

Oct. 26, 1965

E. B. BAHNSEN

3,214,226

TOWEL DISPENSER

Filed May 10, 1963

5 Sheets-Sheet 1



Oct. 26, 1965

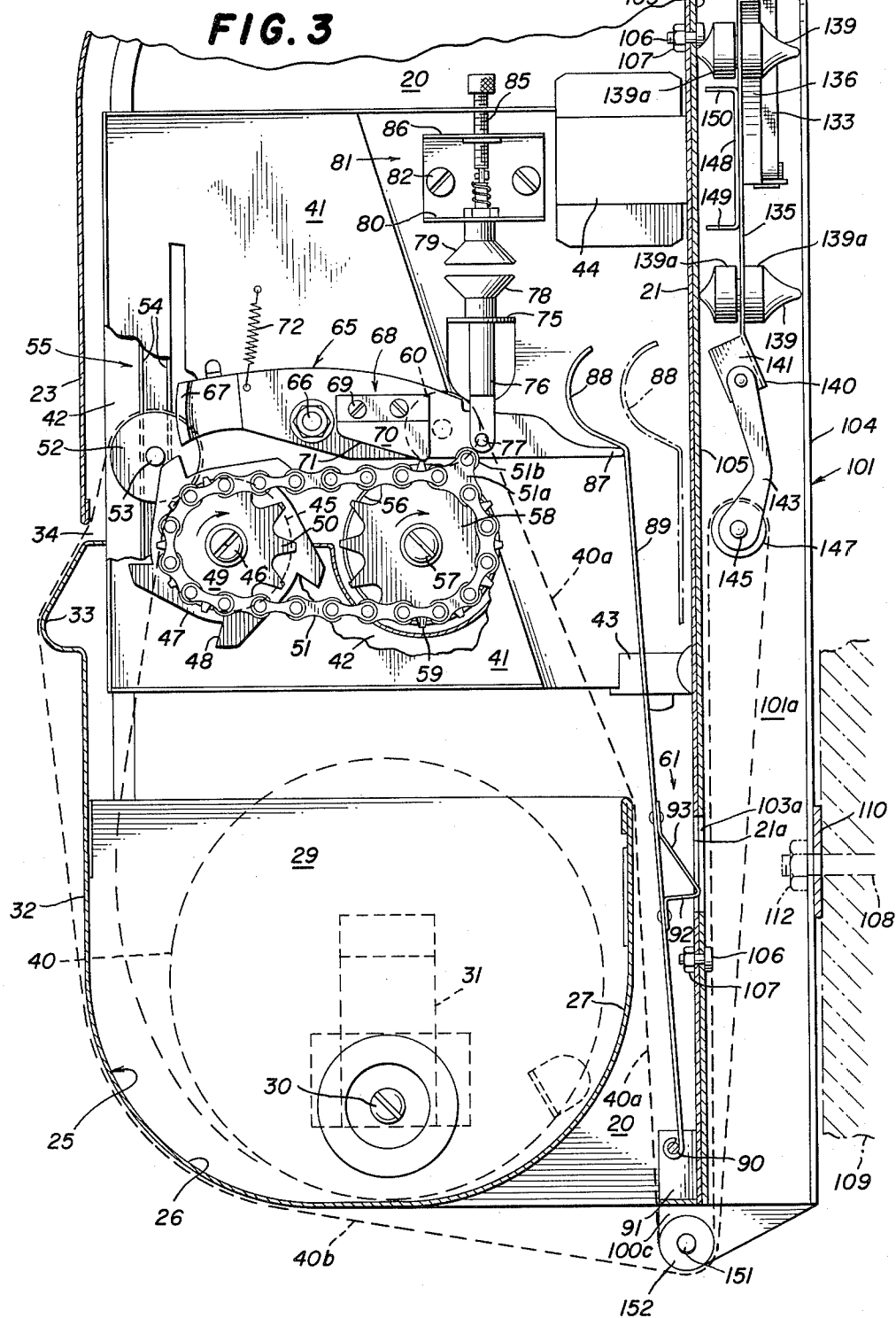
E. B. BAHNSEN

3,214,226

TOWEL DISPENSER

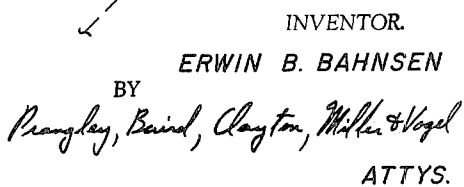
Filed May 10, 1963

5 Sheets-Sheet 2



3,214,226

5 Sheets-Sheet 3



Oct. 26, 1965

E. B. BAHNSEN

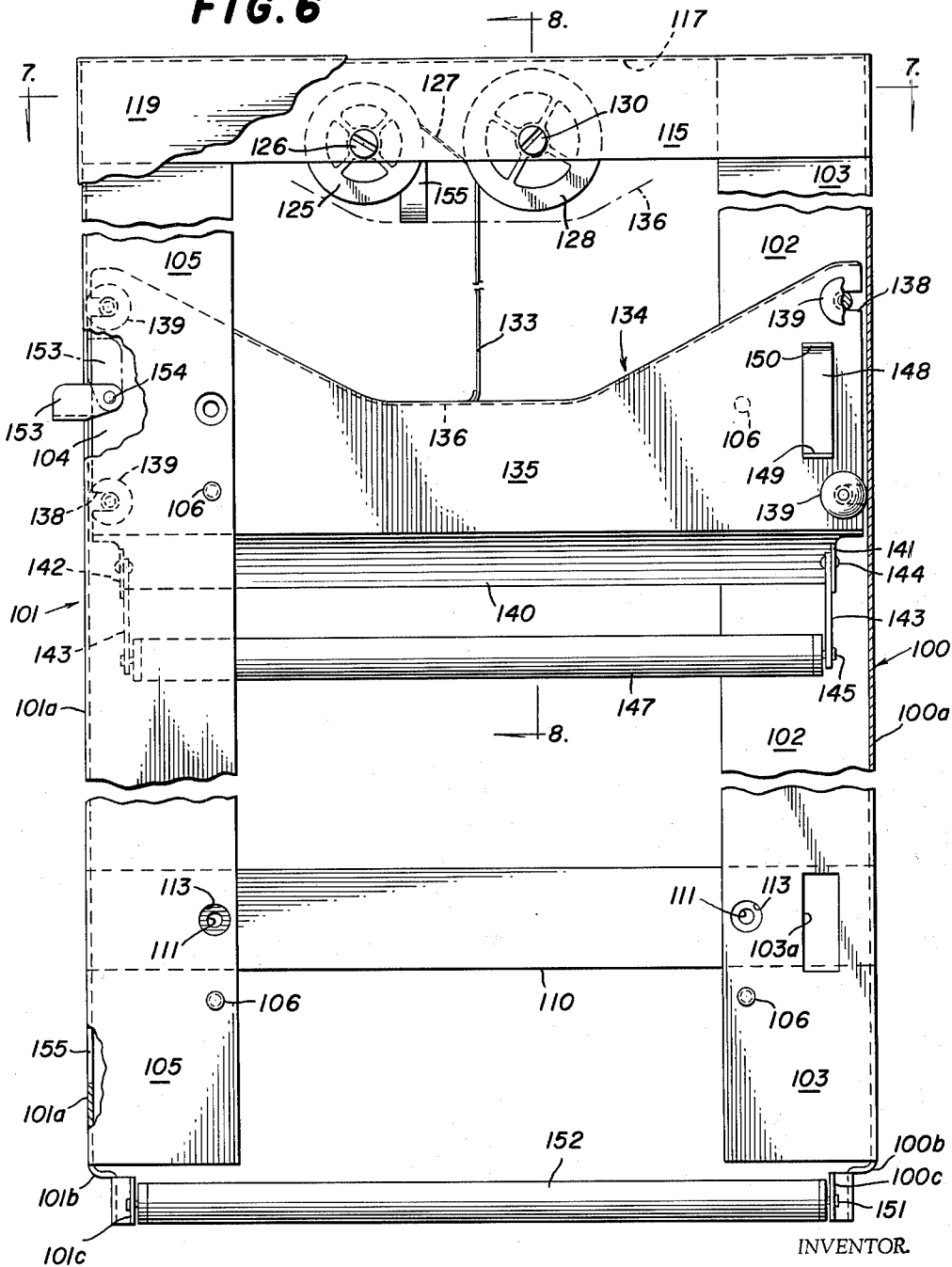
3,214,226

TOWEL DISPENSER

Filed May 10, 1963

5 Sheets-Sheet 4

FIG. 6



INVENTOR.

ERWIN B. BAHNSEN

BY

Pringle, Baird, Clayton, Miller & Vogel

ATTYS.

3,214,226

5 Sheets-Sheet 5

FIG. 7

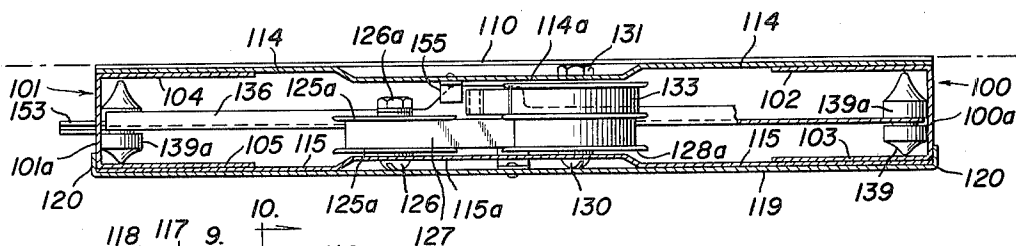


FIG. 9

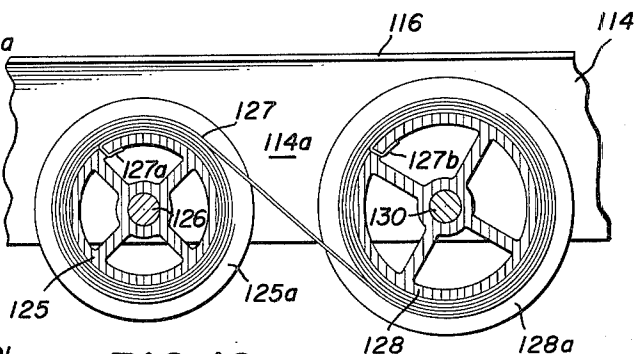


FIG. 10

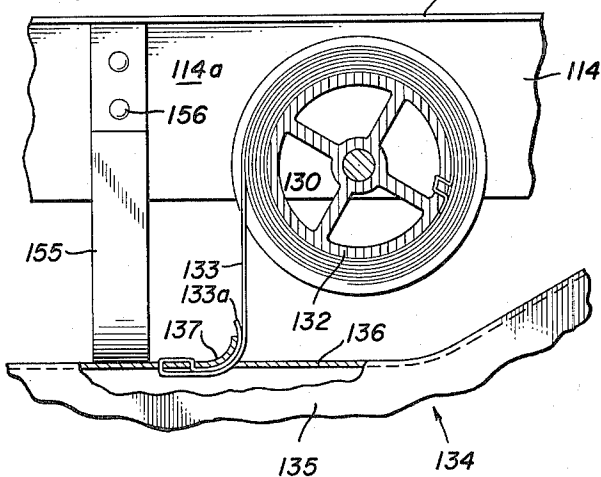
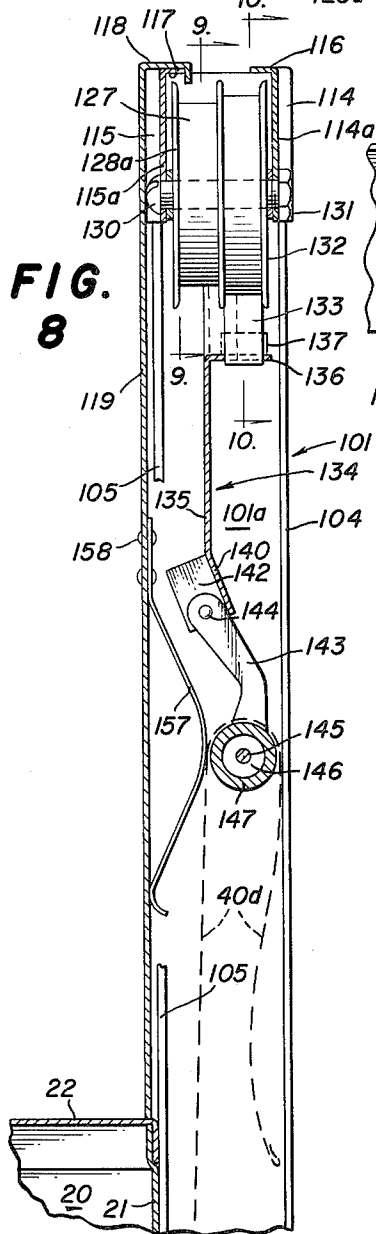


FIG.
8



Pringley, Baird, Clayton, Miller & Vogel
ATTYS.

ATTYS.

1

3,214,226

TOWEL DISPENSER

Erwin B. Bahnsen, Hinsdale, Ill., assignor to Steiner American Corporation, Salt Lake City, Utah, a corporation of Nevada

Filed May 10, 1963, Ser. No. 279,440

3 Claims. (Cl. 312—38)

The present invention relates generally to improvements in dispensing mechanisms, and more particularly to improvements in the operation and construction of towel dispensers which improvements are especially well-adapted for utilization and incorporation in towel dispensers of the so-called continuous type wherein the toweling is made available to the user in the form of a loop of toweling located, in most cases, beneath the dispenser structure.

It is common in towel dispensers of the continuous-towel type to provide a dispensing cabinet having located therein a supply roll of clean toweling in which the toweling may be on the order of as much as 50 yards long. The roll of clean toweling is suitably supported within the dispensing cabinet for rotation, and the clean toweling is commonly fed out of the front portion of the cabinet into a toweling loop which depends beneath the cabinet structure, the front or forward leg of the loop presenting toweling to the user in what may be considered to be a use position, with the loop having a rear leg which extends upwardly into the dispenser cabinet structure. In such prior dispensers, of which the towel dispenser shown in the United States patent to R. G. Birr, No. 2,899,251, is an example, the clean toweling is led over a measuring roll within the dispenser cabinet and around a pinch roll and then out of the forward side of the cabinet into the front leg of the depending towel loop. In most of the prior towel dispensers of that type, the clean toweling from the supply thereof is withdrawn from the cabinet by the operator who grips the forward leg of the depending loop and pulls downwardly thereon. As a length of clean toweling is fed out of the cabinet and into the front leg of the loop, other mechanism within the cabinet simultaneously winds up a substantially equal length of soiled toweling from the rear leg of the loop. In this manner, the depending toweling loop beneath the prior dispensers is maintained, generally speaking, at a substantially constant length.

In prior toweling dispensers of the kind just referred to, it will be appreciated that, after a user has withdrawn a length of toweling from the cabinet and has dried his hands thereon, he walks away from the cabinet and leaves exposed that portion of the toweling which he has just used. Furthermore, those portions of the toweling employed by prior users also constitute a part of the depending, exposed loop of toweling, the rear leg of the depending loop often being soiled throughout its length.

Such depending towel loops in the prior dispensers often present an unpleasant appearance because of their soiled condition, and some health authorities have asserted that, because a subsequent user may grip or handle a portion of the depending towel loop which has previously been soiled, health hazards may be involved. Because the entire front leg of the depending towel loop is readily available to the user in such prior continuous towel dispensers, the user may grip a soiled portion of the front leg of the loop preparatory to withdrawing a new length of clean toweling from the dispenser, and in some cases the user, rather than withdrawing a clean length of toweling, may simply dry his hands on that portion of the depending front leg of the loop which has previously been soiled. Furthermore, since both the soiled portion of the front leg of the loop and the entirety of the soiled rear leg of the loop are available to the user

2

in the prior continuous towel dispensers, some users may handle both of these soiled portions of the loop.

In the prior towel dispensers of the kind referred to above, the trailing end of the toweling drops downwardly and hangs well beneath the dispenser when the supply of clean toweling has become exhausted. Because there is no further clean toweling available to be dispensed, these prior dispensers have no means by which the exposed soiled toweling may be withdrawn into the cabinet. Thus, when the supply of clean toweling becomes exhausted and a new supply of clean toweling is not promptly installed in the dispenser, a series of subsequent users may dry their hands, one after another, on the soiled trailing end of the toweling which hangs beneath the towel-dispensing cabinet. This may constitute a health hazard in certain circumstances and, in any event, the appearance of a hanging, soiled trailing end of toweling is distasteful.

One of the principal objects of the present invention is to overcome and avoid the above objectionable features of prior towel dispensers and to provide a highly-improved towel dispenser wherein soiled toweling is automatically withdrawn from the use position of the toweling when a user has completed his drying operation, thereby avoiding the unpleasant appearance of exposed soiled toweling and avoiding the possible tendency for the next user to handle or use the previously-soiled toweling.

A further object of the present invention is to provide, in an improved towel dispenser of the character just referred to, time-delay means actuated in response to the dispensing of clean toweling to a use position, for use by a first user, and soiled toweling take-up means automatically actuated in response to the timing out of the time-delay means for withdrawing soiled toweling from the use position, thereby minimizing or avoiding the tendency for the next user to handle that portion of the toweling previously soiled. The withdrawal of the soiled toweling in the present invention thus avoids any health problem that may result from having readily available a soiled portion of toweling for use or grasping by a subsequent user, and the present invention avoids the unpleasant appearance presented by exposed soiled toweling.

Still another object of the present invention is to provide, in a continuous-type towel dispenser having the above stated objects and advantages, means for automatically retracting the trailing end of the toweling when the supply of clean toweling has become exhausted, thereby avoiding the unpleasant appearance of a dangling free end of the toweling beneath the dispenser and avoiding the possibility that users may repeatedly use the dangling end of the toweling for drying purposes.

A further object of the present invention is to provide a towel dispenser of the aforesaid kind which is relatively easy to maintain and is relatively easy to load and thread with a new supply of clean toweling. Yet another object of the present invention is to provide simple and relatively-inexpensive means for accomplishing the above-expressed objectives, and to provide such means which, by their nature, may be embodied in many existing towel-dispensing cabinets with a minimum of expense and without extensive modification of the existing portions of the dispensing apparatuses.

Further features of the invention pertain to the particular arrangement and construction of the parts whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its construction and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following description of a preferred embodiment thereof, taken in connection with the accompanying drawings, in which:

FIG. 1 is a schematic, vertical, cross-sectional view

showing certain principal parts of a continuous-type towel dispenser constructed in accordance with the present invention, the path of the toweling being represented by broken lines, and the apparatus being illustrated in the normal condition occupied by the parts thereof after a user has employed the toweling in a drying operation and soiled toweling has been withdrawn from the use position of the toweling;

FIG. 2 is a schematic view similar to FIG. 1, but showing the path of the toweling and the relationship of the parts substantially in the condition occupied thereby when the user has gripped a clean portion of the toweling adjacent the place at which the clean toweling emerges from the front of the cabinet and has pulled downwardly on the toweling to cause a clean length of toweling to be dispensed from the cabinet and to cause a portion of the rear leg of the loop of toweling to be withdrawn from the rear portion of the apparatus, so as to provide a loop of toweling beneath the cabinet of sufficient length to permit the user comfortably and conveniently to dry his hands on the clean front leg of the loop;

FIG. 3 is an enlarged, fragmentary, vertical, cross-sectional view showing the parts of the apparatus as they would be viewed with the wall of the apparatus (nearest to the eye of the viewer) removed, the position of the parts and the position of the path of the toweling corresponding to the positions thereof illustrated in FIG. 1;

FIG. 4 is a fragmentary, cross-sectional view similar to FIG. 3, but showing the position of the parts and the path of the toweling in a use condition corresponding to that illustrated in FIG. 2;

FIG. 5 is a greatly-enlarged, fragmentary view showing the latching action which retains the towel-retracting mechanism in its lowered position (as illustrated in FIG. 4) until a time-delay mechanism times out, whereupon the towel-retracting mechanism is automatically returned or moved upwardly from the position shown in FIG. 4 to the position shown in FIG. 3;

FIG. 6 is an elevational view of the towel-retracting mechanism, taken substantially along the line 6—6 in FIG. 4;

FIG. 7 is a cross-sectional view of the upper portion of the towel-retracting mechanism, taken substantially along the line 7—7 in FIG. 6;

FIG. 8 is an enlarged, fragmentary, vertical, cross-sectional view taken substantially along the line 8—8 in FIG. 6, showing the position occupied by the towel-retracting mechanism when the supply of clean toweling has become exhausted and when the towel-retracting mechanism has been automatically elevated to a position which withdraws into the mechanism the trailing end of the toweling, the trailing end of the toweling being represented in this view by a broken line;

FIG. 9 is an enlarged, fragmentary, cross-sectional view taken substantially along the line 9—9 of FIG. 8, to illustrate a portion of the construction of a substantially constant torque spring-motor embodied in the apparatus for elevating or retracting the towel-retracting mechanism; and

FIG. 10 is an enlarged, fragmentary, cross-sectional view taken substantially along the line 10—10 of FIG. 8, to illustrate a further portion of the means for elevating the towel-retracting mechanism.

For purposes of illustration, the present invention has been shown embodied in a towel-dispensing mechanism of the continuous-towel type and in a mechanism of the broad kind illustrated in the above-mentioned U.S. patent to R. G. Birr, No. 2,899,251. Towel-dispensing cabinets of this general type are provided with a cabinet enclosure having opposite vertical side walls, of which only one is illustrated at 20 in the present drawings (FIG. 1), and having a back wall 21 and a top wall 22. The forward side of the cabinet, in the upper portion thereof, is enclosed by an upper door 23 which may be pivotally mounted, as by a hinge 24, to the forward-edge portion

of the top wall 22, the upper door 23 being pivotal to an open position shown by the broken lines in FIG. 1. The lower portion of the front of the cabinet is occupied by a lower-door construction designated generally by the numeral 25. This lower-door construction is provided at its lower end with a trough-like structure comprising a rounded bottom 26, an upstanding rear wall 27, and opposite upstanding end walls 28 and 29 (FIGS. 2 and 3). The opposite end walls 28 and 29 of the trough-like portion of the lower-door construction 25 are respectively pivotally mounted in any suitable fashion upon and between the inner surfaces of the side walls of the cabinet. Merely for purposes of illustration, this pivotal mounting in the present instance has been shown in FIG. 3 to be comprised of a bolt 30 or the like which extends through the wall 29 and is pivotally received in a suitable bracket structure 31 mounted on the inside of the cabinet wall 20. While only one of the pivotal mountings for the lower-door construction is illustrated in the drawings, it will be appreciated that a similar pivotal mounting is employed in conjunction with the cabinet wall not shown.

From the curved lower portion 26 of the trough-like structure 25, a forward wall 32 extends upwardly to a position adjacent the lower edge of the upper door 23, the uppermost portion of the wall 32 having a protruding lip 33 formed thereon. The uppermost edge of the lip 33 is spaced below the lower edge of the door 23, so as to provide a slot 34 (FIG. 3) through which clean toweling may be dispensed from the cabinet in a manner hereinafter described.

It will be observed that in the particular cabinet structure described above, the upper door 23 and the forward wall 32 of the trough-like lower-door structure 25 comprise the front of the cabinet, while the lower curved wall 26 of the trough structure comprises the bottom of the cabinet, with this bottom of the cabinet being disposed between the lower portions of the two side walls of the cabinet.

A clean towel supply roll 40 lies loosely within the trough-like structure 25, so that the clean roll of toweling may rotate therein and, because of the pivotal mounting of the trough-like structure 25 between the depending outer side walls of the cabinet, the trough-like structure may be pivoted from its closed position (shown in FIGS. 2 and 3) to the broken-line position thereof seen in FIG. 1. Thus, when the upper door 23 has been pivoted upwardly to its broken-line position and the trough-like structure 25 has been pivoted forwardly to the broken-line position thereof shown in FIG. 1, the interior of the cabinet is exposed, and a clean roll of toweling 40 may easily be deposited in the trough-like structure 25.

A suitable lock arrangement, not shown, is normally provided for latching and locking the upper door 23 to the lower trough assembly 25 when the two are in their normal, closed position.

A dispensing mechanism is removably mounted within the cabinet structure just described. The frame of this dispensing mechanism, and the means for its removable mounting within the cabinet, may be identical to that shown in the above-mentioned patent to R. G. Birr, No. 2,899,251. Inasmuch as this particular frame structure and its means for mounting within the cabinet comprise no part of the present invention per se, and inasmuch as the frame structure and its mounting means are fully illustrated and described in the aforementioned Patent No. 2,899,251, they need be only briefly described herein. Suffice it to say that the frame structure is comprised of a pair of upstanding walls 41 and 42 (FIG. 3) which are rigidly secured together in any suitable manner in spaced-apart, upright position, the walls being respectively removably received in hanger brackets 43 and 44 which are suitably fixed on the inner side of the rear wall 21 of the cabinet, the arrangement being such that the dispensing

5

mechanism, including the walls 41 and 42 and the parts mounted thereon, may be removed from the cabinet as a unit, if desired, when the upper door 23 and the lower trough-like assembly 25 are pivoted to their open position.

The dispensing mechanism includes a measuring roll 45 rotatably journaled in any suitable fashion upon and between the walls 41 and 42, one end of the measuring roll 45 having a stub shaft 46 fixed thereon, upon which there is fixed a stop member 47 having a plurality of substantially radially extending stop surfaces 48 thereon. Outwardly of the stop member 47 there is a sprocket 49 fixed upon the stub shaft 46, the sprocket being provided with a plurality of teeth 50 about which there is entrained a link-type chain 51, as shown.

Above the measuring roll 50 and slightly in front thereof, there is a pinch roll 52 disposed between the two walls of 41 and 42. This pinch roll is provided at its opposite ends with stub shafts 53 which are adapted to rotate between, and to move vertically between, pairs of inwardly-directed vertical guide walls 54 (FIG. 3) which may be provided by a pair of U-shaped channel members 55 respectively welded or otherwise secured on the inner surfaces of the walls 41 and 42. With this construction, it will be appreciated that the pinch roll 52 may rotatably ride against the measuring roll 45, but may be raised with respect thereto when the stub shafts 53 on the measuring roll are raised between the walls 54 of the U-shaped channel members 55. Indeed, the space between the upper ends of the walls 54 of each of the U-shaped channel members may be open, so that the pinch roll may be lifted out of the cabinet, if desired, when a new roll of clean toweling 40 is being installed, or in the event it should become desirable to remove and replace the dispensing unit without removing the entirety of the toweling.

The dispensing unit per se also includes a towel take-up drive roll 56 suitably journaled for rotation between the walls 41 and 42, one end of this drive roll having a stub shaft 57 fixed thereto upon which there is fixed another sprocket 58 having a plurality of teeth 59 thereon engaged by the chain 51. Above the take-up drive roll 56, and adapted to ride thereon, there is a towel take-up roll 60, the towel take-up roll 60 being arranged to rest by gravity on the take-up drive roll 56, so that, when the roll 56 is rotated, the roll 60 and toweling to be wrapped thereon will correspondingly be rotated in the opposite direction.

The path followed by the toweling leads initially upwardly from the clean towel supply roll 40, across a segment of the periphery of the measuring roll 45, and then around the pinch roll 52 and thence outwardly through the opening 34 between the upper door 23 and the lower trough-like door assembly 25, as shown in the drawings. From this opening 34, the toweling extends downwardly across the protruding lip 33 on the lower-door face 32. The path thereafter followed by the toweling will be hereinafter described in detail, but it may now be noted that the toweling ultimately returns to the interior of the cabinet along a path 40a leading upwardly through a space 61 provided between the rear wall 27 of the trough-like lower-door structure 25 and the inner surface of the rear wall 21 of the cabinet housing. The returning path 40a of the toweling may engage the uppermost portion of the rear wall 27 of the trough-like lower-door structure 25, and the path thereupon leads upwardly to the towel take-up roll 60, about which the toweling is wrapped. This returning toweling, which moves along the path 40a, as will be subsequently explained, is soiled or used toweling.

In view of the foregoing initial brief description of a portion of the path followed by the toweling, it will be understood at this stage of the description that, if a user grips the clean toweling at the front of the cabinet immediately below the protruding lip 33 and pulls downwardly on the toweling, the downward pull will urge the pinch roll 52 downwardly toward and into pressing engagement with the surface of the measuring roll 45, with a

6

thickness of the toweling therebetween, and a clean length of toweling will be dispensed through the opening 34 in the front of the cabinet, the measuring roll 45 being rotated in a clockwise direction during this operation, and the pinch roll 52 being rotated in the counterclockwise direction, as viewed in the drawings. By reason of the endless link-type roller chain 51, which is entrained about both the sprocket 49 on the measuring roll and the sprocket 58 on the take-up drive roll 56, the drive roll 56 will be rotated simultaneously in a clockwise direction with the rotation of the measuring roll 45 and with the dispensing movement of the clean or fresh toweling. This clockwise rotation of the take-up drive roll 56 drives the take-up roll 60 in the counterclockwise direction, as viewed in the drawings, thereby causing to be rolled up on the take-up roll 60 a length of soiled toweling substantially equal to the length of clean toweling dispensed through the opening 34 at the front of the cabinet. Thus, during this dispensing and take-up action, the total length of toweling extant between the opening 34 at the front of the cabinet and the space 61 at the rear of the trough-like lower-door construction 25 will remain substantially constant.

The chain 51 has one elevated link 51a therein which carries a cam roller 51b. Above the sprockets 49 and 58, and above the chain 51 a stop lever 65 is pivotally mounted, as by a stud 66 or the like, upon the outer side of the wall 41. The left end of the stop lever 65, as viewed in FIGS. 3 and 4, is provided with a stop nose 67 adapted to engage the stop surfaces 48 of the stop member 47. To the right of its point of pivotation, the stop lever 65 is provided with a cam member 68 which may be secured to the stop lever 65 as by screws 69. This stop cam 68 may be formed of heavy sheet metal, and it is provided with an outwardly flared skirt portion 70, the lower edge 71 of which is directly above the chain 51 and in the path of the cam roller 51b on the chain and is adapted to be engaged by that roller.

In its normal condition, the stop lever 65 is retained in the position shown in FIG. 3 by a coiled tension spring 72, one end of which is attached to the stop lever 65 and the other end of which is attached in any suitable fashion to the wall 41. When a user approaches the cabinet and grips the toweling below the lip 33 on the front of the cabinet and pulls downwardly to dispense a clean length of toweling, the chain 51 is driven by the sprocket 49 in a clockwise direction from the position illustrated in FIG. 3. Shortly before the chain completes one revolution, the roller 51b on the link 51a will engage and begin to ride along the lower cam surface 71 on the cam member 68 of the stop lever 65. This engagement of the cam roller 51b and the movement thereof along the cam surface 71 causes the stop lever to be pivoted in a counterclockwise direction against the force of the tension spring 72.

The right-hand end portion of the stop lever 65, as viewed in FIGS. 3 and 4, cooperates with a time-delay mechanism which may be of any suitable, well-known construction, but which is here shown to be substantially identical in structure to the time-delay mechanism illustrated and described in the R. G. Birr Patent No. 2,899,251, above referred to, this particular time-delay mechanism being the subject matter of another patent issued to R. G. Birr, No. 2,940,720. Inasmuch as the details of the structure of the illustrated time-delay mechanism are clearly and fully described at great length and in every particular in the two patents just referred to, such description will not be necessary here. For present purposes, it will be sufficient to state that a portion of the wall 41 is punched outwardly to provide an outwardly projecting table-like finger 75 above the right-hand end portion of the stop lever 65. This finger 75 has an opening therein in which there freely passes, in reciprocating fashion, a rod 76, the lower end of the rod 76 being pivotally mounted, as by a pin 77, to the right-hand end portion of the stop lever 65. The upper end of the rod 76

has fixed thereon a suction cup 78 of rubber or the like adapted to cooperate with an upper suction cup 79 which is fixedly mounted in a lower outwardly projecting flange 80 of a bracket 81 fixed, as by screws 82 or the like, upon the outer surface of the wall 41. The upper suction cup 79, as fully shown in the patents above referred to, has a metal core 83 therein which is provided with an axial bore within which there is a needle valve member 84, the valve position of which needle member is controlled by an adjusting screw 85 threadedly supported in an outwardly projecting upper flange 86 provided on the bracket 81. The inside of the upper suction cup 79 is provided with a small axially-arranged air passage which communicates with the axial bore of the core member 83. Thus, it will be understood that, when the lower suction cup 78 is moved upwardly and pressed into flexing and compressive engagement with the upper suction cup 79, air will be expelled from between the two and the two cups will adhere to each other for a predetermined length of time, that length of time being dependent upon the adjusted valving position of the needle 84 within the core 83, both of the latter of which are adapted to cooperate, as a valve and seat to bleed air at a predetermined adjustable rate into the space between the compressed suction cups 78 and 79. When the vacuum between the cups has thus been dissipated, the cups will tend to separate.

The movement together of the suction cups 78 and 19 of the time-delay apparatus just described is accomplished by the camming action of the cam roller 51b upon the lower cam surface 71 of the cam member 68 on the stop lever 65. As the roller 51b moves under the cam surface 71 during the towel dispensing operation, the stop lever 65 is pivoted in the counterclockwise direction, as previously described, thereby elevating the right-hand end portion of the stop lever 65, as viewed in FIGS. 3 and 4, to move the rod 76 upwardly and thereby forcefully engage the lower suction cup 78 with the upper suction cup 79. The accomplishment of this mating of the two suction cups is illustrated in FIG. 4. Immediately after the cam roller 51b has elevated the stop lever 65 in the manner just stated, the roller 51b passes beyond and free of the cam surface 71, and immediately thereafter one of the stop surfaces 48 of the stop member 47 comes into abutting and stopping contact with the now lowered stop nose 67 of the stop lever 65, thereby halting the rotation of the measuring roll 45 and stopping the dispensing of fresh toweling through the opening 34 in the front of the cabinet. A predetermined amount of fresh toweling thus will have been dispensed. Subsequently, when the suction between the cups 78 and 79 has become dissipated, the cups will part, and the stop lever 65 will be disengaged from the stop surface 48 of the stop member 47, and the stop lever 65 will be restored to its initial position (shown in FIG. 3) by the coil spring 72, thereby preparing the dispensing mechanism for another dispensing operation.

The relative diameters of the measuring roll 45 and the take-up drive roll 56, and the relationship between the number of teeth on the sprockets 49 and 58, if desired, may be such as that described in the above mentioned R. G. Birr Patent No. 2,899,251, so that the measuring roll will be stopped at different angular positions on successive stops, for the purposes described in that patent.

It will be observed that the right-hand end portion of the stop lever 65 is provided with a projecting nose portion 87. This nose portion is adapted to cooperate, in a camming fashion, with a curved, upper-end portion 88 of a lever 89 which is pivotally mounted at its lower end upon a pin 90 carried upon a bracket 91 suitably mounted, as by welding or otherwise, upon the lowermost portion of the rear wall 21 of the cabinet housing, the lever 89 being disposed in alignment with the plane of the stop lever 65. Intermediate its length, the lever 89 is provided with a rearwardly projecting angular bracket having one

leg 92 disposed at a position substantially normal to the body of the lever 89. The outermost end of the bracket leg 92 is joined to a diagonally-disposed and upwardly inclined bracket leg 93 by a rounded nose portion 94, as perhaps best seen in FIG. 5. The bracket legs 92 and 93 may be integral, as shown, with the upper end of the leg 93 and the inner-end portion of the leg 92 being secured to the lever 89 as by rivets or the like.

It may be noted at this stage of the description that, as the stop lever 65 is pivoted in the counter-clockwise direction in the manner above described, the nose 87 of the stop lever is raised upwardly along the curved, upper-end portion 88 of the lever 89, so as to pivot the lever 89 from the position thereof shown in full lines in FIG. 3 to the broken-line position thereof, this latter position also being shown in full lines in FIG. 4. This pivotation of the lever 89 causes the legs 92 and 93 of the bracket thereon to be projected rearwardly through an opening 21a provided in the rear wall 21 of the cabinet housing. The purpose of this action will be fully described hereinafter.

An upstanding frame assembly or secondary housing is secured to the rear side of the rear wall 21 of the cabinet housing for containing a towel-retraction mechanism. This frame assembly or secondary housing is fully illustrated in the drawings and is comprised of two upstanding U-shaped channel members 100 and 101 having intermediate webs 100a and 101a. The channel member 100 is provided with inwardly-directed flanges 102 and 103, and the U-shaped channel member 101 is provided with inwardly directed flanges 104 and 105. The flanges 103 and 105 of the respective channel members 100 and 101 are secured to the rear side of the rear wall 21 of the cabinet housing, as by a plurality of bolts 106 and nuts 107 (FIG. 3). It will thus be understood that the entire frame assembly about to be described, together with the towel-retracting mechanism contained therein, may be easily and conveniently removed from the towel-dispenser housing, so that the above-described towel-dispenser housing and the towel-dispensing parts therein may be utilized in the manner disclosed in the above-mentioned R. G. Birr Patent No. 2,899,251. Conversely, it will be appreciated by those skilled in the art, as the description proceeds, that the frame structure and towel-retracting mechanism about to be described may easily be added to existing towel-dispensing mechanisms of the general kind disclosed in said R. G. Birr Patent No. 2,899,251, with a few relatively inexpensive but fundamental modifications of the prior structure.

In the present instance, the secondary housing or frame structure, which is secured to the rear wall 21 of the cabinet housing in the manner above described, may itself be utilized for mounting the cabinet housing upon a wall. This mounting is illustrated in FIG. 3, where bolts 108 mounted in a wall section 109 are shown to extend outwardly from the wall. A transverse brace member 110, which may be welded or otherwise secured to the flanges 102 and 104 of the channel members 100 and 101, is located at the position of the studs 108, and suitable openings 111 are provided in both the brace member 110 and the flanges 102 and 104 for receiving the studs 108. Nuts 112 are provided on the threaded ends of the studs 108, thereby to secure the upright channel members 100 and 101, and thus the entire cabinet housing, upon the wall 109. It will, of course, be appreciated that, in the structure illustrated, it is desirable that the frame structure comprising the upright channel members 100 and 101 be first mounted upon the wall, and that the dispenser housing thereafter be mounted upon the channel members with the use of the bolts 106 and the nuts 107, the nuts 107 being accessible from within the interior of the cabinet housing. In order that access may be had to the nuts 112 before the cabinet housing is applied to the upright channel members 100 and 101, the flanges 103 and 105 may be provided with

over-size openings 113 directly opposite the openings 111 in the flanges 102 and 104, as shown in the lower portion of FIG. 6.

The upright channel members 100 and 101 are firmly secured together adjacent their lower ends by the transverse brace member 110, previously referred to, and they are secured together at their upper ends by a pair of additional transverse members. One of these latter members is designated by the numeral 114 (see FIG. 7), and this transverse member is spot-welded or otherwise secured at its opposite ends to the flanges 102 and 104 at their upper ends. The other transverse member is designated by the numeral 115, and it is secured, as by spot-welding or the like, to the flanges 103 and 105 opposite the member 114. The upper-edge portion of the transverse member 114 is provided with an inturned flange 116 (FIG. 8) to provide additional rigidity thereto, and the transverse member 115 is provided with a similar inturned flange 117 which not only provides added rigidity but also provides a seat for an upper flanged portion 118 formed on the upper-edge portion of a cover panel 119 which overlies the forward side of the upright frame assembly and serves as a cover therefor. The panel 119 may have rearwardly-turned side flanges 120 (FIG. 7) which overlie the outer surfaces of the web portion 100a and 101a of the respective U-shaped channel members 100 and 101, and the lower end of the cover panel 119 extends downwardly to the upper wall 22 of the cabinet housing. If desired, the lowermost end of the cover plate 119 may lie behind the rear wall 21 of the cabinet housing, so that, when the cabinet housing is bolted upon the flanges 103 and 105 of the upright channel members 100 and 101 with the use of the bolts 106 and nuts 107, the lowermost-edge portion of the panel 119 will be clamped between the rear wall 21 of the cabinet housing and the flanges 103 and 105, thereby to prevent undesired removal of the panel 119.

The central portions of the transverse members 114 and 115 are recessed, as at 114a and 115a (FIG. 7), and between these recessed portions of the transverse members 114 and 115 there is mounted a spring motor of a well-known commercially available type adapted to provide substantially-constant torque. This spring motor is comprised of a wheel 125, of plastic such as nylon or polyethylene or the like, rotatably mounted upon a pin 126 fixed in the recessed portion 115a of the transverse member 115. The pin 126 may be in the form of a bolt having a nut 126a thereon, as shown in FIG. 7. The wheel 125 is provided with peripheral side flanges 125a (FIG. 9), and tightly wrapped about the wheel 125 there is a long, ribbon-like, leaf spring 127 having a natural spring curvature conforming to the direction of curvature of that portion of the spring shown to be wrapped in FIG. 9 on the wheel 125. The innermost end of the spring 127 is secured to the wheel 125 by a hook portion 127a formed on the innermost end of the spring 127 extending through a suitable slot in the periphery of the wheel 125. Alongside the wheel 125 of the spring-motor assembly, there is a second wheel 128 of larger diameter than the wheel 125, the wheel 128 being rotatably mounted upon a pin 130 which is fixed across, and in both, the recessed portion 115a of the transverse member 115 and the recessed portion 114a of the transverse member 114. The wheel 128, like the wheel 125, may be formed of plastic material such as nylon or the like, and it is provided with peripheral flanges 128a. That end of the long, ribbon-like, leaf spring 127 opposite the end which is attached to the wheel 125, is attached and secured to the wheel 128 by means of a hook portion 127b formed on the latter end of the spring 127 and received in a suitable slot provided in the wheel 128 (FIG. 9). As previously stated, that portion of the spring 127 which is wound on the wheel 125 is wound thereabout in conformity with the natural curvature of the spring 127. That portion of the spring 127 which

is wound on the wheel 128, however, is wound on the latter wheel in a direction that is opposite the natural curvature of the spring 127. As a result, the spring 127 constantly tries to wind itself back onto the wheel 125, thereby producing in the wheel 128 a substantially constant torque about the axis of the wheel 128, which torque seeks constantly to cause the wheel 128 to turn in the clockwise direction, as viewed in FIG. 9. It will be appreciated that, when a torque is applied to the wheel 128 in a direction opposite the torque supplied thereto by the spring 127, both the wheel 125 and the wheel 128 will be rotated in a direction which winds the spring 127 from the wheel 125 onto the wheel 128. When the externally-applied torque is relieved from the wheel 128 or is reduced, the force of the spring causes the spring 127 to be wound back onto the wheel 125.

The pin 130, upon which the wheel 128 is rotatably mounted, may comprise a bolt, as seen in FIGS. 7 and 8, supplied with a suitable nut 131. Also rotatably mounted upon the pin 130 and fixed to the wheel 128 is a further wheel 132. In the preferred form, the wheel 132 is molded as an integral unit with the wheel 128, although this is not essential, the important feature being that the wheel 132 is rotatably fixed with respect to the wheel 128. The wheel 125 and the wheels 128 and 132, in the preferred embodiment, are molded of linear polyethylene, but other materials may of course be used.

The wheel 132 is peripherally flanged and has a tape 133 wound thereon, the innermost end of the tape being secured to the wheel 132, as by looping the tape through double slots provided in the wheel, as illustrated in FIG. 10. The tape may be formed of any suitable, strong, flexible material such as woven fabric or any of a variety of suitable commercially-available strong and flexible, synthetic, organic plastics. The tape that is presently preferred is a commercially available tape comprised of a "Mylar" film bonded to a vinyl film. This gives the desired flexibility and strength and lends itself well to the manner in which the tape is attached to the wheel 132, as above described, and to a towel-retracting slide assembly 134, as will be later described, it being noted that no holes are needed in the tape and no screws or the like are employed in attaching the tape to the wheel 132 or to the towel-retracting slide assembly. This latter feature, and the manner employed for attaching the tape, makes it easy to replace the tape in the field, if desired or necessary, largely without the use of tools or special tape attaching materials.

The outer end of the tape 133 is secured to a towel-retracting slide assembly designated generally by the numeral 134, as just suggested. This towel-retracting slide assembly is formed, in part, by a metal slide-plate or sheet 135 which may be suitably rigidified by embossments (not shown). The upper-edge portion of the metal-slide plate 135 slopes downwardly from its opposite or lateral ends toward its center portion, as best seen in FIG. 6, and the upper-edge portion of the metal sheet is provided with a rigidifying, rearwardly-projecting flange 136. The free end of the tape 133 is secured to this flange 136 at approximately the vertical center line of the sheet 135. For this purpose, a portion 137 of the flange 136 is struck upwardly to provide a gentle curve on its under surface, as best seen in FIG. 10, the end of the tape 133 being led around and beneath the upwardly-curved portion 137, then upwardly through a first slot through the flange 136, and then in reverse direction through a second slot in the flange, with the extreme end 133a of the tape underlying the outer portion of the tape which bears against the curved finger-like portion 137, as illustrated in FIG. 10. It will thus be appreciated that the tape 133 may easily be attached to the slide assembly 134 in the field, and that a pulling action on the tape 133 by the metal sheet 135 or the assembly 134 will cause an increase in the binding of the overlapped tape portions where the tape is secured to the sheet 135.

The tape 133 is thus securely anchored to the towel-retracting slide assembly 134, it being understood that the action of the spring motor previously described constantly causes the slide assembly to be urged upwardly.

The lateral side edges of the slide assembly 134, in the embodiment of the invention shown, are each provided with a pair of inwardly-extending slots 138. In each of these slots there is loosely and rotatably disposed a roller member 139. The shape and configuration of these roller members are perhaps best seen in FIGS. 3, 4 and 7. The roller members 139 are preferably identical in construction and each is preferably formed as a single piece of molded, linear polyethylene. The central portion 139a of each roller 139 is cylindrical in shape and is provided therein with a short section of reduced diameter having a size slightly smaller than the width of the slots 138. This permits the rollers to be slipped into the open-ended slots 138 and to be rotatably mounted therein, the depth of the slots 138 being such that the outer peripheries of the rollers 139, in the region of their cylindrical central portions 139a extend outwardly slightly beyond the lateral edges of the slide assembly 134, so that the cylindrical surfaces at the central portions 139a of the rollers 139 will ride on the inner surfaces of the webs 100a and 101a of the respective upright channel members 100 and 101 of the frame structure. The opposite ends, axially speaking, of the rollers 139 are generally conical in shape, with each end terminating in a gently-rounded tip. Thus, the opposite end tips of the rollers 139 on the right-hand side of the upright frame assembly, as viewed in FIG. 6, are adapted to ride along and contact the inner surfaces of the flanges 102 and 103 of the upright channel member 100. On the other hand, the opposite tip portions of the rollers 139 on the left-hand side of the assembly 134, as viewed in FIG. 6, are adapted to contact and ride along the inner surfaces of the flanges 104 and 105 of the upright channel member 101. Thus, it will be understood that the channel members 100 and 101 serve as a track for the towel-retracting slide assembly 134, the rollers 139 serving as guide bearings for the towel-retracting slide assembly and serving to guide the assembly as it moves upwardly and downwardly within the channel members 100 and 101, keeping the metal parts of the towel-retracting slide assembly 134 out of contact with the upright channel members 100 and 101.

The inwardly-turned flanges 116 and 117, which are formed along the upper edges of the respective transverse frame members 114 and 115 (FIG. 8) preferably terminate well short of the opposite ends of the transverse frame members 114 and 115, so that the towel-retracting slide assembly, with the rollers 139 already deposited in the slots 138, may be inserted into the frame assembly from the top thereof before the spring-motor mechanism comprising the wheels 125, 128, and 132 is installed between the transverse frame members 114 and 115. So that the towel-retracting slide assembly 134 may be installed in this manner in its sliding position within the upright channel members 100 and 101, it is desirable that the rearwardly-turned flange 136 on the upper edge of the assembly 134 be of a width which will permit it to pass downwardly between the opposed inner ends of the flanges 116 and 117 (see FIG. 8).

The lower edge of the metal sheet 135, which forms the main portion of the towel-retracting slide assembly 134, is formed or bent rearwardly, as at 140 (FIGS. 6 and 8), and the opposite-end portions of this rearwardly-bent flange-like element 140 has a pair of forwardly projecting ears 141 and 142 formed thereon. On each of these ears 141 and 142 a slightly elbow-shaped bracket 143 is pivotally mounted as by a rivet 144, the two brackets 143 being identical and being generally of the shape best illustrated in FIGS. 3, 4, and 8. Between the outer or lower ends of the brackets 143 there is secured a rod 145, and upon this rod there is rotatably mounted a tubular metal core 146, the latter of which is covered

by any suitable cylindrical fiber sheath 147, it being understood that the core 146 and the sheath 147 thereon are adapted to rotate as a unit on the rod 145.

The forward face of the metal plate 135 of the towel-retracting slide assembly 134 has welded or otherwise fixed thereto a U-shaped bracket 148 having a pair of vertically spaced-apart, forwardly-projecting legs 149 and 150. These legs 149 and 150 are in vertical alignment with the legs 92 and 93 of the previously mentioned bracket that is secured to the intermediate portion of the previously-mentioned lever 89, and the legs 149 or 150 are adapted to engage the legs 92 and 93 of the bracket on the lever 89 when the legs 92 and 93 project rearwardly through the opening 21a in the rear wall 21 of the cabinet housing, and through a mating opening 103a (FIG. 6) provided in the flange 103, into the path of the legs 149 and 150 as and when the towel-retracting slide assembly 134 is lowered in a manner hereinafter described.

The lowermost ends of the outer webs 100a and 101a of the respective upright channel members 100 and 101 extend below their respective adjacent inwardly-directed flanges 102, 103, 104, and 105. These downwardly-extending extensions of the webs 100a and 101a are designated respectively by the numerals 100b and 101b in FIG. 6. The extensions 100b and 101b are bent inwardly and then downwardly, as best seen in FIG. 6, to provide forwardly-projecting ears 100c and 101c. The ears 100c and 101c extend forwardly to a position somewhat ahead of the plane of the rear wall 21 of the cabinet housing, and between the forwardly-extending ears 100c and 101c there extends a shaft 151 upon which there is rotatably mounted a roller 152 which may be of a construction identical to the previously-described roller 146, 147.

As will be subsequently described, the towel-retracting slide assembly 134 is raised by the action of the spring motor described earlier herein, and it is lowered by the action of toweling which is entrained above the roller 146, 147. At this stage of the description of the apparatus, however, it may be noted that the towel-retracting slide assembly 134 may be lowered manually by means of a key 153 which is pivotally mounted, as by a rivet 154 upon the left-hand edge portion of the towel-retracting slide assembly, as viewed in FIG. 6. The web 101a of the upright channel member 101 is provided with a vertical slot 155 throughout substantially its entire length, so that the key may be pivoted outwardly from the broken-line position thereof shown in FIG. 6 to the full-line position thereof and thereafter be used manually to pull the towel-retracting slide assembly downwardly against the force of the spring-motor assembly. As will be explained more fully hereinafter, it is desirable to lower the towel-retracting slide assembly manually in this manner preparatory to threading the dispenser assembly with fresh toweling.

The upper limit of movement of the towel-retracting slide assembly 134 is determined by a leaf spring 155, secured at its upper end, as by rivets 156, on the inner surface of the transverse frame member 114 (FIG. 10). The lowermost end of the leaf spring 155 may be gently curved rearwardly, and this lower end is engaged by the flange 136 on the towel-retracting slide assembly 134, thereby to define the uppermost limit of movement of the slide assembly 134. This uppermost position of movement is represented in FIG. 6 by the broken line 136.

Another spring cooperates with the slide assembly 134, or at least a portion thereof, when the assembly is in its uppermost position. This latter-mentioned spring is designated by the numeral 157 and is shown in FIG. 8. The spring 157 is secured, as by rivets 158, to the inner surface of the upstanding cover plate 119. As seen in FIG. 8, the spring 157 is bowed inwardly and then back toward the cover plate 119, the spring 157 having a free end which bears on the cover plate 119. As will be later explained, this spring 157 cooperates with the roller 146, 147 to hold

and retain the free end of the toweling in an elevated and withdrawn or retracted position within the upstanding frame assembly when the supply of fresh toweling 40 has become exhausted and when the towel-retracting slide assembly 134 has thereupon been raised to its uppermost position by the action of the previously-described spring motor.

In the normal condition of the dispensing apparatus just described—that is, when it is approached by a user—the toweling and the parts of the dispensing apparatus are in the positions thereof illustrated in FIGS. 1 and 3. In this condition, it will be observed that the toweling leads from the opening 34 in the front of the housing downwardly across the protruding lip 33 and then downwardly in a toweling leg 40b which extends around the rounded, lower-front portion of the trough-like, lower-door assembly 25, and then rearwardly around the roller 52 and upwardly within the upstanding frame assembly. Within the frame assembly the toweling extends upwardly around the rear side of and over the roller 146, 147 and then downwardly, again around the roller 152 and thence upwardly along the path 40a to the toweling take-up roll 60. In this condition the towel-retracting slide assembly 134, which carries the roller 146, 147, is in an intermediate elevated position and is being urged upwardly by the spring-motor assembly previously described. Thus, the leg 40b of the toweling beneath the cabinet is held firmly upwardly against the lower portion of the cabinet, and there is no part of the toweling dangling or hanging beneath the dispensing structure. A relatively small portion of the toweling in the path 40b directly beneath the dispenser structure will no doubt be soiled from prior use, and all of the toweling within the upright frame structure and within the path 40a in the cabinet housing may be considered to be soiled toweling.

When the user approaches the dispenser in the condition just described, he will see only the clean toweling which extends in a gentle, taut condition downwardly across the projecting lip 133 on the front of the cabinet. Thus, when the user desires to withdraw toweling from the cabinet for use for drying purposes, he will grip the lateral clean edges of the toweling beneath the protruding lip 33, the toweling in this area being spaced forwardly of the front surface 32 of the trough-like lower-door assembly by the lip, to provide easy gripping. The user will then pull downwardly and somewhat outwardly on the toweling in the manner illustrated in FIG. 2. This downward and outward pull accomplishes two results. The pull causes new and fresh toweling to be withdrawn from the clean supply roll 40 and upwardly across the measuring roll 45 and around the pinch roll 52 and out of the front opening 34 to provide a clean and fresh leg of toweling 40b, as shown in FIG. 2. At the same time, the downward and slightly outward pull on the toweling will draw the towel-retracting slide assembly 134 downwardly from the position thereof shown in FIG. 3, substantially to the position thereof shown in FIG. 4, to provide a rear leg of toweling 40c, thereby to provide a loop of toweling beneath the dispenser structure of a length suitable for the convenient drying of the user's hands, the lower portion of the clean leg of toweling 40b being toweling which is in a use position below and free of contact with the under portion of the cabinet. As the user or operator pulls downwardly and outwardly on the toweling, as seen in FIG. 2, the measuring roll 45 is rotated, as previously described, and the chain 51 is thereby propelled in the clockwise direction to rotate the take-up drive roll 56 and consequently to rotate the take-up drive roll 60. Thus, as the towel-retracting slide assembly 134 is pulled downwardly to feed the double leg of accumulated toweling out of the upright frame assembly to provide toweling for the leg 40c of the loop, a length of soiled toweling, substantially equal to the length of new toweling withdrawn from the opening 34, will be drawn upwardly along the path 40a and will be wound about the toweling take-up roll 60. As the chain

51 rotates, the cam roller 51b thereon will come into lifting contact with the lower cam surface 71 on the cam member 68, thereby rotating the stop lever 65 in the counterclockwise direction to press the two suction cups 78 and 79 together, thereby to begin a timing operation. Immediately after causing the stop lever 65 to be rotated in the manner just described, the cam roller 51b will move free of the cam surface 71 to approximately the solid-line position of the roller shown in FIG. 4, and one of the stop surfaces 48 on the stop member 47 will come into stopping engagement with the stop nose 67 on the stop lever 65, thereby stopping the withdrawal of fresh toweling from the opening 34 into the fresh toweling leg 40b.

The pull on the toweling, as previously described, will have pulled the towel-retracting slide assembly 134 downwardly to its lower position, and, as the stop lever 65 is pivoted in its counter-clockwise direction, the camming nose 87 on the right-hand end of the stop lever 65 will be moved upwardly along the forwardly-curved portion 88 at the upper end of the lever 89, thereby to move the lever 89 into the position thereof illustrated in FIG. 4, in which position the legs 92 and 93 of the bracket thereon project through the openings 21a and 103a into the upright frame assembly and into the path of the legs 149 and 150 of the bracket 148 on the slide assembly 134. If the slide assembly 134 has already been pulled downwardly to the position thereof shown in FIG. 4, the leg 92 of the bracket on the lever 89 will come to a position overlying the leg 149. On the other hand, if the slide assembly 134 has been forcefully moved downwardly to its extreme lowermost position (seen only in FIG. 2), the leg 92 of the bracket on the lever 89 will overlie the leg 150 of the bracket 148. In addition, it may be noted that, if the user pulls downwardly and outwardly on the toweling in a way such that the leg 149 on the bracket 148 has not yet reached the position thereof seen in FIG. 4, the leg 149 will contact the diagonally-disposed leg 93 of the bracket on the lever 89 and, because of a certain amount of flexibility in the parts, will cause the rounded-nose portion 94 of the bracket 92, 93 to be cammed out of the way to permit the leg 149 to reach the position thereof illustrated in FIG. 4.

When the parts of the dispensing apparatus have reached the position thereof seen in FIG. 4, it will be observed that for so long as the suction cups 78 and 79 adhere to each other, the nose 87 of the stop lever 65 will retain the lever 89 in the position thereof seen in FIG. 4. This will retain the leg 92 of the bracket on the lever 89 in its position overlying either the leg 149 or the leg 150 of the bracket 148, as the case may be. This will hold and retain the towel-retracting slide assembly 134 in its lowered position. As a consequence, the user will find himself handling and drying his hands on the front clean leg 40b of a toweling loop which now hangs freely beneath the dispensing apparatus much in the fashion of the toweling loops of the prior art, the clean leg 40b of the toweling now hanging in a depending use position beneath the apparatus.

When the time-delay apparatus, comprising, in the present instance, the suction cups 78 and 79, times out, the spring 72 will cause the stop lever 65 to be pivoted in a clockwise direction from its position illustrated in FIG. 4 back to its normal position shown in FIG. 3. This will release the dispensing apparatus for a subsequent dispensing of another measured length of clean toweling, but, the moment the time-delay device times out and the stop lever 65 is pivoted to the position thereof shown in FIG. 3, the nose 87 of the stop lever 65 will move downwardly along the rounded portion 88 at the upper end of the lever 89, and the upward force exerted by the spring-motor mechanism on the towel-retracting slide assembly 134 will cause the leg 149 or 150 of the bracket 148, as the case may be, to cam the rounded nose 94 of the bracket 92, 93 on the lever 89 forwardly, thereby returning the lever 89 to the solid-line position thereof

15

shown in FIG. 3 and consequently freeing the towel-retracting slide assembly 134 for a returning upward movement by the spring-motor assembly. Thus, when the time-delay device times out, the spring-motor assembly, with the tape 133 thereof, immediately raises the towel-retracting slide assembly 134 from its lower position to the raised position shown in FIG. 3. This movement carries the roller 146, 147 upwardly within the upstanding frame assembly, thereby simultaneously to withdraw the leg 40b of the toweling from its use position and retract upwardly into the upstanding frame assembly all of the soiled toweling of the rear leg 40c of the loop. This raising and towel-retracting action of the towel-retracting slide assembly thus retracts and returns the toweling path to that seen in FIGS. 1 and 3, wherein all previously-soiled portions of the toweling are either entirely retracted within the dispensing assembly or withdrawn from the use position to a position in which it cannot be conveniently gripped or touched by the next user, thereby avoiding the unsightly appearance of dangling, soiled toweling and avoiding such health hazards as may be involved in having soiled toweling in a position in which it may be gripped by the next person seeking to use the dispensing assembly.

It will be appreciated that, when the supply of clean toweling 40 has become exhausted, the free end of the toweling will be pulled out of the dispenser opening 34. When this occurs, and, when the time-delay device times out at the end of the dispensing cycle in which the free end of the toweling was pulled out of the dispenser opening 34, the slide assembly 134 will again be raised by the spring-motor assembly as previously described. Under these conditions, however, unlike the earlier described condition wherein the taut toweling itself limits the upward movement of the slide assembly 134 substantially to the position shown in FIG. 3, the freedom of free end of the toweling will prevent the toweling from becoming taut, and the toweling thus will not limit the upper movement of the slide assembly 134. On the contrary, the slide assembly will be immediately raised by the spring-motor assembly to its uppermost position against the lower end of the spring 155, thereby carrying the entirety of the free end of the toweling upwardly into the upright frame assembly and into the position shown in FIG. 8, wherein the free-end portion of the toweling is represented by the numeral 40d. It will be observed that in this condition, the free-end portion 40d of the toweling, in addition to having been elevated and withdrawn entirely within the upright frame structure, will be gripped between the roller 146, 147 and the bowed spring 157, thereby preventing the free end of the toweling from slipping around the roller 146, 147 and dropping downwardly to a dangling position beneath the dispensing structure. Thus, it will be understood that, when the supply roll 40 of clean toweling becomes exhausted, the free end of the toweling is retracted entirely within the present structure, thereby avoiding the unsightly appearance of a dangling free end of soiled toweling and entirely avoiding the possibility that multiple subsequent users might be inclined to dry their hands on the same length of dangling toweling.

In reloading the present apparatus with clean toweling, the slide assembly 134 is manually lowered to its lowermost position with the use of the key 153 previously referred to. The cabinet doors 23 and 25 are opened, and the free-end portion of the soiled toweling is wound onto the towel take-up roll 60 by manually rotating the roll, whereupon that roll 60 is removed from the cabinet, the soiled roll of toweling is removed therefrom, and the roller 60 is replaced in the cabinet. During this operation and during the subsequent threading of clean toweling through the apparatus, the slide assembly 134 is preferably retained in its lowermost position, shown in FIG. 2, by holding the key 153 downwardly. This depression and retention of the slide assembly 134 is materially as-

16

sisted by the fact that the brackets 143 upon which the roller 146, 147 is mounted, are pivotally secured to the ears 141 and 142, which permits the brackets 143, because of their slight elbow shape, to be pivoted forwardly beneath the roller 152 to the position thereof seen in FIG. 2. In this condition, the engagement of the slightly elbow-shaped brackets 143 with the under side of the roller 152 materially assists in retaining the slide assembly 134 in its lowermost position.

In loading the fresh toweling in the cabinet, a fresh supply roll 40 is deposited in the position shown in the drawings, and the leading end of the fresh toweling is threaded upwardly across the measuring roll 45 and around the pinch roll 52 and then forwardly and downwardly around the outside of the trough-like lower door, around the roller 147 and across the roller 152 (in the path seen in FIG. 2), and thence upwardly about the toweling take-up roll 60. When this has been accomplished, the doors 25 and 23 of the cabinet are closed, and the manual downward pressure on the key 153 is released, whereupon the slightly elbow-shaped brackets 143 disengage from the roller 152 and all of the parts and the path of the toweling returns to the normal position thereof shown in FIG. 3, in which condition the dispensing assembly is ready for further dispensing and use.

It will, of course, be appreciated by those skilled in the art that many variations may be made in the apparatus disclosed. For example, substitutes may be provided for the slide assembly 134 which, in effect, is a slack, soiled-towel retracting or take-up mechanism. Variations may also be made in the slide itself. For example, the stop or retaining action exerted on the slide by the bracket 92, 93 and by the legs 149 and 150 of the bracket 148 may be applied centrally of the slide rather than adjacent one side thereof, as shown in the present drawings. Furthermore, it will be appreciated that the legs 149 and 150 are, in effect, the teeth of a rack, and that a full rack may be provided on the slide, with numerous teeth, so that the slide assembly 134 need not be pulled down by the user to any carefully-defined lower position in order to be caught and retained by the pawl action provided by the bracket 92, 93.

While one preferred embodiment of the present towel dispenser has been shown in the accompanying drawings and has been described above, it will be understood by those skilled in the art that many additional and various modifications may be made therein which fall within the spirit and scope of the appended claims.

I claim:

1. A towel dispenser of the continuous towel type wherein at least a portion of a loop of toweling is exposed and is at all times accessible to a user, comprising: housing means; dispensing means within said housing means for dispensing to said loop and into use position exteriorly of said housing means a predetermined length of clean toweling when said accessible portion of said loop is pulled by a user; loop retracting means for releasably retracting a major portion of the loop into said housing means, said loop retracting means being movably mounted within said housing means and having a normal first position therein for maintaining in retracted position said major portion of said loop within said housing means, said loop retraction means being movable from said first position to a second position in response to the pull by a user upon the accessible portion of said loop to add to the loop exteriorly of said housing means at least a part of the retracted portion of the loop, thereby to provide exteriorly of said housing means an accessible loop portion of substantial length; time delay means within said housing means for producing a time delay period; means for actuating said time delay means in response to the operation of said dispensing means; means for retaining said loop retracting means in said second position during said time delay period; and means for returning said loop retraction means from said second position to said first

17

position upon the timing out of said time delay means, thereby to retract into said housing means a major portion of the exteriorly disposed loop.

2. A towel dispenser of the continuous towel type wherein at least a portion of a loop of toweling is exposed and is at all times accessible to a user, comprising: housing means; dispensing means within said housing means for dispensing into one end of said loop and into use position exteriorly of said housing means a predetermined length of clean toweling when said accessible portion of said loop is pulled by a user; soiled toweling accumulation means actuated simultaneously with said dispensing means for withdrawing from the other end of said loop a length of toweling substantially corresponding to said predetermined length; loop retracting means for releasably retracting a major portion of the loop into said housing means, said loop retracting means being movably mounted within said housing means and having a normal first position therein for maintaining in retracted position said major portion of said loop within said housing means, said loop retraction means being movable from said first position to a second position in response to the pull by a user upon the accessible portion of said loop to add to the loop exteriorly of said housing means at least a part of the retracted portion of the loop, thereby to provide

18

exteriorly of said housing means an accessible loop portion of substantial length; time delay means within said housing means for producing a time delay period; means for actuating said time delay means in response to the operation of said dispensing means; means for retaining said loop retracting means in said second position during said time delay period; and means for returning said loop retraction means from said second position to said first position upon the timing out of said time delay means, thereby to retract into said housing means a major portion of the exteriorly disposed loop.

3. The combination set forth in claim 2, wherein said means for returning said loop retraction means from said second position to said first position thereof is comprised of spring motor means.

References Cited by the Examiner

UNITED STATES PATENTS

1,788,962	1/31	Steiner	-----	312—38
2,100,729	11/37	Birr	-----	312—38
2,172,482	9/39	Steiner	-----	312—38
2,899,251	8/59	Birr	-----	312—38

CLAUDE A. LE ROY, *Primary Examiner.*