Oct. 19, 1954 F. REINIGER 2,692,340

UNIPOLAR X-RAY TUBE PROVIDED IN AN OIL-FILLED CONTAINER

Filed July 5, 1952

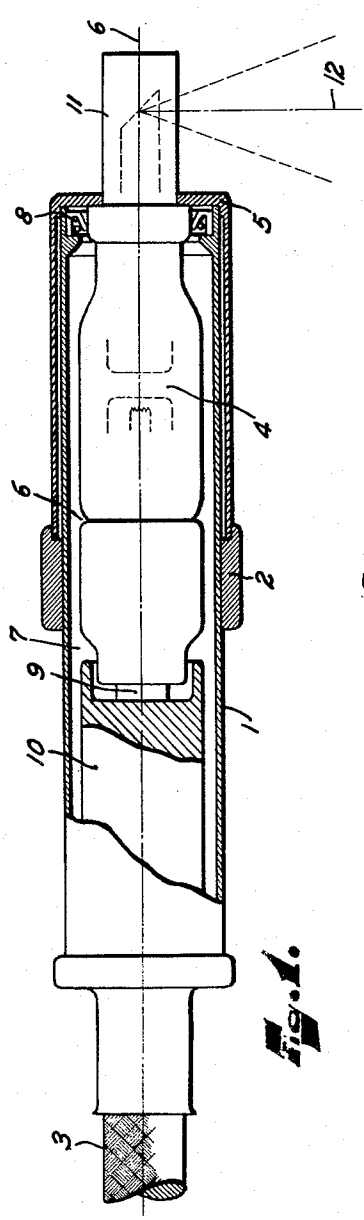

Fig. 1.

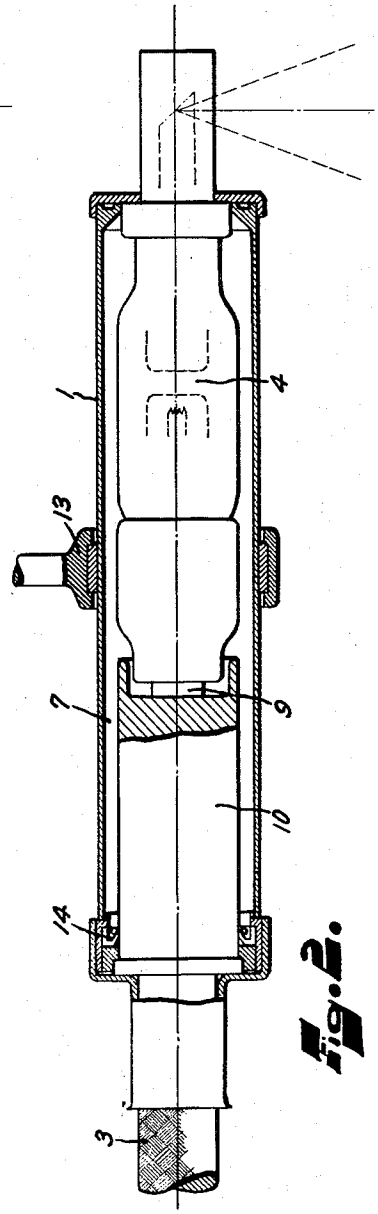

Fig. 2.

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Patented Oct. 19, 1954

2,692,340

UNITED STATES PATENT OFFICE

2,692,340

UNIPOLAR X-RAY TUBE PROVIDED IN AN OIL-FILLED CONTAINER

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Application July 5, 1952, Serial No. 297,248

Claims priority, application Germany September 8, 1951

1 Claim. (Cl. 250—90)

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This invention relates to the combination of a unipolar shockproof X-ray tube comprising a current supply cable, in which the space between the inner wall of the shockproof enclosure and the X-ray tube is filled with insulating liquid.

The term "unipolar X-ray tube" is to be understood in this case to mean an X-ray tube of which only one electrode is insulated for high tension with respect to the enclosure. Consequently, in this tube only one current supply wire is required to be insulated for high tension with respect to earth. In the combination according to the invention, this wire is in the form of a high-tension cable, the extremity of which is introduced into the enclosure in the direction of the longitudinal axis of the tube.

In X-ray tubes of this kind, the high-tension cable was hitherto rigidly connected to the shockproof enclosure. When the X-ray tube had to be turned around its axis in order to give the cone of rays a different direction it was necessary to twist the high-tension cable. The torsion of the cable is very troublesome more particularly if accurate adjustment of the cone rays is desired, which is the case, for example, with tubes with hollow anode for irradiating cavities of the body.

The present invention permits of obviating the said disadvantage. According to the invention, the X-ray tube is rotatable around its longitudinal axis with respect to the cable with the use of a bearing comprises a packing ring which closes the space filled with liquid. The rotatability of the X-ray tube may be ensured in different ways, it being possible for the enclosure to be rigidly connected to either the X-ray tube or the cable.

In order that the invention may be readily carried into effect, it will now be described in greater detail with reference to the accompanying drawing showing diagrammatically two examples of the combination according thereto, in which the high-tension cable and the X-ray tube respectively is rigidly connected to the shockproof enclosure.

In the construction shown in Fig. 1, the shockproof enclosure 1 is intended to be carried by a support secured to a central portion 2 thereof. A high-tension cable 3 is rigidly secured to the enclosure. An X-ray tube 4 having an anode connected to earth and a cathode connected to a high-tension is secured to a cylinder 5 and is, together with the latter, rotatable about its longitudinal axis 6. An insulating liquid, for example oil, is provided in a cavity 7, which exists between the X-ray tube and the enclosure. In order to avoid leakage of oil from the enclosure, a rotatable packing ring 8 of known construction

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is provided such as used in mechanics for leading piston rods or shafts in a liquid-tight manner through a wall. The supply current for the tube, together with the filament current for the cathode from the high-tension cable is led to the cathode by way of a rotary contact device 9 provided between an insulator 10 and the X-ray tube. The anode 11 of the X-ray tube comprises a window and a funnel for passage of the rays which may have a filter (not shown). If it is desired to give the funnel a different position for moving the axis 12 of the cone of rays in a different direction, the cable 3 and the envelope 2 keep in position, but the cylinder 5, together with the X-ray tube 4, is turned about the axis 6. The packing ring 8 and the contact device 9 allow this movement. The former prevents leakage of liquid along the anode and the latter maintains the electrical connection between the X-ray tube and the high-tension cable.

In the example shown in Fig. 2, the shockproof enclosure is rotatably secured to the support with the use of a bush 13. The enclosure is rigidly connected to the X-ray tube, but it is rotatable about its axis with respect to the cable 3 through the intermediary of a packing ring 14, so that here also the cone of rays may be moved in the direction desired without twisting the cable. The electric current is led to the cathode through a rotatable contact device 9 provided the insulator 10 and the X-ray tube in a similar manner as in the construction shown in Fig. 1.

What I claim is:

A unipolar shockproof X-ray apparatus comprising an elongated shockproof enclosure, an X-ray tube disposed within and rigidly secured to said enclosure, an insulating liquid filling the space between said tube and said enclosure, a high-tension cable extending in the longitudinal direction of said enclosure and rotatably secured to one end thereof, a bearing including a liquid-tight packing ring coupling said cable to said one end of said enclosure whereby both the X-ray tube and the enclosure rigidly secured thereto are rotatable about their longitudinal axis relative to the high-tension cable, and means for effecting electrical connection between the high-tension cable and the X-ray tube though the latter is rotated relative to the former.

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