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A. KAGAN CHABCHAY, ALSO KNOWN AS A. KAGON-CHABCHAY

RADIOACTIVE ARTICLE

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Fig. 2.

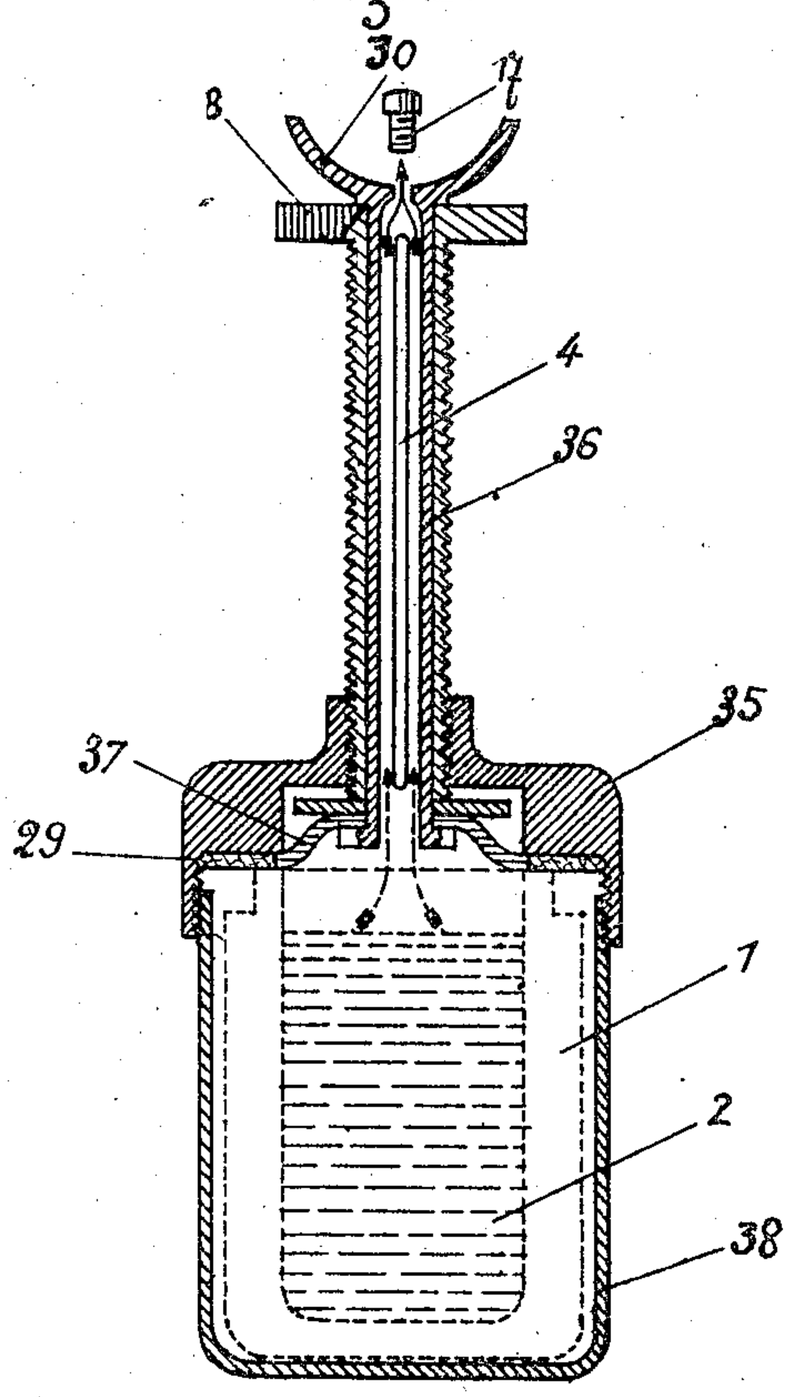
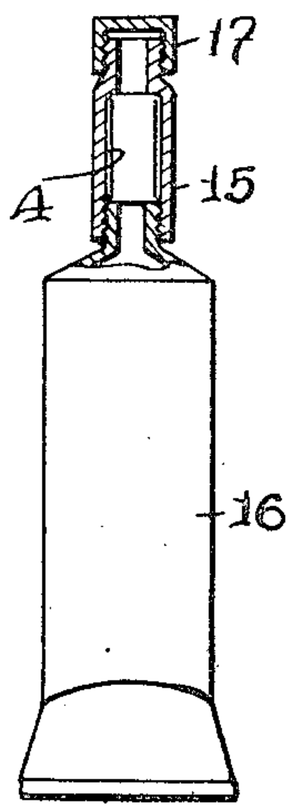


Fig. 1.



Inventor

Alexander Kagan-Chabchay

By Howlett Stevens & Garford

Attorney

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RADIOACTIVE ARTICLE

Alexander F. Kagan Chabchay, also known as Alexandre Kagon-Chabchay, Paris, France

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6 Claims. (Cl. 128—1.1)

This invention relates to apparatus to be used for rendering radioactive various products and other objects as well as to devices to be employed for the application of these methods.

The existing methods, e. g., the incorporation of a radioactive substance in the product, the incorporation of a radioactive substance in the material of the receptacle which contains the product to be rendered radioactive, the introduction into the mass of the product of the emanation yielded by a special generator, are not adapted to render radioactive only a part of the contents of a receptacle. Therefore, even those parts of the material which are not to be used immediately are impregnated with emanation which is useless, since the effect is lost before the material is used. Furthermore, the majority of these methods require application of special receptacles and products. The first of above mentioned methods has also this inconvenience that it requires the consumption of the radioactive substance itself and not of its emanation which not only means a waste of the radioactive substance but may be even injurious for health.

According to the present invention, it becomes possible to use ordinary products, receptacles and apparatus and to radioactivate at once just a portion of the product to be used first. The invention in its general principle consists in maintaining the products, the apparatus, etc., under the influence of an appropriated radioactive source set up in an independent removable element disposed outwardly or inwardly with regard to the object (to the mass of the product, to the walls of the receptacle, to the body of the apparatus, etc.), in such a way that only those portions of the product which will be used next are influenced by the radioactive source or are more particularly influenced than other portions of the product. Consequently, it becomes possible to utilize in the devices of the present invention very small quantities of radioactive substances, far beneath the limit of nocivity, which makes unnecessary the filtration of the emanation. Fluids in motion may be rendered radioactive in such a way that the fluid undergoes the influence of a radioactive source just before it leaves its conduit.

The nature of the radioactive substances to be employed and the mode of their application vary in accordance with the nature of the product or of the apparatus to be radioactivated. For instance, if the product to be radioactivated is enclosed in a covered vessel where the emanation can be accumulated, a salt of radium yielding radon is preferably used; in other cases, substances of the thorium family producing thoron should be employed, as the thoron which has a very short life is yielded continuously.

The elements comprising a radioactive source may be utilized in any appropriated form. It is preferable, of course, to use dissolved radioactive salts placed in a capsule which, on its side turned to the object to be radioactivated, is made of a material permeable to the emanation. It is suggested to use capsules made of a synthetic resin which is more resistant to humidity and heat than for instance Celluloid, etc.

Where a radioactive substance is to be applied to a support, it is recommended to spread it in form of a thin film lest the free passage be barred to alpha particles possessing a very feeble penetrating capacity.

In order to fix a radioactive substance on a support, it is suggested to mix a radioactive salt with a synthetic resin properly diluted and to apply the mixture to the active surface of the support in any appropriate manner. The suggested method has this essential advantage over the now prevailing method of use that it makes possible to determine the exact quantity, in weight, of a mixture used for coating and consequently, the exact quantity of the radioactive substance actually applied in each particular case, which is practically impossible to obtain by the existing methods, as the degree of concentration of a viscous solution other than a synthetic resin (cellulose, etc.) varies considerably during the manipulation, according to its age, to prevailing temperatures, etc.

In order to make the invention quite clear, certain preferred embodiments thereof are described below with reference to the annexed drawing:

These are merely given as examples and for the purpose of illustrating and explaining the invention and the best manner of embodying the same in practical use. They are not intended to be exhaustive or limiting of the invention, but on the contrary are intended to enable others to modify the invention and to embody it in numerous other forms each as may be best suited to the requirements of any particular use.

In the drawing:

Fig. 1 is a view partly in elevation, partly in section of a device embodying my invention; and

Fig. 2 is a view in axial section of another embodiment of my invention.

In the example shown in Fig. 1, the source 4 of radioactive material is placed in a movable and interchangeable element. In this instance

a supplementary tube 15 is removably applied to the mouth of a collapsible tube 16, which, for example, may be of any of the ordinary commercial types. This supplementary tube 15 is provided with a cap 17 which serves both to close the combination contained and to prevent loss of radio-active emanation.

It will be observed that in the use of this device the contents of the tube are delivered from the mouth of the tube 15 when the cap 17 is removed and that, after each use, the portion of the material which is to be used next will remain within the tube 15 where it is exposed to the emanation from radioactive substance carried at the radioactive source 4. Thus the part of the contents of the tube 16 which remains within the tube 15 beside the source 4 is radioactivated continuously until it is extruded from the tube for use; and thus with a relatively small source of radioactivity the contents may be strongly radioactivated.

It is an advantage of this form of the invention that the supplemental tube 15 may be readily fitted to any similar collapsible tube 16 and thus when the contents of one tube 16 are exhausted the tube 15 can quickly be transferred to a new collapsible tube.

Fig. 2 shows a modified form which is similar to that of Fig. 1, in that the material which is to be used is extruded through a tube extended from the mouth of the receptacle in which the supply of material is maintained and the radioactivation of the material occurs in this tube, whereby only the portion of the material which is to be next used is subjected to the action of the radio-active source. This embodiment, however, is designed particularly for use with creams, pastes, ointments, etc., which are supplied in jars instead of in collapsible tubes.

In this embodiment of the invention the receptacle 1 contains the supply of a product 2 which is to be radioactivated. This receptacle is placed within the casing 38, onto which is screwed the cover 35. The latter is provided with a suitable gasket 29 so that, when screwed firmly onto the casing 38, a pressure tight seal is made with the receptacle 1.

Into this cover is screwed an extruding means which consists of the threaded tubular extension 36 and a piston 37 (e. g., of an extensible material such as leather, cork, etc.) fitted on its end which in turn fits the inside of the receptacle 1. The threaded member 36 is hollow for delivery of the material extruded from the jar 1 and carries within it the source 4 of the radioactive material.

In the case illustrated, the upper end of the tube 36 is made in the form of a cup 30. This is particularly useful for ointments, massage creams, etc., where it is desired to take a film of the material onto the tips of one's fingers. A plug or cap 17 is provided for closing the opening when the material is not being used.

A knurled knob 28 is provided at the upper end of the screw to control the extrusion of the material from the jar.

In the example illustrated I have made the extruding tube 36 separate from the tubular screw which latter is integral with the knob 28. It will be understood, however, that this is not essential and that the parts could be made integral or could be completely separated.

When the extension 36 is screwed down into the casing by turning the knob 28, the piston 37 is pressed down onto the top of the material within the receptacle 1 and the material is thereby squeezed up from the receptacle 1, through the tube 36, past the radioactive source 4 and into the cup 30. Between subsequent uses of the device the conduit 36 is closed by the stopper or cap 17 and a portion of the material remains within the conduit exposed to the action of the radioactive source 4 so that when it is next used it will come out from the tube strongly radioactivated.

It is an advantage of this construction that it may be readily adapted to numerous forms and sizes of commercial jars for pastes, ointments, creams and the like or, obviously, the product 2 may be put directly into the casing 38 instead of being contained within a separate receptacle 1, i.e., the top 35 and the other part may be screwed directly onto the jar in which the product 2 is supplied. In any case the piston 37 should be of a size adapted to fit the sides of the receptacle or casing in which the product is contained so as to exert pressure thereon for extruding. Where the casing 38 is used without the inner receptacle 1 the piston 37 may be made of a rigid material accurately fitted to the interior of the casing, whereas in the case where less accurately dimensioned commercial receptacles are used it is preferable to use for the piston a resilient compressible material which can adjust itself to these variations in dimensions.

What I claim is:

1. A device for irradiation of materials such as pastes, creams and the like which comprises a receptacle for the material adapted for extruding the contents thereof through a mouth thereon, means adapted to be connected to the mouth of the receptacle and having a tubular part through which the material extruded from the mouth of the receptacle is passed before delivery for use, a radioactive material positioned on the inside of said tubular part whereby to irradiate only the small portion of the material which is to be used first.

2. A device as defined in claim 1 in which the receptacle is separable from the means over its mouth and is adapted to carry the material in commerce.

3. A device as defined in claim 1 in which the receptacle is a collapsible tube and the means on its mouth is provided with means for removably connecting it to the mouth of the tube.

4. A device as defined in claim 1 in which the radioactive material is carried by a support removably positioned in the tubular part.

5. A device as defined in claim 1 in which the receptacle is substantially rigid, the device includes means for exerting pressure on the material within the receptacle, and the tubular part extends into the receptacle at least to the surface of the material therein, whereby the pressure exerted on the material will force it into the tubular part.

6. A device as defined in claim 1 in which the receptacle has a substantially cylindrical and rigid inner wall, and the tubular member has around its end a piston fitted to the inside of said cylindrical wall, whereby to press the material up into the tubular part, and an abutment member engaging the end of the receptacle to position the tube relative to the cylindrical wall and to serve as an abutment from which pressure can be exerted on the piston.

ALEXANDER F. KAGAN CHABCHAY,
Also known as Alexandre Kagon-Chabchay.