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L. E. CUSTER & D. H. ALLEN.

SHIELD AND SUPPORT FOR X-RAY TUBES.

APPLICATION FILED APR. 6, 1903.

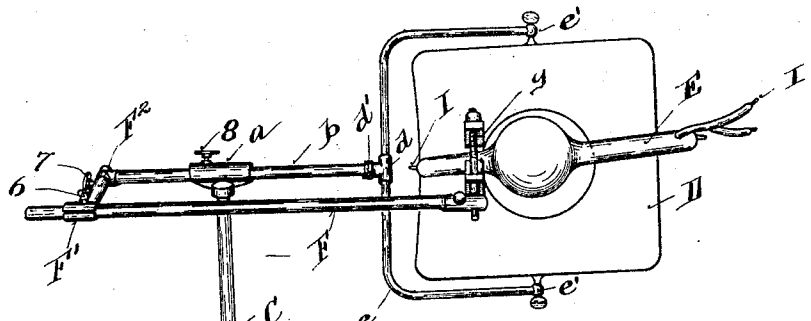
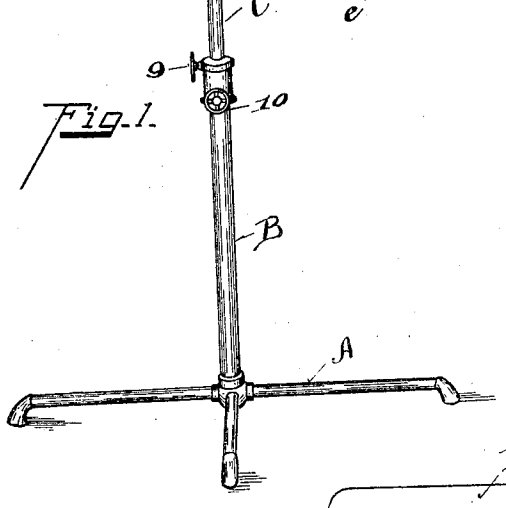


Fig. 1.



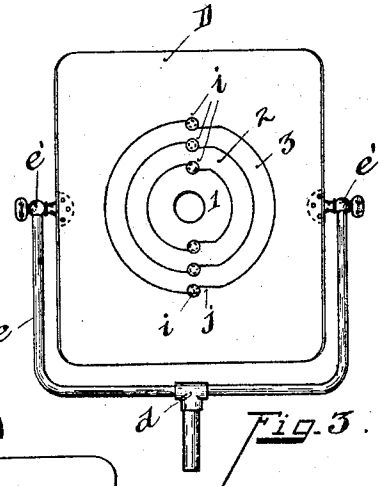


Fig. 3.

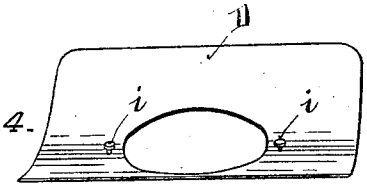


Fig. 4.

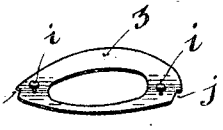


Fig. 5.

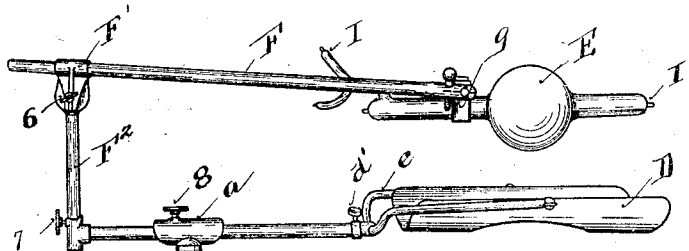


Fig. 2.

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UNITED STATES PATENT OFFICE.

LEVITT ELLSWORTH CUSTER, OF DAYTON, AND DAVID H. ALLEN, OF MIAMISBURG, OHIO; SAID CUSTER ASSIGNOR TO SAID ALLEN.

SHIELD AND SUPPORT FOR X-RAY TUBES.

SPECIFICATION forming part of Letters Patent No. 794,788, dated July 18, 1905.

Application filed April 6, 1903. Serial No. 151,283.

To all whom it may concern:

Be it known that we, LEVITT ELLSWORTH CUSTER, residing at Dayton, and DAVID H. ALLEN, residing at Miamisburg, in the county of Montgomery and State of Ohio, citizens of the United States, have invented certain new and useful Improvements in Shields and Supports for X-Ray Tubes, of which the following is a specification.

The object of our invention is to provide an instrumentality for supporting an artificial light for surgical use. It is shown, preferably, as supporting the vacuum-tube of an X-ray light, also employing means to direct the light-rays to any desired area.

Another object of our invention is to so construct the mechanism supporting the vacuum-tube controlling and directing the area of light to any given point, and to this end the shield and tube are mounted upon a separate axis, and one of which is revoluble around the other and each being independently adjustable.

The features of our invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which—

Figure 1 is an elevation of our improvement in position for use and directing the rays of light horizontally. Fig. 2 is an elevation of the adjusting apparatus brought into position for directing the rays of light vertically downward. Fig. 3 is a plan view of the shield-support and shield. Fig. 4 is a plan view of the base of the shield. Fig. 5 is a perspective view of one of the diminishing sections.

A represents a stand upon which is supported the vacuum-tube and shield.

B represents a telescopic extension of the stand.

C represents an upright telescopic tube, upon which is supported a sleeve *a*.

b represents a shaft adjustably journaled in sleeve *a*.

d represents a T-shaped coupling secured to shaft *b* and is held in position by the set-screw *d'*, so that it may be rotatively adjusted on said shaft.

e represents a bail supported in the coupling *d*.

D represents a shield which is pivotally attached to the eyes *e'* at the end of the bail-limbs. By this means the shield can be revolved axially in either a horizontal or a vertical direction, as desired, so as to locate the rays of light passing through the shield upon any desired place or area.

E represents the vacuum-tube, which is supported upon an adjustable arm F. Said arm is journaled in the clamp-sleeve F', mounted upon the short arm F^2, which is connected to the arm *b* by swiveling coupling *b'*, so that the arm F may be adjusted to the arm *b* in either direction. The vacuum-tube E is secured to the arm F by clamp *g* engaging the stem of the vacuum-tube.

I represents the terminals for the vacuum-tube.

The shield D is preferably concave relative to the light and convex to the object. The concavity relative to the light cuts off the greatest possible number of radiating light-rays, while the convexity relative to the object enables the shield to be placed in close proximity to the portion of the body exposed for treatment.

It is frequently desired to contract the area upon which the light-rays are to be directed, as the size of area to be subjected to the influence of the X-rays varies greatly. In order to increase and decrease the area, several diminishing shield-sections are employed. In Fig. 3 we have shown three such sections, (numbered, respectively, 1 2 3.) Any desired number may be employed. In Fig. 5 we have shown one of these sections in perspective. In order to attach or detach these shield-sections rapidly, we provide the following instrumentalities: *i i* represent posts fixed to the shield and also on the shield-sections. *j j* represent notches in the periphery of the sections. The heads of the posts engage the periphery of the section and hold it in place. Each additional section is provided with similar posts and notches for the attachment of the next succeeding section. Thus the orifice through which the rays of light are allowed to pass

upon the object to be treated or subjected to the action of the light-rays may be varied to suit the wishes of the operator.

Suppose a portion of the body is to be subjected to the action of the X-rays and, for instance, the top of the head is brought under the action of the light-rays. Then the shield-support is extended a sufficient height to bring the shield above the head of the person and the vacuum-tube is made to revolve around the axis of the shield in a complete circuit. The operator can direct the rays of light to any desired part of the object without subjecting the person to be operated on to varying attitudes.

6 7 8 represent set-screws holding the parts in adjusted position.

9 represents a set-screw connecting the stem of the telescoping joint to the main stem B.

10 represents a set-screw holding the extension-stem to its varied adjusted positions.

Having described our invention, we claim—

1. A support for an artificial light employed for surgical purposes, consisting of a stand, U-shaped arm members connected together, one of which is journaled in the stand, a light, means for supporting the light on one member, means for supporting the shield on the opposite member, and means for adjusting the free member and locking the same in different positions relative to the journaled member, substantially as described.

2. In a support for an artificial light employed for surgical purposes, a stand, two connected arms one of which is adjustably mounted on the stand, the light secured in one arm, a shield having a light-orifice mounted on the other arm, and means for clamping said arm in adjusted position, substantially as described.

3. A stand, an arm journaled on the stand, a shield having a light-orifice, supported on said arm, means for supporting a light, and means for adjusting and clamping the shield in different positions relative to the object treated, substantially as described.

4. In combination with a vacuum-tube for an X-ray light an arm-support therefore, a shield having a central orifice mounted upon a revoluble arm, and means for adjusting said shield rotatively upon its support, substantially as described.

5. A shield for an X-ray tube consisting of a concave plate having a central orifice in combination with diminishing sections having orifices of lesser diameter, means for connecting and readily detaching the sections to and from the shield and an adjustable support for said shield, substantially as described.

6. In combination with an artificial light for surgical purposes, a stand, arms connected together and supported by the stand, means for adjusting said arms in different relative planes, means for supporting a light in one and a shield in another of said arms, substantially as described.

7. A support for an artificial light for surgical treatment, consisting of a stand, a pair of connected arms one of which is journaled in the stand, means for rotating and sliding said arm in its journal, means for supporting a light on one arm and a shield having a light-orifice, in the other arm, and means for clamping said arms in adjusted position, substantially as described.

8. In combination with an artificial light employed for surgical purposes, a stand, a shield having a light-orifice, arms substantially parallel one of said arms being adjustably supported by the stand and means for holding the light in the end of one arm, and the shield in the end of the other arm, substantially as specified.

9. In combination with an artificial light employed for surgical purposes, a stand, a shield having a light-orifice, means for varying the size of said orifice, arms substantially parallel adjustably mounted upon the stand, and means for adjustably supporting the shield on the end of one of the parallel arms and means for adjustably supporting the light on the end of the other arm, substantially as described.

10. A shield for an X-ray tube, consisting of a main concave plate with a light-orifice, a series of plates with graduated diminishing orifices adapted to be detachably fitted to said main plate, means for supporting the shield, and means for securing adjustments in different planes between the light and shield with reference to the object to be treated, substantially as described.

11. A support for an artificial light for surgical purposes consisting of a stand, two connected arms one of which is rotatively and slidably mounted in the stand, means for clamping said arm, a U-shaped bracket at the end of one of said arms, a shield having a light-orifice adjustably mounted in said U-shaped bracket, and a light secured in the end of the other arm opposite to the shield, substantially as described.

12. An X-ray tube, a shield therefor, respectively supported upon parallel arms and having a common axial support, a central orifice in said shield, a series of detachable plates having orifices of successively lesser diameter, means for connecting said plates to the shield and a journal-support for the common axis of said parallel arms, substantially as described.

In testimony whereof we have hereunto set our hands.

LEVITT ELLSWORTH CUSTER.
DAVID H. ALLEN.

Witnesses:
SOL FLATAU,
OLIVER B. KAISER.