

Dec. 19, 1961

J. K. MACOMBER

3,013,368

WRAPPING AND TEAR BANDING MACHINE

Original Filed Dec. 16, 1957

4 Sheets-Sheet 1

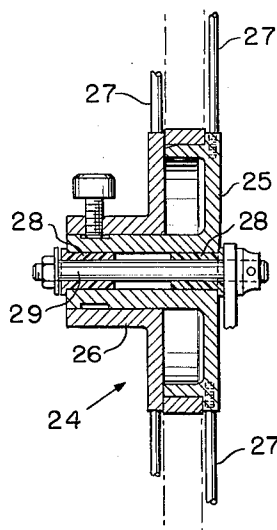
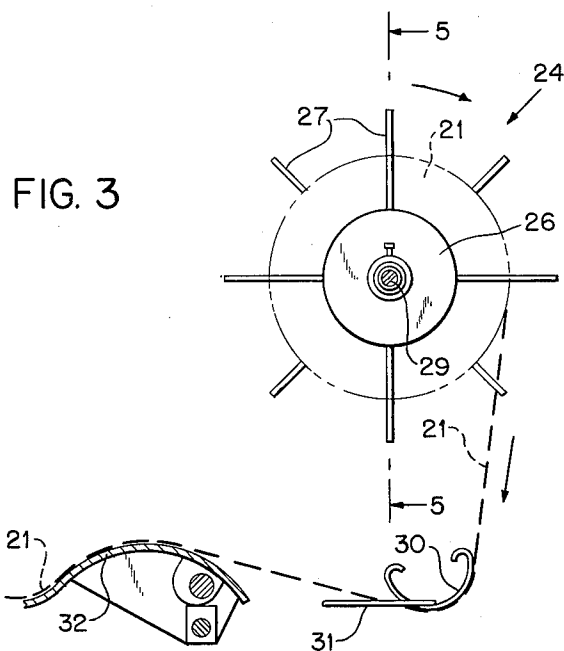


FIG. 5

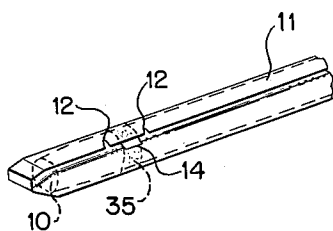


FIG. 1

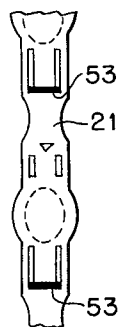


FIG. 2

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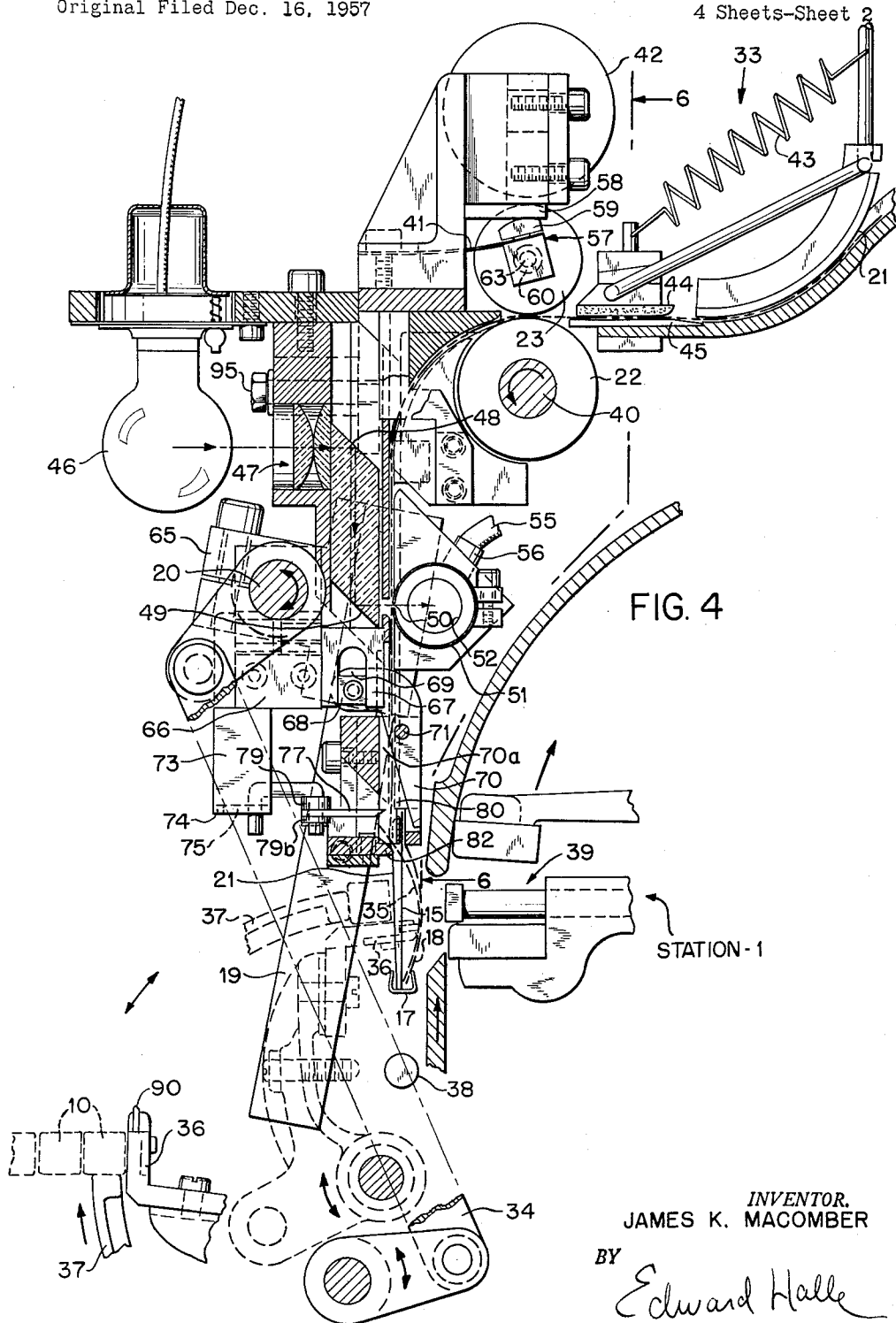
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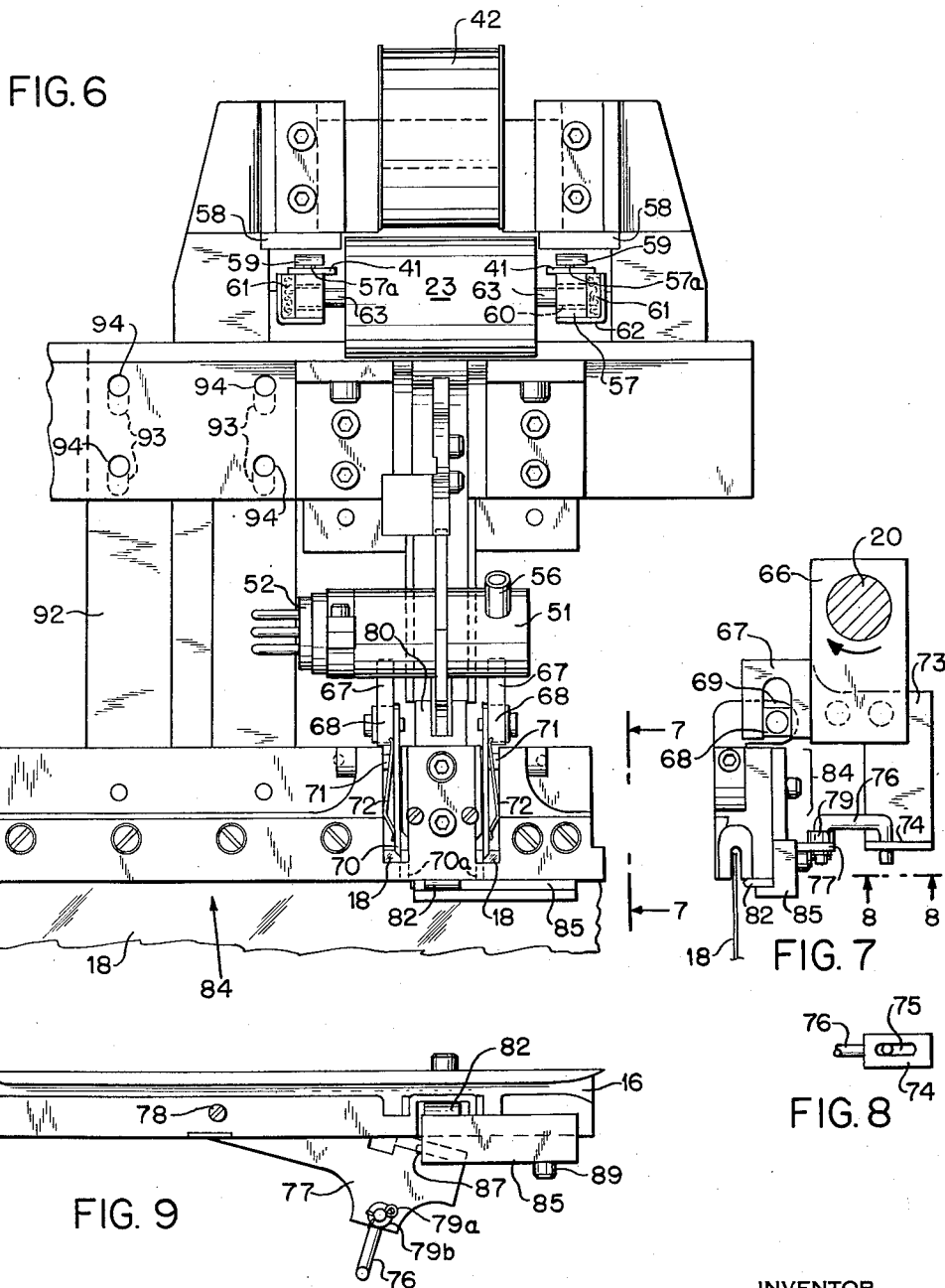
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WRAPPING AND TEAR BANDING MACHINE

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4 Sheets-Sheet 3



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WRAPPING AND TEAR BANDING MACHINE

Original Filed Dec. 16, 1957

4 Sheets-Sheet 4

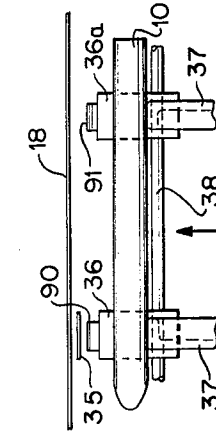
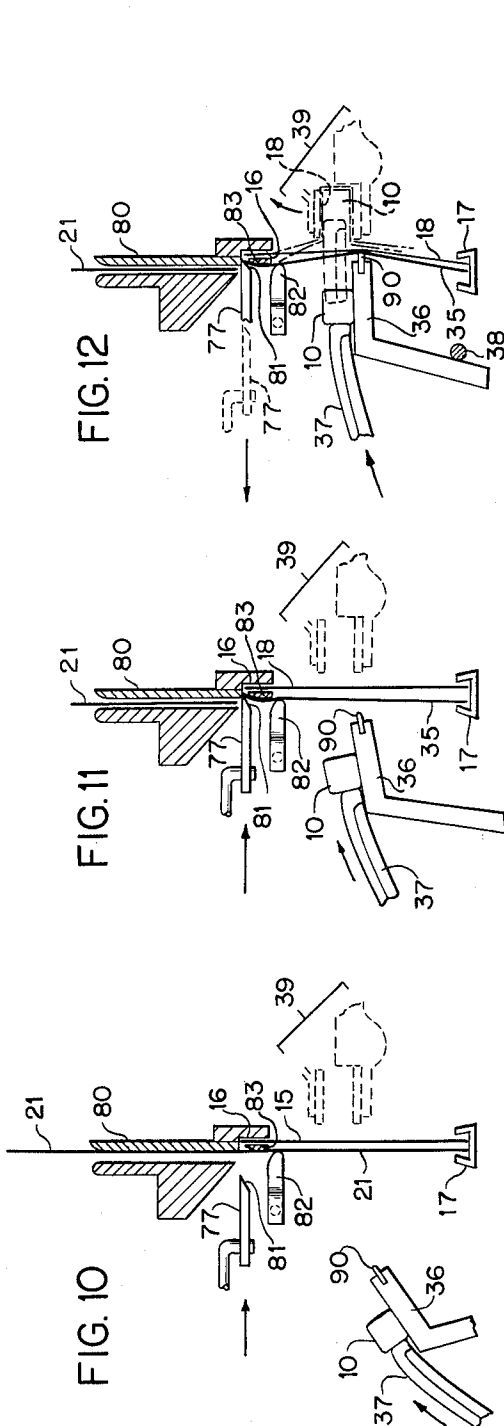


FIG. 13

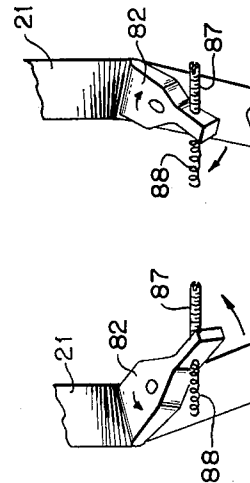


FIG. 16

FIG. 15

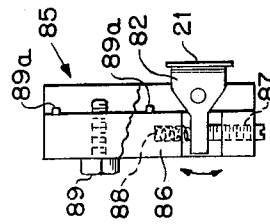


FIG. 14

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3,013,368

WRAPPING AND TEAR BANDING MACHINE

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Original application Dec. 16, 1957, Ser. No. 702,994.
Divided and this application Nov. 17, 1959, Ser. No. 853,613

17 Claims. (Cl. 53-14)

This invention relates to machines for wrapping cigars in cellophane packages, with a cigar label tear band adjacent to nicks or cuts in the wrapper to serve as an easy means of removing the wrapper and of identifying the cigar brand.

This application is a division of applicant's prior co-pending application Serial No. 702,994, filed December 16, 1957.

The main object of this invention is to provide positive means to hold and maintain the tear band in proper relative position to the cellophane wrapper after cutting and nicking and until both the band and the wrapper are pushed into the wrapping pocket of the machine at the first wrapping station.

This object is achieved by providing a friction point suspension for the cut tear band; and rubber and fiber pushing tips for the tear band and the cellophane wrapper respectively, as will be more fully described hereinbelow.

It is another object of my invention to provide an alignment adjustment for the tear band. Unless the band is properly aligned and held, prior to wrapping, it will curl transversely, or helically, within the wrapper around the cigar. I achieve this proper alignment by providing a pivoting edge in the friction point suspension which may be adjusted by means of a screw.

Another object is to provide an air puffer to keep the slit for the light path of the photoelectric system free of bits of debris and foreign matter. A further object is to provide for relatively easy adjustment of the nicking knives. Still another object is to provide an improved electromagnetically controlled roller means for the tear band ribbon feed. It is also an object to include a friction controlled supply reel for the tear bands. These objects and others, as well as their advantages, will appear below in the specification.

In the accompanying drawings,

FIGURE 1 is a perspective view of a cigar with one end cut away, wrapped in a transparent cellophane wrapper, with a tab of the tear band extending beyond the wrapper;

FIGURE 2 is a top plan view of a portion of the tear band ribbon 21;

FIGURE 3 is a side elevation of the tear band ribbon supply reel 24, and a suspended tension plate 30, around which the tear band ribbon 21 is guided.

FIGURE 4 is a partial cross section of the feed portion of my device through which the tear band ribbon and the web of cellophane are fed, cut, nicked, and folded into a pocket at the first station of the turret, and the tear band ribbon 21 shown at the upper right hand portion of FIGURE 4 is a continuation of the ribbon 21 shown at the lower lefthand portion of FIGURE 3;

FIGURE 5 is a cross section of the supply reel 24 as shown along the lines 5-5 in FIGURE 3;

FIGURE 6 is a partial rear elevation of portions of the feed mechanism of my device including the photoelectric tube casing 51 and adjustable assembly 84 as seen from the line 6-6 in FIGURE 4; but leaving out the drive roller;

FIGURE 7 is a side elevation as seen from the lines 7-7 in FIGURE 6, including a cross section of a cam

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operated oscillating shaft 20 and connections to the knives 70 and 77;

FIGURE 8 is a bottom plan view of the band cutting knife actuating arm and a portion of the link as seen from lines 8-8 of FIGURE 7;

FIGURE 9 is a bottom plan view of the lower portion of FIGURE 6;

FIGURE 10 is a partial cross section and side elevation showing the action of the band cutting knife 77 and its relation to the operating arm 36 and pusher 37;

FIGURE 11 is a view similar to FIGURE 10, showing the band cutting knife 77 and operating arm 36 and pusher 37 in different positions, and showing the band 35 cut and held between the bevel 81 of the knife 77, the backstop 83, and the band holder 82;

FIGURE 12 is a view similar to FIGURES 10 and 11, showing in solid line a more advanced stage of the operation in which the rubber tip 90 of the operating arm 36 has contacted the band 35 which then touches the wrapper blank 18, and in dotted line the view shows the final operation of pushing the cigar into the band and cellophane wrapper, and thence into the pocket 39 on station 1 of the turret.

FIGURE 13 is a top plan view of the operating arms and the rubber and fiber tips, just before they contact the band 35 and the wrapper blank 18, the arrows signifying the direction of operation at this point.

FIGURE 14 is a top plan view of the band holder showing the adjustment screw for pivoting same.

FIGURE 15 is a perspective view of the action of the band holder when it is pivoted in the direction of the arrow by the adjustment screw; and

FIGURE 16 is another perspective view making an adjustment by the band holder in the opposite direction to FIGURE 15.

Similar numerals refer to similar parts throughout the several views.

The basic wrapping machine may be of the type disclosed in Patent No. 1,964,411 granted June 26, 1934 on application of Robert Jacob Beutel. Although the mentioned patent discloses a cigar cellophaning machine with a six position turret, my improvements may be combined with a six position turret machine, a four position turret machine, or one with any desired number of turret positions. This is because my invention is concerned with operations prior to and during the step when the tear strip band and cellophane wrapper blank are pushed into the wrapping pocket at the first position of the turret.

In Beutel's device, a web of cellophane is intermittently fed laterally into the machine and cut, and then folded around the cigar in one of a number of folding pockets which take different stations in an intermittently rotating turret. The ends of the wrapper are tucked in and it is heat sealed around the cigar. Thus the cigar will be wrapped in a cellophane package heat sealed at the ends and along the longitudinal seam.

A charging device, comprising paired pushers and transfer arms, pushes the cigar into the cut cellophane blank and on into one of the said pockets, and the cellophane thereby is folded around three sides of the cigar.

Since the machine disclosed in the mentioned Patent No. 1,964,411 is used as the basic machine in the preferred form of my invention in combination with my new features, I will rely on the disclosure in the mentioned patent and incorporate same herein by reference as if fully set forth herein. The various components which I set forth herein as a part of my invention are attached to the main frame of a machine such as Beutel's. They may also be incorporated in combination, with other wrapping machines, such as disclosed in Patent No. 1,796,073 granted March 10, 1931 on application of said Robert

J. Beutel, and others, without departing from the spirit and principles of my invention.

Beutel's machine is merely a cigar wrapping machine. It does not band the cigar. I have provided means, as a part of my invention, to feed, cut, and hold cigar label tear bands transversely to the cellophane wrapper blank. I have also provided nicking knives to nick the cellophane blank. When the cigar is pushed against both the band and the cellophane, the three-sided fold is made as afore-said to include not only the wrapping blank but also a tear band with an end forming a tab between the nicks in the wrapper.

Thus, when the cigar 10 is wrapped, it will appear as in FIGURE 1 of the drawings, with a folded, heat sealed, cellophane wrapper 11, having tearing nicks 12, and a tear band 35. The end or tab of the tear band 35 should protrude slightly for ease in grasping and tearing.

In operation of the machine, a web of cellophane 15 is fed by intermittent drive into guide channels 16 and 17. A wrapping blank 18 of the proper size is cut off by a knife 19 which is operated by a cam actuated oscillating shaft 20, which is driven by a link 34 as shown, or may be driven from the main shaft of the machine, in any other manner.

A length of paper tear strip band ribbon 21 is fed transversely to the web 15 by means of rollers 22 and 23. A supply reel 24 holds a roll of the tear band ribbon. The reel 24 has a hub 25 and a hubcap 26, each of which has reel guides 27 to retain the roll of band ribbon 21 in place. The rolled band ribbon 21 is first placed on the hub 25 of the reel and held in place by the hubcap 26. The hub 25 has sintered bronze bushings 28 which act as bearings on the steel shaft 29.

The tear band ribbon 21 is fed under a thin curved steel tension plate 30 mounted on a springy wire 31 and is then fed over a ramp 32 through a braking mechanism 33, by and between the drive roller 22 and idler 23, and then down past a photoelectric tube casing 51. The tear band ribbon 21 is stopped when its end is adjacent to the lower edge of the web of cellophane 15.

The tear band ribbon 21 is composed of a printed series of individual labels or tear bands 35. Each printed tear band is approximately as long as the width of the web of cellophane 15. The band 35 is cut slightly above the upper edge of the cellophane 15.

The action of a photoelectric system stops the feeding of the tear band ribbon 21 by means of rollers 22 and 23 which will be described hereinbelow. The tear band 35 is then cut from the band ribbon 21. Simultaneously, the wrapping blank 18 is nicked adjacent to the position of the band 35 and a pair of operating arms 36 and 36a, and pushers 37 bring up the cigar 10. The operating arms 36 and 36a are spring held, as shown in Beutel, and are stopped by a stop rod 38. The pushers 37 continue to push the cigar 10 into the tear band 35 and the wrapping blank 18 and with them into a pocket 39 at station 1 of the turret. The pocket 39 then rotates to the various stations of the turret to complete the folding and heat sealing and then to deliver the banded cigar, wrapped in a tear band package.

The tear band ribbon 21 is drawn from the supply reel 24 by means of the action of a drive roller 22 and an idler 23. The drive roller 22 is affixed to a shaft 40 which is powered from the main drive of the wrapping machine and rotates intermittently. The idler roller 23 rotates only when it is impressed by means of flat steel springs 41 against the roller 22. The action of the drive roller 22 is intermittent; however, it will supply more tear band ribbon 21 than is required for an individual tear band 35 unless its feeding action is stopped when the proper amount is supplied. When it is desired to stop the movement of the ribbon 21, the roller 23 is lifted against the action of the springs 41 by means of an electromagnet 42. The pressure against the ribbon 21 and

the drive roller 22 is relieved and the forward movement ceases. It is essential that the movement stop almost instantaneously. A spring 43 operated felt brake 44 is provided to hold the ribbon 21 against a brake block 45. Thus, when the magnet 42 lifts the idler 23, the braking mechanism 33 (comprising elements 43, 44 and 45), which is always in operation, stops the movement in a minute fraction of an inch.

Thus, the tear band ribbon 21 is fed with an intermittent motion which alternately moves quickly and stops abruptly. This leads to excessive unreeling of the ribbon 21 if the reel 24 is permitted to rotate freely. On the other hand, the use of a usual type of mechanical reel brake adjusted for a full heavy roll of ribbon 21 would be unsatisfactory when the roll becomes lighter as it unreels and empties.

This problem has been somewhat compensated for in the past by the use of a power feed unreeling device which is stopped if the loop of the unreeling ribbon 21 should drop below a certain point as measured by an electric eye, for example. However, that system is both costly and undesirable because the parts are expensive and require constant maintenance.

I have found that by using the sintered bronze bushings 28 as a bearing on the fixed steel shaft 29, the reel 24 will pay out the tear band ribbon 21 at the proper rate. It will pay out the tear band ribbon 21 at the proper rate. It will supply sufficient tear band ribbon 21 for the intermittent action of the device, without overrunning the braking action.

The bushing 28 is not lubricated, and its friction resistance always is nearly proportional to the weight of the ribbon 21 remaining on the reel 24. There is greater frictional resistance for a full reel 24 than a nearly empty one.

The thin curved steel tension plate 30 and the springy wire 31 cooperate to translate the intermittent motion of the drive into a smooth, steady, continuous unreeling of the supply reel 24.

It is in almost all instances desirable to imprint the trademark or other identifying means on the outside of the cigar band. The ribbon passes over the brake block 45 with the printed, ink side, down. I have found that the constant pressure of the felt brake 44 causes the ink to smear a brake block 45 made of steel. I have experimented with other materials, and found that because of the friction involved, the ink would almost invariably smear and come off.

I have solved this problem by looking for a material which affords low friction resistance. I found such a material put out by Du Pont called Teflon. Teflon is a fluoro-carbon, against which there is very little friction. Hardly any other material will adhere to Teflon, and I have found that by using it as a brake block 45 there will be no ink smear. The ink remains on the tear band ribbon 21 in good order.

The action of raising and lowering the idler roller 23 is controlled by a photoelectric device as follows: There is a light source 46. The rays of light pass through a lens system 47, are reflected downward by the upper end 48 of a rhomboid prism, and are again reflected by the lower end 49 of the rhomboid prism, so that they travel through the path of the tear band ribbon 21 and then through a slit 50, into a photoelectric tube casing 51, at which point they are picked up by a photoelectric cell 52.

The bands 35 of the band ribbon 21 are printed in such fashion that at one point on each band 35 there is a heavy mark 53 which interrupts the path of light from the light source 46 to the photoelectric tube 52. A usual type of selector switch, not shown, is employed to make the photoelectric system sensitive just before the mark 53 arrives at the slit 50. When the mark 53 arrives at the slit 50, the action of a photoelectric cell 52 through a suitable electronic system, which is not shown, closes the

circuit of the electromagnet 42, thereby lifting the idler roller 23. The mark 53 is placed at the proper position on each band 35 so that the light rays between the light source 46 and the photoelectric tube 52 will be interrupted and the roller 23 lifted to stop the band ribbon 21 when a complete band 35 is in proper relation in the machine to the width of the web of cellophane 15.

I accomplish this by measuring the distance of the end of band ribbon 21 when it is in the desired position for cutting, from the slit 50, and I register each mark 53 a minute fraction of an inch below the point of meeting the slit 50. Thus, when the circuit of the magnet 42 is energized by the electronic system connected to the photoelectric tube 52, the band ribbon 21 is brought to a complete stop within the mentioned minute fraction of an inch. The band ribbon 21 is placed between the cigar 10 and the cellophane 15, with the printed side away from the cigar 10 and toward the cellophane 15.

I have not described the mentioned electronic system because any kind or type of relay or other electrical system may be used to close the circuit in the electromagnet 42 at a signal from the photoelectric tube 52. The only requirement is that the relay or other system be quick-acting and positive, since any breakdown of faulty operation will prevent the machine from functioning properly.

The slit 50 is .030 inch in width. In order to insure that bits of paper from the band strip and other particles of foreign matter will not clog the slit 50, a puffer is provided which blows a forceful stream of air through the opening of the slit 50. The puffer is not shown because any air puffer such as a piston and cylinder puffer may be used, which can be attached to the main drive of the wrapping machine. I provide a felt filter to keep out dirt, etc., and a ball check valve. The air is puffed through a tube 55 to an air port 56 in the phototube casing 51. Since the only air vents in the phototube casing 51 are the air port 56 and the slit 50, a puff of air into the port 56 will force air through the slit 50 and keep it clear of foreign matter.

The continuous quick lifting of the idler roller 23 places stress on its bearings 57. I have provided nylon strike pads 58 against which the bearing tops 59 strike. This not only prevents the roller 23 from actually striking and damaging the magnet 42, but also absorbs considerable shock resulting from the quick movement of the roller 23.

The bearings 57 include a nylon bushing 60, and are lubricated by permanently oiled, felt packings 61 held against them by clips 62. My construction of the bearings 57 provides for automatic self alignment of the roller 23 with the roller 22. I accomplish this by providing universal spring mountings for the bearings 57. The springs 41 are freely attached to the connecting portions 57a between the bearings 57 and the bearing tops 59. There is no play between the non-seizing nylon bushings 60 and the shaft extensions 63 of the roller 23.

This universal mounting of the bearings 57 provides for three relatively perpendicular degrees of rotational freedom of the roller shaft extensions 63. First the bearings 57 can turn in the springs 41. Second the springs 41 can twist through small angles. Third the shaft extensions 63 are free to rotate in the nylon bushings 60. Thus when the roller 23 is pressed down on to the ribbon 21 and on the roller 22 by the action of the springs 41, the rollers are automatically aligned with their axes parallel, without cramping and seizing of the bearings 57.

I have provided means for cutting the tear band ribbon 21 and cutting and nicking the cellophane 15, simultaneously, and have also provided means for holding the cut tear band 35 in position until it is folded around the cigar 10.

I shall first describe the cutting and nicking means, and then the means for holding the tear band 35 in place.

The shaft 20 has the knife holder 65 which holds the cellophane knife 19. Since the shaft 20 is an oscillating shaft, the cellophane knife 19 works back and forth and

cuts the web of cellophane 15 into wrapping blanks 18 at the proper time. The shaft 20 also has a pair of nicking knife actuating arms 66 which are connected to nicking knife yokes 67. The yokes 67 slideably engage square pivot blocks 68, which are pivoted to the L-shaped ends 69 of nicking knives 70. The nicking knives 70 are pivotably mounted on pins 71, and are retained in place by means of springs 72. The springs 72 are so positioned that one part of them is held by a pin 71 and the other end is brought to bear against the lower end of the nicking knife 70 to insure good cutting action in cooperation with the stationary nicking knives 70a. Inspection of FIGURE 7 of the drawings will show that if the oscillating shaft 20 moves in the direction of the arrow, the yoke 67 will travel up and out bringing with it the square block 68, lifting the L-shaped end 69 of the nicking knife 70, and pivoting the said knife 70 on the pin 71, causing it to move in toward the wrapping blank 18 and nicking same at the upper edge thereof. Since I have provided two nicking knives 70 in my device, two nicks will be made adjacent to each other, one being on each side of a cut tear band 35 as will be apparent from the specification.

One of the nicking knife actuating arms 66 has attached to it a band knife actuating arm 73. This arm 73 has an angle 74 at the bottom thereof which has a slot 75 into which the band knife link 76 is freely inserted. The bandknife 77 is pivoted on a pivot pin 78 and is swivelly connected to a band knife link 76. The band knife link 76 is maintained in position by a collar 79 fitted on the link 76 above the band knife 77 and a cotter pin 79a which holds a washer 79b in position on the link 76 beneath the band knife 77. There is also a stationary knife 80 which cooperates with the band cutting knife 77. The band knife 77 also has a spring-actuated means of holding it in proper alignment similar to the spring means 72 which are used on the nicking knives 70. Reference to FIGURES 7 and 8 of the drawings will show that when the oscillating shaft 20 moves in the direction of the arrow the band knife actuating arm 73 moves toward the band knife. The link 76 is within the control of the slot 75. However, the angle portion 74 of the band knife actuating arm 73 will not engage the link 76 until the end of the slot 75 actually touches the link 76. Thus, there is a degree of lost motion at this point between the ends of the slots 75 and the link 76. The importance of this will be discussed hereinbelow.

The movement of the band knife actuating arm continues after the link 76 is engaged, and causes the band knife 77 to move toward the tear band ribbon 21 and the stationary knife 80 until the end of the tear band ribbon 21 is cut to form a cut tear band 35.

At this stage of the operation of the machine the wrapping blank 18 is cut and nicked, and the tear band 35 has been cut off and is positioned between the nicks 12 in the wrapping blank 18. The machine is about to bring up the cigar 10 to be enfolded in these elements and placed in the turret pocket 39.

Since this is a mass production operation and the machine packages cigars at the rate of 85 to 100 per minute it is essential that the wrapper blank 18 and the tear band 35 be held in proper relative position prior to being folded into the turret pocket 39. Any change in position, relatively or otherwise, of either element 18 or 35, will cause the machine to make a defective package, which necessarily will have to be rejected. I mention this because I consider the means I have devised, as a part of my combination herein, to hold the cut tear band 35, to be an important advance in the art and a most essential part of my invention.

The wrapping blank 18 is held in place by the channel guides 16 and 17. This is old in the art and was the arrangement used by Beutel in his machine.

My novel means is for holding the cut tear band 35 in a friction point suspension comprising the beveled edge

81 of the band knife 77, a band holder 82, and a band holder backstop 83. The band knife 77 has a beveled edge 81. The beveled edge 81 and the edge of the band holder 82 act in conjunction to hold the cut tear band 35 against the opposing action of the band holder backstop 83. Thus, the cut tear band 35 is held lightly as if between three fingers, with two fingers on one side and one finger on the other. This is the situation shown in FIGURE 11 of the drawings.

The band knife 77, the bandholder 82, and the backstop 83 are all located on an adjustable assembly 84. The means of adjustment will be described hereinbelow.

The band holder 82 has its own sub-assembly 85. A top plan view of the band holder sub-assembly 85 is shown in detail in FIGURE 14. It is made out of a block 86. The band holder 82 is pivotally mounted, and may be pivotally adjusted in the direction of the double headed arrow by means of a screw 87 operating against the action of a spring 88. The entire sub-assembly 85 is attached to the adjustable assembly 84 by means of a screw 89 and is aligned by means of dowel pins 89a which fit into proper openings for them in the adjustable assembly 84. The action of the band holder pivotal adjustment will be explained hereinbelow.

The cut band 35, and the wrapper blank 18, are now to be pushed into the turret pocket 39 to enfold the cigar 10. I have found that unless new means are devised to maintain the cut tear band 35 and the wrapper blank 18 in proper position during this operation, they will not fold in correctly and a poor package will result. In other words, immediately after the wrapper blank 18 leaves the guide channels 16 and 17, and the cut tear band 35 leaves its position in the friction point suspension described above, there is a short interval of time before these materials are placed in the pocket 39 with the cigar. It is during this short interval that the relationship between the mentioned elements must be properly maintained.

The operation in the machine, during this interval, is carried out by the operating arms 36 and 36a, aided by a pair of pushers 37, carrying the cigar 10. The forward ends of the operating arms 36 and 36a will contact the cut band 35 and the wrapper blank 18, and start to push them toward the pocket 39 before the cigar 10 is pushed into them and into the pocket 39. This is shown in the two positions of FIGURE 12 of the drawings. FIGURE 13 of the drawings shows that the forward end of operating arm 36 will first contact the cut band 35, which in turn will contact the wrapper blank 18, whereas the forward end of operating arm 36a will only contact the wrapper blank 18, since there is no band 35 on that side.

I have found that in a wrapping machine such as Beutel's which is designed to push a cigar into a cellophane wrapping blank, without provision for a tear band 35, operating arms such as 36 and 36a, with metal forward ends, will operate satisfactorily. However, in my improvement, in which the tear band 35 is wrapped together with the nicked cellophane blank 18, I have found that operating arms with forward ends of the same material, such as metal, will not operate satisfactorily because paper has a different coefficient of friction against cellophane than does metal. If metal ends are pushed against the paper band 35 and the cellophane 18 there will be a difference of a small fraction of an inch in slippage as between the metal against the cellophane and the paper band 35 against the cellophane 18.

If rubber tips are provided for the ends of the operating arms 36 and 36a the one on operating arm 36 will hold the band 35 without apparent slippage and the one on operating arm 36a will hold the cellophane blank 18 without apparent slippage. The same will hold true if a suction device were used on the ends of each of the operating arms 36 and 36a for positive holding. However, in either case there will be sufficient slippage between the band 35 and the cellophane 18 to result in the machine wrapping commercially unacceptable packages. These packages will be

rejected because the overlap seam of the wrapping material 18 will slant and will not be parallel with the axis of the cigar 10.

It is necessary, therefore, to compensate for this by providing a tip such as a rubber tip 90 for the operating arm 36, and a tip such as a fiber tip 91 for operating arm 36a. The fiber tip 91 is designed to have the same coefficient of friction against the cellophane 18 as the band 35 will have. The rubber tip 90 is designed to hold the band 35 positively against the end of the operating arm 36 with no apparent slippage. The rubber tip 90 has a beveled edge which is provided to aid in preventing slippage when it contacts the band 35. A suction device may be substituted for the rubber tip 90 if desired.

I refer now to FIGURE 13 of the drawings, which shows these elements immediately before they contact. The pair of operating arms 36 and 36a are moved in the direction of the arrow. Thus, the rubber tip 90 contacts the band 35, and the fiber tip 91 contacts the cellophane 18. The rubber tip 90 will not slip on the paper. However, since the band 35 is between the rubber tip 90 and the cellophane 18, the band 35 will contact the cellophane 18.

The band 35 will be firmly held. The cellophane blank 18 will then be contacted by the paper tear band 35 and the fiber tip 91, having the same coefficient of friction. The cellophane blank 18 will therefore slip substantially the same fraction of an inch on both sides, and remain in the proper relative position for wrapping. If it were not for these matched elements, the cellophane blank 18 ordinarily would slip more on one side than the other and be out of alignment, as aforesaid. By providing for tips 90 and 91 of different materials, with one designed to hold positively against the band material and the other having a coefficient of friction against the wrapping material to match the coefficient of friction of the band material against the wrapping material, I have provided in my combination novel means of keeping the cigar 10, the tear band 35, and the wrapping blank 18 in proper relative position to be enfolded in the turret pocket 39.

It is conceivable that a cigar or other type of merchandise may be wrapped in a material other than cellophane, such as paper or foil; and have a tear band of some transparent material as disclosed in Patent No. 2,130,729 granted on application of H. A. Burns, September 20, 1938. The tear band may also be made of foil, or any other suitable material.

I do not desire to be limited to the preferred forms specifically shown and described herein such as a paper band 35 and a cellophane wrapping blank 18. Other materials, as indicated, may be used for wrapping and banding. The principles of my invention will however remain the same. The tip 90 of the operating arm 36 would in all cases be designed to hold the cut tear band positively and would therefore be of rubber, or its equivalent (synthetic or otherwise), or a suction device, or any other positive holding means. The tip 91 of the operating arm 36a would be made of a material having a coefficient of friction against the wrapping material matching the coefficient of friction of the band material against the wrapping material.

The friction point suspension described above comprising elements 81, 82 and 83 will work with foil, cellophane, and other materials or combination of same as well as paper.

My invention will also operate to band and package other products in addition to cigars. The machine may be used with any product which has a greater length than cross sectional dimension, such as fountain pens, candy bars and many others. It makes no difference whether the cross section of the product is round, square, or other shape. Having described the essential elements of my improved combination, I should like to explain the sequence of operation of cutting, nicking, holding and moving the wrapper blank 18 and the tear band 35 from

just prior to the cutting operation until they are finally folded into the turret pocket 39. For this purpose, I refer to FIGURES 10, 11 and 12 of the drawings.

In these figures, reference numeral 21 denotes the tear strip ribbon prior to cutting, and reference numeral 35 denotes the tear strip ribbon after it has been cut into an individual band. Likewise, reference numeral 15 denotes the cellophane while it is still part of the large web of cellophane as shown in Beutel, and reference numeral 18 denotes the cellophane after it has been cut into a wrapper blank 18. For example, in FIGURE 10, none of the mentioned elements has been cut; and therefore they are referred to by reference numerals 21 and 15. In FIGURE 11, the tear band 35 and wrapper blank 18 have already been cut, and therefore they are referred to by reference numerals 35 and 18. The same is true for FIGURE 12.

In operation, the oscillating shaft 20 moves in the direction of the arrow shown on FIGURE 7. This causes the cellophane knife 19, the nicking knives 70 and the band cutting knife 77 to move toward the web of cellophane 15 and the tear band ribbon 21. At the same time, the operating arms and the pushers 36 and 36a and 37 are pushing the cigar toward the banding and wrapping materials. The mentioned elements, with the exception of the nicking knives 70, the arm 36a and its pusher 37, are shown in FIGURE 10 of the drawings, in position immediately prior to cutting.

FIGURE 11 of the drawing shows these elements a fraction of a second later, immediately after the knives have completed all cutting operations and just before the operating arms 36 and 36a (not shown in FIGURE 11) contact the cut tear band 35 and the wrapping blank 18. At this stage, the cut tear band 35 is securely held by the friction point suspension formed by the beveled edge 81 of the band knife 77, the band holder 82, and the backstop 83.

Immediately thereafter, the rubber tip 90 contacts the cut band 35, draws it away from the beveled edge 81, and moves it toward the wrapper blank 18 until it comes in contact therewith. At the time of this contact, the fiber tip 91 (not shown in FIGURE 11), also contacts the wrapper blank 18, so that the paper tear band 35, pushed by the rubber tip 90, touches the cellophane blank 18 at the same time as the fiber tip 91.

This is the stage of operation shown in the solid lines of FIGURE 12, with the exception that the fiber tip 91 is not shown in the drawing, because it is a sectional view. Immediately thereafter, the pushers 37 push the cigar 10 into the tear band 35 and the wrapper blank 18, and thence into the pocket 39. The band 35 and blank 18 are pushed away from the tips 90 and 91, and are carried by the cigar 10 during this final stage of the operation, as shown by the dotted lines in FIGURE 12.

In the meantime, the oscillating shaft 20 has been moving in a direction opposite to the arrows shown on FIGURE 7, and all the knives, with the exception of the band cutting knife 77, have been moving away from their cutting positions. The band cutting knife 77 remains stationary for a fraction of a second because of the lost motion provided by the slot 75. It is necessary to keep the band cutting knife stationary and in place for a fraction of a second after it cuts the end of the tear band ribbon 21 into a cut tear band 35, to permit its beveled edge 81 to act as a friction point in the friction suspension described hereinabove. As soon as the rubber and fiber tips 90 and 91 take over, this is no longer necessary and the band knife 77 is then permitted after the lost motion to return to its former position to complete the cycle of its operation.

I have illustrated this in FIGURE 12 of the drawings, which shows the band cutting knife 77 in solid line at that fraction of a second when the tip 90 makes contact and starts to draw the cut band 35 away from the beveled edge 81. I have then shown knife 77 moving

back in the direction of the arrow, in dotted line, after the tear band 35 has been completely removed from contact with beveled edge 81.

The size of the slot 75 is sufficient to permit the beveled edge 81 of band knife 77 to remain as a part of the friction point suspension, by reason of the lost motion, for the necessary fraction of a second.

The linked arrangement between the link 76 and the slot 75; and the action of the square pivot blocks 68 within the yokes 67; permits the adjustable assembly 84 to be adjusted up and down. The adjustable assembly 84 is attached to the main frame of the wrapping machine by means of a slotted plate 92. This plate has slots 93 at its upper end, through which it is attached to the machine by screws 94. Thus, when it is desired to adjust the assembly 84 in an up and down direction, the screws 94 are loosened, the assembly 84 is moved up or down the desired amount within the scope of the slots 93, and then the screws 94 are tightened to complete the adjustment.

Reference to FIGURE 7 of the drawings will show that if the assembly 84 is moved up a short distance, the square pivoted blocks 68 and the link 76 will move up within the yoke 67 and the slot 75, respectively. Thus, when the shaft 20 oscillates, the blocks 68 and the link 76 will still be moved in the same manner as they had been moved prior to raising. Although the elements 68 and 76 will be higher in relation to the elements 67 and 75, they will still cooperate with each other in the same manner and in the same time relationship. The same will hold true for a downward adjustment.

The reason for making the upward and downward adjustment is to move the band cutting knife 77 either higher or lower in relation to the tear strip ribbon 21. When the band cutting knife 77 is moved higher, the tear band 35 cut from the ribbon 21 will be longer at the upper end and shorter at the lower end and the final package will have more of the tab 14 protruding therefrom. It is desirable to have the tab 14 protrude approximately $\frac{1}{2}$ inch from the finished package. If the tab is protruding too much, the assembly 84 is adjusted downward to shorten the protrusion. On the other hand, if the tab 14 is not protruding from the package, the assembly 84 is adjusted upward to correct the situation.

If it were not for my novel means of making this adjustment as described herein, it would be necessary to dismantle certain parts of the machine, which would be both costly and time consuming. In making the adjustments in accordance with my invention, they may be made easily by merely loosening the screws 94, making the adjustment, and tightening them.

The reason why the timing of the cutting and nicking motions is not affected by making this adjustment in accordance with my invention is because the slot in the yoke 67 is vertical, and the end portions of the link 76 are vertical, and thus, the vertical adjustment of the adjustable assembly 84 causes no relative rotations of either of the nicking knives 70 or the band cutting knife 77 on their pivots.

It has been found that the tear band 35 sometimes has a tendency to curve transversely to form a helix about the cigar 10 within the package. This tendency will also be observed in a run of cigars that are slightly tapered. This is not desirable, since it is preferred to have the band form a substantial circle around the cigar 10. The pivoting adjustment of the band holder 82 described hereinabove is another feature of my invention which insures proper alignment of the band 35 by means of pivoting the band holder 82 to the proper angle.

I have found that when the cut band 35 tends to veer to the left, and thereby forms a helix to the left, I can correct this condition by pivoting the band holder 82 to the left. This causes the tear band ribbon 21, and consequently the band 35, to buckle to the right as shown in FIGURE 15 of the drawings. When it is thus caused

to buckle to the right, it is straightened out and in proper position for the wrapping operation. The same adjustment can be made to correct a band 35 which veers to the right, by moving the band holder 82 by means of the screw 87, in the opposite direction as shown in FIGURE 16.

The photo tube casing 51, the rhomboid prism 48, 49, the lens system 47, and the light source 46, comprise a "scanner assembly." The entire scanner assembly may be adjusted vertically. Screws 95 are loosened. This permits the assembly to be moved up or down as a unit. Then the screws 95 are tightened. This vertical adjustment is for the purpose of placing any desired portion of the tear band 35 at any desired portion of the circumference of the package.

By this means, it is possible to adjust the machine so that the brand name on a cigar label will appear in a proper position on the cigar, so that the cigar might be placed in a box with the label facing up. In this manner a row of cigars may be packed side by side, all with labels identically aligned to make a pleasing package. The same principle of an adjustment may be used in packaging products other than cigars.

I have set forth my new wrapping and banding machine in the form which I find preferable. The principles concerned with my improved machine and constructions thereunder may take forms other than the preferred form set forth herein, and I desire to be protected for all forms which may come within the scope of the claims below.

For example, the alignment adjustment of the band holder 82 may be made by pivoting the band holder, or by moving it in any manner to provide increased pressure on a portion of the surface of the band, which will cause the band to buckle and become properly aligned. Thus the band holder may be pivoted, swung or moved to provide this adjustable feature.

Wherefore, I claim:

1. In a wrapping machine, the combination with a main frame of folding means, a web feed for feeding a web of wrapping material alongside of said folding means; means for feeding a tear band ribbon transversely to said wrapper web; mechanism for severing a wrapper blank and a tear band from said web and said ribbon, and nicking one edge of the wrapper web at either side of the tear band; a suspension system comprising the tear band severing means and at least one band holding means and at least one band holding backstop means opposite the mentioned band holding means for holding said cut band, an operating arm for pushing the said tear band, and an operating arm for pushing the said wrapper, the said operating arm pushing the said tear band having a different tip from the said operating arm pushing the said wrapper, and a device for transferring an article into folding means whereby the article is enfolded in a wrapper blank and the tear band is held between the wrapper and the article; folders for folding the longitudinal edges of the wrapper into overlapping relation to form a seam with the nicked edge outermost so that the tear band protrudes from said seam between the nicks of said outer wrapper edge, and means to seal said seam.

2. A wrapping machine, as defined in claim 1, in which the mentioned suspension system comprises the knife which severs the cut tear band from the tear band ribbon, and at least one band holder having an edge to contact the said cut tear band, and at least one band holding backstop contacting the said cut tear band on the opposite surface from that contacted by the edge of the said band holder.

3. A wrapping machine, as defined in claim 1, in which the mentioned suspension system comprises the knife which severs the cut tear band from the tear band ribbon, and at least one band holder having an edge to contact the said cut tear band, and at least one band holding backstop contacting the said cut tear band on

the opposite surface from that contacted by the edge of the said band holder; and means to move the edge of the said band holder laterally in relation to the surface of the said tear band ribbon.

4. A wrapping machine as defined in claim 1 in which one of the mentioned tips of the operating arms, which contacts the cut tear band, is tipped with positive holding means; and the other tip, which contacts the wrapper blank, is tipped with a material with a coefficient of friction against said wrapper blank matching the coefficient of friction of said cut tear band against said wrapper blank.

5. A wrapping machine as defined in claim 1, in which the mechanism for severing the said tear band is controlled by a photoelectric system comprising a light source, and a photoelectric cell encased in a photoelectric cell casing, and an air puffer connected to said photoelectric cell casing by means of which air is puffed into the casing and out through a slit in the said casing.

6. A machine as defined in claim 1, in which the mechanism for severing the tear band ribbon and the mechanism for nicking the edge of the wrapper blank are mounted on an adjustable assembly.

7. A machine as defined in claim 1, in which the mechanism for severing the tear band ribbon and the mechanism for nicking the edge of the wrapper blank are mounted on a vertically adjustable assembly, in which the nicking mechanism comprises nicking knives with pivotal blocks at their upper edges, and the band severing means is a knife having a U-shaped link connector, said pivotal blocks adapted to cooperate with yoke-shaped slots on power operated arms, and said U-shaped link adapted to cooperate with a slot in a power operated actuating arm, whereby, when said assembly is moved vertically, the said pivotal blocks and the said U-shaped link will remain in slideable engagement with the said yolk-shape slots; and the second mentioned slot, respectively.

8. A wrapping machine as defined in claim 1, in which the means for feeding the tear band ribbon comprise, in part, a reel with a sintered bearing on a fixed shaft, and at least one suspension plate mounted on resilient means.

9. A wrapping machine as defined in claim 1, in which the means for feeding the tear band ribbon comprises, in part, a drive roller and an idler roller, said idler roller being connected to spring means which in turn are connected to the main frame of the device, and said connections between the ends of the idler roller and the said spring means being made by means of self aligning bearings, and means to move the said idler roller away from the said drive roller in opposition to the force of the said spring means.

10. In a wrapping machine as defined in claim 1, a photoelectric system to control the mechanism for severing the tear band ribbon comprising; a light source, a lens system, and a photoelectric tube in a photoelectric tube casing, whereby the said tear band ribbon is in the path of the rays of light between the said light source and the said photoelectric tube, and such photoelectric system may be adjusted vertically as a unit with relation to the said tear band ribbon.

11. In a method for machine wrapping an article with a wrapper and a separate band, in which the wrapper and the separate band are pushed toward folding means: the steps of pushing against the band with positive holding means and the wrapper with means providing a coefficient of friction against the said wrapper matching the co-efficient of friction of the band against the said wrapper to maintain the said wrapper and band in proper relative positions.

12. In a wrapping machine which provides for wrapping a package with a band; means for feeding a band ribbon which comprise in part, a drive roller and an idler roller, said idler roller being connected to spring means which in turn are connected to the main frame

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of the device, and said connection between the ends of the idler roller and the said spring means being made by means of self aligning bearings, and a magnet to move the said idler roller away from the said drive roller in opposition to the force of the said spring means, and resilient spacers between the said bearings and the frame, whereby the idler roller is prevented from striking the magnet.

13. In a device for wrapping an article with at least two wrapping materials, wherein the wrapping materials are frictionally held by portions of the device during a part of the operation: frictional holding elements for so holding the wrapping materials, one of said holding elements being tipped with positive holding means and adapted to contact one of the wrapping materials, which in turn contacts another wrapping material, and another of said frictional holding elements which contacts the second mentioned wrapping material being tipped with a material with a coefficient of friction against said second mentioned wrapping material matching the coefficient of friction of the first mentioned wrapping material against the second mentioned wrapping material.

14. In a wrapping machine, the combination with a main frame of folding means, a web feed for feeding a web of wrapping material alongside said folding means; means for feeding a tear band ribbon transversely to said wrapper web; mechanism for severing a wrapper blank and a tear band from said web and said ribbon, and nicking one edge of the wrapper web at either side of the tear band; a suspension system comprising a band holder for holding the said cut band; means for pushing said tear band and said wrapper toward said folding means, and a device for transferring an article into said folding means, whereby the article is enfolded in the wrapper blank and the tear band is held between the wrapper and the article; folders for folding the longitudinal edges of the wrapper into overlapping relation to form a seam with the nicked edge outermost so that the tear band protrudes from said seam between the nicks of said outer wrapper edge, and means to seal said seam.

15. In a device for feeding a portion of band ribbon intermittently, in which means is provided for cutting a portion from the end of the said band ribbon, sus-

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pension means to hold a band cut from the said portion of band ribbon comprising the cutting means and at least one band holding means at one side of the said cut band, and at least one band holding backstop on the other side of the cut band located in spaced relation between the said cutting means and the said band holding means; in which the said cutting means is adapted to move independently with relation to the said band holding means and there is space wider than the thickness of a cut band between the said band holding back-stop, the said cutting means, and the said band holding means.

16. A device as defined in claim 15 in which the band holding means is moveably mounted with respect to the said band ribbon and is positioned in face contacting relation to a surface of the said band ribbon.

17. In a wrapping machine: the combination with a main frame of elements comprising folding means; means for feeding a length of tear band ribbon to said folding means; a web feed for feeding a length of wrapping material transversely to said length of tear band ribbon; means for severing the length of wrapping material into a wrapper blank; means for severing the length of tear band ribbon into a tear band; means for nicking one edge of the length of wrapper web at either side of the tear band; a suspension system comprising a band holder for holding the cut tear band; means for pushing said wrapper and said tear band toward said folding means, and a device for transferring an article into said folding means, whereby the article is enfolded in the wrapper blank and the tear band is between the wrapper and the article; folders for folding the longitudinal edges of the wrapper into overlapping relation to form a seam with the nicked edge outermost.

References Cited in the file of this patent

UNITED STATES PATENTS

1,240,631	Trier	Sept. 18, 1917
1,254,895	Ferguson	Jan. 29, 1918
1,617,560	Aldrich et al.	Feb. 15, 1927
2,653,536	Cooksey	Sept. 29, 1953
2,685,725	Phelps	Aug. 10, 1954