

No. 736,086.

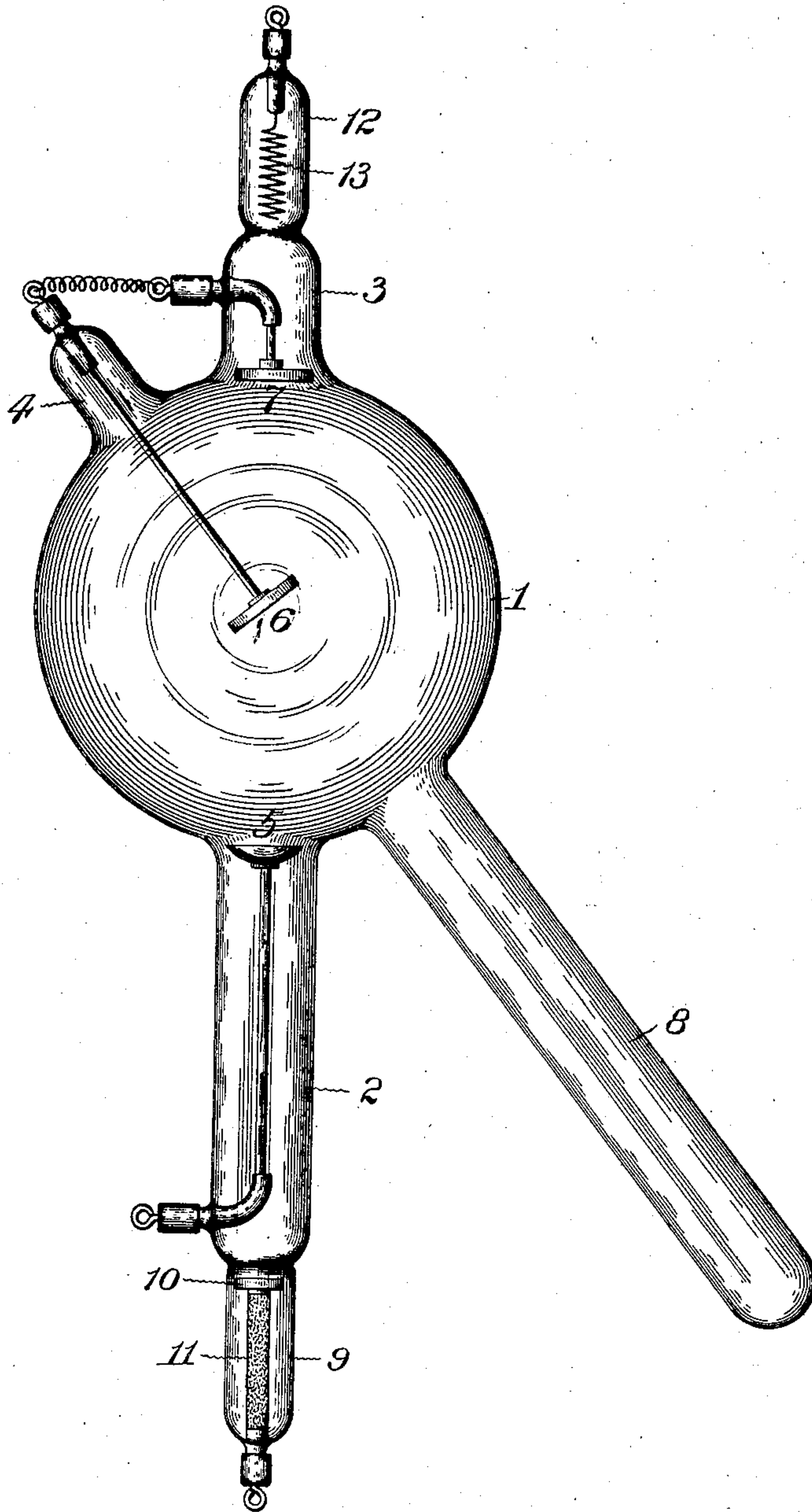
PATENTED AUG. 11, 1903.

R. FRIEDLANDER.

X-RAY TUBE.

APPLICATION FILED MAR. 14, 1903.

NO MODEL.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

ROBERT FRIEDLANDER, OF CHICAGO, ILLINOIS.

## X-RAY TUBE.

SPECIFICATION forming part of Letters Patent No. 736,086, dated August 11, 1903.

Application filed March 14, 1903. Serial No. 147,703. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT FRIEDLANDER, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in X-Ray Tubes, of which the following is a specification.

This invention relates to X-ray tubes, and has for its object to provide a simple and efficient ray-tube construction which is specially applicable for internal application to the mouth or other openings of the human system in the treatment of diseased conditions of the same without material interference with the use of the ray-tube for ordinary X-ray work and which is adapted to maintain the ray-tube in proper position with respect to the surface to be treated.

The accompanying drawing, illustrative of the present invention, is a side elevation of a ray-tube to which the preferred arrangement of parts of the present invention are applied.

Referring to the drawing, 1 represents the body portion of the ray-tube, of any usual form, provided with the usual tubular necks 2, 3, and 4, through which the different line conductors are connected with the usual cathode 5 and main and auxiliary anodes 6 and 7 of the ray-tube in any usual and approved manner.

The present invention comprises an extension-neck 8 of some length and which forms a part of the ray-tube. The outer end of such neck is sealed, while its inner end communicates with the interior of the ray-tube, and its location is such as to be in line with the rays reflected or emanating from the main anode 6 in the practical operation of the ray-tube.

In the preferred form of the present invention the extension-neck 8 is arranged in line with the axis of the main anode 6, as it has been found from practical experience with an extension so arranged that the same is adapted to maintaining the ray-tube in proper position for the treatment of diseased conditions of the mouth or other cavities of the human system, and yet not interfere with the employment of the ray-tube for ordinary uses, such as making X-ray examinations, producing shadow-graphs, giving facial treatments, &c. The diameter of the extension-neck 8 will be as

large as the convenient application of the same to the mouth or other cavity will permit, with a view to permit the passage through the same of the greatest amount of X-rays, and its length will in like manner correspond with the depth of the cavity to be treated.

With the present invention only the X-rays emanating from the main anode pass through the neck 8 aforesaid, and in consequence the extension-neck 8 preserves its normal cool condition and permits of a prolonged application of the X-rays in the treatment of internal diseased conditions without any inconvenience or discomfort to the patient arising from a heated condition of the extension-neck 8 aforesaid.

In the form of ray-tube shown in the drawing 9 is an extension of the neck 2 for the main cathode of the ray-tube. Such extension is adapted to form a subchamber in communication with the main chamber of the ray-tube and contains an auxiliary cathode 10, that is adapted to give off a gas when energized by the passage of a high-frequency current. The auxiliary cathode 10 to this end is usually provided with a coating 11 of potassic hydrate or other analogous gas-producing substance surrounding the stem of such cathode, as shown. Any other usual arrangement of said substance in adjacent relation to the auxiliary cathode 10 may be employed, however, without departing from the spirit of this part of the present invention. The feature of an auxiliary cathode in connection with a gas-producing substance is quite common in the older ray-tubes and is intended to supply gas at will and prevent an overattenuation of the gaseous atmosphere in the ray-tube.

12 is an extension of the neck 4 aforesaid for the auxiliary anode 7 of the ray-tube. Such extension is adapted to form a subchamber in communication with the main chamber of the ray-tube and contains an auxiliary anode 13, that is adapted to absorb portions of the attenuated atmosphere of the ray-tube when energized by the passage of a high-frequency current.

No novelty is claimed for the heretofore-described means for increasing or reducing the atmosphere within the ray-tube, as the same is disclosed in the prior patent of Theo-

dor Friedlander, dated April 14, 1903, No. 725,331.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A ray-tube, comprising in combination, a body portion, cathode and anode terminals therein, and an extension-neck formed on said body portion and in the path of the rays emanating from the anode-terminal and adapted to maintain the ray-tube in proper position with relation to the surfaces to be treated, substantially as set forth.

2. A ray-tube, comprising in combination,

a body portion, cathode and anode terminals therein, and an extension-neck formed on said body portion in line with the axis of the anode-terminal and adapted to maintain the ray-tube in proper position with relation to the surfaces to be treated, substantially as set forth.

Signed at Chicago, Illinois, this 9th day of March, 1903.

ROBERT FRIEDLANDER.

Witnesses:

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