April 29, 1924. 1,491,869

A. J. KUSTERER

TRAY BLANK FEED MECHANISM

Original Filed May 29, 1920 4 Sheets-Sheet 1

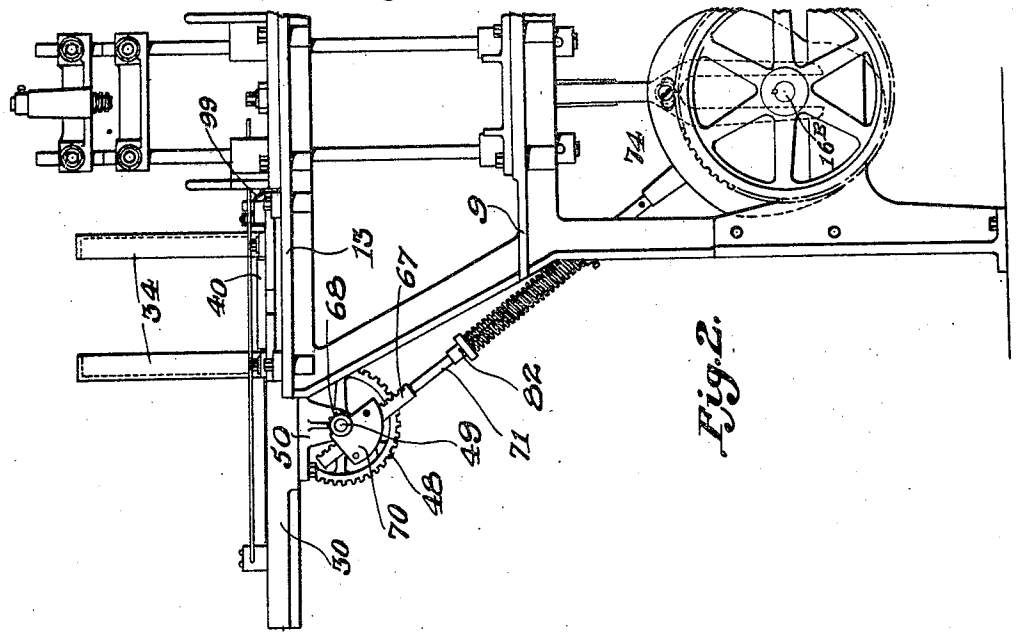


Fig. 2.

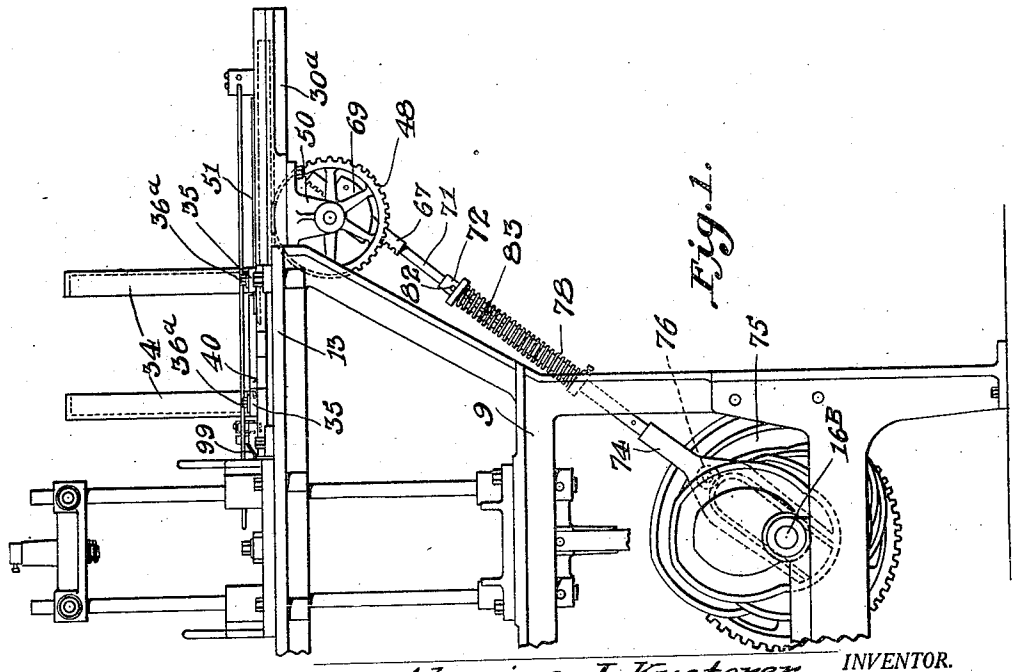


Fig. 1.

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TRAY BLANK FEED MECHANISM

Original Filed May 29, 1920 4 Sheets-Sheet 2

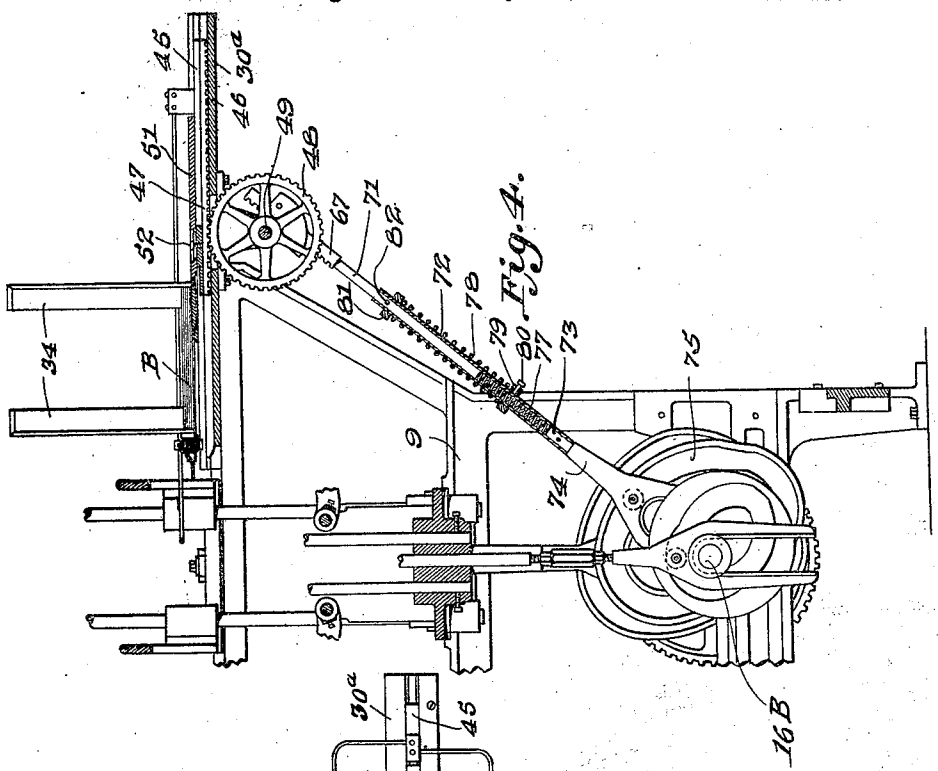


Fig. 4.

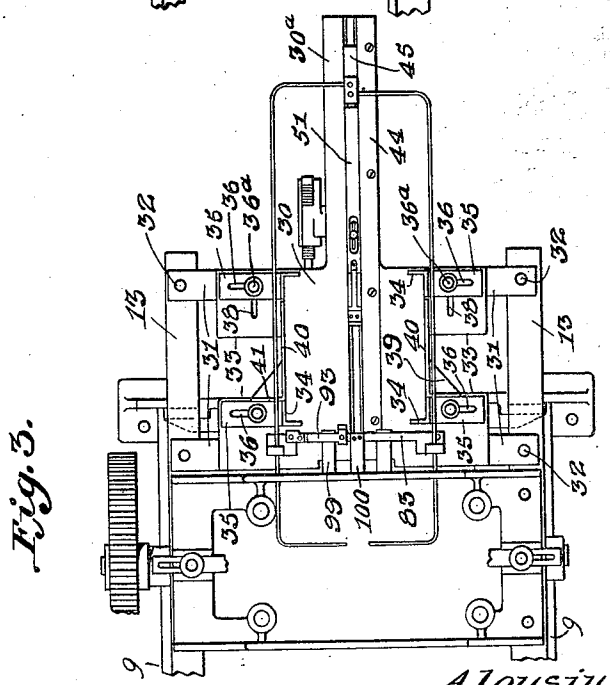


Fig. 3.

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TRAY BLANK FEED MECHANISM

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Fig. 5.

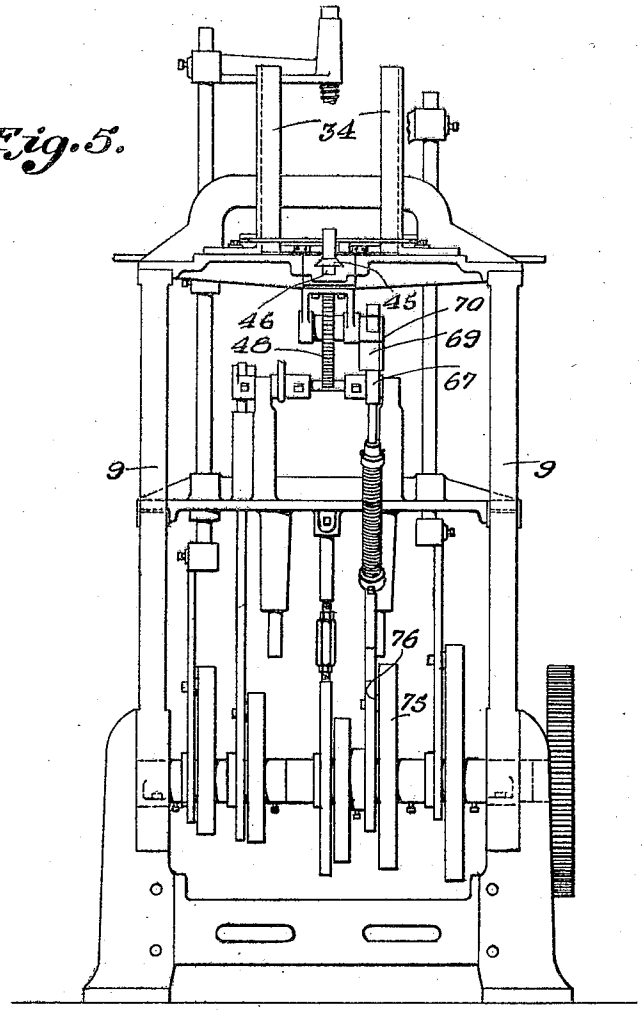
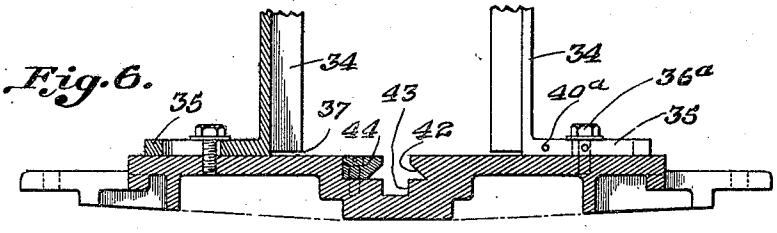


Fig. 6.



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April 29, 1924. 1,491,869

A. J. KUSTERER

TRAY BLANK FEED MECHANISM

Original Filed May 29, 1920 4 Sheets-Sheet 4

Fig. 7.

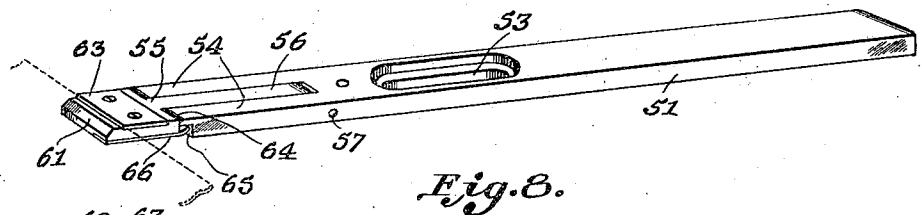


Fig. 8.

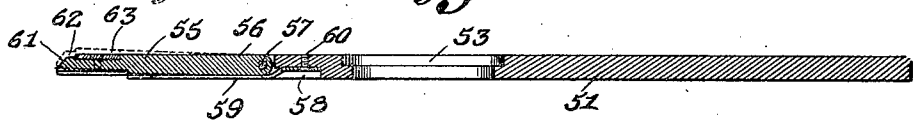


Fig. 9.

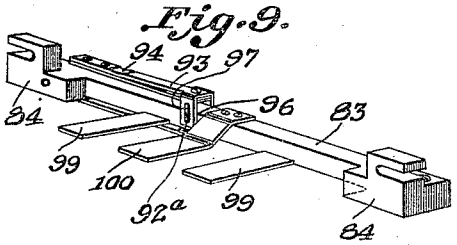


Fig. 10.

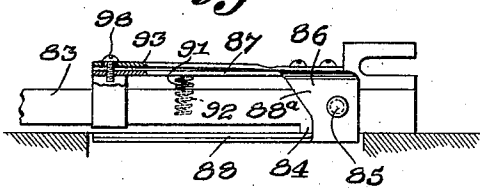


Fig. 11.

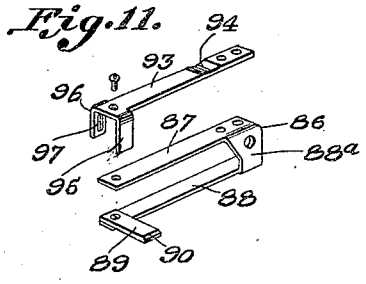
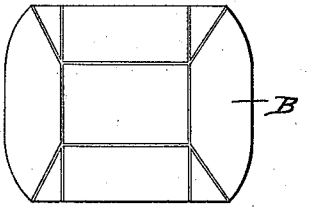


Fig. 12.



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Patented Apr. 29, 1924. 1,491,869

UNITED STATES PATENT OFFICE.

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

TRAY-BLANK FEED MECHANISM.

Original application filed May 29, 1920, Serial No. 385,361. Divided and this application filed August 10, 1921. Serial No. 491,221.

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 Tray-Blank Feed 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 application for a tray-making machine filed May 29th, 1920, Serial No. 385,361. In this application is described and claimed a magazine for holding a stack of prepared blanks of paper-board or the like and mechanism for feeding said blanks to a forming mechanism.

In the accompanying drawings, in which like reference characters indicate like parts throughout the several views:

Figure 1 is a side elevation of one end of my tray making machine comprising the improved feed mechanism;

Figure 2 is an elevation viewed from the side opposite Figure 1;

Figure 3 is a plan view of the feed mechanism;

Figure 4 is a longitudinal vertical section thereof;

Figure 5 is an end elevation;

Figure 6 is a transverse section through the table;

Figure 7 is a perspective of a feed finger;

Figure 8 is a longitudinal section of the feed finger;

Figure 9 is a perspective of a bridge member beneath which blanks are pushed;

Figures 10 and 11 are views of details of the bridge member and assembled parts, and

Figure 12 illustrates the type of blank designed to be fed by the means of this invention.

In the embodiment illustrated and particularly described herein, previously cut and scored paper board blanks impregnated with paraffine, of the form illustrated at B, Figure 12, are stacked in a magazine or hopper at the rear end of the machine. By the operation of the machine the paper board blanks are fed in proper timed relation toward a forming mechanism.

A table casting 30 of irregular outline, as shown in Figure 3, is bridged across the space between frames 9 and bolted to the upper sides of the members 13 of said frames. The sides of the table 30 have T-shaped recesses formed therein providing four narrow lateral extensions 31 through which, and the members 13, securing bolts 32 are passed; and four wider portions 33 on which are mounted four angle columns 34 which constitute a magazine or hopper for holding a stack of paper board blanks B. Each angle column 34 has, at its base, a flange 35 which is slotted at 36. A bolt 36^a passes through this slot and a slot or hole in the table and enables each column 34 to be adjusted laterally of the machine in order to adapt the magazine to hold blanks of different widths. The transverse vertical webs of the forward magazine columns 34 end a distance above the surface of the table 30 substantially equal to the thickness of a paper board blank as shown at 37. The rearward members 33 of the table 30 are slotted longitudinally of the machine as at 38, so that the rearward pair of columns 34 may be adjusted longitudinally of the machine to adapt the magazine to receive longer or shorter blanks B. Fillets 39 serve to strengthen the casting 30. Bolted to each one of the forward columns 34 is a guide member 40, of a height equal to the thickness of the flanged base 35 of the column. The forward end of each guide 40 extends laterally at right angles to its length as shown at 41 and through this laterally extending end 41 each guide 40 is bolted as at 40^a to the base flange 35 of the forward columns 34, respectively. The guides 40 trail back from the forward columns 34 and keep the paper board blank from skewing as it is advanced through the spaces 37, guiding all parts of it in right lines after its forward and rearward ends have moved away from the lateral support of the columns during the feeding operation.

The table 30 is provided centrally with a fore and aft groove having an undercut portion 42 and a depressed right angular channel 43 running from the forward edge thereof to the extremity of a rearward extension 30^a of the table 30. On one side

this groove 42 is bounded by the inset shim 44. A reciprocating feed bar 45 is arranged to reciprocate in the groove 42, 43. The feed bar 45 comprises a bar that is of dove-tail cross section fitting the undercut portion 42 of said groove, and a rack member 46 on its under side fitting the rectangular channel 43. About midway of its length the table 30 is slotted as at 47, from the bottom of channel 43, to permit a gear wheel 48 to engage the rack 46, as clearly shown in Figure 4. The gear wheel 48 is secured to a short shaft 49 which is journaled in hangers 50 bolted to the under side of table 30, and is given an oscillatory or alternating rotary movement, by means to be presently described, in order to reciprocate the feed bar 45.

On top of the reciprocating feed bar 45 a feed finger 51 is adjustably secured by means of the bolt 52 passing through a slot 53 in said finger 51, and threaded into the bar 45 so that the position of said finger 51 may be longitudinally shifted with respect to the bar 45. The finger 51 lies between the side walls of the said fore and aft groove in the table 30 above the undercut portion, but may project slightly above the surface of the table, as by a distance approximately equal to the thickness of one of the paper board blanks stacked in the magazine. The forward end of the finger 51 is slotted longitudinally as shown in Figures 7 and 8, thus providing two parallel ends 54 between which the feed finger tip 55 is pivoted. The finger tip 55 has a forward end of a width equal to the full width of the finger 51. From the wide end of the finger tip a shank 56 extends rearward between the parallel members 54 and is pivoted at 57 near its rear terminal to the finger 51. Back of the end of the shank 56 is a recess 58 formed in the under side of the finger 51. In the recess 58 one end of a spring 59 is riveted or bolted as at 60. The spring 59 extends forward underneath the finger tip giving to the latter an upward bias at its free end. The forward end of the finger tip 55 is chamfered at 61 so that it may slide freely beneath the lowest paper board blank in the magazine 34. Just back of the chamfer 61 is a narrow horizontal surface 62, and back of the surface is a relatively wide recess, rectangular in section, in which is secured a hardened steel or other wear plate 63. The front end of this wear plate 63 is elevated above the surface 62 a distance not greater than the thickness of a paper board blank, so that as the finger advances the chamfered end of the tip 55 will slide under the lowermost blank in the magazine, but the front edge of the wear plate will engage the edge of said blank and advance it from beneath the stack as the feed bar and finger advance. In order that the blank next above the blank being pushed from beneath the stack may not be caught by the ends of the members 54 on the finger 51, these ends are chamfered also as at 64. To prevent the spring 59 from elevating the tip 55 too high, a stop is provided by a rabbet 65 in the under side of the end of the left hand member 54, with the overhanging shoulder of which the projecting end of a stop strip 66, riveted to the under side of the wide portion of the finger tip 55 engages. By this construction the finger tip 55 will properly engage the rear edge of the lowermost blank in the magazine even if said blank be warped, and will not engage more than one blank during the advance of the feed bar and finger. And the feed finger may be positioned on the feed bar in accordance with the length of the blanks which the columns 34 of the magazine are adjusted to receive. It will also be obvious that the wear plates 63 of different thickness may be provided if found desirable in case paper board blanks of different thicknesses should render a change of wear plates advantageous.

In order to reciprocate the feed bar 45 and attached feed finger, the gear wheel 48, before described as arranged to engage the rack 46, is alternately rotated in opposite directions by a rack bar 67, engaging a pinion 68 that is secured to shaft 49 on the end that projects through the hanger 50 toward the right hand side of the machine as shown in Figure 2. On the right hand hanger 50 is formed a slide bearing 69 having an oblique groove to accommodate the slidable rack bar 67, which is held in the groove by a removable cap plate 70. The rack bar 67 is rigidly united to a rod 71 that telescopes in a tubular rod 72, the lower end of which is sleeved over the reduced extremity 73 of a forked member 74, and pinned thereto as shown in Figure 4. The forked member 74 passes astride a flanged hub on the cam 75 secured to shaft 16^B, as shown in Figures 1 and 5, and carries a roller stud 76 that engages a cam groove in the left hand face of said cam 75. Within the tubular rod 72 between the ends of the forked member 74 and rod 71 is a coiled compression spring 77 adapted to elastically resist the upward thrust of the forked member 74, which is the thrust that rotates the gear 48 in the direction to feed a paper board blank. As an additional resilient connection between the rod 71 and the cam actuated fork 74, a coil spring 78 surrounds the tubular rod 72, bearing at its lower end on a collar 79 adjustably secured to said tubular rod by a set screw 80, and bearing at its upper end against a collar 81 that bears against a pin 82 passing through the rod and through a slot 83

in the tubular rod 72, as shown in Figure 1. The purpose of the springs 77 and 78 is to interpose a safety appliance between the positively acting cam 75 and the feed finger 51 so that in case a considerable obstruction is interposed to the advance of the feed finger, as in case a blank should jam, the springs will yield and allow the forked member 74 to make a complete reciprocation without moving the rack 67. Hence, if the machine should accidentally be clogged, no injury to the mechanism can occur. The tension of the spring 78 may be varied by adjusting collar 79. Although two springs are shown and preferred, it will be obvious that one spring disposed in either arrangement will carry out the principle of the machine in the respect noted. One complete rotation of the shaft 16^B and cam 75 accomplishes one complete reciprocation, or advance and return, of the feed finger 51. The cam groove in the cam 75 is designed to effect the necessary or desirable dwells in the movement of the feed finger.

Immediately in advance of the forward hopper or magazine columns 34 is a bridge piece 83, having downward offset ends 84 through which the bridge piece is bolted to the table 30, whereby to provide a space between the bridge piece and the table 30 through which a paper board blank B may pass. Pivoted to the right hand end of bridge piece 83 by a pivot screw 85 is a two armed member 86, one arm 87 of which overlies the top of the bridge piece 83, and the other arm 88 underlies the bottom surface of it. The two arms 87 and 88 are connected at their right hand ends by a connecting web 88^a through which said pivot screw passes and is threaded into the bridge piece 83. The free end of lower arm 88 has riveted to its upper side a horizontal lip 89 extending rearward toward the hopper or magazine, and having a chamfer 90 on the upper side of its extremity. The arm 88 and lip 89 lie in a depression of proper depth and outline in the table 30 so that the upper sides of said arm and lip will present no obstruction to the advance of the paper board blanks B; and the lip is chamfered to allow the blanks to slide freely over it. The lip extends rearward under the stack of blanks when the magazine is filled. A coiled spring 91 seated in a cavity 92 in the upper side of bridge piece 83 exerts its tension to press the arm 87 upward and as this arm is connected to the arm 88 by the web 88^a, to also press upward the arm 88 and the lip 89 carried thereby. Overlying the upper arm 87 and riveted to its right hand end is a flat bar 93 of spring metal, rendered flexible by an arcuate cross cut 94 and given an upward set or bias.

The free end of the flat elastic bar 93 carries a depending plate 95 extending downward over the rear side, or the side next to the magazine, of the bridge piece 83, and also a depending plate 96 extending downward over the front side, or the side away from the magazine, of said bridge piece. The plate 95 is longer than the plate 96 which has a slot 97 through which passes a pin 97^a secured in the bridge piece 83 to limit the vertical play of the arms 87, 88 and bar 93. A headed screw 98 passes freely through a hole in the end of the spring bar 93 and engages a threaded orifice in the arm 87. By the screw 98 the end of the plate 95 may be adjusted toward and from the lip 89 carried by the arm 88. The space between the end of plate 95 and the upper surface of the lip 89 should be just wide enough to admit a paper board blank and the width of this space may be nicely varied to a minute degree by means of the screw 98. Thus the said space constitutes a throat for the entrance of an advancing blank and will automatically adjust itself to a blank though the latter be warped, and prevent the advance of two blanks at once, should one adhere to the other. As the throat once set remains of the same size and may vary its position within limits sufficient to accommodate itself to any blank, flat or warped, that is likely to be presented, all blanks pass from the magazine readily through an even sized throat adjusted with accuracy to the particular thickness of blanks stacked in the magazine.

To keep the blanks pressed flat on the table after they have passed through the throat and beneath the bridge 83 two lateral elastic presser plates 99 and one median plate 100 extend forward from the bridge piece toward the former with their lower faces very slightly above the top of the table 30. These presser plates hold the blanks down and insure their continued engagement with the feed finger tip 55 when no longer held down by the stack of blanks, the bridge 83 and described attachments.

When paper board or other blanks B have been stacked in the magazine formed by the angled uprights 34, with their front portions overlying the lip 89, the feed mechanism is adapted to feed the blanks one by one from the bottom of the stack. As the shaft 16^B rotates, the feed finger 51 advances, the spring-pressed finger-tip 55 engages the near edge of a blank B and pushes it forward beneath the bridge member 83; the throat member, comprising the lip 89 and plate 95, receives the advancing blank B, and the continuing forward movement of the feed finger pushes the blank through the throat under the holding plates 99, 100, into position to be acted on by the forming mechanism as fully described in the application of which this is a division.

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

1. In a tray forming machine, a support for a stack of blanks, a feed finger movable beneath said stack, said feed finger having a longitudinally alined pivoted detachable tip pressed normally upward transversely of the path of movement of the finger, and a shoulder on said tip rearward of its forward end adapted to engage the edge of a blank, the forward end of said finger being chamfered adjacent said shoulder.

2. In a tray forming mechanism, a support for a stack of blanks, a feed finger movable beneath said stack, a longitudinally alined member detachably pivoted to said feed finger, means carried by said member for causing the same to rise normally above the surface of said finger, and a shoulder on the upper side of said member rearward of the front edge adapted to engage a blank, the forward end of said finger being chamfered adjacent said shoulder.

3. In a tray forming machine, a support for a stack of blanks, a feed finger movable on said support beneath said stack, said finger having a longitudinally alined pivoted detachable end, a spring normally urging said pivoted end upward, and a shoulder on said pivoted end rearward of its front edge adapted to engage a blank, the forward end of said finger being chamfered adjacent said shoulder.

4. In a tray forming mechanism, a feed finger adapted to pass beneath a stack of blanks, said feed finger having a longitudinal slot extending vertically and longitudinally at its front end, a finger tip substantially the width of the feed finger at its forward end, said finger tip having a shank lying in the slot, a pivot connecting the shank with the finger, a spring tending to force the finger tip upward, and a shoulder on the upper surface of said tip rearward of its forward edge.

5. In a tray forming mechanism, a support for a stack of blanks, a magazine composed of four angle posts spaced apart adapted to position the corners of the blanks, there being a space between the lower end of the two front flanges of the forward angle posts adapted to permit the removal of the lowest blank from the stack, and guide bars connected to the lower portions of the front angle bars and extending rearward toward the rear angles to guide the lower blank of a stack while being pushed from the magazine.

6. In a tray forming mechanism, a support for a stack of blanks, a bridge piece beneath which the blanks may be fed singly, a device having a guide throat formed by vertically spaced members movable vertically in unison and adapted to conform in position and spacing to an advancing blank to prevent more than one blank at a time from passing beneath the bridge piece.

7. In a tray forming mechanism, a support for a stack of blanks, a bridge piece beneath which the blanks may be passed singly, a device having a guide throat formed by spaced members united to move in unison under the control of a blank passing through it, said device comprising connected arms pivoted to the bridge member at one end.

8. In a tray forming mechanism, a support for a stack of blanks, a bridge piece thereon beneath which blanks may be fed singly, a device having a guide throat formed by two spaced members freely movable in unison in a vertical direction and adapted to prevent the passage of more than one blank at a time, the lower member of said device having a lip extending under the normal position of the stack.

9. In a tray forming mechanism, a support for a stack of blanks, a bridge piece under which blanks may be passed singly, a device having a guide throat formed by two spaced parts movable freely in unison in a vertical direction, the lower of said parts having a lip extending under the normal position of the stack, said lip having a chamfered end.

10. In a tray forming mechanism, a support for a stack of blanks, a bridge piece adapted to permit blanks to pass singly beneath it, a device having a guide throat formed by two parts susceptible of a limited vertical movement, a lip member projecting from the lower part beneath the stack of blanks and a spring for pressing the throat device upward.

11. In a tray forming mechanism, a bridge piece adapted to permit the passage of blanks singly, a device having a guide throat formed by two spaced parts connected together and susceptible of vertical movement, and means for adjusting the spacing of said parts.

12. In a tray forming mechanism, a support for blanks, a bridge piece adapted to permit blanks to pass singly beneath it, a device having a guide throat formed by two arms connected at one end and extending longitudinally of the bridge piece and pivoted thereto at the connected end, a lip projecting from the lower arm of said device, means for limiting the upward movement of the device and means tending to cause said device to move to its uppermost position.

13. In a tray forming mechanism, a support for blanks, a bridge piece adapted to permit the passage of single blanks beneath it, a device pivoted at one end of said bridge piece and having upper and lower arms carrying spaced members adjacent the center of said bridge piece, the upper arm compris-

ing a spring bar secured to said device near its pivoted end and an arm adjustably connected to the spring bar at its free end, said spring bar having the upper of said spaced members secured to it.

14. In a tray forming mechanism, a support for blanks, a bridge piece adapted to permit the passage of a blank beneath it, an arm overlying the bridge piece, an arm underlying said bridge piece, a web connecting said arms at one end, a pivot connecting the web to the side of the bridge piece at one end, a spring bar secured to the upper side of said overlying arm adjacent to the pivoted end, said spring bar having an upward set at its free end, a guide lip projecting from the free end of the underlying bar, a plate on the free end of the spring arm spaced from said lip and an adjusting device connecting the free end of the spring arm to the overlying bar.

15. In a tray forming mechanism, a support adapted to hold a stack of blanks, a feed finger reciprocable on said support beneath said blanks, a rack connected to the feed finger, a gear engaging said rack, a reciprocable rack for rotating said gear, means for reciprocating the rack, and a section in said rack adapted to yield and stop the movement of the feed finger in the event of an abnormal obstruction.

16. In a tray forming mechanism, a table having a groove, said table being adapted to support a stack of blanks above the groove, a feed finger, a rack bar which is reciprocable in said groove, means for attaching the feed finger to said rack bar, gearing beneath the table arranged to engage the teeth of the rack bar, a reciprocating bar having rack teeth thereon adapted to oscillate the gearing, a telescoping rod connected to the rack, a spring for holding said telescoping rod extended, and means for reciprocating said rod.

17. In tray forming mechanism, a support for a stack of blanks, four angle posts adapted to position the stack upon the support, means whereby the rearmost angle posts may be adjusted longitudinally of the blank feed, a reciprocating feed bar, a feed finger thereon adapted to pass beneath the stack of blanks and feed the lowermost blank, and an adjustable connection between the feed bar and the feed finger whereby the latter may be adjusted longitudinally with respect to the feed bar.

In testimony whereof I affix my signature.

ALOYSIUS JOSEPH KUSTERER.