

Nov. 8, 1938.

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2,135,767

PAPER TOWEL DISPENSER AND TIMER

Filed May 15, 1935

3 Sheets-Sheet 1

Fig. 1.

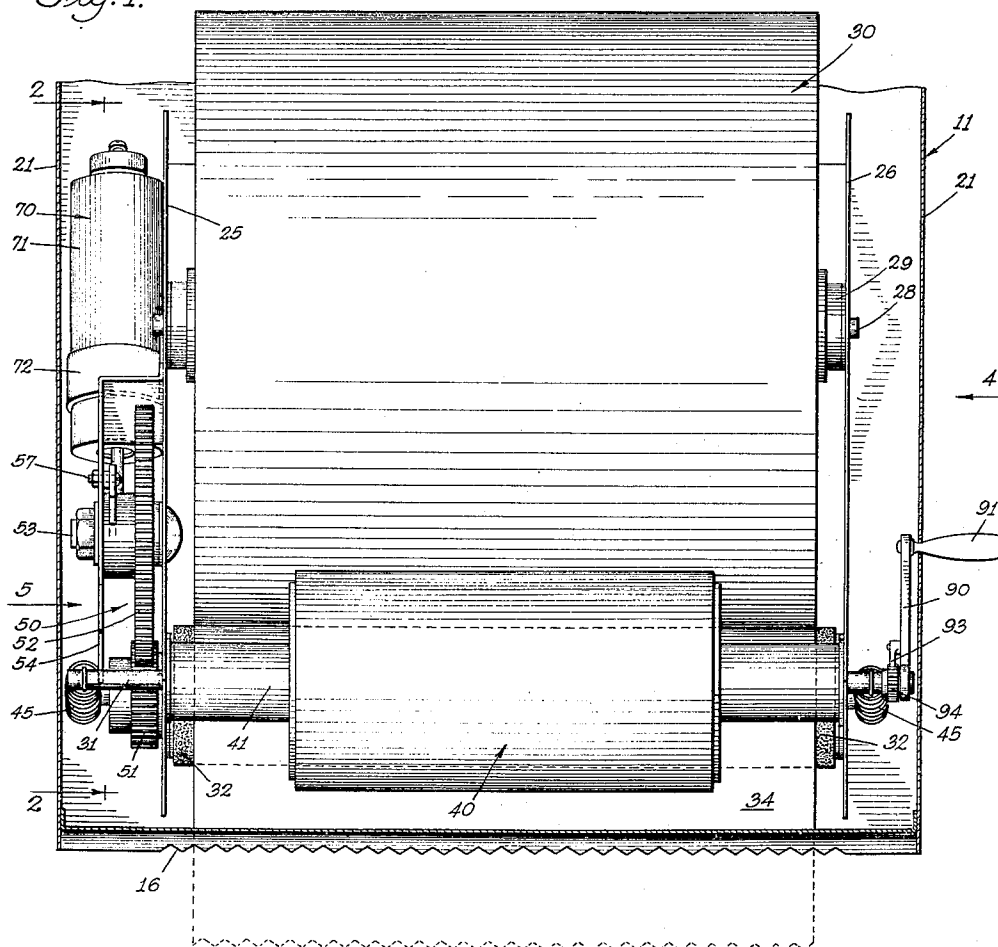
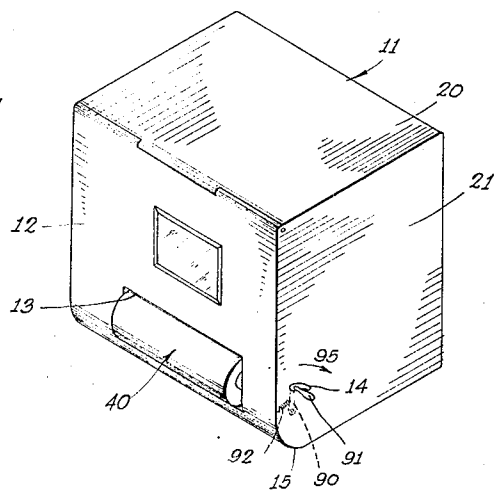


Fig. 4.



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3 Sheets-Sheet 2

Fig. 2.

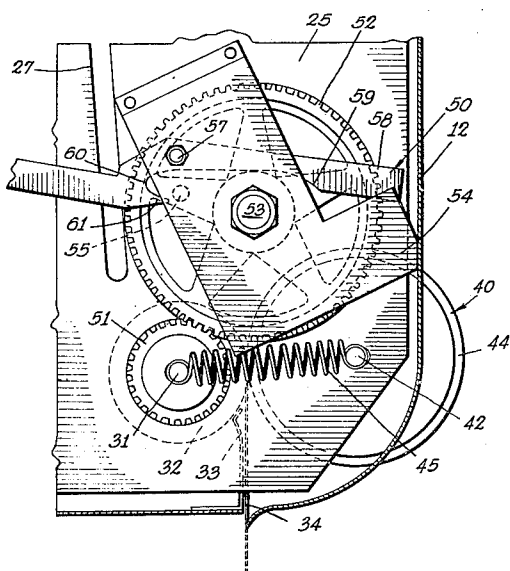
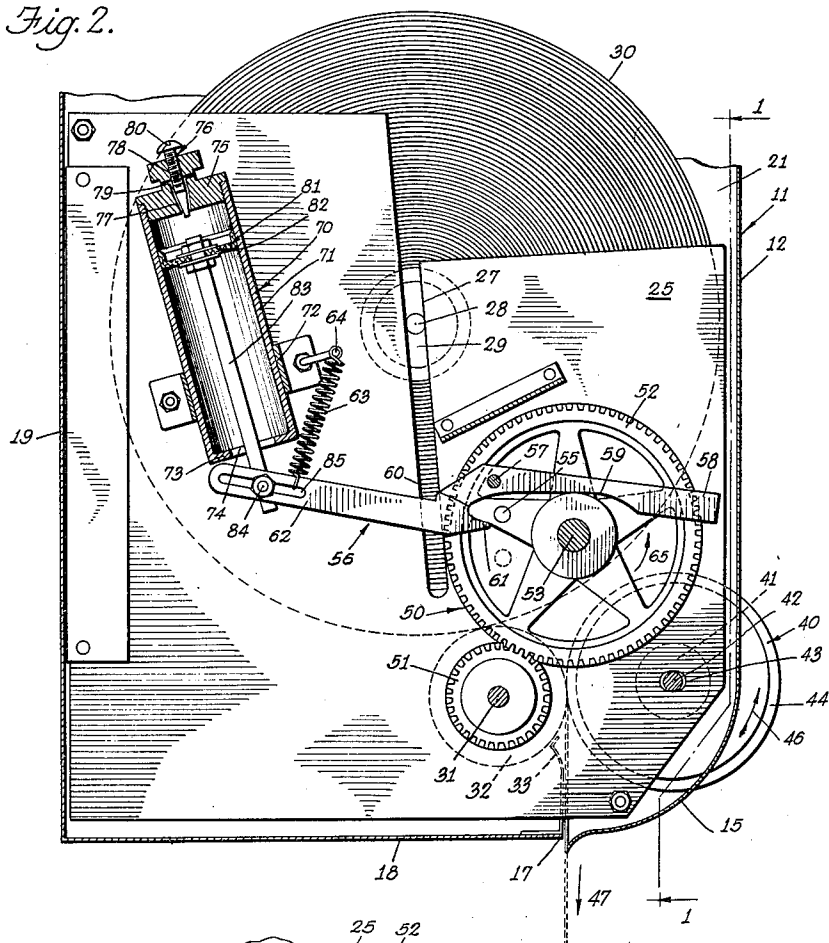


Fig. 5.

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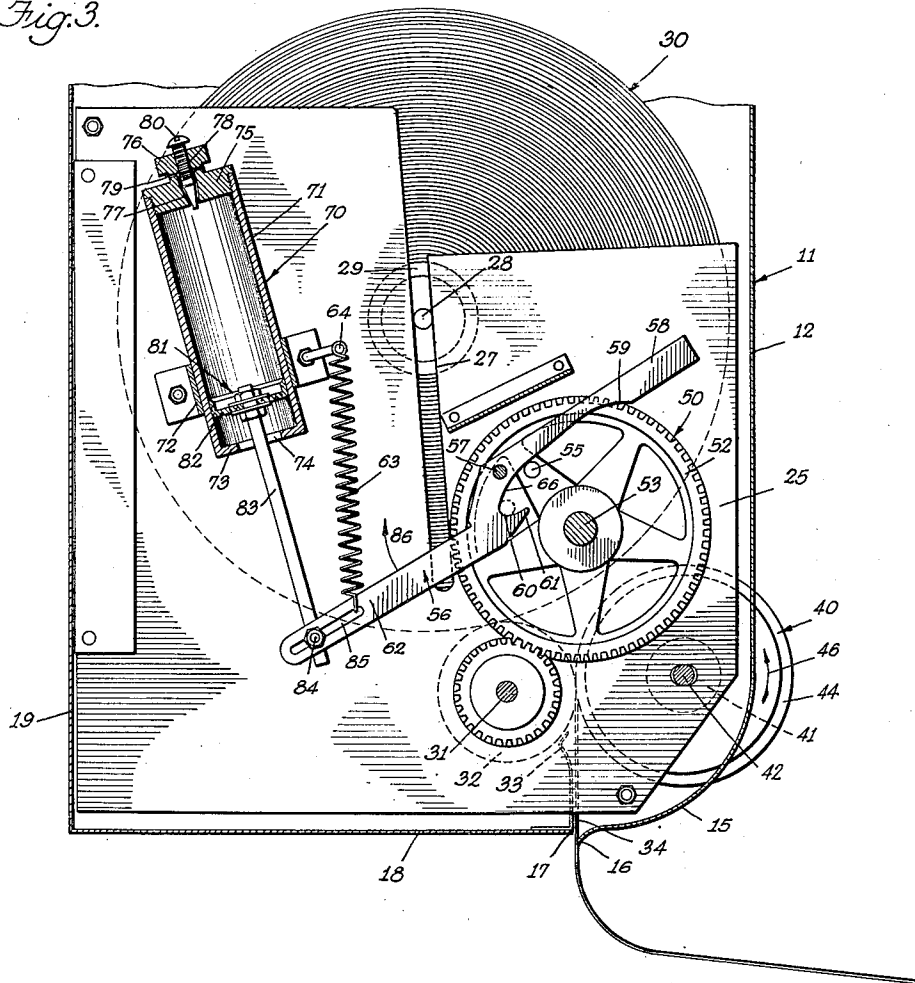
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PAPER TOWEL DISPENSER AND TIMER

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3 Sheets-Sheet 3

*Fig. 3.*



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## UNITED STATES PATENT OFFICE

2,135,767

## PAPER TOWEL DISPENSER AND TIMER

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Application May 15, 1935, Serial No. 21,566

17 Claims. (Cl. 312—38)

Our invention relates to a machine for dispensing paper towels from a roll whereby the paper may be severed into lengths suitable for individual wipes.

5 In the above type of paper towel dispenser, an object and feature of our invention consists in providing a cutter by which the length of paper may be cut or torn to obtain a length for a wipe and thus have the severed end at the opening in a cabinet or the like, together with a mechanism 10 manually operated to give an initial feed for a small portion of the towel, whereby the severed end is caused to project from the cabinet a sufficient distance to allow grasping by the hand. 15 Thus when the end is grasped a person may pull a length of paper out of the cabinet by unrolling the roll mounted therein, such length being sufficient for a single wipe. In connection with this, another object and feature of our invention 20 is forming a positive stop mechanism whereby as the desired length of paper has been unrolled from the supply roll, a positive stop or resistance is developed, preventing a further unrolling or pulling out of the paper. 25 Another and further object of our invention resides in a time delay mechanism which is automatically set on pulling the paper from the cabinet and thus unwinding the roll and this cooperates with the positive stop mechanism, whereby 30 after a predetermined time the stop mechanism is opened or released for a further operation so that the next user may obtain the desired length of towel for a second wipe. This delay feature is in part for the purpose of preventing a person 35 continuously withdrawing or unwinding an unnecessary length of paper from the roll, as when the user finds that the roll is brought to rest so that he can not withdraw any more paper, he will sever the strip already pulled from the cabinet and use such strip. Further, the user will have 40 to wait the predetermined time for which the machine is set before he can secure a further length of towel from the cabinet.

A further detail object of our invention resides 45 in the feature of an initial feed to project the severed end of the web so that the operator may grasp such end to remove a length of towel. However, this initial movement does not set the time delay mechanism, thus it is only the 50 positive unwinding of the paper to secure a length for a wipe which develops the operation of the time delay device with a positive stop mechanism. A further detail feature includes a manual control for the delay mechanism by which the length of 55 time of the delay may be varied.

Another object and feature of our invention resides in the manner of supporting the paper roll and feeding the paper therefrom in which we develop considerable friction for unwinding the roll by supporting substantially the whole weight 5 of the paper roll on a friction roller.

Another object and feature of our invention is having a friction feed roller comparatively small in diameter compared with the roll of paper towel to be dispensed and having the paper 10 roll contact with the friction roller whereby considerable friction is developed between the friction feed roller and the paper, and in connection therewith controlling the number of turns of the friction feed roller by gearing connected to 15 a stop mechanism to feed the desired length of paper to be severed.

Another object and feature of our invention is in engaging the paper web in a bite formed by the friction feed roller and a slightly adjustable 20 feed roller, this latter projecting through an opening in the cabinet to be manually operated to give either an initial or a complete feed to the web of paper.

Our invention is illustrated in connection with 25 the accompanying drawings, in which,

Fig. 1 is a vertical section on the line 1—1 of Fig. 2, taken in the direction of the arrow, the feed roller being shown in elevation.

Fig. 2 is a vertical section on the line 2—2 of 30 Fig. 1 in the direction of the arrows, the escapement stop lever and connected parts being shown in elevation, this illustrating the position of the escapement lever after releasing the stop pin.

Fig. 3 is a section similar to Fig. 2, showing 35 the escapement stop lever pulled downwardly by the stop pin and the piston of the dashpot pulled outwardly.

Fig. 4 is a perspective view of a cabinet suitable for housing our paper dispenser. 40

Fig. 5 is a partial side elevation taken in the direction of the arrow 5 of Fig. 1.

In our invention we employ a cabinet 11 having a door 12 on the front, this door having an opening 13, the side of the cabinet having an arcuate slot 14. The door has an undercurved section 15 adjacent the bottom with a serrated cutting edge 16 for severing the separate sheets 45 of paper from the strip. This severing edge is located in front of the forward edge 17 of the bottom 18 of the cabinet. The cabinet is illustrated as having a back wall 19, a top 20 and two opposite sides 21. The door may be hinged or secured in position on the front of the cabinet in any suitable manner. 55

In the cabinet we utilize a pair of side supporting plates 25 and 26, these being illustrated as attached to the back of the cabinet. Each of these plates has a slot 27 forming a guide for the axle 28 of the mandrel 29 on which the web of paper is formed into a roll 30. Journaled in the sides 25 and 26 is the axle 31 of the friction supporting and feed roller 32. The axle of this roller is positioned slightly in front of a continuation line of the center of the slots 27 which slots slope forwardly towards the front of the cabinet. The friction roller is covered by friction material of a suitable type and forms the sole support for the roll of paper toweling. It will thus be seen that a vertical line through the axle 28 of the paper roll is spaced inwardly from the axle 31 of the supporting and feed roller. The weight of the roll gives sufficient pressure to cause the friction for feeding the paper in the manner hereinunder detailed and also as the roll becomes smaller, there is a forward wedging action between the diminished paper roll and the supporting friction roll.

Upwardly extending fingers or a plate 33 secured to the bottom of the cabinet adjacent its front edge 17, prevent the web of paper from clinging to the friction roll as the paper web passes down in front of the edge 17, the section of the web after severing being indicated at 34 (Figs. 1, 3 and 5).

The manner of feeding the paper comprises using a large feed roll 40, this being mounted on a mandrel 41 having a shaft 42. The shaft is journaled in slots 43 in the side plates 25 and 26. The peripheral portion 44 has a resilient or roughened surface preferably formed of thick rubber. Tension springs 45 are connected between the axles 31 of the supporting friction roll and the axle 42 of the feed roll. Thus the peripheral resilient surface structure 44 of the feed roll 40 contacts the outer face of the web of paper while the inner face follows the cylindrical curve of the supporting friction roll. Thus by engaging the exposed portion of the rubber covering 44 of the roll 40 and moving it in the direction of the arrow 46, it engages the web of paper between the feed roll and the friction roll and moves the web of paper downwardly in the direction of arrow 47. Were it not for the stop mechanism having the escapement hereinunder detailed, a person could unroll as much paper as was desired from the web by merely continuously rotating the roll 40 in the direction of the arrow 46. If it is desired to have the complete feed operated by manipulating the exposed section of the roll 40, the springs 45 can be omitted as the pressure of the hand can move the roll 40 in the slots 43 sufficiently to obtain sufficient operating friction between the roll 40 and the web of paper and between the paper web and the surface of the friction roll. However, even if this device is manipulated by the exposed portion of the feed roll 40, it is desirable to have the springs 45.

By our invention we desire to limit the amount of paper a person can secure for one wipe and give a time delay. Moreover, it is our desire that the roll 40 be only used to give an initial feed of the paper web in order to project the portion of the web above the severing edge 16 which portion is in the cabinet to project it by the operation of the roll 40 slightly below the cabinet as indicated in dotted lines in Figs. 1 and 2; then this slightly projected portion may

be grasped by the fingers and the web of paper unwound.

The control of the paper feed is by means of a positive stop mechanism, indicated as a whole by the assembly numeral 50. This employs a gear 51 secured to the shaft 31 of the supporting and friction roll. Such gear meshes with an idler gear 52 mounted on a shaft 53, which shaft is illustrated as being mounted in the side plate 25 and in a bracket plate 54 secured to the plate 25. This idler gear has a stop pin 55 secured thereto. An escapement lever 56 is mounted on a pivot 57 secured to the bracket plate 54. It has a lever end 58 with a cam surface 59 on its under edge and a hook 60 with an escapement end 61 on the opposite side of the pivot 57. The opposite end 62 of the arm is connected to a tension spring 63 which at its upper end is secured to a pin 64 attached to the plate 25.

The manner of operation and functioning of the machine so far described is as follows: Presuming the paper is properly threaded between the feed roller 40 and the friction roller 42 and the roll of paper entirely supported on this latter roll, the movement of the forward roll 40 in the direction of the arrow 46, projects or extends the end of the web or the severed end after sheets have been removed below the cutting edge 16 of the door, so that this end may be grasped by hand, which end is then pulled downwardly and if the escapement lever is in the position of Fig. 2, the idler gear 52 rotates in the direction of the arrow 65, thus bringing the stop pin in contact with the cam surface 59 of the escapement lever and tilting it to the full line position of Fig. 3 so that the pin 55 is secured in the hook 60, the pin being shown in dotted lines in Fig. 3. A portion 66 of the cam surface 59 adjacent the hook 60 is substantially concentric with the shaft 53 when the escapement lever is tilted to the position of Fig. 3. Thus when the pin 55 catches in the hook 60, a positive stop prevents the rotation of the idler gear 52 and hence of the friction feed roll 32 on account of the gear 52 meshing with the gear 51 on the shaft 31 of the friction roll.

It will be noted that certain characteristics of the equipment lever 56 include as important elements the hook 60 which forms a detent with the escapement end 61 and the portion 66 of the cam surface 59. The portion of the surface of the hook from its base to the escapement end 61 is such that when the lever is being tilted for instance from the position of Fig. 3 to that of Figs. 2 and 5, the pin 55 readily passes this escapement end 61.

The time delay mechanism designated by the assembly numeral 70 employs a dash-pot 71, this being in the form of a cylinder attached by a clamp 72 to the side plate 25. This cylinder has a head 73 with a large opening 74. A plug 75 at the opposite end has a needle valve 76, this having a conical valve seat 77, a rotatable needle stem 78 and outlet ports 79. The stem has a screw driver kerf 80 for adjusting and regulating the opening of the needle valve. The piston 81 has a piston cup 82 with the edges turned inwardly. The piston rod 83 is connected by a pivot pin 84 to a slot 85 in the end 62 of the escapement lever 56.

The manner of operation and functioning of the time delay assembly is as follows: When the paper is pulled out rather quickly, preferably by grasping the projected end, the pivot 57 on the

idler gear swings the escapement lever 56 from the position of Fig. 2 to that of Fig. 3, thus tensioning the spring 63 and at the same time pulling the piston outwardly in its cylinder. A certain amount of air enters the cylinder by passing inwardly around the periphery of the cup and prevents the formation of a vacuum. Also a certain amount of air enters through the outlet ports 79 and around the needle of the needle valve. As above mentioned the hook 60 forms a positive stop to the movement of the idler gear, hence the gear 51 and the friction and supporting roll 32. Hence, neither by pulling on the web of paper or by operating the roll 40, can a person secure more paper while the pin 57 is engaged by the hook 60. The person therefore naturally tears off the strip of paper that has been pulled out of the cabinet, cutting or tearing this against the serrated edge 16 of the lower end of the door. This as above mentioned severs the paper at the bottom of the cabinet. The spring 63 then pulls upwardly on the escapement lever, moving this in the direction of the arrow 86, causing the piston to move inwardly, but as this piston is moving in a direction against the free edges of the cupped washer 82, the only escape of air from the dash-pot is through the needle valve and the exhaust ports 79. These can be regulated to give a slow exhaust. This action under the influence of the spring 63, moves the escapement lever 56 from the position of Fig. 3 to the position of Fig. 2, so that the escapement edge 61 of the hook is at a greater radial distance from the center of the shaft 53 than the pin 55. This leaves the mechanism in condition for dispensing an additional sheet of paper, but on account of the time delay ordinarily a person will not wait until the escapement mechanism operates to secure a further sheet of paper, but is satisfied with one sheet for a wipe. Thus the device economizes in the use of paper.

As an additional mechanism for initially operating the feed roll 40, we employ a ratchet lever 90, freely pivoted on the end of the shaft 42 of the feed roll 40, this preferably being the end which is journaled in the plate 26. A handle 91 extends through the arcuate slot 14 in the side of the cabinet 21. A tension spring 92 is secured to the ratchet lever and also to a portion of the cabinet preferably to the wall 21 on the inside, in order to normally hold the handle at the upper end of the slot 14. A pivoted pawl 93 engages a ratchet gear 94 on the shaft 42 of the feed roll 40; this pawl being held in place by a spring or the like so that on the motion of the ratchet lever 90 and handle 91 in the direction of the arrow 95, the feed roll 40 is rotated the length of the slot 14 and gives an initial feed to the web of paper, projecting a sufficient amount such as shown dotted in Figs. 1 and 2, to be grasped by the fingers of the user.

When reliance is made on the handle 91 to feed the paper, it is desirable to have the springs 45 pulling the feed roll 40 into tight contact with the web of paper. This handle 91 is provided for the use of people who may be unfamiliar with the operation of the machine, by directly pressing against the roll 40. As the feed roller may be operated entirely by the handle 91, it is obvious that the feed roll 40 may be housed completely in the cabinet, in which case the door does not have an opening as indicated at 13.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

We claim:

1. A paper towel dispenser having a friction roll over which a web of paper passes, means to rotate said roll to dispense a portion of the web, an escapement mechanism having a first movable element operatively connected to the friction roll to be actuated thereby, a second element having a hook operated by the first element in its movement to bring the hook into a position to engage the first element and bring the first element to a stop after a predetermined movement of the friction roll to thereby dispense a predetermined length of the web, a releasing device for the escapement mechanism having a spring, said spring being connected to a fixed structure and to the second element having the hook, the said spring being tensioned by the movement of the second element when its hook is brought into an engaging position with the first element, the spring in the release of its tension moving the second element to permit the first element to escape from the hook and means to delay the action of the spring.

2. A towel dispenser having a friction roll over which a web of towel passes in dispensing, means to rotate said roll for dispensing the towel, a stop pin, an operating connection between the stop pin and the roll to move the pin in a circular path, a pivoted escapement lever having a hook, the said pin interengaging the lever and moving such lever on its pivot to bring the hook into a position to engage the pin and stop the movement of the pin and hence of the friction roll after a predetermined length of the paper has been dispensed, a spring connected to a fixed structure and to the escapement lever, said spring being tensioned by the movement of the lever to bring the hook into engaging position with the pin, the said spring in the release of its tension moving the escapement lever to disengage the pin, whereby the friction roll is freed for a second dispensing of a length of towel, and means to delay the action of the spring in the release of its tension.

3. A towel dispenser having a friction roll over which a web of paper passes in dispensing, said roll having a driving gear, a driven idler gear meshing therewith and having a stop pin, a pivoted escapement lever having a cam surface and a hook, the said pin in its rotation engaging the cam surface and moving the lever on its pivot to bring the hook into the path of the pin and thereby stop the movement of the pin, the idler gear, the driving gear and the friction roll, a delay action mechanism having a cylinder with a piston, a piston rod connected to the lever, the cylinder having an air control valve on the side of the piston opposite the piston rod and a retraction spring connected between the lever and a fixed structure, whereby on the pivoting movement of the lever to bring the hook into the path of the pin, the spring becomes tensioned and the piston drawn outwardly in the cylinder, the said spring when tensioned moving the lever in a reverse direction to remove the hook out of the path of the pin and the said piston forcing the air from the said cylinder through the said valve.

4. In a towel dispenser, an escapement and delay action mechanism comprising a stop pin, means to rotate said pin in a circular path, a pivoted lever having a cam surface and a hook, a dashpot structure having a cylinder with a piston and a piston rod, the rod being connected to the lever, the cylinder having an air control valve, a fixed structure, a spring connected be-

tween the lever and the fixed structure, whereby during the rotation of the pin, the pin engages the normally retracted lever at its cam surface and oscillates the lever to bring the hook into the path of the pin, the hook thereby preventing rotation of the pin, the movement of the lever tensioning the spring and drawing the piston outwardly in the cylinder, the tensioned spring then being operated to oscillate the lever in a reverse direction to move the hook out of the path of the pin to release the pin for a continued rotary movement.

5. A towel dispenser comprising in combination a cabinet structure, a friction roll rotatably mounted therein, a structure having guide slots slightly inclined from the vertical, a mandrel having an axle, the axle being guided in the said slots, the mandrel adapted for a web of paper wound thereon, the periphery of the web resting on the friction roll and said roll being the sole support of the web, the mandrel and its axle, a feed roll adjustably mounted as to the friction roll to engage a part of the web between the two rolls, and an operating means extending outside of the cabinet to actuate the feed roll, whereby a length of paper may be dispensed from between the two rolls, the friction roll having a gear, a complementary idler gear having a stop pin thereon, a pivotally mounted escapement lever having a cam surface and a hook, a fixed structure, and a time adjusted retracting means connecting the said lever and the fixed structure, the said pin in its rotation engaging the cam and moving the hook into the path of the pin, the retracting means oscillating the lever to remove the hook out of the path of the pin.

6. A paper dispenser having a friction feed roller over which a web of paper to be dispensed engages, means to operate said friction roller to dispense a portion of the web, an escapement mechanism including a pivoted escapement lever having a detent and a rotatable stop device interconnected with the friction feed roller to rotate in a circular path, the said escapement lever having a cam surface to be engaged by the stop device to set the detent in a position to engage the said stop device, retraction means connected to the escapement lever, said retraction means being set in operative condition by the movement of the escapement lever to engage the stop means and the detent, the said retraction means being operative to move the escapement lever to withdraw the detent portion thereof from said stop means to permit a further operation of the friction feed roller to dispense an additional length of paper.

7. A paper dispenser as claimed in claim 6, an adjustable time delay mechanism operatively connected to the escapement lever and restraining the action of the retraction means to retain the said stop device stationary for a predetermined time period.

8. A paper towel dispenser having a friction feed roller over which a web of paper to be dispensed engages, means to operate this friction roller to dispense a portion of the web, an escapement mechanism including a pivoted escapement lever having a hook forming a detent and a cam surface, a stop pin, means to mount said stop pin for rotation in a circle, means to drive the mounting for the stop pin from the feed roller, the stop pin being adapted to contact the cam surface of the escapement lever to bring the hook of the lever in position to engage the stop pin and prevent rotation of the pin and hence of

the feed roller, a fixed structure, a retraction spring secured to the fixed structure and to the escapement lever, the said spring being tensioned by the movement of the escapement lever under the interaction of the stop pin and the cam portion of the escapement lever, the escapement lever adjacent the hook having an escapement end with a surface configuration whereby the rotation of the escapement lever to its retracted position releases the stop pin without developing a back motion to said pin.

9. A paper towel dispenser as claimed in claim 8, a time delay device having one portion secured to the fixed structure, and another part connected to the escapement lever, the time delay device being adapted to retard the action of the reaction spring.

10. A paper towel dispenser as claimed in claim 8, the said stop pin being mounted on a gear, the feed roller having a gear meshing therewith, the gear carrying the stop pin being larger than the gear on the feed roller whereby the feed roller rotates more than one rotation for each rotation of the stop pin.

11. A paper towel dispenser having a friction feed roller over which a web of paper to be dispensed engages, means to operate said friction roller to dispense a portion of the web, a gear connected to the feed roller, a second gear meshing therewith and having a stop pin thereon, a pivoted escapement lever having a detent to engage the pin and stop the pin and hence the feed roller, the said lever having a cam surface engaged by the said pin to set the detent in position to engage the pin, a resilient retraction means connected to the escapement lever and brought under tension by the pin engaging the cam surface of the lever and moving the detent into position to engage the pin, the said retraction means under the action of its tension being operative to swing the escapement lever in a reverse direction to withdraw the detent from said stop pin and thereby to permit a second feeding movement of the friction roller.

12. A paper towel as claimed in claim 11, the friction roller being mounted in a cabinet, said cabinet having an opening in the front, a feed roller having a portion thereof extending through said opening and having an inner portion of its periphery engaging the web of paper passing over the friction roller whereby a portion of the web of paper is engaged at the bite of friction and feed rollers.

13. A towel dispenser, comprising in combination a cabinet structure, a friction roll rotatably mounted therein, a structure having guide slots slightly inclined from the vertical, said guide slots being adapted to form guides for the axle of a roll of towel web, the periphery of the web being adapted to be solely supported on the friction roll and the web to be fed downwardly from said roll, a feed roll having an axle and being adjustable towards or from the friction roll, the cabinet having an opening with a portion of the feed roll extending therethrough, whereby the feed roll may be engaged by the hands of a user and rotated, the feed and friction rolls being adapted to engage a web of towel between the bite of said rolls inside the cabinet remote from the opening and the said feed roll preventing an operator contacting the towel through said cabinet opening, a stop and escapement mechanism including a rotatably mounted stop pin, means to rotate said pin in a circular path by one of the said rolls, an escapement lever pivotally mounted to a fixed

structure and having a hook and a cam surface adjacent thereto, the pin in its rotation engaging the cam surface and moving the hook into a position to stop the movement of the said pin and thereby stop the rotation of the friction roll, means to retract the lever to move the hook out of engagement with the pin and means to vary the speed of the retraction of the lever.

14. A paper towel dispenser comprising a cabinet having guides at its sides to receive and guide the axle of a mandrel on which a roll of paper is wound, a friction feed roller journaled in the cabinet, the said guides maintaining the outside of the paper roll in engagement with the friction roller, said friction roll carrying substantially the entire weight of its paper roll, the cabinet having an opening in the front, a feed roller journaled in the cabinet, the web of the paper passing over the friction roller being engaged inside the cabinet between the bite of the friction and the feed roller and a portion of the feed roller extending through the opening being adapted for manual operation to feed a portion of the web of paper, an escapement mechanism including a gear on the friction roller, an idler gear meshing therewith and having a stop pin, an escapement lever pivoted in the cabinet and having a hook forming a detent, and a cam surface on the side of the lever opposite the hook and a retraction spring having one end secured in a fixed position relative to the cabinet and the other secured to the escapement lever on the side having the hook, the stop pin rotating in a circle engaging the cam surface of the escapement lever to swing the lever in one direction to bring the hook in position to engage the stop pin, the said retraction spring being adapted to swing the escapement lever in a reverse direction to withdraw the hook from the stop pin and position the cam surface of the escapement lever to be engaged by the stop pin in its further rotation.

15. A towel dispensing apparatus having means for temporarily stopping the discharge of toweling after a predetermined length thereof has been dispensed, comprising rotary means carrying a rotary stop rotatable as the toweling is

dispensed, a pivoted stop movable merely about its pivot into or out of the path of the rotary stop and when in the path of the rotary stop being engageable thereby to stop the discharge of toweling, means operable by the rotary means for moving the pivoted stop about its pivot from its normal position into stop-engaging position, means urging the pivoted stop into its normal position, and time-delay means retarding the return of the pivoted stop to its normal position when moved therefrom into stop-engaging position.

16. A towel dispensing apparatus having means for temporarily stopping the discharge of toweling after a predetermined length thereof has been dispensed, comprising a pivoted lever providing a stop, rotary means rotatable as the toweling is dispensed carrying means engageable with the stop on the lever to stop the further discharge of toweling, means urging the lever into a normal position wherein its stop is in non-engaging position, means operable by the rotary means for turning the lever about its pivot from normal or non-engaging position into engaging position, and time-delay means for retarding the return of the lever to its normal position.

17. A towel dispensing apparatus having means for temporarily stopping the discharge of toweling after a predetermined length thereof has been dispensed, comprising a pivoted lever providing a stop, rotary means rotatable as the toweling is dispensed carrying means engageable with the stop on the lever to stop the further discharge of toweling, means urging the lever into a normal position wherein its stop is in non-engaging position, means operable by the rotary means for turning the lever about its pivot from normal or non-engaging position into engaging position, said means being so arranged as to prevent return of the lever to its normal position after having been moved from its normal position until after the stop and the means engageable thereby have engaged, and time delay means for retarding the return of the lever to its normal position.

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