Jan. 23, 1951 M. POITTEVIN 2,539,323

RADIOLOGICAL OR LIKE APPARATUS

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Fig. 2.

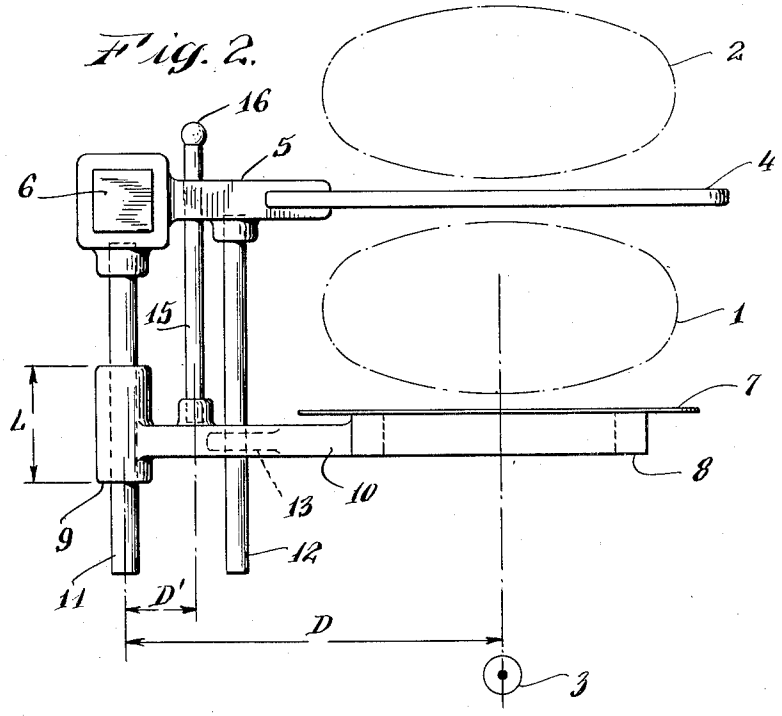
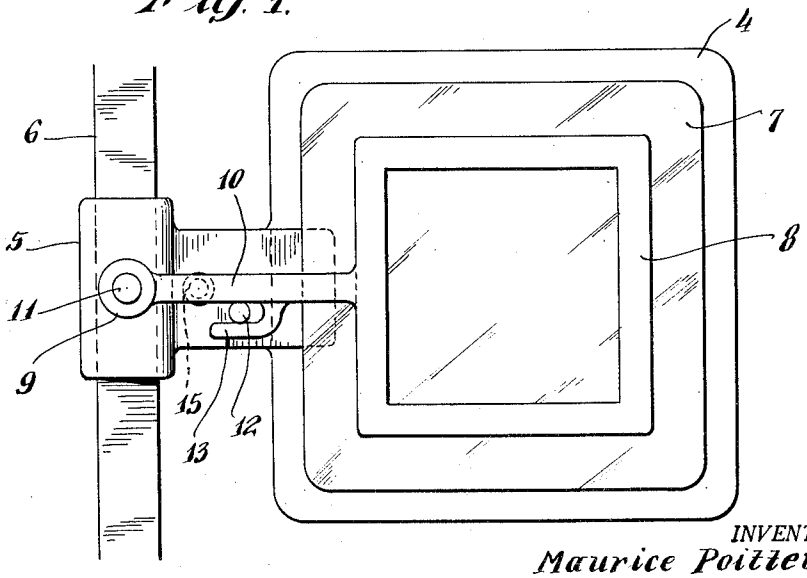


Fig. 1.



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RADIOLOGICAL OR LIKE APPARATUS

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Fig. 4.

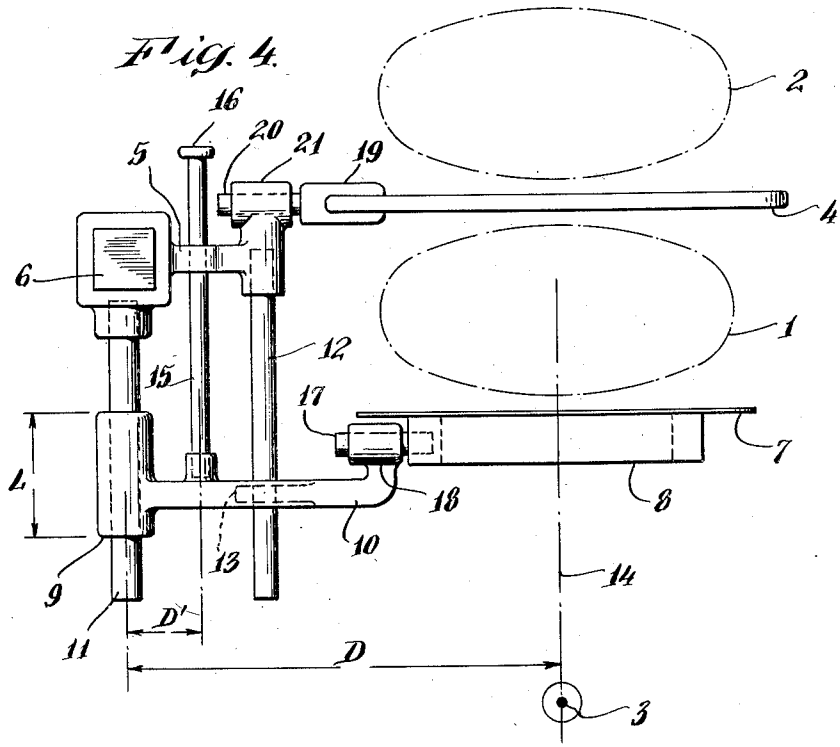

Fig. 3.

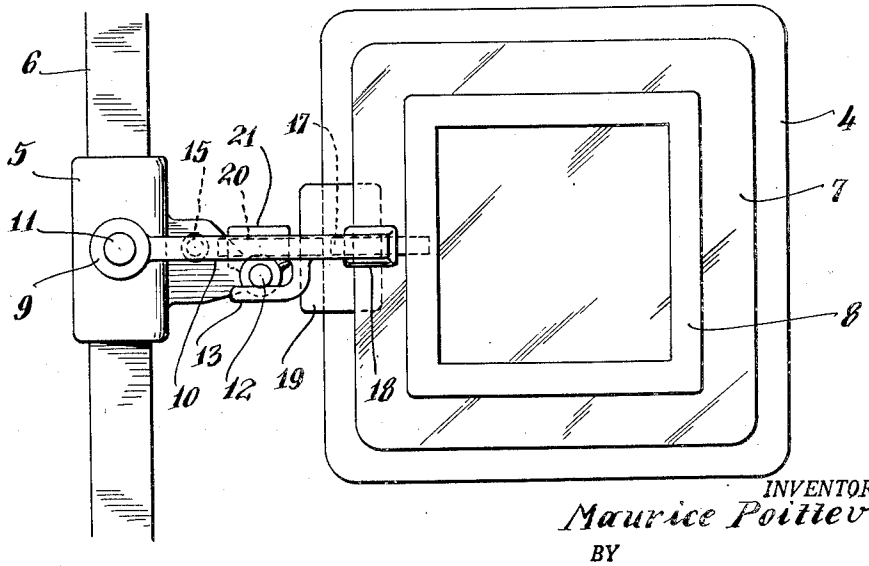

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Fig. 6.

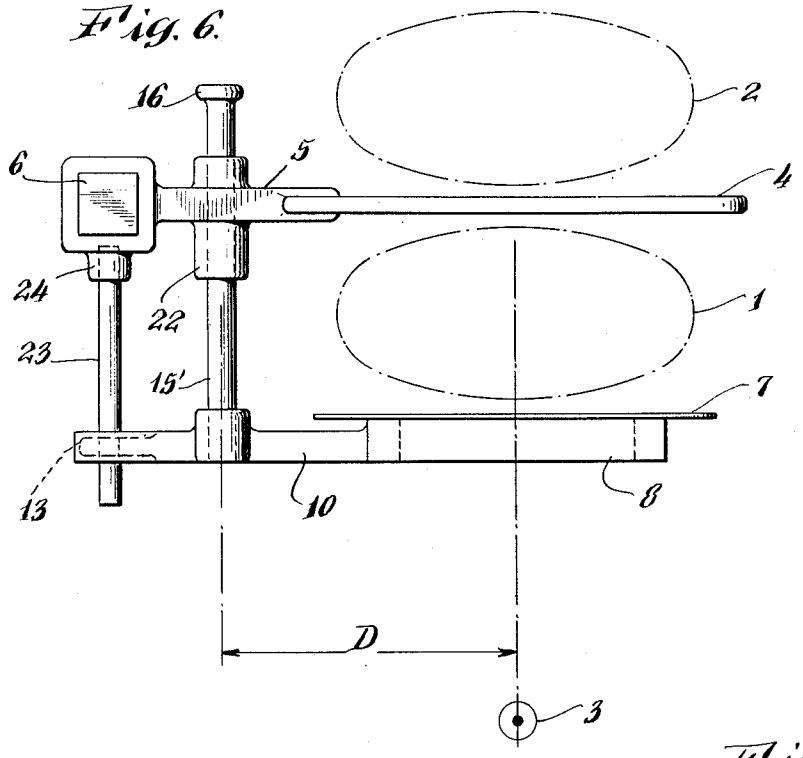
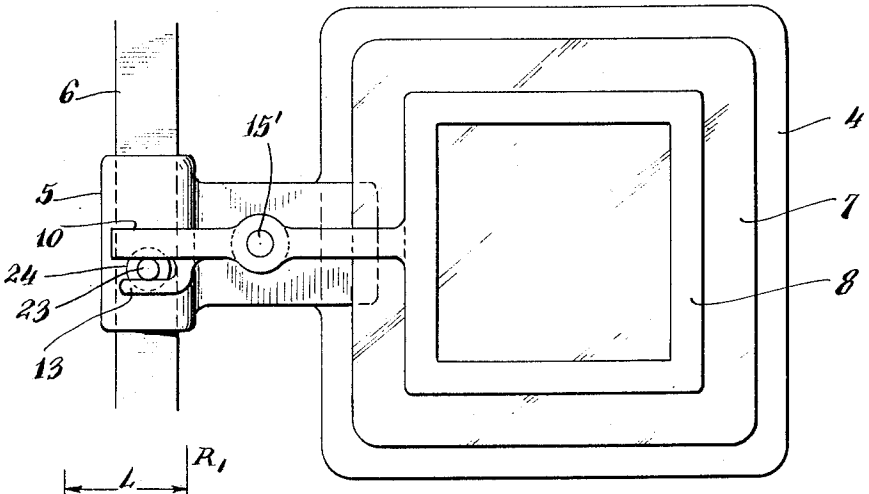


Fig. 5.



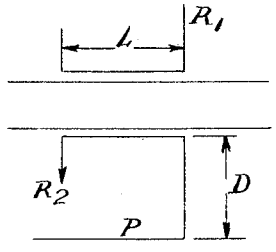


Fig. 7.

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UNITED STATES PATENT OFFICE

2,539,323

RADIOLOGICAL OR LIKE APPARATUS

Maurice Poittevin, Meudon, France

Application September 13, 1947, Serial No. 773,790
In France August 29, 1946

Section 1, Public Law 690, August 8, 1946
Patent expires August 29, 1966

12 Claims. (Cl. 250—53)

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This invention relates to radiological or like apparatus and has for its object to provide improvements therein.

In accordance with the present invention I provide an arrangement applicable to apparatus for radiology or the like characterised by a panel movable relative to a radioscopic or radiographic screen, this panel being guided by a mechanism connected with the support of the screen and moved by the said support in the movements of the said support.

One arrangement particularly advantageous according to the present invention consists in guiding the panel by fixing it onto a sleeve which is displaced on a rod perpendicular to the plane of the screen and rigidly connected to the support of the screen, the rod and the sleeve being so disposed and proportioned that the ratio D/L, of the distance D between the rod and the point of application of the force which can be applied by the subject to the panel to the length L of the sleeve, may be great enough for the panel not to be displaced by this force. This safety arrangement prevents a displacement of the panel by the subject without any locking arrangement being necessary; but this displacement is possible by the operator if he exerts his force near enough to the guide rod.

Figs. 1 and 2 illustrate diagrammatically respectively in elevation and in plan a first embodiment of construction in conformity with the present invention.

Figs. 3 and 4 illustrate diagrammatically respectively in elevation and in plan a modification according to the invention in which the panel and the screen are fixed on their respective supports by means of a hinge.

Figs. 5 and 6 illustrate diagrammatically a second modification in accordance with the invention in which the rod perpendicular to the screen is rigidly connected with the panel, and the guiding sleeve is rigidly connected with the support of the screen.

Fig. 7 is a diagram illustrating an important principle involved in the present invention.

In Figs. 1 and 2 the subject 1, the observer 2, a radiogenic tube 3 and the radioscopic screen 4 or the radiographic carriage, are coaxially arranged. Screen 4 is carried by the support 5

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which can be fixed to any known device allowing it to be given the necessary positions for the examination. In order to simplify these figures there has merely been illustrated a support 5 on a column 6 relative to which it is adapted to be displaced by means not illustrated, the column 6 itself being movable.

A transparent unorificed panel 7 is fixed on the frame 8. The frame 8 is rigidly connected to the sleeve 9 by means of the arm 10. A rod 11 on which the sleeve 9 slides is rigidly connected to the support 5.

A second rod 12 is parallel to the rod 11 and is also rigidly connected to the support 5.

A curved appendage or arm 13 is rigidly connected to the arm 10 and forms with arm 10 a slot in which the bar 12 is engaged in order that the assemblage of the panel 7 and the members with which it is rigidly connected may be prevented from rotating about the rod 11.

The sleeve 9 has the length L above defined. The distance D is, if the subject is centered coaxially with tube 3, screen 4 and frame 8, that which separates the rod 11 from the axis 14, common to the screen, to the panel and to the radiogenic tube.

A rod 15 is rigidly connected with arm 10, parallel to rod 11 and terminated by a handle 16, accessible to the operator; it permits the latter to adjust the distance between the panel and the screen, if the ratio D'/L is small enough, D' being the distance between the axes of rod 11 and of rod 15.

When the subject presses on the panel 7 and therefore on the frame 8, the leverage D applied by the subject to the sleeve 9 is so great compared to the length of the sleeve 9 that the friction of the sleeve 9 on the rod 11 is sufficient to prevent the sleeve 9 sliding whilst the distance between the rods 11 and 15 is so small compared to the length of the sleeve 9 that the leverage applied to the sleeve 9 by the rod 15 when the handle 16 is positioned is not sufficient to cause the sleeve 9 to bind on the rod 11 and therefore the said sleeve 9 can readily be moved on the rod 11.

With the factors D and L as above defined and a coefficient of friction μ between the sleeve 9 and the rod 11, and referring to Fig. 7 R and R are

respective sections of the ends of the sleeve guard adjacent the support **6**

$$R_1=R_2=\frac{P.D}{L}$$

Frictional resistance=

$$2\mu R=\frac{2\mu P.D}{L}$$

P should be smaller than

$$\frac{2\mu P.D}{L}$$

in order that there should be no movement of the sleeve, whence

$$1<\frac{2\mu D}{L}$$

$$\frac{L}{2\mu}<D \text{ therefore } D>\frac{L}{2\mu}$$

In Figs. 3 and 4 the same reference numbers illustrate the same members as in Figs. 1 and 2.

A pin **17** is rigidly connected with the frame **8**. A sleeve **18** in which the pin **17** pivots is rigidly connected with arm **10**.

Jaws **19** carried on the pin **20** rigidly fixed to the said jaws hold the screen **4**. Rigidly connected with support **5** is a sleeve **21** in which the pin **20** pivots.

The frame and the screen may also be movable about a plurality of axes making with each other any suitable angles, the assemblage of the axes forming cardan or like suspensions.

In Figs. 5 and 6 the same reference numbers illustrate the same members as in the preceding figures.

A rod **15** is rigidly connected with arm **10**. A sleeve **22** is rigidly connected with support **5**. A second rod **23**, parallel to rod **15**, passes into the slot provided between arms **10** and **13**. A second sleeve **24** in which is housed the rod **23**, is rigidly connected with support **5**.

A handle **16** on the rod **15** is for adjusting the position of the panel **7**.

The function of the apparatus is the same as in the preceding case, the rod **15** serving in the present case simultaneously as a guide and as a member for controlling the position of the panel.

The invention is broadly, an arrangement to prevent the displacement rearwardly of the panel **7** by the subject being photographed or rather by the application of a light pressure on the subject to hold him steady and against the screen **4** whilst being photographed.

This arrangement allows the panel to be given dimensions approximately equal to those of the screen while with apparatus already known in which the screen does not position the panel this latter has to be much larger, so that the screen is always in front of it.

It results from the small dimensions of the panel that it might be easily positioned by the support of the screen or displaced relative to it whatever be the positions of one or other of these two elements.

What I claim and desire to secure by Letters Patent is:

1. In radiological or like apparatus, a support, carrier means on said support and movable longitudinally thereof, said carrier means having at least two arms disposed at a right angle to each other, a panel carrier on one of said arms and movable longitudinally thereof, a panel mounted on said panel carrier, a screen carrier

on the other arm, a screen mounted on said screen carrier, means associated with said arms, said panel carrier and said screen carrier for maintaining said panel and said screen in parallel planes and between said panel and said screen a subject to be examined is positionable, and operating means associated with the panel carrier and guided by the screen-carrying arm for moving said panel towards and away from the screen without moving the screen, whereby the panel is movable relatively to the screen and is movable as a unit with the screen on movement of the latter.

2. In radiological or like apparatus according to claim 1, rod means fixed to the arm carrying the screen slidable in a member fixed to the panel carrier.

3. In radiological or like apparatus according to claim 1, rod means fixed to the panel carrier slidable in guide means on the arm carrying the screen.

4. Radiological or like apparatus according to claim 1 wherein one arm on the carrier means is a rod and the panel carrier has a sleeve through which said rod is slidable, the length of said sleeve being considerably shorter than the distance between said rod and the common central axis through the screen and the panel.

5. In radiological or like apparatus, a support, an arm carried by a member on said support, a second arm carried by a member on said support and at right angles to the aforesaid arm, a third arm parallel to the first arm, relatively slidable rod and guide connecting means between said first and third arms and at right angles thereto, relatively slidable rod and guide connecting means between said second and third arms whereby the first and third arms always remain parallel, a radiographic screen and a panel carried by the first and third arms respectively, and control means operable from the side of the screen remote from the panel to effect alteration of the distance between the screen and the panel.

6. In radiological or like apparatus according to claim 5, rod means fixed to the arm carrying the screen slidable in guide means on the arm carrying the panel.

7. In radiological or like apparatus according to claim 5, rod means fixed to the arm carrying the panel slidable in guide means on the arm carrying the screen.

8. Radiological or like apparatus according to claim 5 wherein the relatively slidable rod and guide connecting means between the second and third arms comprises a rod carried by the first arm and passing through a sleeve carried by the third arm, the length of said sleeve being considerably shorter than the distance between the rod carried by the first arm and the common central axis through the screen and the panel.

9. Radiological or like apparatus according to claim 8 wherein the ratio of the distance (D) between the axis of the sleeve carried by the third arm and the common axis passing through the screen and the panel, to the length (L) of said sleeve is greater than one-half (μ) the coefficient of friction between the sleeve and the arm upon which the sleeve is mounted.

10. In radiological or like apparatus according to claim 1, one of the said screen and said panel being adjustable to vary the angular relationship between the planes of the faces of said screen and said panel.

11. In radiological or like apparatus according to claim 1, the said screen and said panel being

separately adjustable to vary the angular relationship between the planes of the faces of said screen and said panel.

12. In radiological or like apparatus according to claim 5, the said radiographic screen and said panel being pivotally carried by the first and third arms, respectively, whereby to permit adjustment of the angular relationship between the planes of the faces of the screen and the panel.

MAURICE POITTEVIN.

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Certificate of Correction

Patent No. 2,539,323 January 23, 1951

MAURICE POITTEVIN

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 3, lines 37, 39, 43 and 46, for "rod 15" read *rod 15'*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of March, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.