March 1, 1927. B. HEINRICHS 1,619,615

WRAPPER MAKING MACHINE

Filed Jan. 9, 1922 5 Sheets-Sheet 1

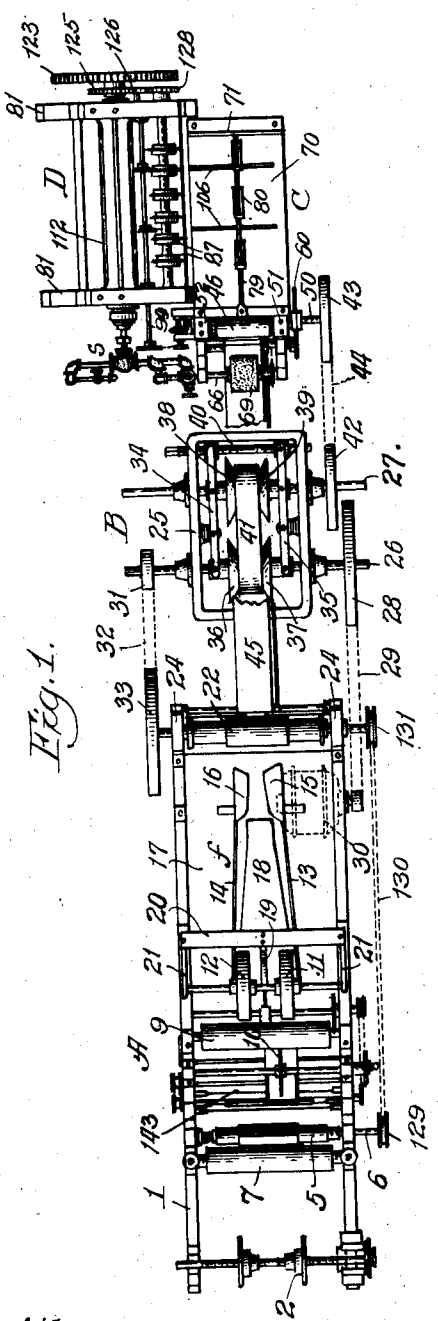


Fig. 1.

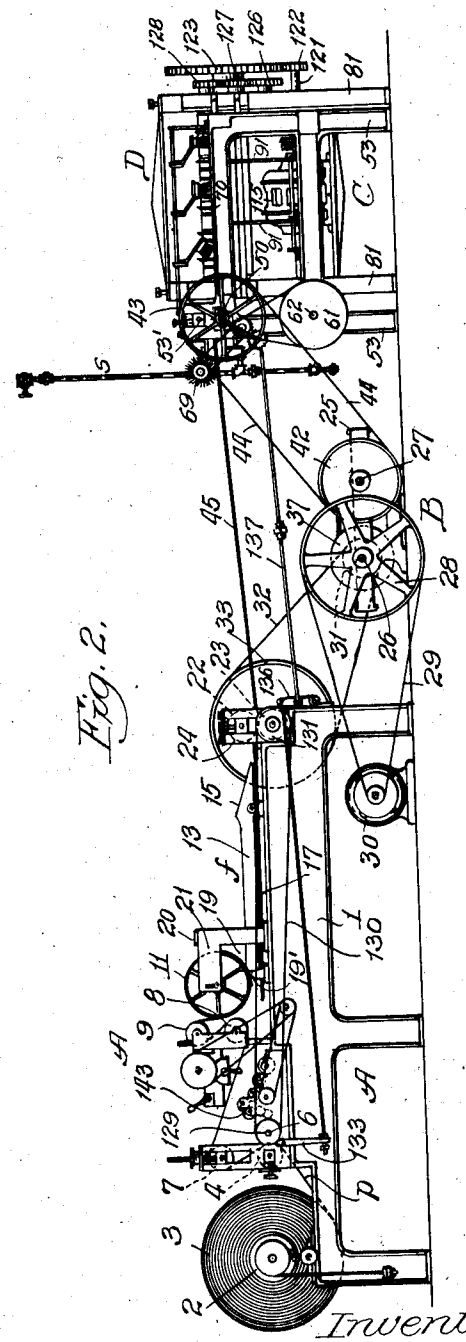


Fig. 2.

Witness:
John Enders

Inventor:
Berg Heinrichs
by Fred J. Wach
his Atty.

March 1, 1927. 1,619,615

B. HEINRICHS

WRAPPER MAKING MACHINE

Filed Jan. 9, 1922 5 Sheets-Sheet 2

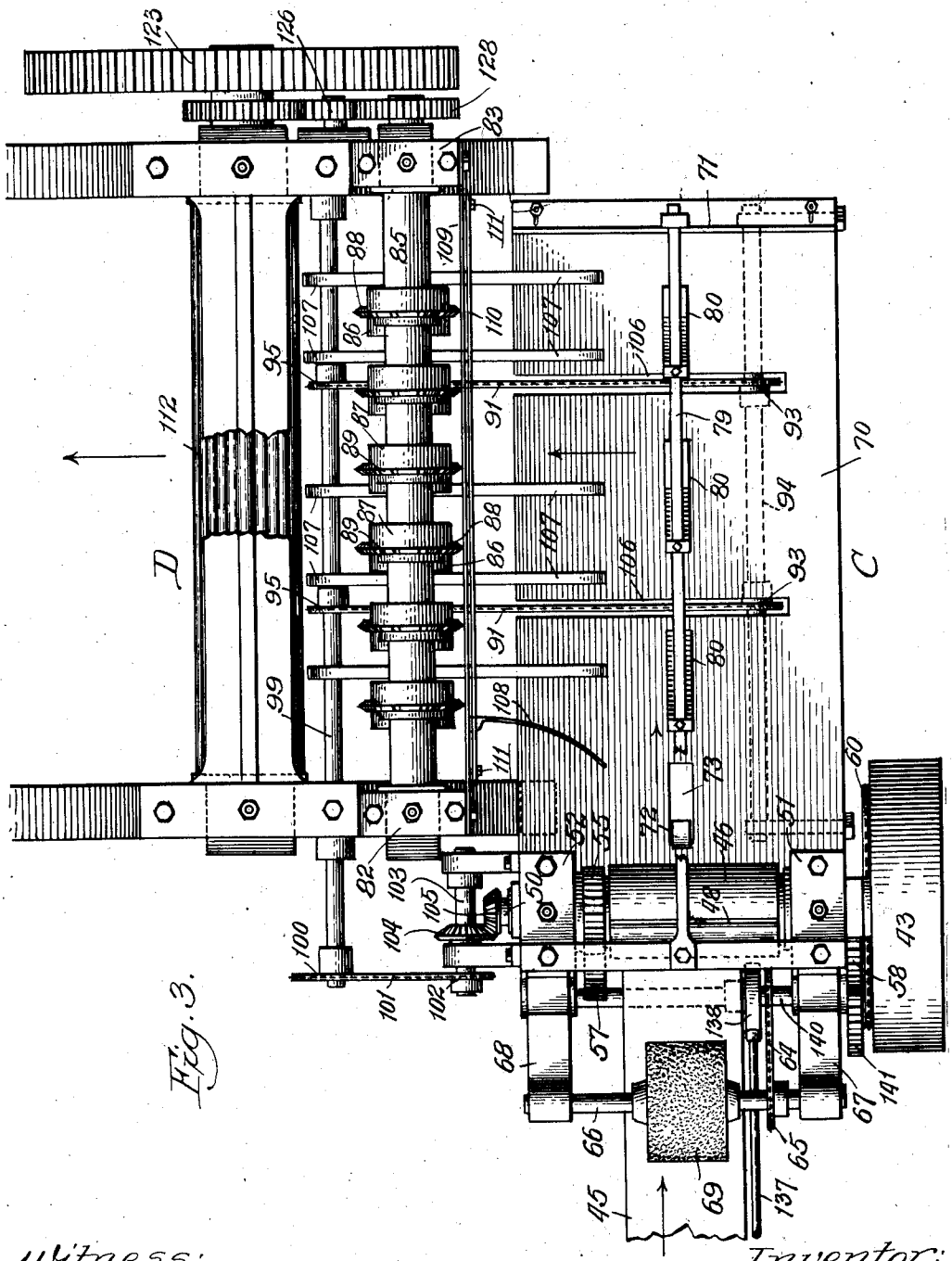


Fig. 3.

Witness:
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March 1, 1927. 1,619,615

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WRAPPER MAKING MACHINE

Filed Jan. 9, 1922 5 Sheets-Sheet 3

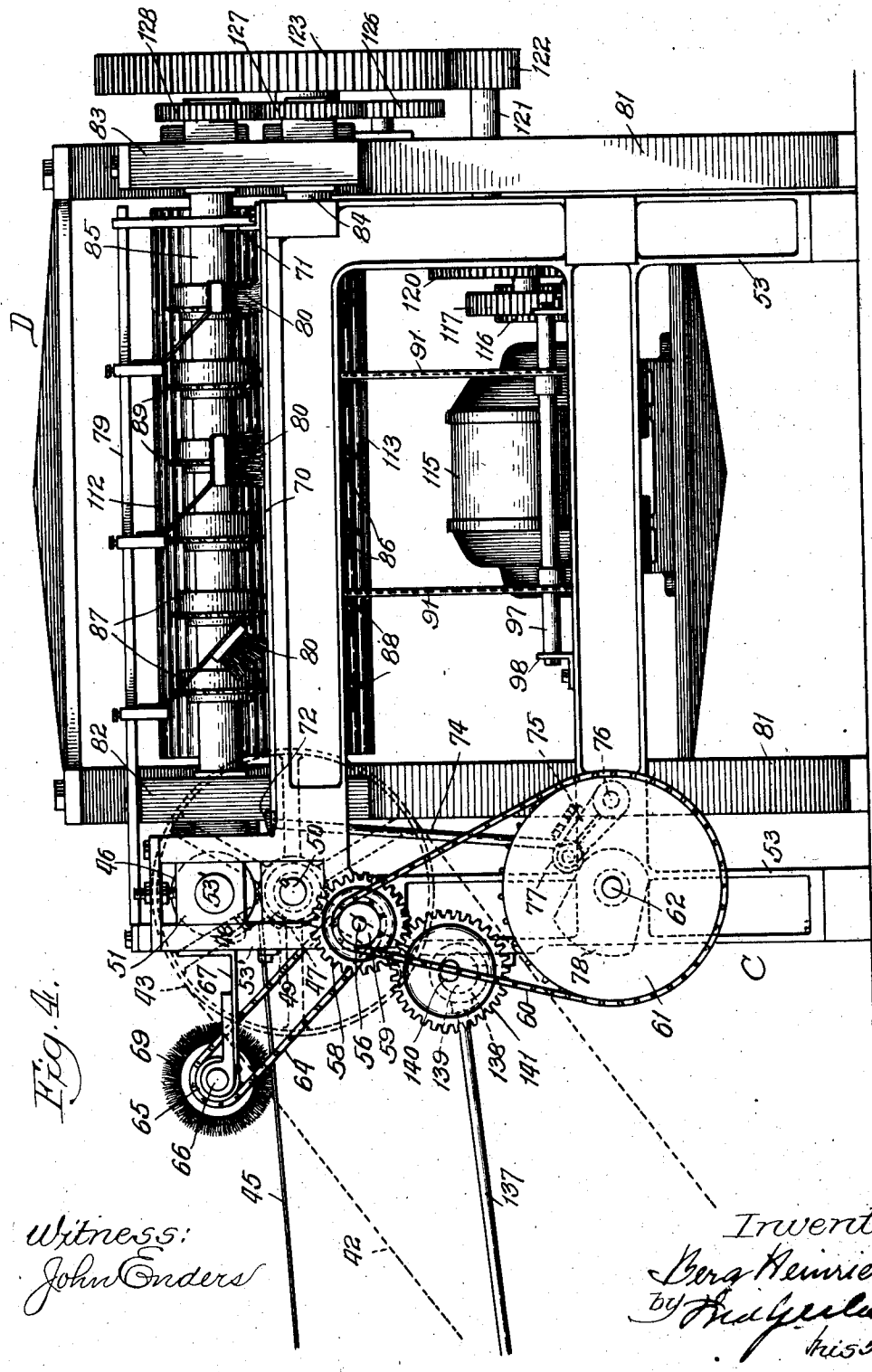


Fig. 4.

Witness:
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March 1, 1927.

1,619,615

B. HEINRICHS

WRAPPER MAKING MACHINE

Filed Jan. 9, 1922

5 Sheets-Sheet 4

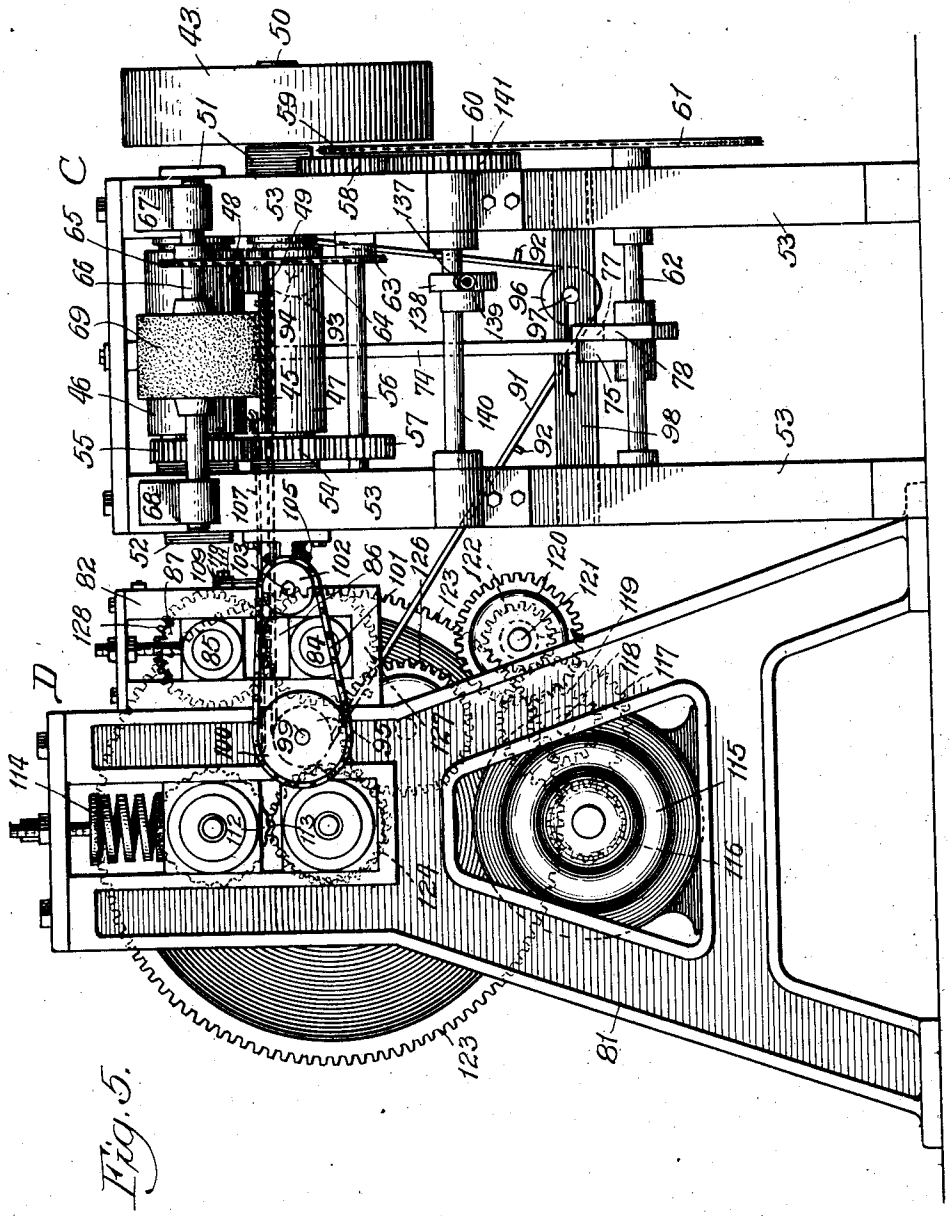


Fig. 5.

Witness:
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March 1, 1927. B. HEINRICHS 1,619,615

WRAPPER MAKING MACHINE

Filed Jan. 9, 1922 5 Sheets-Sheet 5

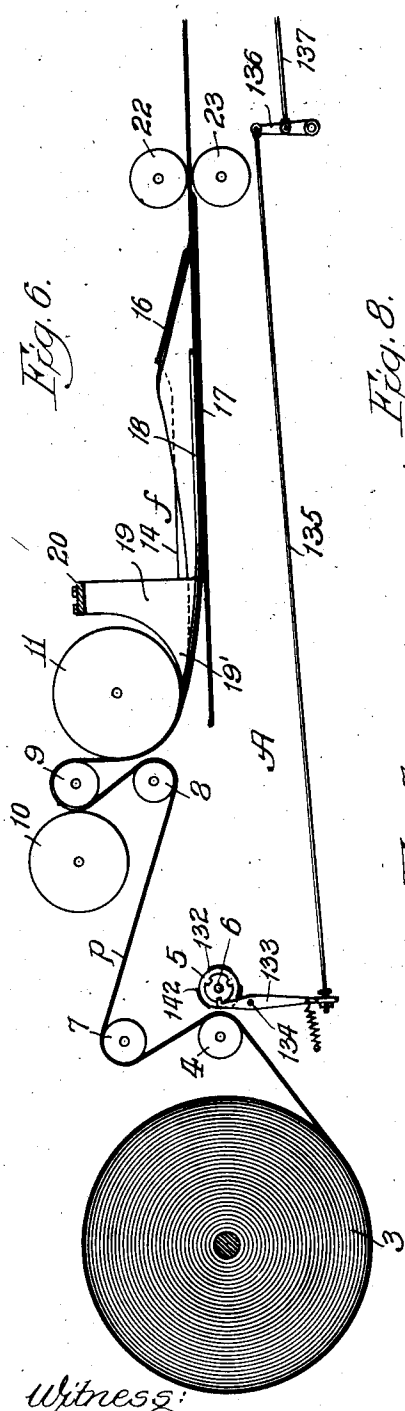


Fig. 6.

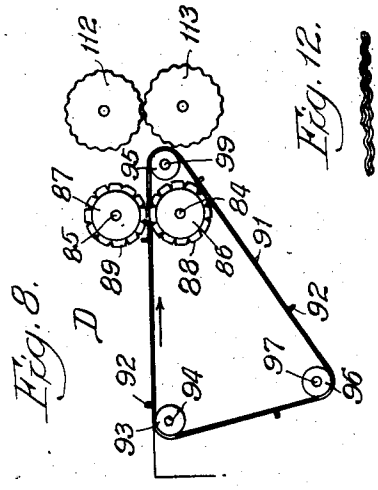


Fig. 8.

Fig. 12.

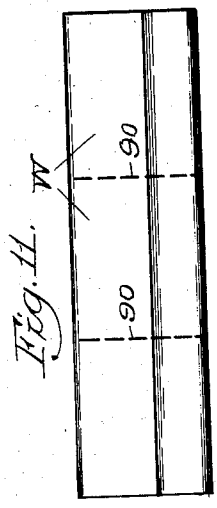


Fig. 11.

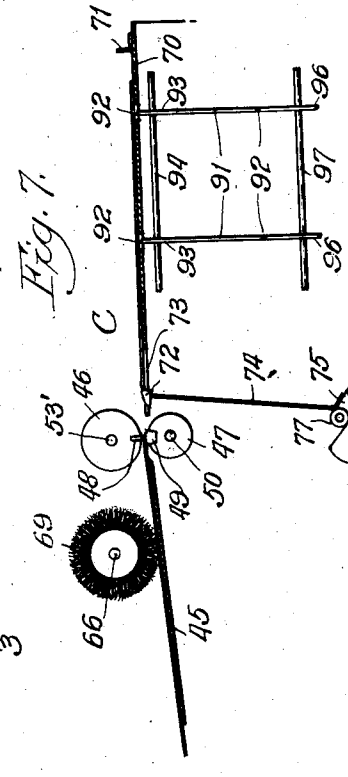


Fig. 7.

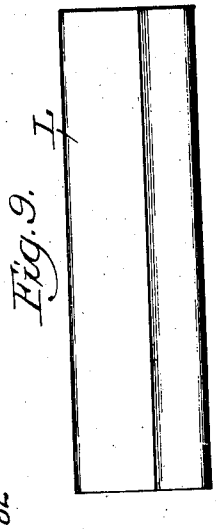


Fig. 9.

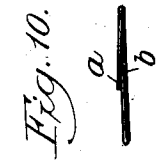


Fig. 10.

Witness:
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Inventor:
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Patented Mar. 1, 1927. 1,619,615

UNITED STATES PATENT OFFICE.

BERG HEINRICHS, OF CHICAGO, ILLINOIS, ASSIGNOR TO MIDWEST BOX COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF INDIANA.

WRAPPER-MAKING MACHINE.

Application filed January 9, 1922. Serial No. 527,819.

My invention relates to wrapper making machines and particularly to a machine for making tubular corrugated wrappers for holding and protecting incandescent lamps and other articles.

The object of my invention is to produce a simple, practical and efficient machine which at one end receives a strip of paper from a roll and which at its other end delivers the finished wrapper with printed matter thereon. My improved machine receives the paper strip, applies glue thereto, then folds the band longitudinally into the form of a flat tube and secures the glued edges together, after which the folded and glued band is cut into lengths which are transversely perforated or slitted, and then longitudinally crimped or corrugated. The construction and arrangement involve efficient adjustment whereby the work is accurately accomplished.

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Fig. 1 is a plan view of my improved machine. Fig. 2 is a side elevational view thereof. Fig. 3 is an enlarged plan view of the section of the machine which takes care of the cutting, slitting and corrugating. Fig. 4 is a side elevational view of the parts shown in Fig. 3. Fig. 5 is an end elevational view of the parts shown in Figs. 3 and 4. Fig. 6 is a diagrammatic side elevational view of the section of the machine which takes care of the printing, gluing and folding. Fig. 7 is a side elevational view of the cutting mechanism. Fig. 8 is a side elevational view of the mechanism for conveying sections through the slitting mechanism. Fig. 9 is a plan view of a folded length of the paper band. Fig. 10 is an end view of such length. Fig. 11 is a plan view of lengths after slitting thereof into sections. Fig. 12 is an end elevational view of the finished wrapper or carton.

The machine comprises the unit A which takes care of the printing, folding, gluing and propulsion of the paper web of which wrappers are made, the mechanism B which provides for power transmission to various operating parts, the mechanism C for cutting the folded web into lengths, and the mechanism D which takes care of the cross slitting of the lengths and the corrugating thereof.

The unit A has the supporting framework 1 on one end of which is mounted the carrier 2 for supporting the roll of paper 3 from which the wrappers are to be made. The paper p first travels around a roll 4 adjacent which is the printing roll 5 which is secured on the shaft 6. The paper then travels around the idler rollers 7 and 8 and thence around the roll 9 where the gluing disk 10 engages therewith. The paper then travels around the spaced apart guide-wheels 11 and 12 which are spaced apart laterally and by which it is guided to the folding mechanism f. This folding mechanism comprises the folding rails 13 and 14 which are convergent away from the wheels 11 and 12 and at their outer ends have respectively the in-folding wings 15 and 16. These rails rise from a table 17 on which the paper travels after leaving the wheels 11 and 12. The paper is held on this table by the presser 18 which is arranged between the rails 13, 14 and is supported from the lower end of a shoe 19 which is suspended from the cross bar 20 on the standards 21 on frame 1. Wheels 11 and 12 are also mounted on standards 21. The point 19′ of the shoe guides the paper from wheels 11, 12 into the space between the tongue 18 and table 17, the tongue being spaced away from the folding rails and its sides converging forwardly, so that as the strip of paper travels its side portions will be deflected upwardly. When the strip reaches the folding wings 15 and 16, the upwardly deflected side margins of the paper will be curled inwardly with one edge slightly overlapping the other, as shown in Fig. 10, the strip emerging from the folding wings in the form of a flattened tube. During travel of the strip through the gluing mechanism, the disk 10 applies glue along one edge thereof and this glued section becomes the overlapping section a which is then glued to the underlying margin at b (Fig. 10). After folding of the strip, it passes between the upper and lower presser and feeding rolls 22 and 23 which press the overlapping edges together so that the glue will rigidly secure these edges together. These rolls 22, 23 are supported at the inner end of the framework 1 in the bearing structure 24. At the mechanism B

of the machine, is provided suitable variable speed driving and transmission mechanism. The mechanism shown comprises the frame 25 in which is journalled the drive shaft 26 and the counter-shaft 27. At one end of the drive-shaft is the pulley 28 connected by belt 29 with the electric motor 30. At its other end the drive-shaft has the pulley 31 connected by belt 32 with the pulley 33 on the shaft of the lower feed roll 23. The variable speed transmission shown comprises the levers 34 and 35 pivoted on the frame 25 and connected at their ends respectively with the pulley disks 36, 37 and 38, 39, which disks are respectively slidable on the shafts 26 and 27. By means of a screw-rod 40, the levers are swung so as to vary the radius of engagement with the respective pulley disks of the belt 41, any speed of transmission being thus readily obtained between the driving shaft 26 and the counter-shaft 27. At its end the counter-shaft has the belt pulley 42 which is connected with the belt pulley 43 by belt 44, the pulley 43 being on the section C of the machine. The mechanism illustrated is that commonly known as the "Reeves" transmission, but it will be understood that any suitable variable speed mechanism may be used.

The flattened paper tube travels from the machine unit A to the cutting mechanism C along the table or guide 45 which terminates at the cutting mechanism which comprises the upper and lower rolls 46 and 47. The upper roll 46 is provided with a knife-bar 48 and the lower roll with a cooperating bar 49. These rolls are driven at different relative speeds so that the bars 48 and 49 will periodically register or coact to sever the strip. That is, for example, if the desired length passes between the cutter rolls during a series of five revolutions thereof, the bars will pass into registry and effect a cut once every five revolutions of the cutters.

The pulley 43 is secured at the front end of the shaft 50 which is journalled in the bearing structures 51 and 52 on the supporting framework 53 of the section C. Between the bearing structures, the shaft supports the lower roll 47 of the cutting mechanism, the knife roll 46 being mounted on the shaft 53′ journalled in the bearing structures 51 and 52 above the shaft 50. The cutter rolls are positively driven, the gear 54 on the shaft 50 meshing with the gear 55 on the knife roll shaft 53′ (Fig. 5).

Below the shaft 50, the shaft 56 is journalled in the framework 53 and supports on its rear end the gear 57 which meshes with the gear 54 on the shaft 50. At its front end, the shaft 56 carries the gear 58 and also the sprocket pinion 59 (Figs. 4 and 5). The sprocket pinion is connected by the chain 60 with the large sprocket 61 secured on the outer end of the shaft 62 journalled in the framework 53. The shaft 56 supports also the sprocket wheel 63 which is connected by the chain 64 with the sprocket 65 on the shaft 66 journalled over the guide-plate 45 in brackets 67 and 68 extending from the upper part of the framework 53. Over the guide-plate 45, the shaft 66 supports the cylindrical brush 69 which engages with the tubular strip of paper coming from unit A, and keeps this band held flatly against the plate and also assists the feed rolls 22 and 23 in propelling the paper to the cutting mechanism. The brush serves also to clean any surplus glue from the band before it reaches the cutter mechanism.

The tubular paper strip travels along the plate 45 and first passes between the cutter rolls and then on to the table 70 on the framework 53, the table being at a little lower level than the end of the plate 45 (Fig. 4). In accordance with my invention, the folded band is cut into lengths L, which lengths are then transversely perforated or slitted so that they can be readily torn or separated into the wrappers or cartons W. The relative adjustment between the feed rolls 22 and 23 and the knife rolls is such that, after the proper length of folded strip has been fed through the cutter-rolls and onto the table 70, the cutter rolls will co-operate to cut the band, the folded band being thus cut at regular intervals and into lengths which are then slitted or perforated transversely. The length of the cut-off sections can be adjusted by the variable speed mechanism. The feed rolls 22 and 23 are driven at a constant speed from the motor 30, but the speed of rotation of the cutter rolls is determined by the setting of the variable speed mechanism B. If the speed of the cutter-rolls is increased, the interval of cutting will be shortened and the wrapper lengths will be shorter, while if the speed of the rolls is decreased, the interval between cutting is lengthened and the wrapper lengths will be correspondingly longer.

After a length has been cut from the folded band, it is placed in proper position on table 70 preparatory to further operation thereon. At the end of said table, an adjustable stop 71 determines the proper position of the length for further operation thereon. At the front end of the table, just behind the cutting rolls, a kicker 72 projects a distance above the table 70 and travels in the slot 73 in the table. This kicker is carried at the upper end of a rod 74 which extends upwardly from a cam-arm 75 pivoted on the framework 53 at 76. At its outer end, the cam-arm has the cam-roller 77 which engages the cam 78 secured on the shaft 62. This shaft 62 is driven from the shaft 50 through the transmission-train comprising the gears 54 and 57, shaft 56, chain 60 and sprocket wheel 61, the cutter rolls being also driven from the shaft 50. Just before each

cutting operation, kicker 72 is held in its front position close to the cutter rolls by the weight of the arm 75. After a cutting operation, the severed length is still engaged for a while by the knife 48 and drops with its rear edge in front of the kicker 72. At this moment, the cam 78 rapidly rotates the cam-arm 75 with the result that the kicker 72 is rapidly operated and will kick or push the severed length along the table 70 until it strikes the stop 71. Above the table is supported a bar 79 from which a number of brushes 80 are suspended with their bristles in the path of the severed strip. These brushes resist the movement of the severed length by the kicker 72 sufficiently to prevent buckling thereof or escape from the table but do not interfere with the positioning of the lengths against the stop 71. The brushes also hold the lengths flatly against the table in transit to the slitting mechanism. Kicker 72 leaves the inner end of the length before the outer ends of the lengths engage the stop 71, to prevent buckling of the lengths.

The parts of the slitting and corrugating mechanism B are mounted on the framework 81 adjacent to the framework 53 of the mechanism C of the machine. At the front of the framework near the top thereof are the bearing structures 82 and 83 in which are journalled the lower and upper shafts 84 and 85 on which are respectively secured the lower and upper cutting wheels 86 and 87. As shown in Fig. 8, the wheels have the cooperating cutting or shearing teeth 88 and 89 for cutting the short perforations or slits 90 in the strip length. The cooperating cutting teeth are in line with the table 70 which is extended rearwardly to the slitting wheels (Fig. 5). There may be any number of sets of slitting wheels and spaced as desired, depending upon the number of wrappers into which the lengths are to be divided.

For shifting the severed lengths from table 70 to the slitting wheels, I provide the chains or bands 91 which have propeller or abutment teeth 92 thereon. These chains (Figs. 5 and 8) travel around the front sprocket wheels 93 on shaft 94, and around the rear and lower sprocket wheels 95 and 96 respectively. The wheels 96 are on a shaft 97 below the shaft 94 and supported on cross-beam 98 of the framework 53. Rear sprocket-wheels 95 are secured on a shaft 99 which is journalled in the framework 81 behind the shaft 84 which carries the lower slitting wheels. The end of this shaft 99 carries the sprocket-wheel 100 which is connected by chain 101 with the sprocket wheel 102 on the short shaft 103 which supports the bevel gear 104 meshing with the gear 105 on the rear end of the shaft 50. The chains or belts 91 travel below the transverse slots 106 provided in the table 70, the upper ring of the chains being parallel with the table and the abutment teeth 92 projecting upwardly through the slots above the table-top to engage with the front edges of the severed lengths L arranged on the table by the kicker 72. Each length is received at its front edge by the abutment teeth and shifted rearwardly on table 70 underneath the presser and guide-fingers 107. The outer end of the length is also engaged by the guide arm 108 which keeps the other end of the length against the stop 71. Spring-fingers 107 press lightly on the lengths and retard the movement thereof to align the lengths which are not already straight for engagement by the teeth on the chains 91. Fingers 107 and the guide-arm 108 are adjustably secured from a bar 109 secured to the framework 81 above the level of table 70, the fingers and arm being clamped between the bar 109 and bar 110 secured to the bar 109 by screws 111. Fingers 107 extend rearwardly between the slitting wheel sets and the lengths are carried between the fingers and the chains and presented to the slitting wheels which cut the transverse rows of slits 90 in the lengths along which the lengths can be readily separated into wrappers or cartons W for containing the lamps or other objects to be wrapped or protected. After the slitting operation, the lengths are carried by the chains into position between the upper and lower crimping rolls 112 and 113 journalled on the framework 81 and yieldingly held together by compression springs 114.

The mechanism for driving the slitting rolls and the crimping rolls is operated by a motor 115 mounted on the framework 81 of the machine-section D. The motor pinion 116 meshes with a gear 117 on the shaft 118, which shaft supports also a pinion 119 which meshes with the gear 120 on shaft 121, this shaft supporting also the pinion 122 which meshes with the large gear 123 secured to the end of the lower crimping roll 113. The lower crimping roll is thus powerfully rotated, and the upper crimping roll meshes with the lower roll so it will be driven thereby.

The gear 124 on the lower crimping roll meshes with the idler gear 126 which in turn meshes with the gear 127 secured on the shaft 84 of the lower slitting wheels. Gear 127 meshes with the gear 128 on the shaft 85 for the upper slitting wheels. The slitting wheels and crimper rolls are thus driven from the motor 115. The finished slitted and crimped blanks are discharged from the machine by the crimping rolls and may be received in a suitable receptacle or by a conveyor-belt (not shown). The lengths are readily packed into compact form for shipment. When they are to be used, they are separated along the slit lines into the flat sections which can be readily opened for the

insertion of lamps or other objects to be protected.

It is usually desirable to have directions, advertising matter, or other information printed on the individual wrappers, and the printing mechanism already referred to is provided for this purpose. The printing mechanism is automatically operated and adjustable to print the paper band before folding thereof so that the printing matter will appear in proper position on the wrappers. As before stated, any number of sets of slitting wheels may be provided, depending upon the number and length of wrappers desired. The number of printing operations must therefore be the same as the number of wrapper sections to each length. In other words, for each cutting operation there must be as many printing operations as there are wrapper sections for each length. Referring to Fig. 1, the printing roll 5 has the pulley 129 thereon which is connected by the belt 130 with the pulley 131 on the shaft of the lower propelling roll 23 to frictionally drive the printing roll under control of an intermittently operated stop-device. On the printing roll are a number of stop-teeth 132 (Fig. 6) adapted to be engaged by a hook-lever 133 which is pivoted intermediate its ends at 134. The lower end of the lever is connected by a rod 135 with the upper end of the lever 136 pivoted at its lower end at the inner end of the framework 1, a rod 137 connecting with said lever intermediate its ends and having at its other end the eccentric strap 138 which receives the eccentric disk 139 on the shaft 140, which is journalled on the framework 53 below the shaft 56. On the shaft 140 is the gear 141 which meshes with the gear 58 on the shaft 56 which is driven from the shaft 50. The cutter rolls 46 and 47 are also driven from this shaft 50 and by providing gears 58 and 141 of proper dimension, the correct number of printing operations for each cutting operation can be adjusted for. On the printing-roll 5, one or more printing plates 142 are provided which are supplied with ink by inking mechanism 143 (Fig. 2). By means of the eccentric mechanism and the connecting rods, the lever 133 is swung at the proper time to release the printing roll so it will rotate one step and is returned in time to receive the next tooth on the printing roll. When the roll revolves, it carries a printing plate against the paper band to print thereon, and when the roll is locked by the lever 133 the printing plates are disengaged from the paper and during such locking of the roll the belt 130 will slip over the pulley 129. The rods 137 and 135 are adjustable so that the operation of the lever 133 will be accurate.

In order that the crimping rolls can more readily crimp or corrugate the lengths, they are preferably heated, and in Figs. 1 and 2 I show steam piping *s* for controlling the application of steam to the rolls for heating them.

The operation of the machine will be as follows: The paper band *p* is fed from the roll 3, first through the gluing mechanism and then through the folding mechanism F where the margins of the strip are folded over to the form shown in Fig. 10 with the overlapping edges glued together. The folded band is now ironed down between the rolls 22 and 23 and also propelled by said rolls along the guide-plate 45 and through the cutting rolls 46 and 47 where, at proper intervals, lengths are successively cut from the strip and propelled by the kicker 72 on the table 70 against the stop 71. Chains 91 carry the successive lengths rearwardly underneath the spring fingers 107 and past the guide-arm 108, and through the sets of slitting wheels by which the length is slit transversely. The chains continue to carry the slitted length and feed it between the crimping rolls where the length is longitudinally corrugated and then ejected from the machine. When the lengths are separated along the slit lines, the resulting wrappers or cartons are ready for use, and are opened up for the insertion of lamps or other objects to be wrapped or protected. The machine is entirely automatic throughout in its operation, the paper band being fed in at one end and the finished wrapper lengths being delivered from the machine, each wrapper section having the printing properly located thereon.

Adjustments on the machine can readily be made. By adjusting the speed of the shaft 27, the speed of the cutting rolls and the lengths of the band sections cut off is adjusted. By arranging the slitting wheels, the lengths can be divided into any number of wrappers and by providing the proper gears 58 and 141 the printing is made to correspond with the lengths and slitting adjustment.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

I claim as my invention:

1. In a machine of the class described, the combination of means for continuously folding a web of paper into the form of a flattened tube, means for securing the overlapping edges of said flattened tube together, means for cutting said flattened tube into lengths, and means for perforating said lengths transversely to form separation lines.

2. In a machine for making wrappers, the combination of means for folding a web of paper continuously into the form of a flattened tube, means for securing the edges of said flattened tube together, means for cut-

ting said flattened tube into lengths, means for perforating said lengths transversely to form separation lines, and means for longitudinally crimping said lengths.

3. In a wrapper producing machine of the class described, the combination of cutting mechanism, means for feeding a band at constant speed through said mechanism, said band being in the form of a flattened tube, variable means for operating said cutting mechanism whereby the length of said band may be varied, means for corrugating said lengths after they have been severed from the web, and means for perforating said lengths transversely so that they may be readily separated into wrappers.

4. In a wrapper making machine, the combination of mechanism for folding a web into the form of a flattened tube, means for securing together the edges of said tube, means for feeding said flattened tube longitudinally, cutting mechanism, means for periodically operating said cutting mechanism to transversely cut said flattened tube into lengths, corrugating mechanism, and means for feeding said lengths after they have been severed from the web successively into said corrugating mechanism to cause longitudinal corrugating thereof.

5. In a wrapper making machine, the combination of mechanism for continuously folding a web of wrapping material into the form of a flattened tube, means for securing the edges of said flattened tube together during formation thereof, cutting mechanism, feeding mechanism for feeding said flattened tube through said cutting mechanism, means for periodically operating said cutting mechanism to transversely cut said flattened tube into lengths, perforating mechanism, corrugating mechanism, and conveyor mechanism for laterally conveying the lengths into said perforating mechanism and said corrugating mechanism whereby said lengths are transversely perforated to form separation lines and then longitudinally corrugated.

6. In a wrapper making machine of the class described, the combination of a table, cutting mechanism at one end of said table, feeding mechanism for longitudinally feeding a band in the form of a closed flattened tube through said cutting mechanism and over said table, means for periodically operating said cutting mechanism to cut said band into lengths, an alining stop on said table, pusher mechanism for pushing severed lengths against said stop, conveyor mechanism below said table engaging with and laterally conveying said lengths from said table, perforating members in the path of said conveyor mechanism through which the lengths are carried to be perforated along transverse lines, and corrugating mechanism positioned to receive the perforated lengths from said conveyor mechanism and operating to longitudinally corrugate said lengths.

7. In a wrapper making machine of the class described, the combination of cutting mechanism, means for continuously feeding a band in the form of a flattened closed tube through said cutting mechanism, means for periodically operating said cutting mechanism to cut said band into lengths, a table for receiving said lengths, an alining stop on said table, means for positioning said lengths on said table against said stop, means for yieldingly holding said lengths after alining thereof, conveyor mechanism for laterally conveying said lengths from said table, perforating mechanism through which said lengths are conveyed by the conveyor mechanism to be transversely perforated to form separation lines, and corrugating mechanism receiving the perforated lengths from the conveyor mechanism and causing longitudinal corrugating thereof.

8. In a wrapper making machine, the combination of cutting mechanism, feeding mechanism for propelling a band in the form of a closed flattened tube through said cutting mechanism, means for periodically operating said cutting mechanism to cut said band into lengths, a table for receiving said lengths, a stop on said table, pusher mechanism operated in synchronism with said cutting mechanism for shifting severed lengths on said table against said stop, conveyor mechanism having projections for engaging with the lengths to shift them laterally on said table, means for yieldingly holding said lengths on said conveyor mechanism, rotary perforating members through which said lengths are carried by the conveyor mechanism and thereby perforated to form transverse separation lines, and corrugating mechanism at the end of the conveyor mechanism for receiving the perforated lengths therefrom and for corrugating them longitudinally.

9. In a wrapper making machine, the combination of cutting mechanism, feeding mechanism for feeding a band in the form of a closed flattened tube through said cutting mechanism, means for periodically operating said cutting mechanism, to cut said band into lengths, a table for receiving said lengths, conveyor mechanism traveling laterally from said table, means for shifting the severed lengths on said table into alinement relative to said conveyor mechanism, means for yieldably holding said lengths on said table after alinement thereof, spring fingers for holding said lengths against the conveyor mechanism, and corrugating mechanism positioned to receive the lengths from said conveyor mechanism and to corrugate them longitudinally.

10. In a wrapper making machine, the combination of mechanism for receiving a

flat band of material and folding it into the form of a flattened tube, means for securing together the edges of said flattened tube during formation thereof, cutting mechanism, means for propelling the flattened tube through said cutting mechanism, means for periodically operating said cutting mechanism to cut the flattened tube into lengths, printing mechanism positioned to print on said flat band before folding thereof, means for causing operation of the printing mechanism in timed relation relative to the operation of the cutting mechanism whereby printing will be uniform on the lengths, and means for corrugating the lengths after they have been severed from the web.

11. In a wrapper making machine of the class described, the combination of mechanism for folding a flat band into the form of a flattened tube, cutting mechanism, means for feeding said flattened tube through said cutting mechanism, means for periodically operating said cutting mechanism to cut said tube into lengths, a plurality of perforating members for transversely perforating said lengths to form separation lines along which the lengths may be separated into wrappers, printing mechanism positioned to print on said band before folding thereof, and means for causing operation of the printing mechanism at a rate depending upon the number of wrappers into which each length is divided and at such time that printing will appear uniformly on the wrappers.

12. In a wrapper making machine of the class described, the combination of mechanism for folding a flat band of material, cutting mechanism, feeding mechanism for feeding the folded material through the cutting mechanism, means for periodically operating the cutting mechanism to cut the folded band into lengths, means for transversely perforating said lengths to form wrapper sections, printing mechanism for printing on said band before folding thereof, and operating mechanism for said printing mechanism controlled in timed relation relative to the cutting mechanism to print at a rate corresponding to the number of wrapper sections into which each length is divided, whereby printing will be uniform on the wrapper sections.

13. In a machine of the character described, the combination of means for folding a web of material into tubular form, means for securing the overlapping margins of the web together, means for severing the tubular web into lengths, and means for corrugating the lengths after they have been severed from the web.

14. In a machine of the character described, the combination of means for folding a web of material into tubular form, means for securing the overlapping margins of the web together, means for severing the tubular web into lengths, and means for longitudinally corrugating the lengths after they have been severed from the web.

15. In a machine of the character described, the combination of means for folding a web of material into tubular form, means for securing the overlapping margins of the web together, means for severing the tubular web into lengths, means for transversely perforating each length to form a series of wrappers, and means for corrugating said lengths after they have been severed from the web.

16. In a machine of the character described, the combination of means for folding a web of material into tubular form, means for securing the overlapping margins of the web together, means for severing the tubular web into lengths, means for transversely perforating each of said lengths to form a plurality of wrappers, means for adjusting the perforating means to vary the number of wrappers from each sheet, and means for corrugating the lengths after they have been severed from the web.

17. In a machine of the character described, the combination of means for folding a web of material into tubular form, means for securing the overlapping margins of the tubular web together, means for severing the web into lengths, means for varying the operation of said severing means to vary the lengths, and means for corrugating the lengths after they have been severed from the web.

18. In a machine of the character described, the combination of means for folding a web of material into tubular form, means for securing the overlapping margins of the web together, means for severing the tubular web into lengths, means controlled by the operation of said severing means for printing the web, and means for corrugating the lengths after they have been severed from the web.

In witness whereof, I hereunto subscribe my name this 4th day of January, A. D. 1922.

BERG HEINRICHS.