June 19, 1923. 1,459,107

A. J. KUSTERER

BINDER BLANK SHAPING MECHANISM

Original Filed May 29, 1920 3 Sheets-Sheet 1

Fig. 2.

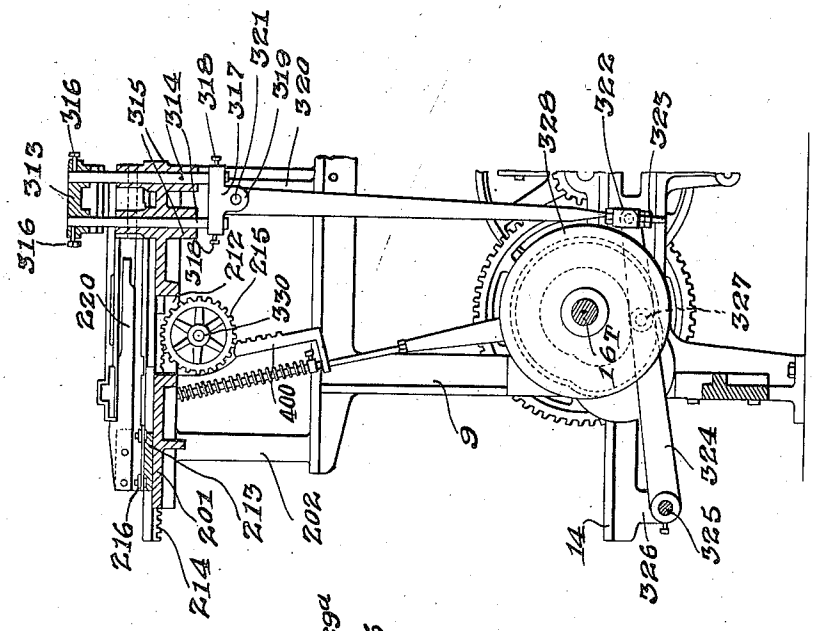
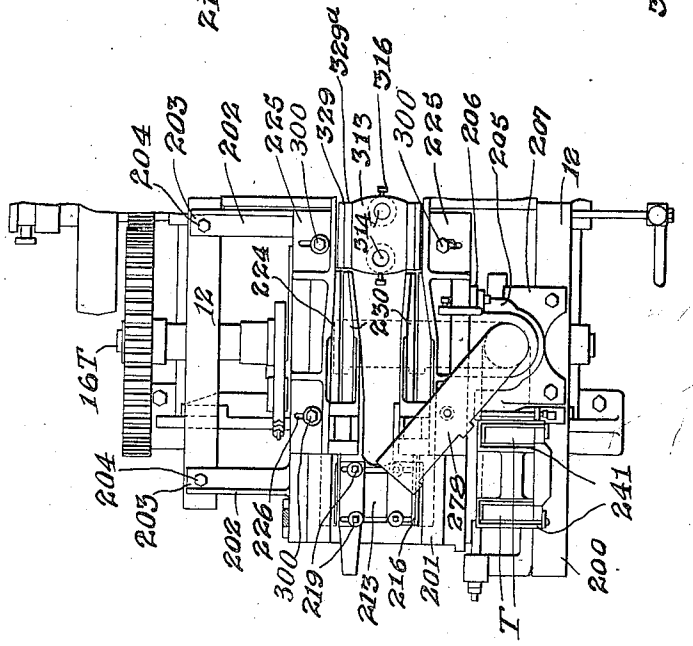


Fig. 1.



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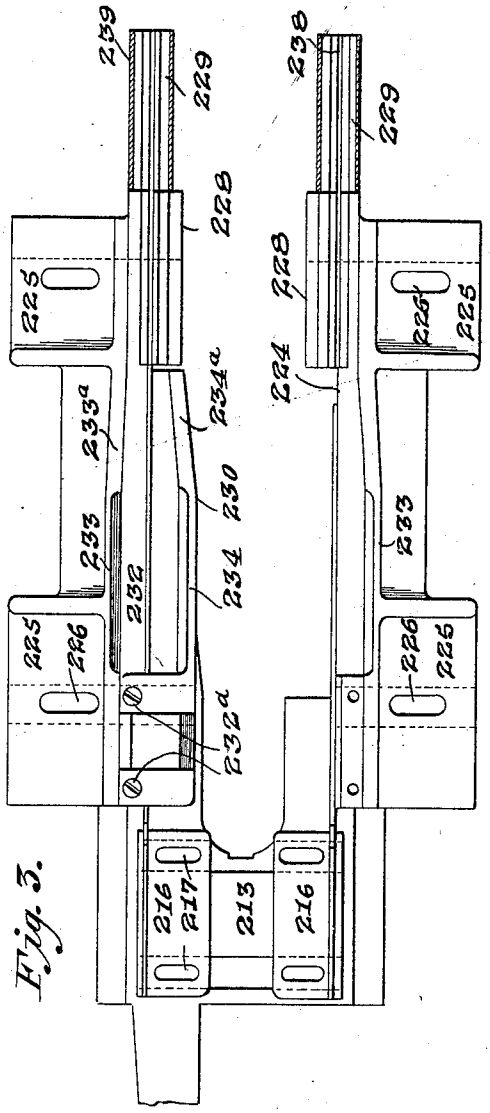

Fig. 3.

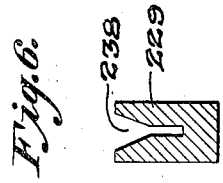

Fig. 6.

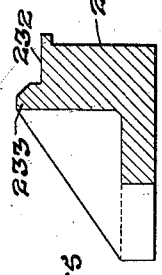

Fig. 5.

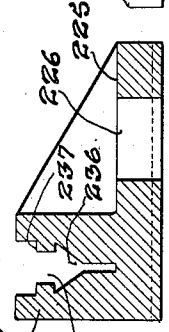

Fig. 7.

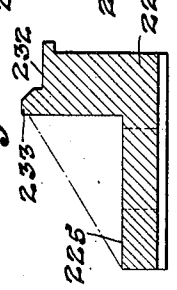

Fig. 4.

Fig. 10.

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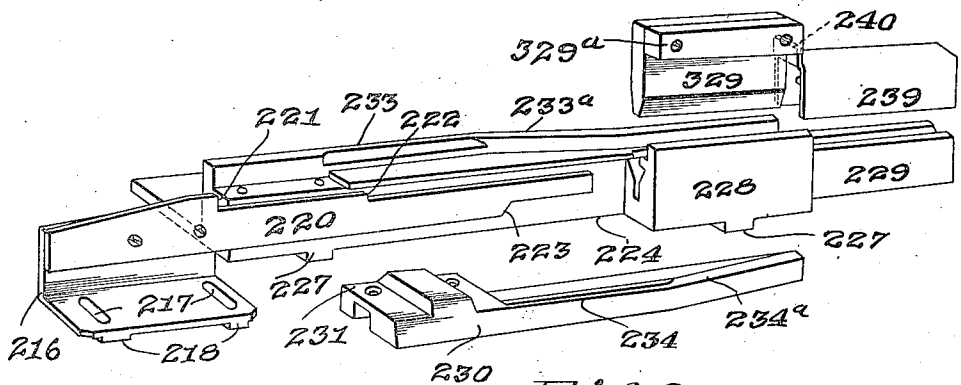
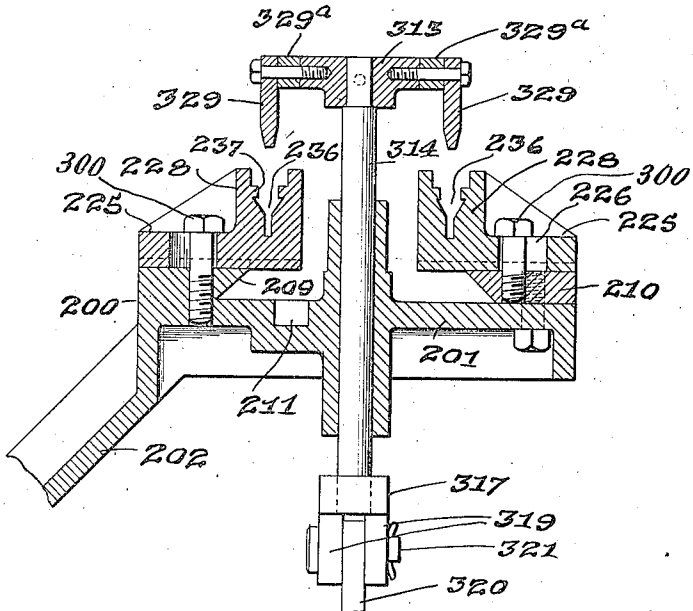


Fig. 8.

Fig. 9.



Aloysius J. Kusterer INVENTOR.

BY

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Patented June 19, 1923. 1,459,107

UNITED STATES PATENT OFFICE.

ALOYSIUS JOSEPH KUSTERER, OF RICHMOND, VIRGINIA, ASSIGNOR TO CONSOLIDATED PAPER AND BOX MANUFACTURING COMPANY, OF RICHMOND, VIRGINIA, A CORPORATION OF VIRGINIA.

BINDER-BLANK-SHAPING MECHANISM.

Original application filed May 29, 1920, Serial No. 385,361. Divided and this application filed August 10, 1921. Serial No. 491,223.

To all whom it may concern:

Be it known that I, ALOYSIUS J. KUSTERER, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Binder-Blank-Shaping Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This application is a division of my patent for tray forming machine Number 1,389,197, dated August 30, 1921. This application relates particularly to a means for die shaping sheet metal blanks to be subsequently secured to the edges of a formed tray as fully set forth in said patent of which this is a division.

In the accompanying drawings in which like reference characters indicate like parts:

Figure 1 is a plan view of one end of a machine embodying this invention;

Figure 2 is a longitudinal section therethrough;

Figure 3 is a detail plan of guideways, matrices and feed fingers;

Figures 4, 5 and 6 are transverse sections through different parts of the guideways;

Figure 7 is a transverse section through a matrix;

Figure 8 is a perspective of parts of the guide, a matrix and die;

Figure 9 is a cross section through the die and matrices;

Figure 10 shows the blank before and after bending in the matrix.

On that part or end of the framing that is herein designated the front end is a casting 200. It comprises a table 201 with guideways and bearings and two inclined legs 202 having base flanges 203 provided with perforations for bolts 204 by which they are rigidly bolted to the upper surfaces of the front portions of the members 12 of right side frame 9. The other or left side of the casting 200 is supported by a hollow casting 205 designed to function as an air chamber in connection with the mechanism for feeding the tin plate blanks T. Two lateral ears or flanges 206 on the casting 205 are bolted to the left hand edge of said table 201, and a horizontal base flange 207 on said hollow casting is bolted to the upper surface on the front part of member 12 of the left hand side frame 9.

In the top of table 201 is a wide guide groove with undercut sides 209, one of which is formed in a removable gib 210. Near the right hand side of the said wide undercut guide groove a rectangular channel 211 is sunk, and midway of this channel is an opening 212 to admit the perimeter of a gear wheel 215. In the guide groove a feed plate 213 is fitted to reciprocate, and on the under side of feed plate 213 there is a rack 214 fitted in the channel 211. The rack 214 projects both forward and rearward of the general front and rear ends of the feed plate 213, and its rack teeth engage the teeth of the gear wheel 215 which projects through the said opening 212. On each side of the fore and aft center line of the reciprocating feed plate 213 is bolted an angle plate 216 each having a horizontal and a vertical flange. The horizontal flanges of the angle plates 216 are provided with transverse slots 217, and on their under sides with guide ribs 218 of rectangular section which fit in corresponding transverse ways upon the feed plate 213. Bolts 219 pass through the slots into the feed plate and thereby secure the angle plates 216 adjustably to the feed plate so that they may be moved toward and from each other transversely of the machine. The re-entrant angles of said angle plates face each other and on the inner faces of the vertical flanges are bolted feed fingers 220, one on each side of the center line of the machine, whereby two tin plate blanks may be simultaneously fed. On the upper edge of each feed finger 220 are two steps forming two shoulders, a front shoulder 221 and an intermediate shoulder 222, while on the other side is a single shoulder 223.

Bolted to the table 201 on each side of the longitudinal center line is a guide member and forming die 224 for the tin plate blanks. These members 224 are similar and face each other, their longitudinal centers lying in the vertical planes that embrace the forming block, supporting a tray blank to which the tins T are to be clamped, as described in said patent of which this is a division. Each

has a pair of horizontal flanges 225, projecting laterally from its under side, having transverse slots 226 therethrough and transverse ribs 227 on their under sides adapted to fit corresponding grooves in the table 200 and gib 210. Bolts 300 pass through said slots 226 thereby enabling said guide members 224 to be adjusted transversely toward and from each other. The inner faces of the guides 224 lie adjacent the path of movement of the feed fingers 220 for the larger portion of their length and then jut inward to constitute the die block 228 in which the tin plate blank T is formed into a V-shaped blank *t*. Beyond the die block the guide continues rearward toward the forming block in a grooved guiding extension 229. A mating guide member 230 is spaced from the upper part of the guide 224 between the guide block 228 and the front extremity of said guide 224. Each mating guide member has a lateral flange 231 through which bolts 232ª are passed and threaded into the upper end surface of the member 224. In the space between guide 224 and mating guide member 230 the feed finger 220 reciprocates, its extremity entering and being guided by a groove in the bottom of the matrix of die block 228 and extension guide 229 and the shoulder 221 passing in a groove on the under side of flange 231. The upper surface 232 of guide 224 and mating guide 230 is flat and constitutes the surface on which the tin blanks T are deposited and moved toward the die block 228. At the front end, or deposit end, this surface is considerably wider than the tin plate blanks and is bounded by flanges 233 and 234 parallel for a portion of their extent and then converging as they approach the die block 228, and extending parallel again on each side of the matrix a distance apart equal to the width of the tins T. As the arm 278, as fully described in said patent, for depositing the tins on the surface 232 is not adjustable and has always the same amplitude of movement, it will be seen that the width of the surfaces at the point of deposit should be greater than the width of the tins by an extent sufficient to adapt said surface to receive the tins whether the guides 224 be adjusted to their positions of nearest approach or greatest separation, the converging portions 233ª and 234ª of the flanges 233, 234, causing the tins to register with the matrices of the die blocks 228 in any event. The die blocks 228 are preferably hardened.

The matrix mouth 235 in the die block 228 is considerably wider than the space between the members 224 and 230 in which the feed finger 220 reciprocates in order that the tin plate blank T may be pushed down into the V-shaped cavity 236 and formed into the blank *t*. The V-shaped cavity 236 of the matrix is overhung by ledges 237 which support the edges of blank T and engage over the edges of the blank *t* and hold it down, owing to the springiness of the tin plate, after it has been thrust and bent into the matrix. The V-shaped groove 238 in extension guide 229 is a direct continuation of the V-shaped cavity 236 of the matrix, and the upper surface of said extension guide 229 lies flush with the under side of the ledges 237 overhanging the V-shaped matrix cavity 236. A cover plate 239 of inverted U-shape is fitted removably over the extension 229 to keep the tin *t* from escaping from the groove 238, and has an upturned lip 240 that projects above the surface 232 on the top of the ledges 237 of the die block 228 to serve as a stop for positioning the tins properly over the matrix.

Means for bending the tin plate blanks in the matrix of the die block 228 comprises a vertically reciprocative die head 313 arranged centrally of the longitudinal center of the machine, mounted on two vertical rods 314, arranged to reciprocate in bearings 315 in the rear end of table 301. The upper ends of the rods 314 are seated in holes in the die head 313 and secured therein by set bolts 316. The lower ends of said rods 314 are connected by a cross head 317, having holes at the front and rear ends, respectively, to receive said rods, which are secured by set bolts 318. Midway between the ends of yoke 317, parallel, perforated ears 319 project from the under side. Between said ears 319 a pitman 320 is pivoted on a pin 321 projecting through said pitman and ears. The lower end of pitman 320 is threaded and passes through a swivel block 322, nuts 323 being secured on said threaded end of pitman 320, securing said swivel block adjustably on said pitman. The swivel block 322 is pivoted to the outer end of a lever 324 fulcrumed on the shaft 325 secured in the hangers 326 depending from the frame extension 14. Between its ends lever 324 carries a roller stud 327 engaging a cam groove in the right hand face of cam 328 secured on shaft 16 T. Removably secured to the right and left hand faces of the die head 313 are die plates 329, the lower edges of which are V-shaped in cross section and are substantially counterparts of the matrix grooves 236 in the die block 228. These plates 329 constitute male dies or patrices that cooperate with the matrices 236 to transform the flat tin plate blanks T into grooved or V-shaped blanks *t*, ready to be clamped upon the edges of a paper board tray as described in the patent of which this is a division. Once during each revolution of the cam 328 the die head 313 moves downward forcing the die plates 329 into the matrix groove 236, and then moves back to its upper position. If a tin plate blank is then lying over the matrix block 228 it will be

forced into the matrix, where its edges will expand and catch under the ledges 237, which hold it there while the die plates return upward. The die plates 329 are removably bolted to the sides of die head 313. In order that said plates 329 may be fitted to cooperate with the matrices whether the guides 224 and guide blocks 228 are adjusted to wide or narrow trays, different plates 329 may be provided with different thicknesses of spacing blocks 329a. Or a series of separate spacing blocks adapted to serve as shims may be provided.

In order that the flat tin plate blanks T deposited on the guides 224 (as by a pneumatic conveyer 278) may be fed to the die block 228, and the V-shaped blanks *t* stamped by the die plates 329 may be fed to the forming mechanism, the feed plate 213 carrying the feed fingers 220 must be reciprocated once during every cycle of the machine, so that the shoulder 221 of each feed finger, which shoulder projects above the surfaces 232 of the guides 224, may engage the ends of the tin plate blanks T and push them over the matrices 236 in die blocks 228; and the tips of the fingers 220 on the next forward movement will engage the V-shaped blanks *t* in the matrix grooves 236 and push them onward through the groove 238 to the clamping jaws, which clamp the V-shaped tins onto the edges of the tray as described in said parent patent. To reciprocate the feed plate 213 the gear wheel 215, before mentioned, must be oscillated or alternately rotated in opposite directions. The blank receiving guide is reciprocated back and forth by means of an alternately rotating gear wheel 215, which is caused to rotate in alternate directions by means of a reciprocating rack 400.

Two stacks of sheet metal blanks T having been placed in a magazine 241 provided for them near the front of the machine, the machine is ready for operation. At the commencement of a cycle two tins are resting in the matrix grooves, and the feed fingers 220 are at their front or starting position; the pneumatic conveyer arm 278 is over the magazine 241. As the drive shaft rotates, at the proper instant with relation to the movements of associated mechanism the pneumatic conveyer arm 278 operates so as to place two blanks T longitudinally on the surfaces 232 of the guides 224 in position for the shoulders 221 of the feed fingers 220 to engage them and advance them to the bending dies. As the shoulders 221 of fingers 220 move the blanks T over the die blocks 228, the ends of said fingers engage the bent blanks *t* and push them out of the matrix through the guides 229 to the applying mechanism described in the parent patent. When the fingers 220 return to initial position the die head 313 descends and presses the tins T deposited on the die block 228, as described, down between the shoulders 237 into the matrix 236 and the arm 278 swings back over the magazine. The described cycle is then repeated.

What I claim and desire to secure by Letters Patent is:

1. In a tray forming mechanism, a guideway having a flat guiding surface and a grooved surface arranged in alinement, a matrix between said surfaces depressed below said flat surface, a die cooperative with the matrix for bending the blanks, the groove in the guideway registering with the matrix, a reciprocating finger having an end adapted to enter the matrix and a shoulder projecting above the flat surface for engaging the flat blanks whereby a flat blank will be advanced simultaneously with the removal of a blank from the matrix.

2. In a tray forming mechanism, a guide member for blanks having a flat surface for receiving flat blanks, a matrix at the end of the flat surface and below the same, a die for cooperation with the matrix, said guide member having a groove registering with the matrix at the end opposite that having the flat surface, a stop at the delivery end of the matrix to position a blank delivered over the flat surface with respect to the die and matrix.

3. In a tray forming mechanism, a guide member for blanks having a flat surface for receiving flat blanks, a matrix at the end of and slightly below the flat surface, a stop for positioning a blank over the matrix, a die co-operating with the matrix adapted to force a flat blank into the matrix slightly below said flat surface, said matrix being open at its opposite ends, said guide member having a groove corresponding in cross section with the cross section of the matrix and in alignment therewith, a cover plate over said groove in the guide, and a feed device having a shoulder to feed flat blanks to the matrix, and an end adapted to feed bent blanks from the matrix and into the grooved guide.

4. In a tray forming mechanism, an integrally formed blank receiving guide and an alined matrix having a V-groove open at its opposite ends, ledges spaced apart and overhanging the groove, a die for bending a flat blank resting above said ledges into said groove, so that the edges of the bent blank engage beneath the ledges.

5. In a tray forming mechanism, an integrally formed blank receiving guide and an alined matrix having a V-groove, ledges spaced apart and overhanging the groove, a die for bending a flat blank resting above said ledges into said groove so that the edges of the bent blank engage beneath the ledges, means for reciprocating the die, and means for adjusting the die vertically with respect

to the reciprocating means in order to establish with precision the limit of descent of the die into the matrix.

6. In a tray forming mechanism, an integrally formed blank receiving guide and an alined matrix having a V-groove, a reciprocating die head carrying a die adapted to enter the groove, vertically sliding means on which the die head is mounted, a pitman for reciprocating said vertically slidable means, a means for reciprocating the pitman and a means for adjusting the pitman to change its effective length in order to relatively adjust the die and matrix.

In testimony whereof I affix my signature.

ALOYSIUS JOSEPH KUSTERER.