Feb. 23, 1960 R. P. RANKIN 2,926,256

PEDIATRIC X-RAY APPARATUS

Filed June 30, 1958 2 Sheets-Sheet 1

Fig.1.

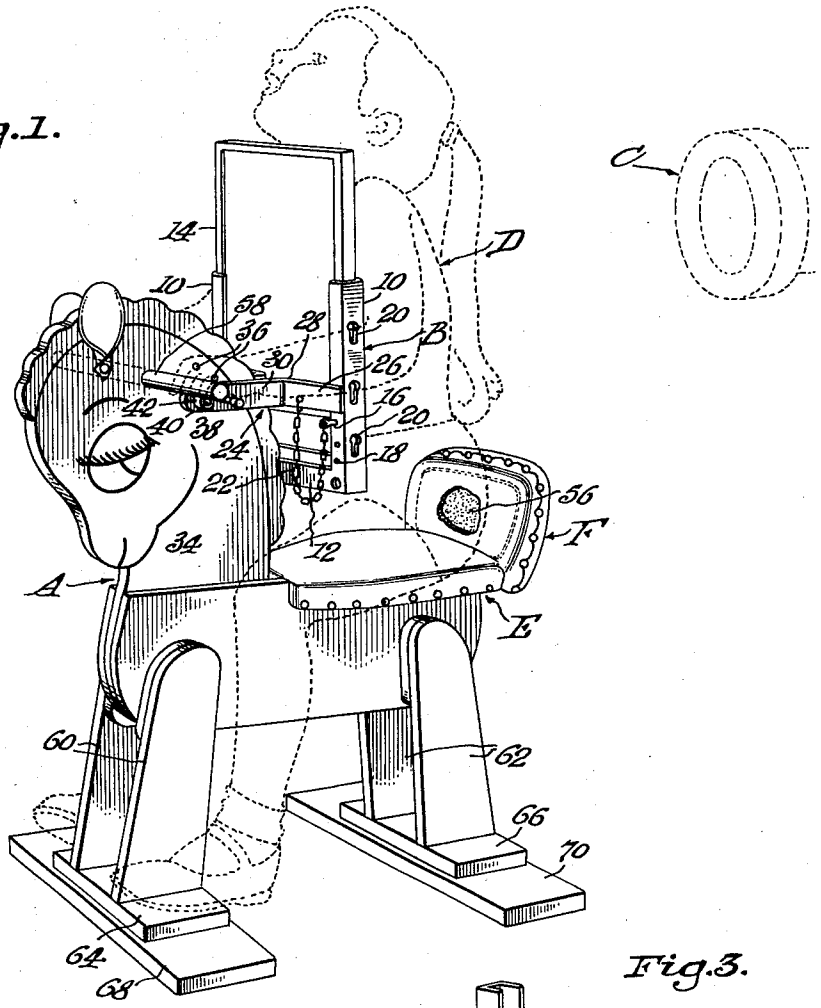


Fig.2.

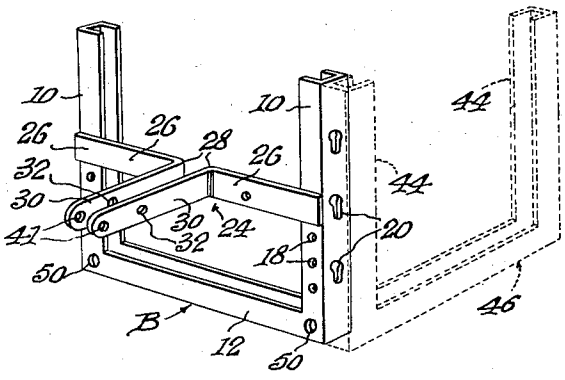
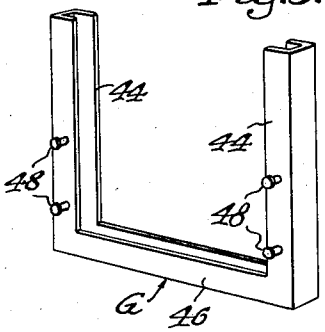


Fig.3.



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Feb. 23, 1960 R. P. RANKIN 2,926,256

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Filed June 30, 1958 2 Sheets-Sheet 2

Fig.4.

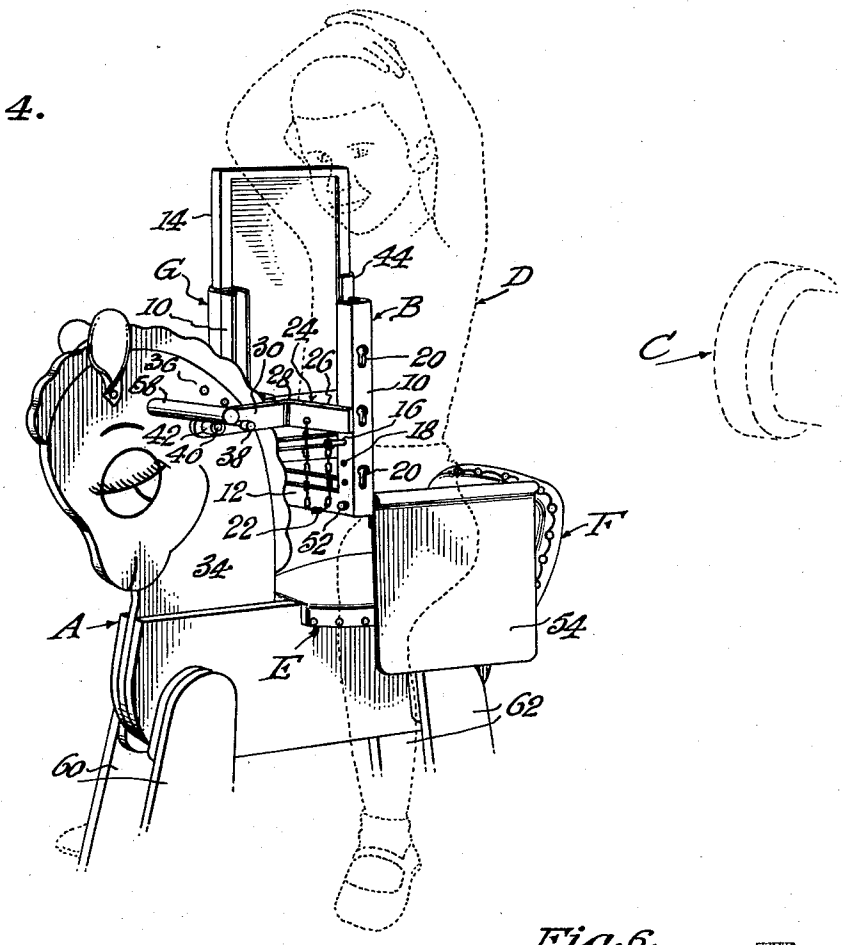


Fig.5.

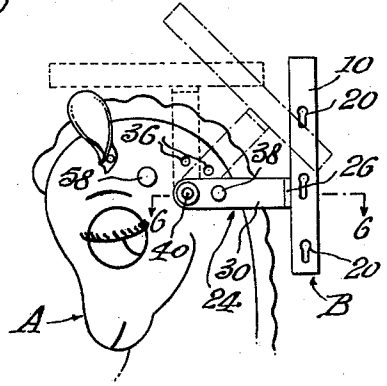
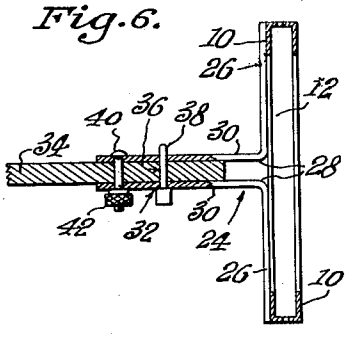


Fig.6.



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PEDIATRIC X-RAY APPARATUS

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5 Claims. (Cl. 250—50)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

The present invention provides improvements in the construction of cassette holders for receiving X-ray film or plates, and particularly provides improvements in cassette holders for receiving X-ray plates used in pediatric radiography among which, very importantly, is the problem of maintaining sufficient calmness and absence of fear in young patients or subjects to be X-rayed, who are of walking age through five years, and who, because of restlessness find it difficult to sit still for X-rays. More particularly, the instant invention is directed to a "hobby-horse cassette holder" which is designed and constructed in view of the fact that children universally are attracted by a hobbyhorse, it being found in actual service that the invention contributes greatly toward dispelling fear and obtaining good patient-technician relationships.

The invention has for one of its objects the provision of a cassette holder which is mounted adjustably on a child-pacifying toy-device on which a child-patient may sit in adjusted position for making X-ray pictures or fluoroscopic examinations, the toy-device preferably being one which will mount a seat for the child-patient and one which will have a soothing or calming effect on the child-patient, inducing him to remain quiet or still long enough for requisite X-ray pictures to be made or X-ray examinations (fluoroscope) to be made. Although the pacifying toy is not necessarily so limited, and may be of any type of mounting for a seat, it is recognized that animal representations are highly suitable for allaying nervous apprehensions on the part of a child-patient. In practice, it is found that a simulated hobbyhorse contributes particularly towards dispelling fear, and such representation of a horse therefore is employed preferably as a mounting device on which a child-patient may be seated and calmed to maintain a still position while X-ray pictures are taken in any desired position of the child-patient.

A further object of the invention is the provision of a cassette holder attached to the head of a stationary hobbyhorse of which the seat on which the child-patient is placed forms a saddle, the cassette holder being adjustable either in horizontal or vertical positions.

A still further object of the invention is to provide means within reach of a child-patient so that the child may grasp the said means for bringing apical areas of the chest to an anterior position symmetrically on the cassette.

A still further object of the invention is to provide a cassette holder mounted on suitable mounting means, such as a representation of a horse or other mounting means possessing eye appeal for a child-patient, so that there is permitted ninety degrees of angulation, making possible examinations not only of the chest, but also of the shoulders, ribs, spine, skull, and upper extremities of the child-patient.

A still further object of the invention is to provide

means on the sides of the yoke-attached cassette holder for enabling attachment of an additional cassette holder for facilitating taking lateral views of the chest of a child-patient while he remains seated on the seat element of the improved structure or assembly of the instant invention.

A still further object of the invention is to provide means for protecting pelvic areas of the child-patient against over-exposure to X-ray radiation during the making of the aforesaid lateral views.

A still further object of the invention is to provide an improved seat for a child-patient, which seat is fashioned as a saddle element having a back or cantle attached thereto, the cantle being provided with a sheet of lead for providing protection from radiation to the pelvic areas of the patient.

Further objects and advantages of the improved construction will become apparent as the description proceeds and the features of novelty will become emphasized in the appended claims. The construction of the invention will become more clearly understood by reference to the accompanying drawings wherein—

Fig. 1 is a perspective view of a cassette holder embodying structural improvements of the present invention, the cassette holder being shown in position for bringing the apical areas of the chest of a child-patient to an anterior position symmetrically with respect to the cassette;

Fig. 2 is a perspective view of the cassette holder of Fig. 1, the view illustrating the attachment of a second cassette holder at substantially right angles to the holder of Fig. 1 for enabling lateral views of a child-patient to be made without disturbance to the seated position of the patient indicated by Fig. 1;

Fig. 3 is a perspective view of the additional cassette holder;

Fig. 4 is a perspective view of the assembly shown in Fig. 2 but with the second cassette holder holding a cassette in position for making requisite lateral X-ray exposures of the patient, the view showing also the mounting for use of a lead shield for protecting pelvic areas of a child-patient against injury from over-exposure to such radiation;

Fig. 5 is a view showing adjustments of the cassette holder of the invention for making examinations of shoulder, ribs, spine, skull, and upper extremities of a child-patient; and

Fig. 6 is a horizontal sectional view of the cassette holder and mounting thereof, the view being taken on the line 6—6 of Fig. 5, looking in the direction of the arrows.

Referring more particularly to the drawings, reference character A represents a child's mounting device for an X-ray cassette holder B which receives unexposed X-ray films or plates to be exposed to X-rays from an X-ray camera C, which is positioned to produce X-ray exposures of desired anatomical parts of a child-patient D. In view of the fact that the child-patient must be maintained pacified and quiet while the desired X-ray exposures are being made, it is found in practice that natural nervousness and restlessness of a child-patient can be quieted and the patient made immobile for the requisite exposure times for the desired X-ray pictures to be taken may be attained to a considerable degree of success by making the mounting unit for the cassette holder B in the character of a suitable toy on which the child-patient can be seated and placed in a suitable position for the making of the desired X-ray photographs. Thus, it is found in practice that a representation of a horse, such as a simulation of a child's hobbyhorse, is particularly appealing and quieting to one-to-

five year old patients, as centering and holding the interest of such a patient and maintaining such a patient quiet and sufficiently immobile in any position of placement long enough for desired exposures to be made. The simulated hobby-horse also is stable and immobile while the child-patient is positioned thereon.

The child-patient is seated for the intended purpose astride a seat E, which is upholstered for comfort, and which defines a "saddle" for the hobbyhorse A. The seat E is provided with a back on cantle F, which also is upholstered for comfort and which includes a thin sheet of lead to protect the pelvic areas of the patient from the beam of the X-ray to such areas while making examinations requiring the beam to be horizontal.

The cassette holder of the instant invention comprises a substantially U-shaped frame including normally upright, parallel spaced side channel arm members **10** integrally interconnected at their bottom ends by an integral cross channel web bar **12**, thereby forming a continuously rigid unitary U-shaped channel frame for receiving an X-ray cassette **14**, control of the depth of insertion of which is effected by a pin **16** inserted in a desired selected hole **18** of a series of such holes provided for such purpose in corresponding forwardly facing flange elements of the upright side channel members **10**. Each upright side channel **10** includes a forwardly facing flange element and a rearwardly facing flange element integrally interconnected by a laterally outwardly facing bight element which is provided with a vertical series of spaced keyhole slots **20** for the purpose hereinafter to be described. The pin **16** is provided with a safety chain **22** to guard against loss. The side channels **10** of the cassette holder have welded thereto a mounting yoke **24** comprising corresponding similar plates or strips **26**, one of which is welded to a corresponding forwardly directed flange element of each of the side channel members **10**, the strips **26** being bent similarly at approximately right angles as indicated at **28** to form a pair of equal parallel yoke arms **30**, which are spaced apart and have registering similar holes **32**. These arms **30** engage opposite sides of the head portion **34** of the hobbyhorse A in which head portion is provided a radially arcuate series of holes **36** which register with the holes **32** in the yoke arms **30** of the mounting yoke for the cassette holder, the holes **36** providing for angular adjustments of the cassette holder from an upright position shown in Fig. 1 for making chest X-ray pictures of the patient, through 45° to a horizontal position, thereby enabling the patient to be placed not only uprightly for chest examinations, but in positions of substantially 45° and also horizontal for convenient photographing of shoulder, ribs, spine, skull, and upper extremities of the patient. The cassette holder is held in desired position by a pin **38** removably inserted in registering holes **32** and **36** in the yoke member or yoke arms **30** of the cassette holder. The yoke arms **30** are pivotally connected to the head portion **34** of the hobbyhorse by means of a pivot bolt **40** passed through holes in the free ends of the yoke arms **30** of the cassette holder and the head portion of the hobbyhorse, this pivot bolt **40** being retained in place by a nut **42** on the bolt.

For making lateral upright examinations of a patient, as shown in Fig. 4, there is provided a second or lateral cassette holder frame G comprising upright side channels **44** integrally interconnected by horizontal channel **46** integral therewith. Corresponding flange elements of the upright channels **44** are provided with spaced locking studs **48** that are received in selected keyhole slots **20** in the bight elements of the upright channel members **10**, thereby removably interlocking the lateral cassette holder frame G with the above-described cassette holder B. Also, at each corner of the latter, there is provided a hole **50** for reception of a bar **52** on which is suspended a protective sheet or skirt **54** of lead rubber to provide protection of the pelvic area from the X-ray beam when making lateral views of the chest of the patient. Further, as has been indicated above, a lead sheet **56** is placed in the cantle F of the saddle seat E prior to upholstering. This lead sheet **56** although being thin, in practice it being only about 1/16-inch in thickness, is adequate to protect the pelvic areas of the patient from the beam of the X-ray to this area while making examinations requiring the beam to be horizontal.

Accordingly, for further assurance and assistance to the patient, a dowel **58** extends through the head portion of the hobbyhorse and is at a sufficient distance to cause the youngster-patient to reach for it, to bring the apical areas of the chest to an anterior position symmetrical to the cassette, the holes **36** in the head of the hobbyhorse being on a radial arc with respect to the pivot **40**.

The cassette holder frames B and G may be constructed of channel steel, although aluminum may be used to advantage in reducing weight of the assembly.

The hobbyhorse-mounting for the cassette holder may be provided with front and rear legs **60**, **62**, to which are secured upper cross-pieces **64**, **66** for stability, and lower cross-pieces **68**, **70**, for increased stability.

It may be noted by way of summary and example, the hobbyhorse itself may be constructed of 3/4-inch plywood and painted. The cross-pieces beneath the legs are two 1 x 4 x 18-inch members, the underside of each of which may be covered with a non-skid material (not shown). The height from the saddle to the floor or X-ray table top measures thirteen inches. The saddle seat measures 8½ inches in length and is 6 inches in width at the point where the cantle is attached, tapering to 3 inches at the front. The cantle of the saddle measures 9½ inches in width by 5½ inches in height. Prior to upholstering the cantle, a sheet of 1/16-inch lead is attached to provide protection from radiation to the pelvic areas of the patient.

Leather ears and a frayed rope and paint-sprayed tail may be added to give the hobbyhorse a realistic appearance.

The cassette holder is constructed of cold steel, although aluminum could be used and would contribute to making the device lighter in weight. It accommodates a 10- by 12-inch cassette in a vertical position, or an 8- by 10-inch in a horizontal position, the holder being 11½ inches wide and 8 inches high. The U-shaped channel is 1-inch thick, making it possible to use a wafer-type grid if desired.

The cassette holder is attached to the head of the hobbyhorse by a steel yoke that allows the holder to be used either in the horizontal or vertical position. Desirable degrees of angulation may be obtained by use of a pin placed in holes drilled through the steel yoke and head of the hobbyhorse.

The sides of the yoke-attached holder have three keyhole slots drilled into them. This is to accommodate an additional U-shaped cassette holder containing two studs on each of the vertical channels, thus providing a holder to facilitate taking a lateral view of the chest with the little patient remaining on the hobbyhorse. Protection for the pelvic area in the lateral view is provided by use of a lead rubber skirt on a steel rod that is held in place by putting an end of the rod into a hole drilled on both sides at the bottom of the yoke-attached holder.

A half-inch dowel placed in the head of the hobbyhorse is at a sufficient distance to cause the youngster to reach for the dowel while simulating a ride on a hobbyhorse.

I claim:

1. A device for positioning and maintaining pacified young children to be X-rayed, comprising, in combination, a pediatric X-ray cassette holder including a seat supported in an elevated position and adapted to have a child to be X-rayed positioned thereon, the seat being

mounted astride back portions of a toy mount therefor simulating a hobbyhorse and forming a saddle therefor, a back member for the saddle seat, a protective sheet in the back member of the seat for protecting pelvic areas of a child seated astride of the saddle against horizontally-directed X-ray beams from a source thereof positioned rearwardly relative to a child on the saddle, cassette-receiving means mounted on head portions of the hobbyhorse adjacent to forward portions of the saddle, the cassette-receiving means being a U-shaped frame including oppositely-disposed, parallel, rigid side channel arms into which a cassette is to be received, the said arms being connected by an integral bottom channel web, a yoke integral with the arms of the frame, the yoke consisting of a pair of corresponding strips each of which is bent at substantially right angles and having one side rigidly secured to each arm of the cassette-receiving frame, and having another side terminating in a free end, and means connecting the yoke to the head portions of the hobbyhorse, the side channel arms of the U-shaped cassette-receiving frame including forwardly facing flange elements and rearwardly facing flange elements, and a bight element integrally interconnecting the flange elements, each bight element facing laterally outwardly with respect to the saddle seat and provided with a series of spaced vertically disposed keyhole slots, the forwardly facing flange element of the arms of the cassette-receiving frame being provided with means enabling selected control of amount of insertion of a cassette into the cassette-receiving frame, the said means being a series of spaced vertical holes in the forwardly facing flange element of the said arms for selectively receiving an inserted pin for limiting downward movement of a cassette being inserted.

2. The device as claimed in claim 1, wherein the cassette-receiving frame is pivotally connected to the head portions of the hobbyhorse by a pivot bolt extending through the yoke adjacent to the free ends thereof and through the head portions of the hobbyhorse, the head portions of the hobbyhorse being provided with a plurality of arcuately disposed holes with the yoke having corresponding holes adapted to register with a selected hole in the head portions of the hobbyhorse, the arcuately disposed holes in the head portions of the hobbyhorse being radially concentric with the pivot bolt for the cassette-receiving frame, and a pin receivable through registering holes in the yoke and head portions of the hobbyhorse for retaining the cassette-receiving frame in a selected position of angularity between and including upright and horizontal positions for enabling exposure to X-rays of selected areas of a child's body.

3. The device as claimed in claim 1, wherein the arms

of the cassette-receiving frame are provided with corresponding substantially equally vertically spaced keyhole slots in the outwardly facing bight elements of the arms, and a second U-shaped cassette-receiving frame complemental to the first-mentioned frame and also having spaced upwardly-extending parallel cassette-receiving channel arms, and vertically spaced studs on inwardly directed forward flanges of the arms of the second frame, the studs being complemental to, and corresponding with, the slots of the first-mentioned frame and being adapted to be inserted in the said slots for demountably mounting the second frame on the said outwardly facing bight elements of the arms of the first-mentioned frame at right angles thereto, the second cassette-receiving frame extending rearwardly with respect to the first-mentioned cassette-receiving frame and with respect to the hobbyhorse and adjacent thereto and laterally adjacent to the saddle for enabling lateral X-ray pictures to be made of a child seated on the saddle.

4. The device as claimed in claim 1, wherein the cassette-receiving frame is provided with corresponding lower corner holes for receiving a mounting rod for a protective apron for pelvic areas of a child on the saddle, a rod in a selected lower corner hole extending rearwardly from the frame and substantially parallel to the saddle, and a protective apron mounted on the rod and depending therefrom, the cassette-receiving frame being elevated with respect to the saddle to enable the apron to protect the pelvic areas from exposure to horizontal X-ray beams directed laterally with respect to the child on the saddle.

5. The device as claimed in claim 2, wherein a dowel bar extends through the head portions of the hobbyhorse adjacent to the radially arcuately disposed holes in the head portions, the dowel bar being adapted to be grasped manually by the child seated on the saddle astride thereof and facing forwardly towards the said head portions, the said dowel bar being mounted in the head portion of the hobbyhorse sufficiently far from the saddle to cause the child patient on the saddle to reach for it, for bringing unobstructedly apical areas of the chest of the patient to an anterior position symmetrical to a cassette in the cassette-receiving frame.

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