T. S. PUKERUD.

CONTROL APPARATUS.

APPLICATION FILED OCT. 2, 1914.

1,260,801. Patented Mar. 26, 1918.

Fig. 1.

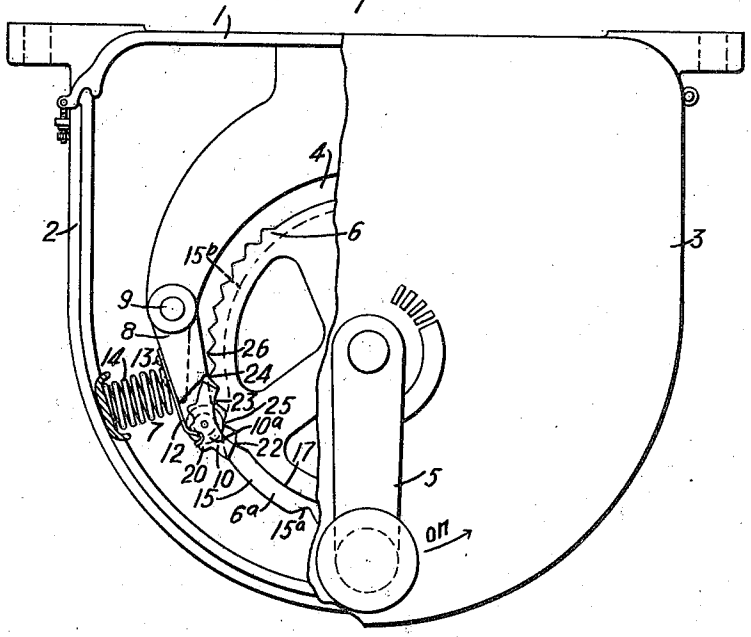


Fig. 2.

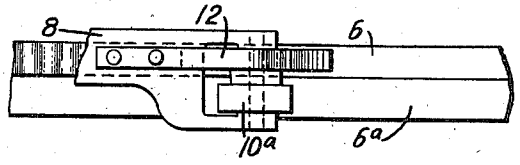
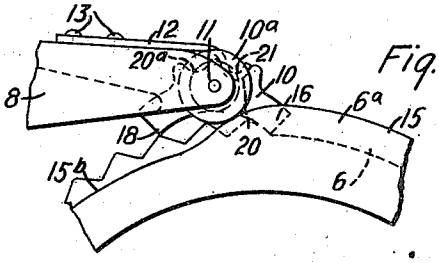


Fig. 3.



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CONTROL APPARATUS.

1,260,801. Specification of Letters Patent. Patented Mar. 26, 1918.

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To all whom it may concern:

Be it known that I, THOMAS S. PUKERUD, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Control Apparatus, of which the following is a specification.

My invention relates to control apparatus, and it has special reference to pawl members that are adapted to engage the position defining members that are customarily employed in drum controllers and the like.

The object of my invention is to provide a device of the above-indicated character which shall be relatively simple and inexpensive in construction and reliable and expeditious in operation.

In the prior art, difficulties have been experienced in preventing drum controllers that embody the usual type of single-arm pawl, from overrunning a desired position, unless special care was taken. Where fine regulation of speed was essential, such operation naturally gave undesirable results.

According to my present invention, therefore, I provide means comprising a double-armed pawl having a centrally pivotally mounted shoe member or escapement beam that is adapted to oscillatively engage successive pairs of non-adjacent teeth of the position-defining member, or star wheel, of the control drum, as it is moved through its successive positions. Over-running of the drum is thus automatically and effectively prevented, although the return to the "off" position may be readily and uninterruptedly accomplished when desired.

In the accompanying drawing, Figure 1 is a plan view, with parts broken away for clearness, of an apparatus constructed in accordance with my invention; and Figs. 2 and 3 are an enlarged view in side elevation and a corresponding bottom plan view, respectively, of a portion of the device shown in Fig. 1.

Referring to Fig. 1 of the drawing, the drum controller here shown comprises a suitable base member 1; a substantially semi-cylindrical front cover member 2; a top cover member 3; a control drum 4 of any familiar type which is adapted to occupy a plurality of operative positions and to be operated by means of a suitable handle 5 that projects through the cover member 3; a toothed position-defining member or star wheel 6 of customary construction, the various teeth of which respectively correspond to the operative positions of the drum 4; a cam plate 6^a that is secured to the member 6 for a function to be defined; and my novel pawl member 7.

The pawl member 7 comprises a body portion or carriage 8 which may be pivotally mounted upon the frame of the controller at any suitable point 9; a double-armed shoe member or escapement beam 10, and a co-operating roller 10^a which are centrally pivotally mounted within the body portion 8 at a point 11, for purposes to be described; a flat spring member 12 which is adapted to bias the shoe member 10 in a predetermined direction, as hereinafter set forth, and which may be secured to the body portion 8 by means of rivets 13, or in any other suitable manner; and a helical spring 14 which is suitably supported by the controller cover member 2 and bears upon the body portion 8 to bias the pawl member 7, as a whole, toward the position-defining member 6.

The cam plate 6^a, which is adapted to guide the roller 10^a, has a portion 15 of its periphery extending beyond the star wheel 6 and provided with a roller-receiving notch 15^a that corresponds to the "off" position of the control drum 4, and has another portion 15^b of its periphery, that corresponds to the operative positions of the drum, recessed to a line radially within the toothed periphery of the star wheel 6. The roller 10^a is thus operative to the exclusion of the pawl member 7 until the operative drum positions are attained, whereupon the pawl member becomes operative and the function of the roller ceases.

The body portion 8 is preferably provided with a bifurcated free end portion between the arms of which the shoe member 10 and the roller 10^a are pivotally mounted at the point 11, as mentioned above. The shoe member 10 has its forward arm 16 biased by the spring 12 to engage the adjacent portion 17, of suitable diameter of the star wheel 6 when the drum 4 occupies its "off" position, and, during operation of the drum, has its rear arm 18 disposed to successive engagement with the teeth of the star wheel in conjunction with the arm 16, as hereinafter set forth. The forward arm 16 is provided with a relatively

deep or position-accentuating recess 20, and the rear arm 18 has a relatively shallow recess 20ª, with which a suitable depression or loop 21 of the spring member is adapted to successively make engagement when the control drum 4 is actuated, thereby causing the arm 18 to be biased to engagement with the adjacent tooth of the star wheel 6, as hereinafter described.

Assuming the control apparatus to occupy the "off" positions wherein the roller 10ª rests within the notch 15ª, and the loop 21 of the spring 12 engages the recess 20 of the arm 16, the operation thereof may be described as follows:

If the controller handle 5 is moved in a counter-clockwise direction, as indicated by the arrow marked "On", the roller 10ª leaves the notch 15ª and rides upon the periphery 15 of the cam plate 6ª. As the drum 4 approaches its first operative position wherein the parts occupy the respective positions shown in the drawing, the arm 16 first engages the initial tooth 22 of the star wheel 6, the roller 10ª gradually approaching the recessed periphery 15ᵇ of the cam plate and thereby permitting this engagement, which forces the forward arm 16 to rotate clockwise about its pivotal point 11 in opposition to the action of the spring member 12, whereupon the rear arm 18 is likewise moved clockwise to disengage a tooth 23 that is disposed a predetermined distance from the tooth 22, in this case being the second tooth distant. As soon as the arm 16 has passed the apex of the tooth 22, the spring member 12 again forces the shoe member 10 to rotate in a counter-clockwise direction, whereby the arm 18 comes into engagement with a tooth 24 which is disposed next in order to the tooth 23, as shown in the drawing.

Upon further movement of the control drum, the forward arm 16 is actuated in a counter-clockwise direction by the spring 12 to engage a tooth 25 that is disposed next in order to the tooth 22, the movement of the pawl member causing the recess 20ª to temporarily engage the loop 21 of the spring. The rear arm 18 of the pawl member is thus moved out of engagement with the tooth 24 and is actuated to occupy a similar position to that shown, being in engagement with a tooth 26 that is disposed next in order to the tooth 24, and the spring loop 21 again engaging the relatively deep recess 20. A similar oscillatory action of the shoe member or escapement beam 10 occurs as the control drum 4 is successively moved to its various operating positions, as will be understood.

The successive engagement of the rear arm 18 of the shoe member 10 with the teeth of the star wheel 6, as the control drum is operated, and the accompanying engagement of the spring loop 21 and the relatively deep recess 20 in the pawl member serves to impose a momentary check upon the movement of the drum that is perceptible to the operator, and, consequently, the overrunning of any desired position is effectively and automatically prevented. However, when it is desired to return the control drum 4 to its "off" position from any operative position, this may be readily effected by reason of the fact that the arms 16 and 18 of the shoe member 10 do not have sufficient time to notch up with the teeth of the star wheel 6, and thus offer no impediment to the rapid return of the drum.

I do not wish to be restricted to the specific structural details or arrangement of parts herein set forth, as various modifications thereof may be made within the spirit and scope of my invention. I, therefore, desire that only such limitations shall be imposed as are indicated in the appended claims.

I claim as my invention:

1. The combination with a movable member having a plurality of peripheral teeth, of a member having a plurality of integral arms for respectively engaging said teeth under predetermined conditions, rotatively movable carrying means for said member, and means for biasing said carrying means to a certain rotative position.

2. The combination with a movable member having a plurality of peripheral teeth, of a coöperating pawl member having a double-armed oscillatory member, means for biasing one of the arms to direct engagement with the teeth, and means for biasing the pawl member as a whole to engagement with said movable member.

3. The combination with a movable member having a plurality of peripheral teeth, respectively corresponding to defined positions of said member, of a coöperating pawl member having a movably supported double-armed shoe member adapted to oscillatively engage predetermined sets of teeth in succession as the said movable member is moved through its successive positions, said pawl member being resiliently biased toward said movable member.

4. The combination with a movable member having a plurality of peripheral teeth respectively corresponding to defined positions of said member, of a pawl member cooperatively biased toward said movable member and having a double-armed escapement beam centrally pivotally mounted and adapted to oscillatively engage successive pairs of non-adjacent teeth as the said movable member is moved through its successive positions.

5. The combination with a movable member having a plurality of peripheral teeth, of a pawl member biased to engagement

with said movable member and having a double-armed centrally pivotally mounted shoe and means for normally biasing the first arm thereof to direct engagement with the teeth, the second arm being normally located near a succeeding tooth and being adapted to engage each succeeding tooth as said first arm is successively disengaged from its previously engaged tooth when the said movable member is operated.

6. The combination with a movable member having a plurality of peripheral teeth, of a resiliently mounted pawl member cooperating with said movable member and having a double-armed centrally pivotally mounted shoe and means for normally biasing the forward arm thereof to direct engagement with certain teeth, the rear arm being normally disposed to engagement with a predetermined succeeding tooth and being adapted to engage each succeeding tooth as said forward arm is successively disengaged from its previously engaged tooth when the said movable member is operated.

7. In a controller, the combination with a rotatable drum, and a position-defining member secured thereto and having a plurality of peripheral teeth, of a coöperating pawl member having a double-armed oscillatory member, means for normally biasing one of the arms to direct engagement with said teeth, and means for normally biasing the pawl member as a whole to engagement with said position-defining member.

8. In a controller, the combination with a rotatable drum, and a position-defining member secured thereto and having a plurality of peripheral teeth respectively corresponding to operative positions of said drum, of a resiliently mounted pawl member having a double-armed escapement beam centrally pivoted and adapted to oscillatively engage successive pairs of non-adjacent teeth of said position-defining member as the drum is moved through its successive positions.

9. In a controller, the combination with a rotatable drum, and a position-defining member secured thereto and having a plurality of peripheral teeth respectively corresponding to operative positions of said drum, of a resiliently mounted pawl member having a double-armed centrally pivoted shoe and means for normally biasing the forward arm thereof to direct engagement with certain teeth, the rear arm being normally in proximity to a predetermined succeeding tooth and being adapted to engage each succeeding tooth as said forward arm is successively disengaged from its previously engaged tooth when the said drum is moved to its successive positions.

10. In a controller, the combination with a rotatable drum, and a position-defining member secured thereto and having a plurality of peripheral teeth, of a coöperating pawl member having a body portion pivotally mounted upon the controller frame, a double-armed shoe centrally pivoted upon said body portion, a spring member bearing upon the forward arm for normally biasing it to direct engagement with said teeth, and a spring member supported by the controller frame and adapted to bias said body portion toward said position-defining member.

11. The combination with a movable member having a plurality of peripheral teeth, of a coöperating pawl member comprising a double-armed oscillatively mounted shoe having a plurality of position-defining recesses, and a spring member adapted to alterantely engage said recesses during the oscillatory action of said pawl member.

12. The combination with a movable member having a plurality of peripheral teeth, of a coöperating pawl member comprising a doubly-armed oscillatively mounted shoe, having a relatively deep and a relatively shallow position-defining recess, and a spring member engaging said relatively deep recess for normally biasing the first arm of said shoe to direct engagement with the teeth, the second arm being normally located near a succeeding tooth and being adapted to engage each succeeding tooth as said first arm is successively disengaged from its previously engaged tooth when the said movable member is operated, and the said spring member being adapted to alternately engage said relatively shallow recess upon disengagement of said first arm from said teeth and said relatively deep recess upon engagement of the succeeding teeth by said second arm.

13. The combination with a movable member having a plurality of peripheral teeth, of a pawl member having a plurality of integral arms for respectively engaging said teeth under predetermined conditions, biased carrying means for said pawl member, a cam member secured to said movable member and having one peripheral portion extending beyond, and another portion receding within, the periphery of said movable member, and an auxiliary member adapted to engage said cam member during a predetermined portion of the operation of said movable member and to become inoperative during another portion thereof to permit operation of said pawl member.

14. The combination with a rotatable drum, and a position-defining member secured thereto and having a plurality of peripheral teeth respectively corresponding to operative positions of the drum, of a cooperating pawl member having a double-armed shoe member, means for biasing one of the arms to direct engagement with the teeth, means for biasing the pawl member as a whole to engagement with said movable

member, a cam member secured to said position-defining member and having a portion that corresponds to the "off" position of the drum of greater radius, and a portion that corresponds to the operative positions of the drum, of lesser radius, than said position-defining member, and a roller member initially engaging said first portion of the cam member while said pawl member is inoperative and subsequently becoming inoperative to permit coöperation of said pawl member and said teeth.

15. A pawl member for controllers pivotally mounted upon a portion of the controller frame, and having a double-armed oscillatory tooth-engaging shoe member, and means for rotatively biasing the pawl member to a predetermined position.

16. A rotatively movable pawl member for controllers having a double-armed oscillatory tooth-engaging shoe member, a spring member having its ends respectively secured to the body of the pawl member and bearing upon said shoe member, and means for biasing the pawl member to a predetermined rotative position.

17. A pawl member comprising a double-armed oscillatable shoe having a plurality of position-defining recesses of different depths and resilient means for alternately engaging said recesses during the oscillatory movement of said shoe.

In testimony whereof, I have hereunto subscribed my name this 28th day of Sept., 1914.

THOMAS S. PUKERUD.

Witnesses:
E. B. DICE,
B. B. HINES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."