

June 3, 1958

D. R. LIMBACH

2,837,658

X-RAY IDENTIFICATION

Filed July 9, 1956

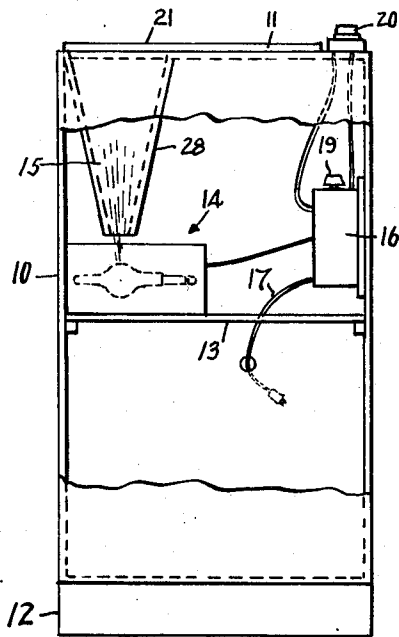


Fig. 1

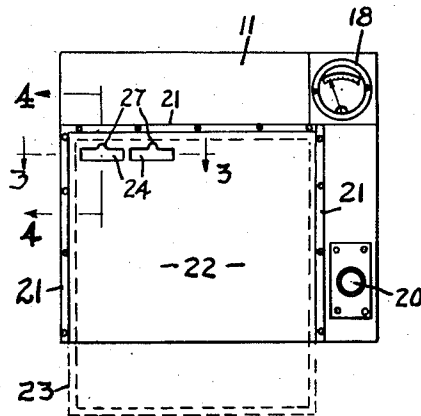


Fig. 2

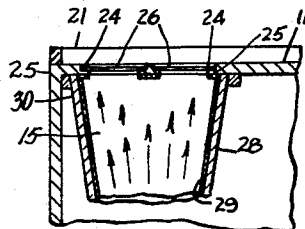


Fig. 3

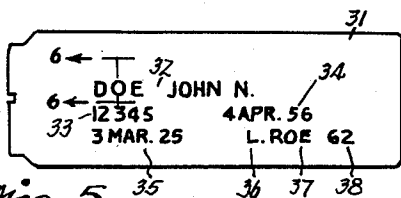


Fig. 5

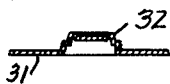


Fig. 6

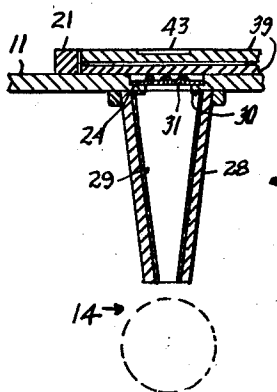


Fig. 4

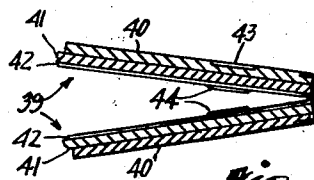


Fig. 7

INVENTOR.
DAVID R. LIMBACH

BY

Oberlin & Limbach
ATTORNEYS.

1

2,837,658

X-RAY IDENTIFICATION

David R. Limbach, Flint, Mich.

Application July 9, 1956, Serial No. 596,658

2 Claims. (Cl. 250—67)

This invention relates as indicated to the identification of X-ray photographs and, more particularly, to the recording of the desired data directly in the photographs themselves.

Several procedures have been proposed and used for this purpose, with perhaps the most common of these involving the placement of lead letters and/or numbers against the holder or cassette in which the film is supported. Since the lead is opaque to X-rays, upon exposure thereto the characters or symbols defined in lead are recorded on the film. While this practice is quite simple, it does have a number of disadvantages, for example, it is time consuming for the technician to select and arrange the various letters and numbers needed to compose the desired information. Furthermore, the lead characters are often indistinct when high intensity radiation is employed. A part of the body being photographed may be interposed between the characters and the source of X-rays, likewise resulting in an indistinct record.

In accordance with another practice, a small portion of the film is shielded during the primary exposure and subsequently this portion is inserted in a camera which reproduces typing on a data card through a lens system. In this case, the image is more distinct, but a reduction in size results. The record can also be made by use of a printed card and a photographic contact printer, both these operations requiring to be carried out in a dark-room.

It is an object of the present invention to provide an identification process which is much simpler and more easily performed than such prior practices. A further object is to provide economical apparatus for such purpose which requires only a minimum amount of time and labor to be expended in the identification process.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features herein-after fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail a certain illustrative embodiment of the invention, this being indicative, however, of but one of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

Fig. 1 is a front elevational view of an X-ray unit employed in accordance with the invention, a portion of the front wall being broken away to illustrate parts housed therewithin;

Fig. 2 is a top plan view of such unit;

Fig. 3 is a sectional view taken on the plane of the line 3—3 in Fig. 2;

Fig. 4 is a sectional view taken on the line 4—4 in Fig. 2;

Fig. 5 illustrates a data plate bearing information in offset characters and used in accord with the invention;

2

Fig. 6 is a fragmentary section of such plate as viewed from the plane of the line 6—6 in Fig. 5; and

Fig. 7 is a fragmented sectional view of an X-ray film holder or cassette.

Referring now to the drawing in detail, the unit illustrated in Fig. 1 comprises an upstanding cabinet 10 of approximately waist-height, for convenience of access to the top 11 thereof, and having an inwardly offset lower front portion 12 for added clearance in such region. The cabinet has an inner shelf 13 on which a conventional X-ray tube assembly 14 is supported.

Such assembly is so arranged that the rays generated by the same are directed upwardly toward the top of the cabinet, as indicated by the dashed lines 15. A likewise conventional power pack 16 is mounted inside the cabinet, on a side wall of the same, this supply including the usual high tension and filament transformers and rectifier, with a lead 17 extending from the rear of the cabinet for connection to a convenience outlet. A milliammeter 18 is mounted in one rear corner region of the cabinet top and connected to measure the space current of the tube, and a usual control 19 is provided for adjustment of the current to obtain the desired contrast.

The application of power is controlled by a push-button switch 20 also at the cabinet top and preferably being of the type in which contact is made upon release of the button.

Secured to the cabinet top 11 are a number of small strips 21 which define a working area, designated at 22, adapted to receive at least a portion of an X-ray cassette or holder, the same being indicated by the dashed lines 23 in Fig. 2 and being positioned by engagement with such stop strips. In a corner of this area, I provide two elongated stepped openings 24 having lower ledges 25 about the peripheries thereof. Radiolucent plastic plates 26 are supported on such ledges and a cut-out 27 is provided centrally at one side of each slot, to the depth of the ledge.

The X-rays emanating from the tube assembly are confined in the illustrated construction by means of a vertical wooden cone 28 having an interior lead lining 29, the mouth or upper end of the cone coinciding approximately with the region of the two elongated slots in the cabinet top. Those portions of the top around the slots and within the cone end area are likewise shielded by lead, for example lead foil, as indicated at 30. Accordingly, the only escape for the X-ray within the unit is through the two elongated slots 24.

With this unit, I employ identification plates which are preferably on the order of the one illustrated in Figs. 5 and 6. This plate 31 is made of thin metal, such as tin, and has stamped therein the data desired to be recorded in the X-ray photograph. Any conventional stamping device may be used for this purpose, and I have here shown the plate as bearing the name 32 of a patient to be photographed, his hospital number 33, the date of the X-ray exposure 34, the birthdate of the individual 35, the side of his body photographed 36, and the name 37 and number 38 of the radiologist. The particular information may, of course, be varied, and a plate of this nature when once made and used can be retained with the patient's record for possible subsequent use.

The plate 31 is of such size as to be capable of seating within one of the elongated slots 24 in the cabinet top, and as thus located it does not project above the upper surface of the same. Such plate is thus in the path of the X-ray produced within the cabinet and escaping therefrom through the particular slot, and it will be obvious that the plate has varying opacity to such rays due primarily to the different orientation of the material with respect to the direction of propagation of the rays. That is, the raised letters and numerals are bounded by por-

tions which have a major extent in the direction of the rays, whereas the body of the plate and hence the material around each character is transverse thereto, so that the effective thickness varies. Another plate bearing the name of the hospital and such other information as may additionally be desired may be similarly formed and disposed in the second slot. The cut-outs 27, of course, facilitate extraction of the plates from the openings.

The film holder or cassette shown in Fig. 7 is essentially of known construction and comprises two leaves or plates 39 hingedly connected at one side. The film is supported between the two plates, and each of the latter comprises an outer sheet of aluminum or plastic 40, padding 41, and an intensifying screen 42, the last conventionally being made up of cardboard or plastic backing, a suitable phosphor coating, and a thin protective plastic cover. One of the plates is provided with a recess, a lead strip 43 inserted therein at a region which coincides with a marginal portion of the film as disposed in the holder. I also prefer to apply pieces of cellulose tape 44 and the like to the inner surfaces of the two holder leaves to reduce the effect of the intensifying screens 42 in such region.

In the use of this apparatus, the plate shown in Fig. 5 is prepared with the particular information to be recorded in the X-ray photograph. The photograph of the patient is made in the usual manner with the holder side bearing the lead strip 43 at the tube or patient side, so that the marginal portion of the film overlain by such strip will be shielded in the primary exposure. The patient's identification plate is inserted in a slot of the identifier unit, and after photographing of the patient, the holder is placed on the cabinet top, this time, with the lead strip being at the side away from the source of the X-rays. The as yet unexposed marginal film portion is located over the data plate, whereby energizing the cabinet generator subjects such film portion to X-rays passed through the plate. The variable opacity of the latter in accordance with the symbols stamped therein results in an image of such symbols being recorded on the film. Subsequent processing of the film follows the usual practice.

It will accordingly be seen that the foregoing procedure provides rapid and accurate identification of X-ray photographs. The entire procedure may be carried out in daylight, thereby eliminating dark-room time, and film handling is at a minimum. The quickness and convenience of the operation permits the technician who has made the exposure for the examination also to do the identifying, thereby avoiding any possible confusion. The savings in time will be particularly appreciated when it is realized that in many hospitals more than one hundred X-ray examinations will be made in a single day.

The particular type of switch employed with the identifier is, of course, conventional, but it may be noted that it is particularly desirable in the disclosed installation since it guards against continuous energization due to someone accidentally laying an object on the switch

or leaning on it. Since the X-ray generator and its directly associated electrical parts are standard, no further description in detail is necessary to a full and complete understanding of the present invention.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I, therefore, particularly point out and distinctly claim as my invention:

1. In apparatus of the character described, a housing, a regulable X-ray generator within said housing and arranged to direct such rays toward a wall thereof, barrier means confining the rays as thus directed to a comparatively small area of such wall, the latter in this area being recessed and substantially translucent to the rays, a thin metal plate having raised identifying indicia therein removably seated in the recess of the wall transversely in the path of the rays emanating from the generator, an X-ray cassette disposed with one side thereof against the outer surface of such wall, and means for positioning said cassette on the wall such that a marginal portion of the cassette closely overlies the recess-mounted metal plate, said plate having varying opacity to the X-rays by virtue of the raised indicia therein to reproduce such indicia on film held in the cassette, the cassette having an X-ray shield at its other and outer side in opposition to the marginal portion overlying the metal plate, the cassette being disposed in the patient exposure with its thus partially shielded side toward the X-ray source to leave such marginal portion unexposed in such operation for subsequent recording of the identifying indicia thereon by means of said regulable X-ray generator and metal plate.

2. In the taking of X-ray photographs, supporting film between rigid plate-like members one of which is provided with a portion opaque to X-rays, said opaque portion coinciding with a marginal section of the film, exposing the film to X-rays passing through the body to be photographed with said one X-ray opaque support member disposed at the side of the X-ray source, whereby such marginal portion of the film is shielded against exposure, thereafter disposing a plate of varying radiolucence against the other support member in the region of such unexposed marginal portion of the film, and passing X-rays through said plate to expose such film portion, the variable permeability of the plate to the X-rays being such to define identifying indicia on this film portion.

References Cited in the file of this patent

UNITED STATES PATENTS

2,036,682	Cantor	Apr. 7, 1936
2,077,500	Townsend et al.	Apr. 20, 1937
2,649,547	Lott	Aug. 18, 1953
2,773,436	Martin	Dec. 11, 1956