Dec. 4, 1956 L. R. TANSLEY 2,772,937

ESCAPEMENT MECHANISM FOR WEB-DISPENSING APPARATUS

Filed Sept. 16, 1954 2 Sheets-Sheet 1

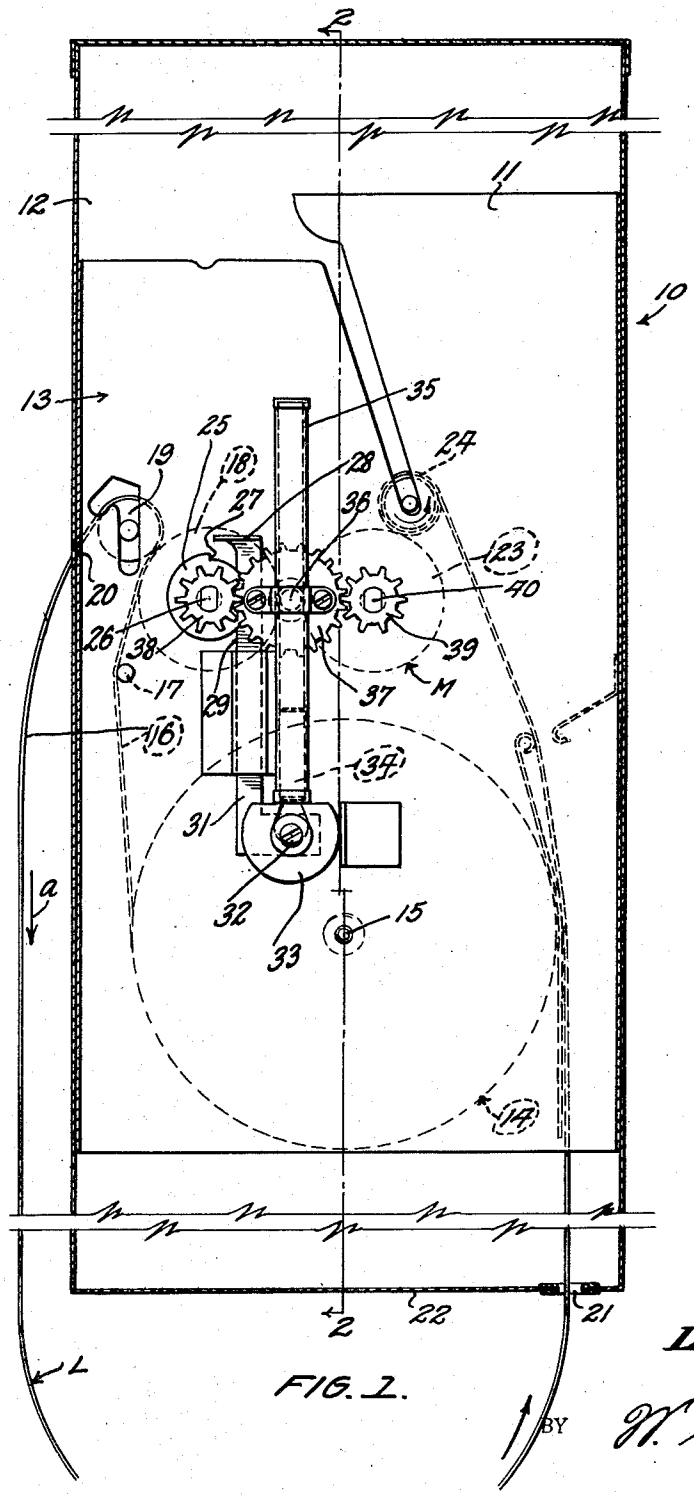


FIG. 1.

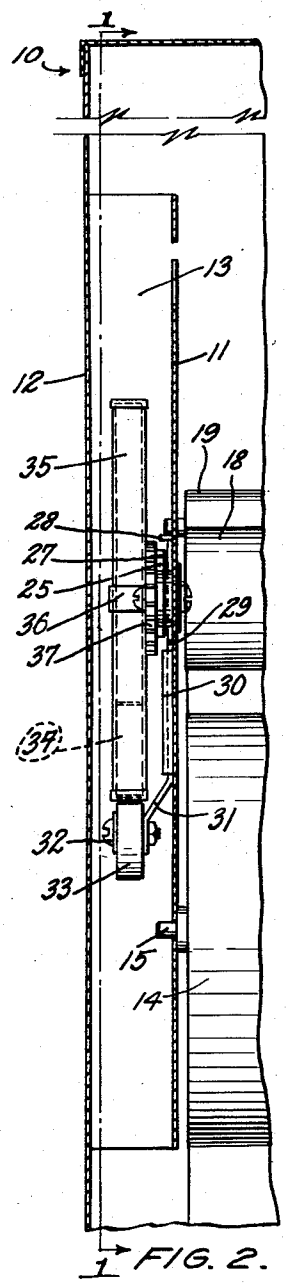


FIG. 2.

INVENTOR

L. R. Tansley

BY W. S. Rambo

ATTORNEY

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ESCAPEMENT MECHANISM FOR WEB-DISPENSING APPARATUS

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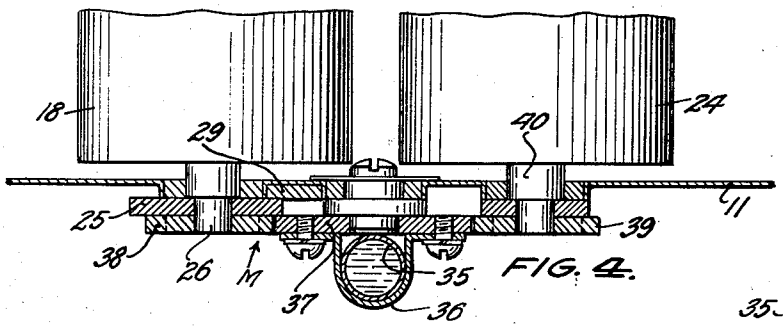


FIG. 4.

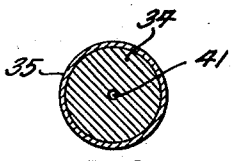


FIG. 5.

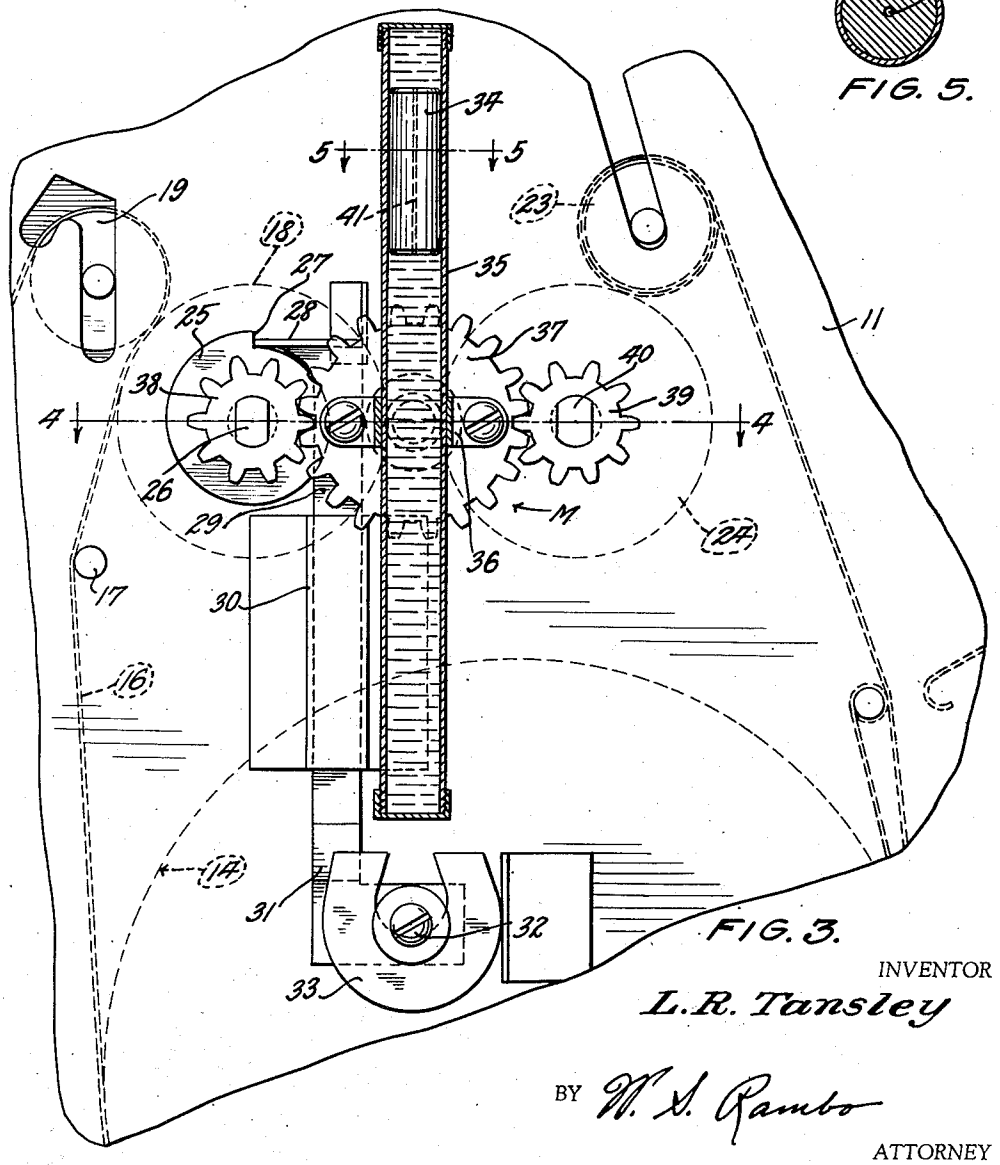


FIG. 3.

INVENTOR

L. R. Tansley

BY W. S. Rambo

ATTORNEY

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2,772,937

ESCAPEMENT MECHANISM FOR WEB-DISPENSING APPARATUS

Leslie R. Tansley, Columbus, Ohio, assignor to White Castle System, Inc., Columbus, Ohio, a corporation of Delaware

Application September 16, 1954, Serial No. 456,382

4 Claims. (Cl. 312—38)

This invention relates to web-dispensing machines and, more particularly, to an improved time-stop escapement mechanism for effecting regulated and intermittent withdrawal of a web from an associated roll.

While the escapement mechanism of the present invention is adapted for general use, it has been designed especially for employment in towel-dispensing machines of the wall-mounted type employed in public lavatories or rest rooms. Such machines or appliances are provided with outer cabinets for the reception of one or more spirally wrapped rolls of towel-forming fabric webbing. Normally these machines are constructed to permit a web to be withdrawn from a supply roll placed within a machine cabinet, the web being passed through a slot in the front of the cabinet. The web is trained and actuated so that the region thereof disposed exteriorly of the cabinet is formed with a constantly maintained loop, while the soiled or used length of each web is returned to the interior of the cabinet. Such return is made at the same rate as fresh clean portions of the web are drawn out of the cabinet.

To provide each patron of such a machine or appliance at any given time with a predetermined length or towel web, and to prevent waste and unnecessary withdrawal of the web from the cabinet thereof, various escapement devices have been used, or proposed for use, to produce between successive withdrawals of towel webbing from the cabinets intervals in which the webbing is locked or held against withdrawal, and it is to the improvement of such escapement mechanisms that the present invention is particularly directed.

Among the objects and features of the invention are: to improve and simplify the construction of such an escapement mechanism and rendering the same more reliable and positive in operation and economical to manufacture than prior mechanism for accomplishing such web-feeding control; to provide for ready adjustment of the mechanism in varying the interval of time in which the towel webbing is locked and held against withdrawal; to provide an escapement for locking the shafts of feeding rolls employed in the guidance and withdrawal of towel webbing from an associated cabinet-mounted supply roll; to employ a shouldered element on the shaft of a feeding roll, which element is cooperative with a stop member forming a part of the escapement and which is movable into and out of engagement with the shoulder of said element in releasing or locking the web-advancing shaft or feeding roll; to provide such a movable stop member with a permanent magnet having poles attracted by a movable magnet-attracting body; to mount said body so that it is slidably confined in a liquid-containing tube disposed for bodily rotation about an axis intersecting the tube midway of its length, the tube being turnable about said axis in unison with turning movement of the web-feeding rolls of the mechanism; to form the magnetic tube-confined body with a restricted liquid-metering bore passing longitudinally therethrough, whereby upon rotation of the tube to invert the same, the magnet-attracting

body is transferred from a normally lowered position in the bottom of said tube to an elevated position in which the rate of descent of the magnetic body in the tube is governed substantially by the passage of displaced liquid through the flow-metering bore of the body, the arrangement being such as to maintain the stop member in motion-arresting engagement with the shouldered element of the feeding roll shafts and to prevent withdrawal of towel webbing from the machine until the inverted magnet-attracting body settles to the bottom of the tube and attracts the permanent magnet of the stop member, the locked condition of the webbing prevailing during the cycle in which the tube is inverted to raise the body therein to the top of the tube chamber and during the descent of the body to the bottom chamber and into restored attraction with the magnet of the stop member, whereby through such attraction the stop member is moved to assume a feed roll and web-releasing position.

The invention consists generally in the constructions and combinations hereinafter described and particularly pointed out in the claims.

In said drawings:

Fig. 1 is a vertical transverse sectional view taken through a wall-mounted towel web-dispensing machine on substantially the line 1—1 of Fig. 2 and disclosing the improved escapement mechanism of the present invention mounted therein;

Fig. 2 is a fragmentary vertical longitudinal sectional view taken through the machine and escapement mechanism on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged vertical transverse sectional view taken through the rotary metering tube of the escapement mechanism, and disclosing the magnetic body in the upper part of the internal liquid-containing chamber of the tube;

Fig. 4 is a horizontal sectional view taken substantially on the line 4—4 of Fig. 3;

Fig. 5 is a similar view taken on the line 5—5 of Fig. 3.

Referring to the drawings, the numeral 10 designates a wall-mounted cabinet of a towel web-dispensing machine. Internally, the cabinet is provided at each side thereof with a stationary roll-mounting side panel 11, forming a supporting means for the escapement mechanism hereinafter defined, one of which being here shown, the panels 11 being disposed adjacent to but in spaced relation from the vertical outer side walls 12 of the cabinet. The spaced parallel order of the panels 11 and the side walls 12 provide therebetween a compartment, such as that indicated at 13. A roll 14 of fabric towel webbing is positioned on an axle shaft 15 having its ends supported and journaled in bearing openings provided in the panels 11.

A web 16 of the towelling is withdrawn from the roll and passed upwardly therefrom over a stationary rod 17 carried by the panels 11 and then trained between a pair of escapement-operating rollers 18 and 19. The web passes over the roller 19 and outwardly of the cabinet 10 through a slot 20 provided in the front wall 21 of the cabinet. From this slot the web depends exteriorly of the cabinet to form a usable loop L for the drying of moisture present on the face or hands of the patrons of the machine.

The return side of the loop projects through a slot 21 in the bottom wall 22 of the cabinet so that the soiled length of the web passes into the interior of the cabinet and is trained around and between a second pair of web-drawing or feeding rollers 23 and 24 rotatably supported in adjacent parallel relation between the side panels 11 for suitable deposit in the cabinet until collected and removed for laundering purposes. The two sets of rollers 18—19 and 23—23 have their rotational speeds coordinated so that the length of the loop L remains constant.

The present invention is concerned with an improved escapement mechanism M for use in conjunction with a

towel web dispensing machine of the above character, whereby to lock or hold against movement the web-feeding rollers for a predetermined period of time upon and following each incremental withdrawal of a clean length of the towel webbing from the machine. To this end, the mechanism M, in a preferred form thereof, comprises a disk element 25 which is mounted on a polygonal-shaped end of a supporting shaft 26 for the roller 18. The periphery of the element 25 is formed with a radial shoulder 27 adapted for cooperation with a laterally and outwardly directed restraining lug 28 formed on the upper end of a vertically slidable stop member 29.

The body of the member 29 is guided for sliding movement in a stationary strap plate 30 applied on the outer face of the panel 11. Below the plate 30, the stop member includes an outwardly directed foot 31 which is spaced from the outer face of the panel 11 and is apertured for the reception of the threaded shank of a headed bolt 32. Supported on the bolt shank is an inverted U-shaped permanent magnet 33. It is by virtue of the magnetic attraction properties of this magnet that the stop member is maintained in the elevated roll-releasing position thereof shown in Fig. 1.

The field of the poles of the magnet normally includes therein a cylindrical metallic body 34 of a composition capable of attracting the permanent magnet when in its pole field. In this instance, the body 34 is disposed for movement within a sealed, internal, liquid holding chamber of a timer tube 35 composed of a non-magnetic metal. This tube midway of its length is fastened by a strap 36 on the flat outer face of a centrally disposed gear wheel 37. The peripheral teeth of this gear wheel mesh on one side thereof with the teeth of a smaller gear 38 fixed on the outer polygonal end of the shaft 26, while the teeth on the opposite side of the gear wheel 37 mesh with those of a small gear 39 mounted on the polygonal end of a shaft 40 carrying the roller 23.

It will be evident in the operation of this escapement mechanism that when a patron desires to use a clean length of the towel web he will pull downwardly on the outer length of the web forming the loop L, as indicated by the arrow *a* of Fig. 1. Due to the engagement of the web, as the latter passes between the escapement-actuating rollers 18 and 19, rotary motion is imparted to the shaft 26 of the roller 18. The turning movement thus imparted to the shaft 26 causes rotation of the disk element 25 and the gear 38, and the latter, in turn, causing the center gear wheel 37 to turn. This results in bodily turning movement of the timer tube 35 about the axis of the wheel 37, so that the cylindrical magnet-attracting body 34, normally in the bottom of the tube, is moved out of the field of the magnet 33, thus causing the stop member 29, on which the magnet is mounted, to drop gravitationally, thereby enabling the stop lug 28 on the upper end thereof to rest on the periphery of the disk element 25.

One complete revolution of the shaft 26 brings the shoulder 27 on the disk element into engagement with the lug 28 which was dropped on the periphery of the disk element when the tube 35 and the body 34 was turned away from the magnet 33. The stop member thus releases and limits the rotation of the shaft 26 to one complete revolution, enabling the towel webbing to be drawn out of the cabinet accordingly. One complete revolution of the gear 38 produces half or 180 degrees of rotation on the part of the center gear wheel 37, because of the fact that said wheel possesses twice the number of gear teeth in its periphery as the gear 38 or the gear 39. When the lug 28 thus reengages the shoulder 27 following 360 degrees of turning movement of the shaft 26, all gear and feed roller motion is arrested. However, such motion having caused a one-half turn on the part of the center gear wheel, produces inversion of the tube 35, carrying with it the body 34, so that the latter assumes a position in the upper end of the liquid-filled tube chamber in spaced relation from the permanent magnet.

The body 34 has formed therein a centrally disposed restricted bore or passageway 41. Through this bore or passageway the liquid contained in the tube chamber passes under metered flow. An adjustable valve, not shown, may be provided for varying the effective diameter of the bore or passageway, or, as here used, several bodies may be provided for selective usage having bores or passageways of different diameters to supply different timing rates. With a bore of minimum diameter, the period of time required for the liquid to pass through the bore to permit the body 34 to descend the chamber in the tube following inversion of the latter will be at maximum length. A somewhat larger diameter bore will, with the use of the same liquid under constant temperature conditions, require a relatively shorter period of time, and so on, as will be readily understood. When the body 34 returns to its normal position in the bottom of the tube chamber and in the field of the magnet 33, the latter moves upwardly toward the bottom of the tube and the body 34 therein until the magnet is in contact therewith, as shown in Fig. 1. This movement causes elevation of the stop member 29 attached to the magnet and the elevation of the lug 28 thereby allowing free turning movement of the roll 14 and the rollers 18—19 and 23—24, whereby to enable the web 16 to be drawn outwardly a predetermined but limited distance for patrons' usage.

I claim:

1. Escapement mechanism for governing the withdrawal of webs from rolls containing the same in a spirally wrapped form, comprising: supporting means for such a web-containing roll; an escapement-operating roller carried by the supporting means in spaced relation to the web roll, said roller being rotated by the passage of a web withdrawn from said roll into contacting engagement with the periphery of said roller; a shouldered element mounted for rotation in unison with said roller; a movable stop member carried by said supporting means in coacting relation with said shouldered element; a permanent magnet having spaced poles mounted rigidly on said stop member; a magnet-attracting body normally disposed in the pole field of said magnet; a fluid-containing carrier means in which said body is movably mounted; a pivotal support for said carrier means; and means responsive to roller rotation to impart turning movement to said carrier means, whereby to provide a timed cycle of movement for said body in which the carrier means is positioned so that the body is removed from the field of said magnet to cause the stop member associated therewith to engage said shouldered element and to stop roller rotation following the withdrawal of a determinate length of the web from its roll, and wherein the return of said body to its position of magnet attraction and roller release is delayed by the fluid contained in said carrier means.

2. Escapement mechanism for governing the withdrawal of webs from spirally wrapped supply rolls, comprising: supporting means for the rotatable reception of a supply roll; a rotatable escapement-actuating roller mounted on said supporting means in spaced relation from said roll, said roller having engagement with a web leading from said roll and by which the roller is rotated concomitantly with the withdrawal of the web from said roll; a movable stop member carried by said supporting means; a shouldered motion-controlling element mounted for bodily rotation in unison with said roller, said element being normally spaced from said stop member to admit of limited turning movement of said element in withdrawing a predetermined length of the web from said roll; means responsive to predetermined rotation of said roller and element to cause said stop member to engage said element and a shoulder thereon to arrest such rotation, thereby restraining said web against withdrawal from said roll; said last-named means embodying a timing device mounted on said supporting means for rotation about a fixed axis; means for transmitting rotation to said timing device from said roller and shouldered

element in a manner in which said device rotates at a reduced rate of movement with respect to that of said element, said timer being formed with a liquid-filled cylindrical chamber; a magnet-attracting body having a restricted passage, said body being disposed for movement longitudinally in said chamber; and a permanent magnet carried by said stop member, said body being disposed, when the stop member occupies a web-releasing position, in the field of attraction of the magnet, whereby to cause the stop member to assume a web-locking position of engagement with said element when the body is moved away from said magnet by turning movement of the timing device.

3. Escapement mechanism for governing withdrawal of a web from a spirally wound supply roll thereof, comprising: a supporting structure for the reception of a web roll; an escapement-actuating roller carried by said structure disposed in engagement with and adapted to be rotated by a web during withdrawal of the latter from said roll; a shouldered motion-controlling element fixed to rotate with said roller; a stop member movably mounted on said structure; a permanent magnet carried by said stop member; a liquid-filled timing tube rotatable with said element at a lower rate of turning movement; and a magnet-attracting body formed with a restricted liquid passage mounted for sliding movement in the liquid contained within said tube, said body being normally disposed in the field of attraction of said permanent magnet to maintain said stop member in a web-releasing position spaced from said element, the turning of said timing tube in response to withdrawal of a web from said roll serving to elevate said body so that the liquid in said tube flowing through the passage in said body will retard the rate of descent of said body to a lowered position in said tube into the field of said magnet, said body when removed from the field of said magnet through turning movement of said tube serving to admit of movement of the magnet to bring the stop member joined therewith into motion-arresting engagement with a shoulder of said motion-controlling element.

4. Escapement mechanism for governing the withdrawal of webs from spirally wrapped supply rolls composed thereof, comprising: supporting means for the rotatable reception of a supply roll; a pair of escapement-actuating rollers mounted on said supporting structure in spaced relation from said roll, said rollers having frictional engagement with a web leading from said roll and trained between them, so that the rollers are rotated concomitantly with the withdrawal of the web from said roll; a movable stop member carried by said supporting means normally disposed in a web-releasing position; a shouldered motion-controlling element mounted for bodily rotation in unison with said rollers, said element being normally spaced from said stop member to admit of limited turning movement of the element and rollers in providing for withdrawal of a predetermined length of the web from said roll; a permanent magnet mounted on said stop member; a timer mounted for rotation about a fixed axis on said supporting means, motion-transmitting means actuated by roller rotation for imparting turning movement to said timer, said timer being formed with an elongated liquid-containing chamber; and a magnet-attracting body mounted in said chamber for longitudinal movement only, said body being formed with a restricted passage providing for a metered flow of liquid from one side of said body to the other during gravitational descent of the body in said chamber, said body when in its lowermost position in said chamber being disposed in the field of attraction of said magnet, whereby to produce movement of said stop member to maintain the same in its normal web-releasing position, said body when removed from said field of attraction by turning movement of said timer causing said stop member to engage said shouldered element in precluding roller rotation.

References Cited in the file of this patent

UNITED STATES PATENTS

2,202,930 Steiner ---------- June 4, 1940