Nov. 7, 1939. A. F. CONTO 2,179,249

FLUOROSCOPE FOR THE ORAL CAVITY AND METHOD OF MAKING THE SAME

Filed May 29, 1937

Fig. 1

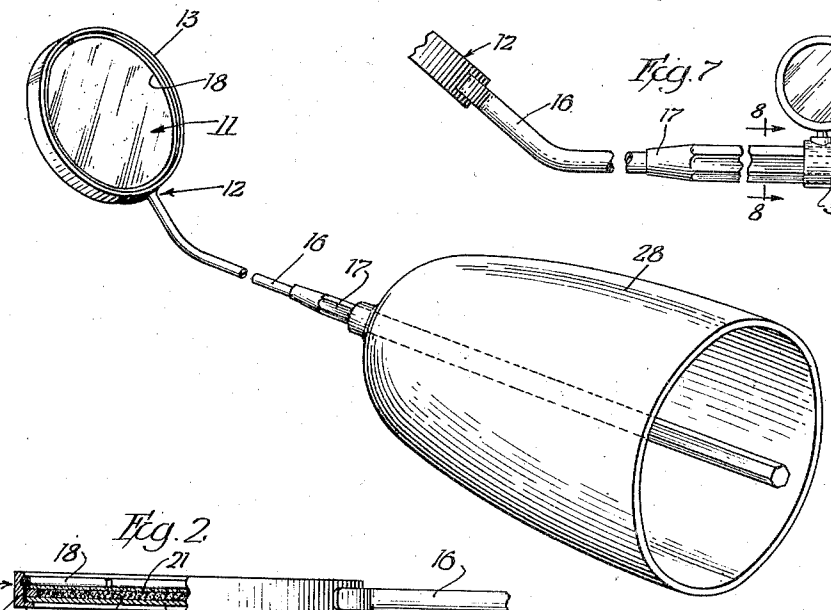


Fig. 8

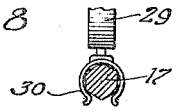


Fig. 7

Fig. 2

Fig. 3

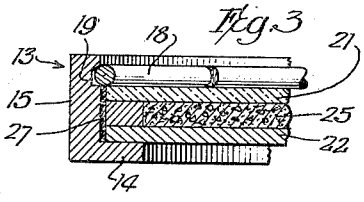


Fig. 4

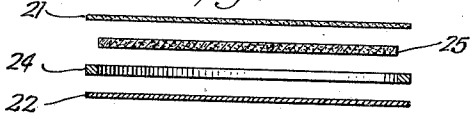


Fig. 5

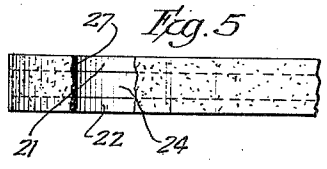
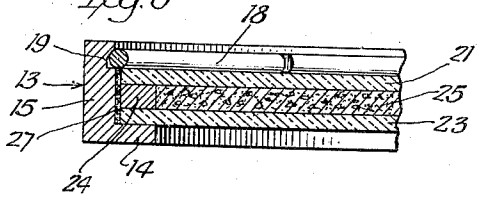


Fig. 6



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Patented Nov. 7, 1939 2,179,249

UNITED STATES PATENT OFFICE

2,179,249

FLUOROSCOPE FOR THE ORAL CAVITY AND METHOD OF MAKING THE SAME

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Application May 29, 1937, Serial No. 145,459

6 Claims. (Cl. 250—80)

This invention relates generally to fluoroscopes and has more particular reference to a fluoroscope for use in the oral cavity as in dentistry and to a method of making such fluoroscopes.

An object of the invention is the provision of a novel and improved dental fluoroscope.

Another object of the invention is the provision of a fluoroscope of such size that it can be employed in the oral cavity and of such construction that it can be readily sterilized without damaging the fluorescent material.

A further object of the invention is the provision and production of a fluoroscopic screen wherein a fluorescent material is so enclosed that the screen assembly can safely be employed in the art of, for example, dentistry to produce Roentgen ray images within the oral cavity.

Other objects of the invention include the combinations and arrangements of parts and a novel method for making such a fluoroscopic screen, all as hereinafter disclosed and as illustrated in the accompanying sheet of drawings.

In the drawing:

Fig. 1 is a perspective view of a dental fluoroscope embodying some of the features of the invention;

Fig. 2 is a fragmentary side elevation of the fluoroscope shown in Fig. 1 and shows it partially in cross section to bring out certain assembly details;

Fig. 3 is a fragmentary cross section on a larger scale than that employed hitherto to bring out the structural details of the fluoroscopic screen and holder therefor;

Fig. 4 is a view illustrative of a step in the novel method and shows the elements of the fluoroscopic screen in unassembled relationship;

Fig. 5 is a fragmentary side elevation of the elements shown in Fig. 4 after assembly, the seal being partially removed for the sake of clarity and illustrative of another step in the novel method of the invention;

Fig. 6 is a view similar to that shown in Fig. 3 and is illustrative of another embodiment of the invention;

Fig. 7 is a view illustrating a gauge mounted on the fluoroscope handle; and

Fig. 8 is a section taken on line 8—8 of Fig. 7.

In dental surgery as well as other branches of surgery practiced in the oral cavity, Roentgen ray or X-ray machines are frequently employed to make highly desirable, if not necessary, diagnoses before proceeding with the treatment. As now employed, only skiagraphy is practiced in such surgery. Thus, a considerable delay is necessitated between examination and the treatment. Such delay is caused by the necessity for developing the film to produce a skiogram. Because of that delay, the patient is subjected to great inconvenience and frequently the danger of a development of an acute condition during the delay, not to mention the pain which often is attendant upon afflictions in the oral cavity.

Fluoroscopes have been employed for bringing out Roentgen ray or X-ray images, without necessitating the use of a film and the consequent delay in developing it. Such fluoroscopes, however, have been of such a size that they could not be employed in dental surgery for that reason alone. In addition, such known fluoroscopes have been so constructed that any attempt to sterilize them by the sterilization agents employed in dentistry would destroy the fluorescent properties of the fluorescent material.

In order to avoid the foregoing difficulties and to attain the objects of this invention, I have provided as illustrated in the drawing a fluoroscope comprising a fluoroscopic screen 11 and a holder 12 therefor which are so constructed and assembled that they may be employed for surgical diagnosis of the kind already mentioned in the oral cavity and that may be sterilized without destroying or endangering the fluorescent properties of the screen 11 in any of the solutions commonly employed for sterilization of similar surgical apparatus.

The holder 12 may be constructed of any suitable material in any convenient or desirable form. As illustrated in Figs. 1, 2, and 3, it comprises a screen holding member 13 of, for example, ring-like configuration with a screen supporting base portion 14 and a peripheral flange portion 15 upstanding from the base portion 14. The size of the screen holding member 13 is such that it can be conveniently inserted into the oral cavity through the mouth and, as illustrated, is made from metal and is preferably carried at the end of an outwardly projecting stem or shank member 16, the outer end of which is provided with a member 17 forming a convenient handle for the fluoroscope.

The fluoroscopic screen 11 is adapted to be carried in the ring-shaped holding member 13 between the supporting base portion 14 and, for example, a split, resilient retaining ring 18. The ring 18 is engageable in a groove 19 at the inner side of the peripheral flange portion 15 as shown best in Fig. 3 for holding the screen 11 in place.

An object of the present invention is to provide a fluoroscopic screen which can be sterilized without injury to, or destruction of, its fluoroscent properties. To that end, I provide a sheet-like member 21 of substantially the same configuration as that of the holding member 13, which may be made of clear Pyralin, or any other transparent sheet material which is not soluble in, for example, "Abbott's metaphen solution" or other similar solutions commonly employed for sterilization in surgery. A similar sheet-like material of black Pyralin

as shown at 22 in Figs. 3 and 4 or of clear Pyralin as shown at 23 in Fig. 6 together with a spacer ring 24, also of the same material as the members 21, 22 and 23, cooperate with the member 21 to provide a container for a suitable fluorescent material 25 which, for convenience, has been illustrated in Fig. 4 in more or less solid form but which may, of course, take other forms such as the crystalline form illustrated in Fig. 3.

In assembling the novel container for the fluorescent material 25 to make the fluoroscopic screen 11, the ring 24 is placed on one of the members 21, 22 or 23 and the fluorescent material 25 is arranged in the ring on that member. The other sheet-like member 21, 22 or 23 is then placed against the ring 24 at the side thereof opposite the first mentioned sheet-like member and the screen so assembled is ready for sealing. As a seal, I prefer to use a solution of Pyralin in acetone although other Pyralin solutions may be employed. That sealing material is spread about the peripheral edge of the screen 11 assembled as just described above and provides an edge seal 27 which is impervious to the sterilization agents described herein and which hermetically seals the container about the fluorescent material.

When only one of the transparent sheet-like members 21 or 23 is used with the opaque sheet-like member 22, as shown in Fig. 3, an image surface or window is provided at one side of the container by means of which the image may be viewed. If it is desired, such an image surface or window may be provided at both sides of the container, as shown in Fig. 6, by employing the transparent, sheet-like members at opposite sides of the container.

The screen 11 as thus assembled and sealed may be inserted in the holder 13 and secured in place by the retaining ring 18 or other securing means. A fluoroscope thus made can be employed to exhibit Roentgen ray or X-ray images through or on the sheet-like member 21 or through or on the sheet-like member 23. As so constructed, it may be employed in the oral cavity and may be sterilized without injury to its fluorescent properties.

In Fig. 1 of the drawing, a hollow shield 28 is shown mounted on the handle 17. The shield is of such size as to enable the operator to insert his hand or a portion thereof into the same for protection against the X-rays during use of the instrument. The shield may be made of metal or of rubber impregnated with lead or of other material which resists penetration of the rays.

In Fig. 7, a gauge 29 is shown and is slidably secured to the handle 17 by any suitable means such as a clip 30. The gauge comprises a ring 31 within which and between suitable discs 32 carried by the ring (one disc only being shown) is fluorescent material which glows when affected by the rays in an X-ray shield. One or both the discs 32 are therefore of clear or transparent material. The gauge is adjustable along the handle and also angularly with respect thereto for indicating the margin of the X-ray field so as to enable the operator to guard against excessive exposure of his hands to the rays.

While I have described a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention. For example, the seal 27 may be resistant to phenylene solutions, other than the "metaphen" specifically referred to hereinbefore and instead of Pyralin or any other sheet-like material may be employed which is not soluble in the sterilizing agent to be used. However, where a plasticized nitro-cellulose sheet such as Pyralin, or other suitable plastic is employed, the sealing material in solution preferably is such that it will soften the edges of the sheets and when dried form a sealing film or band common to the edges of the sheets and integrally bonded thereto. I do not, therefore, wish to be limited to the precise details of construction set forth, but desire to avail myself to all changes within the scope of the appended claims.

I claim:

1. A dental fluoroscope comprising a pair of sheet-like members, at least one of which is transparent, a substantially ring-shaped spacer member arranged between said sheet-like members for spacing them apart, fluorescent material in the space defined by the ring-shaped member between said sheet-like members, and a peripheral edge seal integral with said sheet-like members holding the same and said ring-shaped member in assembled relationship about said fluorescent material and hermetically sealing said fluorescent material therein.

2. A method of making a fluoroscope, which comprises arranging a fluorescent material in a space provided between a transparent sheet-like member of acetone solubility characteristics and another sheet-like member of similar solubility characteristics, and applying a solution of Pyralin in acetone about the peripheral edges of the sheet-like members to provide an annular sealing ring integral with both sheet-like members for hermetically sealing the fluorescent material therebetween.

3. A method of making a dental fluoroscope adapted to be sterilized, which comprises forming a container with a pair of discs of soluble material, at least one of which is transparent, and a spacer ring therebetween, arranging a fluorescent material in said container, securing the container in assembled relationship about said fluorescent material, and hermetically sealing the container about the peripheral edges of said discs with a film-forming solution comprising a solvent capable of producing an integral bond between the film and the peripheral edges of said discs.

4. A method of hermetically sealing fluorescent material between sheets of plasticized material which comprises applying to the edge of the sheets a common band of film forming material in a solution which is a solvent for the sheet material, and thereafter evaporating the solvent from the band to provide a sealing film common to the edges of and integrally united to said sheets.

5. A dental fluoroscope comprising a fluoroscopic screen, a handle therefor, and means on said handle for shielding the hands of the user from Roentgen rays.

6. A dental fluoroscope comprising a fluoroscopic screen, a handle therefor, and a hollow shield on said handle adapted to accommodate the hand of the user for protecting the same from Roentgen rays.

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