Oct. 25, 1960 I. L. LESAVOY 2,957,636

TOWEL DISPENSING APPARATUS

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FIG. 1.

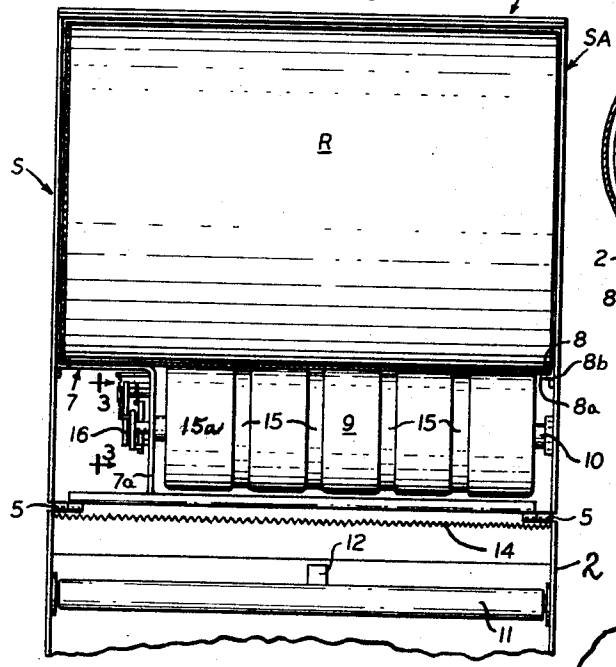


FIG. 2.

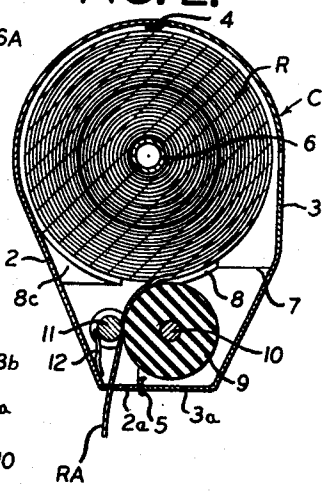


FIG. 4.

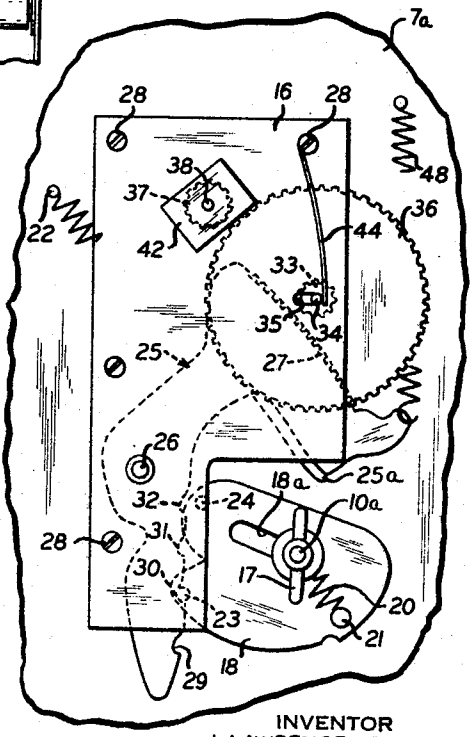
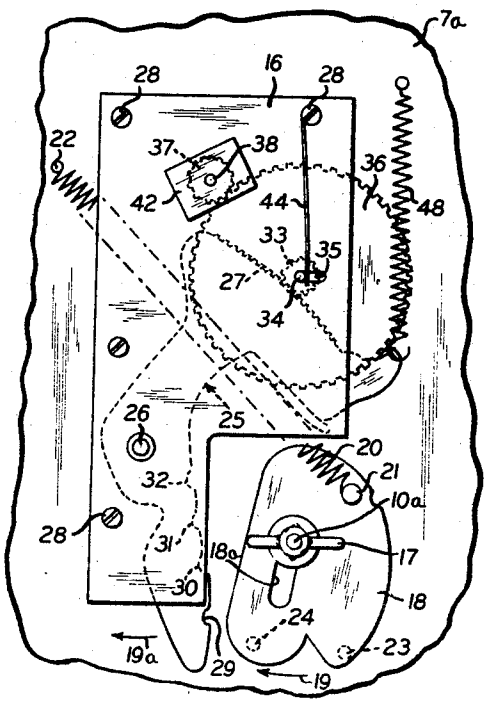


FIG. 3.



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FIG. 5.

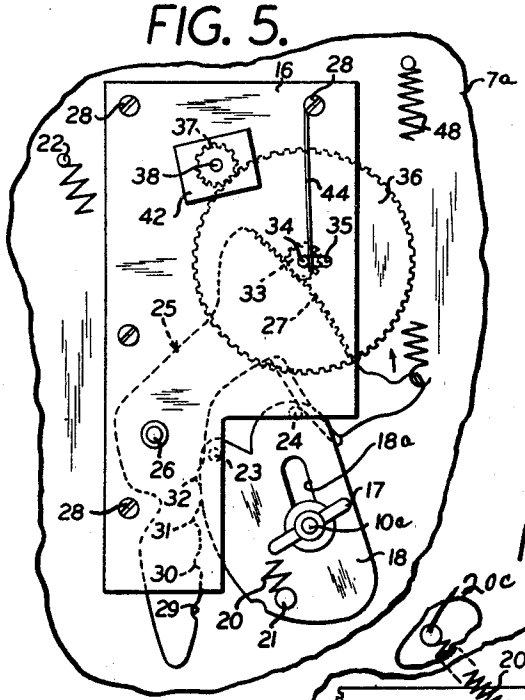


FIG. 8.

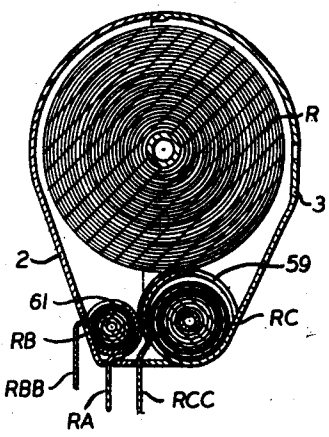


FIG. 7.

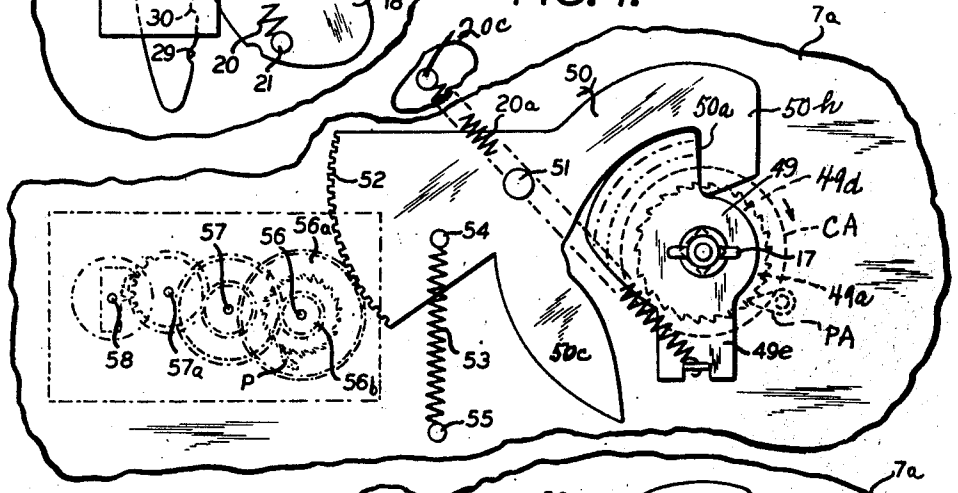
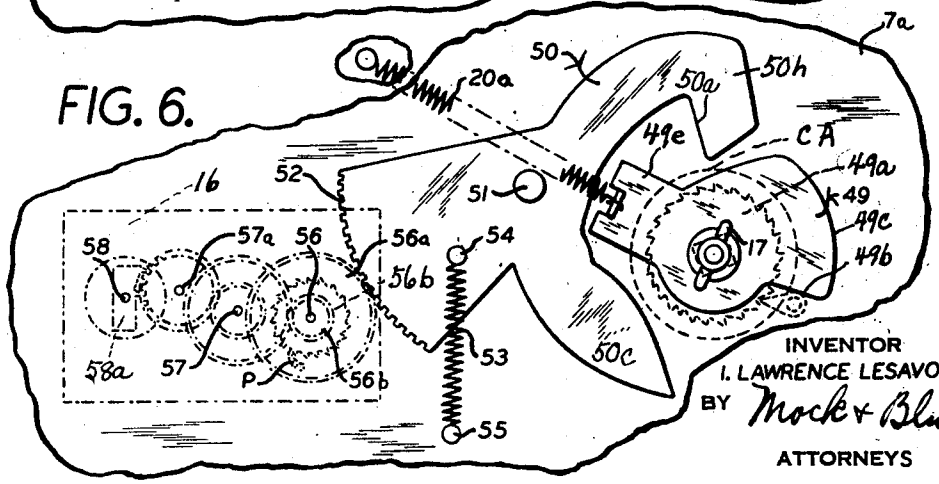


FIG. 6.



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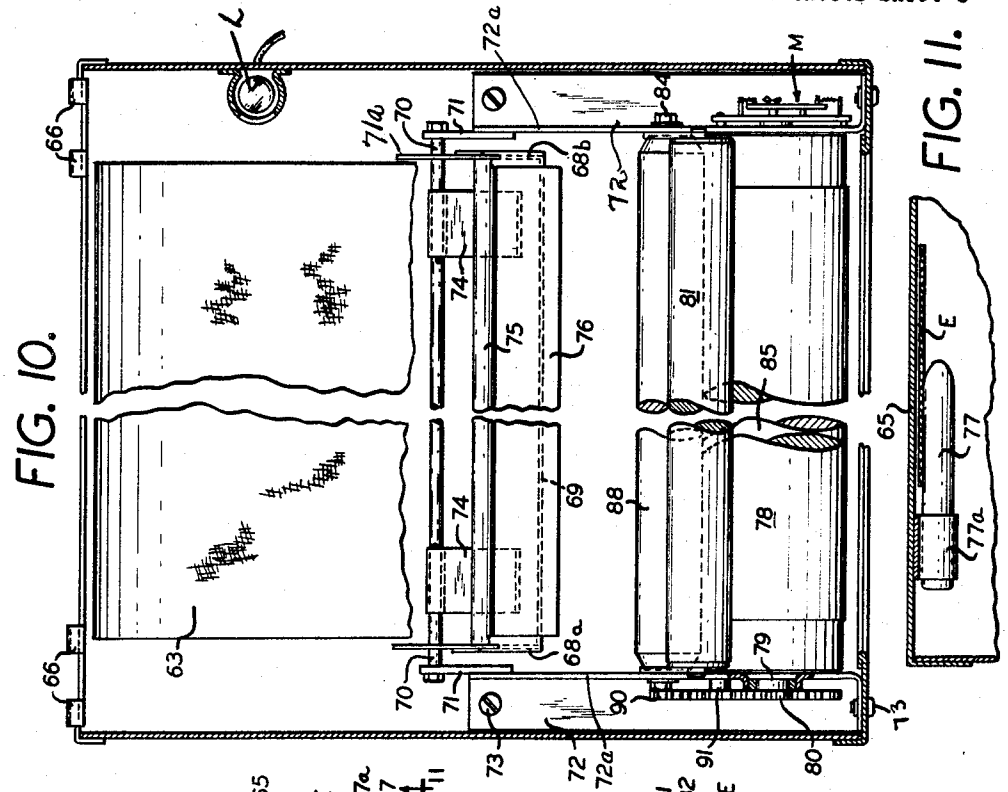


FIG. 10.

FIG. 11.

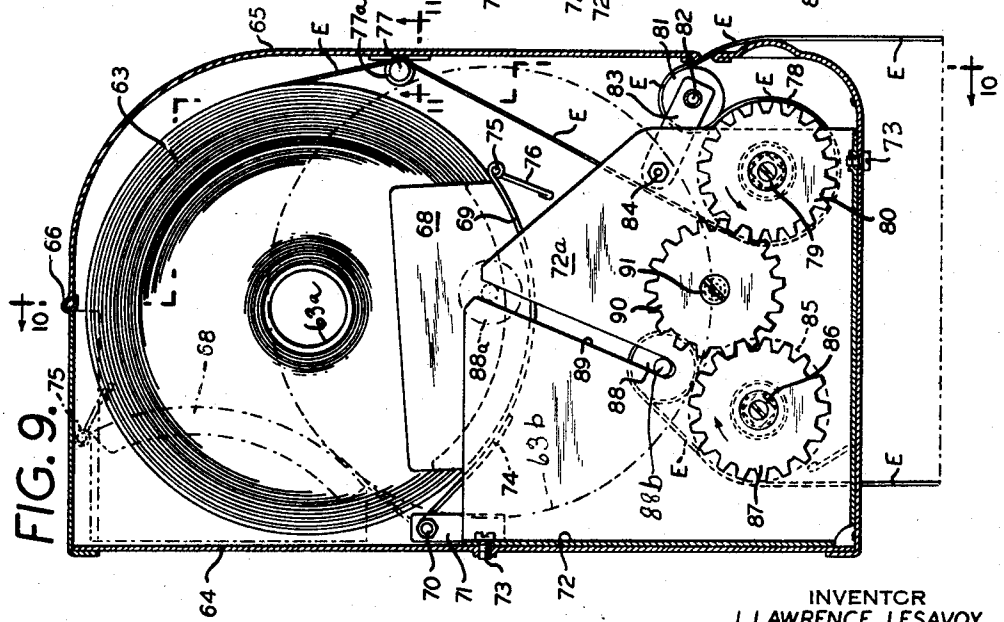


FIG. 9.

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TOWEL DISPENSING APPARATUS

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Filed Jan. 22, 1958, Ser. No. 710,392

5 Claims. (Cl. 242—55.53)

My invention relates to a new and improved machine for dispensing selected lengths of a web of either paper toweling or cloth toweling.

This application is a continuation-in-part of my application Serial Number 639,143, filed on February 8, 1957, in the Patent Office of the United States of America, under the title "Towel Dispensing Means," now U.S. Patent No. 2,861,856, dated November 25, 1958.

According to one feature of my invention, I provide time-delay or time-control means which are wholly mechanical and which consist wholly of rigid parts and springs, thus eliminating the use of suction cups and other pneumatic devices.

In another feature of my invention, I provide a two-piece cabinet or casing, consisting of a front section and a rear section which are movable relative to each other, One section of this cabinet, such as the body of the cabinet, carries a rotatable measuring roll. The other section of this cabinet, such as the cover of the cabinet, carries a friction roll. When these sections are moved apart in order to open the cabinet, the friction roll is automatically separated from the measuring roll. A spirally wound magazine roll of the paper or cloth web can be easily inserted into either section of the open cabinet, and the end of the web can be easily passed below the cabinet before closing the cabinet. When the cabinet is closed, the end of the web is automatically pressed between the measuring roll and the friction roll, so that a pull upon the end of the web which is below the closed cabinet will automatically turn the measuring roll and the friction roll in unison, and without any slip between the pulled end of the web and said measuring roll and said friction roll. This construction makes it unnecessary to thread the end of the web between the measuring roll and the friction roll.

As another feature of my invention, I provide improved and adjustable time-delay means for controlling the dispensing of the paper or cloth web. The improved time-delay means have a minimum number of parts and are easily adjustable.

As another feature of my invention, I provide improved means for dispensing a plurality of webs from a single cabinet or casing.

As another feature of my invention, I provide improved means for dispensing a non-tearable web, such as a web of cloth toweling.

In each embodiment, the measuring roll is rotated in each complete cycle in a single direction through a single complete rotation of 360 degrees. In each embodiment, during each complete cycle, there is an initial partial cycle in which the measuring roll is rotated by a pull upon the free end of the web through a partial rotation, as through an angle of 180 degrees or 270 degrees, or any other angle less than 360 degrees. In said embodiment at the end of said initial partial rotation, the measuring roll is automatically locked in position by the time-delay mechanism, during a selected and adjustable locking period. At the end of said locking period, in said

embodiment the time-delay mechanism releases the measuring roll, which is automatically turned through the remainder of the respective complete rotation of 360 degrees.

Several embodiments of my invention are disclosed in the following description and the annexed drawings.

Figure 1 is a front elevation of one embodiment, showing the front cover section of the cabinet turned away from the rear section of the cabinet.

Fig. 2 is a section on the line **2—2** of Fig. 1, showing the closed cabinet.

Fig. 3 is a side-view on the line **3—3** of Fig. 1, illustrating one type of time-delay mechanism.

In this embodiment, the measuring roll is turned 180 degrees by pulling the free end of the web. In this Fig. 3 the parts of the time-delay mechanism are shown in their position after the pulling operation upon the free end of the web has begun and before said pull has been completed.

Fig. 4 is similar to Fig. 3, showing the position of the parts of the time-delay mechanism subsequent to the stage of Fig. 3, but prior to the end of the pulling operation.

Fig. 5 is similar to Figs. 3 and 4, showing the positions of the parts of the time-delay mechanism after the pull on the free end of the web has been completed, and prior to the release of the measuring roll by the time-delay means.

Fig. 6 is a view of the highly preferred time-delay mechanism, showing its parts in idle position, prior to pulling the free end of the web.

Fig. 7 is similar to Fig. 6, showing the parts of the time-delay mechanism at the end of the pull upon the free end of the web, and while the measuring roll is locked by the time-delay mechanism, before the time-delay mechanism has been moved in its reverse stroke to release the measuring roll.

Fig. 8 is a section similar to Fig. 2 of a device for dispensing a plurality of webs.

Fig. 9 is a section of an embodiment in which a web of cloth toweling is dispensed.

Fig. 10 is a section on the line **10—10** of Fig. 9.

Fig. 11 is a section on the line **11—11** of Fig. 10.

First embodiment, Figs. 1–5

Cabinet C has a front section or cover **2** which has a bottom wall **2***a*; and a rear section **3**, which has a bottom wall **3***a*. Said bottom walls **2***a* and **3***a* are conveniently shown in Fig. 2 in horizontal position, without limitation to said position. These bottom walls **2***a* and **3***a* are connected by pivots or common horizontal hinges **5**, whose common axis is perpendicular to the plane of Fig. 2. For convenience, the horizontal direction of the the axis of the pivots or hinges **5** is designated as the lateral direction. Sections **2** and **3** are releasably connected by latch **4** when cabinet C is closed. Sections **2** and **3** have side-walls which may overlap when cabinet C is in the closed position of Fig. 2, so that the closed cabinet C has flat and vertical and transversely disposed side-walls S and SA, which are spaced laterally from each other.

A plate **7** is fixed to one of the transverse side-walls of rear section **3**. Said plate **7** has a transverse, vertical, flat flange **7***a*.

A rear cradle **8** is fixed to rear section **3** and a front cradle **8***c* is fixed to front section or cover **2**. These cradles **8** and **8***c* may be fixed to the side-walls of their respective sections **3** and **2**. These cradles are of any suitable shape. They may be identical.

The rotatable measuring roll **9** is fixed to a lateral and horizontal shaft **10**, which is turnably mounted in rear section **3**. Said shaft **10** may have one bearing in a side-wall of rear section **3**. The shaft **10** may have any

standard means in its said bearing, to permit said shaft **10** to turn only in the direction **19**.

A friction roll **11** has a lateral and horizontal shaft, which is turnably mounted in front section or cover **2**.

The shaft of friction roll **11** may have bearings in the transverse side-walls of front section **2**.

The measuring roll **9** may be made of resilient and elastic material, such as vulcanized rubber, or it may have a rigid core and a resilient and elastic sleeve. The friction roll **11** may be made of rigid material.

The shaft of friction roll **11** may be turnably mounted in horizontal and parallel slots of the side-walls of front section **2**, and a biasing spring, which is exemplified by blade spring **12**, biases friction roll **11** to press against measuring roll **9** when cabinet C is closed. One end of spring **12** is fixed to cover **2**. This spring **12** may be of any type, such as a tension spring connected to each end of the shaft of roll **11**.

The front bottom wall **2***a* has a lateral slit **14**. Said slit **14** has a serrated edge, for ease in tearing off the end RA of the web of paper or other tearable material which is wound in a spiral magazine roll R, either with or without rigid core **6**.

When the front section or cover **2** is turned down to open the cabinet C as shown in Fig. 1, the magazine roll R is easily inserted into the open end of rear section **3** or into cover **2**, in order to support the magazine roll R on either cradle **8***c* or **8***a* while the cabinet is open. The roll R is turnably supported on both cradles **8***a* and **8***b*, when the cabinet is closed. These cradles may be identical. The cradle **8** has respective laterally spaced edges **8***a* and **8***b*.

While the cabinet is open, the free end RA of magazine roll R is led across the measuring roll **9**, and through the slit **14** in the front bottom wall **2***a* of the open cabinet. The front section or cover **2** is then closed, thus automatically placing cradle **8***c* into position to support magazine roll R at a part of the periphery thereof, and also automatically pressing the free end RA of the paper web between friction roll **11** and measuring roll **9**.

The magazine roll R is thus turnably supported upon the cradles **8***c* and **8**, between the side walls S and SA of the closed cabinet C and said roll R is also supported between the cradles **8***c* and **8** upon the ribs **15***a* of measuring roll **9**, between the recesses **15** of said roll **9**. The roll R may optionally have a core **6** of sufficient weight to produce good frictional contact between rolls R and **9**.

As one example, when cabinet C is thus closed, the free end RA may extend five inches or about 125 millimeter below the horizontally located front bottom wall **2***a*.

When said free end RA is manually pulled in order to start a pulling step, the rolls **11** and **9** move in exact unison with the web to turn magazine roll R, and the magazine roll R is also frictionally turned by the ribs **15***a* of measuring roll **9**. These ribs **15***a* extend through the lateral space between the cradles **8***c* and **8** to contact frictionally with the periphery of magazine roll R.

The horizontal and lateral axis of magazine roll R is offset transversely relative to the horizontal and lateral axis of shaft **10**, so that the axis of roll R is located forwardly of the axis of shaft **10**. This gives a good area of contact between end RA and ribs **15***a*, in order to prevent slip between end RA and measuring roll **9** or friction roll **11**, and also makes it easier to turn measuring roll **9** by a pull on end RA.

Time-delay mechanism of first embodiment of Figs. 1–5

This time-delay mechanism may be used with any embodiment.

A rigid, vertical and transverse plate **16** is fixed rigidly to vertical and transverse flange **7***a* of plate **7** of rear section **3**, by means of lateral and horizontal posts **28**.

At one end thereof, the shaft **10** has a reduced and non-cylindrical end **10***a*. This end **10***a* may be of a square or polygonal cross-section. One end of cylindrical shaft **10** has a bearing in a side-wall of rear section **3**. The other end of the cylindrical part of shaft **10** has a bearing in flange **7***a*. The end **10***a* of shaft **10** extends laterally between flange **7***a* and plate **16**, and also through plate **16**.

A vertical and transverse plate **18** is fixed to shaft **10**, so that plate **18** turns in unison with measuring roll **9**. This plate **18** has a slot **18***a*, which is closed at both ends thereof. The end **10***a* of shaft **10** extends through any selected part of slot **18***a*, and the butterfly screw **17** releasably clamps plate **18** in its selected and adjusted position to end **10***a* of shaft **10**.

The length of the time-delay period can be selected by locating the end **10***a* of shaft **10** in any selected part of slot **18***a*.

The respective ends of a spring **20** are fixed at **22** to flange **7***a*, and at **21** to plate **18**.

At the beginning of each pulling step or pulling operation upon end RA, the spring **20** is relaxed and does not exert any torque upon plate **18** or upon the measuring roll **9** to which plate **18** is fixed by means of shaft **10**.

Even if spring **20** has some initial torque prior to a pulling step, such torque is insufficient to turn measuring roll **9** in a direction reverse to arrow **19**.

A gear-segment **25** is pivoted at horizontal and lateral pivot **26** to plate **16**. This gear-segment **25** has an arcuate row of spur teeth **27**, which are disposed concentrically relative to pivot **26**.

At one face thereof, gear-segment **25** has a succession of ratchet recesses of any desired number, such as the ratchet recesses **29**, **30**, **31**, **32**.

One end of a spring **48** is fixed to gear-segment **25**, and the other end of said spring **48** is fixed to plate **7***a*. When the parts of the time-delay mechanism are in initial normal position, prior to pulling upon end RA, the spring **48** is relaxed so that it does not exert any torque upon gear-segment **25** which would turn gear-segment **25** in a direction reverse to arrow **19***a*.

A spur gear **36** has a part thereof located intermediate plate **16** and flange **7***a*. This spur gear **36** is fixed to a rotatable shaft **34**. One end of shaft **34** has a bearing in flange **7***a*, and said end of shaft **34** is turnable in said bearing around a horizontal axis. The other end of shaft **34** is located turnably in a horizontal and transverse slot **35** of plate **16**.

The upper end of a blade spring **44** is fixed to plate **16**. The lower end of blade spring **44** biases shaft **34** to its position shown in Fig. 3, in which the small spur-gear **33**, which is also fixed to shaft **34**, is in mesh with the spur-gear **27** of gear-segment **25**. A tension spring may be used as a biasing spring, instead of blade spring **44**.

When spur-gear **33** is in mesh with teeth **27**, the spur-gear **36** is also in mesh with a small spur gear **37**, which is fixed to a shaft **38** which has bearings in plate **16** and flange **7***a*. An air-vane **42**, which is adjustable in order to adjust its air resistance, is fixed to shaft **38**.

The plate **18** has horizontal and lateral pins **24** and **23** fixed thereto.

At the beginning of a cycle, the parts of the time-delay mechanism are substantially in the positions of Fig. 3 or close to said positions.

When a pull is exerted upon end RA, the plate **18** is turned clockwise as viewed in Figs. 3, 4, 5, as indicated by arrow **19**, in unison with measuring roll **9**. This extends spring **20** and causes it to exert tension upon plate **18** and measuring roll **9**, but the pull on end RA easily overcomes this tension.

The pins **24** and **23** of plate **18** successively come into contact with gear-segment **25**, thus turning gear-segment **25** in the clockwise direction of arrow **19***a*, as viewed in Figs. 3, 4, 5. After a short initial turn of measuring roll **9**, the forward pin **24** and the ratchet recess **29** prevent

any reverse, counterclockwise turning of measuring roll **9**, if the end RA is released.

When the gear-segment 25 is turned in the direction of arrow **19***a*, the teeth **27** exert a thrust upon spur gear **33**, thus shifting shaft **34** to unmesh spur gear **33** from teeth **27**, and also to unmesh spur gear **36** from spur gear **37**. The spur gear **33** may shift back and forth between its meshing and unmeshing position relative to teeth **27**. In any event, there is no perceptible actuation of the air-vane **42**, during the time that a pull is exerted upon end RA. In effect, the action is the same as though the time-delay mechanism were operated by member **25** through a one-way clutch, thus avoiding operation of the time-delay mechanism during the pull on end RA, so that said pull can be quick and easy, and is sufficient to exceed the tension of springs **20** and **48** which result from said pull.

At the end of a pull on end RA, the parts of the time-delay mechanism are in the positions shown in Fig. 5.

The tensed spring **20** is now in position to complete the rotation of measuring roll **9** through an angle of 360 degrees, in the direction of arrow **19**. The rotatable plate **18** and its pin **23** now clear the gear-segment **25**. The spur gear **33** now meshes with teeth **27**, and spur gear **36** now meshes with spur gear **37**. The tensed spring **48** is now ready to turn gear-segment **25** reversely, back to its initial normal position.

The pin **24** now abuts a flange of gear-segment **25**, at a point which is close to the level of pivot **26** of gear-segment **25**, so that plate **18** exerts a small or negligible counterclockwise torque upon gear-segment **25**, even though spring **20** is under tension. The plate **18** is temporarily locked against further clockwise rotation, until pin **24** has cleared the flange of gear-segment **25**. Said flange of gear-segment **25** may have an inclined position at the end of a pulling step on end RA, as shown in Fig. 5, or said flange may be vertical or only slightly inclined to the right, as viewed in Fig. 5, at the end of a pulling step.

Hence, the measuring roll **9** will remain locked, until spring **48** has turned gear-segment **25** in a reverse, counterclockwise direction, during a selected time-delay period, and until pin **24** clears gear-segment **25**, which is close to the completion of the counterclockwise movement of gear-segment **25**.

When pin **24** clears gear-segment **25**, the tensed spring **20** promptly turns measuring roll **9** through the balance of the respective rotation of 360 degrees in the direction of arrow **19**.

In this example, but without limitation thereto, the pull on end RA turns measuring roll **9** in an initial angle of 180 degrees, and the spring **20** turns measuring roll **9** through a second angle of 180 degrees when plate **18** is released.

By adjusting the position of shaft **10** relative to slot **18***a*, or by shifting the position of pin **22**, the length of the time-delay period can be regulated.

Figs. 6 and 7

These show the highly preferred time-delay mechanism, which can be used with any embodiment in which time-delay is desired.

A ratchet wheel **49***a* and a cam **49** are fixed to the end **10***a* of shaft **10** by said butterfly screw **17**. A pawl PA has one end pivoted to flange **7***a*. This pawl PA is biased by the usual spring, not shown, to press the tip of said pawl against ratchet wheel **49***a*. This ratchet wheel **49***a* and said pawl PA exemplify one means for permitting shaft **10** and measuring roll **9** to turn only in the clockwise direction, as viewed in Figs. 6 and 7, when end RA is pulled. There are many well-known alternative means for permitting the rotation of shaft **10** and roll **9** in only a single direction, and any means may be used for this purpose.

One end of spring **20***a* is fixed to flange **7***a* at **20***c*, and the other end of spring **20***a* is fixed to a rigid extension **49***c* of cam **49**. Said extension **49***c* is bent upwardly from the plane of Fig. 6 and Fig. 7, for the purpose later described. Prior to starting a new pull upon end RA, the spring **20***a* may be in the relaxed condition and in the position shown in Fig. 6. In this case, the spring **20***a* may be under tension in initial position, because the axis of spring **20***a* intersects the axis of shaft **10**.

A gear-segment **50** is pivoted at **51** to flange **7***a*. This gear-segment **50** has a row of spur gear-teeth **52** which are concentric with pivot **51**. This gear-segment **50** also has a lug **50***c*, and a hook **50***h*. This hook **50***h* has a locking face **50***a*.

One end of a spring **53** is fixed at **54** to gear-segment **50**. The other end of spring **53** is fixed at **55** to flange **7***a*. Prior to pulling the end RA, the spring **53** is straight and relaxed and does not exert any torque upon gear-segment **50**.

As an important feature, the gear teeth **52** are always in mesh with means for operating time-delay means.

In this example, the time-delay mechanism includes any number of units which are operated by shaft **56**. In this example, there are two units which succeed shaft **56** and said two units have respective shafts **57** and **57***a*.

These units of this example have intermeshing spur-gears. Thus, small gear **56***b* is fixed to shaft **56**, and said gear **56***b* meshes with a larger spur-gear which is fixed to shaft **57**. Similarly, a small spur gear is fixed to shaft **57**, and said small gear meshes with a larger spur gear which is fixed to shaft **57***a*. A pendulum **58***a* is pivoted to plate **16** at pivot **58**. This pendulum **58***a* may have an adjustable weight of the usual kind, in order to regulate the period of pendulum **58***a*. This pendulum **58***a* has two escapement teeth of the usual type, which alternately engage the respective spur gear on shaft **57***a*, thus regulating the time-delay period. If desired, pendulum **58***a* may be omitted, and replaced by an adjustable air-vane **42** which is fixed to shaft **57***a*.

When the end RA is pulled, the shaft **10** and measuring roll **9** are turned in the forward or clockwise direction, as viewed in Figs. 6 and 7, thus turning cam **49** in unison with shaft **10**, and extending spring **20***a* from its relaxed or initially tensed condition of Fig. 6.

As later explained, when cam **49** is turned clockwise in unison with shaft **10** by pulling end RA, the gear segment **50** is also turned clockwise by cam **49**. During said clockwise turning of gear segment **50**, its teeth **52** turn spur gear **56***a* counterclockwise. Teeth **52** and spur gear **56***a* are always in mesh.

During the pull on end RA, it is desired to keep the time-delay mechanism idle, so that the end RA can be easily and quickly pulled to the desired length.

Hence, in this example, the spur gear **56***a* is freely turnable on shaft **56**. A ratchet wheel **56***b* is fixed to shaft **56**. One end of a pawl P is pivoted to spur gear **56***a*. The other end of pawl P is pressed against the ratchet teeth of ratchet wheel **56***b* by the usual spring, not shown. Hence, when gear-segment **50** is turned clockwise from its position of Fig. 6 to its position of Fig. 7 as the result of a pull upon end RA, thus turning spur gear **56***a* counter-clockwise relative to shaft **56**, the pawl P will slip along the teeth of ratchet wheel **56***b*, and shaft **56** will remain stationary. However, when gear-segment **50** is turned reversely or counterclockwise from its locking position of Fig. 7 to its initial position of Fig. 6, the spur gear **56***a* is biased clockwise relative to shaft **56**, and the pawl P will engage the ratchet wheel **56***b*, and will turn shaft **56** in unison with spur gear **56***a* and gear-segment **50**.

The cam **49** has a forward face **49***b*, which is slightly convex.

When the end RA is pulled, the cam **49** is turned clockwise in unison with measuring roll **9**. The flange **49***e* is bent away from the plane of Figs. 6 and 7, and

the cam 49 and the lug 50c are located in said plane. Hence when cam 49 is turned, its flange 49e clears the hook 50h, and the lug 50c, without exerting any force upon gear-segment 50. The sole turning force which is exerted by cam 49 upon gear-segment 50, is by means of the forward surface 49b of cam 49 and the end-surface 49c of cam 49. When cam 49 is turned clockwise by a pull on end RA, the faces 49b and 49c consecutively contact with the respective convex face of lug 50c, thus turning gear-segment 50 clockwise from its position of Fig. 6 to its position in Fig. 7.

In Fig. 7, the slightly convex face 49b abuts the slightly convex face 50a of hook 50h, thus temporarily locking cam 49 in its position of Fig. 7, until gear-segment 50 is turned reversely or counterclockwise from its position of Fig. 7, to release the cam 49 at the end of a selected time-delay period.

The temporary locking of the cam 49 is regulated by means additional to the regulation of the time-delay mechanism.

Thus, the radial dimension of face 49c, which is concentric with the axis of shaft 10, may be of different radial lengths, as indicated by the broken-line circle CA in Figs. 6 and 7, and the broken arcuate lines in Fig. 6. By decreasing the radius of face 49c, the locking period is decreased.

In the locking position shown in Fig. 7, the face 50a is vertical, and the face 49b is urged in a substantially horizontal direction, and the entire face 49b is substantially at the level of pivot 51. Hence the cam 49, which is biased to turn clockwise in Fig. 7 by the extended spring 20a, exerts only little or negligible counterclockwise force upon gear-segment 50.

As one example, but without limitation thereto, the end RA may depend in a length of 2.5 inches, or about 62.5 millimeters, below the cabinet C, at the beginning of a pull, and the measuring roll 9 is turned ninety degrees for each movement of 2.5 inches of end RA from its initial position.

In this example, the pull on end RA turns cam 49, shaft 10, and measuring roll 9 through an angle close to 270 degrees from the initial position of Fig. 6 to the temporary locking position of Fig. 7.

The point 20c, at which one end of spring 20a is fixed to flange 7a, may be shifted to the right or left of its position of Figs. 6 and 7, while keeping spring 20a under initial tension in its shifted position. This will regulate the length of the web which is pulled out at each pull, up to the point at which the measuring roll 9 is temporarily locked. The same length RA is pulled out in each cycle, because the measuring roll 9 is turned 360 degrees in each cycle.

Fig. 8

The cabinet resembles the cabinet of Fig. 2, in having a hinge in its bottom wall and a releasable latch at its top.

In this case, the cabinet dispenses three respective webs of paper or other tearable material, from three respective magazine rolls R, RB, and RC, whose respective free ends are designated as RA, RBB and RCC. The free end RBB extends through a slit in front section or cover 2. The free end RA extends through a slit in the bottom wall of the cover 2. The free end RCC extends through a slit in the bottom wall of front section 2 or through a slit in the bottom wall of the rear section 3.

A cylinder 59, which is open at its side ends, is made of material which is rigid, or which is flexible and resilient.

At its bottom, said cylinder 59 is optionally connected to the bottom wall of rear section 3, by means of hinges or pivots which have a lateral horizontal axis, like the hinges or pivots 5.

When the cabinet of Fig. 8 is open, the cylinder 59 can be turned outwardly of rear section 3, so that magazine roll RC can at this time be easily inserted into cylinder 59 through one of its open ends. The free end RCC can also be easily inserted at this time through the lateral slit in the bottom wall of front section 2 or of rear section 3.

While the casing is open, the magazine roll RB can be easily inserted into cylinder 61, through either open end of said cylinder 61. While the casing is open, the free end RBB is easily inserted through a horizontal and lateral slit in the upstanding wall of front section 2. This cylinder 61 may be separable from front section 2.

While the casing is open, the large magazine roll R is inserted into position and its free end RA is led through the slit in the bottom wall of the casing. This slit is preferably in the bottom wall of front section 2a, as in the embodiment of Fig. 2.

As in the previous embodiment, when the cabinet C is closed, the ends of magazine roll R abut the inner faces of the side walls of the closed cabinet. The ends of the other magazine rolls RB and RC also abut the inner faces of the side walls of the closed cabinet.

In the closed cabinet, the free end RA of the web of magazine roll R is pressed between the flexible and resilient cylinders 61 and 59, which are subjected to light compression in the closed cabinet, due to the outer diameters of said cylinders 61 and 59. Hence the non-rotating cylinders 61 and 59 replace the rotatable pressure roll 11 and the rotatable measuring roll 9, in subjecting the free end RA to pressure.

This embodiment of Fig. 8 has no time-delay mechanism.

It is thus possible to dispense three webs of material from a single cabinet, such as three webs of paper of different colors and/or properties. One of these webs may be impregnated with a chemical, such as a deodorant.

Figs. 9 and 10

This embodiment can be used for dispensing a cloth towel.

The spiral magazine roll of cloth toweling 63 is optionally wound upon a rigid core 63a. The front section 65 and the rear section 64 of the cabinet are turnably connected at their tops by hinges which have the usual hinge ears 66 and the usual hinge pintles.

When this cabinet is closed, the side walls of sections 64 and 65 may abut or overlap, as in previous embodiments, and the bottom walls of 64 and 65 may abut each other or overlap.

The bottom of magazine roll 63 is supported upon a cradle 68, which has laterally spaced side walls 68a and 68b and an arcuate bottom wall 69. These side walls 68a and 68b are fixed to respective plates 71a, which have cylindrical bores through which a cylindrical and non-rotatable bar or fixed shaft 70 extends with a close fit. These plates 71a are freely turnable on the fixed shaft 71. Hanger plates 74 have bores through which fixed shaft 70 extends with a close fit. These hanger plates 74 are fixed to a part of the arcuate bottom 69 of cradle 68.

The fixed shaft 70 is fixed at its side ends to supporting plates 71, which are fixed to laterally spaced and angular plates 72, which are fixed by releasable fastening members 73 to the walls of rear section 64.

This magazine roll 63 has a free end E. The front edge of bottom wall 69 of cradle 68 is identified by a non-rotatable cylindrical edge 75 which has a depending plate 76.

The side edge-parts of the free end E of magazine roll 63 contact with laterally spaced and turnable guide rolls 77. Each guide roll 77 is turnable in a socket 77a, which is fixed to the front wall of front section 65. Since these guide rolls 77 are spaced laterally from each other and since the cloth material is easily foldable,

it is easy to thread the free end E between the laterally spaced guide rolls **77**.

Below the guide rolls **77**, the free end E first contacts with a part of the first turnable guide roll **78**, which is fixed to shaft **79**, to which a spur gear **80** is fixed. This shaft **79** has bearings in the vertical, transverse and laterally spaced flanges **72***a* of the side plates **72**.

The turnable roll **78** is associated with a second guide roll **81**, which is fixed to a shaft **82**, which is turnable in bearings in laterally spaced plates **83**, which are fixed by fastening members **84** to said flanges **72***a* of said side plates **72**, which, as previously noted, are fixed to the rear section **64**.

The free end E is then passed through a horizontal and lateral slit in the front wall of front section **65**.

The free end E forms a loop E—E under the bottom wall of the cabinet. This loop has a front inlet leg and a rear return leg.

The return leg of loop E—E passes through a horizontal, lateral slit in the bottom wall of the cabinet, and in contact with a part of a third turnable roll **85**, which is fixed to a shaft **86**, to which the spur gear **87** is fixed. This shaft **86** has bearings in the transverse, laterally spaced flanges **72***a* of the angular plates **72**.

The gears **87** and **80** are equal and mesh with an intermediate equal spur gear **90**, which is fixed to horizontal and lateral shaft **91**, which has bearings in the transverse and laterally spaced flanges **72***a* of angular plates **72**, like the horizontal and lateral shafts **79** and **86**.

The transverse and vertical flanges **72***a* of plates **72** have inclined and laterally spaced slots **89**, in which the end-shaft **88***b* of a take-up roll **88** is slidable and turnable. When a fresh magazine roll **63** is inserted into the cabinet, the end of free end E is fixed to said take-up roll **88**, whose horizontal and lateral shaft **88***b* is at the bottom ends of slots **89** at this time. At this time, the take-up roll **88** is in frictional contact with the third roll **85**. If several layers of the cloth are initially wound upon the take-up roll **88** before closing the cabinet and dispensing the toweling therefrom, the outermost layer of wound-up cloth contacts frictionally with the third roll **85**.

As viewed in Fig. 9, the rolls **78** and **85** are turned counter-clockwise and clockwise, respectively. The roll **85** frictionally turns the take-up roll **88** counterclockwise to wind the cloth spirally upon said take-up roll **88**, and in exact unison with rolls **85**, **78**, **81**, so that the loop E—E is always of the same length. There is good frictional grip between third roll **85** and the cloth which is wound upon the take-up roll **88**, so that a tight, spiral roll of cloth is maintained upon the take-up roll **88** at all times.

As the external diameter of the wound-up cloth upon wind-up roll **88** is increased, with a corresponding decrease in the external diameter of magazine roll **63**, the shaft **88***b* of windup roll **88** slides upwardly in slots **89**, to a final position **88***a*, in which all the material of magazine roll **63** has been wound upon wind-up roll **88**, as indicated by the broken circular line **63***b*.

When the external diameter of the spiral take-up roll on take-up roll **88** is sufficiently large, said take-up roll upwardly tilts the cradle **68** in a counterclockwise direction, as viewed in Fig. 9, until the rounded edge **75** of bottom **69** of cradle **68** finally abuts the top rear of rear section **64**, as indicated in broken lines in Fig. 9.

A compact structure is thus provided, because the spiral roll of soiled toweling takes the space originally occupied by the original magazine roll **63**.

A time-delay mechanism or time-control M of any type can be associated with shaft **79** of the second roll **78**. Without limitation thereto, said time-delay mechanism M may be of the types previously disclosed. The type of Fig. 6 and 7 is preferred.

The second roll **78** may be considered as being the measuring roll in this embodiment. In this embodiment, a pull on the front leg E of the loop E—E is sufficient to

turn said measuring roll **78** through a complete rotation of 360 degrees, before temporarily locking measuring roll **78**.

For this purpose, if the embodiment of Figs. 6 and 7 is used, the spring **20***a* is omitted, and the hook **50***h* and front wall **49***b* are initally located, in the position of Fig. 6, so that cam **49** will be turned through a complete rotation of 360 degrees, before abutting front face **49***b* of cam **49** against wall **50***a* of hook **50***h*.

In order to insert a fresh magazine roll into the cabinet, the front section **65** is turned upwardly around the common axis of hinges **66**, the shaft **88***b* of take-up roll **88** is raised from slots **89** together with the roll of soiled toweling **63***b*, and said take-up roll **88** and its roll **63***b* are removed. The cradle **68** is then free to turn back to its initial position of Fig. 9.

A suitable stop is provided, to prevent cradle **68** from being lowered below its position of Fig. 9. Thus, the hangers, **74** may have stop pins which are slidable in partial grooves of the fixed shaft **70**, so that said stop pins contact with the stop-ends of said grooves when cradle **68** is in the initial position of Fig. 9.

While the cabinet in open, the longitudinal edges of the free end E of magazine roll **63** are inserted between the inner face of the front wall of front section **65** and the rolls **77**; and said free end E is then passed around the respective contacting part of measuring roll **78**, between measuring roll **78** and and its companion roll **81**, and through the slit of front wall of front section **65**. Since the companion roll **81** is pivoted to the bars **83**, which are pivoted by pivots **84** to the transverse flanges of plates **72**, it is easy temporarily to separate roll **81** from roll **78** and from the inner face of the front wall of front section **65**, so that the end E can be easily threaded between rolls **78** and **81**, and between roll **81** and the inner face of the front wall of front section **65**.

Below the roll **85**, the bottom wall of the cabinet is detachable. The entire bottom wall of the cabinet may be detachable.

While the bottom of the cabinet is thus wholly or partially exposed, the free end E is threaded through the slit in the bottom wall of the cabinet, and the top part of free end E is fixed to take-up roll **88**, and the ends of shaft **88***b* are inserted into the slots **89**, so that take-up roll **88** then has the initial position of Fig. 9.

The cabinet is then closed, thus providing a loop E—E.

When this loop E—E becomes soiled, the front leg E is pulled down, thus shifting the entire soiled loop E—E into the cabinet, and exposing a fresh loop E—E.

When the front leg of the loop E—E is pulled down to expose a fresh loop, the measuring roll **78** is turned in unison with front end E through a complete rotation of 360 degrees, and the shaft **79** of roll **78** is then temporarily locked by the time-delay mechanism. The rotation of roll **78** through an angle of 360 degrees will rotate the roll **85** through an angle of 360 degrees, because rolls **78** and **85** have equal diameters and said rolls **78** and **85** are turned in unison through the same angle by means of the intermeshing gears **80**, **90** and **87**.

The linear turning movement of the take-up roll **88** is always equal to the linear turning movement of roll **85**. As soiled toweling is accumulated upon take-up roll **88**, the effect is to increase its original diameter, but the take-up on roll **88** will always be equal in length to the downward movement of the front leg of loop E—E, so that said loop E—E will always be of the same length, with equal front and rear lengths.

As the soiled toweling is accumulated on take-up roll **88**, thus increasing its effective diameter, the outer periphery of said soiled toweling will press against the very smooth and polished bottom face of bottom **69** of cradle **68**, with little or no friction between the soiled toweling and the bottom face of bottom **69**. Hence, after the exterior diameter of magazine roll **63** has been suitably reduced, the increasing diameter of the soiled toweling

upon take-up roll 88 will gradually upwardly tilt cradle 68, without pressing the diminished magazine roll 63 against the stationary walls of the cabinet, until the clean toweling has been substantially wholly used up.

I claim:

1. A towel dispensing device comprising a support for a magazine roll of towel material, said magazine roll having a free pull end, a turnable roll having an inner shaft which is in contact with said free end anterior the outer tip of said free end, said turnable roll being forwardly turnable in unison with said pull end by a pull on said pull end, a control member fixed to the shaft of said turnable roll, one-way time-delay mechanism, an operating member for operating said time-delay mechanism, said operating member being forwardly operable from a normal selected starting position to a final position and being also reversely operable from said final position to said normal selected starting position, said operating member being spring biased into said normal selected starting position, said control member being forwardly turned from selected initial position when said pull end is pulled to turn said roll forwardly, said control member being located to movably abut said operating member and to operate said operating member forwardly when said pull end is pulled, said one-way time-delay mechanism being idle when said operating member is forwardly operated, said operating member having locking means for temporarily locking said control member when said operating member is in its final position, said one-way time-delay mechanism being operatively connected to said operating member to be operated by said operating member when said operating member moves reversely from its final position to its normal selected starting position.

2. A towel dispensing device according to claim 1 in which said operating member is turnable, and said operating member has teeth which are always in mesh with a gear which actuates said time-delay mechanism.

3. A towel dispensing device according to claim 1 in which said control member is temporarily locked before said roll has turned through a complete stroke of 360 degrees, a spring connected to said control member, said spring being idle when said control member is in selected initial position, said spring being extended when said control member is temporarily locked, said extended spring being operative to turn said control member during the remainder of a complete stroke of 360 degrees.

4. A towel-dispensing device according to claim 1, in which said parts are mounted in a cabinet, and said free end extends out of said cabinet in a single leg.

5. A towel dispensing device according to claim 1, in which said parts are mounted in a cabinet, said free end extends out of said cabinet in a loop which has a front leg and a rear leg, said magazine roll is mounted in said cabinet in an upwardly tiltable cradle which is upwardly tiltable from initial position, said cabinet having therein a wind-up core to which the outer end of said rear leg is connected, said cabinet having upwardly-directed guide means in which said wind-up core is turnable and slidable, said wind-up core having an initial position in said guide means in which said wind-up core and the materal wound thereon are below said cradle, said wound material on said wind-up core forming a cylindrical body which abuts said cradle and tilts said cradle upwardly when the outer diameter of said cylindrical body reaches a selected limit.

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