

Nov. 15, 1955

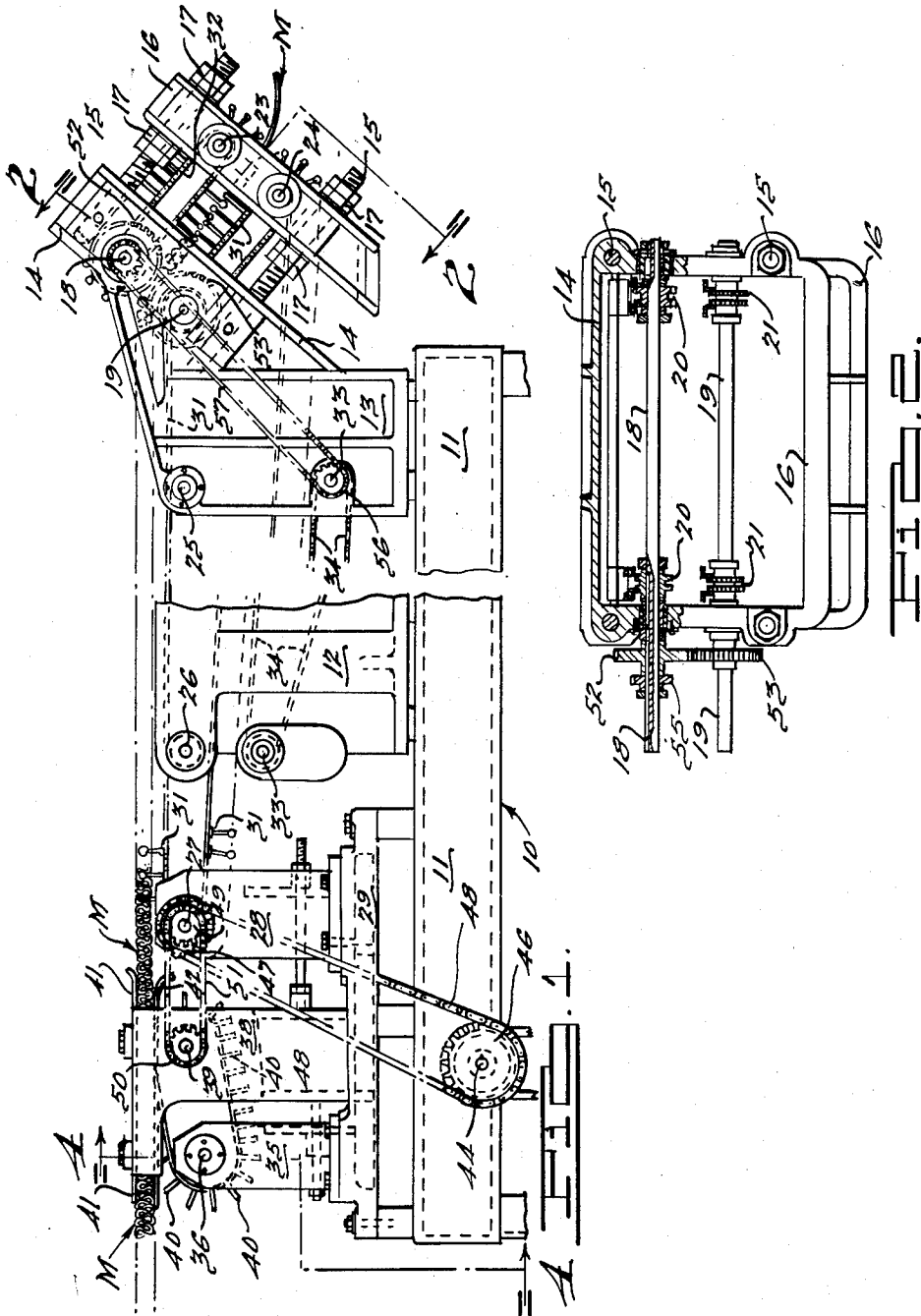
C. E. TEFFT

2,723,708

APPARATUS FOR CORRUGATING MATERIAL

Filed Sept. 14, 1953

9 Sheets-Sheet 1



INVENTOR.
Clinton E. Tefft.

BY

Harrison and Harris

ATTORNEYS.

Nov. 15, 1955

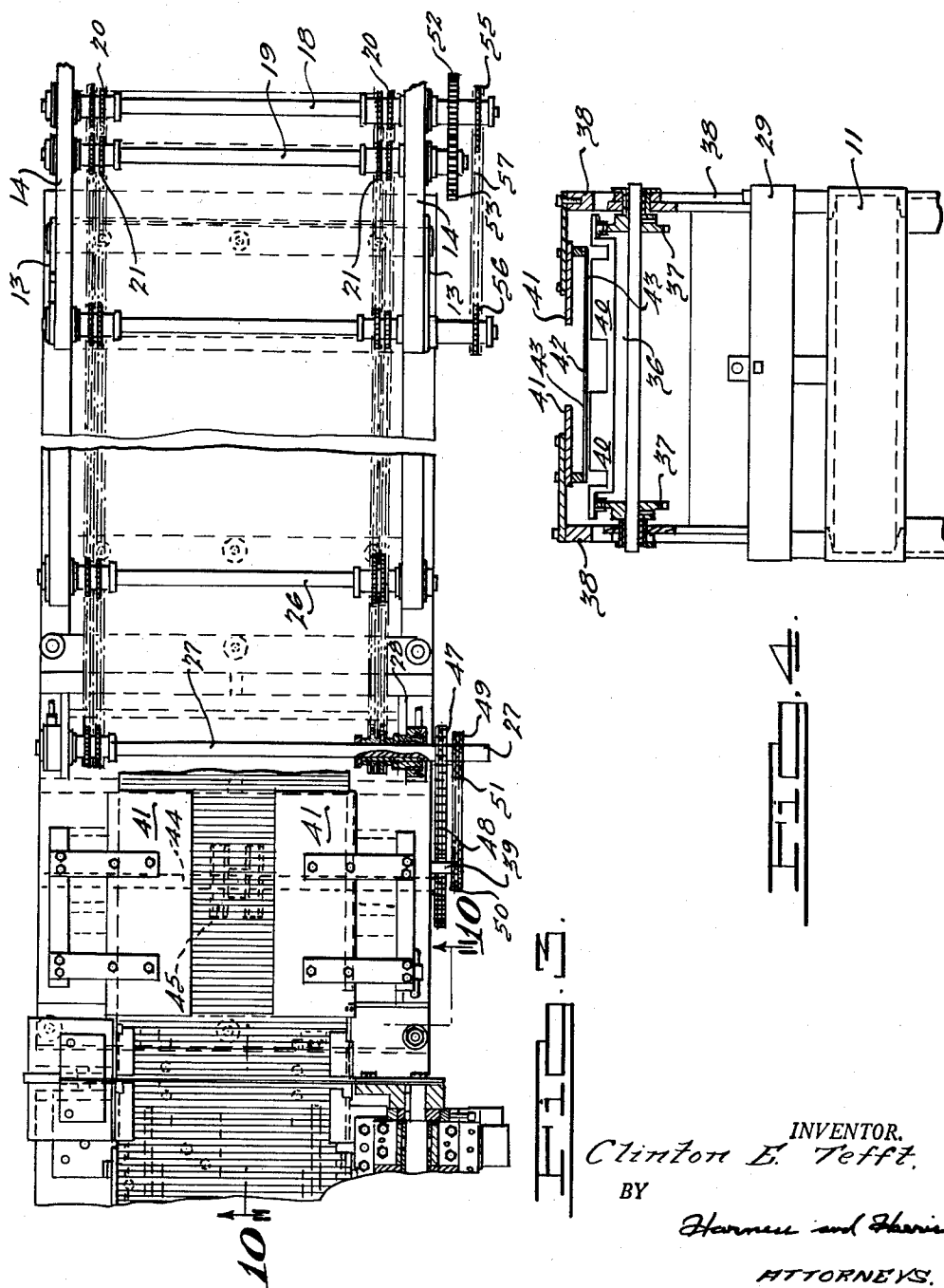
C. E. TEFFT

2,723,708

APPARATUS FOR CORRUGATING MATERIAL

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9 Sheets-Sheet 2



INVENTOR.
Clinton E. Tefft.

BY

Hammill and Harris
ATTORNEYS.

Nov. 15, 1955

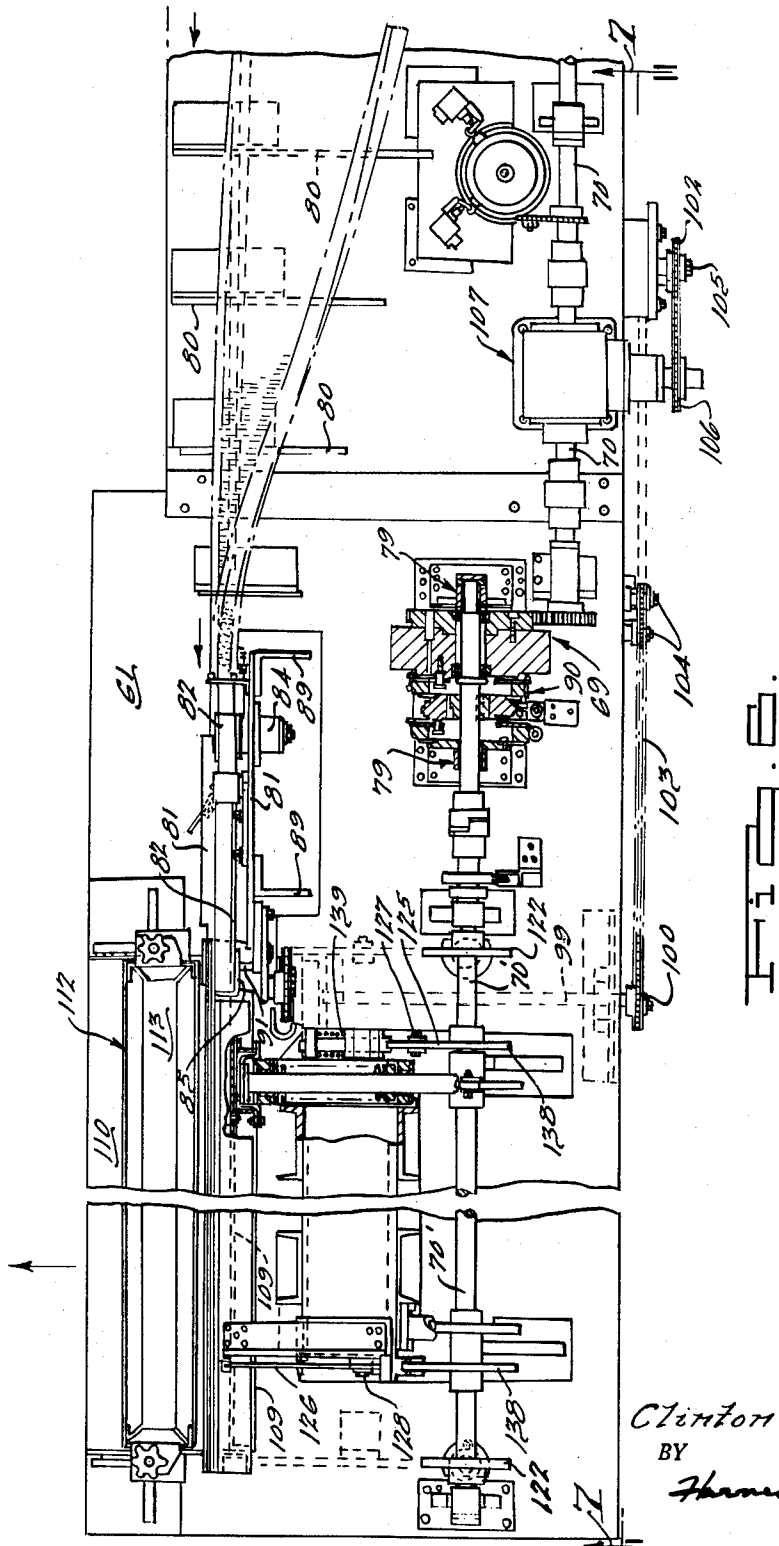
C. E. TEFFT

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APPARATUS FOR CORRUGATING MATERIAL

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9 Sheets-Sheet 4



Nov. 15, 1955

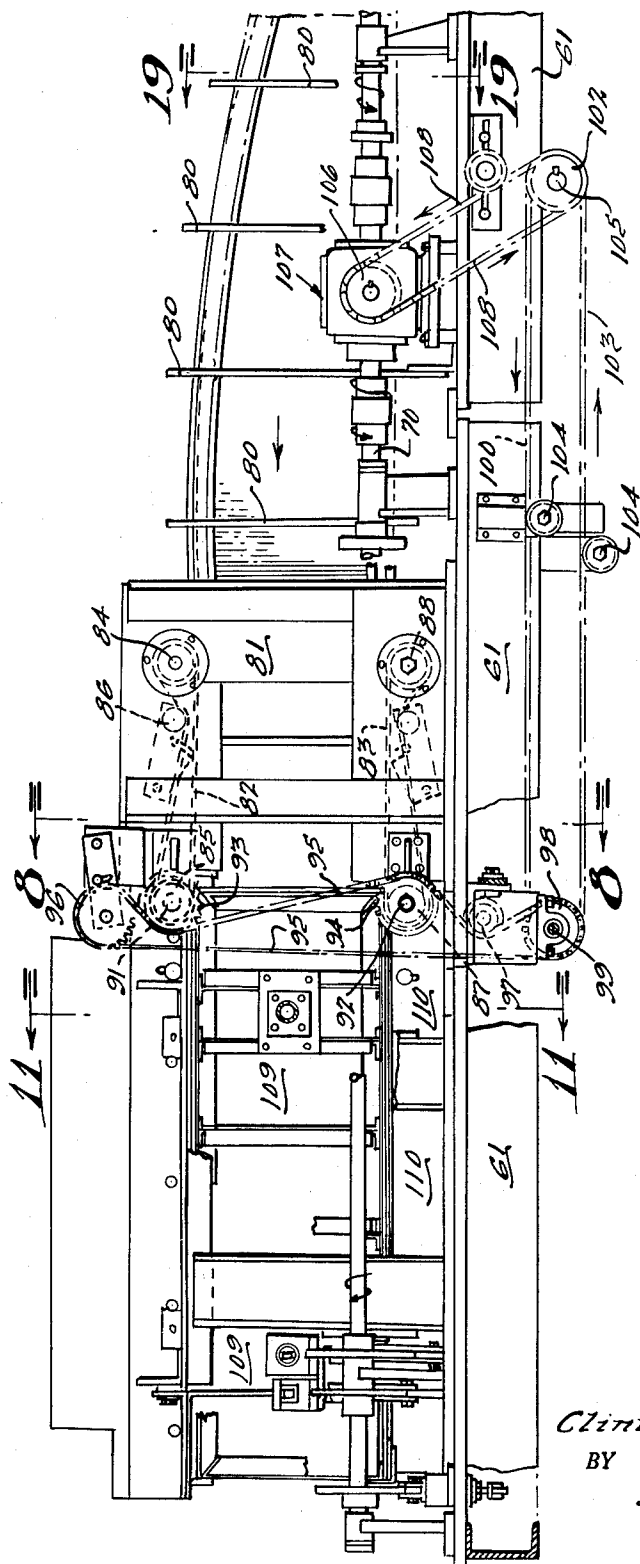
C. E. TEFFT

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APPARATUS FOR CORRUGATING MATERIAL

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9 Sheets-Sheet 5



INVENTOR.
Clinton E. Tefft.
BY
Harmon and Harmon
ATTORNEYS.

Nov. 15, 1955

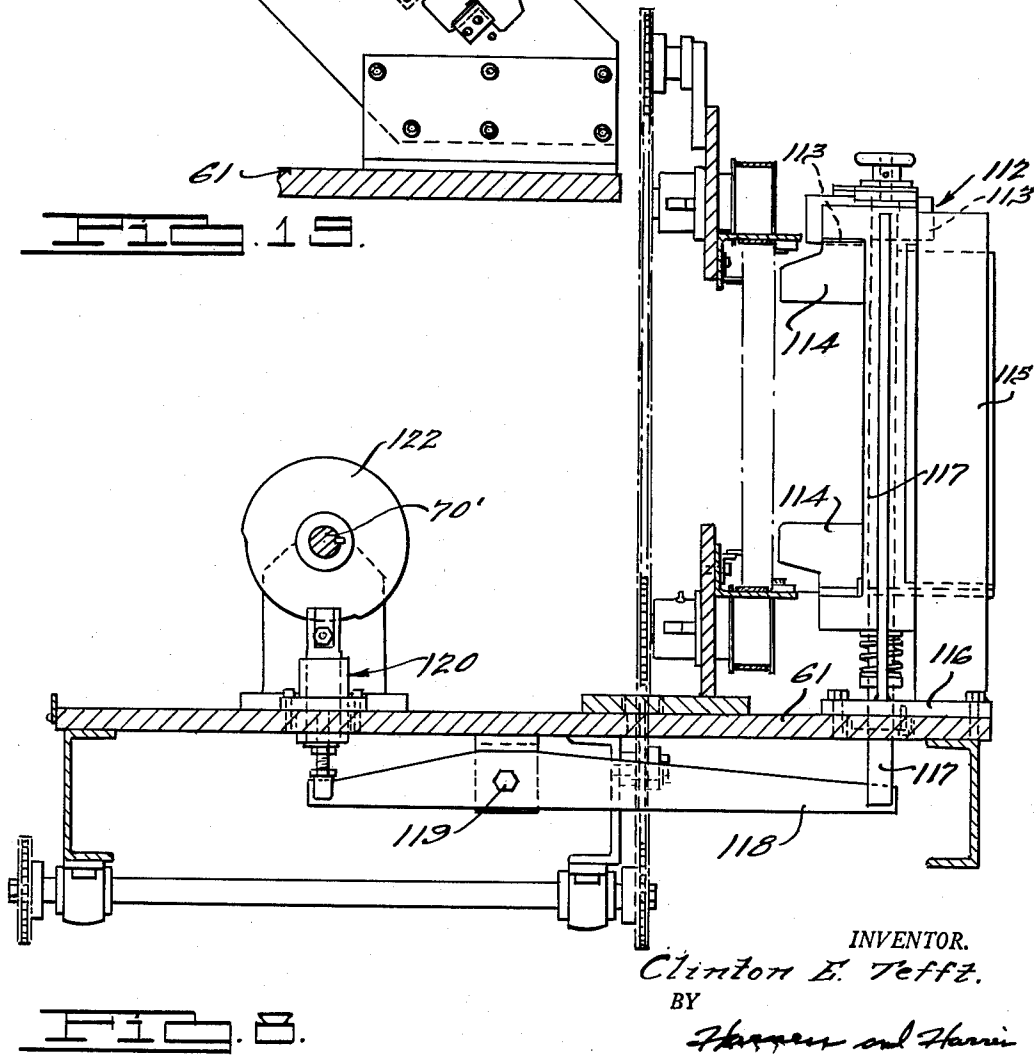
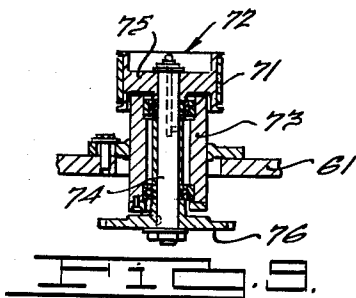
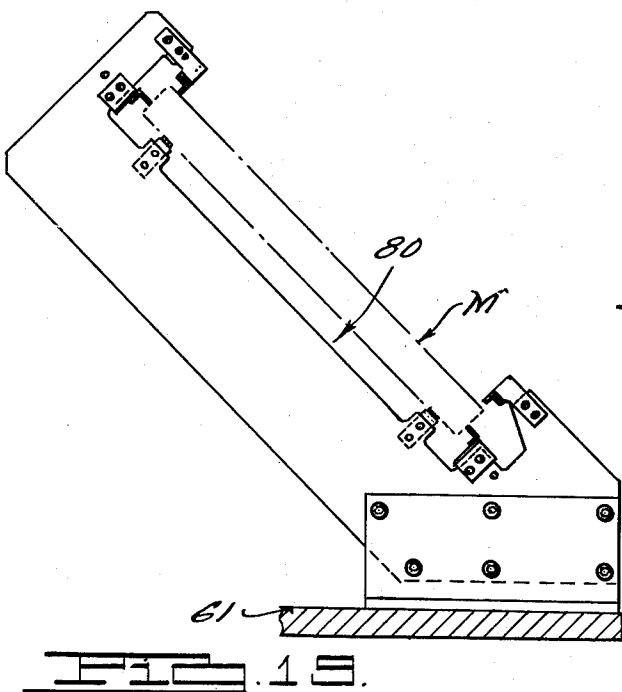
C. E. TEFFT

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APPARATUS FOR CORRUGATING MATERIAL

Filed Sept. 14, 1953

9 Sheets-Sheet 6



INVENTOR.

Clinton E. Telford.

BY

Hager and Harris

ATTORNEYS.

Nov. 15, 1955

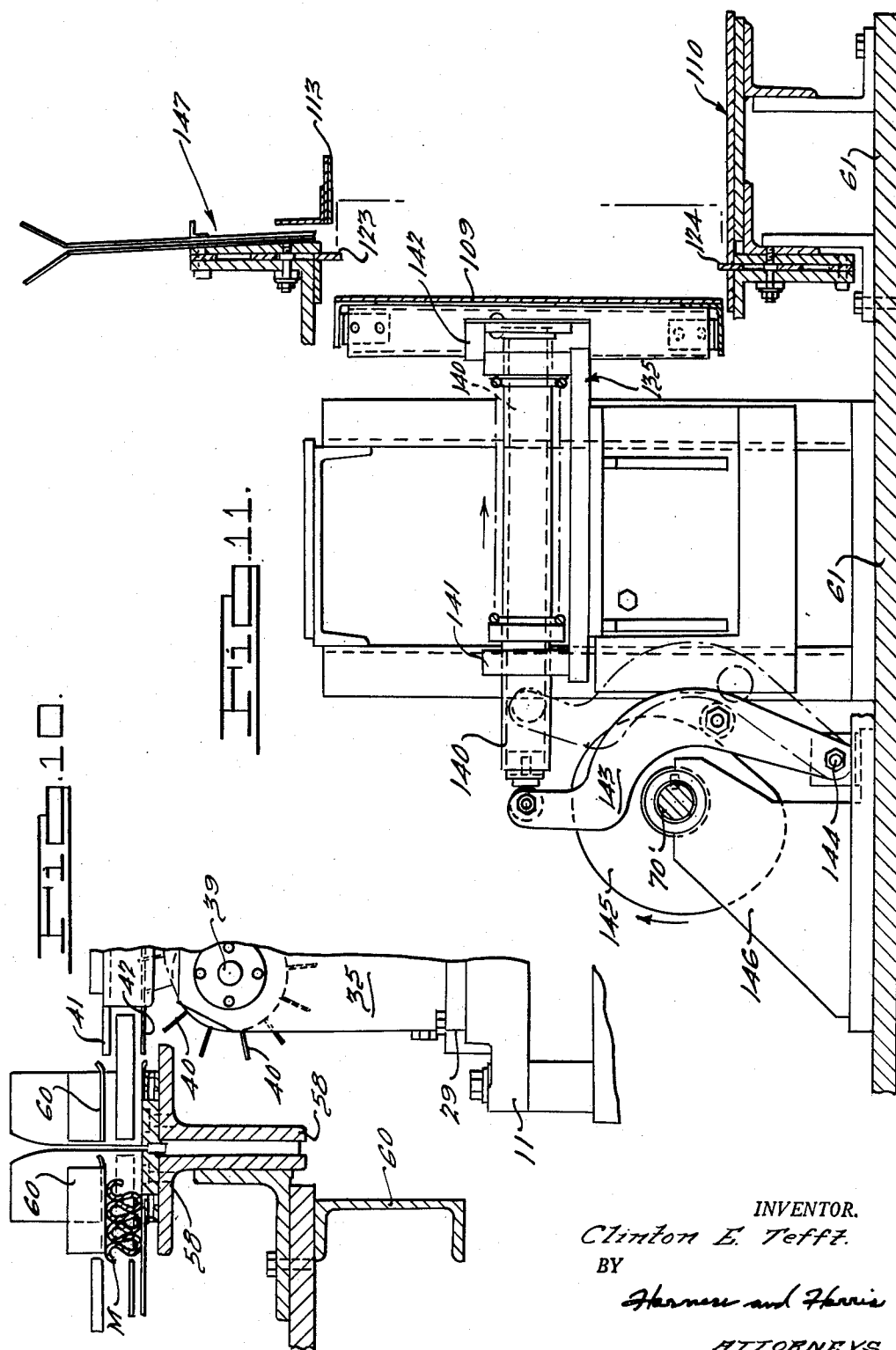
C. E. TEFFT

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APPARATUS FOR CORRUGATING MATERIAL

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9 Sheets-Sheet 7



INVENTOR.

Clinton E. Tefft.

BY

Harness and Harris

ATTORNEYS.

Nov. 15, 1955

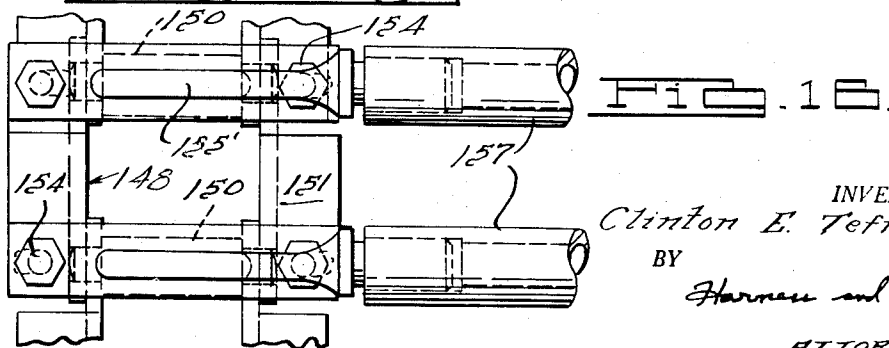
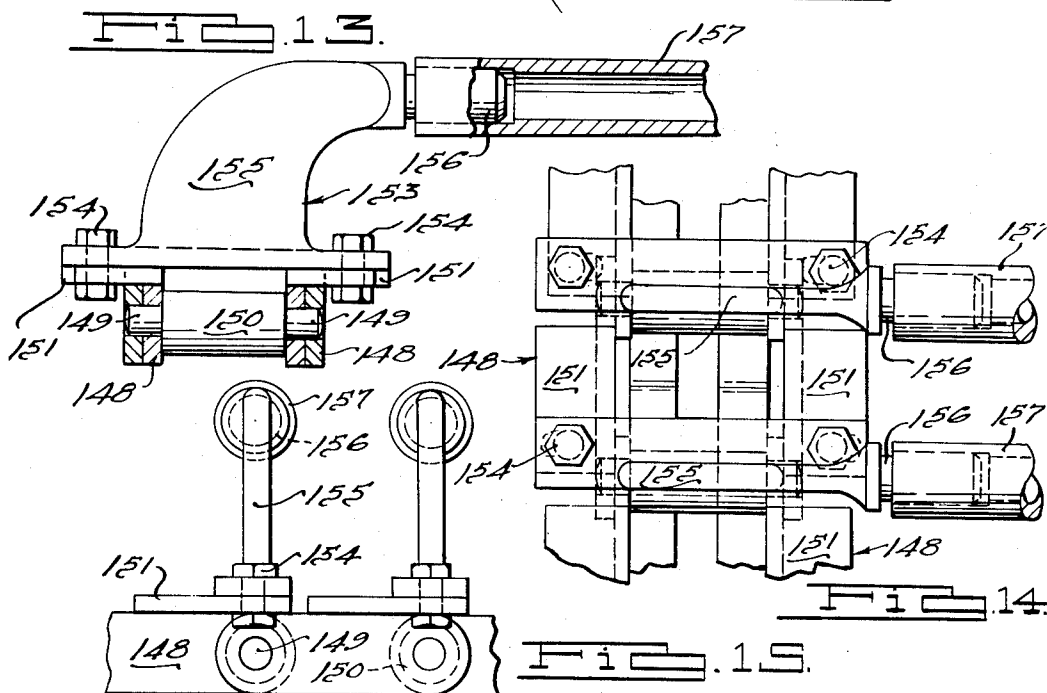
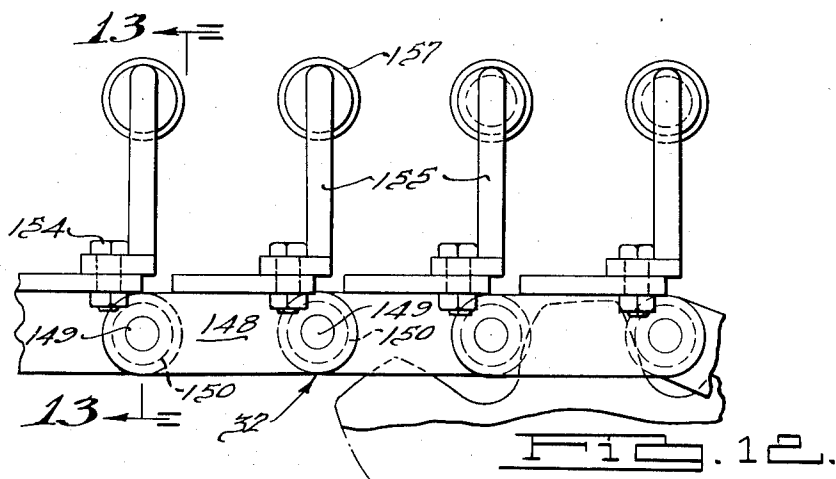
C. E. TEFFT

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APPARATUS FOR CORRUGATING MATERIAL

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9 Sheets-Sheet 8



INVENTOR.
Clinton E. Tefft.

BY

Harnes and Harnes

ATTORNEYS

Nov. 15, 1955

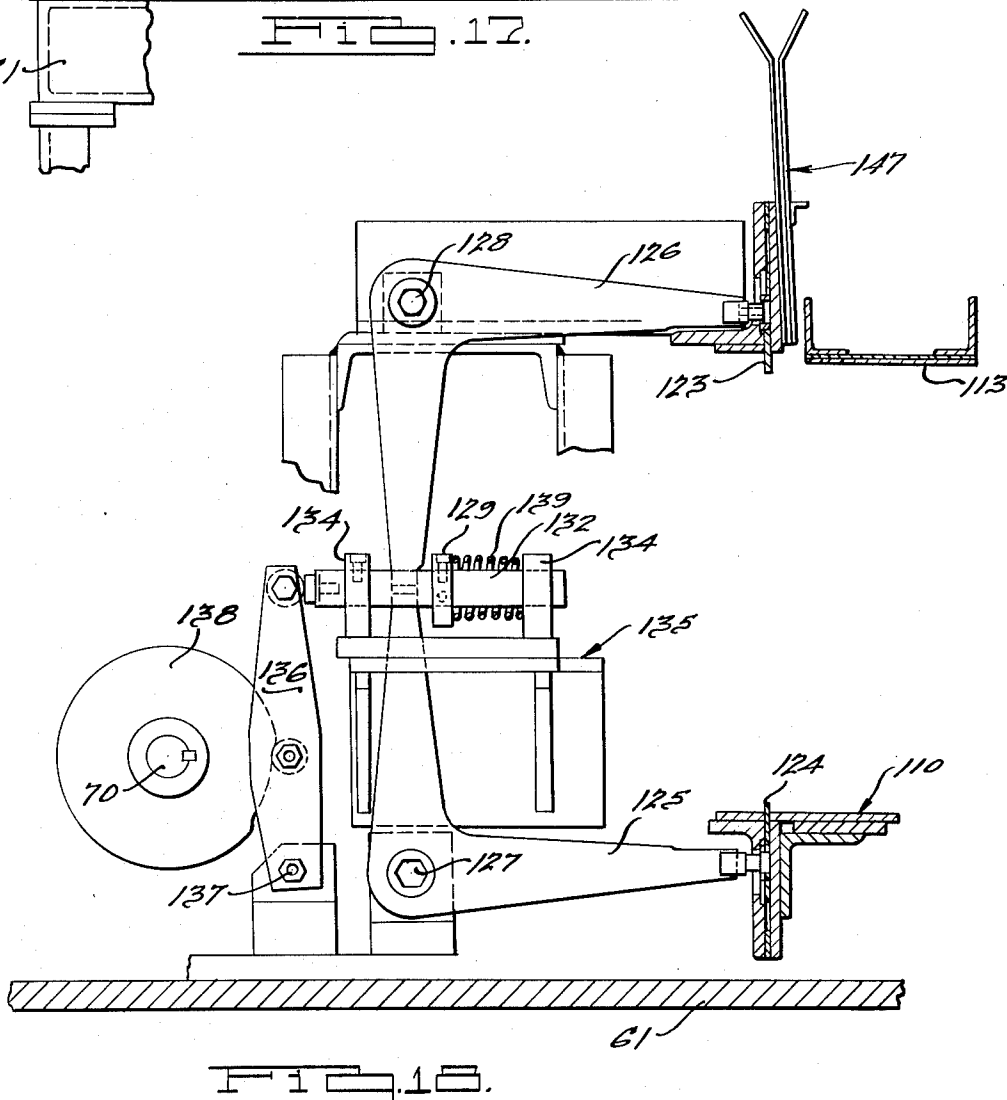
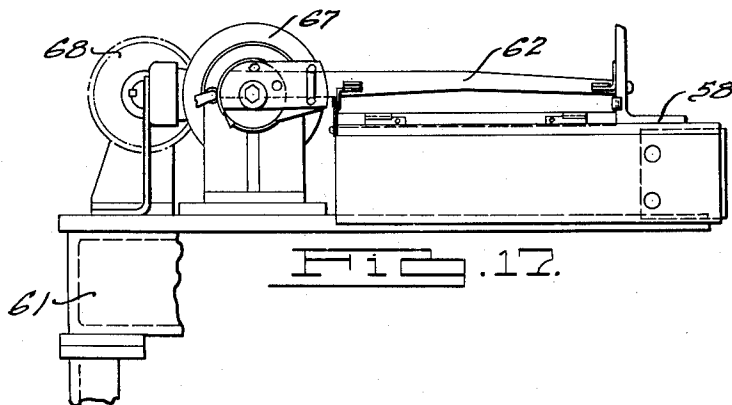
C. E. TEFFT

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APPARATUS FOR CORRUGATING MATERIAL

Filed Sept. 14, 1953

9 Sheets-Sheet 9



INVENTOR.
Clinton E. Tefft.
BY
Harness and Harris
ATTORNEYS.

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2,723,708

APPARATUS FOR CORRUGATING MATERIAL

Clinton E. Tefft, Detroit, Mich., assignor to Chrysler Corporation, Highland Park, Mich., a corporation of Delaware

Application September 14, 1953, Serial No. 379,985

5 Claims. (Cl. 154—30)

This invention relates to improvements in a mechanism for corrugating various materials to provide a sinuous structure of uniform dimensions. More particularly, this invention comprises an apparatus for imparting a sinuous shape to a sheet of suitable fabric and it includes a pair of chains having portions which cooperate to form thereon the fabric sheet.

The apparatus of the present invention is particularly suited to produce a corrugated structure from a roll of sheet material of uniform width and is adapted to operate continuously and automatically. The finished product comprises pads having a sinuous structure consisting of interlocked arches resembling the numerical figure eight and the apparatus is for this reason termed a "figure 8" machine by individuals skilled in the art.

The pair of chains for the "figure 8" machine comprises a series of interengaged forming bars which are disposed transversely with respect to the sheet of rolled material. These forming bars are adapted to receive therebetween the sheets of material to be formed, and in order to obtain the most satisfactory operation it is necessary that the operating clearance between the bars be kept to a minimum. Because of these small clearances, a considerable amount of friction and binding has been experienced which makes frequent replacement of the forming bars necessary. In order to reduce this operating friction between the bars to a minimum, it has been necessary to maintain close tolerances in the manufacture of the components of the forming chain which has necessarily resulted in a high manufacturing cost. Further, the structure of the forming chain was such that the replacement operation for the forming bars was time consuming and the replacement cost was high.

Accordingly, an object of the present invention is to provide a forming chain for use on a "figure 8" machine of the type previously described, which will eliminate operating friction and binding between the interengaged forming bars.

Another object of the present invention is to provide a "figure 8" machine of the type previously described which includes a forming chain having portions which may be readily replaced without interrupting the continuous operation of the machine.

Another object of the present invention is to provide a "figure 8" machine which is adapted to corrugate sheet material on a mass production basis for commercial use and which includes a forming chain having components which are relatively inexpensive to manufacture.

Another object of the invention is to provide a "figure 8" machine having a forming chain comprising a series of forming bars individually journaled thereto to permit relative rotation between the same thereby automatically compensating for small inaccuracies in manufacturing tolerances.

Other objects of the present invention will become apparent from the drawings, the following description and the appended claims.

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In general, the disclosed embodiment of the present invention comprises a forming chain having interlocked forming bars which are adapted to receive a continuous sheet of suitable material such as paper, wood veneer or the like and form the same into corrugations. The formed sheet is then removed from the forming bars by means of a suitable mechanism which will subsequently be referred to as a "stripper." The material is then sheared into suitable lengths by a rotary blade as it passes axially along the machine away from the strippers in a horizontal position. The sheared material is then moved in a horizontal position along an apparatus which will be referred to as the "packer." A suitable means may be provided for spreading glue or other adhesive over the upper surface of the sheared material. The material is then turned from a horizontal position to a vertical position and passed through a belt conveyor until it is positioned adjacent a cam actuated ram. At predetermined intervals the ram is moved transversely across the machine to successively remove the pads of corrugated material.

For the purpose of more particularly describing the disclosed apparatus and its operation, reference will be had to the accompanying drawings wherein:

Figure 1 is an elevational view of the "figure 8" machine;

Figure 2 is a sectional view taken along line 2—2 of Figure 1;

Figure 3 is a plan view of the machine shown in Figure 1;

Figure 4 is a sectional view taken along the line 4—4 of Figure 1;

Figure 5 is a plan view of the "packer" and is a continuation of the plan view of Figure 3;

Figure 6 is a plan view of the "packer" and is a continuation of the plan view of Figure 5;

Figure 7 is a side elevational view of the portion of the "packer" shown in Figure 6;

Figure 8 is a sectional view taken along line 8—8 of Figure 7 showing a portion of the mechanism for discharging the finished product from the packer;

Figure 9 is a detail sectional view taken along the line 9—9 of Figure 5;

Figure 10 is a sectional view through the "stripper" taken along section 10—10 of Figure 3;

Figure 11 is a sectional view taken along the line 11—11 of Figure 7 showing the ram mechanism;

Figure 12 is a detail view of the forming chain;

Figure 13 is a sectional view taken along the line 13—13 of Figure 12 showing an individual forming bar;

Figure 14 is a plan view of the forming chain of Figure 12;

Figure 15 is a detail view of a modified forming chain;

Figure 16 is a plan view of the modified forming chain of Figure 15;

Figure 17 is a view taken along section line 17—17 of Figure 5 showing a rotary cutting blade;

Figure 18 is a sub assembly view of a cam actuated mechanism for controlling the position of a pair of guide plates which guide the corrugated material; and

Figure 19 is a detail view of a guide plate taken along the section line E—E of Figure 7.

Having reference first to Figures 1 and 3, the "figure 8" machine is designated generally by numeral 10 and it includes a suitable base plate 11 to which a series of vertical supports 12 are secured. At one end of base plate 11 at either side thereof are secured supports 13 to which an upwardly extending pair of brackets 14 is integrally secured.

A pair of threaded members 15 is received by the brackets 14 at either side of the machine and is adapted

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to adjustably carry another pair of brackets 16 in spaced parallel relationship with respect to brackets 14. The position of brackets 15 with respect to brackets 14 may be suitably adjusted by means of the retaining nuts 17.

A pair of shafts 18 and 19 are journaled in the brackets 14 on either side of the machine. A pair of sprocket wheels is secured to each of the shafts 18 and 19 and are best seen in Figure 3 at 20 and 21 respectively.

Another pair of shafts are journaled in the brackets 18 and are shown in Figure 1 at 23 and 24. These shafts extend transversely across the end of the machine from one of the brackets 16 to the other and are parallel to the shafts 18 and 19 which, as seen in Figure 3, are parallel to each other.

Another shaft 25 is journaled in the support 13 and it is similarly provided with sprocket wheels at either end thereof.

A series of such sprocket shafts are journaled in the supports 12 on either side of the machine and are designated by numeral 26. The last of the series of sprocket shafts is shown at 27 and is journaled in supporting bracket 28 which is bolted to a base structure 29 for the stripper which in turn is bolted to the main base 11.

A forming chain 31 is mounted upon each of the sprocket shafts 19, 24, 25, 26, and 27 and is adapted to form a continuous circuit. Another forming chain 32 is continuously engaged by the sprocket shafts 18 and 23. Each of the forming chains 31 and 32 has sections thereof which are disposed in parallel relationship with respect to each other and which have interlocking portions through which a sheet of fabric material may be fed. The forming chain will subsequently be described in more particular detail.

Under each of the sprocket shafts 26 and the sprocket shaft 25 is mounted another series of sprocket shafts, individual ones of which are shown at 33 in Figure 1. These shafts are journaled on either side of the machine and extend transversely thereacross. Sprocket wheels are secured on each shaft 33 at either end directly under the sprocket wheels carried by the shafts 26 and the shaft 25. Sprocket chains 34 are mounted upon the sprocket wheels associated with the shafts 33. One chain 34 is located at each side of the machine and they have one section thereof in close proximity to the lower section of the forming chain 31.

It will subsequently be apparent that the forming chain rotates about its associated sprocket shafts in a counterclockwise direction, as viewed in Figure 1, and the chain 34 revolves in a clockwise direction at the same speed. Therefore, the chain 34 serves to support the weight of the forming chain 31 as it passes from the sprocket shaft 27 at the left end of the machine to the sprocket shaft 24 at the right end of the machine.

The structure which comprises the stripper is located at the left end of the machine as viewed in Figure 1, and comprises a base 29 upon which supports 35 are bolted. One such support is located on either side of the machine. A sprocket shaft 36 is journaled in the supports 35 and is adapted to carry suitable sprocket wheels 37, shown in Figure 4, at either end thereof. Another pair of supports 38 is secured to the base 29 which rotatably carries the shaft 39. Sprocket wheels are provided on the shaft 39 similar to those provided on shaft 37. A chain is carried by the shafts 36 and 39 and is adapted to revolve about the same. This chain is best seen in Figure 4 and it comprises a continuous series of transverse blades 40.

A guide plate structure is bolted upon the supports 38 and it comprises two spaced parallel plates 41 and 42 as seen in Figure 4. The lower plate 42 has formed therein a pair of longitudinal openings 43 through which the blades 40 are adapted to extend. As seen in Figure 1, the shaft 31 is disposed at a higher position than its associated shaft 36 thereby permitting the blades 40 to extend through the openings 43 only at the right side of the guide plate structure.

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The means for driving the forming chains, the chain 34 and the blades 40 includes a transverse sprocket shaft 44 shown in phantom in Figure 3, which is journaled in the base 11. A sprocket wheel 45 is centrally disposed on the shaft 44 and another sprocket wheel 46 is secured to the end of shaft 44 externally of the base 11.

The shaft 27 has secured thereon a sprocket wheel 47 located externally of the bracket 28. The sprockets 46 and 47 are drivably interconnected by means of a chain 48.

Another driving sprocket 49, which has a smaller pitch diameter than that of the sprocket 47, is secured to the shaft 27 adjacent the sprocket 47. Sprocket 46 is interconnected to a sprocket 50 secured to the shaft 39 by means of a chain 51.

A positive driving connection is provided between the shafts 18 and 19 by means of the intermeshed drive gears 52 and 53 which are respectively secured to these shafts.

A suitable source of power is delivered to the sprocket 45 which is transmitted to shaft 27 by means of the chain drives 46, 47, and 48. The chain 51 is effective to deliver driving power to the stripper mechanism 39, 50, 37, 36, and 40. The sprocket wheels 49 are effective to deliver power to the forming chain 31 which in turn drives the shaft 19 and gear 53. The gear 53 drives the gear 52, shaft 19 and sprocket wheel 20 which in turn drive the forming chain 32.

The shafts 18 and 33 have secured thereon the sprocket wheels 55 and 56, respectively, at the extreme ends of each shaft and they are drivably connected by means of chain 57. The chain 34 is therefore driven so that it idles about sprocket shafts 33 by virtue of the positive chain drives 55, 56, and 57.

The continuous sheet of fabric material is fed into the machine at the right end, as viewed in Figure 1, and is designated by means of the symbol M. The rotation of the two forming chains is such that the sheet material is passed through the interlocked forming bars thereby causing the fabric to assume a corrugated shape as seen at the left of Figure 1.

The forming chain 31 carries the formed fabric up to the sprocket shaft 27. At this point the blades 40 of the stripper mechanism, which are caused to rotate in a counterclockwise direction, engage the individual folds of the corrugated material M to remove the same from the forming chain 31. The continuous rotation of the blades 40 cause the material M to pass between the guide plates 41 and 42. The blades 40 maintain contact with the folds in the material M by virtue of the openings 43 in the lower guide plate 42 and thereby cause the material M to travel to the end of the machine.

The portion of the apparatus known as the "packer" is disposed to the left of the machine of Figure 1 and is generally illustrated in Figures 5 and 6. The end-to-end relationship of the packer and the machine of Figure 1 is illustrated in more particular detail in Figure 10 which shows the material M passing out from between guide plates 41 and 42 under the driving influence of the stripper blades 40. A platform structure is provided at 58 and suitable side guides are provided at 60 through which the material M passes. A portion of the "packer" base structure is seen in Figure 10 at 61.

A knife blade is shown in Figure 5 at 62 and is adapted to swing between the slot in the platform structure 58 and shear the material M into suitable lengths. The blade 62 is secured to a bearing shaft 63 which is rotatably mounted upon the base plate 61 by means of the bearing structure shown in Figure 5 at 64 and 65. Interposed between the two spaced bearing structures 64 and 65 is a suitable limit switch assembly 66. The shaft 63 is powered by means of a gear assembly 67 which is keyed thereto and which is drivably engaged with a gear 68 secured to the power shaft 70.

The material M is moved to the left along the "packer," as viewed in Figure 5, by means of a frictional engage-

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ment between a conveyor belt 71 secured to the four spindles 72 located in pairs on either side of the "packer." The structure of the spindles may best be described with reference to the sectional view of Figure 9.

The spindle 72 of Figure 9 comprises a body portion 73, which is bolted to the base structure 61, through which a spindle shaft 74 axially extends. Suitable bearing means are provided to permit rotation of the shaft 74 and a pulley 75 which is secured thereto at one end. A sprocket wheel 76 is secured to the other end of shaft 74.

Each of the four spindles is provided with similar sprocket wheels which are adapted to be driven by a chain 77 engaged therewith. The chain is disposed in a horizontal plane and is looped about the sprocket wheels 76 as shown in Figure 5 thereby imparting a driving motion to the belts 71. The chain 77 is powered by means of a suitable reduction gear assembly 78 which is powered by the shaft 70.

A suitable means may be provided for spreading adhesive or glue over the upper surface of the material M while the same is in the horizontal position, as shown in Figure 5.

Suitable guide means are shown in Figures 5, 6, and 7 at 80 for turning the material M from a horizontal position to a vertical position or it passes along the "packer" assembly. One such guide means is shown in Figure 19 and includes a base portion secured to the base 61 and a sloping plate portion adapted to receive the material M. The shape of the plate portion increases progressively throughout the length of the machine until the material assumes a vertical position.

As best seen in Figures 6 and 7, the material M is caused to enter a vertical channel formed between parallel and vertical guide plates 81 secured to the base 61. In order to maintain a steady movement of the material M through the "packer," other conveyor belts are provided at 82 and 83. The belt 82 is drivably carried by the pulleys 84 and 85 and an idler pulley is provided at 86 to permit an adjustment of the belt tension. The belt 83 is similarly carried by the pulleys 87 and 88. Each of the pulleys 85, 86, 87 and 88 is rotatably mounted upon the guide plate structure 81 which in turn is structurally reinforced by bracket 89.

The pulleys 85 and 87 are rotatably mounted upon shafts 91 and 92 respectively. The shafts 91 and 92 have secured thereto sprocket wheels 93 and 94 respectively which are powered by a drive chain 95 which in turn is looped about idler sprockets 96 and 97 and the drive sprocket 98. The drive sprocket 98 is drivably secured to a shaft 99 which carries at its outer end a sprocket 100 which is drivably connected to a power sprocket 102, shown in Figure 7, by a drive chain 103. Suitable idlers may be provided at 104 to provide support for the chain 100.

The sprocket 102 is mounted upon a shaft 105 which serves as the source of driving power for the shaft 70 as well as the belts 82 and 83. Any suitable power plant may be used to drive the shaft 105.

The shaft 105 carries a sprocket 106 which is connected to a Boston spiral right angle drive, shown generally at 107, by chain 108.

The material M is finally moved to a position directly adjacent a ram which is shown at 109 in Figures 6 and 11. A platform structure 110 is provided to support the material M after it is discharged from the conveyor belts 82 and 83. The height of the platform 110 is such that the ram 109 may move transversely thereacross to move the sheared segment of corrugated material under a suitable hold down device shown generally in Figure 8 at 112.

The hold down device 112 comprises a plate structure 113 and suitable side guide plates at 114 and 115. The entire assembly is bolted to the base 61 at 116. The plate structure 113 may be raised and lowered by virtue of the

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lifting rod 117 to which the plate 113 is attached. The rod 117 extends through an aperture in the base 61 and is contacted by lever 118 which is pivoted at 119. The other end of lever 118 is connected to a plunger structure shown at 120 which is mounted upon base 61. The plunger 120 is actuated by means of a cam 122 which is secured to a shaft 70'. Upon rotation of the cam 122, the lever 118 is caused to raise the push rod 117 and the plate structure 113 thereby allowing the ram 109 to push a section of corrugated material M under the plate 113. As the material M so moves, it pushes out the previous segment of corrugated material and stacks the same in a suitable hopper provided for this purpose. The glued surface of the corrugated segment of material causes the successive layers of the corrugations to adhere together thereby resulting in a continuous pad having a sinuous structure.

A pair of guides are shown in Figure 11 at 123 and 124. In order that the ram 109 might remove the segments of material M in a transverse direction, it is necessary that the guides 123 and 124 be temporarily removed. The apparatus for doing this is shown in Figure 18 and comprises a pair of toggle levers 125 and 126 which are pivoted at 127 and 128 respectively. One end of each toggle lever is suitably journaled to one of each of the guides 123 and 124. The other free end of the toggle levers is disposed adjacent to the abutment 129 secured to a shaft 132 which in turn is slidably received in a pair of brackets 133 and 134. A suitable supporting structure is provided at 135 for mounting the brackets 133 and 134.

An actuating lever is provided, as seen in Figure 18, at 136 and is pivoted at 137 to an anchored base. A cam 138, which is keyed to shaft 70', is adapted to oscillate the shaft 136 against the force exerted by spring 139 thereby causing the guides 123 and 124 to oscillate vertically to facilitate the removal of the corrugated material.

The actuating mechanism for the ram 109 is best seen in Figure 11 and comprises supporting arms 140 which are secured to the ram proper, shown at 109, and which is slidably mounted in suitable brackets 141 and 142 secured to the mounting structure 135. The arms 140 are secured at their outer ends to levers 143 which are pivoted to the base 61 at 144. Cams 145, which are rotatably mounted upon a fixed support 146 and keyed to shaft 70', are adapted to contact the levers 143 and actuate the same thereby imparting an oscillatory motion to the ram 109.

The shaft 70' is positively driven by shaft 70 through a reduction gear assembly shown in Figure 6 at 69. Suitable bearing means are provided at 79. A limit switch structure is generally shown at 90 and is located between the spaced bearing means 79. The limit switch 90 is operative to control the sequence of operation of the cams driven by shaft 70'.

A structure is shown at 147 in Figures 11 and 18 which enables the operator of the machine to insert metal spacer sheets between the successive pads of corrugated material at desired intervals.

In Figure 12, a typical section of the forming chain 32 has been illustrated and it comprises a standard roller link chain having link segments 148 which are journaled in end-to-end relationship by means of the pins 149 extending axially from either side of the rollers shown at 150.

As best seen in the sectional view of Figure 13 and the plan view of Figure 14, each of the segments is formed with a horizontal platform portion 151. A series of forming bar supports, shown at 153, is bolted to the portions 151 by suitable bolts 154 which extend through the base of the supports 153 and through apertures in the portions 151.

The supports 153 comprise web structures 155 which are integrally formed with the base of the support. The webs 155 are turned inwardly at the upper end thereof

and terminate in spindle bearings shown at 156. The spindle bearings 156 are received within hollow forming bars 157 at the ends thereof which are adapted to rotate about their longitudinal axis. Similar supports 153 are secured to the forming chains on either side of the "figure 8" machine thereby providing bearing supports for the forming bars 157 at either end thereof. The forming bars 157 may be either solid or hollow, but in either case the ends are bored to provide an internal bearing surface.

In the supports illustrated in Figure 14 the web portion 155 is offset from the centerline of the bolts 154. A vertical load upon the forming bars will therefore set up a bending moment at the supports 153. In the modified form of the forming bar supports illustrated in Figure 16 the web portion 155' is located directly over the centerline of the bolts 154 and is for this reason more structurally rigid.

The construction of the forming bars and forming chains disclosed herein is such that the operating friction between the interlocked portions is reduced to a minimum. The bars 157 of the chain 31 are adapted to enter the spaces between the bars 157 of the chain 32. The sheets of fabric to be formed are interwoven over the interlocked bars and the resulting operating clearances are very small. By providing the forming bars with individually journaled end supports, relative rotation is allowed between the bars thereby permitting self-adjustment to compensate for slight inaccuracies in manufacturing tolerances. This feature increases the life of the bars and reduces replacement costs.

Further, the individually journaled bars 157 may readily be removed from the supports 153 merely by moving one of the side forming chains slightly in a sideward direction. This greatly simplifies the replacement operation when replacement becomes necessary. Also, the continuous operation of the machine need not be interrupted for any great length of time to provide replacements.

While certain preferred embodiments of the invention have been disclosed, it is understood that the invention is not limited thereto since many variations may readily become apparent to those skilled in the art, and the invention is to be given its broadest possible interpretation within the scope of the following claims.

I claim:

1. In a corrugating machine for corrugating sheet material or the like, a pair of endless conveyors, each conveyor comprising a pair of side link type sprocket chains adapted to be trained over spaced sprockets, each side sprocket chain comprising two adjacent series of link elements, a plurality of spacer elements interposed between the link elements of the two adjacent series of link elements, said spacer elements including pivot means for joining the link elements of each of said adjacent series in end-to-end relationship, each of said link elements having a laterally extending flat portion formed thereon, a plurality of brackets spanning said adjacent series of link elements and positioned upon said flat portions, fastening means for securing said bracket to said flat portions, each of said brackets having a web portion disposed transversely to the plane of said flat portions, a bearing means formed on the web portion of each of said brackets, and a series of spaced forming bars interposed between said pair of side sprocket chains, each of said forming bars being rotatably journaled at either end thereof on the bearing means associated with separate ones of said brackets.

2. In a corrugating machine for corrugating sheet material or the like, a pair of endless conveyors having intermeshing portions, each conveyor comprising a pair of side link type sprocket chains adapted to be trained over spaced sprockets, each side sprocket chain comprising two adjacent series of link elements, a plurality of spacer elements interposed between the link elements of the two adjacent series of link elements, said spacer

elements including pivot means for joining the link elements of each of said adjacent series in end-to-end relationship, a plurality of brackets disposed across said adjacent series of link elements, each bracket being fixedly secured to one link element of each of said series, a bearing means formed on each of said brackets, and a series of spaced forming bars interposed between said pair of side sprocket chains, each of said forming bars being rotatably journaled at either end thereof on the bearing means associated with separate ones of said brackets.

3. In a corrugating machine for corrugating sheet material or the like, a pair of endless conveyors, each conveyor comprising a pair of side link type sprocket chains adapted to be trained over spaced sprockets, each side sprocket chain comprising two adjacent series of link elements, a plurality of spacer elements interposed between the link elements of the two adjacent series of link elements, said spacer elements including pivot means for joining the link elements of each of said adjacent series in end-to-end relationship, each of said link elements having a laterally extending flat portion formed thereon, a plurality of brackets spanning said adjacent series of link elements and positioned upon said flat portions, fastening means for securing said bracket to said flat portions, each of said brackets having a web portion disposed transversely to the plane of said flat portions, a bearing means formed on the web portion of each of said brackets, a series of spaced forming bars interposed between said pair of side sprocket chains, each of said forming bars being rotatably journaled at either end thereof on the bearing means associated with separate ones of said brackets, said bearing means comprising a projection extending from said web portion, an external cylindrical bearing surface formed on said projection, and a cylindrical cavity extending axially into the ends of each of said forming bars, the walls of said cavity forming an internal cylindrical bearing surface, one of said projections being disposed within each of said cavities.

4. In a corrugating machine for corrugating sheet material or the like, a pair of endless conveyors having intermeshing portions, each conveyor comprising a pair of side link type sprocket chains adapted to be trained over spaced sprockets, each side sprocket chain comprising two adjacent series of link elements, a plurality of spacer elements interposed between the link elements of the two adjacent series of link elements, said spacer elements including pivot means for joining the link elements of each of said adjacent series in end-to-end relationship, a plurality of brackets disposed across said adjacent series of link elements, each bracket being fixedly secured to one link element of each of said series, a bearing means formed on each of said brackets, a series of spaced forming bars interposed between said pair of side sprocket chains, each of said forming bars being rotatably journaled at either end thereof on the bearing means associated with separate ones of said brackets, said bearing means comprising a projection extending from said web portion, an external cylindrical bearing surface formed on said projection, and a cylindrical cavity extending axially into the ends of each of said forming bars, the walls of said cavity forming an internal cylindrical bearing surface, one of said projections being disposed within each of said cavities.

5. In a corrugating machine for corrugating sheet material or the like, a pair of endless conveyors, each conveyor comprising a pair of side link type sprocket chains adapted to be trained over spaced sprockets, each side sprocket chain comprising two adjacent series of link elements, a plurality of spacer elements interposed between the link elements of the two adjacent series of link elements, said spacer elements including pivot means for joining the link elements of each of said adjacent series in end-to-end relationship, each of said link elements having a laterally extending flat portion formed thereon,

a plurality of brackets spanning said adjacent series of link elements and positioned upon said flat portions, fastening means for securing said bracket to said flat portions, each of said brackets having a web portion disposed transversely to the plane of said flat portions, said fastening means being positioned substantially in the plane of said web portion, a bearing means formed on the web portion of each of said brackets, and a series of spaced forming bars interposed between said pairs of side sprocket chains, each of said forming bars being ro-

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tatably journaled at either end thereof on the bearing means associated with separate ones of said brackets.

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