This invention relates generally to improvements in a strip-forming machine, and more particularly to improvements in the feeding and cutting mechanisms.

An important object is achieved by the provision of means for feeding the strip through the edge-shaping elements while holding the web portion rigid and unyielding between the edges, although moving, during shaping so as to preclude stress from flowing into such web portion.

The arrangement provides that a strip-severing means of rigid, but moving plates engaging opposite sides of the web portion between the edges under pressure and in substantially full surface contact with the sheet strip.

Another important object is realized in that in position shown, the above-mentioned plates is comprised of a caterpillar-type tread that engages the web portion of the strip with a full surface contact and serves to move the strip through the edge-shaping elements.

Still another important object is afforded by constructing the strip-feeding mechanism of a pair of endless belts arranged one over the other so that one span of each belt engages opposite sides of the web portion of the strip.

Other important advantages are realized by the provision of means that urges the strip-engaging belt spans against the web portion under pressure. The pressure can be adjusted to obtain the desirable condition and also the optimum condition for forming the lateral strip edges without stressing the web portion engaged by the belt spans.

An important object is provided by the structural arrangement of a plurality of transversely arranged bars forming each of the endless belts, the bars being disposed closely adjacent to each other in the space so as to engage the strip. For greater effective gripping action, each of the bars is provided with a substantially flat resilient facing.

Other important advantages are obtained by mounting the bars on a pair of laterally spaced chains and by driving the chains at synchronized speed through a suitable drive mechanism, the chains being mounted and held by cooperating sprockets.

Another important object is achieved by the provision of means including a pair of rigid, but moving, plates engaging opposite sides of the web portion between the edges under pressure and in substantially full surface contact to hold the web portion rigid and unyielding, although moving, during shaping so as to preclude stress from flowing into such web portion.

Yet another important object is realized by providing a feed means of the strip-severing means which is operatively connected to the delivering the strip to the severing means, and means interconnecting the feed means with the severing means for releasing the feed means from the strip when the severing means is located in the cut position. The means interconnecting the feed means with the severing means reengages the feed means with the strip when the severing means is moved subsequently to its inoperative position so as to deliver another strip length through the severing means.

An important object is afforded by the provision of a unique and improved structural connection between the feed means and the severing means so as to accomplish the functional results described previously.

Another important object is to provide an improved limit switch for automatically determining the length of strip that is formed by the machine, such switch being capable of determining any quantity of strips of a specified length and being adjustable to determine any number of strips of any other lengths.

It is an important object to provide a strip-forming machine that is simple and durable in construction, economical to manufacture and assemble, highly efficient in operation, and which is substantially automatic in operation and capable of use by any one with only a minimum of instruction.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from the following detailed description of a preferred embodiment, particularly when considered in connection with the accompanying drawings, in which:

FIG. 1 is a side elevational view of the strip-forming machine;
FIG. 2 is an end elevational view as seen from the left of FIG. 1;
FIG. 3 is an end elevational view as seen from the right of FIG. 1;
FIG. 4 is a top plan view of the machine shown in FIG. 1;
FIG. 5 is a fragmentary view, partly in cross section, as seen along line 5—5 of FIG. 1;
FIG. 6 is an enlarged side elevational view of the limit means as seen from the right of FIG. 5;
FIG. 7 is an end elevational view of the limit means as seen from the right of FIG. 6;
FIG. 8 is a cross sectional view of the belt mechanism as seen along line 8—8 of FIG. 3;
FIG. 9 is a view, partly in cross section, as seen along line 9—9 of FIG. 8;
FIG. 10 is a view, partly in cross section, as seen along line 10—10 of FIG. 4, showing only the arrangement of the edge-shaping means and the mounting frame for the purpose of clarity;
FIG. 11 is a side elevational view of the structure shown in FIG. 10;
FIG. 12 is a view, partly in cross section, as seen along line 12—12 of FIG. 4;
FIG. 13 is a view, partly in cross section, as seen along staggered line 13—13 of FIG. 12;
FIG. 14 is an electrical diagram showing the switch connections to the motor;
FIG. 15 is a fragmentary, perspective view illustrating a side unit formed by the strips, and
FIG. 16 is a fragmentary, perspective view of a strip before and after the edges are shaped.

Referring now by characters of reference to the drawings, and first to FIGS. 1—3, it will be apparent that the machine includes a stand generally indicated at 10 constructed of four legs 11 interconnected by braces 12.
Extending upwardly from each corner of stand 10 is a tubular post 13, the front posts 13 being substantially upright while the rear posts 13 are inclined slightly upwardly and rearwardly as is best seen in FIG. 1. Attached to the front and rear posts 13 at each side of the machine is a substantially horizontal rail 14 of a tubular box construction, the rails 14 being substantially parallel and laterally spaced. The rails 14 are interconnected by a pair of spaced, transversely arranged plates 15 and 16.
Extending upwardly from cross plate 15 at each side of the machine are a pair of substantially vertical frame plates 17 interconnected at the top by another cross plate...
18. Similarly, a pair of substantially vertically frame plates 20 are attached to the cross plate 16, the frame plates 20 being laterally spaced on opposite sides of the machine and interconnected at the top by a cross plate 21. Attached to the pair of frame plates 20 are a pair of coating bearing blocks 22 that journal a cross shaft 23 as is best seen in FIG. 3. Attached to and disposed immediately vertically above the bearing blocks 22 are another pair of coating bearing blocks 24 adapted to mount rotatively another cross shaft 25. A pair of intermeshing gears 26 attached to one end of the cross shafts 23 and 25 are operatively interconnected so that rotation of one will drive the other at a synchronized speed.

From FIG. 9 it is seen that another pair of coating bearing blocks 27 are attached to the laterally spaced forward frame plates 17 and are adapted to rotatably mount a cross shaft 30. As will be apparent from later description, the cross shaft 30 engages with the cross shaft 23 to provide an endless belt assembly 35. Similarly, another pair of bearing blocks 31 are attached to the frame plates 17 immediately above the bearing blocks 27 and are adapted to mount rotatively another cross shaft 32. The cross shafts 32 and 25 cooperate to provide another belt assembly 39 immediately above the one 35 mentioned previously.

Drivingly attached to shaft 23 so as to be rotatable therewith is a pair of laterally spaced sprockets 33. A coating pair of laterally spaced sprockets 39 are drivingly attached to the cooperating shaft 30. An endless chain 35 operatively interconnects each of the sprockets 33 with one of the sprockets 34, the chains 35 being correspondingly spaced laterally.

Extending transversely between the chains 35 are a plurality of bars 36 arranged in close adjacent relation so that in the upper and lower spans of the belt assembly 38 the bars 36 are contiguous to constitute a substantially uninterrupted plate. The bars 36 are attached to the links forming the chains 35. In order to form a more effective gripping surface, the bars 36 are faced with substantially flat resilient pads 37.

The superjacent belt assembly 39 is constructed in a very closely similar manner. For example, a pair of coating sprockets 40 are drivingly attached to the shaft 25 in laterally spaced relation so as to be rotatable therewith. Another pair of coating sprockets 41 are drivingly attached to the cross shaft 32 in laterally spaced relation so as to be rotatable therewith. A link chain 42 drivingly interconnects each one of the sprockets 40 with one of the sprockets 41, the chain 42 being laterally spaced. Attached to and extending between the chains 42 are a plurality of transverse bars 43 arranged in closely adjacent relation so that the upper and lower spans form a substantially uninterrupted continuous plate. Each of the bars 43 is faced with a resilient pad 44 to provide a greater gripping action.

The upper span of the upper belt assembly 38 and the lower span of the upper belt assembly 39 are adapted to engage opposite sides of the web portion of a strip passed therebetween to hold the web portion rigid and unyielding, although moving, during shaping so as to preclude stress from flowing into such web portion, as will be explained in detail subsequently.

A rail 45 engages the inner surface of the upper span of each chain 35. The ends of the rails 45 are secured to a pair of cross braces 46 and 47 extending between and attached to the frame plates 20 and 17 respectively. A corresponding rail 50 engages the inner surface of the lower span of each chain 42. The ends of the rails 50 are secured to a pair of cross braces 51 and 52 secured respectively to the frame plates 20 and 17. The chains of adjacent spans ride over and along the rails 45 and 50 and are urged toward each other so that the transverse bars 36 and 43 clamp the web portion of the strip securely therebetween.

As appears best from FIGS. 3 and 9, it will be understood that the upper and lower belt assemblies 38 and 39 are relatively offset laterally so that one end of the upper span of the lower belt assembly 38 projects laterally beyond the corresponding edge of the lower span of the upper belt assembly 39, and similarly the other edge of the lower span of the upper belt assembly 39 extends beyond the other edge of the upper span of the lower belt assembly 38. The arrangement facilitates the location of the shaping means as will be apparent upon later description of parts.

Mounted on and carried by the stand 10 is a power means that includes an electric motor 53 operatively interconnected to a suitable speed-reducing unit 54. As will be understood from FIG. 3, the output shaft 55 of the power means is operatively interconnected by a suitable sprocket and chain drive 56 to the cross shaft 23 of the lower belt assembly 38. Upon operation of the motor 53, the drive shaft 55 will operate through the sprocket and chain drive 56 to rotate cross shaft 23 and consequently move the lower belt assembly 38. Because the upper belt assembly 39 is operatively connected to the lower belt assembly 38 through the interconnecting gears 25 it (39) is also moved at a synchronized speed.

The strip-shaping means includes a plurality of forming rollers 57 rotatably mounted to a brace 60 extending between and attached to one of the frame plates 20 and 17 at one side of the machine. Particularly, the rollers 57 are located adjacent the sprockets 34 and 39 and cooperatively drive the upper belt assembly 39. A cooperating forming mandrel 61 is located below the rollers 57 closely adjacent the upper span of the lower belt assembly 38, the mandrel 61 being located in the space provided by the offset arrangement of such belt assemblies 38 and 39. The mandrel 61 is also connected to and extends between one of the frame plates 20 and 17 at the same side of the machine.

At the opposite side of the machine are another series or number of rollers 62 rotatably mounted in a brace 63 attached to and extending between one of the frame plates 20 and 17 at the other side of the machine. The rollers 62 are disposed closely adjacent the upper span at the opposite side of the lower belt assembly 38. A cooperating mandrel 64 is located above the rollers 62 and disposed in the space provided by the offset arrangement of the belt assemblies 38 and 39, and specifically is located closely adjacent the opposite side of the lower span of the upper belt assembly 39. The mandrel 64 is secured to one of the frame plates 20 and 17 at the same side of the machine.

A strip-covering means is located ahead of the belt assemblies 38 and 39 constituting the feed means. The covering means includes a pair of laterally spaced posts 65 fixed to the cross plate 15 of the machine frame. Each of the posts 65 is provided with a pair of vertically spaced tubular guides 66. Extending between and secured to the laterally spaced posts 65 is a stationary blade 67, the upper cutting edge of which is disposed immediately below the plane assumed by the strip in moving through the machine.

To assist and position the strip in its path of movement, a platform 70 is secured to the posts 65 and extends forwardly of the stationary blade 67. A plurality of guide or idler rollers 71 are located at each side of the platform 70 and serve to engage the strip edges to define a linear strip movement to the severing means.

A crosshead 72 is provided with a pair of depending cylindrical pins 73, one rod 73 being located at each end, which slidably interfit the post guides 66. Fixed to the movable crosshead 72 is a knife 74 that cooperates with the fixed blade 67 to sever the strip along a predetermined plane, knifed by a pair of knife positions 75 and 77. The knifed positions reciprocatively to a cut position as is shown in FIGS. 12 and 13, or to a raised inoperative position.

A pair of side brackets 75 serve to mount a cross shaft 76 rotatively, the shaft 76 being rigidly connected to an inverted, substantially U-shaped handle 77. The side
brackets 75 are secured to the front frame plates 17 at opposite sides of the machine.

Formed in the crosshead 72 are a pair of laterally spaced guide brackets 108 which are attached at each end of the bar. A finger 81 drivingly attached to each end of the shaft 76 interferes one of the recesses 80 and effectively engages the crosshead 72 for raising or lowering action upon manipulation of the handle 77.

Fixtured to one of the rails 14 by an L-shaped bracket 82 at one side of the machine is a switch 83 having an actuating button 84 disposed immediately below the lower end of one of the movable pins 73. The switch 83 is operatively connected to the motor 53. When the handle 77 is manipulated to lower the cross bar 72 through the action of fingers 81 in order to cause a severing action between the knife 74 and stationary blade 67, the lower end of one pin 73 engages the associated button 84, and thereby actuates the switch 83 to energize the motor 53. The purpose of this action will be more fully described subsequently.

Located forwardly of the strip-severing means is a feed mechanism that includes a pair of spaced rods 85 and 86 attached at the top ends by bars 87 to which the brackets are extended. The rods 85 and 86 extend substantially vertical and are attached at the top ends by bars 87 to which the brackets 75 are attached. A pair of integral pins 88 are attached to each cooperating pair of rods 85 and 86. Rotatively mounted between the posts 88 at each side of the machine is a transverse drive roll 90.

A drive means operatively interconnects the drive roll 90 with the cross shaft 30 of the lower belt assembly 38. Specifically, a sprocket 91 shown in FIG. 12 is drivingly attached to the cross shaft 30 while a cooperating sprocket 92 is drivingly attached to the shaft on which the roll 90 is carried. The sprockets 91 and 92 are operatively interconnected by an endless chain 93. An idler sprocket 94 engages the upper span of the chain 93 and tensions the chain 93 to provide an effective drive of roll 90.

Extending between the posts 88 is a table 95 that serves to guide the strips into and through the feed mechanism, the upper surface of the table being aligned horizontally with the upper edge of the roll 90. A pair of guide rollers 96 are disposed at each side of the table 95 to engage the edges of the strip in its movement.

At each side of the machine there is a block 97 slidably mounted between a cooperating pair of rods 85 and 86 for reciprocating vertical movement and央电 between the blocks 97 and rotatively mounted therein is a shaft 100 on which an idler pressure roll 101 is attached. The pressure roll 101 is located immediately above the cooperating drive roll 90 so that such rolls engage opposite sides of the strip fed therebetween and operate to deliver the strip past the severing means and into the belt assemblies 38 and 39.

A spring 102 is located between each post 87 and each roll block 97, the springs 102 tending to urge the blocks 97 and hence the idler pressure roll 101 upwardly away from its cooperating roller 90. Another spring 103 seats on the upper side of each movable block 97, each spring 103 having one end attached to a pin 105 extending freely through an aperture formed in horizontal bar 87. Another pin 105 is attached to the crosshead 72 at each end, the pin 105 extending freely through an aperture formed in the horizontal bar 87.

Secured to the upper surface of each of the horizontal bars 87 is a bifurcated yoke 106. A lever 107 pivoted to each of the yokes 107 by a pin 108. One end of lever 107 is pivotally attached to the outer end of pin 105, while the opposite end of the lever 107 seats on top of the pin 104.

As the knife crosshead 72 is moved downwardly to a cut position, the lever 107 rotates clockwise as seen in FIG. 12 so that the movable idler pressure roll 101 raises away from the drive roll 90 under the influence of springs 102, thereby releasing the idler roll 101 from frictional engagement with the strip and consequently halting any feeding action of the strip toward the severing means. Conversely, when the knife crosshead 72 is moved upwardly, the pin 105 rotates the lever 107 in a counterclockwise direction so as to depress the return spring 103 and thereby lower the idler roll 101 into frictional engagement with the strip. Because the strip is now clamped between the cooperating rolls 90 and 101, such strip is fed in a direction toward the severing means.

The rill 14 at each side of the machine extends rearwardly of the belt assemblies 38 and 39 as is suggested in FIGS. 1, 4 and 5. Fixed to each of the side rails 14 is an upstanding bracket 110. A tubular brace 111 interconnects the pair of laterally spaced brackets 110. Seated on the brace 111 is a substantially U-shaped channel referred to at 112 having a bottom wall 113, a substantially vertical side wall 114, and a substantially L-shaped side wall 115. The channel 112 serves as a receiver for the formed strip after it leaves the belt assemblies 38 and 39.

As will appear best from FIG. 4, the bottom wall 113 of the channel 112 is provided with a longitudinally extending scale generally indicated at 116 which indicates the distance from the plane of cut defined by movable knife 74 and stationary blade 67. A limit switch referred to at 117 is carried by the channel 112 and cooperates with the scale 116 to determine a specific strip length.

The detailed construction of the limit switch 117 is perhaps best shown in FIGS. 6 and 7. It will be understood that the limit switch 117 includes an upper jaw 120, the lower face of which is adapted to fit over the angular side wall 115 of channel 112, and a cooperating lower jaw 121 having an upper face adapted to fit under such channel side wall 115. The jaws 120 and 121 are clamped together by a screw 122, the screw 122 being actuated by a handle 123.

Fixed to the upper jaw 120 by an angle bracket 124 is a switch 125 having a depending actuating button 126. A small pin 127 is rotatably mounted in the lower jaw 121 and is aligned directly below the switch button 126. A tab 130 is secured to one end of shaft 127 and extends downwardly close to the bottom wall 113 of the channel 112. Secured to the other end of shaft 127 immediately below the switch button 126 is a cam 131 the configuration of which is best shown in FIG. 6. It will be noted that the cam 131 is substantially circular but has a flat side that allows the switch button 126 to be fully extended when the tab 130 is disposed substantially vertically. A small spring 132 is applied to the tab 130 and to the jaw 121, the spring 132 tending to hold the tab 130 in its substantially vertical position.

The switch 125 is operatively connected to the power means and particularly to the motor 53. The limit switch 117 is adjustably located along the channel side wall 115 until the tab 130 is aligned with the desired strip length indicated on scale 116. As the strip is formed and passes through the belt assemblies 38 and 39, the formed portion of the strip is received by the channel 112 and moves therealong until the end of such strip strikes the tab 130 and pivots the cam 131. Immediately, the cam 131 presses the switch button 126 to actuate switch 125, and hence deenergizes the motor 53. The limit switch 117 operates in this manner to define a formed strip of any predetermined length.

It is thought that the operation and functional advantages of the strip-forming machine have become fully apparent from the foregoing detailed description of parts, but for completeness of disclosure one cycle of operation of the machine will be briefly described.

First, it will be assumed that the movable knife 74 is raised to its inoperative position so that the switch 83 is open. The switch 125 of the limit switch 117 is normally in a closed position as is illustrated in the electrical circuit diagram of FIG. 14. However, the manual switching switch 133 is normally maintained in an open circuit position.
A roll of sheet strip material has its free and located on table 95 with its edges between the guide rollers 96 and is fed by pressing the starting switch 133 which operates to drive the belt assemblies 38 and 39 through the chain drive 56 and the gears 26 at a synchronized speed. In addition, the drive roll 90 is drivingly turned by the sprocket attached to the motor drive 91-93. The rolls 90 and 101 engage opposite sides of the sheet strip and deliver the strip to and through the severing means and into the region between the belt assemblies 38 and 39.

The bars 36 of the upper span of the lower belt assembly 38 and the bars 43 of the lower span of the upper belt assembly 39 frictionally engage the opposite sides of the web portion of the strip under pressure while moving the strip edges through the shaping means provided by forming rolls 57 and 63 and their respective cooperating mandrels 61 and 64. The clamping action of the bars 36 and 43 preclude any stress from entering into the web portion that would cause any deformation while the edges of the bars are bent as is suggested in FIG. 16. Yet the cooperating clamping spans of the belt assemblies 38 and 39 move the strip through the shaping means and deliver the formed strip portion to the channel 112.

Assuming that the limit switch 117 has been located at a selected predetermined position for a particular strip length, when the end of the formed strip portion engages the tab 130, the cam 131 will depress switch button 126 and open the switch 125 to de-energize the motor 53. Immediately, the belt assemblies 38 and 39 will stop their movement, and obviously the rotation of drive roll 90 will be halted. The operator then can manipulate the handle 77 to lower the knife 74 in order to sever the strip.

It will be understood that a portion of the severed strip will not be formed along the edges because it has not yet had a chance to move through the belt assemblies 38 and 39 and through the shaping means. Immediately upon severing the strip, the slide pin 73 connected to the knife crosshead 72 will engage and depress the switch button 84 to actuate the switch 83 to energize the motor 53. The belt assemblies 38 and 39 will be then re-actuated through the chain drive connection 56 to move the unformed portion of the severed strip through the shaping means and deliver the completely formed severed strip into the channel 112.

It will be realized that upon lowering the knife 74 to its cut position, the idler roll 101 is raised out of frictional engagement with the upper side of the strip, thereby causing the cooperating drive roll 90 merely to turn freely at this stage upon energization of the motor 53 without causing any feeding action of the strip to the severing means.

If and when another strip length is to be formed, the operator merely manipulates the handle 77 to raise the knife 74 to its inoperative position which causes the upper feed roll 101 to lower into engagement with the strip so that the cooperating rolls 90 and 101 engaging opposite sides of the strip under pressure feed an additional length of strip through the severing means and into the belt assemblies 38 and 39 for shaping operation in the manner previously described. This procedure completes one cycle of operation.

As is shown in FIG. 16, the completely formed strip has its opposite side edges shaped for use as siding. FIG. 15 illustrates the conventional assembly of a plurality of formed strips in an interlocking arrangement to illustrate the installation of a siding construction.

Although the invention has been described by making detailed reference to a single preferred embodiment, such detail is to be understood in an instructive, rather than in any restrictive sense, many variants being possible within the scope of the claims hereto appended.

1. In a strip-forming machine:
   (a) means shaping opposed edges of a strip in a shaping zone, and
   (b) means feeding the strip through said shaping means, the feeding means automatically engaging and holding the web portion of such strip between the edges rigid and unyielding, although moving, during the shaping in the shaping zone so as to preclude stress from flowing into such web portion, yet automatically releasing the web portion after movement through the shaping zone.

2. In a strip-forming machine:
   (a) means shaping opposed edges of a strip in a shaping zone, and
   (b) means feeding the strip through said shaping means including clamp members automatically engaging opposite sides of the web portion between the edges to hold the web portion rigid and unyielding, although moving, prior to and during shaping in the shaping zone so as to preclude stress from flowing into such web portion, yet automatically releasing the web portion after movement through the shaping zone.

3. In a strip-forming machine:
   (a) means shaping opposed edges of a strip in a shaping zone, and
   (b) means feeding the strip through said shaping means including a pair of rigid, but moving plates automatically engaging opposite sides of the web portion between the edges under pressure and in substantially full surface contact to hold the web portion rigid and unyielding, although moving, during shaping in the shaping zone so as to preclude stress from flowing into such web portion, yet automatically releasing the web portion after movement through the shaping zone.

4. The combination and arrangement of elements as recited above in claim 3, but further characterized in that at least one of said plates is comprised of a caterpillar-type tread the elements of which are disposed in close contiguous relationship when engaging said web portion to provide the substantially full surface contact.

5. In a strip-forming machine:
   (a) means for shaping opposed edges of a strip, and
   (b) means for feeding the strip through said shaping means including a pair of endless belts arranged one over the other so that one span of each belt engages opposite sides of the web portion between the edges to hold the web portion rigid and unyielding, although moving, during shaping so as to preclude stress from flowing into such web portion.

6. The combination and arrangement of elements as recited above in claim 5, but further characterized by the provision of means urging one belt span of each endless belt against said web portion under pressure so that the web portion of the strip is clamped between a pair of coaxing belt spans and is moved by said coaxing belt spans through the shaping means.

7. In a strip-forming machine:
   (a) means for shaping opposed edges of a strip,
   (b) a pair of endless belts arranged one over the other so that one span of each belt engages opposite sides of the web portion between the edges,
   (c) each said belt including a plurality of transversely arranged bars disposed closely adjacent each other and engaging the web portion in substantially full surface contact to hold the web portion rigid and unyielding, although moving, during shaping so as to preclude stress flowing into such web portion, and
   (d) means driving at least one of said belts for moving the strip through said shaping means.

8. The combination and arrangement of elements as recited above in claim 7, but further characterized in that each said bar is provided with a substantially flat resilient pad to provide a more effective frictional engagement with the web portion of the strip.

9. In a strip-forming machine:
   (a) means for shaping opposed edges of a strip,
(b) a pair of endless belts arranged one over the other so that one span of each belt engages opposite sides of the web portion of the strip between the edges, (c) each belt including a pair of laterally spaced chains, and a plurality of transversely arranged bars mounted on said pairs of chains in close adjacent relation so that one span of each belt holds the web portion rigid and unyielding to preclude stress from flowing into such web portion, and (d) means driving said chains at a synchronized speed to move said strip through said shaping means.  

10. The combination and arrangement of elements as recited above in claim 9, but further characterized by the provision of adjustable rails engaging each coating pair of chains of each belt along one span to maintain said bars of said one span in pressure engagement with the web portion of said strip.  

11. In a strip-forming machine: (a) means for shaping opposed edges of a strip, (b) a pair of endless belts arranged one over the other and in laterally offset relation, (c) each belt including a pair of sprockets at each side, (d) a chain interconnecting each pair of said sprockets, (e) a plurality of transversely arranged bars mounted on the coating pair of chains of each belt, said bars being disposed in close adjacent relationship so that one span of each belt engages opposite sides of the web portion of the strip between the edges to hold the web portion rigid and unyielding during shaping so as to preclude stress from flowing into such web portion, (f) each bar having substantially flat resilient pad engaging said web portion to provide greater frictional drive for moving the strip through the shaping means, and (g) adjustable rails engaging one span of each chain tending to urge said bars of said span in a direction to maintain pressure engagement of said bars with said web portion.  

12. The combination and arrangement of elements as recited above in claim 11, but further characterized in that the said shaping means includes rigid mandrels in the spaces formed by the lateral offset of said belts, and forming rollers laterally adjacent each belt outside of its associated mandrel.  

13. In a strip-forming machine: (a) means for shaping opposed edges of a strip in a shaping zone, (b) means including a pair of rigid, yet moving, plates automatically engaging opposite sides of the web portion between the edges under pressure and in substantially full surface contact to hold the web portion rigid and unyielding, although moving, during shaping in the shaping zone so as to preclude stress from flowing into such web portion, yet automatically releasing the web portion after movement through the shaping zone, (c) a strip-severing means ahead of said shaping means, (d) power means driving said plates, (e) limit means stopping said power means upon passing of a predetermined strip length by said severing means, and (f) means actuated by said strip severing means on severing action to start said drive means and cause said plates to move the unformed portion of the severed strip through the shaping means.  

14. A strip-forming machine: (a) means for shaping opposed edges of a strip in a shaping zone, (b) means including a pair of rigid, yet moving, plates automatically engaging opposite sides of the web portion between the edges under pressure and in substantially full surface contact to hold the web portion rigid and unyielding, although moving, during shaping in the shaping zone so as to preclude stress from flowing into such web portion, yet automatically releasing the web portion after movement through the shaping zone, (c) a strip-severing means ahead of said shaping means including a knife movable toward or away from said strip, (d) power means driving said plates, (e) limit means stopping said power means upon passing of a predetermined strip length by said severing means, (f) a switch operatively connected to said power means and actuated by said knife upon severing action to start said drive means and cause said plates to move the unformed portion of the severed strip through the shaping means.  

15. In a strip-forming machine: (a) means for shaping opposed edges of a strip in a shaping zone, (b) means including a pair of rigid, but moving, plates automatically engaging opposite sides of the web portion between the edges under pressure and in substantially full surface contact to hold the web portion rigid and unyielding, although moving, during shaping in the shaping zone so as to preclude stress from flowing into such web portion, yet automatically releasing the web portion after movement through the shaping zone, (c) a strip-severing means ahead of said shaping means, (d) power means driving said plates, (e) feed means ahead of said strip-severing means, the feed means being operatively connected to said power means for delivering the strip to the severing means, (f) limit means stopping said power means upon passing of a predetermined strip length by said severing means, (g) means interconnecting said feed means with said severing means for releasing the feed means from said strip when the severing means is located in the cut position, and (h) means actuated by said strip-severing means on severing action to start said drive means and cause said plates to move the unformed portion of the severed strip through the shaping means.  

16. In a strip-forming machine: (a) means for shaping opposed edges of a strip in a shaping zone, (b) means including a pair of rigid, but moving, plates automatically engaging opposite sides of the web portion between the edges under pressure and in substantially full surface contact to hold the web portion rigid and unyielding, although moving, during shaping in the shaping zone so as to preclude stress from flowing into such web portion, yet automatically releasing the web portion after movement through the shaping zone, (c) a strip-severing means ahead of said shaping means, (d) power means driving said plates, (e) limit means stopping said power means upon passing of a predetermined strip length by said severing means, (f) feed means ahead of said strip-severing means, the feed means including a roll movable toward or away from said strip, said roll selectively engaging the strip for delivering the strip to said severing means, (g) means operatively interconnecting the roll with said severing means so as to move the roll away from and disengage the strip when the severing means is located in the cut position, and (h) means actuated by said strip-severing means upon severing action to start said drive means and cause the plates to move the unformed portion of the severed strip through the shaping means.
17. The combination and arrangement of elements as recited above in claim 16, but further characterized in that the said means operatively interconnecting the roll with the severing means engages the roll with the strip when the severing means is moved to its inoperative position so as to deliver another strip length to the severing means.

18. The combination and arrangement of elements as recited above in claim 16, but further characterized in that the said means interconnecting the roll with said severing means includes a lever having one end movable with said severing means and the other end movable with said roll, and by the provision of a manipulating means for moving the severing means to a cut position in which the lever allows the roll to move away from and disengage the strip.

19. In a strip-forming machine:
(a) means for shaping opposed edges of a strip in a shaping zone,
(b) means including a pair of rigid, but moving, plates automatically engaging opposite sides of the web portion between the edges under pressure and in substantially full surface contact to hold the web portion rigid and unyielding, although moving, during shaping in the shaping zone so as to preclude stress from flowing into such web portion, yet automatically releasing the web portion after movement through the shaping zone,
(c) a strip-severing means ahead of said shaping means including a knife movable toward or away from said strip,
(d) power means driving said plates,
(e) limit means stopping said power means upon passing of a predetermined strip length by said knife,
(f) a switch operatively connected to said power means and actuated by said knife upon severing action to start said drive means and cause said plates to move the unformed portion of the severed strip through the shaping means,
(g) a feed means ahead of said knife including a roll movable toward or away from said strip,
(h) resilient means tending to urge said roll away from said strip,
(i) a lever having one end movable with said knife and the other end movable with said roll, and
(j) manipulating means for moving the knife to a cut position in which the lever allows the roll to move away from and disengage the strip under the loading of said resilient means and for moving the knife to its inoperative position in which the lever moves said roll selectively into engagement with said strip so as to deliver another strip length past said knife.

20. In a strip-forming machine:
(a) means for shaping opposed edges of a strip in a shaping zone,
(b) means including a pair of rigid, but moving, plates automatically engaging opposite sides of the web portion between the edges under pressure and in substantially full surface contact to hold the web portion rigid and unyielding, although moving, during shaping in the shaping zone so as to preclude stress from flowing into such web portion, yet automatically releasing the web portion after movement through the shaping zone,
(c) a strip-severing means ahead of said shaping means,
(d) power means driving said plates,
(e) limit means connected to said power means including a switch and a switch arm located in the path of the formed strip at a predetermined distance from said severing means, the switch arm engaging the strip and actuating said switch to stop the power means upon passing of a predetermined strip length past said severing means, and
(f) means actuated by said severing means upon severing action to start said power means and cause said plates to move the unformed portion of the severed strip through the shaping means.

References Cited by the Examiner

<table>
<thead>
<tr>
<th>UNITED STATES PATENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,295,769 2/1919 Kux 72--176</td>
</tr>
<tr>
<td>1,317,581 9/1919 Kipness et al. 72--178</td>
</tr>
<tr>
<td>2,420,064 5/1947 Boddy 72--154</td>
</tr>
<tr>
<td>2,522,956 9/1950 Middleton 264--153</td>
</tr>
<tr>
<td>2,569,266 10/1951 Thompson 82--166</td>
</tr>
<tr>
<td>2,581,190 1/1952 Hodges 72--129</td>
</tr>
<tr>
<td>2,618,012 11/1952 Milne 18--19</td>
</tr>
<tr>
<td>2,828,792 4/1958 Hill 72--313</td>
</tr>
<tr>
<td>2,957,348 10/1960 Rippe 113--1</td>
</tr>
<tr>
<td>3,962,075 11/1960 Warp 72--326</td>
</tr>
</tbody>
</table>

CHARLES W. LANHAM, Primary Examiner.
K. C. DECKER, Assistant Examiner.