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[54] **TWO-POSITION PANEL INDICATOR**
5 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **116/70,** 73/388, 200/67
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[50] **Field of Search** ..... 116/70, 65; 73/407, 388, 146.2, 146.8; 200/67 B, 83.9, 83.31

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ABSTRACT: A mechanical panel indicator with a two-position mechanism capable of providing snap action which mechanism is operable under the influence of a motor for causing changes in indicator condition. Adjustment means are provided to selectively allow for maintained or momentary indicator conditions when the influence of the motor is removed.

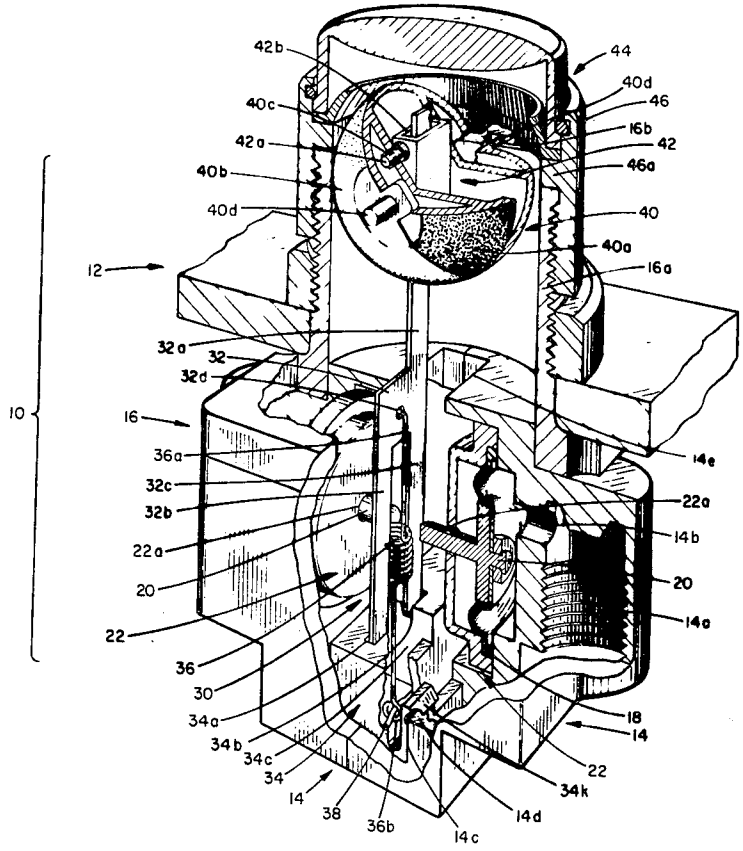


Fig-1

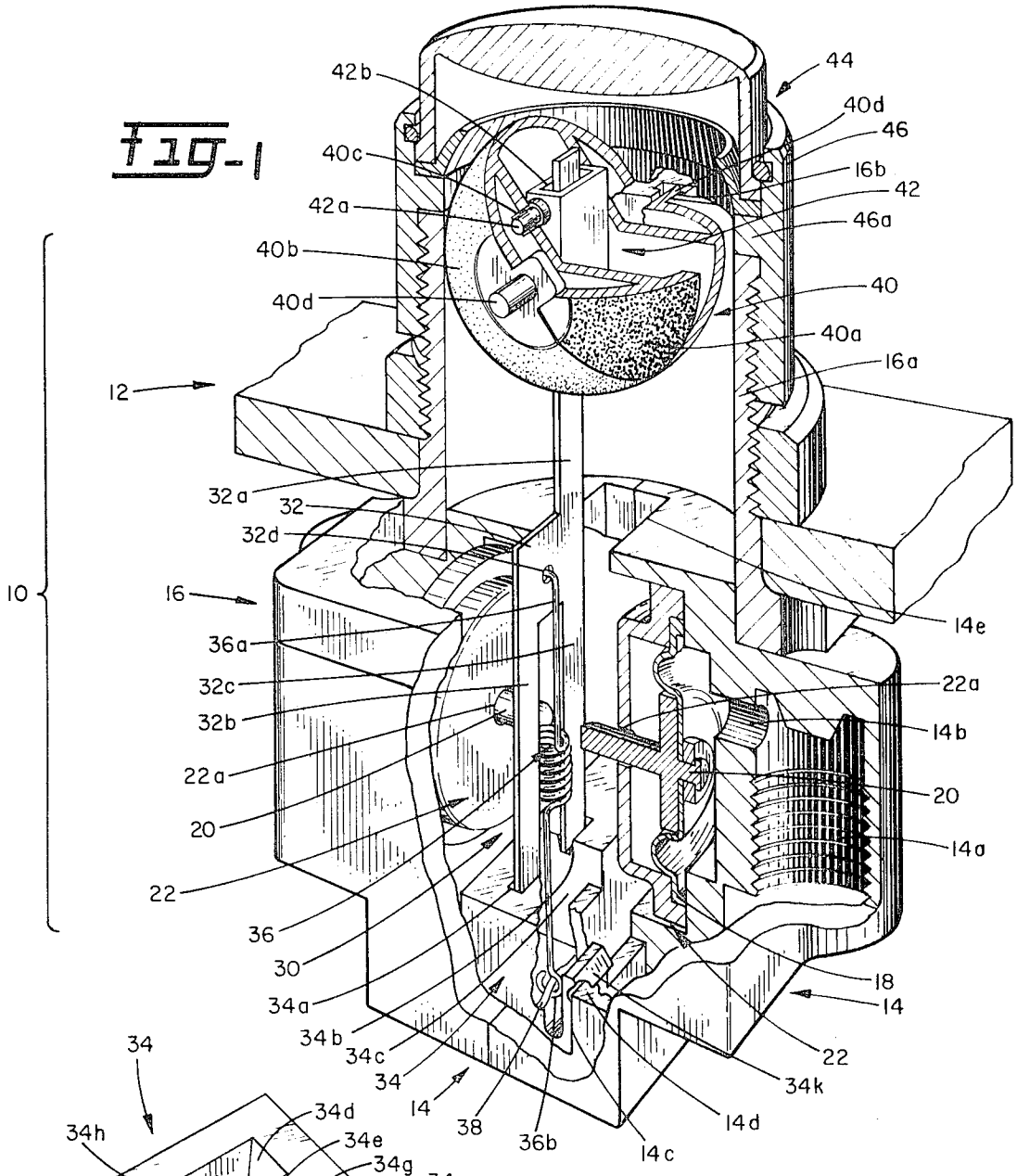


Fig-2

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TWO-POSITION PANEL INDICATOR

The present invention is directed to a mechanical two-position panel indicator wherein the indicating member is movable between two positions by a driving mechanism under the influence of a motor means which mechanism is adjustable so as to selectively allow for maintained and momentary conditions of the indicating member upon removal of the influence of the motor means.

Mechanical indicators of the multiposition type are generally slow acting in the movement of the indicating member from one position to another or they incorporate rather complex detent arrangements to provide a degree of snap action. With the slow acting configuration, confusion can arise when the indicating member is "between" positions. On the one hand in utilizing the detent arrangement while the shortcoming just noted is not encountered, a more intricate mechanism is the result. Further, such mechanical indicators are conventionally limited to either maintained or momentary conditions. That is, the indicating member remains at its new position or returns to its initial position, respectively, upon removal of the driving force.

The mechanical panel indicator disclosed herein overcomes the problem of the indicating member being "between" positions and accomplishes it without utilizing complex detent arrangements. Thus, the expedient of positioning the indicating member by means of a two-position mechanism capable of providing snap action is utilized. The mechanism in turn is arranged to be positioned by motor means. Further, by selectively adjusting the two-position mechanism, both maintained and momentary conditions of the indicating member are possible. In the specific embodiment disclosed, a spherical member having two distinct signals carried thereby is directly positioned by a toggle overcenter spring system which is under the influence of a double acting fluidic pressure operated device. The selective provision of maintained and momentary conditions in a single indicator involves variably positioning a pivotal connection of the toggle overcenter spring system. The positioning is arranged to be accomplished manually and from outside the indicator and without tools of any kind being required and without any disassembly of the indicator from its mounting.

Therefore, an object of the present invention is to provide a mechanical two-position indicator in which the indicating member can be driven between positions by a two-position mechanism capable of providing snap action.

It is a further object of this invention to provide an indicator as above set forth which includes adjustment means so as to allow for selective maintained and momentary conditions of the indicating member.

These and other objects will become apparent from a reading of the following specification and appended claims in which:

FIG. 1 is a perspective view, partially in section, of a mechanical two-position indicator incorporating the invention; and

FIG. 2 is an enlarged, perspective, partial, bottom view of a portion of the indicator of FIG. 1 showing the adjustment means utilized to provide the selective change of the indicating member between maintained and momentary conditions.

In FIG. 1, a mechanical two-position indicator **10** incorporating the invention hereof is shown secured to a mounting panel **12**.

The indicator **10** includes a housing which may be formed of a plastic molded material and which includes a pair of like casings **14** and a cover **16** having a threaded cylindrical mounting bushing **16***a* extending therefrom.

Each of the casings **14** includes a diaphragm **18** with a driving pin **20** secured thereto and a retainer **22**. In initial assembly, the retainer **22** is appropriately fastened to the casing **14** so as to secure the diaphragm **18** in place and accommodates the driving pin **20** in a clearance opening **22***a* provided therein. The casings **14** each include a threaded opening **14***a* to accommodate a pressure source, not shown, so as to allow for pressure fluid to pass into the casing and through

opening **14***b* and thereby act on the diaphragm **18** to position the driving pin **20**. With the initial assembly of the casings **14**, as just set forth, completed, the casings are appropriately secured together. Thereupon the cover **16** is appropriately secured to the assembled casings **14** so as to provide an assembled, integral housing having a motor means of the double acting fluid pressure operated type therein.

A two-position mechanism capable of providing snap action in the form of a toggle overcenter spring system **30** is arranged to be disposed between and acted upon by the driving pins **20**. The spring system **30** comprises a U-shaped lever **32** having an outwardly extending extremity **32***a* and a pair of arms **32***b* and **32***c* which are located in a pair of pivotal slots **34***a* and **34***b* of an insert **34** which may be formed of a plastic molded material. A tension coil spring **36** includes a first extremity **36***a* which is secured in opening **32***d* of the lever **32** and a second extremity **36***b* which is disposed, referring now also to FIG. 2, through opening **34***c* of the insert **34** and located about a centrally crimped U-shaped rod member **38** so as to provide a pivotal connection therebetween. The extremities of rod member **38** are associated with slots **34***d* whereas the central portion is associated with a set of grooves **34***e* provided in the insert **34**. Additional grooves **34***g* and **34***h* are provided in the insert **34**, the function of all of the grooves being set forth below.

The arrangement of the coil spring **36** with the lever **32** of course causes the latter as well as the rod member **38** to be placed in compression. The toggle overcenter spring system **30** is initially assembled with the insert **34** and then the assembly of the spring system and the insert is disposed for final assembly into an appropriate opening **14***c* provided in the lower wall of the casings **14** and is secured in place by means of tabs **34***k* provided on the insert **34** which overlie shoulders **14***d* provided in the casings. The upper portion and outwardly extending extremity **32***a* of the lever **32** are arranged to be disposed through opening **14***e* located in the upper wall of the casings **14**.

With the assembly of the toggle overcenter spring system **30** and the insert **34** in place in the housing, the driving pins **20** are arranged to each engage an opposite side of the arm **32***b* of the lever **32** upon movement of the pins under the influence of the double-acting fluid pressure-operated device.

The indicating member is substantially in the form of a sphere **40** which may be fabricated of plastic-molded material and which is comprised of two identical half-portions **40***a* and **40***b* appropriately fastened together. The outer surface of the sphere halves **40***a* and **40***b* are colored differently so as to provide two distinct signals. In assembly of the sphere halves **40***a* and **40***b*, a guide member **42** is disposed therebetween so that journal portions **42***a* of the guide member are disposed in openings **40***c* provided in the sphere halves. When assembled, the guide member **42** is free to rotate in the openings **40***c* and about the axis of the journals **42***b*. The assembled sphere **40** and guide member **42** are disposed in the upper extremity of the threaded cylindrical mounting bushing **16***a* so that journals **40***d* of the sphere are disposed in bearing cutouts **16***b* provided in the upper surface of the bushing. Further, the assembly of the sphere **40** and guide member **42** is located so that the outwardly extending extremity **32***a* of the lever **32** is disposed into and through opening **42***b* provided in the guide member.

A lens assembly **44** is conventionally fastened to the bushing **16***a* by means of a fastener **46** having a flange **46***a* which overlies the bearing cutouts **16***b* and secures the assembly of the sphere **40** and guide member **42** in place.

With the indicator **10** of FIGS. **1** and **2** as just described and with pressure sources affixed to the threaded openings **14***a* of the casings **14**, the indicator is ready to use. The toggle overcenter spring system **30** has its pivotal connections located so that the assembly of the sphere **40** and guide member **42** will remain in the position to which it was last driven by the motor means. In other words, the indicator **10** is arranged to provide maintained positions. This of course is caused because of the overcenter action of the spring system **30** and the system being

without sufficient return force inherent therein to cause a return thereof to the initial position after the influence of the double-acting fluid pressure-operated device is removed. Consequently, alternate movements of the respective driving pins **20** and the diaphragms **18** under the influence of the double-acting fluid pressure-operated device will cause snap action of the spring system **30** with resulting snap movement of the sphere **40** to alternate maintained positions to exhibit the two distinctively colored signals.

Should it be desired to have momentary condition of the indicator **10** with one or other of the distinct signals showing when not under the influence of the motor means, the rod **38** may be adjusted against the force of the coil spring **36** from groove **34***e* to one of the other of the grooves **34***g* or **34***h* and a pressure source affixed to the appropriate threaded opening **14***a* in the casings **14**. Such movement of the rod **38** changes the relationship of the forces in the spring system **30** so as to provide the return force which upon removal of the influence of the motor means causes a return of the sphere **40** from the position to which it was actuated by the motor means to its initial or at rest position.

It will be noted that the adjustment of the rod **38** can be accomplished manually without utilization of tools, from outside the indicator **10** and without any need of removal of the indicator from the panel **12**.

From the foregoing, it will be appreciated that we have provided a mechanical two-position indicator which can be snap action operated between the two positions and an indicator which allows for selective maintained and momentary conditions. Many variations of our invention are possible. For example, other forms of adjustment means could be utilized to provide the maintained and momentary conditions. Similarly, other two-position mechanisms which are capable of providing snap action could be utilized. Thus, mechanisms of the type disclosed in the Martin U.S. Pat. No. 2,644,052 could be employed. Therefore, the scope of our invention should be determined from the following claims.

We claim:

1. A mechanical two-position panel indicator comprising: a support arranged to be mounted on a panel; a two-position indicating member carried by said support so as to be visible from the front of the panel with the indicator associated therewith; said two-position indicating member being movable

alternately between the two positions by a two-position mechanism capable of providing snap action associated in driving relation therewith to separately exhibit two distinct signals carried by said indicating member; said two-position mechanism carried by said support, positionable by a motor driver also carried by said support and incorporating an overcenter spring system having a selective adjustment means movable to at least two positions with respect to said overcenter spring system so as to vary the return force inherent therein and provide maintained and/or momentary conditions thereof and of said indicating member in its excursions.

2. The arrangement of claim **1** wherein the support member is a housing enclosing said indicating member, said two-position mechanism and said motor and wherein the adjustment means is accessible from outside said housing.

3. The arrangement of claim **2** wherein the two-position mechanism incorporates a toggle overcenter spring system of the two-element type including a first element pivoted on said housing for driving said indicating member and a second element for providing the overcenter snap action having a first extremity fastened to said first element and the second extremity pivoted on said housing, one of said elements being in tension and the other in compression and wherein said adjustment means includes one of said pivotal connections arranged for selective adjustment with respect to the remainder of the indicator.

4. The arrangement of claim **3** wherein the pivotal connection arranged for selective adjustment is that between the second extremity of said second element and said housing and wherein the adjustment means further includes a rod associated with the second extremity of said second element and spaced depressions in said housing to accommodate said rod, movement of said rod against the spring force of said second element from one depression to another providing for change in said indicating member between the maintained and momentary conditions.

5. The arrangement of claim **4** wherein said indicating member is in the form of a pivoted spherical element type, said two-position mechanism includes a compression lever as the first element and a tension coil spring as the second element, and said motor is in the form of a double-acting fluid pressure-operated device.

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