

April 6, 1943.

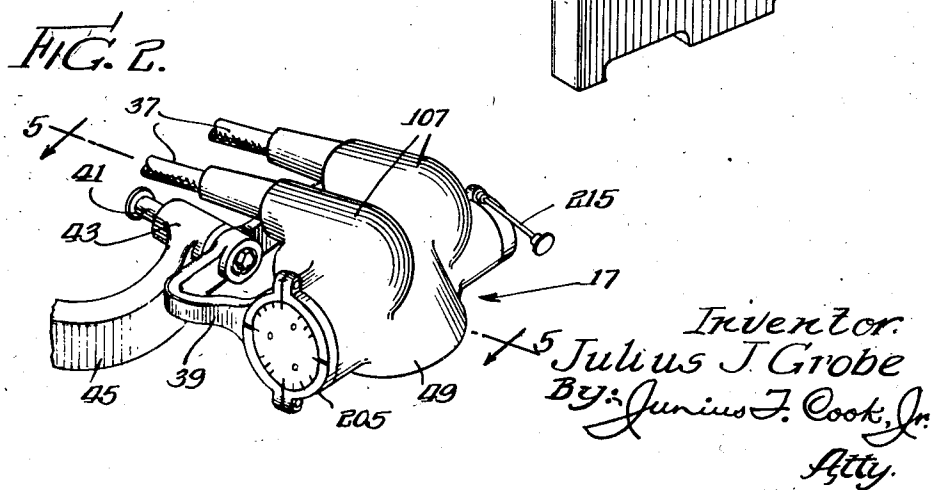
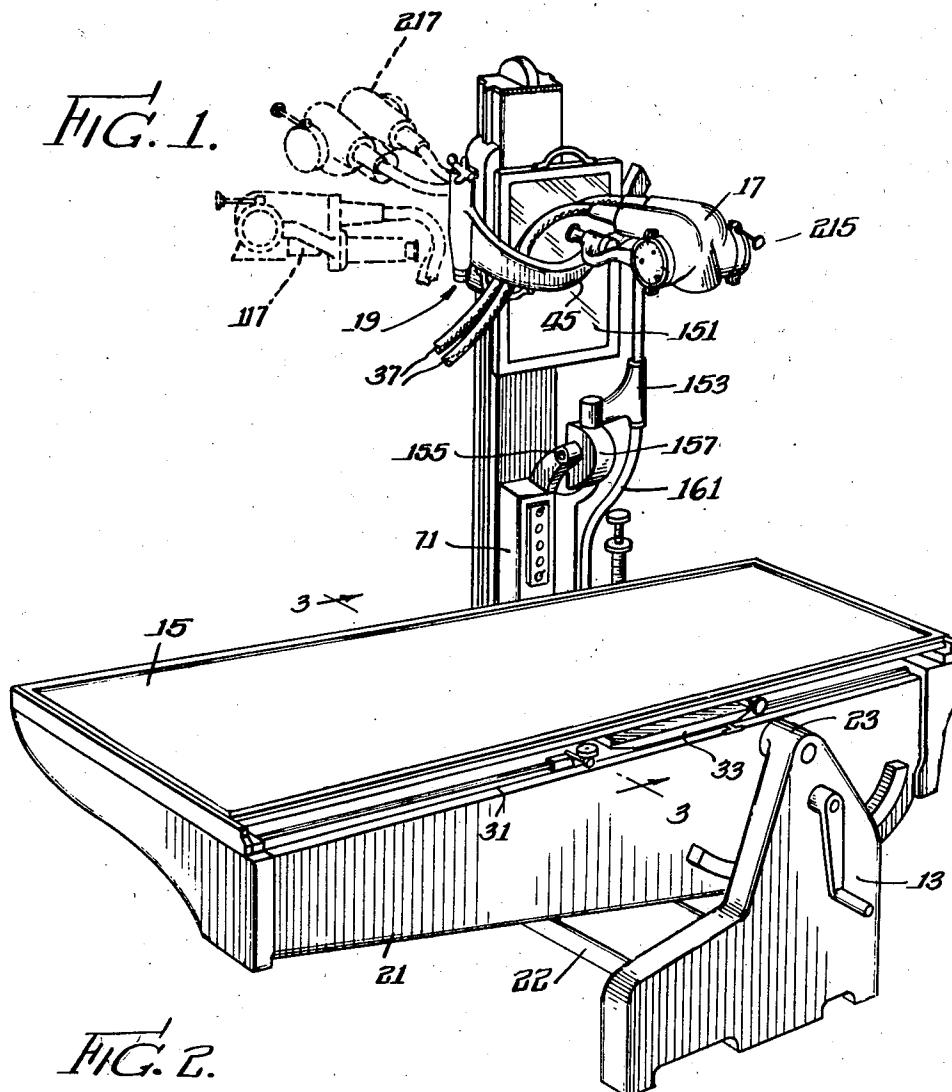
J. J. GROBE

2,315,787

TUBE CASING AND SUPPORT

Original Filed May 20, 1939

4 Sheets-Sheet 1



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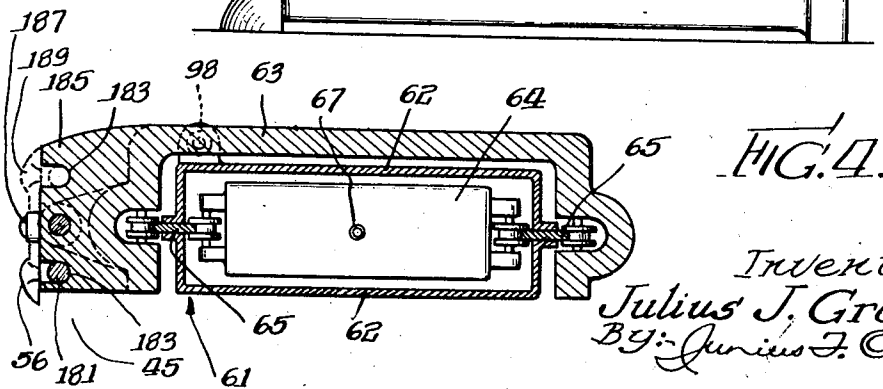
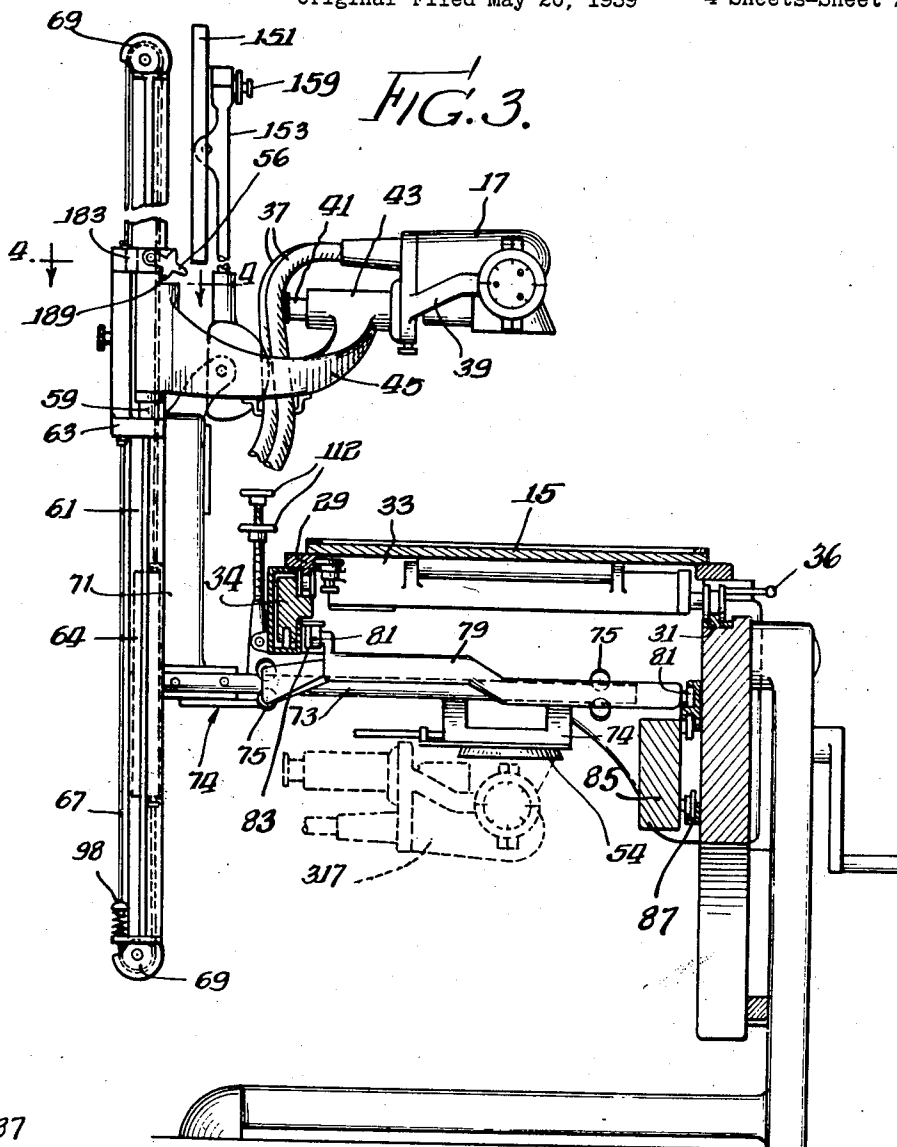
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TUBE CASING AND SUPPORT

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TUBE CASING AND SUPPORT

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4 Sheets-Sheet 3

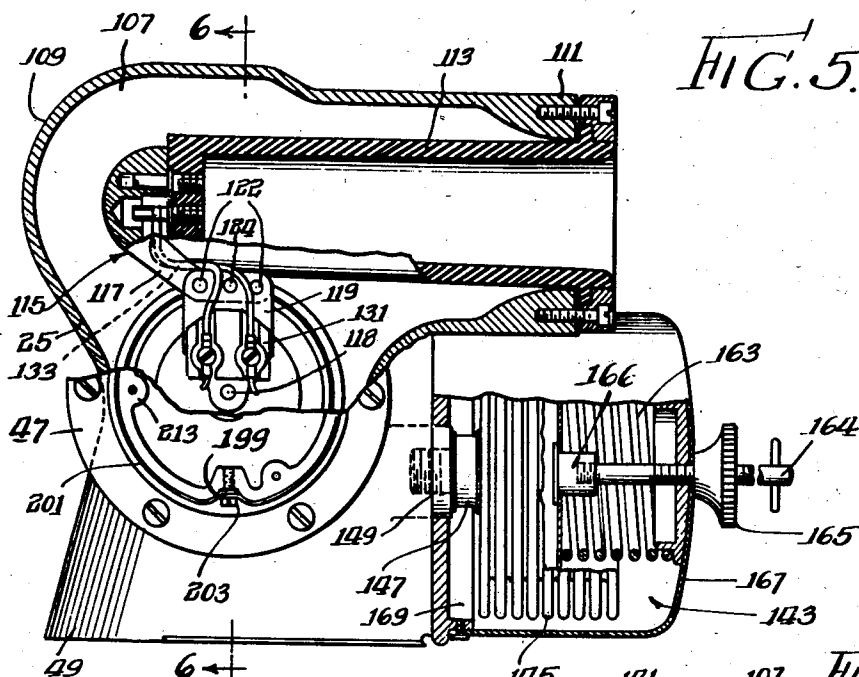


FIG. 5.

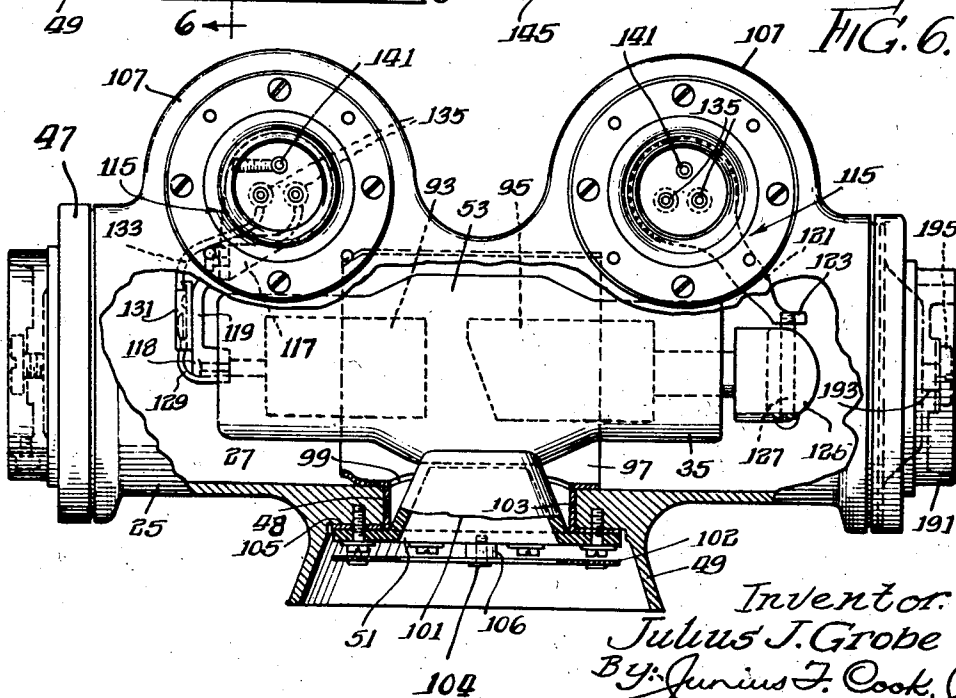


FIG. 6.

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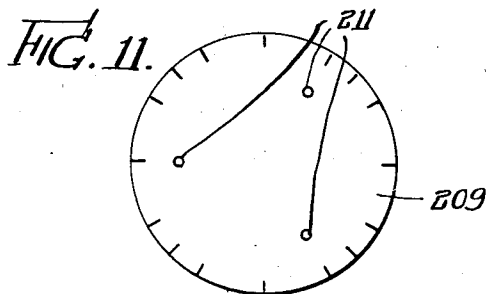
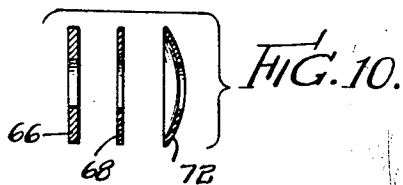
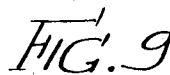
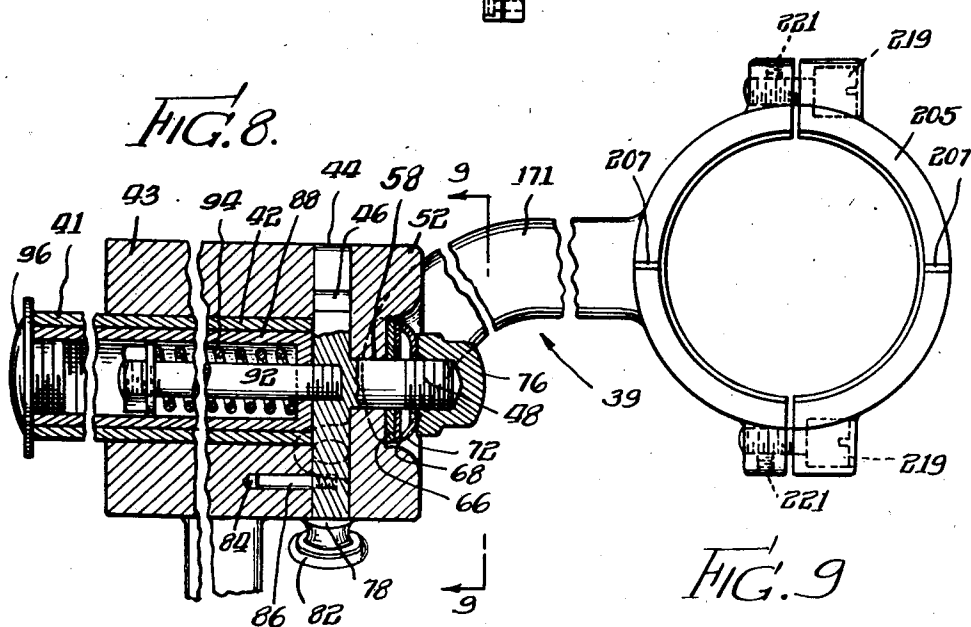
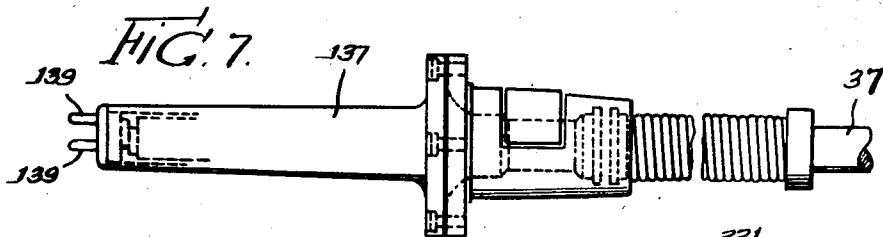
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TUBE CASING AND SUPPORT

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,315,787

TUBE CASING AND SUPPORT

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Original application May 20, 1939, Serial No. 274,778. Divided and this application July 15, 1940, Serial No. 345,534

15 Claims. (Cl. 250—90)

My invention relates in general to electrical apparatus, especially high potential apparatus, and has more particular reference to a shock-proof casing and support means for X-ray tubes, the present application comprising subject-matter divided from my co-pending application for United States Letters Patent, Serial No. 274,778, filed May 20, 1939.

An important object of the present invention is to provide improved light-weight support means for X-ray tube apparatus; a further object being to embody the support as a casing having facilities for mounting an X-ray tube therein in readily removable fashion so that the tube, when mounted in the casing, is thoroughly insulated in shock-proof fashion.

Another important object is to provide a light-weight compact support for X-ray tubes, comprising a casing in which the tube may be mounted in position immersed in a suitable insulating liquid, including means for maintaining the casing portions containing the tube entirely filled with the insulating liquid, the tube mounting withal being light in weight and compact and by the same may be readily shifted to desired positions with respect to a subject to be exposed to the action of the X-light generated by the tube.

Another important object is to provide a light-weight adjustable mounting for the tube carrier whereby the same may be shifted easily to any desired position with respect to a subject being treated and tilted on the mounting in order to adjust the direction toward the subject of X-light emitted by the supported tube.

Another important object resides in providing index means for indicating the relatively tilted position of the mounted X-light generator.

Another important object resides in providing improved support means for the tube casing whereby the same may be carried at a desired elevation above a table and arranged at any point within the area of the table, the support extending compactly on one side of the table only and comprising a single upright and having the ability not only to support the lamp above the table but allowing the lamp to be positioned beneath the table and also to be swung behind the support away from the table for use independently of the table; a further object being to provide a tube housing of such lightness and compactness as will permit the mounting of the same upon the simplified, extremely compact, multiple-purpose support.

These and numerous other important objects, advantages and inherent functions of the inven-

tion will become apparent as the same is more fully understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment of the invention.

Referring to the drawings,

Figure 1 is a perspective view of radiographic apparatus providing an adjustable support for an X-light generator in accordance with the teachings of the present invention;

Figure 2 is an enlarged perspective view of a casing for an X-light generator forming a part of the apparatus shown in Figure 1;

Figure 3 is a vertical section taken substantially along the line 3—3 in Figure 1;

Figure 4 is a sectional view taken substantially along the line 4—4 in Figure 3;

Figure 5 is a sectional view taken substantially along the line 5—5 in Figure 2;

Figure 6 is a sectional view taken substantially along the line 6—6 in Figure 5;

Figure 7 is an elevational view of a cable connector;

Figure 8 is a view of a support bracket;

Figure 9 is a sectional view taken substantially along the line 9—9 in Figure 8;

Figure 10 is a sectional view of washers forming part of the assembly as shown in Figure 8; and

Figure 11 is a face view of an index plate.

To illustrate the invention, the drawings show a compact apparatus for fluoroscopic examination and for radiographic purposes, comprising means forming a support 13 for tiltably carrying a table 15 upon which may be supported a subject for X-ray exposure, a housing 17 for an X-light generator, and mounting means 19 for adjustably supporting the housing and generator contained therein whereby the source of X-light may be adjusted vertically and horizontally with respect to the table 15 and may be tilted to adjust the angularity of the X-light emitted by the generator. While the illustrated apparatus has many novel and convenient features, the present invention is not, of course, necessarily restricted to the particular form or arrangement of its component parts which are shown on the drawings to illustrate the utility of the adjustable support and the enclosed mounting for the X-light generator.

The radiographic apparatus, in which for purposes of exposition the adjustable support and casing for the X-light generator are illustrated, comprises the table 15 and the table support 13 on or against which a body may be carried in

position to be pictured radiographically or otherwise exposed to X-rays. The table-like element 15 comprises a panel suitably supported in a frame 21 which in turn is mounted on the support pedestal 13. This pedestal in the illustrated embodiment comprises a foot portion 22 and an upstanding portion affording a bearing 23 in which the frame 21 and table 15 are tiltably mounted.

Cooperating means on the frame 21 and the pedestal 13, preferably comprising a rack on the frame and suitable gears on the pedestal drivingly connected with a hand crank, are provided for turning the frame 21 on the pedestal to any desired inclination. The frame may be provided with tracks 29 and 31 along the opposite sides of the frame and under the table top 15 for guiding and supporting a carriage 33 for longitudinal movement immediately beneath the table top, the carriage being adapted to support a cassette or holder for film sensitive to X-light for the making of radiograms in cooperation with the X-light generator in the casing 17 as a light source. The carriage 33 is freely movable between the opposite ends of the table 15 whereby the film may be positioned in any desired locality within the longitudinal extent of the table, and suitable means 34 for counterbalancing and means 36 for locking the carriage 33 in any adjusted position within the length of the table top is provided.

The radiographic equipment also comprises an X-light generator 35 in the form of an X-ray tube contained in the housing 17, which housing is formed with a window through which X-rays generated in the tube 35 may be projected outwardly of the housing 17, and means is provided for supporting a casing 17 above the table top in position to direct X-light downwardly upon a body supported on the table. The tube in the casing 17 may be energized through suitable cables 37 connecting with the tube within the casing whereby the entire assembly is rendered substantially shock-proof.

The casing 17 is tiltably mounted in a yoke 39 having a stem 41 extending in and supported by a bushing 43, which in turn is carried on an arm 45 extending from an upright 61, the arm preferably being carried on a pivot 59 in a frame 63 which is slidable longitudinally upon the support 61.

As shown in Figure 8 the stem 41 comprises a cylindrical member 42 slidably received in the bushing 43, said member 42 at one end being secured on a disk 44 formed with peripheral notches 46. This disk 44 extends opposite an end of the bushing 43 and has an outwardly extending pin 48 thereon in line with the axis of the bushing 43 and forming a support upon which a collar 52 comprising a part of the yoke 39 is tiltably mounted, said collar 52 having a central opening 58 for receiving the pin 48 and said pin carrying thereon a fiber washer 66, a metal washer 68, and a spring washer 72, the collar 52 and the washers 66, 68, and 72 being held on the pin 48 as by means of a cap nut 76.

The collar 52 is provided with an offset sleeve 78 preferably formed integrally therewith in position to overlie the notched edge of the disk 44, and said sleeve 78 is fitted with a manually retractable spring pressed detent 82 adapted to lock in the notches 46 in order to secure the yoke and the casing 17 and enclosed tube 35 in predetermined angularly adjusted position on the pin 48, said adjusted positions being determined by

the positions of the notches 46 which are preferably such as to hold the yoke 39 in the position shown in full lines in Figure 1 and in positions rotated 90° in either direction and 180° from the position shown in Figure 1.

Suitable means, such as a socket 84 in the end of the bushing 43 and a pin 86 on the disk 44 adapted to be slidably received in the socket is provided for preventing relative rotation of the disk 44 with respect to the bushing 43.

Within the cylindrical extension 42 of the disk 44 extends a preferably cylindrical shell 88 adapted to move longitudinally in the sleeve 42. The case 88 has an opening in its bottom through which projects a stem 92 which is fastened on the disk 44 in position extending within the case 88. This stem 92 has a nut and washer secured on its end within the case 88 in position to hold a spring 94 between the bottom of the case 88 and the washer on the stem 92, said spring encircling said stem and serving normally to draw the case 88 within the bushing 43 toward the plate 44. The open end of the case 88 has a cap 96 threaded therein, said cap having edges overlapping the end of the sleeve 42 and the end of the bushing 43. The spring 94 thus normally retains the plate 44 and the collar 52 of the yoke against the end of the bushing 43. However, the yoke and lamp housing may be drawn longitudinally away from the end of the bushing 43 in order to obtain additional extension in the event that it may be desired to position the lamp above the extreme side edge of the table 15 opposite from the upright 61. It will be noted, however, that when thus extended, a substantial portion of the sleeve 42 will remain within the bushing 43 to provide adequate support; that the cap 96 when the parts are at maximum extension serves to hold the yoke within the bushing 43; and that when the parts are in normal position illustrated in Figure 8 the stem means 41 does not project outwardly of the bushing 43 sufficiently to interfere with the free movement of the cables 37 when the yoke is tilted about the axis of the bushing.

The arm 45, it will be noted, extends downwardly from the bushing 43 and thence substantially horizontally to the support bracket 63 in order not to interfere with or crimp the cables 37 when the yoke and casing 19 is rotated 90° in a counterclockwise direction from the position shown in Figure 1.

The illustrated casing support structure permits the casing to be adjustably tilted in the yoke 39 and be locked in adjusted position by means of the manually operable clamp member 215, and also permits the yoke 39 on the stem 41 to be tilted to any desired angular position within the bushing 43 and locked in predetermined angular relationship by means of the manually operable latch 82.

The frame 63, on which the arm 45 is pivoted, may likewise be clamped in any vertically adjusted position on the support member 61, and latching means 56 is provided for the purpose of securing the arm 45 in position on the frame 63 to support the casing 17 firmly in position. In making radiographic pictures of the subject on the table 15, the tube and its casing may be secured in position directing the X-light vertically downwardly toward the table top, and the position of the casing 17 may be adjusted laterally of the table top by sliding the stem 41 longitudinally in the bushing 43 when the parts are positioned as shown in Figure 1 of the drawings. The

support 61 preferably extends in a direction at right angles with respect to the plane of the table top, and the bracket or carriage 63 affords a means for adjusting the vertical distance between the lamp housing 17 and the top of the table.

The support 61 preferably comprises a reinforced tubular member of sheet metal forming tracks 55 on its opposite sides for slidingly carrying the frame 63 for longitudinal movement on the support. A counterweight also may be, and preferably is, arranged within the tubular support 61 for sliding movement along internally-disposed tracks. To this end, the member 61 may comprise a pair of sheet metal plates 62 having flanged ends secured together upon opposite sides of steel track forming strips 65, said strips forming internal tracks for the counterweight 64 and external tracks for the bracket 63. The counterweight 64 is preferably interconnected with the bracket 63 by means of cords 67 travelling on sheaves 69 at the opposite ends of the support member 61 whereby to support the frame 63 and the tube-carrying casing 17 at any adjusted position on the support and also to facilitate the movement of the tube-carrying assembly on the support 61.

The support 61 and the tube-carrying assembly thereon are mounted for longitudinal as well as lateral movement with respect to the table top 13, and to this end the member 61 is mounted on a frame 79 which in turn is mounted on the table support frame 21 for movement thereon in a longitudinal direction with respect to the table top. To this end, the frame 79 is provided with rollers 81 which extend in suitable tracks 83 formed longitudinally in the opposite sides of the frame 21. A suitable counterweight 85, longitudinally movable in tracks 87 on the frame 21, is provided for balancing the weight of the frame 79 and the tube-carrying elements supported thereby when the table top is tilted from a horizontal position, the counterweight 85 being interconnected with the opposite sides of the frame 79 by means of cords travelling on suitable sheaves at the opposite ends of the frame 21.

To provide for lateral movement of the support 61 and of the light source in the casing 17 with respect to the table top, the member 61 is mounted on a bracket 71 forming a part of a support frame 74, comprising preferably a pair of spaced rails 73 extending from the bracket 71 beneath the frame 21 and slidingly received in rollers 75 on the mounting frame 79. The bracket 71 and the member 61 thus are supported for movement with respect to the frame 21 in a direction normal to the direction of movement of the frame 79 in the tracks 81.

It will be seen that the member 61 extends below the bracket 71 and substantially beneath the table top, and this arrangement permits the tube casing 17 to be positioned beneath the table in the position illustrated in dotted lines in Figure 3 of the drawings. This is accomplished by unlatching the fastener 56, swinging the arm 45 into the position shown in dotted lines at 117 in Figure 1 of the drawings and then forcing the frame 63 downwardly along the upright 61 to bring the arm below the frame 74. The lamp in the casing 17 may then be inverted by turning the lamp housing and yoke in the bushing 43, after which the arm 45 may be swung beneath the table to position the housing under the frame 74, said frame having preferably an annular seat 54 to receive the rim 49 of the housing 25 defining the X-light transmitting portions thereof. By rais-

ing the arm 45 on the member 61 after the casing 17 has been positioned opposite the seat 54, the casing 17 may be snugly engaged in the seat 54 to hold the same in position, as shown in dotted lines at 317 in Figure 3 to project X-light upwardly through the table top and through a body supported thereon for fluoroscopic examination.

As a convenience in positioning the device in the dotted position 317, I preferably provide a mounting at the bottom of the member 61 upon which is carried a spring pressed buffer 98, the buffer comprising a pin in the mounting around which is carried a helical spring with the end of the spring extending above the end of the pin and carrying a preferably rubber buffer member attached to the spring. The buffer faces toward the lower end of the frame 63 and the parts are so positioned that as the frame engages the buffer and the buffer spring is compressed, the frame 63 will be resiliently supported on the upright 61 so that the arm 45 with casing 17 inverted thereon need merely be swung into position beneath the seat 54. Thereupon, the latch means 56 will operate to secure the arm 45 on the frame, and as the latch so locks the arm 45 in position, the frame 63 may be released and forced by the action of the spring pressed means 98 upwardly on the member 61 to force the casing yieldingly upon the seat 54.

The latch 56, as shown in Figure 4, comprises a pin 181 set in the arm 45 at the upper end of the bearing 59 in position to be received in one or other of a pair of notches 183 formed in an extension 185 at the upper end of the sliding bracket 63. When the pin 181 is in one of said notches 183 the arm 45 will occupy the position shown in full lines, shown in Figures 1 and 3 in the drawings. When the pin 181 is in the other of said notches 183 the arm will occupy the position 217 shown in dotted lines in Figure 1 of the drawings. The pin 181 may be locked and thus retained in either of the notches by means of the latch member 56, which comprises an arm pivoted as at 187 on the frame 63 midway between the notches 183. This pivoted arm has oppositely extending fingers 189 of cam-like shape so that if the arm 45 is swung toward one of the notches while the latch 56 is in latching position, the pin 181 may engage upon the cam-like fingers 189 and tilt the latch member 56 upwardly on its pivot to uncover the notch and permit the pin 181 to enter the same beneath the raised latch. After the pin thus has entered the notch, the latch of its own weight will drop behind the pin into locking position.

A suitable screen 151 is provided for fluoroscopic examination. This screen is mounted on an arm 153 pivoted as at 155 on the bracket 71. Suitable spring and latch means are provided in a housing 157 to normally hold the screen in an inoperative position as shown in Figure 1. The screen, however, may be swung down over the table top when needed for fluoroscopic work. The frame 74 adjacent the seat 54 may be provided with a shutter actuated by a control cable 161 under the control of suitable actuating means 159 conveniently located on the arm 153 adjacent the screen 151.

The arm 45 may also be swung from the position shown in Figure 1 to a position 217 behind the vertical support member 61 in order to permit the use of the lamp in the casing 17 for radiographic and fluoroscopic purposes, independently of the table, and when so positioned,

of course, the casing may be tilted in the bushing 43 to any desired angularity.

It will be seen from the foregoing that the apparatus may be readily adjusted to position the light source in the casing 17 at any desired elevation above any desired point within the area of the table top; that the light source also may be positioned below the table top and also in position behind the upright 61 for independent use. This facility is accomplished not only by the simple counter-balanced support means afforded by the movement of the bracket 63 on the upright 61 and by the neat, compact arrangement of the support arm 45 and the bracket 39, but the flexibility of the apparatus is in no small measure due to the provision of the light-weight shockproof casing 17 in which the tube 35 is supported. Were it not for the unusual lightness of the casing, which in part is due to its particularly compact design, great difficulty would be encountered in supporting the lamp with sufficient rigidity at a point remote from the upright 61 to permit effective operation of the lamp for radiographic and fluoroscopic purposes. The features of the invention, however, pertaining to the light-weight and compact construction of the housing 17 allow the same to be mounted on the support means heretofore described, which support means may conveniently be designated as an overhung beam support in that the weight of the supported parts is carried entirely on and through the upright 61 which in turn is carried entirely at one side of the table. The entire arrangement provides a compact equipment in which one side, both ends, and a substantial portion of the remaining side of the table on which the support 61 is positioned are entirely free and unobstructed. This is a valuable feature that will be greatly appreciated by roentgenologists.

As heretofore stated, the manifold advantages and simplicities of the equipment herein illustrated and described are made possible in part by the novelties of design and construction of the casing 17, which comprises a housing 25 preferably formed as a casting of light-weight metal and affording an elongated preferably cylindrical cavity 27 in which the X-ray tube 35 may be assembled, the ends of the cavity 27 being open to facilitate insertion of the tube therein, and covers 47 comprising plates of light-weight metallic material are provided for sealing the open ends of the cavity 27 after the tube has been mounted in the cavity.

The housing 25 is provided with an opening 48, the outer walls of the housing being formed with an annular rim 49 at said opening, and the opening within said rim is closed by a plate 51 of material freely pervious to X-light. The tube 35 may comprise the usual sealed envelope 53 in which is arranged a cathode 93 and an anode 95 adapted to function as a source of X-rays when bombarded with electrons emitted by the cathode. Within the cavity 27 and encircling the tube 35 when in place, and particularly the central portions thereof, is arranged a cylindrical sleeve 97 of lead or other material impervious to X-light, said sleeve 97 having an opening 99 therein in position coinciding with the casing opening 48, and the tube is preferably supported adjacent the inner end of a cone 101 of X-light pervious material extending in the opening 48 between the tube 35 and the plate 51, said cone being preferably formed integral with said plate 51, and its inner tube facing surfaces, being

equally spaced at all points therein from the facing portions of the tube 35.

The inner surfaces of the opening 48 also are preferably covered by means of a sleeve 103 of lead or other material impervious to X-light, and the plate 51 is sealed at its edges on the casing by means of a fluid-tight sealing gasket 105. A ring of lead 102 also is preferably anchored on the plate 51 at the rim thereof by means of fastening screws 104 and blocks 106.

The housing 25 preferably at its side opposite from the opening 48 is formed with a pair of spaced apart chambers 107, the walls of which are formed integral with the walls of the tube cavity 27. These chambers 107 are closed at one end by walls 109 forming a continuation of the walls of the cavity 27, so that the chambers 107 communicate with the cavity 27 approximately opposite the ends of the tube 35. Other ends of the chambers 107 are formed with openings defined by seats 111, in which are sealed socket members 113 preferably of insulating material, extending within the chambers 107 from the open ends thereof to a point opposite the ends of the tube 35. These socket members provide leak-proof covers for the open ends of the chambers 107 and are adapted to receive the terminal ends of the anode and cathode cables 37, and to make connection between the several conductors of the cable and terminals 135 and 141 at the bottom of the cable socket members 113.

The socket members 113 at their inner ends carry bracket means 115 for supporting the tube 35. The socket member 113 at the anode end of the casing is provided with a bracket member 121 having a portion 123 carrying a headed screw 127 in position opposite a projection element 125 at the anode end of the tube, said projecting element being electrically connected with the anode and being provided with a diametral slot to receive the member 127 as the tube is inserted from the cathode end of the casing. The socket member 113 at the cathode end of the casing carries a bracket member 117 on which is secured a plate 119. The plate 119 is adapted to be removably fastened on the cathode end of the tube by means of a screw 118. The plate 119 is first attached on the tube and inserted with it into the casing. The plate has a pair of openings to receive dowels 122 on the bracket 117, and the plate has an opening 124 to take a holding screw for fastening the plate to the bracket 116.

The electrical connection between the anode and its corresponding cable 37 is accomplished through the bracket 121 and the terminals 135 and 141 with all of the conductors of the anode cable. Electrical connection with the cathode is accomplished by means of the cathode leads 129, which may be connected on an insulated terminal block 131 carried by the plate 119. After insertion of the tube in the casing conductors 133 may be connected between the terminal block and the terminals 135 disposed in the ends of the cathode socket member 113 which preferably is formed of insulating material.

The cables 37 preferably comprise heavily insulated conductors, the ends of the cable being fitted in a jack member 137 carrying prongs 139 which are adapted to make contact with the terminals 135 when the jack member 137 is inserted in the socket member 113. The jack member 137 preferably comprises three prongs 139, at least one of which is of a size different from the others so that the jack 137 may be inserted in one position only to make proper contact between the

prongs 139 and the terminals 135. One of the prongs 139 also fits a terminal 141 which is grounded on the bracket 117 and hence connected through the plate 119 with the cathode structure in the tube 35.

The cover members 47 are provided with annular outstanding flanges 191 and have oil filling openings 193 within the flange 191, a stop plug 195 being provided to normally seal the filler openings. The annular flange 191, in each cover, is preferably provided with a depressed seat 199, and I provide a band preferably of sheet steel 201 around the outer surfaces of the annular flange 191, the opposed ends of the band being received in the seat 199 and held in place by means of a set screw 203 which serves to draw the ends of the band into the depression and tighten the same upon the annular flange 191. This band provides a good bearing surface for tiltably mounting the casing 17 in the yoke 39.

The yoke 39 has a pair of arms 171 extending outwardly and forwardly of the collar portion 52, the terminal portions of the arm forming split cap bearings 205 in which the flanges 191, faced with the steel band 201 at the opposite ends of the casing, may be received. The cap bearings are provided with index marks 207 on opposite sides thereof to cooperate with the graduated dial plate 209, shown in Figure 11, the edges of which are graduated to indicate the angularity of the casing in the bearings 205. The index plates 209 are mounted upon the cap plates 47 over the filler plugs 95 by means of set screws penetrating openings 211 formed in the index plates, said set screws threading into embossments 213 formed on the cover plates 47 preferably adjacent and within the annular flanges 191.

One of the cap bearings 205 is provided with a manually operable clamp knob 215 in order to clamp the housing 17 in angularly adjusted position on the yoke 39, the other cap bearing being fastened to a predetermined snugness on its co-operating flange 191 by suitable screws 219 which may be locked in place by means of set screws 221.

It will be seen that the casing forms a sealed leak-proof enclosure for the tube 35 which, however, may be readily replaced by removing the covers 47. The casing, however, is compact and light in weight. The arrangement of the chambers 107 in position extending alongside of the cavity 27 provides an exceedingly compact unit and aids in reducing the weight of the casing. It is intended that the casing shall be filled with an insulating fluid such as oil in order to aid in insulating the tube 35 by oil immersion. To this end, means 143 forming an oil reservoir is attached on the casing, said reservoir preferably comprising an expansible member 145 sealed at one end on a tubular fitting 147 which is threaded in an opening 149 formed in the wall of the casing 25 between the open ends of the chambers 107 whereby the interior of the expansible means 145 is in communication at all times with the interior of the cavity 27. Yielding means preferably comprising a helical spring 163 is provided in position normally to compress the housing 145 so as to maintain the cavity 27 and the chambers 107 around the sockets 113 completely filled with insulating oil. The spring and the expansible means 145 may be enclosed in a shell-like cover 167 having an open end adapted to be secured on a rim 169 formed on and ending outwardly of the housing 25.

In order to release the pressure of the spring 75

163 when filling the casing with oil, I provide a threaded stem 164 adapted to be threaded into a collar 166 in the end of the expansible member. This stem has a nut 165 adapted to be tightened on the stem to retract the spring to any desired degree, and gage marks may be provided on the nut and cover in order to indicate the expansion of the reservoir and consequently the amount of liquid that may be charged into the casing. The amount of liquid will vary to some extent with the mean temperature in which the device is set up for operation.

It is thought that the invention and numerous of its attendant advantages will be understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the form herein described being a preferred embodiment for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. A mounting for an X-ray tube comprising a casing having an elongated cavity for receiving an X-ray tube, said casing having lateral openings, and means forming elongated chambers communicating laterally thereof with said cavity through said openings, said chambers having axes lying in a plane substantially parallel to and spaced from the longitudinal axes of said cavity.

2. A mounting for an X-ray tube comprising a casing forming an elongated, substantially cylindrical tube-receiving cavity and integral, substantially cylindrical cable receptacle chambers communicating with said cavity laterally of said chambers, the axes of said chambers lying in a plane offset from the longitudinal axis of the cavity.

3. A mounting for an X-ray tube comprising a casing forming an elongated, substantially cylindrical tube-receiving cavity and integral substantially cylindrical cable receptacle chambers communicating with said cavity laterally of said chambers, the axes of said chambers lying in a plane offset from the longitudinal axis of the cavity a distance not less than the radial dimension of said cavity.

4. A mounting for an X-ray tube comprising a substantially cylindrical casing having walls forming an elongated cavity for receiving an X-ray tube, said casing having lateral openings in said walls, and means forming elongated chambers communicating laterally thereof with said cavity through said openings, said chamber having longitudinal axes extending tangentially with respect to the walls of the casing.

5. A mounting for an X-ray tube comprising a casing having an elongated cavity for an X-ray tube, means on said casing forming journals for tiltably carrying the casing in a support, a support yoke affording clamp bearings receiving said journals and in which said casing is adjustably tiltable, and means on said clamp bearings and on said casing for indicating the tilted adjustment of the casing in said bearings.

6. A mounting for an X-ray tube, comprising a casing having an elongated cavity for an X-ray tube, said casing having elongated chambers opening laterally of the chambers upon said cavity, support means in said chambers for receiving cables, terminal means on said support means, including a bracket at one end of the cavity and an arm carrying a stem in position at the other end of said cavity to detachably receive and sup-

port one end of the X-ray tube and a hanger comprising a terminal block and means to secure the same on the opposite end of the X-ray tube, and means for removably connecting the hanger on said bracket.

7. A mounting for an X-ray tube comprising a casing having an elongated cavity for an X-ray tube, said casing having an opening at least at one end of said cavity, cable support means in said casing including a bracket in said cavity adjacent the open end thereof and an arm at the other end of said cavity, said arm having tube support means thereon to interfittingly receive and support one end of the X-ray tube whereby the tube may be inserted through said opening and connected on said tube support means, a hanger and means to secure the same on the opposite end of the X-ray tube, and means for detachably securing the hanger on said bracket.

8. A mounting for an X-ray tube comprising a casing having an elongated cavity for an X-ray tube, said casing having an opening at least at one end of said cavity, cable support means in said casing including a bracket in said cavity adjacent the open end thereof and an arm carrying a stem at the other end of said cavity in position to detachably receive and support one end of the X-ray tube, said stem being provided with a head for receiving a notched member on the end of the X-ray tube whereby to support the same in place in the cavity when inserted therein through said opening, a hanger comprising a terminal block and means to secure the same on the opposite end of the X-ray tube, and means for removably connecting the hanger on said bracket.

9. A mounting for an X-ray tube comprising a casing having an elongated cavity for receiving and supporting the tube, chamber means on said casing forming receptacles for cable means connecting with the tube, said cavity being open at the opposite ends of the casing, said chamber means opening upon said cavity intermediate the opposite open ends thereof, and covers comprising plates removably secured on said casing for sealing the opposite ends of said cavity, said covers being formed with outwardly projecting journals for rotatably mounting the casing in spaced bearings.

10. A mounting for an X-ray tube comprising a casing having an elongated cavity for receiving and supporting the tube, a support yoke comprising a pair of spaced bearing clamps in axial alignment, said cavity being open at the opposite ends of the casing, and removable covers for sealing

the opposite ends of said cavity, said covers carrying said casing therebetween and defining journals for rotatably mounting the casing in said spaced bearing clamps, said bearing clamps being operable to secure the covers and the casing carried therebetween in adjusted angular position on the yoke.

11. A mounting for an X-ray tube comprising an elongated casing for receiving the tube, journal means at the opposed ends of the casing, a yoke comprising a stem and spaced clamps on said stem for receiving the spaced journals in order to support the casing on the yoke, and means forming a support arm having a collar, said stem being supported in said collar for turnable movement therein.

12. A mounting for an X-ray tube as set forth in claim 11, including latch means for securing the yoke in any one of a plurality of angularly adjusted positions with respect to said collar.

13. A mounting for an X-ray tube comprising a support collar, a yoke comprising a stem axially movable in said collar, an elongated casing for receiving the tube, journals formed at the opposite ends of the casing, and spaced clamps on said stem for receiving the spaced journals in order to support the casing on the yoke.

14. A mounting for an X-ray tube comprising a support collar, a yoke comprising a stem axially movable in said collar, an elongated casing for receiving the tube, journals formed at the opposite ends of the casing, spaced clamps on said stem for receiving the spaced journals in order to support the casing on the yoke, said stem comprising telescopic members supported in said collar, and spring means normally urging said telescopic members toward relatively contracted position to retain said yoke in retracted position on said collar, while permitting said yoke to be arranged in projected position thereon.

15. A mounting for an X-ray tube comprising a support collar, a yoke comprising a stem axially movable in said collar, an elongated casing for receiving the tube, journals formed at the opposite ends of the casing, spaced clamps on said stem for receiving the spaced journals in order to support the casing on the yoke, a support standard, an arm carrying the support collar and pivoted for swinging movement on the support standard, and means to latch the arm in one of a plurality of angular positions with respect to said support standard.

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