April 19, 1932. A. J. BRIGGS 1,854,977

LABEL CUTTING AND FOLDING MACHINE

Filed Jan. 20, 1930 8 Sheets-Sheet 1

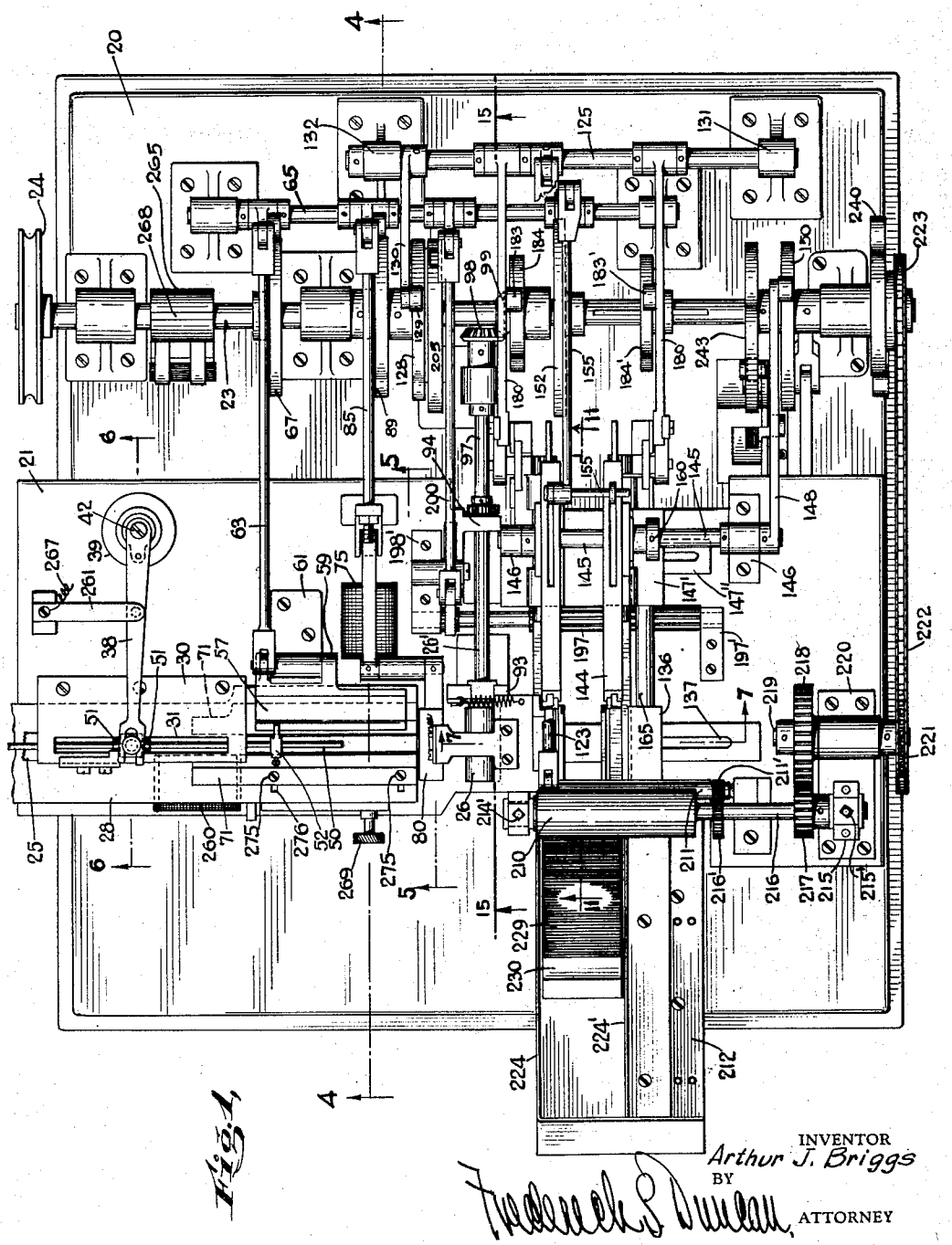

Fig. 1.

INVENTOR
Arthur J. Briggs
BY
Frederick S. Duncan
ATTORNEY

April 19, 1932. A. J. BRIGGS 1,854,977

LABEL CUTTING AND FOLDING MACHINE

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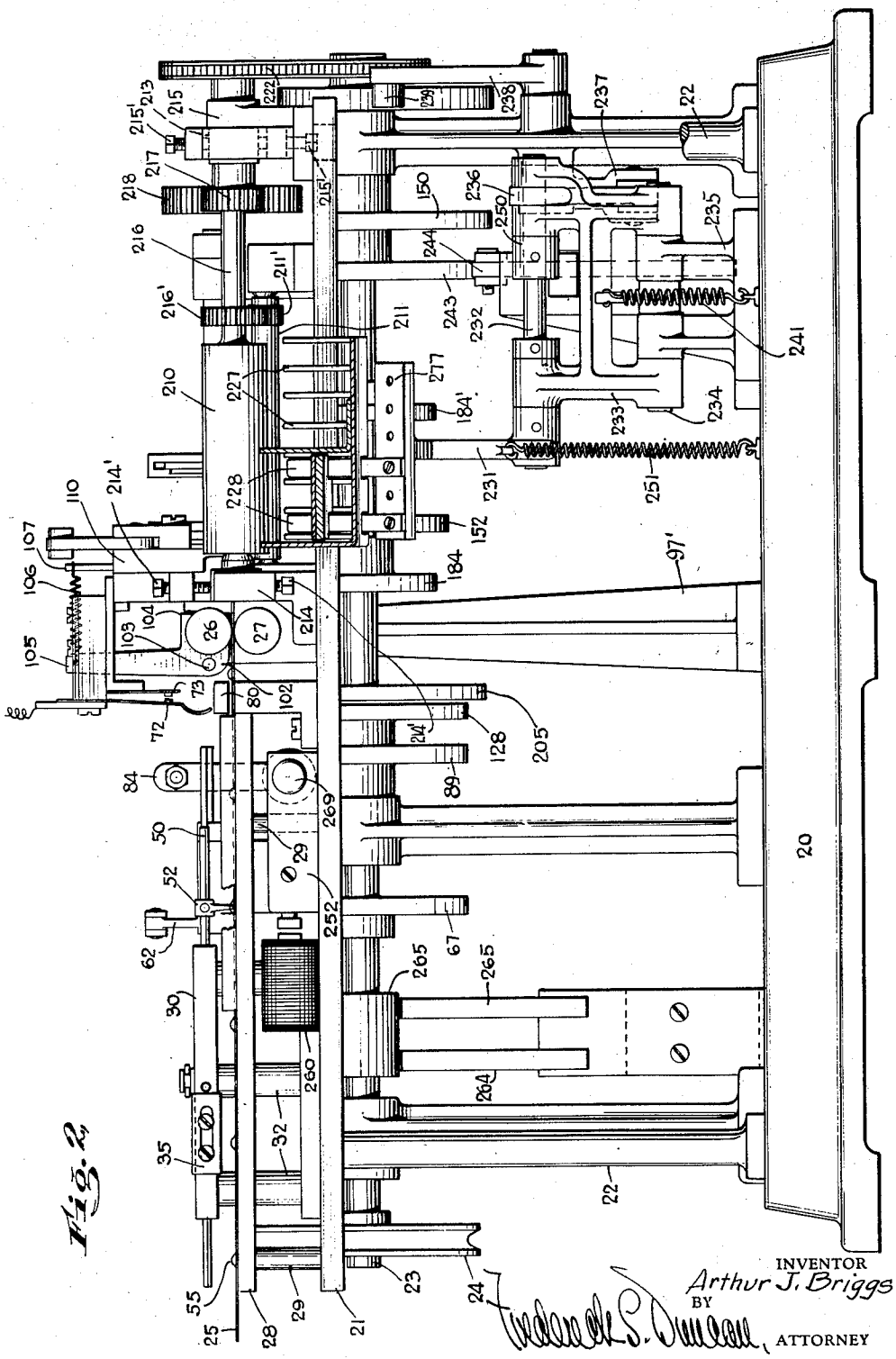

Fig. 2.

INVENTOR
Arthur J. Briggs
BY
Frederick S. Duncan, ATTORNEY

April 19, 1932. A. J. BRIGGS 1,854,977

LABEL CUTTING AND FOLDING MACHINE

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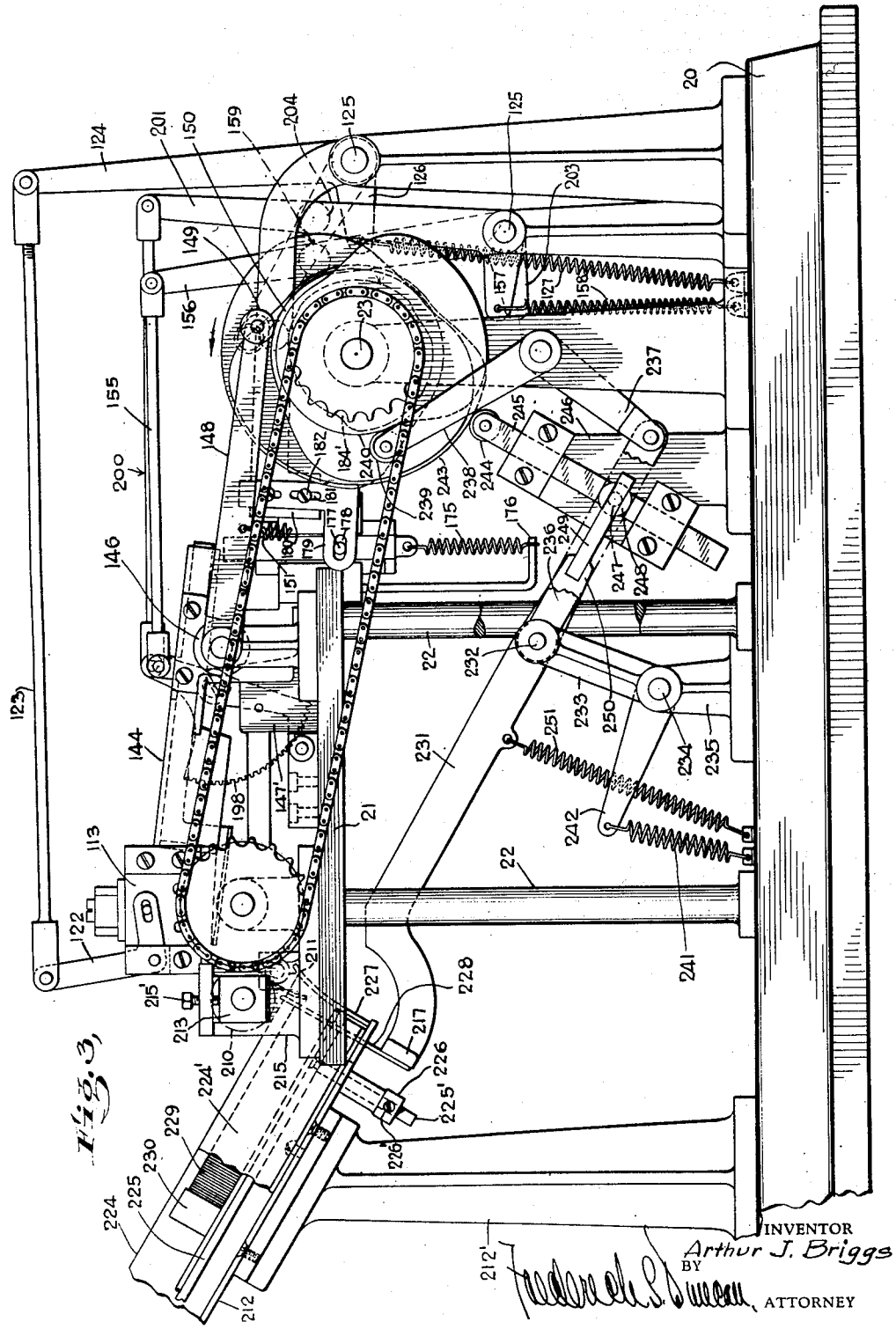

Fig. 3.

INVENTOR
Arthur J. Briggs
BY
Frederick S. Duncan
ATTORNEY

April 19, 1932. A. J. BRIGGS 1,854,977

LABEL CUTTING AND FOLDING MACHINE

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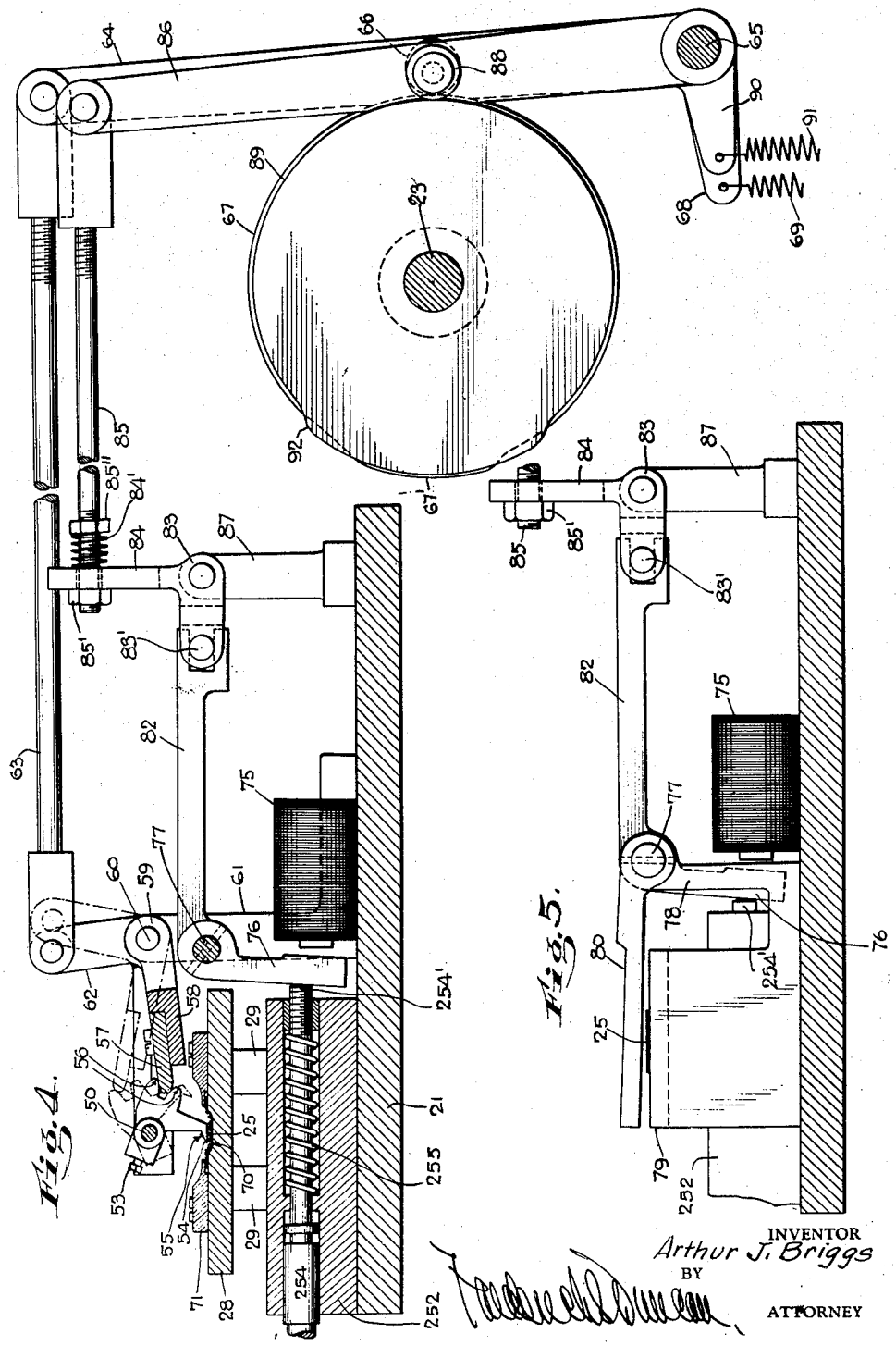

Fig. 4.

Fig. 5.

INVENTOR
Arthur J. Briggs
BY
ATTORNEY

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LABEL CUTTING AND FOLDING MACHINE

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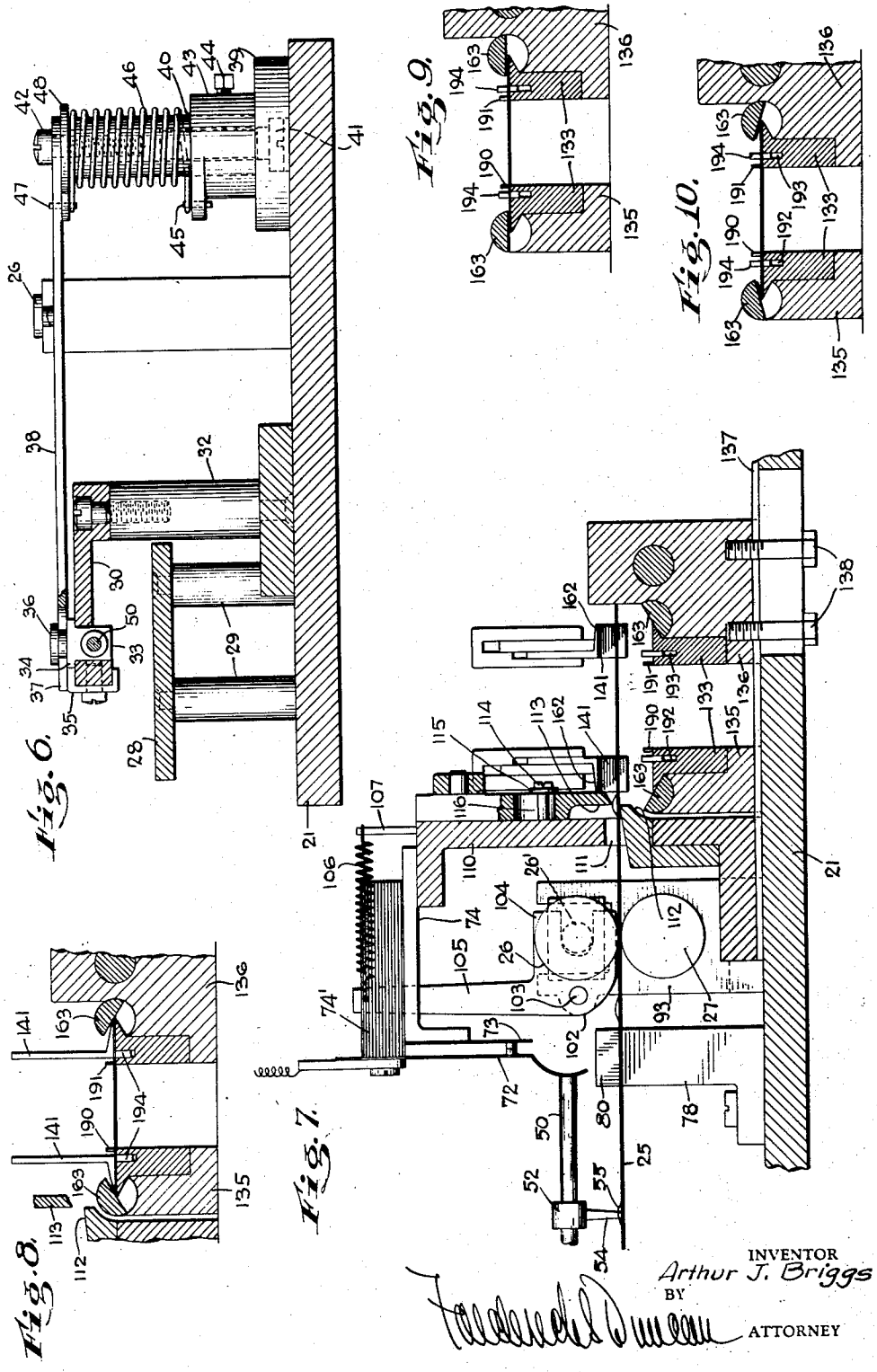

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

INVENTOR
Arthur J. Briggs
BY
ATTORNEY

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LABEL CUTTING AND FOLDING MACHINE

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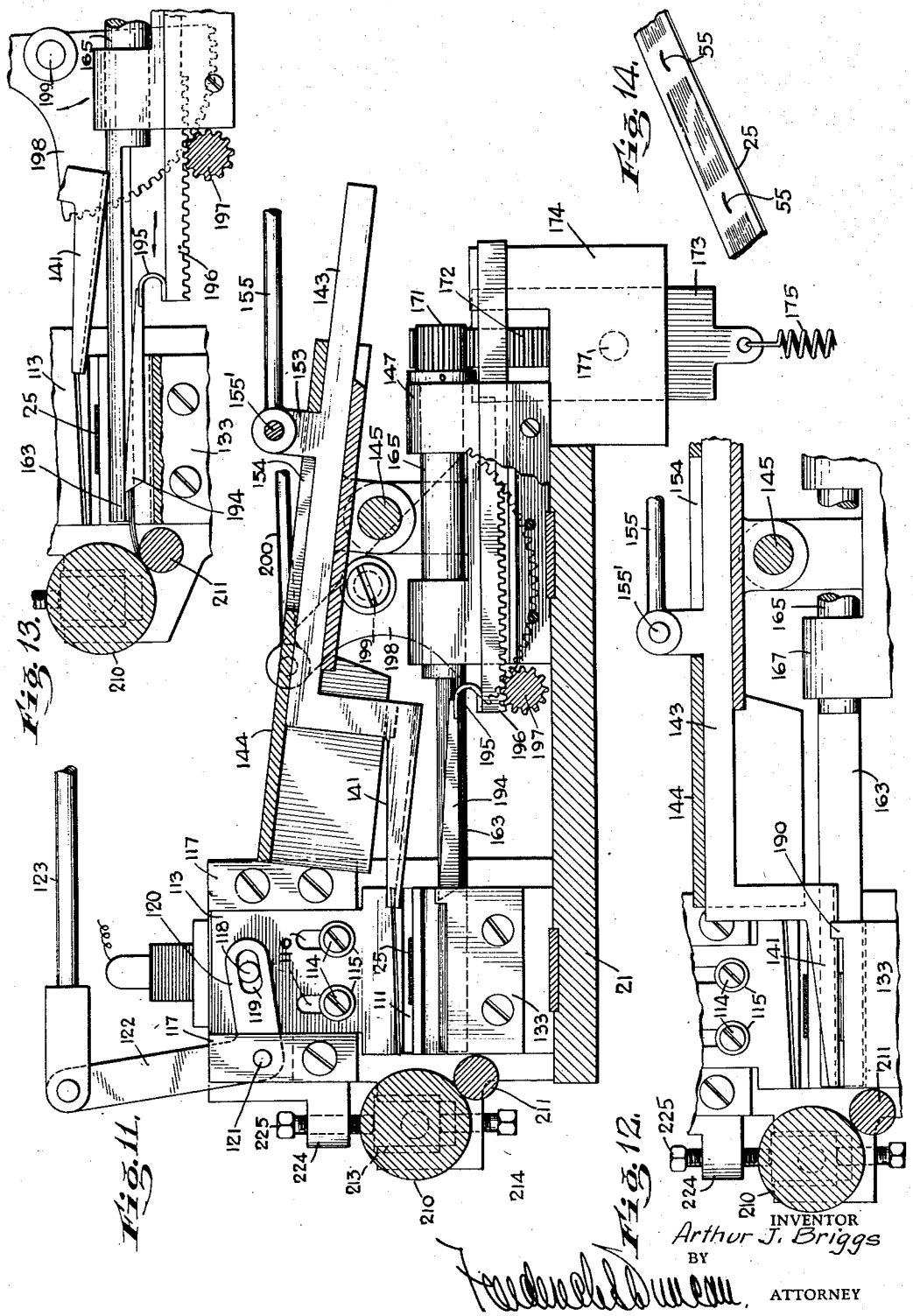

Fig. 13.

Fig. 14.

Fig. 11.

Fig. 12.

INVENTOR
Arthur J. Briggs
BY
ATTORNEY

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LABEL CUTTING AND FOLDING MACHINE

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Fig. 17.

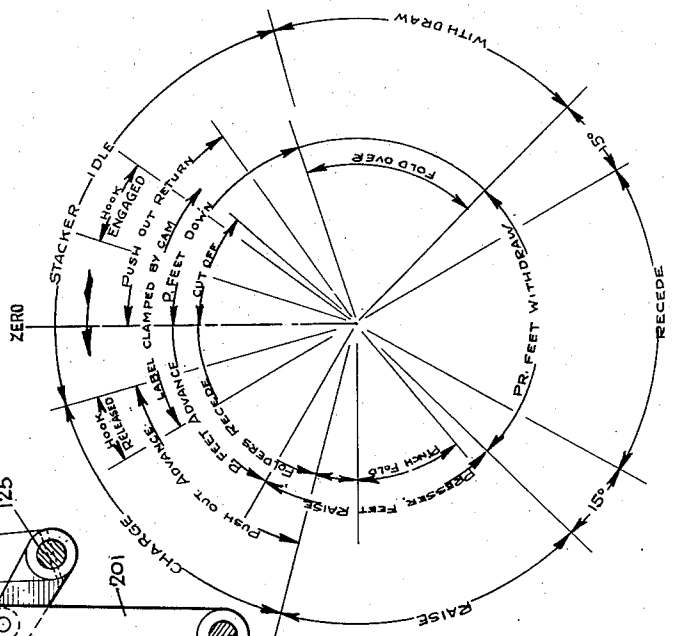
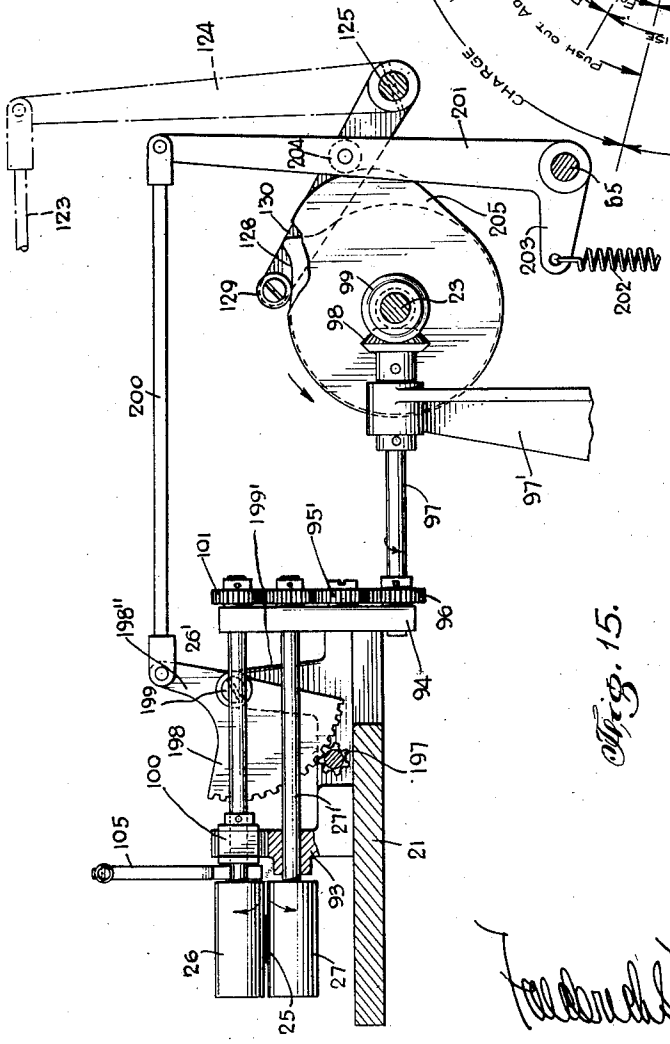


Fig. 15.



INVENTOR
Arthur J. Briggs
BY
Richard S. Duncan, ATTORNEY

April 19, 1932. A. J. BRIGGS 1,854,977

LABEL CUTTING AND FOLDING MACHINE

Filed Jan. 20, 1930 8 Sheets-Sheet 8

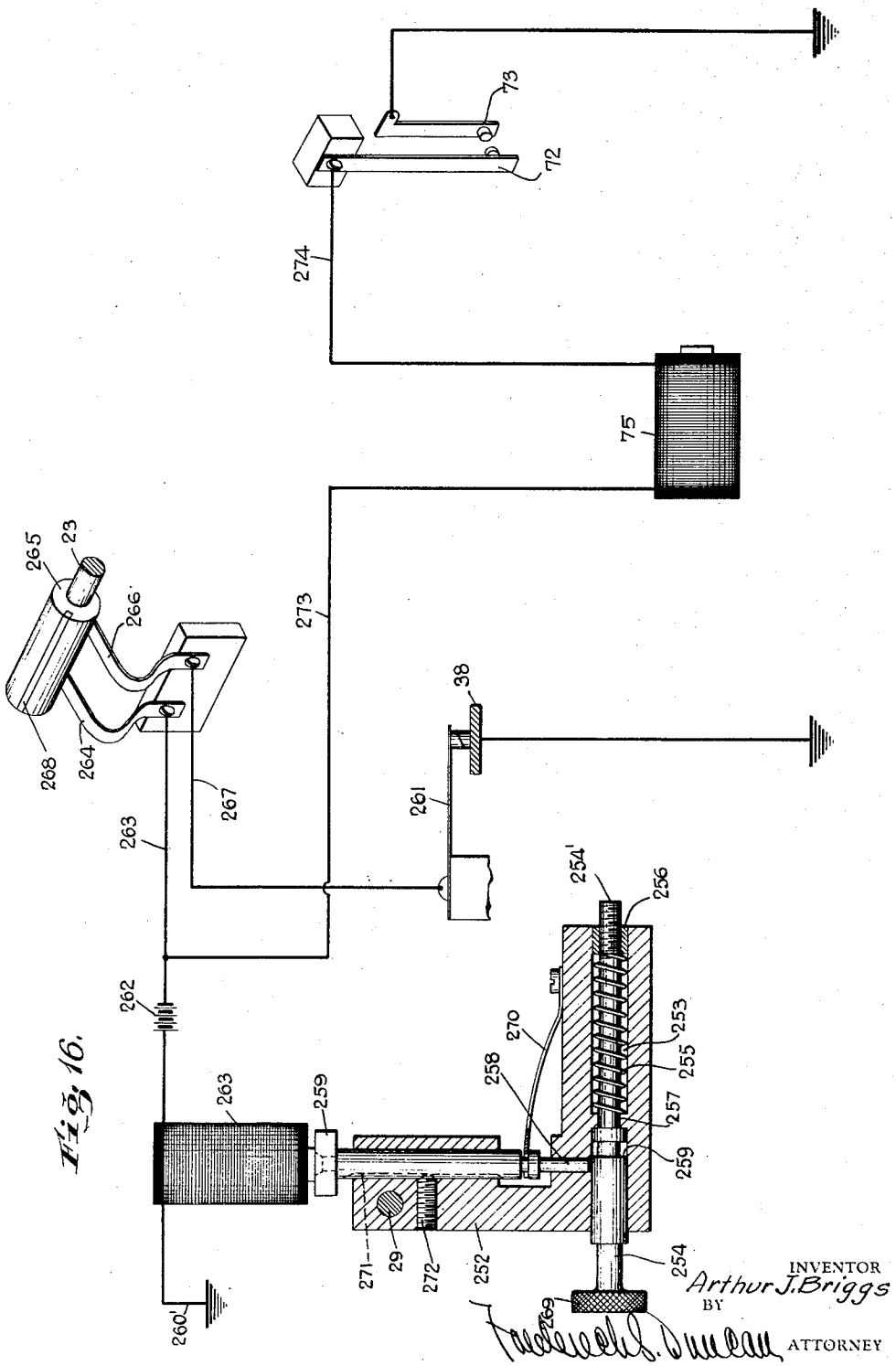


Fig. 16.

INVENTOR
Arthur J. Briggs
BY
ATTORNEY

Patented Apr. 19, 1932 1,854,977

UNITED STATES PATENT OFFICE

ARTHUR J. BRIGGS, OF SYRACUSE, NEW YORK, ASSIGNOR TO AMERICAN FABRICS COMPANY, A CORPORATION OF CONNECTICUT

LABEL CUTTING AND FOLDING MACHINE

Application filed January 20, 1930. Serial No. 422,015.

The present invention relates to improvements in label cutting and folding machines and has for an object to provide an automatic machine for severing labels from a strip, folding over the severed ends, pressing the folded ends, and delivering and packing the folded labels into a suitable receptacle.

My machine is particularly adapted for operating on continuous fabric or tape strips in which the label markings are woven, although it will be obvious that the machine could also be used for cutting strips bearing printed labels.

The cutting of labels by automatic machines is complicated by the fact that there are slight variations in the length of the label markings and the spaces between them, due to irregularities in the weave of the fabric. Hence it is impracticable to use a uniform feed of the strip to the severing means, but the feed must be constantly altered to compensate for these variations else they might accumulate to such an extent that the machine would be cutting through the markings instead of between them.

To overcome this difficulty it has been the practice to feed the label strip to proper position with respect to the severing means by means of pusher members arranged to clear the body of the tape and engage only the raised or thickened area presented by the label marking. In some instances a transverse rib is woven in the strip midway between label markings for the pusher to engage.

It is an object of the present invention to provide a more positive means of properly positioning the labels with respect to the severing means. To this end a label strip is employed in which a loop of thread is formed between each paid of label markings, and these loops are utilized to correct the feed of the strip in accordance with the irregularities of the markings.

Another object of my invention is to provide a machine in which the folding of one label and the feed of the next label length to the severing means will be carried on simultaneously, thereby increasing the output of the machine.

Another object is to provide improved means for packing the finished product in a suitable receptacle.

With these and other objects in view which will appear hereinafter, I shall now describe a preferred embodiment of my invention, as shown in the accompanying drawings forming a part of this specification, and shall then define the novelty and scope of the invention in the appended claims.

Figure 1 is a plan view of a label cutting and folding machine embodying my invention;

Fig. 2 is an elevation of the machine as viewed from the lefthand side of Fig. 1;

Fig. 3 is an elevation of the machine as viewed from the bottom of Fig. 1;

Fig. 4 is a view in section taken on the line 4—4 of Fig. 1 and illustrating certain mechanism employed in controlling the feed of the label strip;

Fig. 5 is a fragmentary view in section taken on the line 5—5 of Fig. 1;

Fig. 6 is a view in section taken on the line 6—6 of Fig. 1;

Fig. 7 is a view in section taken on the line 7—7 of Fig. 1 and illustrating the cutting, folding and ejecting mechanism;

Figs. 8, 9 and 10 are fragmentary sectional views taken in the same plane as Fig. 7 and illustrating successive steps in the operation of the folding mechanism;

Fig. 11 is a view in section taken on the line 11—11 of Fig. 1 and illustrating the folding and ejecting mechanism;

Figs. 12 and 13 are fragmentary sectional views taken in substantially the same plane as Fig. 11 and illustrating successive positions of the folding and ejecting mechanism;

Fig. 14 is a perspective view of a portion of a label strip showing principally the under side of the strip and illustrating the loops formed between successive label markings,

Fig. 15 is a view in section taken on the line 15—15 of Fig. 1;

Fig. 16 is a largely diagrammatic view illustrating certain trip mechanism and electrical connections for controlling the same; and

Fig. 17 is a timing diagram.

Before proceeding to a detail description of

the invention I will describe briefly the plan of operations carried out on the machine. The tape or label strip with label markings printed or woven therein is fed into the machine with the reverse side upward so that the loops between the label markings, which are formed on the under side of the label strip, will lie face upward to engage certain trigger mechanism. The label strip is drawn into the machine by means of a pair of friction rollers which run continuously. At suitable time intervals a trigger hook is scraped across the strip to engage one of the loops. The trigger is then drawn forward by the loop until it actuates a trip which causes a clamping member to clamp the strip and arrest its forward movement. In the meantime the rollers continue to rotate but their frictional engagement with the strip is not sufficient to feed the strip when the latter is engaged by the clamp. The clamping action is timed by the co-operation of the trigger and one of the loops to arrest the label strip in such position that it will be severed by a pair of shear blades on a line midway between two label markings. The severed label is then pressed down against a table by means of a pair of presser feet. The opposite ends of the label project beyond the feet and are bent up and folded over by means of a pair of segmental folding members. The presser feet are now withdrawn and as soon as they have cleared the label the folders press the folded ends down firmly upon the table to make a decided crease at each fold. Thereafter the folders are opened slightly and a pair of ejector fingers feed the label laterally to a pair of ironing rollers. Thence the label is fed into a hopper or trough and is packed against a sliding weight in the trough by means of a stacker. Such in general is the operation of my machine; a more specific description of the various parts follows:

The machine is provided with a base plate 20 above which is a table 21 supported on legs 22 secured to the base plate. To the right of the table 21, as shown in Figs. 1 and 3, is a main driving shaft 23 provided with a driving pulley 24 by which the shaft may be belt-driven from any suitable source of power.

The label strip 25 is drawn into the machine by a pair of friction rollers 26 and 27 (see also Figs. 2 and 15). As the tape is fed into the machine it rests on a shelf or secondary table 28 supported by legs 29 above the main table 21. Above the secondary table 28 there is a plate 30 formed with a slot 31 which runs parallel to the tape. The plate 30 is supported on posts 32, as clearly shown in Fig. 6. Mounted to slide in the slot 31 is a block 33 formed with a head 34, and a stop member 35 adjustably secured to the edge of the plate 30 serves to limit rearward movement of the block in the slot. The block 33 carries a headed stud 36 which is engaged by the forked end 37 of an arm 38.

To furnish a swivel support for the arm 38 I provide a member 39 which is secured to the table 21. The member 39 is formed with a cylindrical vertical body portion 40 which is centrally bored and threaded to receive a screw 41, as shown by dotted lines in Fig. 6. The screw 41 is introduced from the bottom of the member 39 and the head of the screw is countersunk therein. The arm 38 is swiveled on a screw 42 which is threaded into the upper end of the screw 41. Mounted to turn on the body 40 is a collar 43 which may be secured at any desired angular adjustment by means of a set-screw 44. At one side of the collar 43 there is an ear 45 which provides an anchorage for one end of a coil spring 46, the other end of which is anchored to a pin 47 which passes through a washer 48 at the top of the body 40 and also through an opening in the arm 38. The spring serves to hold the arm 38 in retracted position with the slide head 34 bearing against the stop 35, and the tension of the spring may be adjusted by turning the collar 43 on the body 40 and then securing it at the desired adjustment by means of a set-screw 44.

Passing freely through the block 31 is a trigger rod 50 which is held against endwise movement with respect to the block by means of a pair of collars 51. Mounted on the forward end of the trigger rod 50 is a trigger 52 which is of the form best shown in Fig. 4. This trigger is adjustable along the rod 50 and may be secured at any desired adjustment by means of a set-screw 53. The trigger is provided with a hook 54 adapted to hook under a loop 55 in the tape or label strip 25. Formed at one side of the trigger are a pair of teeth 56 which mesh with the tooth-shaped edge of a plate 57. The latter is carried by a member 58 formed with ears 59, journalled on a hinge pin 60 mounted in a bracket 61. The member 58 is formed with an upwardly projecting arm 62 which is pivotally connected to one end of a rod 63, the other end of the rod being pivotally connected to a lever 64 fulcrumed on a shaft 65. Journalled on the shaft is a roller 66 which engages a cam 67 keyed on the driving shaft 23. The lever 64 is formed with an arm 68 to which is attached one end of a tension spring 69, the other end being anchored to the base 20, so that the roller 66 is held in engagement with the cam 67 under spring tension.

In Fig. 4 the lever 64 is shown in its forward position with the plate 57 swung downward, as shown by the full lines, while in dotted lines the plate is shown in the position it assumes when the swell 67′ of the cam 67 forces the roller 66 toward the right. When the plate 57 is swung downward the trigger 52 swings about its axis causing the

hook 54 to engage one of the loops 55. The surface of the table 28 is formed with a depression 70 along the path of the tape 25, so that the hook, as it scrapes transversely across the tape, pressing the latter into the depression, will contact with the tape through an arc of appreciable length, thereby making sure that the hook will pick up the loop. At each side of the depression 70 I provide a guide plate 71 which overlaps opposite edges of the tape serving to hold the tape in proper alinement on the table 28 and preventing lateral displacement due to scraping action of the hook.

As soon as the hook 54 engages a loop 55 the trigger together with the rod 50 is moved forward by the tape as the latter is drawn into the machine by the feed rolls 26 and 27. In the meantime the hook is held in engagement with the loop by the plate 57 which is maintained in depressed position by the spring 69 and the teeth 56 of the trigger slide along the tooth-shaped edge of the plate 57. As the rod 50 is advanced by engagement of the hook 54 with the loop 55, it encounters a spring contact finger 72 and flexes said finger against a second spring contact finger 73 thereby completing an electric circuit through an electro-magnet 75. As shown in Fig. 7 the contact member 73 is secured to a bracket 74 and is electrically grounded to the machine while the arm 72 is carried by a block of insulating material 74′ supported on the bracket 74.

The electro-magnet 75 is provided with an armature 76 (Fig. 5) which is pinned to a shaft 77 journalled in a bracket 78. The bracket is also formed with a clamping surface 79 which lies flush with the upper face of the table 28. Pinned to the shaft 77 is a clamping jaw 80 which is adapted to press the tape 25 down upon the clamping surface 79 when the armature 78 is attracted by the electro-magnet 75. When the tape is thus clamped between the jaw 80 and the surface 79 it is prevented from being fed forward by the rolls 26 and 27, and the latter turn idly until the plate is again released by the raising of the jaw 80.

The clamping jaw 80 is held in clamping position for only a brief interval by the electro-magnet 75, but mechanical means are provided for holding the jaw in closed position after the electro-magnet has been de-energized. An arm 82 is secured at one end of the shaft 77 and is forked at its free end to engage a pin 83′ in one arm of a bell crank lever 83. The other arm 84 of the bell crank is connected by a rod 85 to a lever 86 fulcrumed on the shaft 65. The bell crank lever 83 is pivoted on a bracket 87 secured to the table 21. The lever 86 carries a roller 88 which bears against a cam 89 secured to the driving shaft 23. The lever 86 is also formed with a lateral arm 90 which at its outer end is connected to one end of a spring 91, the other end of which is anchored to the base 20, so that the roller 88 is held by the spring against the cam 89. The cam 89 is formed with a swell 92 which operates to draw the lever 86 toward the right as viewed in Fig. 4, thereby turning the bell crank lever 83 on its axis and causing the armature 76 to move into engagement with the electro-magnet forcing the clamping jaw 80 down upon the tape 25.

The connection between the bell crank arm 84 and the rod 85 is such as to permit the armature to be drawn by the magnet 75 without moving the lever 86. The rod 85 passes freely through an opening in the bell crank arm 84 and carries a nut 85′ which normally bears against the left hand side of the bell crank arm 84 as viewed in Fig. 4. Bearing against the opposite side of the arm is a compression spring 84′ which is coiled about the rod 85 and abuts against a second nut 85″. The spring 84′ holds the clamping jaw normally in raised position clear of the tape, but will yield to the pull of the electro-magnet 75 on the armature 76, permitting operation of the clamping jaw without movement of the lever 86 which is held against the cam 89 by the more powerful pull of the spring 91. When the cam swell 92 swings the lever 86 to the right, the nut 85′ engages the arm 84 and positively holds the jaw 80 in clamping position.

After the cam 89 has moved into position to positively hold the jaw 80 the swell 67′ of the cam 67 comes into engagement with the roller 66, causing the plate 57 to swing up to the dotted position shown in Fig. 4 and thus swinging the hook 54 out of engagement with the loop 55. As soon as the trigger is thus released the spring 46 (Fig. 6) acting on the arm 38 slides the block 33 back to normal position against the stop member 35.

The rollers 26 and 27 are positively driven by a gear train connecting them with the shaft 23, as shown in Fig. 15. The roller 27 is carried by a shaft 27′ which is journalled in brackets 93 and 94 supported on the table 21. Secured to the shaft 27′ is a pinion 95 which meshes with an idler 95′ engaging a gear 96 secured to a shaft 97. The latter is journalled in the bracket 94 and a bracket 97, and is driven by a pair of miter gears 98 and 99 secured respectively to the shafts 97 and 23. The roller 26 is carried by a shaft 26′ which at one end is journalled in the bracket 94 and adjacent the roller has a bearing in a journal box 100 slidable vertically in the bracket 93. The shaft 26′ is driven by a pinion 101 meshing with the pinion 95. The sliding journal 100 provides for adjusting the upper roller 26 toward or from the lower roller 27 so as to vary the frictional engagement with the tape 25.

Mounted on the bracket 93 is a bell crank lever 102 (see also Figs. 2 and 7) which is fulcrumed on a stud 103 and has a bifurcated lateral arm 104 engaging the shaft 26'. The lever 102 has a substantially vertical arm 105 to which is fastened one end of a tension spring 106, the other end of the spring being anchored to a pin 107 projecting from a bracket 110. Thus the spring 106 tends to flex the shaft 26' downward pressing the roller 26 against the roller 27 with a certain amount of pressure which is sufficient to feed the tape into the machine when the jaw 80 is raised but not sufficient when the jaw is in clamping position.

The tape 25, as it is fed forward by the rolls 26 and 27, passes through a slot 111 in the bracket 110 and passes to position to be severed and then folded. Mounted on the bracket 110 is a fixed lower cutting blade 112 which projects through the slot 111, as best shown in Fig. 7. Immediately above the blade 112 is a movable cutting blade 113 (see also Fig. 11) which is slidable vertically against the face of the bracket 110, being held thereto by screws 114 and washers 115, the screws passing through slots 116 in the blade 113. The blade 113 is also guided in its vertical movement by guide plates 117 at either side thereof. The blade 113 carries a pin 118 which engages a slot 119 in one arm 120 of a bell crank lever. The latter is pivoted on a pin 121 supported by the bracket 110 and one of the guide plates 117. The other arm 122 of the bell crank lever has pivotal connection with one end of the rod 123, as shown in Fig. 3, the opposite end of the rod being pivotally connected to a lever 124 keyed to a shaft 125. The lever 124 is formed with a laterally projecting arm 126 to which is connected one end of a spring 127, the other end being anchored to the base plate 20. Thus the spring tends to move the rod 122 toward the left, as viewed in Fig. 3, causing the bell crank 120 to raise the blade 113 to the position shown in Fig. 11.

The blade 113 is forced downward by means of a cam 128, (see Figs. 1 and 15) which is engaged by a roller 129 on an arm 130 fixed to the shaft 125. The shaft 125 is journalled in brackets 131 and 132 supported on the base 20. As the blade 113 is moved downward by the cam, it shears off the length of tape projecting through the slot 111. The parts are so timed by action of the trigger rod 50 on the contact finger 72 that the tape is arrested with a loop section directly under the shear blade 113, (see Fig. 7) so that a label length is cut off the tape at a point midway between the markings carried by the tape.

The length of tape that has been cut off by the shear blade 115 drops upon a pair of anvils 133, which are mounted in blocks 135 and 136 respectively, carried by the table 21. The block 136 may be adjusted along a guide 137 formed on the table 21 and the guide and table are slotted to receive screws 138 which are threaded into the block 136 and serve to clamp the block at the proper position relative to the block 135. Thus provision is made for labels that vary considerably in length.

The label is pressed into engagement with the anvils 133 by means of presser feet 141. These presser feet, as best shown in Fig. 11, are formed respectively with vertically offset shanks 143 which slide in box frames 144 secured on a shaft 145. The shaft 145 is journalled in brackets 146 (see Fig. 1) supported by the table 21. Fixed on the shaft 145 is an arm 148 which bears a roller 149 engaging a cam 150 fast on the shaft 23 (Fig. 3). By means of this cam the box frames 144 are periodically rocked, a spring 151 coacting to hold the roller 149 in engagement with the cam 150. At the same time the shanks 143 are arranged to slide in the box frames 144 under control of a cam 152. To this end each shank 142 is formed with an upwardly projecting ear 153 which passes through a slot 154 in the box frame 144. A transverse shaft 155' passes through the ears and provides a pivotal support for one end of a connecting rod 155, the opposite end of which is pivotally connected to a lever 156 freely journalled on the shaft 125. A laterally projecting arm 157 of the lever 156 is connected by a spring 158 to the base 20 so that the shanks 143 are normally urged forward or to the left as viewed in Figs. 3 and 11. A roller 159 on the lever 156 engages the cam 152. The latter serves to withdraw the shanks 143 and the presser feet 141 against the action of the spring and in suitably timed relation to other operating parts of the machine.

To provide for labels of varying length, the forward box frame 144, that is the one nearest the bottom of Fig. 1, may be slid along the shaft 145 and secured by means of a set screw 160.

The cams 150 and 152 co-operate to advance the presser feet to the left, as viewed in Fig. 11, while the presser feet are in raised position, so that they pass over the label as it is sheared by the blade 113. Thereupon the cam 150 rocks the box frames 144 on the shaft 145 bringing the presser feet 141 down on the label and pressing it firmly upon the fixed anvils 133. It will be observed (see Fig. 7) that the presser feet are provided with outwardly extending portions 162 which are tapered to a sharp outer edge and that the label as it is sheared off by the blade 113 projects beyond these sharp edges. The anvils 133 are similarly formed with corresponding outwardly projecting tapered edges which are reversely tapered with respect to the edges of the presser feet.

Seated in semi-cylindrical depressions in the blocks 135 and 136 are a pair of folder

members 163 which are of semi-cylindrical form and constitute extensions of a pair of rods 165 respectively journalled in brackets 147 and 147'. The bracket 147' is adjustable along a guide 147'' and may be secured at the desired adjustment by any suitable means. Each rod 165 is provided at its righthand end, as viewed in Fig. 11, with a pinion 171 which is adapted to engage a rack 172. The racks 172 are formed on plates 173 which are slidable vertically in suitable ways in extensions 174 of the brackets 147 and 147'. Springs 175 are connected at their upper ends to the plates 173 and at their lower ends to fixed arms 176, thus tending to hold the racks in depressed position. Projecting from each plate 173 is a pin 177 (see Fig. 3) which engages a slot 178 in a plate 179 secured to an arm 180. The plates 179 are preferably adjustable on the arms 180 and to this end are formed with vertical slots 181 through which pass screws 182 threaded into the arms 180, thereby permitting vertical adjustment of the plates 179 on the arms 180. The arms 180 are fulcrumed on the shaft 125 and carry folders 183 and 183' which engage cams 184 and 184' respectively. By means of these cams the racks 172 are raised causing the pinions 171 to turn and thus turning the folders 163. The cam 184 is fixed to the shaft 23 but the cam 184' is splined thereon so that it may be adjusted along the shaft as the bracket 147 is adjusted along the guide 147''.

Under control of the cams 184, 184' the folders 163 pass through a cycle of oscillations which is illustrated at various points in the cycle in Figs. 7, 8, 9, and 10. As the presser feet 141 come down upon the label and clamp it firmly against the anvils 133 the folders 163 turn through an angle of about 120 degrees to the position shown in Fig. 8, thereby folding over the ends of the label upon the presser feet 141. Thereupon there is a dwell in the turning movement of the folders while the presser feet are withdrawn laterally with respect to the label by the action of the cam 152. To prevent the presser feet from dragging the label laterally as they are withdrawn, the anvils 133 are formed with upwardly projecting ears 190 and 191 respectively. As soon as the presser feet have cleared the label, they are rocked upward by action of the cam 150, and in the meantime the folders are moved to the position shown in Fig. 9, folding over the ends of the label upon the anvils 133 are clearly shown in Fig. 9. The folders thus form a decided crease in the ends of the label.

The next operation is to eject the label from the machine. To this end the anvils 133 are formed with slots 192 and 193 respectively in which ejector fingers 194 are adapted to slide. These ejector fingers are connected respectively at their inner ends by means of springs 195, to racks 196 which are slidable in suitable bearings in the brackets 146 and 147. Normally the springs hold the ejector fingers above the upper face of the anvils 133, but the springs 195 permit them to be depressed by the presser feet. As soon as the label has been creased, as shown in Fig. 9, the folders swing open slightly to the position shown in Fig. 10 and the ejectors 194 then move the label laterally off the anvils 133 or toward the left as viewed in Fig. 11.

To operate the ejector fingers I provide a cylindrical rack pinion 197, mounted in fixed brackets 197' and 198', which is adapted to engage the two racks 196. The pinion 197 is in turn engaged by a toothed sector 198 which is hinged upon a stud 199 carried by the bracket 199'. An arm 198'' of the toothed sector is pivotally connected to one end of a rod 200. The other end of the rod 200 is freely connected to a lever 201 which is freely mounted upon the shaft 125. A spring 202 anchored at one end to the base plate 20 is connected at the other end to a lateral arm 203 of the lever 201 and serves to press a roller 204 carried by the lever 201, against a cam 205. The cam 205 rocks the lever 201 against the action of the spring 202, turning the sector 198 on its axis 199 and thereby rotating the cylindrical pinion 197. As the pinion 197 is rotated the racks 196 are moved, sliding in the brackets 147 and 147' respectively. The parts are so timed that as soon as the folders have returned to the position shown in Fig. 10, the ejector fingers 194 are moved to the left, as shown in Fig. 11, sliding the label off the anvils 133.

Immediately to the left of the anvils 133 are two rollers 210 and 211 which seize the ejected label and feed it into a hopper 212. The roller 211 turns in fixed bearings while the roller 210 is journalled in journal boxes 213 which are adjustable in brackets 214 and 215, being held at desired adjustment by means of opposed set screws 214' and 215'. Mounted on a shaft 216 which carries the roller 210 is a pinion 217 which engages a gear 218 on a stud 219 journalled in a bracket 220. The stud 219 has fixed thereon a sprocket wheel 221 which is driven by a chain belt 222 from a sprocket wheel 223 fixed on the main drive shaft 23. A pinion 216' fast on the shaft 216 engages a pinion 211' on the roller 211 so that both of the rollers are positively driven by the shaft 23 while the set screws 214' and 215' permit of adjusting the roller 210 to vary the pressure of the rollers one against the other. These rollers serve to iron the label as it issues from the machine into the hopper 212. The hopper 212 is arranged in inclined position, as best shown in Fig. 3, and is supported on a bracket 212' secured to the base 20. As shown in Fig. 1 the hopper has a fixed side wall 224 and an adjustable side wall 224' consisting of a

flanged plate which may be secured to the bottom of the hopper by means of screws at a number of different positions, depending upon the length of the labels. To provide for labels of different width, a false bottom plate 225 is used, which is supported on studs 225′ one of which is shown in Fig. 3. These studs pass through socket members 226 formed on the bottom of the hopper and may be secured at any adjustment desired by means of set screws 226′. The lower end of the hopper is provided with spaced curved fingers 227 (see Fig. 2) between which a furcated stacker 228 may pass. It will be understood that the bottom of the hopper and the plate 225 are slotted at their lower ends to clear the furcations of the stacker.

In Fig. 3 a number of finished and folded labels are shown at 229 resting against the stacker 228 and pressed thereagainst by means of a sliding weight 230. It will be observed that there is a space between the stacker 228 and the fingers 227 into which the finished label is deposited as it issues from the ironing rollers 210 and 211. The stacker 228 is arranged to move downward out of engagement with the labels in the stack after each new label has dropped into place against the fingers 227. The stacker then moves clear of the end of the hopper, rises, and enters between the fingers 227 against the newly deposited label, pressing it and the stack of labels upward against the sliding weight 230.

The movements of the stacker are controlled by a pair of cams secured to the cam shaft 23. The stacker 228 is supported on the end of an arm 231 which is fixed to a shaft 232 mounted in a yoke 233. This yoke is mounted on and secured to a shaft 234 which is journalled in a bracket 235. Freely connected to the shaft 232 is a link 236 which, at its opposite end, is connected to one arm 237 of a bell crank lever 238, the other arm of which carries a roller 239 which bears against a cam 240. The cam 240 rocks the bell crank lever 238 swinging the yoke 233 on the axis 234, thereby varying the position of the shaft 232 which forms the fulcrum of the arm 231. To hold the roller 239 against the cam 240, a spring 241 is provided which at one end is anchored to the base 20 and at the other is connected to the free end of an arm 242 keyed to the shaft 234. Thus provision is made for forward and rearward movement of the stacker. Movement at right angles thereto is provided by a cam 243 against which bears a roller 244 on a bar 245 which slides transversely to the movement of the link 236 in bearings carried by a bracket 246. A pivot pin 247 mounted to swivel freely in the bar 245 has a head 248 which is slotted to provide a slide bearing for a bar 249. This bar forms an extension of a short arm 250 which is pinned to the shaft 232. Thus as the cam 243 reciprocates the bar 245, the shaft 232 will be rocked, swinging the arm 232 and moving the stacker 227 transversely with respect to the hopper 224. A tension spring 251 is connected at one end to the arm 231 and at the other to the base 20 and serves to press the roller 244 against the cam 243.

Fig. 3 shows the stacker just after having moved a label into the stack, with a new label, (shown by dotted lines) issuing from the rolls 210 and 211 and entering the hopper immediately behind the stacker. After the shaft 23 has moved through an angle of approximately 135 degrees in the direction indicated by the arrow, the cam 243 will permit the bar 245 to rise and the stacker 228 to move downward under impulse of spring 251. As the stacker is thus withdrawn transversely to the hopper the stack of labels 229, urged by the weight 230, may slide down against the freshly-deposited label. Thereupon the cam 240 will operate to draw the stacker 228 rearwardly so as to clear the end of the hopper 212. The cam 243 will then operate to raise the stacker against the action of spring 251, and finally the spring 241 will return the stacker to the position shown in Fig. 3 pressing the newly deposited label against the stack of old labels and up the inclined hopper.

A safety means is provided for stopping the feed of tape into the machine in case of failure of the hook 54 to engage the loop 55. This is shown in Figs. 4 and 16. An L-shaped block 252 secured to the table 21 under the shelf 28 is formed with a horizontal bore 253 in one leg of the block to receive a pin 254 which is slidable therein on a line parallel to the axis of the electro-magnet 75. The pin has a body portion which fits the bore and a stem portion 254′ of smaller diameter about which is fitted a coil spring 255. A nut 256 threaded on the stem 254′ bears against the outer end of the spring while the inner end bears against an annular abutment 257 within the bore 253. The spring thus serves to force the pin to the right as viewed in Fig. 16 with the stem 256 projecting from the block 252 and the abutment 257 serves as a stop against which the body portion of the pin abuts. Normally, however, the pin 254 is held in retracted position by a detent pin 258 which enters an annular groove 259 formed in the body of the pin 254. The detent pin is mounted to slide transversely to the pin 254 in a bore formed in the other leg of the L-shaped block. The outer end of the detent pin carries an armature 259 of an electro-magnet 260 so that when said electro-magnet is energized the detent pin will be withdrawn from the groove 259, and the pin 254 will spring forward from the position shown in Fig. 4 to that shown in Fig. 16. The outer end of the stem 254′ normally bears against the armature 76 and when the pin 254 is actuated by the spring 255 the stem

254′ swings the armature 76 about its axis causing the jaw 80 to clamp the tape against the pull of the feed rollers 26 and 27. However, release of the pin 254 is arranged to take place only in case of failure of the hook 54 to engage a loop 55.

Referring to Fig. 1, it will be observed that adjacent the arm 38 there is a spring contact member 261 which normally engages the arm 38 so that whenever the arm 38 is drawn forward by engagement of the hook with a loop, the circuit through the contact member 261 is broken. Referring back to Fig. 16 it will be observed that one terminal of the electro-magnet 260 is grounded at 260′ while the other terminal is connected to one pole of a battery 262. The other pole of the battery is connected by a lead 263 to a brush 264 bearing against a commutator 265 fast on the shaft 23. A second brush 266 also bearing against the commutator is connected by a lead 267 to the contact member 261. The body of the commutator is of insulating material and interrupts the circuit of the electro-magnet 260, but at a certain interval in each rotation of the shaft, a conductor bar 268 carried by the commutator bridges the brushes 264 and 266. If, when this occurs, the arm 38 is in contact with the member 261 the circuit through the electro-magnet 260 will be completed and the armature 259 will be raised, releasing the pin 254 and causing the clamping jaw to engage the tape and stop the feed thereof. Normally, however, the circuit is interrupted by a movement of the arm 38 whenever the hook 52 engages a loop 55. Should, for any reason, the hook fail to engage a loop, the arm 38 would not be moved out of contacting position, and the pin 254 would then operate to arrest the feed of the tape.

After the feed has been stopped by action of pin 254, the rest of the machine may continue to function without doing any damage to the tape, and when the difficulty which caused the stoppage has been corrected, the pin 254 may be withdrawn by hand. As shown in Figs. 2 and 16, the pin 254 is provided with a knurled head 269 to provide a finger hold for withdrawing the pin to normal position. When the pin 254 is thus retracted the detent 258 is forced into engagement with the groove 259 by a spring 270 which at one end is anchored to the block 252 and at the other is forked to engage an annular groove formed in the detent pin. To hold the armature 259 in correct alinement with the electro-magnet 260, the detent pin is formed with a keyway 271 which is engaged by a set screw 272.

As shown in Fig. 16, the electro-magnet 75 is also adapted to be energized by the battery 262 and is connected in series with the electro-magnet 260 so that whenever the contact members 72 and 73 are brought into engagement current from the battery will flow by way of a lead 273 through the electro-magnet 75 and thence through a lead 274 and contact springs 72 and 73 to ground. Although the current goes simultaneously through electro-magnets 260 and 75, the relative resistance of these magnets is so chosen that the armature 259 will not be actuated when the electro-magnet 75 is in circuit with the magnet 260.

While the general plan of the machine has already been outlined and the operations of various parts have been explained above, the following resumé of the operation of the machine and the relative timing of the various moving parts may prove of value. In this connection attention is drawn to Fig. 17 which represents a cam-timing diagram in which the cam rollers are assumed to engage the top of their respective cams along the vertical line marked "Zero". While the cams turn in counter-clockwise direction, as viewed in the diagram, the operations they perform must necessarily be read in clockwise-direction.

As explained above, the label strip or tape is drawn into the machine and fed between the cutting blades 112 and 113 by the friction rollers 26 and 27 which run continuously; but the tape is interrupted periodically by the clamp 80 as lengths of the tape, each individually measured by the tape itself, are fed to the cutting blades. We may assume that the machine has been interrupted in its operations with the parts in the position marked "Zero" on the diagram. In this position the swell 67′ of the cam 67 has operated to swing the lever 64 to the left, as viewed in Fig. 4, and the hook 54 has been raised to the position shown by broken lines. Since the hook is disengaged from the tape the trigger must be in retracted position, as shown in Fig. 1, having been withdrawn by the spring 46 (Fig. 6) acting on the arm 38. The clamp 80, in the meantime, is held in clamping position by the swell 93 of cam 89 acting on lever 86.

If the machine is now started the cutting blade 113 will immediately descend and sever a label length from a strip of tape, being moved to severing position by the cam 128. At the same time the presser feet 141 will start to move down with the blade 113 so that as soon as the label length is severed it will be forced down on the anvil 113. While the cutting blade is moving down, the roller 66 will move off the cam swell 67′, and the spring 69, acting on the lever 64, will throw the trigger 52 to the position shown by full lines in Fig. 4 so that the hook 54 will scrape the surface of the tape and engage a loop 55. As soon as the blade 113 has severed the label length it rises, and at the same time the roller 88 clears the swell 92 of cam 89 permitting the clamping jaw 80 to rise and allow the tape to be fed forward by the feed rollers

26 and 27. A new length of tape will then be fed between the cutting blades until the rod 50 has been carried forward by engagement of the hook 54 with the loop 55 sufficiently to close the circuit of the electromagnet 75, whereupon the clamp 80 will be swung downward into clamping position again arresting the feed of the tape.

In the meantime the folders 163 actuated by the cam 184′ will turn from the position shown in Fig. 7 to that shown in Fig. 8, folding over the ends of the severed label length on the lateral extensions 162 of the presser feet. After the folders have reached the position shown in Fig. 8, there is a dwell in their cycle of movement while the presser feet 141 are withdrawn by the cam 152 acting upon the cam lever 156. As soon as the presser feet have cleared the label length, the folders will resume their folding movement in the same direction, pinching the ends of the label down upon the anvils 133, as shown in Fig. 9. Thereafter the folders will turn backward slightly to the position shown in Fig. 10, while the ejector fingers 194 are moved forward by the cam 205, sliding the label off the anvils 133 and between the ironing rollers 210 and 211. The latter will iron the creases formed by the folder and deliver the finished label into the hopper 224 immediately behind the stacker 228. Before the ejectors have completed their movement the cam 89 will operate to hold the clamp 80 in clamped position, while the cam 67 operates to withdraw the hook from the loop in the tape and permit the trigger to return to position to engage the next loop. In the meantime the presser feet are raised by the cam 150 and then advanced under control of the cam 152 so that they overlie the length of label which is about to be cut by the next operation of the cutting blade 113. This completes a cycle of movement, and it will be observed that while one label length is being folded, creased and ironed another label length is being fed forward between the cutters ready to be operated upon the folders as soon as it is cut off the strip of tape. It will also be observed by referring to the diagram that the ejector fingers return to their retracted position while the new label length is being cut off and are depressed by the presser feet which are simultaneously moving downward into clamping position, but the ejectors spring up as soon as they clear the presser feet so as to be in position to engage the edge of the label after it has been creased by the folders.

At a convenient moment after the clamp 80 has been released by the cam 89 the commutator bar 268 bridges the brushes 264 and 266 so that in case the hook 54 has failed to catch a loop 55 the magnet 260 will operate to cause the arrest of the tape feed.

The stacker remains idle while the presser feet are moving down upon the anvils 133. During the first folding operation of the folders 163 the stacker is swung downward clear of the hopper under control of the cam 243. The stacker is then drawn rearward by the cam 240 while the presser feet are being withdraw, and while the presser feet are being raised and the folding operation is being completed the stacker is raised by the cam 243. Finally just as the ejectors start to eject the folded label the stacker is moved forward by the spring 241 under control of the cam 150, forcing the previously deposited label with the other labels in the hopper upward against the sliding weight 230.

Provision is made for handling labels that vary considerably in length and width. The guides 71 on the table 28 are adjustable laterally, being secured by bolts 275 which pass through slots 276 in the table, as shown in Fig. 1. To provide for labels that vary in length by a considerable amount, that is, more than would be represented by variations in weave, the trigger 52 may be adjusted along the rod 50 to correspondingly vary the point at which the circuit of the electromagnet 75 will be closed. Feed rollers 26 and 27 feed the tape at such a rate that the longest label for which the machine is designed will be fed between the cutting blades before the cam 89 acts to interrupt the feed. The block 136 carrying one of the anvils 133 is slidable along the guide 137 and may be secured at any desired adjustment. One of the presser feet 141 is adjustable along the shaft 145. The bracket 147′ which carries one of the folders 163 and one of the ejector fingers 194 is also adjustable along the slide 174″ and may be secured at the desired adjustment depending upon the length of the label to be cut. Finally the wall 224′ of the hopper may be adjusted correspondingly. As shown in Fig. 2, the stacker comprises a number of fingers 228 which are attached to a head 277 formed on the arm 231, and as the label length is increased, more of these fingers may be added to the head 277 so as to provide a good bearing upon the labels ejected from the machine.

While a preferred embodiment of the invention has been described above, it is obvious that many alterations, modifications and changes in form, arrangement, and construction of various parts could be made without departing from the spirit and scope of the invention and I consider myself at liberty to make such changes as fall within the definition of the appended claims.

I claim:

1. In a label cutting machine, means for severing a label strip, means for effecting relative movement between the strip and the severing means, and means actuated by the strip for arresting said relative movement

when a predetermined part of the strip has been presented to the severing means.

2. In a label cutting machine, means for severing a label strip, means for effecting relative movement between the strip and the severing means, means actuated by the strip for arresting said relative movement when a predetermined part of the strip has been presented to the severing means, and means for actuating the severing means while said relative movement has been arrested.

3. In a label cutting machine, means for severing a label strip, means for effecting relative movement between the strip and the severing means, arresting means for interrupting said relative movement, and means actuated by the strip for operating said arresting means when a predetermined part of the strip has been presented to the severing means.

4. In a machine for severing tape bearing spaced markings, means for severing the tape, means for feeding the tape to the severing means, means controlled by the tape for arresting the feed thereof as each space between markings is centered with respect to the severing means.

5. The combination with a tape formed with spaced loops of continuously operating means for non-positively feeding the tape, and means coacting with said loops successively to intermittently arrest the feed of the tape.

6. In a machine for severing tape formed with raised parts, means for severing the tape, means for feeding the tape to the severing means, and means coacting with said raised parts to arrest the tape intermittently in predetermined relation to the severing means.

7. In a tape-severing machine means for severing the tape, means for feeding the tape to the severing means, means for arresting the the tape, and trigger means actuated by engagement with catch means formed on the tape for operating the tape-arresting means when a predetermined part of the tape has been fed to the severing means.

8. In a machine for severing tape formed with spaced loops, means for severing the tape, means for feeding the tape to the severing means, and means coacting with said loops to arrest the tape intermittently in predetermined relation to the severing means.

9. In a machine for severing tape formed with spaced loops, a cutter, means for feeding the tape to the cutter, means engaging said loops successively to arrest the tape intermittently in predetermined relation to the severing means, and automatically actuated means for operating the cutter while the tape is arrested.

10. In a label cutting machine, means for severing a label strip, a feed roller frictionally engaging the strip and serving to feed the strip to the severing means, and means coacting with a loop formed on the strip to arrest the feed of the strip after a predetermined portion thereof has been fed to the severing means.

11. In a label cutting machine, tape-severing means, a pair of continuously driven friction rollers for feeding the tape to the severing means, and means coacting with a loop formed on the strip to arrest the strip after a predetermined portion thereof has been fed to the severing means.

12. In a label cutting machine, a pair of cutting blades, feeding means frictionally engaging a label strip for feeding the strip to the cutting blades, and means controlled by engagement with a loop formed on the strip to arrest the feed of the strip after a predetermined portion thereof has been fed between the cutting blades.

13. In a label cutting machine, a cutting blade, means for non-positively feeding a label strip under the cutting blade, means controlled by a loop formed on the strip for arresting the feed of the strip after a predetermined portion thereof has been fed under the cutting blade, and means for operating the cutting blade to sever said portion from the strip while the feed of the strip is arrested.

14. In a machine for cutting a label strip, intermittently operating severing means, continuously operating means for non-positively feeding the strip to the severing means, a clamp for arresting the strip during operation of the severing means, means operating in timed relation to the severing means for actuating the clamp, and independent means controlled by the strip for actuating the clamp.

15. In a machine for cutting a label strip, intermittently operating severing means, continuously operating means for non-positively feeding the strip to the severing means, a clamp for arresting the strip during operation of the severing means, means operating in timed relation to the severing means for actuating the clamp, independent means controlled by the strip for actuating the clamp, and means for adjusting said independent means for labels of different length.

16. In a machine for cutting a label strip, intermittently operating severing means, continuously operating means for non-positively feeding the strip to the severing means, a clamp for arresting the strip during operation of the severing means, means controlled by the strip for operating the clamp, safety means for operating the clamp, and means controlled by operation of the strip controlled means for preventing operation of the safety means.

17. In a tape-severing machine, intermittently operating severing means, non-positive means for feeding the tape to the sev-

ering means, a clamp for arresting the tape during operation of the severing means, a trigger adapted to engage a loop formed on the tape and be fed forward thereby, means actuated by engagement with the trigger for operating the clamp when a predetermined part of the tape has been fed to the severing means, spring-actuated means for operating the clamp, a detent normally holding the spring-actuated means inoperative, an electro-magnet adapted, when energized, to release the detent, the circuit of the electro-magnet being formed with two gaps, and a commutator adapted to close one of the gaps momentarily in predetermined relation to the operation of the severing means, the trigger mechanism being arranged to open the other gap when the trigger is fed forward by the loop, thereby preventing operation of the spring-actuated means.

18. In a machine for cutting label strips formed with loops between labels, intermittently operating severing means, feed rollers frictionally engaging the label strip for feeding the strip non-positively to said severing means, a clamp adapted to interrupt the feed of the strip, a measuring device bearing a hook, means operated in timed relation to the severing means for moving the hook into engagement with a loop whereby the measuring device will be advanced by the strip, means actuated by the advance of the measuring device for operating the clamp, means operating in timed relation to the severing means for disengaging the hook, and means for returning the measuring device to initial position.

19. In a machine for cutting label strips formed with loops, intermittently operating severing means, feed rollers frictionally engaging the strip and feeding the strip non-positively to said severing means, a clamp adapted to interrupt the feed of the strip, a reciprocable measuring device bearing a hook, means operated in timed relation to the severing means for moving the hook into engagement with a loop whereby the measuring device will be advanced by the strip, means controlled by the advance of the measuring device for operating the clamp, means operating in timed relation to the severing means for disengaging the hook, a spring for returning the measuring device, and an adjustable stop against which the measuring device is returned by the spring.

20. In a machine of the character described, means for cutting a label from a strip, folders for folding and creasing the cut ends of the label, a pair of ironing rollers, and means for transferring the label from the folders to the ironing rollers.

21. In a machine of the character described, means for cutting a label from a strip, a pair of anvils adapted to receive the label, a pair of presser feet adapted to clamp the labels on the anvils, a pair of rotary folders, cam-actuated means for operating the folders to fold the ends of the label over the presser feet, means for withdrawing the presser feet transversely while the folder is in folding position, said folders operating thereafter to crease the folded ends of the label on the anvils and then partly release the labels, and ejecting means operating to eject the labels from the folders.

22. In a machine of the character described, means for cutting a label from a strip, a pair of anvils adapted to receive the label, a pair of presser feet adapted to clamp the labels on the anvils, a pair of rotary folders, cam-actuated means for operating the folders to fold the ends of the label over the presser feet, means for withdrawing the presser feet transversely while the folder is in folding position, said folders operating thereafter to crease the folded ends of the label on the anvils and then partly release the label, ejecting means operating to eject the labels from the folders, and a pair of ironing rollers between which the label is fed by the ejecting means.

23. In a machine of the character described, a table, a cutter at one end thereof, means for feeding a tape along the table to the cutter, means for operating the cutter to sever the tape after a predetermined part thereof has been fed to the cutter, anvils below the plane of the table and on which the severed part of the tape is received, and means for folding the ends of the severed part on the anvil below the level of the table whereby the folding of said severed part may be performed without interrupting the feeding of a succeeding length of the tape.

In testimony whereof, I have signed this specification.

ARTHUR J. BRIGGS.