Nov. 19, 1963 C. L. PAULLUS ET AL 3,110,974

TOWEL APPARATUS

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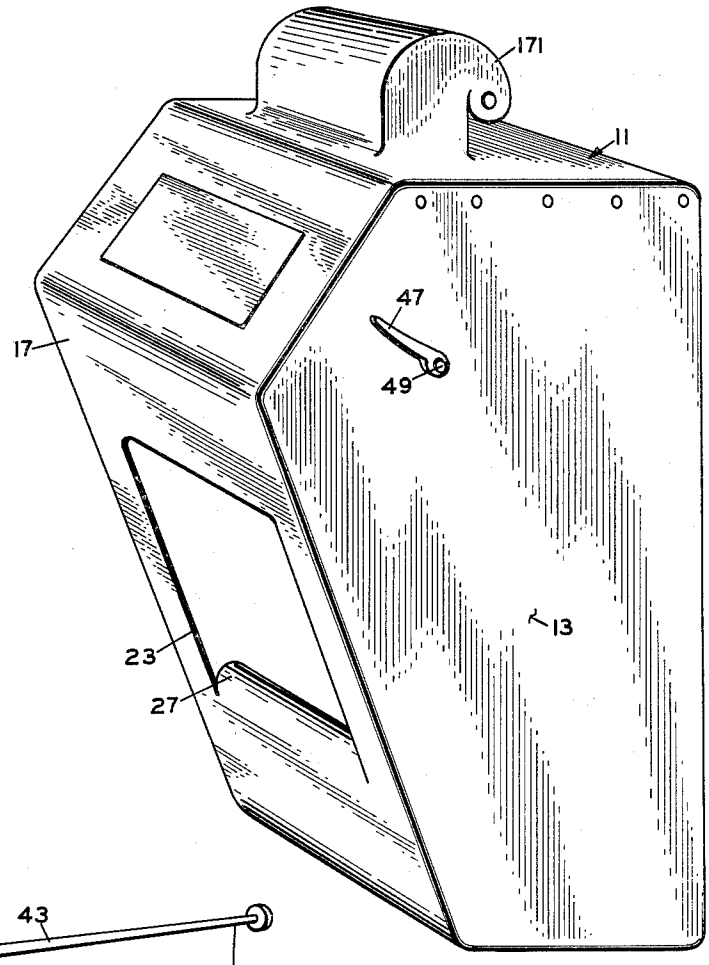


FIG. 1

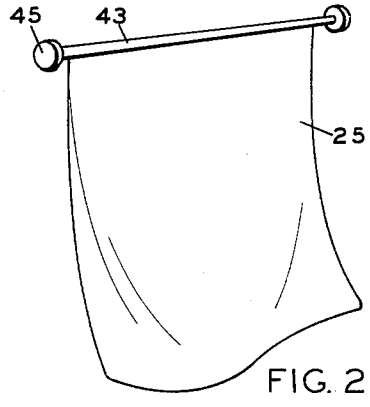


FIG. 2

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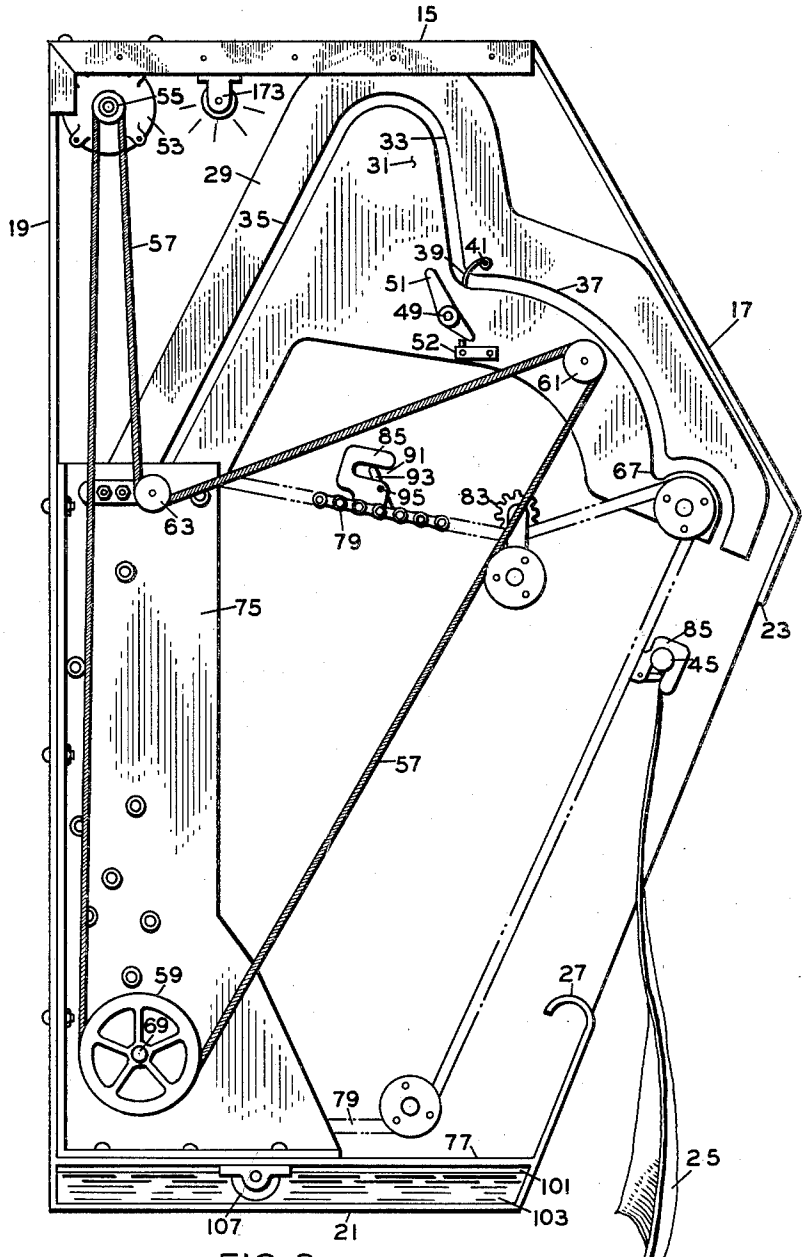


FIG. 3

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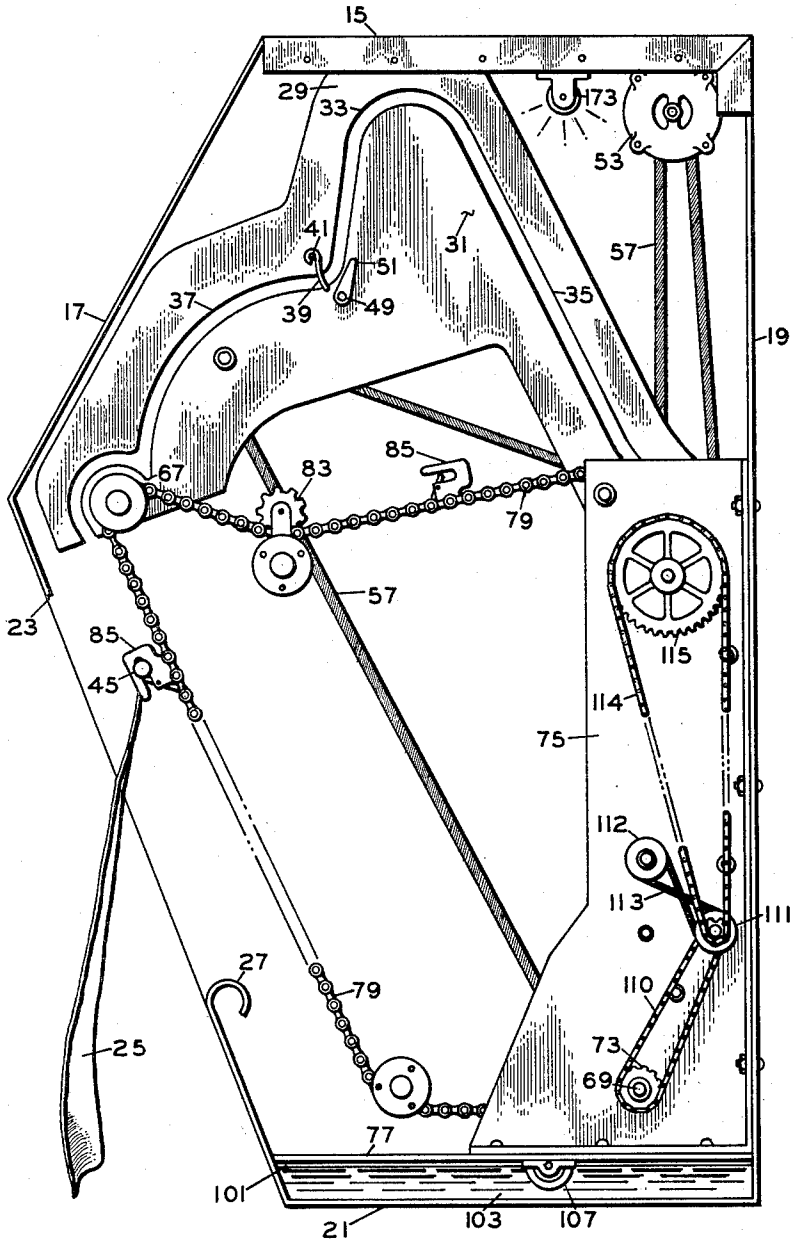


FIG. 4

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TOWEL APPARATUS

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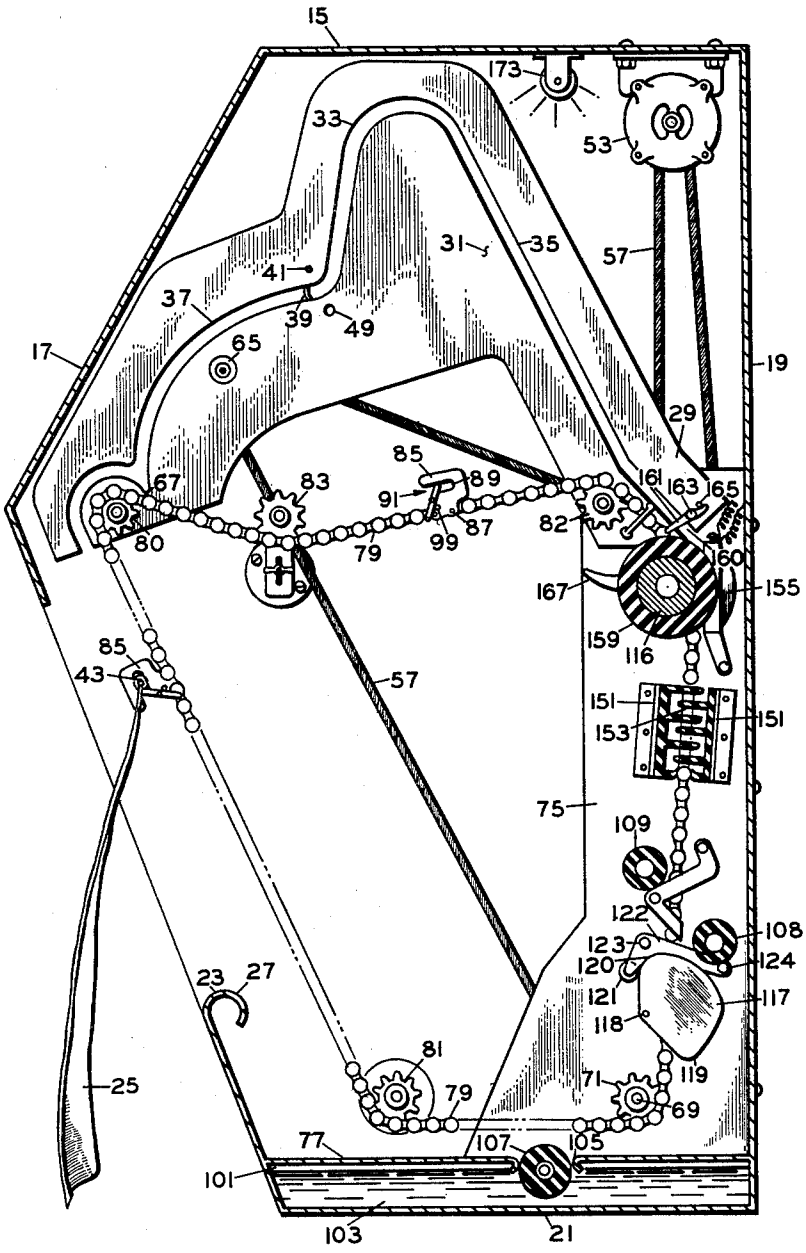


FIG.5

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TOWEL APPARATUS

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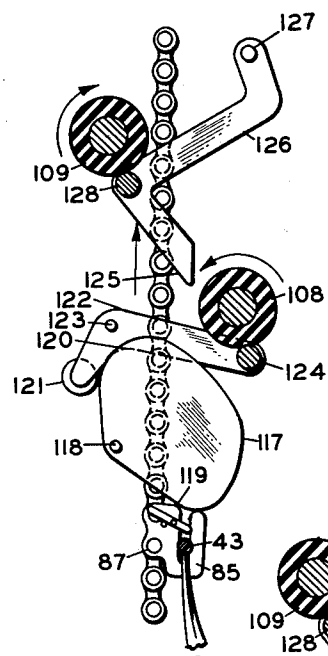


FIG. 6

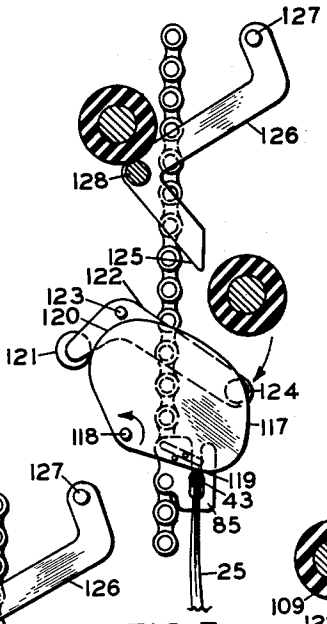


FIG. 7

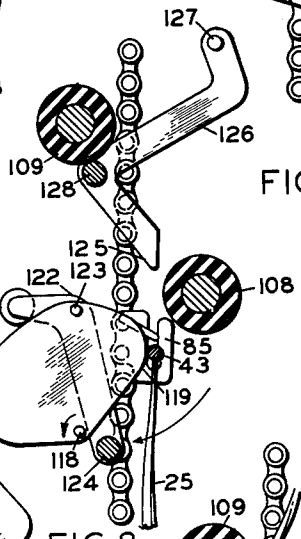


FIG. 8

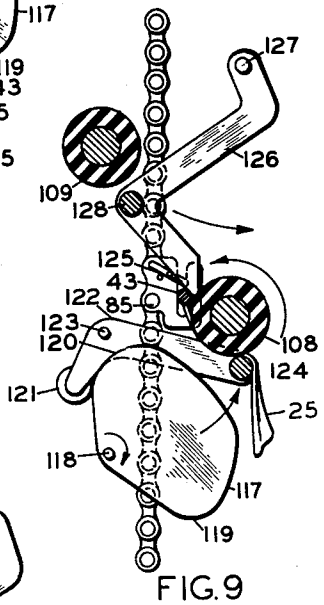


FIG. 9

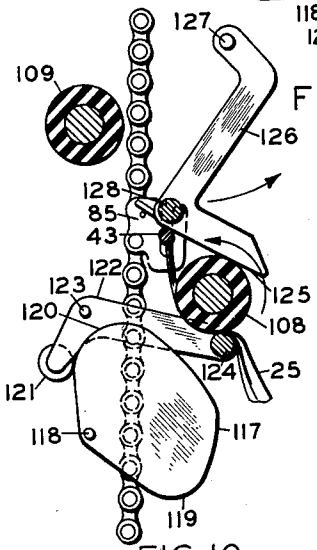


FIG. 10

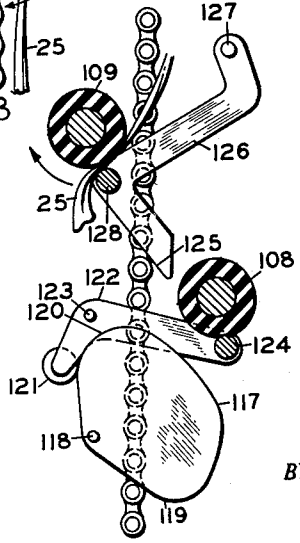


FIG. 11

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TOWEL APPARATUS

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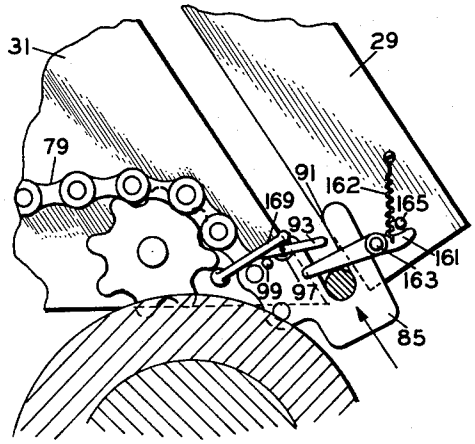


FIG. 12

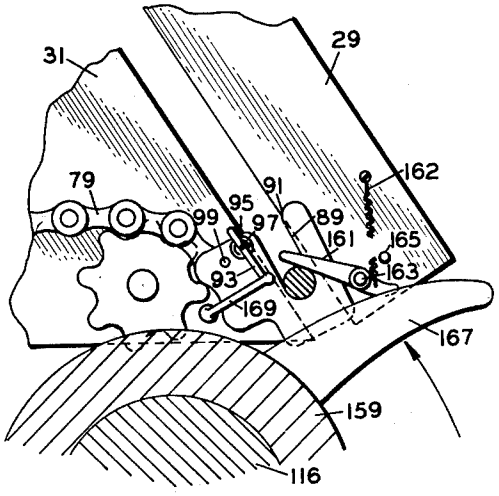


FIG. 13

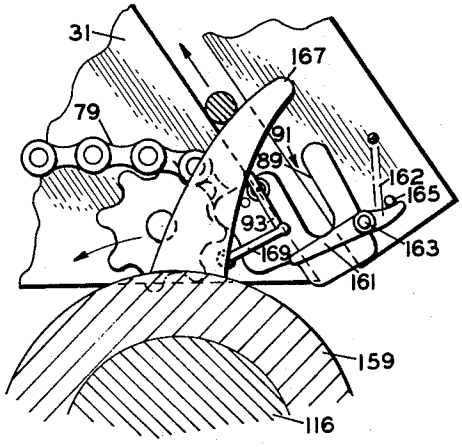


FIG. 14

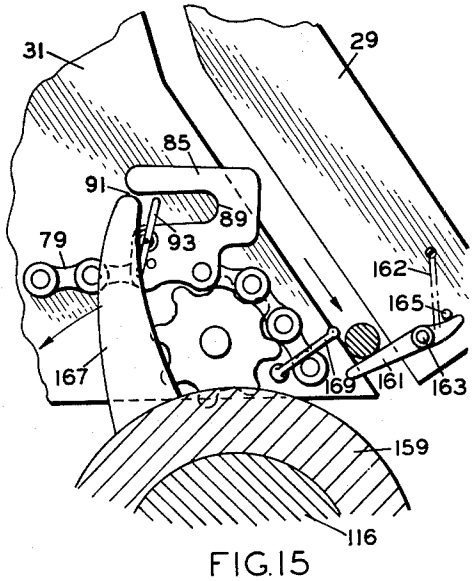


FIG. 15

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United States Patent Office 3,110,974 Patented Nov. 19, 1963

3,110,974
TOWEL APPARATUS

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Filed June 9, 1961, Ser. No. 116,137
6 Claims. (Cl. 38—2)

This invention relates to an apparatus for furnishing towels for use in public washrooms or the like, and, more particularly, to an improved apparatus for providing clean individual towels to the user, automatically washing, ironing, and sterilizing the individual towels, and then storing them for later re-use.

Many different types of devices have been used in public or industrial washrooms to provide means for drying the face and hands. Included among these devices are cabinets for dispensing paper towels that are used and thrown away, warm air driers usually having a blower and electric heater, and roller towel cabinets having a long web of towel material with a portion of the long web hanging from the front of the cabinet so that the user may pull a clean area from one roll and simultaneously wind the soiled area onto a second roll. Some of the disadvantages of these devices are readily apparent. Because of the expense, it is impractical to provide a disposable paper towel sufficiently soft and pleasant to the skin. Even the cost of present paper towels, which are usually stiff and chafing, is enough that other devices have been sought to replace them. Warm-air drying devices are slow and therefore unsatisfactory to those individuals who wish to have their hands and face dried quickly. Paper-towel and roll-towel cabinets require frequent periodic servicing and often the supply of material in these cabinets is exhausted at a time when it is most needed.

In the past, machines have been proposed which have included a washing and ironing mechanism within a cabinet. These machines, however, usually have a web of toweling material joined at the ends to form a continuous loop and soak the towel with liquid, so that drying is difficult and often incomplete. If the dispenser receives heavy use, the towel may still be wet when presented to the user. After prolonged use when the loop of towel material is worn in one spot, either the worn parts must be cut out of the loop and repaired, or the entire towel must be discarded.

This invention includes a device that provides an individual towel for each user. The towels may be dispensed in rapid succession but the time allotted for washing and drying the towel material does not depend upon the rate at which the footage of towel material is pulled or fed through the machine. That is, washing and drying rate is constant and does not vary with the demand made on the machine.

Briefly described, this invention includes an apparatus wherein each towel is attached to a metal rod, a plurality of rods being mounted in and free to move in a storage track. A clean towel is pushed from the storage track onto a feed track and presented through an opening in the cabinet front when the device is activated by the user. After a predetermined period of time, the towel rod is automatically engaged by a conveyor and removed from the feed track. The conveyor movement eventually withdraws the towel into the cabinet, passes it through a cleaning, ironing, and disinfecting cycle, and then deposits it in the storage track for later re-use.

One advantage of this invention is that servicing of the apparatus is greatly reduced. Another advantage is the compact mechanism resulting in a small, lightweight dispenser. Other advantages and features of the invention will be apparent from the following description, the drawings, and the claims.

In the drawings:

FIG. 1 is a perspective view of the exterior of the apparatus;

FIG. 2 is a perspective view of a towel attached to a rod suitable for use in the apparatus;

FIGS. 3 and 4 are elevational views of the apparatus with opposite sides removed;

FIG. 5 is a sectional elevational view through the center of the apparatus;

FIGS. 6, 7, 8, 9, 10, and 11 are sectional views of the washing apparatus of this invention and show the progress of a towel through the apparatus; and

FIGS. 12, 13, 14, and 15 are enlarged elevational views of the mechanism for returning the towels to the storage track.

Referring to FIGS. 1, 3, 4, and 5, the cabinet 11 for the apparatus is constructed of side panels 13—13, top panel 15, front panel 17, back panel 19, and bottom panel 21. The front panel 17 is provided with a feed-out and towel return opening 23 for presenting a towel 25 to the users thereof for drying their faces and hands. The front panel 17 is slanted and the feed-out opening 23 is large enough to allow a towel 25 to be dropped through the opening 23 from a position located inside the cabinet 11 and above the opening 23. At the bottom of the opening 23, the front panel 17 is curled inwardly to provide a smooth ledge 27 so that the towel 25 will not catch and tear when it is later withdrawn through the opening toward the bottom of the cabinet 11.

On each side of the interior top of the cabinet and parallel to each other are two flat plates 29 and 31 contoured so that a track 33 is formed between them. The track 33 is separated into a storage track 35 and a feed track 37 by a flat spring 39 mounted on a pin 41 attached to the flat plate 29 with the spring 39 extending across the track 33. The towels 25—25 are each attached to a rod 43 (shown in FIG. 2) by any suitable fastening means (for example, a loop may be formed on the end of each towel 25 and the loop slipped over the rod 43) and the rod 43 has an enlarged portion or knob 45 at each end. A plurality of rods 43—43 is loaded into the storage track 35 so that it is essentially completely filled. The knobs 45—45 on the towel rods 43—43 are larger than the width of the track 33 to keep the towel rods from slipping out of the track 33. The spring 39 retains the towel rods 43—43 in the storage track 35. (The rods 43—43 are not shown loaded in the storage track since the figures are clearer by not showing this arrangement.)

A handle 47 at the side of the cabinet 11 is attached to a rod 49 that extends from one side of the cabinet 11 to the other. Attached to the rod 49, on each side of the storage track 35, are arms 51—51. When the handle 47 is pivoted, the arms 51—51 also pivot and engage the ends of a towel rod 43 that is resting against the retainer spring 39. The towel rod 43 is thus pushed past the retainer spring 39 and onto the feed track 37. Pivoting the handle 47 also activates a switch 52 which closes a circuit to the power means or motor 53. The switch is preferably a time-delay switch that keeps the circuit closed for a predetermined time, i.e., the time required for a towel 25 to be presented to the user, then washed, ironed, and returned to storage. The handle 47 is pivoted back after it is activated by a spring (not shown).

The power means or motor 53 has a driver pulley 55 that drives a belt 57. The belt 57 passes over and in turn drives pulleys 59 and 61. Idler pulley 63 which also engages the belt is adjustable and is used to tighten the belt 57.

After the towel rod has been pushed past the retainer spring 39, it moves down the feed track 37 by the force of gravity with the towel 25 hanging downward. As the rod 43 moves down the feed track 37, the towel 25 even-

tually contacts a roller 65 (FIG. 5) which is activated by a pulley 61 and rotating rapidly. The roller 65 is preferably covered with a highly frictional material, such as rubber, so that, as the towel contacts the rotating roller 65, the roller engages the towel lifting it upward, dropping it over the other side of the roller and through the feed-out opening 23 in the front of the cabinet 11. The towel bar eventually comes to rest in a notch 67 near the end of the feed-out track 33. At this point the towel is extending through the feed-out opening 23 and is available to the user.

Pulley 59 which is activated by the motor 53 through the belt 57 is attached to an axle 69 and the axle 69 has mounted thereon two driving sprocket wheels 71—71 (FIG. 5) and a chain pulley 73 (FIG. 4). Axle 69 is rotatably mounted in two upright frame members 75—75 that are attached by suitable means to the back panel 19 and inner bottom panel 77 of the cabinet. The frame members 75—75 also support various other members of the washing and ironing system to be discussed later. A roller chain 79 passes over each driving sprocket wheel 71 and idler sprocket wheels 80, 81, and 82 to form a continuous loop. An adjustable sprocket wheel 83 is provided for tightening each chain 79. At selected intervals on each chain 79, and directly opposite each other, a rod carrier or hook 85 is attached to a link of the roller chain so that the parallel roller chains 79—79 and the rod carriers or hooks 85—85 are a means for moving the towel rods 43—43 through the apparatus.

The towel carrier 85 (best shown in FIGS. 12–15) has two holes 87 so that it may easily be mounted on the roller chain 79 and a throat 89 for receiving and holding a towel rod 43. Near the opening 91 of the throat 89 a small lever or finger 93 is pivotally mounted on a pin 95 so that it is pushed out of the way when the towel rod 43 enters the throat but is pivoted backward to close the throat 89 after the towel rod has entered the throat 89. The finger 93 is pivoted across the throat 89 by spring 97 which holds one end of the finger 93 against the stop 99. The weight of the towel rod 43 is sufficient to overcome the action of the spring 97 pivoting the finger 93 to open the throat 89 of the towel carrier 85 when the towel rod 43 is engaged at notch 67 of the feed track 33. Once the towel rod 43 has entered the throat 89 it is retained in the carrier 85 until removed by means later described.

After the roller chain 79 begins to move, a pair of carriers 85 eventually arrive at the notch 67 of the feed track and engage the towel rod 43 resting therein. The carrier 85 moves around the idler wheel 80 thus removing the towel rod 43 from the feed track 33. By the time the carriers 85—85 have moved from idler wheels 80—80 to idler wheels 81—81, the user has had ample time to dry his face and hands. The towel 25 of course follows the rod 43 engaged in the carriers 85—85 and is withdrawn into the machine as the carrier 85 passes opposite the ledge 27 and passes around the idler sprocket wheel 81.

In the bottom of the cabinet 11 a chamber 101 is provided and contains a liquid detergent 103. Extending down into the detergent 103 through an opening 105 in the inner bottom panel 77 is a roller 107 which is suitably mounted for free rotation. As the towel carriers 85—85 move from idler wheels 81—81 to driving sprocket wheels 71—71, the towel 25 is carried or dragged behind the towel rod 43 and passes over the roller 107. This causes the roller 107 to rotate and coat the towel 25 with a small amount of the detergent 103 but much less detergent is applied to the towel 25 than if it were dipped or passed through a detergent. The roller 107 may, of course, be connected into the driving mechanism of the dispenser so that it is caused to rotate continuously while the roller chains 79—79 are moving.

The towel 25 carried by the rod 43 next passes through a scrubbing mechanism that is best shown in FIGS. 6, 7, 8, 9, 10, and 11. There are two scrubbing mechanisms located on opposite sides of the path of the conveyor and scrub opposite sides of the towel 25. The scrubber is comprised of rollers 108 and 109 rotatably mounted in the frame 75—75. The rollers 108 and 109 are activated through a chain 110 (FIG. 4) that passes over chain pulley 73 to drive multiple pulley 111. Multiple pulley 111 is connected to roller 108 and drives pulley 112 by a belt 113 that is crossed over so that roller 109, which is connected to pulley 112, is driven in the opposite direction to that of roller 108. Multiple pulley 111 is also connected by a chain 114 to pulley 115 which drives an ironing roller 116.

Rollers 108 and 109 preferably have a sponge rubber surface although other surfaces such as a brush could be used. The towel carriers 85 are moved by the conveyor chain 79 with a towel bar 43 held between them. The towel bar contacts (FIG. 6) a pair of cams 117—117 pivotally mounted on the frame 75 by pins 118—118. The towel rod 43 contacts one surface 119 of each of the cams 118—118 (FIG. 7) and rotates the cams 118 so that cam surface 120 is forced against the cam follower 121. A cam follower 121 is mounted on an end of each pair of arms 122—122. Arms 122—122 are pivotally mounted on pins 123—123 and have a bar 124 suspended between their ends opposite the cam followers 121—121. The bar 124 is held against the roller 108. Movement of the towel rod 43 against the cams 117—117 rotates the cams 117—117 and consequently pivots arms 122—122 so that the bar 124 is swung away from the roller 108 allowing the towel bar 43 and towel 25 to pass between the bar 124 and roller 108 (shown in FIGS. 6–8). After the towel rod 43 has passed the cams 117—117, the cams 117—117 and arms 122—122 pivot back to their original position through the action of springs (not shown) so that the towel 25 is pressed against the roller 108 by the bar 124. The roller 108 rotates so that the surface that contacts the towel 25 is moving in a direction opposite to the movement of the towel 25 by the conveyor. Rotation of the roller 108 against the surface of the towel 25 works the detergent 103 into a foam and scrubs the towel surface.

After the towel rod 43 has passed the roller 108, it contacts the surfaces 125—125 of arms 126—126. Arms 126—126 are pivotally mounted on frame 75 by suitable means such as pins 127—127. A bar 128 is suspended between the arms 126—126 and presses against the roller 109 having the same function with respect to roller 109 as bar 124 has to roller 108. As shown in FIGS. 9, 10, and 11, the towel rod 43 pushes against the surfaces 125—125 of the arms 126—126 so that the bar 128 is pivoted away from the roller 109 and the towel rod 43 can pass between the bar 128 and the roller 109. After the bar has passed between bar 128 and roller 109 the arms 128 return to their original position and press the towel 25 against the roller 109.

Referring now to FIG. 5, after the towel bar 43 and towel 25 have passed through the scrubbing rollers 108—109, they are carried between two plates 151—151 located on each side of the path of the conveyor which have a number of flexible sheets 153—153 extending across the path of the towel 25. The flexible sheets 153, which are preferably made from a rubber material, act as a squeegee and remove the foam from the surface of the towel 25. Means may be provided to carry off the used foam to a storage compartment in the cabinet 11 or to a drain connection at the bottom of cabinet 11 (not shown).

The towel rod 43 and towel 25 next pass between the ironing roll 116 and ironing shoe 155. The ironing shoe 155 is pivotally mounted between the frame members 75—75 and spring loaded to press against the ironing roll 116. The shoe 155 is electrically heated and provides the heat necessary to dry and remove the wrinkles from the towel as it presses the towel over the ironing roll 116 which is preferably covered with a cloth 159. The heat

applied for ironing is also sufficient to disinfect the towel 25.

The towel bar 43 is then deposited in the end 169 of the storage track 37 (FIGS. 12, 13, 14, and 15) and, as it passes into the track 37, a catch 161 extending across the storage track 37 and pivotally mounted on a pin 163, is pushed out of the way so that the storage track is open to receive the towel bar. After the towel bar 43 has passed the latch 161, a spring 162 pivots the latch 161 back across the storage track 37 against a stop 165 so that the towel bar does not fall backwards from the storage track 37. A pin 169 attached to the flat plate 31 engages the finger 93 on the towel carrier 85, pivoting the finger 93 to open the throat 89 of the towel carrier 85. After the throat 89 of the towel carrier 85 is opened, a pair of arms 167—167 on the ironing roller 116 pushes the towel bar 43 from the towel carrier 85. The towel rod 43 is thus deposited in the storage track 37 for later re-use.

In some installations the apparatus will receive heavy use. In order to further insure that the towels stored in the apparatus are completely dry when presented to the user, a small warm air dryer 171 is provided and positioned to direct warm air over the towels 25—25 when they are resting in the storage track 37. A sterilized atmosphere is also desirable and is provided by an ultraviolet light 173 which is preferably operated continuously.

It will be understood, of course, that, while the form of the invention shown and described constitutes a preferred embodiment, it is not intended to illustrate all possible forms or ramifications of the invention. It will also be understood that the words used are words of description rather than words of limitations and that various changes, such as changes in shape, size, and arrangement of parts may be made without departing from the spirit and scope of the invention herein disclosed.

What is claimed is:

1. An apparatus for furnishing and laundering towels comprising: a frame enclosed by a cabinet having a towel feedout and return opening therein; a conveyor including a pair of roller chains mounted parallel to each other on a plurality of sprocket wheels, the sprocket wheels being rotatably mounted on the frame; a track having opposite ends in communication with the conveyor; a plurality of towel rods each one adapted to be attached to a towel and slidably mounted in the track, the towel rods having enlarged ends; a handle on the outside of the cabinet connected to means inside the cabinet for engaging a towel rod and moving the towel rod so that a towel attached thereto is presented through the opening; means on the conveyor including a pair of hooks, similarly located, one on each roller chain, having a throat for engaging the towel rods and a finger across the throat, the finger being pivotally mounted allowing a towel rod to enter the throat and subsequently closing the throat to retain the towel rod; a roller adjacent the conveyor partially immersed in liquid detergent and positioned to contact the surface of the towel; a pair of scrubbing means positioned to scrub opposite surfaces of the towel as said towel rods move on the conveyor, each said scrubbing means including a rotatably mounted scrubbing roller activated to rotate so that the roller surface moves in a direction opposite to the movement of the towel surface, a pair of arms having a bar attached between one of their ends and positioned to be engaged by each of said towel rods as the towel rod is carried by said conveyor and to co-act with said towel rod to pivot said bar across the path of movement of said conveyor, allowing said towel rod to pass and then to return said bar to push said towel against said scrubbing roller; means positioned to scrape the foam from the surface of the towel; a rotatably mounted cloth-covered roller and an electrically heated ironing shoe positioned to contact and press against the oposite surface of the towel as it is moved by the conveyor; a pin for engaging the finger of the hook, pivoting said finger to open the throat of said hook, and arms on the rotatably mounted fabric-covered roller to engage and lift the towel rods from said throat of said hook as they enter the track; and a latch across the track free to pivot, allowing the towel rods to enter the track and preventing the towel rods from falling out of the track.

2. Apparatus for furnishing and laundering towels comprising: a frame enclosed by a cabinet having an opening therein; a conveyor supported by the frame; a track supported by the frame and having its ends adjacent to the conveyor; a plurality of towel rods, each adapted to be attached to a towel and slidably engageable in said track; means on the conveyor for contacting, carrying and disengaging one of said towel rods from said track, thereby presenting the towel through the opening in the cabinet and subsequently withdrawing said towel within the cabinet; a washer and ironer supported on said frame and positioned with respect to said conveyor so that each one contacts said towel as said towel rod is carried with said conveyor, said washer and ironer reconditioning said towel for reuse; and means supported by said frame releasing the towel rod from said conveyor and engaging said towel rod in said track.

3. An apparatus for furnishing and laundering towels comprising: a frame enclosed by a cabinet having a feedout and return opening therein; a conveyor including a pair of roller chains mounted parallel to each other on a plurality of sprocket wheels, said sprocket wheels being rotatably mounted on said frame; a track supported by said frame and having its opposite ends in communication with the conveyor; a plurality of towel rods each one adapted to be attached to a towel and slidably engageable in said track; a handle on the outside of said cabinet connected to actuate means inside said cabinet to move a towel rod in the track, thereby presenting the towel through the cabinet opening; means on the conveyor for engaging and carrying the towel rod withdrawing the towel through the cabinet opening; a detergent applicator, scrubber, foam remover and ironer all supported by said frame and positioned with respect to the conveyor so that each in turn contacts a towel as the towel rod is carried with said conveyor thereby reconditioning said towel for re-use; and means supported by said frame for disengaging the towel rod from the conveyor and engaging said towel rod in said track.

4. An apparatus for furnishing and laundering towels comprising: an enclosure having an opening therein; a manually startable conveyor in said enclosure; two parallel flat plates, each plate having an elongated slot to form a track, said track having its opposite ends in communication with said conveyor; a plurality of towel rods, each one adapted to be attached to a towel and slidably mounted in said track; means for moving each towel rod to a position where the towel is presented through the enclosure opening; means on the conveyor for engaging and carrying the towel rod after the towel has been presented through the enclosure opening; a detergent applicator positioned to apply detergent on the surface of the towel as said towel rod is carried by the conveyor; a pair of scrubbing means positioned to scrub opposite surfaces of said towel as said towel rod is carried by said conveyor, each said scrubbing means including a rotatably mounted scrubbing roller activated to rotate so that the roller surface moves in a direction opposite the movement of the towel surface; a rotatably mounted fabric-covered roller and an electrically heated ironing shoe positioned to contact and press against opposite surfaces of said towel as said towel rod is carried by said conveyor; arms on said rotatably mounted fabric-covered roller to engage and lift said towel rod from said conveyor as said towel rod enters said track; a latch across the end of said track free to pivot allowing said towel rod to enter said track, then returning to rest position preventing said towel rod from falling out of said track;

and means for stopping said conveyor at a predetermined time after the last manual starting thereof.

5. An apparatus for furnishing and laundering towels comprising: an enclosure having a towel feed-out and return opening therein; a manually startable conveyor in said enclosure including a pair of roller chains mounted parallel to each other; two parallel flat plates each plate having an elongated slot to form a track, said track having its opposite ends in communication with said conveyor; a plurality of towel rods each one adapted to be attached to a towel and slidably mounted in said track; said towel rods having enlarged ends; means for moving each towel rod to a position where the towel is presented through said enclosure opening; means on the conveyor for engaging and carrying each towel rod after the towel has been presented through said enclosure opening, including a pair of hooks, similarly located one on each roller chain, having a throat for engaging one of said towel rods and a finger across said throat, said finger being pivotal allowing said towel rod to enter said throat and subsequently closing said throat to retain said towel rod; a detergent applicator positioned to apply detergent on the surface of said towel as said towel rod is carried by said conveyor; a pair of scrubbing means positioned to scrub opposite surfaces of said towel as said towel rod is carried by said conveyor, each said scrubbing

means including a rotatably mounted scrubbing roller activated to rotate so that the roller surface moves in a direction opposite the movement of the surface of said towel; a rotatably mounted fabric-covered roller and an electrically heated ironing shoe positioned to contact and press against opposite surfaces of the towel as said towel rod is carried by said conveyor; a pin for engaging said finger on said hook, pivoting said finger to open the throat of said hook; a pair of arms attached to said rotatably mounted fabric-covered roller to engage and lift said towel rod from the throat of said hook as said towel rod enters said track; a latch across the track free to pivot, allowing said towel rod to enter said track and preventing said towel rod from falling out of said track; and means for stopping said conveyor at a predetermined time after the last manual starting thereof.

6. An apparatus for furnishing and laundering towels according to claim 5 wherein an auxiliary warm air heater is positioned to force warm air over said towels.

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