This invention relates to new and useful improvements in material dispensing apparatus and more particularly to a motor driven dispenser for toilet tissue or the like material in rolled sheet form.

In the past mechanical dispensers, mostly hand operated, have been suggested for the unrolling and dispensing of web or sheet material such as paper towels, waxed paper, tape, tickets, and the like. These devices were generally cumbersome and expensive to build and did not generally present a neat unobtrusive appearance when installed.

It is an object of the present invention to provide a sheet material dispenser that is operated by an electric motor actuated by an accessible hand switch or button.

Another important object of the present invention is to provide an electric tissue dispenser which may be housed entirely within a room wall and which presents a trim neat appearance.

A further object of the invention is to provide a toilet tissue dispenser driven by an electric motor which may be easily swung out from a wall for refilling the paper supply or maintenance of the motor or drive mechanism.

A still further object of the invention is the provision of a motor-driven feed-roll assembly for a sheet material dispenser which resiliently engages material being fed and which will not tear or crinkle even delicate material such as toilet tissue.

Another object of the instant invention is the provision of a motor-driven feed-roll assembly for a dispenser for perforated sheet material which will permit manual pulling of the material end without tearing intermediate two perforation lines.

It is another object of the invention to provide a chute structure for a motor-driven sheet material dispenser which serves to guide the material from its roll through mating feed roll pairs and out of the dispenser discharge opening without folding or fouling in the machine.

Other objects of the invention are to provide a motor-operated sheet material dispenser bearing the above objects in mind which is of relatively simple construction, has a minimum number of parts, is inexpensive to manufacture, and is at all times efficient, reliable, and safe in operation.

For other objects and for a better understanding of the invention, reference may be had to the following detailed description taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view of the dispenser of the present invention installed in a tiled bathroom wall;

FIGURE 2 is a side elevational view of the dispenser taken along the line 2—2 of FIGURE 1 and showing the folding of the front cover plate in dotted lines;

FIGURE 3 is a cross-section along the lines 3—3 of FIGURE 2 with the roll of paper removed;

FIGURE 4 is a fragmentary cross-section along line 4—4 of FIGURE 3.

FIGURE 5 is a cross-section along the line 5—5 of FIGURE 4.

FIGURE 6 is a vertical fragmentary cross-section along line 6—6 of FIGURE 3.

Reference is now made more specifically to the drawings, wherein like numerals designate similar parts throughout the several views and wherein the dispensing device constituting the subject matter of this invention is designated generally at 10 and is shown flush mounted in the usual tiled bathroom wall 11.

The dispenser body is generally fabricated in the form of a sheet metal box or housing 12 being open at the front and having a cut away portion at the bottom adjacent the open side. It is anticipated that plastic may well be utilized instead of sheet metal for this purpose.

A mounting flange 13 is welded or otherwise attached around the four sides of the box to permit neat mounting in a wall recess regardless of the accuracy of the wall cut. A front sheet metal cover 14 is hingedly attached to the box in a novel manner as shown in FIGURES 2 and 3. Perforated cover hinges 15 are secured adjacent to the bottom corners of the front cover but spaced upwardly therefrom and are received within the bifurcation of each of the slide bars 16. Hinge pins 17 are employed to pivotally secure the hinges and slide bars together. Each of the slide bars is freely slideable within slide bar guide tubes 18 which are welded or otherwise secured to the bottom of the box 12. In order to limit the outward movement of the slide bars, stop screws 19 are threaded into each of the bars adjacent their free ends and will abut the inside end of the slide bar guide tubes 18 to prohibit complete withdrawal.

It can thus be seen that in order to open the dispenser, merely pulling outward near the top of cover 14 causes it to be pulled outwardly withdrawing the slide bars until stop screws 19 abut against the guide tubes 18 as shown in dotted lines in FIGURE 2. The cover can then be pivoted to the horizontal position about pins 17.

In order to permit ease of maintenance and of refilling, all of the mechanical elements of the feed mechanism are attached to the inside of the front cover 14 so as to be accessible upon opening of the cover. The rolled tissue paper or the like shown at 20 is also received within the front cover section.

Fixed to the inside of the cover 14 as by welds 24 are two spaced parallel side plates 21 and 22 and a bottom plate 23 which spans and closes off the bottom between the two plates. Within the enclosure defined by these three elements all of the mechanical elements are supported.

Adjacent the forward or discharge end of each of the side plates a guide chute opening 25 is formed for reception of the outwardly directed forward portion of a material guide chute 26 later to be described. Additional openings 27, 28 which are slightly elongated and have rounded ends are provided for reception of the pressure roll shafts 29 and 30. Further additional openings or holes are provided in each of the side plates, not shown, for reception and journaling of various gear shafts later described.

In order to maintain the rigidity and spacing of the side plates 21 and 22, spacer bars 31, 32 are provided adjacent the upper side of the plates and spanning them. Bar 32 also serves the secondary purpose of acting as a front support for the rolled material 20 and prevents it from slipping down into the mechanical moving elements when the roll diameter diminishes in size.

Guide chute 26 receives the sheet material and guides it downwardly to the discharge opening 33 formed in the cover 14. This chute has a general box like construction of sheet metal or plastic and includes top plate 34, bottom plate 35 and side plates 36. The top and bottom plates flare outwardly adjacent the discharge end and the top plate is of shorter length and when viewed side above (as can be seen from FIGURE 4) starts and terminates inwardly of the lower plate. The entire chute is mounted angularly as shown in FIGURE 2 and 4 and extends between the side plates 21 and 22. As can be seen, the distance between the upper and lower plates increases with the distance from the inward chute end. The forward or discharge end of the chute is welded or otherwise secured to the cover 14 about the cover discharge
opening 33. The width of the chute between the two side plates 36 is slightly greater than the width of the sheet material to be dispensed. It has been found that toilet tissue is generally standardized in width at 4½ inches. If the device is to be adapted to dispense such tissue a preferable width for the chute interior would be 4½ inches. Each of the top and bottom chute plates is provided with roll receiving recesses generally rectangular in shape as shown at 37. As described in greater detail further, these recesses are of greater width than the rolls received therein but of lesser width than the material to be dispensed. For toilet tissue, a width of 4½ inches has proven adequate. The rearward recess on the top plate 34 is cut at the very edge of the plate and hence is only enclosed from three sides. This facilitates initial feeding of the material.

Rubber drive rolls 38 and 39 are fitted securely on drive roll shafts 40 and 41, which shafts are journaled in and extend through opposite holes in the side plates 21 and 22. The shafts are so positioned that the roll peripheries will extend through the roll receiving recesses 37 in the bottom plate 36 of the chute 26. While the rolls 38 and 39 are preferably made of hard rubber, it has been found that wood, plastic and cork are equally effective. The shafts are held from axial displacement on one side by positioning washers or clips 42 which may fit in annular recesses formed in the shafts. On the opposite end of each of the shafts, outboard of the side plate 22, is fastened a driven gear 43, 44 by means of a set screw passing through gear hubs 45, 46.

A countershaft 47 extends between the side plates 21, 22 between the drive roll shafts and is journaled in openings in the plates. A similar positioning washer or clip 42 is employed at one end to prevent displacement and a gear 48 is fitted on the other end of the countershaft in the manner of gears 43, 44 on their shafts. Gears 43, 44, and 48 are preferably of the same size and number of teeth and are operatively connected in meshing engagement.

Mounted for movement up and down in the elongated openings 27 and 28 in the side plates are the pressure roll shafts 29 and 30 which extend through the plates and are provided with clips or washers 42 to prevent axial withdrawal and yet permit free play up and down in the slots or openings. Each of the pressure roll shafts has secured thereto a rubber, cork, or wood pressure roll 49, 50. These pressure rolls are movable into the roll receiving recesses 37 formed in the chute top plate 34. The elongated side plate openings 27 and 28 are of sufficient length to permit the pressure rolls to engage the drive rolls 38, 39.

In order to provide a resilient downward force on the pressure rolls so that they cooperate with the feed roll and so that the pressure rolls can be lifted slightly when the dispensable material is pulled, means are provided to urge the pressure rolls downwardly. This means comprises a pair of pressure bars 51, 52 which have openings on one side to engage the pressure roll shafts 29 and 30 between the side plates 21, 22 and the positioning washers 42. Each pressure bar is provided with a small hole 53 between the two bar openings but closer to the opening above the inlet of the guide chute. A tension spring for each pressure bar has one end engaged in hole 53, and the other end engaged in a hole 55 formed in each of side plates 21 and 22. With this structure, the pressure roll 49 will exert more pressure against drive roll 38 than will pressure roll 50 against drive roll 39. This is because the spring 54 is attached to each of the pressure bars closer to the engagement with the shaft of roll 49.

Power to drive the dispenser is accomplished by the use of the electric motor 56 which is secured to the bottom plate 23. This motor may be any commercially available model but is preferably a two speed reversible gear ratio motor. A drive pinion 57 is mounted on the rotor shaft of the motor and is in driving engagement with driven gear 44 of the drive roll gear train. It will be seen that in operation drive rolls 38 and 39 will both be driven in the same direction due to the intermediate gear 48.

The motor 56 is connected to the 120 volt line and has interposed therein a cut off safety switch 58 and a push button start and stop switch 59. Safety switch 58 serves to shut off electrical connection to the line whenever the front cover of the dispenser is open. This switch is spring operated and is normally held engaged by the side bar 60. When the side bar 60 is pulled out slightly the spring button will extend cutting off power to the motor. Push button 59 is of the conventional spring type and is normally off until depressed. If desired, a reverse switch 60 may be provided on the side of the box for actuation if for any reason the material should jam up in the chute and it is desired to reverse the drive or wind in.

Operation of the dispenser can be readily envisioned. Material, such as toilet tissue, in roll form or even squashed into an oval is dropped in position between the side plate so that it rests on the forward spacer bar 32. The rear pressure roll 49 is raised by grasping one of the knurled take up knobs 61 on the drive roll shaft 29. When released, the spring 54 will cause the paper to be pressed against the drive roll 38. If desired the knob 61 may be turned to initiate paying out of the material, otherwise the cover may be closed and the button 59 engaged. This will actuate the motor 56 and rotate drive rolls 38 and 39 in a paying out direction pulling the paper or other material off of the roll and into the guide chute and thence out of the discharge opening 33. When the desired amount of material is in sight the user merely grasps the paper and by only pulling on it slightly will cause it to tear off within the chute leaving no unsightly paper protruding through the discharge opening. It is the novel pressure bar construction which achieves this result. When the paper is grasped and pulled it is held firmly by the rolls 38 and 49 due to the spring action on the pressure bars. Pressure roll 50, however, being further from the spring and not having so much downward force will be lifted slightly. In most cases it has been found that the paper or tissue which has been perforated will tear off between the two pressure rollers.

It is anticipated that the instant device will be useful in all applications wherein perforated material is to be dispensed such as paper towels, toilet tissue, wrapping tissue, napkins, etc.

While we have shown and described a preferred embodiment of the invention, it is to be understood that the drawings and detailed disclosure are to be construed in an illustrative rather than a limiting sense since various modifications and substitutions of equivalents may be made by those skilled in the art within the spirit and scope of the invention as defined in the appended claims.

What we claim as new and desire to protect by Letters Patent of the United States is:

1. A dispenser for sheet material comprising a housing having an open side, a cover normally closing said open side of said housing, said cover including a window opening therein, means to support a roll of sheet material within said housing, a discharge opening in said cover, a guide chute to guide said material from said roll to said discharge opening, a drive roll extending within said chute and rotatably mounted below said chute within said housing, a pressure roll rotatably mounted within said housing above said guide chute and extending thence outward and in contact with said drive roll, resilient means biasing said pressure roll against said drive roll, and motor means mounted within said housing and in driving engagement with said drive roll.

2. A dispenser for sheet material comprising a housing having an open side, a cover normally closing said open side of said housing, means to support a roll of sheet material within said housing, a discharge opening in said...
cover, a guide chute to guide said material from said roll to said discharge opening, a plurality of parallel drive rolls rotatably mounted within said housing below said chute and extending into said chute, a plurality of parallel pressure rolls rotatably mounted within said housing above said guide chute and extending into said chute; said pressure rolls each being in contact with one of said drive rolls, each of said pressure rolls being mounted for movement toward and away from said drive rolls, bar means in contact with said pressure rolls, resilient means in contact with said bar means acting to bias the bar means and said pressure rolls downwardly against said drive rolls, and motor means mounted within said housing and in driving engagement with said drive rolls.

3. A dispenser for sheet material as defined in claim 2 wherein said motor means comprises an electric motor connected by a line to a source of electrical potential, an on-off switch interposed in said line, and a safety means operative upon opening of said cover to disconnect said motor from said source.

4. A dispenser for sheet material comprising a housing having a discharge opening therein, means to support a roll of sheet material within said housing, a plurality of parallel drive rolls rotatably mounted in said housing between said roll of material and said opening, a plurality of parallel pressure rolls rotatably mounted in said housing between said roll of material and said opening and above said drive rolls, each of said pressure rolls being mounted for movement toward and away from a respective drive roll, bar means above said plurality of pressure rolls and in contact therewith, resilient means acting on said bar means at a point immediately adjacent to the pressure roll nearest to the roll of material to force said pressure rolls downwardly against said drive rolls, and means to drive said drive rolls.

5. A dispenser for sheet material as defined in claim 4 wherein said resilient means comprises a tension spring connected at one end within the housing below said bar means and at the other end to said bar means.

6. A dispenser for sheet material as defined in claim 4 wherein said means to drive said drive rolls comprises an electric motor within said housing and a gear train operatively connected to said drive rolls.

7. A dispenser for sheet material comprising a housing having one open side, a cover normally closing said open side of said housing, said cover having a discharge opening therein, means to support a roll of sheet material on the inside of said cover, a plurality of parallel drive rolls rotatably mounted on said cover between said roll of material and said opening, a plurality of parallel pressure rolls rotatably mounted on said cover between said roll of material and said opening, and above said drive rolls, each of said pressure rolls being mounted for movement toward and away from a respective drive roll, bar means above said plurality of pressure rolls and in contact therewith, resilient means acting on said bar means at a point immediately adjacent to the pressure roll nearest to the roll of material to force said pressure rolls downwardly against said drive rolls, and means to drive said drive rolls.

8. A dispenser for sheet material as defined in claim 7, wherein said means to drive said drive rolls comprises an electric motor.

9. A dispenser for sheet material as defined in claim 8, wherein said motor is connected to a source of electrical potential by a line, an on-off switch interposed in said line, and a safety means operative upon opening of said cover to disconnect said motor from said source.

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