April 7, 1942. J. B. ENGEL 2,279,135

PAPER DISPENSING CABINET

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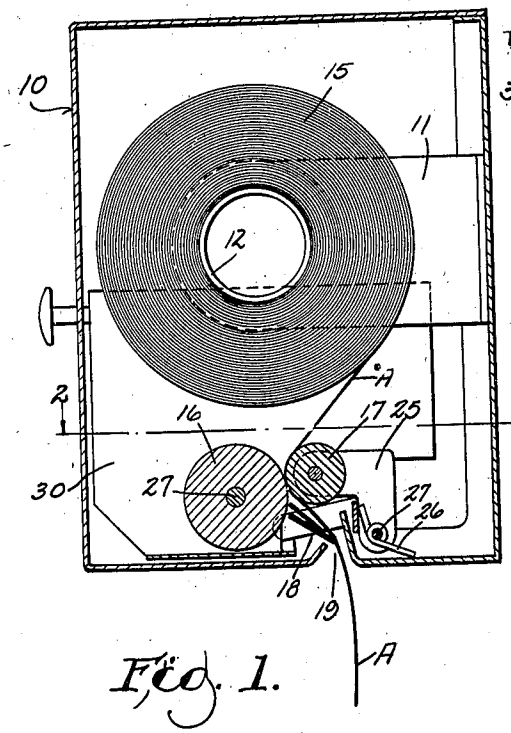

Fig. 1.

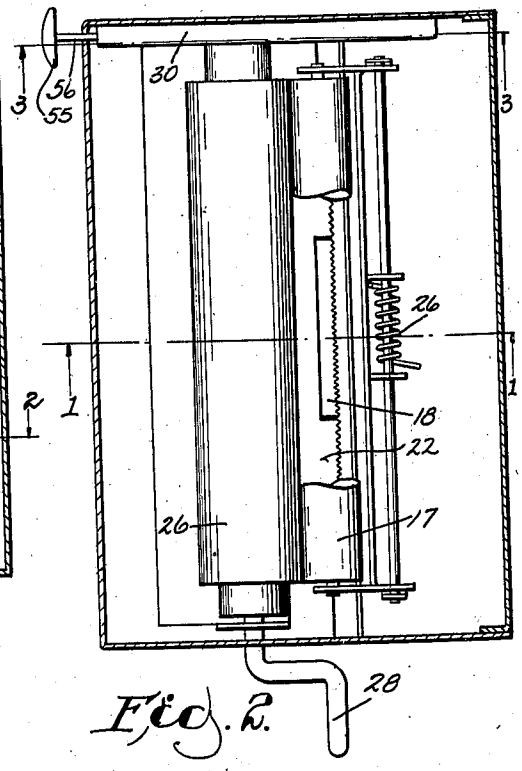

Fig. 2.

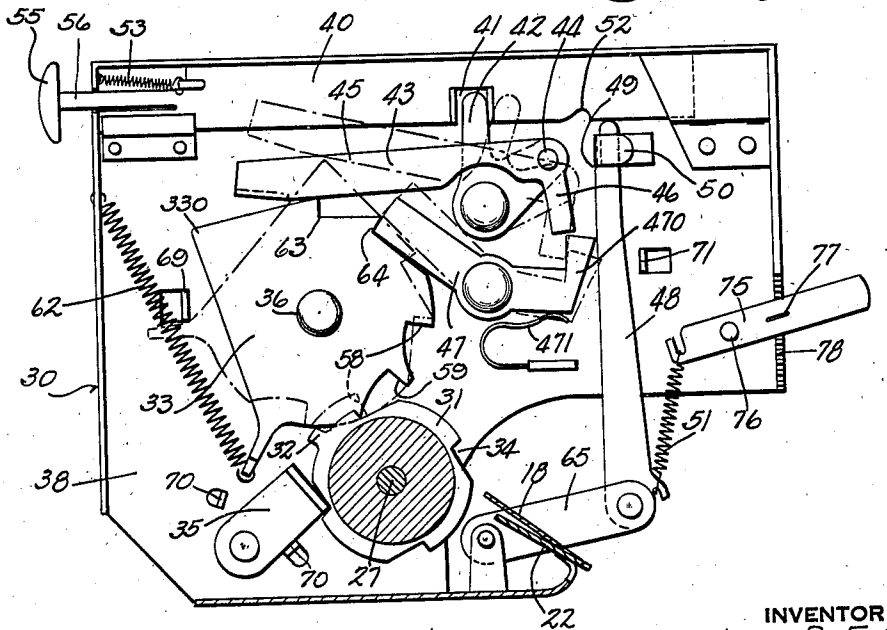

Fig. 3.

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PAPER DISPENSING CABINET

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9 Claims. (Cl. 164—84.5)

This invention relates to improvements in paper dispensing cabinets.

A primary object of the invention resides in the provision of improved means for controlling the dispensation of a web in accordance with the tearing operation. The present invention contemplates an improvement and simplification of the general type of structural organization shown in United States Patent No. 2,202,011, allowing a reduction in manufacturing costs and resulting in improved operation.

In prior art devices of the general type to which this invention pertains, a single tooth pinion connected with the feed roller has acted upon a mutilated gear plate to advance the plate one step for each rotation of the feed roller until the absence of further teeth on the plate brings the feed roller to rest, thereupon requiring manual pressure from a push button to restore the plate to its initial position. One of the objects of the present invention is to provide an organization in which the step by step advance of such a toothed plate stores energy in a spring which is released for the restoration of the plate automatically when the push button is actuated, eliminating any requirement for manual pressure for the restoration of the plate to a position such as to permit further dispensing of paper.

A still further object is to provide an improved structure wherein, during a delivery operation, energy is stored up in the control mechanism to bring the mechanism into condition for a subsequent delivery operation upon the manual release of said energy.

Other objects are to generally improve and simplify the construction and operation of paper dispensing mechanism, having particular reference to mechanism controllable in relation to a web severing operation, and still other objects and advantages will be apparent to persons skilled in the art upon an examination of the following disclosure and the drawing, wherein:

Fig. 1 is a view of a dispensing cabinet embodying this invention as such cabinet appears in a section taken above line 1—1 of Fig. 2.

Fig. 2 is a fragmentary view of the cabinet in horizontal section in the plane indicated at 2—2, Fig. 1.

Fig. 3 is a detail view of the cabinet taken in section along line 3—3, Fig. 2.

Like parts are designated by the same reference characters throughout the several views.

The cabinet 10 may be of any desired construction and provided with any suitable means such as arm 11 for the support of a core 12 upon which is wound a roll 15 comprising a web of paper or the like.

Within the cabinet a feed roller 16, a pinch roll 17, and a pivotally mounted tear-off blade 18 are disposed in longitudinal parallelism with a paper dispensing slot 19, the webbing A from roll 15 passing between the feed roll 16 and the pinch roll 17 to extend downwardly over the tear-off blade 18 and through the slot 19.

The pivotally mounted tear-off blade 18 preferably comprises the central section of a fixed blade 22, the central section being yieldable about its pivot under the tension of the paper during the tear-off operation only after a substantial transverse tear has been effected by the stationary part of the blade. Such a multiple section tear-off blade is described in Patent 2,202,011, but it is immaterial to the present invention whether the tear-off blade is sectional or unitary. The pinch roll 17 is supported by bell cranks 25 pivotally supported from the bottom of the cabinet and urged in the direction of the feed roll by a spring 26 coiled about the pivot shaft 27. The paper is withdrawn from the roll and fed through the slot 19 by rotation of the feed roll 16 which is mounted on a shaft 27 extending through one end wall of the casing and provided with a manually operable crank 28. The end of the shaft 27 opposite that provided with crank 28 extends into a control box 30 attached to the opposite end wall of the cabinet.

In this control box, Fig. 3, shaft 27 is provided with a disk 31 having a single tooth 32 aligned for engagement with the teeth of a gear plate 33, said disk also being provided with circumferentially spaced notches 34 for ratcheting engagement by gravity actuated pawl 35 to prevent reverse rotation of the feed roll during operation of the device. Gear 33 is journaled at 36 to the control box. The control box may, if desired, have an open inner face or be reduced to the form of a mere mounting plate 38 on which shaft 27, pawl 35, gear 33, as well as mechanism hereinafter described, are mounted.

To adjust the gear 33 to disk-releasing position, an actuator is employed, which, as shown, may comprise a slide 40. Slide 40 is channeled at 41 for engagement with bell crank 42, said bell crank in turn carrying an L-lever 43, pivoted thereto at 44. The L-lever has a long arm 45 and a short arm 46. The long arm serves as a weight to hold the short arm 46 in a downwardly extending direction which is defined by engagement of the longer arm 45 with the top of the gear plate 33.

The slide 40 is normally retracted by spring 53 toward the front of the cabinet and has an extension 56 extending through the front wall of the cabinet and provided with a knob or push button 55 operable to advance slide 40 rearwardly against the tension of spring 53. Such advance oscillates the bell crank 42 to remove the L-lever 43 bodily downwardly with its shorter arm 46 in a position to engage the upstanding end portion 470 of the pawl 47, thus oscillating the pawl from its full line position to its dotted line position (Fig. 3). The L-lever may be generically termed a disengageable motion transmitting part for communicating the motion of the actuator to the pawl 47.

Such oscillation of pawl 47 disengages the pawl from the teeth 63 of the gear plate, leaving the gear plate free to rotate under the tension of spring 62, energy having been stored in the spring during the previous movement of the gear plate in response to feed roll rotation as hereinafter described. The clockwise rotation of the gear plate from the position shown in full lines in Fig. 3 to the position shown in broken lines in that view, is arrested by the stop 69. In the meantime, however, the corner 330 of the gear plate has moved with a camming action beneath the longer arm 45 of the L-lever 43 to oscillate such L-lever toward its broken line position (Fig. 3), whereby the short arm of the lever 46 clears the extension 470 of pawl 47 so that such pawl is released.

At the same time the slide is prevented from returning to its initial position by engagement of the trip bar 48 in the notch 52 of the slide. The trip bar is connected with the pivotally mounted tear-off blade section 18 by means of lever arm 65. The tension of spring 51 exerted on the trip bar is such as to tend to engage the shoulder 49 of the trip bar with a fixed catch plate 50 which holds the trip bar normally out of engagement with the slide 40. However, the tilting movement of the pawl 47 to a position for the release of the gear plate 33 causes the extension 470 of the pawl to contact the trip bar and to thrust it to the right as viewed in Fig. 3, thereby disengaging its shoulder from the catch plate and allowing the bar to rise under the bias of spring 51 to engage the slide 40 in the manner described. Thus, when the parts are in readiness for the dispensing of paper, the slide 40 is held in its rear or advanced position by the bar 48, the L-lever is oscillated to the position shown in broken lines in Fig. 3, and is there supported against the gravity bias of its heavy arm 45 by the cam corner 330 of the gear plate 33; the pawl 47 is held by the gear plate in the position shown in broken lines in Fig. 3, against the bias of spring 471, which constantly urges the pawl counter-clockwise; and the gear plate is in its broken line position as determined by stop 69 subject to the bias of spring 62.

With slide 40 locked in its rear or advanced position, handle 28 may be rotated in a clockwise direction to cause the feed roll 16 to withdraw the paper strip from the roll 15 and to feed it with the aid of the pinch roll 17 through the slot 19 across the cut-off knife. During the first revolution of the feed roll, the associated tooth 32 engages the tooth 58, as shown in the dotted line position, and partially advances the gear plate counter-clockwise to its full line position. In this first position of advance the pawl 47, under bias of spring 471, engages the shoulder 63 of the gear plate to hold the gear plate in its partially advanced position against the bias of spring 62 during the next complete rotation of the feed roll and its single tooth pinion.

During the second revolution of the feed roll, the tooth 32 engages the cam shoulder 59 and advances the cam gear counter-clockwise to its full line position, as shown in Fig. 3, the tooth 32 abutting the untoothed margin of gear plate 33 at the end of the second revolution, as shown in heavy lines, Fig. 3, to prevent further rotation of the feed roll. In the second step of advance of the gear plate 33 the pawl 47 has become engaged with shoulder 64 thereof. The parts are now completely locked against further movement in any direction pending the tearing of the web. The feed roll and pinion are precluded by engagement of tooth 32 with an untoothed portion of the gear plate from rotating clockwise, and are precluded by pawl 35 from rotating counter-clockwise. The gear plate itself continues to be biased in a clockwise direction but is precluded by pawl 47 from movement in such direction. The slide 40 is in its advanced position and is there held by the detent bar 48.

When the delivered portion of the web is torn across the knife, the section 18 of the knife yields under the tension of the web to retract the detent bar 48 ond thereby to free the slide 40, which springs to its retracted position at the front of the case under the bias of its spring 53. This movement of the slide 40 lifts bodily the L-shaped lever 43 and under the bias of the longer end portion 45 of such lever, the shorter end swings to a position above the extension 470 of pawl 47 in a position such as to bring renewed pressure upon the pawl in the next operation of the slide.

Before a subsequent delivery of web is possible, the slide 40 must be manually advanced to release pawl 47 from the gear engaging position, shown in heavy lines, whereupon the gear is spring oscillated to the dotted line position shown in Fig. 3, under the urge of spring 62, thus placing the mechanism in condition for repetition of the delivery cycle.

The mechanism as disclosed is extremely positive in its operation. If the restoration of the gear plate to its starting position were dependent upon motion transmitted from the manually operated slide 40, an inadequate movement of the slide would result in an inadequate oscillation of the gear plate, with the possibility that the mechanism would be jammed and, in any event, would not permit delivery of a full length portion of the web. In the device as disclosed, the movement of the slide 40, to be effective for any purpose, must be sufficient to trip the pawl 47, and once this pawl is tripped, the movement of the gear plate to its starting point is entirely automatic, being occasioned by the spring 62.

The delivery of energy to the spring 62, in turn, is an incident to the delivery of the web. Reverse movement of the apparatus from any of the intermediate positions of the parts being impossible, it has been found that the mechanism as disclosed will not jam and is positive and precise in its operation.

Stop members, such as stop 69 for the gear plate, stops 70 for limiting the swing of pawl 35, stop 71 to limit the outward pivotal movement of trip bar 48, and catch plate 50, may be stamped in one operation from mounting plate 38. The tension of the springs used may be made adjustable if desired, as is indicated by the adjustment provided for spring 51. This spring is anchored

to a lever 75 pivoted at 76 to the mounting plate 33 and having at 77 a rib engaged with any one of a series of teeth 78 in the margin of the mounting plate to hold the lever 75 in any position to which it may be manipulated.

I claim:

1. A control mechanism comprising the combination with a gear plate mounted for oscillation between advanced and retracted positions and biased for movement toward its retracted position, of means for the step by step advance of the gear plate toward its advanced position against said bias, pawl means coacting with said gear plate and restraining it from return movement, and manually operable pawl releasing means including an actuator and a disengageable motion transmitting part for communicating the motion of the actuator to the pawl in a pawl releasing direction, said part being positioned to receive motion from said gear plate in the movement of said gear plate toward its retracted position following release by said pawl, whereby said gear plate disengages said part from said pawl to permit said pawl to re-engage said gear plate.

2. In a web dispenser, the combination with a feed roll, of a gear plate mounted for oscillation between advanced and retracted positions and biased toward its retracted position, means connected with the feed roll for advancing said gear plate against said bias in each feed roll rotation, a pawl engageable with the gear plate to restrain the gear plate from movement responsive to said bias toward said retracted position, a manually operable actuator movable between advanced and retracted positions and biased for its retracted position, manually releasable detent means for restraining said actuator in its advanced position, and mechanism including a releasable part movable with said actuator and releasably engageable with said pawl in a direction to transmit motion in the advance of said actuator to release said pawl from said plate, said disengageable part having a portion in the path of movement of said plate and said plate having a cam portion coacting with said portion for the movement of said part in a pawl releasing direction, whereby movement of said plate to its retracted position in response to its bias disengages said part from said pawl, leaving said pawl free to re-engage said plate.

3. In a web dispenser, the combination with a feed roll and a fractional pinion operable in accordance with the rotation of said roll, of a multiple toothed gear plate with which said pinion interacts in the rotation of said roll, spring means biasing said gear plate toward a retracted position from which said gear plate is subject to advance in successive rotations of the roll, said gear plate also having ratchet teeth and a cam, a pawl biased toward engagement with successive ratchet teeth of said plate in the successive positions of advance thereof to restrain said plate from movement toward its retracted position in response to the bias of said spring, a pawl actuating part, a carrier upon which said part is bodily movable in a direction for pawl actuation, said part being mounted on said carrier for independent movement in a direction to release said pawl, an arm on said pawl actuating part positioned to be engaged by the cam of said gear plate for actuation in a pawl releasing direction following the release of said cam plate by said pawl, whereby said pawl is immediately re-engageable with said cam plate, and means for the manual actuation of the carrier.

4. In a web dispenser, the combination with a feed roll, of mechanism for limiting the advance of said feed roll in a single operation, said mechanism including a motion limiting member biased toward a retracted position and provided with a driving connection from the feed roll for advance from said position, a pawl adapted to restrain said member in the position to which it has been advanced in response to the movement of the feed roll, and manually operable means for releasing the pawl for the restoration of said member in response to its bias to its retracted position in readiness for a renewed operation of the feed roll.

5. A web dispensing device comprising the combination with a feed means and a web severing means, of control mechanism including a member biased toward a retracted position and provided with connections to receive motion from said feed means for advancing in response to the actuation of said feed means, a restraining device co-operative with said member to hold it in a position to which it is advanced, manually operable means for actuating said device in a direction to release said member for return responsive to its bias to a position for accommodating renewed operation of said feed means, and detent means including a connection to said web severing device and mechanism whereby the operation of said web severing device is a prerequisite to the release of said manually operable means.

6. In a web dispenser, the combination with web dispensing means and web severing means, of control mechanism including a part having limited movement from retracted to advanced positions in each operation of said web feeding means, said part being biased toward its retracted position, manually releasable means precluding the return of said part to its retracted position pending release by said manually operable means, and detent mechanism operatively connected to hold said manually operable means inactive and provided with releasing connections from said web severing means, whereby the operation of said web severing means is prerequisite to the release of said manually operable means and the release of said manually operable means is prerequisite to the resetting of said part in its retracted position in response to its bias.

7. A web dispensing device comprising the combination with a feed roller and a tear-off knife having at least a portion yieldably mounted, of a pinion connected with said feed roller to receive motion therefrom, a mounting plate adjacent said pinion, a gear plate rotatably mounted on the mounting plate and provided with teeth in a limited number with which said pinion coacts, said gear plate also being provided with ratchet teeth and with a cam surface, means on the mounting plate providing a stop, a spring biasing said gear plate toward said stop, a pawl pivoted to the mounting plate and provided with means biasing it for engagement with the ratchet teeth of the gear plate, said pawl having an operating extension, a bell crank pivoted to the mounting plate, a lever pivoted to one arm of the bell crank and provided with a portion releasably engageable with said pawl extension, said lever having another portion operable by said cam to release said pawl extension when said gear plate oscillates in response to its bias, and

a slide comprising manually operable means for the oscillation of said bell crank.

8. A web dispensing device comprising the combination with a feed roller and a tear-off knife having at least a portion yieldably mounted, of a pinion connected with said feed roller to receive motion therefrom, a mounting plate adjacent said pinion, a gear plate rotatably mounted on the mounting plate and provided with teeth in a limited number with which said pinion coacts, said gear plate also being provided with ratchet teeth and with a cam surface, means on the mounting plate providing a stop, a spring biasing said gear plate toward said stop, a pawl pivoted to the mounting plate and provided with means biasing it for engagement with the ratchet teeth of the gear plate, said pawl having an operating extension, a bell crank pivoted to the mounting plate, a lever pivoted to one arm of the bell crank and provided with a portion releasably engageable with said pawl extension, said lever having another portion operable by said cam to release said pawl extension when said gear plate oscillates in response to its bias, and a slide comprising manually operable means for the oscillation of said bell crank, together with means biasing said slide toward a retracted position of movement, a detent co-operable with the slide to hold the slide in an advanced position of its movement against said bias, and means operatively connecting said detent with a yieldable portion of said cut-off knife for release of said slide in response to web tension across the yieldable cut-off knife portion, whereby the yielding of the cut-off knife is a prerequisite to the return of said slide in response to its bias, and the movement of said slide in opposition to its bias is a prerequisite to the release of said gear plate from said pawl, the release of the gear plate automatically restoring the gear plate to its retracted position to permit a renewed operation of said feed roll and automatically disengaging said lever from said pawl.

9. Control mechanism for a web dispenser comprising the combination with a mounting plate, of a gear plate rotatable thereon, a spring biasing said gear plate toward a retracted position, a pawl engageable with said gear plate to restrain it from movement in response to its bias, a bell crank pivoted adjacent the pawl, an L-lever pivoted on the bell crank and having a downwardly extending arm, said pawl having an upward extension with which said lever arm is releasably engageable, and another arm on said lever extending into proximity to the gear plate, the gear plate having a cam engageable with said last arm for lever oscillation in a pawl releasing direction and a slide provided with means engageable with the bell crank for the oscillation thereof.

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