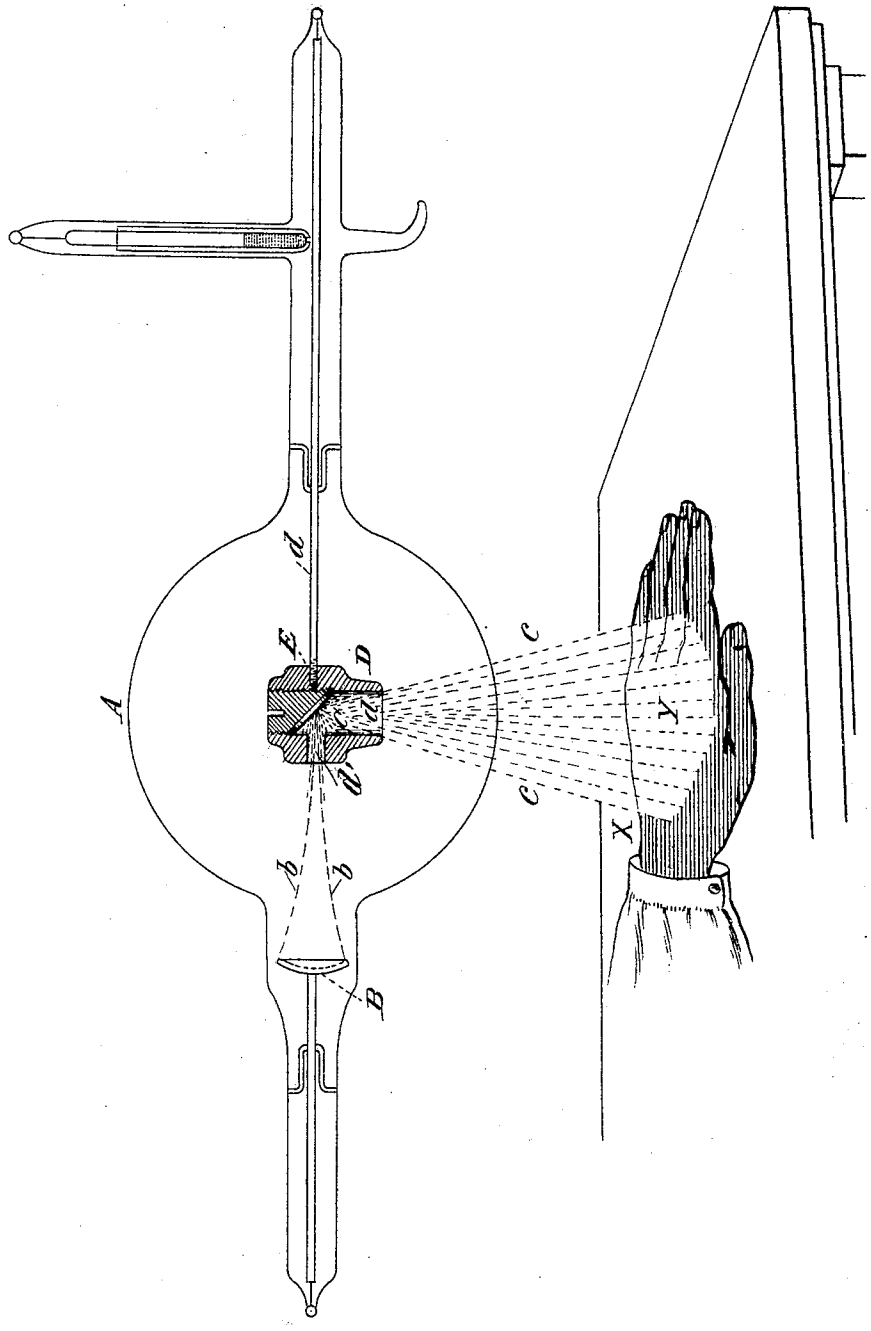
No. 805,795. PATENTED NOV. 28, 1905.

J. O. HEINZE, JR.

X-RAY TUBE.

APPLICATION FILED MAR. 16, 1905.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

JOHN OTTO HEINZE, JR., OF LOWELL, MASSACHUSETTS.

X-RAY TUBE.

No. 805,795. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed March 16, 1905. Serial No. 250,398.

To all whom it may concern:

Be it known that I, JOHN OTTO HEINZE, Jr., a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in X-Ray Tubes, of which the following is a specification.

My invention relates to X-ray tubes, and its object is to provide means whereby only so much of a body as the operator of the tube may desire may be subjected to the action of X-rays.

As is well known, X-rays radiate spherically from the point of bombardment on an anode, and hence subject all bodies in the sphere of activity of the X-rays to their action unless the objects are protected from said rays. In case the object is a living being the rays are likely, for example, to burn the flesh, neutralize the growth of spermatozoa, and, in fact, be a menace to those who often use X-rays, as in surgery or in laboratories. Obviously there is a great necessity so to confine the action of X-rays that neither the operator nor portions of a body not to be treated will be affected by them. Now by means of my invention X-rays may be so confined.

The figure shows an anode of a common X-ray tube provided with my invention in vertical section.

In the drawing illustrating the principle of my invention and the best mode now known to me of embodying that principle A is an X-ray tube, B its cathode, and D its anode, the novel feature of my invention. The anode D has a stem *d* of iron. Mounted on the free end of the stem is the confining-shield E, made of such material as will absorb X-rays, metals, as lead and bismuth, which have the greatest atomic weights, being most suitable. This shield E has two holes *d d'* at an angle with each other, one, *d*, extending through the shield and being, say, at right angles to the axis of the anode-stem *d*, and the other, *d'*, being in said axis and opening into the first hole *d*. A face or point of bombardment C, of hard metal, as platinum, is mounted, as by brazing, upon a metallic plug, which is screwed into a threaded arm of the hole *d*. The anode and cathode occupy their usual relations to each other.

In operation a cathode-stream (indicated in dotted lines *b b*) freely enters the shield E through the hole *d'* and bombards in the well-known way the face C of the anode D, but plainly only those rays which do not impinge against the sides of the holes *d d'* within the shield E and are not absorbed by said shield—namely, rays *c c*—can pass through the glass of the X-ray tube A and have any effect outside it, as upon a hand X, which has only a limited area Y subject to the action of these rays *c c*.

It will now be plain how the action of X-rays may be limited to a required area and that the openings, as *d d'*, in the shield may as to their location, size, and shape be varied as desired to suit the purpose for which the X-rays are to be used.

Knowing that the principle of my invention may be embodied in different forms without departing from the spirit thereof, I desire to protect my invention in the broadest manner legally possible.

What I claim is—

In an X-ray tube, a cathode; a shield made out of metal, and mounted on the end portion of an anode-stem; said shield having two holes; the first hole passing through it, a portion of said hole having a thread cut therein; the second hole leading into the first hole to receive the cathode-stream; a plug having a hard metal surface, mounted on the end thereof, and being provided with a screw-thread, whereby it may be screwed into the thread portion of said second hole, to secure the point of bombardment of the anode in the path of the cathode-stream.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN OTTO HEINZE, JR.

Witnesses:

L. W. CUTTING,

E. A. PERHAM.