Nov. 20, 1962 R. G. FISCHER 3,064,855

SPECIMEN CONTAINER

Filed Aug. 4, 1959

Fig. 1

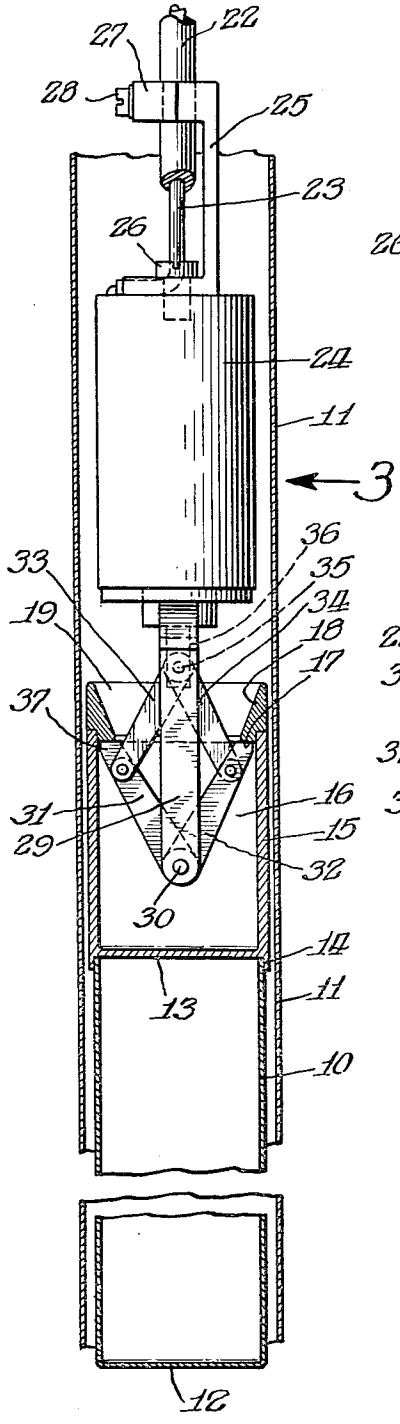


Fig. 2

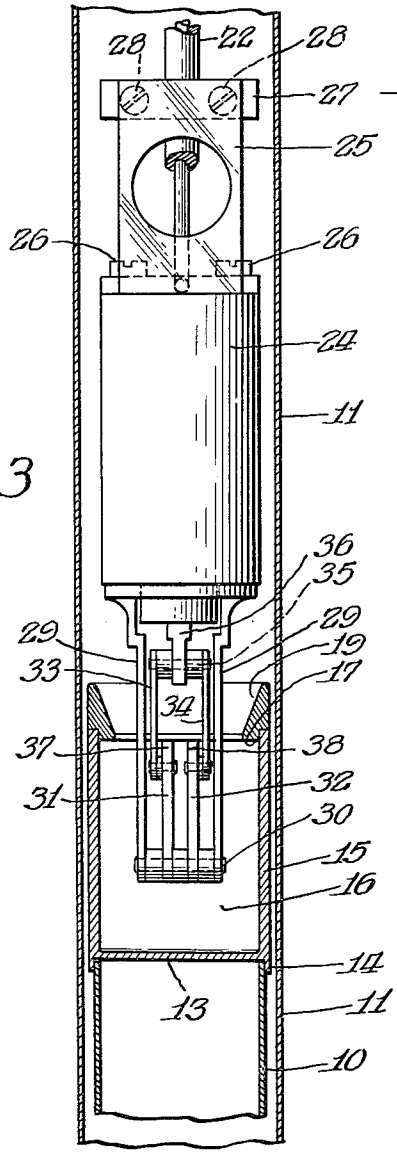
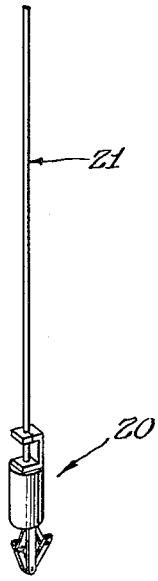


Fig. 3



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SPECIMEN CONTAINER

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1 Claim. (Cl. 220—66)

The present invention relates generally to a container for material which is to be irradiated in a nuclear reactor, and which is particularly adapted to be handled (i.e., raised or lowered) by a pick up mechanism of the general type disclosed in application Serial No. 744,364, entitled "Neutronic Reactor," also owned by the assignee of this application, and is disclosed and claimed in my prior sole application, Serial No. 825,090, filed July 6, 1959, also owned by said assignee.

The container itself which constitutes the subject matter of this application is also disclosed in said application, Serial No. 744,364, and in my said sole application, but is not claimed in either of said prior applications.

The principal object of the present invention is to provide an efficient, inexpensive and practical container construction which is particularly adapted to use with a pick up mechanism of the general type disclosed herein and in the two prior applications herein referred to. Although said container as herein described is of particular value in connection with a nuclear reactor, it will be understood that it is available for use in other fields.

Other objects and advantages of the present invention will be apparent in view of the following description and claim, and the accompanying drawings, in which:

FIGURE 1 is a side view of a portion of the pick up mechanism in engagement with a supported container located in an axially vertical pipe, the container and pipe being illustrated in cross section;

FIGURE 2 is a side view similar to that shown in FIGURE 1, but looking in the direction of the arrow 3 in FIGURE 1; and

FIGURE 3 is a perspective view of the pick up hook with its supporting cable.

In reactors of the type to which the invention herein is particularly applicable, the material specimen is loaded into a tubular container 10 which is of a size capable of free vertical up and down movement in a conventional delivery and removal pipe 11. Said tubular container 10 is preferably closed at its lower end, said closure, in the present instance, comprising a bottom flat disc 12 constituting an integral part of the tube 10. The upper end of the tube 10 is initially open in order to admit the material which is to be irradiated and subsequently the open end is capped. The cap or seal, in this instance, comprises a disc element 13 having an outer depending flange 14 fitting around the upper rim of the filling end of the tube 10. Said flange 14 is threaded, crimped or otherwise joined to the upper end of the tube 10.

The container tube is provided with special means for facilitating the hoisting and the lowering of the specimen container 10 vertically within the outer pipe 11. As shown, there is provided a tubular, upstanding extension 15, preferably integral with the cap 13, the axis of said tubular extension 15 being aligned with the axis of the material receptacle 10. The interior 16 of the tubular extension 15 constitutes a recess or space into which the lower end of the lifting device may be inserted from above. Said lower end of the lifting device or pick up mechanism takes the form of an expandable and collapsible retractor having latches or hooks which are capable of engagement with an inwardly directed shoulder or lip, which, in the present instance, is a circular flange-like

formation or seat 17 extending around the interior circumference of the tubular extension 15 at a level located at the top of the recess 16. Said shoulder or flange 17 in the present instance is shown as constituting the lower portion of a ring or nipple 18 formed on the upper end of the extension 15 in any suitable manner, and having a flaring mouth 19 to facilitate the insertion of the lower end of the pick up hook.

In the embodiment shown, the pick up mechanism, designated as a whole by the numeral 20 (see FIGURE 3), is preferably suspended on the end of a suitable inextensible cable 21 having an outer sheath 22 (see FIGURE 1) surrounding a cable 23, serving to supply electric current for energizing a lifting solenoid contained within a casing 24 capable of sliding freely in the pipe 11. Said casing 24 is rigidly secured to the supporting cable 21 by means of a bracket 25, the lower end of which is secured to the casing 24 by cap screws 26, while the upper end of said clamp 25 is secured to the outer sheath of the cable by means of a clamp element 27 and cap screws 28.

On the bottom end of the solenoid casing 24 there is mounted a pair of spaced, depending bars 29 (see FIGURE 2), the lower ends of which constitute a support for a horizontal, transverse pin 30 upon which there are pivoted a pair of oppositely disposed, upstanding links 31 and 32. The upper ends of these links 31 and 32 are pivoted respectively to the lower ends of a pair of depending links 33 and 34. The upper ends of the links 33 and 34 are pivoted on the lower end 35 of the plunger 36 of the solenoid.

The links 31, 32, 33 and 34 constitute in effect a collapsible parallel linkage, the horizontal dimensions of which can be reduced by upward movement of the plunger 36 when the solenoid is energized. When the current is cut off from the solenoid, the plunger 36, being downwardly biased by gravity or the equivalent, such as a spring, will descend, and the linkage will expand in a horizontal position shown in FIGURE 1. In that FIGURE 1 position, the shoulder or flange 17 will be engaged on one side by an extension 37 of the upper end of the link 31 and on the other side by a similar extension 38 of the opposite link 32. Thus, the upper ends of the links 31 and 32, when the solenoid is deenergized, constitute hooks or latches for supporting the specimen tube when the hook of the pick up mechanism is lowered into the recess 16. However, after the tube has reached its final lowest position in the reactor, the application of current to the solenoid will lift the plunger and cause a contraction of the linkage in a horizontal direction and the hook portion of the pick up will be retracted or disengaged from the shoulder 17, thus permitting the entire pick up mechanism to be drawn upwardly out of the tube 11, and leaving the container 10 behind in the lower end of the pipe 11.

Various of the features of the invention believed to be new are set forth in the appended claim.

I claim:

A specimen container adapted to be inserted and withdrawn through the delivery and removal pipe of a nuclear reactor by means of a remotely controlled expansible pick up device insertable in said pipe and having a hook capable of being cammed inwardly transversely of the axis of said pipe, comprising a tubular container closed at only one end and having a diameter less than that of the pipe, a tubular extension of substantially the same diameter as said tubular container joined at one end to the open end of said tubular container in coaxial relationship therewith, said extension being closed adjacent said one end and forming a closure for the open end of said tubular container, and an inwardly projecting ring at the other end of said extension, said ring

forming a shoulder which extends inwardly of said extension, and having an inner diameter greater than that of said hook in its inward position but less than that of said hook in its outward position, said ring being tapered inwardly and toward said tubular container, thereby providing a camming surface for moving said hook inwardly to permit passage of the same into said extension.

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