Jan. 30, 1923.

1,443,694.

J. McKECHNIE.

DEVICE FOR OPERATING HINGED OR SIMILAR MEMBERS.

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Fig. 1.

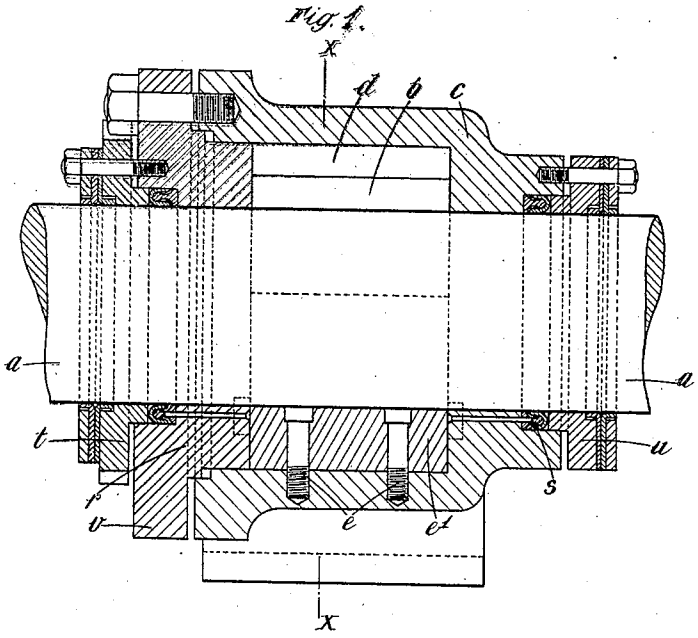
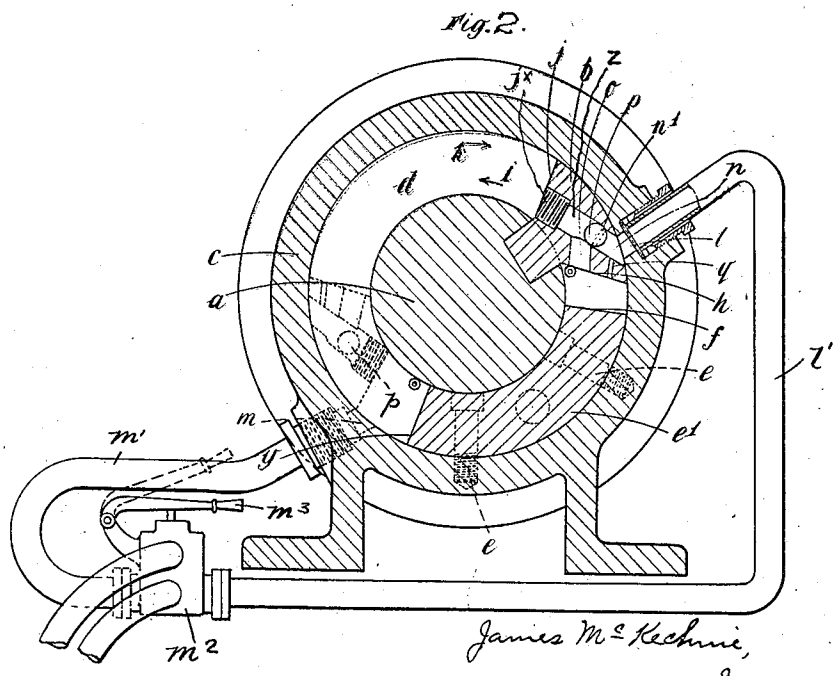


Fig. 2.



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UNITED STATES PATENT OFFICE.

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DEVICE FOR OPERATING HINGED OR SIMILAR MEMBERS.

Application filed February 3, 1920. Serial No. 356,094.

To all whom it may concern:

Be it known that I, JAMES McKECHNIE, a subject of the King of Great Britain, residing at Naval Construction Works, Barrow-in-Furness, in the county of Lancaster, England, have invented certain new and useful Improvements in or Relating to Devices for Operating Hinged or Similar Members, of which the following is a specification.

This invention relates to an improved pressure fluid device which is particularly but not exclusively intended for use with a submarine or other vessel where a member such as a hinged cover is employed for closing in a water-tight manner the top of a funnel or an opening in the deck through which opening a telescopic funnel may pass or relatively to which opening a funnel may be hinged, the said device being of the kind comprising a shaft provided with an oscillatory radial vane or piston arranged within a cylinder and adapted to be operated by liquid under pressure admitted alternately between opposite faces of the piston and corresponding abutment pieces within the cylinder, thereby enabling the shaft to be moved angularly so as to actuate a member operatively connected thereto.

According to this invention the member-actuating shaft extends concentrically through the working cylinder which has stuffing boxes and glands at its opposite ends for said shaft to pass through; within the cylinder is an abutment piece extending across the space between said cylinder and shaft and the shaft carries the oscillatory vane or piston which also extends across said annular space. This oscillatory vane or piston is formed with inlet and exhaust ports and carries a valve for controlling said ports in such manner that a free flow of pressure fluid is permitted at the commencement of the operative movement of the vane or piston and a restricted flow of the exhaust at the termination of said operative movement. The said valve is preferably in the form of a spherical non-return valve which is actuated directly by the pressure fluid itself.

In order that the said invention may be clearly understood and readily carried into effect the same will now be described more fully with reference to the accompanying example illustrated by the drawings, in which:—

Figure 1 is a longitudinal vertical section of the said device and

Figure 2 is a section taken on the line X—X of Figure 1.

a denotes the angularly movable or oscillatory shaft, to which the hinged member is fixed in any appropriate manner, the said shaft having secured thereto the vane or piston *b* arranged to operate within the cylinder *c* in an annular space *d* provided between the shaft and the cylinder. Disposed within the said space and secured to the cylinder by means of screws *e* is a segmental member *e'* provided with faces *f*, *g* (Figure 2) serving as abutments. The said shaft is adapted to be operated preferably through the medium of oil under pressure which is admitted through the port *l* to the space between the abutment *f* and the face *h* of the piston when the shaft is to be moved angularly in the direction of the arrow *i*, while the port *m* is open to exhaust. To effect the reverse movement of the piston oil under pressure is admitted through the port *m* to the space between the abutment *g* and the face *j* of the piston while the port *l* is open to exhaust, the shaft being thus caused to move angularly in the direction of the arrow *k*. The said ports *l m* are connected by appropriate piping provided with a control valve m^2 arranged in such a manner that each of the said ports *l*, *m* can serve alternately as an inlet and an exhaust port as above stated, according as the handle m^3 of the control valve is placed in its full line position or its dotted line position. As the weight of the hinged member to be operated by the shaft *a* may be considerable, provision is made to check the momentum of the said hinged member towards the end of one of its movements which in the example shown, is the closing movement. For this purpose the piston is provided with ports *n*, *o* and a non-return valve *p* having a seating at *n'* so that the escape of the oil in the space between the face *h* of the piston and the abutment *f* when the piston is approaching the position represented by full lines in Figure 2, will be prevented by the non-return valve being held on its seating by the oil

acting through the port *o* with the result that the said oil is only able to escape through the restricted passage or leakage port *q*. The motive fluid passage *z* with which the various ports *n o q* communicate is closed at its inner end by means of a screw threaded block *j*. By using oil under pressure the moving parts within the cylinder are efficiently lubricated and bearing loads of about 1000 lbs. per square inch can be sustained by the parts without injury thereto. As shown in Figure 1, the oscillatory shaft *a* passes through the cylinder *c* which is provided at the ends thereof with stuffing boxes *r*, *s*, and glands *t*, *u*, leather packings being provided therein. The stuffing box *r* is formed in a cover *v* which is adapted to be detached so as to permit ready access to the interior of the cylinder for inspection or repair.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A pressure fluid operating device consisting in the combination of a working cylinder having at its periphery two ports each serving alternately as an inlet and outlet port, an oscillatory power transmitting shaft concentric with the working cylinder, a valveless abutment piece in said cylinder extending across the annular space between said cylinder and shaft, an oscillatory vane or piston on said shaft also extending across said annular space and having a motive fluid passage communicating with a port at the periphery of the vane or piston and with two other ports on a face of the vane or piston and means whereby these last mentioned ports admit pressure fluid from the said peripheral port at the commencement of one stroke of the oscillatory vane or piston but only one of them serves to exhaust pressure fluid to said peripheral port during the completion of the other stroke of the oscillatory vane or piston.

2. A pressure fluid operating device consisting in the combination of a working cylinder having at its periphery two ports each serving alternately as an inlet and outlet port, an oscillatory power transmitting shaft concentric with the working cylinder, a valveless abutment piece in said cylinder extending across the annular space between said cylinder and shaft, an oscillatory vane or piston on said shaft also extending across said annular space and having a motive fluid passage communicating with a port at the periphery of the vane or piston and with two other ports of unequal area on a face of the vane or piston and a valve located in said motive fluid passage for controlling said ports of unequal area so that both of them are operative at the commencement of one stroke of the oscillatory vane or piston but only the one of smaller area is operative during the completion of the other stroke of said vane or piston.

In testimony whereof, I affix my signature.

JAMES McKECHNIE.