Feb. 20, 1945. L. L. PRICE ET AL 2,369,851

TOWEL DISPENSER

Filed Feb. 18, 1939 3 Sheets-Sheet 1

Fig. 1

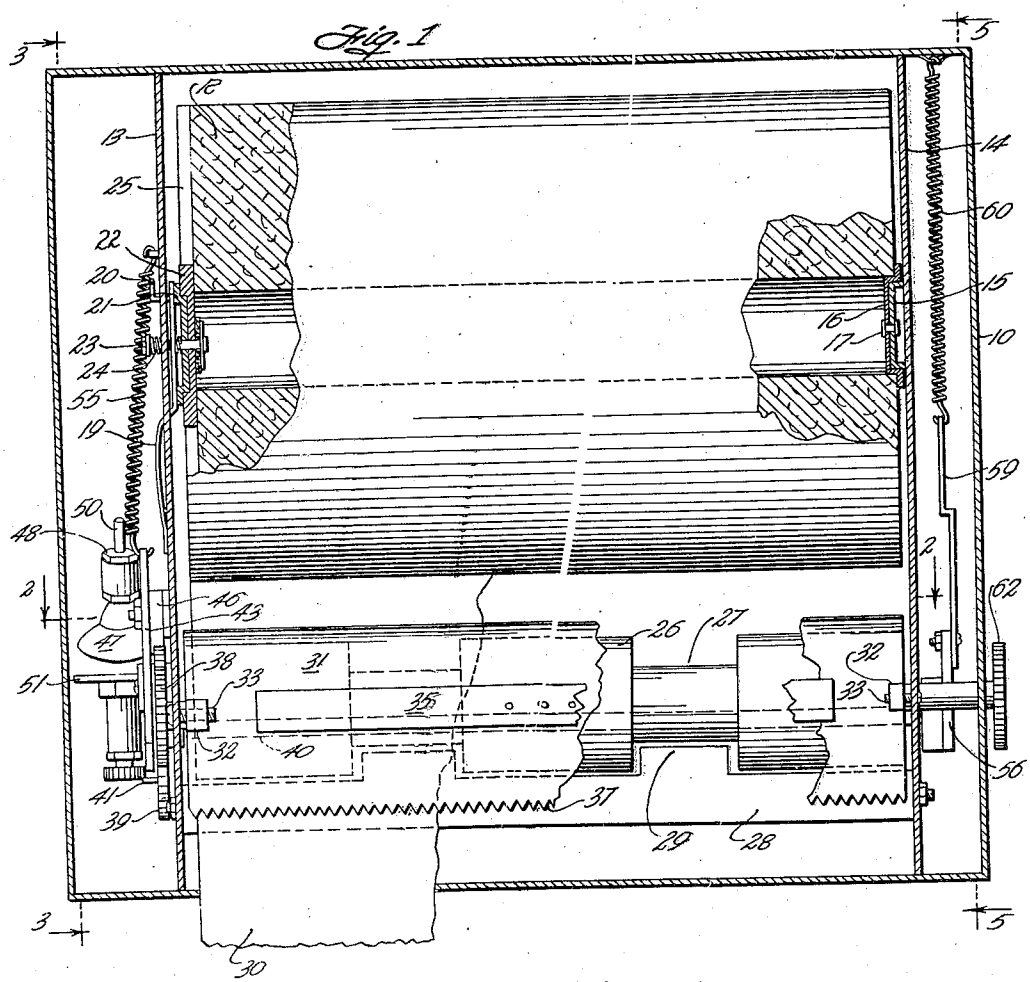
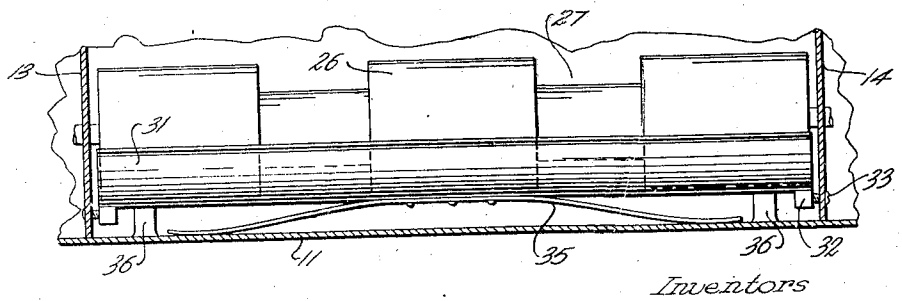


Fig. 2



Inventors
LAURENCE L. PRICE
MAURICE E. MALTBY
By Hazard and Miller
Attorneys

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Fig. 3

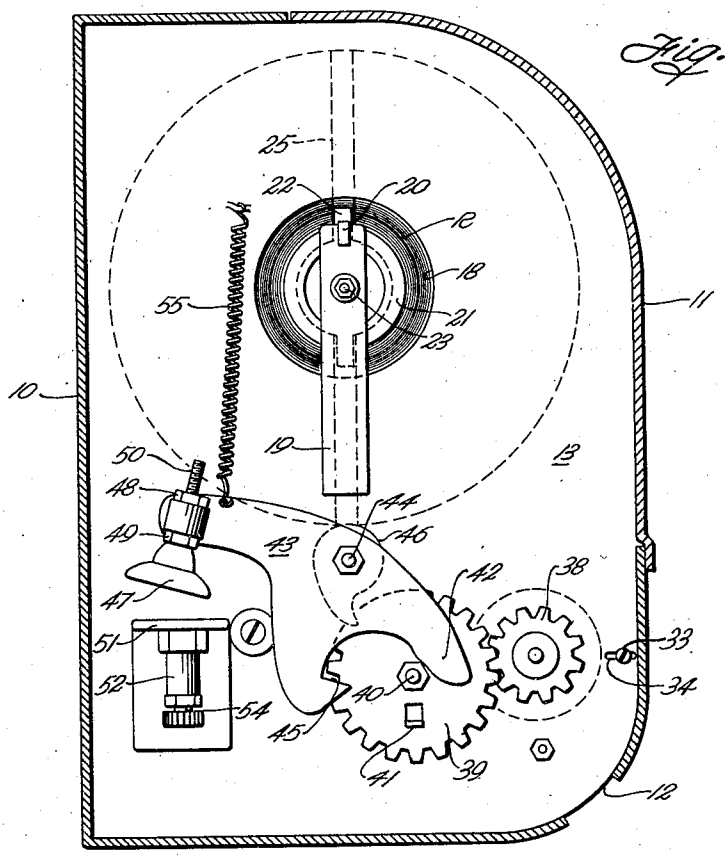
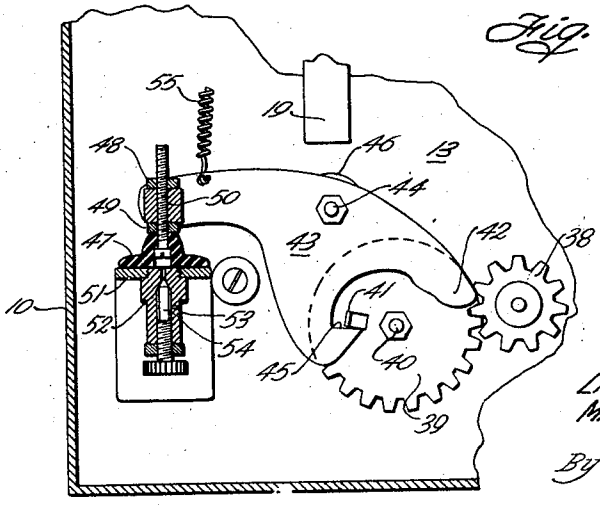


Fig. 4



Inventors
LAURENCE L. PRICE
MAURICE E. MALTBY
By Hazard and Miller
Attorneys

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Filed Feb. 18, 1939 3 Sheets-Sheet 3

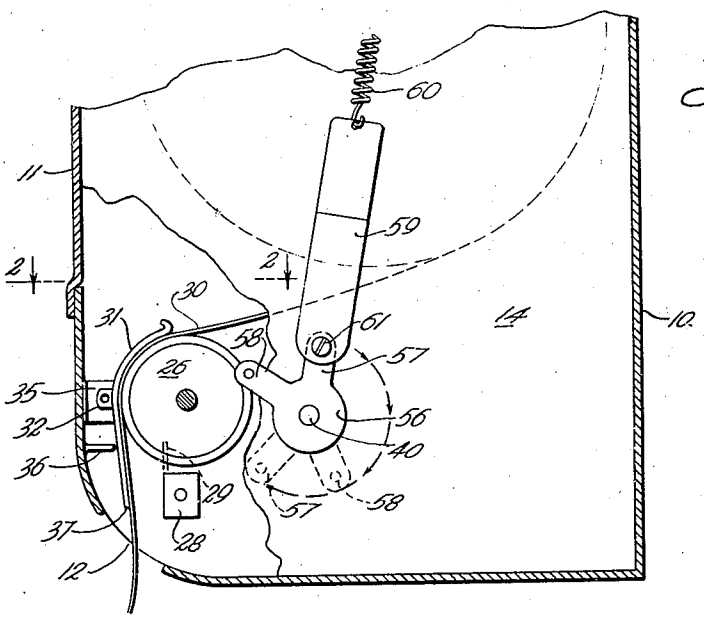


Fig. 5

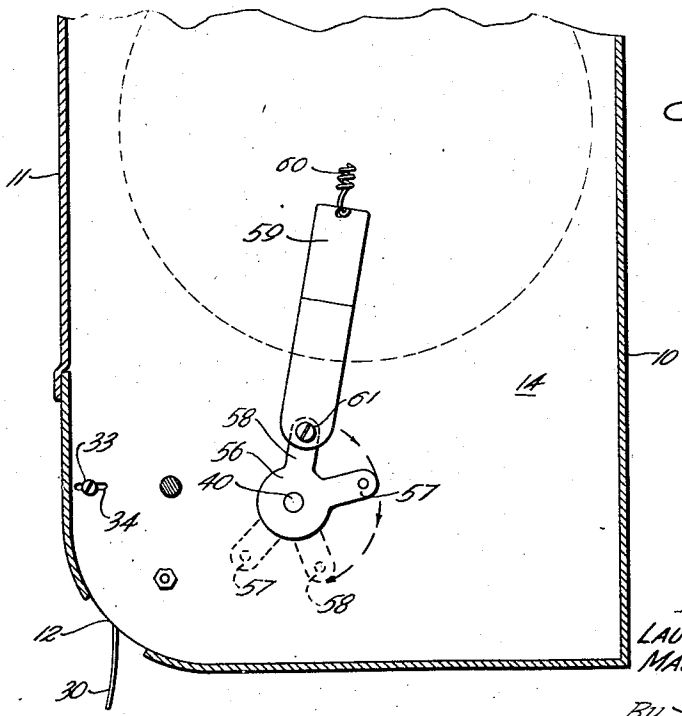


Fig 6

Inventors
LAURENCE L. PRICE
MAURICE E. MALTBY
By Hazard and Miller
Attorneys

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UNITED STATES PATENT OFFICE

2,369,851

TOWEL DISPENSER

Laurence L. Price, Los Angeles, and Maurice E. Maltby, Bell, Calif., assignors, by mesne assignments, to Philip A. Wooster

Application February 18, 1939, Serial No. 257,104

1 Claim. (Cl. 271—2.3)

This invention relates to improvements in towel dispensers.

The towel dispenser embodying the present invention has been primarily designed for dispensing paper toweling but features thereof may be incorporated in devices for dispensing cloth toweling if so desired.

An object of the invention is to provide a towel dispenser wherein a predetermined length of toweling is dispensed or withdrawn from the device after which further withdrawal of the toweling is arrested for a predetermined length of time before a subsequent withdrawal can be accomplished, and to provide a novel, simple, durable, and efficient time-delay means for holding the toweling for such predetermined length of time.

In greater detail, the improved time-delay means comprises a deformable vacuum cup formed of rubber or other deformable material which is forced against a rigid, flat, stationary seat in which a controllable air inlet is formed. When the vacuum cup is forced against the seat air therein is expelled. The air inlet permits air to slowly enter the interior of the vacuum and thus release it from the seat. It has been proposed to secure a time-delay means employing two opposed vacuum cups which mutually engage. The advantages of the use of a single vacuum cup and a flat seat thereof are that the construction is to a large extent, self-cleaning in that dust and particles of the paper toweling are blown off of the seat by the seating vacuum cup. Where opposed vacuum cups are used the lower cup acts somewhat as a container for dust and paper particles so that when the vacuum cups mutually engage these paper particles are retained in a position to be blown out through the air inlet opening to clog or plug the needle valve that controls the air flow therethrough.

Another object of the invention is to provide a towel dispenser wherein the supply roll of toweling is mounted for rotation by means of a suitable friction brake which will retard rotation of the supply roll and continuously impose a drag thereon so that if the end of the toweling is quickly withdrawn there is no danger of the supply roll coasting or spinning which would cause an unwinding of the toweling and possible interference with the dispensing mechanism. To this end, an object of the invention is to provide a novel form of friction brake which can be easily moved into and out of engaging position with the supply roll to facilitate the insertion of replacement rolls.

Another object of the invention is to provide a novel and simple friction plate in conjunction with the measuring roll of the dispenser which guides the withdrawn end of the toweling over and around the measuring roll so that the measuring roll will be caused to accurately measure the portion dispensed and which will provide means enabling the withdrawn end to be severed from the balance of the roll.

Another object of the invention is to provide a dispensing mechanism for toweling wherein a predetermined length of toweling is withdrawn from the machine and when the predetermined or measured length of toweling is withdrawn further withdrawal is prevented for a predetermined length of time, after which the mechanism is released to permit of a subsequent withdrawal.

It will be understood that by causing a predetermined time interval to elapse between successive withdrawals of toweling that a material saving is accomplished in that users of the towels will not be tempted to unnecessarily withdraw consecutive towels. In connection with this form of apparatus it is desirable to have the mechanism automatically eject a portion of the succeeding towel at the time of release so that when the mechanism is released for subsequent operation a portion of the succeeding towel will be extended to be grasped to facilitate further withdrawal.

It is a further object of the invention to provide a simple construction which may be either automatic or semi-automatic in its operation to eject a portion of the succeeding towel at the time of release.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claim, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 is a sectional view through the improved paper towel dispenser, the section being taken mainly just behind the front wall of the dispenser to illustrate internal construction;

Fig. 2 is a horizontal section taken substantially upon the line 2—2 upon Fig. 1;

Fig. 3 is a vertical section taken substantially upon the line 3—3 upon Fig. 1 illustrating the parts in normal or released position;

Fig. 4 is a partial vertical section similar to Fig. 3 illustrating the parts in locking or arresting position;

Fig. 5 is a sectional view taken substantially upon the line 5—5 upon Fig. 1 illustrating the ejecting mechanism, the ejecting mechanism be-

ing attached in such a manner as to produce automatic ejection upon release of the mechanism; and

Fig. 6 is a view similar to Fig. 5 illustrating the parts as being connected to accomplish semi-automatic ejection upon release as will hereinafter be explained.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the mechanism is enclosed within a suitable housing, generally designated at 10, which may have an openable cover 11 and which has an outlet opening 12 for the ejection of the toweling. This housing is so designed as to be suitable for mounting on a wall at any convenient location. Within the housing adjacent the end walls thereof there are two partitions 13 and 14 and on the inner face of partition 14 there are mounted nested discs or plates 15 and 16 which are rotatably connected together such as by rivet 17. The disc or plate 15 is permanently attached to the inner face of partition 14 such as by welding. The disc or plate 16 is rotatable with respect thereto and is designed to enter the end of the central core or opening in the supply roll of toweling R, thus making provision for rotatably mounting the supply roll on partition 14. Partition 13 has an opening 18 formed therein adjacent which there is secured a spring 19 which may have its lower end rigidly fastened such as by welding, to the outer face of the partition. This spring extends through the opening and is equipped with a handle 20 disposed on the outer side of the partition. The spring has a disc or plate 21 rigidly attached thereto on which is nested a plate 22. A bolt 23 extends through the spring 19 and the two plates and is equipped with a spring 24 which urges the two plates into engagement. One end of the roll R has a diametrical groove 25 cut therein and the plate 22 is provided with portions designed to enter and fit the inner or central portion of the groove. In this manner, the roll R is, in effect, locked or keyed to the plate 22 and as the plate 22 is urged into frictional engagement with plate 21, this forms a type of friction brake or drag which rotatably supports the left-hand end of the supply roll. If desired, leather or other friction means may be interposed between the plates to increase the frictional engagement therebetween.

By this construction it will be appreciated that a type of friction drag brake supports the supply roll which will prevent the roll from spinning or coasting even though the toweling is suddenly jerked therefrom.

In order to replace a supply roll, it is merely necessary to spring the spring 19 outwardly by means of handle 20 permitting the application of a new supply roll, the diametrical groove 25 of which may be caused to fit properly on the disc or plate 22. The diametrical groove formed on the end of the supply roll also serves another function. It enables a person undertaking to service the dispenser to ascertain how much toweling remains on the supply roll within the machine without opening the machine to ascertain this. It will be understood that the groove 25 forms notches in the ends of the layers of paper making up the roll. Adjacent the outside of a complete roll these notches are rather widely spaced, whereas adjacent the center of the roll these notches are closely arranged. Thus, when anyone desires to ascertain how much paper remains on the supply roll within the machine, it is merely necessary to withdraw a paper towel therefrom and inspect the notches formed by groove 25 in its edge. If these notches are widely spaced this will signify that a large portion of the roll R remains in the machine. On the other hand, if these notches are closely spaced this signifies that the roll is about to require replacement.

Below the supply roll R and forwardly thereof a measuring roll 26 is rotatably mounted between partitions 13 and 14. This measuring roll is preferably grooved on its exterior as indicated at 27, and a stripper 28 is mounted between the partitions carrying fingers 29 which enter the grooves. The stripper serves to prevent the free end 30 of the paper toweling which is trained over the measuring roll from following around the measuring roll as the measuring roll rotates. The exterior surface of the measuring roll may be rubber covered or otherwise faced to form a good frictional gripping with the paper of the paper toweling. The free end 30 is urged into snug, frictional engagement with the measuring roll by means of a friction plate 31. The friction plate 31 is curved so as to fit around a substantial portion of the peripheral surface of the measuring roll. As shown in Fig. 5, the curvature is such as to cause the paper to firmly engage the measuring roll around nearly one-fourth of the surface of the measuring roll. The friction plate 31 is mounted by means of ears 32 on small bolts 33 which extend through slots 34 in the partitions 13 and 14. In this way the friction plate is mounted for rotation or tilting so as to accommodate itself to the measuring roll, and it is also mounted for sliding movement toward or away from the measuring roll. The friction plate is urged into engagement with the paper 30 trained around the measuring roll by means of a spring 35 which is fastened to the front of the friction plate and which bears against the interior surface of the front wall of the housing. Excessive tilting of the friction plate is prevented by means of stops 36 which may be fastened to the front wall of the housing 10 in such a position as to be engageable by the downwardly extending portion of the friction plate.

The friction plate extends vertically downward from the forward side of the measuring roll and at its lower end it provides a severing edge 37 which may be in the nature of a serrated or saw-toothed edge as clearly shown in Fig. 1. The end of the paper 30 which is trained around the measuring roll is guided by this lower portion through outlet opening 12 and when the ejected portion of the paper is pulled it may be severed from the remaining paper within the machine along the severing edge 37.

One end of the measuring roll is provided with a pinion 38 disposed on the outer side of partition 13. This pinion meshes with a gear 39 on a shaft 40 extending transversely through the machine. Gear 39 constitutes a rotary means rotatable as the paper is withdrawn from the machine. It is equipped with a stop 41 constituting a rotary stop engageable with finger 42 on a lever 43 pivoted at 44 on the outer side of partition 13. The lever 43 also provides a stop 45 which, when swung from the position shown in Fig. 3 to the position shown in Fig. 4, is engageable by the rotary stop 41 to arrest rotation of gear 39 and consequently of the measuring roll 26. On the pivot 44 there may be provided a back-up pawl 46 engageable with the teeth on

gear 39 to prevent reverse rotation of the gear and of the measuring roll.

A feature of the invention concerns the construction of the time-delay means which delays the return of the lever 43 from the position shown in Fig. 4 to the position shown in Fig. 3. This time-delay means comprises a rubber or deformable vacuum cup 47 fastened onto the lever 43 and which is adjusted in the desired position by means of jamb nuts 48 and 49 which are threaded onto the bolt or stem 50. The vacuum cup is engageable with a seat 51 in the form of a small sheet metal angle attached to the outer face of partition 13. Attached to its center is a small nipple 52 which provides an air inlet indicated at 53 controlled by means of a needle valve 54. The lever 43 is urged into the position shown in Fig. 3 by means of a tension spring 55. In this form of construction, when stop 41 engages finger 42 the vacuum cup is forced downwardly against the seat. The air within the vacuum cup is expelled beneath its edges and to a slight extent through the air inlet 53. When the stop 41 has passed from beneath the finger into engagement with stop 45, air then slowly enters the interior of the vacuum cup through the air inlet 53 and finally releases the vacuum cup from the seat. The rate of release is, of course, controlled by the adjustment of the needle valve. A feature of this form of construction is that any dust or paper particles tending to collect on the seat are expelled by the air forced out of the seating vacuum cup. As the seat is flat there is no tendency for the seat to retain thereon any of these dust or paper particles. Consequently, danger of plugging or clogging the air inlet passage is reduced to a minimum.

On the opposite end of shaft 40 which is disposed on the outer side of partition 14 there is arranged a small crank 56 having two arms 57 and 58. In the position shown in Fig. 5 a link 59 is pivotally attached to arm 57 and is urged upwardly by means of a coil spring 60 attached to the top of housing 10. Arm 57 is so arranged that when stop 41 is engaged by stop 45 to arrest further rotation of the measuring roll the arm will be in the dotted line position shown in Fig. 5. In this position, it will be noted that arm 57 has passed over or beyond center so that the effect of spring 60 is to urge arm 57 to continue in its direction of rotation as indicated by the arrows on Fig. 5. Continued rotation of the arm and of shaft 40 is, of course, prevented as long as stops 41 and 45 are in engagement. When the vacuum cup 47, however, is released shaft 40 is then free to rotate and spring 60 may then rotate the arm and the shaft from the dotted line position shown in Fig. 5 to the full line position shown in Fig. 5. This rotation takes place automatically upon release of stop 41 by stop 45. It produces a small rotation of the measuring roll and consequently, when stop 41 is released there is an automatic ejection of a small portion of the subsequent towel which may be grasped to pull out the subsequent length of towel which is measured by the measuring roll until stop 41 again engages stop 45.

The above-described construction produces an automatic ejection of the paper towel when the dispenser is released. However, in some instances it is undesirable to have an automatic ejection of the toweling when stop 41 is released. There are circumstances when such automatic ejection is conducive to a wasting of towels in that a person using one towel and in so doing consuming the time required for the vacuum cup to be released has his attention called to the fact that a second towel has been ejected and is free for his use. This causes temptation to use a second towel unnecessarily.

By a slight alteration the present mechanism may be converted to a semi-automatic ejection of the paper towel when the vacuum cup is released. This adjustment is accomplished by shifting link 59 to arm 58. When thus connected, as shown in Fig. 6, arm 58 stops in the dotted line position shown in Fig. 6 when stop 41 engages stop 45. In this position it will be noted that the point of connection between link 59 and arm 58 has not passed over center as yet in the direction of rotation. Reverse rotation of shaft 40 is, of course, prevented by back-up pawl 46. With this alteration made, it is necessary to rotate the measuring roll forwardly until the connection indicated at 61 has passed over center. When this is done the spring 60 becomes effective to rotate shaft 40 and arm 58 into the full line position shown in Fig. 6. To accomplish this rotation the measuring roll is provided with a handle 62 arranged on the outer side of the housing. The measuring roll cannot be rotated by the handle until stops 41 and 45 have disengaged. However, when they have disengaged by the release of the vacuum cup, handle 62 may be turned a short distance to move connections 61 over center after which spring 60 will be effective to rotate shaft 40 approximately one-half of a revolution which causes the measuring roll to be rotated a sufficient distance to eject the desired length of the free end of the subsequent towel to enable its being grasped to operate the machine through a subsequent cycle of operations.

The operation of the machine may be briefly described as follows: With the machine in normal position there is a small portion of toweling protruding through outlet opening 12. This is grasped and pulled downwardly causing the measuring roll to rotate until stops 41 and 45 engage when further rotation of the measuring roll is prevented or arrested. The paper is held in firm engagement with the measuring roll so that it will not slip thereover by the spring-pressed friction plate 31. When rotation of the measuring roll is arrested, further tension on the paper causes it to be severed along the severing edge 37.

Movement of lever 43 by engagement of stop 41 with finger 42 prior to the mutual engagement of stops 41 and 45 causes the vacuum cup to be forced downwardly against its seat against the action of spring 55. It remains in this position for a predetermined length of time, namely, that time required for sufficient air to enter past needle valve 54 to effect a release of the vacuum cup. When the vacuum cup is released, spring 60 becomes effective to continue rotation of gear 39 for a short distance, this being occasioned by the swinging of arm 57 from the dotted line position shown in Fig. 5 to the full line position shown therein. Or, if the construction is connected to arm 58 small rotation of handle 62 is necessary to cause spring 60 to become effective. Rotation of gear 39 and shaft 40 produces adjustment of the free end of the paper towel into a position as shown in Fig. 5.

Whenever the supply of toweling has become exhausted or nearly so the cover of the housing is opened and spring 19 is swung outwardly by

means of handle 20 permitting the insertion of a replacing roll. It is merely necessary with the replacing roll to start the free end of its paper between the measuring roll and friction plate 31 to enable the machine to resume operation.

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 claim.

We claim:

In a towel dispenser, rotary means adapted to rotate as the toweling is dispensed, means for arresting rotation of the rotary means when a predetermined length of toweling is dispensed, time-delay means for releasing the arresting means after a predetermined length of time, an arm connected to and rotatable with the rotary means, spring means connected thereto, the arrangement of the arm and spring being such that when the rotary means is arrested the spring will be loaded to urge the rotary means in a direction opposite the direction of rotation, means for preventing reverse rotation of the rotary means and separate manually operated means for further rotating the rotary means so as to enable the spring means to become effective to rotate the rotary means in the direction of dispensing.

LAURENCE L. PRICE.
MAURICE E. MALTBY.