Claims

1. A high-voltage winding, comprising

a winding body,

a high-voltage coil, and

a high-voltage insulating layer,

wherein a wire is wound on the winding body to form the high-voltage coil, and the high-voltage insulating layer is wrapped around the high-voltage coil and the winding body,

wherein the high-voltage insulating layer is made of injection-molded silicone rubber, and the injection-molded silicone rubber is high-temperature vulcanized silicone rubber comprising raw rubber.

2. The high-voltage winding of claim 1,

wherein the winding body is made of a fiber-reinforced composite material.

3. The high-voltage winding of claim 1,

wherein the high-temperature vulcanized silicone rubber further comprises reinforcing agent, flame retardant and heat resistant agent.

4. The high-voltage winding of claim 1,

wherein the winding body comprises a winding portion, and the high-voltage coil comprises a plurality of coil sections, the coil sections are wound on the winding portion and spaced apart along an axial direction of the high-voltage winding.

5. The high-voltage winding of claim 4,

wherein the wire comprises a first wire and a second wire, the first wire is wound from a first end of the winding portion to a middle of the winding portion along the axial direction of the high-voltage winding, and the second wire is wound from the middle of the winding portion to a second end of the winding portion along the axial direction of the high-voltage winding.

6. The high-voltage winding of claim 4,

wherein the winding portion comprises a plurality of winding plates, each of the winding plates is provided with a plurality of comb teeth, the winding plates are arranged along a circumferential direction of the high-voltage winding, and at least one of the coil sections is arranged between two adjacent comb teeth on the winding plates.

7. The high-voltage winding of claim 6,

wherein a height of the comb tooth along the axial direction of the high-voltage winding is defined as a tooth height, and tooth heights of the comb teeth in a middle of the winding plate and tooth heights of the comb teeth at two ends of the winding plate are both greater than tooth heights of the comb teeth in other parts of the winding plate, so that a first high comb-tooth region, a first low comb-tooth region, a second high comb-tooth region, a second low comb-tooth region, and a third high comb-tooth region are sequentially formed on the winding plate from an end of the winding plate to the other end of the winding plate in the axial direction of the high-voltage winding.

8. The high-voltage winding of claim 4,

wherein each of the coil sections is reciprocally wound in layers along the axial direction of the high-voltage winding, and the coil section is provided with at least one interlayer insulating layer along the axial direction of the high-voltage winding.

9. The high-voltage winding of claim 1,

wherein the injection-molded silicone rubber is wrapped around the high-voltage coil and the winding body by integral vacuum injection, and the injection-molded silicone rubber fills a gap between the high-voltage coil and the winding body and is wrapped around two ends of the winding body.

10. The high-voltage winding of claim 4,

wherein the winding body further comprises a supporting barrel, the winding portion is arranged on an outer peripheral surface of the supporting barrel, and the supporting barrel is a hollow

column.

11. A method for manufacturing a high-voltage winding, the high-voltage winding being the high-voltage winding according to claim 1, wherein the method comprises the following steps:
in Step 1000: winding the wire circumferentially along the outer peripheral surface of the winding body to form the high-voltage coil, and forming a tap during the winding of the wire;
in Step 1100: placing the tap in a protective chamber of a tooling connector, and connecting and fixing the tap to the tooling connector;
in Step 1200: putting the winding body around which the high-voltage coil is wound into a mold of an injection molding machine as a to-be-injected body, and injecting injection-molded silicone rubber on a periphery of the to-be-injected body, the injection-molded silicon rubber being high-temperature vulcanized silicone rubber comprising raw rubber, so that the injection-molded silicone rubber is wrapped around the high-voltage coil and the winding body; and
in Step 1300: removing the tooling connector to obtain the high-voltage winding with the tap exposed to an outside of the injection-molded silicone rubber.

12. The method of claim 11,
wherein the winding body comprises a supporting barrel and a winding portion located on an outer peripheral surface of the supporting barrel, and in Step 1000, the wire is wound on the winding portion to form the high-voltage coil.

13. The method of claim 12,
wherein, prior to Step 1000, the supporting barrel and the winding portion are made of glass fibers impregnated with epoxy resin.

14. The method of claim 12,
wherein the winding portion comprises a plurality of winding plates, and prior to Step 1000, the winding plates are circumferentially and evenly distributed, bonded, and fixed to the outer peripheral surface of the supporting barrel.

15. The method of claim 11,

wherein, in Step 1200, the injection-molded silicone rubber is wrapped around the high-voltage coil and the winding body by integral vacuum injection and fills a gap between the high-voltage coil and the winding body and is wrapped around two ends of the winding body.

16. A method for manufacturing a high-voltage winding, the high-voltage winding being the high-voltage winding according to claim 1, the winding body comprising an auxiliary member and a winding portion, the winding portion being fixed and connected to the auxiliary member, and the high-voltage insulating layer being wrapped around the high-voltage coil, the winding portion, and the auxiliary member, wherein the method comprises the following steps:

in Step 2000: pasting a high-temperature resistant film on an outer peripheral surface of a winding tool;

in Step 2100: fixing the winding body to the high-temperature resistant film, and stably clamping the auxiliary member with the winding portion;

in Step 2200: winding the wire on the winding portion to form the high-voltage coil with a tap changer;

in Step 2300: putting the winding body around which the high-voltage coil is wound as a to-be-injected body into an injection molding machine together with the winding tool, and integrally injecting injection-molded silicone rubber on a periphery of the to-be-injected body to form the high-voltage insulating layer, to obtain the high-voltage winding, the injection-molded silicone rubber being high-temperature vulcanized silicone rubber comprising raw rubber; and

in Step 2400: demoulding the high-voltage winding from the winding tool.

17. The method of claim 16,

wherein the auxiliary member comprises a middle auxiliary member, and in Step 2100, the middle auxiliary member is sleeved on the high-temperature resistant film, and then the winding portion is arranged along a circumferential direction of the winding tool to enable an inner wall of the middle auxiliary member to be flush with an inner wall of the winding portion.

18. The method of claim 16,

wherein the auxiliary member comprises an end-portion auxiliary member, and in Step 2100, the winding portion is arranged along a circumferential direction of the winding tool, and then the end-portion auxiliary member is fixed to an outer side of an end portion of the winding portion.

19. The method of claim 16, wherein the winding portion comprises a plurality of comb-shaped winding plates, and in Step 2100, the winding plates are spaced apart and circumferentially and evenly distributed on the outer peripheral surface of the winding tool.

20. The method of claim 16,
wherein, in Step 2100, the winding portion or the auxiliary member is bonded to the high-temperature resistant film.