



(86) Date de dépôt PCT/PCT Filing Date: 1996/12/20
(87) Date publication PCT/PCT Publication Date: 1997/07/17
(45) Date de délivrance/Issue Date: 2005/10/25
(85) Entrée phase nationale/National Entry: 1998/07/03
(86) N° demande PCT/PCT Application No.: DE 1996/002482
(87) N° publication PCT/PCT Publication No.: 1997/025732
(30) Priorité/Priority: 1996/01/05 (196 01 053.5) DE

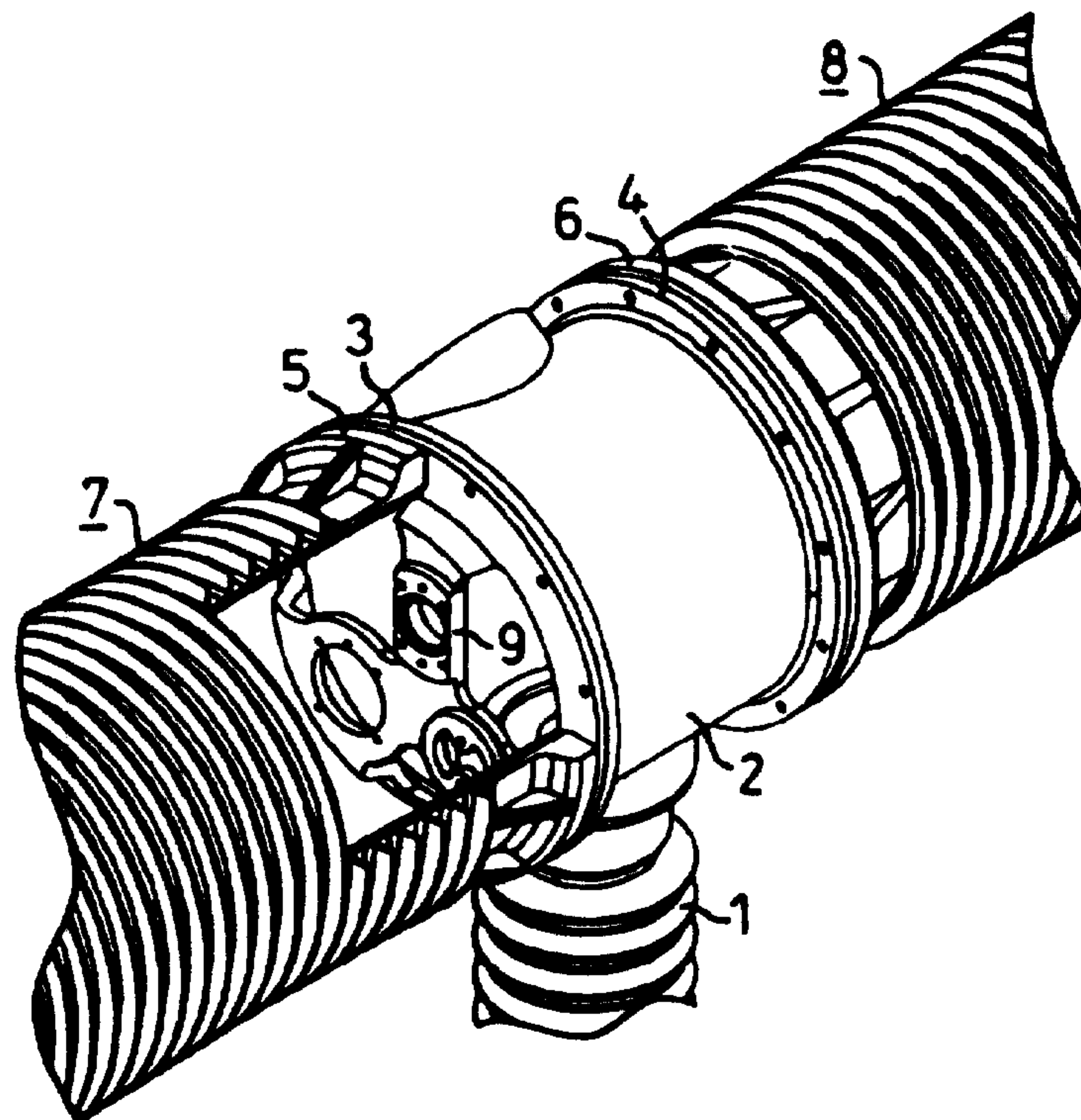
(51) Cl.Int.⁶/Int.Cl.⁶ H01H 33/02, H01H 33/16

(72) Inventeur/Inventor:
MASCHER, KARL, DE

(73) Propriétaire/Owner:
SIEMENS AKTIENGESELLSCHAFT, DE

(74) Agent: FETHERSTONHAUGH & CO.

(54) Titre : DISJONCTEUR HAUTE TENSION POUR L'EXTERIEUR
(54) Title: AN OUTDOOR HIGH-VOLTAGE POWER CIRCUIT BREAKER



(57) Abrégé/Abstract:

The invention concerns an open air high-voltage circuit breaker comprising a circuit breaker unit (13) and a control capacitor connected electrically in parallel to it and surrounded by a common composite isolation housing (7, 8) made essentially of plastic, resting a terminal column (1) fixed to one of its ends. The use of a composite isolation housing saves cost and weight at the upper end of the terminal column and also improves earthquake security.



PCT
WELTORGANISATION FÜR GEISTIGES EIGENTUM
Internationales Büro
INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE
INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

(51) Internationale Patentklassifikation ⁶ : H01H 33/02, 33/16	A1	(11) Internationale Veröffentlichungsnummer: WO 97/25732 (43) Internationales Veröffentlichungsdatum: 17. Juli 1997 (17.07.97)		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> (21) Internationales Aktenzeichen: PCT/DE96/02482 (22) Internationales Anmeldedatum: 20. December 1996 (20.12.96) (30) Prioritätsdaten: 196 01 053.5 5. Januar 1996 (05.01.96) DE (71) Anmelder (für alle Bestimmungsstaaten ausser US): SIEMENS AKTIENGESELLSCHAFT [DE/DE]; Wittelsbacherplatz 2, D-80333 München (DE). (72) Erfinder; und (75) Erfinder/Anmelder (nur für US): MASCHER, Karl [DE/DE]; Am Dachsbau 102a, D-13503 Berlin (DE). </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> (81) Bestimmungsstaaten: CA, CN, US. Veröffentlicht <i>Mit internationalem Recherchenbericht. Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist. Veröffentlichung wird wiederholt falls Änderungen eintreffen.</i> </td> </tr> </table>			(21) Internationales Aktenzeichen: PCT/DE96/02482 (22) Internationales Anmeldedatum: 20. December 1996 (20.12.96) (30) Prioritätsdaten: 196 01 053.5 5. Januar 1996 (05.01.96) DE (71) Anmelder (für alle Bestimmungsstaaten ausser US): SIEMENS AKTIENGESELLSCHAFT [DE/DE]; Wittelsbacherplatz 2, D-80333 München (DE). (72) Erfinder; und (75) Erfinder/Anmelder (nur für US): MASCHER, Karl [DE/DE]; Am Dachsbau 102a, D-13503 Berlin (DE).	(81) Bestimmungsstaaten: CA, CN, US. Veröffentlicht <i>Mit internationalem Recherchenbericht. Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist. Veröffentlichung wird wiederholt falls Änderungen eintreffen.</i>
(21) Internationales Aktenzeichen: PCT/DE96/02482 (22) Internationales Anmeldedatum: 20. December 1996 (20.12.96) (30) Prioritätsdaten: 196 01 053.5 5. Januar 1996 (05.01.96) DE (71) Anmelder (für alle Bestimmungsstaaten ausser US): SIEMENS AKTIENGESELLSCHAFT [DE/DE]; Wittelsbacherplatz 2, D-80333 München (DE). (72) Erfinder; und (75) Erfinder/Anmelder (nur für US): MASCHER, Karl [DE/DE]; Am Dachsbau 102a, D-13503 Berlin (DE).	(81) Bestimmungsstaaten: CA, CN, US. Veröffentlicht <i>Mit internationalem Recherchenbericht. Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist. Veröffentlichung wird wiederholt falls Änderungen eintreffen.</i>			

(54) Title: OPEN-AIR HIGH-VOLTAGE CIRCUIT BREAKER

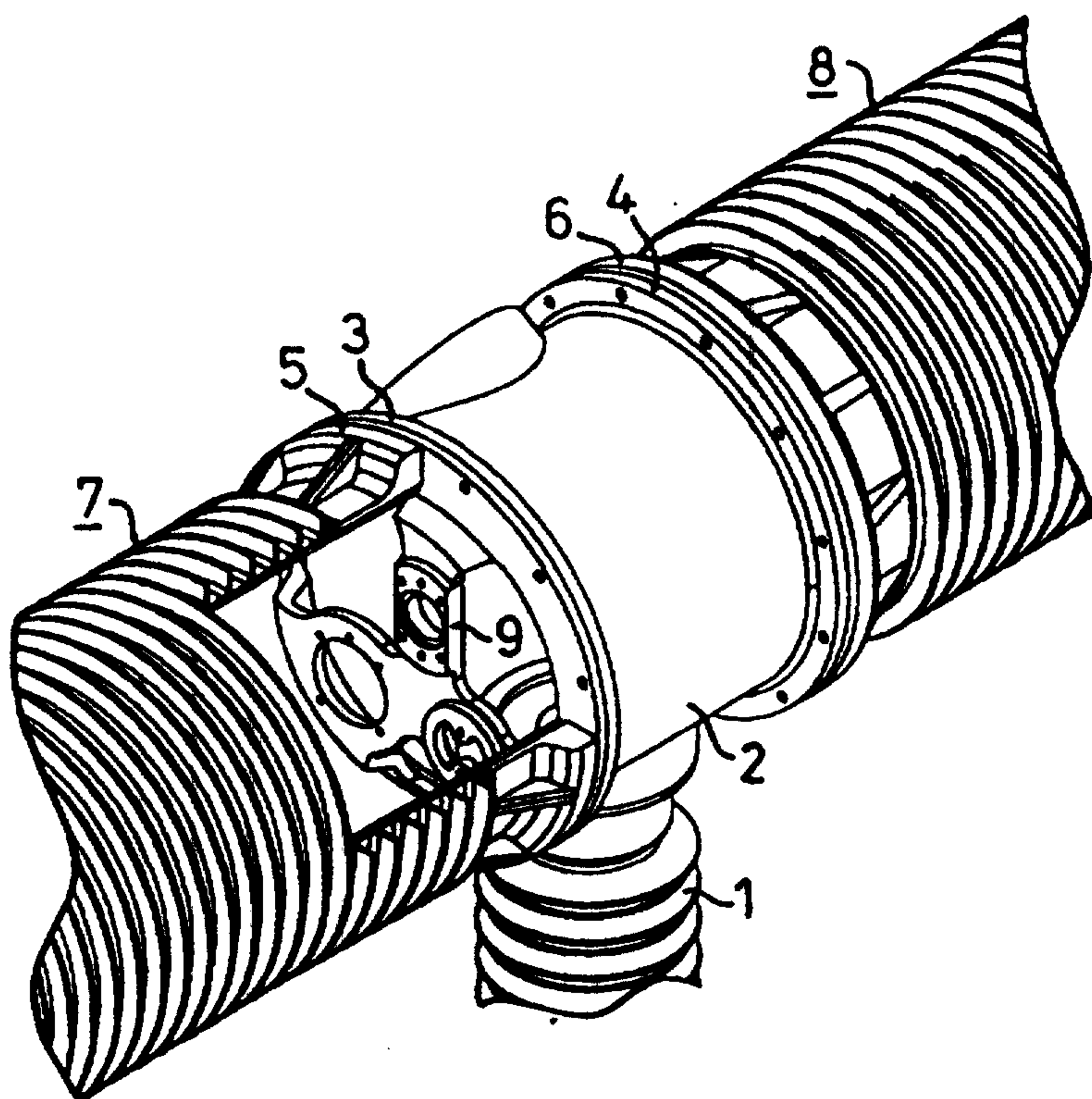
(54) Bezeichnung: FREILUFT-HOCHSPANNUNGS-LEISTUNGSSCHALTER

(57) Abstract

The invention concerns an open air high-voltage circuit breaker comprising a circuit breaker unit (13) and a control capacitor connected electrically in parallel to it and surrounded by a common composite isolation housing (7, 8) made essentially of plastic, resting a terminal column (1) fixed to one of its ends. The use of a composite isolation housing saves cost and weight at the upper end of the terminal column and also improves earthquake security.

(57) Zusammenfassung

Bei einem Freiluft-Hochspannungs-Leistungsschalter sind eine Unterbrechereinheit (13) und ein dieser elektrisch parallel geschalteter Steuerkondensator von einem gemeinsamen, mit einem seiner Enden an einer Polsäule (1) tragend befestigten, im wesentlichen aus Kunststoff bestehenden Verbundisolatorgehäuse (7, 8) umgeben. Die Verwendung eines Verbundisolatorgehäuses spart Kosten und Gewicht am oberen Ende der Polsäule, wodurch auch die Erdbebensicherheit verbessert wird.



20365-3880

An Outdoor High-voltage Power Circuit Breaker

The invention relates to an outdoor high-voltage power circuit breaker with an interrupter unit and a grading capacitor connected electrically in parallel with it.

5 Such an outdoor h.v. power circuit breaker is known from German Utility Model 1 995 069, for example.

 With the known outdoor power circuit breaker, both the interrupter unit and the grading capacitor are mounted on the upper end of a pole column. The longitudinal axes of
10 the interrupter unit and the grading capacitor are horizontal. The interrupter unit and the grading capacitor are each arranged in a separate porcelain housing.

 French Patent No. 1 170 411 describes a high-voltage power circuit breaker with an insulator housing made
15 of plastic in which a capacitor is also arranged. The grading capacitor there can be partially integrated into the wall of the plastic housing.

 The object of the present invention is to make it simpler and less expensive to manufacture a h.v. power
20 circuit breaker of the type defined initially.

 In accordance with this invention, there is provided an outdoor high-voltage power circuit breaker, comprising: a pole column including a corner gear casing and having a first longitudinal axis; a composite insulator
25 housing mounted on the pole column and having a second longitudinal axis, the second longitudinal axis being across the first longitudinal axis, the composite insulator housing being substantially composed of plastic; an interrupter unit; and a grading capacitor electrically coupled in
30 parallel to the interrupter unit, the grading capacitor

20365-3880

being arranged adjacent and parallel to the interrupter unit, the interrupter unit and the grading capacitor being surrounded by the composite insulator housing and being supported at a first end by the corner gear casing.

- 5 This design eliminates the need for a separate housing for the grading capacitor. The composite insulator housing is designed to be larger accordingly, so that it can accommodate both the interrupter unit and the grading

capacitor. This arrangement nevertheless takes up less space than one with two individual insulator housings. Furthermore, assembly is simplified, because only a single housing need be attached to the end of the pole column. There is also only a single gas space in which both the interrupter unit and the grading capacitor are arranged. This is important in particular when the gas space is filled with a quenching gas such as SF₆ which must be monitored in some form.

A composite insulator housing can be manufactured with a much lower weight than a corresponding porcelain insulator. In comparison with the design with individual porcelain housings, two thirds of the weight is eliminated with a common composite insulator housing.

This results in static advantages with the design according to the present invention, especially with a horizontal arrangement of the interrupter unit and the composite insulator housing.

The composite insulator housing is partially relieved of the weight of the interrupter unit and the grading capacitor due to the fact that one end of the interrupter unit and the grading capacitor and in particular the resistor are supported by part of the pole column, in particular by a corner gear casing. These components can thus be mounted on the corner gear casing, where they may be mounted on a flange. The composite insulator housing may also be removed separately without having to also remove from the pole column the grading capacitor and the part of the interrupter unit mounted on the pole column.

The present invention can also be designed to advantage by also arranging in the composite insulator housing a resistor wired in parallel electrically to the

interrupter unit.

5 A closing resistor or tripping resistor or a voltage limiting element can also be accommodated in the composite insulator housing without requiring any extra space.

10 Another advantageous embodiment of the invention proposes that the composite insulator housing be a fiber-reinforced plastic tube with silicone shields arranged on the outside.

15 A high mechanical stability of the composite insulator housing is achieved by using a fiber-reinforced plastic tube. The silicone shields arranged on the outside ensure a high dielectric strength on the outside and prevent creep currents.

20 Another advantageous embodiment of the invention proposes that the composite insulator housing be lined with a layer of plastic on the inside.

25 Due to the internal lining of the composite insulator housing with a fiber-reinforced plastic, for example, such as that available under the brand name Trevira, the inside wall of the plastic tube is protected from the influence of switching gases which can develop due to the electric arc burning in the interrupter unit.

30 The invention illustrated below in a drawing on the basis of an embodiment and then is described.

Figure 1 shows a perspective top view of the composite insulator housing;

35 Figure 2 shows a schematic cross-sectional view of the interrupter unit, the grading capacitor and the closing

resistor with the composite insulator housing.

Figure 1 shows upper section 1 of a pole column arranged in a vertical orientation on a mounting structure (not shown). On upper section 1 of the pole column there is mounted a corner gear casing 2 in which the pulling and pushing movements of a drive rod running in the pole column are translated into the horizontal direction in switching. However, the corner gear is not shown in detail in the figure.

In the case illustrated here, the pole column supports two interrupter units.

Corner gear casing 2 has a flange 3, 4 on each side to which a mounting flange 5, 6 of a composite insulator housing 7, 8 is attached by bolts. Only part of composite insulator housing 7, 8 is shown on each side of corner gear casing 2.

Supporting base 9 for the interrupter unit (not shown here), the grading capacitor and the closing resistor can be seen through a cutaway portion of composite insulator housing 7. Supporting base 9 is connected to and supported by corner gear casing 2.

Figure 2 shows in a highly schematic form a cross section through composite insulator housing 7 with a tube 10 made of fiberglass-reinforced plastic and with silicone shields 11 arranged on it on the outside and an internal lining 12. An interrupter unit 13, a closing resistor 14 arranged in parallel next to it and a grading capacitor 15 are shown in the interior of composite insulator housing 7.

20365-3880

CLAIMS:

1. An outdoor high-voltage power circuit breaker,
comprising:

a pole column including a corner gear casing and
5 having a first longitudinal axis;

a composite insulator housing mounted on the pole
column and having a second longitudinal axis, the second
longitudinal axis being across the first longitudinal axis,
the composite insulator housing being substantially composed
10 of plastic;

an interrupter unit; and

a grading capacitor electrically coupled in
parallel to the interrupter unit, the grading capacitor
being arranged adjacent and parallel to the interrupter
15 unit, the interrupter unit and the grading capacitor being
surrounded by the composite insulator housing and being
supported at a first end by the corner gear casing.

2. The outdoor high-voltage power circuit breaker
according to claim 1, further comprising:

20 a resistor electrically coupled in parallel to the
interrupter unit and arranged in the composite insulator
housing.

3. The outdoor high-voltage power circuit breaker
according to claim 1, wherein the composite insulator
25 housing includes a fiber-reinforced plastic tube and a
silicon shield, the silicon shield being arranged on an
outside surface of the tube.

20365-3880

4. The outdoor circuit breaker according to claim 1, wherein the composite insulator housing includes a plastic layer, the plastic layer being arranged on an inside surface of the composite insulator housing.

FETHERSTONHAUGH & CO.

PATENT AGENTS

OTTAWA, CANADA

1/1

96 P 4002

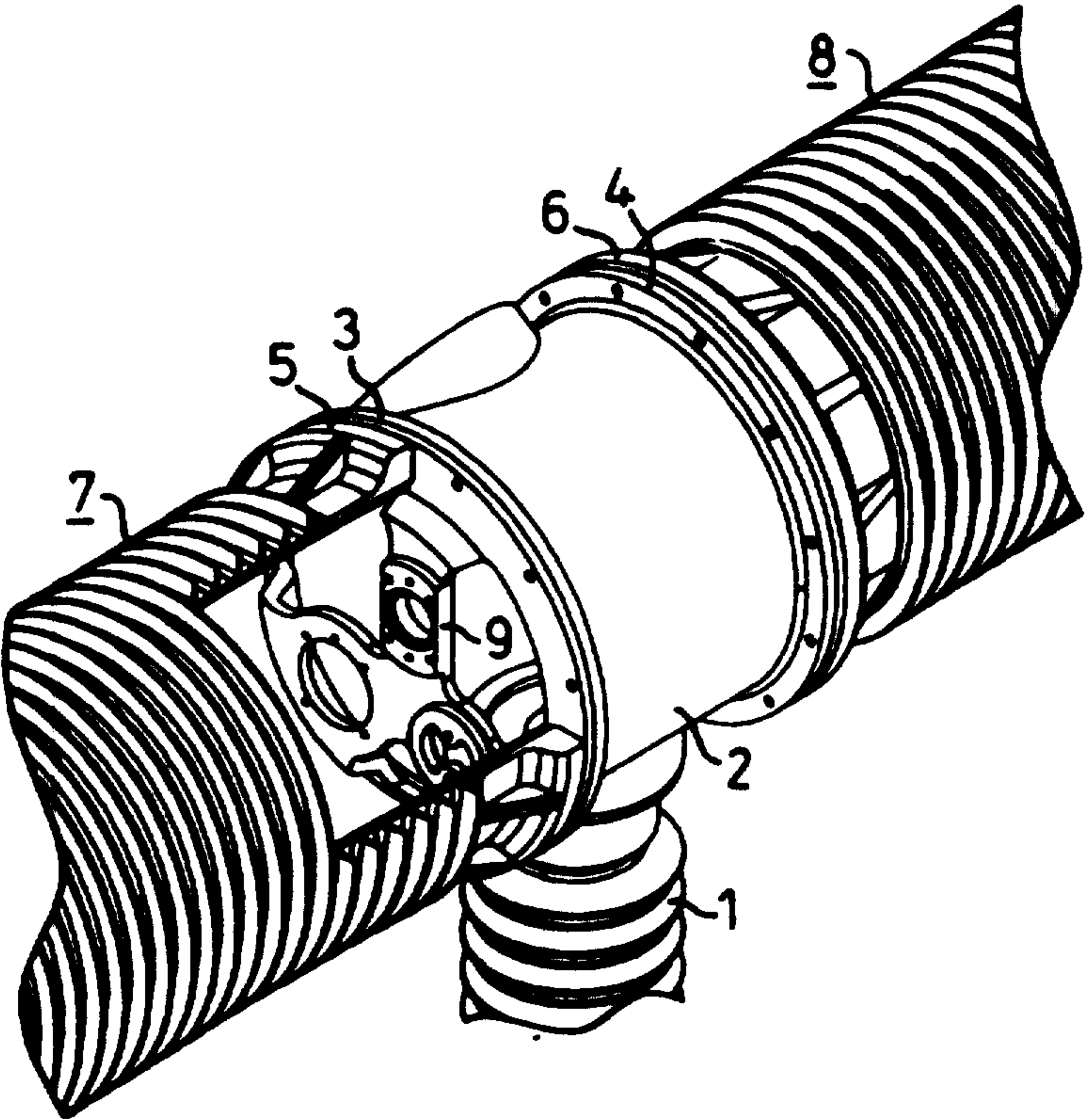


FIG 1

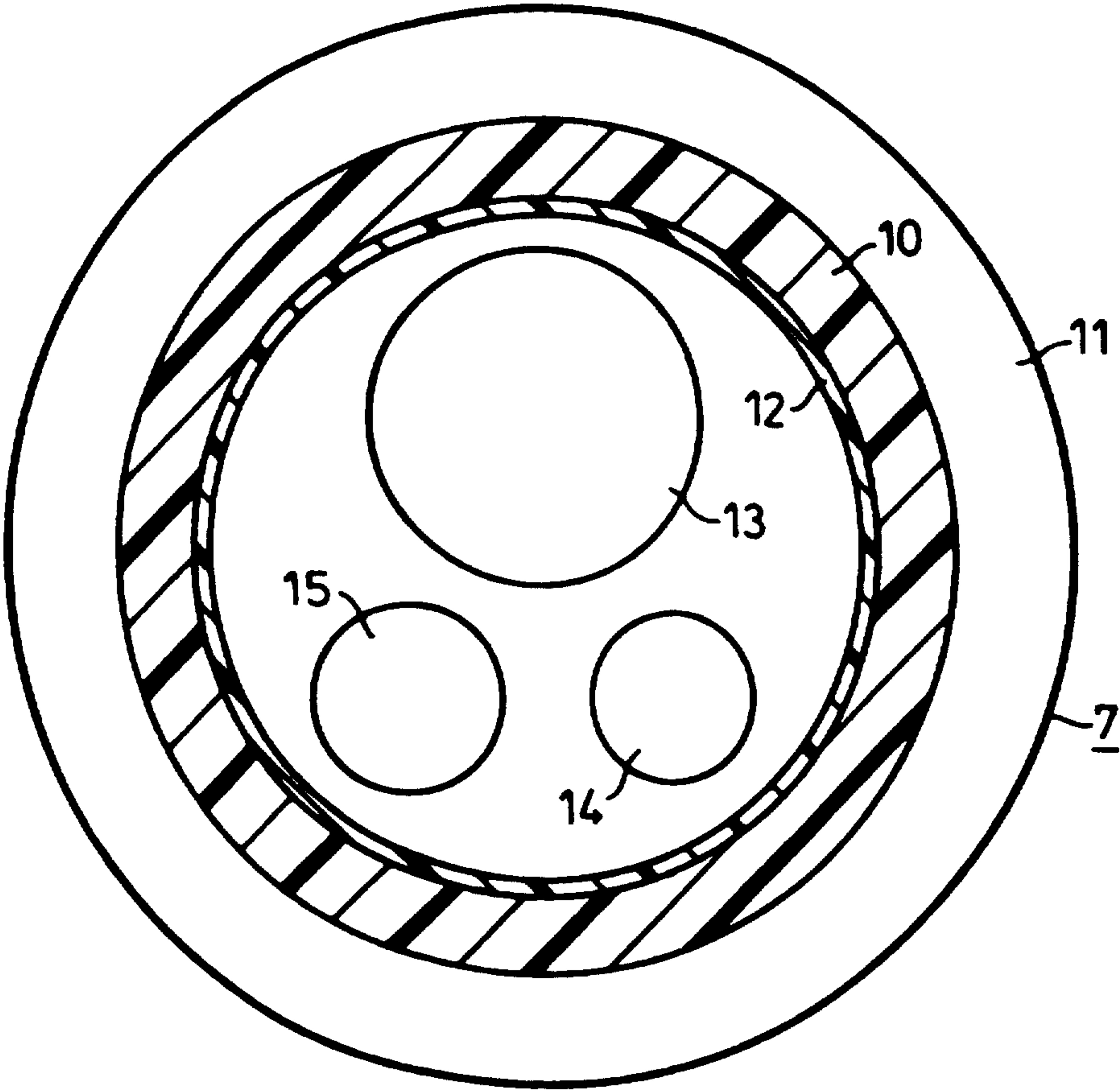


FIG 2

