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CONTROL MECHANISM FOR PUSH BUTTON AND THE LIKE

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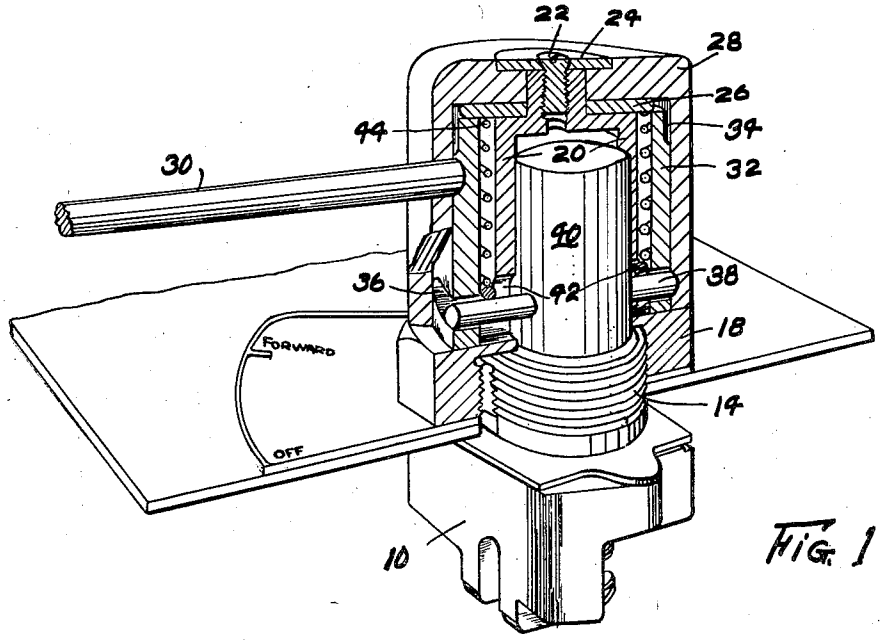


FIG. 1

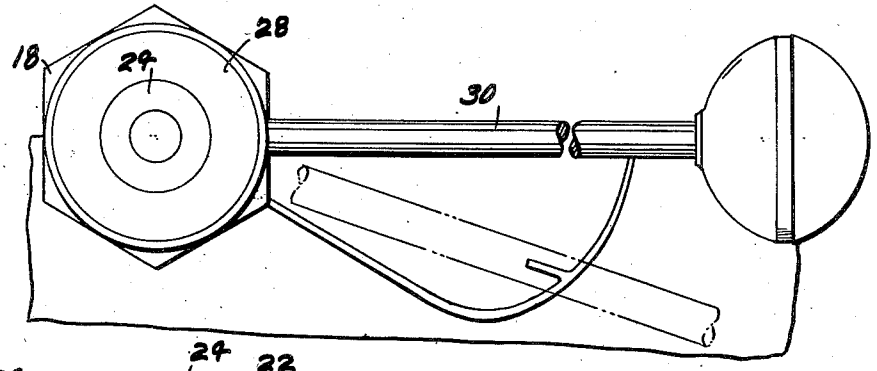


FIG. 2

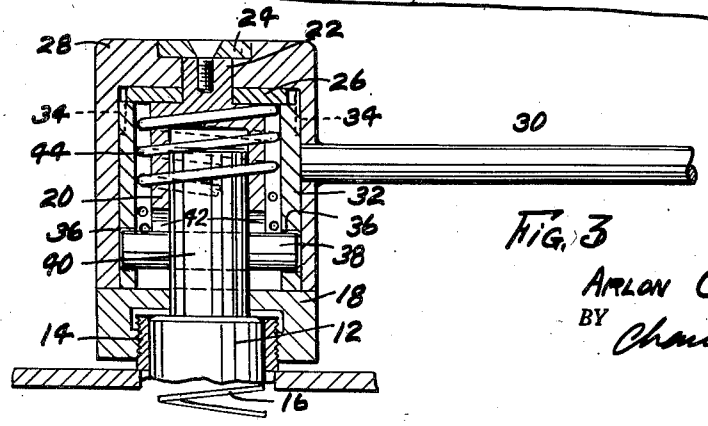


FIG. 3

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CONTROL MECHANISM FOR PUSH BUTTON AND THE LIKE

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3 Claims. (Cl. 74—503)

This invention relates to a new and improved control mechanism for push buttons and the like rectilinearly operable devices such as start and stop buttons for the control of machinery, and one of the principal objects of the present invention resides in the provision of an attachment which may be incorporated as a part of a conventional push button or the like so that the same may be operated by an angular motion of a control rod rather by axial pushing motion on the push button to the end that the push button or the like may be much more easily operated, particularly in cases where the push buttons are operated continually and also to the end that the control of the push button is made more positive.

Another object of the invention resides in the provision of the combination of a push button and angularly movable means and mechanism converting the same into the reciprocatory motion required for operating the push button, said means including a spring opposing the conventional push button return spring, the strength of said spring being greater than the strength of the push button spring, this spring therefore overcoming the push button spring. This spring, however, has a travel only half the length of the push button spring and therefore pushes the push button only to a mid point, at which point both contacts are open. The device therefore functions as a spring centered normally open double throw switch.

A further object of the invention includes the provision of a device having means for attachment to the housing of a push button or other similar rectilinearly movable operator element, a shell on the attachment, a handle to rotate or oscillate the shell, a cam sleeve in the shell movable therewith, a cross pin moved rectilinearly only as the cam sleeve is moved angularly or rotatively, means to constrain the cross pin to a rectilinear path, and a plunger connected to the cross pin for operation thereby, the attachment being secured to the housing in position to cause depression of the push button upon movement of the handle in one direction. Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a perspective view, partly in section, illustrating the device;

Fig. 2 is a top plan view of the device; and

Fig. 3 is a vertical section therethrough.

The reference numeral **10** indicates a bracket for the support of a conventional push button **12** having an exteriorly threaded casing **14**. The push button **12** is provided with a return spring **16**, so that when the operator pushes down upon plunger **12**, the same is automatically returned by the spring. The plunger **12** works in the casing **14**, and the latter is fixed on a machine or on the usual push button housing bracket **10**. These push buttons may be used for starting or stopping machinery and in many other applications. In many instances, the push buttons have to be operated continually so that the operator's finger becomes sore and tired from the operation thereof.

The present invention comprises a nut **18** adapted to be threaded upon the threads **14** and this nut is adapted to be firmly seated on the threads on the push button housing. Secured to the nut or integral therewith there is a central shell, sleeve or the like indicated at **20**. This shell at its upper end is provided with a boss **22** into which is threaded a fastener holding plate **24**. A washer **26** is disposed on the top of the sleeve **20** which is closed at this end, and forms a rotative bearing for an exterior housing **28** to which is secured a handle **30**. When the handle **30** is moved angularly as for instance between the "off" and "forward" positions in Fig. 1, the exterior housing **28** is similarly rotated. The plate **24** holds the housing **28** to the shell **20**, but housing **28** is rotatable thereon.

The interior of housing **28** has a series of longitudinal serrations **34** to receive a mating set of serrations on the outside surface of a sleeve **32**. These serrations serve to lock parts **28**, **32** together, so that they move together, and they also serve the purpose of providing a plurality of relative angular positions of the housing **28** in relation to the sleeve **32**. In this fashion, the handle can be positioned at the desired angular position at assembly.

Sleeve **32** is provided with a pair of oppositely located angularly directed slots indicated at **36** and these slots receive a cross pin **38**, which pin extends through the interior sleeve **20** and also through a central plunger **40**. When sleeve **32** is moved angularly, the pin moves axially by a camming action caused by slots **36**, thus moving the plunger **40** with it; and the plunger **40** bears on the push button **12**, thus depressing the latter. The sleeve **32** is provided with vertical slots **42** receiving the pin **38** and allowing the same to move up and down with respect thereto.

The bracket **10** is assumed to be fixed to a support such as a machine frame or housing, not shown, in the usual and conventional application of any switch to any use. The casing **14** being fixed to the fixed bracket **10** is in turn fixed, and the nut **18** is turned upon the casing **14**, so that this nut is also fixed. The sleeve **20** being fixed to or integral with nut **18**, as above stated, is likewise fixed, while exterior housing **28** and sleeve **32** may be turned on a vertical axis as far as permitted by the relative motion of slots **36** limited by rotationally fixed pin **38**. Pin **38** can move vertically in slots **42**, and thus also moves plunger **40** and plunger **12**, the latter having the spring **16** to return the plungers upwardly.

A coil spring **44** may be used in some cases and surrounds the innermost shell **20**, being located interiorly of shell **32**.

When this spring is furnished, its function is to center the operating handle in the mid-position of its travel. This spring (and washer) can travel only half the stroke-length of the device, at which point further travel is restricted by a shoulder on the body **18**. Since this spring **44** is stronger than spring **16**, it can overcome spring **16** to the extent of its travel, thereby centering the handle and stopping the contacts mid-way with all poles open. Any movement of the handle in either direction is opposed by one spring or the other and thereby the handle is returned to the center position.

This invention provides an extremely evenly and smoothly operable device and one which an operator may utilize for long periods of time without fatigue. At the same time, the operator exercises much more constant and even control of the push button, so that he is enabled to work it exactly as required by the machine or the operation that it is engaged upon.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein

disclosed, otherwise than as set forth in the claims, but what I claim is:

1. An attachment for operating a push button or the like having a housing and a spring, comprising means to mount the attachment on the push button housing, a plunger to contact and depress the push button, means to restrict the plunger to a rectilinear motion, said means including a pin on the plunger and a sleeve fixed with relation to the housing, said sleeve having a longitudinal slot receiving the pin, another sleeve, a cam slot angularly disposed in the second-named sleeve, said pin extending into the cam slot, means to angularly move the second-named sleeve, and a spring normally urging the plunger toward the push button and opposing the push button spring.

2. The attachment of claim 1 wherein the two springs balance so that the push button stays where positioned by the plunger.

3. The attachment of claim 1 wherein the plunger spring is weaker than the push button spring.

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