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(54) **INTEGRATED ELECTRONIC CIGARETTE AND METHOD FOR MANUFACTURING THE INTEGRATED ELECTRONIC CIGARETTE**

(57) Disclosed are an integrated electronic cigarette and a processing method thereof. The integrated electronic cigarette includes a housing, and a main unit, a cartridge, and an auto-eject structure that are disposed within the housing, where the main unit and the cartridge are respectively disposed on both ends of the housing, and the auto-eject structure is located between the main unit and the cartridge. To smoke the electronic cigarette, a user inserts cartridge into a through hole defined in an end surface of the housing and presses the cartridge to return and secure the auto-eject structure at a preset position; the cartridge is thus coupled to the main unit and ready for inhaling. When replacing cartridge or adding e-liquid, the user presses cartridge to force auto-eject structure to eject from the preset position, and releases the force allowing cartridge to eject from the housing before the cartridge is simply pulled out.

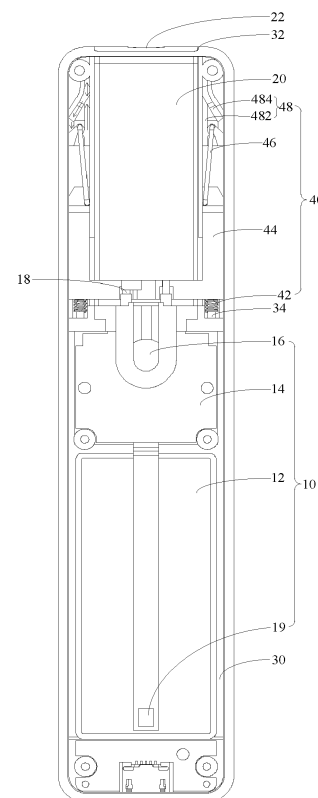


FIG. 3

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Description

[0001] The present disclosure relates to the technical field of cigarette substitutes, and more particularly, to an integrated electronic cigarette and a method for manufacturing the integrated electronic cigarette.

BACKGROUND

[0002] An electronic cigarette is an electronic product that simulates cigarette and has similar smoke, flavor, and feel compared to the cigarette. Because the toxic components in tobacco will enter the user's body along with smoking, it will adversely affect the health of the users and those around them. Thus, electronic cigarettes which are mainly used for smoking cessation and replacement of cigarettes have seen rapid promotion and usage.

[0003] Currently, an electronic cigarette commonly found on the market includes a battery main unit and a cartridge that is connected to the battery main unit. The cartridge is filled with an electronic cigarette liquid, when activating an atomizer assembly in the cartridge, a heating wire brings a high temperature which heats and atomizes the electronic cigarette liquid such that the nicotine is turned into vapor ready for the user to inhale. Commonly, the cartridge is inserted into the battery main unit and fixed thereto by means of magnetic attraction or a snap fastener, such that the cartridge would be electrically connected to and thusly powered up by the battery main unit for user to inhale.

[0004] However, the current design of the electronic cigarette is not conducive to keeping the cartridge clean, and it is laborious and inconvenient to take out and insert the cartridge, resulting in an unsatisfactory user experience.

Summary

[0005] In view of the above, there is a need to provide an integrated electronic cigarette which is prone to keeping the cleaning of the cartridge, and is simple and convenient for taking out and inserting the cartridge, as well as a method for manufacturing the integrated electronic cigarette.

[0006] There is provided an integrated electronic cigarette. The integrated electronic cigarette includes a main unit, a cartridge, and a housing. The main unit and the cartridge are both disposed within the housing and are located at two ends of the housing, respectively. The integrated electronic cigarette further includes an auto-eject structure disposed between the main unit and the cartridge. The housing defines a through hole in an end surface of the end where the cartridge is located. The auto-eject structure controls the insertion or ejection of the cartridge into or from the through hole.

[0007] In one embodiment, the auto-eject structure includes an elastic member, a movable base, a movable

support rod, and a guiding and limiting groove. The elastic member connects the housing with the movable base. The movable base is disposed between the main unit and the cartridge, and is disposed to abut against a bottom of the cartridge. The guiding and limiting groove is defined in an inner wall of the housing. One end of the movable support rod is rotatable connected to the movable base, and the other end of the movable support rod is secured or slides within the guiding and limiting groove. The guiding and limiting groove guides the cartridge and the movable support rod.

[0008] In one embodiment, the inner wall of the housing is provided with a frame, and the main unit is fixed to a corresponding mounting position of the frame. The frame further includes a limiting post parallel to a running direction of the cartridge, and the elastic member is fixed to the limiting post. The movable base defines a limiting hole, and the elastic member is a spring, with one end of the spring sleeved on the limiting post and the other end inserted in the limiting hole.

[0009] In one embodiment, the movable support rod is a U-shaped hook. The movable base is provided with a hook hole. One end of the U-shaped hook is disposed in the hook hole, and the other end of the U-shaped hook slides in the guiding and limiting groove.

[0010] In one embodiment, the guiding and limiting groove includes an ejection guide groove and an insertion guide groove. The ejection guide groove is disposed parallel to the spring. The insertion guide groove is disposed to be bifurcated with the ejection guide groove, and an end point of the insertion guide groove coincides with a start point of the ejection guide groove. The ejection guide groove protrudes from the insertion guide groove at a bifurcation with the insertion guide groove.

[0011] In one embodiment, the auto-eject structure is a dual-track auto-eject structure, where the guiding and limiting groove and the U-shaped hook are each symmetrically disposed on both sides of the cartridge, respectively, for the purpose of guiding the cartridge. The movable base is a U-shaped frame movable base, and three sides of the U-shaped frame movable base are in contact with the cartridge.

[0012] In one embodiment, the auto-eject structure further includes an elastic pressing piece which is fixed to the housing and presses the movable support rod to stay within the guiding and limiting groove.

[0013] In one embodiment, the main unit includes a battery, a circuit board, a pneumatic switch, and a first airflow passage. The battery, the circuit board, and the pneumatic switch are electrically connected. The battery, the circuit board, and the pneumatic switch are all disposed in their respective mounting positions on the inner wall frame of the housing. The pneumatic switch is in communication with the first airflow passage. The circuit board is provided with conductive columns electrically connected to the cartridge. The cartridge includes an atomizer assembly, an oil reservoir, and a second airflow passage. The atomizer assembly includes electrode col-

umns, a heating element, and an oil guiding element. The heating element is connected to the electrode columns and to the oil guiding element. The electrode columns are matched with the conductive columns. The oil guiding element is in communication with the oil reservoir. The first airflow passage is in communication with one end of the second airflow passage, and the other end of the second airflow passage is a mouthpiece.

[0014] In one embodiment, the housing is flat shaped, and a tempered glass cover is disposed on each of both sides of an exterior of the housing. The main unit is further provided with an indicator light electrically connected to the circuit board and disposed on an inner side of the tempered glass covers.

[0015] There is further provided a processing method for processing an integrated electronic cigarette, the processing method including the following steps:

S1: molding, in which an aluminum-magnesium alloy or a stainless steel substrate is subjected to an extrusion molding process for preliminary molding;

S2: CNC machining, in which precise processing of the substrate preliminarily molded in S1 is performed to form a frame;

S3: nano-corrosion, in which the frame formed in S2 is sequentially placed in an alkali solution, an acid solution, and a T solution, such that nano-scale micropores are formed on the surface of the frame, and the frame is then cleaned and dried;

S4: injection molding, in which injection molding of a polyphenylene sulfide (PPS) plastic or a polyethylene terephthalate (PET) plastic is performed to form a mounting panel;

S5: nano-injection, in which the mounting panel is placed within the frame, and the mounting panel permeates the nano-scale micropores of the frame by way of injection molding, such that the mounting panel is combined firmly with the aluminum alloy frame to form a housing;

S6: anodizing, in which the housing formed in S5 is placed in an electrolyte for anodization;

S7: CNC machining, in which finishing of the housing in S6 is performed;

8: installing the components of the main unit and the auto-eject structure in the housing; and

S9: gluing, in which glass covers are glued to the housing, and a glass cover is glued to each of both sides of the housing.

[0016] The above-described integrated electronic cig-

arette and the processing method thereof include at least the following advantages.

[0017] The electronic cigarette housing is internally provided with an auto-eject structure, whereby the cartridge can be inserted into or ejected from the housing by the user's operation. When needing to smoke the electronic cigarette, the user simply inserts the cartridge into the through hole provided at the end of the housing and then presses the cartridge such that the auto-eject structure would be returned to a preset position and secured thereat. At this point, the cartridge is connected to the main unit, and so the electronic cigarette is ready for inhaling. In other cases where it is needed to replace the cartridge or add e-liquid, then the user simply presses the cartridge at the through hole such that the auto-eject structure would be forced to eject from the preset position at which it is secured, and then release the force the cartridge would eject out of the housing a certain distance. As such, the user can then pull out the cartridge by hand. On the one hand, viewed from the outside as a whole, only the one-piece designed housing can be seen, resulting in superior integrity of overall appearance. On the other hand, the cartridge is placed within the housing, which is beneficial to keep the cartridge clean, and furthermore the cartridge can be removed and inserted simply by a gentle press, which is simple and convenient, resulting in a superior user experience.

[0018] The processing method for processing the electronic cigarette with a cartridge placed therein adopts nano-injection molding, whereby the plastic mounting panel is combined firmly with the acid-corroded aluminum alloy frame. In particular, the plastic permeates therein leading to a reaction of grease and amine, so that the plastic mounting panel is exchanged and fused with the aluminum alloy frame allowing the nano-micropores created by the acid corrosion on the aluminum alloy frame to be rapidly filled with the grease and amine, whereby the aluminum alloy frame and the plastic mounting panel are firmly combined together thanks to the anchor effect. Therefore, not only is the metallic appearance taken into account, but is the design of the product's structural parts be simplified, making the product lighter, thinner, shorter, and smaller.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

[0019]

FIG. 1 is a schematic view illustrating an integrated electronic cigarette in a cartridge-inserted configuration in accordance with the present disclosure.

FIG. 2 is a schematic view illustrating an integrated electronic cigarette in a cartridge-ejected configuration in accordance with the present disclosure.

- FIG. 3 is a schematic view illustrating an internal configuration of an integrated electronic cigarette in accordance with the present disclosure.
- FIG. 4 is a schematic view illustrating another internal configuration of an integrated electronic cigarette in accordance with the present disclosure.
- FIG. 5 is a schematic diagram illustrating a partial configuration of an integrated electronic cigarette in accordance with the present disclosure.
- FIG. 6 is a flowchart illustrating a processing method of processing an integrated electronic cigarette in accordance with the present disclosure.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0020] The above-described objects, features, and advantages of the present disclosure will be better understood and more apparent from the following detailed description of various specific embodiments in accordance with the present disclosure taken in conjunction with the accompanying drawings. Numerous specific details are set forth in the description below in order to provide a thorough understanding of the present disclosure. However, the present disclosure can be implemented in many other ways than those described herein, and those skilled in the art can make similar modifications without departing from the scope of the present disclosure. Thus, the present disclosure will not be limited by the specific implementations disclosed below.

[0021] It should be noted that when an element is referred to as being "fixed to" another element, it may be directly positioned on the other element, or there may exist an intermediate element. When an element is regarded as being "connected to" another element, it may be directly connected to the other element, or there may further exist an intermediate element.

[0022] Unless otherwise defined, all technical and scientific terms used herein will have the same meanings as commonly understood by those skilled in the art to which this disclosure pertains. The terminology used in the description of the present disclosure is for the purpose of describing particular embodiments and is not intended to limit the disclosure. The term "and/or" used herein includes any and all combinations of one or more of the associated listed items.

[0023] Referring to FIGS. 1 to 4, where schematic views of an integrated electronic cigarette according to an embodiment are shown. In this embodiment, the electronic cigarette includes a main unit 10, a cartridge 20, a housing 30, and an auto-eject structure 40. Main unit 10, cartridge 20, and auto-eject structure 40 are all disposed within housing 30. In particular, main unit 10 and cartridge 20 are disposed at two ends of housing 30, respectively. Auto-eject structure 40 is located between main unit 10

and cartridge 20. Housing 30 defines a through hole 32 in an end surface of the end where cartridge 20 is located. Auto-eject structure 40 controls the insertion or ejection of cartridge 20 into or from through hole 32. Main unit 10 and cartridge 20 are matched with each other. Cartridge 20 can be inserted into housing 30 and connected to main unit 10 before the electronic cigarette is ready for the user to inhale.

[0024] Auto-eject structure 40 can control cartridge 20 to be inserted into or ejected from housing 30 depending on the user's operation. When needing to smoke the electronic cigarette, the user simply inserts cartridge 20 into through hole 32 provided at the end of housing 30 and then presses cartridge 20 such that auto-eject structure 40 would be returned to a preset position and secured thereat. At this point, cartridge 20 is connected to main unit 10, and so the electronic cigarette is ready for inhaling. In other cases, where it is needed to replace cartridge 20 or add e-liquid, then the user simply presses cartridge 20 at through hole 32 such that auto-eject structure 40 would be forced to eject from the preset position at which it is secured, and then release the force cartridge 20 would eject out of housing 30 a certain distance. As such, the user can then pull out cartridge 20 by hand.

[0025] Referring now to FIG. 3, specifically, main unit 10 includes a battery 12, a circuit board 14, a pneumatic switch 16, and a first airflow passage. Battery 12, circuit board 14, and pneumatic switch 16 are electrically connected. The inner wall of housing 30 is provided with an integrally formed frame. The frame includes mounting positions matched with the various components of main unit 10, and battery 12, circuit board 14, and pneumatic switch 16 are all disposed in their respective mounting positions of the inner wall frame of housing 30. Circuit board 14 is provided with conductive columns 18 electrically connected to cartridge 20. Pneumatic switch 16 is in communication with the first airflow passage so that during smoking the air flows through the first airflow passage and then through pneumatic switch 16. Thus, pneumatic switch 16 is triggered and turned on by the air flow, so that cartridge 20 is started to work, atomizing the e-liquid for the user to inhale.

[0026] Cartridge 20 includes an atomizer assembly, an oil reservoir, and a second airflow passage. The atomizer assembly includes electrode columns, a heating element, and an oil guiding element. The oil guiding element is wound around the heating element and is in communication with the oil reservoir. The heating element is coupled to the electrode columns, and can produce heat when powered up, thereby atomizing the e-liquid. The electrode columns are matched with conductive columns 18. When the electrode columns are coupled to conductive columns 18, the air flow triggers pneumatic switch 16 to be turned on, causing the electrode columns to be electrically connected to conductive columns 18, such that the heating element produces heat which atomizes the e-liquid. The first airflow passage is communicated with one end of the second airflow passage, while the

other end of the second airflow passage is a mouthpiece 22. Thus, when smoking the electronic cigarette, the user can inhale at mouthpiece 22 such that the airflow would be driven to flow inside via the first airflow passage and the second airflow passage. During this process, because pneumatic switch 16 is triggered thus activating the atomizer assembly, what is eventually sucked into the user's mouth is the airflow accompanied with smoke.

[0027] In this embodiment, a one-way silicone valve can further be disposed at the air inlet of the second airflow passage. When inhaling, the one-way silicone valve opens due to suction, such that air flows in via the air inlet. If a misoperation is performed, namely blowing at mouthpiece 22, then the one-way silicone valve would seal the air inlet cutting off the air flow between the air inlet and pneumatic switch 16. As such, pneumatic switch 16 is turned off, thereby protecting the atomizer assembly from being burned out and scraped, where the user may otherwise even be scalded, because of the misoperation. In addition, the occurrence of a condensate within cartridge 20 flowing back to circuit board 14 via the air inlet causing a short circuit and damage of circuit board 14 is also reduced.

[0028] Referring now to FIG. 5, in this embodiment, auto-eject structure 40 includes an elastic member 42, a movable base 44, a movable support rod 46, and a guiding and limiting groove 48. Movable base 44 is disposed between main unit 10 and cartridge 20 and abuts against a bottom of cartridge 20. Elastic member 42 connects housing 30 and movable base 44. Guiding and limiting groove 48 is defined in the inner wall of housing 30, and more particularly the housing 30 is integrally formed by way of die molding to create guiding and limiting groove 48. One end of movable support rod 46 rotatably connected to movable base 44, while the other end thereof is secured or slides within guiding and limiting groove 48. When cartridge 20 is in the state of being inserted into housing 30, movable support rod 46 is secured at a preset position and is subjected to a pressure provided by elastic member 42 and guiding and limiting groove 48 in conjunction. Guiding and limiting groove 48 provided guidance for cartridge 20 and movable support rod 46.

[0029] Specifically, the frame of housing 30 further includes a limiting post 34 parallel to a running direction of cartridge 20. Movable base 44 defines a limiting hole. Elastic member 42 is a spring with one end of the spring sleeved on limiting post 34 and the other end inserted into the limiting hole, and limiting post 34 corresponds to the limiting hole in position. When cartridge 20 is pressed by an external force, elastic member 42 can provide movable base 44 an axial elastic force parallel to the running direction of cartridge 20, driving cartridge 20 to move smoothly.

[0030] Movable support rod 46 is a U-shaped hook, and movable base 44 defines a hook hole. One end of the U-shaped hook is disposed in the hook hole, and the other end of the U-shaped hook slides within guiding and limiting groove 48, so that the U-shaped hook can rotate

freely within the hook hole depending on the forces applied to cartridge 20. In some embodiments, the U-shaped hook deflects by a certain angle from the straight line in which elastic member 42 lies. When cartridge 20 is pressed to have the U-shaped hook released from the position where it is secured, the U-shaped hook can enter guiding and limiting groove 48 according to an expected moving path.

[0031] Guiding and limiting groove 48 includes an ejection guide groove 482 and an insertion guide groove 484. Ejection guide groove 482 is disposed parallel to the spring. Insertion guide groove is disposed to be bifurcated with ejection guide groove 482, and an end point of insertion guide groove 484 coincides with a start point of ejection guide groove 482 thus forming a motion loop. Ejection guide groove 482 protrudes from insertion guide groove 484 at its bifurcation with insertion guide groove 484. In some embodiments, insertion guide groove 484

and ejection guide groove 482 are bifurcated in a "┐" shape. In particular, ejection guide groove 482 and insertion guide groove 484 are arranged as a trapezoid. The trapezoid is curved at one of its legs that is closer to main unit 10; that is, the inner wall of the guide groove where the curved leg is located is also arranged as a curved slope. One end of movable support rod 46 abuts against the curved leg, in which case cartridge 20 is placed inside housing 30. To remove cartridge 20, cartridge 20 is pressed such that movable support rod 46 would slide out of the curved leg, and limited by the curved slope, movable support rod 46 would further slide out of the curved leg to a lower base of the trapezoid. Then the force applied on cartridge 20 is released such that the spring supplies an elastic force setting movable base 44 into motion, which in turn drives cartridge 20 and movable support rod 46 to move. As such, movable support rod 46 slides along the lower base of the trapezoid to a preset position. This is the ejection guide groove 482, in which cartridge 20 is partially ejected facilitating the manual removal of cartridge 20. When inserting cartridge 20, cartridge 20 is inserted into through hole 32 and then pressed to move, and thus movable base 44 and movable support rod 46 are driven to move. Because ejection guide groove 482 protrudes from insertion guide groove 484, movable support rod 46 would move along insertion guide groove 484. Here, the guiding groove formed by the straight leg, the upper base, and the partial curved leg of the trapezoid of insertion guide groove 484 is the insertion guide groove 484. Thus, cartridge 20 is pressed driving movable support rod 46 to move to the curved leg and be secured therein. Then releasing the force the presses cartridge 20, cartridge 20 would not pop up.

[0032] Returning to FIG. 4, more specifically, the straight leg of insertion guide groove 484 has a design of first flat, then slope, and then flat. The groove heights of the respective running portions of ejection guide groove 482 and insertion guide groove 484 at the curved leg are also different; in particular, insertion guide

groove 484 protrudes from ejection guide groove 482. Thus, when popping up, movable support rod 46 would only slide according to a preset ejection trajectory due to the height difference of the groove surfaces.

[0033] Auto-eject structure 40 further includes an elastic pressing piece 49 which is fixed to housing 30 and presses movable support rod 46 to stay within guiding and limiting groove 48. Movable support rod 46 slides in guiding and limiting groove 48, and elastic pressing piece 49 will create a certain pressure to movable support rod 46. On the one hand, movable support rod 46 can be prevented from sliding off from guiding and limiting groove 48. On the other hand, the resistance would become increasingly larger in the process of inserting cartridge 20 so that the user can roughly estimate the insertion status from the force, thus leading to a superior user experience.

[0034] In this embodiment, auto-eject structure 40 is a dual-track auto-eject structure. That is, guiding and limiting groove 48 and U-shaped hook are symmetrically disposed on both sides of cartridge 20, respectively, for purposes of guiding cartridge 20. Thus, cartridge 20 is subjected to a symmetric guidance leading to a relatively uniform force applied to cartridge 20, preventing cartridge 20 from going askew or becoming stuck, which would otherwise adversely affect the ejection or insertion of cartridge 20. Referring now to FIG. 5, more specifically, movable base 44 is a U-shaped frame movable base. Three sides of the U-shaped frame movable base are all in contact with cartridge 20. That is, the position of cartridge 20 is restricted on three faces, thereby avoiding the occurrence of cartridge 20 going askew resulting from the position of cartridge 20 being restricted on only one face. Thus, the fluency and experience of use are improved.

[0035] Referring back to FIGS. 1 and 2, in this embodiment, housing 30 has a flat shape, and a tempered glass cover 36 is disposed on each of both sides of the outer wall of housing 30. When viewed from the outside, only the tempered glass covers 36 on both sides and the aluminum alloy frame can be seen, resulting in superior integrity and fashionability. Main unit 10 is further provided with an indicator light 19 connected to circuit board 14. Indicator light 19 can be disposed on the outer surface of battery 12 or circuit board 14, and then covered by and placed on the inner side of tempered glass covers 36. Indicator light 19 can be a flashing indicator light, and when indicator light 19 is not lit the lighting would not be visible; otherwise when indicator light 19 is lit, cool visual effects can be seen from tempered glass covers 36. Tempered glass covers 36 not only have relatively high strength that can meet the strength requirement for use, but also allow the user to observe the usage of the e-liquid inside cartridge 20 through tempered glass covers 36, so that it is convenient to add e-liquid or replace cartridge 20 when the e-liquid runs low.

[0036] Of course, housing 30 also further defines a hole for mounting a charging port. In particular, main unit 10 is provided with a charging port coupled to battery 12

for charging battery 12.

[0037] The above-described electronic cigarette with cartridge 20 placed inside includes at least the following advantages.

[0038] Electronic cigarette housing 30 is internally provided with auto-eject structure 40, which can control cartridge 20 to be inserted into or ejected from housing 30 depending on the user's operation. When needing to smoke the electronic cigarette, the user simply inserts cartridge 20 into through hole 32 defined in the end surface of housing 30 and then presses cartridge 20 such that auto-eject structure 40 would be returned to a preset position and secured thereat. At this point, cartridge 20 is connected to main unit 10, and so the electronic cigarette is ready for inhaling. In other cases where it is needed to replace cartridge 20 or add e-liquid, then the user simply presses cartridge 20 at through hole 32 such that auto-eject structure 40 would be forced to eject from the preset position at which it is secured, and then release the force cartridge 20 would eject out of housing 30 a certain distance. As such, the user can then pull out cartridge 20 by hand. On the one hand, viewed from the outside as a whole, only the housing 30 of the one-piece designed housing can be seen, resulting in superior integrity of overall appearance. On the other hand, cartridge 20 is placed within housing 30, which is beneficial to keep cartridge 20 clean, and furthermore cartridge 20 can be removed and inserted simply by a gentle press, which is simple and convenient, resulting in a superior user experience.

[0039] Referring now to FIG. 6, there is further provided a processing method for processing an electronic cigarette with cartridge 20 placed inside, the processing method including the following steps:

S1: molding, in which an aluminum-magnesium alloy or a stainless steel substrate is subjected to an extrusion molding process for preliminary molding;

S2: CNC machining, in which precise processing of the substrate preliminarily molded in S1 is performed to form a frame, where positions for a through hole 32 and a charging port are reserved on the frame;

S3: nano-corrosion, in which the frame formed in S2 is sequentially placed in an alkali solution, an acid solution, and a T solution, such that nano-scale micropores are formed on the surface of the frame, and the frame is then cleaned and dried;

S4: injection molding, in which a polyphenylene sulfide (PPS) plastic or polyethylene terephthalate (PET) plastic is injection molded to form a mounting panel; the mounting panel is integrally formed with mounting positions for a battery 12, a circuit board 14, a pneumatic switch 16, the cartridge 20, an elastic member 42, etc., and is further integrally formed with a guiding and limiting groove 48; the mounting

panel has a simple die-molded integrated structure, is convenient to manufacture, has low cost, and can meet certain processing quality requirements;

S5: nano-injection, in which the mounting panel is placed within the frame, and the mounting panel permeates the nano-scale micropores of the frame by way of injection molding; in particular, the plastic injection leads to the reaction of grease and amine, so that the plastic mounting panel is exchanged and fused with the aluminum alloy frame, and the nano-scale micropores created by acid corrosion of the aluminum alloy frame are rapidly filled with the grease and amine, enabling the aluminum alloy frame and the plastic mounting panel to be firmly combined with each other thanks to the anchor effect, whereby the mounting panel and the aluminum alloy frame are firmly bound with each other forming the housing;

S6: anodizing, in which the housing formed in S5 is placed in an electrolyte for anodizing; thus, a protective film is formed on the frame of the housing, making the appearance more metallic, improving the corrosion resistance, and enhancing the wear resistance and hardness;

S7: CNC machining, in which finishing of the housing in S6 is performed;

S8: installing the components of main unit 10 and auto-eject structure 40 in the housing; and

S9: gluing, in which tempered glass covers 36 are glued to housing 30, and a glass cover is glued to each of both sides of housing 30.

[0040] The above-described processing method for processing the electronic cigarette with cartridge 20 placed inside includes at least the following advantages.

[0041] The processing method for processing the electronic cigarette with a cartridge 20 placed inside adopts nano-injection molding, whereby the plastic mounting panel is combined firmly with the acid-corroded aluminum alloy frame. In particular, the plastic permeates therein leading to a reaction of grease and amine, so that the plastic mounting panel is exchanged and fused with the aluminum alloy frame allowing the nano-micropores created by the acid corrosion on the aluminum alloy frame to be rapidly filled with the grease and amine, whereby the aluminum alloy frame and the plastic mounting panel are firmly combined together thanks to the anchor effect. Therefore, not only is the metallic appearance taken into account, but is the design of the product's structural parts be simplified, making the product lighter, thinner, shorter, and smaller.

[0042] The various technical features of the above-described embodiments can be combined arbitrarily. For

brevity of description, not all possible combinations of the various technical features of the above embodiments have been described. However, as long as no contradiction is present in a combination of these technical features, such a combination should be deemed as falling in the scope of the present specification.

[0043] The above-described embodiments are merely illustrative of several implementations according to the present disclosure, and though the description of these implementations is quite specific and detailed, it should not be construed as limiting the patent scope of the present disclosure. It should be noted that numerous variations and modifications may be made by those skilled in the art without departing from the spirit and scope of the present disclosure, where all such variations and modifications shall fall within the scope of protection of the present disclosure. Therefore, the scope of the present disclosure should be defined in and by the appended claims.

Claims

1. An integrated electronic cigarette, comprising:

a main unit (10);
a cartridge (20);
a housing (30), the main unit (10) and the cartridge (20) being both disposed within the housing (30) and located at both ends of the housing (30), respectively; and
an auto-eject structure (40), disposed between the main unit (10) and the cartridge (20), the housing (30) being defined with a through hole (32) in an end surface of the end of the housing (30) where the cartridge (20) is located, the auto-eject structure (40) controlling the cartridge (20) to be inserted into or ejected from the through hole (32).

2. The integrated electronic cigarette as recited in claim 1, wherein the auto-eject structure (40) comprises:

an elastic member (42);
a movable base (44), the elastic member (42) connecting the housing (30) and the movable base (44), and the movable base (44) being disposed between the main unit (10) and the cartridge (20) and abuts against a bottom of the cartridge (20);
a movable support rod (46); and
a guiding and limiting groove (48), the guiding and limiting groove (48) being defined in an inner wall of the housing (30), one end of the movable support rod (46) being rotatably connected to the movable base (44) and the other end of the movable support rod (46) being located or sliding in the guiding and limiting groove (48), the

- guiding and limiting groove (48) guiding the cartridge (20) and the movable support rod (46).
3. The integrated electronic cigarette as recited in claim 2, wherein the inner wall of the housing (30) is defined with a frame, the main unit (10) is fixed to a mounting position of the frame, the frame further comprises a limiting post (34) parallel to a running direction of the cartridge (20), the elastic member (42) is fixed to the limiting post (34), the movable base (44) defines a limiting hole, the elastic member (42) is a spring, one end of the spring is sleeved on the limiting post (34) and the other end of the spring is inserted into the limiting hole.
 4. The integrated electronic cigarette as recited in claim 3, wherein the movable support rod (46) is a U-shaped hook, the movable base (44) is defined with a hook hole, one end of the U-shaped hook is disposed in the hook hole, and the other end of the U-shaped hook slides in the guiding and limiting groove (48).
 5. The integrated electronic cigarette as recited in claim 4, wherein the guiding and limiting groove (48) comprises:
 - an ejection guide groove (482); and
 - an insertion guide groove (484), the ejection guide groove (482) being parallel to the spring, the insertion guide groove (484) and the ejection guide groove (482) corporately forming a bifurcation structure, an end point of the insertion guide groove (484) coinciding with a start point of the ejection guide groove (482), the ejection guide groove (482) protrudes from the insertion guide groove (484) at the bifurcation of the insertion guide groove (484) and the ejection guide groove (482).
 6. The integrated electronic cigarette as recited in claim 5, wherein the auto-eject structure (40) is a dual-track auto-eject structure, the guiding and limiting groove (48) and the U-shaped hook are each symmetrically disposed on both sides of the cartridge (20), respectively, to guide the cartridge (20); the movable base (44) is a U-shaped frame movable base, and three sides of the U-shaped frame movable base are all in contact with the cartridge (20).
 7. The integrated electronic cigarette as recited in any one of claims 2 to 6, wherein the auto-eject structure (40) further comprises an elastic pressing piece (49), the elastic pressing piece (49) is fixed to the housing (30) and presses the movable support rod (46) to allow the movable support rod (46) staying within the guiding and limiting groove (48).
 8. The integrated electronic cigarette as recited in claim 7, wherein the main unit (10) comprises a battery (12), a circuit board (11), a pneumatic switch (16), and a first airflow passage, the battery (12), the circuit board (11), and the pneumatic switch (16) are electrically connected and are all disposed in their respective mounting positions in the inner wall frame of the housing (30), the pneumatic switch (16) is in communication with the first airflow passage, the circuit board (11) is defined with conductive columns (18) electrically connected to the cartridge (20), the cartridge (20) comprises an atomizer assembly, an oil reservoir, and a second airflow passage, the atomizer assembly comprises electrode columns that are matched with the conductive columns (18), a heating element, and an oil guiding element, the heating element is coupled to the electrode columns and the oil guiding element, the oil guiding element is in communication with the oil reservoir; the first airflow passage is in communication with one end of the second airflow passage, and the other end of the second airflow passage is a mouth piece (22).
 9. The integrated electronic cigarette as recited in claim 8, wherein the housing (30) has a flat shape, and a tempered glass cover (36) is disposed on each of both exterior sides of the housing (30); the main unit (10) is further defined with an indicator light (19), which is coupled to the circuit board (11) and placed on an inner side of the tempered glass covers (36).
 10. A method for manufacturing an integrated electronic cigarette, comprising:
 - S1: molding, wherein an aluminum-magnesium alloy or a stainless steel substrate is subjected to an extrusion molding process for preliminary molding;
 - S2: CNC machining, wherein precise processing is performed on the substrate preliminarily molded in S1 to form a frame;
 - S3: nano-corroding, wherein the frame formed in S2 is sequentially placed in an alkali solution, an acid solution, and a T solution, to create nano-scale micropores in the surface of the frame, and then the frame is cleaned and dried;
 - S4: injection molding, wherein polyphenylene sulfide plastic or polyethylene terephthalate plastic is injection molded to form a mounting panel;
 - S5: nano-injecting, wherein the mounting panel is placed within the frame, and by way of injection molding, plastic injected permeates the nano-scale micropores of the frame, allowing the mounting panel to firmly combine with the aluminum alloy frame to form a housing (30);
 - S6: anodizing, wherein the housing (30) formed in S5 is placed in an electrolyte for anodization;

S7: CNC machining, wherein finishing of the housing (30) in S6 is performed;

S8: installing the components of a main unit (10) and an auto-eject structure (40) within the housing (30); and

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S9: gluing, wherein glass covers are glued to the housing (30), with each of both sides of the housing (30) being glued with a glass cover.

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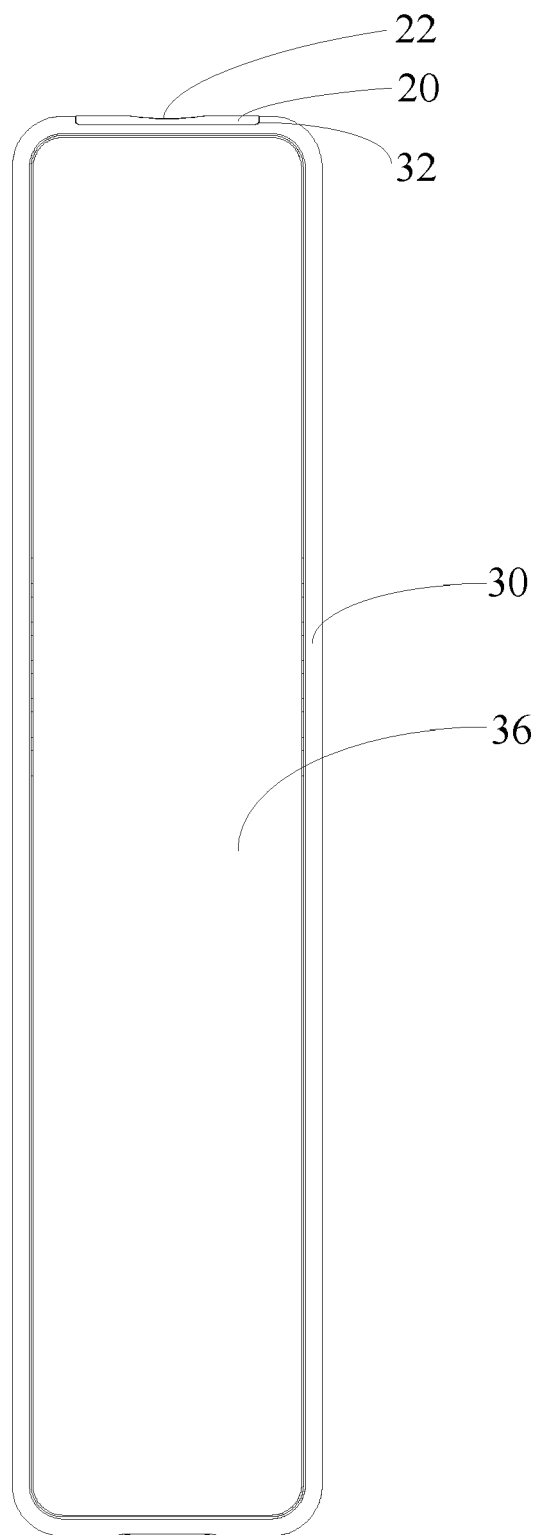


FIG. 1

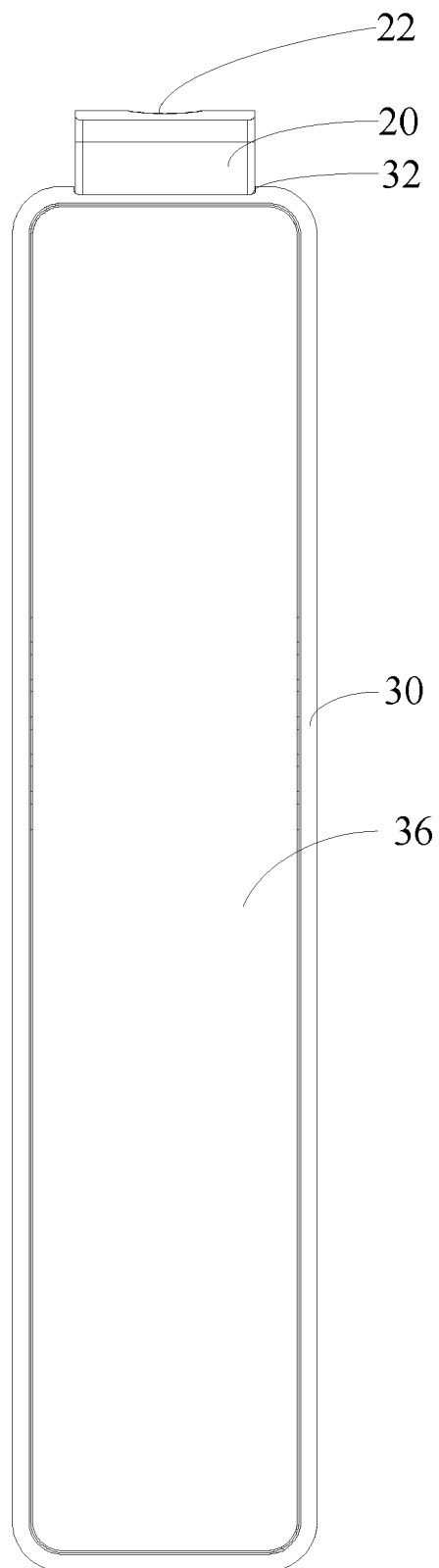


FIG. 2

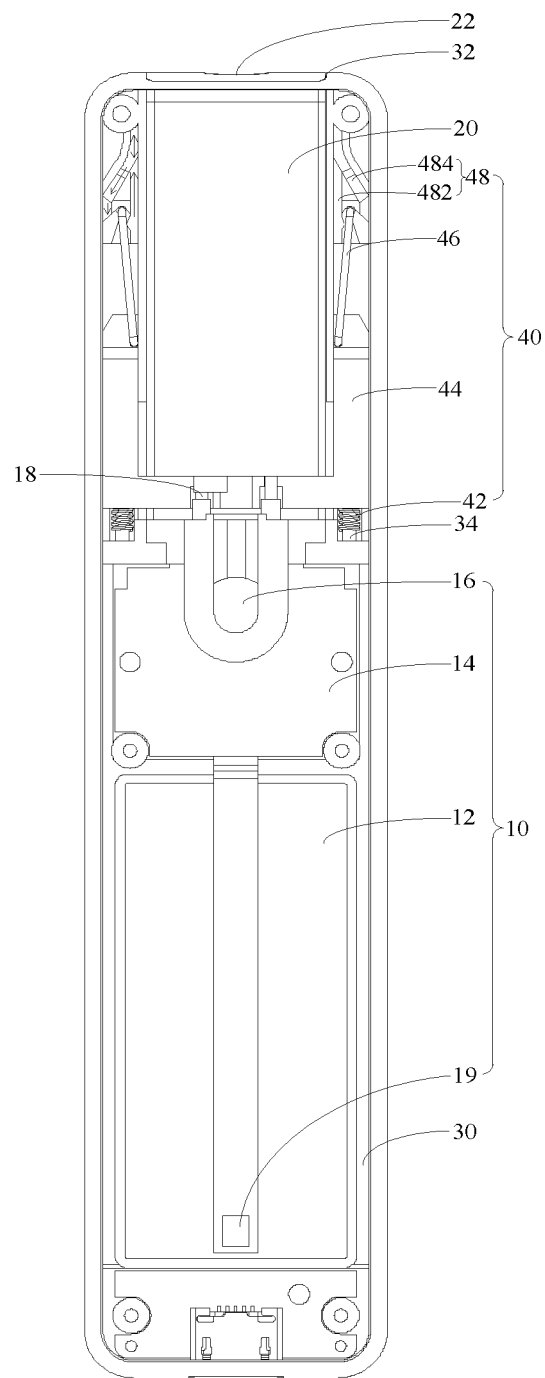


FIG. 3

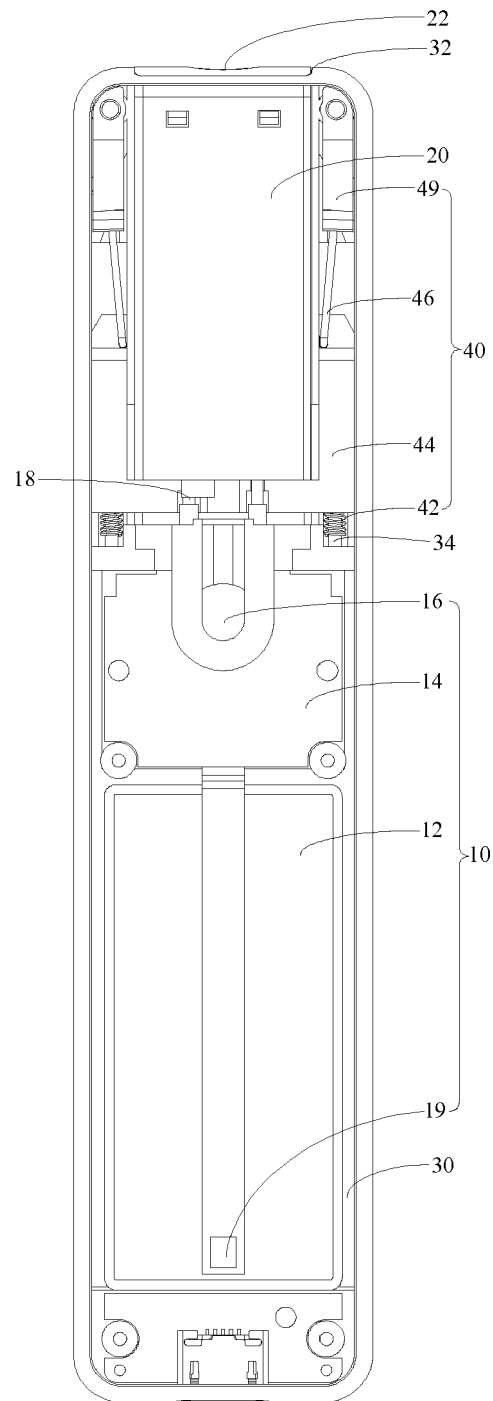


FIG. 4

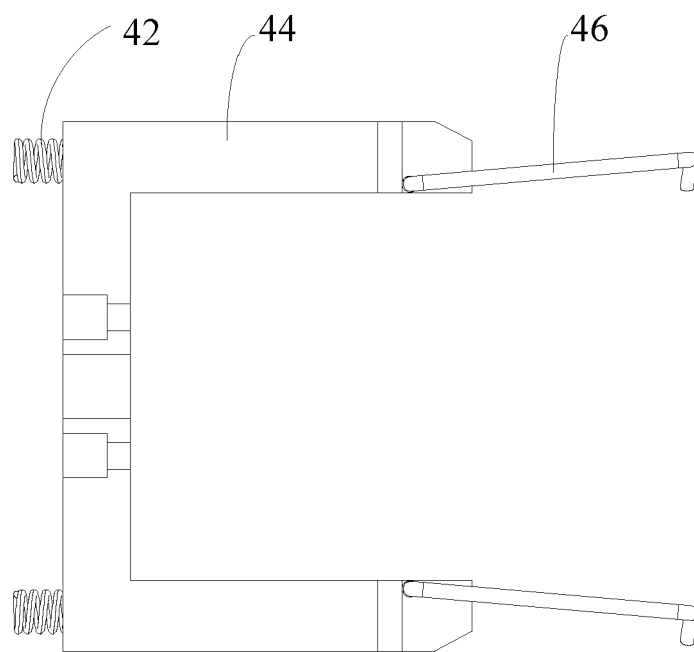


FIG. 5

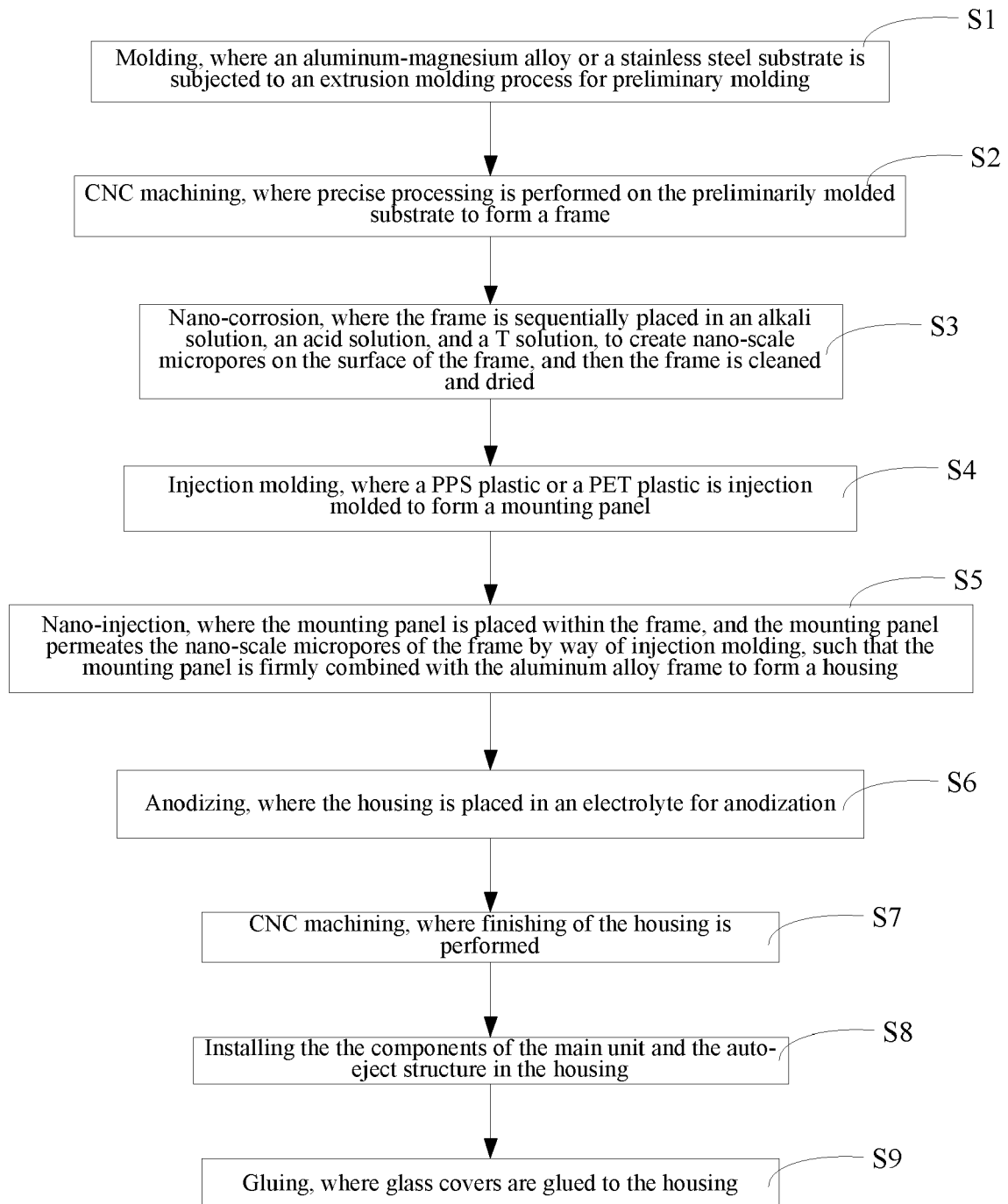


FIG. 6



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Application Number
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			A24F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 6 May 2019	Examiner Cardan, Cosmin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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