OR 3,410,526 SEARCH ROOM

Nov. 12, 1968 L. GALLAGHER 3,410,526

APPARATUS FOR MANIPULATING A SOURCE OF RADIOACTIVE MATERIAL

Filed Oct. 6, 1966 2 Sheets-Sheet 1

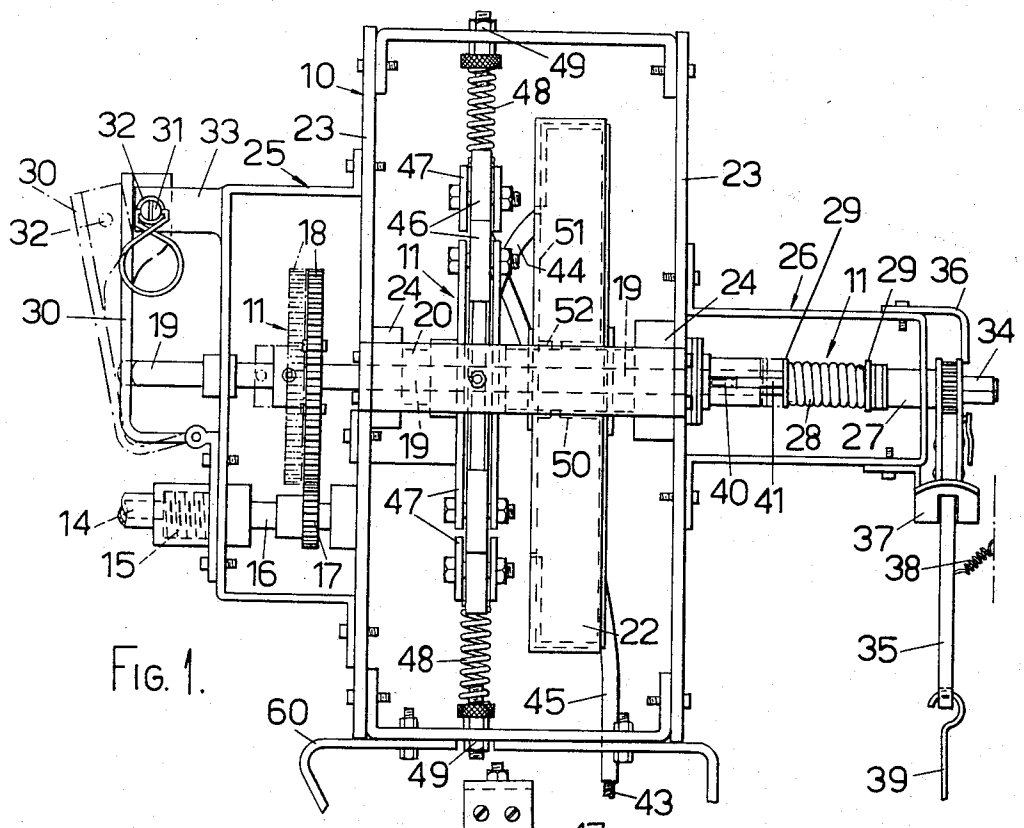


FIG. 1.

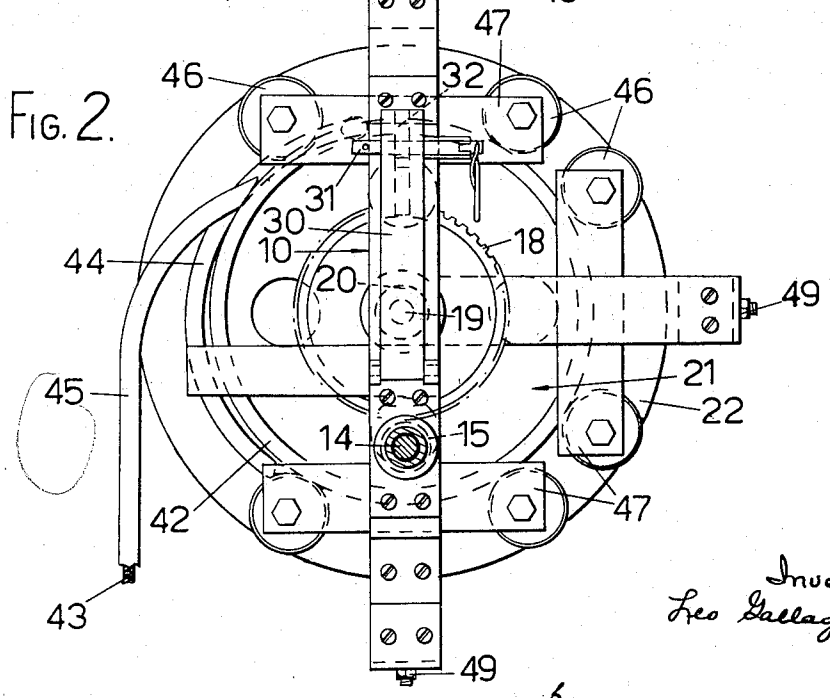


FIG. 2.

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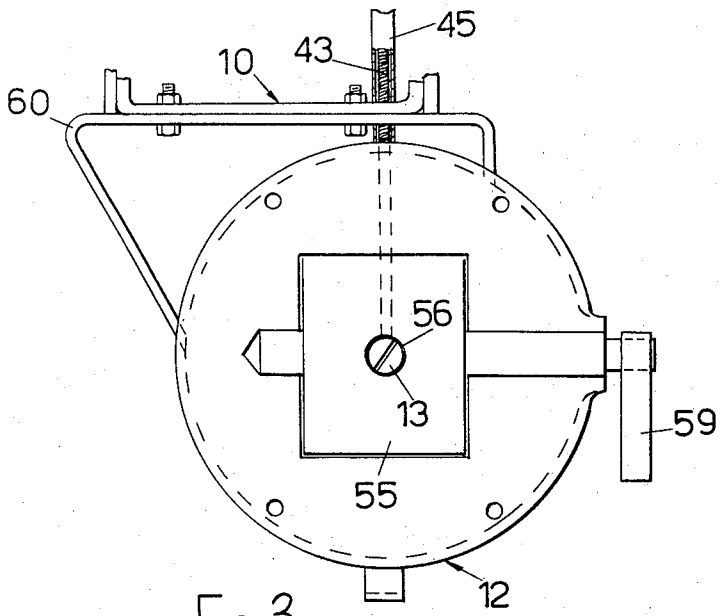


FIG. 3.

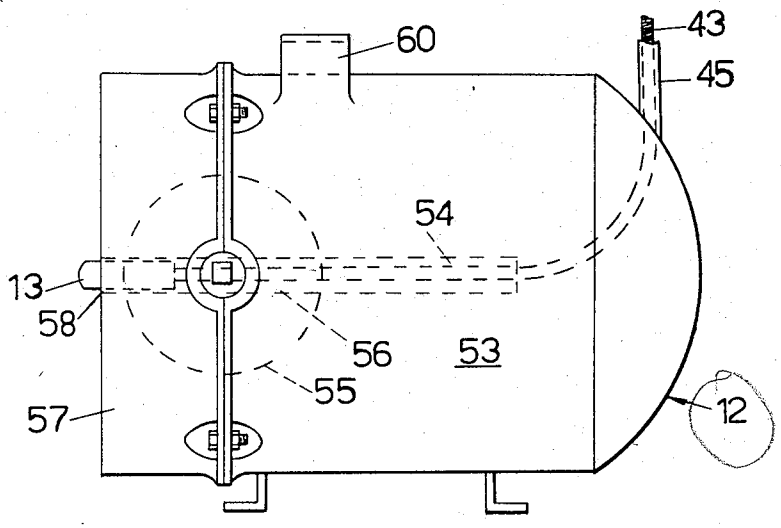


FIG. 4.

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APPARATUS FOR MANIPULATING A SOURCE OF RADIOACTIVE MATERIAL

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2 Claims. (Cl. 254—150)

ABSTRACT OF THE DISCLOSURE

Apparatus for manipulating a source of radioactive material on the end of a flexible cable in which means are provided to advance and retract the cable and in which additional means are provided to retract the cable and source should the first mentioned means be rendered inoperative. The cable is driven by cooperative engagement with a grooved wheel which acts as a clutch due to the cable being resiliently urged against said wheel by spring biased rollers.

This invention relates to apparatus which contains and provides means for manipulating a source of radioactive material.

The apparatus of this invention is designed to advance a radioactive source into an area where radioactive exposure is to take place and then to subsequently be withdrawn back into a shielded area in the apparatus. With such apparatus it is necessary to provide for it to be fail safe so that if the retracting mechanism fails the capsule can still be withdrawn into the shielded area.

In one type of prior construction the capsule has to be displaced from one position to another by compressed air, the capsule being a sliding fit into a tube. This is a cumbersome arrangement as the tube has to be provided with an air supply at each end of the working stroke so that the capsule can be advanced or retracted.

In accordance with the present invention the capsule is attached to one end of an elongated flexible member and is normally housed in a shielded area having an opening for the capsule to pass through, the flexible member being fed into the shielded area by drive means and additional means for retracting the capsule should the drive means fail in service.

The present invention provides a device for manipulating a source of radioactive material comprising a drive mechanism for advancing and retracting a container for radioactive material mounted on a flexible member into and out of a shielded housing, a guide assembly for guiding the flexible member into and out of a storage reel during retraction and advancing of the container, drive means for actuating said drive mechanism, catch means for disconnecting said drive means from said drive mechanism and selectively operable means for retracting the flexible member to position the source in the shielded member when said catch means have been actuated to disconnect said drive means from said drive mechanism.

The invention is hereinafter described by way of example with reference to the accompanying drawings in which:

FIGURE 1 is a front elevation of the device of this invention;

FIGURE 2 is a side elevation of the device of FIGURE 1;

FIGURE 3 is a front elevation of the shielded housing for attachment to the device of FIGURES 1 and 2; and

FIGURE 4 is a side elevation of the shielding housing of FIGURE 3.

In the preferred construction there is provided a frame **10** on which the drive mechanism **11** is mounted and a

radioactive shield assembly **12** in which the radioactive source **13** is normally housed.

The drive assembly **11** is arranged to be driven by a remotely operated flexible cable **14** or other means operated manually or otherwise. The drive cable or means engages a threaded nipple **15** on the frame with a socket journalled therein of known construction on a shaft for engagement with a coupling member on the drive cable or other drive means. The drive shaft **16** has a pinion **17** which engages a main gear **18** on a main shaft **19** also journalled in the frame. The main shaft **19** is journalled in a winding shaft **20** on which a drive drum **21** is keyed and a supply drum **22** is journalled.

The frame includes spaced arms **23** through which the winding shaft passes with bearings **24** secured to the arms to rotatably mount the winding shaft. Bearing brackets **25** and **26** are secured to each spaced arm **23** outboard thereof and in one such bracket **25** the main shaft **19** beyond the main gear **18** is journalled. Similarly a more elongated bracket **26** is positioned on the other spaced arm to support a bearing **27** in which the adjacent end of the main shaft **19** is positioned. This end is hereinafter termed the return end of the main shaft. The bearing **27** in such bracket defines on its inner end a shoulder which is engaged by a coil spring **28** which also engages an enlarged shoulder **29** on the main shaft **19** and urges it towards the main gear end of the frame. It is normally prevented from being displaced by such spring by a pivoted catch lever **30** on the main gear return end bracket which is held in position by a pin **31** in matched holes **32** in a projection **33** on the bracket and in the catch lever **30**. When the pin **31** is pulled out the main shaft **19** is displaced by the spring **28** to free the main gear **18** from the pinion **17** as shown in broken lines and to bring a driving portion **34** into engagement with a socket in a ratchet lever **35** mounted on the main shaft **19** and positioned by a bracket **36** and slotted guide **37** on the return end bracket **26**. The ratchet lever is spring biassed by a spring **38** secured to the lever and to a portion of the frame **10** in its return movement so that drive movement by means of a rod **39** can be imparted to the ratchet from a remote location to return the mechanism and retract the source should the main drive mechanism fail. A slotted keyway **40** in the winding shaft and a key **41** on the main shaft mechanism connects the main shaft **19** with the winding shaft **20** under the influence of the biassing spring **28** during operation by both drive means. Separate power operated return means may also be provided.

The drive drum comprises a grooved wheel **42** for actuating a cable **43** on which the source **13** is positioned. A tubular guide **44** positioned on the frame **10** from the shield assembly **12** to the grooved wheel **42** and vice versa guides the cable. Another or second tubular guide **45** is arranged to guide the cable **43** onto the grooved wheel from the supply drum **22** or vice versa.

At two diametrically opposite positions and in one position transverse thereto around the drive wheel **42** the cable portions are urged into engagement with the groove of the drive wheel by rollers **46** mounted on each end of brackets **47** which are urged against the grooved wheel by coil springs **48** acting between the frame **10** and the brackets **47** and adjustable by nuts **49** for tension. In the other transverse position the tubular guides **44** and **45** are positioned out of engagement with the grooved wheels. This arrangement acts as a drive clutch.

The supply drum **22** includes a sheet metal housing with a radial plate portion, a flange on the periphery thereof extending towards the drive wheel and then extending inwards towards the main shaft axis **19**. The radial plate portion is provided with a sleeve bearing **50** which is journalled on the winding shaft. The open side of the drum is substantially closed by a disc **51** which is also

journalled by a sleeve bearing **52** on the shaft **19** and has passing through it the tubular guide **44**.

The shielded housing **12** which is attached to the frame **10** is lead lined and has a fixed base part **53**, with passage **54**, and at its front end has a circular pivoted door **55** which is apertured with a diametrical passage **56** and which coacts with a part circular fixed guide **57** secured to the base part **53** and having a coacting aperture **58** so that the source **13** and cable **43** may be guided through the passages in the members **53**, **55** and **57** when they are in line. A lever **59** is provided to displace the door between open and closed positions. When the source is retracted it is housed in the passage **54** and the door **55** rotated through 90° to seal off any radiation.

The housing **12** is secured to the main frame **10** by a bracket **60** which is bolted to the main frame.

The main frame **10** and the assembly therein is mounted inside a metal casing which for clarity has been omitted from the drawings.

I claim:

1. A device for manipulating a container having a source of radioactive material therein into and out of a shielded housing comprising a frame, a drive mechanism mounted on said frame for advancing and retracting a flexible member connected to said containers, a guide assembly for guiding said flexible member into and out of said storage reel during retraction and advancing of the container, drive means for actuating said drive mechanism, catch means for disconnecting said drive means from said drive mechanism, selectively operable means for retracting the flexible member to position said container within said shielded housing when said catch means have been actuated to disconnect said drive means from said drive mechanism, said drive mechanism including a drive shaft on which said storage wheel is rotatably

mounted, a winding shaft mounted on and driven by the drive shaft, a drive wheel having a substantially smooth driving surface, said wheel being fixedly mounted on the winding shaft for rotation therewith, a plurality of rollers mounted around the periphery of the drive wheel for urging the flexible member into driving contact with the driving surface of said drive wheel, spring means for biasing said rollers against said flexible member, the tension in said spring means being such as to allow slippage with respect to said drive wheel upon encountering of an obstruction by said flexible member, said drive means comprising a pinion, a driving member for driving said pinion, a main gear for driving engagement with the pinion and fixedly mounted on the drive shaft for rotation therewith, said drive shaft being mounted for axial movement on said frame, and a spring mounted on the main shaft for urging said drive shaft axially to displace said main gear out of driving engagement with said pinion in response to release of said catch means.

2. A device as claimed in claim **1** in which the selectively operable means comprises a ratchet lever mounted on the drive shaft, said shaft having a portion which is brought into driving engagement with said ratchet lever when the main shaft is displaced by said spring when said catch means have been actuated.

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