Dec. 3, 1957 J. E. ANNEN 2,815,061

MACHINE FOR APPLYING CUTTER STRIPS TO A DISPENSING CARTON FOR ROLLS OF WRAPPING MATERIAL SUCH AS PAPER

Filed Oct. 18, 1954 5 Sheets-Sheet 1

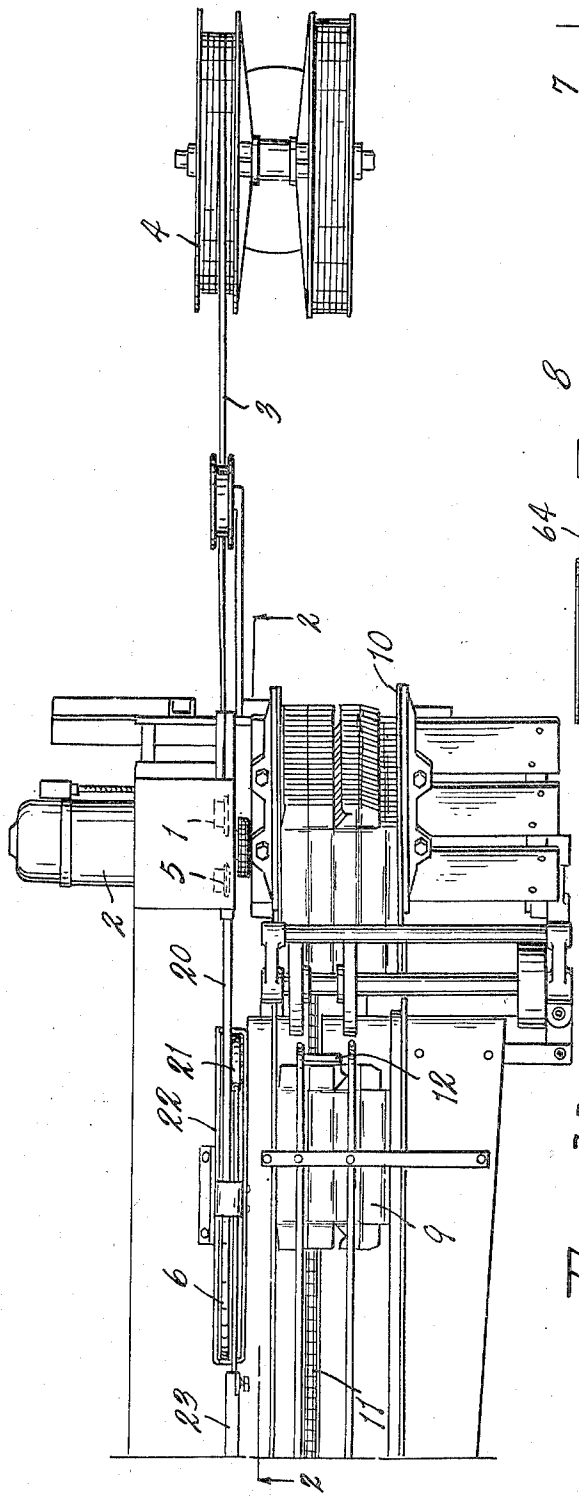


FIG. 1A.

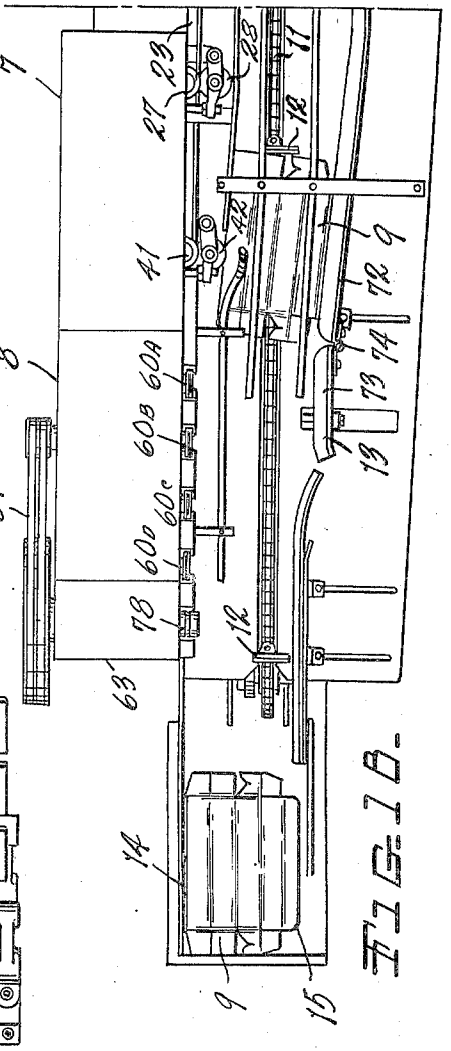


FIG. 1B.

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Filed Oct. 18, 1954 5 Sheets-Sheet 2

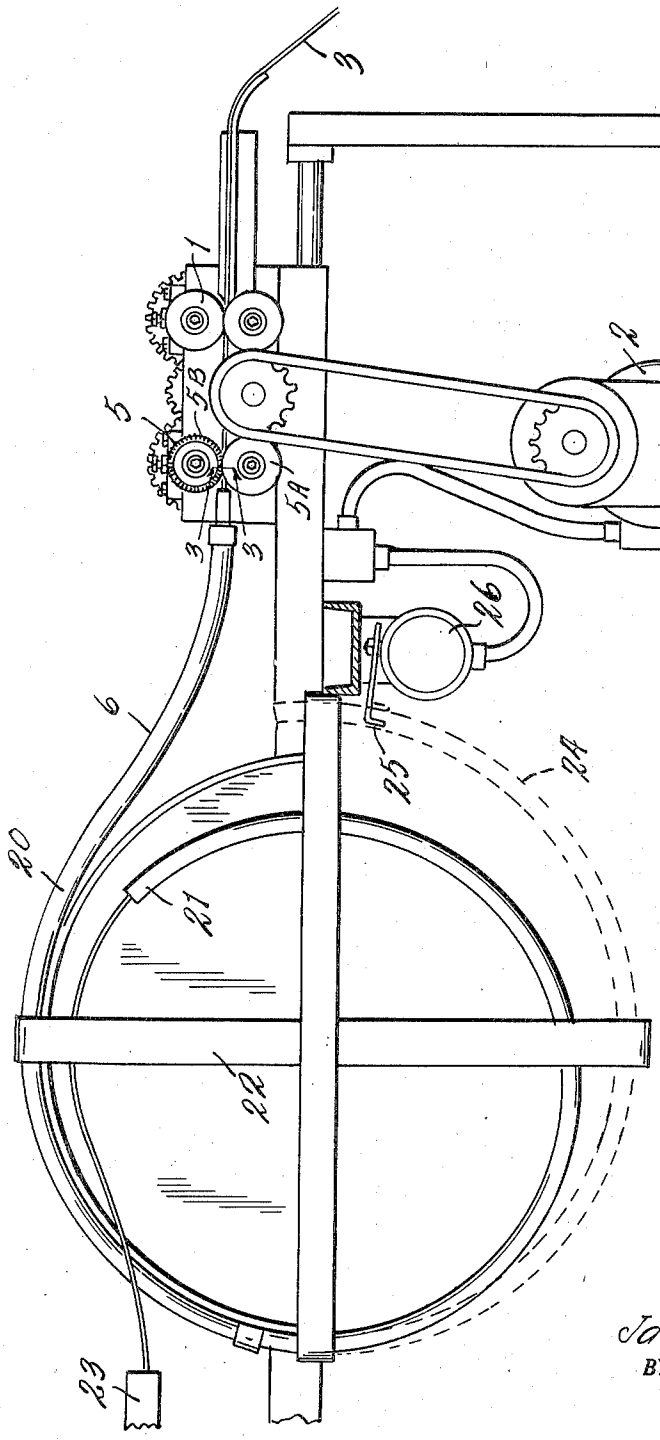


FIG. 2.

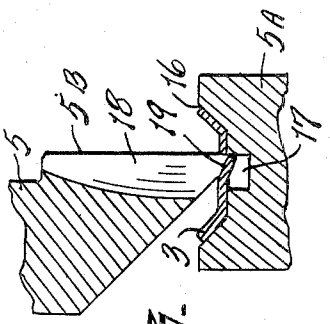


FIG. 3.

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Filed Oct. 18, 1954 5 Sheets-Sheet 3

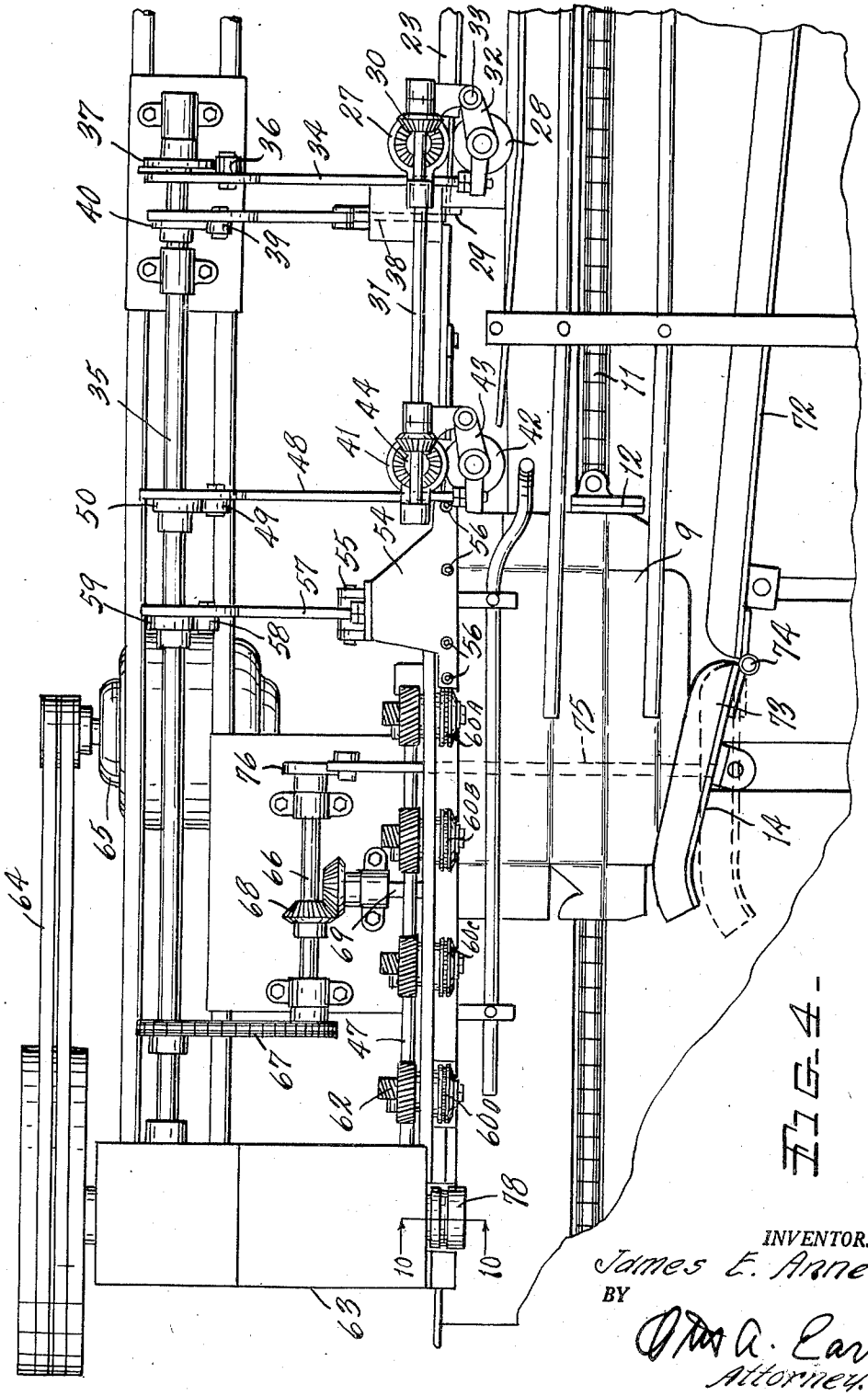


FIG. 4

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Filed Oct. 18, 1954 5 Sheets-Sheet 4

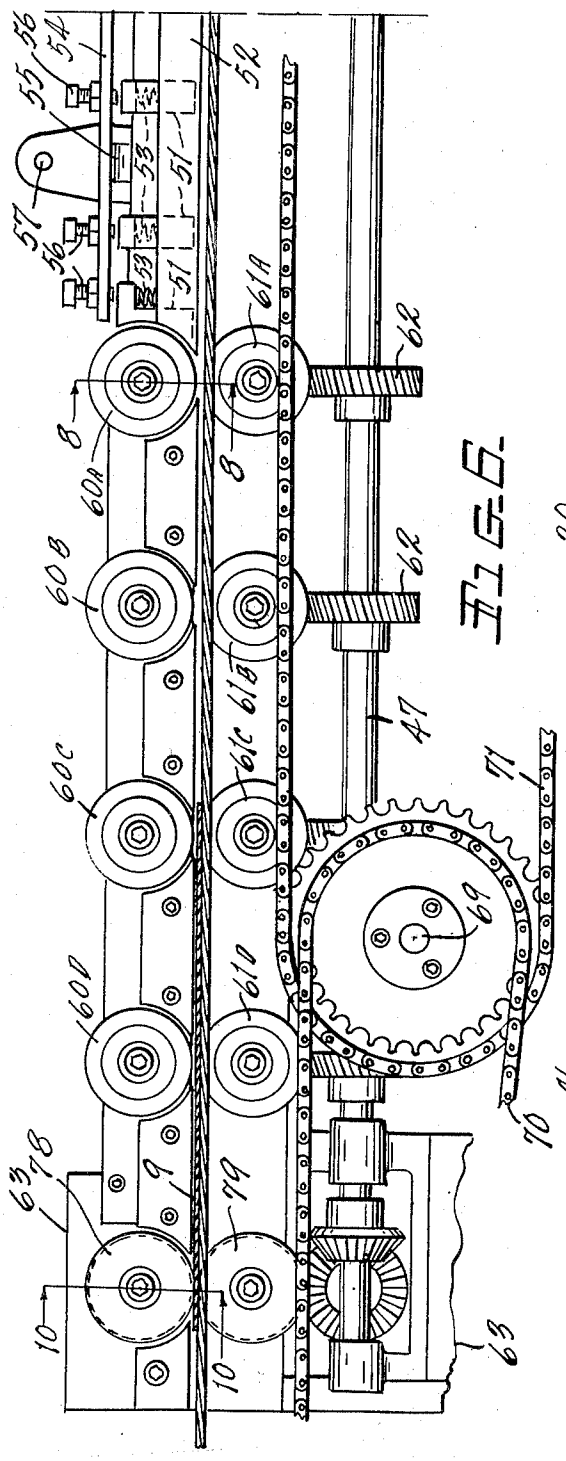


FIG. 4.

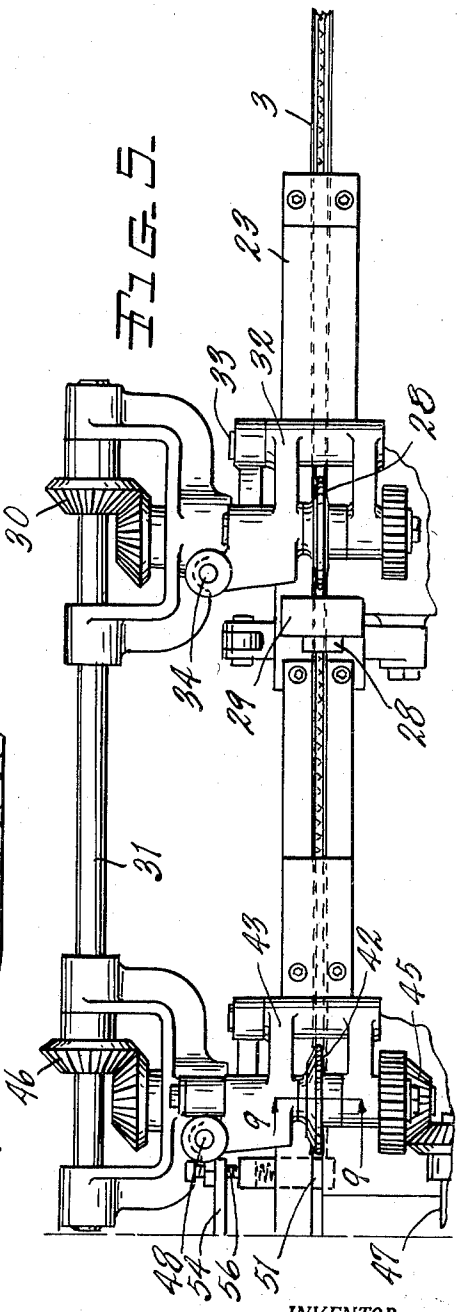


FIG. 5.

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Filed Oct. 18, 1954 5 Sheets-Sheet 5

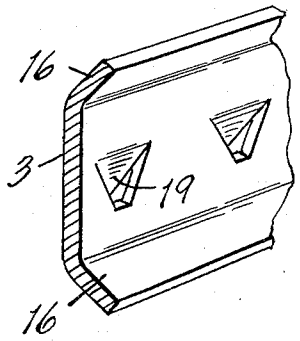


FIG. 7

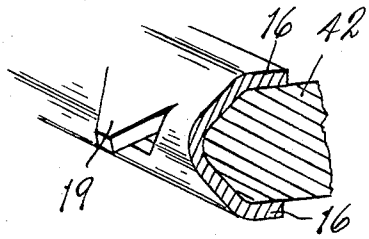


FIG. 9

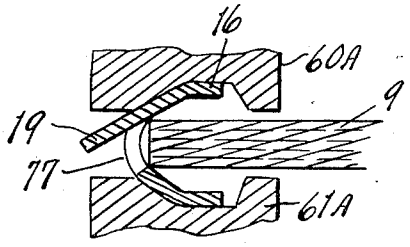


FIG. 8

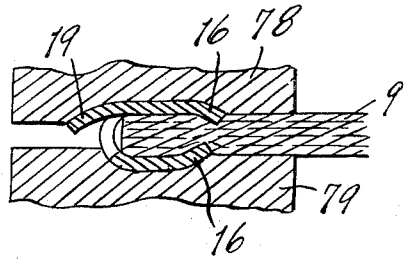


FIG. 10

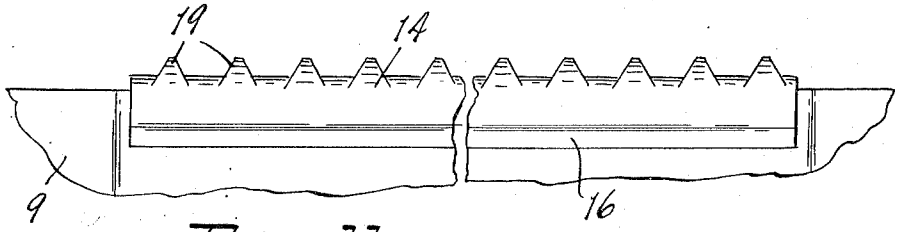


FIG. 11

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2,815,061

MACHINE FOR APPLYING CUTTER STRIPS TO A DISPENSING CARTON FOR ROLLS OF WRAPPING MATERIAL SUCH AS PAPER

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Application October 18, 1954, Serial No. 462,681

11 Claims. (Cl. 153—1)

This invention relates to machine for applying cutter strips to a dispensing carton for rolls of wrapping material such as paper.

The principal objects of this invention are:

First, to provide a machine for rapidly attaching cutter strips to dispensing carton blanks while the blanks are in flat form and as the blanks are continuously advanced along a conveyor so that the attaching operation is carried out as part of a continuous operation.

Second, to provide a machine which will form a continuous length of flat metal strip stock into lengths of individual cutter strips and form cutter teeth in the strips and attach the lengths to the edges of carton blanks in a continuous automatic operation.

Third, to provide a machine which forms cutter strips and attaches the strips to the edges of the carton blanks in a secure and smooth connection.

Fourth, to provide a machine which attaches cutter strips to the edges of carton blanks in a continuously crimped joint as distinguished from an intermittently stapled joint.

Fifth, to provide a machine which attaches cutter strips to carton blanks in a smooth joint having no rough projections other than the teeth of the cutter strip which are likely to catch or scratch the hands or the web of material dispensed from the carton.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims.

The drawings, of which there are five sheets, illustrate a highly practical form of machine and the several operations performed in forming or attaching the cutter strips to the carton blanks.

Fig. 1A is a plan view of the leading or starting end of the machine into which the materials are fed.

Fig. 1B is a plan view of the trailing end of the machine from which the finished product is delivered and constitutes a continuation of Fig. 1A.

Fig. 2 is an enlarged fragmentary side elevational view partially in cross section taken along the plane of the line 2—2 in Fig. 1A and illustrating the stock feeding and perforating portions of the machine.

Fig. 3 is an enlarged fragmentary cross sectional view through the stock perforating rolls taken along the plane of line 3—3 in Fig. 2.

Fig. 4 is an enlarged fragmentary plan view of the cutter strip severing and attaching portion of the machine illustrated in Fig. 1B.

Fig. 5 is an enlarged fragmentary elevational view of the cutter strip severing and feeding portion of the machine shown in Fig. 4.

Fig. 6 is an enlarged fragmentary elevational view of the cutter strip crimping and attaching portion of the machine shown in Fig. 4.

Fig. 7 is a fragmentary perspective view of a portion of the cutter strip stock after the first forming operations have been performed thereon.

Fig. 8 is a fragmentary cross sectional view through the first forming rolls taken along the plane of the line 8—8 in Fig. 6 and illustrating the first forming and attaching operation of the machine.

Fig. 9 is a fragmentary perspective view through the final forming rolls taken along the plane of line 9—9 in Fig. 6.

Fig. 10 is an enlarged fragmentary cross sectional view through the final pressure and attaching rolls taken along the plane of line 10—10 in Figs. 4 and 6.

Fig. 11 is a fragmentary elevational view of the finished cutter strip attached to the carton blank.

This invention deals with the formation and attachment of cutter strips to carton blanks of the type that are used for dispensing webs of material such as wax paper, metal foil, and more particularly the newly developed synthetic films. The material to be dispensed is formed in a roll and let out through the cover of a carton, a cutter strip is attached to the edge of the carton so that sheets of desired length can readily be severed from the web of material as will be readily understood. Generally, as indicated in Figs. 1A and 1B, the machine comprises driving stock feeding rolls 1 operated from a motor 2 and adapted to draw in a continuous strip of flat metal stock 3 from a supply coil 4. The feed rolls 1 may also partially form the strip of stock. The rolls 1 deliver to perforating toothing rolls 5 and the stock is delivered from the perforating rolls to a flexibly coiled stock take-up member 6. The stock is advanced from the take-up member 6 to a forwarding and cutting head or station 7 where the stock is severed into individual cutter strips of the desired length and advanced to an attaching or crimping head 8 where the individual strips are attached to the edges of the individual carton blanks. Simultaneously with the advance of the strip stock and the individual cutter strips a plurality of carton blanks are advanced individually as at 9 from a blank feeding machine and hopper 10, to a conveyor 11 having blank advancing flights 12. After the blanks 9 pass the cutting head 7 they are shifted transversely of the conveyor by a reciprocating shift member 13 to bring each of the blanks into registering relation with the individual cutter strips in the attaching head 8. The finished blanks with the cutter strips 14 attached thereto are delivered to a stack at the end of the machine as at 15 in Fig. 1B.

Considering more particularly the infeeding and toothing of the metal strip stock attention is directed to Figs. 2 and 3.

The flat strip stock 3 is taken in by the infeeding rolls 1 which form the flat strip into a shallow channel with inclined side walls 16. The channeled stock is delivered to perforating rolls 5 also driven from the motor 2. The lower perforating roll 5A is merely a backing roll having a channeled rim shaped to receive the channeled stock. A peripheral groove 17 in the roll 5A leaves the center of the web of stock unsupported. The upper perforating roll 5B has a plurality of radially projected teeth 18 which engage the inside of the strip of stock and press a plurality of similarly shaped teeth 19 downwardly into the groove 17 in the lower perforating roll 5A. The teeth 19 are slightly blunted and are pressed only part way from the plane of the center of the strip of stock so that the tips and side edges of the teeth are completely severed from the strip of stock.

After passing from the perforating rolls 5 the strip of stock is directed through a coiled flexible sheath 20. The sheath 20 has a free end 21 and is limited as to expansion by a retaining frame 22. In passing through the sheath 20 to a receiving conduit 23 the strip of stock is twisted so that the channel section of the stock opens laterally or transversely toward the conveyor 11. Should the strip of stock break between the conduit 23 and the

sheath 20, or should the feed rolls 1 deliver more strip stock than is taken up by the remainder of the machine, the sheath 20 will expand as shown by the dotted lines 24 in Fig. 2 to actuate the lever 25 of an electric switch 26. The switch 26 is connected to control the motor 2 and stop the motor in the event of malfunctioning of the machine.

The guide conduit 23 delivers the twisted and laterally facing strip of channel stock to feed rolls shown more particularly in Figs. 4 and 5. The first feed roll 27 operates against the back of the channel and cooperates with the pressure roll 28 to advance the stock to a cutter block 29. The feed roll 27 is driven from the mitre gears 30 by a shaft 31 and the pressure roll 28 is swingably mounted on an arm 32 pivotably supported at 33. The pressure roll 28 and the arm 32 are arranged to be swung out of coacting feeding relation with the roll 27 by operation of a push rod 34 from a cam shaft 35 (see Fig. 4). The push rod 34 carries a follower 36 actuated by a cam 37 on the cam shaft.

A reciprocal cutter part or knife 38 coacts with the cutter block 29 to sever the continuous strip stock into individual cutter strips. The knife 38 has a cam follower 39 actuated by a cam 40 on the cam shaft 35. The cams 37 and 40 are shaped and positioned on the shaft 35 so that the pressure roll 28 first functions to deliver the desired length of strip stock past the cutter block 29 after which the pressure roll 28 is desirably backed off by the cam 37 to interrupt the feed of the strip stock while the knife 38 is actuated.

In passing from the feed rolls 27 and 28 the strip stock is advanced to a second driven feed roll 41 having a coacting pressure roll 42 mounted on a swingable arm 43. The second feed roll 41 is driven from a shaft 44 by the mitre gears 45 (see Fig. 5) and the shaft 44 in turn drives the previously mentioned shaft 31 through mitre gears 46. Drive from gears 45 comes through a shaft 47, as will be described.

The feed rolls 41 and 42 act to advance the severed cutter strip after it has been disconnected from the strip stock and is no longer under direct control of the feed rolls 27 and 28. For this purpose the pressure roll 42 and the arm 43 are arranged to be swung between operative and inoperative positions by a push rod 48 having a cam follower 49 operated by the cam 50 on the shaft 35. Normally the cam 50 holds the pressure roll 42 in inoperative relation until the cutter strip has been severed and is ready to advance in timed relation with blank 9 on the conveyor.

The length of the individual cutter strips to be formed is matched with the length of the blank to which the strip is to be attached. This is controlled by a plurality of stop pins 51 slidably mounted in a block 52 and biased upwardly by springs 53 (see Fig. 6). The stop pins 51 are selectively pressed downwardly into the path of the end of the strip stock to prevent advancing of the stock by means of a stop actuating plate 54 pivotably supported at 55 and having selectively adjustable screws 56 adjusted to actuate any one of the stop pins 51. The stop actuating plate 54 is rocked on its pivot by a push rod 57 having a cam follower 58 driven by the cam 59 on the shaft 35. The cam 59 depresses the plate and the selected stop 51 to determine the length of the cutter strip and after the knife 38 has operated the cam 59 retracts the stops and the cam 50 places the feed rolls 41 and 42 in operation.

The severed and partially formed cutter strips are advanced by the rolls 40 and 42 to under a series of forming rolls 60A–D. The forming rolls have coacting driven rolls 61A to D driven by beveled gears 62 from the previously mentioned shaft 47. The shaft 47 is driven from a gear box or transmission 63 connected by belts 64 to the motor 65. The transmission 63 also drives the previously mentioned shaft 35 so that the several cams and feed rolls are actuated in timed relationship with the forming rolls.

A parallel shaft 66 driven by the chain 67 from the shaft 35 is provided with a mitre gear connection 68 to a cross shaft 69 and the shaft 69 is coupled by the chain 70 (see Fig. 6) to the conveyor for advancing the carton blanks. A chain 71 connects the drive and carton conveyor to the previously described carton blank feeding mechanism 10 so that all elements of the carton blank feeding mechanism are operated in timed relationship.

The conveyor 11 which advances the carton blanks is provided with a side rail 72 which is radially adjustable to accommodate carton blanks of different sizes. A transversely shiftable shift member 73 is pivoted on the end of the side rail as at 74 and actuated by a push rod 75 from a cam 76 on the parallel shaft 66. The shift member 73 is thus operated in timed relationship with the other elements of the machine to shift the individual carton blanks transversely into nesting relation with the individual cutter strips as the blank and cutter strips are advanced through the forming rolls 60A to D.

The character and function of the forming rolls 60A to D is more particularly shown in Figs. 8 and 9. The forming or shaping of the cutter strips may be accomplished progressively by several sets of forming rolls, as illustrated, with each successive set of rolls forming the strip slightly more than the previous set. The first set of rolls 60A and 61A form the cutter strip from its partially formed shape as shown in Fig. 7 into a sharper bent section to bring the side flanges 16 into parallel spaced relationship with the edge of the carton blank, folding the section in the center of the cutter strip, as at 77, without contact with the center of the strip so that the teeth 19 are not bent but are inclined sharply away from the body of the cutter strip. Succeeding forming rolls fold the sides of the cutter strip into close lapping contact with the edge of the carton blanks, as is shown in Fig. 9. Final crimping and pressing rolls 78 and 79 have peripheral grooves spaced and positioned to crimp the edges of the cutter strip into the carton blank as in Fig. 10, and also to smoothly round the sides of the cutter strip and curve the teeth 19 slightly around the edge of the cutter strips.

The end product is a cutter strip firmly attached to the carton blank and having no sharp projecting edges other than the teeth and even the teeth are smoothly curved away from one surface of the cutter strip and blank so as not to present objectionable rough edges. At the same time the downwardly curved sides of the teeth are highly effective in cutting a web of material passed over the cutter strip from a roll contained in the carton after the carton is erected.

No attempt has been made to describe possible modifications of the several elements and characters of the machines which may show the scope of the invention, as defined in the claims.

Having thus described the invention, what is claimed as new and is desired to be secured by Letters Patent is:

1. Cutter strip applying mechanism for carton blanks comprising, a driven roll arranged to feed a continuous length of metal strip stock and form the same into a shallow channel with inclined sides and a flat bottom, a perforating roll positioned to operate on said strip after said first roll and having closely spaced teeth adapted to press blunted teeth from the bottom of the channel in the middle of the strip, a coiled flexible guide member positioned to guide said strip as it leaves said perforating roll and twist said strip to face the channel thereof laterally of the strip, a switch positioned to be actuated by said guide member as said member uncoils beyond a predetermined point, said switch being connected to shut off the drive to said driven roll, a pair of driven feed rolls and shiftable coacting pressure rolls positioned in longitudinally spaced relation to advance said strip from said guide member, a cutter positioned to cut said strip between said feed rolls,

a stop shiftable into the path of said strip after passing the second of said feed rolls, a plurality of forming rolls positioned to receive the severed lengths of said strip and act successively thereon, a conveyor having flights arranged to advance carton blanks in timed relation to said strips, a shift member movable transversely of the line of said forming rolls to move the edge of a carton blank on said conveyor transversely into the channel of the severed lengths of said strip, and drive means connected to continuously drive said forming rolls and conveyor and to intermittently actuate the pressure rolls of said feed rolls and said cutter and said stop and said shift member in timed relation, said forming rolls being shaped to first bend the center of the web of the channel section of said length of strip to bring sides thereof into spaced parallel relation to the edge of the blank and to extend the tips of the teeth on the strip in inclined relation from the folded edge of the strip and to thereafter fold the sides of the strip into contacting lapped relation to the edge of the blank and to thereafter crimp the free edges of the strip into the edge of the blank and curve the teeth on the strip slightly from their bases around the edge of the blank.

2. Cutter strip applying mechanism for carton blanks comprising, a driven roll arranged to feed a continuous length of metal strip stock and form the same into a shallow channel with inclined sides and a flat bottom, a perforating roll positioned to operate on said strip and having closely spaced teeth adapted to press teeth from the bottom of the channel in the middle of the strip, a coiled flexible guide member positioned to guide said strip and twist said strip to face the channel thereof laterally of the strip, a switch positioned to be actuated by said guide member as said member uncoils beyond a predetermined point, said switch being connected to shut off the drive to said driven roll, a pair of driven feed rolls and shiftable coacting pressure rolls positioned in longitudinally spaced relation to advance said strip from said guide member, a cutter positioned to cut said strip between said feed rolls, a stop shiftable into the path of said strip after passing the second of said feed rolls, a plurality of forming rolls positioned to receive the severed lengths of said strip and act successively thereon, a conveyor having flights arranged to advance carton blanks in timed relation to said strip, a shift member movable transversely of the line of said forming rolls to move the edge of a carton blank on said conveyor transversely into the channel of the severed lengths of said strip, and drive means connected to continuously drive said forming rolls and conveyor and to intermittently actuate the pressure rolls of said feed rolls and said cutter and said stop and said shift member in timed relation, said forming rolls being shaped to first bend the center of the web of the channel section of said length of strip to bring sides thereof into spaced parallel relation to the edge of the blank and to extend the tips of the teeth on the strip in inclined relation from the folded edge of the strip and to thereafter fold the sides of the strip into contacting lapped relation to the edge of the blank and to thereafter crimp the free edges of the strip into the edge of the blank.

3. Cutter strip applying mechanism for carton blanks comprising, a driven roll arranged to feed a continuous length of metal strip stock and form the same into a shallow channel, a perforating roll positioned to operate on said strip and having closely spaced teeth adapted to press blunted teeth from the bottom of the channel, a coiled flexible guide member positioned to guide said strip as it leaves said perforating rolls, a pair of driven feed rolls and shiftable coacting pressure rolls positioned in longitudinally spaced relation to advance said strip from said guide member, a cutter positioned to cut said strip between said feed rolls, a stop shiftable into the path of said strip after passing the second of said feed rolls, a plurality of forming rolls positioned to receive the severed lengths of said strip and act successively thereon, means for delivering carton blanks in timed relation to the sides

of said strips, a shift member movable transversely of the line of said strips to move the edge of a carton blank from said delivery means transversely into the channel of the severed lengths of said strip, and drive means connected to continuously drive said forming rolls and intermittently actuate the pressure rolls of said feed rolls and said cutter and said stop and said shift member in timed relation, said forming rolls being shaped to fold the sides of the strip into contacting lapped relation to the edge of the blank and to thereafter crimp the free edges of the strip into the edge of the blank and curve the teeth on the strip slightly from their bases around the edge of the blank.

4. Cutter strip applying mechanism for carton blanks comprising, a driven roll arranged to feed a continuous length of metal strip stock formed into a shallow channel with inclined sides and a flat bottom, a perforating roll positioned to operate on said strip and having closely spaced teeth adapted to press teeth from the bottom of the channel in the middle of the strip, a pair of driven feed rolls and shiftable coacting pressure rolls positioned in longitudinally spaced relation to advance said strip from said perforating roll, a cutter positioned to cut said strip between said feed rolls, a stop shiftable into the path of said strip after passing the second of said feed rolls, a plurality of forming rolls positioned to receive the severed lengths of said strip and act successively thereon, means to advance carton blanks in timed relation to said strip, a shift member movable transversely of the line of said forming rolls to move the edge of a carton blank from said blank advancing means transversely into the channel of the severed lengths of said strip, and drive means connected to continuously drive said forming rolls and to intermittently actuate said feed rolls and said cutter and said stop and said shift member in timed relation, said forming rolls being shaped to first bend the center of the web of the channel section of said length of strip to bring sides thereof into spaced parallel relation to the edge of the blank and to extend the tips of the teeth on the strip in inclined relation from the folded edge of the strip and to thereafter fold the sides of the strip into contacting lapped relation to the edge of the blank and to thereafter crimp the free edges of the strip into the edge of the blank.

5. In a cutter strip applying machine, means for delivering cutter strips of channel shaped cross section having inclined sides walls and a flat bottom with teeth bent slightly from the plane of the bottom, means for delivering the edge of a carton blank into the channel of each strip, means for simultaneously advancing each strip and blank longitudinally of the strip, a first pair of forming rolls positioned to act on the strip and bend the side walls thereof into parallel spaced relation to the edge of said blank and bend the bottom of the strip to incline said teeth further away from said bottom, a second pair of forming rolls positioned to act on said strip and bend the same into contacting relation to the edge of said blank, and a third pair of rolls positioned to crimp the free edges of said strip into the side surfaces of said blank and curve said teeth slightly around the edge of said blank.

6. In a cutter strip applying machine, means for delivering cutter strips of channel shaped cross section having inclined side walls and a flat bottom with teeth bent slightly from the plane of the bottom, means for delivering the edge of a carton blank into the channel of each strip, means for simultaneously advancing each strip and blank longitudinally of the strip, a first pair of forming rolls positioned to act on the strip and bend the side walls thereof into parallel spaced relation to the edge of said blank and bend the bottom of the strip to incline said teeth further away from said bottom, a second pair of forming rolls positioned to act on said strip and bend the same into contacting relation to the edge of said blank, and a third pair of rolls positioned to crimp the

free edges of said strip into the side surfaces of said blank.

7. In a cutter strip applying machine, means for delivering cutter strips of channel shaped cross section having side walls and a bottom with teeth bent slightly from the bottom, means for delivering the edge of a carton blank into the channel of each strip, means for simultaneously advancing each strip and blank longitudinally of the strip, a pair of forming rolls positioned to act on said strip and bend the same into contacting relation to the edge of said blank, and bend the bottom of the strip to incline said teeth further away from said bottom, and a second pair of rolls positioned to crimp the free edges of said strip into the side surfaces of said blank.

8. In a cutter strip applying machine, means for delivering cutter strips of channel shaped cross section having inclined side walls and a flat bottom with teeth bent slightly from the plane of the bottom, means for delivering the edge of a carton blank into the channel of each strip, a first pair of forming rolls positioned to act on said strips and spaced apart further than the thickness of said blanks and having peripheral grooves with flat parallel bottoms to act on the side walls of the strips and inclined edges to act on the bottom of said strips at each side of said teeth, and a second pair of forming rolls spaced apart a distance equal to the thickness of said blanks and having opposed shallow peripheral grooves with curved edges, the groove engaged with the side of the strips to which said teeth are attached being wider than the groove in the other roll of the second pair to incline the teeth at a lesser angle than the folded edge of the strip.

9. In a cutter strip applying machine, means for delivering cutter strips of channel shaped cross section having inclined side walls and a flat bottom with teeth bent slightly from the plane of the bottom, means for delivering the edge of a carton blank into the channel of each strip, a first pair of forming rolls positioned to act on said strips and spaced apart further than the thickness of said blanks and having peripheral grooves with flat parallel bottoms to act on the side walls of the strips and inclined edges to act on the bottom of said strips at each side of said teeth, and a second pair of forming rolls spaced apart a distance equal to the thickness of said blanks and having opposed shallow peripheral grooves with curved edges, the groove engaged with the side of the strip to which said teeth are attached being wider than the groove in the other roll of the second pair, the edges of said grooves engaged with the free

edge of said strip being laterally off-set to crimp one edge of the strip into the blank closer to the edge of the blank than the other edge of the strip.

10. Apparatus for making cutter strips for dispensing cartons from flat strip stock comprising, feed rolls positioned to advance said stock and shaped to form the stock into a shallow channel, a cutter wheel positioned to operate on said stock and having peripherally spaced jaws adapted to press successive teeth from the transverse mid-portion of said stock, a backing member coacting with said cutter wheel on the opposite side of the stock therefrom and having a groove registering with the center of the strip whereby the area from which the teeth are pressed is unsupported, and opposed forming rolls positioned to act on the stock after the teeth have been pressed therefrom, said forming rolls being spaced apart further than twice the thickness of the stock and having opposed peripheral grooves with inclined edges converging toward the web of the stock to bend the web while leaving the teeth projecting tangentially from the bent web.

11. Apparatus for making cutter strips for dispensing cartons from strip stock comprising, feed rolls for said stock, a cutter wheel positioned to operate on said stock and having peripherally spaced jaws adapted to press successive teeth from the plane of the transverse mid-portion of said stock, said jaws projecting from the cutter wheel about the thickness of the stock whereby the teeth are projected only about the thickness of the stock, a backing wheel coacting with said cutter wheel on the opposite side of the stock therefrom and having a peripheral groove registering with the mid-portion of the strip whereby the area from which the teeth are pressed is unsupported, and opposed forming rolls positioned to act on the stock after the teeth have been pressed therefrom, said forming rolls being spaced apart further than twice the thickness of the stock and having opposed peripheral grooves to bend the web while leaving the teeth projecting tangentially from the bent web.

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