

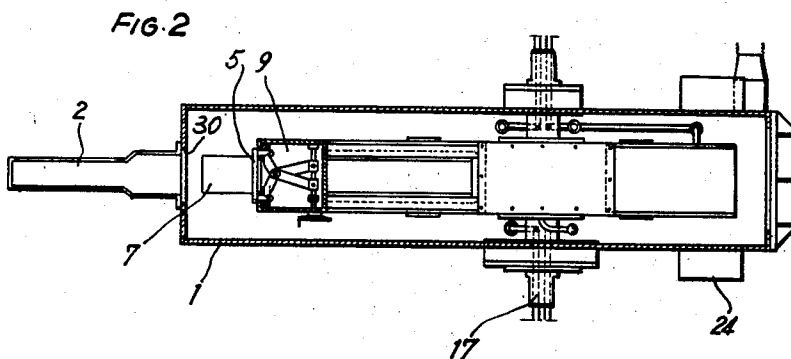
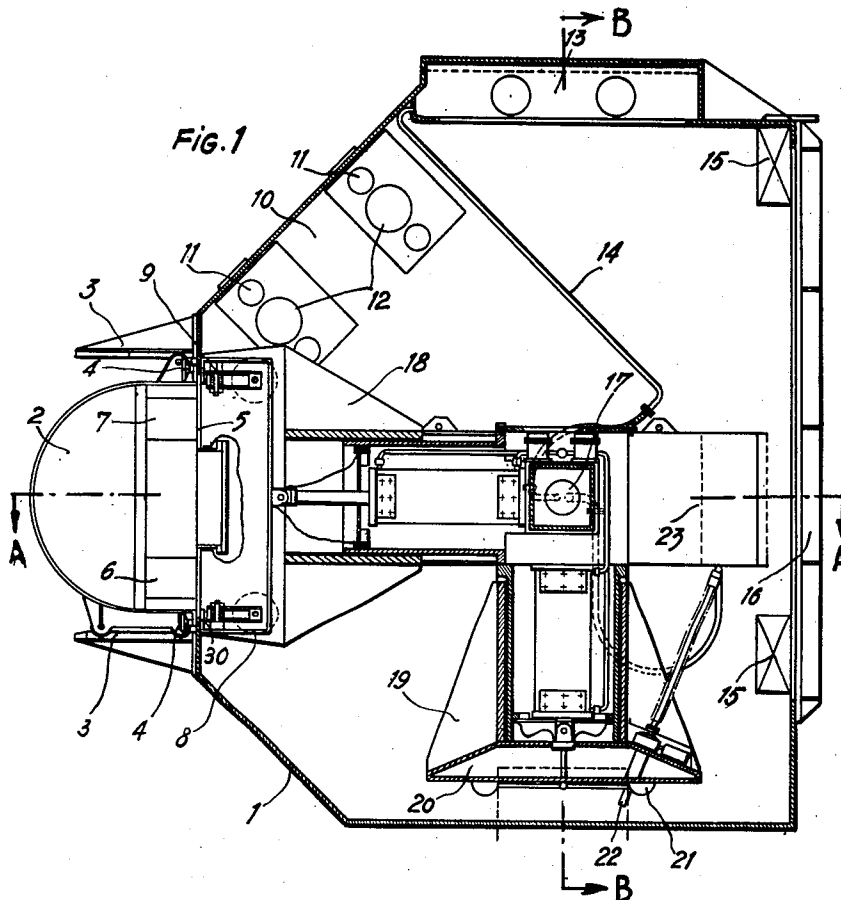
Aug. 4, 1964

A. SIMON  
DISASSEMBLY AND DECONTAMINATION APPARATUS  
ESPECIALLY FOR CALUTRONS

3,143,119

Filed Nov. 13, 1962

4 Sheets-Sheet 1



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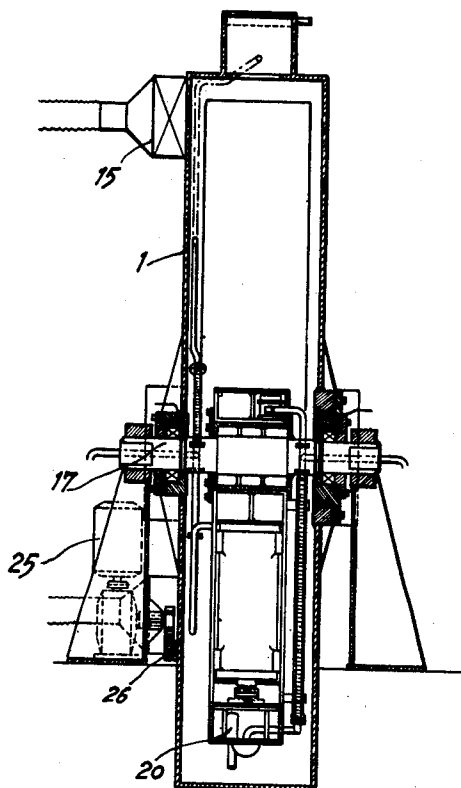


FIG. 3

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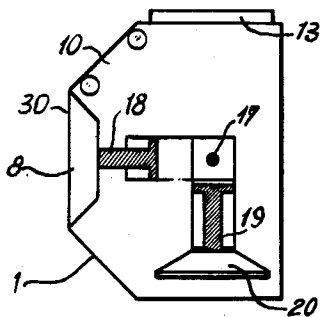


FIG. 4a

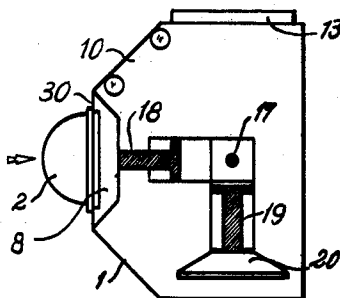


FIG. 4b

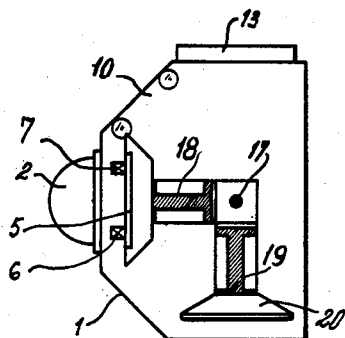


FIG. 4c

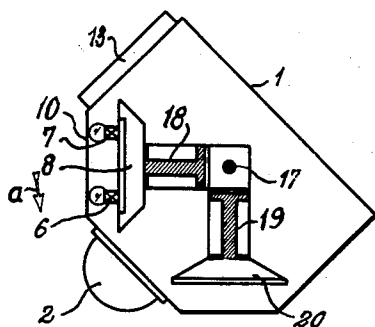


FIG. 4d

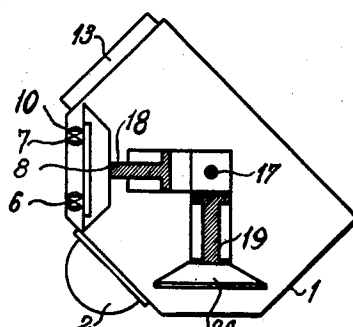


FIG. 4e

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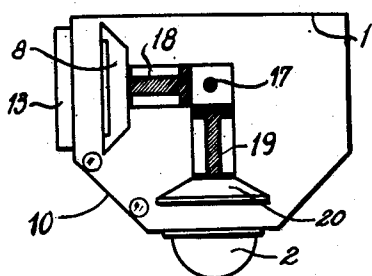


FIG. 4f

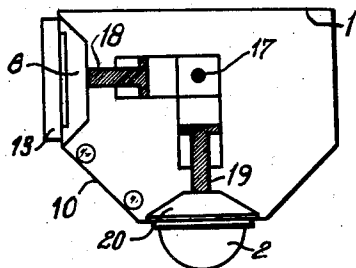


FIG. 4g

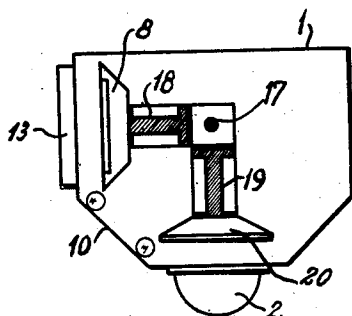


FIG. 4h

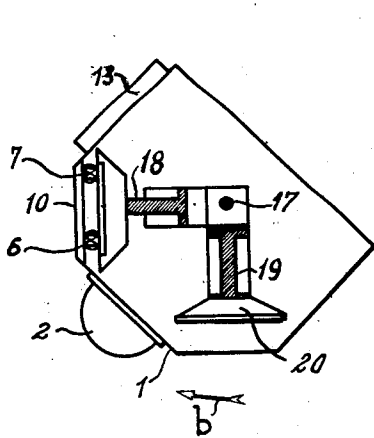


FIG. 4i

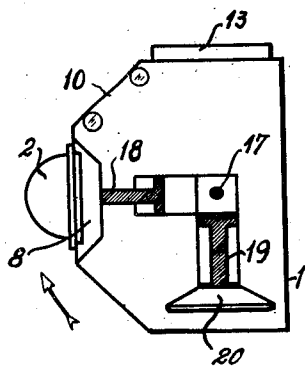


FIG. 4j

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3,143,119

**DISASSEMBLY AND DECONTAMINATION APPARATUS ESPECIALLY FOR CALUTRONS**

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Claims priority, application France Nov. 29, 1961  
5 Claims. (Cl. 134—59)

The present invention relates to a disassembly and decontamination apparatus.

The invention applies to the operations involved in handling a highly radioactive vessel, especially with a view to carrying out the disassembly as well as the decontamination of a calutron vessel, that is to say, those operations which involve the recovery of isotopes, the chemical washing of the elements of a calutron, for example, by means of solutions of hot acids, and the reconditioning of said elements for a further isotopic separation, these different operations being carried out in a protective atmosphere, and the dangers of contamination being reduced to a minimum.

Since there is no apparatus which carries out all these operations, such operations usually have to be carried out directly in an active medium, the operators being protected by frogsuits; alternatively, the contaminated parts to be manipulated are isolated by protective covers of vinyl. These methods entail a large number of manipulations, and safety is not absolutely guaranteed.

The present invention has for its object a disassembly and decontamination apparatus which overcomes the above-mentioned disadvantages.

The disassembly and decontamination apparatus which forms the subject of the invention is essentially characterized in that it comprises a leakproof casing with glove holes and inspection windows which is pivotally mounted on a horizontal shaft and which is provided on the periphery thereof with a coupling station designed to receive the vessel to be disassembled and decontaminated, a disassembly station as well as a station for washing the cover of the vessel, said leakproof casing containing a stationary assembly of two jacks which are integral with two bell-housings, the first of said bell-housings being fitted with a device for sealing and securing the cover of said vessel, whilst the second bell-housing is fitted with means for washing said vessel.

In order that the technical characteristics of the present invention may be more clearly understood, there will be given below a description of one example of construction relating to an apparatus for the disassembly and decontamination of the vessel of a calutron, it being understood that said example does not have any limitative character as regards the modes of utilization of the invention and the purposes to which it can be applied.

FIG. 1 represents a vertical cross-section of the apparatus,

FIG. 2 represents a horizontal cross-section taken along the line A—A of FIG. 1, the jack being shown in the withdrawn position,

FIG. 3 represents a vertical cross-section taken along the line B—B at right angles to the vertical cross-section of FIG. 1,

FIG. 4a—4j show the different stages of operation.

In FIG. 1 especially, there is shown the casing 1 in the coupling position. The vessel 2 of the calutron which has been guided by the rails 3 is secured to a coupling station 30 provided at one side of the casing by means of the hand-wheels 4; the said vessel, which is withdrawn from between the poles of the electromagnet of the calutron is closed by a cover 5 which carries the sources 6 and the collectors 7. The bell-housing 8 which is op-

2

erated by a dual-purpose jack device 18 contains the device 9 for securing the vessel cover, the said device being designed to permit of either the removal or the replacement of said cover by producing action on the jack. On the other hand, when the operation is completed and the vessel is withdrawn, the said bell-housing closes the coupling station and serves to isolate the interior of the contaminated casing. The interior of the bell-housing and the exterior of the cover are not liable to be contaminated since these latter are not in contact with the interior of said casing. Sealing gaskets are provided on the bell-housing for this purpose.

The device 9 for securing the cover is constituted by a kind of clamp which is operated by means of a screw and hand-wheel system through a glove hole and which is engaged over lugs which are welded to the cover.

The station 10 for the disassembly and reassembly of the sources and collectors is located at an angle of 45° with respect to the coupling station and is provided with glove holes 11 and inspection windows 12; other glove holes and inspection windows are disposed in the casing so as to provide access to the different internal mechanisms and to permit the rough internal decontamination of the casing by means of water-hose nozzles fed from the exterior but located inside the casing.

The station 13 for washing the cover is located at an angle of 90° with respect to the coupling station and is provided with an outlet 14 for the washing liquors.

Absolute filters are disposed at 15 and effect the ventilation of the casing. An access door 16 serves for the purpose of effecting substantial disassembly operations either in a frogsuit if the decontamination cannot be carried out or in a conventional manner in the contrary case.

The access for frogmen can be completed by a vinyl lock-chamber which is connected to a close-operation zone.

The stationary, horizontal shaft 17 which pivotally mounts the casing 1 thereon and carries the device 18 for sealing and operating the vessel cover, also carries the device 19 for washing the vessel and comprising a jack which operates a bell-housing 20 fitted with a sprinkler head 21 and a pumping tube 22.

The pipes for the inlet and outlet of the washing solutions pass through the interior of the hollow shaft 17 as well as the conduits for the operation of the jacks. Double seals are fitted on the shaft 17 and are supplied with a slight overpressure between the two seals in order to prevent any contamination.

The device 18 is balanced by a counterweight 23.

The casing, which is balanced by a counterweight 24 as shown in FIG. 2, is operated by an electric motor 25 with reduction unit designed to produce action upon a toothed sector 26 which is integral with the casing (as shown in FIGS. 2 and 3).

FIGS. 4a—4j show the different stages of operation from the moment when a vessel is brought away from the electromagnet after an isotopic separation has taken place up to the moment when said vessel is finally returned in readiness for a further separation.

The casing being in the position of readiness shown in FIG. 4a, a vessel 2 is brought in by means of a conventional handling trolley on approach rails 3, then thrust into contact with the casing 1 and the sealing and securing bell-housing 8 (as shown in FIG. 4b).

The fixing devices 4 are fitted in position and locked as well as the fixing devices 9 which couple the cover to the bell-housing 8. The jack device 18 which actuates the bell-housing withdraws, thereby moving the cover 5 away from the vessel 2 (as shown in FIG. 4c).

The casing 1 rotates through a 45° angle in the direction of the arrow *a* (as shown in FIG. 4d), the bell-hous-

ing 8 which carries the cover moves forward until it comes within reach of the glove holes (as shown in FIG. 4e), these latter being then employed for the purpose of carrying out the disassembly of the collectors 7 and of the sources 6; these elements are then removed under vinyl through lock-chambers provided for this purpose.

The bell-housing 8 withdraws to its limit of travel so as to permit another rotation of the casing 1 through an angle of 45° and in the same direction as before (as shown in FIG. 4f), whereupon the said bell-housing is applied against the washing station 13 while the bell-housing 20 for washing the vessel 2 moves down onto this latter (as shown in FIG. 4g). Sealing gaskets are provided on the washing station 13 and on the bell-housing 20 so as to prevent any admission of washing solution or vapor inside the casing 1.

The washing of the vessel 2 can then be carried into effect merely by sprinkling or by soaking; a pumping tube serves to remove the washing liquors. The washing of the cover can be effected by means of a manual device which is located inside the washing station 13 and which can be operated from the glove holes which are provided for this purpose.

When the washing operations have been completed, a drying treatment with air or hot argon can be performed; it is merely necessary for this purpose to make provision for the necessary supply pipes.

If so required, an electrolytic burnishing operation can be carried out by fitting the washing apparatus 20 with the necessary electrodes.

When the washing and drying operations are completely finished, the bell-housings are withdrawn to the limits of travel thereof (as shown in FIG. 4h) and the casing 1 rotates through an angle of 45° in the direction of the arrow b; the bell-housing 8 is brought into position (as shown in FIG. 4i) and new sources 6 and collectors 7 are brought in through the vinyl lock-chamber and placed in position manually. The bell-housing 8 moves backwards and the casing 1 returns to its initial position.

The bell-housing 8 is applied against the vessel 2 (as shown in FIG. 4j) which, when released, can subsequently return for the purpose of a further isotopic separation while the bell-housing 8 seals off the casing.

It should be noted that the spaces between sealing joints of the vessel 2 and of the cover 5 are washed, thereby ensuring the practically complete decontamination of said spaces. Should it prove necessary, a more extensive decontamination can be effected by rinsing with a clean solution after the washing operation.

It will be understood that the invention is not limited in any sense to the form of embodiment which has been described and illustrated and which has been given solely by way of example.

What I claim is:

1. Apparatus for the disassembly and decontamination of highly radioactive vessels, characterized in that said apparatus comprises a leakproof casing with glove holes and inspection windows which is pivotally mounted on a horizontal shaft and which is provided on the periphery thereof with a coupling station designed to receive the vessel to be disassembled and decontaminated, a disassembly station as well as a station for washing the cover of the vessel operably connected with said casing, said leakproof casing containing a stationary assembly of two jacks which are integral with two bell-housings, the first of said bell-housings being fitted with a device for sealing and securing the cover of said vessel, whilst the second bell-housing is fitted with means for washing said vessel.

2. Disassembly and decontamination apparatus in accordance with claim 1, characterized in that the movement of the casing is controlled by an electric motor with reduction unit designed to produce action on a toothed sector which is integral with said casing.

3. Apparatus for the disassembly and decontamination of highly radioactive vessels, comprising; a leakproof casing having glove holes and inspection windows, a fixed support rotatably mounting said casing thereon, said casing including successively on the periphery thereof a coupling station to receive the vessel to be disassembled and decontaminated, a disassembly station and a station for washing the cover of the vessel; a stationary assembly of two jacks each having a bell-housing integral therewith disposed within said casing; one of said bell-housings including means for sealing and securing the cover of said vessel thereto, the other of said bell-housings including means for washing said vessel.

4. Apparatus as defined in claim 3 wherein said coupling station, said disassembly station and said washing station are disposed substantially forty-five degrees (45°) apart and said bell-housings are disposed substantially ninety (90°) degrees apart whereby said one bell-housing may be positioned at said washing station and said other bell-housing may at the same time be positioned at said coupling station for washing said cover and said vessel simultaneously.

5. Apparatus as defined in claim 3 including means for rotating said casing and means for selectively operating said jacks.

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