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J. C. LAYTON ET AL
ROLL PAPER TOWEL DISPENSER

2,712,934

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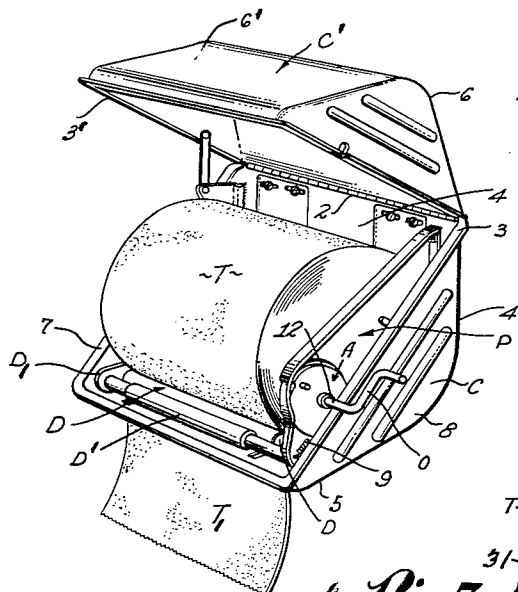


Fig. 1

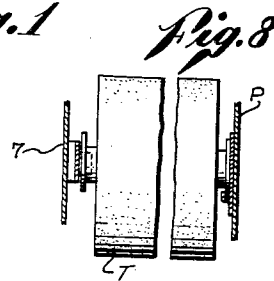


Fig. 8

Fig. 2

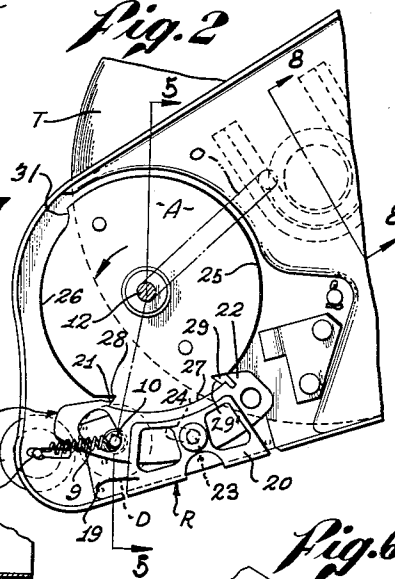


Fig. 3

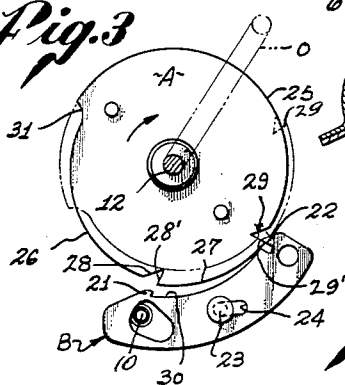


Fig. 7

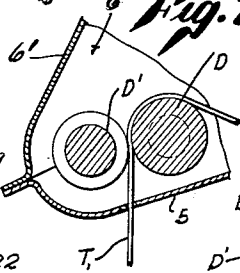


Fig. 5

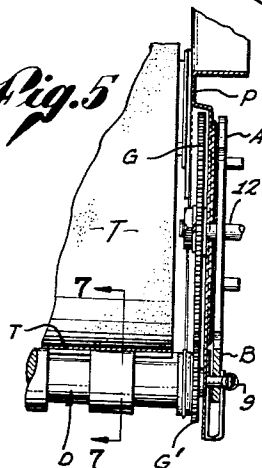


Fig. 6

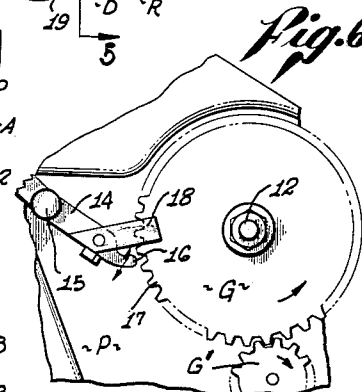
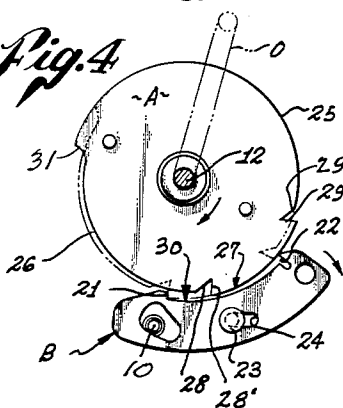


Fig. 4



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ROLL PAPER TOWEL DISPENSER

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8 Claims. (Cl. 271-2.4)

This invention relates to and has for a general object the provision of an improved type of a machine for dispensing successive sections of paper toweling of uniform length from a roll and means for preventing issue of more than a predetermined length of paper at each operation.

This invention provides certain improvements over the machine disclosed in Patent No. 2,277,051 granted to one W. H. West on March 24, 1942 for a towel dispenser and assigned to Towlsaver, Inc., a corporation of California, of Los Angeles, California.

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 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.

Another object is to provide means for preventing the trailing of successive sections relative to preceding sections without manipulation of an operating member in a reverse direction to that required to issue a section, thereby requiring extra effort on the part of a user to obtain a second and each subsequent section, and discourage a user against use of excessive paper.

A still further object is to provide a manually rotatable control member and a relatively oscillatable locking member which is centrally pivoted on the dispenser case so as to alternately swing terminal portions thereof into and from locking engagement with said control member. The control member is preferably formed as a disc and the locking member is additionally arranged to slide in opposite directions to a limited extent on its pivot by and under the influence of said disc with or without assistance of gravity, to limit the rotation of said disc to a predetermined extent in opposite directions and thereby to maintain positive control and limitation of each operation to but a single section of paper of desired length.

Another object is to provide a rotatable control disc formed with a plurality of segments of different radius and extent, and a locking member formed with abutments at its ends adapted to engage shoulders of said segments during each dispensing cycle of the unit for first unlocking the disc to permit issuance of a section of paper and then locking the unit against issuance of a succeeding section after a first or prior section has been issued for use, until the disc has been reversely rotated to effect an unlocking operation.

In one form of unit the control disc may have two concentric segments of different radius with shouldered notches at the junctions thereof for lockingly engaging the abutments on the locking member. Thus, when one abutment of the locking member engages the edge of

one segment of the disc the other abutment of the locking member will become effective to bodily shift the locking member on its pivot and also to lockingly engage a shoulder of the disc to prevent rotation of the disc in a corresponding direction. For example: when the trailing abutment of the locking member engages the major segment of the disc during a dispensing cycle, the leading abutment of the locking member can at a predetermined point in a dispensing cycle drop into the leading notch and engage the shoulder thereof for positively arresting forward rotation of the disc beyond the point of completion of the issue of a single section of paper of predetermined length. Also, thereafter, a succeeding section of paper can be issued only by reversely rotating the control disc, thereby retracting the locking member and releasing its leading abutment from the disc and simultaneously engaging its trailing abutment with the shoulder of the trailing notch on the disc. Hence the unit is set to permit a succeeding dispensing cycle of operation and the issue of a succeeding sheet of paper.

Other objects may appear as the description of my improvements progresses.

I have shown a preferred form of mechanism in the accompanying drawing, in which:

Fig. 1 is a perspective view of a towel dispenser embodying the instant invention and shown with the cover of the case open;

Fig. 2 is an enlarged fragmentary elevational view of the control mechanism and supporting panel therefor when detached from the case and viewed from the outside;

Fig. 3 is a side view of the control disc and locking member shown in unlocked positions to permit the disc for forward rotation as in a dispensing operation;

Fig. 4 is a view similar to Fig. 3 except that the control disc is shown approaching position to either be locked against or authorizedly move to an extent to complete a dispensing cycle of operation;

Fig. 5 is a fragmentary section on line 5-5 of Fig. 2;

Fig. 6 is a view of the inside of the control panel showing a gear driven by the operating member and a detent or back stop for preventing reverse movement of the dispenser before completion of a dispensing cycle of operation;

Fig. 7 is a fragmentary section of the dispenser in a vertical plane as on line 7-7 of Fig. 5; and

Fig. 8 is a longitudinal section of the machine showing the paper roll support at opposite ends within the case C.

The form of dispenser shown is of a clam shell type embodying a case C and a closure C' hinged together at their upper edges as at 2 and flanged portions 3 and 3' respectively which abut in a plane cutting the axis of hinge 2 and together forming a receptacle for a roll of paper toweling T within the bulging bodies C and C'. Said member C has a back 4 and a bottom 5 while the member C' has an inclined top 6 and a front 6'.

A dispensing roller D is rotatably supported on opposite ends of case C in bearings D₁ affixed to an end 7 of member C and in a panel P affixed to the other end 8 of member C. Paper roll T is also journaled at opposite ends in side 7 in panel P. The outer end portion of the roll of paper as at T₁ extends over roller D and under a companion roller D' (Fig. 7) which is also rotatably supported on side 7 and panel P and is urged into frictional contact with paper portion T₁ by springs 9, one at each end of the roller and connected at their opposite ends with a spindle 10 of roller D and spindle 11 of roller D'.

An operating crank O has a trunnion 12 rotatable on panel P to which a driving gear G is fixed for meshing

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with and driving a smaller gear G' fixed to and for rotating dispenser roller D.

The ratio of gears G and G' is such that one complete revolution of crank O will issue a section T₁ of paper from roll T of desired predetermined length but no more or no less. Gears G and G' may only be rotated forwardly due to a back stop detent pawl 14 which is pivoted at 15 to panel P and has an end 16 overlying and engageable with the teeth 17 of gear G to prevent backward rotation of the gear, dispensing rollers D and D' and crank O, which would otherwise occasion clogging of the machine and render the dispenser uncertain of operation, if at all.

Pawl 14 carries a pair of flat springs 18 which frictionally engage opposite sides of gear G and serve to move the pawl into engagement with the gear G when the crank O is rotated backwardly (see Fig. 6).

The control mechanism, best shown in Fig. 2, includes a disc A fixed to crank O at 12 and a locking bar B which is pivotally and slidably mounted on panel P between portions 19 and 20 of a lock retainer R. Bar B is of arcuate form with leading and trailing abutments 21 and 22, respectively, which are arcuately spaced apart on opposite sides of a fulcrum pin 23 extended between portions 19 and 20 of member R so as to pivotally and slidably support the bar when pin 23 is extended through an elongated slot 24 formed therein.

Disc A is formed with an elongated major concentric peripheral segment 25, of approximately 180° extent, a shorter and slightly eccentric segment 26 of approximately 120° in extent and a still shorter concentric segment 27 of greater radius from a common axis than said other segments and of 60° extent. Notches 28 and 29 are formed in disc A at opposite extremities of segment 27 and provide leading and trailing shoulders 28' and 29', respectively. Said notches are adapted to be engaged respectively by abutments 21 and 22 on lock B for preventing rotation of the disc and crank in opposite directions at times. As shown in Fig. 2 the segment 27 of the disc and the arcuate edge 30 of lock B are of approximately the same radius and extent and in such case were it not for the engagement of abutment 21 with the shoulder 28' of said disc, as at the completion of a dispensing movement, a second operation could be effected without an unlocking operation.

But, as shoulder 28' engages abutment 21 further rotation of disc A is prevented in a clockwise direction as viewed in Fig. 2 while at the same time lock B will slide leftward to a maximum extent and is so held until disc A is reversely rotated and to engage the trailing portion of segment 26 with abutment 21 and thereby swing abutment 22 upwardly against segment 25 of disc A and into the path of shoulder 29'. A reverse movement of the crank and disc only to an extent to engage the shoulder 29' with abutment 22 is necessary to shift lock B rightward and abutment 21 is dropped out of the path of the shoulder 28' and a new forward revolution of the disc is permitted.

At the leading extremity and point of minimum radius of segment 26 a recess 31 is formed on disc A so that during the rotation of disc A when said recess reaches a point opposite the leading abutment 21 of locking member B the shoulder 28' will approach the trailing abutment 22 of member B. If at such time, for any reason, member B should have been shifted leftwardly from its position as shown in Figs. 3 and 4, the shoulder 28' will engage and force abutment 22 outwardly from disc A and simultaneously move abutment 21 inwardly toward the disc and into the path of the then approaching shoulder 28'. Shoulder 28' thus engages abutment 21 and then shifts member B leftwardly and locks the disc against further clockwise rotation until the crank O is reversely rotated to engage shoulder 29' with abutment 22 so as to unlock the mechanism for a new dispensing operation. As member B is shifted to the left the engagement of

shoulder 28' therewith also slightly swings member B so that abutment 21 will positively lock against shoulder 28'. Reverse rotation of crank O not only retracts member B to the right but also swings abutment 22 inwardly to an extent necessary to positively engage said abutment with shoulder 29'.

Hence the recess 31 of the slightly eccentric segment 26 allows inward movement of abutment 21 as abutment 22 is moved outwardly by shoulder 28'. Otherwise, if segment 26 were concentric, the abutment 21 could not move inwardly to the path of shoulder 28'.

Another and most important aspect of the operation of the eccentric segment 26 lies in the fact that it eliminates the possibility of the jamming of the leading end of the lock bar B against the peripheral edge of the disc A which, in prior constructions, has prevented rotation of the disc A and thus, the dispensing of towels from the dispenser.

The jamming of the lock bar B would occur, in prior art constructions, if the trailing end of the bar B were struck by the leading shoulder 28' of the disc A during the clockwise rotation of said disc. This would cause the lateral shifting of the bar B in a left-hand direction thus locating the leading edge of said bar in a position in which it would wedge against the peripheral edge of the disc A and prevent further rotation of said disc.

However, in the present construction, such jamming is eliminated because the lateral shifting of the locking bar B will urge the leading end thereof into the recess in the peripheral edge of the disc A constituted by the eccentric segment 26. As the rotation of the disc A continues, the rise of the eccentric segment 26 will urge the leading end of the locking bar B outwardly and thus position the leading abutment 21 on the locking bar B for engagement with the leading shoulder on the disc A.

When the mechanism is at rest, as shown in Fig. 2, the shoulder 28' in disc A will bear against the abutment 21 on locking bar B, thereby preventing further forward rotation of the crank and disc and also preventing the issuance of a section T₁ from a roll of paper T. In such instance the greater weight of bar B is forwardly of its pivot 23.

Now in order to obtain a section T₁ of paper from the roll it is necessary to reversely rotate the operating crank O which would correspondingly move abutment 22 of bar B so that the abutment 22 would move inwardly into and over notch 29 of said disc under limitation of segment 25 and thereby prevent further reverse rotation of the operating crank. However, because the abutment 22 was enabled to engage shoulder 29' the bar B is moved in inclined slot 24 with the abutment 21 into a position wherein it will not be engaged by the shoulder 28' when the crank is again rotated in a forward direction. As the crank is so rotated the dispenser roller has become effective to move a section T₁ from the roll outwardly through a slot in the bottom 5 of the case near its front, but after the initiation of a dispensing operation and before its completion, the operating crank can not be rotated in a backward direction by reason of the fact that the pawl 14 would be quickly moved into engagement with the teeth 17 of gear G by reason of the friction between the flat friction members 18—18 on said gear. Hence each forward operation must be completed before a second dispensing operation can be instituted.

When, however, a dispensing operation is instituted by disengagement of abutment 21 on bar B from shoulder 28' on disc A the backward thrust of the shoulder 29' against abutment 22 serves to move abutment 21 from the path of the segment 27 of the disc and said segment will be permitted to pass over said abutment 21 but in so doing and so long as the abutment and segment are thus engaged, the concentric segment 25 of the disc will have moved over abutment 22 thereby permitting continued rotation in a forward direction to the full extent

of the length of a section T_1 to be issued and until the forward end portion of bar B is permitted to further move out of the path of segment 27 and the abutment 21 is correspondingly moved inwardly onto the eccentric segment 26 of the disc. The operation thus continues until the abutment 21 again engages the shoulder 28' and stops forward movement of the crank and disc, thus requiring a slight reverse movement of the crank to a limited extent for permitting an ensuing dispensing operation.

It may be noted that in the slight reverse movement of the operating crank in order to release the mechanism for a dispensing operation such movement is not sufficient to engage pawl 14 with the teeth 17 of gear G although said pawl is effective for stopping reverse rotation at any point between the beginning and end of a dispensing operation by reason of the friction of elements 18 on gear G.

It also may be noted that as the segment 27 approaches abutment 22 on bar B it serves to cam said abutment outwardly and to correspondingly move abutment 21 inwardly so as to be engaged by the shoulder of notch 28. Recess 31 of section 26 of the disc in a forward rotation registers with abutment 21 and permits the movement of said abutment toward section 26 before shoulder 28' registers with abutment 21 and there is a sufficient interval of time allowed to assure the locking engagement of abutment 21 with shoulder 28' regardless of the speed at which the crank is rotated because abutment 22 is moved outwardly by segment 27. As segment 27 moves into peripheral engagement with edge 30 of bar B the abutment 21 is thereby forced into the path of the shoulder 28' and serves to positively lock the margin against a succeeding issue of a trailing section T_1 of paper until the crank O and disc A have been reversely moved to effect a succeeding operation.

In the form of case shown it is important that the back 4 of the case be supported in a vertical plane for ensuring the operation of bar B under the influence of gravity. It will therefore be obvious that the improvements shown herein are desired advantages over the mechanism shown by said prior patent particularly in providing the modified and beneficial form of disc A of this invention over the disc 29 of said former patent and the obviously important other characteristics of the disc and locking bar of corresponding elements shown in said prior patent.

It may be noted that the control mechanism is mounted as a unit on panel P which is detachably secured to the case C and said panel is so mounted in the case that the bar B will be disposed pivotally and shiftably below the disc A in order that gravity at times may affect the swinging movement of the bar when one end thereof overbalances the other. Inasmuch as the disc A is locked against forward rotation at the end of each operating cycle with the leading shoulder 28' thereon engaged with the leading abutment 21 on bar B, said disc can be released only by retraction of the operating member to a slight extent and a corresponding reverse rotation of disc A until such rotation of the disc is stopped by engagement of the trailing shoulder 29' on the disc with the trailing abutment 22 on bar B.

In the final movement of the disc necessary for the completion of an operating cycle the engagement of the leading shoulder on the disc with the leading abutment on the bar pulls the bar forwardly to a maximum extent and correspondingly the retractive movement of the disc pulls the bar backwardly to a point where the leading abutment 21 of the bar will drop out of the path of the leading shoulder of the disc due to the fact that the trailing abutment of the bar has at such time dropped into the trailing notch 29 on the disc. Immediately following stoppage of the backward movement of the disc another forward movement can be made because the leading shoulder 28' of the disc will clear the leading abutment 21 on the bar and a complete forward revolution can then be effected

during which the leading abutment of the leading shoulder on the disc will strike the trailing abutment on the bar and force the leading abutment on the bar upwardly into the path of the leading shoulder on the disc thereby completing a succeeding operating cycle.

During the forward movement of the disc following its release from the locking bar the trailing abutment 22 of the bar traverses the elongated minor concentric segment 25 and prevents the extension of the leading abutment 21 into the path of the leading shoulder 28' of the disc. At a time substantially in advance of the engagement of the leading shoulder 28' of the disc with the trailing abutment 22 of the bar said abutment 22 can move inwardly to the extent of its contact with the eccentric segment 26 and said abutment will traverse segment 26 until engaged by the leading shoulder on the disc again as hereinbefore described.

It will be noted that the bar B is so arranged that it will be shifted not only forwardly but also upwardly in an inclined plane due to the inclination of the slot 24 so as to properly dispose the leading abutment 21 of the bar relative to the path of the leading shoulder 28' of the disc, and also upon reverse rotation of the disc to ensure outward movement of the abutment 21 of the bar into position outwardly of the path of the major segment 27, while simultaneously elevating the abutment 22 to a position to be engaged by segment 27 for retracting the abutment 21.

The control mechanism herein shown and described is economical in design by reason of the fact that all parts are in the form of metal stampings, and is free from complications because there are no springs or other devices to occasion trouble and frequent service.

We claim:

1. A control mechanism for limiting rotation of a member to a predetermined extent comprising: a rotatable control disc and a locking member coplanar with said disc, means for pivotally and shiftably supporting said locking member with an inner edge thereof adjacent the periphery of said disc, said disc having a first concentric segment of substantially 180° extent, a second concentric segment of substantially 60° in extent and of greater radius than said first concentric segment and an eccentric segment of intermediate extent between said concentric segments providing an elongated recess in the peripheral edge of said disc, said eccentric segment having a maximum radius at a point near said second concentric segment and a minimum radius less than and at a point adjacent said first concentric segment to permit the leading abutment on said locking member to be received in said recess adjacent said first concentric segment and to urge it out of said recess adjacent said second concentric segment, said disc having reentrant peripheral shoulders at opposite extremities of said second concentric segment, said locking member having an arcuate inner edge co-radial with the periphery of said second concentric segment to engage the same and spaced leading and trailing abutments alternatively engageable with the shoulders on said disc to respectively stop rotation of said disc at the completion of a predetermined movement of the disc and to release said disc from the locking member for subsequent forward rotation upon reverse fractional rotation of the disc.

2. A control mechanism for limiting rotation of a member to a predetermined extent as set forth in claim 1, in which: the trailing abutment on said locking member is extended inwardly beyond the arcuate inner edge of the locking member so as to be engaged by the leading end of said second concentric segment and thereby swing the leading abutment on the locking member into position for subsequent engagement with the leading shoulder to stop forward rotation of the disc.

3. A control mechanism for limiting rotation of a member to a predetermined extent as set forth in claim 1, in which: the trailing abutment on said locking member is extended inwardly beyond the arcuate inner edge

of the locking member so as to be engaged by the leading end of said second concentric segment and thereby swing the leading abutment on the locking member into position for subsequent engagement with the leading shoulder to stop forward rotation of the disc, the trailing shoulder on the disc being engageable with the trailing abutment on the locking member upon slight reverse rotation of the disc to retractably shift the locking member and swing its leading abutment out of the path of the second concentric segment to thus permit another forward rotation of the disc.

4. A control mechanism for limiting rotation of a member to a predetermined extent as set forth in claim 1, in which: the trailing abutment on said locking member is extended inwardly beyond the arcuate inner edge of the locking member so as to be engaged by the leading end of said second concentric segment and thereby swing the leading abutment on the locking member into position for subsequent engagement with the leading shoulder to stop forward rotation of the disc, the trailing abutment of the locking member being engageable with and adapted to traverse said first concentric segment and said eccentric segment in succession until the leading abutment is restored to locking position by engagement of the trailing abutment with the leading extremity of the second concentric segment.

5. A control mechanism for limiting rotation of a member to a predetermined extent as set forth in claim 1, in which: the trailing abutment on said locking member is extended inwardly beyond the arcuate inner edge of the locking member so as to be engaged by the leading end of said second concentric segment and thereby swing the leading abutment on the locking member into position for subsequent engagement with the leading shoulder to stop forward rotation of the disc, and means for mounting said locking member for bodily movement both toward and away from said disc and laterally in opposite directions under impact of its engagement with the shoulders on said disc, for operatively positioning the abutments thereon as the disc is rotated in opposite directions.

6. In a paper towel dispenser embodying a cabinet for containing a roll of paper and a dispensing opening through which successive sections of paper are issuable and dispensing means mounted in said cabinet: a control mechanism for regulating issue of paper including a manually rotatable disc having a concentric segment of major radius, a minor concentric segment of lesser radius than said major segment, and an eccentric segment of gradually decreasing radius defining a recess in the peripheral edge of said disc having its minimum radius adjacent said minor segment, said disc having peripheral notches at opposite extremities of said major segment providing shoulders, a locking bar coplanar with said disc and pivotally and shiftably mounted on said cabinet and provided with leading and trailing abutments

for respective engagement with correspondingly leading and trailing shoulders on said disc at the extremities of said major segment at the completion of one dispensing operation and prior to a succeeding operation, said leading abutment being receivable in said recess adjacent the minimum radius of said eccentric segment to prevent said bar from jamming said disc against rotation.

7. A mechanism of the character described comprising: a rotatable member and a swingable and shiftable locking member peripherally engageable with said rotatable member to stop forward and reverse rotation of the rotatable member at predetermined points in a revolution thereof; said locking member having leading and trailing abutments on opposite sides of its fulcrum and extended toward the periphery of the rotatable member; said rotatable member having a first concentric segment of major radius with shoulders at its opposite extremities, a second concentric segment trailing said first segment and an eccentric segment intermediate said first and second segments providing an elongated recess in the edge of said rotatable member said eccentric segment being of gradually increasing radius from its junction with the second segment to its extremity adjacent the first segment but of less maximum radius than the first segment, whereby when the rotatable member is rotated in a forward direction the leading shoulder of the first segment will engage the trailing abutment of the locking member so as to move the leading abutment of the locking member into the path of the leading shoulder of the first segment of the rotatable member for arresting forward rotation thereof and also forwardly shifting the locking member, and upon a fractional reverse rotation of the rotatable member the trailing shoulder of the first segment of the rotatable member will engage the trailing abutment of the locking member to permit further forward rotation of the rotatable member, said recess receiving the leading abutment of said locking member when the engagement of the trailing abutment with the leading shoulder of said disc urges said locking member into a position in which it would jam said disc against rotation.

8. A mechanism of the character set forth in claim 7, including: a detent operatively connected with and for preventing reverse rotation of the rotatable member beyond an extent necessary to release the locking member therefrom.

References Cited in the file of this patent

UNITED STATES PATENTS

1,224,224	Shelley	May 1, 1917
2,175,141	Wooster	Oct. 3, 1939
2,277,051	West	Mar. 24, 1942
2,451,191	Birr	Oct. 12, 1948