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AUTOMATIC STOP MECHANISM

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FIG. 1

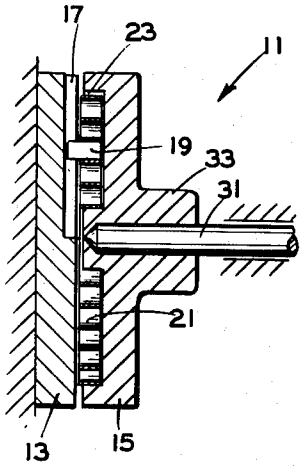


FIG. 2

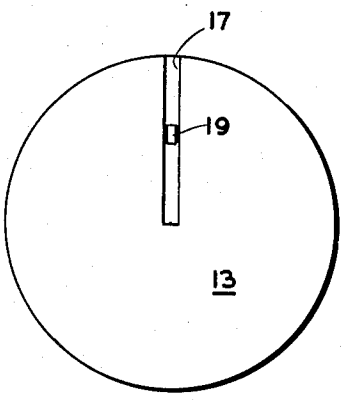


FIG. 3

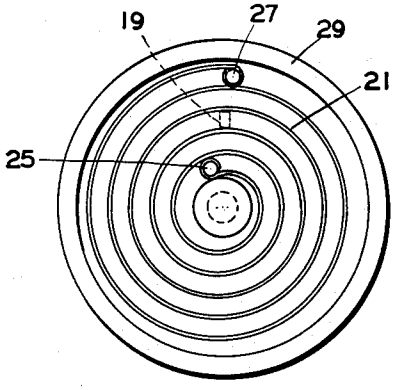
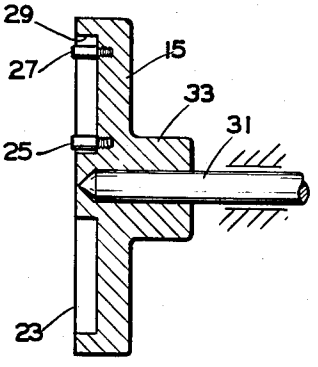


FIG. 4



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AUTOMATIC STOP MECHANISM

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7 Claims. (Cl. 188—69)

The present invention relates to automatic stops and more particularly to mechanism which provides a positive stop action to arrest movement of a member after it travels a predetermined distance. Specifically, the invention is directed to mechanisms for producing a positive stop action where it is desired to rotate a member more than one revolution in either direction before a stop becomes operative.

An object of the present invention, therefore, is to provide a novel mechanism wherein means are employed for arresting motion of a member after it travels a predetermined distance.

Another object is to provide a novel mechanism wherein means are employed for effecting more than one revolution of a member in either direction before motion thereof is arrested.

A further object is to provide a novel mechanism wherein the number of revolutions of a member is a function of the number of turns of a resilient spiral member.

The present invention, therefore, contemplates a novel mechanism wherein a member may be rotated more than one revolution before movement thereof is arrested and comprises a pair of members arranged for relative movement. A radially movable block is carried by one of the members and extends between and engages adjacent turns of a spiral spring disposed on the other member. When one of the members is rotated, the block travels between the turns of the spiral spring until it engages a stop on the rotating member whereupon rotation of the member is arrested, the number of revolutions of the member being a function of the number of turns of the spiral spring.

The above and other objects and advantages of the present invention will appear more fully hereinafter from a consideration of the detailed description which follows taken together with the accompanying drawing, wherein one embodiment of the invention is illustrated.

In the drawing;

Figure 1 is an elevational view, in section, of a mechanism embodying the present invention;

Figure 2 is an elevational view of a stationary circular plate of the mechanism of Figure 1;

Figure 3 is an elevational view of a movable plate of the mechanism of Figure 1 and shows in particular, one arrangement of a spiral spring supported thereby; and

Figure 4 is a section of the movable plate with the spiral spring removed therefrom.

Referring now to the drawing for a more detailed description of the present invention, and more particularly to Figure 1 wherein one embodiment thereof is clearly illustrated, a mechanism, generally designated by the numeral **11**, comprises a pair of coaxially arranged circular plates **13** and **15**. A radial slot **17** is formed in plate **13** and accommodates a block **19** which is free to slide within the slot. Block **19** projects above the face of plate **13** and a portion of the block extends between and engages adjacent turns of a detachable spiral spring member **21** disposed in a recess **23** formed in plate **15**.

The ends of spring **21** are formed in the shape of loops and slip over a pair of stop pins **25** and **27** which serve to retain the spring within recess **23**. Pins **25** and **27** are located adjacent to the center of plate **15** and an annular peripheral flange **29**, respectively, and have threaded portions which engage threaded recesses in the plate whereby the pins are secured to the plate. A shaft **31** is fixed to a hub portion **33** of plate **15** and rotation of the shaft effects movement of plate **15** relative to plate **13**, the latter being fixed in any suitable manner to prevent movement thereof.

With each revolution of plate **15**, successive pairs of adjacent spring turns engage block **19** and displace the latter within slot **17** until the block engages one of the stop pins, whereupon rotation of the plate is arrested. For example, rotation of plate **15** in one direction provides upward movement of block **19** until it engages stop pin **27** while rotation of the plate in the opposite direction effects downward movement of the block until stop pin **25** is engaged. For the sake of illustration, spring **21** is shown in the drawing as having five turns, equally spaced apart, whereas in practice, a spring having a larger number of turns may be employed, in which case the turns above and below the block are crowded together and may be in engagement. The maximum number of turns of spring which can be accommodated within recess **23** is limited only by the number of engaging turns which can fit within the recess together with block **19**.

It may now be understood that the number of revolutions of plate **15** is a function of the number of turns of spring **21** whereby a larger number of turns provides for an increase in revolutions of the plate while a smaller number of turns provides for a decrease in plate revolutions. If it is desired to vary the number of revolutions of plate **15**, the spring within recess **23** is removed by disconnecting the looped ends from the stop pins and thereafter substituting a spring of a different number of turns having similar looped ends.

It will now be apparent that the present invention provides a novel mechanism of few parts for effecting more than one revolution of a member before motion thereof is arrested. By providing a spiral spring having turns which engage and displace a movable block a certain distance with each revolution of a rotatable member until the block engages a stop pin, the number of revolutions of the rotatable member is a function of the number of turns of the spiral spring. Furthermore, the arrangement of the present mechanism provides structure whereby the spiral spring may be replaced by a spiral spring of a different number of turns to vary the number of revolutions of the rotatable member.

Although one embodiment of the invention has been illustrated and described in detail, it is to be expressly understood that the invention is not limited thereto. Various changes can be made in the design and arrangement of the parts without departing from the spirit and scope of the invention as the same will now be understood by those skilled in the art.

I claim:

1. In a device of the class described, a pair of members arranged for relative rotation, a replaceable resilient spiral member removably carried by one of said first named members and including a predetermined number of turns, a movable element carried by the other of said first named members and extending between adjacent turns of said spiral member and movable thereby upon relative rotation between said first named members, and stop means engageable with said element to thereby arrest relative rotation between said first named members, the amount of such relative rotation being a function of the number of turns of said spiral member.

2. Mechanism for limiting the displacement of an

angularly movable member relative to a stationary member, comprising a spiral spring arranged within a recess formed in the movable member, an element supported by the other of said members for transverse movement relative thereto and engaging said spring for movement thereby upon relative motion of said members, and anchoring means for the inner and outer ends of said spring defining limits of movement of said element, the anchoring means being removably mounted in the movable member whereby the spring may be replaced with another of more or less convolutions.

3. In an automatic stop mechanism of the character described, a rotatable disc plate having a peripheral lip extending beyond one face thereof to form a well, a hub centrally of the well, an inner stop pin mounted in the floor of the well in close proximity to the hub, an outer stop pin mounted in the well near the peripheral lip, a spiral band spring wound about the hub and having its inner terminal end anchored to the inner stop pin in such manner that the stop pin has a position between the innermost spring turn and the next outer adjacent turn and having an outer terminal end anchored to the outer stop pin in such manner that the stop pin has a position between the outermost spring turn and the next inner adjacent turn, and the spring being wound sufficiently loose to allow the turns of the spring to pass over a vertically slidable element received between the turns until one stop or the other limits against the slide element accordingly as the rotatable disc is rotated in a clockwise or a counterclockwise direction.

4. A rotatable disc as in claim 3, wherein the stop pins are removably threaded into the floor of the well whereby the spiral spring may be readily removed and replaced with another having a greater or lesser number of turns.

5. A rotatable disc as in claim 3, wherein the terminal ends of the spiral spring are removably looped about the stop pins, whereby the spring may be readily removed and replaced with another having a greater or lesser number of turns.

6. In a device of the character described, the combination of a rotatable disc plate, a spiral band spring removably anchored at its terminal ends upon stop pins fixed in spaced relation to each other in the face of the plate, one pin being near the center of the disc and the other near the edge thereof, the stop pin at the outer terminal end having a position between the outermost and next adjacent turn of the spring, the stop pin at the inner terminal end having a position between the innermost turn and the next adjacent outer turn of the spring, a horizontally disposed slide element having one end received between adjacent turns of the spring, and a fixed plate having an elongated slot in which the body of the slide element is vertically slidable upon the turns of the spring being carried by rotation of the disc plate over it, and rotation of the disc in either a clockwise or counterclockwise direction being limited by one or the other of the stop pins coming in contact with the slide element.

7. In a device as in claim 6, wherein the spring may be replaced by another having a greater or less number of turns.

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