

Aug. 4, 1953

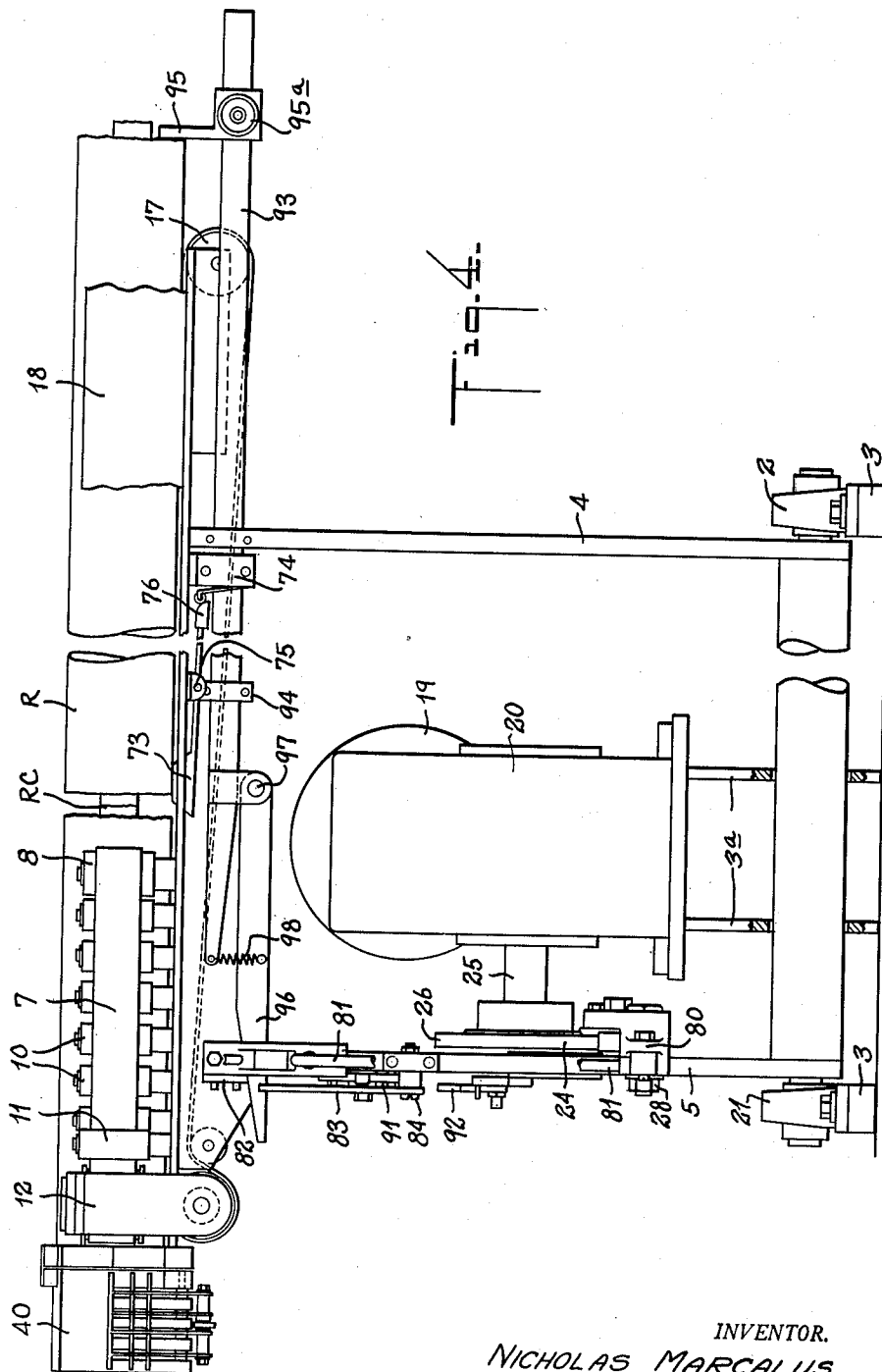
N. MARCALUS

2,647,576

PRODUCTION OF SHORT PAPER ROLLS FROM LONG PAPER ROLLS

Filed Feb. 16, 1949

5 Sheets-Sheet 2



INVENTOR.
NICHOLAS MARCALUS
BY
Kenyon & Kenyon
ATTORNEYS

Aug. 4, 1953

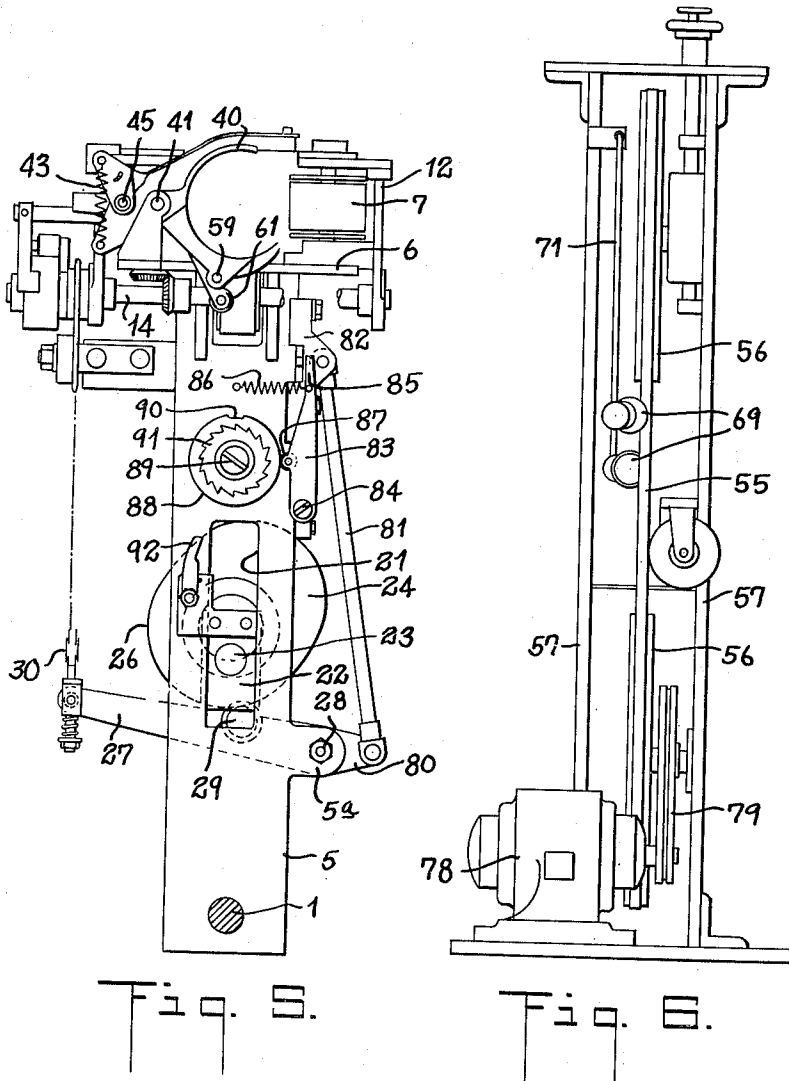
N. MARCALUS

2,647,576

PRODUCTION OF SHORT PAPER ROLLS FROM LONG PAPER ROLLS

Filed Feb. 16, 1949

5 Sheets-Sheet 3



INVENTOR.
NICHOLAS MARCALUS
BY
Kenyon & Kenyon
ATTORNEYS

Aug. 4, 1953

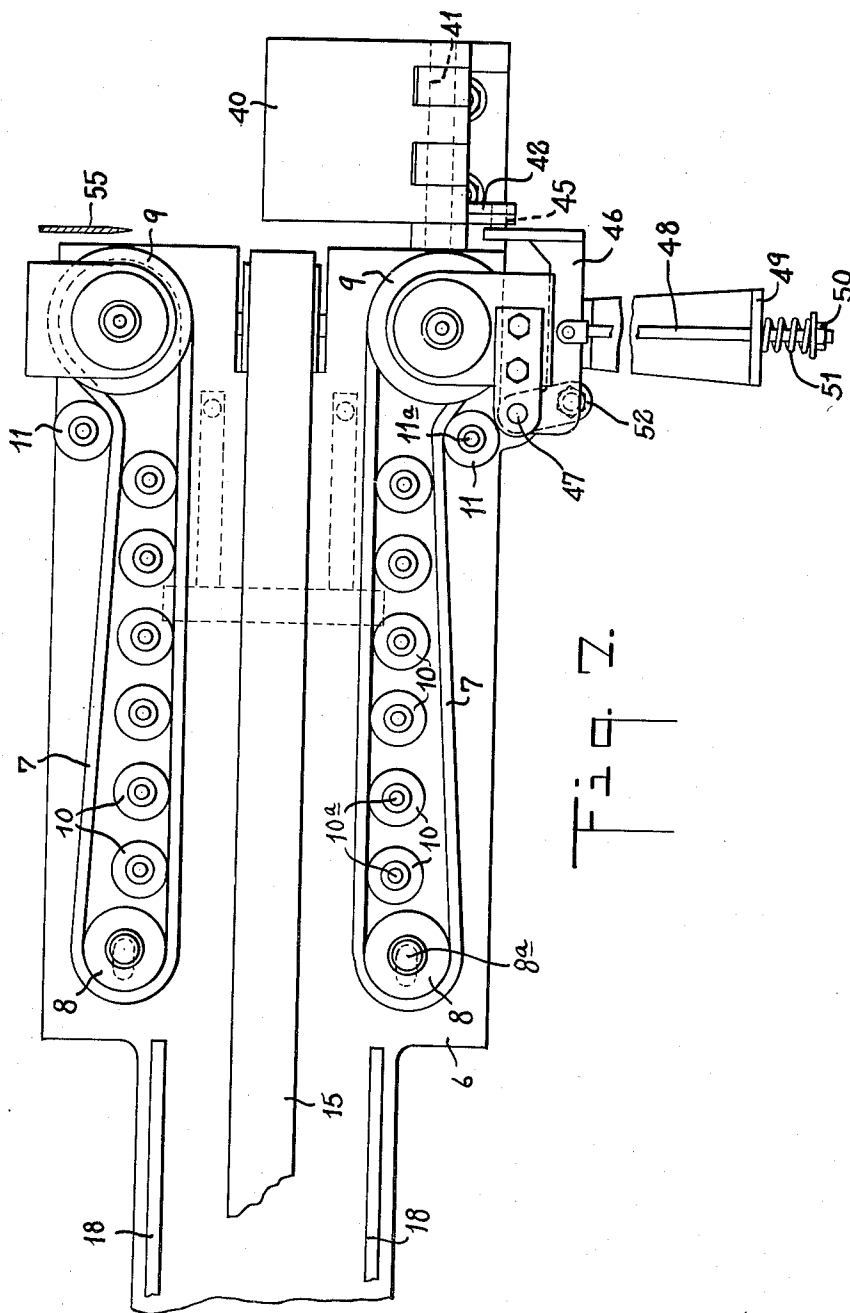
N. MARCALUS

2,647,576

PRODUCTION OF SHORT PAPER ROLLS FROM LONG PAPER ROLLS

Filed Feb. 16, 1949

5 Sheets-Sheet 4



INVENTOR.
NICHOLAS MARCALUS

BY

Kempton & Kempton

ATTORNEYS

Aug. 4, 1953

N. MARCALUS

2,647,576

PRODUCTION OF SHORT PAPER ROLLS FROM LONG PAPER ROLLS

Filed Feb. 16, 1949

5 Sheets-Sheet 5

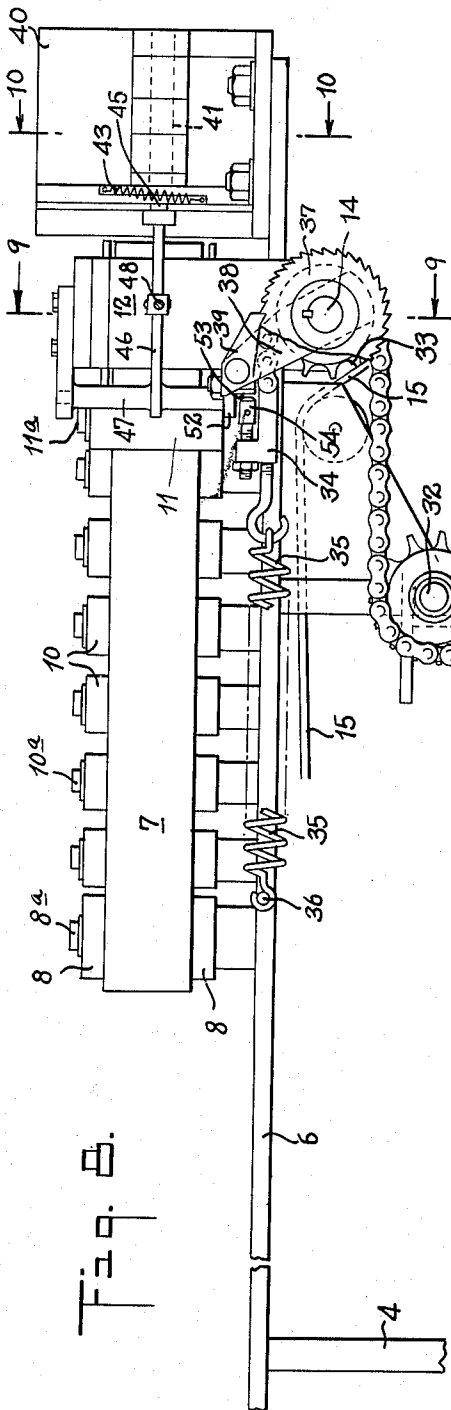


Fig. 9.

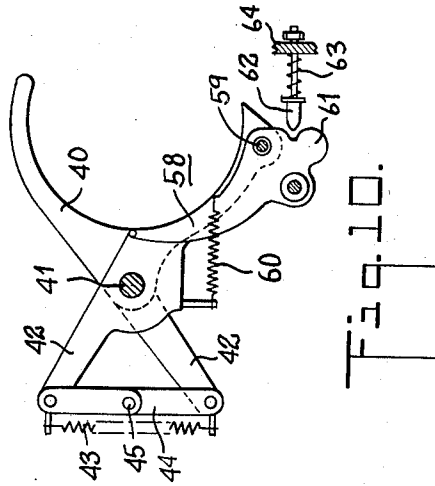
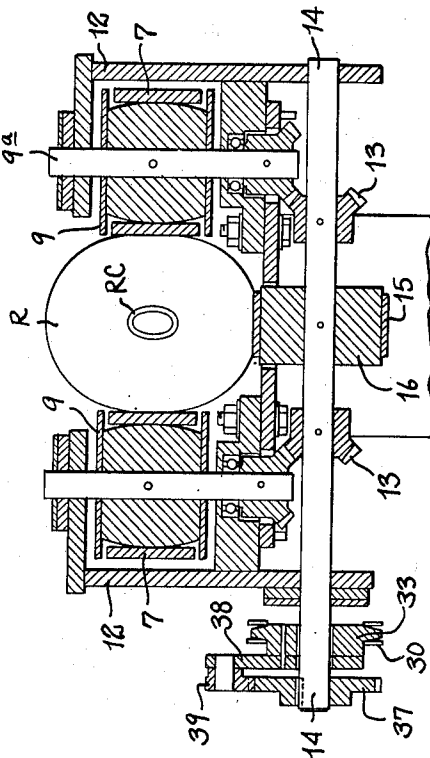


Fig. 10.



INVENTOR.
NICHOLAS MARCALUS

BY

Kenyon + Kenyon

ATTORNEYS

UNITED STATES PATENT OFFICE

2,647,576

PRODUCTION OF SHORT PAPER ROLLS
FROM LONG PAPER ROLLS

Nicholas Marcalus, West Englewood, N. J.

Application February 16, 1949, Serial No. 76,758

15 Claims. (Cl. 164—35)

1

This invention was developed in connection with the production of rolls of toilet paper of the familiar normal or standard width range from the much wider toilet paper stock produced by the paper mill.

Previously the long mill roll of the wider paper was processed in a machine whereby it was unwound and passed through a multiple slitter which longitudinally slit the work into a plurality of strips of the normal or standard width. The machine then coiled these strips individually on the usual paper roll centers to provide the normal or standard length toilet paper rolls. The operation was continuous. The customary transverse perforations were made just prior to the slitting.

The above presented the problem that due to the soft nature of the paper and its low tensile strength which prevented effective guiding, it was impossible to produce toilet paper rolls having the ends of the convolutions in exact radial alignment. The rolls were unattractive in appearance and tended to jam in the usual unrollers provided in bathrooms.

One of the objects of the present invention is to process the large and long mill roll of toilet paper to the small and short product rolls provided for the ultimate user, so that the edges of the various convolutions are exactly aligned radially to provide roll ends that are completely smooth and flat and without projecting convolution edges due to misalignment of the various convolutions.

According to the present invention the wide paper is unwound from the long mill roll, transversely perforated in the usual manner and then wound on an equally long paper roll center to provide a long roll that is as long as the mill roll, but which carries only the normal or standard toilet paper roll length of paper. The paper roll center may be made from the same stock as is customarily used, but must be as long as is necessary to carry the full mill width of paper. When this much paper is rolled on the paper roll center the paper is transversely severed and the top convolution on the long or work roll of paper is wet to make it stick and prevent unwinding. Then this long roll of toilet paper is transversely cut to provide the normal or standard length toilet paper rolls. A plurality of the ultimate product rolls are produced from each long work roll. The transverse cutting of the long work roll is done by accurately working equipment so as to provide truly right angular cuts respecting the roll's axis and with the cuts

2

smoothly made. In this fashion the aforementioned object is attained, the product rolls produced having flat ends that are radially smooth and flush throughout and free from any projecting convolution edges due to misalignment of the convolutions. So far as is known a product of this character is new.

The practice of the above requires a machine for cutting the product rolls from the long work rolls of toilet paper, and which works at high production speeds and in an accurate manner. Therefore, another object of the present invention is to provide such a machine. This machine may have advantages for use in other industries than the one for which it has been specifically designed and this should be kept in mind in considering the following disclosure and claims.

The accompanying drawings illustrate the machine as it has been specifically designed for the purpose described. This machine represents what is now considered the best form of the invention. In these drawings the various figures are as follows:

Fig. 1 is a side view of the machine showing a support and feeder for the paper work roll and a relatively high speed endless band knife at the right hand or front end of the support and feeder;

Fig. 2 shows the details of wedges that are positioned at the back of the band knife at a position vertically aligned with the front end of the support and feeder;

Fig. 3 is a cross section taken from the line 3—3 in Fig. 2;

Fig. 4 shows the side of the support and feeder opposite its side shown by Fig. 1;

Fig. 5 is a front end view of Fig. 4;

Fig. 6 shows the end of the machine opposite the support and feeder;

Fig. 7 is a top view of the front end portion of the support and feeder shown in Fig. 1;

Fig. 8 is a side view of Fig. 7;

Fig. 9 is a cross section taken from the line 9—9 in Fig. 8, and

Fig. 10 is a cross section taken from the line 10—10 in Fig. 8.

The support and feeder is for the long work roll of toilet paper which is rolled on the long paper roll center with the paper strip length equaling that of the ultimate product length but with its width equaling that of the mill roll. It includes a long horizontal shaft 1 that is radially fixed by being journaled at axially spaced locations by rotary bearings 2 positioned by standards

3 which are fixed to the plant floor or to a separate base, if desired.

Upstanding levers 4 and 5 are fixed to the opposite ends of the shaft 1 at right angles thereto and parallel relative each other, and the tops of these levers carry a long flat horizontal support 6 for the long work roll of mill width toilet paper. This support 6 is made slightly longer than the work roll. It is relatively narrow because the long work roll has only the diameter of the finished product rolls of toilet paper. The support 6 including its levers 4 and 5 and the shaft 1 may be swung back and forth about the latter's axis whereby the levers and support are transversely reciprocative.

The front end of the support 6 carries elongated flexible belts 7 positioned in vertical planes by being looped over spaced end rollers 8 and 9 which are vertically journaled on the front end portion of the support 6. The opposing peripheries of these four rollers are rectangularly arranged to provide opposed straight belt spans that are parallel and extend longitudinally of the support 6 so as to grip the diametric sides of the work roll. A plurality of back-up rollers 10 support the straight belt loop spans which grip the roll, and looping rollers 11 are positioned near the rollers 9 to engage the outsides of the belts and loop the belts around more than 180° of these rollers to enhance the belt friction between the belts and these rollers 9.

The rollers 8, 10 and 11 may be journaled by vertical cantilever shafts 8a, 10a and 11a but the rollers 9 at the front end of the feeder are journaled by continuous shafts 9a, the upper ends of the latter being supported by arms 12. These shafts 9a are keyed to the rollers 9 and the lower ends of the shafts 9a may be rotated by right angle gearing 13 interconnecting them with a common horizontal driveshaft 14. Since both shafts 9a are thus rotatively interconnected, synchronous operation of the two belts 7 is obtained.

This feeding arrangement is particularly well illustrated by Fig. 9 which shows the work roll R on the paper roll center RC engaged and slightly flattened by the two parallel work engaging spans of the belts 7. That is to say these loop spans are spaced together a little less than the diameter of the work they engage whereby the paper roll is compressed somewhat as represented. Thus the two belts 7 have good frictional engagement with the paper roll.

In addition to the above feeding arrangement for the rolls placed on the support 6, the bottom of this support is shown with a horizontal belt 15 running its full length. The front end of this belt 15 is looped over a roller 16 keyed to the shaft 14 while the rear end is carried by an idler roller 17 at the back end of the support 6. This belt 15 provides an additional frictional drive for the bottom of the roll and reduces the work required to be done by the belt 7. Upstanding work roll guides 18 extend from the rear or receiving ends of the belts 7 back along the complete length of the support 6. These guides serve to position the paper roll transversely of the support 6 throughout the roll portions not engaged by the relatively shorter feeding belts 7 at the front end.

A rotary electric motor 19 connected with a reduction gear drive 20 are both mounted by standards 3a beneath the front end portion of the support and feeder. The upstanding lever 5 is provided with a longitudinal crosshead guideway 21 guiding a crosshead 22 journaled on a crankpin 23 of a disk crank 24 keyed to the front

end of the reduction geared driveshaft 25 extending from the reduction gear drive 20. This driveshaft is parallel to and spaced above the shaft 1.

The motor 19 works through the reduction gear so that the driveshaft 25 revolves relatively slowly, as for example around sixty R. P. M. As it revolves it oscillates the lever 5 through the action of the lever's crosshead guideway 21 and the crosshead 22 driven by the crankpin 23 of the disk crank 24 fixed to the reduction geared driveshaft of the motor 19. Both the levers 4 and 5 are firmly fixed to the shaft 1 and the latter is of large diameter so the levers 4 and 5 reciprocate in synchronism without undue flexure of the various parts. Therefore the support 6 reciprocates transversely at a relatively rapid rate.

The disk crank 24 has a periphery providing a cam 26. The lever 5 has a short transverse arm 5a projecting outwardly from it and a lever 27 is pivoted to this arm 5a at 28. This lever is positioned adjacent the periphery of the rotary plate cam 26 and journals a follower 29 for the periphery of this cam 26. The plate cam 26 is shaped and oriented relative the crankpin 23 so that as the latter swings the lever 5 to the left, as viewed in Fig. 5, the cam engages the follower 29 to momentarily thrust down the lever 27 during the interval the lever 5 is near and at the reciprocation limit in the left hand direction noted.

A sprocket chain 30 connects with and extends upwardly from the free end of the lever 27, loops around a sprocket 31 journaled at 32 to the lever 5, and then horizontally and reversely loops around a sprocket 33 journaled on the horizontal shaft 14 and then extends backwardly of the support 6 and connects with a block 34 which connects with one end of a helical tension spring 35 which then extends horizontally back along the support 6 with its free end anchored to the latter at 36. This tension spring 35 is designed to keep the sprocket chain 30 elastically biased against the urge of the lever 27 carrying the follower 29 working against the spring bias on the periphery of the plate cam 26. Each time the lever 5 reciprocates closely to its reciprocating limit previously mentioned the cam forces down the follower 29 so as to pull down on the chain 30 and thus reciprocate the sprocket 33 journaled on the shaft 14. This functions to provide an intermittent drive for the shaft 14 synchronized as indicated. This drive is effected by the shaft 14 carrying a ratchet wheel 37 keyed to it adjacent the sprocket wheel 33 with the latter carrying a radial arm 38 supporting a panel 39 engaging the ratchet periphery of the ratchet wheel 37.

The cam 26 is proportioned so that the feeding action slightly exceeds that required to feed forward an exact ultimate product length of the long toilet paper work roll. An abutment presently described is provided for engaging and stopping the end of the work roll when the exact length desired is fed beyond the end of the support 6 so it overhangs the latter, the various feeding belts slipping slightly respecting the roll of paper. That is to say, the arrangement is such that the belts 7 and 15 rotate forwardly at each feeding action a linear distance greater than the length of the ultimate toilet paper roll product with the long work roll advancing end engaging an abutment, the various belts then overdriving or slipping on the paper roll.

As the paper roll is thus fed forwardly intermittently and while the support is near or at its noted reciprocation limit, the front or over-

5

6

hanging end of the feeding roll is projected into the jaws 40 of a releasable clamp. These jaws are pivoted on a horizontal shaft 41 fixed to the front end of the support 6 and extending longitudinally from the latter so that the jaws 40 swing transversely respecting the paper roll work. The jaws 40 are mechanically force biased to closed or clamping positions by having oppositely extending crossed operating levers 42 with their ends interconnected by a helical tension spring 43. These levers 42 may be strutted apart by a toggle 44 which may be cocked slightly beyond its dead center position to hold the jaws open and which permits the latter to snap shut when the toggle is tripped toward the pivot shaft 41.

Operation of the above jaw assembly is effected automatically. This is done by having the swinging pivot 45 of the toggle 44 engaged by the swinging end of a horizontal lever 46 fixed to a vertical rotary shaft 47 that is journaled by the support 6 near its front end. When this lever 46 is swung backwardly the toggle 44 is cocked to hold the jaws 40 open and when the lever 46 is moved forwardly slightly it trips the toggle 44 so it snaps open and permits the jaws 40 to snap shut or to clamping positions.

Jaw opening or cocking motion of the toggle 44 is effected by having the lever 46 pivoted to a tension rod 48 extending transversely from it and with its end adapted for engagement with an abutment 49 that is fixed relative the reciprocation of the support 6. This is done by providing the rod 48 with a nut 50 and a compression buffer spring 51 between it and the abutment 49. The rod 48 slides freely through the abutment 49 excepting for the engagement noted, so when the support 6 is reciprocating toward the fixed abutment 49 no moving force is applied the lever 46. But the proportion of the rod 48 is such that on opposite reciprocation of the support 6 towards its reciprocation limit opposite that where the feeding action occurs, the motion of the rod 48 is halted by the abutment 49 so that as the support continues a slight forward motion towards the noted reciprocation limit the lever 46 is stopped and thus swung relative the support 6 so as to close or cock the toggle 44 and open the jaws 40.

Closing of the jaws 40 is effected by a lever 52 fixed to the bottom end of the vertical shaft 47 which swings the lever 46. The levers 46 and 52 are fixed to the shaft 47 in the sense that the two levers must swing relative each other synchronously. This lever 52 is provided with an abutment 53 on its swinging end and which is engaged by an adjustable bumper 54 carried by the block 34 fixed to the upper end of the sprocket chain 30 which powers the feeding device. The association is such that as the sprocket chain 30 reaches the end of its work feeding motion the bumper 54 engages the abutment 53, turns the shaft 47 and thus swings the lever 46 so as to kick the toggle 44 from its cocked position so that the compression spring 43 operates to snap the jaws 40 closed on the overhanging end portion of the paper roll that has just been fed forwardly.

Cutting of the paper roll is effected by an endless band knife 55 that is looped over the peripheries of two large wheels 56 that are vertically positioned by a housing 57 so that the band knife 55 travels vertically by the front or feeding end of the support and feeder 6. The sharp or front edge of the band knife 55 points in the reciprocating direction of the support and feeder 6 and

is located approximately intermediate the latter's reciprocating limits. The knife edge points against the direction the feeder swings immediately after each feeding operation.

The various parts of the machine should be positioned and timed so that the paper roll is fed forwardly in the manner described and its overhanging fed end then promptly clamped by the jaws 40, all while the reciprocating support 6 is out of alignment with the band knife sufficiently to permit the feeding to be completed without striking the band knife. Immediately thereafter the reciprocating support 6 swings the paper roll against the cutting knife 55 and far enough beyond its back to sever the feed or overhanging end, and promptly after cutting is finished the jaws 40 are pulled open in the manner previously described so that the cut roll of toilet paper in its final product length is freed and discharged. There is clearance for the knife between the clamp and support end as shown by Fig. 7. As that reciprocating limit is reached the support 6 starts to return rapidly with the motion throwing the product from the jaws 40. In the interest of operational certainty the jaws 40 are provided with a knockout lever 58 that is pivoted to one of the jaws at 59 so that when it swings outwardly it knocks out the paper roll product. Knockout operation is effected by using a helical tension spring 60 for holding the knockout retracted and by providing the knockout lever with an operating bent lever 61 adapted to be engaged by a fixed abutment 62 preferably buffered by being slidably mounted and provided with a helical compression spring 63 between its head and the fixed support which mounts it. This fixed support 64 may be positioned by the frame 57 which, of course, is stationary and does not reciprocate. The parts should be arranged so that the knockout 58 operates just prior to arriving at the reciprocating limit, with the jaws 40 timed to open just previously to the operation of the knockout.

The abutment for stopping overfeeding of the advancing end of the toilet paper work roll is shown at 65 as comprising a smoothly finished plate arranged transversely to the advancing end of the work roll and adjustably positioned relative the end of the support 6 by a bracket 66 supported by the band knife frame 57. This abutment 65 is located at the reciprocation limit where work feeding occurs and is smoothly finished to permit relative transverse motion of the advancing work roll without damaging the latter. With the smooth finish there is little chance for this since the work need not be made to jam too hard against the abutment, the various feeding belts frictionally slipping relative the work roll enough to prevent building up very much driving force and the amount of overfeeding being only adequate to obtain accurate results.

Adjustment of the support 65 permits some adjustment of the exact product roll length desired but if material adjustment is needed it is considered preferable to use a different cam 26 with a different riser 26a or to change the mechanical advantage of the various parts. But the adjustability of the support 65 which permits slight adjustment of the plate or abutment 65 is very advantageous in effecting exact adjustment of the product length desired.

Deflection of the band knife 55 during the transverse cutting is prevented by the use of back-up rollers 67 which engage the back of the band knife 55 above and below its cutting span

to positively prevent displacement of the band knife. These back-up rollers span the reciprocating path of the work roll and rigidly provide the reaction for the cutting force. These back-up rollers 67 are shown carried by horizontal shafts 68 mounted by the frame 57. They span the reciprocative path of the feeder and work roll.

Suitably shaped abrasive wheels 69 engage the opposite sides of the band knife front or sharp edge so as to continually sharpen it. These abrasive wheels 69 are shown journaled by blocks 70 suspended as pendulums by levers 75 from the top of the frame 57 with the levers 75 slightly deflected from the vertical by the wheels 69 resting on the knife edges and with the blocks 70 providing weight for forcing the wheel 69 against the opposite sides of the knife edge. A very nice adjustment of the sharpening pressure used may be obtained by the use of the helical tension springs 72 shown lightly biasing each lower end of each of the pendulum levers 71 away from the direction they swing by gravity. Adjustment of these springs either by adjusting the positions of their anchored ends or by substituting springs providing different forces permits a nice adjustment of the sharpening pressure.

Although the feeding belts 7 nip a substantial amount of the front end of the work roll during the feeding operation and thus in conjunction with the clamping jaws 40 steady the roll during cutting to assure an exactly right angular cut, there is some chance for inaccurate cutting as the very last end of the work roll is reached so that perhaps only an inch or so of its length is engaged by the belts 7. This trouble may be avoided by forwarding a succeeding long work roll of the toilet paper directly behind the advancing roll so that the advancing end of the former abuts or jams against the trailing end of the remnant. The over travel of the belts 7 in conjunction with the stopping of the remnants advancing end by the abutment 65 aids in this jamming effect.

As shown by Fig. 1 a feeler 73 is arranged to project up through the support 6 by way of a suitable slot offset from the long horizontal belt 15. Deflection of this feeler is effected by the toilet paper rolls, and by positioning the feeler at or near the entrance of the channel formed by the two belts 7 it becomes possible to stop the motor 19 by placing a relay in its power circuit and using a pilot circuit for this relay and controlled by a limit switch 74 worked by the feeler. The circuit details are not illustrated because conventional arrangement may be used. But the location and use of the feeler 73 in the present machine is considered new. This feeler is illustrated as a two arm lever fulcrumed at 75 with one arm formed upwardly for engagement and depression by the work rolls of paper and which is located in their traveling path over the support 6 and at a location adjacent the back ends of the feeding belts 7. The other arm of this lever is bent downwardly and provided with a counterweight 76 for biasing its first mentioned end upwardly, and this other or weighted end of the lever works the operator of the limit switch 74. Preferably this limit switch 74 is of the so-called micro-limit switch type requiring very little operating force so that the feeler 73 may be lightly made and rather lightly biased to its operative position. Thus material interference with the travel of the work rolls is avoided.

With the above arrangement, whenever the

person in charge of the machine fails to place a succeeding roll for closely trailing after a preceding roll, the motor 19 is de-energized as the trailing end of the preceding roll leaves the feeler 73 so that the upturned end of the latter rises under the urge of the counterweight 76. Operation restarts immediately upon another roll being placed in position to again depress the feeler.

As shown by Figs. 2 and 3 a set of parallel, laterally aligned pin wedges 77 are positioned by a support 77a fixed to the band knife frame 57. These pin wedges 77 are positioned parallel the back or dull edge of the band knife 55 with their pointed or wedge ends pointing towards the band knife's back and quite close thereto. The pointed edges of the wedge pins should be as close as is possible without engagement with the back of the band knife. These wedge elements are located between the back up rollers 67 and so as to be in the reciprocating path of the toilet paper work roll as it is reciprocated by the reciprocating support and feeder 6. These wedge elements function to wedge the cut edge portion of the roll from the supply portion so as to supply cutting relief for the band knife 55 by preventing pinching of the latter by the severed paper roll sections.

The band knife 55 may be powered by a suitable electric motor 78 working through a belt drive 79 powering the bottom one of the band knife wheels 53. The motor should be capable of driving the band knife at a linear speed high enough to cleanly sever the paper roll in spite of the latter's high cutting speed rate resulting from the relatively rapid reciprocating rate of the support and feeder.

With the machine constructed as described so far some waste may be caused by the uncontrolled cutting action. If the long roll of the paper is simply placed in the machine, the first short roll cut off is of full product length but must be discarded because one of its ends is untrimmed, and more may be cut from the trailing end of the long roll than is necessary for trimming purposes. The same thing may happen as succeeding rolls are fed into the machine. Using long rolls of toilet paper of 68½" length, only 14 product rolls 4½" long are obtained by the uncontrolled cutting action. It should be possible to get 15 of these 4½" long rolls from the 68½" long roll and still leave ½" at each end for trimming. The following features are incorporated so that the full possible 15 rolls are automatically obtained in the case of the specific instance described. The same principles may be used regardless of the lengths involved.

The lever 27 that reciprocates the chain 30 is provided with an oppositely extending relatively short lever 80 which moves with the lever 27. The levers 27 and 28 form a two-armed lever pivoted at 28. The short lever arm 80 is pivoted to a connecting rod 81 that extends upwardly along the arm 5 to a reciprocating latch member 82 guided on the upper portion of the arm 5. This latch member 82 is thus reciprocated by the lever 27 continuously.

A latch lever 83 is pivoted to the lever 5 at 84 below the latch member 82 and so as to extend theretowards. This latch lever 83 has a latch end 85 biased by a tension spring 86 to latch beneath the latch member 82 and it is held away from its latching position by a cam follower 87 which rides on the periphery of a rotary cam 88 journaled at 89 to the lever 5.

This cam 88 has a re-entrant portion 90 into which the follower 87 drops when the cam 88 is properly indexed and when this occurs the latch end 85 latches beneath the latch member 82. This action prevents full return of the lever 27 to its normal upper extreme as the cam 26 turns to permit this and it therefore shortens the stroke of the chain 30 and hence shortens the feeding action of the various feeding belts previously described and which frictionally engage the paper roll in the feeder.

Indexing of the cam 88 is effected by it being driven by a ratchet wheel 91 positioned for engagement by a pawl 92 carried by the crosshead 22. Each time the crankpin 23 turns once the pawl 92 rises and rotates the cam 88 a distance determined by the number of the teeth of the ratchet wheel 91. The cam 88 is suitably restrained frictionally so that it stays in position after each indexing action. Depending on the number of the teeth of the ratchet wheel 91 the feeding action goes through a cycle of intermittent feeding moving the long work roll forwardly each time a distance equal to the length of product desired and with the cycle terminating or starting by a shorter distance feeding as the re-entrant portion 90 permits the cam follower 87 to be released enough for the latching end 85 of the latch lever 83 to latch beneath the latching member 82 and effect the shorter stroke of the chain 30.

In the case of the paper work rolls and product rolls of the lengths specifically exemplified 16 teeth are provided on the ratchet wheel 91. This permits 15 normal feeding actions and a 16th short or trimming feeding action. Therefore each advancing end of each long paper roll is trimmed off by a short cut the length of which is determined by the amount the return of the chain 30 is limited.

In commercial work it is impractical to make all of the long work rolls of exact length so it is desirable to vary the length trimmed off. Therefore, a horizontal slide bar 93 slides beneath the working top of the feeder in guide-ways 94. The back end of this bar 93 has an adjustably positioned upstanding abutment 95 which may be pushed with the bar against the back end of the long paper rolls as they are placed on the feeder with their front ends contacting the back ends of preceding rolls. The front end of the bar 93 supports a forwardly projecting wedge bar 96 that is pivoted to the bar 93 at 97 to swing vertically and is biased upwardly by a tension spring 98. The wedge front of this bar 96 rides beneath the latch member 82 and swings up and down as the latter reciprocates. The latch end 85 of the latching lever 83 is adapted to snap beneath this wedge bar 96 whereby the latter adjusts the length of the short trimming stroke depending on the longitudinal position of the wedge bar and hence its effective thickness. The further forward the wedge bar is the more it restricts the return stroke of the chain 30 and the farther back it is the less it restricts this return.

The machine is set by moving the slide bar 93 back and forth while measuring the feeding distance obtained during the trimming feed. With the toilet paper long rolls described this distance is about 2" because the paper centers RC project somewhat beyond the end of the rolls. Then the abutment is adjusted on the bar 93 so that when the front end of a long roll of perfect length engages the rear end of a preceding roll located

where its release of the feeler 73 has stopped it, this abutment will engage the back end of the roll of perfect length. The opposing ends of the roll centers will interengage but the abutment is designed to engage only the rolled paper. A screw 95a is used to lock the abutment to the bar 93 in its proper position.

In the illustrated machine each preceding roll clears the feeler 73 and stops when 4 more cuts are needed to finish the cutting into all the product rolls. With the machine set as described, the attendant next places a new long roll in the feeder and pushes it forwardly while pushing the abutment 95 with it until this roll's front end engages the back end of the preceding roll and also the feeler 73 so as to start the feeder. This is done quickly so that the abutment 95 is properly positioned before the feeding starts to move the preceding roll. If the newly placed roll is also of perfect length this will return the wedge bar to its originally selected position, but it will not do this otherwise. If the new roll is a little short the wedge bar 96 will move further forwardly and will cause a shorter trimming feed and if this roll is a little long the opposite will occur.

As soon as the feeler is depressed the feeder again starts and completes the last 4 of its normal feeding movements, whereupon the cam 88 indexes its re-entrant portion 90 with the follower 87 so that the short trimming feed occurs and trims the front end of the new roll, after which the feeder feeds with the first 11 of its fifteen normal feedings and the feeder stops ready to go through another cycle when another new long roll is placed in it.

I claim:

1. A machine for cutting long work into short products and including a cutting tool, a transversely reciprocating work support having a front end reciprocating transversely beyond the front and back of said tool and adjacent the latter, and an intermittently operating feeder provided with long work engaging means having an endless unidirectional path of travel at all times relative to said support for intermittently feeding the long work longitudinally forwardly on said support and synchronized respecting the latter for feeding action only when said support is in front of said tool, whereby to successively thrust short work lengths over said support end for cutting into short products by reciprocation with said support and against said tool.

2. A machine as defined by claim 1 with said support carrying a clamp beyond its front end with clearance therebetween for said cutting tool and with said clamp provided with an automatic operator synchronized with said support and said feeder to close at the end of said feeding action and open when said support approaches its reciprocation limit back of said tool.

3. A machine as defined by claim 1 with said support carrying a clamp beyond its front end with clearance therebetween for said cutting tool and with said clamp provided with an automatic operator synchronized with said support and said feeder to close at the end of said feeding action and open when said support approaches its reciprocation limit back of said tool, with said clamp having a work knock-out automatically operating upon opening of said clamp.

4. In a machine for cutting a relatively long mill roll of tissue paper into relatively short rolls, successively, a cutting tool for severing said short

rolls from said mill roll and having a definite cutting path, a transversely reciprocating mill roll support for movement through and out of said path to effect severance of a mill roll carried by said support into said short rolls, said support having an intermittently operated feeder provided with long mill roll engaging means having an endless unidirectional path of travel at all times relative to said support for feeding said mill roll longitudinally of said support and towards said cutting path and being effective to position the leading end section of said mill roll a sufficient distance beyond said cutting path to constitute a short roll for severance from said mill roll by said tool upon movement of said support through said cutting path, said feeder being synchronized relative to the reciprocation of said support to confine said feeding of said mill roll to a period solely when said support is out of said cutting path, whereby, to preclude engagement of said tool with said mill roll during said feeding and movement of said feeder relative to said mill roll during said severance.

5. A machine as defined by claim 1 with said feeder including feeding surfaces frictionally engaging the work's side and moving a distance greater than the desired feeding distance at each feeding action and with a fixed abutment for the advancing work end to limit the work feeding distance to that desired and adapted for transverse sliding action between it and said work end, said feeding surface being long enough to engage simultaneously the trailing and advancing ends of successive pieces of work to steady the front piece as it shortens by said two ends pressing together.

6. A machine as defined by claim 1 with said feeder including feeding surfaces frictionally engaging the work's side and moving a distance greater than the desired feeding distance at each feeding action and with a fixed abutment for the advancing work end to limit the work feeding distance to that desired and adapted for transverse sliding action between it and said work end, said feeding surface being long enough to engage simultaneously the trailing and advancing ends of successive pieces of work to steady the front piece as it shortens by said two ends pressing together, said feeder having a controlling limit switch adapted to stop its feeding action and with an operator projecting into the path of the work feeding on said support and adapted for operation by work at a position at the front of said feeding surfaces, whereby to stop said feeding action when there is no work piece following a piece engaged by said feeding surfaces.

7. A machine for reciprocating and intermittently feeding work, said machine including a lever having a work support on its swinging end and a rotary work feeder for engaging and feeding work on said support, a rotary driveshaft spaced from said work feeder and connecting with said lever through a mechanical movement converting rotary to reciprocatory motion, a rotary cam turned by said driveshaft a lever transversely pivoted to said support lever with a follower for said cam connected therewith, said cam being contoured and oriented respecting said movement to engage said follower when said lever is at a reciprocation limit, a ratchet wheel geared to said feeder, a swinging pawl for said ratchet, a chain connecting said swinging pawl with said follower lever, and means for mechanically biasing said pawl to swing reversely from the direction said chain swings it.

8. A machine as defined by claim 7 with said support equipped at its front end with a work clamp having open and closed positions and spring biased to one position and moved to its other position by a toggle adapted to hold it there when this toggle is closed, and with a member fixed to said toggle and connected to a stationary anchor to pull closed said toggle when said support moves away from said anchor, and with an actuator for breaking open said toggle and actuated by said chain.

9. A feeder for longitudinally feeding rolls of soft paper and including laterally spaced belts having oppositely spaced straight sections arranged substantially parallel for frictionally engaging the opposite sides of said rolls, and with means for driving said belts so said sections travel in the same direction, said belts carried by a transversely reciprocating support and with said means synchronized with said support's motion for operation only when near one of the reciprocation limits thereof.

10. A machine as defined by claim 1 with said feeder having means for controlling its feeding to a shorter trimming distance after predetermined successions of normal feedings.

11. A machine as defined by claim 1 with said feeder adapted to feed a shorter trimming distance after predetermined successions of normal feedings, and with an adjuster for controlling the extent of said distance and a controller for engaging the long work at its rear end when said work is first placed in said feeder and with said controller adapted to adjust said adjuster.

12. A machine for cutting long work into short products and comprising a feeder operating intermittently for longitudinally feeding said work intermittently and a cutter for intermittently cutting the work after each feeding thereof by said feeder, the latter having a control adapted to cause it to feed through cycles of intermittent feedings terminated by a shorter trimming feeding for the advancing ends of succeeding work pieces.

13. A machine as defined by claim 12 with said control including an adjuster for varying its trimming feeding distance and a device for operating said adjuster variously depending on the position of said device and with the latter adapted to contact the backs of uncut work pieces when they are placed in the machine.

14. A machine for cutting long rolls of wide strip into short rolls of narrow strip and including, in combination, a feeder for longitudinally feeding the long rolls, means for intermittently actuating said feeder through cycles of a predetermined number of feeding distances with interposed shorter feedings, said means including an adjustable regulator for said shorter feedings, a control for stopping the action of said means and responsive to an operator positioned in the path of said long rolls in said feeder to stop said means when not engaged by a long roll in said feeder, an adjuster for said regulator, a device for adjusting said adjuster and including a part for engaging the back end of a long roll in said feeder with its front end engaging the back end of a partially fed long roll in front of it in said feeder with said part gauging the adjustment, and means for transversely cutting the long rolls at a fixed station at the front of said feeder.

15. A machine as defined by claim 1 including, fixed bearing means, a yoke provided with rela-

13

tively fixed upstanding levers having their upper ends connected to said support and their lower ends pivoted to said bearing means, an eccentrically operated mechanism connected with at least one of said levers and effective for rocking said yoke and thus oscillate said support relative to said tool.

NICHOLAS MARCALUS.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
Re. 20,711	Connelly	May 3, 1938

Number

556,857	
871,828	
968,134	
1,088,573	5
1,537,344	
1,832,424	
1,897,541	
2,022,799	
2,326,536	10
2,367,310	

14

Name

Date

Madden	Mar. 24, 1896
Sexton	Nov. 26, 1907
Davis	Aug. 23, 1910
Heldmann	Feb. 24, 1914
Giles	May 12, 1925
Rau	Nov. 17, 1931
Van Berkel	Feb. 14, 1933
Blosser et al.	Dec. 3, 1935
Hartsock et al.	Aug. 10, 1943
Pease	Jan. 16, 1945