PATENT SPECIFICATION (11) 1 442 237

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(21) Application No. 42470/74 (22) Filed 1 Oct. 1974

(61) Patent of Addition to No. 1 403 265 dated 6 Oct. 1972

(44) Complete Specification published 14 July 1976

(51) INT. CL.² G01T 1/203

(52) Index at acceptance

G1A 203 20Y 218 247 248 269 316 351 35Y 369 372 387 506 524 52Y 530 53Y 626 762 763 768

(54) PORTABLE APPARATUS FOR MEASUREMENT OF NUCLEAR RADIATION

(71) I, GERALD DAVID WHITLOCK, a British subject of 18, Pixiefields, Cradley, Malvern, WR13 5ND, Worcester, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement: —

This invention relates to portable apparatus for measurement of nuclear radiation and is an improvement in or modification of the invention which is the subject of my patent application No. 46250/72 (Serial No. 1 403 265).

According to this invention there is provided a portable apparatus for measurement of nuclear radiation, comprising a plastic scintillator sheet arranged in a base of a housing for detection of nuclear radiation, a sealing ring mounted in the base of the housing to make a substantially hermetic and light-tight seal between a support surface and the base of the housing, photomultiplier means optically coupled to the scintillator sheet to detect and amplify scintillations of the sheet, and a pump to reduce air pressure in the region of the sheet to substantially below atmospheric pressure, the pump comprising a variable volume chamber, the pump being manually operable to reduce the volume of the chamber, a selectively releasable latch being provided to latch the pump in its reduced volume condition and a spring being provided to increase the volume of the chamber and hence to reduce the air pressure in the region of the sheet when the latch is released.

In one possible embodiment of the invention, the pump is formed by the housing, one portion of which is telescopically slidable within another portion thereof.

Alternatively the pump may be a rolling diaphragm pump, lever-operated to obtain a mechanical advantage.

Because of the provision of the latch to latch the pump in its reduced volume condition, there is no need of a pressure-relief non-return valve to vent air from the apparatus.

The invention will be described by way of example with reference to the accompanying drawing, which illustrates a section through a portable apparatus for measurement of nuclear radiation in accordance with the invention.

Referring to the drawing, the illustrated apparatus is identical to the apparatus described and illustrated in patent application No. 46250/72 (Serial No. 1 403 265) except for two differences.

One of these differences is the provision of a latch 60 for selectively holding housing portions 8 and 9 telescoped one into the other with spring 10 compressed. The latch 60 takes the form of a projecting pin 61 on housing portion 9 engaging in a recess in the form of a groove 62 in housing portion 8. The groove 62 has a vertical portion 63 and has a horizontal portion 64 at the bottom of the vertical portion 63.

The latch 60 is adapted to be operable by pressing housing portion 9 down over housing portion 8, compressing spring 10, until the pin 61 reaches the bottom of the vertical groove portion 63, thereby compressing spring 10, and then rotating housing portion 9 to move pin 61 into the horizontal groove portion 64, in which position the latch 60 holds housing portions 8 and 9 telescoped together.

In this condition, (that is, with housing portions 8 and 9 telescoped together,) the apparatus is, in use, placed on a working surface (not shown) believed to be contaminated with radioactive material, so that the sealing ring 5 makes good contact with the working surface. Then the latch 10 is released by rotating housing portion 9 in the opposite direction and releasing it so

that the compressed spring 10 pushes housing portion upwardly to expand the chamber 6 and hence to reduce air pressure in chamber 6 and in the region of the scintillator sheet 13 to substantially below atmospheric pressure, for a measurement to be made.

After the measurement, the housing portion 9 is again pressed down, and the latch 60 is engaged, to restore the pressure in chamber 6, whereupon the apparatus can be readily moved to another position.

It will be apparent that there is no need of a pressure-relief valve such as the valve "7" in the drawings of Patent Application No. 46250/72 (Serial No. 1 403 265), this being the other one of the two differences mentioned above.

WHAT I CLAIM IS:—

1. A portable apparatus for measurement of nuclear radiation, comprising a plastic scintillator sheet arranged in a base of a housing for detection of nuclear radiation, a sealing ring mounted in the base of the housing to make a substantially hermetic and light-weight seal between a support surface and the base of the housing, photomultiplier means optically coupled to the scintillator sheet to detect and amplify scintillations of the sheet, and a pump to reduce air pressure in the region of the sheet to substantially below atmospheric pressure, the pump comprising a variable volume chamber, the pump being manually operable to reduce the volume of the chamber, a selectively releasable latch being provided to latch the pump in its reduced volume condition and a spring being provided to increase the volume of the chamber and hence to reduce the air pressure in the region of the sheet when the latch is released.

2. Apparatus as claimed in claim 1, wherein the pump is formed by the housing, one portion of which is telescopically slidable within another portion thereof.

3. Apparatus as claimed in claim 2, wherein the latch is formed by a projection of one housing portion engageable in a recess of the other housing portion.

4. Apparatus as claimed in claim 1, wherein the pump is a rolling diaphragm pump.

5. Apparatus as claimed in claim 4, wherein the pump is lever-operated.

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Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1976.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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1 SHEET

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale.