élément de raccordement (20) et présentant une pluralité de fentes en forme de L (211) agencées au niveau de celui-ci;
 - une pluralité de secondes bornes (22) qui sont fixées dans les fentes en forme de L (211) respectivement et sont raccordées aux premières bornes (11) respectivement pour former un raccordement électrique entre le premier élément de raccordement (10) et le second élément de raccordement (20);
 - une base (23) disposée sur l'autre extrémité du second élément de raccordement (20), opposée à l'extrémité du second élément de raccordement (20) avec la base de raccordement (21), et constituée d'une surface de jonction (231) située sur un côté de celle-ci tournée vers la base de raccordement (21), et une surface d'assemblage (232) formée sur l'autre côté de celle-ci opposé au côté avec la surface de jonction (231);
 - un cadre (24) qui est disposé sur la surface d'assemblage (232) et présentant un espace de

montage (241) enfermé ainsi et communiquant avec les fentes en forme de L (211), et deux rainures de verrouillage (242) agencées symétriquement au niveau de deux côtés opposés de celles-ci respectivement;

une broche (221) étant étendue depuis la seconde borne (22) vers l'espace de montage (241), butant contre le cadre (24) et faisant saillie au-delà de la base (23);

une plaque de couvercle (25) qui est placée dans l'espace de montage (241) du cadre (24) et est constituée d'un bloc de verrouillage (251) agencé au niveau de chacune des deux extrémités de celle-ci et verrouillé dans la rainure de verrouillage (242) pour le maintien de la broche (221) entre le cadre (24) et la plaque de couvercle (25), et

caractérisé en ce que

une première rainure d'emballage (252) est située sur la périphérie de la plaque de couvercle (25); et

le connecteur de type lame imperméable comprend en outre une couche de colle thermofusible (26) qui est utilisée pour remplir et rendre étanche la première rainure d'emballage (252) et un espace autour de la broche (221),

dans lequel une seconde rainure d'emballage (243) est agencée au niveau d'une arête intérieure du cadre (24) du second élément de raccordement (20); la broche (221) est enfermée par la seconde rainure d'emballage (243) conjointement avec la première rainure d'emballage (252) de sorte qu'une épaisseur de la couche de colle thermofusible (26) remplie dans l'espace autour de la broche (221) soit égale à la profondeur de rainure totale de la première rainure d'emballage (252) et la seconde rainure d'emballage (243).

2. Connecteur selon la revendication 1, dans lequel une encoche de limitation (236) est formée entre les deux broches adjacentes (221) du second élément de raccordement (20) alors qu'une pluralité de blocs de pressage (253) est disposée sur une arête de la plaque de couvercle (25) et la première rainure d'emballage (252) chevauche l'arête du bloc de pressage respectif (253); les blocs de pressage (253) sont mis en prise dans les encoches de limitation (236) respectivement pour maintenir la broche (221) entre les deux blocs de pressage adjacents (253); les broches (221) sont insérées dans la même surface de la plaque de couvercle (25) remplie avec la couche de colle thermofusible (26) de manière à ce que les broches (221) passent à travers la même surface.
3. Connecteur selon la revendication 2, dans lequel une séparation (212) est disposée entre les deux fentes en forme de L adjacentes (211) de la base de

raccordement (21) et est étendue dans l'espace de montage (241) pour former une partie inférieure (213); une rainure de montage (254) est formée sur un côté de la plaque de couvercle (25) tournée vers l'espace de montage (241) et est étendue aux blocs de pressage (253); un joint imperméable (28) est monté au niveau de la rainure de montage (254) et est en butée contre les parties inférieures (213) des séparations (212) alors que la broche (221) est enfermée par le joint imperméable (28).

4. Connecteur selon la revendication 1, dans lequel deux pièces de projection (233) sont agencées au niveau de la surface d'assemblage (232) de la base (23) et sont raccordées au cadre (24) pour renforcer le cadre (24); la pièce de projection (233) est traitée pour former la rainure de verrouillage (242) de sorte que la rainure de verrouillage (242) ne pénètre pas dans le cadre (24).

5. Connecteur selon la revendication 4, dans lequel deux inserts à filetage interne (234) sont montés dans la base (23); une extrémité de l'insert à filetage interne (234) est ouverte sur la surface de jonction (231) de la base (23) alors que l'autre extrémité de celui-ci est étendue dans la pièce de projection (233) de sorte qu'un raccordement sûr entre l'insert à filetage interne (234) et la base (23) soit atteint par la pièce de projection (233).

6. Connecteur selon la revendication 1, dans lequel un élément étanche (12) est intégré dans le premier élément de raccordement (10); une pluralité de trous d'insertion (121) est disposée sur l'élément étanche (12) et un bloc latéral en forme de C (122) est formé au niveau de l'élément étanche (12); les premières bornes (11) sont insérées dans les trous d'insertion (121) et passent à travers ceux-ci respectivement alors que l'élément étanche (12) conjointement avec le bloc latéral (122) bute contre les fentes en forme de L (211) lorsque les premières bornes (11) et les secondes bornes (22) sont reliées les unes aux autres.

7. Connecteur selon la revendication 1, dans lequel un joint (27) est monté sur la base de raccordement (21) du second élément de raccordement (20) et est en butée contre la surface de jonction (231) de la base (23); le joint (27) est fermement maintenu pour l'imperméabilité alors que la base du second élément de raccordement (20) est assemblée.

8. Connecteur selon la revendication 7, dans lequel une rainure annulaire (235) est agencée au niveau de la surface de jonction (231) de la base (23); un anneau de saillie (271) est formé sur une arête intérieure d'un côté du joint (27) et est monté dans la rainure annulaire (235) alors qu'une partie annulaire

(272) est agencée au niveau de l'autre côté du joint (27), opposé au côté avec l'anneau en saillie (271) ; tout en étant assemblée, la partie annulaire (272) est compressée de sorte que l'anneau en saillie (271) soit expansé et pressé contre la rainure annulaire (235) pendant l'assemblage. 5

9. Connecteur selon la revendication 1, dans lequel la seconde borne (22) inclut en outre un support (222) plié vers l'intérieur et deux branches de clip (223) disposées sur le support (222) symétriquement ; la seconde borne (22) est fixée dans la fente en forme de L (211) par le support (222) ; une extrémité fixée de la branche de clip (223) raccordée au support (222) est située près d'une ouverture de la fente en forme de L (211) alors qu'une extrémité libre de celle-ci est située près de l'espace de montage (241) ; ainsi une portion inférieure de la première borne (11) est maintenue étroitement par les deux branches de clip (223). 10 15 20

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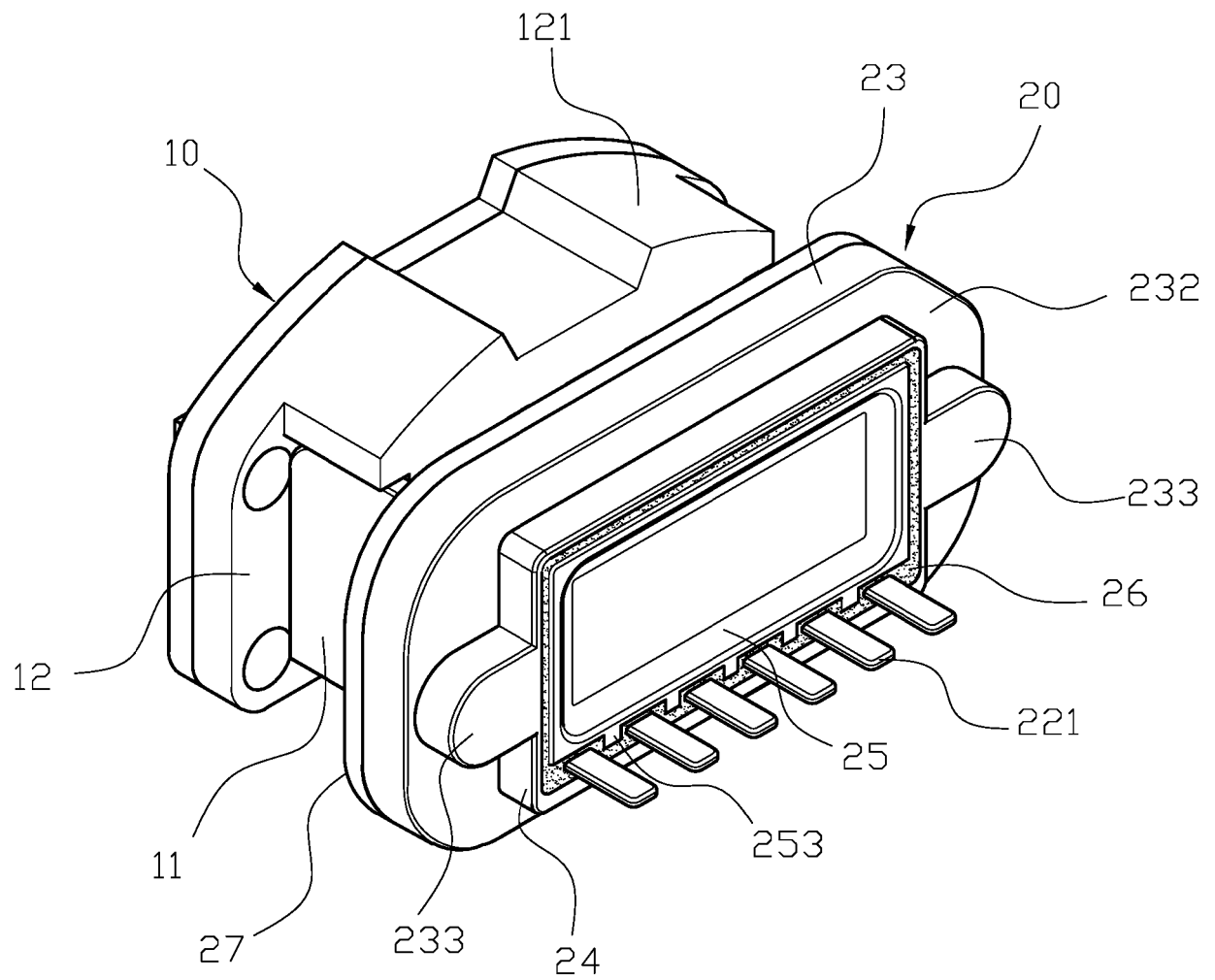


FIG. 1

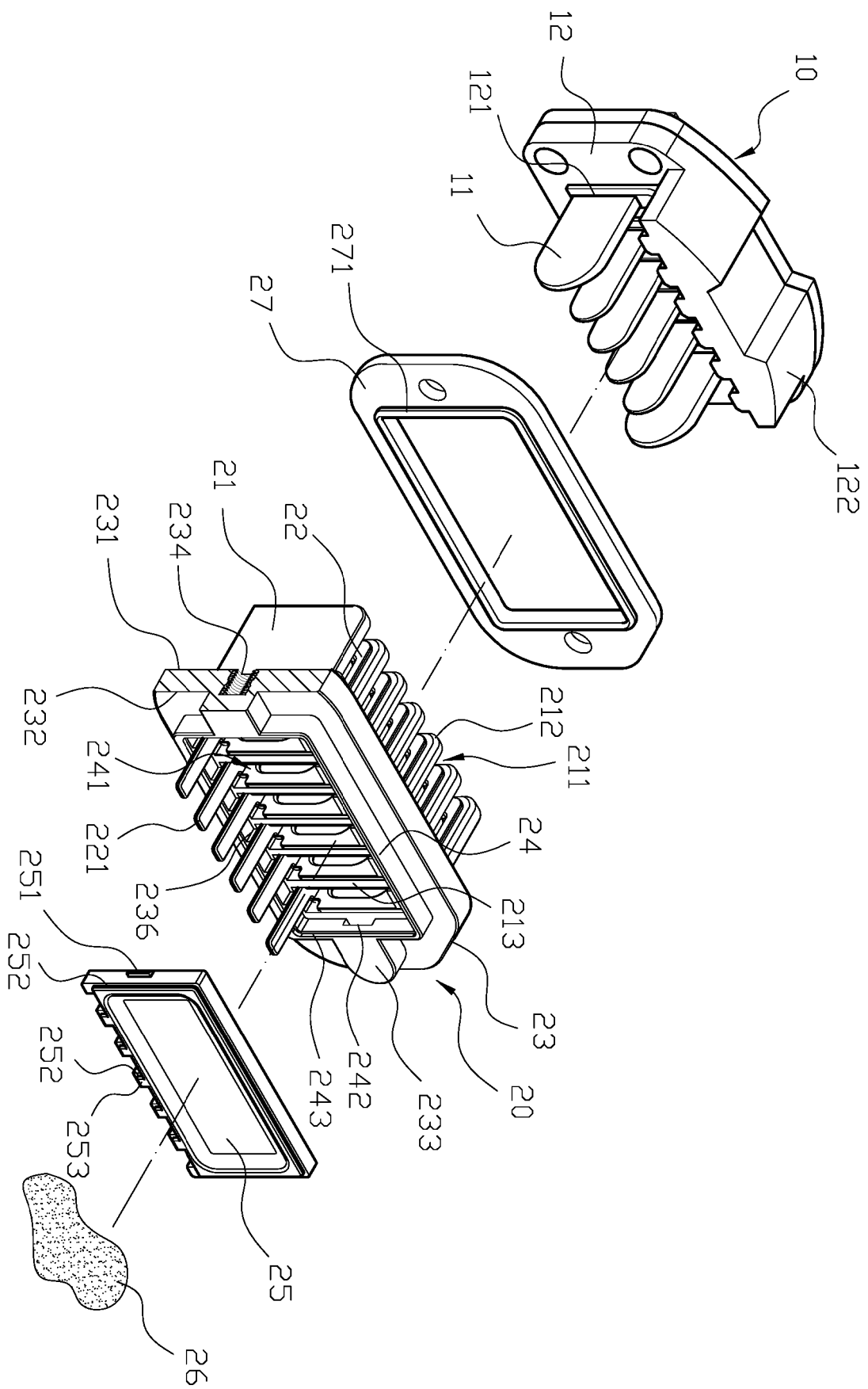


FIG. 2

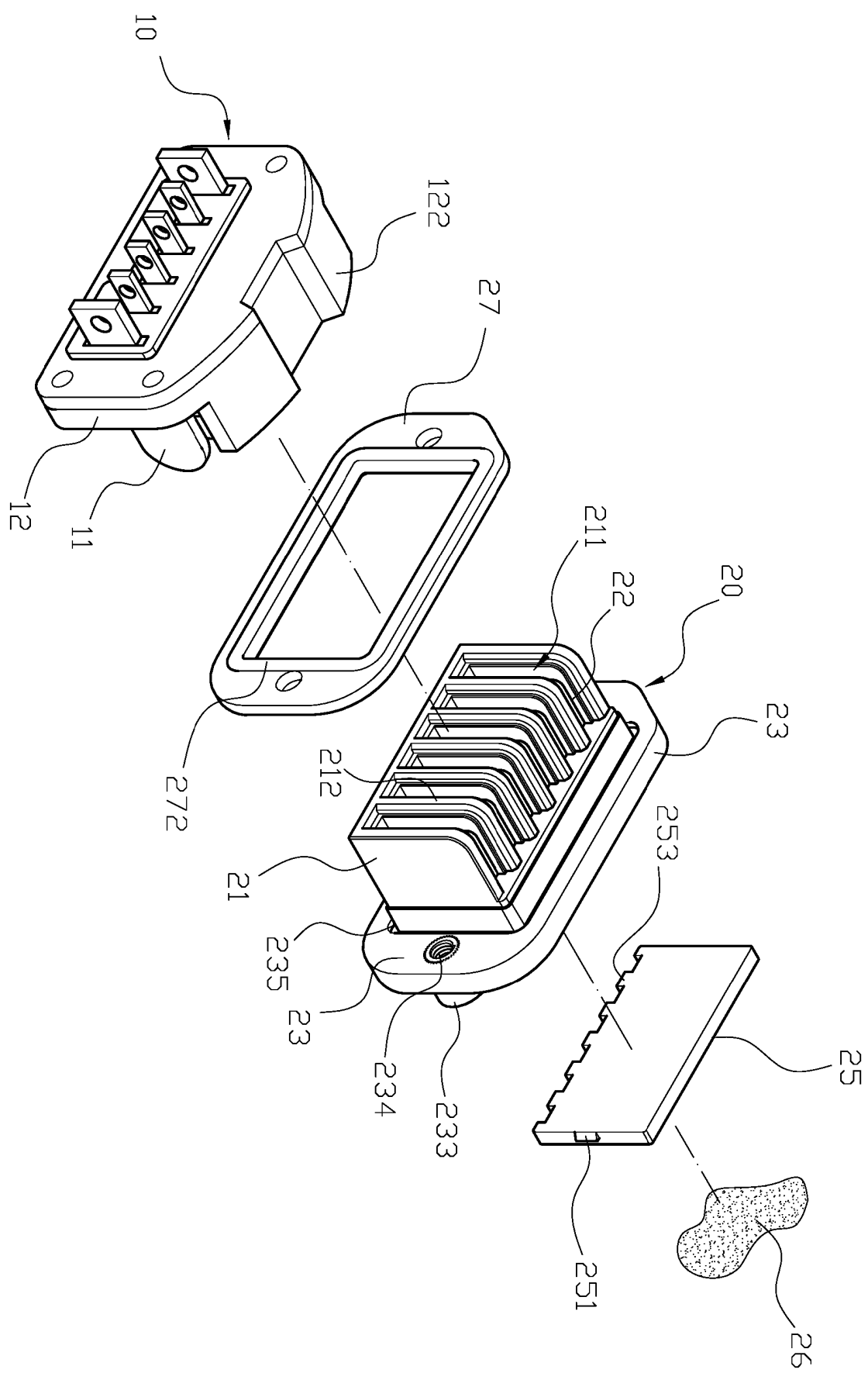


FIG. 3

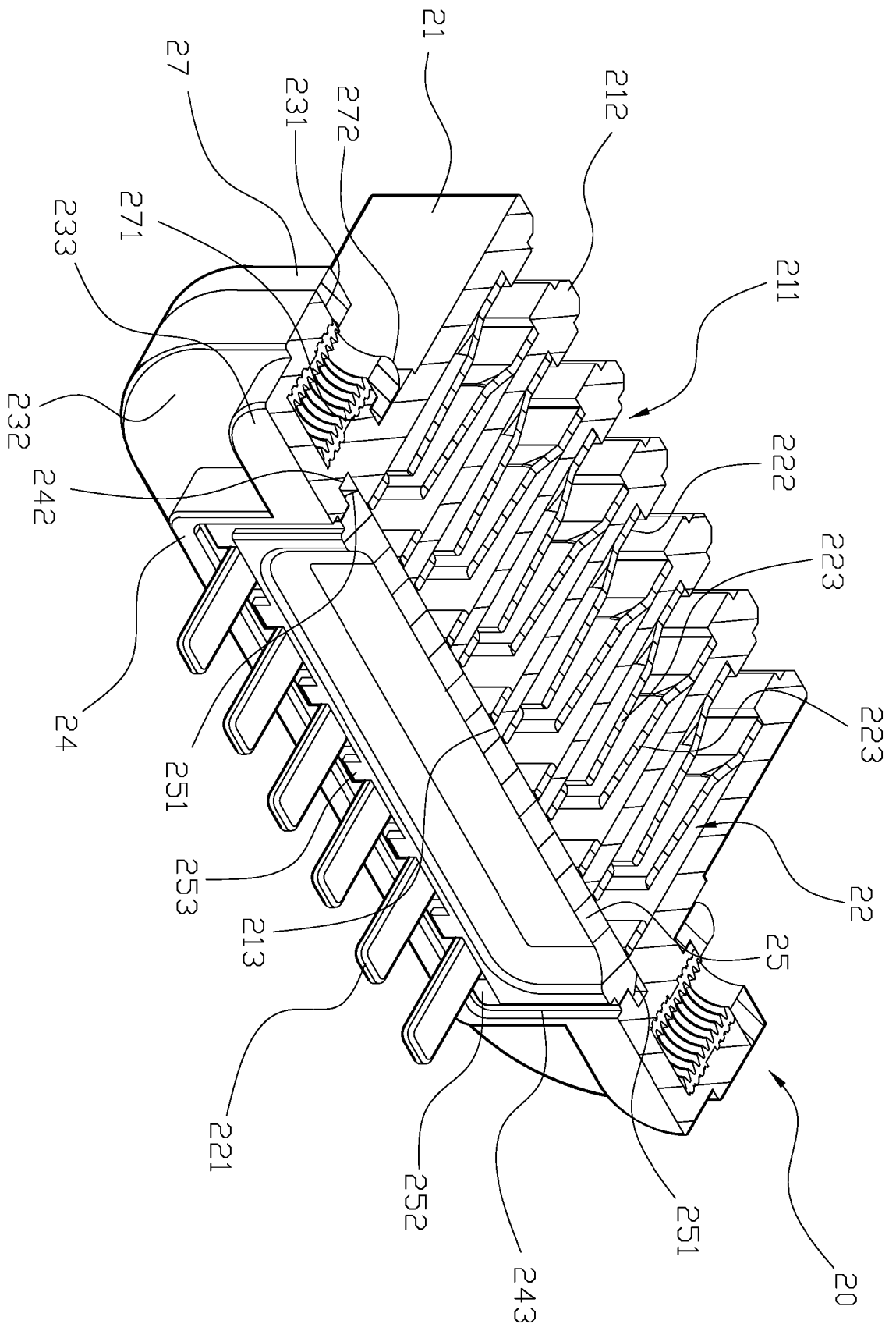


FIG. 4

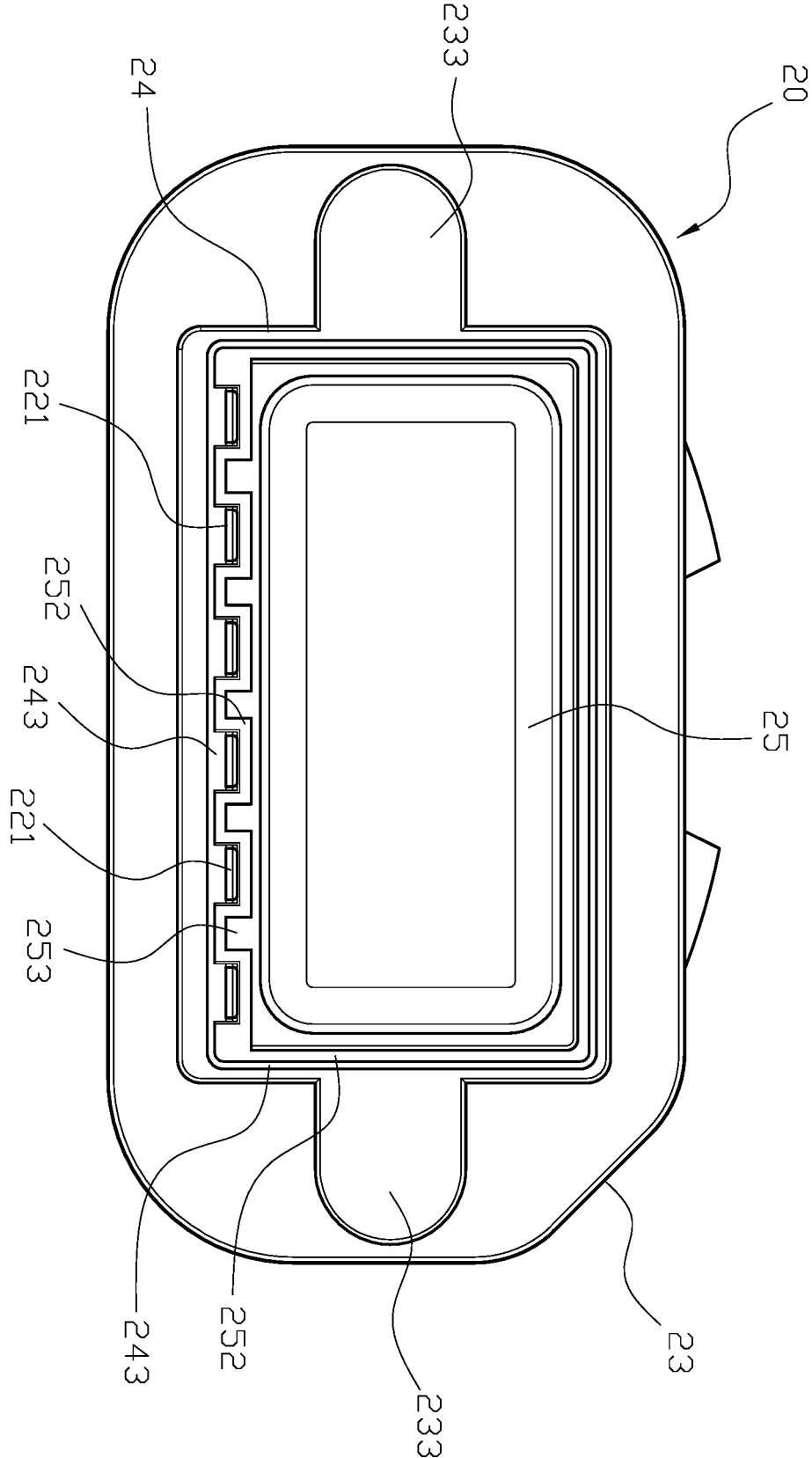


FIG. 5

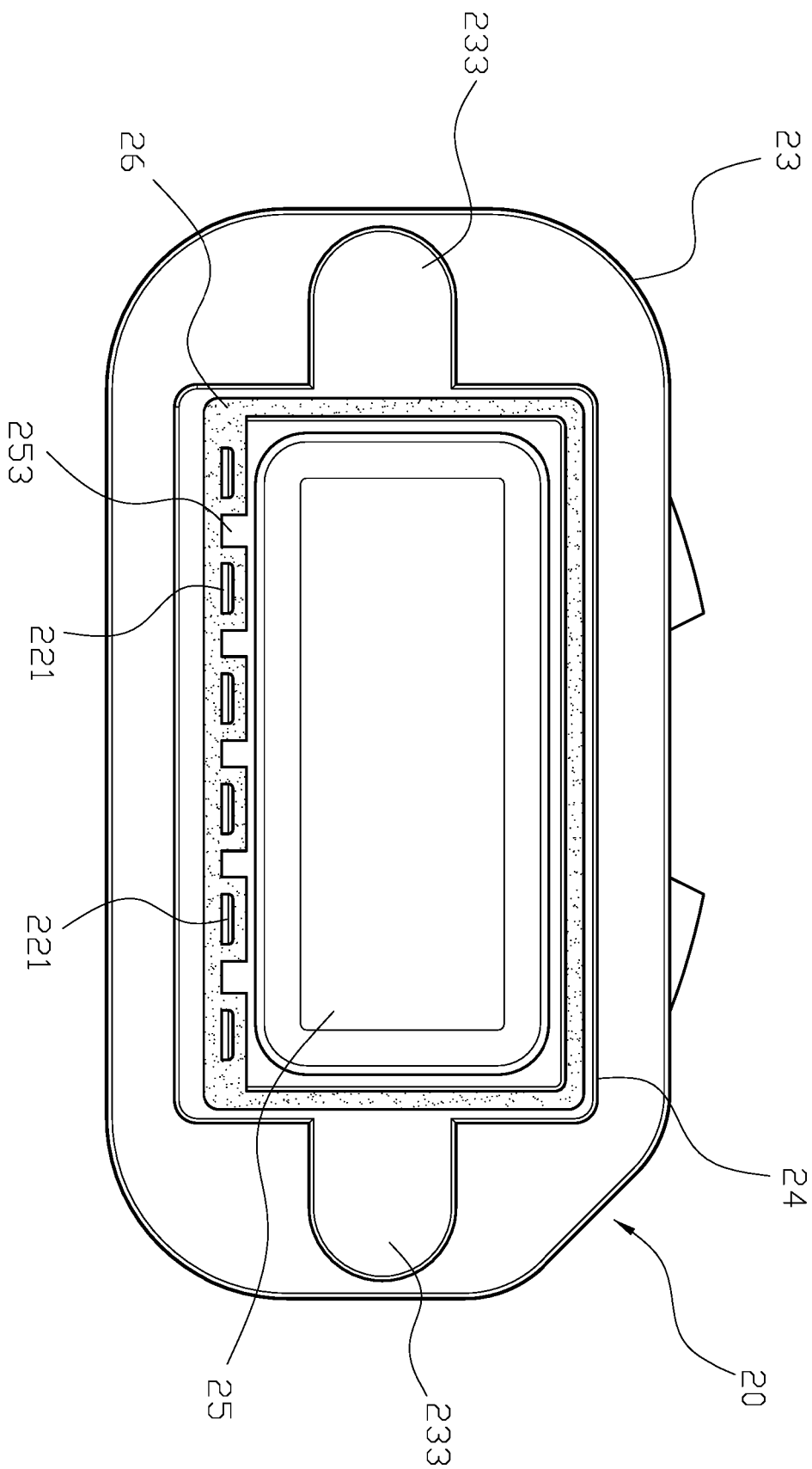


FIG. 6

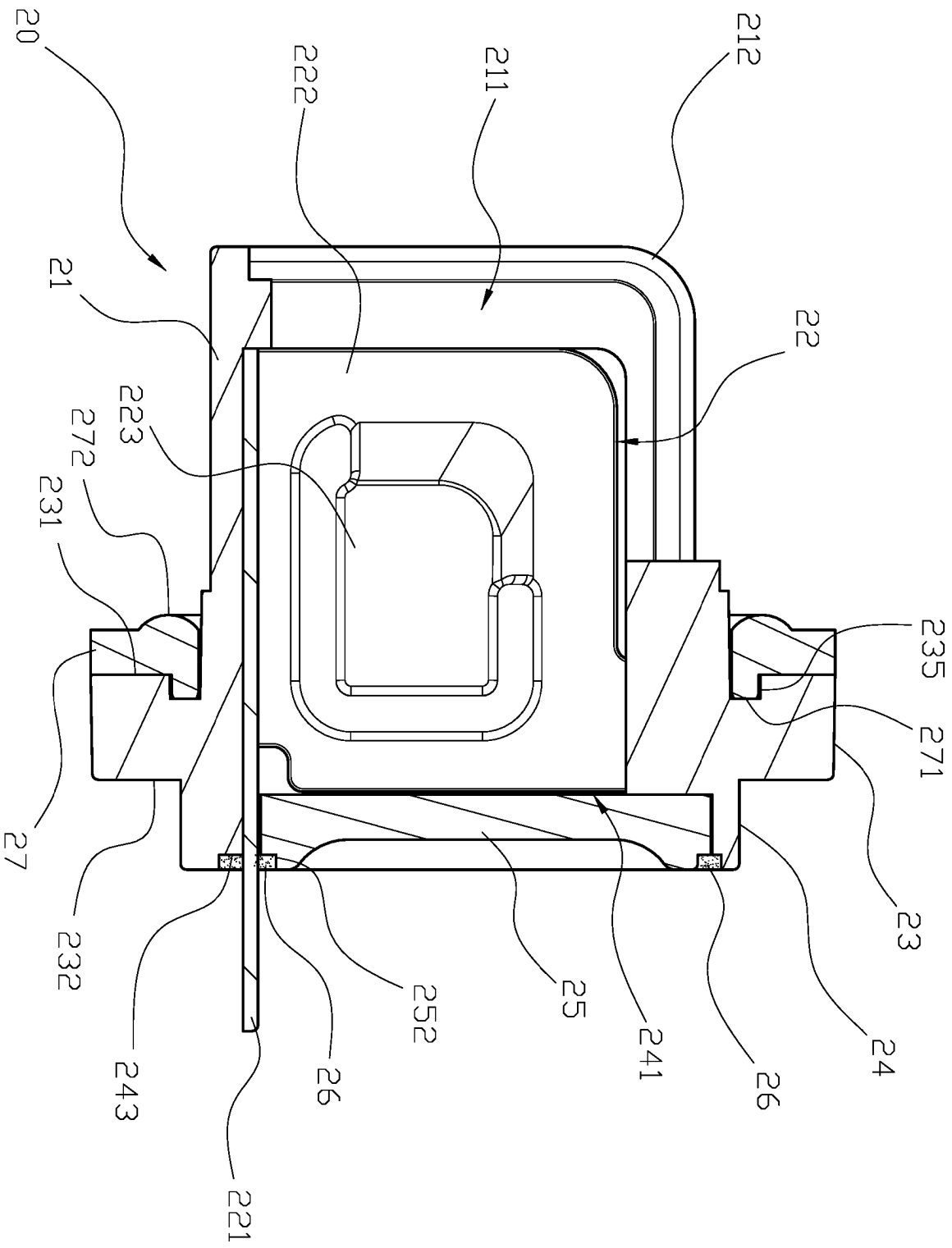


FIG. 7

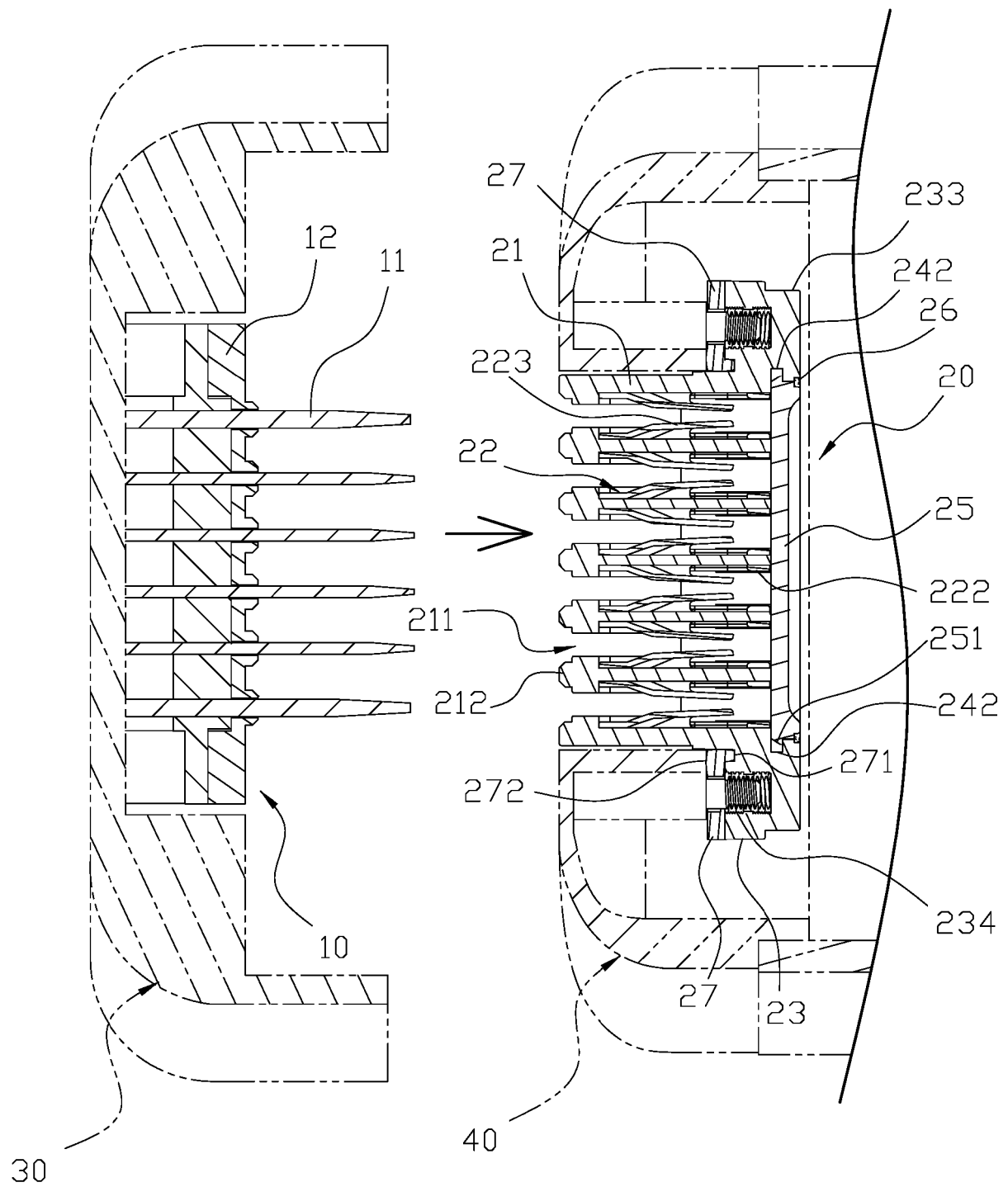


FIG. 8

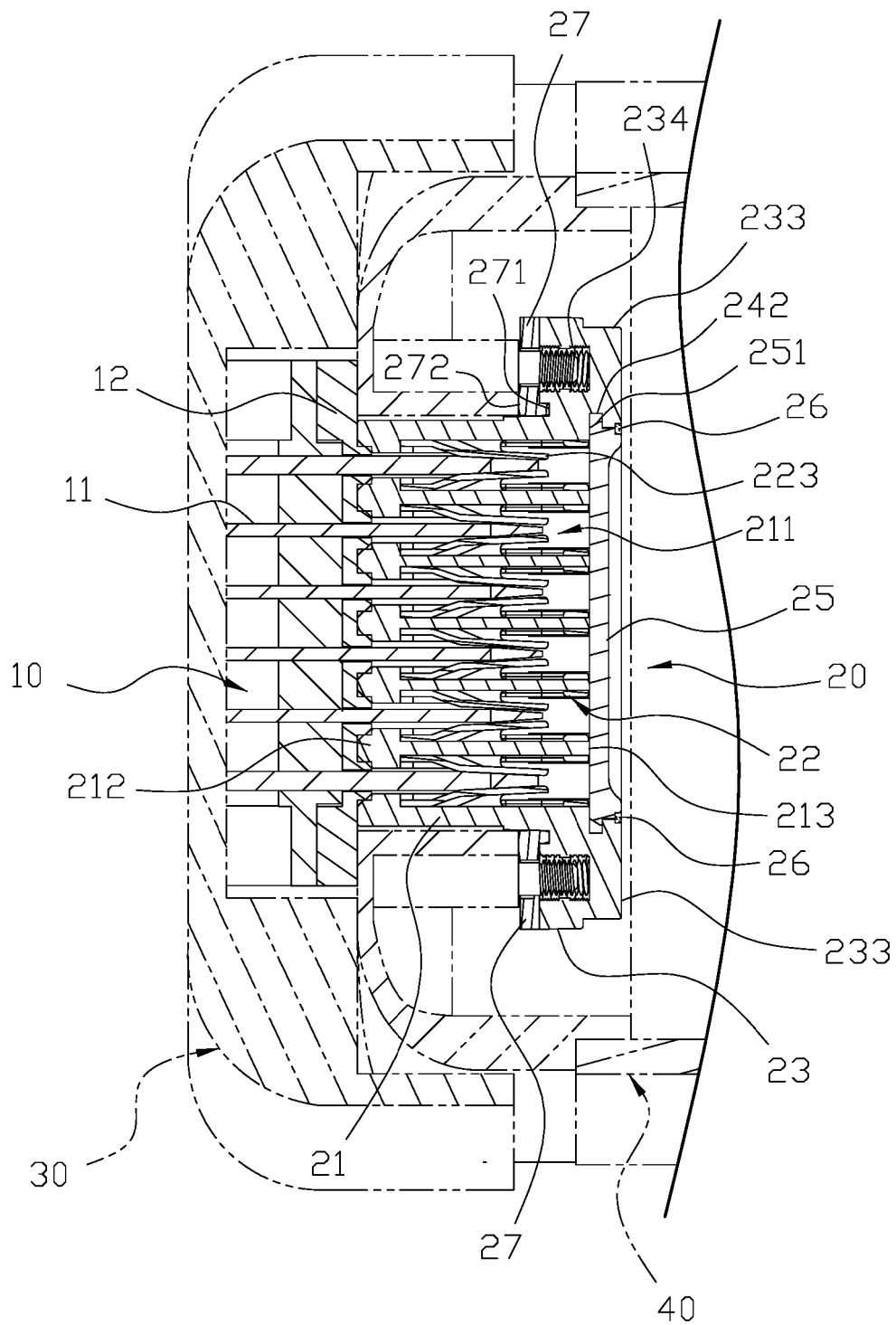


FIG. 9

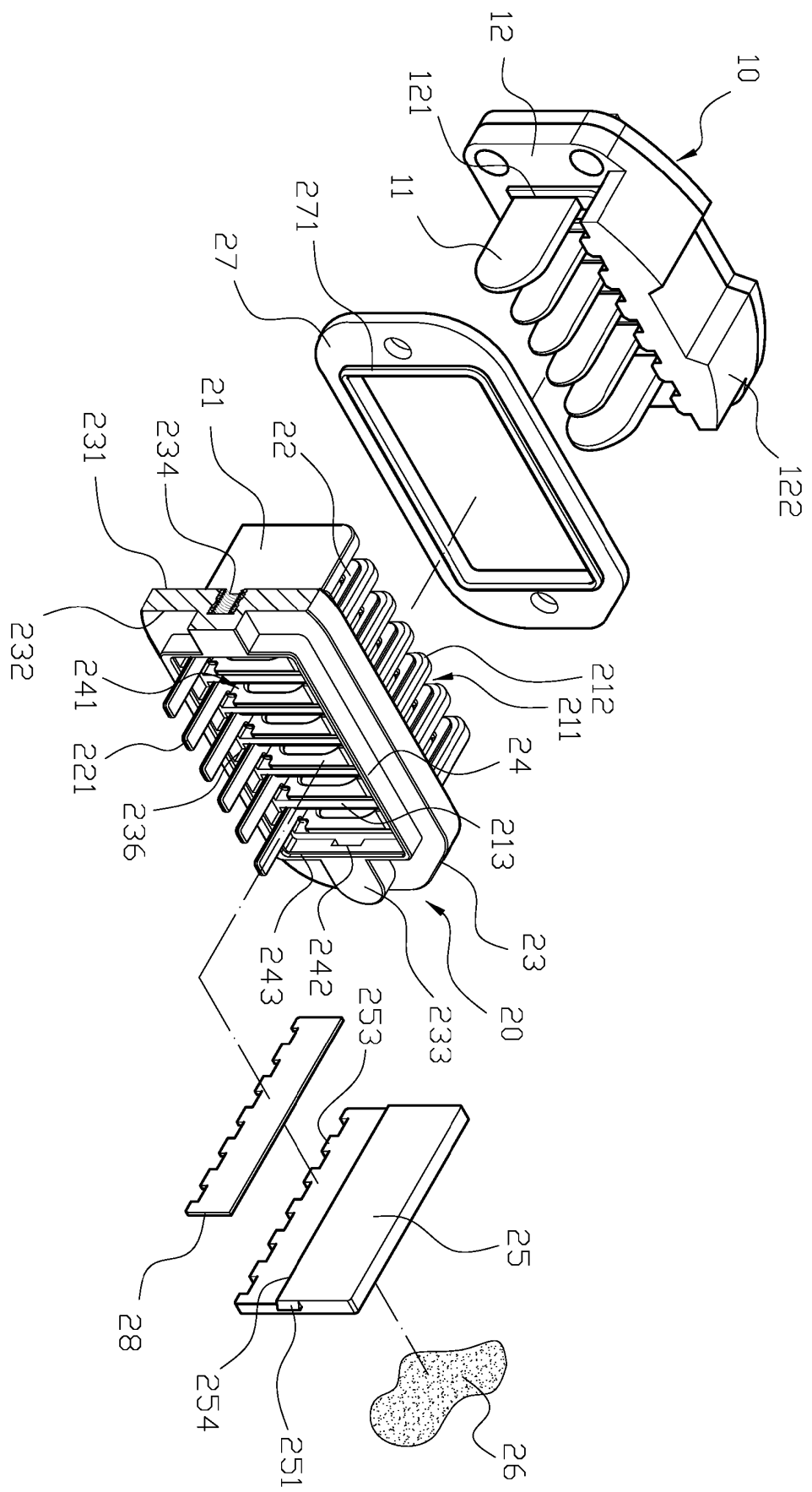


FIG. 10

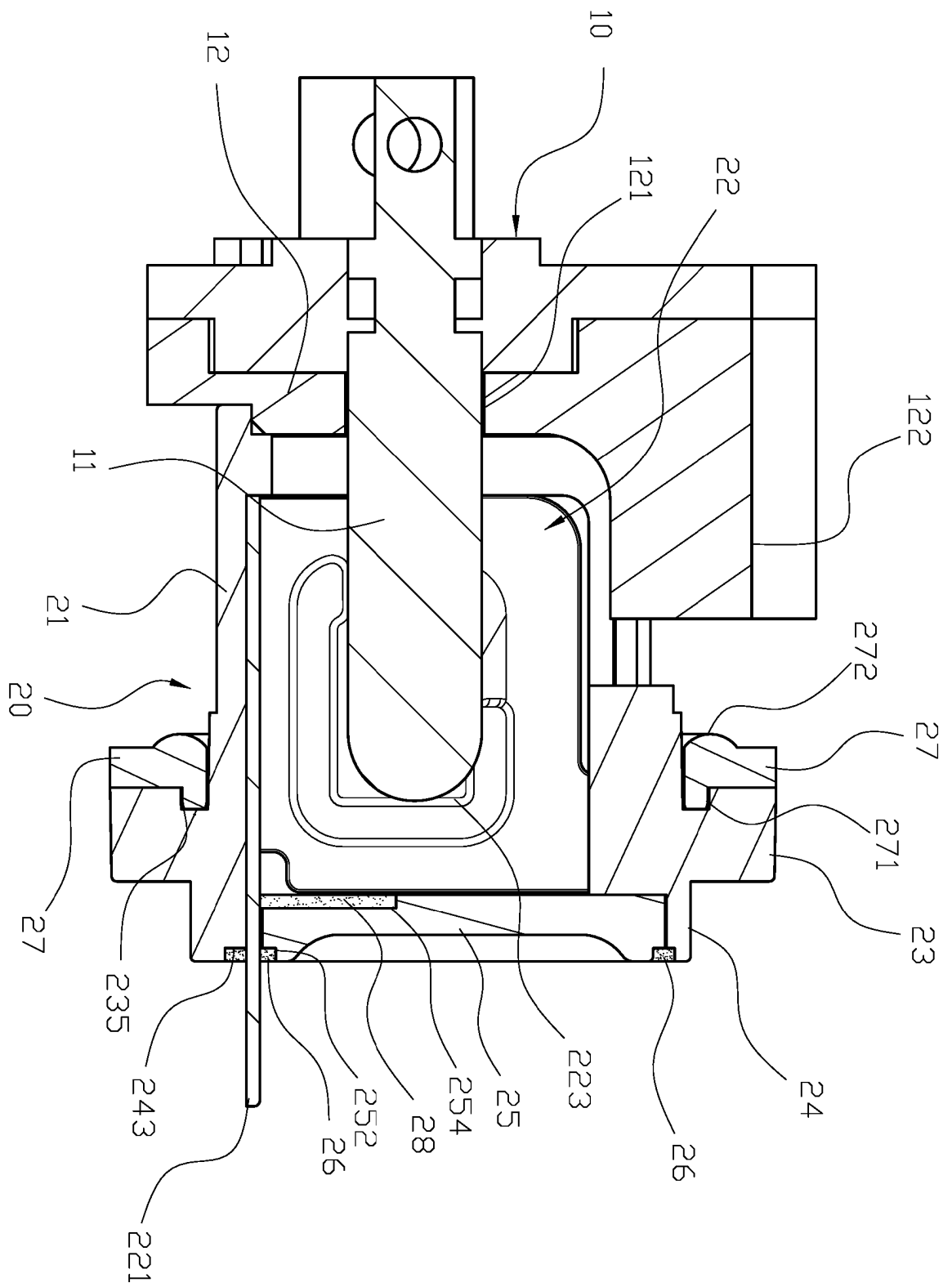


FIG. 11

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6491536 B1 [0004]