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3,010,338

ROTATION CONTROL UNIT FOR DISPENSERS

Filed July 6, 1959

FIG. 1.

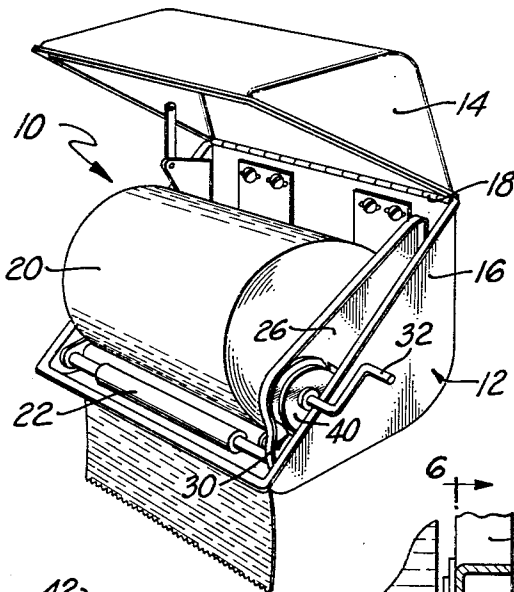


FIG. 2.

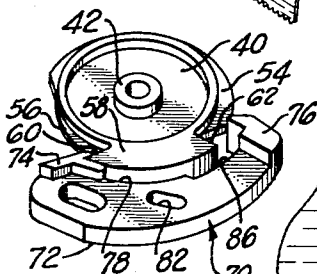
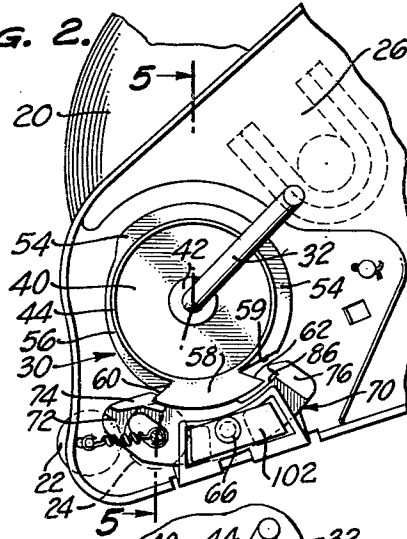


FIG. 7.

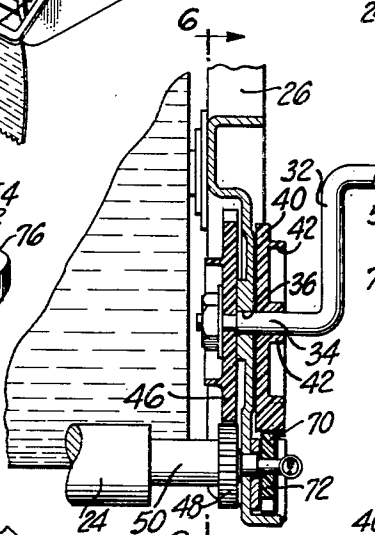


FIG. 5.

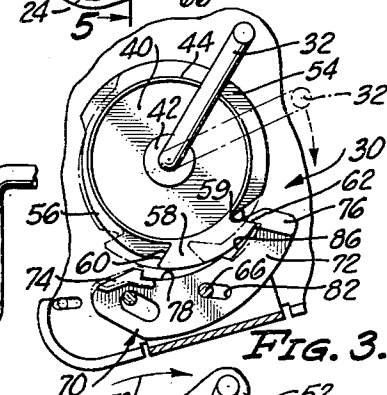


FIG. 3.

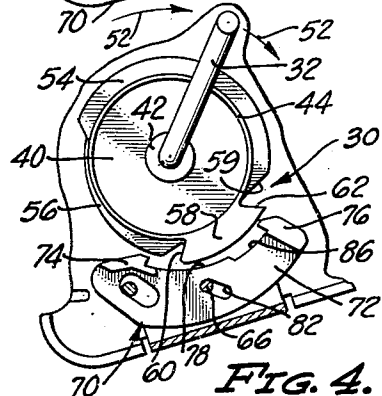


FIG. 4.

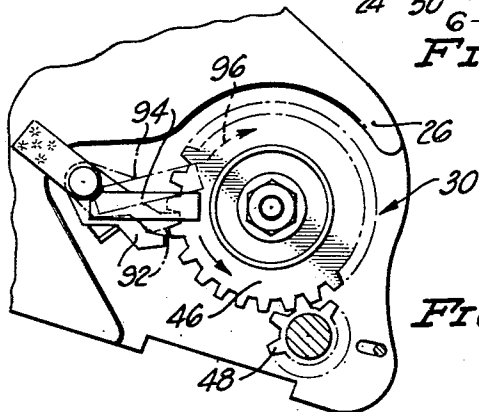


FIG. 6.

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3,010,338
ROTATION CONTROL UNIT FOR
DISPENSERS

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This invention relates to a rotation control unit for dispensers and, more particularly, to a rotation control unit adapted to be utilized in conjunction with a dispenser for material in strip form such as roll paper toweling or the like.

This invention constitutes an improvement over the dispenser disclosed in United States Letters Patent No. 2,712,934 granted to J. C. Layton and Ralph Shaffer on July 12, 1955 for a "Roll Paper Towel Dispenser."

Machines of the type embodying the present invention are usually installed in public lavatories, offices and residences and, obviously, while necessarily simple and easily operated, in the absence of suitable controls users of the towel sheets are careless and frequently extravagant in the use of the paper sheets dispensed.

It is, therefore, an object of the invention to provide means for limiting the length of the sheets dispensed to a substantially uniform section issuable at each operative cycle in order to deter users from wasting expensive paper without actually preventing the use of as many sections as users may desire but requiring a separate operation for each section dispensed.

Machines of the type in which the rotation control units of the present invention are embodied are usually installed, as stated hereinabove, in environments where they are subject to continuous hard usage with consequent relatively accelerated wear upon the component parts thereof. In addition, because the rotation control unit limits the amount of paper which will be dispensed during one cycle of rotation of the control unit, the rotation control unit is frequently subjected to excessive mechanical loads because of undue pressure brought to bear thereupon by a user of the dispenser in which the rotation control unit is embodied.

It is, therefore, an object of my invention to provide a rotation control unit adapted to limit the amount of toweling dispensed from an associated dispenser and which is so constructed as to effectively sustain excessive loads imposed thereupon and to resist the accelerated wear constantly encountered during use of said control unit.

In order to accomplish the desired structural reinforcement of the rotation control unit and to provide for longer life of the unit, I have found it desirable to utilize a synthetic plastic such as nylon or the like. Because of the inherently resilient nature of this material it has been found necessary to greatly rigidify certain of the component parts of the control unit in a manner which would resist the deflection of the component parts when subjected to extreme loads.

A further object of my invention is the provision of a rotation control unit which is characterized by its trouble-free operation and by the extremely prolonged life thereof.

Other objects and advantages of the invention will be apparent from the following specification and the accompanying drawing which is for the purpose of illustration only and in which:

FIG. 1 is a perspective view of a towel dispenser embodying the rotation control unit of the present invention;

FIG. 2 is an enlarged, side elevational view of the rotation control unit of my invention;

FIG. 3 is a fragmentary, sectional view showing the

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control unit in the position which the component parts thereof assume when the unit is released;

FIG. 4 is a view similar to FIG. 3 showing the component parts of the control unit in the position assumed when the component parts thereof are about to engage in locking relationship with each other;

FIG. 5 is a vertical sectional view taken on the broken line 5-5 of FIG. 2;

FIG. 6 is a vertical sectional view taken on the broken line 6-6 of FIG. 5; and

FIG. 7 is a perspective view showing the locking member constituting a component of the rotation control unit of the invention.

Referring to the drawing and particularly to FIG. 1 thereof, I show a dispenser 10 incorporated in a housing 12, said housing being constituted by first and second housing portions 14 and 16 hingedly connected to each other at 18. Mounted within the second housing portion 16 is a roll 20 of toweling in strip form and dispensing rollers 22 and 24 are located within the second portion 16 of the housing 12 to cause the toweling to be dispensed from the roll 20.

Mounted within the second housing portion 16 on a partition 26 is a rotation control unit 30, said rotation control unit being adapted to determine the amount of toweling dispensed from the dispenser 10 during each cycle of said rotation control unit. The rotation control unit includes an actuating handle 32, said handle being provided with an axially directed shank 34 which is journaled for rotation in a bearing opening 36 provided in the partition 26.

Secured to the shank 34 of the handle 32 is a rotation control element constituted by a disk 40, said disk being fabricated from nylon or similar plastic and incorporating a centrally located hub 42 which encompasses the shank 34 and an axially directed stiffening rib 44 of circular configuration on one side thereof. Operatively connected to the inner or left-hand extremity of the handle 32, as viewed in FIG. 5 of the drawing, is a drive gear 46 which engages a driven gear 48 connected to the shaft 50 which mounts the dispensing roller 24. Therefore, when the handle 32 is rotated in a clockwise direction, as indicated by the arrows 52 in FIG. 4 of the drawing, the drive gear 46 and dispensing roller 24 are correspondingly rotated to cause a length of paper toweling to be issued or dispensed from the roll 20 thereof.

The disk 40 incorporates an elongated, major, concentric peripheral segment 54 which is of approximately 180° in extent. A somewhat shorter peripheral segment 56 is juxtaposed to the major segment 54 and is of approximately 120° in extent, being somewhat eccentric with respect to the center of the disk 40. The remainder of the periphery of the disk 40 is constituted by a concentric segment 58 of approximately 60° in extent which projects beyond the abutting extremities of the major segment 54 and the eccentric segment 56.

The concentric segment 58 on the perimeter of the disk 40 constitutes a detent portion having first and second detent notches or surfaces 60 and 62 at its opposite extremities. Mounted adjacent the perimeter of the disk 40 on a pivot pin 66 is a locking member 70 constituted by an elongated dogging member 72 of generally arcuate configuration, said dogging member incorporating first and second dogging lugs 74 and 76 on its opposite extremities which are respectively engageable with the first and second detent notches or surfaces 60 and 62 at the opposite extremities of the concentric segment 58 of the disk 40.

It will be noted that the concentric portion 54 of the perimeter of the disk 40 is cut away, as at 59, immediately adjacent the second detent surface or notch 62. Therefore, clearance of the second dogging lug 76 by the disk

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40 is assured when the disk 40 is rotated in a clockwise direction as indicated by the arrow 52 in FIG. 4 of the drawing. In other words, the cut-away portion at 59 prevents the leading edge of the major concentric segment from impinging on the dog 76 and driving the dog 76 outwardly to urge the dog 74 into a position in which it will be engaged by the first detent surface 60.

It will be noted that the edge 78 of the locking member 70 which is juxtaposed to the perimeter of the disk 40 is concentric with the second concentric segment 58 and that the thickness of the dogging lugs 74 and 76 is approximately twice the thickness of the remainder of the dogging member 72, said thickness corresponding to the thickness of the concentric segment 58 which is considerably greater than that of the concentric segment 54 and the eccentric segment 56 of the disk 40.

By thickening the dogging lugs 74 and 76 and the detent portion constituted by the concentric segment 58 of the disk 40, the deflection of either the dogging lugs 74 or 76 or the detent portion constituted by the concentric segment 58 under load is prevented, in a manner to be described in greater detail hereinbelow.

It will be noted that the leading edge of the segment 58 adjacent the first detent surface 60 is truncated or wedge-shaped so that, should the leading edge wear, it will wear without the creation of a fillet thereupon. Moreover, the truncation of the leading edge of the detent segment 58 will cause it to cam the dogging member 72 outwardly should the dogging member 72 inadvertently slip into a position in which it might engage the first detent surface 60.

The dogging member 72 incorporates an elongated slot 82 intermediate its extremities and the pivot pin 66 extends through said slot to mount the dogging member 72 for both rotational and longitudinal movement during cooperative engagement of the dogging lugs 74 and 76 with the corresponding detent notches 60 and 62 on the segment 58.

A clearance recess 86 is formed in the edge 78 of the dogging member 72 adjacent the second dogging lug 76 and is adapted to receive that portion of the segment 58 defining the second detent notch 62, as best shown in FIG. 3 of the drawing. The function of the clearance recess 86 will be described in greater detail below in describing the mode of operation of the rotation control unit 30. At this juncture, it should be pointed out that the drive gear 46 has a dog 92 associated therewith and maintained in operative engagement therewith by means of a spring jaw 94 to prevent reverse rotation of the gear 46 in the direction of the arrow 96 as shown in FIG. 6 of the drawing.

In addition, a leaf spring 102 has its opposite extremities engaged upon the adjacent surface of the dogging member 72 to maintain the dogging member in a position into which the dogging member has been urged by cooperative engagement with the segment 58 of the disk 40. The leaf spring 102 is secured in operative engagement with the dogging member 72 by the pivot pin 66 upon which the dogging member 72 is mounted.

During the dispensing operation the handle 32 is rotated in a clockwise direction as indicated by the arrow 52 in FIG. 4 of the drawing. This causes corresponding clockwise rotation of the disk 40 and the drive gear 46. During rotation of the disk 40 the leading edge of the segment 58 adjacent the first detent notch 60 contacts the second dogging lug 76 and cams it outwardly to rotate the dogging member 72 in a clockwise direction and to dispose the first dogging lug 74 in the path of the first detent notch 60. As rotation of the disk continues the first detent notch 60 engages the first detent lug 74 and, after the dogging member 72 is carried downwardly on the pivot pin 66 to the extremity of the slot 82, further rotation of the disk 40 is prevented, thus limiting the amount of toweling dispensed from the roll 20.

If the user of the dispenser 10 desires to obtain another

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length of toweling, the disk must be rotated in a counterclockwise direction which causes the second dogging lug 76 to be engaged by the second detent notch 62 as best shown in FIG. 3 of the drawing. Engagement of the second detent notch 62 with the second dogging lug 76 is facilitated by the provision of the clearance recess 86. Otherwise there would be a tendency to prevent proper engagement of the second detent notch 62 with the second dogging lug 76 because the trailing edge of the segment 58 adjacent said second detent notch would urge the dogging member in a clockwise direction and prevent impingement and locking engagement of the second dogging lug 76 in the second detent notch 62.

When such locking engagement occurs the dogging member 72 is carried upwardly until the pin 66 engages the left-hand extremity of the slot 82 as best shown in FIG. 3 of the drawing, which causes corresponding counterclockwise rotation of the dogging member 72 to carry the first dogging member out of the path of rotation of the first detent notch 60 and permit another dispensing cycle of the disk 40. Once the segment 58 has been carried past the first dogging lug 74 reverse rotation of the disk 40 is prevented by impingement of the dog 92 on the drive gear 46 and thus subsequent rotation of the disk 40 must be made in a clockwise direction. This prevents the end of the roll 20 of toweling from being disengaged from operative relationship with the dispensing roller 24. The significance of the eccentric segment 56 of the disk 40 and its cooperative relationship with the dogging member 72 has been described in the above mentioned patent and it is thought that no further description thereof is necessary. It will be noted that the correspondingly thick dogging lugs 74 and 76 and disk segment 58 resist the deflection which would occur if the dogging lugs 74 and 76 and disk segment 58 were of the same cross section as the associated dogging member 72 and disk 40, respectively.

Furthermore, when the disk 40 is rotated in a clockwise direction during a dispensing rotation of said disk, the second dogging lug 76 of the dogging member 72 is disposed in the path of the first detent surface or notch 60 on the concentric segment 58. Engagement of the first detent surface or notch 60 with the second dogging lug 76 of the dogging member 72 cams said dogging member outwardly to rotate the dogging member 72 about the pivot pin 66 and to urge the first dogging lug 74 into the path of the first detent notch or surface 60. Therefore, the first detent notch or surface 60 will be engaged by the dogging lug 74 and, when the pivot pin 66 reaches the end of the slot 82, the dogging member 72 will restrain the disk 40 against further dispensing movement.

To release the disk 40 from the dogging member 72 it is necessary to rotate the disk 40 in a reverse direction which causes the second detent notch or surface 62 to be engaged by the second dogging lug 76. At this juncture the clearance recess 86 and the cut-away portion 59 of the major concentric segment 54 of the disk 40 cooperate to allow the proper longitudinal and rotational movement of the dogging member 72 about the pivot pin 66 located in the slot 82.

If the clearance recess 86 were not provided in the dogging member 72 only limited engagement of the second detent notch 62 with the second dogging lug 76 would take place and it is conceivable that the dogging member 72 would not be rotated and shifted sufficiently to cause the first dogging lug 74 to be moved out of the path of rotation of the first detent notch 62.

However, the clearance recess 86 permits the second detent notch 62 to be properly engaged by the second dogging lug 76, thus causing the dogging member 72 to be drawn linearly upwardly with reference to the pin 66 and to be rotated about the pin 66 when the end of the slot 82 is engaged upon the pin 66 to urge the first dogging

lug 76 out of the path of the first detent notch 60 when

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a dispensing cycle is initiated by clockwise rotation of the disk 40.

When the second dogging lug 76 is rotated inwardly toward the perimeter of the disk 40 by engagement of the second notch 62 therewith, the cut-away portion formed at 59 in the major concentric portion 54 of the disk prevents said concentric portion 54, adjacent the second detent notch 62, from engaging upon the second dogging lug 76 of the dogging member 72 and rotating said second dogging lug outwardly to drive the first dogging lug 74 into the path of the first detent notch 60. In this manner, the possibility that the dogging member 72 will repeatedly lock the disk 40 against dispensing rotation is eliminated.

Reference has been made previously to the truncation of the leading edge of the concentric segment 58 adjacent the first detent notch or surface 60 to prevent the first detent notch 60 from inadvertently engaging the first dogging lug 74 if the dogging member 72 should possibly slip into a position where it is so close to the leading edge of the detent segment 58 that inadvertent engagement of the first detent notch 60 on the first dogging lug 74 would result. In such a circumstance, the wedge shaped leading edge of the concentric segment 58 will cam the first dogging lug outwardly to prevent locking engagement of the first detent notch or surface 60 with the first dogging lug 74. Therefore, inadvertent and repeated locking of the disk 40 against dispensing rotation is prevented.

I claim:

1. In a rotation control unit, the combination of: a mounting plate; a rotatable actuating handle mounted on said plate; a rotatable control element mounted for rotation on said handle and constituted by a disk having a radially projecting detent portion thereupon at its periphery, said detent portion having first and second angularly oriented detent surfaces at its opposite extremities and constituting approximately 60° of said periphery; a locking member mounted on said mounting plate disposed adjacent the path of rotation of said disk, said locking member having an arcuate inner edge conforming to the periphery of said detent portion and having first and second dogs at its opposite extremities engageable by said first and second detent surfaces on said detent portion, said locking member being mounted for pivotal and endwise movement and said inner edge thereof incorporating a clearance groove adjacent said second dog to facilitate the engagement of said second detent surface with said second dog, and a spring engageable with said locking member to maintain it in a position into which it has been urged by said detent portion.

2. In a rotation control device for controlling the length of a strip dispensed from a roll of strip material, the combination of: a mounting plate; a handle mounted on said plate; a control disk mounted for rotation on said handle, said control disk having a perimeter including a concentric, radially extending detent portion, said detent portion having first and second detent surfaces at the opposite extremities thereof, said perimeter including another concentric portion disposed inwardly of and adjacent the detent portion of said perimeter and said perimeter having an eccentric portion interposed between said detent portion and said other concentric portion, said detent portion constituting approximately 60° of said perimeter; a locking member mounted on said mounting plate for pivotal and endwise movement adjacent the perimeter of said disk, said locking member having first and second dogging lugs at its opposite extremities engageable, respectively, with the first and second detent surfaces on said detent portion of said disk and having an inner edge concentric with said detent portion of said disk, said inner edge incorporating a clearance recess adapted to facilitate the engagement of said second detent surface with said second dogging lug; and a spring engageable with said locking member to maintain it in

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a position into which it has been urged by said detent portion.

3. In a rotation control device for controlling the length of a strip dispensed from a roll of strip material, the combination of: a mounting plate; a handle mounted on said plate; a control disk mounted for rotation on said handle, said control disk having a perimeter including a concentric, radially extending detent portion, said detent portion having first and second detent surfaces at the opposite extremities thereof, said perimeter including another concentric portion disposed inwardly of and adjacent the detent portion of said perimeter and said perimeter having an eccentric portion interposed between said detent portion and said other concentric portion, said detent portion being of greater thickness than the remaining perimeter of said disk, said detent portion constituting approximately 60° of said perimeter; a locking member mounted on said mounting plate for pivotal and endwise movement adjacent the perimeter of said disk, said locking member having first and second dogging lugs at its opposite extremities engageable, respectively, with the first and second detent surfaces on said detent portion of said disk and having an inner edge concentric with said detent portion of said disk, said inner edge incorporating a clearance recess adapted to facilitate the engagement of said second detent surface with said second dogging lug, said dogging lugs being of greater thickness than the remainder of said locking member and being substantially equivalent in thickness to said detent portion of said disk; and a spring engageable with said locking member to maintain it in a position into which it has been urged by said detent portion.

4. In a rotation control unit, the combination of: a mounting plate; a rotatable actuating handle having an axially directed shank thereupon mounted on said plate; a control disk mounted for rotation on said shank, said control disk having its perimeter provided with a radially extending detent portion incorporating first and second detent surfaces and being concentric with said disk, another concentric portion disposed adjacent but inwardly of said detent portion, and an eccentric portion disposed intermediate said first and second portions, said detent portion being of greater thickness than said other concentric and eccentric portions, said detent portion constituting approximately 60° of said perimeter; a locking member mounted on said mounting plate adjacent the perimeter of said disk for pivotal and endwise movement, said locking member incorporating first and second dogs at its opposite extremities which correspond in thickness to the thickness of said first portion of said disk whereby, when said first and second detent surfaces are engaged by said first and second dogs, deflection of said first and second dogs away from said first and second detent surfaces is prevented, said locking member having an inner edge concentric with said detent portion of said disk, said inner edge incorporating a clearance recess adapted to facilitate the engagement of said second detent surface with said second dog; and a spring engageable with said locking member to maintain it in a position into which it has been urged by said detent portion.

5. In a rotation control unit, the combination of: a mounting plate; a rotatable actuating handle having an axially directed shank thereupon mounted on said plate; a control disk mounted for rotation on said shank, said control disk having its perimeter provided with a radially extending detent portion incorporating first and second detent surfaces and being concentric with said disk, another concentric portion disposed adjacent but inwardly of said detent portion, and an eccentric portion disposed intermediate said detent and other concentric portions, said detent portion being of greater thickness than said other concentric portion, said detent portion constituting approximately 60° of said perimeter; a lock-

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ing member mounted on said mounting plate adjacent the perimeter of said disk for pivotal and endwise movement, said locking member incorporating first and second dogs at its opposite extremities which correspond in thickness to the thickness of said detent portion of said disk whereby, when said first and second detent surfaces are engaged by said first and second dogs, deflection of said first and second dogs away from said first and second detent surfaces is prevented, said locking member having an inner edge concentric with said detent portion of said disk and said inner edge incorporating a clearance recess adapted to permit said second detent surface to engage the second dog on said locking member; and a spring engageable with said locking member to maintain it in a position into which it has been urged by said detent portion.

6. In a rotation control unit, the combination of: a mounting plate; an actuating handle mounted on said plate; a rotation control disk operatively connected to said actuating handle, said control disk having a perimeter provided with a radially extending detent portion incorporating first and second detent surfaces and being concentric with said disk, another concentric portion disposed adjacent but inwardly of said detent portion, and an eccentric portion disposed intermediate said detent and other concentric portions, said detent portion constituting the smallest portion of the periphery of said disk; a locking member mounted on said mounting plate adjacent the perimeter of said disk for pivotal and endwise movement, said locking member including first and second dogging lugs at its opposite extremities engageable, respectively, with said first and second detent surfaces, said locking member having an inner edge juxtaposable to the edge of said detent portion and said inner edge incorporating a clearance recess adapted to permit said second detent surface to engage said second dogging lug on said locking member; and a spring engageable with said locking member to maintain it in a position into which it has been urged by said detent portion.

7. In a rotation control unit, the combination of: a mounting plate; an actuating handle mounted on said plate; a rotation control disk operatively connected to said actuating handle, said control disk having a perimeter provided with a radially extending detent portion incorporating first and second detent surfaces and being concentric with said disk, another concentric portion disposed adjacent but inwardly of said detent portion, and an eccentric portion disposed intermediate said detent and other concentric portions, said other concentric portion being cut away adjacent said second detent surface, said detent portion constituting the smallest portion of the periphery of said disk; a locking member mounted on said mounting plate adjacent the perimeter of said disk for pivotal and endwise movement, said locking member including first and second dogging lugs

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at its opposite extremities engageable, respectively, with said first and second detent surfaces, said locking member having an inner edge juxtaposable to the edge of said detent portion and said inner edge incorporating a clearance recess adapted to permit said second detent surface to engage said second dogging lug on said locking member, the cut-away area of said other concentric portion permitting said other concentric portion to pass said second dogging lug after said second dogging lug has been moved inwardly by engagement with said second detent surface; and a spring engageable with said locking member to maintain it in a position into which it has been urged by said detent portion.

8. In a rotation control unit, the combination of: a mounting plate; an actuating handle mounted on said plate; a rotation control disk operatively connected to said actuating handle, said control disk having a perimeter provided with a radially extending detent portion incorporating first and second detent surfaces and being concentric with said disk, another concentric portion disposed adjacent but inwardly of said detent portion, and an eccentric portion disposed intermediate said detent and other concentric portions, said other concentric portion being cut away adjacent said second detent surface, said detent portion constituting the smallest portion of the periphery of said disk; a locking member mounted on said mounting plate adjacent the perimeter of said disk for pivotal and endwise movement, said locking member incorporating first and second dogging lugs at its opposite extremities for engagement, respectively, with said first and second detent surfaces and said cut-away area of said other concentric portion permitting said disk to pass said second dogging lug after it has been shifted inwardly toward the perimeter of said other concentric portion by engagement of said second detent surface on said second dogging lug and by reverse rotation of said disk and said locking member, said locking member having an inner edge concentric with said detent portion of said disk, said inner edge incorporating a clearance recess adapted to facilitate the engagement of said second detent surface with said second dog; and a spring engageable with said locking member to maintain it in a position into which it has been urged by said detent portion.

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