Nov. 15, 1932. P. F. COLE 1,887,801

X-RAY APPARATUS

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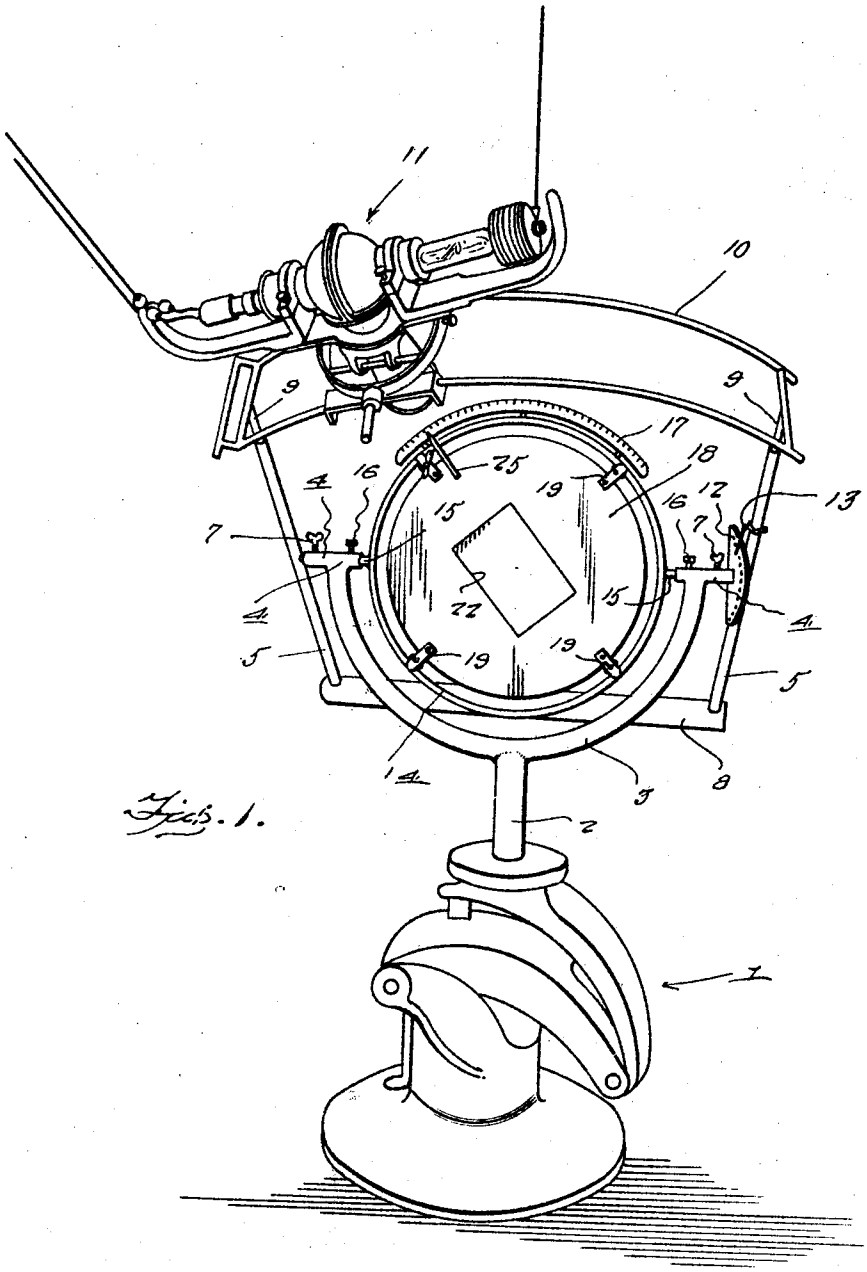

Fig. 1.

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Fig. 2.

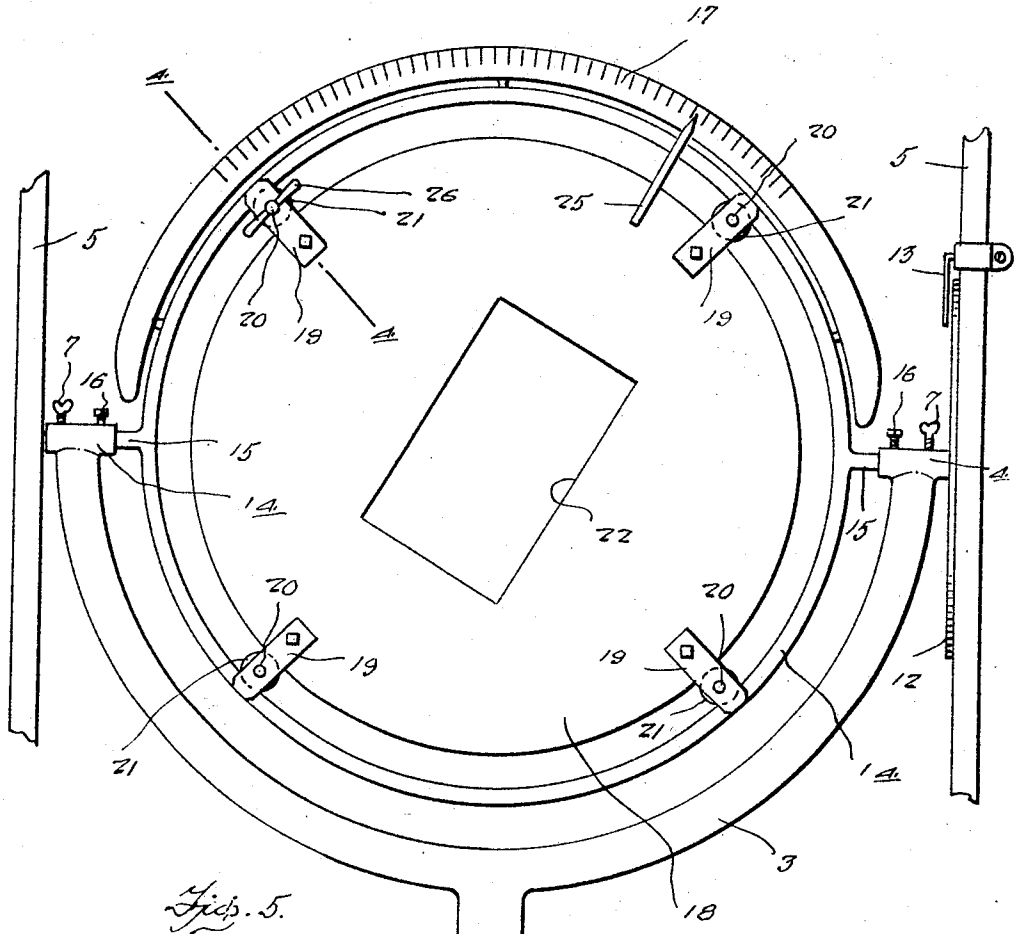

Fig. 5.

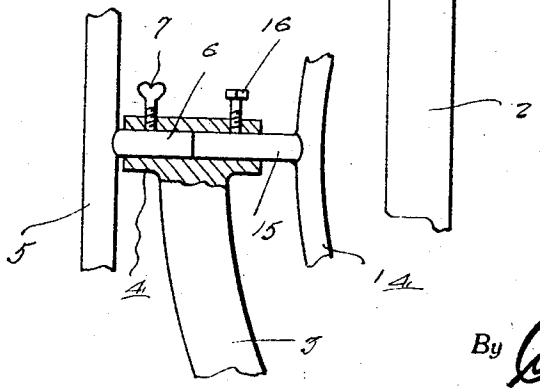

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Fig. 3.

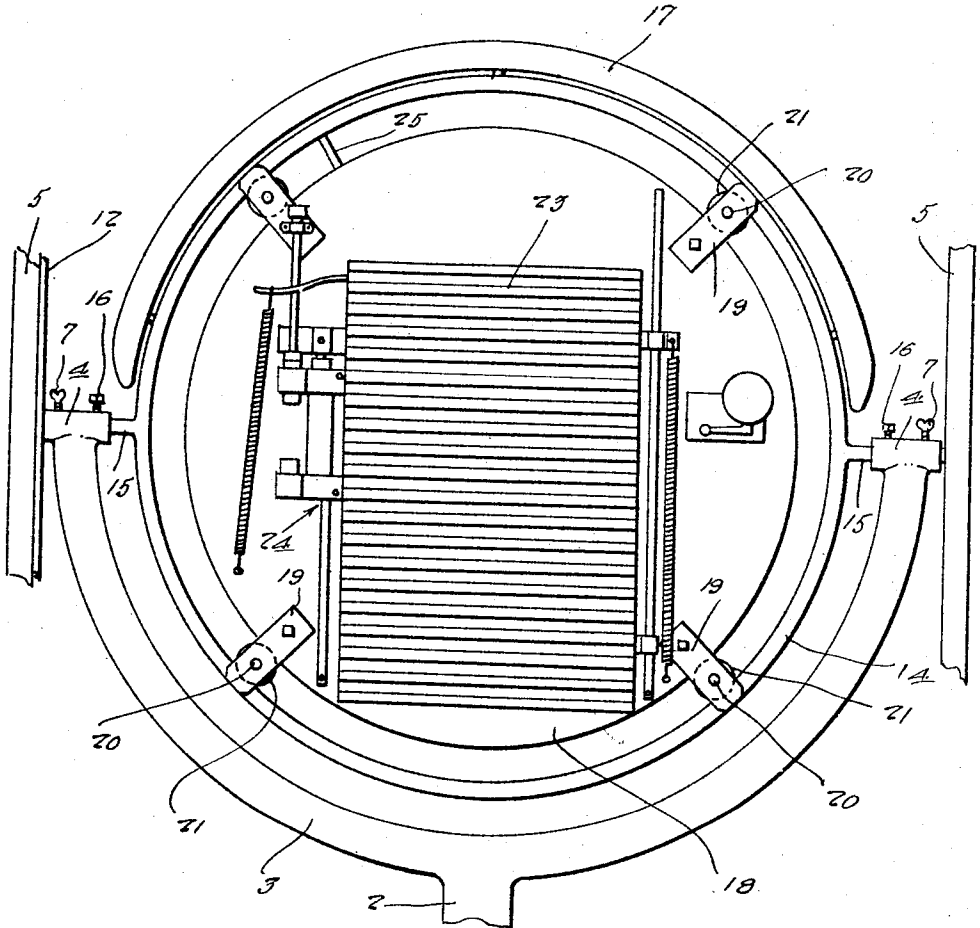
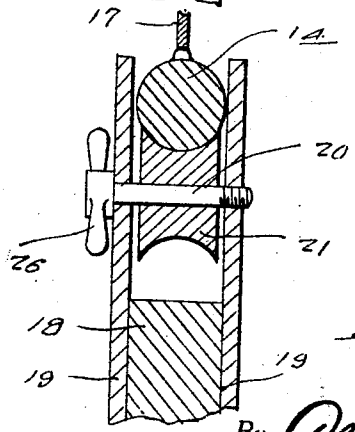


Fig. 4.



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UNITED STATES PATENT OFFICE

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X-RAY APPARATUS

Application filed October 13, 1931. Serial No. 568,592.

The present invention relates generally to new and useful improvements in X-ray apparatus and has for its primary object to provide, in a manner as hereinafter set forth, an apparatus of this character embodying a novel construction, combination and arrangement of parts through the medium of which the grid may be expeditiously rotated and tilted as desired for bringing said grid to the optimum position for permitting the vertical or essential rays to pass and fall upon the plate or film.

Other objects of the invention are to provide means for setting the X-ray tube at various angles with relation to the plate or film, permitting the part of the body being examined to rest parallel with the grid; and rotating the grid to the desired angle, permitting the central ray to pass through the grid. In this way the central ray is brought to an angle of 90 degrees with the grid. This result is obtained by the circular mounting of the grid permitting its rotation. To the best of my knowledge no other Potter-Bucky grid has ever before been so arranged as to accomplish the above named results.

Other objects of the invention are to provide an adjustable grid mounting means which will be simple in construction, strong, durable, efficient and reliable in use and which may be manufactured at low cost.

All of the foregoing and still further objects and advantages of the invention will become apparent from a study of the following specification, taken in connection with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views, and wherein:—

Figure 1 is a view in front elevation of an X-ray apparatus embodying a grid mounting in accordance with the present invention.

Figure 2 is a view in front elevation of the grid mounting per se.

Figure 3 is a view in rear elevation showing the grid and its mounting.

Figure 4 is a cross sectional view taken substantially on the line 4—4 of Figure 2.

Figure 5 is a detail view in section through one of the bearings showing the trunnions mounted therein.

Referring now to the drawings in detail, it will be seen that the reference numeral 1 designates generally a vertically adjustable supporting base from which rises a standard 2 having formed integrally with its upper end a yoke 3. Horizontally disposed, aligned bearings 4 are provided on the ends of the yoke 3.

The reference numeral 5 designates a pair of elongated tubular rods having trunnions 6 extending inwardly from intermediate portions and journaled in the bearings 4 for supporting said tubular rods for swinging adjustment. Set screws 7 are threaded into the bearings 4 for engagement with the trunnions 6 for securing the rods 5 in adjusted position. The trunnions 6 are of less length than the bearings 4. The rods 5 are normally disposed at an inclination and the lower ends thereof are connected by a counterweight 8. Rods 9 are mounted for sliding adjustment in the upper end portions of the rods 5 and have mounted thereon the arcuate frame 10 upon which a tube holding unit designated generally by the reference numeral 11 is mounted for sliding adjustment. A graduated disk 12 is fixed on the outer end portion of one of the bearings 4 and cooperates with a pointer 13 mounted on the adjacent tubular rod 5 for indicating the position or inclination of the tubular rods and consequently indicating the position of the tube holding unit 11.

The reference numeral 14 designates a ring of circular cross section having extending from diametrically opposite sides thereof the trunnions 15 which are journaled in the bearings 4. Thus, the ring 14 is mounted for swinging adjustment. Set screws 16 are threaded into the bearings 4 for engagement with the trunnions 15 for securing the ring 14 in adjusted position. A graduated segment 17 is mounted concentrically on the upper portion of the ring 14.

The reference numeral 18 designates a disk which is mounted for rotation in the ring 14, said disk being disposed in spaced, concentric relation to the ring. Circumferentially

spaced pairs of arms 19 radiate from the disk 18 and have their free end portions disposed on opposite sides of the ring 14. Pins 20 extend between the pairs of arms 19 and journaled thereon are the peripherally grooved rollers 21 which travel on the inner periphery of the ring 14. Thus, the disk 18 is mounted for rotation in the ring 14.

The disk 18 is provided with a substantially rectangular opening 22. Mounted on the rear side of the disk 18 is a grid 23 which is secured for adjustment on the disk by conventional means designated generally by the reference numeral 24. The grid 23 is disposed in the rear of the opening 22 in the disk 18. A pointer 25 is mounted on the disk 18 and cooperates with the graduated segment 17 for indicating the position of the disk and consequently the grid 23.

As best seen in Figure 4 of the drawings, one of the pins 20 is in the form of a screw which is slidably and rotatably inserted through one of the arms 19 and has one end portion threaded through the other arm 19. This pin is provided with a winged head 26 for actuating the same. By rotating the winged head 26 in the proper direction this pair of the arms 19 may be drawn toward each other to frictionally clamp the ring 14 therebetween for securing the disk 18 carrying the grid 23 in adjusted position against rotation in the ring 14.

If desired, the disc supporting rollers may be journalled on the ring 14 and have rolling contact with the periphery of the disc 18. The dial 17 may be placed on the disc and the indicator 25 mounted on the ring 14.

It is believed that the many advantages of an X-ray apparatus in accordance with the present invention will be readily understood, and although the preferred embodiment of the invention is as illustrated and described, it is to be understood that changes in the details of construction and in the combination and arrangement of parts may be resorted to which will fall within the scope of the invention as claimed.

What is claimed is:—

1. An X-ray apparatus comprising a support, an annular track mounted for swinging adjustment on the support, an apertured member mounted for rotary adjustment on the track, and a grid mounted on the member adjacent the aperture therein.

2. An X-ray apparatus comprising a support, an annular track mounted for swinging adjustment on the support, an apertured disk mounted for rotary adjustment in the track, a grid mounted on the disk adjacent the aperture therein, and means on the disk engageable with the track for securing said disk in adjusted position.

3. An X-ray apparatus comprising a support, an annular track mounted for swinging adjustment on the support, an apertured disk mounted for rotary adjustment in the track in spaced, concentric relation to said track, a grid mounted on the disks adjacent the aperture therein spaced pairs of arms mounted on the disk and radiating therefrom, pins extending between the pairs of arms, and rollers journaled on the pins for rolling contact with the inner periphery of the track.

4. An X-ray apparatus comprising a support, an annular track mounted for swinging adjustment on the support, an apertured disk mounted for rotary adjustment in the track in spaced, concentric relation thereto, a grid mounted on the disk adjacent the aperture therein spaced pairs of arms mounted on the disk and extending therefrom on opposite sides of the track, pins extending between the pairs of arms, rollers journaled on the pins between the arms for rolling contact with the inner periphery of the track for supporting the disk thereon, one of the pins being slidably and rotatably inserted through an arm of one of the pairs and having an end portion threaded through the other arm of said one pair, a head on the other end of said one pin for actuating the same, said one pin constituting means for drawing said one pair of arms toward each other for frictionally clamping the track therebetween for securing the disk in adjusted position relative to the track.

5. An X-ray apparatus comprising a supporting yoke, aligned bearings on the ends of the supporting yoke, an annular track, trunnions projecting from diametrically opposite sides of the track and journaled in the bearings for mounting the track for swinging adjustment on the yoke, means for securing the track in adjusted position, an apertured disk mounted for rotary adjustment in the track in spaced concentric relation thereto, pairs of arms mounted on the disk and radiating therefrom, pins extending between the pairs of arms, rollers journaled on the pins for rolling contact with the inner periphery of the track for mounting the disk thereon, and a grid mounted on one side of the disk adjacent the aperture therein.

6. An X-ray apparatus comprising a base, a standard rising from the base, a yoke on the upper end of the standard, aligned bearings on the ends of the yoke, a pair of rods, trunnions on intermediate portions of the rods journaled in the bearings for mounting the rods for swinging adjustment on the yoke, a counterweight connecting the rods together at one end, a frame extending between the other ends of the rods, a tube holding unit operatively mounted on the frame, an annular track, trunnions extending from diametrically opposite sides of the track and journalled in the bearings for mounting the track for swinging adjustment on the yoke,

means for securing the track in adjusted position on the yoke, an apertured disk mounted for rotation in the track, means on the disk engageable with the track for securing said disk against rotation relative to said track, and a grid mounted on one side of the disk and adjacent the aperture therein.

In testimony whereof I affix my signature.

PAUL F. COLE.