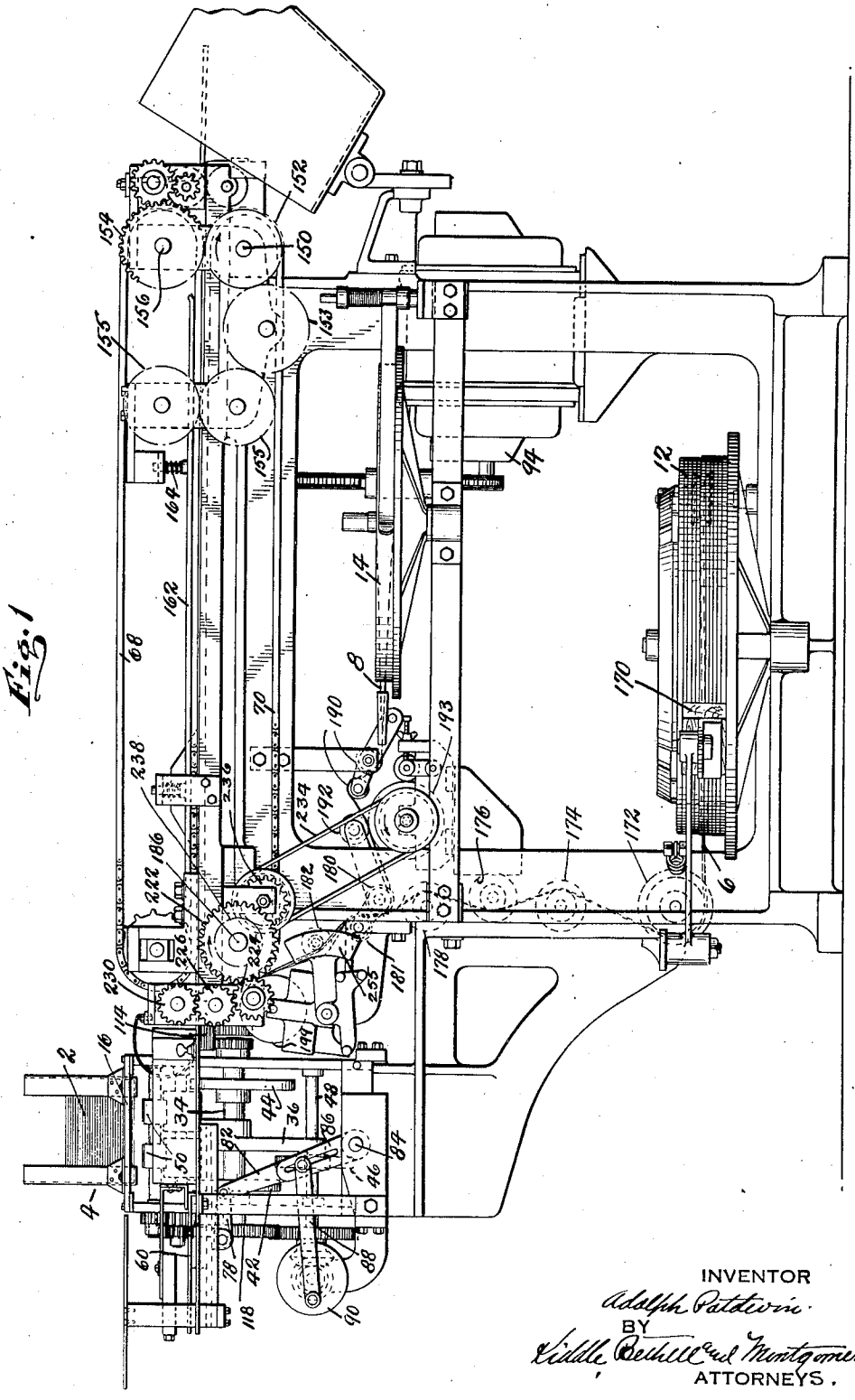
Oct. 24, 1939. A. POTDEVIN 2,177,117

METHOD OF AND APPARATUS FOR FORMING TYING STRIPS AND APPLYING THE SAME TO BAGS

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Fig. 1



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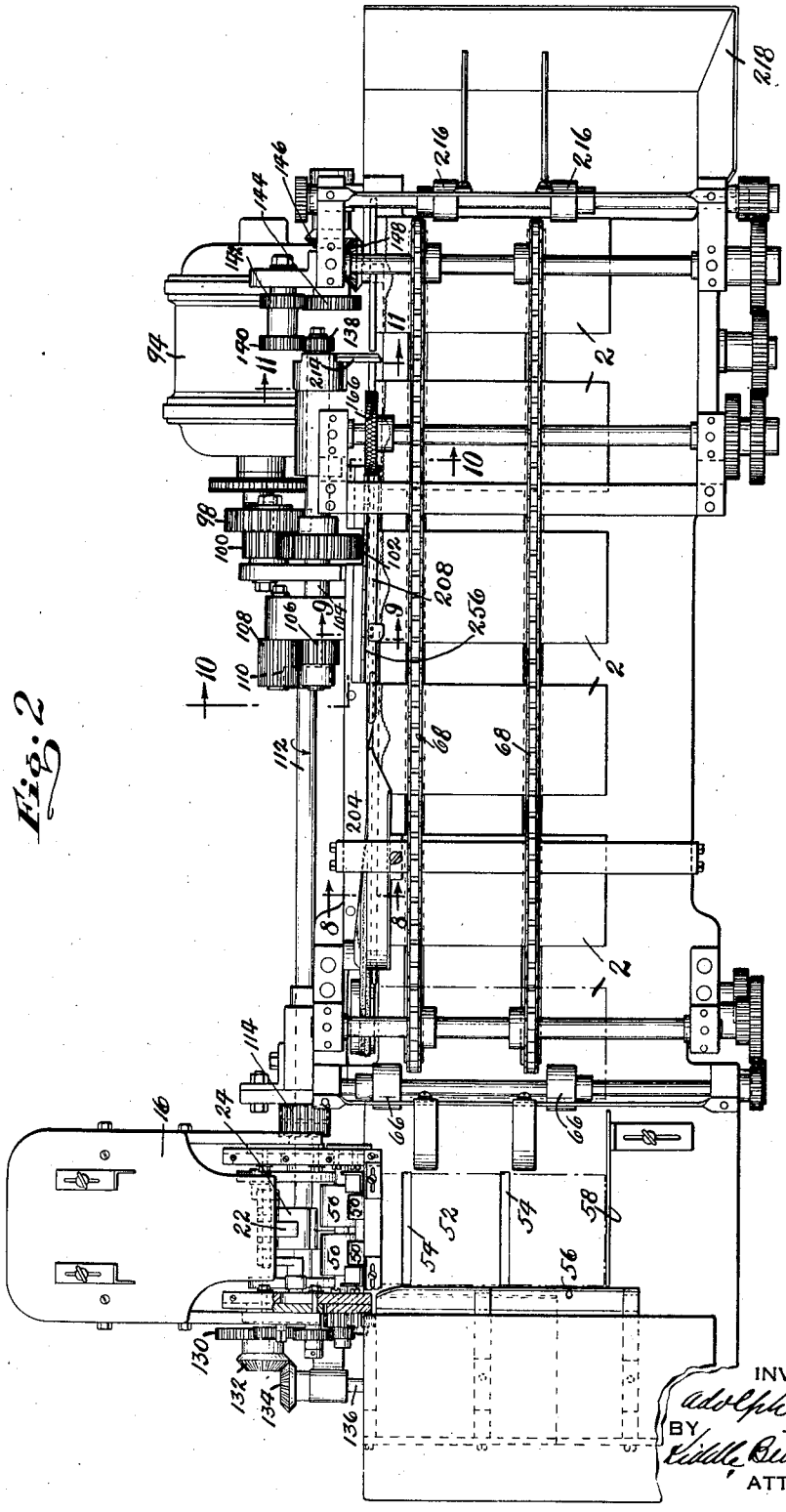


Fig. 2

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Fig. 4

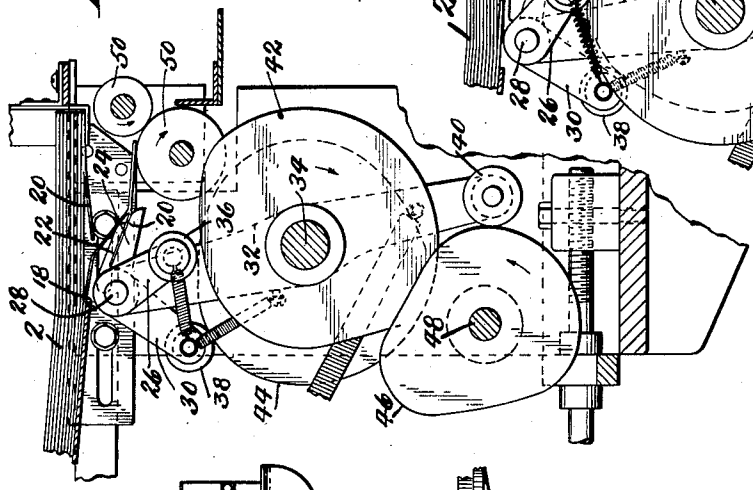


Fig. 5

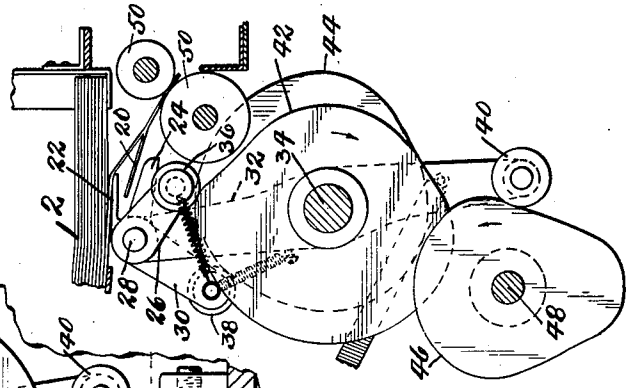
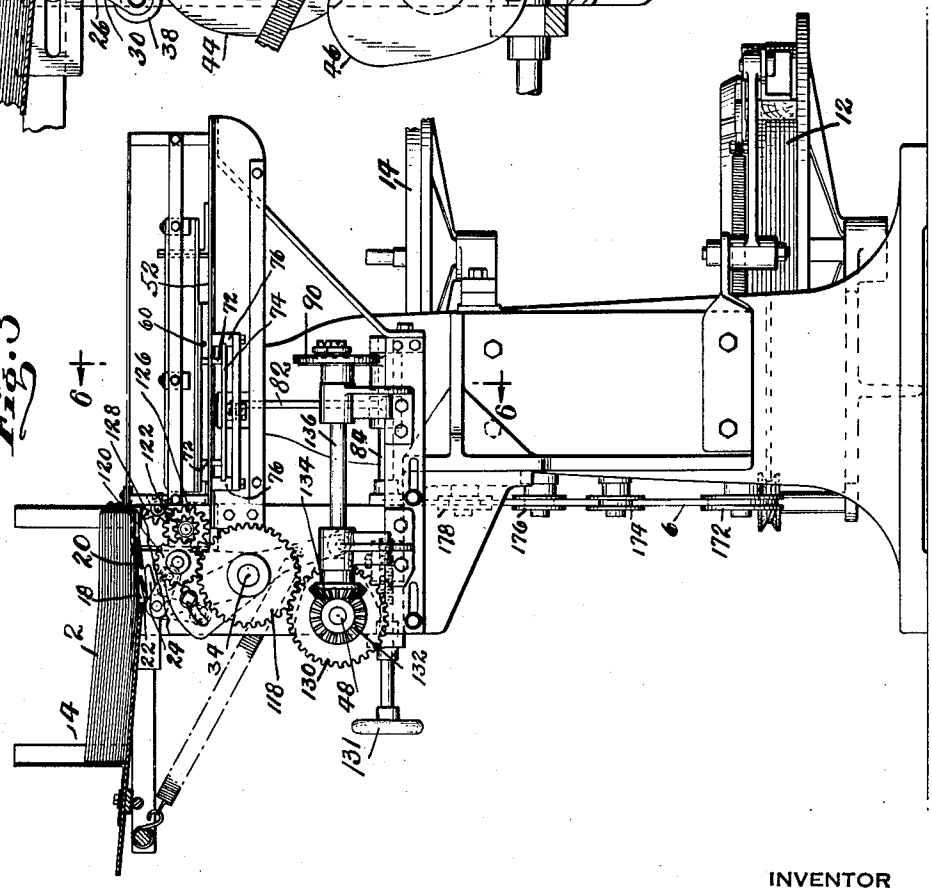


Fig. 3



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METHOD OF AND APPARATUS FOR FORMING TYING STRIPS AND APPLYING THE SAME TO BAGS

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Fig. 6

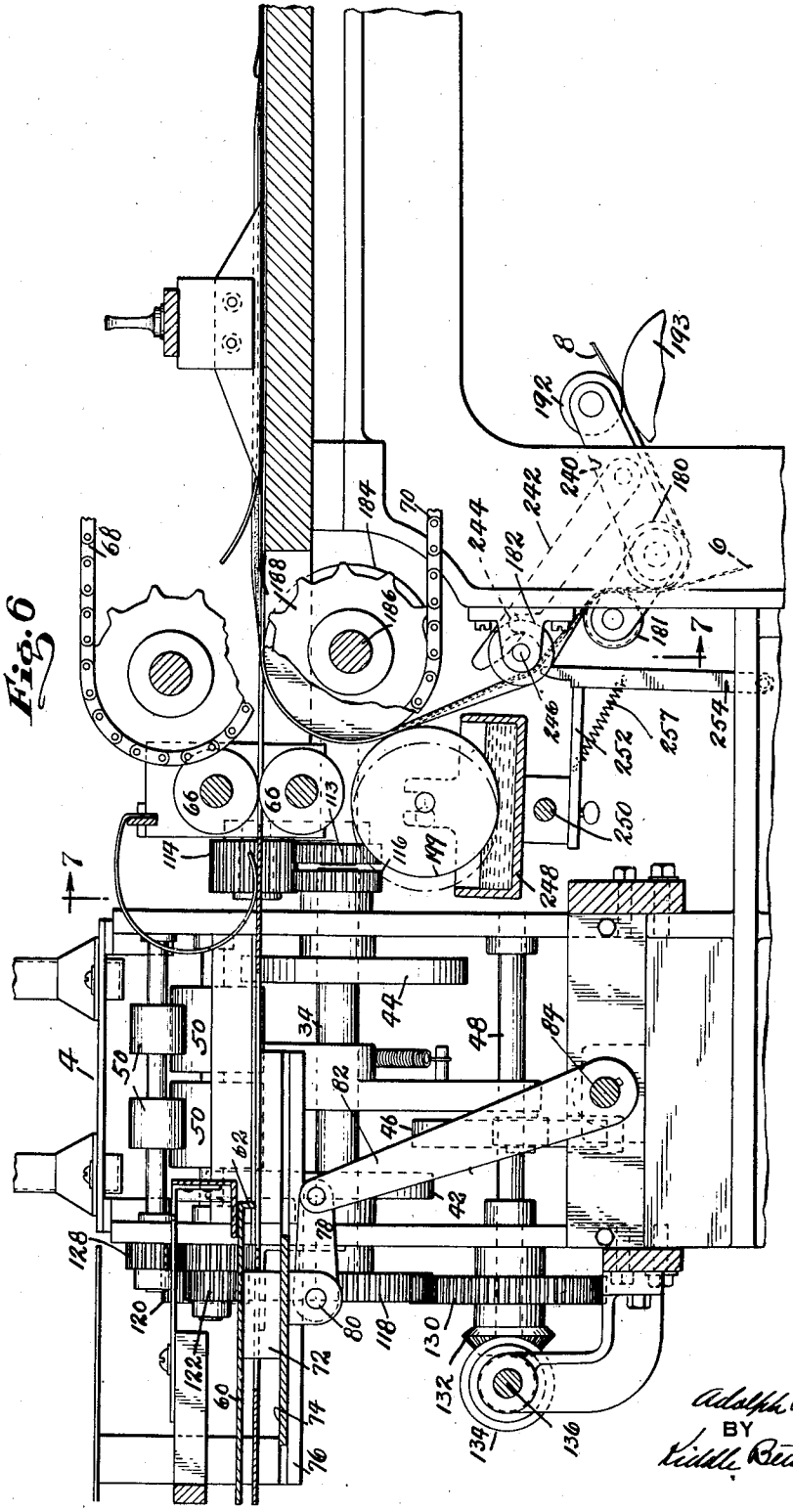
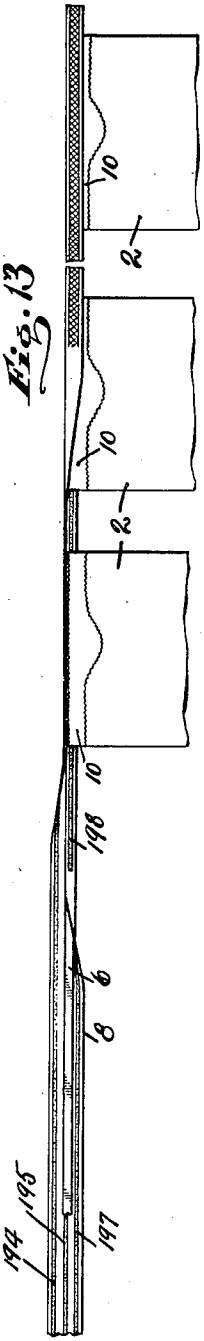


Fig. 13



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METHOD OF AND APPARATUS FOR FORMING TYING STRIPS AND APPLYING THE SAME TO BAGS

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Fig. 10

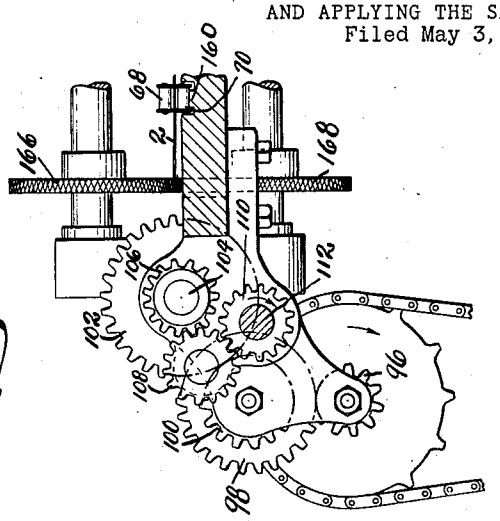


Fig. 11

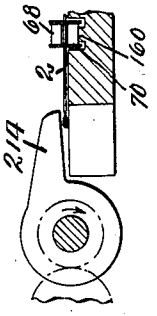


Fig. 8

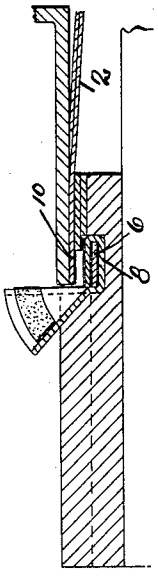


Fig. 9

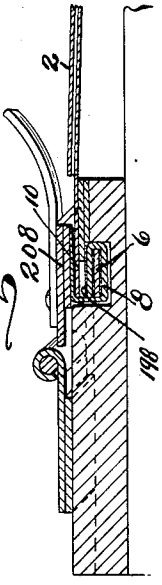
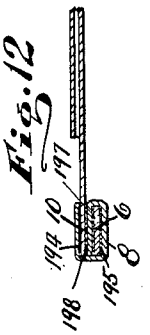


Fig. 7

Fig. 12



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UNITED STATES PATENT OFFICE

2,177,117

METHOD OF AND APPARATUS FOR FORMING TYING STRIPS AND APPLYING THE SAME TO BAGS

Adolph Potdevin, Garden City, N. Y., assignor to Potdevin Machine Company, Brooklyn, N. Y., a corporation of New York

Application May 3, 1937, Serial No. 140,436

10 Claims. (Cl. 93—8)

This invention relates to an improved and novel machine for applying a metal tie strip to the end of bags of the type known commercially as metal tie bags. In such bags a small metal strip extending transversely of the bag is applied to the open end of the bag and when the bag is to be closed the strip and bag end are rolled over upon the bag several times and the ends of the tie strip bent over the bag body. This holds the bag closed and does away with the use of twine or other tying means. An example of a metal tie bag is found in Patent No. 2,018,228, dated October 22, 1935.

The machine of this application is full automatic in its operation and is adapted to form the tie strips and apply the same to the bag in a continuous operation.

More specifically the present invention provides an automatic machine wherein paper tape and metal tape are continuously drawn from supply reels, the metal enclosed in the paper and the strip thus provided fed continuously through the machine adjacent the open end of the bags which are also being continuously advanced through the machine. As the tie strip and bags advance the strip is automatically attached to the bags, cut into proper lengths and the bags with the strip attached discharged successively from the machine.

In the accompanying drawings:

Fig. 1 is a side elevational view of a machine embodying my invention;

Fig. 2 is a plan view;

Fig. 3 is an end view of the machine taken at the charging end;

Fig. 4 is a part sectional elevational view of the cam mechanism by which the bags to which the tie strips are to be applied are fed forward into the machine;

Fig. 5 is a view of this same part of the machine but with the cams, etc., in a different position;

Fig. 6 is a section on the line 6—6 of Fig. 3 looking toward the feed end of the machine;

Fig. 7 is a section on the line 7—7 of Fig. 6;

Fig. 8 is a section on the line 8—8 of Fig. 2;

Fig. 9 is a section on the line 9—9 of Fig. 2;

Fig. 10 is a section on the line 10—10 of Fig. 2;

Fig. 11 is a section on the line 11—11 of Fig. 2;

Fig. 12 shows a section of an end of the completed bag; and

Fig. 13 illustrates the various stages of making up the tie strip and attaching the same to the end of the bags as the same are passing through the machine.

Referring to the drawings in detail: Bags 2 are taken from a magazine 4 located at the charging end of the machine and passed through the machine continuously while traveling laterally. During the advance of the bags a metal strip 6 enclosed in the paper tape 8 and constituting the tie strip is applied to the projecting flap 10 which is provided for this purpose at the open end of each bag.

The metal tape 6 and the paper tape 8 are taken from supply spools 12 and 14, respectively, the paper tape being folded about the metal strip as the two progress through the machine.

The supply bags 2 are stacked at the magazine 4 on a table or bed 16. The bags in the stack lie transversely of the machine, and are fed forward successively from the bottom of the stack, with the bag bottom in the lead, into position to be picked up by the forwarding mechanism which forwards the bags laterally toward the discharge end of the machine.

Referring particularly to Figs. 2, 3, 4 and 5 of the drawings, it will be seen that the magazine table or bed 16 is provided with an opening 18 in the bottom thereof, the bags being disposed on this table or bed so that the flap 20 of the bag bottom of the lowermost bag of the stack will sag downwardly through this opening, as seen in Fig. 3.

Beneath the magazine table or bed 16 are a pair of forwardly jaws designated 22 and 24. The jaw 22 is affixed to an arm 26, the jaw and arm being pivoted on a stud 28. The jaw 24 is affixed to arm 30 also pivoted on a stud 28 which is carried on the free end of a lever 32 pivoted intermediate its ends on shaft 34.

The free end of the arm 26 carrying the jaw 22 is provided with a cam follower 36, the free end of the arm 30 for the jaw 24 with a cam follower 38 and the free end of lever 32 with a cam follower 40. The cam follower 36 cooperates with a cam 42 and the cam follower 38 cooperates with a cam 44. Both of these cams are mounted on the shaft 34. The cam follower 40 cooperates with cam 46 on a shaft 48.

The operation of the jaws 22 and 24 and the various cams controlling the same will be described in full detail hereinafter but at this point I would like to say that this mechanism is so arranged that at the proper time the jaws 22 and 24 will close upon the flap 20 at the bottom end of the lowermost bag in the stack of bags and then pivot in a forward direction away from the magazine to drag the end of the bag out of the stack and move it forward sufficiently for the same

to be engaged between a pair of forwarding rollers 50 which are mounted to rotate about axes extending lengthwise of the machine, the jaws 22 and 24 upon delivering each bag to these rollers opening and then returning to their original position to receive the next bag.

The forwarding rollers 50 deposit each bag crosswise of the machine upon a table or bed 52 provided with slots 54 extending lengthwise of the machine. This table 52 is provided with a side plate 56 and an end plate 58 for promoting proper positioning of the bags on the table. These plates are adjustable so as to accommodate the machine to bags of different lengths as well as to bags of different widths.

As each bag is deposited upon the table or bed 52 it is engaged by a pusher 60 which is reciprocated lengthwise of the machine. The forward end of this pusher is bent downwardly, as seen in Fig. 6, to provide a flange 62 which engages the side of each bag as the same is deposited on the plate 52 to move the bag laterally lengthwise of the machine to forwarding rollers 66. The rollers 66 deliver the bags between upper and lower forwarding chains designated 68 and 70, respectively.

Reverting to the pusher mechanism by which the bags are pushed from the table 52, it will be seen that webs 72 are secured to the underside of the pusher plate 60. These webs are carried by a plate 74 mounted on rails 76 extending lengthwise of the machine. Secured to the plate 74 is a short arm 78 pivoted to the plate at 80, this arm being pivotally attached to a lever 82 carried by shaft 84. The shaft 84 also carries crank arm 86 pivotally connected to connecting rod 88, the free end of which is attached to crank disc 90. The connection of the connecting rod 88 to the crank arm 86 is adjustable so that the throw of the arm or lever 82 and hence throw of the pusher 60 may be adjusted to accommodate bags of different widths.

94 designates the driving motor for the machine. This motor, through a sprocket and chain drive, drives a pinion 96 meshing with a spur gear 98 mounted on a stub shaft which carries a gear 100. The gear 100 meshes with gear 102 mounted on shaft 104 carrying pinion 106, the latter meshing with a pinion 108 in mesh with a pinion 110 on shaft 112. The latter extends longitudinally of the machine toward the charging end thereof where the shaft terminates. This end of the shaft carries a gear 113 meshing with wide faced gear 114, the gear 114 meshing with a gear 116 on the shaft 34 carrying the cams 42 and 44. The opposite end of this cam shaft 34 carries a gear 118 meshing with gear 120 in mesh with gear 112 on the shaft carrying the lower roller of the two forwarding rollers 50, this shaft carrying a gear 126 in mesh with gear 128 on the shaft of the upper rollers of the forwarding rollers 50.

This provides a drive for the forwarding rollers 50 and for the cams 42 and 44.

Below the cam shaft 34 is the cam shaft 48 carrying the cam 46 and this shaft is also driven off the gear 118 through gear 130. The shaft 48 carries bevel gear 132 meshing with bevel gear 134 on the shaft 136 carrying the crank 90.

It is to be noted that the grippers 22 and 24, their controlling cams, the forwarding rollers 50, and the gear trains for driving the cams and forwarding rollers, as well as the crank for driving the pusher 60 can be adjusted transversely of the machine by hand wheel 131.

The drive for the forwarding chains 68 and 70 is from a pinion 138 on the stub shaft 104, gears 140, 142, 144, bevel gears 146 and 148 which drives shaft 150 carrying the sprocket for the lower chain 70. This shaft 150 carries gear 152 meshing with gear 154 on the shaft 156 carrying the upper chain 68. This gear train will drive the lower lead of the chain 68 and the upper lead of the chain 70 in the same direction toward the delivery end of the machine.

Referring to Fig. 7, it will be seen that the upper lead of the lower chain 70 rides along depressed tracks 160 in the machine bed 158 while the lower lead of the chain 68 rides beneath a spring-pressed plate 162 urged downwardly toward the chain 70 by springs 164. This provides for gripping the bags so as in effect to attach the bags successively to the forwarding chains for advancement.

As above stated the metal tape 6 forming part of the tie strip is taken from the supply reel 12. This reel lies beneath the machine and the tape is drawn upwardly to the machine bed and then forward toward the discharge end of the machine by feed rolls 166 and 168. The roll 12 is equipped with suitable retarding mechanism 170 to prevent overrunning. The metal tape as it is drawn upwardly passes about guide rolls 172, 174, 176, 178, 180, 181, 182 and roller 184 which is carried on the same shaft 186 as the idler sprockets 188 for the lower chain 70.

The paper tape 8 which is taken from the reel 14 and which is to enclose the metal tape 6 before the latter is placed in position on the bags 2 is also forwarded by the feed rolls 166 and 168.

This tape passes from the reel 14 about guiding and tensioning rollers 190, between roller 192 and gluing roller 193 where three stripes of adhesive are continuously applied to the face of the tape. These stripes are designated 194, 195 and 197.

The paper next passes about the rollers 180, 181, and 182, previously referred to. The roller 182, as will be seen from Fig. 7, is so shaped that as the paper tape passes the same one edge of the tape will be turned inwardly over and upon the metal tape 6 to bring the adhesive stripe 197 into engagement with the face of the metal tape. As the paper tape and metal tape continue their forward movement a stripe of adhesive 198 is applied to the turned-over part of the tape, as shown in Fig. 7. This stripe is applied by the striper 199.

The paper tape then passes over the roller 184, and the two tapes from thence travel lengthwise of the machine beneath the projecting flap 10 of the bags 2, the adhesive stripe 198 contacting the underside of the flap.

As the paper and metal tapes together with the bags travel lengthwise of the machine they pass a plate 204 which deflects that portion of the paper tape carrying the adhesive stripe 194 over upon the upper face of the flap 10 of the bags. The tapes and bags then pass beneath a hinged plate 208, to the rollers 166 and 168 which press the tapes and bags together.

The tie strip is continuous, as will be understood, and after it has passed the rollers 166 and 168 it is cut off between adjacent bags 2 by a striker bar 214. After the tie strip has been severed the chains 68 and 70 continue the lateral advance of each bag with tie strip attached until the same is picked up by discharge rollers 216 by which the bags are successively discharged into a receiving trough 218. The discharge rollers 216 are geared together and are driven off the gear 154.

The feed rollers 166 and 168 are driven off the gear 152 through intermediate gear 153 and gears 155.

The shaft 186 which carries the sprocket 188 for one end of the lower forwarding chain 70 is provided with a gear 222 meshing with a pinion 224 which in turn meshes with pinion 226 on the shaft of the lower pair of forwarding rollers 66, this gear meshing with gear 230 on the shaft of the upper pair of forwarding rollers 66.

The drive for the adhesive-applying roller 193 is through a belt or chain 234 the pulley for which is driven by gear 236 meshing with gear 238 on the shaft 186 carrying one of the sprockets for the lower chain 70 as already described. For purposes of threading the machine initially the roller 192 which cooperates with the adhesive-applying disc 193 is mounted on a pivoted arm 240 to which is attached an arm 242. This arm is provided with a notch 244 adapted to engage the shaft 246 which mounts the roller 182. By lifting up the roller 192 and engaging the notch 244 with the shaft 246 the roller 192 will be held out of cooperative relation with the adhesive-applying disc 193.

Likewise for purposes of threading the machine or for any other purpose desired, the adhesive-applying disc 199 can be moved to one side out of engagement with the paper tape passing the same. This disc is mounted in bearings carried by a glue pot 248 which is pivotally mounted on rod 250. An extension 252 at one end of this glue pot normally engages a stop 254 as shown in Fig. 6 which holds the disc in engagement with the paper tape. The stop 254 is notched and when the disc is to be moved out of engagement with the paper it is simply necessary to move the outer end of the extension 252 into this notch which, it will be apparent, will hold the disc in the dotted line position shown in Fig. 6. The other end of the glue pot is provided with a weight 255 which assists the spring 257 in holding the glue pot either in the full line position or the dotted line position of Fig. 6.

Referring to Fig. 2 of the drawings, the plate 208 beneath which the ends of the bags and the tying strip are passed during their travel through the machine is hinged as shown at 256.

It will be seen from all of the foregoing that the present invention provides an automatic machine so constructed and arranged that bags are continuously taken from a supply stack and forwarded laterally through the machine. At the same time paper tape and metal tape are continuously fed lengthwise through the machine in superposed relation to each other, adhesive being applied to the paper before the same contacts the metal strip and the paper being wrapped about the metal, these two tapes finally being brought into superimposed relation with respect to the laterally traveling bags, whereupon the paper tape is folded over and attached to the bags. Prior to the discharge of the bags from the machine the taps, which constitute the tying strip, are severed between adjacent bags so that in the finished bag we find a tying strip made up of paper and metal attached to the projecting flap on the open end of the bag with the ends of the tying strip projecting a short distance beyond the sides of the bag.

It is to be understood that the details of construction and arrangement of parts herein shown and described may be varied without departing from the spirit and scope of my invention.

What I claim is:

1. The method which comprises progressively enclosing a traveling continuous metal tape within a traveling continuous paper tape with a portion of the paper tape projecting beyond the edge of the enclosed metal tape, advancing the composite strip thus formed lengthwise together with a plurality of laterally moving bags, with the bags and the said projecting portion of the strip in superimposed relation, and folding the enclosed portion and the projecting portion of the advancing strip about the end of one wall of each bag and securing the same thereto.

2. The method which comprises advancing metal tape in superimposed relation to paper tape of greater width than the metal tape, progressively folding the paper tape about the metal tape and securing the two together to provide a continuous composite strip with the paper projecting from one side thereof, advancing the composite strip and a plurality of bags each having a projecting flap at one end with the flap in superimposed relation to the projecting portion of said strip while attaching the metal enclosing portion of the paper tape to one face of one wall of the bag and folding the remainder of the paper over upon and attaching the same to the other face of said bag wall.

3. A machine of the class described comprising in combination, a bag stack, pivoted grippers for gripping the bottom of the lower bag of the stack and withdrawing the same from the stack, forwarding mechanism for receiving the withdrawn bags and advancing the same laterally toward the discharge end of the machine, feed rollers for drawing a continuous tying strip through the machine with the strip extending transversely of the bags and adjacent the open end thereof, and a folder for folding part of the tying strip over upon the upper face of the lower wall of each bag as the bags and strip are advancing.

4. A machine of the class described comprising in combination, grippers for successively withdrawing bags from a stack, a pusher for moving the bags laterally and successively, forwarding rollers for receiving the bags, chains for receiving the bags and advancing them laterally through the machine, feed rollers for drawing a continuous tying strip beneath the ends of the bags being forwarded by said chains, and a folder for folding the tying strip over the ends of the bags.

5. In a machine of the class described, the combination of a spool of metal tape, a spool of paper tape, means for drawing the tapes continuously from said spools, adhesive-applying means for applying adhesive to one face of the paper tape, guides for thereafter bringing the metal tape into contact with the adhesive-carrying face of the paper tape and to fold the paper tape over upon the face of the metal tape, adhesive-applying means thereafter to apply adhesive to the face of the turned over paper tape, guides for guiding the composite strip thus formed into juxtaposition to the end of a traveling bag with the adhesive in contact with the underside of one wall of the bag, and deflecting means for folding the paper tape over upon the upper face of said wall of the bag to contact the adhesive carried by the tape with the upper face of said bag wall whereby the composite strip is secured to both faces of said bag.

6. The method which comprises continuously advancing a strip of paper tape, applying adhesive to said tape, continuously advancing a strip of flat metal tape in superimposed relation to

said paper tape, folding one edge of said paper tape over upon said metal tape adhesively to secure the same thereto, continuously advancing a plurality of bags with the open end of each bag in superimposed relation to the unfolded portion of said paper tape and during the travel of the bags and tapes contacting one face of one wall of the open end of each bag with the unfolded adhesive-carrying face of said paper tape and finally folding over the portion of said paper tape containing said metal tape upon the opposite face of said wall to bring the adhesive of the tape into contact with said opposite face thereby adhesively to enclose the edge of one wall of the bag in said composite strip.

7. The method which comprises continuously advancing a strip of paper tape applying adhesive to said tape, continuously advancing a strip of flat metal tape in superimposed relation to said paper tape, folding one edge of said paper tape over upon said metal tape adhesively to secure the same thereto, applying a strip of adhesive to the outer face of said folded over edge, continuously advancing a plurality of bags with the open end of each bag in superimposed relation to the unfolded portion of said paper tape and during the travel of the bags and tapes contacting one face of one wall of the open end of each bag with the unfolded adhesive-carrying face of said paper tape and finally folding over the said folded over adhesive-bearing edge of said paper tape containing said metal tape upon the opposite face of said bag wall to contact the adhesive of the tape with said opposite face of said bag wall thereby adhesively to enclose the edge of one wall of the bag in said composite strip.

8. The method which comprises continuously advancing a strip of paper tape, applying adhesive to said tape, continuously advancing a strip of flat metal tape in superimposed relation to said paper tape, folding one edge of said paper tape over upon said metal tape adhesively to secure the same thereto, continuously advancing a plurality of bags each having a projecting flap at its open end with the said flaps in superimposed relation to the unfolded portion of said paper tape and during the travel of the bags and tapes contacting one face of said flap with the unfolded adhesive-carrying face of said paper tape and finally folding over the said folded over adhesive-bearing edge of said tape containing said metal tape upon the opposite face of said flap thereby to contact the adhesive with said opposite flap face to enclose the edge of one wall of the bag in said composite strip.

9. The method which comprises continuously advancing a strip of paper tape, applying a continuous stripe of adhesive to said tape, continuously advancing a strip of flat metal tape in superimposed relation to said paper tape, folding one edge of said paper tape over upon said metal tape adhesively to secure the same thereto, applying a stripe of adhesive to the outer face of said folded over edge, continuously advancing a plurality of bags each having a projecting flap at its open end with the said flaps in superimposed relation to the unfolded portion of said paper tape and during the travel of the bags and tapes contacting one face of said flap with the unfolded adhesive-carrying face of said paper tape and finally folding over the said folded over adhesive-bearing edge of said tape containing said metal tape upon the opposite face of said flap thereby to contact the adhesive with said opposite flap face to enclose the edge of one wall of the bag in said composite strip.

10. The method which comprises continuously advancing a strip of paper tape, applying a plurality of continuous parallel adhesive stripes to said tape, continuously advancing a strip of flat metal tape in superimposed relation to said paper tape and intermediate said adhesive stripes, folding one edge of said paper tape bearing an adhesive strip over upon said metal tape to secure the same thereto, applying a stripe of adhesive to the outer face of said folded over edge, continuously advancing a plurality of bags with the open end of each bag in superimposed relation to the unfolded portion of said paper tape and during the travel of the bags and tapes contacting one face of one wall of the open end of each bag with the unfolded adhesive-carrying face of said paper tape and finally folding over the said folded over adhesive-bearing edge of said tape containing said metal tape upon the opposite face of said wall to contact the adhesive with the said opposite wall face thereby to enclose the edge of one wall of the bag in said composite strip.

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