Jan. 2, 1923. 1,441,160.

F. W. LOVEJOY.

DENTAL X-RAY PACKAGE.

FILED MAY 15, 1920.

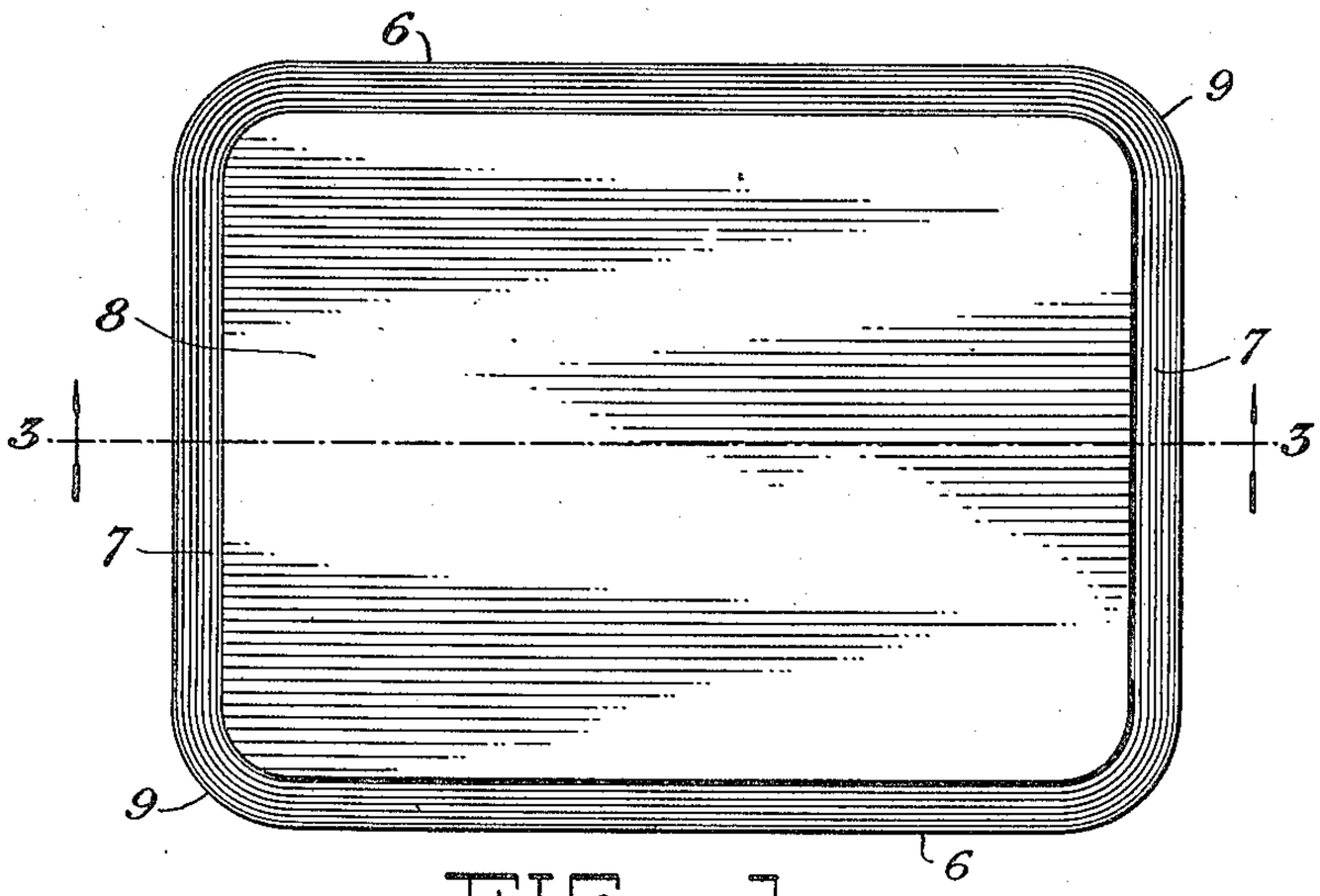

FIG. 1.

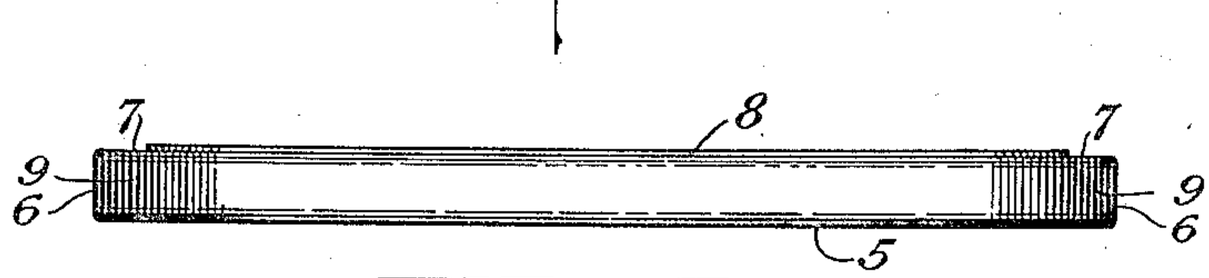

FIG. 2.

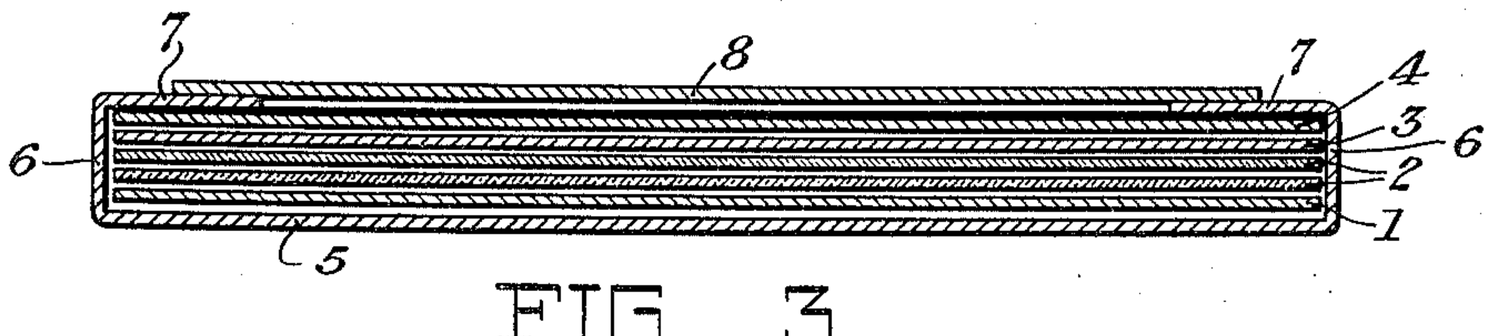

FIG. 3.

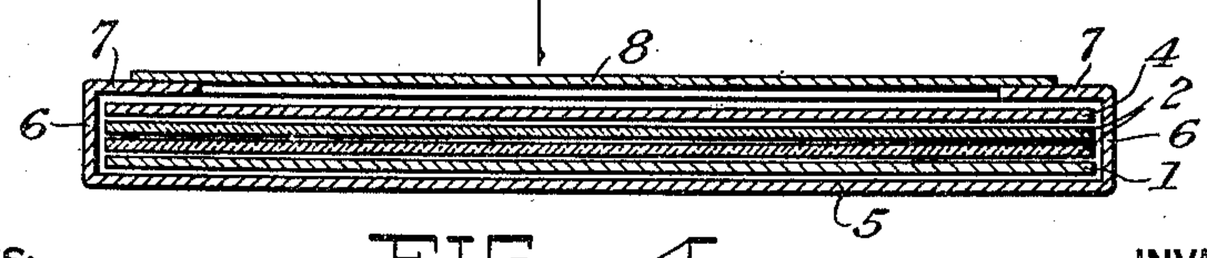

FIG. 4.

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UNITED STATES PATENT OFFICE.

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DENTAL X-RAY PACKAGE.

Application filed May 15, 1920. Serial No. 381,728.

To all whom it may concern:

Be it known that I, FRANK W. LOVEJOY, a citizen of the United States of America, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Dental X-Ray Packages, of which the following is a full, clear, and exact specification.

My invention relates to packages of sensitized films prepared for use individually in dental X-ray work.

The object of my invention is to provide a wrapper for such an individually packed film which will be simple to manufacture and convenient to use, which will be sufficiently waterproof for all ordinary purposes, which is at all times easy to open and which is sufficiently flexible to be bent as needed in use. Other objects will appear hereinafter.

These and other ends, I have attained by the structure more fully explained hereinafter and particularly by the use in the joints of the outer envelope of the package of an adhesive that is unaffected by water, as specified in the claims attached hereto.

Reference will now be made to the appended drawings in which the same reference characters refer to the same parts throughout:

Fig. 1. is a plan of my improved package;
Fig. 2. is an elevation thereof;
Fig. 3. is a section on line 3—3 of Fig. 1;
Fig. 4. is a section of a modified form.

The package contains preferably the following elements: a sheet 1 of black protective paper, opaque to ordinary light but pervious to X-rays, two sheets 2 of sensitized film, a sheet 3 of metallic foil, such as lead, and another sheet of black protective paper 4, all of these sheets being of the same size. It is to be understood that the number and character of the contained sheets may vary widely, the only essential characteristic being a sheet of material sensitive to X-rays; but I have shown and described a form which in practice is found very desirable.

Around the enclosed leaves enumerated above is placed a wrapping sheet 5, of opaque paper, of greater area than the enclosed sheets. This overlies the sheet 1 and its edges are bent up around the edges of the contained sheet at 6 and then bent to overlie the surface of sheet 4, in a continuous flange or fold 7, extending around the entire periphery of the package. A sheet of paper or other material 8, coated with an adhesive that is unaffected by water is attached by the adhesive around its entire edge to this fold 7, overlapping this to an extent sufficient to insure a firm and reliable adherence. As shown, it does not extend entirely to the edge of the package. The corners of the package, as is common, are shown rounded at 9.

The simplest way of supplying the sheet 8 is to strike it out from a large sheet of coated material so that the entire under surface is coated; but it is, of course possible to coat only a portion thereof, such as the edges. The sheet will when pressed against the fold 7 contact it most forcibly since its upper surface will be raised by the thickness thereof above sheet 4. But it will also contact and adhere more or less firmly to the central portion of sheet 4. In Figs. 3 and 4, all the sheets are shown spaced for the sake of clearness.

It has been found that an adhesive or sheet containing rubber tends, to a noticeable degree, to prevent secondary radiation and in that respect has the function of a sheet of metallic foil. For that reason the absence of the foil from the package is not attended with the loss of all the properties accompanying it. A package from which the foil is omitted is shown in Fig. 4, the reference characters being applied otherwise as in Fig. 3.

While the particular composition of the adhesive is not of importance, it may be stated that it is preferably a composition of rubber and coal tar pitch with any suitable softener, such as benzol, gasoline or chloroform. This is sufficiently adherent without heat, though heat may be advantageously used when the sticker is pressed into position. Composition such as that mentioned are well known and are used for adhesive tapes of various kinds, such as that known as "surgeons' tape."

While this package is exceedingly simple, it has numerous advantages in addition to those already mentioned, that are not obvious from the mere description and which will now be pointed out. It has sometimes been found desirable in using a package hav-

ing a wrapper of material that is not waterproofed, to place the same in a bag or cot of rubber to prevent the moisture of the mouth reaching and permeating the envelope or wrapper and thus affecting deleteriously the sensitive film within. I have found, however, that the weak point in such packages is not so much the material of the wrapper as the meeting points between the pieces of material, and that by improving the joint a package having an envelope made of a good grade of paper may be used alone.

It is desirable and customary when the dental X-ray operator is taking a number of exposures to place the exposed individual film packages in a receptacle, from which they are removed at one time by the person who develops them. It quite frequently happens, therefore, that the package remains in a moist condition for an appreciable length of time. If the parts of the envelope are connected by an adhesive that is permeable to moisture, these joints are at once attacked, by the moisture of the mouth; and, particularly if the package stands some time, the joint will become unsealed, although the moisture may not have permeated the paper directly. By using an adhesive that is unaffected by moisture, I make a joint that will not become loosened from use in the mouth; and experience has shown that a good grade of heavy paper, even though not fully waterproofed, when the joints are thus waterproof, will protect the film from the moisture for a reasonable length of time, such as is usual in regular practice.

Not only does the use of the water repellant adhesive render the joint less easily opened when such opening is undesired, but it renders it more easily opened when opening is desired. The water soluble adhesives, when dry, form hard joints that are not readily opened. Packages protected from moisture during exposure are thus hard to open and are ripped open or mutilated with some difficulty in the dark room. An adhesive of the type here described permits the sheet 8 to be engaged at its edge by the finger nail and peeled off, in the manner of surgeon's tape. It is thus evident that while a package sealed with a soluble adhesive opens too easily if exposed to the moisture of the mouth, and with too great difficulty if protected therefrom, that by the use of a waterproof adhesive a package results that may be opened with sufficient ease at all times, but which does not end to open of itself.

Another advantage attained by my package is that when a water soluble adhesive is used, it is necessary in forming the packages to apply moisture thereto and thus unavoidably introduce into the package at the time of manufacture a certain small amount of moisture that is wholly undesirable. Moreover the moistening of the adhesive introduces a separate operation into the assembly of the package, while this operation is omitted in the formation of my improved package.

A still further advantage is that adhesives of the water repellant type do not get hard and inflexible, as do those affected by water. For certain exposures it is necessary to bend the package in order to insert it into the necessary position. If the adhesive is hard and dry, it either prevents the bending, or it cracks and tends to open the joint; while if a flexible adhesive is used, it permits the bending of the package. Inasmuch as the whole of sheet 8 is coated for manufacturing reasons, this would, if coated with a hard dry material, cause the whole package to be inflexible.

An additional advantage in the use of this sticker is that if it is found desirable to make a package which is entirely waterproof, it is possible still to use only the single wrapping, because the adhesive will stick to it, even though it is impregnated or coated with water repellant material, to which a water soluble adhesive would not adhere.

I contemplate as within the scope of my invention all changes and modifications, such for instance as have been indicated above, which fall within the reasonable interpretation of the appended claims.

From the above description it is evident that I have provided a package that is simple to manufacture, convenient to handle, is sufficiently waterproof for all reasonable purposes and may be completely waterproof, tends to prevent secondary radiation, is easily opened under all circumstances, but does not open spontaneously, is flexible and is comfortable to the patient.

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

1. A package of dental X-ray film comprising a sheet of sensitized film, a sheet of fibrous protective material larger than said sensitized film and overlying one surface thereof, and a sheet of material coated with an adhesive material that is unaffected by moisture, the edges of the last named sheet being pressed into adhesive contact with the edges of the first named sheet continuously around the entire periphery of the package.

2. A package of dental X-ray film comprising a sheet of sensitized film, a sheet of protective material larger than said sensitized film and overlying one surface thereof, and a sheet of protective material coated with a slow drying adhesive material that is unaffected by moisture, the edges of the last named sheet being pressed into adhesive contact with the edges of the first named sheet continuously around the entire periph-

ery of the package, the joint thus produced being light and water tight but permitting the ready stripping apart of the sheets.

3. A package of dental X-ray film comprising a sheet of sensitized film, a sheet of fibrous protective material larger than said sensitized film and overlying one surface thereof, the edges of said last defined sheet being bent around the edge of the sensitized sheet to form a continuous flange overhanging the other surface of said sheet, and a sheet of material at least a part of which is coated with an adhesive material that is unaffected by water, the last named sheet being pressed into adhesive contact with the flange.

4. A package of dental X-ray film comprising a sheet of sensitized film, an opaque protective paper sheet overlying one surface thereof, an opaque protective paper sheet of larger size than said film overlying the other surface thereof, the edge of said last defined sheet around the entire periphery thereof being bent around the edges of the film and the other protective sheet and forming a continuous flange overlying the entire periphery thereof, and a sheet of material at least a part of which is coated with an adhesive impervious to moisture, the last named sheet being pressed into intimate adhesive contact with the flange.

5. A package of dental X-ray film comprising a sheet of sensitized film, sheets of protective material impervious to actinic light rays and pervious to X-rays, overlying each surface thereof, one of said sheets being of substantially the same size as the film and the other of larger size, the edge of said last defined sheet around the entire periphery thereof being bent around the edges of the film and the other protective sheet and forming a continuous flange overlying the entire periphery thereof and a sheet of material coated with an adhesive composition comprising rubber and impervious to moisture over its entire inner face, and pressed into intimate adhesive contact with the flange continuously around the entire periphery of the package.

Signed at Rochester, New York, this 13th day of May, 1920.

FRANK W. LOVEJOY.