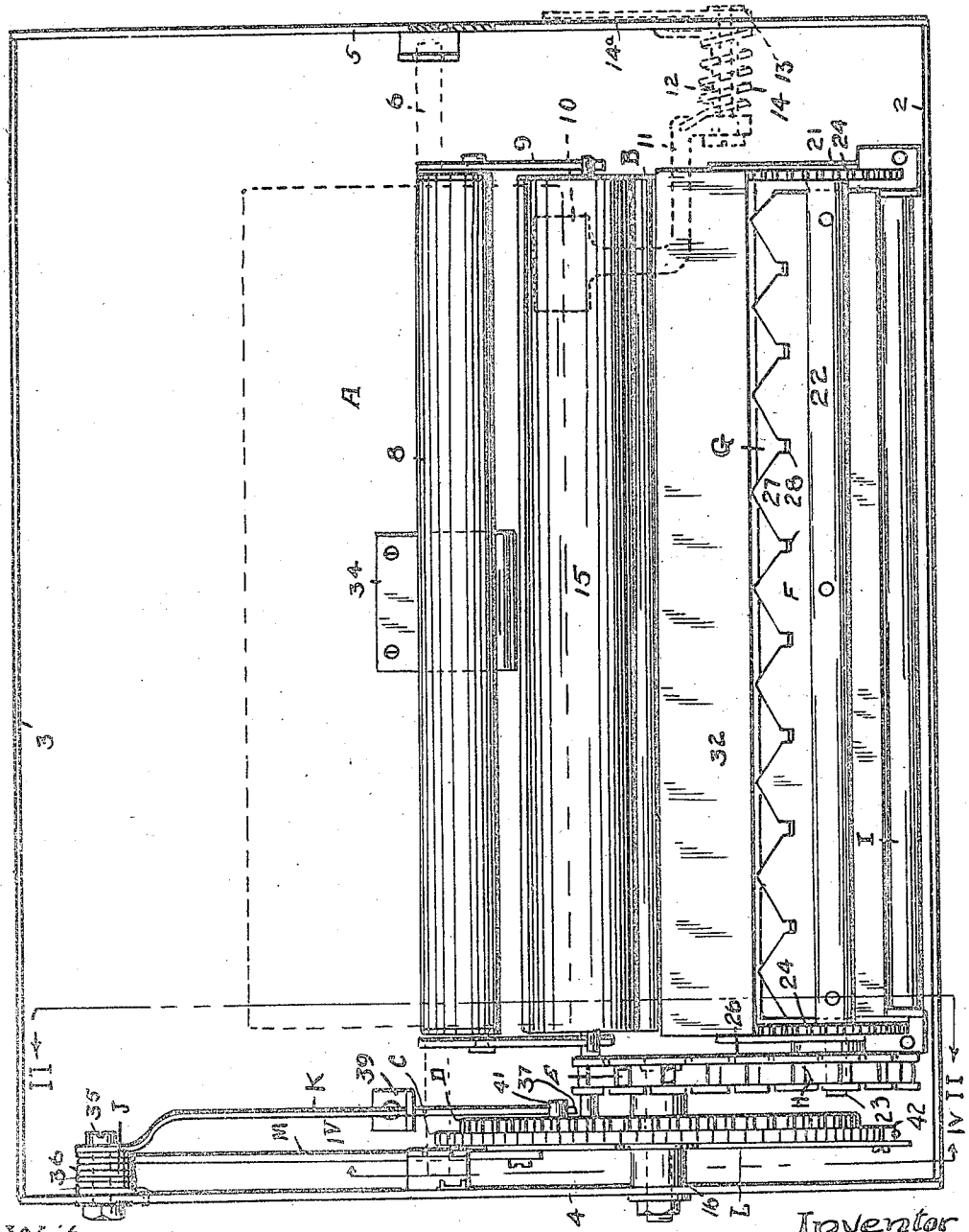
Mar. 20, 1923. 1,449,062.

H. E. SCHROEDER.

PAPER DISPENSING APPARATUS.

FILED JUNE 22, 1921. 3 SHEETS—SHEET 1.



Witness
F F Dilworth

Inventor
Harry E. Schroeder.
by Edward A. Lawrence

Fig. 1

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Fig. 2

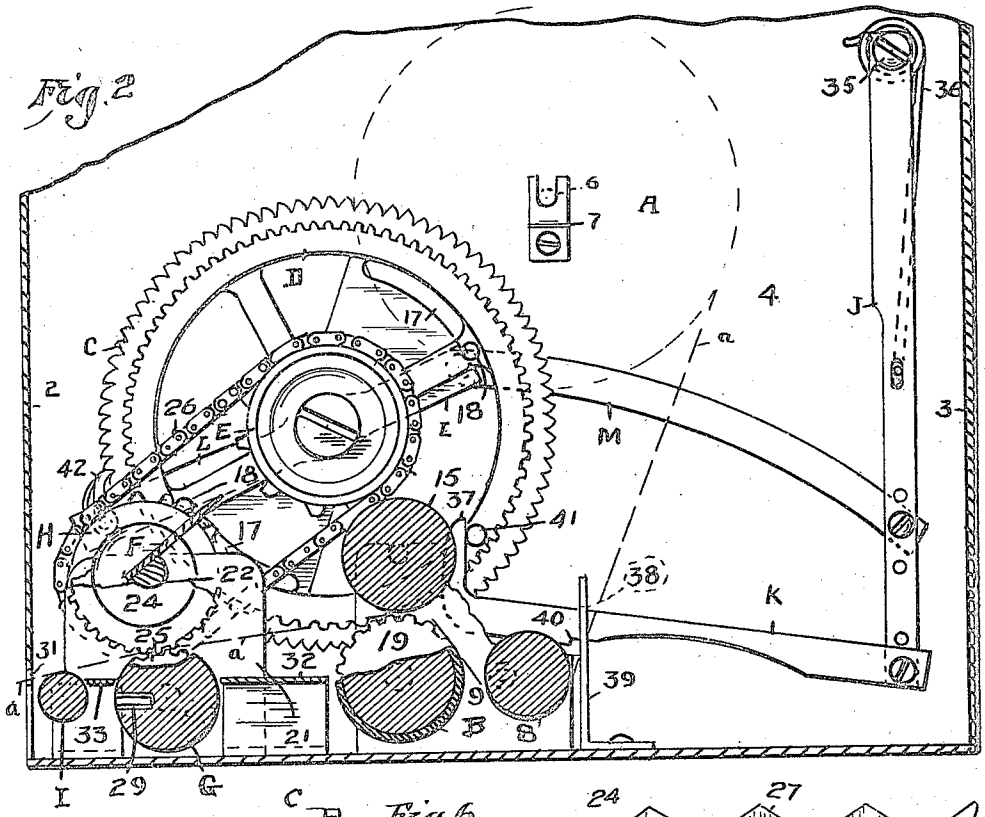


Fig 7

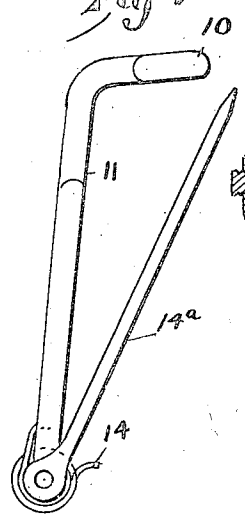
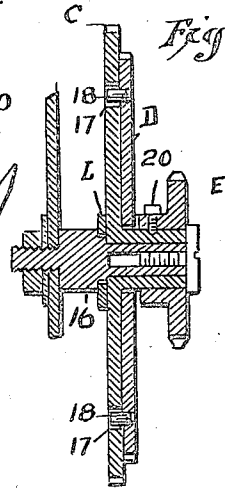


Fig 6



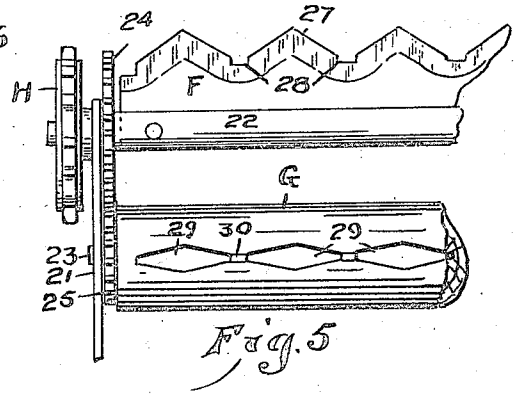


Fig. 5

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Fig. 3

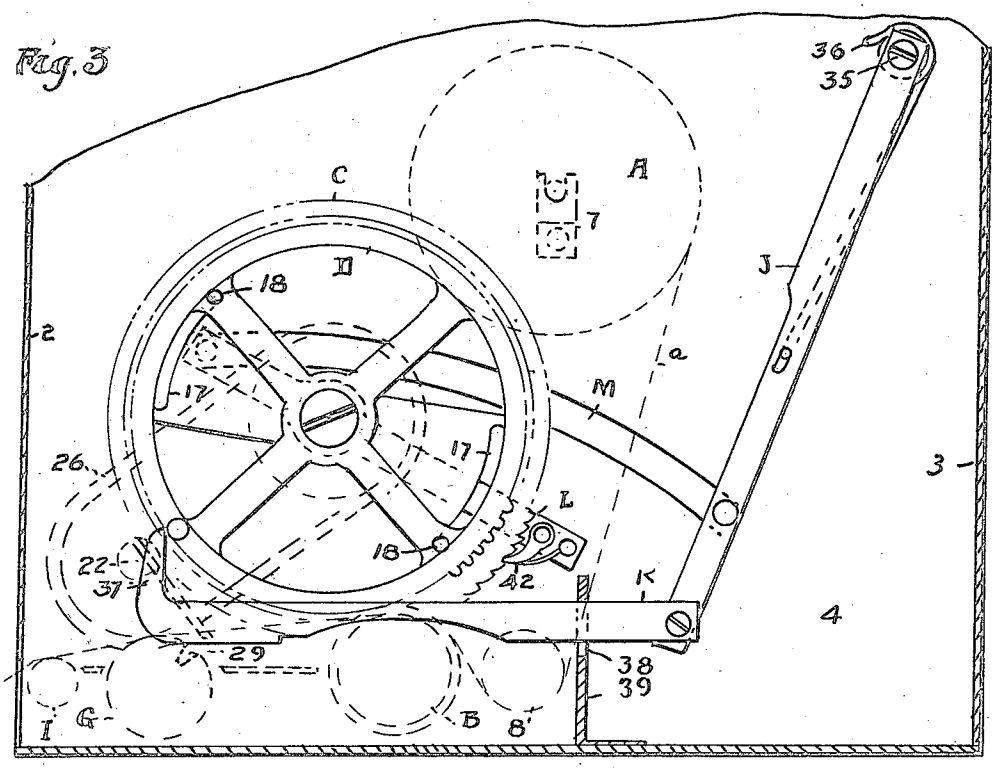
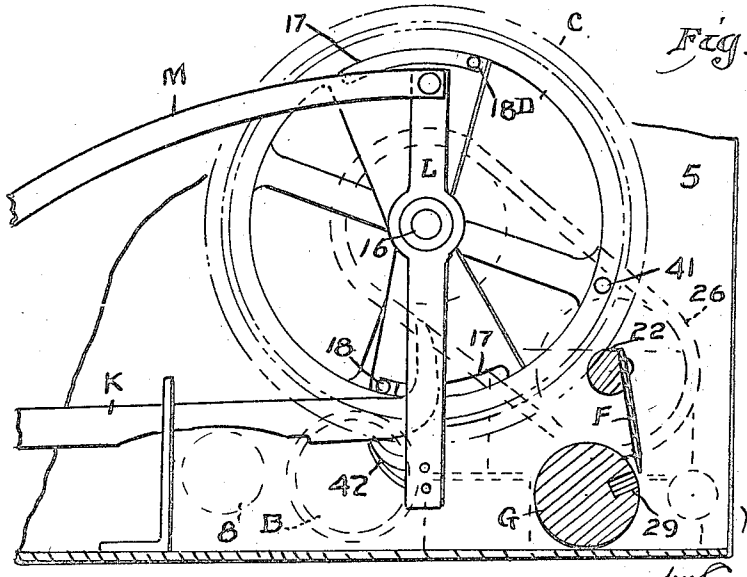


Fig. 4



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Patented Mar. 20, 1923. 1,449,062

UNITED STATES PATENT OFFICE.

HARRY E. SCHROEDER, OF PITTSBURGH, PENNSYLVANIA.

PAPER-DISPENSING APPARATUS.

Application filed June. 22, 1921. Serial No. 479,432.

To all whom it may concern:

Be it known that I, HARRY E. SCHROEDER, a citizen of the United States, and residing in the city of Pittsburgh, in the county of Allegheny, and State of Pennsylvania, have invented or discovered the new, useful, and Improved Paper-Dispensing Apparatus, of which the following is a specification.

My invention consists in a new and improved apparatus for severing and dispensing measured sheets of paper from a parent roll, as for instance towels, toilet paper, wrapping paper and the like.

Two methods of dispensing sheets of paper for these and like purposes are now in use.

One method is to transversely perforate or partially sever the paper at proper intervals before rolling it up, so that when a proper amount has been unwound from the roll, a sharp lateral jerk will detach the unwound portion. This method is objectionable because of the added expense of the preliminary perforating or partial severance of the paper; and it also encourages waste, as the users are not careful to properly limit or measure the unwinding before tearing off the unwound portion.

The other method is to use a parent roll of unperforated paper from which the user unwinds the desired amount and then either tears the paper against a cutting edge or uses a manually operated cutting device. This method is also objectionable as there is no control of the amount of paper which the operator may unwind before he detaches the same, and also because the use of both hands is generally required.

Attempts have been made to design an operative machine which will measure the paper as the user unwinds it from the parent roll, and automatically sever the same when the proper amount has been unwound; but the severing operation has been uncertain and unsatisfactory, thus rendering such machines commercially impractical.

The object which I have in view is the provision of a practical and reliably operative dispensing apparatus for the purposes described, to which the paper is supplied in the form of an unperforated parent roll and from which roll the paper is drawn or unwound by the user, as needed, the amount of paper dispensed being automatically measured and then severed by the machine, so that the user cannot obtain at a single operation of the machine more than one sheet of paper, and that of the exact predetermined size.

I accomplish this object by means of a machine wherein the unwinding of the paper from the parent roll is used to store energy which at the proper moment, when the predetermined amount of paper has been unwound, is used to operate the severing means while the unwinding action is momentarily interrupted to prevent the paper piling up in front of the severing means; and after the measured amount of paper is severed, such stored energy is used to project the edge of the paper past the severing station to provide a free end for the user to grasp for the next operation.

New and improved severing means are provided, which positively and cleanly cut through the paper without danger of folding it into the mechanism without cutting and thus clog the same.

Other novel features of construction and arrangement of parts will appear from the following description.

In the accompanying drawings, which are however merely intended to furnish an illustration of a practical embodiment of the principles of my invention without limiting the scope of the claims to the construction shown, Fig. 1 is a plan view of a dispensing machine embodying the principles of my invention, the lid or cover of the same being removed; Fig. 2 is a sectional view of the same taken along the line II—II in Fig. 1, the machine in said two views being shown as measuring the paper as the latter is being drawn out at the front of the machine by the user; Fig. 3 is a view similar to Fig. 1 but the machine is shown just about to cut off the measured sheet of paper; Fig. 4 is a view looking toward the right from the line IV—IV in Fig. 1 showing the apparatus after the measured sheet has been severed and as the free end of the paper is being projected forwardly past the severing mechanism; Fig. 5 is a broken front elevation of the severing mechanism comprising the knife and its coacting recessed roll; Fig. 6 is a vertical diametric section through the ratchet and spur gears and the driving sprocket, and Fig. 7 is a detail showing the spring tension device for the parent roll which is provided to prevent spinning.

The following is a detailed description of the drawings.

The machine is inclosed in a suitable box or case which is shown as composed of the bottom 1, front wall 2, back wall 3 and side walls 4 and 5. A suitable removable lid or cover, not shown, is also provided.

A represents the parent roll of paper mounted on the shaft 6 which is journaled at its end in bearings 7 on the side walls of the case, at least one of said bearings being open at the top to permit the roll on its shaft to be placed in position in the case. The paper *a* is led from the rear of the roll A under a roll 8 which need not rotate, being mounted between the two vertical brackets 9 extending upwardly from the floor 1. I prefer to mount said roll 8 eccentrically so that the tension on the paper *a* can be adjusted.

10 is a plate which maintains, by contact, sufficient tension on the parent roll to prevent the same spinning, and thus feeding the paper too fast. Thus I show said plate, indicated in dotted lines in Fig. 1, mounted on the free end of a bent arm 11 secured to a sleeve 12 which protrudes through a hole in the end wall 5 and is held rotatably in position by means of the clamping bolt 13. 14 is a helical spring wound about the sleeve 12 with one of its ends inserted in an aperture in the wall 5 while its other end is attached to the arm 11, thus holding the plate 10 in resilient contact with the parent roll A. As the roll diminishes in diameter, owing to the unwinding of the paper therefrom, the compression of the spring is accordingly lessened, thus proportionating the retarding effect to suit the momentum of the parent roll. The outer end of the sleeve 12 may be provided with a radial pointer 14^a which may work in relation to a scale marked on the outer face of the wall 5, thus indicating the amount of paper still remaining on the roll.

The paper *a* is led forwardly over a rubber covered roll B whose axle is journaled in the brackets 9, and 15 is a weighted roller, mounted in vertically slotted journal openings in said brackets, whose function is to press the paper down on the roller B so that the latter will be rotated by the unwinding of the paper from the parent roll, and, vice versa, the paper will be unwound from the parent roll when the roll B is power-rotated.

C represents a ratchet gear having its teeth directed counter-clockwise. Said gear is provided with an axial hub journaled on an inwardly extending stud shaft 16 on the side wall 4.

D is a spur gear rotatably mounted against the inner face of the ratchet gear C and on the hub of the latter. The ratchet gear C is provided with one or more arcuate, concentric slots 17 which are each engaged by a stud 18 on the spur gear D, thereby providing for a limited independent movement.

The axle of the roller B is provided with a pinion 19 meshing with the gear D, whereby said gear is rotated by the unwinding of the paper *a* past the roll B.

E is a sprocket wheel mounted on the hub of the gear C against the face of the gear D and rigidly secured to said hub, as by means of the set screw 20.

21 represents a pair of journal brackets mounted on the floor 1 in front of brackets 9.

F represents the cutting knife having attached to its butt edge a shaft 22 journaled in the brackets 21. G is the recessed roll having its axle 23 journaled in said brackets 21 below the shaft 22. The shaft 22 and the axle 23 are provided at each end inside the brackets 21 with intermeshing pinions 24 and 25, respectively, the ratio of the same being such that the surface speed of the recessed roll is the same as the speed of the edge of the cutting knife F.

The protruding end of the shaft 22 is provided with a sprocket wheel H which is operatively connected to the driving sprocket E by the chain 26.

The preferred form of knife F is clearly shown in Figs. 1 and 5, presenting a series of triangular cutting teeth 27 inter-spaced by angular recesses or blanks 28. The coacting roll G is provided with a longitudinally disposed series of recesses 29 which are equal in number with the knife teeth 27 and are wider at their center and taper toward both ends so when the knife registers with the recesses the teeth of the former will have sufficient clearance to enter and leave the recesses as they pass the same.

30 represents bridges or solid portions of the roller G which separate the recesses and register with the blanks 28 of the knife.

This construction of cutting knife and recessed roll insure an almost complete severance of the paper, the narrow and weak necks between the cuts readily and immediately breaking away from the pull on the paper.

Thus there is no danger of the paper being merely folded or creased into the recessed roll as would occur were the roll provided with merely a longitudinal slot coacting with a straight or serrated edged knife.

I is an idle delivery roll journaled in the brackets 21 in front of the recessed roll G over which the paper is delivered out through the bottom opening or slot 31 in the front wall 2.

32 represents a horizontal table between the rolls B and G and 33 a similar table between the rolls G and I to prevent the end of the paper when passing said rolls

from wrapping around the same. 34 is a curved sheet metal guide which directs the end of the paper when a new parent roll is placed in the machine, upward between the rolls 8 and B.

J represents a lever having its upper end pivotally mounted on a spur shaft 35 extending inwardly from the upper rear of side wall 4, a helical spring 36 being coiled about said shaft with one of its ends secured to the wall and the other end secured to the lever, whereby said spring tends to swing said lever rearwardly or counterclockwise, and energy is stored in said spring when said lever is swung forwardly.

K is a reach arm whose rear end is pivotally connected to the lower end of the lever J and whose front end is provided with an upwardly turned hook 37. The arm K is slidably supported in a substantially horizontal position by being passed through a vertical slot 38 in a bracket 39 extending up from the floor 1, said slot being sufficient to permit a limited movement of the reach arm in a vertical plane. The reach arm is provided with a shoulder 40 on its bottom edge to limit the rearward movement of the arm by contact with the bracket 39.

The spur gear D is provided on its exposed face with a wrist pin 41 which as the gear rotates clockwise in Figs. 2 and 3, engages the hook 37 and thus draws the reach arm K forwardly until said hook is released as the pin rises up after passing the vertical diametric axis of the gear.

L is a rocking arm rotatably mounted intermediate of its ends on the shaft 16 between the wall 4 and the gear C and which is provided at one end with a spring pressed pawl 42 adapted to engage the teeth of the ratchet gear C when the arm L is turned clockwise, thus rotating the gear with the arm; but which pawl trails idly over the teeth of said gear C when the arm L is turned counterclockwise. The other end of the arm L is connected by a link M, with the lever J intermediate of the ends of the latter.

It is evident that when the tooth 37 is engaged by the wrist pin 41, thus drawing forward the reach arm K, the lever J is swung forwardly, thus storing power in the spring 36 and also turning the rocking arm L counterclockwise with the pawl 42 trailing idly over the teeth of the gear C. When the hook 37 is released from the wrist pin 41 the spring 36 throws the lever J rearwardly until it is halted by the engagement of the shoulder 40 on the reach arm K with the bracket 39. This action swings the arm L clockwise with its pawl engaged with a tooth of the gear C, thus rotating said gear clockwise while the gear D remains stationary until the studs 18 of the gear D are engaged by the rear ends of the slots 17 of the gear C, thus causing the gear D to rotate with the gear C for the remainder of the spring actuated movement.

The operation of the machine is as follows:

The parent roll A is mounted in the machine and the end of the paper *a* is inserted by means of the guide 34 under the roll 8 and between the rolls B and 15, and is thence led over the table 32, between the knife F and the recessed roll G, across the table 33 and over the delivery roll I so that the end of the paper protrudes from the machine sufficiently to be grasped by the next user.

The knife F is now directed horizontally toward the front of the machine; the lever J is swung back into its substantially vertical position and the studs 18 engage the rear ends of the slots 17. When paper is to be dispensed, the user grasps the protruding end of the paper and draws the same out by unwinding the paper from the parent roll A. The travel of the paper over the roll B rotates the same, thus imparting rotation to the spur gear D, causing the studs 18 to travel along the slots 17 until the front ends of the latter are engaged. During this movement of the gear D the cutting knife and recessed roll are idle. When the studs 18 reach the front end of the slots 17, the ratchet gear C is picked up and rotates in unison with the gear D, thus starting the knife F and the recessed roll G to rotate toward their cutting position.

As the gears C and D continue to rotate the wrist pin 41 picks up the hook 37 as shown in Fig. 2, and draws the reach arm K forwardly, thus swinging the lever J forwardly and storing energy in the spring 36, and at the same time trailing the spring pawl rearwardly along the ratchet gear C. When the knife F and the recessed roll G approach their cutting position, as shown in Fig. 3, the wrist pin 41 is rotated out of engagement with the hook 39, thus releasing the reach arm K and permitting the lever J to be swung rearwardly by the spring 36 until the shoulder 40 halts such movement by striking against the bracket 39. This rearward movement of the lever J rotates the arm L forwardly thereby rotating the gear C independently of the gear D until the rear ends of the slots 17 engage the studs 18. Thus the power of the spring 36 rotates the cutting mechanism through its cutting position, thus severing the paper. Inasmuch as the pull exerted on the paper by the user while the cutting is being accomplished is interrupted at the knife and recessed roll, the parent roll A stops unwinding and the rubber roll B is halted as there is no pull on the paper in the rear of cutting mechanism to rotate said roll.

The spur gear D is also idle until its studs 18 are engaged by the rear ends of the slots 17.

Thus during the cutting operation no paper is fed from the parent roll and the paper is prevented from piling up in the rear of the knife.

As the paper is severed and the knife F and roll G leave their coacting positions, the rear ends of the slots 17 engage the studs 18 whereby the power-rotated ratchet gear picks up the temporarily idle spur gear, thus starting the rubber roll B to rotate. This causes the forward feed of the paper to be resumed until a sufficient length has been projected forwardly between the knife and recessed roll and over the delivery roll K for the next user to grasp. At this point the shoulder 40 of the reach arm engages the bracket 39, thus halting the machine in the relative position of parts first described.

It is thus evident that when the pull is first exerted by the user upon the end of the paper, the paper is unwound and measured while the cutting mechanism is idle. As the pull is continued the knife and recessed roll begin to rotate toward their cutting position and as they reach the same, the unwinding ceases to prevent the paper piling up in the front of the knife. As soon as the cutting operation is completed the paper again starts to unwind until the fresh cut edge is sufficiently projected from the machine, and meanwhile the knife and recessed roll rotate into their position of rest; whereupon the machine stops.

The length of the measured sheet is determined by the amount of paper passing the cutting mechanism, and therefore the length of the sheet is determined by the ratio of three factors, the circumference of the rubber covered roller B, the pitch diameter of the pinion 19 and the pitch diameter of the spur gear D. Thus by varying this ratio, the length of the sheet may be regulated.

It is thus evident from the foregoing that my improved apparatus automatically and accurately measures and severs the paper as used, in the form of sheets of the predetermined dimensions, and that but a single sheet is dispensed at one operation of the machine. This, coupled with the fact that unperforated paper is used, render the machine very economical, as paper in the most expensive form is used and none of the paper is wasted in dispensing.

Although, for the sake of clearness of illustration of the principles of my invention, I have minutely described the embodiment of the same shown in the drawings, I do not wish to limit myself thereby, but claim broadly:

1. In a machine for dispensing paper in measured sheets from a parent roll from which the paper is unwound by pulling on the end of the paper, means for cutting the paper transversely, means whereby said cutting operation is accomplished when a predetermined amount of paper has been unwound, means whereby the unwinding is interrupted during the cutting operation to prevent piling up of the paper against the cutting means, and automatically operated means whereby the shortened end of the paper is projected past the cutting means immediately after the cutting operation, for the purposes described.

2. In a machine for dispensing paper in measured sheets from a parent roll from which the paper is unwound by pulling on the end of the paper, a cutter for cutting the paper transversely, means for operating said cutter, means whereby when a predetermined amount of paper has been unwound the cutting operation is automatically accomplished, means whereby the unwinding is automatically interrupted during the cutting operation to prevent piling up the paper against the cutter, and automatically operated means whereby the unwinding is temporarily resumed immediately after the cutting operation to project the shortened end of the paper past the cutter.

3. In a machine for dispensing paper in measured sheets from a parent roll from which the paper is unwound by pulling on the end of paper, a cutter for cutting the paper transversely, means for operating said cutter, said cutting operation being automatically accomplished when a predetermined amount of paper has been unwound, means whereby the unwinding is interrupted during the cutting operation to prevent piling up the paper against the cutter, and automatically operated means whereby the cutter operating means cause a temporarily resumption of the unwinding immediately after the cutting operation to project the shortened end of the paper past the cutter, for the purpose described.

4. In a machine for dispensing paper in measured sheets from a parent roll from which the paper is unwound by pulling on the end of the paper, a cutter for cutting the paper transversely, means for operating said cutter, means whereby the cutting operation is automatically accomplished when a predetermined amount of paper has been unwound, means whereby the unwinding is interrupted during the cutting operation to prevent the piling up of the paper against the cutter, and automatically operated means whereby the cutter operating means causes the projection of the shortened end of the paper past the cutter immediately after the cutting operation for the purpose described.

5. In a machine for dispensing paper in measured sheets from a parent roll from which the paper is unwound by pulling on

the end of the paper, a cutter for cutting the paper transversely, stored energy means for operating said cutter when a predetermined amount of paper has been unwound, means whereby the energy for said last mentioned means is stored by the unwinding of the paper, means whereby the unwinding is automatically interrupted during the cutting operation, and automatically operated means whereby immediately after the cutting operation said stored energy means causes the temporary resumption of the unwinding to project the shortened end of the paper past the cutter, for the purpose described.

6. In a machine for dispensing paper in measured sheets from a parent roll from which the paper is unwound by pulling on the end of the paper, a cutter for cutting the paper transversely, spring actuated means for operating said cutter when a predetermined amount of paper has been unwound, energy being stored in said last mentioned means during the unwinding of the paper, means whereby the unwinding is automatically interrupted during the cutting operation, and automatically operated means whereby said spring actuated means causes the temporary resumption of the unwinding immediately after the cutting operation to project the shortened end of the paper past the cutting means, for the purpose described.

7. In a machine for dispensing paper in measured sheets from a parent roll, the combination of a pair of rotators mounted on a common axis, means whereby the unwinding of the paper causes one of said rotators to rotate, cutting means operated by the rotation of the other rotator, means for rotating said second named rotator, and a lost motion connection between said rotators whereby the second rotator is idle during the first unwinding of the paper and the unwinding of the paper is interrupted during the cutting operation.

8. In a machine for dispensing paper in measured sheets from a parent roll, the combination of a pair of rotators mounted on a common axis, means whereby the unwinding of the paper causes one of said rotators to rotate, cutting means operated by the rotation of the other rotator, means for rotating said second named rotator, and a lost motion connection between said rotators whereby the second rotator is idle during the first unwinding of the paper and the unwinding of the paper is interrupted during the cutting operation and is then temporarily resumed to project the shortened end of the paper past the cutting means.

9. In a machine for dispensing paper in measured sheets from a parent roll, the combination of a pair of rotators mounted on a common axis, means whereby the unwinding of the paper causes one of said rotators to rotate, cutting means operated by the rotation of the other rotator, stored energy means for rotating the second named rotator, means whereby said stored energy means are energized by the rotation of the first named rotator, and a lost motion connection between said rotators, whereby during the first unwinding the cutting means remain idle and during the cutting operation the unwinding is interrupted but after the cutting operation the unwinding is temporarily resumed to project the shortened end of the paper past the cutting means.

10. In a machine for dispensing paper in measured sheets from a parent roll, the combination of a pair of rotators mounted on a common axis, means whereby the unwinding of the paper causes one of said rotators to rotate, cutting means operated by the rotation of the other rotator, stored energy means for rotating the second named rotator, means whereby energy is stored in said last mentioned means by the unwinding of the paper, and a lost motion connection between said rotators, whereby during the first unwinding the cutting means remain idle and during the cutting operation the unwinding is interrupted but after the cutting operation the unwinding is temporarily resumed to project the shortened end of the paper past the cutting means.

11. In a paper dispensing machine wherein the paper is delivered in measured sheets from a parent roll, cutting means comprising a rotary knife, and a recessed roll journaled in parallelism and coacting to cut the paper passed between them, the edge of said knife being provided with serrations separated by blank spaces and said roll being provided with recesses of greater intermediate width and tapering toward their ends to provide clearance for said serrations, and separated by solid portions of said roll.

Signed at Pittsburgh, Pa., this 17th day of June, 1921.

HARRY E. SCHROEDER.