March 15, 1938. F. G. STEINER 2,111,375

PAPER TOWEL DISPENSING APPARATUS

Filed Feb. 6, 1935 3 Sheets-Sheet 1

FIG. 1

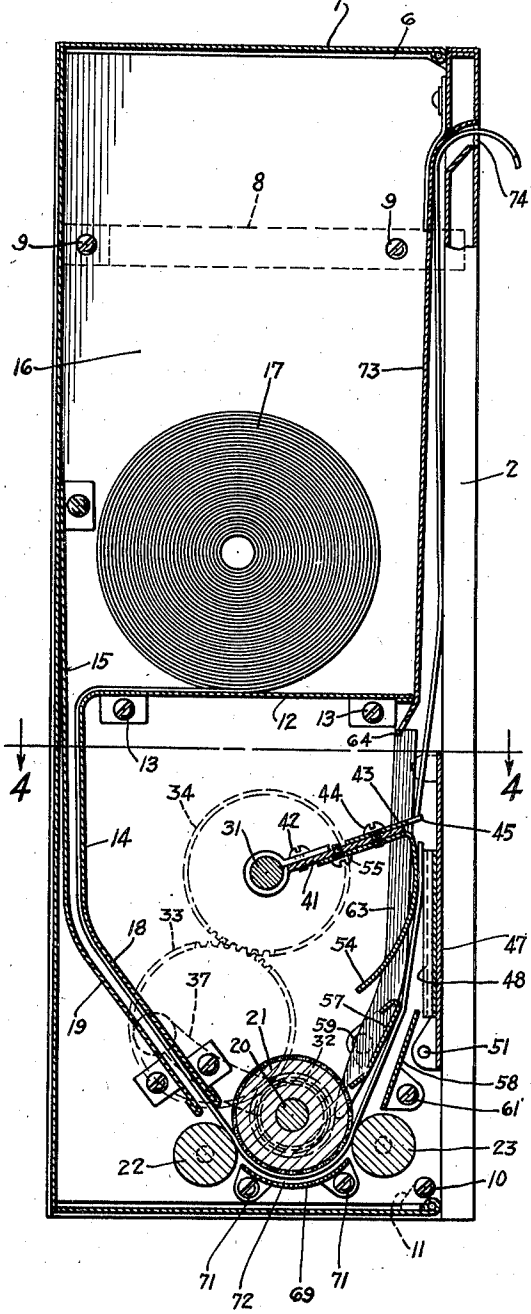
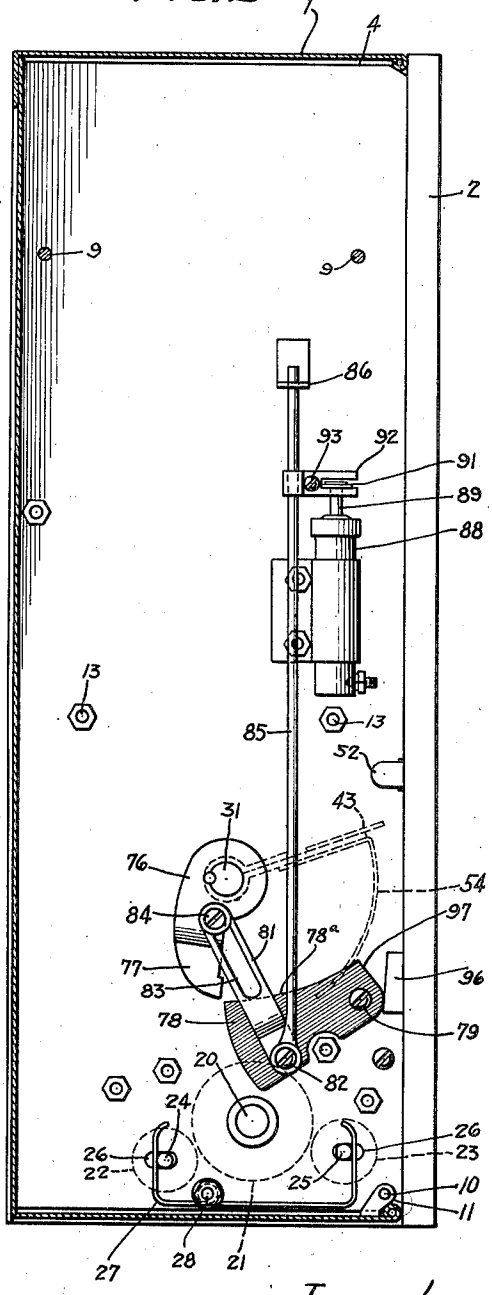


FIG. 2



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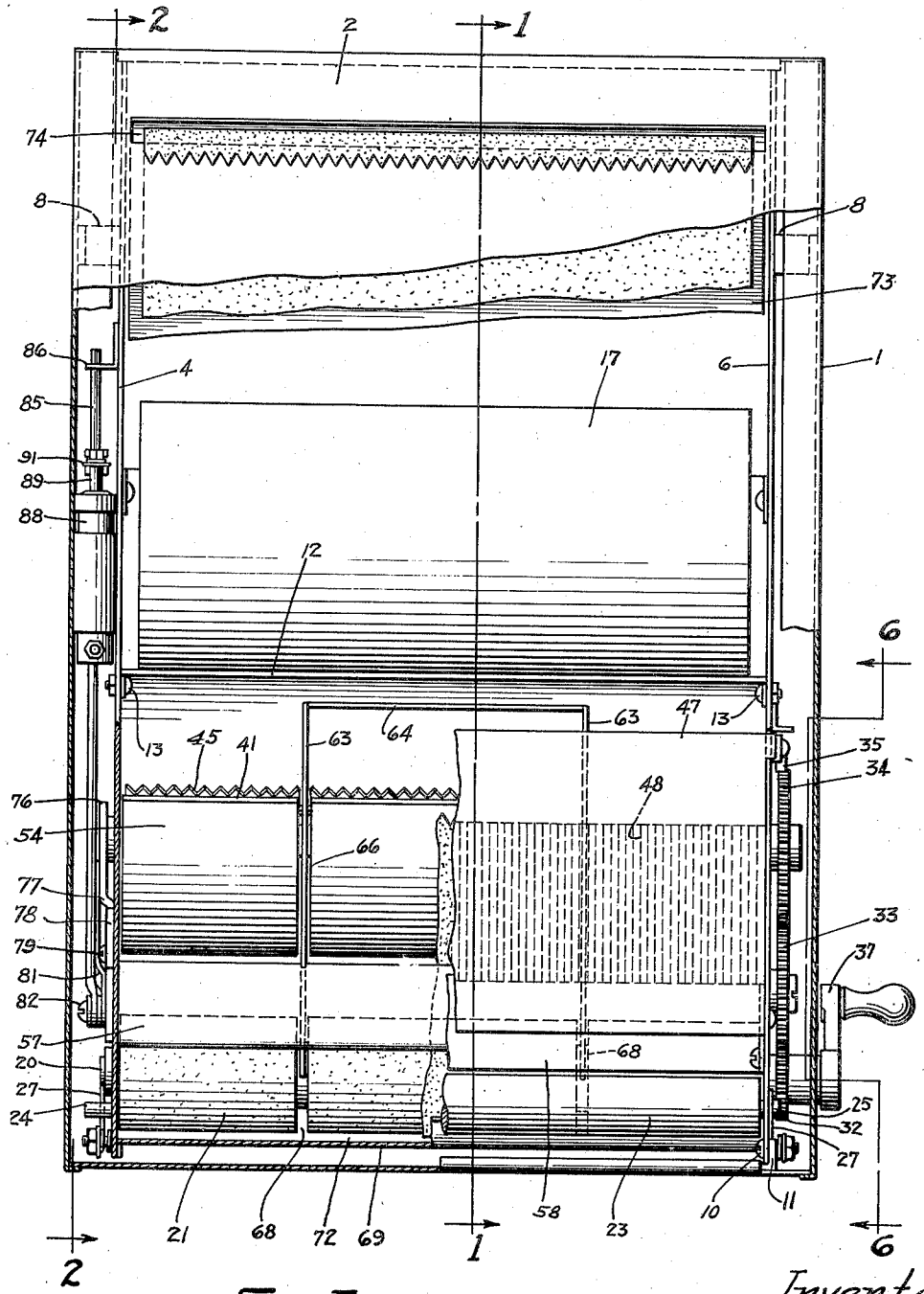


FIG. 3

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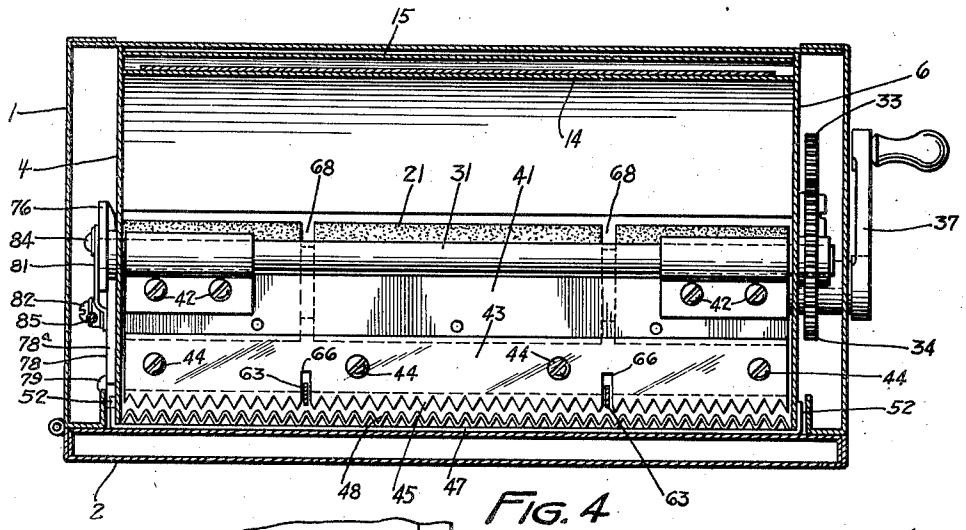


FIG. 4

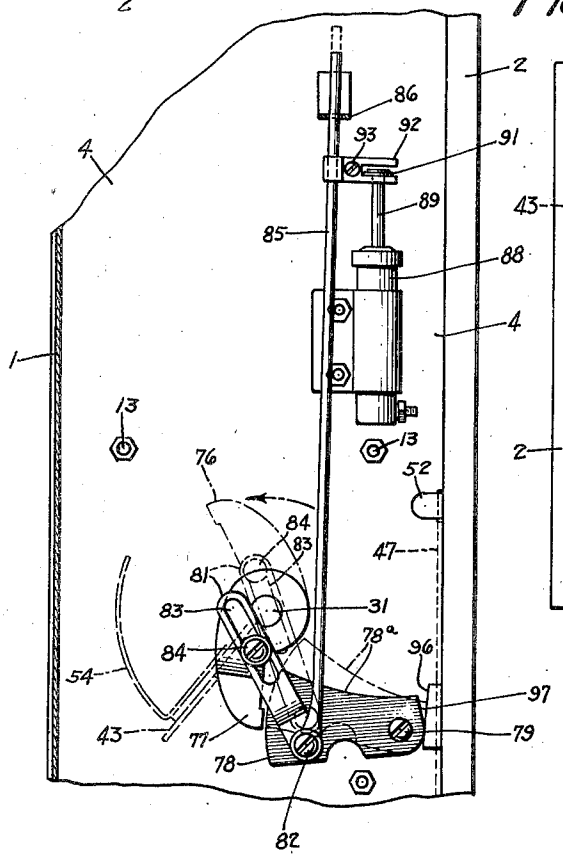


FIG. 5

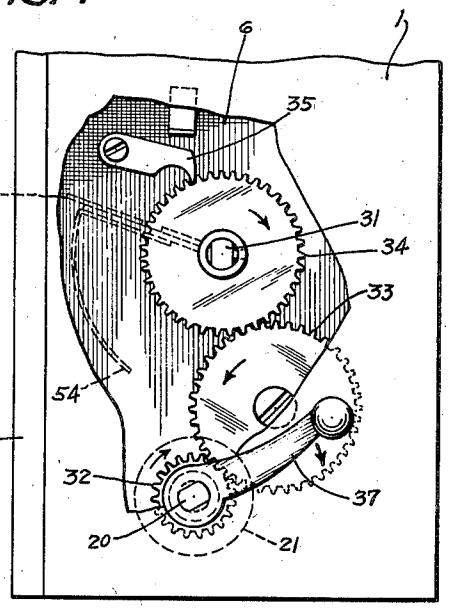


FIG. 6

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Patented Mar. 15, 1938

2,111,375

UNITED STATES PATENT OFFICE

2,111,375

PAPER TOWEL DISPENSING APPARATUS

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Application February 6, 1935, Serial No. 5,265

10 Claims. (Cl. 164—84.5)

This invention relates to improvements in paper towel dispensing apparatus and has for its main object to provide means for delaying the delivery of a second length of towel paper to a user, thus making it necessary for the user to wait for some predetermined time period before he can obtain a second paper towel. By the practice of this invention, the number of towels used is substantially reduced and great economic gain is made.

It has been commonly observed that there is tremendous waste of paper towels because, as a rule, the user pulls a greater number from the cabinet than he actually needs, seldom, if ever, waiting until the water absorbing limit of the paper is reached before he pulls a second towel. In this way, millions of dollars' worth of paper towels are annually wasted.

Another object of the invention is to provide means for preventing quick successive deliveries of lengths of towel paper, whether the towels be produced by severing lengths from a roll of paper toweling, or whether separate towels are delivered from a pile, or whether the paper towels are delivered one at a time from a package of interfolded paper towels of the type wherein the pulling out of one towel positions another towel for access to the user.

Another object is to provide means whereby lengths of paper toweling are successively severed from a roll of paper toweling, and successively delivered for access to the user, and to provide means for preventing quick successive operations of the severing and delivery mechanism.

Another object is to provide manually operable feeding, severing and delivering means, and to provide means for preventing quick successive operations of said means.

Features of the invention include all of the broader aspects of the invention in relation to prevention of quick successive deliveries, and timed delay in delivery.

Objects, features and advantages of the invention will be set forth in the description of the drawings forming a part of this application, and in said drawings:

Figure 1 is a vertical section on line 1—1 of Figure 3, showing the parts positioned as after completion of the severing operation for the paper towel web, with the end of the severed web disposed to be grasped and removed by the user;

Figure 2 is a vertical section on line 2—2 of Figure 3, illustrating the stop mechanism, and means for automatically timing the release of said stop mechanism, with the parts positioned in correspondence to the position of the parts of Figure 1;

Figure 3 is a front view of the cabinet with portions broken away to more clearly show the operating parts thereof;

Figure 4 is a plan section on line 4—4 of Figure 1, showing the serrated cutting blade and its complemental shearing plate;

Figure 5 is a fragmentary view similar to Figure 2, showing the actuation of the stop mechanism and the automatic time release therefor; and

Figure 6 is an end view of the driving mechanism for the feed roll and cutting blade, with parts positioned in correspondence to the positions of the parts of Figures 1, 2, and 4.

The invention is embodied in a wall-type towel dispensing cabinet, but there is no intention to limit the invention entirely to a particular type. The broad idea of timing delivery of successive paper towels is the broad feature of this invention.

Numeral 1 indicates the outer casing of a cabinet having a door 2. Within the casing 1 is an inner housing formed of elements including two side plates 4, 6, secured adjacent their upper ends to wall brackets 8, by means of the screws 9. These wall brackets 8 are welded to the side walls of the outer casing 1. The lower ends of the side plates 4, 6, are secured to the outer casing 1 by means of screws 10 passing through said plates and in threaded engagement with upstanding lugs 11, preferably welded to the bottom of the outer casing 1.

Cross-connecting the side plates 4, 6, and secured thereto by means of screws 13, is a shelf member 12 having at its rear a downwardly extending portion 14 spaced from a plate 15, also secured to the side plates 4, 6, and arranged adjacent the rear wall of the outer casing 1. The portion 14 and plate 15 thus form a guide throat for the paper. The shelf 12 is positioned substantially midway between the upper and lower walls of the outer casing 1 to provide a compartment 16 for the reception of a roll of paper toweling 17 which rests upon the shelf 12.

The portion 14 of shelf 12, and the plate 15 have forwardly and downwardly extending portions 18, 19, which are also spaced apart, and form a continuation of the guide throat. These portions 18, 19, terminate adjacent a feeding mechanism, including a feed roll 21, and a spring tensioned pressure-feed roll 22. Thus a narrow paper guiding passage is provided by which a web of the paper toweling 17 is led from the com-

partment 16 to pass between the rolls 21 and 22, thence to be fed to a web-separating mechanism, including elements presently to be described.

The feed roll 21 is suitably rotatably mounted in the plates, 4, 6, adjacent the bottom wall of the cabinet. In addition to the pressure feed roll 22, a second similar roll 23 is provided. Referring to Figure 2: The shafts of the rolls are respectively indicated at 24, 25, and said shafts are loosely mounted in slots 26 of the side plates 4, 6. The rolls are constantly urged toward the feed roll 21 by means of upstanding ends of springs 27. These upstanding ends engage the protruding ends of the shafts or trunnions 24 and 25, as shown. The springs 27 are secured to the corresponding plate members as at 28, see also Figure 3. Both ends of the rolls 22 and 23 are similarly mounted. Any other suitable feeding mechanism can be used. The mechanism is manually operated by means herebelow described.

The web-severing mechanism includes, a shaft 31 mounted above the feed roll 21 and having bearings in the side plates 4, 6. This shaft has driving connections with said feed roll 21, which are best shown in Figure 6. Secured to the shaft 20 of the feed roll 21 is a pinion 32 meshing with the idler gear 33 mounted on the side plate 6. Idler 33, in turn, meshes with the gear 34 fixed to the cross-shaft 31. A dog 35 allows the train of gears to rotate only in feeding direction, indicated by the arrows of Figure 6. The shaft 20 of the feed roll 21 extends outwardly through the wall of the outer casing 1, and has fixed thereto a crank 37 for manually rotating the feed roll and consequently the cross-shaft 31. In the present embodiment it will be noted that the relative sizes of the pinion 32 and the gear 34 are such that two revolutions of the feed roll 21 impart one revolution to the cross-shaft 31.

Mounted upon the cross-shaft 31 is a plate-like member 41 clampingly secured to the shaft 31 by means of the screws 42, see Figure 4. Upon the plate 41 is fixed, by means of screws 44, a cutting bar 43. The cutting bar 43 has on one edge, teeth 45 which extend beyond the outer edge of the supporting plate 41. Mounted upon the side plates 4, 6, is a plate 47 which in turn has secured thereto a corrugated member 48, the corrugations of which are complemental to the teeth 45. The points of the teeth 45 of the cutting bar are in cooperative relation with the valleys of the corrugations.

The plate member 47 is pivotally mounted as at 51, but is normally held in upright position by the ears 52 formed on the plate 47, see Figure 2, frictionally engaging the outer sides of side plates 4, 6. When the door 2 of the cabinet is closed it also provides a backing for the plate member 47.

To the under side of the plate 41, see Figure 1, is secured by screws 55 an arcuate web guide and web smoothing member 54 having its center of curvature in the axis of shaft 31. Cross-connecting the plates 4, 6, adjacent feed roll 21 and presser roll 23 are two spaced apart stationary guide members 57 and 58 secured to the side walls by screws 59 and 61 respectively. Secured to the guide plate 57 as by welding are a pair of substantially upright guide rails 63, braced together at the top by a cross bar 64 as shown in Figure 3. The supporting member 41 and the cutting bar 43 and the arcuate web guide and web smoothing member 54 are slotted as at 66, to provide clearance relatively to the stationary guide rails 63, as the cutting bar assembly rotates with the shaft 31. The feed roll 21 is provided with two grooves 68 into which the lower extremities of the guide rails 63 project. Below the feed roll 21 is an arcuate web-guide plate 69 secured to the plates 4, 6, by screws 71 and spaced from the feed roll 21 to provide a passageway for the paper towel web.

In loading the machine with paper toweling, the free end of the web of the roll of paper toweling 17 is brought downwardly into and through the passageway formed by elements 14, 15, 18, 19, until the edge of the toweling contacts with the roll 22 and the roughened surface of the feed roll 21. Upon rotation of the feed roll 21 by means of the crank 37 secured thereto, the towel web is drawn between the tension roll 22 and the feed roll 21, into the guide passage 72 between the arcuate guide plate 69 and the feed roll, thence upwardly between the tension roll 23 and the feed roll 21, thence upwardly between the two guide plate members 57 and 58, to lie against the corrugations 48, after plate 47 has been swung to the position shown in Figure 1.

The feeding and severing operation is as follows: After a predetermined length of toweling has been fed upwardly toward the exit slot 74, the serrated knife blade moves into engagement with the towel web. The teeth 45 of the cutting bar puncture those portions of the web which bridge the peaks of the corrugations of member 48 and the teeth pass through the towel web into the grooves. The speed of the serrated cutting bar is slightly greater than that of the feeding speed of the web, so that the web is not only cut, but the forward part is actually forcibly pulled and separated from the following part.

As the towel web is severed the faster moving cutter bar moves the severed length upwardly away from the slower moving towel web and the movement is sufficient to cause the upper end of the severed length of web to project from the slot 74 to be readily grasped by the user. The severed length of toweling is shown resting upon the cutter bar 43 and against the guide rails 63, and is shown projecting upwardly between the door 2 and the guide plate member 73. The plate 73 is secured to the door 2 adjacent the slot 74 through which the severed towel projects to be grasped by the user and withdrawn from the cabinet.

A broad feature of this invention is the use of means for preventing quick successive deliveries of lengths of towel paper, and this feature of the invention is applicable to the timed control of towel delivery whether a length severed from a roll of paper toweling is to be delivered, or whether a towel be delivered from a pile, or from a package of inter-folded paper towels of the type wherein the pulling out of one towel positions the next for access by the user.

In the present embodiment, the timer mechanism includes means adapted to stop the cutter bar immediately after a cutting and severing operation and at a position in which the bar acts to support the severed sheet in position for withdrawal by the user. The position is shown in full lines in Figure 1, and in dotted lines in Figure 2. At this position, the mechanism is held for a timed interval.

The cutter bar shaft 31 projects outwardly beyond the side plate 4, see Figure 2, and has secured thereto a stop arm 76 having an inwardly laterally offset stop portion 77, adapted to engage a pivoted stop member 78 when the latter is in either the dot-and-dash line or the full line position of Figure 5. The stop member 78

is pivoted at 79 to the side plate 4. A link 81 is pivoted at 82 to the stop member 78 and has a slot 83 traversed by the screw 84 of the stop arm 76 of shaft 31.

Also mounted on the pivot 82 is an upwardly extending rod 85 having its upper end sliding freely in a guide 86 secured to plate 4. A dashpot 88 acting as a timer is mounted also on the plate 4 and has a plunger 89 which extends upwardly. The plunger has a head 91, and this head is operatively engaged with the slot of clip 92, which clip is clamped to the upright rod 85 by means of screw 93.

The full line parts of Figure 5 are positioned as when the timing operation is about half completed, the timing movement of the rod 85 being downwardly. The dot-and-dash line positions of the elements 76, 78, 43, and 54 represent the position of the elements at the beginning of the timing operation, and it will be noted that the screw 84 is engaged against the upper end of the slot 83 and has acted to pull the link and the stop 78 to stop position, at the same time setting the timer.

Rotation of the cutter 43 from the dotted line position shown in Figure 2 (or full line position of Figure 1) to the dot-and-dash line position of Figure 5 swings the member 78 on its pivot 79 to the dot-and-dash line position of Figure 5, thus moving the rod 85 upwardly to move the plunger in the dashpot 88 and set it for timing.

In Figure 5, the dot-and-dash line position of the element 76, link 81, member 78 and upper end of rod 85 and the full line position of the dashpot stem 89, corresponds to the position at which the timer begins its timing operation. Shortly after setting of the timer, member 76 will have moved to the stop position shown in full lines in Figure 5, while the elements 43, 54, etc. will have moved to the full line position of Figure 1. In other words, Figure 5 shows in dot-and-dash lines, the "timer-set" position, as well as the position of the element 76 resultant from its continued motion to "stop" position after the timer setting. Figure 2, of course, shows the parts conditioned to permit a manual feeding and severing operation, in which it will be noted stop 78 is positioned to permit arm 76 to be rotated one complete revolution from the position shown.

With the parts positioned as shown in Figure 2, the operator can, by turning the crank 37, rotate the shafts 20 and 31 in counter-clockwise direction to feed the paper and cause the knife 43 to sever it after a sufficient length of paper has been fed. During this movement, the link will, after the part 76 has traveled a sufficient distance, raise element 78 to the dot-and-dash line position of Figure 5. In this movement, the shaft 31 makes a complete rotation, near the last part of which severing is accomplished, after which the part 78 is positioned as shown in dot-and-dash lines in Figure 5, and with the knife positioned as shown in Figure 1. At the end of the time period the stop element 78 will have assumed the position of Figure 2. Therefore, during the timed movement of the element 78 from the dot-and-dash line position of Figure 5 to the full line position of Figure 2 the machine cannot be operated for feeding or for severing or for delivering another sheet of toweling.

The relations of the stop elements, their pivots, the link, etc., are such that the element 78 is not lifted until the outer end of the element 77 has moved a sufficient distance in counter-clockwise direction to prevent jamming by engagement of the upper surface 78a of the element 78 with the element 77.

The dashpot 88, of course, retards or times the downward movement of the member 78 about its pivot 79, as a result of the connection with rod 85. When the member 78 is lowered to the position shown in Figure 2, it no longer lies in the path of the offset portion 77. A stop member 96 is secured to the plate 4 adjacent the pivot 79 and a flat surface 97 of the member 78 engages it to prevent upward motion of member 78 beyond the position shown in dot-and-dash lines in Figure 5, if the operating crank is operated with undue acceleration.

I claim as my invention:

1. In a cabinet for dispensing paper towels, means for feeding a web of paper toweling, separate means for automatically severing a portion of said web, and means for rendering both means inoperative for a predetermined time interval after a severing operation.

2. In a cabinet for dispensing paper towels, means for feeding a web of paper toweling, separate means for automatically severing a predetermined portion of said web and thereafter supporting the severed portion in accessible position, and means for preventing a succeeding feed and severance until after the lapse of a predetermined time interval.

3. A cabinet for dispensing paper towels having, an orifice through which lengths of paper toweling are delivered for access to the user, means for severing the towels, said means acting after severing to hold the severed length in accessible position for withdrawal from the cabinet.

4. A cabinet for dispensing paper towels having, an orifice through which the paper towels are delivered for access to the user, means for successively feeding towels toward the orifice, rotatable means for receiving each fed towel and acting to support the towel in position for withdrawal through the orifice, and means controlled by the rotatable means for holding the same at supporting position.

5. In a paper towel dispensing apparatus, first means operable by the user for feeding and severing paper toweling and delivering severed lengths for access to the user, said severing means having a shaft, and second means controlled by and controlling said shaft for delaying the operation of the first means for a predetermined time interval after delivery of each length, said second means being set by the first means and thereafter acting automatically to perform its timing function.

6. A cabinet for dispensing paper towels, comprising means for feeding a web of paper toweling, automatic severing means independent of the feeding means and to which the feeding means delivers, means synchronizing the severing and feeding means, and means controlled by and controlling the aforementioned means for limiting the amount of feeding and thereafter preventing further feeding and severing operations until after a predetermined time interval.

7. A cabinet for dispensing paper towels, comprising a delivery orifice, means for feeding a web of paper toweling, automatic severing means independent of the feeding means and upwardly to which the feeding means delivers, means synchronizing the severing and feeding means, and means controlled by and controlling the aforementioned means for limiting the amount of feeding and thereafter preventing further opera-

tion until after a predetermined time interval, said severing means acting to deliver the severed sheet upwardly to said delivery orifice.

8. A cabinet for dispensing paper towels comprising a delivery orifice through which the towels may be positioned for withdrawal from the cabinet by the user, manually operable feeding means for delivering towels to said orifice, severing means arranged intermediately of the feeding means and orifice, and controlled by the feeding means, and time control means in said cabinet actuated by operation of said feeding means to render said feeding means inoperable for a predetermined time interval after each operation, said time control means operating after said time interval to render said feeding means again operable.

9. A cabinet for dispensing paper sheets comprising, a roll for feeding paper, first and second presser rolls cooperating with the feed roll, a first guide directing the paper between the feed roll and the first presser roll, a second guide receiving paper from the cooperating feed roll and second presser roll, and a severing mechanism arranged above the feed roll and to which the second guide delivers including, a member which moves with the advancing web as severing occurs, and which applies pressure to a portion of the paper which projects from the second guide.

10. In a cabinet for dispensing paper, the combination of an upper chamber to receive a supply of paper, a second chamber in said cabinet located below the first mentioned chamber, means in said second chamber for feeding the paper from the first chamber, severing means in said second chamber positioned above the feed means and to which the feed means delivers, a downwardly directing guide for positively guiding the paper from the supply chamber to the feed means, and an upwardly directing guide between the feed means and the severing means for positively guiding the paper to the severing means.

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