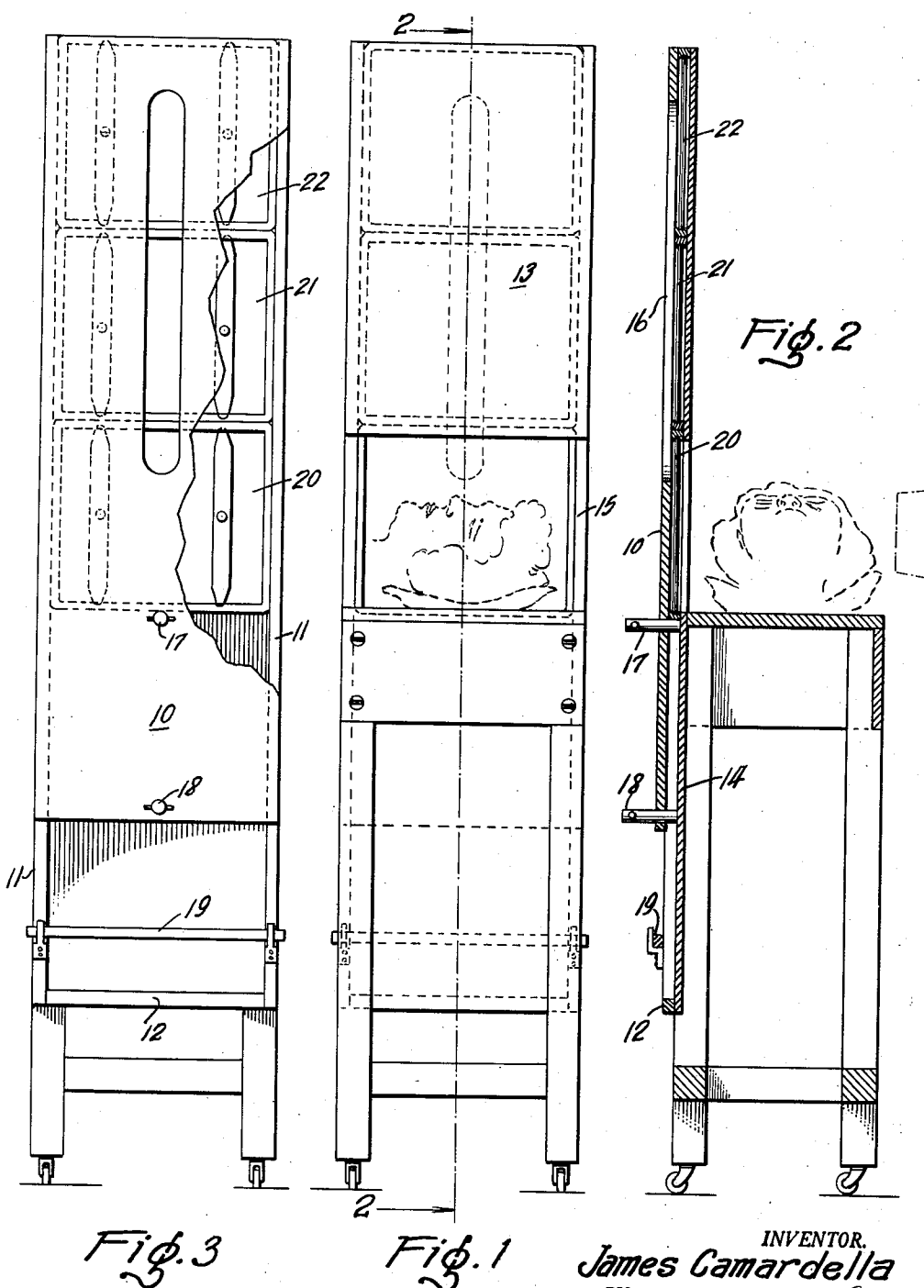


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X-RAY FILM CHANGER

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X-RAY FILM CHANGER

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6 Claims. (Cl. 250—66)

This invention relates to a film changer for X-ray film.

An object of the invention is to provide a film changer particularly for use in the field of cerebral arteriography, which is a diagnostic procedure permitting study of the blood vessels in and about the brain. This procedure is being employed with increasing frequency in the study of brain tumors, abscesses, aneurysms and arterial malformations.

This invention speeds up the process of taking a series of pictures so that a complete set of pictures may be made under a local anesthesia and on the X-ray table.

In the procedure the doctor places a needle within the carotid artery in the neck of the patient and injects an opaque X-ray solution, which is carried in the blood stream to the brain. Thus the blood vessels are outlined in a fashion that permits diagnosis of abnormalities and displacements. Heretofore, only one X-ray film could be taken with an injection because the solution remains in the brain for less than four seconds. By use of the device of the present invention three pictures, for instance, may be taken with one injection thereby showing the arteries, capillaries and the veins of the brain on three successive films. As a result, a complete study is obtained without subjecting the patient to multiple injections.

It will be seen therefore that the principal object of the invention is to provide for the rapid replacement of X-ray film cassettes in position to take a series of X-ray photographs in very rapid succession.

Other and further objects and advantages of the device will be clear from the following specifications, taken with the accompanying drawing in which like characters of reference refer to like parts in the several views, and in which:

Fig. 1 is a front elevation of an embodiment of the present invention;

Fig. 2 is a section taken on line 2—2 of Fig 1; and

Fig. 3 is a rear elevation, partly broken away of an embodiment of the present invention.

Film changers are known in which a sequence of pictures may be taken, but these known film changers operate slowly and have not proven successful in taking, for instance, three pictures within a period of less than four seconds. A further objection to the known film changers is that they sometimes jam, in which case only the first of the series of pictures can be relied upon to be taken and in many cases even the first picture may be destroyed if the second film jams before it comes into proper position.

As seen in the drawing, a long vertical casing is provided comprising a back panel 10 extending from the top to a position short of the bottom. An opening very slightly in excess of the width of the film cassettes being used is left open at the bottom. The width and the thickness of the casing is just sufficient to provide an interior space permitting a stack of cassettes placed edge to edge to move freely longitudinally of the casing. The

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sides of the casing are provided by two vertical rails 11 of only slightly greater thickness than the cassettes. The bottom of the casing is formed by a strip 12, similar to the strips 11, and the front of the casing is formed of two portions 13 and 14 which are of, lined with, or protected by lead. These two front panels are separated by a space 15 at the center front of the casing so as to leave the picture taking area of one cassette exposed. The top of the casing is open.

Back panel 10 is provided in its upper part with a slot 16 so that, as the cassettes are inserted in the top, the operator may lower the cassette in the casing by placing his fingers through the slot. Immediately below the opening 15 there is a hole in the back panel 10. A stop or pull pin 17 projects into the casing through this hole. When pin 17 is in position, it will support a cassette in picture taking position.

A second stop element 18 similar to stop 17 is mounted through a hole in the back panel 10 a distance equal to the height of one cassette below stop 17 so that when pin 18 is in position the second cassette in the stack will be in picture taking position.

Bottom strip 12 is spaced from opening 15 such a distance that when the stack of cassettes is resting on strip 12 the third, or in this case top, cassette will be in a picture taking position.

The device as illustrated is specifically designed to take three pictures in rapid sequence. If four pictures in rapid sequence were to be taken it would be necessary to elongate the casing upwardly the height of one cassette to supply the fourth cassette in the stack and to elongate the casing downwardly the height of one cassette to accommodate the first (or lower) three cassettes below the picture opening 15. Where four cassettes are to be used, a third stop similar to stops 17 and 18 is required.

In the exemplification shown, the casing below stop 18 is substantially open at the back but is provided with a removable cross bar 19 which will temporarily retain the cassettes in the device when they reach the lower end of the casing.

As shown in the drawing, the casing may be conveniently fastened to a small table which has a top flush with the bottom of picture taking opening 15 in the front of the casing. As indicated in the drawing the patient's head may be placed on this table top and an X-ray lamp properly adjusted so its rays will penetrate the patient's head and expose the film in cassette 20.

When the device is prepared for operation, three cassettes are inserted in the top of the casing and are lowered so that the bottommost cassette rests on stop 17. The second cassette 21 rests on cassette 20, and a third cassette 22 rests on cassette 21. It will be noted that cassettes 21 and 22 are protected by front panel 13, which is impervious to X-rays because of the lead.

After the patient's head has been placed in position and the X-ray machine properly adjusted, the doctor administers the injection of opaque material, and, at a proper interval thereafter, makes the first exposure and immediately pulls out stop 17 whereupon the three cassettes drop so that cassette 20 now is resting on stop 18 and is protected by the impervious panel 14 to protect it from further exposure. Cassette 21 is then in position opposite opening 15, and cassette 22 has moved down and is in the position formerly occupied by cassette 21. The doctor then makes the second exposure and immediately removes stop 18, whereupon the three cassettes again drop until cassette 22 is in position opposite opening 15 and the third exposure is made.

The stop elements 17 and 18 are shown as merely pull pins, but may of course, be replaced by other forms of latch.

After exposure of the cassettes as above described,

they may be removed from the bottom of the casing upon removal of the cross bar 19.

It will thus be seen that the objects hereinbefore set forth may readily and efficiently be attained and, since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. A rapid change device for photographic film cassettes comprising a vertical casing to receive three cassettes in vertical edge to edge alignment, a first removable stop to support said stack, a picture taking opening so located with respect to said first stop as to expose the bottommost cassette in the stack at said opening, a second removable stop so located with respect to said picture taking opening as to support said stack to expose the second or middle cassette at said opening, and a casing bottom so located with respect to said opening as to support said stack to expose the top cassette at said opening, all of said cassettes being simultaneously moved vertically at least twice during picture taking operations to provide at least three rapid exposures.

2. A rapid change device for photographic film cassettes comprising a flat vertical casing having a front and a back face, said casing having interior dimensions to slidably receive a plurality of cassettes in vertical edge

to edge alignment, a picture taking opening mid-length of the casing in the front face thereof, a plurality of vertically spaced stops, the uppermost so located with respect to said picture taking opening as to support said stack with the lowermost cassette in alignment with said opening, the remainder of said stops being spaced at such intervals below said first stop and so located with respect to said picture taking opening as to support said stack with successive cassettes in vertical alignment with said picture taking opening for successive exposure, all of said cassettes being dropped vertically at least twice during picture taking operations to provide at least three rapid exposures.

3. The device of claim 2 in which the front of said casing exclusive of said opening is made of a material impervious to X-rays.

4. The device of claim 2 in which the back face is provided at its lower end with an opening of sufficient size to withdraw the cassettes one at a time as they descend.

5. The device of claim 4 in which said casing is mounted on a support having a surface flush with the lower edge of said picture taking opening on which an object may be supported for X-ray photography.

6. The device of claim 2 in which the front face of said casing is rendered impervious to penetration of X-rays, the upper portion of the back face being provided with a slot for manipulation of the cassettes as they are being placed in the casing and provided with an opening at the bottom for removal of the cassettes after exposure.

References Cited in the file of this patent

UNITED STATES PATENTS

35 1,977,770 Lee Oct. 23, 1934