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CONTROL DEVICE WITH PREDETERMINED SUCCESSIVE POSITIONS

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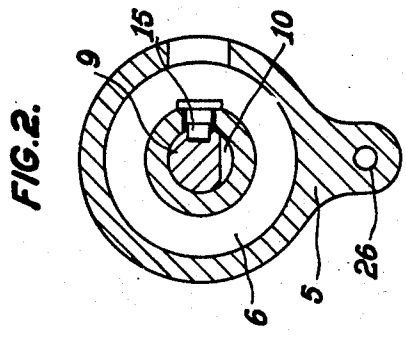


FIG. 2.

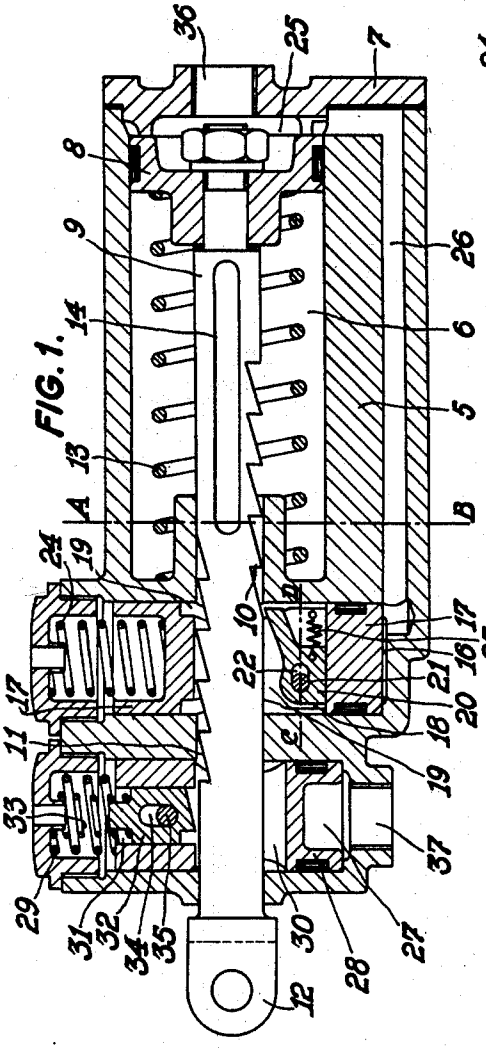


FIG. 1.

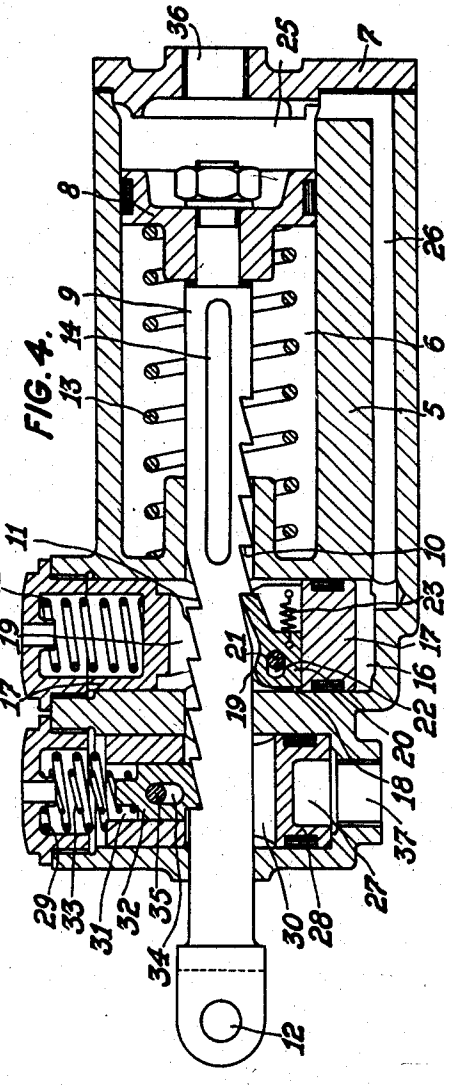


FIG. 4.

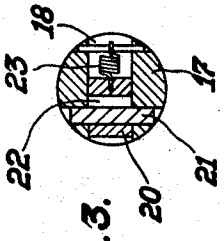


FIG. 3.

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CONTROL DEVICE WITH PREDETERMINED SUCCESSIVE POSITIONS

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6 Claims. (Cl. 121—40)

My invention relates to a device for the control of an apparatus of which the controlling member must successively occupy different predetermined positions.

According to my invention the member intended to occupy successively different predetermined positions is moved against the opposition of resilient means by the action of a compressed fluid which operates simultaneously a mechanism intended to limit each movement of the said member, a locking member being provided in order to lock automatically and hold this member in each of the positions which it can occupy when the action of the fluid is interrupted, the release of this locking member to permit the return of this member to its initial position being obtained when a driving member operating on the said locking member is moved by the pressure of the driving fluid.

One form of embodiment of the invention will be hereinafter described simply by way of example with reference to the attached drawing, in which:

Fig. 1 is a view showing a longitudinal section of the assembly of the device;

Fig. 2 is a view in section of the device along the line A—B of Fig. 1;

Fig. 3 is a view in section of a detail of the device along the line C—D of Fig. 1;

Fig. 4 is a view in longitudinal section of an assembly of the device shown in one of its operating positions.

According to these figures, in a body 5 is arranged a cylinder 6 closed by a cover 7 and in which slides a piston 8 subjected to the opposition of a spring 13.

A rod 9 integral with the said piston is guided in the body 5 and is provided with a groove 14 in which can engage a spur 15 (Fig. 2) preventing the rotation of the said rod and of the said piston around their axis (Figs. 1 and 2).

The rod 9 which controls by its extremity 12 a receiving apparatus (not shown) has in its cylindrical face, ratchet teeth 10 and 11 respectively notched in such a way as to present each an opposite ratchet gear direction.

In a bore 16 arranged transversely in the body 5 there slides, against the opposition of spring 24, a piston 17 in the body of which is arranged a transverse aperture 19 of elongated form permitting the passage of the rod 9. In a notch 18 notched in the wall of this aperture can slide with limited longitudinal play a pawl 20 provided with an eye 22 into which extends a guide pivot 21 supported in the body of the said piston 17 (Fig. 3), the said pawl being always urged towards the right-hand side (looking at Fig. 1) by a spring 23.

A conduit 26 connects the bore 16 to the chamber 25 of the cylinder 6.

In a second bore 27, also transversely to the body 5 and arranged at the side of the bore 16, slides a piston 28 subjected to the opposing action of a spring 29. The body of the said piston 28 is provided with a transverse aperture 30 of elongated form into which extends the rod 9 of the piston 8.

In the body of the piston 28 is also provided a concentric aperture 31 in which can slide a locking member 32. The latter is urged against the rod 9 by a spring 33 and is guided with limited longitudinal play by a pivot 35 supported in the body of the said piston 28 and extending into an eye 34 of the locking member 32.

An aperture 36 provided in the cover 7 and an aperture 37 arranged in the body 5 below the piston 28 are respectively intended for the admission of compressed fluid into the cylinder 6 and into the bore 27.

The operation of the device is as follows:—

When the operator acts on the control distributor provided on a conduit connecting the source of compressed fluid to the aperture 36 of the device (not shown in the drawing), the fluid penetrates into the chamber 25 of the cylinder 6 and also passes through the conduit 26 into the bore 16. Under the action of the fluid the piston 8 is forced back while moving the rod 9, while the piston 17 is also moved by the pressure of the fluid and causes the pawl 20 to engage in the first one of the teeth 10. When the end of the said pawl comes in contact with the active face of the tooth 10 on account of the progressive movement of the piston 8, the pawl 20 is moved against the opposition of spring 23 and slides in the notch 18 due to the clearance presented by the eye 22 until the instant when the first tooth 11 arrives opposite the locking member 32 which engages in this latter tooth under the action of the spring 33.

In spite of the action of the compressed fluid under the piston 8, the rod 9 of the device is rendered stationary at this instant under the action of the pawl 20 in the first tooth 10 (Fig. 4).

If the pressure of the fluid in the cylinders 6 and 16 is interrupted, the piston 7 again takes up its position of rest under the action of the spring 24, while releasing the pawl 20 which is brought back to its initial position by the spring 23, while the piston 8 is locked against the action of the

spring 13 by the engagement of the locking member 32.

In order to obtain an additional displacement of the rod 9 corresponding to the magnitude of a tooth, the operator will act as previously on the control distributor of the driving fluid and the same effects as those described above will be repeated. It will be the same for each additional displacement to the value of one tooth which it is desired to impart to the rod 9.

Consequently the receiving apparatus which is connected at 12 to the rod 9 will be moved by the amount of one tooth upon each operation of the operator.

In order to bring back the device to its initial position the operator acts on a second distributor, not shown, provided on a conduit connecting the source of compressed fluid to the aperture 37 of the cylinder 27. Under the effect of the driving fluid the piston 28 is forced back against the opposition of the spring 29 and in its movement moves the locking member 32 by means of the pivot 35.

The movement of this locking member releases the tooth 11 which was engaged while the rod 9 and the piston 8 are brought back to their initial position under the action of the spring 13. The action of the fluid on the piston 28 is then interrupted and the different members of the device again take up the position shown in Fig. 1.

What I claim is:—

1. In a device for controlling the displacements of a member adapted to occupy successively different predetermined positions, a first fluid driven motor for operating the said member, notches provided on the said member, a second motor subjected to the effect of the fluid acting in the said first motor, and means operated by the said second motor and displaced against the action of a spring to cooperate with the said notches to limit each displacement of the said member due to the action of the driving fluid.

2. In a device for controlling the displacements of a member adapted to occupy successively different predetermined positions, a first fluid operated motor for driving the said member, resilient means opposing the displacement of the said member, notches provided on the said member, a second motor subjected to the effect of the fluid acting in the said first motor, means driven by the said second motor to cooperate with the said notches to limit each displacement of the said member due to the action of the drive fluid, and a locking member subjected to the action of a spring to cooperate with the said notches to automatically lock the first said member in each of the positions it may occupy.

3. In a device as claimed in claim 2, the provision of fluid operated means for releasing the locking member and for allowing the member operated by the said first motor to return to its initial position.

4. In a device for controlling the displacements of a member adapted to occupy successively different predetermined positions, a first fluid operated drive cylinder, a piston in the said cylinder, an opposing spring for the said piston, a piston rod for the said piston, two oppositely directed series of ratchet teeth cut lengthwise into the said piston rod, a second fluid operated drive cylinder provided transversely of the said piston rod, a conduit to connect the said first cylinder to the said second cylinder, a piston in the said second cylinder, an opposing spring for the latter piston, a pawl supported by the latter piston to cooperate with one series of ratchet teeth when the piston in the said first cylinder is subjected to the action of the fluid, and means cooperating with the other series of ratchet teeth for automatically locking in position the piston rod of the piston in the said first cylinder after the action of fluid has ceased in the latter.

5. In a device for controlling the displacements of a member adapted to occupy successively different predetermined positions, a first fluid operated drive cylinder, a piston in the said cylinder, an opposing spring for the said piston, a piston rod for the said piston, two oppositely directed series of ratchet teeth cut lengthwise into the said piston rod, a second fluid operated drive cylinder provided transversely of the said piston rod, a conduit to connect the said first cylinder to the said second cylinder, a piston in the said second cylinder, an opposing spring for the latter piston, a pawl supported by the latter piston to cooperate with one series of ratchet teeth when the piston in the said first cylinder is subjected to the action of the fluid, a third drive cylinder provided transversely of the piston rod of the piston in the said first cylinder, a spring loaded piston in the said third cylinder, a spring loaded pawl-like locking member supported with limited axial play in the latter piston to automatically engage the other series of ratchet teeth to lock the piston rod of the piston of the said first cylinder in position after the action of the fluid has ceased in the said first cylinder, the latter locking member being released when the third said piston is subjected to the action of the driving fluid, to allow the piston in the said first cylinder to return to its initial position under the effect of the opposing spring acting upon the latter piston.

6. In a device as claimed in claim 5, the arrangement characterized in that the pawl associated with the piston in the said second cylinder is supported with transverse play with respect to the latter piston.

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