July 15, 1958 G. F. HOWATT 2,842,915

BANDING MACHINE

Filed Oct. 31, 1955 6 Sheets-Sheet 1

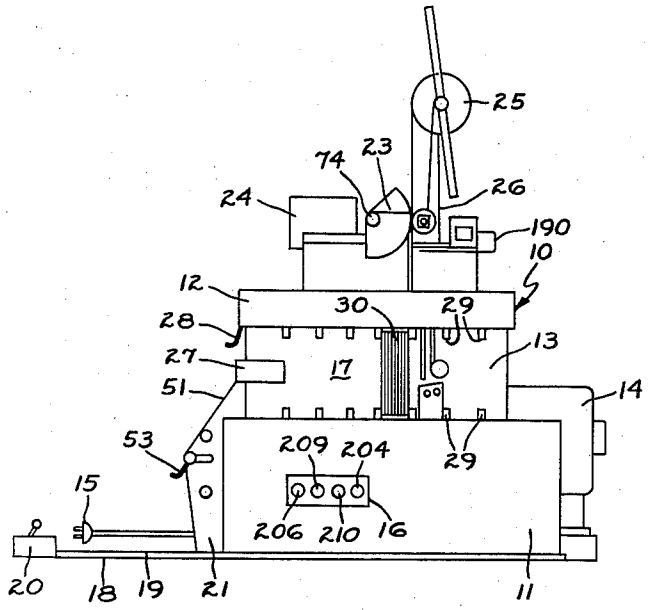


Fig. 1

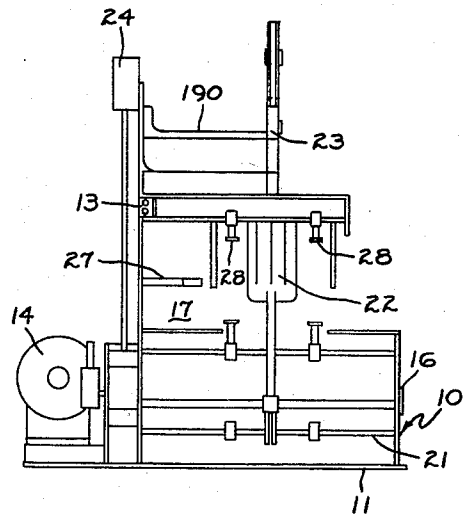


Fig. 2

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July 15, 1958 G. F. HOWATT 2,842,915

BANDING MACHINE

Filed Oct. 31, 1955 6 Sheets-Sheet 2

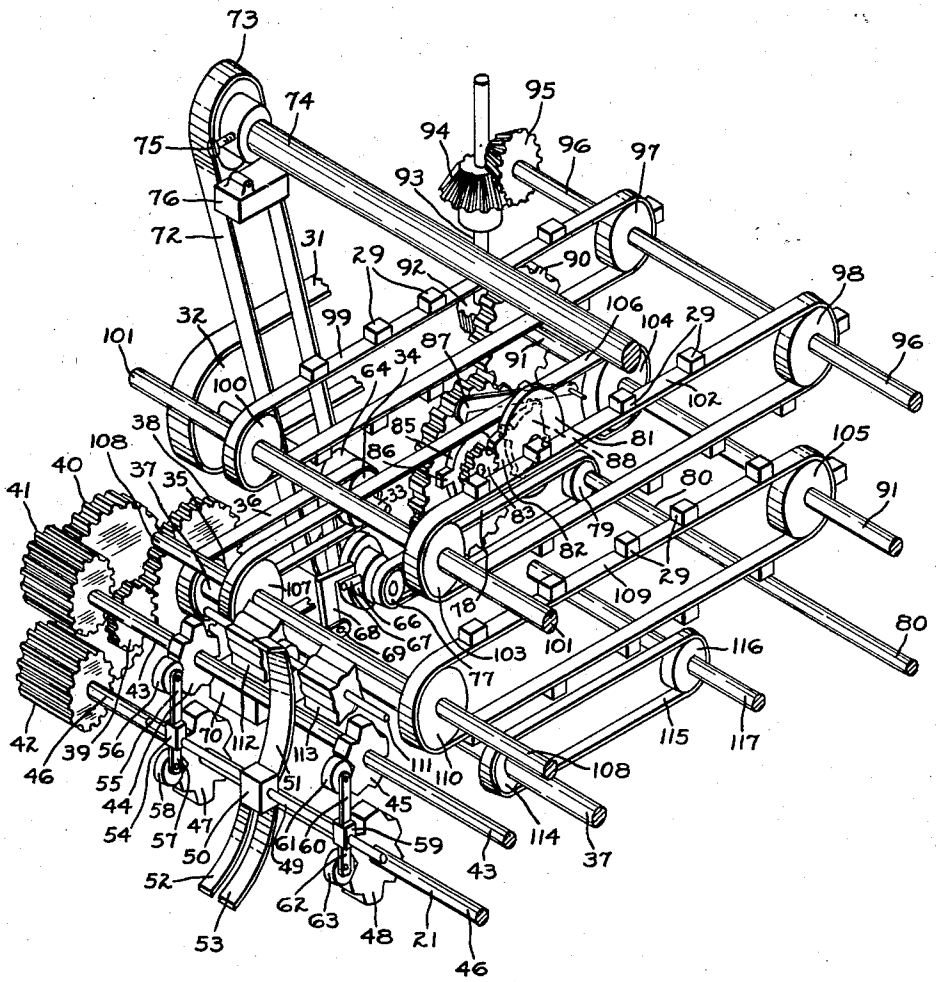


Fig. 3

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BANDING MACHINE

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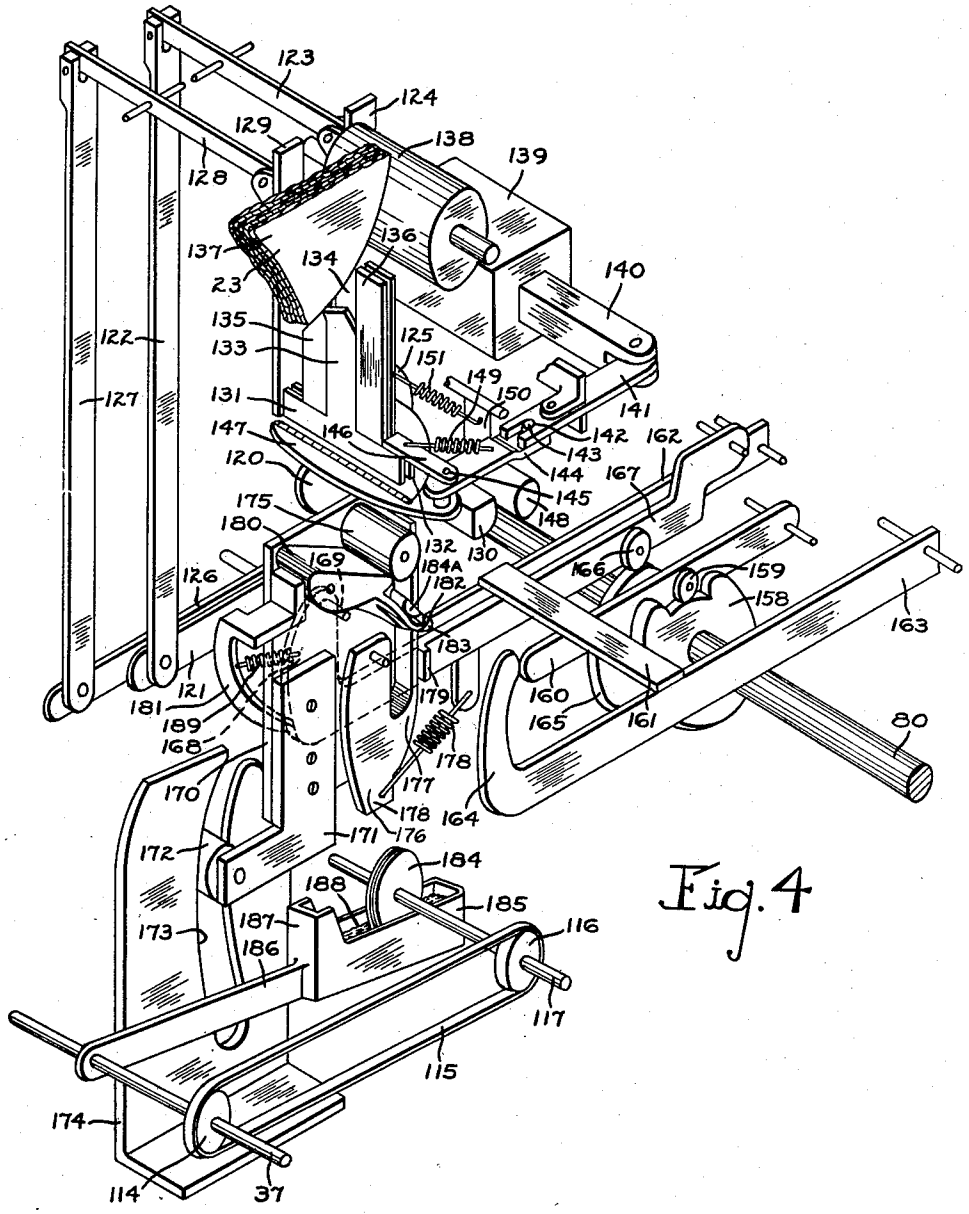


Fig. 4

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July 15, 1958 G. F. HOWATT 2,842,915

BANDING MACHINE

Filed Oct. 31, 1955 6 Sheets-Sheet 4

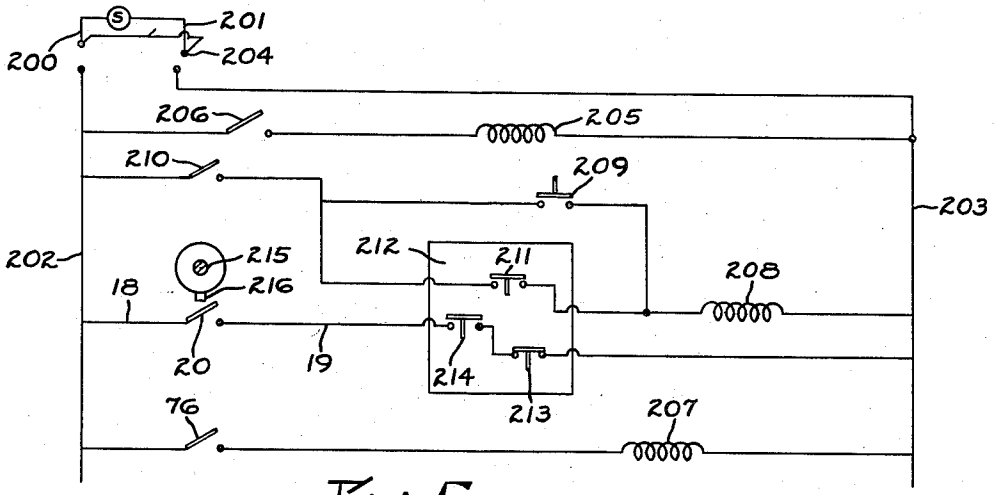


Fig. 5

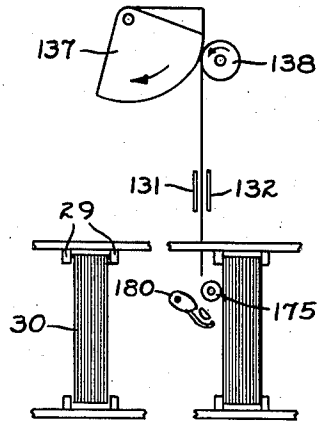


Fig. 6

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July 15, 1958 G. F. HOWATT 2,842,915

BANDING MACHINE

Filed Oct. 31, 1955 6 Sheets-Sheet 5

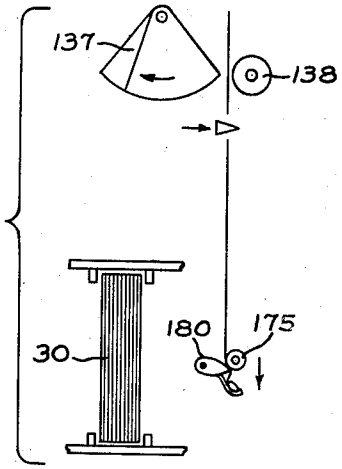


Fig. 7

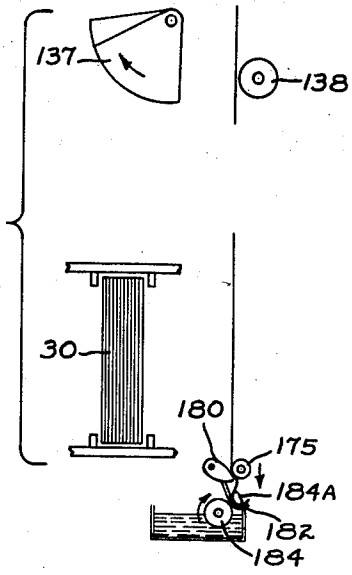


Fig. 8

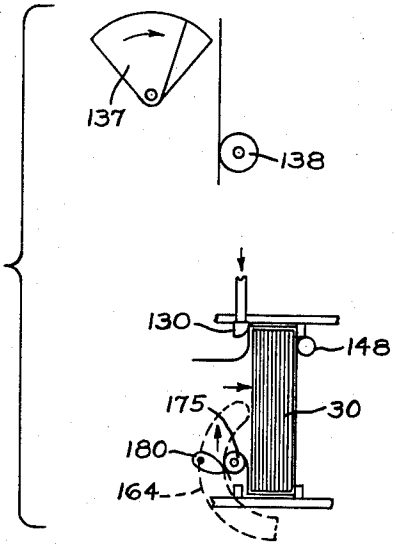


Fig. 9

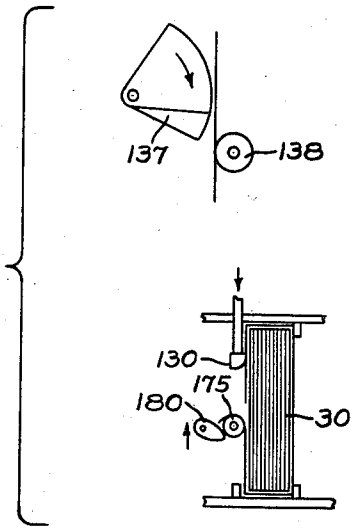


Fig. 10

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BANDING MACHINE

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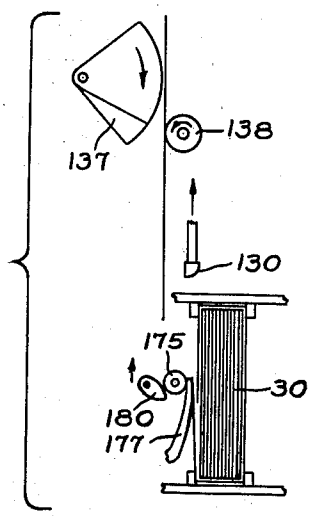


Fig. 11

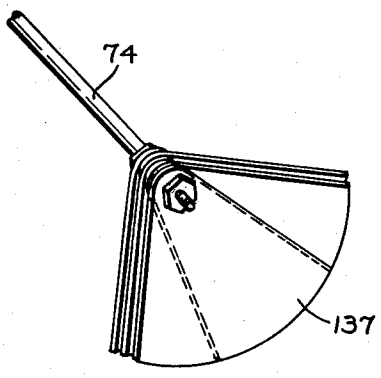


Fig. 12

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United States Patent Office

2,842,915

Patented July 15, 1958

2,842,915

BANDING MACHINE

George F. Howatt, Northboro, Mass., assignor to New England Envelope Manufacturing Company, Worcester, Mass., a corporation of Massachusetts

Application October 31, 1955, Serial No. 543,681

24 Claims. (Cl. 53—74)

This invention relates to a banding machine and more particularly to apparatus arranged to encircle a number of envelopes or the like with a paper band to form a pack.

In the art of envelope making, it is very often necessary to form envelopes into a packet containing a predetermined number of envelopes, this packet to be sold in the retail trade. Although there are several ways in which this may be done, the most satisfactory has proved to be enclosing the pack with a band of paper; this consists of a strip of paper or like material wrapped around the center of the pack of envelopes with the ends cemented or glued together. The advantages of this method of forming the package over such methods as the use of pressure sensitive tape, clips, rubber bands and the like are that it is inexpensive and that all of the envelopes are undamaged and may be used by the purchaser. For the most part, the process of forming packs of envelopes with paper bands has been carried on by hand; this procedure, involving, as it does, the human element, is expensive, slow and subject to error. Machines have been developed in the past to do this work, but without exception they have been heavy, bulky, and have called for permanent installation to handle the output of one envelope-making machine. It is seldom, however, that the entire output of a given machine may be desired to be banded. What has been needed in the art is a banding machine that is truly portable and may be moved from one machine to another as desired. Such a machine should also be inexpensive to manufacture, rugged in construction, and simple to maintain. The disabilities of the prior art are obviated in a novel manner in the present invention.

It is therefore an outstanding object of the invention to provide a portable banding machine.

It is another object of this invention to provide an inexpensive and rugged banding machine that is simple in construction and requires a minimum of maintenance.

A still further object of the instant invention is the provision of a banding machine embodying a procedure for wrapping and cementing which is adapted to high-speed operation.

Another object of the present invention is the provision of a banding machine involving a novel means for feeding a paper strip of predetermined length.

It is a further object of the invention to provide a banding machine having a novel means of feeding and assembling the envelopes prior to the application of the paper strip.

It is another object of this invention to provide a banding machine containing a novel means for applying cement to one end of the paper strip.

A still further object of the invention is the provision of a banding machine having means to assure accurate alignment of the cemented ends of the paper strip, to produce tight wrapping of the pack of envelopes without buckling thereof, to permit adjustment for a considerable range of sizes of envelopes and of number in each pack, and to allow high-speed operation for packaging the output of a high-speed envelope-making machine.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

The character of the invention, however, may be best understood by reference to certain of its structural forms, as illustrated by the accompanying drawings in which:

Figure 1 is a side elevational view of a banding machine embodying the principles of the invention,

Figure 2 is an end elevational view of the invention,

Figure 3 is an isometric projection of the driving arrangement of the invention,

Figure 4 is an isometric projection of certain operating parts of the invention,

Figure 5 is a schematic drawing of the electrical portions of the invention,

Figures 6 through 11 are schematic views of certain portions of the invention during successive portions of the operating cycle, and

Figure 12 is an isometric projection of a portion of the invention.

Similar reference numerals denote like parts in the several figures of the drawings.

In the description which follows, the expression "rearward" or similar expressions will indicate the direction of left in Figure 1, while "forward" will indicate the right in Figure 1, "drive side" will be the left side in Figure 2, and "operator's side" will indicate the right side in Figure 2.

Referring first to Figures 1 and 2, which best show the general features of the invention, the banding machine, indicated generally by the reference numeral **10**, is shown as comprising a box-like base **11** and an upper table **12** joined on the drive side by a vertical wall **13**. An electrical motor and gear reduction unit **14** is mounted on the drive side and is provided with a plug and cord arrangement **15** in the usual manner. A switch plate **16** is mounted on the operator's side of the base and is provided with switches, as will be explained more fully hereinafter.

The lower horizontal surfaces of the table **12**, the upper horizontal surfaces of the base **11** and the vertical surface of the wall **13** facing the operator's side serve to define a rectangular parallelepipedal space **17**, which shall be referred to as the operating space. Generally speaking, the operation of the machine is such that the envelopes or the like enter the operating space at the rearward end and pass through the space in a horizontal direction, eventually leaving at the forward end.

Connected to the machine **10** by means of two electrical leads **18** and **19** is a micro-switch **20** adapted to be mounted on an envelope-making machine or the like. An envelope feeding mechanism **21** is located at the rearward end of the machine while a banding mechanism **22** is located more or less centrally of the ends. On the upper portion of the table **12** is mounted a band-feeding apparatus **23** as well as an electrical timer **24**. The table **12** is adjustable vertically on the wall **13** and suitable guide means and loading means are provided for this purpose. A roll **25** of paper strip is rotatably supported on a suitable frame **26** extending from the vertical wall **13**.

A number of features of the invention are shown only in Figures 1 and 2. For instance, an aligning element **27** is fastened to the wall **13** and provides a finger extending longitudinally of the operating space **17** parallel to the wall **13** and spaced a short distance therefrom. Also shown clearly in these views are curved guiding fingers **28** extending downwardly from the table **12** and projecting rearwardly over the envelope feeding mechanism **21**. It is particularly to be noted the manner in

which dogs 29 extend downward from the table 12 and upwardly from the base 11 and serve to support a pack 30 of envelopes.

Referring next to Figure 3, wherein is particularly shown the driving arrangement of the invention, a belt 31 passes over a main drive pulley 32 and, in turn, over the output pulley of the motor and reduction unit 14, not shown in this view. The main drive pulley is keyed to a horizontal stub shaft 33 which passes through the wall 13. On the stub shaft is keyed a sprocket wheel 34 which is joined and serves to drive another sprocket wheel 35 through the medium of a chain 36. It should be noted that in most instances the appearance of the sprockets and chains shown in the drawings has been simplified somewhat for ease of presentation. The sprocket wheel 35 is keyed to a horizontal shaft 37; also keyed to the shaft 37 is a relatively large gear 38 which is in meshing engagement with a relatively small gear 39. Keyed to the same shaft as the gear 39 is a relatively large gear 40 which turns in meshing engagement with small gears 41 and 42. The gear 41 is mounted above and slightly forwardly of the gear 42 and is keyed to a horizontal upper feed roll shaft 43. The shaft 43 is provided with upper feed wheels 44 and 45 keyed thereto at spaced positions on opposite sides of the center of the shaft. The lower gear 42 is keyed to a horizontal lower feed roll shaft 46 on which are also keyed lower feed rolls 47 and 48 underlying the rolls 44 and 45, respectively. The rolls are of such a diameter and the spacing of their shafts is such that the peripheries of the lower rolls are very close to the peripheries of their respective upper rolls. Furthermore, the upper rolls 44 and 45 are notched to provide more positive feeding action as will be evident as this description progresses. The notches on the rolls 44 and 45 match one another for simultaneous action on the lower edges of an envelope. Mounted on the rearward end of the base 11 in a suitable manner is a fixed rod 49, on the center of which is fastened a supporting block 50; extending upwardly from the block is a curved guiding finger 51 and extending downwardly are curved fingers 52 and 53. Fixed to the rod 49 in the general plane of the feed wheels 44 and 47 is a supporting block 54 from which extends upwardly an arm 55 on the upper end of which is mounted a pressure wheel 56 engaging the feed wheel 44; a similar arm 57 extends downwardly from the block and has fastened to its lower end a pressure wheel 58 which engages the feed wheel 47. In like manner, a supporting block 59 is fixed to the rod in the plane of the feed wheels 45 and 48; an upwardly-extending arm 60 is provided at its upper end with a pressure wheel 61 adapted to engage the feed wheel 45, while a downwardly-extending arm 62 is provided at its lower end with a pressure wheel 63 which presses against the feed wheel 48 and rotates therewith.

Returning now to the stub shaft 33, a sprocket wheel 64 is keyed thereto and is connected in driving relation by a chain 65 to the input side of a one-way clutch 66 which is preferably of the roller-cam type. An actuating pin 67 extends from a portion of the clutch such that, when the pin is held in one place, no power is transmitted to the output side of the clutch. A latch 68 extends vertically within the base 11 and has a right-angle head at its upper end which engages and holds the pin 67 in one position. The latch is hingedly connected at its lower end to the bottom of the base 11 to move pivotally toward and away from the pin 67. At its intermediate portion the latch is pivotally attached to the plunger 69 of a solenoid 70 which is mounted on the bottom of the base 11. The output shaft of the clutch 66 extends horizontally through the main body of the clutch and on the end at the drive side of the machine is mounted a sprocket wheel 71 which is connected by a chain belt 72 to a sprocket wheel 73. The sprocket wheel 73 is keyed to a band-feeder shaft 74 and is provided with a contact member 75 adapted at a certain time in the rotation of the wheel and shaft to strike the actuating member of a micro-switch 76, for a purpose which will be explained more fully hereinafter.

The other end of the output shaft of the clutch 66 is provided with a sprocket wheel 77 which is keyed thereto and which is connected by a chain belt 78 to a sprocket wheel 79 keyed to a cam shaft 80. Keyed to the end of the cam shaft at the drive side of the machine is a segment wheel 81 having a gear segment 82 of relatively large pitch diameter extending from the periphery thereof. The gear segment, when in a generally horizontal position extending rearwardly of the machine, engages a small gear 83 keyed to a stub shaft 84. Also fastened to the stub shaft 84 adjacent the gear 83 is a cog wheel 85 having abutments 86 extending radially therefrom every 90 degrees. A latch member 87 is pivotally mounted to the frame of the base 11 and extends over the cam shaft 80 so that its free end overlies the cog wheel 85; the said free end is formed with a right-angle projection adapted on occasion to engage one of the abutments 86 to prevent the cog wheel and its associated equipment from rotating. The latch member is moved up and down by its engagement with a cam 88 which is shown in dotted lines as keyed to the cam-shaft 80. The cam 80 is provided with a single projection which serves to lift the latch member away from the cog wheel at an appropriate point in the rotation of the cam shaft 80. Keyed to the stub shaft 84 externally of the wall 13 is a relatively large gear 89 which engages a somewhat smaller gear 90 in driving relationship. The gear 90 is keyed to a forward lower carrier chain shaft 91. On the end of the shaft 91 which is adjacent the gear 90 is fastened a bevel gear, not shown, which engages a bevel gear 92 fastened to the lower end of a vertical shaft 93. On the upper portion of the shaft 93 is mounted for sliding adjustment a bevel gear 94 adapted to engage a bevel gear 95 which is keyed to the end of a forward upper carrier chain shaft 96. This shaft has two sprocket wheels 97 and 98 keyed thereto approximately in the planes occupied by the envelope feed wheels 44 and 45, respectively. The wheel 97 is connected by a carrier chain 99 to a sprocket wheel 100 which is keyed to a rearward upper carrier chain shaft 101, while the sprocket wheel 98 is connected by a carrier chain 102 to a sprocket wheel 103 also keyed to the shaft 101. The carrier chains are provided with outwardly extending dogs 29 located in pairs at definite intervals, as will be explained hereinafter. The forward lower carrier chain shaft 91 is also provided with sprocket wheels 104 and 105 keyed thereto in positions such that they lie substantially in the planes of the envelope feeding wheels 44 and 45, respectively. The sprocket wheel 104 is connected by a carrier chain 106 to a sprocket wheel 107 keyed to a rearward lower carrier chain shaft 108, while the sprocket wheel 105 is connected by a carrier chain 109 to a sprocket wheel 110 keyed to the shaft 108. The carrier chains 106 and 109 are provided with dogs 29 in a manner similar to the case of the chains 99 and 102.

Referring again to the shaft 37, it should be noted that it serves to drive an auxiliary feed shaft 111 by sprocket wheels and a chain and on the shaft 111 are mounted two auxiliary feed wheels 112 and 113. These wheels are provided with pointed abutments extending radially outwardly at widely-spaced intervals about their surface. The shaft 111 is located midway between the shafts 43 and 108 and the wheels are of such a diameter that a plane tangential to the wheels 44, 45, 107 and 110 would also be more or less tangential to the auxiliary wheels 112 and 113. Furthermore, the shaft 37 is provided with a sprocket wheel 114 which is connected by a chain belt 115 to another sprocket wheel 116 of similar size which is keyed to a glue wheel shaft 117, the purpose of which will be explained more fully hereinafter.

In Figure 4 is best shown the general features of the operative parts of the machine. The cam shaft 80 has a cam 120 keyed thereto on the drive side end of the machine. This cam is generally in the form of an eccentric ellipse and contacts one end of a lever 121 pivotally mounted for movement in a plane parallel to the wall 13. The other end of the lever is pivotally connected to the lower end of a vertical connecting rod 122. The upper end of the rod is hingedly attached to one end of a lever 123 which is pivoted at its intermediate portion and which is hingedly attached at the other end to a vertical plunger 124. The plunger is slidable in a vertical guideway, not shown. Another cam 125 is also keyed to the cam shaft 80 beside the cam 120; the cam 125 is in the general form of an eccentric ellipse and is attached to the cam shaft so that the point of maximum throw is considerably out of phase with that of the cam 120. The cam 125 rides against one end of a lever 126 which is pivoted centrally and which is hingedly connected to the bottom end of a vertical connecting rod 127. The upper end of the connecting rod is hingedly fastened to one end of a transverse lever 128. This lever is pivotally mounted in its central portion and hingedly fastened at the other end to a vertical plunger 129 which is mounted for vertical sliding in guides, not shown. The plunger 124 extends downwardly a considerable distance and is provided at its lower end with a pressure bar 130 which extends horizontally and transversely of the machine in the central portion thereof. The pressure bar has a cross-sectional shape which approximates a 90 degree segment of a circle, the curved portion facing forwardly and downwardly. The plunger 129 extends downwardly and terminates with two parallel guide plates 131 and 132; these plates are spaced a very small distance apart and are provided with vertical extensions 133 and 134, respectively. These extensions extend upwardly from the center of the plates and are curved away from each other at their upper ends. The extensions extend between parallel vertical plates 135 on one side and plates 136 on the other side, the space between these plates being the same as between the plates 131 and 132 and their extensions 133 and 134. The plates 135 and 136 are fixed to a transverse bracket 190 extending from the wall 13 of the machine. As is evident in the drawing, the band-feeding apparatus 23 is located adjacent the upper part of the plates 135 and 136 and a segment 137 forming a part thereof is located so that an extension of the gap between the plates would be tangential to the curved periphery of the segment. Furthermore, a pressure cylinder 138 is rotatably mounted to touch the said curved periphery at certain portions of the rotation of the segment. Mounted on the bracket 190 extending from the wall is a solenoid 139 having a plunger 140 which is connected by a vertical pivot pin to one end of a lever 141. This lever is pivotally connected in its intermediate portion to the bracket 190 and is provided at its other end with a longitudinal slot 142. In the slot resides a vertical pin 143 which extends upwardly from one end of a bell crank 144 the other end of which is keyed to a vertical hinge pin 145 which is rotatably mounted in a supporting abutment 146 fastened to the fixed plates 136 and, thus, indirectly to the bracket 190. Also keyed at one end to the hinge pin 145 is a knife 147 having a slightly-curved blade which normally lies slightly below the lower edge of the guide plates 131 and 132 and outside the vertical extension of the gap between them. A coil spring 149 connects the bell crank 144 to the bracket 109. A fixed knife, not shown, is mounted on the forward side of the plates 131 and 132 for engagement on occasion by the knife 147. Mounted on the underside of the table 12 is a horizontal pressure roll 148 which is on a general level with the pressure bar 130 but spaced forwardly therefrom. The pressure roll 148 is mounted at the lower end of an arm 150 which is hinged on a horizontal axis at its upper end and thus connected to the table 12. A coil spring 151 connects the intermediate portion of the arm to the table. Referring once more to the cam shaft 80, a cam 158 is keyed to the central portion thereof; this cam is of a generally circular shape but is provided with two substantial rounded cusps fairly close together at one side of the cam. The cam is contacted by a roller 159 rotatably mounted on the intermediate portion of a longitudinally-extending lever 160, the forward end of which is hingedly connected to the framework of the base 11 for movement in a vertical plane. The other end of the lever has resting thereon a crossbar 161 which extends between and is fastened to two spaced, parallel arms 162 and 163. The arms extend longitudinally of the machine and are connected to the base for vertical motion about a common pivotal axis. At its rearward end, the arm 163 is provided with an upstanding finger 164 and the arm 162 is provided with a similar finger, not shown.

The cam shaft 80 is provided with another cam 165 which is keyed thereto adjacent the cam 158 and between the arms 162 and 163. This cam is of a plain eccentric type having one portion with substantially more throw than the opposite portion and a smooth gradient from one portion to the other. The cam contacts a roller 166 rotatably mounted on an intermediate portion of a longitudinally-extending supporting arm 167 which is pivotally connected at its forward end to the base 11 for movement in a vertical plane. At its rearward end, the supporting arm is provided with an upstanding finger 168, this portion of the arm being shown in dotted lines in the drawing. A pivot pin 169 extends horizontally through the upper end of the finger and on this pin is swingably supported a mounting plate 170; the sole support for the mounting plate is the pivot pin which passes through the plate at its upper end and the plate hangs suspended in this manner. To the lower rearward portion of the plate is bolted an L-shaped guiding member 171 having a roller 172 rotatably mounted on its rearward extremity. The roller rides in a cam slot 173 which is formed in a vertical wall of a guide member 174 which is fastened to the bottom of the base 174. The slot is formed in such a manner that the mounting plate 170 is held substantially vertically despite movement of the supporting arm 167 about its pivotal axis. On the forward upper corner of the mounting plate 170 is rotatably mounted a gripping roller 175. On the plate on a level below the pivot pin 169 is swingably mounted a plate 176 having attached to its forward edge a resilient finger 177 which extends upwardly into contact with the roller 175. A coil spring 178 extends between the lower part of the plate 176 and an abutment on the supporting arm 167. This resiliently biases the finger into contact with the roller; however, a stop 179 extends outwardly from the supporting arm to limit motion of the plate and finger. The nature of the arrangement is such that the finger moves forwardly from the roller at certain parts of the cycle as will be explained. To the upper rearward portion of the mounting plate 170 is rotatably fastened a gripping jaw 180 which is of a generally tear-drop cross-sectional shape. The cusp or point of the jaw is located so that it strikes the surface of the gripping roller 175 when the jaw is rotated. The end opposite the point is provided with an arm 181 which extends downwardly, engages the upwardly-extending finger 168 of the supporting arm 167 on occasion, and is biased to such contact by a coil spring 189. Fastened to the lower surface of the jaw 180 and extending downwardly therefrom is a bifurcated member 182, each branch of which is provided with a barb 183 at its lower extremity. Fastened to the mounting plate 170 and underlying the roller 175 is a gluing anvil 184A having a rearwardly-facing cylindrical surface. The bifurcated member 182 is shaped to conform generally to this curved surface of the gluing anvil and, when the point of the jaw 180 strikes the roller 175, the bifurcated member is closely adjacent to the anvil. The space between the

bifurcations of the member 182 is sufficiently wide to admit a glue wheel 184. The glue wheel is keyed to the shaft 117, which has been described in connection with Figure 3, and is driven from the shaft 37. A glue box 185 is provided with a long arm 186, the rearward end of which is rotatably mounted on the shaft 37. The rearward end of the box is provided with a hood 187 to facilitate cleaning. The glue wheel 184 has its lower periphery normally resting in a body 188 of glue in the box.

In Figure 5 is shown schematically the electrical arrangement used in the invention. Lines 202 and 203 are connected to power lines 200 and 201 entering the system from the plug 15 which has been inserted in a source of 120 volt A. C. electricity. A main switch 204 serves to make or break the connection. The field coil 205 of the motor 14 is connected from the line 203 to one side of a starter switch 206, the other side of which is connected to the line 202. The coil 207 of the cutter solenoid 139 is connected on one side to the line 203 and on the other side to one side of the micro-switch 76 (see Figure 3), the other side of which is connected to the line 202. The coil 208 of the clutch-releasing solenoid 70 is connected on one side to the line 203 and on the other side through a normally-open push button switch 209 and a toggle switch 210 to the line 202. The switch 209 is by-passed by a line containing the normally-open output relay contactor 211 of a timer 212, which may be of the electronic type. The line 203 is connected through a normally-closed contactor 213 of the timer and a normally-open contactor 214 of the timer to one side of the micro-switch 20 (see Figure 1). The line 18 connects the micro-switch 20 to the power line 202, while the line 19 connects it to the timer. The shaft 215 is part of the counting mechanism of an envelope-making machine and is provided with a dog 216 set to strike the contactor of the micro-switch 20 when a predetermined number of envelopes have been made.

In Figure 12 is shown the manner in which the band-feeding segment 137 is constructed. It is made up of a number of separate plates which are interleaved together and held on the shaft 74 by nuts. Each plate subtends a circular sector which gives a peripheral length equal to the minimum length of paper band that will be used. The length of band which is to be metered is determined by the adjustment of the plates to give a greater or lesser peripheral length for the entire segment.

The operation of the apparatus of the invention will now be readily understood in view of the above description. The banding machine 10 is placed at the end of an envelope-making machine from which finished envelopes are being expelled one-by-one. The rearward end of the banding machine is located adjacent the point of exit of the envelopes from the envelope-making machine. Each envelope strikes the forward sides of the fingers 52 and 53 and is seized between the feed wheels 47 and 48 and their respective pressure rollers 58 and 63. The feed wheels are revolved at an extremely high speed because of the drive arrangement. The main switch 204 has been closed, so that power appears across the lines 202 and 203; the starter switch 206 has been closed, so that current passes through the coil 205 of the motor 14, so that the motor is running and is driving the pulley 32 through the belt 31. The shaft 33 is, thus, driven continuously and, of course, it carries the wheel 34 with it. The wheel 34 drives the wheel 35 and the shaft 37 with it and power is transmitted from gear 38 on the shaft 37 to gear 43 and gear 40; gear 40 drives the gears 41 and 42 on the shafts 43 and 46 respectively, thus driving the feed wheels. The feed wheels, as has been stated, are driven at very high surface speed, such speed being greater than the speed at which the envelopes leave the envelope-making machine so that there is no danger of one envelope catching up with its predecessor. The envelope passes from the feed wheels 47 and 48 to the feed wheels 44 and 45 with their respective pressure rolls 56 and 61. The envelope is therefore given a strong upward thrust and, as it leaves the feed rolls 44 and 45, the lower edge catches in the notches of the upper feed wheel and the envelope is given an additional thrust. The envelope continues to move upwardly and slightly forwardly toward the operating space 17. The finger 51 projects slightly forwardly between the feed wheels 44 and 45, so that each envelope is given a slight buckle as it moves upwardly; this tends to promote better engagement between the bottom edge of the envelope and the notches of the feed wheels. It is given a last kick by the auxiliary feed wheels 112 and 113 which are driven from the continuously-rotating shaft 37. As the envelope moves upwardly toward the operating space it is prevented from moving rearwardly by the guide finger 51 and by the guide fingers 28; the edges of successive envelopes are aligned by the element 27. The carrier belts 99, 102, 106 and 109 are stationary at this point and four pairs of dogs 29 are located adjacent the rearward entrance to the operating space to receive successive envelopes, the rearward dogs not having traveled around the sprocket wheels at this time. Successive envelopes accumulate behind the forward dogs and form a pack. The counter on the envelope-making machine rotates the shaft 215, carrying the dog 216; when the preselected number of envelopes has passed out of the envelope-making machine, the dog 216 strikes the actuator of the micro-switch 20 and current passes through the coil of the initiating relay 214 of the timer 212. At the end of the predetermined time delay, the contactors of the output relay 211 close and permit current to pass through the coil 208 of the solenoid 70, the switch 210 having been previously closed by the operator. At the same time the contactors of the relay 213 open, permitting the relay 214 to become deactivated, so that the timer is ready for the next cycle. The contactors of the relay 211 remain closed for only a short time to allow the solenoid 70 to be energized and then they open again to be ready for the next cycle. The timer 212 is wired internally to perform these operations, but, of course, the actual construction of the timer is not part of the present invention and is not shown or described in detail. It should be noted that the timer is constructed so that the contactors of the output relay 211 open for re-setting the timer only if the micro-switch 20 is open once more; if, however, the operator stops the envelope-making machine with the dog 216 holding the micro-switch continuously closed, the contactors of the relay 211 will remain closed.

The energization of the coil 208 of the solenoid 70 causes the plunger 69 to move rearwardly of the machine, carrying the latch 68 with it. The input side of the clutch 66 is being driven continuously by the motor 14 through the chain 31, the pulley 34, the stub shaft 33, the wheel 64 and the belt 65. When the latch 68 is withdrawn from the pin 67, the output side of the clutch revolves, carrying the pin 67 and the wheels 77 and 71 with it. Since the solenoid 70 is deenergized shortly after the pin 67 is released, the latch is returned to the forward position before the pin returns; when the output side of the clutch has completed one revolution, the pin strikes the latch and the clutch ceases to transmit power. It can be seen, then, that the output side of the clutch 66 makes a single revolution every time the micro-switch 20 is closed or, in other words, every time the predetermined number of envelopes leaves the envelope-making machine and enters the banding machine.

The single revolution of the output side of the clutch and of the wheel 77 produces a similar single revolution of the cam shaft 80 through the medium of the belt 78 and the wheel 79. The segment wheel 81 makes a single revolution with the cam shaft and, at a certain point in its revolution, the gear segment 82 engages the gear 83,

turning the shaft 84, the gear 89 and the gear 90. The turning of the gear 90 produces a similar effect on its shaft 91 and the lower carrier chains 106 and 109. The turning of the shaft 91 operates through the bevel gear attached to its end, the bevel gear 92, the vertical shaft 93, the bevel gear 94 and the bevel gear 95 to revolve the shaft 96 and to move the upper carrier chains 99 and 102. The gearing is selected so that the carrier chains move such an amount that each pair of dogs 29 occupies the position formerly occupied by the pair of dogs ahead of it on the chain. Successive movements of the carrier chains carries the packs of envelopes forwardly through the operating space where, at one position they are operated on by the banding mechanism 22 and then move forward to be discharged. The same single revolution of the output side of the clutch that produced the above effects also turns the wheel 71, thus driving the shaft 74 through the medium of the belt 72 and the wheel 73. At a certain point in the revolution of the shaft 74, the contact member 75 strikes the actuating element of the micro-switch 76 and permits current to pass through the coil 207 of the solenoid 139, thus actuating the cutter.

It should be noted that as the segment wheel 81 revolves, the cam 88 on the cam shaft revolves also. Just before the gear segment 82 engages the gear 83, the protuberance on the cam 88 engages the latch 87 and lifts it clear of the abutment 86 on the cog wheel 85. The shaft 84 is then free to turn. The latch 87 is dropped soon after revolution begins and catches the next abutment; the abutments are spaced to permit the full effect of the engagement of the segment gear 82 before the locking engagement of the latch and abutment. This locking engagement prevents overriding of the apparatus due to the inertia of the parts.

The single revolution of the cam shaft 80 causes a similar revolution of the cam 125, thus raising and lowering the end of the lever 126 contacted thereby, lowering and raising the other end, lowering and raising the connecting rod 127, raising and lowering the end of the lever 128 pivoted to the rod and, ultimately, lowering and raising the plunger 129; this motion is transmitted to the guide plates 131 and 132 and their associated extensions 133 and 134. The cam 120 turns through one revolution also and acts through the lever 121, the connecting rod 122 and the lever 123 to produce a lowering and raising of the plunger 124 which carries the pressure bar 130 with it. The single revolution of the cam shaft produces a like effect on the cam 153 which acts through the roller 159, the arm 160 and the cross-bar 161 to move the arms 162 and 163 through a rotational movement up and down about their pivotal axis, their fingers 164 taking part in the same motion. The cam 165 partakes of the same single revolution with the cam shaft and acts through the roller 166 to swing the supporting arm 167 up and down about its pivotal axis. As the arm swings up and down, the mounting plate 170 swings about its pivot pin 169 because its lower end it constrained to the movement dictated by the movement of the roller 172 in the slot 173. The slot is formed in such a manner that the mounting plate maintains successive positions despite the accurate path through which the pivot pin 169 passes, which positions are such that the gripping jaw 180 and the gripping roller 175 move substantially vertically up and down together. The arm 181 moves toward the finger 168 of the supporting arm and this surface is so formed that, whereas the jaw 180 normally presses against the roller 175, the arm 181 contacts the finger 168 and the jaw is separated from the roller slightly when the jaw and roller approach their uppermost position. When the point of the jaw 180 rests against the roller, however, the bifurcated member 182 is closely adjacent the gluing anvil 184A. The finger 177 rests against the roller 175 except during one portion of the cycle when the nature of the arrangement

causes the finger to move forwardly away from the roller; then the finger strikes the stop 179 and is given a more substantial movement forwardly from the roller. At the bottom portion of the up-and-down motion of the mounting plate, the bifurcated member 182 is lowered over the glue wheel 184 and the glue wheel passes through the bifurcations and approaches the gluing anvil 184A.

The operation of the banding mechanism 22 will best be understood by reference to the diagrams shown in Figures 6 through 11 taken in conjunction with Figure 4. In Figure 6, the parts are in the relationship which they are to be found at the instant the pin 67 of the clutch 66 is released and the cam shaft 80 begins its single revolution. A pack of envelopes has just been banded and a new pack awaits that operation. The gripping jaw 180 and the roller 175 are near the top of their vertical reciprocal movement and the guide plates 131 and 132 are near the bottom of their up-and-down motion. The segment 137 has already fed a considerable strip or band of paper downwardly from the roll 25 by rotating in pressure contact with the pressure cylinder 138. The paper band is held vertically by the guide plates 131 and 132 and their extensions 133 and 134, as well as by the fixed vertical plates 135 and 136. It might be said that the guide plates 131 and 132 serve to carry the bottom end of the paper band downwardly, while the segment 137 meters an exact amount. At the top of their movement, the jaw 180 and the roller are not clamped together and the end of the paper band is free to pass between them and slide down the bifurcated member 182 until the end strikes the barb 183. The gripping jaw and roller start their downward motion at a point, as indicated in Figure 7, the paper is clamped between the jaw and roller. The segment 137 has rotated until it no longer bears against the pressure cylinder 138 and, so, it no longer feeds paper strip downwardly. At that point the contact member 75 strikes the actuating member of the micro-switch, thus energizing the solenoid 139. The solenoid plunger 140 is drawn inwardly. The knife 147 moves across the paper band and cuts it. As shown in Figure 8, the gripping jaw and roller move downwardly still farther and at the bottom of the stroke the gluing roller passes between the bifurcations in the member 182. The end of the paper band is pressed upwardly against the anvil 184A. It may be noted that the glue wheel 184 is grooved and the ungrooved portions of the periphery are spaced apart approximately a third of the width of the strip, so that glue is applied in two narrow parallel stripes to the center of the band. Furthermore, the curvature of the anvil and the position of the barbs 183 assure that the stripes of glue does not extend to the extreme end of the band, but stops short of the end by a good distance. At this point in the cycle, the segment 137 continues to rotate, while the end of the strip hanging down from the roll 25 is stationary and lies beside the pressure cylinder 138. In Figure 9 it will be observed that the cam shaft 80 has rotated to the point where the gear segment 82 has engaged the gear 83 and has moved the carrier chains forward at high rate of speed. The dogs 29 carry the unbended pack 30 of envelopes forwardly and the pack strikes the intermediate portion or bight of the length of paper band. The lower end of the band is clamped tightly by the gripping jaw and roller, but the upper end, which has just been cut, is free to move downwardly. In Figure 9, the gripping jaw and roller are moving upwardly over the rearward face of the pack and are carrying the lower end of the band with them. The pressure bar 130 has moved downwardly and is pressing the upper end of the band downwardly over the rearward face of the pack. The effect of the gripping jaw and roller on the one hand and the pressure bar on the other hand pulling the band in opposite directions is to pull it tightly around the pack. The pressure roll 148 is resiliently pressed against the upper center of the forward face of the pack.

Also, the arms 162 and 163 move upwardly with their fingers 164 and press against the center of the pack to prevent the rearward buckling of the pack which would otherwise take place.

In Figure 10, the gripping jaw and roller have progressed upwardly still further. The upper end of the band lies flat against the rearward face of the pack and extends well below the center. The gripping jaw has just moved away from the roller, thus releasing the lower end of the band to which glue has been applied. The segment 137 has rotated until it is just contacting the pressure cylinder 138 and is beginning to feed another length of paper band downwardly. In Figure 11, the gripper jaw and roller have proceeded upwardly still further and the roller has rolled the glued lower end of the band over the upper end. The finger 177 moves forwardly at this point and presses on the glued joint for a period of time. The pressure bar 130 has moved upwardly out of the way and the segment 137 has already fed a considerable part of the paper band downwardly ready to be used on the next pack. At this point in the cycle, the pin 67 strikes the latch 68 and the clutch 66 no longer transmits power from the motor 14. The parts of the banding mechanism 22 come to a complete stop and wait for the actuation of the micro-switch 76 for the start of another cycle.

In view of the above description, it will be realized that the timer 212 is inserted in the electric circuit to assure that the last envelope in the predetermined number has sufficient time to leave the envelope-making machine and be moved into its pack before the clutch is released and the next banding cycle begins.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by Letters Patent is:

1. A banding machine for use with envelopes, comprising: feed wheels for introducing envelopes one at a time into the machine, means for collecting the envelopes to form a pack, means connected to the feed wheels for driving them at high speed, a clutch having a driven input side, means for engaging the clutch for one revolution of its output side, a band-feeding mechanism connected to the said output side of the clutch, a banding mechanism located in the path of travel of the packs and connected to the said output, the banding mechanism including a gripping jaw movable across one face of a pack from one extreme position where it grasps a free end of the band to a second extreme position where glue is applied to said end, means causing the pack to move quickly into the bight of the band after the jaw reaches the said second extreme position, the jaw then returning to the said one extreme position while passing over the other side of the pack.

2. A banding machine for use with envelopes, comprising: feed wheels for introducing envelopes one at a time into the machine, means for collecting the envelopes to form a pack, means connected to the feed wheels for driving them at high speed, a motor, a clutch having its input side connected to the motor, means for engaging the clutch for one revolution of its output side, a band-feeding mechanism connected to the said output side of the clutch, carrier belts connected to the said output for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to the said output, the banding mechanism including a gripping jaw movable across one face of a pack from one extreme position where it grasps a free end of the band to a second extreme position where glue is applied, means causing the pack to move quickly into the bight of the band after the jaw reaches the said second extreme position, the jaw then returning to the said one extreme position while passing over the other side of the pack.

3. A banding machine for use with envelopes, comprising: a motor, means for collecting envelopes introduced into the machine to form a pack, a clutch having its input side connected to the motor, means for engaging the clutch for one revolution of its output side, a band-feeding mechanism connected to the said output side of the clutch, carrier belts connected to the said output for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to the said output, the banding mechanism including a gripping jaw movable across one face of a pack from one extreme position where it grasps a free end of the band to a second extreme position where glue is applied to said end, means causing the pack to move quickly into the bight of the band after the jaw reaches the said second extreme position, the jaw then returning to the said one extreme position while passing over the other side of the pack, and a bar adapted to move across the other face of the pack to press the other end of the band thereagainst.

4. A banding machine for use with envelopes, comprising: a motor, feed wheels for introducing envelopes one at a time into the machine, means for collecting envelopes to form a pack, means directly connecting the motor to the feed wheels for rotation at high speed, a clutch having its input side connected to the motor, means for engaging the clutch for one revolution of its output side, a band-feeding mechanism connected to the said output side of the clutch, means connected to the said output for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to the said output, the banding mechanism including a gripping jaw movable across one face of a pack from one extreme position where it grasps a free end of the band to a second extreme position where glue is applied to said end, means causing the pack to move quickly into the bight of the band after the jaw reaches the said second extreme position, the jaw then returning to the said one extreme position while passing over the other side of the pack, and means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch.

5. A banding machine for use with envelopes, comprising: a motor, feed wheels for introducing envelopes one at a time into the machine, means for collecting the envelopes to form a pack, means directly connecting the motor to the feed wheels for rotation at high speed, a clutch having its input side connected to the motor, means for engaging the clutch for one revolution of its output side, a band-feeding mechanism connected to the said output side of the clutch, carrier belts connected to the said output for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to the said output, the banding mechanism including a gripping jaw movable across one face of a pack from one extreme position where it grasps a free end of the band to a second extreme position where glue is applied to said end, means causing the pack to move quickly into the bight of the band after the jaw reaches the said second extreme position, the jaw then returning to the said one extreme position while passing over the other side of the pack.

6. A banding machine for use with envelopes, comprising: means for collecting envelopes to form a pack, a clutch having a driven input side, means engaging the clutch for one revolution of its output side, a band-feeding mechanism connected to the said output side of the clutch, means connected to the said output side of the clutch for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to said output side of the clutch, the banding mechanism including a jaw

movable across one face of a pack from one extreme position where it grasps a free end of the band to a second extreme position where glue is applied to said end, means causing the pack to move quickly into the bight of the band after the jaw reaches the said second extreme position, the jaw then returning to the said one extreme position while passing over the other side of the pack, and means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch.

7. A banding machine for use with envelopes, comprising: means for collecting envelopes to form a pack, a roller-cam clutch having a driven input side, means associated with the clutch for bringing about one revolution of its output side, a band-feeding mechanism connected to the said output side of the clutch, means connected to the said output side of the clutch for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to said output side of the clutch, the banding mechanism including a jaw movable across one face of a pack from one extreme position where it grasps a free end of the band to a second extreme position where glue is applied to said end, means causing the pack to move quickly into the bight of the band after the jaw reaches the said second extreme position, the jaw then returning to the said one extreme position while passing over the other side of the pack, and means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch.

8. A banding machine for use with envelopes, comprising: means for collecting envelopes to form a pack, a clutch having a driven input side, means engaging the clutch for one revolution of its output side, a band-feeding mechanism connected to the said output side of the clutch, means connected to the said output side of the clutch for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to said output side of the clutch, the banding mechanism including a pivoted jaw and a roller movable across a face of a pack from one extreme position where they grasp a free end of the band to another extreme position where glue is applied to said end, and means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch.

9. A banding machine for use with envelopes, comprising: means for collecting envelopes to form a pack, a clutch having a driven input side, means engaging the clutch for one revolution of its output side, a band-feeding mechanism including a circular segment connected to the said output side of the clutch and a pressure cylinder which the segment engages, means connected to the said output side of the clutch for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to said output side of the clutch, the banding mechanism including a jaw movable across a face of a pack from one extreme position where it grasps a free end of the band to another extreme position where glue is applied to said end, and means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch.

10. A banding machine for use with envelopes, comprising: means for collecting envelopes to form a pack, a roller-cam clutch having a driven input side, means associated with the clutch for bringing about one revolution of its output side, a band-feeding mechanism including a circular segment connected to the said output side of the clutch and a pressure cylinder which the segment engages, means connected to the said output side of the clutch for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to said output side of the clutch, the banding mechanism including a pivoted jaw and a roller movable across a face of a pack from one extreme position where they grasp a free end of the band to another extreme position where glue is applied to said end, and means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch.

11. A machine for applying a band to an article, comprising: means for feeding a predetermined length of band, means for moving the article in a rectilinear path, means for gripping one end of the band and carrying it across the path of the article, means for applying glue to the end of the band, means causing the article to move into the bight of the band so that the bight lies against one side of the article and the ends reside on the other side, means for pressing the ungripped end of the band against the article, and means causing the gripping means to move across the article and to press its end of the band onto the other end while maintaining the band in tension.

12. A banding machine comprising a supporting arm pivotally mounted at one end, cam means acting on the intermediate portion of the arm to subject it to a swinging motion, a mounting plate pivotally mounted on the arm and partaking of its swinging motion, cam means acting on the said plate to cause it to move substantially rectilinearly without rotational movement, a gripping roller mounted on the plate, a gripping jaw mounted on the plate and having a portion adapted to be pressed against the roller, a gluing anvil fixed to the plate, a bifurcated member mounted on the said jaw and formed to cooperate with the anvil.

13. A banding machine as recited in claim 12 wherein the gripping jaw is provided with a finger which engages the supporting arm, the arm normally causing the jaw to press against the roller, but on occasion moving it out of contact with the roller.

14. A banding machine as recited in claim 12 wherein a pressure finger is pivotally fastened to the mounting plate and extends to the roller and resilient means is provided normally to bias the finger into pressure contact with the surface of the roller, means being provided during part of the cycle of swinging of the supporting arm to remove the finger from the roller.

15. A banding machine comprising a first pair of high-speed feed wheels mounted on a horizontal axis, a second pair of high-speed feed wheels mounted on a horizontal axis substantially above that of the said first pair, a first pair of endless carrier chains arranged with their upper runs lying in a horiozntal plane which is on a level with the top of the second pair of feed wheels, a second pair of endless carrier chains mounted above the first pair and having lower runs which are parallel to and spaced from the upper runs of the first pair, dogs fastened to the chains and extending outwardly therefrom, and means moving the chains simultaneously and intermittently.

16. A banding machine for envelopes or the like comprising a first pair of high-speed feed wheels mounted on a horizontal axis, a second pair of high-speed feed wheels mounted on a horizontal axis substantially above that of the said first pair, a first pair of endless carrier chains arranged with their upper runs lying in a horizontal plane which is on a level with the top of the second pair of feed wheels, a second pair of endless carrier chains mounted above the first pair and having lower runs which are parallel to and spaced from the upper runs of the first pair, dogs fastened to the chains and extending outwardly therefrom, and means moving the chains simultaneously and intermittently, means for collecting envelopes to form a pack, a clutch having a driven input side, means engaging the clutch for one revolution of its output side, a band-feeding mechanism connected to the said output side of the clutch, the endless carrier chains being connected to the said output side of the clutch for carrying packs of envelopes through

the machine, a banding mechanism located in the path of travel of the packs and connected to said output side of the clutch, the banding mechanism including a pivoted jaw and a roller movable across a face of a pack from one extreme position where they grasp a free end of the band to another extreme position where glue is applied to said end, and means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch.

17. A machine for applying a band to an article comprising a first pair of high-speed feed wheels mounted on a horizontal axis, a second pair of high-speed feed wheels mounted on a horizontal axis substantially above that of the said first pair, a first pair of endless carrier chains arranged with their upper runs lying in a horizontal plane which is on a level with the top of the second pair of feed wheels, a second pair of endless carrier chains mounted above the first pair and having lower runs which are parallel to and spaced from the upper runs of the first pair, dogs fastened to the chains and extending outwardly therefrom, and means moving the chains simultaneously and intermittently, means for feeding a predetermined length of band, the carrier chains moving the article in a rectilinear path, means for gripping one end of the band and carrying it across the path of the article, means for applying glue to the end of the band, means causing the article to move into the bight of the strip so that the bight lies against one side of the article and the ends reside on the other side, means for pressing the ungripped end of the band against the article, and means causing the gripping means to move across the article and to press its end of the band onto the other end while maintaining the band in tension.

18. A banding machine comprising a first pair of high-speed feed wheels mounted on a horizontal axis, a second pair of high-speed feed wheels mounted on a horizontal axis substantially above that of the said first pair, a first pair of endless carrier chains arranged with their upper runs lying in a horizontal plane which is on a level with the top of the second pair of feed wheels, a second pair of endless carrier chains mounted above the first pair and having lower runs which are parallel to and spaced from the upper runs of the first pair, dogs fastened to the chains and extending outwardly therefrom, and means moving the chains simultaneously and intermittently, a circular band-feeding segment mounted over the carrier chains for rotation about an axis passing through the apex, a pressure cylinder mounted for rotation about its axis, the axes of rotation of the segment and the cylinder being parallel, the circular periphery of the segment engaging the cylinder, the said means for initiating the chains also initiating a single revolution of the segment.

19. A banding machine comprising a first pair of high-speed feed wheels mounted on a horizontal axis, a second pair of high-speed feed wheels mounted on a horizontal axis substantially above that of the said first pair, a first pair of endless carrier chains arranged with their upper runs lying in a horizontal plane which is on a level with the top of the second pair of feed wheels, a second pair of endless carrier chains mounted above the first pair and having lower runs which are parallel to and spaced from the upper runs of the first pair, dogs fastened to the chains and extending outwardly therefrom, and means moving the chains simultaneously and intermittently, a supporting arm pivotally mounted at one end, cam means acting on the intermediate portion of the arm to subject it to a swinging motion between the pairs of chains, a mounting plate pivotally mounted on the arm and partaking of its swinging motion, cam means acting on the said plate to cause it to move substantially rectilinearly without rotational movement, a gripping roller mounted on the plate, a gripping jaw mounted on the plate and having a portion adapted to be pressed against the roller, a gluing anvil fixed to the plate, a bifurcated member mounted on the said jaw and formed to cooperate with the anvil.

20. A banding machine for use with envelopes, comprising: means for collecting envelopes to form a pack, a clutch having a driven input side, means engaging the clutch for one revolution of the output side, a band-feeding mechanism connected to the said output side of the clutch, means connected to the said output side of the clutch for carrying packs of envelopes through the machine, a banding mechanism located in th path of travel of the packs and connected to said output side of the clutch, the banding mechanism including a pivoted jaw and a roller movable across a face of a pack from one extreme position where they grasp a free end of the band to another extreme position where glue is applied to said end, means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch, a supporting arm pivotally mounted at one end, cam means acting on the intermediate portion of the arm to subject it to a swinging motion, a mounting plate pivotally mounted on the arm and partaking of its swinging motion, cam means acting on the said plate to cause it to move substantially rectilinearly without rotational movement, the roller being mounted on the plate, the pivoted jaw mounted on the plate and having a portion adapted to be pressed against the roller, a gluing anvil fixed to the plate, a bifurcated member mounted on the said jaw and formed to cooperate with the anvil.

21. A banding machine for use with envelopes, comprising: means for collecting envelopes to form a pack, a clutch having a driven input side, means engaging the clutch for one revolution of the output side, a band-feeding mechanism connected to the said output side of the clutch, means connected to the said output side of the clutch far carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to said output side of the clutch, the banding mechanism including a pivoted jaw and a roller movable across a face of a pack from one extreme position where they grasp a free end of the band to another extreme position where glue is applied to said end, means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch, the band-feeding mechanism consisting of a circular segment mounted for rotation about an axis passing through the apex, a pressure cylinder mounted for rotation about its axis, the axes of rotation of the segment and the cylinder being parallel, the circular periphery of the segment engaging the cylinder, and means for initiating a single revolution of the segment.

22. A banding machine for use with envelopes, comprising: means for collecting envelopes to form a pack, a clutch having a driven input side, means engaging the clutch for one revolution of the output side, a band-feeding mechanism connected to the said output side of the clutch, means connected to the said output side of the clutch for carrying packs of envelopes through the machine, a banding mechanism located in the path of travel of the packs and connected to said output side of the clutch, the banding mechanism including a pivoted jaw and a roller movable across a face of a pack from one extreme position where they grasp a free end of the band to another extreme position where glue is applied to said end, means associated with the completion of a pack of envelopes to initiate the single revolution of the output side of the clutch, the band-feeding mechanism feeding a predetermined length of band, the jaw and roller gripping one end of the band, means for applying the glue to the end of the band, means causing the pack to move into the bight of the strips so that the bight lies against one side of the pack and the ends reside on the other side, means for pressing the ungripped end of the band against the article, and means causing the jaw and roller to move across the pack and to press its end of the band onto the other end.

23. A banding machine comprising a supporting arm pivotally mounted at one end, cam means acting on the intermediate portion of the arm to subject it to a swinging motion, a mounting plate pivotally mounted on the arm and partaking of the swinging motion, cam means acting on the said plate to cause it to move substantially rectilinearly without rotational movement, a gripping roller mounted on the plate, a gripping jaw mounted on the plate and having a portion adapted to be pressed against the roller, a gluing anvil fixed to the plate, a bifurcated member mounted on the said jaw and formed to cooperate with the anvil, a band-feeding mechanism mounted over the arm comprising a circular band-feeding segment mounted for rotation about an axis passing through its apex and a pressure cylinder mounted for rotation about its axis, the axes of rotation of the segment and the cylinder being parallel, the circular periphery of the segment engaging the cylinder, and means for intiating a single revolution of the segment.

24. A machine for applying a band to an article, comprising: means for feeding a predetermined length of band, means for gripping one end of the band, means for applying glue to the end of the band, means causing the article to move into the bight of the band so that the bight lies against one side of the article and the ends reside on the other side, means for pressing the ungripped

end of the band against the article, and means causing the gripping means to move across the article and to press its end of the band onto the other end, the means for gripping one end of the band comprising a supporting arm pivotally mounted at one end, cam means acting on the intermediate portion of the arm to subject it to a swinging motion, a mounting plate pivotally mounted on the arm and partaking of its swinging motion, cam means acting on the said plate to cause it to move substantially rectilinearly without rotational movement, a gripping roller mounted on the plate, a gripping jaw mounted on the plate and having a portion adapted to be pressed against the roller, a gluing anvil fixed to the plate, and a bifurcated member mounted on the said jaw and formed to cooperate with the anvil.

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