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2,700,904

CONTROL MECHANISM

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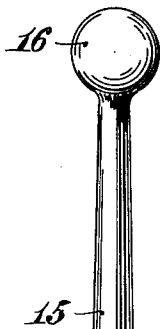


Fig. 1.

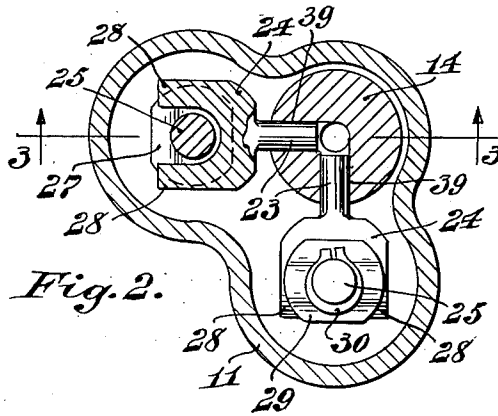


Fig. 2.

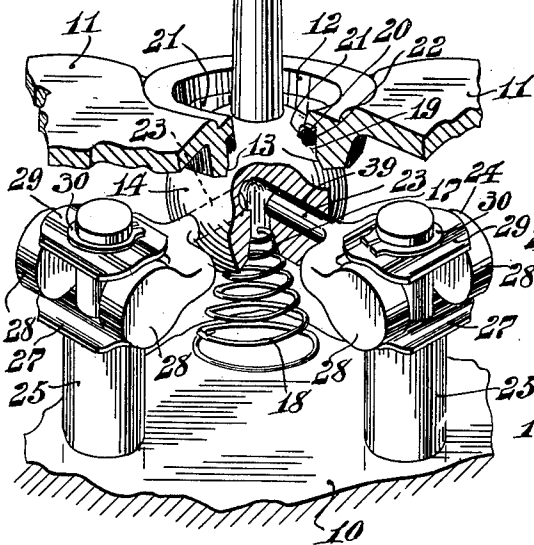


Fig. 3.

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2,700,904

CONTROL MECHANISM

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5 Claims. (Cl. 74—471)

This invention relates to control mechanism and it relates more particularly to improved means for the control of a plurality of actuating rods by means of a single lever either alternatively or simultaneously or in combination. Such mechanism will be found to be useful when the actuating rods are connected to hydraulic valves, electrical controls, pneumatic valves, and linkages for various purposes.

The principal object of the present invention is to provide simple, durable and efficient mechanism for the control of a plurality of actuating rods by means of a single lever, whereby the actuating rods may be alternatively or simultaneously actuated, or may be actuated in differing proportional amounts according to the manner in which the lever is manipulated.

A further object of the invention is to provide mechanism of the character aforesaid, which will be relatively inexpensive and of a rugged non-complicated design.

A further object of the invention is to provide mechanism of the character aforesaid, which will be positive in its action, and which will eliminate the necessity of spring loaded means for returning the actuating rods.

A further object of the invention is to provide mechanism of the character aforesaid, in which the essential working parts may be enclosed to maintain the same free from dirt, and in which the working parts may, if desired, be subjected to an oil bath to facilitate the lubrication of the same.

A further object of the invention is to provide mechanism of the character aforesaid, in which the actuating rods will be substantially free floating without having any torque or bending moments imposed thereon by the primary actuating mechanism.

The nature and characteristic features of the invention will be more readily understood from the following description, taken in connection with the accompanying drawing forming part hereof, in which:

Figure 1 is a perspective view, partly broken away, of control mechanism embodying the main features of the present invention;

Fig. 2 is a horizontal section thereof taken approximately on the line 2—2 of Fig. 3; and

Fig. 3 is a vertical section thereof taken approximately on the line 3—3 of Fig. 2.

It should, of course, be understood that the description and drawing herein are illustrative merely, and that various modifications and changes may be in the mechanism shown without departing from the spirit of the invention.

Referring to the drawing, in the particular embodiment of the invention therein shown, 10 is a base member which may be a portion of the frame work or housing of a particular machine upon which the control mechanism is mounted.

Secured to the base member 10 in any preferred manner (not shown) is the housing 11 having a suitable opening 12 in the top thereof.

Immediately below the opening 12 is an annular shoulder 13 forming a bearing for an enlarged ball 14 seated on the bearing and from which the lever 15 extends upwardly. The lever 15 may have, at its free end a ball shaped handle 16 adapted to be gripped by the operator when the lever 15 is to be manipulated, as will be hereinafter more fully set forth.

The lower end of the bearing ball 14 is provided with a recess 17 in which there is seated the upper end of a conical coil spring 18, the other end of which may rest upon a portion of the base member 10.

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The conical coil spring 18 will not only serve to maintain the bearing ball 14 on its seat, but may also be used in some instances to return the lever 15 to a neutral position.

For the purpose of preventing the admission of dirt and also for the purpose of retaining the lubricating oil within the housing 11 there may be provided, above the bearing seat 13 against which the ball 14 abuts, a recess 19 in which a washer 20 is mounted. The washer 20 has a collar 21 serving to retain a packing ring 22 in place in the recess 19.

The bearing ball 14 is also provided with a plurality of radial holes 39, the axis of each of which passes through the center of movement of the bearing ball 14. In the form of the invention shown in the drawing, in which two rods are to be selectively or simultaneously manipulated, the axis of one of the holes will preferably be disposed at right angles to the axis of the other hole.

Each of the holes 39 serves as a bearing for the cylindrical shank portion 23 of a clevis 24 provided for the control of one of the actuating rods 25.

Each of the actuating rods 25 is slidably mounted in the base member 10 and has its end portion reduced in diameter to provide a shoulder 26 upon which a suitably shaped washer 27 is positioned, and with which the arms 28 of the clevis 24 are in engagement.

Disposed above the arms 28 of each clevis 24 is another washer 29 which is held in place on the reduced portion of the actuating rod 25 by a split washer 30 positioned in a groove cut in the reduced end portion of the actuating rod 25.

The ends of the arms 28 of each clevis 24 are preferably of circular conformation, with the central axis passing through the axis of the actuating rod 25, and the washers 27 and 29 are shaped complementary to the circular ends of the arms 28 thereby providing a pivotal connection between the ends of the clevis 24 and the end of the actuating rod 25 controlled thereby.

It should here be noted that the shank portion 23 of each clevis 24 is so mounted in the bearing ball 14 as to be capable of both slidable and rotatable movement relative thereto, and also that the distance between the inner faces of the arms 28 of the clevis 24 is appreciably greater than the diameter of the end portion of the actuating rod 25 around which said arms 28 extend.

By the foregoing arrangement either of the actuating rods 25 may be selectively manipulated by moving the hand lever 15 in the plane of the rod 25 to be actuated, and also that when it is desired to simultaneously manipulate both of the actuating rods 25 this may be accomplished by a movement of the hand lever 15 in a plane midway between, and at an angle of 45° to each of the planes of the actuating rods 25, and whenever the hand lever 15 is manipulated in any other plane, the actuating rods 25 will be manipulated in varying amounts, accordingly as the plane of actuation of the hand lever 15 is to one side or the other of the median plane.

A not unimportant feature of the present invention is that, when the hand lever 15 is manipulated in any desired plane, there will be no binding at any of the points of connection between the bearing ball 14 and the shank 23 of either clevis 24, and likewise, the sidewise movement permitted at the arm portions 28 of the clevises by reason of the spacing of the same to an extent greater than the diameter of the end of the actuating rods will prevent improper torsional and bending stresses at those locations.

I claim:

1. Mechanism for the control of a plurality of actuating rods either alternatively or simultaneously by a single lever comprising the provision, on the lever, of a bearing ball for a universal fulcrum thereof, a seat engaged by the bearing ball, means for maintaining the bearing ball on its seat, a plurality of clevises each having a shank portion rotatably and slidably mounted in the bearing ball on an axis passing through the fulcrum point of said bearing ball, the axis of the shank portion of one clevis being at an angle to the axis of the shank portion of another clevis, each of said clevises having a pair of arms in pivotal connection with the end of an actuating rod, and also having a limited range of transverse movement

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on the axis of said pivotal connection, said pivotal connection comprising the provision, on the ends of the arms of the clevis, of portions having circular surfaces, and members rotatably mounted on the end of the actuating rod having opposed faces complementary to the ends of the clevis arms, and the clevis arms being separated a distance sufficiently greater than the diameter of the end of the actuating rod to permit the requisite transverse movement.

2. Mechanism for the control of a plurality of actuating rods either alternately or simultaneously by a single lever comprising the provision, on the lever, of a bearing ball for a universal fulcrum thereof, a housing in which said bearing ball is located, a portion of said housing shaped to provide a bearing seat engaged by the bearing ball, means for maintaining the bearing ball on its seat, a plurality of clevises each having a shank portion rotatably and slidably mounted in the bearing ball on an axis passing through the fulcrum point of said bearing ball, the axis of the shank portion of one clevis being at an angle to the axis of the shank portion of another clevis, each of said clevises having a pair of arms in pivotal connection with the end of an actuating rod, and also having a limited range of transverse movement on the axis of said pivotal connection.

3. Mechanism for the control of a plurality of actuating rods either alternatively or simultaneously by a single lever comprising the provision, on the lever, of a bearing ball for a universal fulcrum thereof, a housing in which said bearing ball is located, a portion of said housing shaped to provide a bearing seat engaged by the bearing ball, a spring for maintaining the bearing ball on its seat, a plurality of clevises each having a shank portion rotatably and slidably mounted in the bearing ball on an axis passing through the fulcrum point of said bearing ball, the axis of the shank portion of one clevis being at an angle to the axis of the shank portion of another clevis, each of said clevises having a pair of arms in pivotal connection with the end of an actuating rod, and also having a limited range of transverse movement on an axis passing through the point of said pivotal connection.

4. Mechanism for the control of a plurality of actuating rods either alternatively or simultaneously by a single lever comprising the provision, on the lever, of a bearing ball for a universal fulcrum thereof, a housing in which said bearing ball is located, a portion of said housing shaped to provide a bearing seat engaged by the bearing ball, a spring for maintaining the bearing ball on its seat, a plurality of clevises each having a shank portion rotatably and slidably mounted in the bearing ball on an axis

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passing through the fulcrum point of said bearing ball, the axis of the shank portion of one clevis being at an angle to the axis of the shank portion of another clevis, each of said clevises having a pair of arms in pivotal connection with the end of an actuating rod, and also having a limited range of transverse movement on the axis of said pivotal connection, said pivotal connection comprising the provision, on the ends of the arms of the clevis, of portions having circular surfaces, and members rotatably mounted on the end of the actuating rod having opposed faces complementary to the ends of the clevis arms.

5. Mechanism for the control of a plurality of actuating rods either alternatively or simultaneously by a single lever comprising the provision, on the lever, of a bearing ball for a universal fulcrum thereof, a housing in which said bearing ball is located, a portion of said housing shaped to provide a bearing seat engaged by the bearing ball, a spring maintaining the bearing ball on its seat, a plurality of clevises each having a shank portion rotatably and slidably mounted in the bearing ball on an axis passing through the fulcrum point of said bearing ball, the axis of the shank portion of one clevis being at an angle to the axis of the shank portion of another clevis, each of said clevises having a pair of arms in pivotal connection with the end of an actuating rod, and also having a limited range of transverse movement on an axis passing through the point of said pivotal connection, said pivotal connection comprising the provision, on the ends of the arms of each clevis, of portions having circular surfaces, and members rotatably mounted on the end of the actuating rod having opposed faces complementary to the ends of the clevis arms, and the clevis arms being separated a distance sufficiently greater than the diameter of the end of the actuating rod to permit the requisite transverse movement.

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