Dec. 28, 1948. R. G. BIRR 2,457,439

DISPENSING APPARATUS FOR SHEET MATERIAL

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Fig. 1.

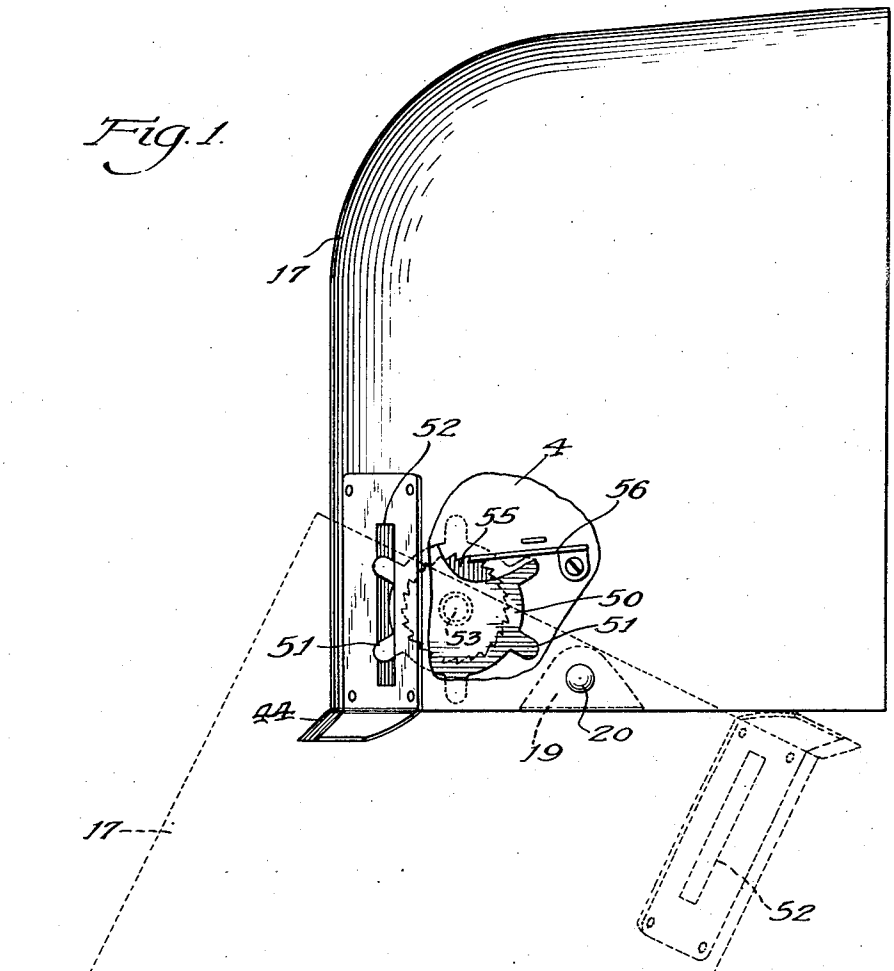
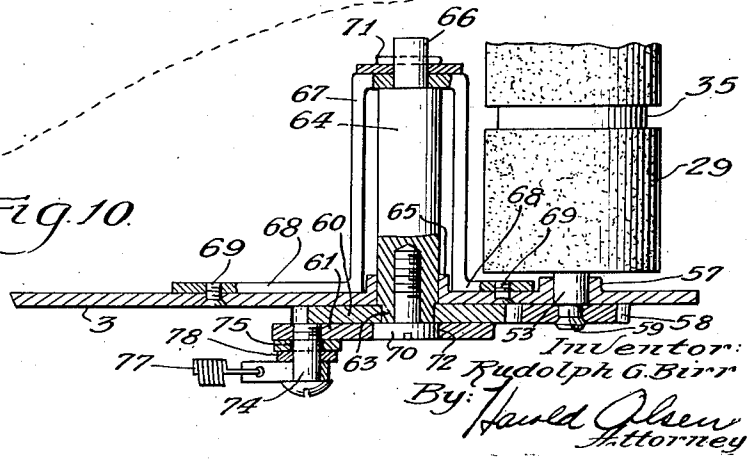



Fig. 10.




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DISPENSING APPARATUS FOR SHEET MATERIAL

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Fig. 2.

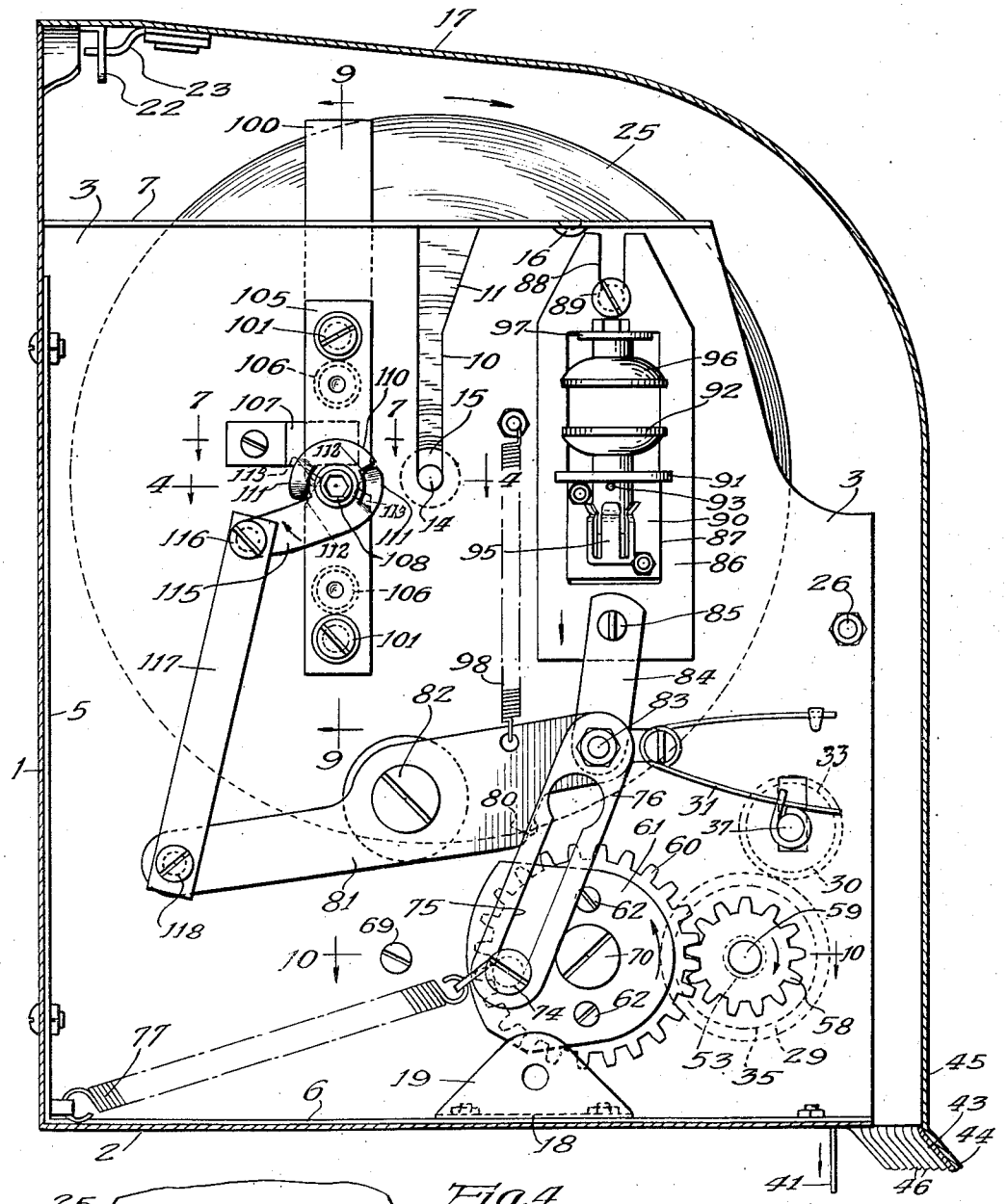
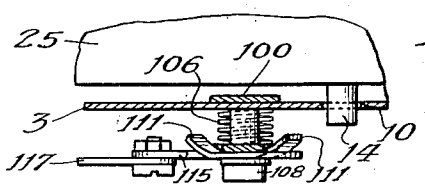



Fig. 4.




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DISPENSING APPARATUS FOR SHEET MATERIAL

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Fig. 3.

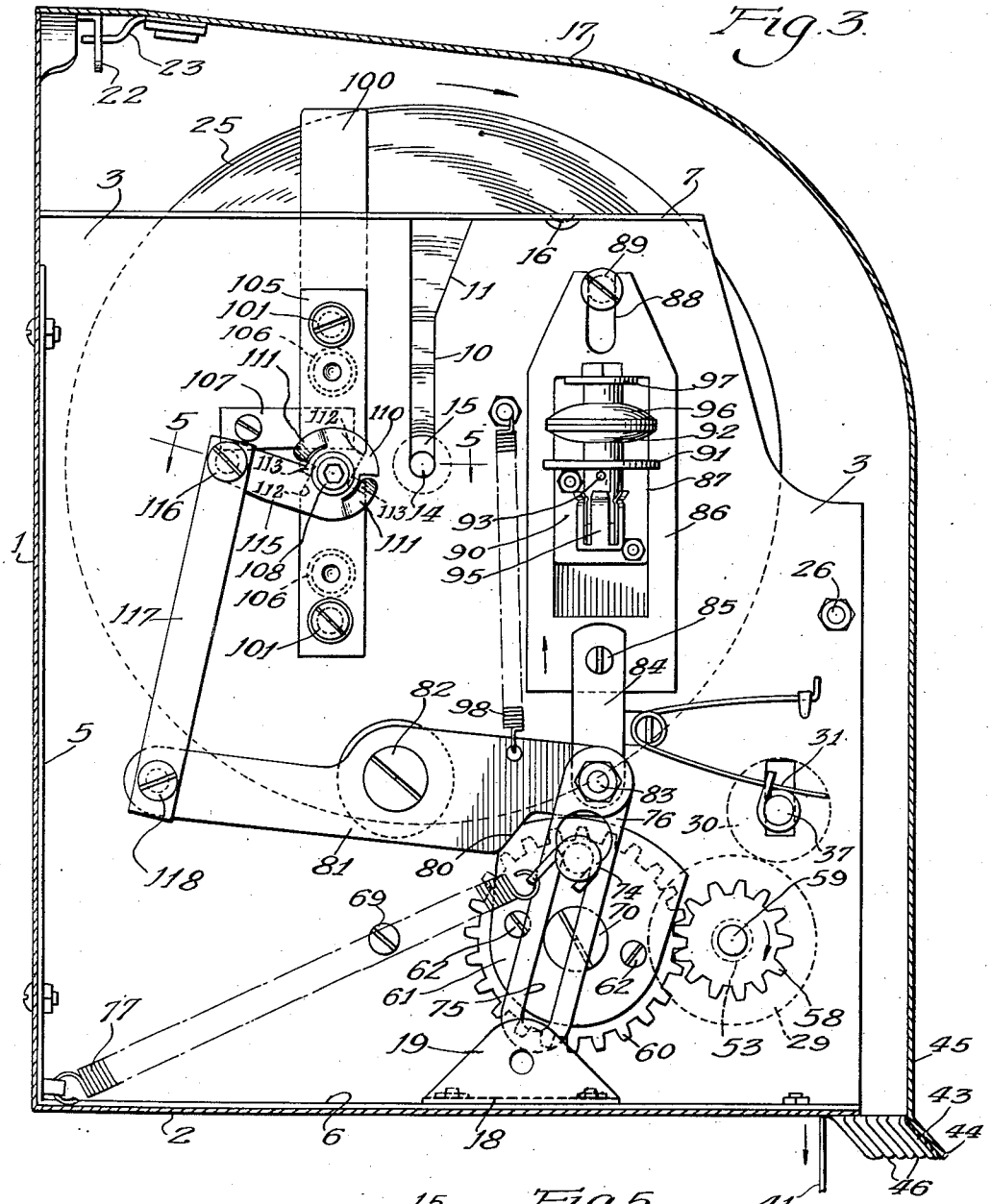
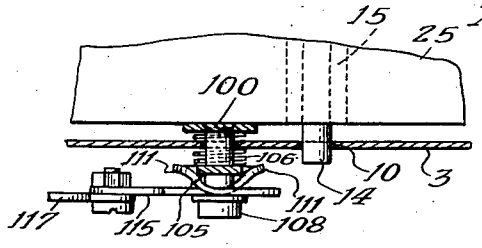



Fig. 5.




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DISPENSING APPARATUS FOR SHEET MATERIAL

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Fig. 6.

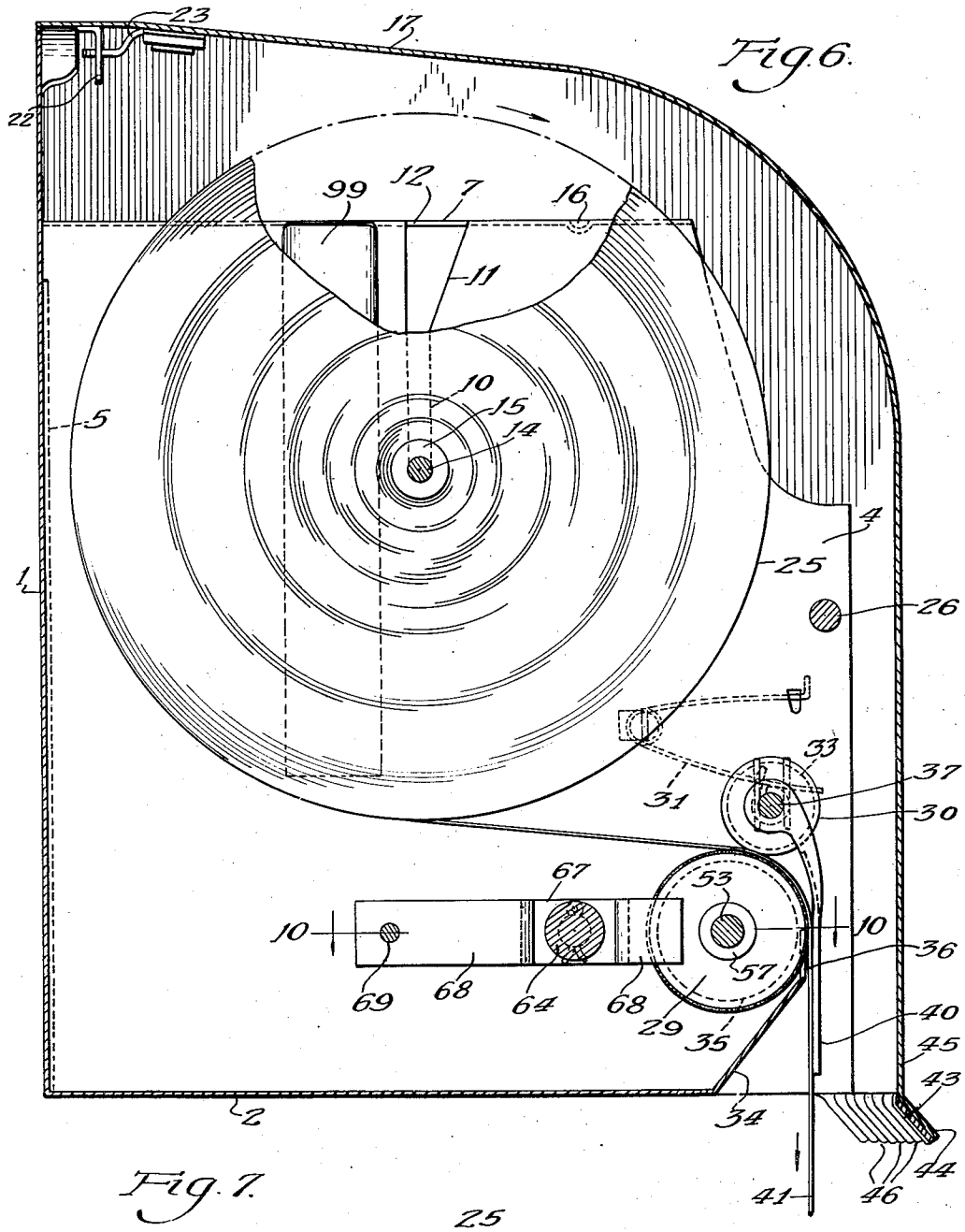
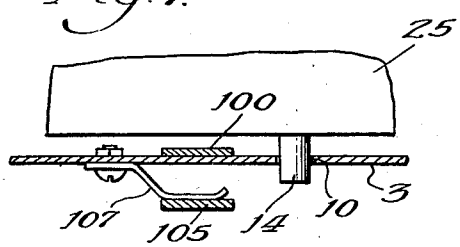



Fig. 7.



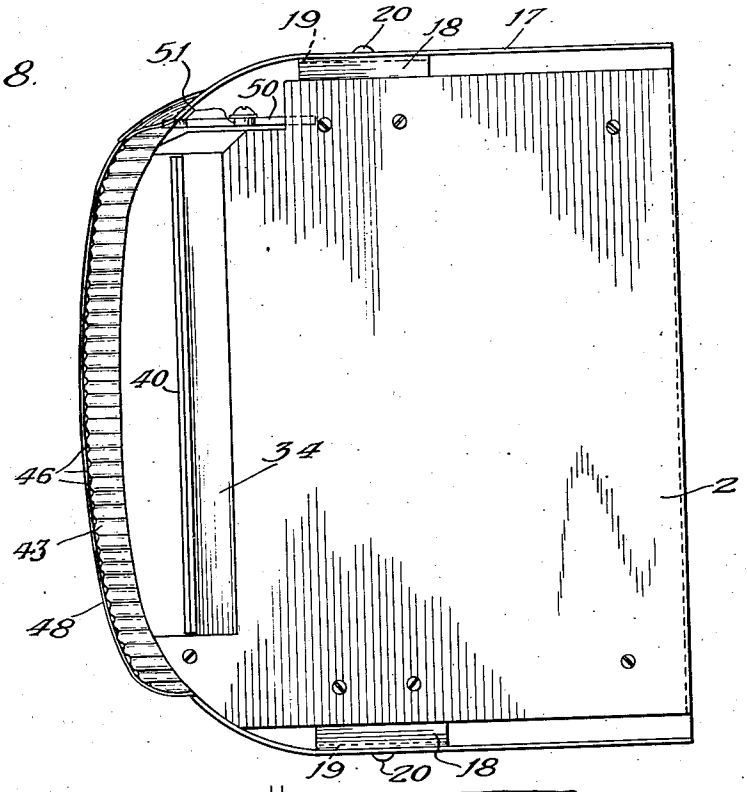

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Fig. 8.



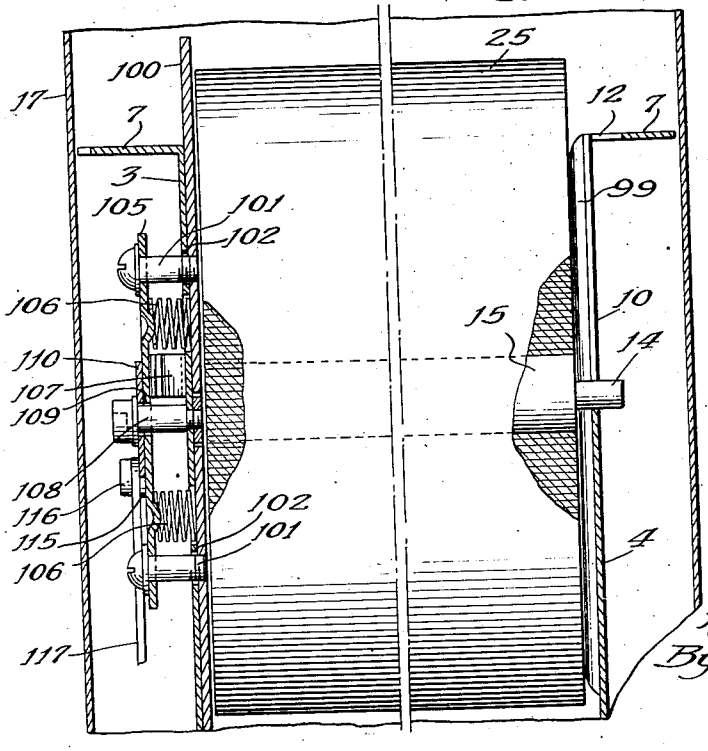




Fig. 9.

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Patented Dec. 28, 1948 2,457,439

# UNITED STATES PATENT OFFICE

2,457,439

## DISPENSING APPARATUS FOR SHEET MATERIAL

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Application July 14, 1944, Serial No. 544,919

9 Claims. (Cl. 242—55.5)

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This invention relates to improvements in dispensing apparatus and has among its objects; to provide a cabinet having a large capacity for the material to be dispensed, in this specific case the capacity to handle an unusually large roll of sheet material to be dispensed.

To understand the need and advantages of this invention in relation to a stop mechanism, it should be noted that in dispensing material from a roll the dispensing act is rapid and stopping action is abrupt. The supply roll is given a momentum which continues after the stop engages. Moreover, the larger the roll the greater the momentum given to the roll during dispensing. But it is desirable to use the largest possible supply roll so that replenishment of supply will have to be less frequent. Particularly in cases where the force for operating the dispensing mechanism is transmitted through the paper to the measuring roll, the paper is under strain and may break before the dispensing act has been completed if the supply roll is not mounted for free rotation, and therefore prevented from adding its friction load to that of the other mechanism. Therefore, means is provided herein controlled by the stop mechanism for allowing free rotation of the roll until dispensing is substantially completed and substantially until the stop engages, but preventing continued rotation of the supply roll when the stop is engaged. The action of the device herein, therefore, only prevents overrun due to momentum of the supply roll incident on stop engagement.

Other objects are to provide an improved stop mechanism controlled by and controlling a measuring roll or equivalent means by which sheet material is dispensed; to operate such a brake mechanism through a part of a stop mechanism; to operate a time-stop mechanism which includes linkage elements and to connect with these linkage elements a lever which operates a brake when the stop is operated by the act of dispensing, to set the time stop; to provide a dial and ratchet mechanism by which the time stop can be set against the action of a spring which is adapted to automatically dispense sheet material on release of the stop; and to provide a cheap way of utilizing corrugations as means for forming a tearoff knife for paper. Features of the invention include: all details of the construction shown, along with various combinations and subcombinations of the structures, and the broader means inherent in the disclosure.

Objects, features and advantages of the invention will be set forth in the description of the

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drawings forming a part of this disclosure, and in said drawings—

Fig. 1 is a side elevation of the cabinet looking at the dial side, and showing in dotted lines the cover as positioned to support the supply roll during servicing;

Fig. 2 is a vertical transverse section through the cabinet looking at the outer face of one of the supporting plates and showing the stop and brake mechanisms with the parts in their normal or released position;

Fig. 3 is a view similar to Fig. 2, but showing the parts in stopping and braking positions;

Fig. 4 is a detail, horizontal section on line 4—4 of Fig. 2 with the brake released;

Fig. 5 is a detail, horizontal section on line 5—5 of Fig. 3 with the brake set;

Fig. 6 is a vertical section taken between the supporting plates showing the bearing structure for the stop-carrying gear, and showing the relation of feed rolls and the relations of the corrugated tearoff knife to the paper as trained over the measuring roll;

Fig. 7 is a detail, horizontal section on line 7—7 of Fig. 2 showing a retracting spring for the brake elements;

Fig. 8 is a bottom plan showing the relation of the corrugated tearoff knife to the delivery throat;

Fig. 9 is a detail, vertical section on line 9—9 of Fig. 2 showing the supporting plates, supply roll and the brake mechanism; and

Fig. 10 is a detail, horizontal section on line 10—10 of Fig. 2, showing the novel bearings for the gears.

The cabinet proper, in addition to the novel braking and stop mechanism, has certain details of construction which are features of this invention. The cabinet is composed of an inner section or body and an outer section or cover. The inner section is formed from a single sheet of metal bent to provide the vertical back 1, and the horizontal bottom 2. Secured to and stiffening the back and bottom are two mechanism-supporting plates 3, 4 by which substantially all of the mechanism of the cabinet is carried. Each of these plates is provided with three stiffening flanges 5, 6, 7. Flanges 5 and 6 are connected by screws to the back and the bottom, and the plates with their flanges thus stiffen the structure.

In each supporting plate is a downwardly extending slot 10 made wider at the top as at 11. These slots intersect the top flanges 7 as best shown at 12 in Figs. 6 and 9. By enlarging the

vertical slots 10 at their upper open ends the trunnions 14 of the supply roll-supporting bar 15 are easily introduced into the slots. Forwardly of these slots 10, one at each side, are depressions 16 in the flanges 7 into which the trunnions 14 may be received to support the supply roll preliminary to the introduction of the trunnions into the slots. It is to be noted that an unusually large supply roll can be used in this cabinet because of its particular construction.

The body or inner section is constructed in a manner heretofore mentioned, but the top, front and sides of the device are provided by a one-piece cover 17, and this cover is pivoted near its lower edge and about midway between its front and back to brackets or plates 18 which are secured to the top faces of the bottom flanges 6 of the supporting plates 4. These brackets extend outwardly beyond the flanges 6 and have vertical flanges 19 having openings which receive the pivots 20 of the cover, which may be threaded bolts. The cover can be formed in one piece as a stamping.

On the back of the cabinet or on the inner section is a top flange having bent downwardly therefrom another flange 22 which acts as a keeper to be engaged by a suitable hook-like locking member 23 of a suitable key-operated lock of the cover. Suitable slots (not shown) are provided in the back 1 by which the cabinet can be hung on a wall. The cover can be moved downwardly to a position shown in dotted lines in Fig. 1 to act as a support for the supply roll 25 while the paper is being threaded between the feeding rolls of the device.

The supporting plates 3 and 4 are cross-connected at the front by a stiffening bar 26. Below this bar are arranged the feed rolls. One of these rolls (see Fig. 6) is a measuring roll 29. A presser roll 30 lies above the measuring roll and is yieldably pressed against the measuring roll by springs 31. This presser roll 30 is reduced in diameter as at 33 to facilitate, by grasping action of fingers placed in this reduced portion, the preliminary introduction of paper forwardly between the rolls while the supply roll 25 is being supported by the cover 17 when in the dotted-line position of Fig. 1. The measuring roll is grooved as at 35 to receive fingers 36 which are integral with an upturned front portion 34 of the bottom 2 of the inner unit.

Depending from and swingable about the ends 37 of the shaft of the presser roll is an apron 40 which normally lies in the position of Fig. 6, to hold the paper 41 spaced rearwardly of a tearoff knife on the bottom of the cover, to facilitate introduction of the fingers for grasping the paper. The specific formation of this knife is a feature, because of its cheapness and efficiency.

The manner of forming the knife by means of corrugations is believed to be new and to provide a cheap method of manufacture. The feature is that a toothed tearoff knife is formed by the ends of corrugations. A feature shown is a corrugated strip 43 of metal attached to the inner surface of a forwardly, downwardly slanted portion 44 of the bottom of the front wall 45 of the cover 17. The lower ends or corners 46 of the corrugations form a serrated edge. The use of such a strip is cheaper than corrugating the metal of the cover by a stamping process, because such a process involves the making of expensive dies. However these corrugations may be formed, whether by attaching a separate corrugated piece as shown in the drawings, or by



forming them by pressing the metal of the cover itself, the arrangement is such that the lower edges of the corrugations form a serrated knife edge. These corrugations intersect the bottom edge of 43 or of 44, and against the serrations thus formed the paper can be drawn by a forward pull and be torn off.

Now referring to Fig. 8, which is a bottom plan view of the cabinet, it will be noted that the knife edge formed by the corrugations is curved as at 48 in relation to the straight apron 40. It is to be understood that the invention is not entirely limited to this curved relation, because the tearoff knife may be a straight edge.

Another feature of this invention is the use of an emergency dial 50 having fingers 51 which are adapted to project outwardly through a slot 52 of the cover 17 as shown in Fig. 1. The purpose of the dial is to permit manual operation to preliminarily feed the paper to the position of Fig. 6, at which it can be grasped by the user. Ordinarily this disk is only used preliminarily to condition the cabinet for its first use. It may be considered as an emergency feeding means. This disk is attached to the shaft 53 of the measuring roll 29. Another feature of the invention is the arrangement on this shaft 53 and between this dial 50 and the outer surface of the supporting plate 4 of a relatively fine-toothed ratchet wheel 55 held against motion in one direction by a pawl 56 suitably pivoted to plate 4. This fine-toothed, pawl-controlled wheel 55 facilitates dial feeding action against the force of certain springs later described, it being understood that this emergency feedout action is opposed to the spring power during setting of the time stop.

Another feature of this invention (best shown in Fig. 10) relates to the mounting of the driving gears by which the measuring roll operates the stop mechanism and the brake. These gears and their related elements are mounted on the supporting plate 3 of the inner unit. The shaft 53 of the measuring roll passes outwardly through a struck-out bearing 57 of the plate 3 and the outer end of the shaft is reduced in diameter to receive a small spur gear 58 and to provide a shoulder against which this small gear is forced and secured as by peening over. This reduced portion 59 may be squared. A large gear 60 meshes with the small gear and carries the stop 61 secured by screws 62 to the gear 60. The gear 60 is attached to reduced and squared portion 63 of a shaft 64, which has one end rotative in a punched-out bearing 65 of the plate 3, and which has its other end 66 reduced and rotative in a U-shaped bracket 67. Extensions 68 of the bracket are connected to the plate as by screws 69. The gear 60 is held to the shaft 64 by means of a suitable screw 70 and the shaft 64 is held against axial translation by means of a washer interposed between the end of the bracket portion 67 and a split key 71. The stop 61 is held to the gear 60 by the screws 62 as shown in Figs. 2 and 3, and this stop has an opening 72 to receive the head of the screw 70. A rugged bearing is thus provided for the stop-carrying gear which is submitted to sudden strains due to impacts of the stops to limit dispensing action.

With this construction, assembly of the parts is facilitated. The shaft 64 can be merely inserted into its bearings, the large gear 60 can then be placed on the reduced portion and the screw 70 applied. As to the small gear 58, it can be placed on its squared portion and secured by

peening, either before or after the large gear is applied. Preferably, the stop 61 of the large gear is attached to the gear before the gear itself is secured to its shaft.

The stop carries a pin 74 which passes through a slot 75 of a timer-setting link 76. A clip to which one end of the automatic feedout spring 77 is attached is releasably secured to the pin 74, a washer 78 being inserted between this clip and the link 76.

The stop 61 is engageable with a stop shoulder 80 (see Fig. 3) to limit the motion of the measuring roll. The stop shoulder 80 is formed on a stop lever 81 pivoted as at 82 to a punched-out projection of the plate 3, which projection spaces the inner surface of the lever from the face of the plate. The lever is of the first class, providing an arm at each side of the pivot 82. A detachable pivot 83 on one arm of the lever passes through the slotted link 76 and through a second short link 84. The link 84 is pivoted as at 85 to a slide plate 86 of a timer mechanism. This plate is cut out centrally as at 87 and has at its top an inwardly extending slot 88. A guide screw 89 passes through the slot as shown. A bracket 90 engages the sides of the opening 87 and forms a second guide for the slide 86. The slide is held against movement away from the face of the plate 3 by means of a horizontal shelf portion 91 which is of greater width than the width of the opening 87. On the shelf is mounted a vacuum cup 92, the entry of air into which is controlled through an opening 93 controlled by a screw which can be adjusted by the finger piece 95. Cooperative with the cup 92 is a second cup 96 carried by horizontal bracket 97 of the slide 86. A spring 98 connects at one end with the lever 81 and the other end is secured to the plate 3 as shown. This spring assists in moving the parts to the position shown in Fig. 2 following the release of the stops, as will be more fully explained. The elements 81, 76 and 84, are connected by a common pivot 83. The pin 83 so connects the lever 81 with the link 76 as to synchronize brake operation with stop operation. The lever 81 is a stop as well as a brake-controlling element.

A very important feature of this invention is the means provided for preventing unwanted spinning of a rotatable supply roll following the engagement of the stop. I believe myself the first to use a device of this kind in relation to a stop mechanism and a supply roll and thereby to make possible the use of a larger supply roll. It will be understood that in devices of this kind where the supply roll must be rotatably supported there has always heretofore been the objection that the paper unrolls unduly after the stops engage following dispensing. The sudden engagement of the stop, leaves the supply roll in spinning condition which in prior devices continued after the stop mechanism was set, often filling the cabinet with unrolled paper. The result is that the paper either jams part of the mechanism or does not feed evenly. It is therefore an object of this invention to overcome these objections by automatically preventing spinning of the roll, yet leaving the roll free for rotation until the stop engages.

In this embodiment yieldable means has been provided which engages one of the end surfaces of the roll, the roll being disposed between the supporting plates 3 and 4 and between two brake plates, one of which is stationary and the other of which is movable. While all details of construction are believed new and are herein claimed, I believe it broadly new to provide any means for stopping spinning under the conditions met in the dispensing of paper from a rotatable roll, either by means of a stop mechanism only, or by means of a time-stop mechanism or when using an automatic feed, or otherwise. It is conceivable that the present invention may be applied in any case where, when the paper from a rotatable supply roll moves in dispensing direction it can operate a brake mechanism to prevent overrotation of the supply roll after the stop is set, and which becomes operative as a result of pulling or dispensing of the paper, and remains operative while the stop is engaged. A feature herein is that my device can be applied to automatic as well as manual dispensing.



Now referring to Fig. 9. The roll of paper is mounted between the plates 3 and 4 on the bar 15 having the trunnions 14 engaged in the slots 10. Referring also to Fig. 6. On the inner wall of the supporting plate 4 is a relatively broad stationary plate 99 and on the inner side of the supporting plate 3 is a second relatively narrow plate 100 which is movable from an inoperative position shown in Figs. 9, 4 and 7 to the operative position shown in Fig. 5. In Fig. 5 the supply roll is being yieldably forced against the plate 99 of Figs. 9 and 6. This movable plate 100 is provided with two studs 101 which are threaded into it and which pass loosely through openings 102 of the supporting plate 3. Slidable on the studs 101 is a plate 105 and this plate is normally held as in Fig. 9 against the heads of the screws 101 as shoulders, by means of two compression springs 106. Both of the plates 100 and 105 are moved to and held in release position by means of a spring 107 (see also Fig. 7) which engages the inner side of the plate 105. Attached as by suitable threads and a nut to the plate 3 is a stud 108 centrally arranged between the studs 101 and between the springs 106. This stud passes loosely through an opening 109 in the plate 105 and has rotatable and slidable thereon a cam generally indicated 110. This cam is provided with two curved arms 111 struck out from opposite sides of its body, and these two arms normally lie as shown in Figs. 2 and 4 in notches 112 formed in the lateral, vertical edges of the plate 105. The lower side of one, and the upper side of the other, of these notches is bevelled at about the same inclination as the inclination of the curved arms in their relation to the plane of the body of the cam, these bevelled portions being indicated at 113. The cam 110 has an arm 115 to which is pivoted as at 116 a link 117, in turn pivoted at 118 to one of the arms of the lever 81. The cam 110 normally engages a shoulder formed by the head of the stud 108 and reaction between this shoulder and the plate 105 occurs when the cam is rotated from the position of Fig. 2 to the position of Fig. 3, to set the clamp plate as in Fig. 5.

This rotation causes the plate 105 to move inwardly and to compress the springs 106, which in turn move the plate 100 to its clamping position. At the same time the spring 107 is put under greater compression between the plate 105 and the supporting plate 3. On return of the cam to the initial position shown in Fig. 2, the spring 107 moves both plates again to the position shown in Fig. 9 and the springs 106 become correspondingly decompressed to assume their initial position in that figure. When pressure is applied by the plate 100, the supply roll is moved slightly

axially against the plate 99 and is thus yieldably, frictionally held. It will be understood, of course, that the yielding braking action is so regulated that the roll can rotate properly during dispensing action but immediately stops turning when dispensing action ceases. The braking structure is a feature per se, separate from its operation by the act of dispensing. The specific structure may have other uses.

The dispensing operation is as follows: First referring to Fig. 2 which shows the mechanism with the paper 41 ready to be grasped by the user and pulled out. When the operator pulls on the paper the measuring roll and its gear 58 are moved in clockwise direction, the large gear 60 and its stop 61 are moved in counter-clockwise direction, the pin 74 acting on the link 76 pulls the stop 80 into the path of stop 61, and as this motion continues the stops assume the stopping position as shown in Fig. 3. Upward movement of the stop 80 is prevented by the timer. During this act of dispensing the link 84 has moved the slide 86 downwardly and the cup 96 has become vacuum-attached to the cup 92 as shown in Fig. 3 and timing begins. The link 84 is connected to 81 and 86, and upward motion of 86 is prevented by the cups. Motion of the stop 80 to stopping position moves the link 117 to correspondingly move the cam 110 to the position of Fig. 3 to cause clamping action as shown in Fig. 5. At the same time the spring 77 (see Fig. 2) is put under tension with the pin 74 in the position shown in Fig. 3. On release of the stops 61 and 80 by the timer, spring 77 acts to bring the pin 74 from the position in Fig. 3 to the position in Fig. 2 to automatically eject another length of the toweling to a position to be grasped by the user as in Fig. 2.

It is also against the action of this spring 77 that the force applied to the dial 50 must act. The pawl holds the dial 50 against the reverse action of this spring during a portion of the dispensing action. In fact, the force applied to the dial acts against both springs 77 and 98, but only until the pin 74 arrives at a position substantially diametrically opposite to the position in which it is shown in Fig. 2. After it has reached such a diametric position the spring 77 acts to force the stop 61 against the stop 80. Therefore, for this portion of the feeding cycle, the dial 50 is not needed, in those cases where automatic feeding is used.

As the stop 80 begins to move downwardly into the stopping path of stop 61, the lever 81 operates the link 117, moving it upwardly and moving the cam 110 in clockwise direction to the position shown in Fig. 3 to eventually cause application of the brake before the stops 61, 80 engage. It will be noted in Fig. 9 that the plate 100 is initially spaced from the end of the supply roll so that the rotation of a large supply roll can be more easily started. The brake cams gradually apply pressure through the plate 105 and springs 106 to the plate 100 so that supply roll rotation will be stopped just before or just as the stop engages. In any event, overrun of the supply roll is prevented just before or as soon as the stop engages.

What I claim is:

1. A dispensing device comprising a measuring roll, a stop mechanism controlled by and controlling said roll, a supply roll of paper freely rotatable on a support, means for exerting a braking pressure on said roll, and means operated through the stop mechanism for causing said braking pressure means to apply pressure to prevent continuation of supply roll rotation when the stop is set, the said braking pressure means being adapted to relieve the pressure when the stop mechanism is released.



2. A dispensing cabinet comprising a pair of journal plates, a support held by the journal plates and having a supply roll freely rotatable thereon, a first plate on the inner side of one of said journal plates and engageable with one end of said roll to resist its rotation, a second plate on the outer side of said journal plate, means on the first plate slidably supporting the second plate, resilient means normally acting on said first and second plates to keep the inner plate out of engagement with said supply roll, resilient means acting to hold the second plate spaced from the first plate, a dispensing mechanism, and means operable by said dispensing mechanism during dispensing for moving said second plate against the action of said resilient means to cause the inner plate to engage the end of said roll as a brake.

3. A device of the class described, comprising a pair of supports, a supply roll rotatably supported on and between said supports, a first clamping plate between the supports and adapted to engage the end of the roll, a second plate at the opposite side of one of the supports, springs between the plates passing through the support and compressible during clamping action, means connecting the plates to be moved simultaneously away from clamping position, a spring for obtaining such movement, and a cam adapted on rotation to act against the second plate and against the action of all springs to move the first plate to clamping position.

4. A device of the class described, comprising a pair of supports, a supply roll rotatably supported on and between said supports, a first clamping plate between the supports and adapted to engage the end of the roll, a second plate at the opposite side of one of said supports, springs between the plates passing through the support and compressible during clamping action, means connecting the plates to be moved simultaneously away from clamping position, a spring for obtaining such movement, a cam adapted on rotation to act against the second plate and against the action of all springs to move the first plate to clamping position, means for dispensing material from said supply roll, and means operable by said dispensing means to operate the cam to cause clamping action between the first plate and the supply roll during dispensing.

5. A device of the class described, comprising a lever of the first class, the first arm of which has a stop shoulder constituting a first stop, a supply roll rotatably supported, a brake mechanism adapted to yieldably hold the supply roll against over-rotation, a link connecting with the second arm of the lever and adapted to operate the brake mechanism to set the brake when the lever is moved to stopping position, a second stop operated by a dispensing roll, and means operable by the second stop to move the lever to stopping position and then condition the lever for automatic movement away from stopping position, and means for automatically moving the lever away from such position.

6. A device for dispensing sheet material comprising, a supply roll supported for free rotation about its axis, a measuring roll operable by movement of the material thereagainst, a stop mechanism controlled by and controlling said measuring roll including a stop which suddenly engages to stop movement of the material, brake means

adapted to yieldably resist rotation of the supply roll, and means controlled by the stop as it moves toward stopping position for operating said brake means to resist supply roll rotation after stop engagement and for releasing said brake means to again permit free rotation of the roll after said stop releases.

7. A device for dispensing sheet material comprising, a supply roll supported for free rotation about its axis, a measuring roll operatively related to the supply roll, first and second meshing gears, the first attached to the measuring roll and the second having a first stop, a pivoted second stop, means for automatically moving the second stop toward and away from the first stop, brake means adapted to yieldably resist rotation of the supply roll, and means controlled by the second stop as it moves toward stopping position for operating said brake means to resist supply roll rotation and for subsequently permitting free rotation of the supply roll as the second stop moves away from the first.

8. A device for dispensing sheet material comprising, a supply roll supported for free rotation about its axis, a measuring roll operatively related to the supply roll, a stop mechanism, a timer controlled by and controlling the stop mechanism, brake means adapted to yieldably resist rotation of the supply roll, means by which the stop mechanism controls and is controlled by the timer, and means operable by the last mentioned means for operating said brake means to resist supply roll rotation as the stop and timer are set and for releasing said brake means as the stop is released.

9. A device of the class described having a mechanism for dispensing sheet material including a measuring roll, a supply roll of sheet material operatively positioned in relation to said measuring roll, a first spur gear operated by the measuring roll, the second spur gear driven by the first gear and having a first stop, a second stop engageable with the first stop, a timer, means by which the second gear operates the second stop and the timer, including a link pivoted to the second stop and the timer and a link pivoted to the second gear and the second stop, a brake member yieldably engageable with the supply roll, a cam for moving said brake member into engagement with the supply roll, and means by which the second stop operates said cam to cause application of the brake when the stop is engaged and to release said brake when the stop is disengaged.



RUDOLPH G. BIRR.


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