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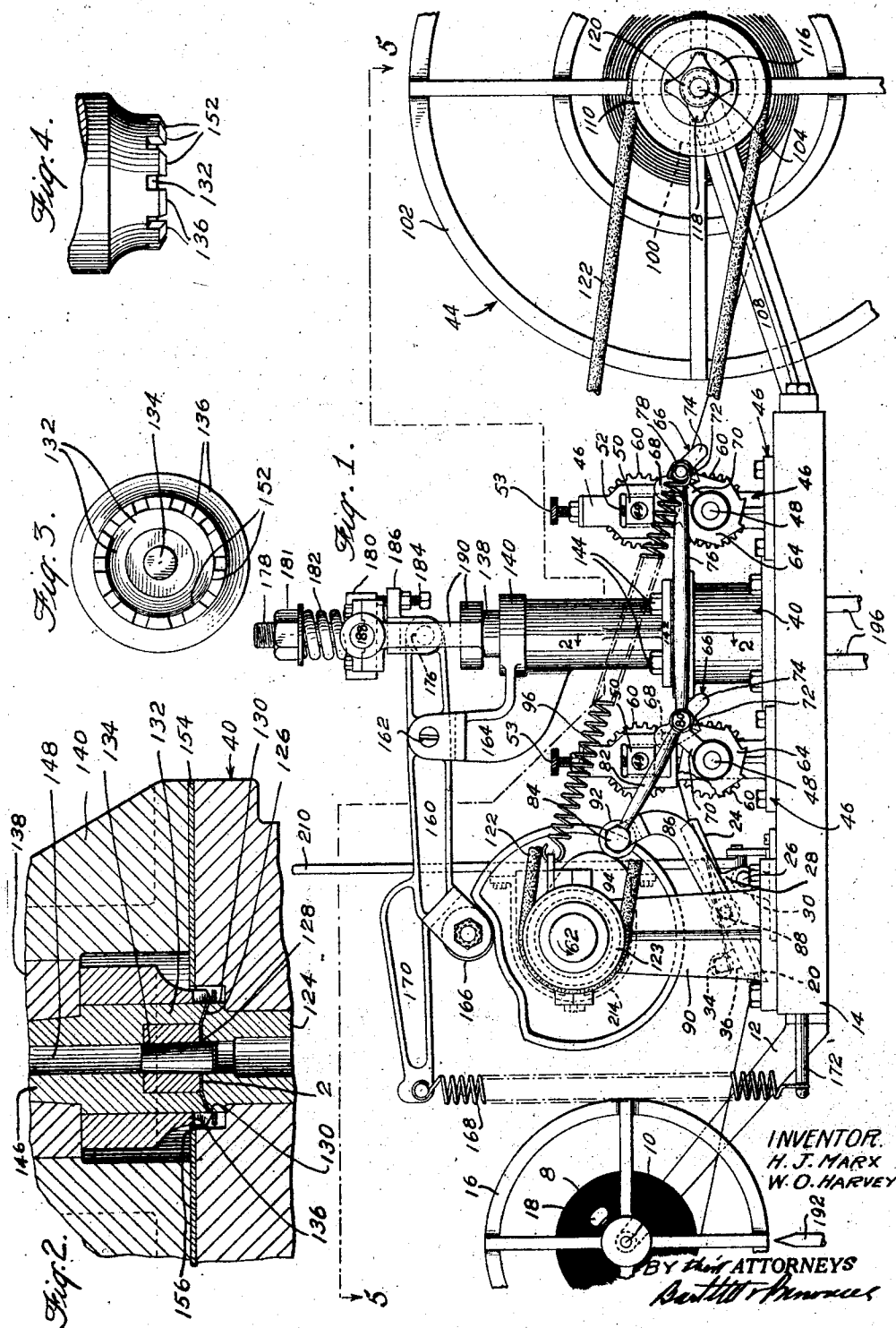
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Filed August 5, 1925

3 Sheets-Sheet 1



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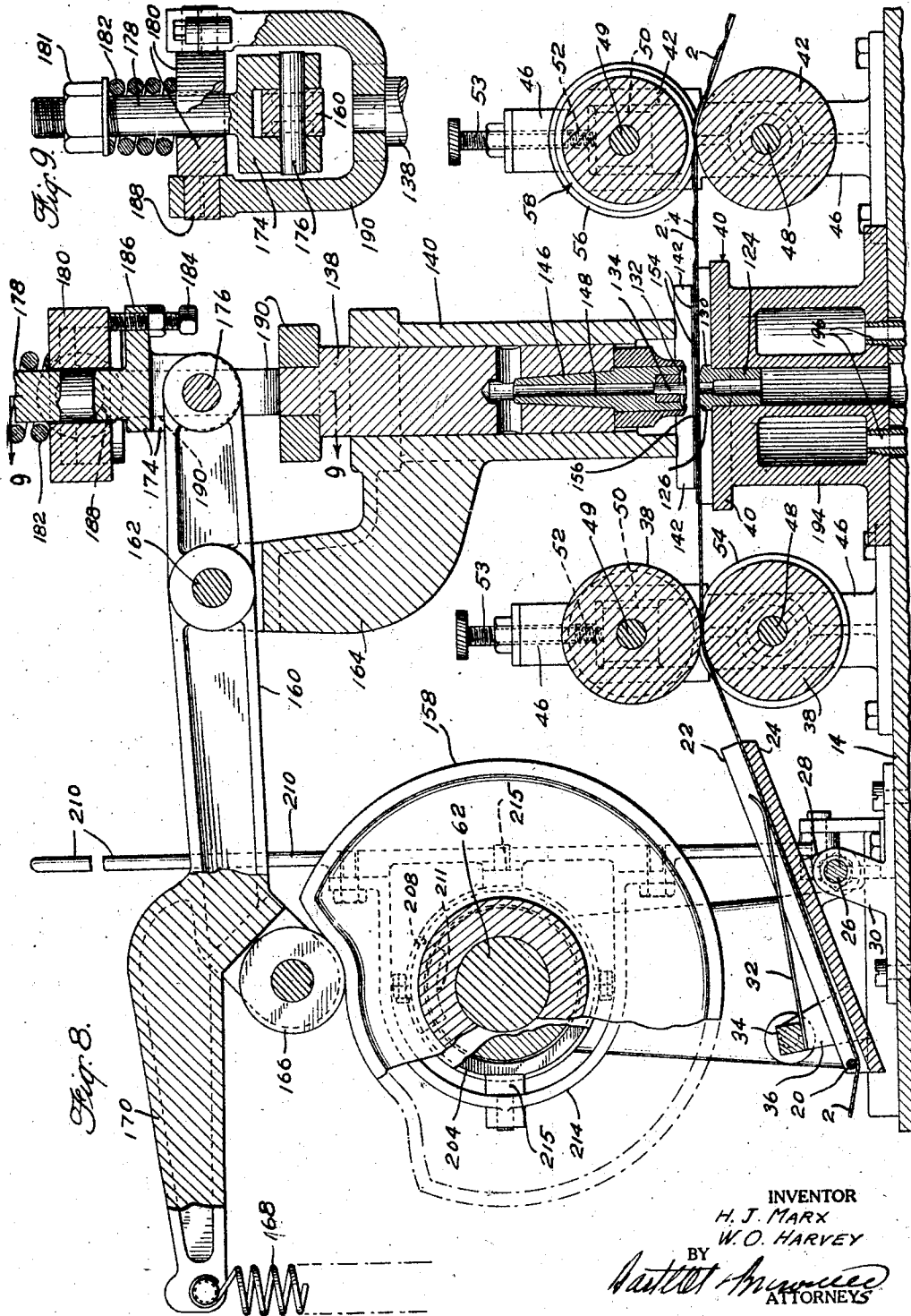
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INVENTOR
H. J. MARX
W. O. HARVEY

BY *Walter H. Harvey*
ATTORNEYS

UNITED STATES PATENT OFFICE.

HENRY J. MARX AND WALTER O. HARVEY, OF HOLYOKE, MASSACHUSETTS, ASSIGNORS
TO THE AMERICAN THREAD COMPANY, OF NEW YORK, N. Y., A CORPORATION OF
NEW JERSEY.

MACHINE FOR USE IN THE MANUFACTURE OF BOBBINS FOR SEWING MACHINES.

Application filed August 5, 1925. Serial No. 48,222.

To all whom it may concern:

Be it known that we, HENRY J. MARX and WALTER O. HARVEY, citizens of the United States, both residing at Holyoke, county of Hampden, State of Massachusetts, have invented a certain new and useful Improvement in Machines for Use in the Manufacture of Bobbins for Sewing Machines, of which the following is a full, clear, and exact description.

Our invention relates particularly to machines for use in the manufacture of sewing machine bobbins of the type in which the flanges or end pieces of the bobbins are so constructed as to apply a yielding pressure on the ends of thread wound on the core of the bobbin. In pending application Serial No. 649,212, filed July 3, 1923, by Curry, Cook and Marx, a machine is illustrated and described for cutting pieces from a suitably formed strip and applying them to the ends of the bobbin core to form the flanges of the bobbin.

The principal object of the present invention is to provide a machine which is simple in construction, rapid and reliable in operation, and particularly adapted for forming a strip of the character of the one used in the machine of said pending application.

The several features of the invention will be clearly understood from the following description and accompanying drawings, in which,

Figure 1 is a front elevation of a machine embodying the features of the invention in their preferred form;

Fig. 2 is an enlarged detail sectional view, taken on the line 2—2 of Fig. 1, showing the operating instrumentalities of the machine in their work-engaging position;

Fig. 3 is a detail bottom plan view of the parts illustrated in Fig. 2 that operate on the top side of the strip;

Fig. 4 is a side elevation of the same;

Fig. 5 is a sectional plan view taken on the line 5—5 of Fig. 1;

Fig. 6 is a detail plan view of a portion of a strip after a part thereof has been acted upon by the machine;

Fig. 7 is a longitudinal sectional view of the same;

Fig. 8 is a sectional view, partly in elevation and on an enlarged scale, taken on the line 8—8 of Fig. 5; and

Fig. 9 is a detail sectional view taken on the line 9—9 of Fig. 8.

The machine illustrated in the drawings is particularly adapted for use in forming a series of circular bumps or embossed portions 2 in a plain flat strip of paper or other fibrous material, the series of bumps extending the length of the strip and being equally spaced, and each bump having a centrally located circular aperture 4 and a series of slits 6 about its outer margin. The blank from which this bumped strip is formed is supplied to the machine in a roll 8 which is slipped loosely over a stud 10 projecting from the end of a bracket member 12 secured on the base plate 14 of the machine. The supply roll 8 is held on the stud 10 between flanges or spiders 16, the forward one of which is detachably secured on the stud by means of a thumb screw 18 screw-threaded through an aperture in the hub of the spider and engaging the stud, this spider being thus removable to enable a new supply roll to be placed in the machine. The blank strip drawn from the supply roll is passed beneath a guide pin 20 which extends between upstanding strip guiding flanges 22 on the longitudinal edges of a strip supporting table 24. This table is mounted for pivotal adjustment on a bolt 26 extending through apertures in depending lugs 28 on the under side thereof, and lugs 30 on a bracket member secured on the base plate 14, the lugs 28 being arranged outside of the lugs 30. The table is held in adjusted position by tightening the bolt 26 so as to clamp the lugs 28 on the table between the head and nut of the bolt. A suitable tension is placed on the strip as it is drawn over the table 24 by means of a flat spring 32 having one end secured on a pin or rod 34 extending between upstanding lugs 36 on the table, and having its other end curled upwardly and bearing upon the strip. The blank strip passes from the table through a pair of positively driven feed rolls 38, then over a support 40, and then between positively driven feed rolls 42, the completed bumped strip being then wound upon a reel 44. The strip is fed intermittently by the two sets of feed rolls 38 and 42, and during the periods of rest thereof it is acted upon by suitable devices hereinafter described to form the bumps in the

strip as it passes over the support 40. The feed rolls of each pair are mounted on standards 46 secured on the base 14. The lower feed rolls of the two pairs have their shafts 48 extending through and journaled in fixed bearings in the standards 46. The upper feed rolls of the two pairs have the ends of their shafts 49 journaled in bearing blocks 50 which are mounted to slide vertically in suitable guide-ways in the standards 46. These upper feed rolls are pressed downwardly to cause the rolls of each pair to suitably grip and feed the paper strip, by means of coiled springs 52 acting on the bearing blocks, the tension of the springs being adjustable by means of the usual adjusting screws 53. The lower roll of the pair of feed rolls 38 is provided with flanges 54 for guiding the strip between them, the strip being engaged throughout its width by these two feed rolls. The upper roll of the pair of feed rolls 42 is provided with flanges 56 for guiding the completed strip, and is further provided with a central annular clearance groove 58 for the bumps in the strip. The feed rolls of each pair are caused to rotate in unison to feed the strip by means of intermeshing gears 60 formed on their forward ends. The two pairs of feed rolls are driven in unison to impart the necessary intermittent feeding movement to the strip through connection with the driving shaft 62 of the machine. This connection comprises a ratchet wheel 64 secured on the forward end of each of the shafts 48 of the lower feed rolls of the two sets, and a cooperating pawl 66 having one end pivotally mounted on a pin or bolt 68 secured on the upper end of an arm 70 which is pivotally mounted upon the associated shaft 48. Each pawl 66 is provided with a tooth 72 which is arranged to engage the teeth of the ratchet wheel, and is provided with a weighted extension 74 for holding the pawl down upon the periphery of the ratchet wheel. The two pawl-carrying arms 70 are connected so as to move together by means of a rod or link 76 having one end pivotally mounted upon a pin or screw bolt 78 secured to the pawl carrying arm 70 associated with the lower feed roll 42, and its other end pivotally mounted on a pin or screw bolt 80 secured to the pawl-carrying arm 70 associated with the lower feed roll 38. The pawl-carrying arms 70 are actuated by means of a link or rod 82 having one end pivotally mounted on the screw bolt 80 and its other end pivotally mounted on a screw bolt 84 secured on the free end of a cam actuated arm 86 having its other end pivotally mounted on a screw bolt 88 secured to a standard 90. The free end of the cam lever 86 is forked to receive a cam roll 92 which is mounted on the screw bolt 84 and engages a cam 94 carried by the driving shaft 62. The cam roll 92 is held in engagement with the periphery of the cam 94 by means of a coiled spring 96 having one end secured to the screw bolt 78 of the pawl-carrying arm 70 of the lower feed roll 42, and having its other end secured to the standard 90. With this construction it will be apparent that during the rotation of the driving shaft 62 the cam 94 will act through the cam roll 92 and the pawl and ratchet connections with the two sets of feed rolls to positively drive the feed rolls intermittently, a feeding movement being imparted to the feed rolls during each rotation of the driving shaft 62.

It may be noted that the cam 94 is so constructed as to impart quick feeding movements to the feed rolls with relatively long periods of rest.

The reel 44 upon which the completed bumped strip is wound comprises a drum 100 and two flanges or spiders 102 adjacent opposite ends of the drum, the drum and the forward spider being integral. The drum and spiders are secured on the rear end of a shaft 104 which extends through and is journaled in an elongated bearing 106 on the end of a bracket arm 108 secured to the base plate 14. The rear spider 102 is secured to the shaft 104 by means of a thumb screw 108 screw-threaded through the hub of the spider and engaging the shaft, this spider being thus removable so as to permit the bumped strip roll to be removed. A pulley 110 is mounted on the forward end of the reel shaft 104, and is provided with friction clutch faces 112 on the ends of its hub. The rear friction clutch face 112 is arranged adjacent a friction clutch face on a collar 115 secured to the reel shaft 104, adjacent the forward end of the bearing 106, and the forward friction clutch face 112 is arranged adjacent a corresponding clutch face on a disk 116. A spring washer 118 is mounted on the shaft 104 between the disk 116 and adjusting nuts 120 screw-threaded on the end of the shaft, the spring washer acting to press the cooperating friction clutch faces together. A driving belt 122 passes over the pulley 110 and a pulley 123 carried by the driving shaft 62 of the machine. With this construction it will be apparent that the clutch pulley 110 will be rotated continuously through its connection with the driving shaft 62 and through the cooperating clutch faces will tend to drive the reel 44 continuously. By suitable adjustment, however, of the nuts 120, slippage will occur between the clutch pulley 110 and the reel shaft during the periods of rest of the strip feed rolls, so that the reel will act to wind up the bumped strip only during the rotation of the feed rolls to the feed strip.

The devices for forming the bumps in the strip comprise a tubular block 124 which is

set in a vertical hole in the strip support 40, the upper end of the block being enlarged to provide a shoulder upon which the block rests. The upper end of the block 124 is provided with a convex or bump-forming surface 126. The upper end of the block is further provided with an inner cutting edge 128 and an outer cutting edge 130. Above the block 124 there is arranged a cooperating bump-forming die 132, a punch 134 for cooperating with the inner cutting edge 128 on the block to cut the central aperture in the strip, and a cutting die 136 for cooperating with the outer cutting edge 130 to cut the slits in the strip. The forming die 132, the punch 134, and the slitting die 136 are all rigidly secured on the lower end of a plunger 138 which is mounted for vertical movement in a tubular bearing 140 having its lower end provided with downwardly and outwardly projecting flanges 142 which are secured by bolts 144 to the strip support 40. The bump-forming die 132 is provided with a tapering shank 146 which is secured in a vertical aperture in the plunger 138, and with an axial aperture 148 in the lower end of which the shank of the punch 134 is secured. The slit cutting die 136 is in the form of a sleeve which is secured on the projecting end or head of the forming die 132, and is provided with downwardly extending equally spaced slit cutting portions 152 corresponding in number to the number of slits to be cut about the margin of the bump in the strip. A stripping plate 154 is mounted on the support 40, and is clamped in position between the top surface of the support and the flanges on the lower end of the plunger bearing 140. The strip being acted upon, passes beneath this stripping plate 154 and over the lower bump forming die 124, the stripping plate being provided with a hole 156 through which the movable dies work.

With this construction, during the downward movement of the plunger 138 the punch 134 will cooperate with the cutting edge 128 in the die block 124 to punch the central aperture in the strip; then the slit forming die 136 will cooperate with the cutting edge 130 to cut the slits in the strip about the outer margin of the bump to be formed, and then the bump forming die 132 will cooperate with the convex surface 126 on the upper end of the die block 124 to form the bump in the strip. During the upward movement of the plunger 138 the stripping plate 154 will cause the strip to be stripped from the movable dies. Such operation of the plunger 138 occurs during each period of rest of the strip feed rolls and is held retracted during each feeding movement of the feed rolls.

The plunger 138 is thus actuated by means of a cam 158 carried by the driving shaft

62. The connection between the cam 158 and the plunger carrier comprises a lever 160 which is pivotally mounted at 162 on the upper end of an upwardly projecting bracket arm 164 on the tubular bearing 140. The left hand arm of the lever 160 carries a cam roll 166 that is held in engagement with the cam 158 by a coiled spring 168 having one end connected with an extension 170 on the outer end of said lever arm and having its other end secured to a pin 172 on the base plate 14. The other end of the lever 160 is received in a depending yoke 174 and is connected with the yoke by means of a pivot pin 176 extending through an aperture therein and in the arms of the yoke. The yoke 174 is provided with an upwardly projecting stud or bolt 178 which extends through and is adapted to slide in an aperture in a block 180. An expansion spring 182 is coiled about the stud 178 and interposed between the block 180 and a nut 181 screw-threaded on the upper end of the stud. The upward movement of the stud 178 by the action of the spring 182 is limited by an adjustable stop screw 184 screw-threaded through an aperture in a laterally projecting lug 186 on the bolt, which engages the underside of the block 180. The block 180 is provided with diametrically opposed trunnions 188 that are received in bearings in the upper ends of a yoke 190 secured to the upper end of the plunger 138 so as to permit pivotal movement of the block. With this construction upon movement of the cam actuated lever 60 in one direction, the lever will act through the stud 178, spring 182, pivoted block 180 and yoke 190 to move the plunger 138 toward the work, the spring 182 being sufficiently strong to cause the bump forming dies to exert the necessary pressure on the work.

The cam 158 has a long dwell which holds the bump-forming dies in forming position and is so constructed with relation to the feed roll actuating cam 94, that the plunger 138 and the operating devices carried thereby are held up out of engagement with the strip only a sufficient length of time during each rotation of the cams to permit the strip to be fed, the devices carried by the plunger carrier being held in operative engagement with the strip during substantially 270 degrees of rotation of the driving shaft. Such timing of the operation of the plunger carrier gives the bump-forming dies the maximum length of time to act on the strip with relation to the speed of operation of the machine.

As the blank strip leaves the supply roll 8, moisture is supplied to its under side by means of a humidifying nozzle 192. As the strip passes over the working support 40, heat is supplied thereto and the bump-form-

ing dies are heated, by means of a steam chest 194 formed in the work support through which steam is circulated by means of steam pipes 196.

5 It has been found that by thus moistening the strip a considerable distance in advance of the bump-forming dies and heating the strip as it passes over the work support that it will be suitably tempered to permit
10 the heated dies to easily form the bumps in the strip, and cause them by the dwell of the heated dies to be permanently set when they leave the work support, the strip leaving the work support in a substantially dry
15 condition. The slits 6 cut in the blank strip, permit the bumps to be smoothly and cleanly formed without crinkling the paper, and to be permanently set.

20 The driving shaft 62 has its forward end journaled in a bearing in the upper end of the standard 90, and its rear portion extending through and journaled in a bearing in the upper end of a similar standard 198 mounted on the base plate 14. The shaft 62 is driven
25 through suitable speed reducing gearing from a driving pulley 200. The plunger carrier operating cam 158 is loosely mounted on the shaft 62 and the feed roll operating cam 94 is secured by a set collar 201 on the
30 hub 202 of the cam 158. A clutch collar 204 is mounted on the shaft 62 between the cam 158 and a collar 206 secured to the shaft. The clutch collar 204 is caused to rotate continuously with the shaft by means of a sliding
35 tongue and slot connection 208 with the fixed collar 206. The forward side of the clutch collar 204 is provided with a tongue 211 which when the clutch collar is shifted forwardly, is caused to engage a projection
40 213 on the hub of the cam 158 so as to connect the cams 158 and 94 with the shaft, and when the clutch collar is shifted rearwardly is withdrawn from the slot so as to disconnect the cams and shaft. The clutch collar
45 is adapted to be thus shifted by means of a hand operable lever 210 having its lower end pivotally mounted on the base plate 14, and carrying midway of its ends, a clutch
50 shifting yoke 214 having diametrically opposed studs or rolls 215 that enter an annular groove in the clutch collar. With this construction, the operator may by means of the clutch lever 210 connect and disconnect the
55 cams 94 and 158 from the driving shaft 62, and thus throw the strip feeding devices and the plunger 138 into and out of operation as desired. As the driving pulley 124 for the reel 44 is fixed on the driving shaft 62, the
60 slip clutch connection will tend to drive the reel after the strip feeding devices and operating devices are thrown out of operation as above described which will ensure the completed strip being maintained tightly wound
65 on the reel while said devices are at rest.

As will be evident to those skilled in the

art our invention permits various modifications without departing from the spirit thereof or the scope of the appended claims.

What we claim is:

1. A machine of the class described having, in combination, means for intermittently
70 feeding a strip, devices operable during the periods of rest of said feeding means comprising a punch and die for forming an
75 aperture in the strip and means acting while said punch is inserted through said aperture to form a circular bump in the strip having
80 its outer edge arranged substantially concentrically with said aperture, and actuating means for said devices.

2. A machine of the class described having, in combination, means for intermittently
85 feeding a strip, devices operable during the periods of rest of said feeding means to form in the strip an aperture, a circular series of slits concentrically of the aperture, and a
90 bump having its outer edge defined by said slits, and actuating means for said devices.

3. A machine of the class described having, in combination, means for intermittently
95 feeding a strip, devices operable during the periods of rest of said feeding means to form in the strip an aperture, a plurality of slits arranged concentrically about the aperture, and a bump having its outer edge defined
100 substantially by said slits, actuating means for said devices, means for moistening the strip as it is being fed to said devices, and means for heating the strip as it is being acted upon by said devices.

4. A machine of the class described having, in combination, a support for a strip,
105 means for heating said support, means for intermittently feeding the strip over said support, devices operable during the periods of rest of said feeding means to form in the
110 strip an aperture, slits arranged concentrically with said aperture, and a bump having its outer edge defined substantially by said slits, actuating means for said devices, and means for moistening the strip as it is being fed to said devices.

5. A machine of the class described having, in combination, a support for a strip,
115 a carrier movable toward and from said support, means comprising a punch, a slit cutting die, and a forming die for forming in the strip during the movement of the carrier toward said support an aperture, a
120 plurality of slits arranged about the aperture, and a bump having its outer edge defined substantially by said slits, respectively, and actuating means for said carrier.

6. A machine of the class described having, in combination, a support for a strip, a
125 carrier movable toward and from said support, means comprising a slit cutting die and a forming die mounted on the carrier to form in the strip, during the movement of
130 the carrier toward said support, a plurality

of slits arranged substantially in a circle, and a bump having its outer edge defined by said slits, respectively, and actuating means for said carrier.

5 7. A machine of the class described having, in combination, a support for a strip, means for intermittently feeding the strip over said support, a carrier movable toward and from said support during the periods
10 of rest of said feeding means, devices carried by the carrier and acting during the movement thereof toward said support to first form an aperture in the strip and then to form a circular bump in the strip having
15 its outer edge arranged substantially concentrically with said aperture, and actuating means for said carrier.

8. A machine of the class described having, in combination, means for intermittent-
20 ly feeding a strip, devices operable during the periods of rest of said feeding means to form in the strip a plurality of slits arranged substantially in a circle, and then to form a bump in the strip having its edge defined
25 substantially by said slits.

9. A machine of the class described having, in combination, a support for a strip, a carrier movable toward and from said support, devices carried by the carrier and co-
30 operating devices mounted on said support to form in the strip during the movement of the carrier toward said support an aperture, a plurality of slits arranged concentrically about the aperture, and a bump having its
35 outer edge defined substantially by said slits, a spring connected with the carrier, and means acting through said spring for moving the carrier toward said support.

10. A machine of the class described having, in combination, a support over which a strip is adapted to be fed, a carrier movable toward and from said support, means comprising devices carried by the carrier for forming a bump in the strip, and for
40 cutting slits about the margin of the bump during the movement of the carrier toward said support, feed rolls for feeding the strip over said support, a drive shaft, a cam carried thereby, connections between the cam
45 and feed rolls for imparting a step by step movement thereto to intermittently feed the strip over said support, and a second cam carried by said drive shaft and suitable connections for actuating said carrier to cause
50 said devices to act on the strip during the periods of rest of the feeding movement of the strip.

11. A machine of the class described having, in combination, a support over which a
60 strip is adapted to be fed, a tubular die block mounted on said support having a convex top

surface for engagement with the under side of the strip and having circular outer and inner cutting edges, a carrier movable toward and from said support, an outwardly spring-
65 pressed plunger mounted on said carrier having a die formed on its outer end adapted to cooperate with said convex surface to form a bump in the strip during the movement of the carrier toward said support, and
70 a cutting die and a punch carried by the carrier for cooperating with said cutting edges to act on the strip previously to the effective operation of said bump forming die.

12. A machine of the class described having, in combination, feed rolls for feeding a strip intermittently and acting to hold the strip from movement during the periods
80 of rest thereof, devices for forming a bump in the strip during each period of rest of the feeding movement of the strip, a roll for winding up the strip as it leaves said devices, means comprising a slip clutch connection tending to drive the reel continuously to wind up the strip but incapable of
85 thus driving the reel against the holding action of the feed rolls on the strip during the periods of rest of the feeding movements of said rolls, and means for throwing said
90 feed rolls and said bump forming devices into and out of operation independently of said reel driving means.

13. A machine of the class described having, in combination, a support over which
95 a strip is adapted to be fed, a tubular die block mounted on said support having a curved top surface for engagement with one side of the strip, and having circular outer and inner cutting edges, a carrier movable
100 toward and from said support, a forming die, a cutting die, and a punch carried by the carrier for cooperating with said curved surface and said outer and inner cutting edges, respectively, to form in the strip a
105 bump, an aperture and slits, the aperture being arranged substantially at the center of the bump and the slits defining the margin of the bump, feed rolls for feeding the strip over said support, a drive shaft, con-
110 nections between said feed rolls and drive shaft to intermittently feed the strip over said support, and connections between said drive shaft and carrier for moving the carrier toward said support during the periods
115 of rest of said strip.

In testimony whereof, we have signed our names to this specification this 31st day of July, 1925.

HENRY J. MARX.
WALTER O. HARVEY.