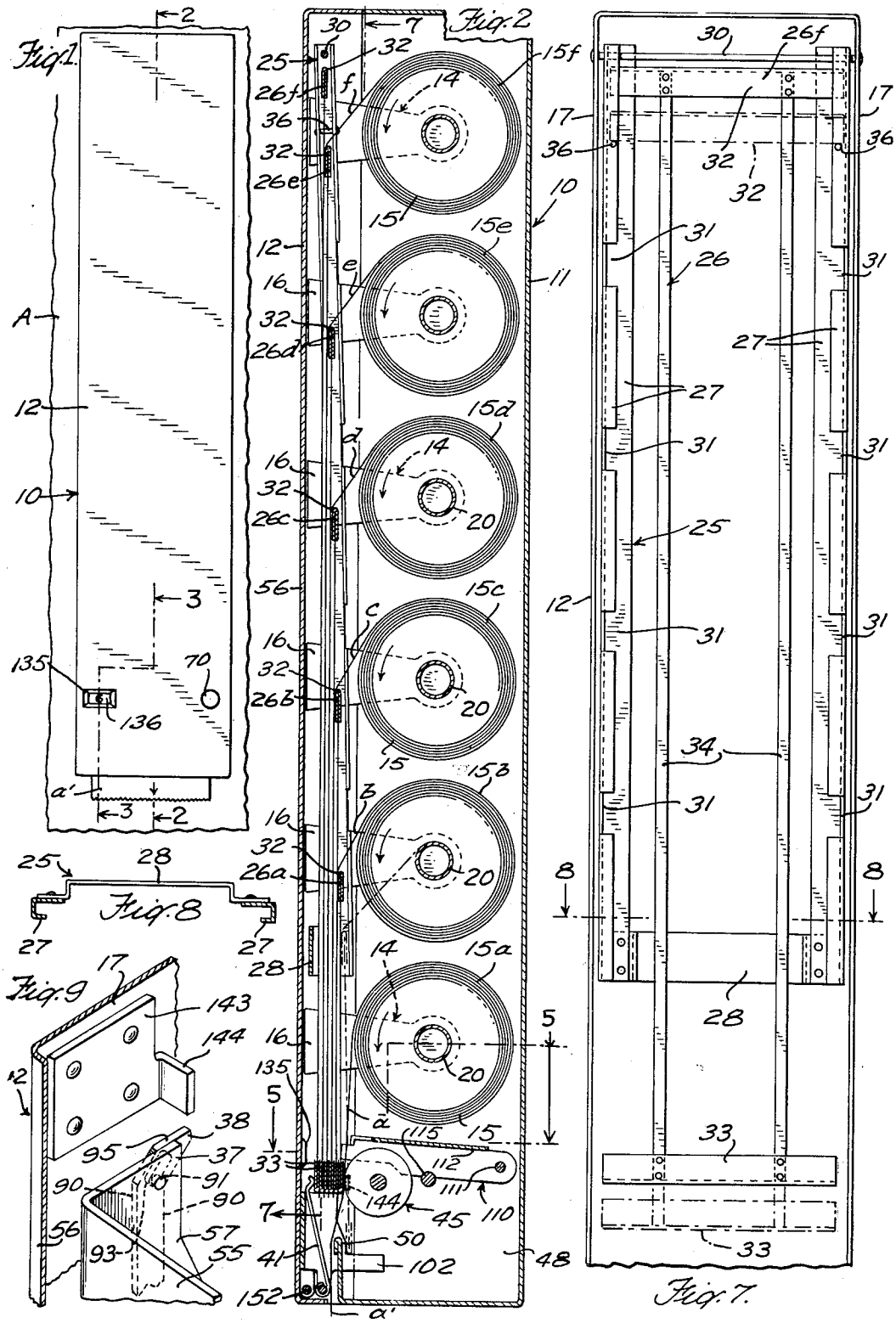
March 20, 1956 W. J. DOBKIN 2,738,934

PAPER TOWEL DISPENSER

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PAPER TOWEL DISPENSER

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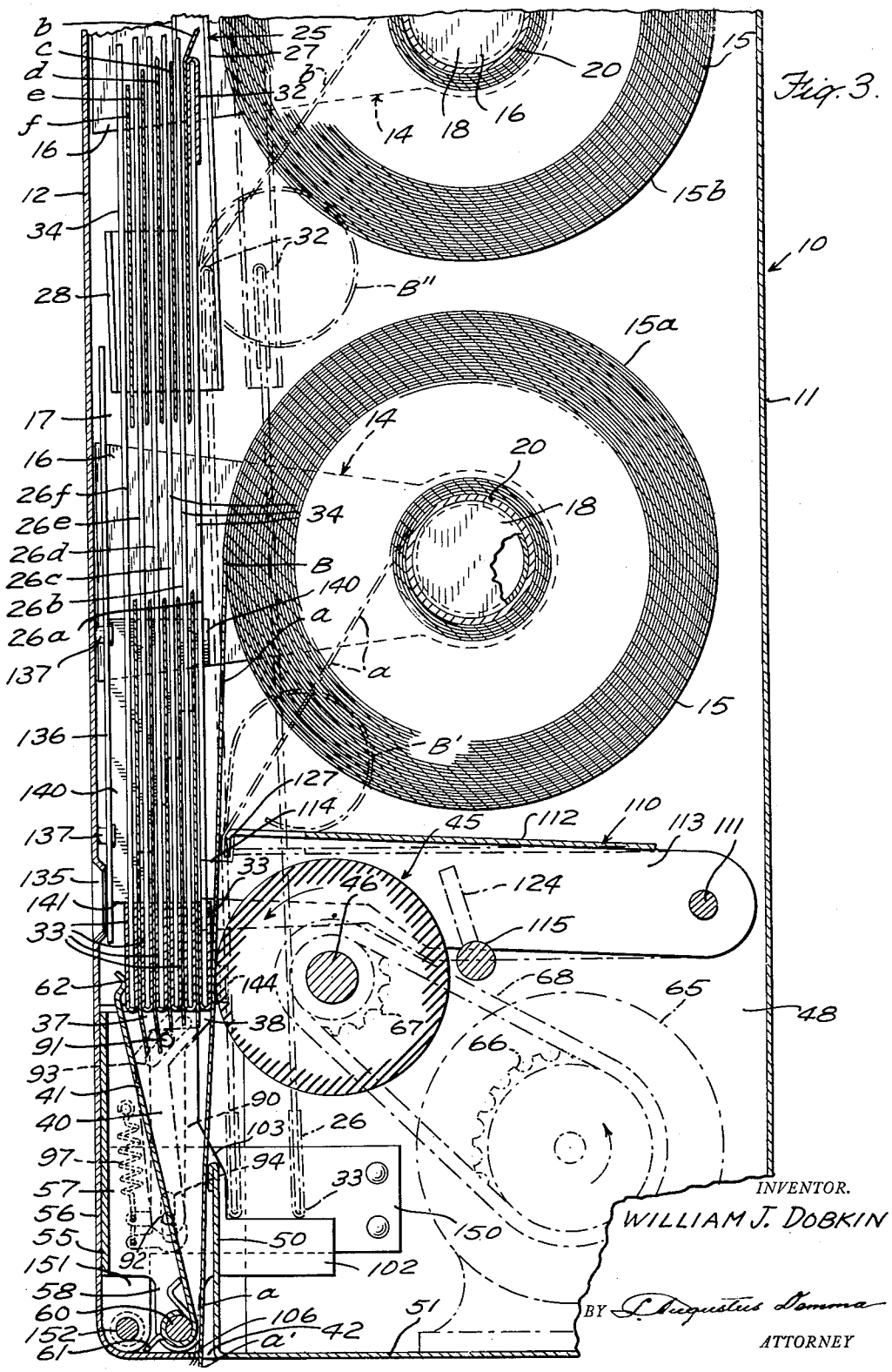


Fig. 3.

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PAPER TOWEL DISPENSER

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Fig. 4.

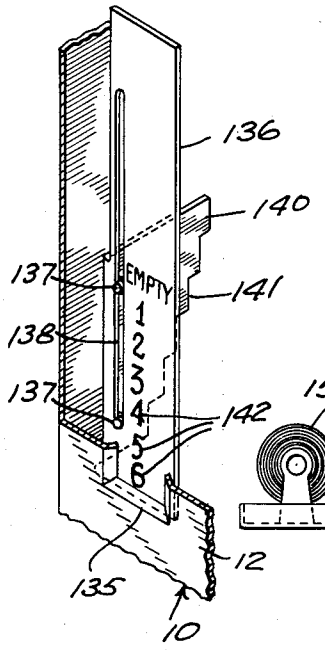


Fig. 10.

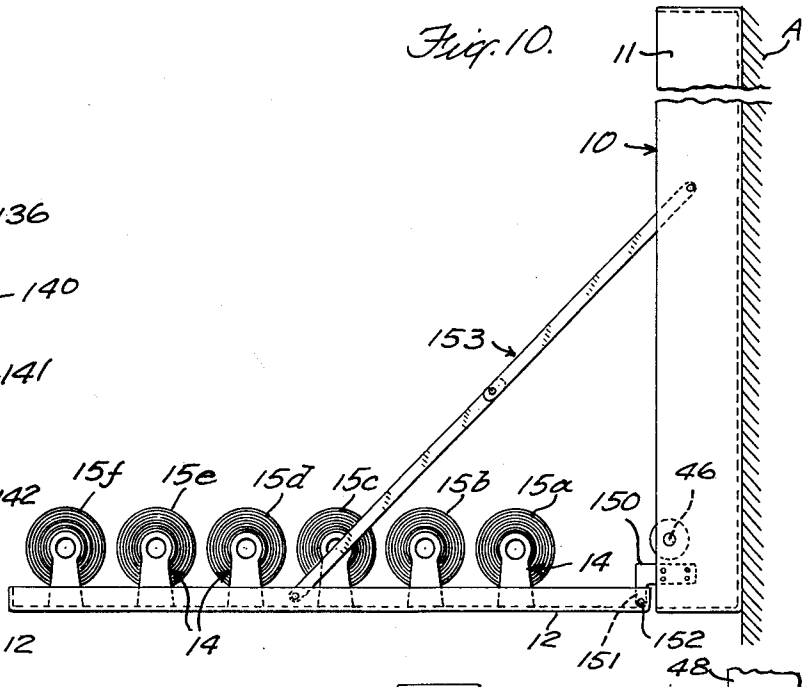


Fig. 11.

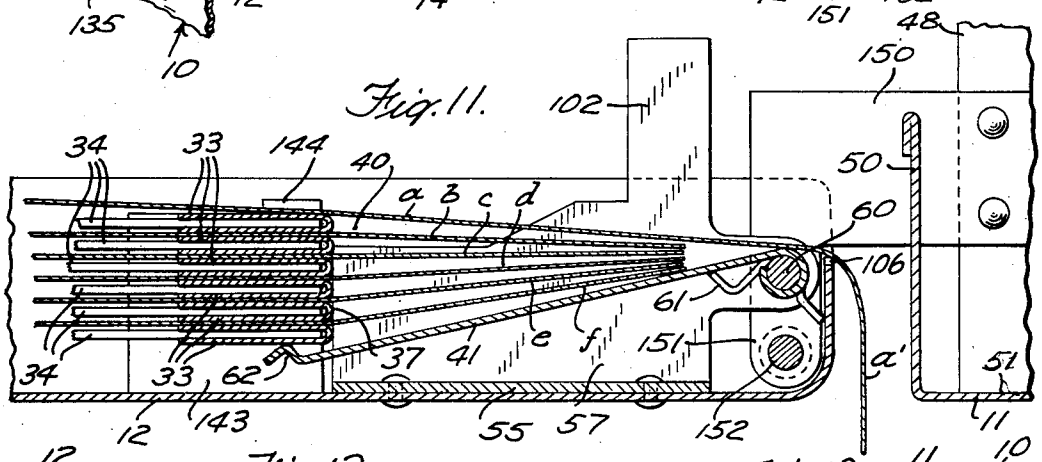


Fig. 12.

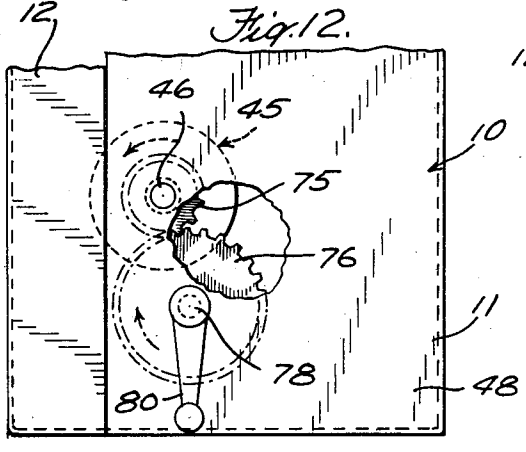
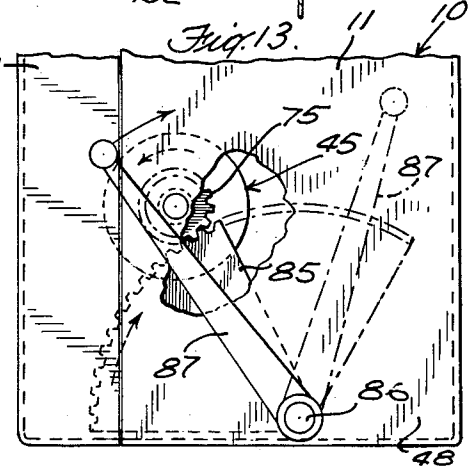


Fig. 13.



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Fig. 5

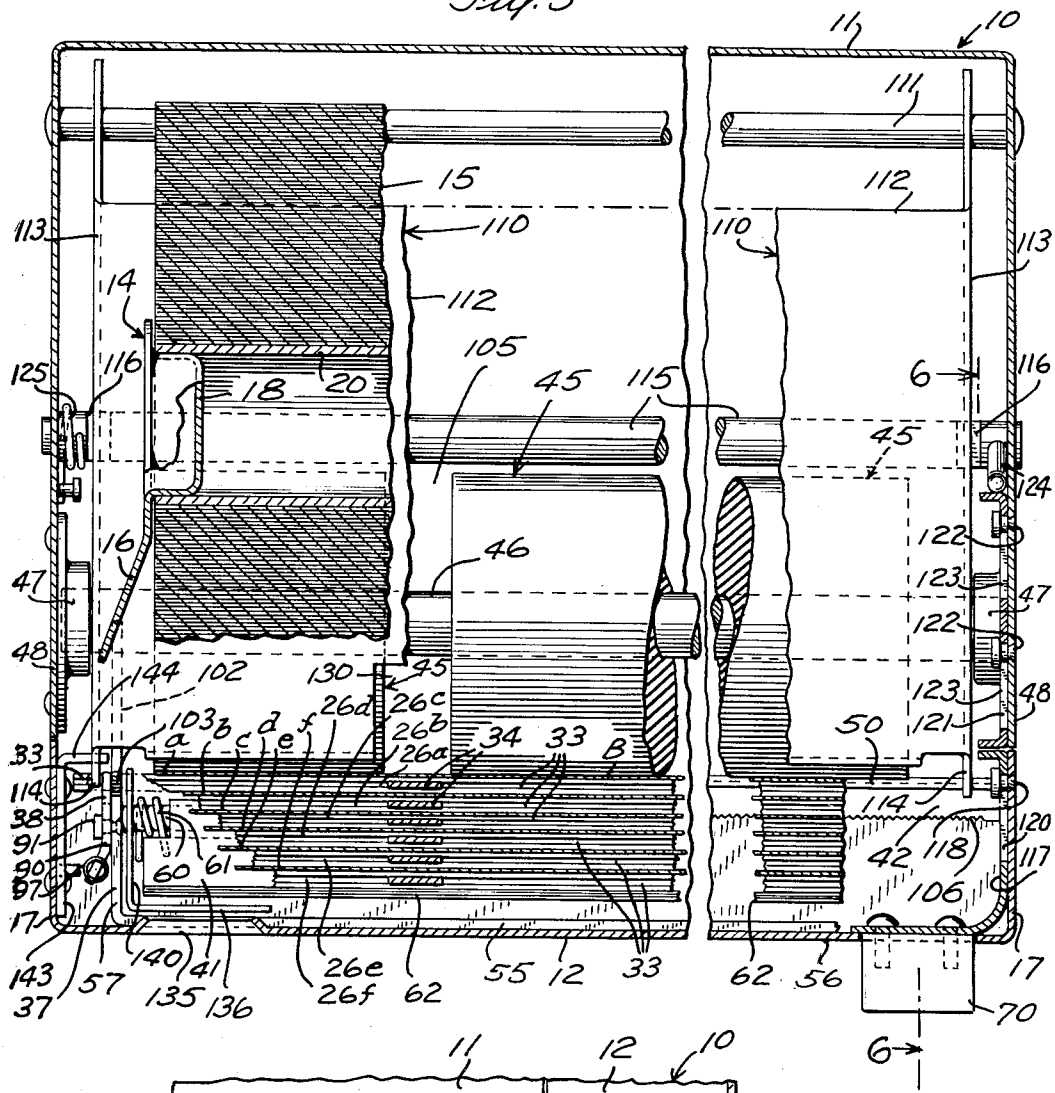
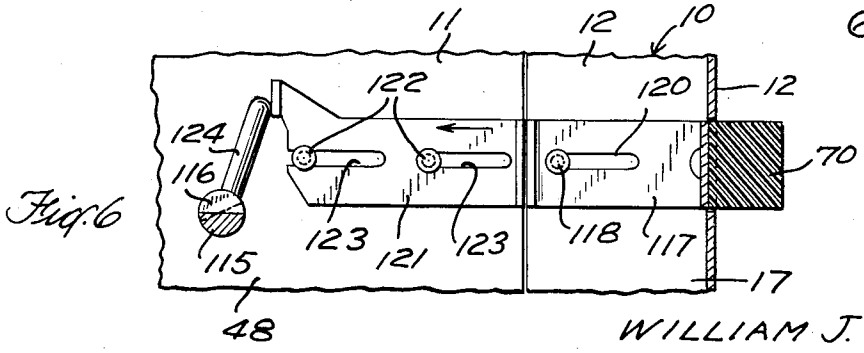


Fig. 6



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PAPER TOWEL DISPENSER

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Application December 15, 1953, Serial No. 398,256

22 Claims. (Cl. 242—55.4)

The present invention relates to paper towel dispensers of the roll type.

A general object of the present invention is to provide a new and improved paper towel dispenser of the roll type.

A more specific object is to provide a paper towel dispenser containing an active paper towel roll and a number of reserve paper towel rolls and designed to pick-up the towel feed for dispensation from said reserve rolls successively and automatically, as the rolls are successively consumed.

Another specific object is to provide a paper towel dispenser of the multiple roll type, operable for automatic feed pick-up from roll to roll in sequence, as described, without changing the positions of the axes of said rolls.

A further specific object is to provide a paper towel dispenser of the automatic multiple roll type described, having means for indicating automatically the number of towel rolls still in reserve.

A still further specific object is to provide a paper towel dispenser of the automatic multiple roll type described designed to permit easy replacement of the supporting cylinders or cores of the used paper rolls by full paper rolls, without disturbing the positions of the reserve rolls still unused.

In accordance with certain features of the present invention, the paper towel dispenser is operable either electrically or manually to dispense paper towels of predetermined length from continuous rolled sheets and comprises a cabinet having means for supporting a series of paper towel rolls, one of which is operative, the others being held in reserve. After the operative roll has been completely used up, the next section of paper toweling is dispensed from the first roll in reserve without changing the position of this first reserve roll. This switch-over in towel feed to the first of the reserve rolls is effected automatically after the operative roll is completely consumed. In a similar manner, the other reserve rolls are placed successively into feed operation, automatically as these rolls are successively consumed.

An indicating device denotes the number of reserve paper rolls in the cabinet, and as these rolls are successively consumed, this device is automatically operated to register according to the roll supply condition in the cabinet.

As a paper towel roll is used up, the empty supporting cylinder or core thereof remains in position, while the next paper roll held in reserve, is placed into feed operation, without disturbing the position of this next roll. The dispenser is so designed, as to permit the empty roll cylinders or cores to be replaced with full paper rolls without disturbing the positions of the reserve paper rolls still unused.

Various other objects, features and advantages of the invention are apparent from the following particular description and from inspection of the accompanying drawings, in which:

Fig. 1 is a front plan view of the paper towel dispenser

embodying the present invention and shown supported on a wall;

Fig. 2 is a vertical section of the paper towel dispenser somewhat diagrammatic taken approximately along the lines 2—2 of Fig. 1 but on a larger scale and showing said dispenser fully loaded and ready for use;

Fig. 3 is a detail vertical section of the lower part of a motor-driven paper towel dispenser taken approximately along the lines 3—3 of Fig. 1 but on a larger scale;

Fig. 4 is a fragmentary perspective of the indicating device of the paper towel dispenser;

Fig. 5 is a transverse section of the paper towel dispenser taken approximately along the lines 5—5 of Fig. 2 but on a larger scale, and showing some parts broken away to reveal the structure behind said parts;

Fig. 6 is a detail section of the paper towel dispenser taken along the lines 6—6 of Fig. 5;

Fig. 7 is a section of the paper towel dispenser taken along the lines 7—7 of Fig. 2 but directed more specifically to the paper guide mechanism;

Fig. 8 is a detail section of the guide mechanism taken along the lines 8—8 of Fig. 7;

Fig. 9 is a fragmentary perspective of the paper towel dispenser;

Fig. 10 is a side elevation somewhat diagrammatic of the paper towel dispenser shown in open loading position;

Fig. 11 is a fragmentary section of the paper towel dispenser shown in open loading position;

Fig. 12 is a fragmentary side view of a form of manually operated paper towel dispenser; and

Fig. 13 is a fragmentary side view of another form of manually operated paper towel dispenser.

Referring to the drawings, the paper towel dispenser of the present invention comprises a cabinet **10** (Figs. 1 and 2) made of two parts consisting of a main section **11** in the form of a rectangular box-like back adapted to be attached to a wall A (Fig. 1) in any suitable manner and a front **12** of similar size and shape but shallower than said back, hinged to said back in a manner to be described, to serve as a door for the cabinet. Attached to this cabinet front **12** is a series of paper roll support brackets **14** (Figs. 2, 3 and 5) arranged to support a series of paper towel rolls **15** in a a vertical row with their axes parallel, six of such rolls being shown, designated herein by the numeral **15** when referred to generally, and designated herein by the numeral **15** with subscripts *a, b, c, d, e* and *f* to distinguish the different rolls, when referred to specifically. These brackets **14** are of the usual type commonly employed to support paper towel rolls, and are shown each comprising a pair of arms **16** affixed at one end to the side walls **17** respectively of the cabinet front **12** and having near their other ends respective journals or pivots **18** adapted to engage loosely the ends of the hollow cardboard core or cylinder **20** of a paper roll **15** and to support thereby said roll for rotation, as the toweling is pulled therefrom. One or both of the bracket arms **16** are resilient, to permit them to spring relatively apart, when inserting a new roll or when removing the core, after the roll is used up.

In order to hold the unreeled ends *a, b, c, d, e* and *f* from the paper towel rolls **15***a*, **15***b*, **15***c*, **15***d*, **15***e* and **15***f* respectively in position to be picked-up for feed at the proper time, there is provided a frame **25** (Figs. 2, 3, 7 and 8) within the cabinet front **12** adapted to support a series of paper guides **26** for these unreeled paper ends, these guides being designated herein by the numeral **26** when referred to generally and being designated herein by the numeral **26** with subscripts *a, b, c, d, e* and *f* to distinguish the different guides, when referred to specifically. This frame **25** comprises a pair of parallel upright channels **27**, rigidly interconnected at their lower

ends by a cross-brace 28 and supported at their upper ends for swinging movement on a rod 30 secured at its ends to the side walls 17 of the cabinet front 12. The channels 27 are provided with notches 31 (Fig. 7) to permit the guides 26 to be inserted within said channels for the purpose to be described.

The number of guides 26 provided corresponds to the number of paper rolls 15 in the cabinet 10, six guides being shown in the instant example. Each of these guides 26 comprises a bar 32 at its upper end in the form of a U-channel and a platen 33 at its lower end shown in the form of a U-shaped channel bar, the two bars 32 and 33 being rigidly connected together by two flat parallel straps 34 to form a rigid rectangular open structure, with the bars 32 and 33 projecting outwardly at their ends beyond said straps and into the channels 27 of the frame 25. The upper bars 32 of the guides 26 are narrow enough to permit them to pass freely through the notches 31 in the frame channels 27, in the operation of inserting these bars into these channels during loading or removing them therefrom.

All the guides 26 are of similar construction, except that the straps 34 thereof are of different lengths to accommodate the heights of the different paper rolls 15, and each guide is symmetrically designed to permit the guide to be properly inserted in the frame 25 through the appropriate notches 31 with either channel end up, when loading the cabinet 10. The longest guide 26*f*, which is the last guide, is permanently secured within the frame channels 27 by means of pins 36 secured in these channels, since this guide is not removed for loading. All other guides 26 are freely removable from the frame 25 to permit loading, as will be described.

When the dispenser is fully loaded and ready for use, the paper rolls 15 are supported one above the other, with sufficient clearance to afford freedom thereto from each other and guides 26 are packed close together and supported on seats or stops 37 and 38, as shown in Figs. 3 and 5. The dispenser is loaded from the top downward, while the cabinet front 12 is open as shown in Figs. 10 and 11, and while all the guides 26, except the last guide 26*f* are out of the frame 25. This last guide 26*f* which is permanently attached to the frame 25, lies above or inwardly beyond the seats or stops 37, while the cabinet 10 is being loaded.

After the top paper roll 15*f* is inserted between its pivot supports 18, the loose unreeled end *f* from this roll is stretched out along the guide 26*f* to the bottom of the cabinet 10. Guide 26*e* is then inserted through a pair of opposed notches 31 in the frame channels 27 and pushed along the frame 25 towards its upper end, until the lower end of this guide clears the stops 37. The next paper roll 25*e* is then loaded on its pivot supports 18 and its loose unreeled end *e* stretched out along the guide 26*e* to the bottom of the cabinet 10. Guide 26*d* is then inserted through a pair of opposed notches 31 on the frame channels 27 and pushed along the frame 25 towards its upper end, until its lower end clears the stops 37. In each case, the unreeled end of the toweling from a paper roll 15 is trained over the upper bar 32 of a corresponding guide 26, and the loading process described is continued for all the rolls 15, until the last bottom roll 15*a* is loaded. The unreeled end *a* of this last bottom paper roll 15*a* is not trained over the bar 32 of the corresponding guide 26*a*, as in the case of the unreeled ends of the other paper rolls, but is threaded directly from said roll 15*a* through the bottom of the dispenser and out to define a loose hanging end *a'*. All the other unreeled roll ends *b*, *c*, *d*, *e* and *f* are trained over the top bars 32 of the guides 26*a*, 26*b*, 26*c*, 26*d* and 26*e* respectively, threaded between adjoining guides 26 and convergently collected in a pocket 40 (Figs. 3 and 11) of tapering cross-section, serving as a chute for these roll ends and formed near the lower end of the dispenser between the loose end *a* of the bottom roll 15*a* and a confining wall plate 41, to be more fully described. The unreeled paper end *a* is led directly from the bottom paper roll 15*a* along the face of the bottom platen bar 33 of the end guide 26*a* and out to define the surplus flap end *a'*, as shown in Figs. 3 and 11. In fully loaded position, the open cabinet will be in the condition shown in Fig. 11.

After the dispenser is fully loaded with the loose extreme end *a'* from the bottom roll 15*a* hanging out to afford surplus for a starting flap, and after the cabinet front 12 has been closed for operation, the unreeled end *a* from the bottom paper roll 15*a* will be sandwiched between the bottom platen bar 33 of the end guide 26*a* and a feed roller 45. After closing of the cabinet front 12, the surplus end *a'* of the toweling unreeled from the bottom paper roll 15*a* will project through a dispensing opening slot or throat 42. This surplus projecting end *a'* of the toweling from the bottom roll 15*a* is torn off across a serrated cutting edge 106 on one side of the dispensing slot 42, thus leaving the dispenser ready for use, either by manipulation of a push-button or of a handle, as will be more fully described, to deliver a predetermined length of toweling through the dispensing slot 42.

The feed roller 45 (Figs. 3 and 5) is desirably made of soft rubber molded to a shaft 46 supported in bearings 47 in the side walls 48 of the cabinet back 11.

To direct the towelings unreeled from the paper rolls 15 towards the dispenser slot 42 after they pass the feed roller 45, a wall 50 (Figs. 2, 3, 5 and 11) is provided on one side of the course of these towelings, extending upwardly from the bottom wall 51 of the cabinet back 11, on one side of the dispensing slot 42. On the opposite side of the course of the toweling ends unreeled from the paper rolls 15 is the plate 41. Both of these plates 41 and 50 extend edgewise the full width of the towelings and converge towards the dispensing slot 42 to form the chute 40 for these towelings tapering towards said dispensing slot.

To form the seats or stops 37 for the guides 26, there is provided a U-shaped bracket 55 (Figs. 3, 5 and 11) affixed to the wall 56 of the cabinet front 12 and having side arms 57 bent inwardly from said wall, the upper sections of these side walls serving as the stops 37 respectively. These stops 37 are wide enough to support all of the guides 26 except the one nearest to the feed roller 45. The end guide 26 nearest to the feed roller 45 is supported on the seats or stops 38 mounted on the stops 37 respectively for movement out of guide supporting position, when said end guide is dragged downward by the feed roller 45, in the absence of intervening paper toweling, as will be more fully described.

The side arms 57 of the bracket 55 have respective bottom tab extensions 58 respectively supporting a hinge rod 60 for the lower edge of the wall plate 41. This plate 41 is biased by a spring 61 encircling the hinge rod 60 and urging said plate in a clockwise direction about the axis of said hinge rod (Figs. 3 and 11). The upper edge of the plate 41 is bent or rolled to define a bead 62 serving to establish resilient pressure contact on the lower platen bar 33 of the end guide 26*f*, due to the action of the spring 61.

The upper ends of the guides 26 are supported within the side channels 27 of the frame 25, as already described, while their lower ends resting on the stops 37 and 38 are free to slide along said stops towards the feed roller 45 under the pressure action of the spring-pressed plate 41, except as limited by said feed roller. As a result, the lower ends of the guides 26 are pressed by the plate 41 against the feed roller 45, so that constant feed pressure is maintained against the paper toweling between said feed roller and the platen bar 33 of the first guide 26 adjacent to said feed roller.

Since the feed roller 45 is made of soft rubber, it affords sufficient frictional contact with one side of the paper toweling to grip the toweling and feed it downward with-

out slippage along the comparatively smooth metallic surface of the platen bar 33 of the adjacent guide 26. The surface of this platen bar 33 presents little frictional resistance to the downward feed of the paper toweling, thereby causing the paper toweling to be fed through the dispensing slot 42 at the peripheral speed of the feed roller 45.

The feed roller 45 may be operated either electrically or manually. In the electric control shown in Fig. 3, the feed roller 45 is actuated by a geared electric motor 65 secured to the base 51 of the cabinet back 11 and driving said roller through sprockets 66 and 67 and a link-chain 68. The motor 65 is geared to rotate sprocket 66 one full revolution with each manipulation of a motor control switch 70 shown in the form of a push-button (Figs. 1, 5 and 6) accessible for manipulation from the front of the cabinet 10. The control device by which the motor sprocket 66 is rotated one revolution for each actuation of the push button 70 and then automatically stopped, is well-known in the towel dispensing art. The ratio of the diameters of the sprockets 66 and 67 is such, that each revolution of the sprocket 66 will rotate the feed roller 45 a number of predetermined revolutions, to deliver a predetermined length of toweling through the dispensing slot 42.

Fig. 12 shows a manually operated arrangement using a crank handle to rotate the feed roller 45 through the required number of revolutions. In this arrangement, a gear 75 is mounted on one end of the feed roller shaft 46 inside the cabinet 10 and a second gear 76 in said cabinet is secured to a shaft 78 supported for rotation on a side wall 48 of the cabinet back 11 and extending through said side wall to the outside of said cabinet. Secured to the outside end of this shaft 78 is a feed control member 80 in the form of a crank handle. Gear 76 is in mesh with the gear 75 and their speed ratio is such, that one complete turn of the crank handle 80 will rotate the feed roller 45 sufficiently, to dispense a predetermined length of toweling. A stop, such as is generally used to limit a crank movement to one revolution, is used in this mechanism to prevent continuous feed of the toweling.

Fig. 13 shows another type of manual operation. In this arrangement, a sector gear 85 is mounted on a shaft 86 extending through a side wall 48 of the cabinet back 11 and carrying at its end outside the cabinet 10 a crank handle 87 serving as a feed control member. This sector gear 85 meshes with the gear 75 on the feed roller shaft, so that one swing of the handle 87 from front to back of the cabinet 10, will dispense the desired length of toweling.

From the description of the device so far presented, it is apparent that the feed roller 45 exerts no friction on the operative platen bar 33 adjacent to the feed roller and will feed the exposed toweling from the bottom paper roll 15*a* until it is completely used up. When the last remnant of toweling from this bottom paper roll 15*a* has passed the feed roller 45, the friction hold afforded by this feed roller is transferred directly to the platen bar 33 itself, and since this feed roller is of soft rubber, its rotation will urge the platen bar downward.

As already indicated, the fixed stops 37 constituting the upper sections of the side arms 57 respectively of the U-bracket 55 are wide enough to support all of the guides 26 except the guide 26 nearest the feed roller 45 which is supported on the movable stops 38, as shown in Figs. 3, 5 and 9. Each of these movable stops 38 forms part of a spring-pressed upstanding slide 90 movably attached to a corresponding side arm 57 of the U-bracket 55 by a pair of guide studs 91 and 92 affixed to said side bracket arm. The stud 91 passes through an angularly inclined cam slot 93 on the upper end of the slide 90 and the stud 92 passes through a guide slot 94 at the lower end of said slide extending lengthwise of said slide. The upper end of this slide 90 defining a corresponding stop 38 presents a seat 95 for the guide 26 nearest the feed roller 45. This seat 95 is normally maintained in its uppermost position level with the top guide seating surface of the corresponding stop 37 by means of a tension spring 97 secured at one end to a lateral extension of the slide 90 and at its other end to an anchor pin affixed to the corresponding side arm 57 of the bracket 55. The stud 92 limits the upper movement of the slide 90 to the guide supporting position adjacent to the feed roller, as described.

When there is no toweling between the feed roller 45 and the adjacent guide 26 seated on the stops 38, the friction of said feed roller drags this guide downward against the action of the springs 97, thereby depressing the stops 38. Due to the inclination of the cam slot 93 on each slide 90, this slide is cammed angularly away from the feed roller 45 as this slide moves downward, thereby causing the stop 38 at the upper end of this slide to move sideways away from said feed roller and from under the paper guide 26 adjacent to said feed roller, until the stop 38 clears said guide. Under these conditions, the cleared guide 26 adjacent to the feed roller 45 will be lowered by the friction action of said feed roller thereon, until this guide is stopped by extensions 102 on the side bracket arms 57 serving as racks for the guides 26 which have completed their paper guiding function, as shown in dotted lines in Fig. 3. These side bracket arms 57 have respective sloping edges 103 for directing the idle guides 26 beyond the wall 50 and onto the racks 102. As each guide 26 is dropped onto the racks 102, it moves the other guides one step along the racks towards their outer ends. The feed roller 45 is provided with two circumferential slots 105 (Fig. 5) for receiving the straps 34 of the idle guides 26, as these guides are dropped into inoperative position on these racks 102.

Since the entire group of guides 26 is under the pressure of the plate 41 through the spring 61, the entire group moves up towards the feed roller 45 along the stops 37, as soon as the guide 26 nearest the feed roller has been forced down out of the way. This operation exposes the unreeled toweling of the next paper roll 15 in reserve and pushes it into contact with the feed roller 45, while moving the next guide 26 facing said toweling onto the stops 38, which by this time have been released into their uppermost guide seating position under the action of the springs 97. This change to a new paper roll 15 is repeated automatically, whenever the previous paper roll has been exhausted, until the last paper roll in the dispenser is used up. When this final dispensing stage is reached, the dispenser is automatically locked against further manipulation, either by disconnecting the current operating the motor 65 or by locking the gears in the case of a manually operated machine. This locking mechanism is not shown but it may be accomplished, as for example, when the last remaining guide 26*f* is forced down, after the last paper roll 15*f* has been exhausted, by causing this downward guide movement to actuate the locking mechanism. It should be noted that enough clearance exists between the top bar 32 of this last guide 26*f* and the pins 36 on the frame 25, in the operative position of said guide, to permit said guide to drop onto the the racks 102, when the last roll 15*f* has been consumed.

It should be noted again that the upper ends of the channels 27 (Figs. 2, 3, 7 and 8) of the frame 25 retaining the guides 26 are suspended on the rod 30 near the top of the cabinet front 12 but the lower end of this frame including the bottom cross-brace 28 is free to swing. This swinging action of the frame 25 about the axis of the rod 30, permits the guides 26 resting on the stops 37 and 38 to move successively up to the feed roller 45 and partway within said roller, as indicated by the dotted lines in Fig. 3. At the same time, the lower ends of the frame channels 27 including the cross-brace 28 move over from position shown in full lines in Fig. 3 to dot and dash line position shown. The guides 26 and frame channels 27 in the dot and dash line position shown in Fig. 3, appear to cut partway through the paper towel

rolls 15, but it must be understood that the lower paper rolls are used up before the guides move into that position, so that no interference is encountered.

At the lower end of the cabinet front 12 on one side of the dispensing slot 42 (Figs. 3 and 5) is a serrated cutting edge 106 provided to aid in the process of tearing the toweling dispensed through this dispensing slot, when the end of the toweling projecting from the cabinet 10 is pulled towards the user from the normal delivered position shown in full lines in Fig. 3 to tearing position shown shown in dot and dash lines. When the end of the toweling from a paper roll 15 is fed out past the feed roller 45, it will curl and be caught in the chute between the walls 41 and 50, so that it will not drop out by itself through the dispensing slot 42, but can be pulled by the user by pulling on the projecting part of the toweling.

Since the feed roller 45 is arranged to rotate through a definite cycle initiated electrically or mechanically by a manipulation of the user, and since each cycle discharges a predetermined length of toweling, there might be an interval during certain cycles, when the end of the feeding from one paper roll 15 and the beginning of the feeding from the next paper roll 15 overlap, so that the toweling from a fresh paper roll 15 starts feeding before the end of the previous paper roll 15 has been withdrawn from the chute defined between the walls 41 and 50. To prevent this overlapping feed during any cycle, the toweling from a new paper roll 15 is prevented from coming into contact with the feed roller 45, during any cycle during which said feed roller has been feeding out the end from a previous paper roll 15. This permits the feed roller 45 to complete this cycle and to come to a stop and causes the feed from the next paper roll to be delayed until the next cycle is initiated by a fresh manipulation by the user.

To prevent feed overlap during any one cycle, as described above, there is provided a guide pawl or detent 110 (Figs. 3 and 5), which is shown in the form of a hood pivotally supported near one end for up and down swinging movement on a rod 111 mounted on the side walls 48 of the cabinet back 11, and which covers the feed roller 45. This guide detent 110 comprises a top wall 112 extending across the full width of the cabinet 10 and downwardly extending side flanges 113 flanking the ends of said feed roller. Each of these flanges 113 has a guide stop 114 in the form of a tab extending therefrom beyond the feed roller 45 to a point slightly less than the thickness of the lower platen bar 33 on the guide 26 adjacent to the feed roller, and when said guide is in operative normal position adjacent to said feed roller, as shown in full lines in Fig. 3, the detent 110 is in raised position with its guide stops 114 resting on said platen bar. When the toweling from the active paper roll 15 is used up and the paper guide 26 adjacent to the feed roller 45 is forced downward by the friction action of said feed roller directly thereon, as described, the guide detent 110 drops down by the action of gravity about the axis of its supporting rod 111, until said detent is stopped by a control rod 115, as indicated in dot and dash lines in Fig. 3. In this dropped position of the guide detent 110, the guide stops 114 will assume a position in front of the platen bar 33 of the next succeeding guide 26, thereby blocking the movement of said guide towards the feed roller 45, until the detent is lifted again.

The rod 115 controlling the downward guide blocking position of the detent 110 into the dot and dash line position shown in Fig. 3, also serves to return said detent into elevated position shown in full lines. For that purpose, this control rod 115 (Figs. 3, 5 and 6) is journalled in the side walls 48 of the cabinet back 11 for rotation about its longitudinal axis and is provided with two notches 116 to receive the side flanges 113 respectively of the guide detent 110. When the guide detent 110 is in its lower position and its side flanges 113 are resting in the notches 116 of this rod 115, the rotation of this rod in either direction will lift the detent 110, raising the stops 114 on this detent above the platen bar 33 of the guides 26 resting on the stops 37, and releasing thereby the guides 26 for movement towards the feed roller 45 by the action of the spring-pressed plate 41. This control rod 115 is rotated by the same manipulation of the user which initiates the next towel feeding cycle. The mechanism for rotating this control rod 115 may be of any suitable type and in Figs. 5 and 6 this mechanism is shown comprising a linkage made up of a slide 117 adjacent to one side wall 17 of the cabinet front 12 connected at one end to the push button 70 by which the motor 65 is started for operation through a single cycle, and guided for movement across said side wall by a pin 118 in said side wall passing through an elongated slot 120 in said slide and a slide 121 adjacent to a side wall 48 of the cabinet back 11 disposed in end to end abutting relationship with the slide 117 and guided for movement across said side cabinet wall 48 by means of a pair of pins 122 in said side cabinet wall 48 passing through respective elongated slots 123 in said slide 121. One end of the slide 121 engages an arm 124 secured to one end of the control rod 115, this arm being maintained in contact with the end of the slide 121 by means of a suitable spring 125 acting on the control rod.

In operation, the guide detent 110 is normally maintained in elevated position, shown in full lines in Fig. 3, with the guide stops 114 on said detent resting on the platen bar 33 of the guide 26 adjacent to the feed roller 45, but spaced beyond the platen bar 33 of the next succeeding guide 26. While a paper roll 15 is active, every time a towel dispensing cycle is initiated by actuation of the push button 70, the control rod 115 is rotated clockwise (Fig. 3) through the linkage 117 and 121, through an angle, but this operation of the control rod 115 is an idle one, since the detent 110 is already in elevated position shown in full lines in Fig. 3. However, when the last of this active roll 15 has been fed during a cycle beyond the feed roller 45, the guide 26 adjacent to the feed roller 45 coming into direct contact with the feed roller is moved downward thereby, causing the detent 110 supported on said guide to drop with said guide into dot and dash line position shown in Fig. 3, to block the movement of the next guide 26 into towel feeding position with respect to the feed roller 45. The detent 110 is maintained in this guide blocking position, until the start of the next dispensing cycle. When this next dispensing cycle is initiated by manipulation of the push button 70, the control rod 115 is rotated clockwise (Fig. 3) to lift the detent, until its guide stops 114 clear the platen bar 33 of the next succeeding guide 26, as shown in full lines in Fig. 3, whereupon the group of platen bars 33 is moved by the action of the spring-pressed plate 41 towards the feed roller 45, until the paper toweling on the end platen bar 33 is pressed against said feed roller for dispensation.

In the case of a manually operated dispenser, a suitable connection is provided between the rocker arm 124 on the control rod 115 and the operating handle or crank employed for operating the feed roller 45 to produce the function of preventing feed overlap, described above in connection with an electrically operated dispenser.

The guide detent 110 serves not only the function described but serves also to guide the paper toweling from the bottom roll 15*a* immediately above the detent towards the feed side of the feed roller 45. The purpose of all of the guides 26, in addition to holding the paper toweling against the feed roller 45, is to maintain the toweling above said feed roller from collapsing and becoming tangled, when the upper end of the toweling is pulled loose from the roll core 20. Since there are no guides 26 serving to prevent the tail end of the paper toweling from the bottom paper roll 15*a* just above the guide detent 110 from collapsing, this detent serves as a guide for this purpose. When the paper toweling B is pulled loose from the core 20 of the bottom roll 15*a* it

curls and falls on top of the detent 110, as shown by the dot and dash lines B' in Fig. 3. Further drag by the feed roller 45, will straighten out the paper toweling and feed it past the feed roller. The front edge of the guide detent 110 has a downwardly turned flange 127 serving as a smooth guide lip over which the paper toweling rides in its passage towards the feed roller 45.

In a like manner, the upper end of each guide 26 holds the loose end of each paper roll 15 in the form of a curl, as shown by the dot and dash lines B'' in connection with the second paper roll 15*b* in Fig. 3, and straightens this curl as the paper toweling is pulled down. The guide 26 maintains the toweling straight between their straps 34, until the unreeled ends of these towelings are fed out past the feed roller 45.

Although the guides 26 have been described as being rendered inoperative as they are dropped successively onto the racks 102, actually the top cross-bar 32 of the last guide to drop onto said racks serves as a guide for the paper from the active roll 15, as shown in dot and dash lines in Fig. 3.

As already described, the feed roller 45 is cut away with slots 105 to receive the straps 34 on the idle guides 26, as they are pushed onto the rack 102 into the dot and dash line position shown in Fig. 3. Similarly, the top wall 112 of the detent 110 has slots 130 (Fig. 5) in line with the slots 105 on the feed roller 45, to receive the guide straps 34, as the idle guides 26 are pushed onto the rack 102.

In order to indicate to the attendant when the dispenser should be reloaded, the cabinet front 12 has in its front panel near the bottom a window 135 (Figs. 1, 3, 4 and 5) located in the left or right side of the front. Inside the cabinet front 12 is an indicating device comprising a plate 136 movable across the window 135 and supported for vertical slide movement by means of studs 137 secured to the front panel of the cabinet front 12 and passing with free slide fit through a slot 138 in said plate. The plate 136 has a right-angle offset 140 at its lower end, notched to provide a stepped edge 141 extending above and across the entire group of guides 26, as shown in Figs. 3, 4 and 5, the width of each step being equal to the width of a platen bar 33 on each guide 26. On the face of the slide plate 136 is a vertical row of indications 142 visible successively through the window 135, as this slide plate is dropped step by step, in the manner to be described. These indications 142 comprise the word "Empty" and below this word the numerals "1" to "6" reading downward.

When the dispenser is full and the bottom paper towel 15*a* is active, the bottom step on the offset 140 of the slide plate 136 rests on the platen bar 33 of the last guide 26*f*, so that the numeral "6" appears in the window 135, indicating that there are six paper rolls in the dispenser, at least five of which are in reserve. When the bottom roll 15*a* is used up and the guide 26*a* pushed into inoperative position onto the rack 102, the remaining guides 26*b* to 26*f* are moved one step towards the feed roller 45, causing the platen bar 33 of the last guide 26*f* to move forward out of the way of the bottom step on the offset 140 of the slide plate 136. This causes the slide plate 136 so released to drop by gravity one step, until the step next from the bottom seats on the platen bar 33 of the last guide 26*f*, thereby bringing the numeral "5" into view through the window 135, to indicate that there are at least four reserve paper rolls 15 and one active roll 15. This step by step operation of the indicating device is continued, until the word "Empty" appears through the window 135, indicating that all of the paper rolls 15 have been consumed.

When reloading the dispenser, it is necessary to move the indicator plate 136 manually back to its uppermost position, since in its lowermost position, its offset 140 blocks the restoration of the guides 26 back into position along the stops 37 and 38.

While the cabinet front 12 is closed, the pack of guides 26 is held by means of the spring-pressed plate 41 against the feed roller 45 mounted on the cabinet back 11. However, when the cabinet front 12 is opened, this pack of guides 26 is no longer confined by the feed roller 45, so that the pressure of this plate on these guides tends to move these guides away from the stops 37 and 38. To hold the guides 26 in place against the pressure of the plate 41 when the cabinet front 12 is opened, there is provided a pair of angle pieces, each having a leg 143 (Figs. 3, 5 and 9) secured to a side wall 17 of the cabinet front above the stops 37 and 38 and a short leg 144 overlapping the platen bar 33 of the front guide 26, to serve as a check against the movement of the guides 26 away from the stops 37 and 38 under the spring action of the plate 41. When loading the dispenser in open position of the cabinet front 12, it is necessary to depress slightly the bead 62 on the plate 41, to insert the paper guides 26 between said bead and the guide checks 144. When the cabinet front 12 is closed for operation, the feed roller 45 forces the paper guides 26 away from the checks 144, as seen in Fig. 3, these checks remaining idle until the cabinet front is opened again.

Where the dispenser is limited to low capacity, as for example, to three or four rolls of toweling for the less active washrooms, the cabinet will be low enough to permit the use conveniently of a cabinet front with a side hinge connection to the cabinet back. However, in a busy washroom, it may be necessary to extend the cabinet from a normal operating height at the bottom to close to the ceiling. In such a case, to avoid using a step ladder for loading, the cabinet front 12 is designed to hinge to the back 11 at the bottom and to swing out in front to a horizontal position, as shown in Figs. 10 and 11. The hinge for this bottom connection comprises a plate 150 rigidly secured to each side wall 48 of the cabinet back 11 near the bottom and extending out into the cabinet front 12, each plate having a depending tab 151 at its outer end as a hinge support. A hinge rod or pintle 152 is inserted through the side walls 17 of the cabinet front 12 and through the tabs 151, thus hinging the cabinet front 12 to the cabinet back 11. A link arm 153 (Fig. 10) for each side of the cabinet 10 between the back 11 and the front 12 comprises a pair of links pivotally connected at one end to the cabinet back and cabinet front respectively and jointed together at their opposite ends, and these link arms serve to support the cabinet front horizontally when in loaded position. These link arms 153 fold up within the cabinet 10, when the cabinet is closed. A suitable latch or lock (not shown) is provided to secure the cabinet front 12 in closed position against the cabinet back 11.

The attendant may wait until all of the paper rolls 15 are consumed before he reloads the dispenser. More likely, he will load at some stage, while a paper roll 15 is still active and unconsumed and while some paper roll or rolls are still in reserve. For loading the dispenser while in partially filled condition, the attendant opens up the cabinet front 12 and removes from the frame 25 the guides 26 which have dropped into inoperative position onto the rack 102, except the last guide 26 to drop onto said rack. This last guide 26 is replaced onto the unreeled end of the toweling from the partially consumed roll 15, the empty cores 20 of the consumed paper rolls 15 are replaced with full paper rolls 15, and the idle guides 26 which had been removed from the frame 25 are replaced on this frame with the unreeled ends of the full replacing rolls 15 interleaved alternately between these guides and with the unreeled end of the bottom roll 15*a* on top. The loose ends *b*, *c*, *d*, *e* and *f* of the paper rolls 15*b*, 15*c*, 15*d*, 15*e* and 15*f* respectively, beyond the guides 26, extend in the chute between the plates 41 and 50, while the last loose end of the bottom roll 15*a* is pulled beyond the tear edge 106 to provide the surplus *a'*. The loose toweling ends of the other paper rolls 15,

except the paper roll which is partially consumed and was active before reloading extend in the chute between the plates **41** and **50** but are short of reaching the tear edge **106**, while the loose end of this partially consumed roll extends to this tear edge but does not interfere with the feed of the toweling from the bottom roll **15***a*, when the dispenser is closed and the next dispensing cycle is initiated. The paper rolls **15** are used successively from the bottom to the top as described, the partially consumed roll becoming a reserve roll and coming into feed action again when its turn is reached. In this manner, the reloading of the dispenser is effected without interfering with the reserve and active paper rolls **15** in the dispenser.

While the invention has been described with particular reference to specific embodiments, it is to be understood that it is not to be limited thereto but is to be construed broadly and restricted solely by the scope of the appended claims.

What is claimed is:

1. In a paper towel dispenser, the combination comprising a cabinet having a dispensing opening, means for supporting a plurality of paper rolls in said cabinet in a row one above the other, one of said rolls being set for feed through said opening while the succeeding rolls are held in reserve, and means for picking up the feed from said rolls in succession for dispensation through said opening automatically as the rolls are successively consumed, while maintaining said rolls in their reserve position one above the other.

2. In a paper towel dispenser, the combination comprising a cabinet having a main section and a door section movably attached thereto for movement into open and closed positions and presenting a dispensing opening, means for supporting a series of paper rolls on said door section one above the other for movement with said door section, means for feeding paper from said rolls towards said opening for dispensation, and means for setting said rolls from a reserve state successively into operation for feeding automatically as the rolls are successively consumed, while maintaining said rolls in their original reserve position one above the other.

3. In a paper towel dispenser, the combination as described in claim 2, wherein said main section is in the form of a box of rectangular shape open at the front and adapted to be secured to a wall, said door section constitutes a front for said main section and is hinged thereto and said paper supporting means are adapted to support the paper rolls on said door section in a row one above the other.

4. In a paper towel dispenser, the combination comprising means for supporting a plurality of paper rolls, a corresponding plurality of platens stacked in position one ahead of the other face to face in a row with the unreeled ends of said rolls alternately positioned with respect to said platens and one roll end at the end of the platen stack exposed and in face contact with the adjacent platen to receive feed support therefrom, a feed roller in position to engage frictionally the exposed unreeled roll end and to feed it along the platen in contact with said exposed roll end, means for pressing the stack of platens and said feed roller relatively towards each other, and means mounting said platens for movement from said stacked position into inoperative positions, whereby said platens may be moved successively into said inoperative positions, as the paper rolls are successively used up to expose successively the unreeled ends of the paper rolls alternately positioned with respect to said platens and to cause said roll ends successively as they are exposed to engage said feed roller for feeding action.

5. In a paper towel dispenser, the combination comprising means for supporting a plurality of paper rolls in a row one above the other, a corresponding plurality of paper guides arranged in a pack one ahead of the other in front of the position of the supported paper rolls and having respective platens face to face in a row, the unreeled ends of the paper from said rolls except the unreeled end of the bottom paper roll being adapted to be interleaved alternately and stretched out between said paper guides, while the unreeled end of the bottom paper roll is exposed at the end of the guide pack, a feed roller in position opposite to said platens to engage frictionally the exposed unreeled paper end and to feed it along the platen which is in contact with said exposed paper end, means for pressing the pack of platens and said feed roller relatively towards each other, and means mounting said guides for movement from said pack position into inoperative positions, whereby said guides may be moved successively into said inoperative positions, as the paper rolls are successively used up to expose successively the unreeled ends of the paper roll alternately positioned with respect to said platens and to cause said roll ends successively as they are exposed to engage said feed roller for feeding action.

6. In a paper towel dispenser, the combination as described in claim 5, wherein each of said paper guides except the last one, includes a cross-bar near one end serving as a guide bar for a corresponding unreeled roll end, a cross-bar near the other end defining the corresponding platen, and a pair of substantially parallel straps interconnecting said cross-bars into a rigid substantially rectangular open structure, said last paper guide including a pair of substantially parallel straps and a bottom cross-bar interconnecting said latter straps to form a rigid open structure.

7. In a paper towel dispenser, the combination as described in claim 5, comprising a frame for retaining said paper guides in upright position as a pack, said guides being supported on said frame for movement with respect thereto into inoperative position as the corresponding paper roll is consumed, and being of different lengths to accommodate the heights of the different paper rolls.

8. In a paper towel dispenser, the combination comprising means for supporting a plurality of paper rolls in a row one above the other, a frame supported for swinging movement and comprising a pair of substantially parallel upright channels rigidly interconnected by a cross-brace, a plurality of paper guides supported as a pack in said frame one ahead of the other in front of the position of the supported paper rolls, the unreeled ends of the paper from said rolls except the unreeled end of the bottom paper roll being adapted to be interleaved alternately and stretched out between said paper guides, while the unreeled end of the bottom paper roll is exposed at the end of the guide pack, each of said paper guides except the last one including a cross-bar near the top serving as a guide bar for a corresponding unreeled roll end, a cross-bar near the bottom defining a paper platen, and a pair of substantially parallel straps interconnecting said cross-bars into a rigid substantially rectangular open structure, said last paper guide including a pair of substantially parallel straps and a bottom cross-bar interconnecting said latter straps to form a rigid open structure, all of said cross-bars projecting at their ends beyond said straps and into the channels of said frame, said straps being of different lengths to accommodate the height of the different paper rolls, the platens being arranged face to face in a row, a feed roller in position opposite to said platens to engage frictionally the exposed unreeled roll end and to feed it along the platen which is in contact with said exposed roll end, means for pressing the platens towards said feed roller as a pack, and means mounting said guides for movement from said pack position with respect to said frame into inoperative positions, whereby said guides may be moved successively into said inoperative positions, as the paper rolls are successively used up to expose successively the unreeled ends of the paper roll alternately positioned with respect to said platens and to cause said roll ends successively as they are exposed to engage said feed roller for feeding action.

9. In a paper towel dispenser, the combination comprising means for supporting a plurality of paper rolls, a corresponding plurality of platens stacked in position one ahead of the other face to face in a row with the unreeled ends of said rolls alternately positioned with respect to said platens and one roll end at the end of the platen stack exposed and in face contact with the adjacent first platen to receive feed support therefrom, means for supporting all of said platens except the first one, means supporting said first platen in operative position and having a spring-pressed mounting permitting the latter platen supporting means to be depressed when the first platen supported thereon is forced downward, a feed roller opposite said platen stack in position to engage frictionally the exposed unreeled roll end and to feed it along said first platen, while said first platen is supported on said depressible platen supporting means, means for pressing the stack of platens towards said feed roller, said first platen when engaged directly by said feed roller in the absence of intervening paper being pressed down by said feed roller with a force to cause said depressible platen supporting means to be depressed, thereby allowing said first platen to move downward, and means for guiding said first platen into inoperative position as said first platen is depressed, thereby causing the stack of platens to move under the action of said pressing means one step towards said feed roller, to bring the next exposed unreeled paper end into feed contact with said feed roller, and to bring the next platen in contact with the latter exposed unreeled paper end in position to be supported on said depressible supporting means.

10. In a paper towel dispenser, the combination comprising means for supporting ap lurality of paper rolls, a paper feed control member, means responsive to each manipulation of said control member for feeding through a cycle a section of paper of predetermined length from said paper rolls for dispensation, means for setting said rolls from reserve successively into operation for feeding, automatically as the paper rolls are successively consumed, and means for interrupting the feed from a fresh paper roll until the next feeding cycle, during any cycle in which the tail end of a previous active roll is dispensed.

11. In a paper towel dispenser, the combination as described in claim 4, comprising a paper feed control member, means responsive to each manipulation of said control member for driving said feed roller through a predetermined angle to feed a section of paper of predetermined length from said paper rolls for dispensation, means for holding said stack of platens and said feed roller against relative movement towards each other under the action of said pressing means during any feed cycle in which the first platen adjacent to said feed roller has been moved into inoperative position, whereby the next exposed unreeled roll end is maintained out of feed contact with said feed roller until the next feed cycle, and means operable upon each manipulation of said control member for rendering said holding means inoperative during the initial period of each feed cycle.

12. In a paper towel dispenser, the combination comprising means for supporting a plurality of paper rolls in a row one above the other, a feed roller below the position of the bottom paper roll, a paper feed control member, means responsive to each manipulation of said control member for driving said feed roller through a predetermined angle to feed a section of paper of predetermined length from said paper rolls for dispensation, means for setting said paper rolls from reserve successively into operation for feeding, automatically as the paper rolls are successively consumed, and means for interrupting the feed from a paper roll until the next feeding cycle during any cycle in which the tail end of a previous active roll is dispensed and comprising a hood disposed between the position of the bottom paper roll and said feed roller and supported for movement into and out of operative position, and a connection between said control member and said hood for actuaing said bond into inoperative position upon each actuation of said control member, said hood serving also to support the curled tail end of the paper from the bottom paper roll, when said tail end has been pulled off said bottom paper roll.

13. In a paper towel dispenser, the combination comprising means for supporting a plurality of paper rolls, means for feeding paper from said rolls for dispensation, means for setting said rolls from reserve successively into operation for feeding, automatically as the rolls are successively consumed, means for indicating the number of rolls in reserve, and means automatically operable as each roll becomes exhausted and each reserve roll is placed into operation for operating said indicating means.

14. In a paper towel dispenser, the combination comprising a cabinet defining a dispensing opening, means for supporting a plurality of paper rolls within said cabinet, means for feeding paper from said rolls through said dispensing opening, means for setting said rolls from reserve successively into operation for feeding, automatically as the rolls are successively consumed, said cabinet having a window, an indicating plate behind said window bearing indicia representing the number of reserve rolls in said cabinet, said indicia being successively exposable through said window according to the position of said indicating plate, and means for moving said indicating plate step by step automatically as said paper rolls are successively consumed, each step corresponding to the distance between successive indicia to expose an indicium through said window from which the number of rolls still in reserve in the cabinet can be determined.

15. In a paper towel dispenser, the combination comprising a cabinet defining a dispensing opening, means for supporting a plurality of paper rolls within said cabinet with one serving as an active roll and the others as reserve rolls, means in said cabinet at the entrance of said dispenser defining a chute tapering in cross-section towards said opening, means for guiding the unreeled papers from the reserve paper rolls into said chute in array one in front of the other but short of reaching said dispensing opening and for guiding the unreeled paper from the active roll into said chute in front of the array of other unreeled papers and through said dispensing opening and means for feeding the unreeled papers in said chute successively through said dispensing opening, as the paper rolls are successively consumed.

16. In a paper towel dispenser, the combination comprising a cabinet defining a dispensing opening, means for supporting a plurality of paper rolls within said cabinet, a corresponding plurality of platens stacked in position one ahead of the other face to face in a row with the unreeled ends of said rolls alternately positioned with respect to said platens and one roll end at the end of the platen stack exposed and in face contact with the adjacent platen to receive feed support therefrom, a feed roller in position to engage frictionally the exposed unreeled roll end and to feed it along the platen in contact with said exposed roll end, means in said cabinet at the entrance to said dispenser opening defining a guide chute for all of the papers from said rolls, which tapers in cross-section towards said opening and which includes a plate forming a wall of said chute, said plate being spring-pressed against the stack of platens to press said platens towards said feed roller, and means for moving said platens successively out of said stacked position into inoperative position, as the paper rolls are successively used up to expose successively the unreeled ends of the paper rolls alternately positioned with respect to said platens and to cause said roll ends successively as they are exposed to engage said feed roller for feeding action.

17. In a paper towel dispenser, the combination comprising a cabinet having a dispensing opening fixed with respect to said cabinet when the dispenser is in operative condition, means for supporting a plurality of paper rolls in predetermined orderly sequence in said cabinet with one paper roll in operative position for dispensa-

tion of its paper through said opening and with the other paper rolls in reserve position for later successive operations and for dispensation of their papers through said dispensing opening, and means automatically operable as each operative roll becomes exhausted for initiating the rotation of the next reserve roll in the sequence in a paper dispensing direction and for thereby setting up the latter roll as the next operative dispensing roll.

18. In a paper towel dispenser, the combination comprising a cabinet having a dispensing opening fixed with respect to said cabinet when the dispenser is in operative condition, means for supporting a plurality of paper rolls in predetermined orderly sequence in said cabinet with one paper roll in operative position for dispensation of its paper through said opening and with the other paper rolls in reserve position for later successive operations and for later dispensations of their papers through said opening, means blocking the reserve rolls against dispensing operations automatically while the operative roll remains unexhausted, and means automatically operable as each operative roll becomes exhausted for releasing the means blocking the operation of the next reserve roll in the sequence, whereby the latter roll can be set up as the next operative dispensing roll.

19. In a paper towel dispenser, the combination comprising a cabinet having a dispensing opening fixed with respect to said cabinet when the dispenser is in operative condition, means for supporting a plurality of paper rolls in predetermined orderly sequence in said cabinet with one paper roll in operative dispensing condition and with the other paper rolls in reserve for successive dispensing operations, means for feeding the paper from each roll to said dispensing opening, means for rendering the feeding means for the reserve rolls inoperative automatically while the operative roll remains unexhausted, whereby the delivery of paper from the reserve rolls to said opening is prevented while the operative roll remains unexhausted, and means automatically operable as each operative roll becomes exhausted for rendering operative the feeding means for the next reserve roll in the sequence, whereby the latter roll is set up automatically as the next operative dispensing roll.

20. In a paper towel dispenser, the combination comprising a cabinet having a dispensing opening, means for supporting a plurality of paper rolls in predetermined orderly sequence in said cabinet with one paper roll in operative position and with the other paper rolls in reserve position, a control member, means responsive to each actuation of said control member through a cycle for feeding a predetermined length of paper from each of the rolls through said dispensing opening, means rendering the paper feeding means for the reserve rolls inoperative automatically while one of the rolls remains operative for dispensation, and means automatically operable as each operative roll becomes exhausted for rendering operative the feeding means for the next reserve roll in the sequence, whereby the actuation of said control member will cause dispensation of paper from the latter roll.

21. In a paper towel dispenser, the combination comprising a cabinet having a dispensing opening fixed with respect to said cabinet when the dispenser is in operative condition, means for supporting a plurality of paper rolls in predetermined orderly sequence in said cabinet with one paper roll in operative position for dispensation of its paper through a part of said dispensing opening and with the other paper rolls in reserve position for later successive operations and for dispensation of their papers through said part of the dispensing opening, means blocking the operation of the reserve rolls automatically while the operative roll remains unexhausted, means automatically operable as each operative roll becomes exhausted for releasing the means blocking the operation of the next reserve roll in the sequence, and means automatically operable with the release of the blocking means for the latter roll for initiating the dispensing operation of the latter roll, while maintaining the latter roll in the axial position it had as a reverse roll, whereby the latter roll is set up as the next operative dispensing roll.

22. In a paper towel dispenser, the combination as described in claim 4, wherein said feed roller is operable to move said platens successively out of said stacked position into inoperative positions, automatically as the paper rolls are successively used up.

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