XR 3,604,934

United States Patent

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[54] **APPARATUS FOR RADIOACTIVE IRRADIATION OF SAMPLE MATERIALS**
1 Claim, 2 Drawing Figs.

[52] **U.S. Cl.** **250/106,** 250/52, 252/84
[51] **Int. Cl.** **G21h 5/00**
[50] **Field of Search** ..... 250/106, 106 S, 84, 52

[56] **References Cited**

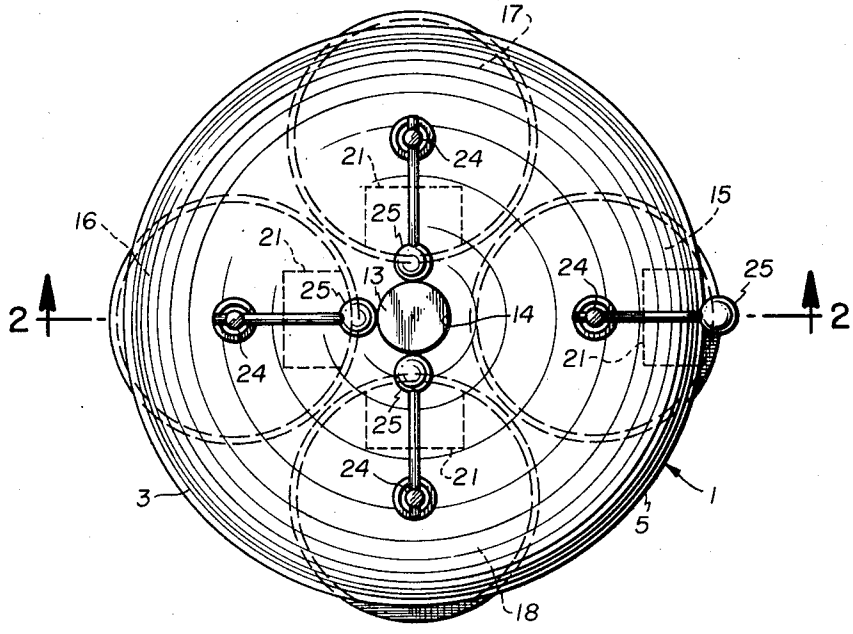
UNITED STATES PATENTS

2,810,839	10/1957	Ferguson	250/106 S
3,340,397	9/1967	Johnston	250/52

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ABSTRACT: Apparatus for the irradiation of sample materials with radioactive radiation comprising a housing containing a substantially centrally located cavity containing radioactive material, a plurality of horizontally disposed cylindrical passages each having a vertical axis and communicating with the central cavity, the passages being spaced from each other about the central cavity, each passage containing a coaxial cylindrical rotatable carrier therein, the carrier having a seat for containing a sample to be irradiated, the seat being recessed into the peripheral wall of the carrier, each seat being horizontally registrable with the central cavity upon rotation of the carrier, thereby permitting a plurality of the carrier seats to be simultaneously or selectively exposable to the source of radiation.

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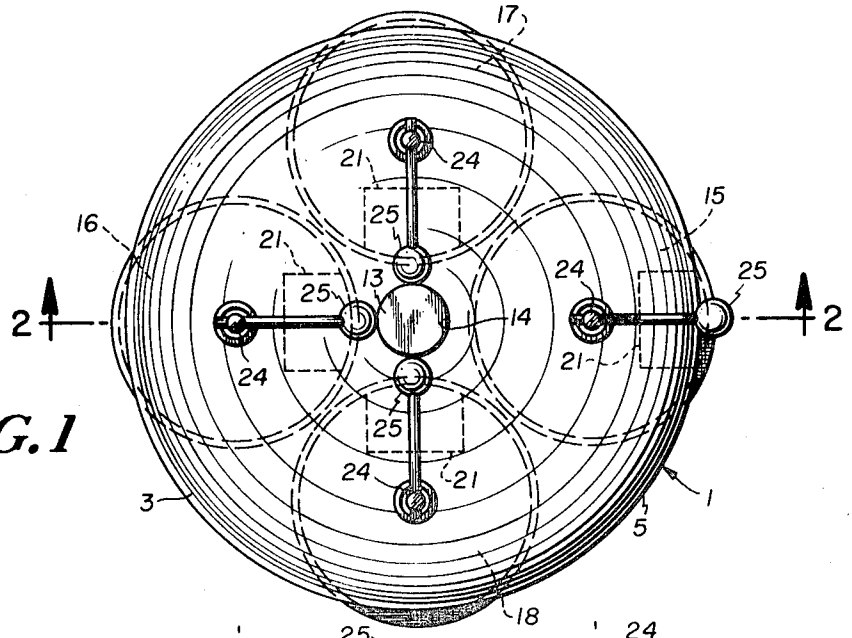


FIG. 1

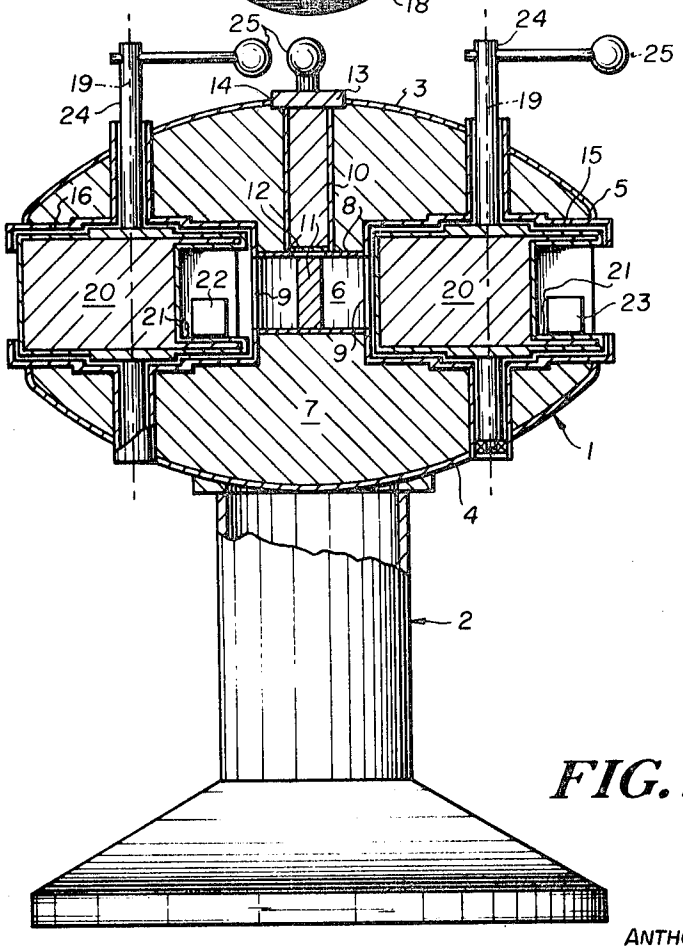


FIG. 2

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APPARATUS FOR RADIOACTIVE IRRADIATION OF SAMPLE MATERIALS

BACKGROUND OF THE INVENTION

Several types of apparatus for the irradiation of sample materials with radioactive radiation are known. ONe such known type is illustrated by U.S. Pat. No. 2,810,839 which permits a single sample to be exposed to irradiation. There is a need to provide an apparatus which can selectively or simultaneously irradiate a plurality of samples to determine overexposure or underexposure to radioactive radiation to arrive at the optimum exposure for the sample being irradiated, while at the same time assuring that no harmful radiation emission escapes from the housing when one or more samples are removed during selective time intervals.

SUMMARY OF THE INVENTION

In accordance with the invention there is provided an apparatus for the irradiation of sample materials with radioactive radiation comprising a housing having top, bottom and sidewalls of, for example, stainless steel and containing a substantially centrally located cavity containing containing a radioactive material as a source of radioactive radiation, a plurality of horizontally disposed cylindrical passages each having a vertical axis are located in the housing each in communication with the central cavity, each passage containing a coaxial cylindrical rotatable carrier therein, the carrier having a seat for containing a sample to be irradiated, the seat being recessed into the peripheral wall of the carrier, each seat being horizontally registrable with the central cavity upon rotation of the carrier within its passage, thereby permitting a plurality of the carrier seats to be simultaneously or selectively exposable to the source of radiation, the housing being filled with a radiation shieldable material such as lead, and the carriers being composed of a lead core having an outer covering of, for example, stainless steel.

DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a top view of the apparatus of the invention, and

FIG. 2 illustrates a cross-sectional view along lines 2—2 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the FIGS., the apparatus of the invention comprises a housing **1** mounted on a pedestal **2**. The housing **1** is preferably a stainless steel housing advantageously of substantially elliptical cross section having an arcuate top wall **3**, an arcuate bottom wall **4**, and an annular sidewall **5** interconnecting the top and bottom walls thereby forming the substantially elliptical cross section of the housing. A substantially centrally located cavity **6** is contained in the housing with the housing being otherwise filled with a radiation shieldable material **7** such as lead or a lead alloy such as a lead-antimony alloy. In

providing the cavity **6**, a frame **8** having side openings **9** is mounted on one end of a tube **10** with the tube communicating with the frame interior and with the other end of the tube opening through the top wall **3** of the housing. A charge **11** of a radioactive isotope is inserted into the cavity **6** defined by the frame **8** through the tube **10**, a disc **12** is then inserted into the tube **10** closing the inner end portion of the tube and the tube is filled with the radiation shielding material **7** after which the top of the tube is closed by closure piece **13** welded to the walls of opening **14** in the top wall **3**. A plurality of horizontally disposed cylindrical passages **15**, **16**, **17** and **18** each having a vertical axis **19** are located in the housing each in communication with the central cavity **6** by means of the frame openings **9**, the passages being spaced from each other about the central cavity **6**. Each passage contains identical coaxial cylindrical carriers **20** therein, the carriers each having an identical seat **21**, the seats being recessed into the peripheral wall of each carrier and each seat being horizontally registrable with the central cavity upon rotation of the carrier within its respective passage, thereby permitting a plurality of carrier seats carrying sample materials **22** and **23** to be simultaneously or selectively exposable to the source of radiation **11**. Each carrier is provided with a vertical shaft **24** suitably journaled in the housing **1** by which the carrier may be manually rotatably manipulated by means of a handle **25**.

The radioactive material **11** employed may be composed of a radioactive isotope such as metallurgical compacts of cesium-134, cobalt-60, samarium-153, thulium-170, lutetium-177, ytterbium-169, gadolinium-153, or radioactive alloys of plutonium and beryllium or americium oxide and beryllium.

The structures such as the frame **8**, tube **10**, and the linings of the cylindrical passages are advantageously formed of stainless steel.

Various modification of the invention are contemplated within the scope of the appended claims.

What is claimed is:

1. Apparatus for the irradiation of sample materials with radioactive radiation, comprising a housing containing a filling of radiation shieldable material, a substantially centrally located cavity within the housing and containing a radioactive material, the housing having a plurality of horizontally disposed cylindrically shaped passages each having a vertical axis and each being communicable with the central cavity, the passages being spaced from each other about the central cavity, each passage containing a coaxial cylindrical rotatable carrier therein, the carrier having a seat for containing a sample to be irradiated, the seat being recessed into the peripheral wall of the carrier, each seat being horizontally registrable with the central cavity upon rotation of the carrier within its passage, and means for rotating each carrier within its passage thereby permitting a plurality of the carrier seats to be simultaneously or selectively exposable to the radioactive material the central cavity being defined by a frame having a plurality of side openings, each recessed seat being registrable with one of the side openings, the frame being mounted at one end of a vertically mounted tube, and the tube being filled with a radiation shielding material.