

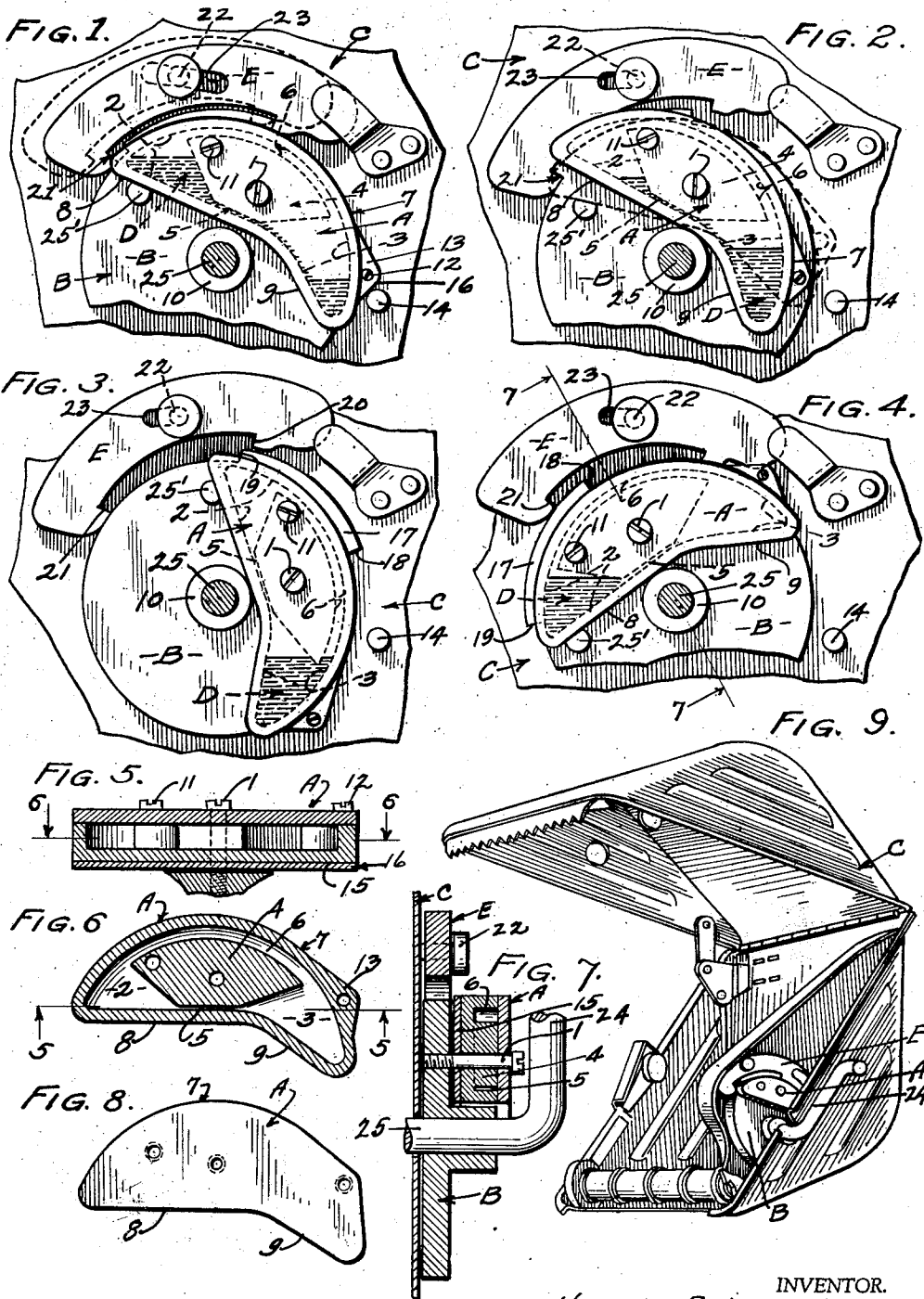
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DELAYED ACTION TIME CONTROL FOR MECHANISMS

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DELAYED ACTION TIME CONTROL FOR MECHANISMS

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20 Claims. (Cl. 161—1)

This invention relates to and has for an object the provision of an improved time delay means adapted to be applied to mechanisms wherein immediately successive operations are prevented but wherein, after a predetermined lapse of time, during which the time delay means is effective, the mechanism may again be rendered operative at the will of the operator.

Various mechanical, electrical and vacuum controlled means have heretofore been employed for the purpose of this invention, all of which are more or less complicated and expensive, especially when used on certain types of apparatus, whereas my invention embodies an extremely simple and effective means which is readily applicable to many mechanisms requiring a time delay element.

My invention comprehends the provision of a time delay member in the form of a container for a fluidic or granular element adapted to be operatively associated with a movable member, such as an actuating medium, whereby the shifting of the element from one to another position or chamber of the container will, by the influence of gravity, stop the operation of the movable member for a predetermined period of time during which the element is shifted, somewhat after the fashion of the operation of an hour glass. The invention may, for instance, be illustrated in one way by reference to a rotatable disc on which is pivotally mounted a time delay member centrally pivoted between two chambers and having two passages connecting the chambers, one of which is of greater area than the other, so that when an element such as sand which is granular and mercury which is fluidic is held in the container said element may be shifted from one to the other of said chambers, depending upon the particular position of the time delay member on the rotatable member.

The element causes the overbalancing of the time delay member in one or another direction as the rotatable member revolves about its axis and a fixed stop provided on the base or case of the rotatable member is adapted to be engaged at certain times and when the mechanism assumes certain positions so as to prevent the further operation of the mechanism for an ensuing operation until the shifting of the element is completed for the purpose of releasing the mechanism.

The provision in the container for said element of separate passages affording different means of communication between the two chambers, one of which restricts the flow of the element and

the other of which affords free and quick passage of the element, permits a rapid transfer of the element during an operation of the mechanism and a substantially slow transfer of the element during a period of stoppage of the mechanism.

A further object is to combine my improved time delay means with a known form of intermittent control for mechanisms such as is disclosed in an application for patent filed by W. H. West, for Towel dispensers, April 16, 1938, Serial No. 202,489, as well as other well known mechanisms to which the invention is obviously applicable. Other objects may appear as the description progresses.

I have shown a preferred form of device embodying my improvements in the accompanying drawing, subject to modification, within the scope of the appended claims, without departing from the spirit of my invention.

In said drawing:

Fig. 1 is a face view of my improved time delay means shown in operative association with a rotatable member such as is embodied in a paper towel dispenser and an intermittent control mechanism therefor; at the close of one operation and during the period when the time delay means is effective for preventing an immediate successive operation;

Fig. 2 is a view of the same following the initial counterclockwise movement of the rotatable member and time delay member into position for releasing the time delay member from a fixed stop provided on the case of the mechanism;

Fig. 3 is a view of the same following a slight clockwise movement of the rotatable member and time delay member, following the release thereof upon the institution of an ensuing operation, as for dispensing a strip of toweling;

Fig. 4 is a view of the same at a point in a revolution of the rotatable member nearing the completion of a dispensing operation or a single revolution of the rotatable member;

Fig. 5 is a cross sectional view of the time delay member on line 5—5 of Fig. 6;

Fig. 6 is a cross sectional view of the time delay member on line 6—6 of Fig. 5;

Fig. 7 is a sectional view of the assembled mechanism on line 7—7 of Fig. 4;

Fig. 8 is a detached face view of the time delay member; and

Fig. 9 is a perspective view of a paper towel dispenser embodying the mechanism associated with the time delay member and in connection with which it is adapted for use.

My invention embodies as a primary element a

time delay member A of hollow cross section which is adapted to be mounted upon or otherwise operatively associated with a movable member B such as an actuating medium of any mechanism to which my improvements may be applied, but herein shown as a rotatable control member forming a part of the dispensing mechanism embodied in a paper towel dispensing machine of the character shown in Fig. 9 and which includes a supporting case C.

Preferably, but not necessarily, member A is formed of glass or plastic material which is transparent so as to clearly reveal and define the position therein of a gravity actuated shiftable element D, of granular form such as sand or other material, liquid such as water, glycerine, oil or other material, but preferably of mercury, of sufficient volume and capable of being automatically shifted, in hour glass fashion, from one to another position on the member A, for the purpose of overbalancing the time delay member on its pivoted support 1.

Thus, the member A is of generally segmental form and has two chambers 2 and 3 formed therein at opposite extremities on opposite sides of a central core 4, with a restricted passage 5 at the inner side and a wider and free passage 6 at the outer side of the core 4, by means of which the element D may be shifted alternately from one to the other of said chambers 2 and 3, depending upon the particular position of member A on member B. The outer periphery 7 of member A is generally concentric with but may slightly overlie the periphery of member B while the inner periphery has two slightly angular portions 8 and 9 disposed outwardly of the hub 10 of member B. Core 4 of member A is so formed and the passages 5 and 6 are of such cross sectional area that, as shown in Fig. 1, the element D will slowly flow through passage 5 from chamber 2 to chamber 3, and when in a position diametrically opposite to that shown in Fig. 1 the element will rapidly flow through passage 6 from chamber 3 to chamber 2, the member A being then upside down on member B.

Member A may be made of mating halves suitably sealed together for retaining the element D therein or the two halves may be attached as by means of screws 11 and 12, the latter screw being extended through lugs 13 and said lugs being adapted for engagement with a fixed stop member 14 attached to a portion of case C or any other supporting or adjacent member. I provide a metal plate 15 on the side of member A adjacent member B which is held thereon by the screws 11 and 12 and that portion 16 of said plate at the periphery of lug 13 may extend slightly outwardly of said lug so that the plate will take the thrust when the member A engages stop 14.

Member B has a slightly eccentric segment 17 with shoulders 18 and 19 at opposite ends thereof which are, respectively, engageable with shoulders 20 and 21 formed on a control member E which is pivotally and slidably mounted on a portion of case C at 22 as by means of a pin or screw, the body of which is fixed to case C and extends through an inclined elongated slot 23 in member E. Thus, the member E may swing on its fulcrum at different positions relative to member B, as will be hereinafter described.

Member B may be rotated as by means of a crank 24 having a portion 25 forming the axis of member B and when said member is rotated in a clockwise direction, the shoulder 18 of seg-

ment 17 will engage and lift the left hand end of member E and move thereunder until it engages the shoulder 20 of member E, whereupon member E is bodily moved forwardly so that shoulder 20 will rest upon the periphery of member B and shoulder 21 will be disposed in the path of shoulder 19 to prevent a substantial counterclockwise movement of the member B, as shown in Fig. 1.

Thus, the operation of member B forwardly is stopped until a reverse movement of the crank and member B is effected so that shoulder 19 will engage shoulder 21 and thereby lift the shoulder 20 from a position of interference with shoulder 18, which, in the absence of member A or other time delay means, would make it possible for an immediately ensuing operation of the crank and member B. Member A, however, with the movement of member B into the position shown in Fig. 1, will have assumed the position shown with its forward end engaging the fixed stop 14, thereby preventing the clockwise movement of the mechanism until the element D has been completely or sufficiently shifted through the restricted passage 5 from chamber 2 to chamber 3, so as to overbalance the member A and permit its release from stop 14 upon the counter-clockwise movement of the crank and member B and the disengagement of member B from shoulder 20, as shown in Fig. 2.

Thus, the continued rotation of member B is permitted for a single revolution thereof, as shown in Figs. 3 and 4, preparatory to another operation after a predetermined length of time has elapsed. Member B carries a stop 25' thereon for limiting the movement of member A in a counter-clockwise direction on member B, while stop 14 prevents the forward motion of member A while it is engaged therewith. After member A leaves stop 14, however, it is free to swing on its pivot as it may be influenced by gravity, the element D being transferred from chamber 3 while member A is upside down, or partially so, through passage 6, during the continued rotation of member B, in readiness for assumption of the starting position shown in Fig. 1.

Hence, it is quite impossible to rotate member B for immediately successive revolutions by mere reversal of the direction of rotation through the medium of crank 24 until and unless the element D has been shifted from chamber 2 to chamber 3, after the lapse of a predetermined period of time, and when used in connection with a towel dispensing machine an unnecessary number of towel strips may not be dispensed in too quick order and thus cause wastage.

Member E, it should be remembered, is bodily shiftable on its fulcrum pin 22 by reason of the inclined slot 23, whereby said member is overbalanced at one or the other ends by gravity action. Thus, when the left hand end is overbalanced the shoulder 21 drops against the periphery of member B and when the right hand end is overbalanced the shoulder 20 drops into engagement with member B. However, the inclination of slot 23 is such that both shoulders 20 and 21 will engage member B (Fig. 1) at or near the completion of each revolution of member B so that in a reverse movement shoulder 19 may engage shoulder 21 for disengaging shoulder 20 from shoulder 18 by sliding member E to the left bodily. Of course shoulder 18 has previously engaged shoulder 20 and has thus moved member E to the right.

The eccentricity of segment 17 serves to allow the left hand end of member E to drop slightly in

the direction of member B after segment 17 has raised and moves under the shoulder 21 in its approach to locking position, the subsequent engagement of shoulders 18 and 20 serving to shift member E to the right and thereby permit and effect the engagement of shoulder 21 with member B.

What I claim is:

1. A device of the character described comprising: a rotatable member, a gravity actuated time delay member movable on and rotatable with said rotatable member, and a relatively fixed stop member engageable with a portion of said time delay member for stopping the rotation of said rotatable member for a predetermined period of time until the force of gravity is effective for releasing the same for further rotation.

2. A device of the character described comprising: a rotatable member, a time delay member movable on and rotatable with said rotatable member, said time delay member carrying a gravity actuated shiftable element thereon, and a fixed stop member disposed so as to engage a portion of said time delay member for preventing rotation of said rotatable member for a given length of time during the shifting of said element from one to another position during such stoppage of rotation, said rotatable member being released for rotation upon the shifting of said element.

3. A device of the character described comprising: a movable member, a time delay member movable on and bodily with said movable member, a shiftable element carried by said movable member and adapted to overbalance said time delay member in at least two positions, and a fixed member engageable with a portion of said time delay member in one of said positions and disengageable therefrom in said other position, depending upon the preceding movement of said movable member.

4. A device of the character described comprising: a movable member, a time delay member movable on and bodily with said movable member, a shiftable element carried by said movable member and adapted to overbalance said time delay member in at least two positions, and a fixed member engageable with a portion of said time delay member in one of said positions and disengageable therefrom in said other position, depending upon the preceding movement of said movable member, said time delay member being formed so as to retard the shifting of said element from one position thereon to another in order to provide substantially uniform lapses of time between successive operations of said movable member.

5. A device of the character described comprising: a movable member, a time delay member movable on and bodily with said movable member, a shiftable element carried by said movable member and adapted to overbalance said time delay member in at least two positions, and a fixed member engageable with a portion of said time delay member in one of said positions and disengageable therefrom in said other position, depending upon the preceding movement of said movable member, said time delay member being formed so as to retard the shifting of said element from one position thereon to another in order to provide substantially uniform lapses of time between successive operations of said movable member, and said element being of such character as to prevent the bodily shifting thereof from one position to another.

6. A device of the character described comprising: a movable member, a time delay member movable on and bodily with said movable member, a shiftable element carried by said movable member and adapted to overbalance said time delay member in at least two positions, and a fixed member engageable with a portion of said time delay member in one of said positions and disengageable therefrom in said other position, depending upon the preceding movement of said movable member, said time delay member forming a container for said element and provided with spaced chambers connected by a restricted passage, for gradually transferring said element from one chamber to the other under the influence of gravity as the time delay member is overbalanced in different directions.

7. A device of the character described comprising: a movable member, a time delay member movable on and bodily with said movable member, a shiftable element carried by said movable member and adapted to overbalance said time delay member in at least two positions, and a fixed member engageable with a portion of said time delay member in one of said positions and disengageable therefrom in said other position, depending upon the preceding movement of said movable member, said time delay member being of hollow cross section and adapted to contain said element of granular or fluid form therein for gradually transferring the element from one portion of the interior thereof to another, under the influence of gravity when the time delay member is overbalanced in one or another direction.

8. A device of the character described comprising: a movable member, a time delay member movable on and bodily with said movable member, a shiftable fluid element carried by said movable member and adapted to overbalance said time delay member in at least two positions, and a fixed member engageable with a portion of said time delay member in one of said positions and disengageable therefrom in said other position, depending upon the preceding movement of said movable member.

9. A device of the character described comprising: a movable member, a time delay member movable on and bodily with said movable member, a shiftable volume of mercury carried by said movable member and adapted to overbalance said time delay member in at least two positions, and a fixed member engageable with a portion of said time delay member in one of said positions and disengageable therefrom in said other position, depending upon the preceding movement of said movable member.

10. In a device of the character described: a rotatable control member having peripherally spaced stop portions thereon, a pivoted and bodily shiftable member having shoulders engageable with the stop portions on the control member for, respectively, stopping the forward movement of the control member at a given point in each revolution and for limiting the reverse movement thereof at such times to a slight initial extent, a gravity actuated time delay member pivotally carried by and rotatable with said control member, a fixed stop member engageable with a portion of said time delay member when the forward movement of the control member is arrested by its engagement with the foremost of said shoulders, and a shiftable element carried by said time delay member for alternately overbalancing the time delay member on opposite

sides of its pivot for preventing the forward movement of the control member and for releasing the same for forward movement, respectively, when the control member is moved forwardly and backwardly, said time delay member being hollow and so formed as to gradually transfer said shiftable element from one to another position thereon, said shiftable element being of fluidic constituency, said foremost shoulder serving to arrest rotation of the control member when the movement is too rapid for the time delay stop to become operative.

11. In a device of the character described: a rotatable control member having peripherally spaced stop portions thereon, a pivoted and bodily shiftable member having shoulders engageable with the stop portions on the control member for, respectively, stopping the forward movement of the control member at a given point in each revolution and for limiting the reverse movement thereof at such times to a slight initial extent, a gravity actuated time delay member pivotally carried by and rotatable with said control member, a fixed stop member engageable with a portion of said time delay member when the forward movement of the control member is arrested by its engagement with the foremost of said shoulders, and a shiftable element carried by said time delay member for alternately overbalancing the time delay member on opposite sides of its pivot for preventing the forward movement of the control member and for releasing the same for forward movement, respectively, when the control member is moved forwardly and backwardly, said time delay member being hollow and so formed as to gradually transfer said shiftable element from one to another position thereon, said element consisting of a volume of mercury, the foremost of said shoulders being operative for initially arresting forward movement of the control member until the shiftable element has overbalanced the time delay member and occasioned its release from the fixed stop for permitting a new dispensing operation.

12. A mechanism of the character described comprising: a rotatable member having a segment with radial abutments at the ends thereof, and a shiftable stop member pivotally and slidably mounted at a point intermediate its extremities and outwardly of the periphery of the rotatable member and provided with shoulders at the opposite extremities thereof whereby as the rotatable member approaches the end of each revolution the leading abutment of said segment will engage the leading shoulder of the shiftable member so as to correspondingly shift the shiftable member on its support to a predetermined extent prior to the completion of each revolution of the rotatable member, while the reverse movement of the rotatable member effects a reverse shifting of the shiftable member on its support to a predetermined extent through the engagement of the trailing abutment of said segment with the trailing shoulder on the shiftable member; the shifting of the shiftable member serving to overbalance the same and thereby cause said leading and trailing shoulders to move by gravity into contact with the periphery of the rotatable member, respectively, when the shiftable member is moved forwardly and backwardly.

13. A mechanism of the character described in claim 12 including: means for pivotally and shiftable mounting the shiftable member, embodying a fixed fulcrum engaging a slot in the central portion of the shiftable member.

14. A mechanism as characterized in claim 12 in which the peripheral distance between said abutments is substantially less than the distance between said shoulders.

15. A mechanism as characterized in claim 12 in which the backward movement of the shiftable member serves to disengage the leading shoulder of the shiftable member from the corresponding abutment of the rotatable member and to thereby release the rotatable member for subsequent rotation in a forward direction.

16. A mechanism as characterized in claim 12 including: a time delay device embodying elements carried by and apart from the rotatable member for preventing the forward rotation of the rotatable member after its release from the shiftable member until the lapse of a predetermined period of time.

17. A mechanism as characterized in claim 12 including: a time delay device pivotally mounted on the rotatable member for preventing the forward rotation of the rotatable member after its release from the shiftable member until the lapse of a predetermined period of time, said time delay element having communicating chambers on opposite sides of its fulcrum, and a shiftable medium housed therein and automatically transferable from one to another of said chambers during each revolution of the rotatable member, for overbalancing the time delay member in opposite directions at given positions in each operating cycle.

18. A mechanism of the character described comprising: a rotatable member, a time delay member pivotally mounted thereon and provided on opposite sides of its axis with a chamber adapted to hold a shiftable element, there being a major and a minor passage connecting said chambers so as to occasion a rapid and a relatively restricted flow of said element from one chamber to another depending upon the position of the time delay member during the rotation of the rotatable member, and a fixed stop engageable with an extension of the time delay member at the same point in each revolution thereof for arresting and preventing subsequent forward rotation of the rotatable member until said element is completely transferred from one to the other of said chambers and the rotatable member has been reversely rotated to a predetermined extent.

19. A device of the character described comprising: a rotatable member having a peripheral segment with an abutment at each end thereof, a stop member pivotally and shiftable mounted adjacent the periphery of the rotatable member and provided with spaced shoulders for engagement, respectively, with the abutments of said segment, said stop member having an elongated slot therein and a fixed fulcrum pin extending through said slot and attached to a support, whereby the stop member may be bodily shifted peripherally of the rotatable member into and from overbalanced positions on opposite sides of said fulcrum for alternately engaging the shoulders on the stop member with the abutments on the rotatable member when the rotatable member is rotated in opposite directions, for, respectively, preventing the forward rotation of and releasing the rotatable member for forward rotation.

20. A time delay mechanism comprising: a rotatable member, means for arresting the forward rotation thereof as the same approaches the end of each revolution and also for arresting the reverse rotation thereof following the completion of each forward movement, a time delay member

centrally pivoted to the rotatable member and provided with a chamber on each side of its pivot and means for affording free communication between said chambers, a shiftable element carried by the time delay member adapted for alternate transfer from one to the other of said chambers for overbalancing the time delay member, means for limiting the swinging of the time delay member on the rotatable member, and a fixed stop en-

gageable with a portion of the time delay member for arresting the forward movement of the rotatable member until after the lapse of a period of time sufficient to effect the transfer of the shiftable element to an appropriate chamber, so as to release the rotatable member for further rotation.

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