July 20, 1943. W. R. QUENTIN 2,324,876

CONTROLLER OPERATING MECHANISM

Filed July 4, 1942

Fig. 1.

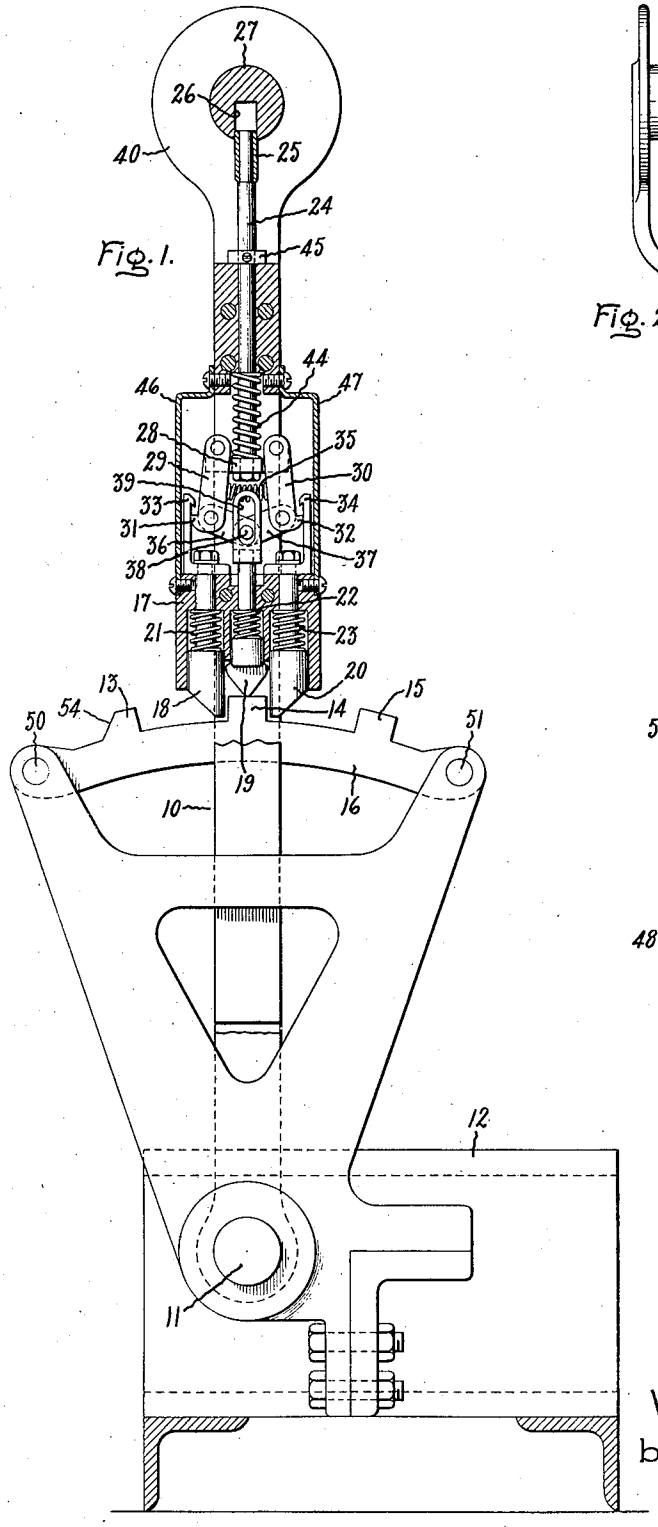
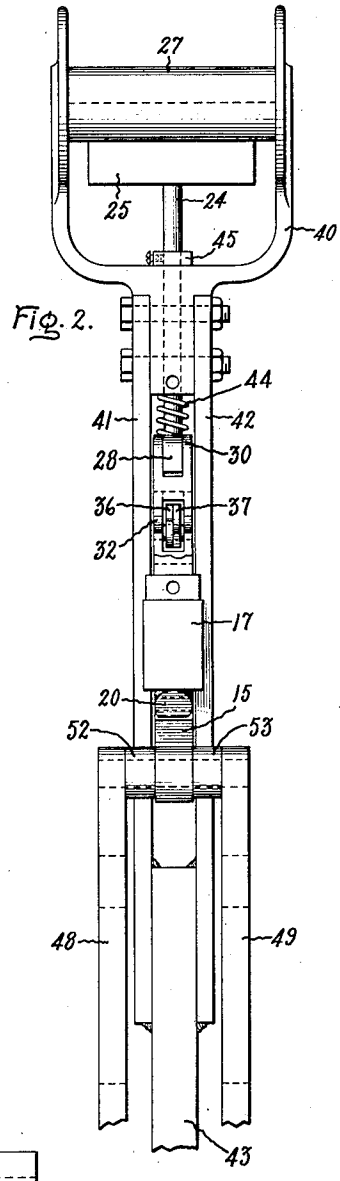


Fig. 2.



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CONTROLLER OPERATING MECHANISM

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10 Claims. (Cl. 74—565)

My invention relates to controller operating mechanism, particularly operating mechanism for electric controllers, wherein it is desired positively to bring the controller to rest in one or more positions over its range of movement, and has for its object simple and reliable means for causing the operator to stop the controller at a predetermined point.

In carrying out my invention in one form, I provide one or more stop projections in the path of movement of the controller handle, together with three spring pressed members on the handle which cooperate with the stop. Two of these members take positions on opposite sides of a stop projection to bring the handle to rest while the third member engages the projection and thereby renders effective the lifting mechanism for the other two members. The operator may now raise the two latching members to clear the projection so that the handle movement can be continued. When the third member disengages the stop, however, it disables the lifting mechanism for the two latching members so that they can not be held in a position to clear the next stop which, therefore, positively brings the handle to rest.

For a more complete understanding of my invention, reference should be had to the accompanying drawing, Fig. 1 of which is an end elevation view, partly in section, of a controller and operating mechanism therefor embodying my invention, while Fig. 2 is a side elevation view of the operating mechanism shown in Fig. 1 but with enclosing covers removed.

I have shown my invention in one form as applied to the operating handle or lever 10 which is mounted on an operating shaft 11 for the electric controller 12. It will be understood that the shaft 11 drives a suitable electric switching device (not shown) in the controller. The lower end of the handle is rigidly secured to the shaft so that arcuate movement of the handle turns the shaft through a small angle.

This controller may be used, for example, in the control of an electric motor. It is desired to prevent the operator from moving the handle quickly over certain positions in order that the motor, for example, may have time to accelerate and the severity of service on both the motor and supply conductors thereby be decreased.

I have shown a mechanism for bringing the handle positively to rest in three positions defined by stop projections 13, 14 and 15 on an arcuate member 16 adjacent the handle and extending in the direction of its movement. Carried by the handle is a support 17 in which are mounted slidably three plungers or latch members 18, 19 and 20. These plungers are each free to move in a direction substantially parallel with the handle, as shown, and are slidably mounted in substantially parallel bores provided for them in the support 17 but they are held against rotation in the bores by suitable splined connections (not shown). They are depressed, as seen in the drawing, respectively by helical springs 21, 22 and 23.

With the parts in the positions shown in the drawing, the handle is latched against movement in either direction by the plungers 18 and 20 which are on opposite sides of the projection 14. Also, it will be observed that the plunger 19 is in its raised position and rests on the projection 14. The outer beveled ends of the plungers 18 and 20 provide for lifting of the plunger which first engages the projection 14 after which this leading plunger is forced down in front of the projection when the handle is brought to rest by the engagement of the trailing outer plunger with the projection. The plunger 19 has its end beveled for each direction of movement so that it is raised to the position shown upon engagement with the projection regardless of the direction of movement of the handle.

In order to continue the movement of the handle in either direction, the operator must pull upward on the operating member or rod 24 so as to raise the plungers 18 and 20. This he can conveniently do by grasping a cross member 25 on the other end of the rod 24 which member 25 fits into a slot 26 in the hand grip member 27 on the end of the handle. On the lower end of the rod is a cross member 28 carrying pivotally on its opposite ends the links 29 and 30. When the links are raised by raising the rod, projections 31 and 32 on the links engage with projections 33 and 34 on members secured to the upper ends of the plungers 18 and 20 whereby these plungers are lifted. At this time, the links 29 and 30 are pressed apart by a helical spring 35 whereby the toggle links 36 and 37 connecting the lower ends of the links 29 and 30 are substantially straightened, as shown in the drawing. During this upward movement, the knee pin 38 of the toggle links 36 and 37 is free to move upward in a slot member 39 secured to the upper end of the plunger 19. It will be observed that the rod 24 is substantially parallel with the plungers.

Thus, the plungers 18 and 20 can be lifted by grasping the cross member 25 so as to both clear the projection 14 and provide for movement of the handle in either direction. However, when

the handle is moved far enough for the plunger 19 to clear the projection 14, the plunger is forced downward by the spring 22 to its lowermost position in which the upper wall of the slot 39 engages the knee pin 38 forcing it downward and pulling the lower ends of the links 29 and 30 toward each other. This moves the projections 31 and 32 out of engagement with the projections 33 and 34 so that the plungers 18 and 20 are released and forced downward by their springs even though the operator may continue to hold the cross member 25 in its raised position. Thus it is impossible for the operator to hold the plungers 18 and 20 in their raised positions.

It will be understood from the preceding description that when a projection is reached, the leading plunger 18 or 20 is raised and passes over the projection and the handle is brought to rest by the trailing plunger. At the same time, the middle plunger 19 is raised so as to render effective the manual lifting mechanism for the plungers 18 and 20.

Continuing with the details of construction, it will be observed that the U-shaped member 40 carrying the hand grip 27 is mounted between the upper ends of two parallel bars 41 and 42 which at their lower ends are secured, as by welding, to an arm 43 secured in turn to the shaft 11. The support 17 is mounted between the bars 41 and 42 as are also the various links.

A helical compression spring 44 surrounds the rod 24 between the cross bar 28 and the member 40 thereby to bias the rod 24 to a lowermost position with a collar 45 on the rod resting against the support 40.

Enclosing covers 46 and 47 are provided on opposite sides of the bars 41 and 42 and are held by suitable screws on the bars and on the upper ends of the support 17 so as to enclose the operating mechanism. These caps are not shown in Fig. 2.

As shown, the arcuate member 16 is mounted at its ends between two sector supporting members 48 and 49 secured at their lower ends to the housing of the controller 12. Thus pins 50 and 51 extend through the upper ends of the members 48 and 49 and through apertures in the ends of the member 16 so as to support the member 16. As seen in Fig. 2, spacing members 52 and 53 are provided on opposite sides of the member 16 at each end so that the supporting members 48 and 49 are spaced apart far enough for the bars 41 and 42 to move freely between them. Also, it will be observed that the arcuate member 16 extends loosely between the bars 41 and 42. This arrangement, moreover, provides stop limits for the handle which is brought to rest in each extreme position by engagement of the bars 41 and 42 with the spacing members 52 and 53 at that end.

If desired, one or more of the stop projections can be beveled on one side to provide for continuous movement of the handle past that projection in one direction. This arrangement is shown in connection with the projection 13 which has one beveled side 54. Thus when the handle is moved to its extreme position toward the left, it can be moved toward the right past the projection 13, the plunger 18 being lifted by the beveled side 54.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I therefore contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patents of the United States is:

1. Stop mechanism for two members, at least one of which is movable relative to the other, comprising a stop projection on one of said members in the path of relative movement of said members, two latches on the other of said members, means biasing said latches to positions to embrace said stop, release mechanism for moving said latches to second positions to clear said stop, and disabling means for said release mechanism rendered ineffective by engagement with said stop when said latches are in positions to embrace said stop but released by disengagement from said stop upon relative movement of said members for disabling said release mechanism thereby to prevent the holding of said latches in said second positions.

2. Stop mechanism for two members, at least one of which is movable relative to the other, a stop projection on one of said members in the path of relative movement of said members, two spring pressed latches on the other of said members arranged to embrace said stop, release mechanism for moving said latches to second positions to clear said stop, and means raised to an ineffective position on said stop when said latches embrace said stop and released when said latches move past said stop upon continued movement of said handle for disabling said release mechanism thereby to prevent the holding of said latches in said second positions.

3. The combination with an operating handle of a stop in the path of movement of said handle, two spring pressed latches carried by said handle arranged to embrace said stop, latch mechanism for raising said two plungers to clear said stop, and disabling means for said release mechnism rendered ineffective by engagement with said stop when said latches are in positions to embrace said stop but released by disengagement from said stop upon continued movement of said handle for disabling said latch mechanism thereby to prevent the holding of said latches in their raised positions by said latch mechanism.

4. The combination with an operating handle of a stop in the path of movement of said handle, two spring pressed latches carried by said handle arranged to embrace said stop, latch mechanism for raising said two latches to clear said stop, a spring pressed member arranged to engage said stop, and an operating connection between said member and said latch mechanism whereby upon continued movement of said handle, said member operates said latch mechanism to release said latches thereby to prevent the holding of said latches in their raised positions.

5. The combination with an operating handle, of a stop projection in the path of movement of said handle, three spring pressed plungers carried by said handle, the two outermost of which are arranged to embrace said stop projection with the middle plunger resting on said projection, latch mechanism for raising said two outer plungers to clear said stop projection, and an operating connection between said middle plunger and said latch mechanism whereby when said middle plunger moves off of said stop upon continued movement of said handle, said middle plunger operates said latch mechanism to release said two outer plungers thereby to prevent the holding of said two outer plungers in their raised positions.

6. A stop mechanism for two members, one of which is movable with respect to the other, com-

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prising a stop projection on one of said members, two spring pressed latch members carried by the other of said members arranged in the path of relative movement of said stop and to embrace said stop, an operating member adjacent said latch members, a pair of links pivoted on said operating member and extending toward said latch members, a spring biasing said links apart, a first operating projection on the other end of each of said links, second operating projections on said two latch members engaged by said first projections when said member is moved away from said latch members whereby said latch members are moved to clear said stop and provide for continued relative movement between said members, and means cooperating with said stop for moving said links together when said latch members pass said stop thereby to release said latch members.

7. A stop mecchanism for two members, one of which is movable with respect to the other, comprising a stop projection on one of said members, three spring pressed plungers carried by the other of said members arranged substantially parallel with one another in the path of relative movement of said stop and the two outermost of said plungers being arranged to embrace said stop with the middle plunger resting on said stop, an operating member adjacent said plungers, a pair of links pivoted on said member and extending toward said plungers, a spring biasing said links apart, a latching projection on the other end of each of said links, second latching projections on said two outer plungers engaged by said first projections when said member is pulled away from said plungers whereby said plungers are moved to clear said stop and provide for continued relative movement between said members, and a mechanical connection between said middle plunger and said links for moving said links together when said middle plunger moves off said stop thereby to release said two outer plungers.

8. The combination with an operating handle of a stop projection in the path of movement of said handle, three spring pressed plungers carried by said handle arranged in alignment and substantially parallel with one another in the path of movement of said handle and the two outermost of said projections being arranged to embrace said stop projection with the middle plunger resting on said projection, a longitudinally movable operating member on said handle having one end adjacent said plungers, a pair of links pivoted on said member and extending toward said plungers, a spring biasing said links apart, a latching projection on the other ends of each of said links, second latching projections on said two outer plungers engaged by said first projections when said member is pulled away from said plungers whereby said plungers are moved to clear said stop projection and provide for continued movement of said handle in either direction, and a mechanical connection between said middle plunger and said links for moving said links together when said middle plunger moves off said stop thereby to release said two outer plungers.

9. The combination with an operating handle of a stop projection in the path of movement of said handle, three spring pressed plungers carried by said handle arranged in alignment and substantially parallel with one another in the path of movement of said handle and the two outermost of said projections being arranged to embrace said stop projection with the middle plunger resting on said projection, an operating rod on said handle substantially parallel with said plungers having one end adjacent said plungers, a cross member on said end of said rod, a first pair of links pivoted on the ends of said cross member and extending toward said plungers, a second pair of links forming a toggle connecting the other ends of said first links together, a spring biasing said first links apart thereby to straighten said toggle, a latching projection on said other ends of each of said first links, second latching projections on said two outer plungers engaged by said first projections when said rod is pulled away from said plungers whereby said plungers can be raised to clear said stop projection and provide for continued movement of said handle in either direction, and a mechanical connection between said middle plunger and the knee pivot of said toggle for breaking said toggle when said middle plunger moves off said stop thereby to move said first links together and prevent the raising of said two outer plungers.

10. A stop mechanism for two members at least one of which is movable relative to the other comprising a stop projection on one of said members in the path of relative movement of said members, a latch on the other of said members, means biasing said latch to one position to engage said stop and thereby to hold said members against relative movement in a predetermined direction, release mechanism for moving said latch to a second position to clear said stop, and disabling means for said release mechanism on one of said members biased to a position to disable said release mechanism, and means on said disabling means engaged by said stop when said latch is in engagement with said stop whereby said disabling means is moved by said stop to a position rendering said disabling means ineffective and said latch can then be moved by said release mechanism to a position to clear said stop for relative movement of said members whereupon said disabling means is released by disengagement from said stop and moves in accordance with its bias to disable said release mechanism and prevent the holding of said latch in said second position.

WILLIAM R. QUENTIN.