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(54) **HIGH-VOLTAGE OUTLET STRUCTURE OF 750 KV SHUNT REACTOR**

(57) A high-voltage outlet structure of a 750 kV shunt reactor, comprising an ascending seat (1), L-shaped fixing blocks (2) being fixedly mounted at positions of the bottom of the ascending seat (1) close to two sides thereof, each L-shaped fixing block (2) being provided with a plurality of fixing holes (3), a plurality of supporting blocks (4) being connected at the middle of the ascending seat (1), and a plurality of wire clips (5) being fixedly mounted on the surface of the ascending seat (1), a threaded groove (6) being provided inside each of the wire clips (5), a threaded pin (7) being threadedly connected to the inside of the threaded groove (6), an end of the threaded pin (7) being provided with a soft pad (8), the top of the ascending seat (1) being connected to an insulating paper cylinder (10) by means of a fastener (9), and a sleeve

(11) being provided at a position inside the insulating paper cylinder (10) close to the top thereof, the bottom of the sleeve (11) being connected to the top of an insulating voltage-equalizing ball (12), and the insulating voltage-equalizing ball (12) being provided with a paper pulp layer (13), support strips (14) and a molded insulating member (15) in sequence from inside to outside, the bottom of the insulating voltage-equalizing ball (12) being connected to a voltage-equalizing tube (16), and an engaging block (17) being provided between the voltage-equalizing tube (16) and the insulating paper cylinder (10).

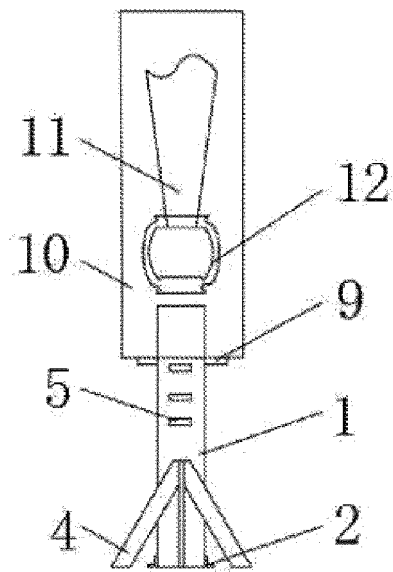


FIG. 1

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application is filed based upon and claims priority to Chinese Patent Application No. 201811240928.1, filed on October 24, 2018, the contents of which are hereby incorporated by reference in their entirety.

TECHNICAL FIELD

[0002] The application relates to the field of reactor outlet structures, and particularly to a high-voltage outlet structure of a 750 Kilovolt (kV) shunt reactor.

BACKGROUND

[0003] An indirect outlet structure is usually adopted for a high-voltage outgoing line of a 750kV ultrahigh-voltage shunt reactor. The high-voltage outgoing line enters an outlet device formed by an insulating piece, a copper tube, a voltage-sharing ring and the like, and then is connected with a bushing terminal board. The outlet device and a bushing are mounted in a "trunk-shaped" ascending flanged base separate from an oil tank. Since a reactor body greatly vibrates as a vibration source, separation of the high-voltage "trunk-shaped" ascending flanged base from the oil tank of the body will produce a great shearing action on the oil tank. Under the vibration of the 100 Hertz (Hz) of reactor body, the separate "trunk-shaped" ascending flanged base has great potential safety hazards. In addition, since the body and the ascending flanged base are not much different in weight, if they are connected only through a flange and stiffening member, shock resistance is relatively poor, which has a certain impact on a using process of a user. Therefore, a high-voltage outlet structure of a 750kV shunt reactor is proposed.

SUMMARY

[0004] Embodiments of the application are intended to provide a high-voltage outlet structure of a 750kV shunt reactor, which may effectively solve the problems in the BACKGROUND.

[0005] The embodiments of the application include the following technical solutions.

[0006] The embodiments of the application provide a high-voltage outlet structure of a 750kV shunt reactor, which may include an ascending flanged base. L-shaped fixing blocks may be fixedly mounted at positions, adjacent to two sides of the ascending flanged base, at a bottom of the ascending flanged base, each of the L-shaped fixing blocks may be provided with a plurality of fixing holes, a plurality of support blocks may be connected to a middle portion of the ascending flanged base, and a plurality of wire clamps may be fixedly mounted on

a surface of the ascending flanged base. Each of the wire clamps may be in a form of a rectangular frame with a threaded groove formed in an outer side edge of the rectangular frame, a threaded pin may be connected to inside the threaded groove by screwing, a cushion block may be arranged at an end of the threaded pin, an insulating paper cylinder may be connected to a top of the ascending flanged base through a fastening piece, a bushing may be arranged at a position in the insulating paper cylinder adjacent to a top of the insulating paper cylinder, a bottom of the bushing may be connected with a top of an insulating voltage-equalizing ball, the insulating voltage-equalizing ball may be sequentially provided with a paper pulp layer, a stay and a formed insulating piece from an inner wall to an outer wall of the insulating voltage-equalizing ball, a voltage-equalizing tube may be connected to a bottom of the insulating voltage-equalizing ball, and a connecting block may be arranged between the voltage-equalizing tube and the insulating paper cylinder.

[0007] In an optional embodiment of the application, each of the L-shaped fixing blocks may be fixedly connected with the ascending flanged base through fixing pins inserted into the fixing holes.

[0008] In an optional embodiment of the application, each of a surface of the ascending flanged base and a surface of each of the support blocks is provided with a connecting piece, and bottom ends of the ascending flanged base and the support block may be welded with an oil tank through respective connecting piece.

[0009] In an optional embodiment of the application, there are three groups of the support blocks, and the support blocks may be uniformly distributed on a periphery of the ascending flanged base in a circumferential direction.

[0010] In an optional embodiment of the application, a flange and stiffening member may be arranged between the ascending flanged base and the voltage-equalizing tube, and a mounting hole may be formed in a bottom of the insulating paper cylinder.

[0011] In an optional embodiment of the application, the threaded pin may be movably connected with the wire clamp through the threaded groove, a surface of the threaded groove may be coated with lubricating oil, and an adhesive may be arranged between the cushion block and the end of the threaded pin.

[0012] The embodiments of the application have the following beneficial effects. According to the high-voltage outlet structure of the 750kV shunt reactor, the electrical strength and insulation reliability of a 750kV outgoing line are ensured. In addition, it is ensured that the outlet structure and the bushing are mounted on an oil tank body to avoid a shearing action of the high-voltage ascending flanged base on the oil tank body, improve the shock resistance of the 750kV shunt reactor and ensure long-term safe running of the reactor. Thus, the whole high-voltage outlet structure of the 750kV shunt reactor is relatively practical, simple and convenient to operate and

has a better using effect than that of a conventional outlet structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

FIG. 1 is a front view of a high-voltage outlet structure of a 750kV shunt reactor according to an embodiment of the application.

FIG. 2 is a structure diagram of an L-shaped fixing block of a high-voltage outlet structure of a 750kV shunt reactor according to an embodiment of the application.

FIG. 3 is a side view of a high-voltage outlet structure of a 750kV shunt reactor according to an embodiment of the application.

FIG. 4 is a sectional view of a wire clamp of a high-voltage outlet structure of a 750kV shunt reactor according to an embodiment of the application.

FIG. 5 is a sectional view of an insulating voltage-equalizing ball of a high-voltage outlet structure of a 750kV shunt reactor according to an embodiment of the application.

[0014] The reference numerals in the drawings are listed as follows: 1: ascending flanged base; 2: L-shaped fixing block; 3: fixing hole; 4: support block; 5: wire clamp; 6: threaded groove; 7: threaded pin; 8: cushion block; 9: fastening piece; 10: insulating paper cylinder; 11: bushing; 12: insulating voltage-equalizing ball; 13: paper pulp layer; 14: stay; 15: formed insulating piece; 16: voltage-equalizing tube; and 17: connecting block.

DETAILED DESCRIPTION

[0015] As shown in FIG. 1 to FIG. 5, the embodiments of the application provide a high-voltage outlet structure of a 750kV shunt reactor, which includes an ascending flanged base 1. L-shaped fixing blocks 2 are fixedly mounted at positions, adjacent to two sides of the ascending flanged base, at a bottom of the ascending flanged base 1. Each of the L-shaped fixing blocks 2 is provided with a plurality of fixing holes 3. A plurality of support blocks 4 are connected to a middle portion of the ascending flanged base 1. A plurality of wire clamps 5 are fixedly mounted on a surface of the ascending flanged base 1. Each of the wire clamps 5 is in a form of a rectangular frame with a thread groove 6 formed in an outer side edge thereof. A threaded pin 7 is connected to inside of the thread groove 6 by screwing. A cushion block 8 is arranged at an end of the threaded pin 7. An insulating paper cylinder 10 is connected to a top of the ascending flanged base 1 through a fastening piece 9. A bushing

11 is arranged at a position in the insulating paper cylinder 10 adjacent to a top thereof. A bottom of the bushing 11 is connected with a top of an insulating voltage-equalizing ball 12. The insulating voltage-equalizing ball 12 is sequentially provided with a paper pulp layer 13, a stay 14 and a formed insulating piece 15 from an inner wall to an outer wall of the ball. A voltage-equalizing tube 16 is connected to a bottom of the insulating voltage-equalizing ball 12, and a connecting block 17 is arranged between the voltage-equalizing tube 16 and the insulating paper cylinder 10.

[0016] In an optional embodiment of the application, fixing pins are arranged between the L-shaped fixing block 2 and the ascending flanged base 1, and the L-shaped fixing block 2 is fixedly connected with the ascending flanged base 1 through the fixed pins inserted into the fixing holes 3. The fixing pins play a role in fixing.

[0017] In an optional embodiment of the application, each of the surface of the ascending flanged base 1 and the surface of each of the support blocks 4 is provided with a connecting piece, and a bottom end of the ascending flanged base 1 and an bottom end of the support block 4 are welded to an oil tank through respective connecting piece. With the connecting pieces, the ascending flanged base 1 and the support blocks 4 may be conveniently fixed on the oil tank.

[0018] In an optional embodiment of the application, there are three groups of the support blocks 4, and the support blocks 4 are uniformly distributed around the ascending flanged base 1 in a circumferential direction.

[0019] In an optional embodiment of the application, a flange and stiffening member is arranged between the ascending flanged base 1 and the voltage-equalizing tube 16, and a mounting hole is formed in a bottom of the insulating paper cylinder 10. The flange and stiffening member fixes the voltage-equalizing tube 16 and the ascending flanged base 1.

[0020] In an optional embodiment of the application, the threaded pin 7 is movably connected with the wire clamp 5 through the thread groove 6, a surface of the thread groove 6 is coated with lubricating oil, and an adhesive is arranged between the cushion block 8 and the threaded pin 7. The lubricating oil may reduce the friction of the contact surface and play the role of lubrication. The adhesive may improve stability of connection between the cushion block 8 and the threaded pin 7.

[0021] It is to be noted that, when the high-voltage outlet structure of the 750kV shunt reactor according to an embodiment of the application is in use, the ascending flanged base 1 forms a main body of the whole high-voltage outlet structure of the 750kV shunt reactor. By the L-shaped fixing blocks 2 and the support blocks 4, the shock resistance of the 750kV shunt reactor may be improved, and long-term safe running of the reactor may be ensured. By the ascending flanged base 1, it may be ensured that the outlet structure and the bushing 11 are mounted on an oil tank body to avoid a shearing action of high voltage on the oil tank body. By the wire clamps

5, electric wires may be conveniently taken up. The movable connection of the threaded pin 7 with the wire clamp 5 through the thread groove 6 may play a role of clamping the electric wires. The cushion block 8 plays a role in buffering to protect the electric wires. By the fastening piece 9, the insulating paper cylinder 10 may be conveniently fixed with the ascending flanged base 1. The insulating paper cylinder 10 is matched with the insulating voltage-equalizing ball 12 in use to ensure the electrical strength and insulation reliability of a 750kV outgoing line. By the paper pulp layer 13, the stay 14 and the formed insulating piece 15, the insulativity of the insulating voltage-equalizing ball 12 may be ensured. The voltage-equalizing tube 16 plays a role in guiding and limiting. By the connecting block 17, the stability of connection between the voltage equalizing tube 16 and the insulating paper cylinder 10 may be improved. The whole high-voltage outlet structure of the 750kV shunt reactor is simple, convenient to use and relatively practical.

[0022] The above description shows and describes the basic principle and main characteristics of the embodiments of the application and advantages of the embodiments of the application. Those skilled in the art should know that the application is not limited to the embodiments. Only the principle of the embodiments of the application is described in the embodiments and the specification. Various variations and improvements may also be made to the embodiments of the application without departing from the spirit and scope of the embodiments of the application and all these variations and improvements shall also fall within the scope of protection of the embodiments of the application. The scope of protection of the embodiments of the application is defined by the appended claims and equivalents thereof.

Claims

1. A high-voltage outlet structure of a 750 kV shunt reactor, comprising an ascending flanged base (1), wherein L-shaped fixing blocks (2) are fixedly mounted at positions, adjacent to two sides of the ascending flanged base (1), at a bottom of the ascending flanged base (1), each L-shaped fixing block of the L-shaped fixing blocks (2) being provided with a plurality of fixing holes (3), a plurality of support blocks (4) being connected to a middle portion of the ascending flanged base (1), a plurality of wire clamps (5) being fixedly mounted on an outer surface of the ascending flanged base (1), each of the wire clamps (5) being in a form of a rectangular frame with a threaded groove (6) formed in an outer side edge of the rectangular frame, a threaded pin (7) being connected to an inside of the threaded groove (6) by screwing, a cushion block (8) being arranged at an end of the threaded pin (7), an insulating paper cylinder (10) being connected to a top of the ascending flanged base (1) through a fastening piece (9), a

bushing (11) being arranged at a position in the insulating paper cylinder (10) adjacent to a top of the insulating paper cylinder, a bottom of the bushing (11) being connected with a top of an insulating voltage-equalizing ball (12), the insulating voltage-equalizing ball (12) being sequentially provided with a paper pulp layer (13), a stay (14) and a formed insulating piece (15) in a direction from an inner wall to an outer wall of the insulating voltage-equalizing ball, a voltage-equalizing tube (16) being connected to a bottom of the insulating voltage-equalizing ball (12), and a connecting block (17) being arranged between the voltage-equalizing tube (16) and the insulating paper cylinder (10).

2. The high-voltage outlet structure of the 750kV shunt reactor of claim 1, wherein the L-shaped fixing block is fixedly connected with the ascending flanged base (1) through fixed pins inserted into the fixing holes (3).
3. The high-voltage outlet structure of the 750kV shunt reactor of claim 1, wherein each of a surface of the ascending flanged base (1) and a surface of each support block of the support blocks (4) is provided with a connecting piece, bottom ends of the ascending flanged base (1) and each support block (4) being welded with an oil tank through respective connecting piece.
4. The high-voltage outlet structure of the 750kV shunt reactor of claim 1, wherein there are three groups of the support blocks (4), the support blocks (4) being uniformly distributed on a periphery of the ascending flanged base (1) in a circumferential direction.
5. The high-voltage outlet structure of the 750kV shunt reactor of claim 1, wherein a flange and stiffening member is arranged between the ascending flanged base (1) and the voltage equalizing tube (16), and a mounting hole is formed in a bottom of the insulating paper cylinder (10).
6. The high-voltage outlet structure of the 750kV shunt reactor of claim 1, wherein the threaded pin (7) is movably connected with the wire clamp (5) through the threaded groove (6), a surface of the threaded groove (6) being coated with lubricating oil, an adhesive being arranged between the cushion block (8) and the end of the threaded pin (7).

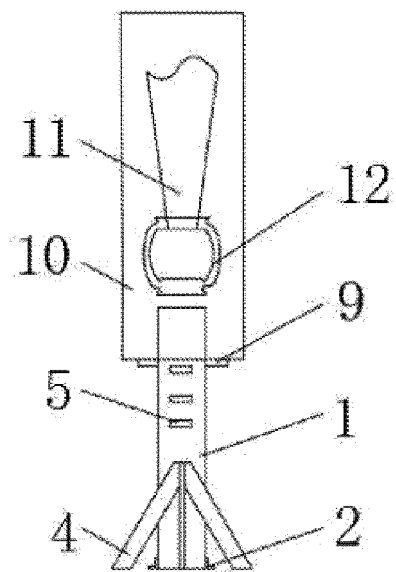


FIG. 1

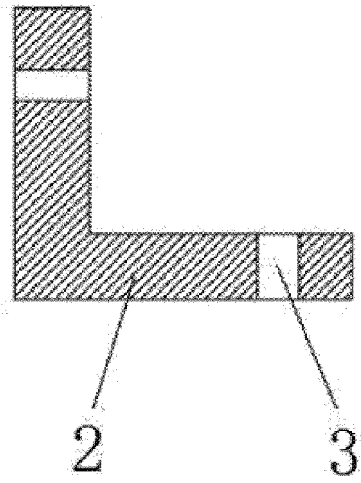


FIG. 2

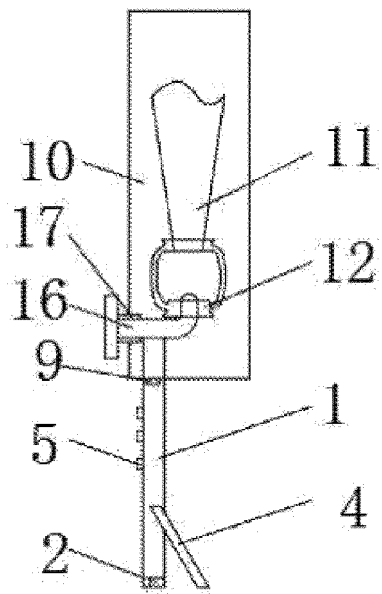


FIG. 3

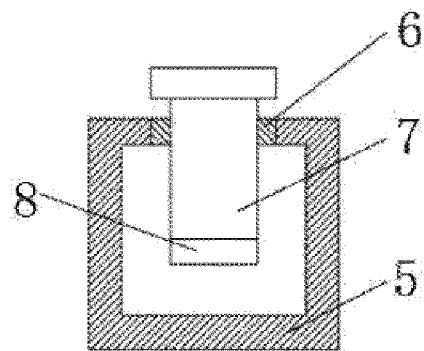


FIG. 4

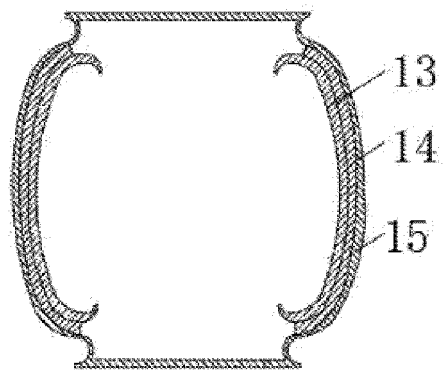


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/105774

A. CLASSIFICATION OF SUBJECT MATTER

H01F 27/06(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI; EPODOC; CNKI; CNPAT: 电抗器, 并联, 出线, 线夹, 螺纹, 垫块, 绝缘, 套管, 铜管, 固定, 均压球, 衔接, 座, 油箱, electric reactor, parallel, outgoing line, coil out, fix, pipe, tube, base, screw thread, insulation

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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PX	CN 208706378 U (SHANDONG POWER EQUIPMENT COMPANY) 05 April 2019 (2019-04-05) claims 1-6	1-6
Y	CN 204695942 U (SHANDONG POWER EQUIPMENT COMPANY) 07 October 2015 (2015-10-07) description, paragraphs [0019]-[0023], and figures 1-8	1-6
Y	CN 206282975 U (LU, Jiatong) 27 June 2017 (2017-06-27) description, paragraphs [0016]-[0022], and figures 1-4	1-6
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A	CN 103325550 A (STATE GRID CORPORATION OF CHINA et al.) 25 September 2013 (2013-09-25) entire document	1-6

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

29 November 2019

Date of mailing of the international search report

13 December 2019

Name and mailing address of the ISA/CN

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Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/105774**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4464644 A (MITSUBISHI DENKI KABUSHIKI KAISHA) 07 August 1984 (1984-08-07) entire document	1-6

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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CN 109119227 A	01 January 2019	None	
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CN 206282975 U	27 June 2017	None	
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Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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