

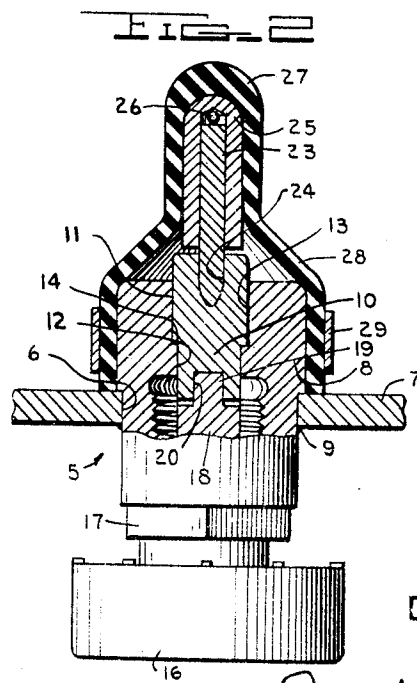
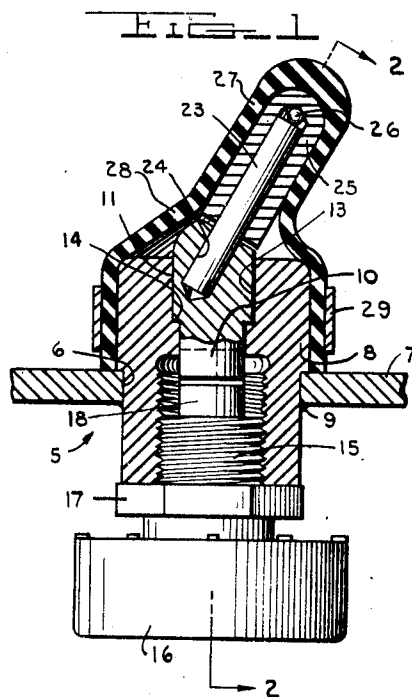
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D. E. ALBERT

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ROTARY CONTROL MECHANISM

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Inventor

Donald E. Albert

By Ralph L Chappell
Attorney

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ROTARY CONTROL MECHANISM

Donald E. Albert, Alexandria, Va.

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1 Claim. (Cl. 286—29)

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1

This invention relates to rotary control mechanisms, and more particularly to a moisture proof rotary control mechanism.

Where equipment is operated under water or under conditions where excessive moisture is present, it becomes necessary to hermetically seal the equipment. If the operation of the equipment is to be varied by manipulating controls directly connected to the equipment, it is then desirable to provide some means whereby the control may be externally actuated without disturbing the hermetic seal.

An object of this invention is to provide a simple and effective moisture proof rotary control mechanism.

In accordance with one embodiment of this invention, a moisture proof rotary control mechanism may be provided comprising a rotatable shaft journaled in a housing one end of which is hermetically sealed to the housing of the equipment, a control device of which is to be externally actuated. The inner end of the shaft operably engages the equipment control device, while the outer end of the shaft is provided with a short shaft which is fixed thereto and extends at an angle therefrom to provide a crank handle. The base of a nipple-shaped rubber housing encloses the exposed portion of the shaft housing and the stub shaft extends into the reduced portion thereof. By moving the outer portion of the stub shaft in a rotary path, the shaft may be caused to rotate and to actuate the control device of the equipment.

Other objects and advantages of the present invention will be apparent from the following detailed description taken in conjunction with the drawings wherein:

Fig. 1 is a vertical, sectional view, partly in elevation, of a rotary control mechanism constructed in accordance with one embodiment of this invention, having associated therewith a control device to be actuated thereby; and,

Fig. 2 is a sectional view along the line 2—2 of Fig. 1.

Referring now to the drawings, it will be seen that this mechanism includes a sleeve-shaped, shaft housing 5 which extends through and is mounted in an aperture 6 formed in a panel 7, the upper peripheral portion of the housing 5 being provided with a shoulder 8, the lower edge of which rests on the outer surface of the panel 7. A ring 9 of solder or other suitable sealing material by which the inner portion of the housing may be both fixed and sealed to the inside of the panel 7 is located on the underside of the panel. It will

2

be understood that the panel 7 represents a portion of an equipment housing or case which may be hermetically sealed. A rotatable shaft 10 having a shouldered upper portion 11 is journaled in an aperture 12 which extends through the housing 5. In order to locate the shaft 10 properly with respect to the housing 5, the upper portion 13 of the aperture 12 is enlarged somewhat to form a narrow, peripheral ledge 14 on which the lower edge of the shoulder 11 bears.

The portion of the housing 5 which extends downwardly, as viewed in these drawings, through the panel 7 is internally threaded to engage the upper portion of an externally threaded sleeve 15, the lower end of which is fixed to a control device 16 of the equipment. A lock nut 17, rotatably mounted on the threaded sleeve 15, is adjustable to bear against the lower edge of the housing 5 after the control device has been moved into the desired position. A rotary control shaft 18, by which the control device 16 is directly operated, extends axially through the threaded sleeve 15 from the control device 16, and is provided with an integral, transversely extending key 19 in its upper end which extends into a slot 20, formed in the lower end of the shaft 10. It will be apparent from the foregoing that rotation of the shaft 10 will cause the shaft 18 to rotate therewith and thereby to actuate the control device 16.

In order to rotate the shaft 10, a short stub shaft 23 is mounted in and extends at an angle of approximately 30° from the upper end of the shaft 10. This stub shaft 23 may be integrally formed with the upper end of the shaft 10 or may, as shown, comprise a short rod one end of which is press-fitted into a small cylindrical recess 24 formed in the upper end of the shaft 10 at an angle approximately 30° from the axis thereof, thus forming in effect a crank handle for the shaft 10. By moving the outer end of the stub shaft 23 in a rotary path it will be apparent that the shaft 10 will be caused to rotate, and, in turn, the shaft 18 of the control device 16 will be rotated.

In order to hermetically seal the exposed portion of the rotary control mechanism which includes the outer portion of the housing 5, the upper portion of the shaft 10 and the stub-shaft 23, and at the same time to permit free rotary motion thereof, a sleeve 25, of U-shaped cross section, is rotatably mounted on the stub shaft 23. To prevent binding, a spherical bearing 26 may be interposed between the outer end of the stub shaft 23 and the inner concave surface of

3

the sleeve 25, as shown. A nipple-shaped covering 28, which may be made of rubber or other suitable resilient material which is impervious to moisture, is positioned over the exposed portion of the rotary control mechanism, the stub shaft 23 and associated sleeve 25 extending into the reduced portion 27 thereof and the larger base portion being disposed over the shouldered portion 8 of the housing 5. A ring 29, or other suitable clamping device, is positioned about the periphery of the enlarged portion 28 of the nipple and clamps it tightly against the outer surface of the shouldered portion 8 to form a hermetic seal therebetween.

It will be apparent from the foregoing that by providing the rotatable sleeve 25, the stub shaft 23 may be caused to move in a rotary path by grasping the outer portion of the nipple 28, which encloses the stub shaft and relatively rotatable sleeve 25, and by moving it in a rotary path, without causing undue twisting of the nipple 28. As hereinbefore stated this motion will cause the shaft 13 to rotate and the shaft 16 will, in turn, rotate the shaft 13 of the control device 16.

While but one embodiment of this invention has been shown and described it will be understood that many changes and modifications may be made therein without departing from the spirit or scope of the present invention which is limited only by the appended claims.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

What is claimed is:

A moisture proof rotary control mechanism comprising a shaft housing, a rotatable control shaft journaled in said housing, a stub shaft having one end thereof fixed to one end of said

4

rotatable shaft and extending at an angle thereto to form a crank therefor, a sleeve having a closed end rotatably mounted on said stub shaft, bearing means between the other end of said stub shaft and the closed end of said sleeve, said sleeve being of sufficient length to substantially enclose the stub shaft, a continuous covering of resilient moisture impervious material positioned over said sleeve and terminated in a moisture proof seal with said housing to enclose the sleeve, the stub shaft and said one end of said rotatable shaft, said covering including a central portion formed to tightly enclose said sleeve throughout a greater portion of its length measured from the closed end thereof and a base portion extending from the central portion with gradually increasing diameter and terminating with an internal configuration to form a tight fit with the end of said housing adjacent said one end of said rotatable shaft, and means clamping the base portion to said housing.

DONALD E. ALBERT.

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