

UNITED STATES PATENT OFFICE.

RICHARD KEIL, OF EISLEBEN, GERMANY.

RADIO-ACTIVE COMPOSITION.

No. 901,177.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RICHARD KEIL, merchant, a subject of the German Emperor, residing at Eisleben, Germany, have invented certain new and useful Improvements in Radio-Active Composition; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Radium has hitherto been used for medical purposes, but up to the present time in an uneconomical manner, because only those quantities of emitted rays and other radio-active products were utilized which were formed during the time of application. While, however, the radium was not in use, it was emitting rays which were without effect and lost. By my invention the emitted rays are stored and collected, as well as the other products of decomposition of the radium on which the medical effect is based. In using the product produced by my invention, not only is that quantity of the rays which corresponds to the time of application effectively used, but also the total quantity formed during all the time previous to the application. This result is obtained in the following manner:—In order to retain the products of the decomposition of the radium and to collect the emitted rays, I inclose an emitting center or core of radio-active substance in a material, which with respect to the emitted products is neither impervious as glass would be, for example, and not fully pervious as would be the case of highly porous materials. The substances inclosing the emitting center must allow the rays to enter therein, but not to penetrate therethrough, the rays being, therefore, stopped in the substance. Many materials ground to fine powder and afterwards compressed are proper materials nearly impervious to said rays. I use, for example, barley flour, wheat flour, sugar, lime or plaster. For instance I take 0.01 gram radium barium carbonate which contains 0.005 milligram radium carbonate and mix this with one gram of any powder, for instance milk sugar, merely for the purpose of separating the particles of the radium compound and holding them in the proper position. From this mixture I form pills, and press around these pills which form a central core, a coating consisting of 30 grams of dry flour. I

can press this coating of flour upon the pill at one step by means of a pill press, but I prefer to first use 10 grams of dry flour as a coating which is compressed around the central core containing radio-active material and then another coating of 10 grams of dry flour is compressed under a stronger pressure around the previous product, and similarly a third coating of 10 grams of dry flour is compressed under a still greater pressure around the preceding product. If desirable a fourth coating, or even more coatings, may be applied, the pressure being increased each time. The result is a pill containing a core of radio-active material with successive coatings of a partially pervious material therearound into which the rays can penetrate, but through which they would have difficulty in passing. I can then make these pills fully impervious by coating each of them with water glass, paraffin, varnish or any material which is impervious to the rays. I do not restrict myself, however, to spherical pills, as the material might be made in the form of rods, for example. In using said pills or rods, a pill or a portion of the rod is broken into pieces and dissolved in water.

The pills or rods thus produced show, in the beginning, no sensible radio-activity, because the coating surrounding the radium core retains the emitted products of the latter. As soon, however, as the pill or rod is broken the radio-activity of the core manifests itself. If such a pill or rod is broken twenty-five days after it has been made, for example, it will show, by suitable measuring apparatus, an apparent increase of radio-activity, generated by the products emitted from the radium core and arrested in the coating, the inner part of which has, therefore, been made radio-active. It is possible to obtain in this manner, by means of very small quantities of radium, a quantity of radio-activity that could not be obtained without using much larger quantities of radium without the inclosing coating. In other words, it is possible in the matter described to produce by small means a very great radio-active effect. This is the reason that my invention is of great importance in applying radium for medical purposes, for example, or in all cases where radio-activity is desired.

The product may be made in any irregu-

lar or regular shape, such as balls, tablets, rods, etc., according to the purpose for which they are to be used.

I claim:—

5 1. An article of manufacture consisting of a radio active core or center and a coating of pulverized material nearly impervious to the rays emitted from said center, and compressed around said core or center, sub-
10 stantially as described.

2. An article of manufacture, consisting of a radio-active core or center, and a coating of material nearly impervious to the emitted rays, said coating consisting of suc-
15 cessive layers applied under increasing pressure to said core, substantially as described.

3. An article of manufacture, consisting of a core of radio-active material, a coating therefor of material nearly impervious to the emitted rays and composed of successive
20 layers of said material, each layer being pressed upon the core or the preceding layer under increasing pressures, and an outer coating impervious to said rays, substan-
25 tially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

RICHARD KEIL.

Witnesses:

WOLDEMAR HAUPT,
WILLIAM MAYNER.