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J. O. WRIGHT

3,375,340

MOMENTARY ACTUATING ARRANGEMENT

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Fig-2

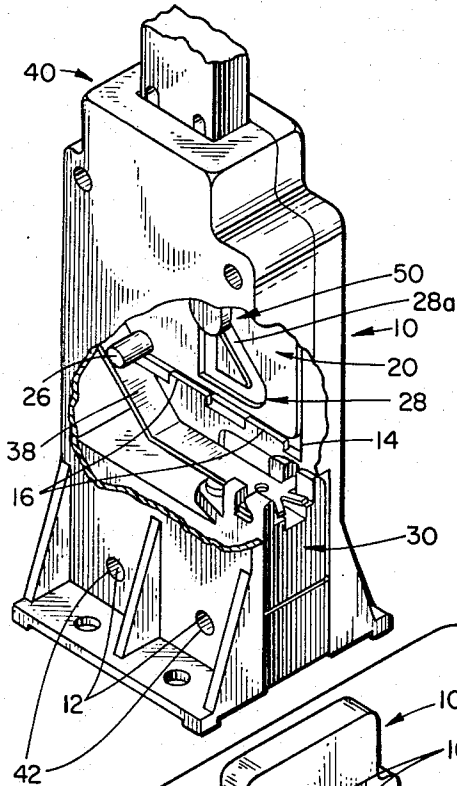


Fig-3

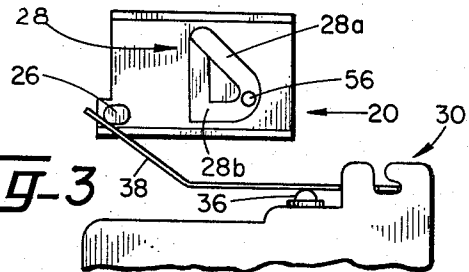
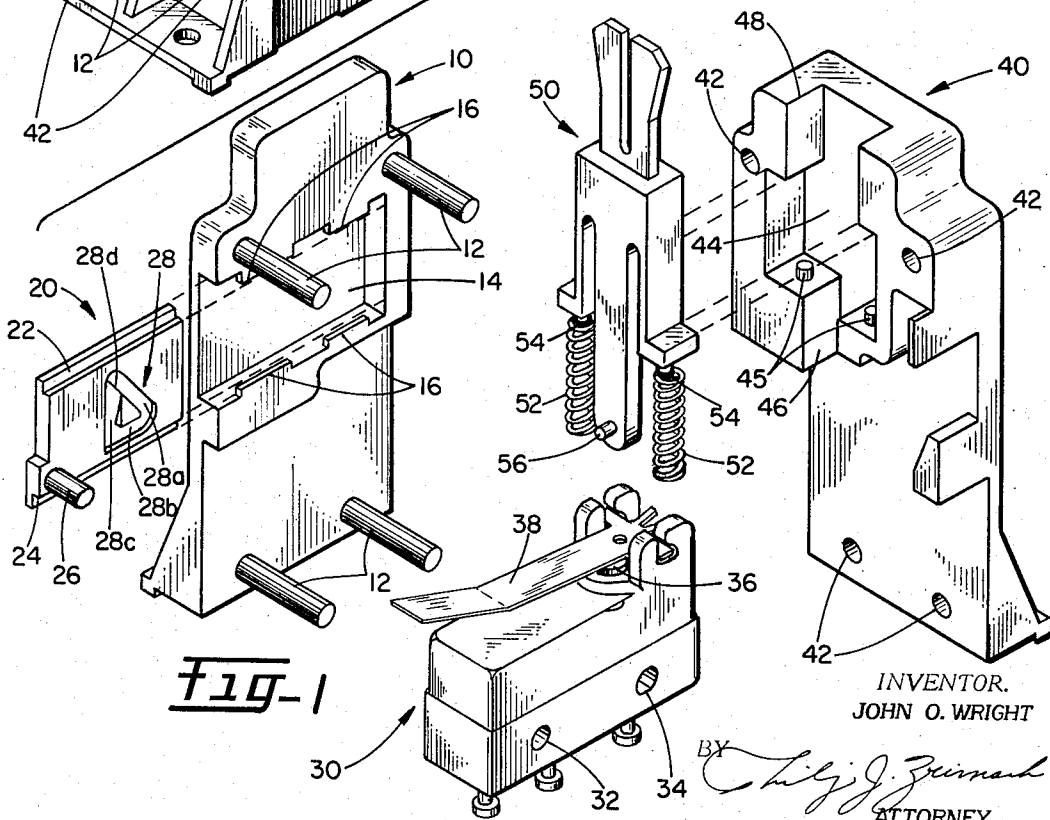
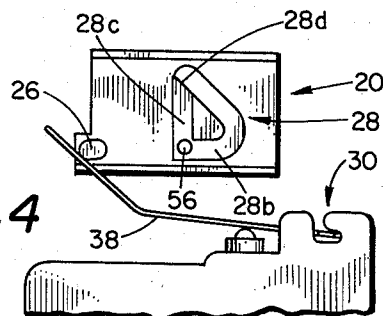


Fig-4



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MOMENTARY ACTUATING ARRANGEMENT
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ABSTRACT OF THE DISCLOSURE

An arrangement to provide a momentary actuation of a control device wherein initial movement of an actuating means brings about actuation of the control device, further movement in the same direction brings about deactuation and deactuation is continued during return movement.

The present invention is directed to an actuating arrangement for a control device which provides a momentary change in condition of the control device when the actuating arrangement is moved in one direction but which does not cause a change in condition of the control device upon movement of the actuating arrangement in the opposite direction.

Momentary actuating arrangements are known in the prior art and take many forms of which those disclosed in the Lester Patent 2,648,234 and the Borges Patent 3,142,743 are but two examples. However as is always the case, a continuing search is made for the arrangement which is simpler and less expensive because of fewer parts more easily formed, which is more compact and more reliable, and which provides smoother operation.

An actuating arrangement having the attributes just set forth is disclosed herein and essentially comprises three elements which provide the momentary change in condition of a control device in the form of an electrical switch. The three elements comprise a support in the form of a housing which supports the switch, a driver member and a driven member. The driver and driven members are arranged for guided relative transverse movement in the housing and have a disengageable driving connection therebetween. The driving connection in the preferred embodiment is in the form of a continuous cam track and follower each associated with one of the members. Thus initial movement of the driver member causes movement of the driven member by means of the cam track and follower arrangement and ultimately causes actuation of the switch. Further movement of the driver member in the same direction results in disengagement of the driving connection between the cam track and follower allowing reverse movement of the driven member and causing deactuation of the switch. The cam track and follower are so arranged that the driving connection does not again become engaged until the driver member returns to its original position and hence the switch is unaffected by reverse movement of the driver member.

The nominal number of parts in the actuating arrangement of the present invention gives rise to a straightforward reliable approach. Also because the elements can be fabricated of plastic and hence can be molded, an inexpensive, compact, and smooth operating construction is possible.

It is an object of the present invention to provide a momentary actuating arrangement wherein initial move-

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ment thereof brings about a change in condition of a control device, further movement in the same direction causes the control device to assume its initial condition and return movement has no effect on the control device.

A further object of the present invention is to provide a momentary actuating arrangement as just set forth which is straightforward in design, inexpensive because of a minimum number of easily formed elements, and compact and which provides reliable and smooth operation.

These and other objects will become apparent from a reading of the following description and appended claims when taken in conjunction with the drawing in which:

FIGURE 1 is a perspective explosion view of the various elements of the preferred embodiment of the invention;

FIGURE 2 is a perspective assembly view of the preferred embodiment of the invention with a portion of the housing broken away to show the movable elements in an initial or at rest position;

FIGURE 3 is a partial side view of some of the elements of the invention with the driver and driven elements in a position to cause a change in condition of the control device; and

FIGURE 4 is a partial side view of some of the elements of the invention with the driver member so located as to cause the disengageable driving connection to be disengaged to thereby allow return movement of the driven member to its initial or at rest position whereby the control device assumes its original condition.

Attention is first directed to FIGURE 1. There a support in the form of a split housing member 10 which can be formed of an appropriate plastic material includes four cylindrical pins 12 which extend outwardly from and generally perpendicular to the main plane thereof. The housing 10 also includes a cavity 14 with upwardly and downwardly extending edges 16.

A driven member 20 which can be formed of an appropriate plastic material and which includes an upper groove 22 and a lower groove 24 is arranged to be disposed in the cavity 14 of the housing 10 with the grooves associated with the ledges 16 thereof so as to allow for guided reciprocal movement of the driven member parallel to the facing surfaces of the ledges. The driven member 20 includes an actuating portion 26 which when the driven member is disposed in the cavity 14 extends in the same general direction as the pins 16. The driven member 20 also includes a continuous cam track 28 which comprises an angular surface 28a, a horizontal surface 28b, and a vertical inclined surface 28c substantially transverse to the horizontal surface and closing on the angular surface. A drop off 28d is provided between the surface 28c and the surface 28a so that at the drop off, the surface 28c is shallower than the surface 28a. For more detail as to this type cam track with a drop off, attention is directed to the Ensign, Jr. et al. Patent 2,956,446.

A control device in the form of an electrical switch 30 which may be of the snap acting type disclosed in the Martin Patent 2,644,052 includes a pair of mounting holes 32 and 34 through which the lower pins 12 are arranged to be disposed. The switch 30 includes an operating plunger 36 for actuating the snap acting switch mechanism, not shown, which plunger in turn is actuated by the switch

supported leaf actuator 38 which may be of the type disclosed in the commonly assigned Hadley application, Ser. No. 558,715, filed June 20, 1966.

A second split housing member 40 which can also be formed of an appropriate plastic material includes four openings 42 which are arranged to accept the pins 12 of the housing member 10. The housing member 40 also includes a cavity 44 having pins 45 extending upwardly from the lower surface thereof and having a lower opening 46 and an upper opening 48 both communicating therewith.

A driver member in the form of an actuating plunger 50 which can be formed of an appropriate plastic material is arranged to be disposed in the cavity 44 of the housing member 40 with the upper portion extending into and beyond upper opening 48 and the lower portion extending into and beyond lower opening 46 so as to allow for guided reciprocal movement of the actuating plunger. Coil springs 52 are arranged to be disposed between pins 54 provided on the actuating plunger 50 and the pins 45 disposed in the cavity 44 of the housing member 40. The lower portion of the actuating plunger 50 includes a pin or follower 56 which is arranged to be associated with the cam track 28 of the driven member 20 and for positioning the driven member, dependent upon the position of the actuating plunger 52. The cam track 28 and the follower 56 provide a disengageable driving connection between the driver member 50 and the driven member 20 as will become apparent below. A pushbutton, not shown, may be associated with the upper portion of the actuating plunger 52 by means of a snap fastening therebetween.

The various elements are arranged to be associated together as briefly described above and when this is accomplished, the arrangement of FIGURE 2 arises. Thus referring to FIGURES 1 and 2, the driven member 20 is disposed in the cavity 14 of the housing member 10 and slidably maintained in place by the ledges 16 thereof. Further, the actuating plunger 50 and coil springs 52 are disposed in the cavity 44 of the housing member 40. And with the switch 30 supported by the pins 12 of the housing member 10, the housing members 10 and 40 can be brought together so that the follower 56 is disposed in the cam track 28 to establish a driving connection therebetween and so that the pins 12 are disposed in the openings 42. The housing members 10 and 40 can be maintained together by properly upsetting the extremities of the pins 12 with respect to the outer surface of the housing member 40.

As shown in FIGURE 2, the actuating arrangement is in its initial or at rest position with the actuating plunger 50 in its extreme outward location under the influence of the coil springs, not shown, so that the follower, not shown, is at the upper extremity of the surface 28a. The actuating portion 26 while proximate to the outer extremity of the leaf actuator 38 does not give rise to actuation of the switch 30.

Inward movement of the actuating plunger, against the restraining force of the coil springs, and the resultant inward movement of the follower causes substantially transverse movement of the driven member with respect to the actuating plunger because of the interrelationship between the follower and the cam track. Thus referring to FIGURE 3, the driven member 20 and hence the actuating portion 26 has been moved by the follower 56 in its travel in the cam track 28 so as to cause the leaf actuator 38 to sufficiently depress the operating plunger 36, against the bias provided by the snap acting switch mechanism of the switch 30, to bring about actuation thereof. It will be noted that the follower 56 is located near the lower extremity of the surface 28a of the cam track 28 and is about to enter the surface 28b.

Further inward movement of the actuating plunger and resultant movement of the follower results in the disengagement of the driving connection between the cam track and follower followed by deactuation of the

switch. Thus referring to FIGURE 4, the driven member 20 and leaf actuator 38 have been returned to their initial or at rest position with the switch 30 in a deactuated condition. This is because the follower 56 in entering surface 28b of the cam track 28 permitted return movement of the driven member 20 to its initial or at rest position under the bias provided by the snap acting switch mechanism of the switch 30 and transmitted through the leaf actuator 38 to the actuating portion 26. Once the just described relative movement between the cam track 28 and the follower 56 has taken place which results in deactuation of the switch 30, re-actuation thereof can not arise upon partial outward and inward excursions of the actuating plunger. Likewise, upon complete outward movement of the actuating plunger whereby the follower 56 ultimately assumes the position of FIGURE 2, re-actuation of the switch 30 does not take place. Further, as the follower 56 moves along the surface 28c, it follows the incline thereof until the drop off 28d is encountered and the driving connection between the cam track 28 and the follower 56 is re-established and a further actuating cycle is possible. It is apparent the drop off 28d is provided so that upon inward movement of the actuating plunger from its initial or at rest position, it follows surface 28a rather than surface 28c.

While in the preferred embodiment the bias is provided by the snap acting switch mechanism of the switch, it could be provided by a resilient leaf actuator or resilient means associated with the driven member, for example.

From the foregoing, it will be appreciated that a momentary actuating arrangement has been disclosed wherein actuation of a control device arises upon an initial movement of a driver member with respect to a driven member followed by deactuation upon continued movement of the driven member which deactuation continues until a further actuating cycle is initiated and the initial movement takes place.

The momentary actuating arrangement disclosed as pointed out previously is very straightforward, inexpensive, and compact.

Since the invention disclosed herein may take other forms, the measure of the invention should be determined from the following claims in which I claim:

1. A momentary actuating arrangement comprising: a support for mounting a control device; a driver member guided for movement with respect to said support along a first reciprocal path; and a driven member guided for movement with respect to said support along a second reciprocal path substantially transverse to said first path and including an actuating portion for causing a change in condition of said control device upon movement of said driven member in opposite directions along said second path; said driving member and said driven member having a disengageable driving connection therebetween so that movement of said driver member in a first direction along said first path causes movement of said driven member in a first direction along said second path and against a bias to change the condition of said control device, further movement of said driver member in said first direction causing disengagement of said driving connection allowing the bias to move said driven member in the opposite direction along said second path to its original position resulting in said control device to assume its original condition, and subsequent movement of said driven member in the opposite direction to its original position re-establishing said driving connection.

2. The arrangement of claim 1 wherein said control device is an electrical switch and the bias is provided by one of the switch elements.

3. The arrangement of claim 1 wherein said control device is an electrical switch which includes a leaf actuator and the bias is transmitted by said actuator.

4. The arrangement of claim 1 wherein said disengageable driving connection comprises a continuous cam track and follower each associated with one of said driver and

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driven members, the disengagement and subsequent relative movement therebetween being provided by the form of said cam track with respect to said follower.

5. The arrangement of claims 3 and 4 wherein said support is a split snap together housing which maintains said switch device as a prisoner therebetween, wherein said driving member is a spring return plunger guided for movement in a first cavity provided in said housing and wherein said driven member is guided for movement in a second cavity provided in said housing.

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References Cited

UNITED STATES PATENTS

2,671,354	3/1954	Goos	-----	200—160	XR
2,956,446	10/1960	Ensign et al.	----	200—160	XR
3,142,743	7/1964	Borges	-----	200—160	
3,187,602	6/1965	Cousins	-----	200—153.9	

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