J. D. REIFSNYDER.

BLANK BENDING MACHINE.

APPLICATION FILED JULY 6, 1914.

1,211,757.

Patented Jan. 9, 1917.

3 SHEETS—SHEET 1.

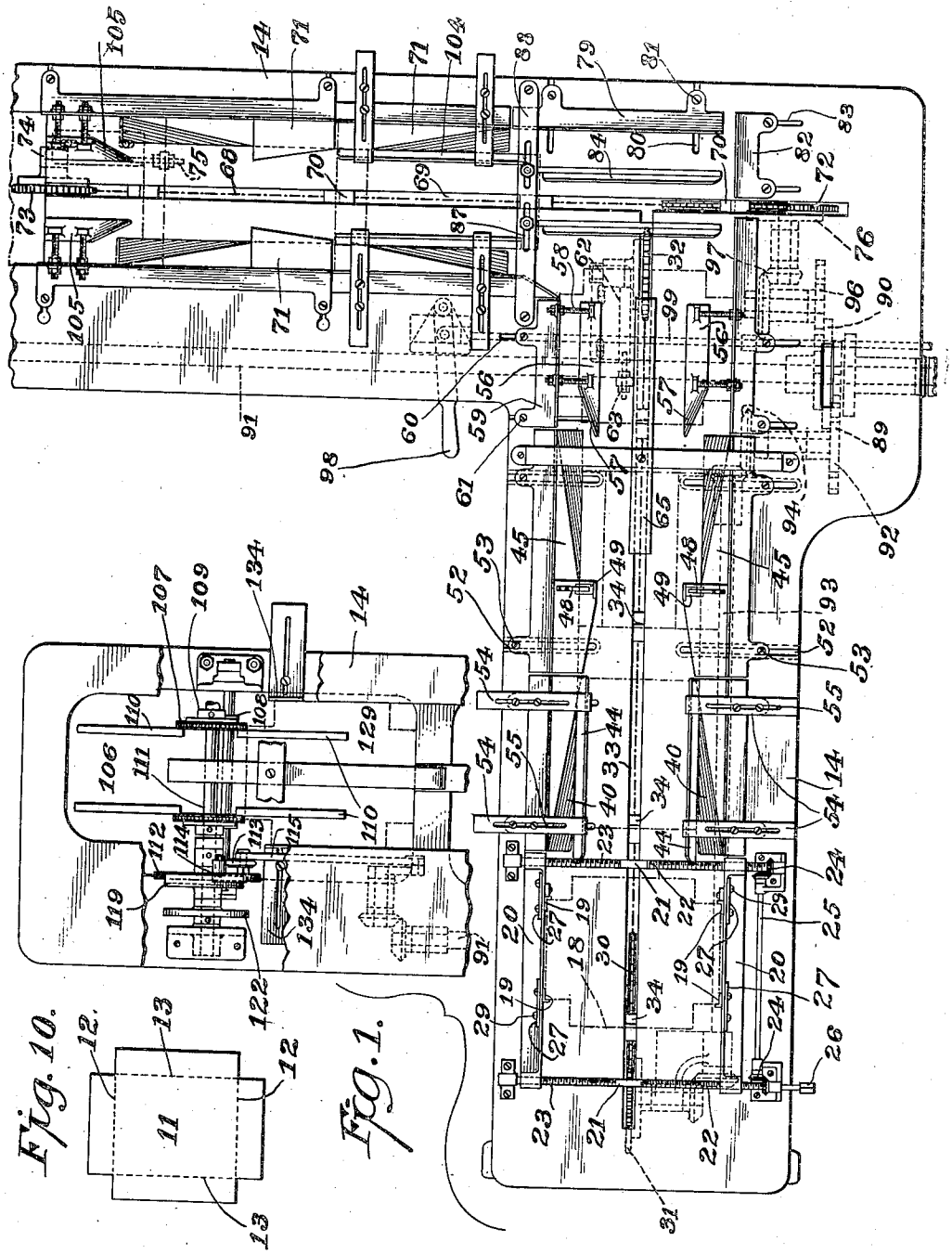


Fig. 1.

Fig. 10.

Witnesses:
A. R. Appleman
W. W. Hawkins.

Inventor
James D. Reifsnyder
By his Attorneys
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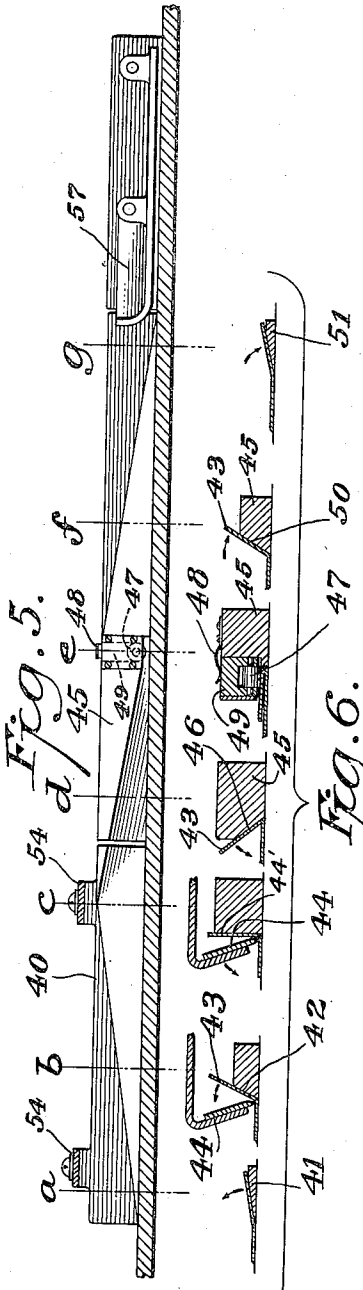


Fig. 5.

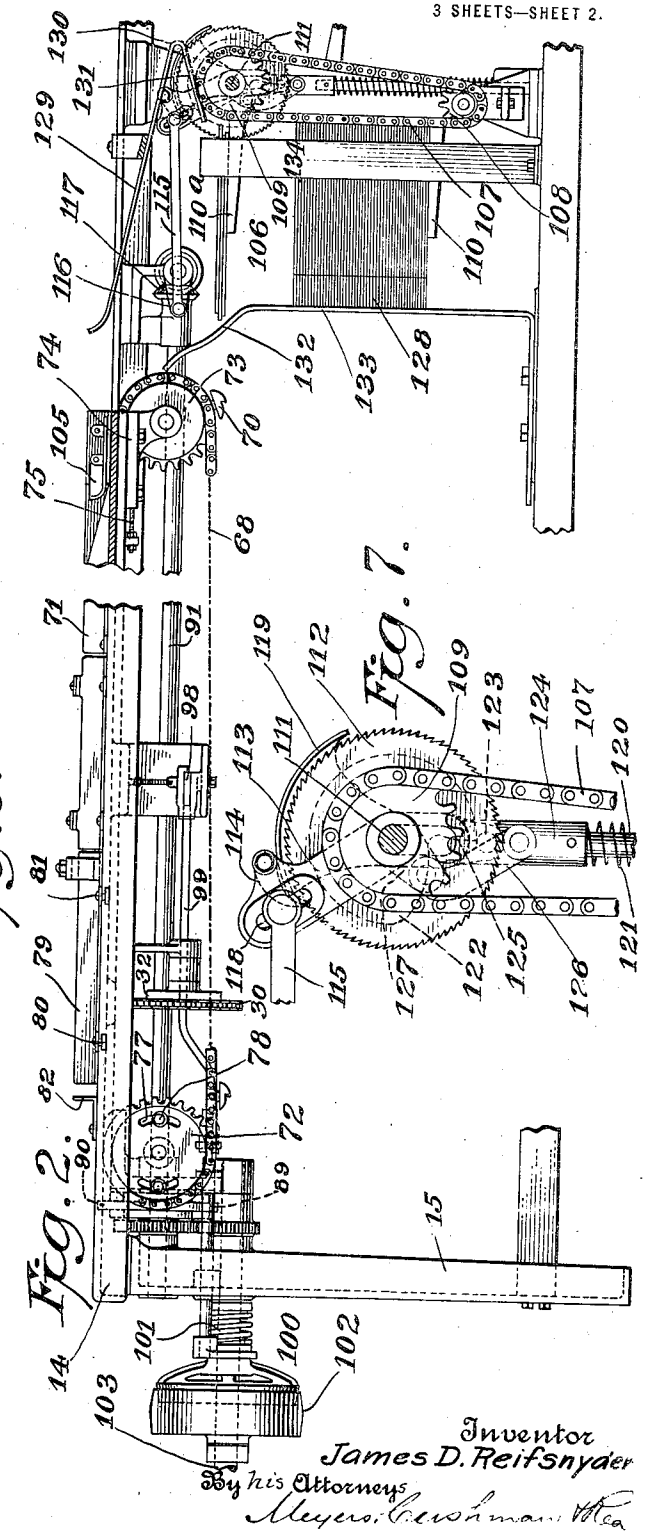


Fig. 6.

Fig. 2.

Fig. 7.

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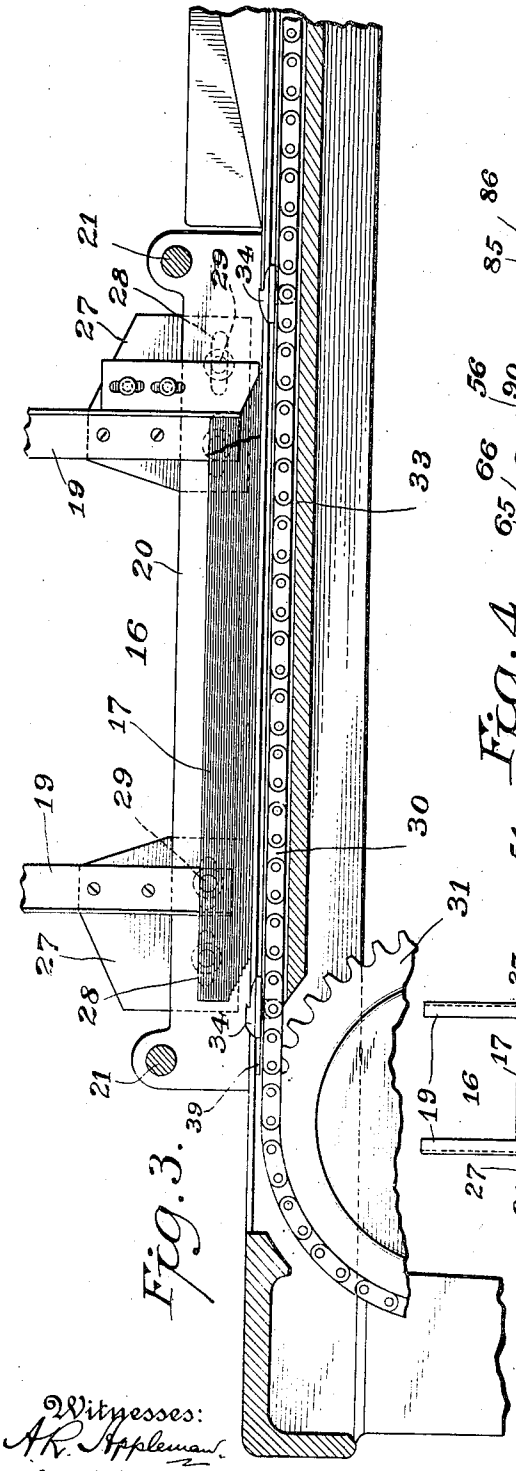


Fig. 3.

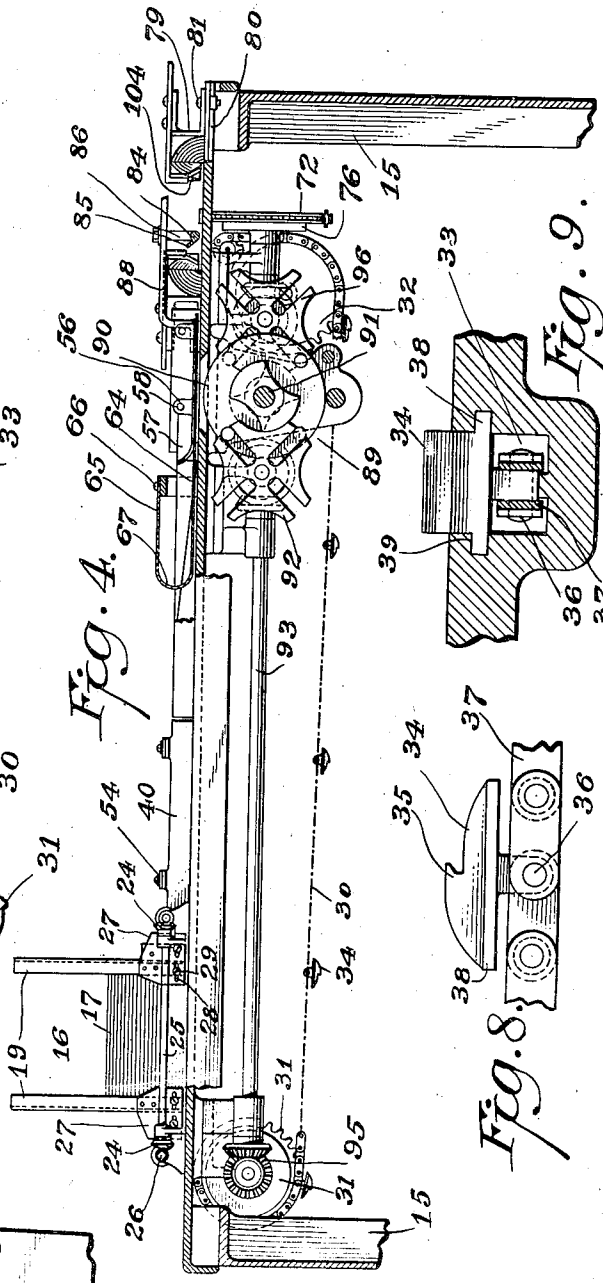


Fig. 4.

Fig. 9.

Fig. 8.

Witnesses:

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UNITED STATES PATENT OFFICE.

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BLANK-BENDING MACHINE.

1,211,757. Specification of Letters Patent. Patented Jan. 9, 1917.

Application filed July 6, 1914. Serial No. 849,271.

To all whom it may concern:

Be it known that I, JAMES D. REIFSNYDER, a citizen of the United States, residing at Olney, in the city of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Blank-Bending Machines, of which the following is a specification.

This invention relates to a machine for treating blanks such as are employed for forming boxes or other articles. Such blanks are usually in the form of a flat piece of card board or similar material having extensions which are to be folded on the body of the blank so as to form the box.

The purpose of the machine to which my invention is applied is to bend up these portions of the blank at the proper points to "break" or weaken the material in such a way that when the blanks are folded into box form by hand or in a box machine, they will offer little resistance and will be readily shaped into the box form.

One of the objects of this invention is to produce a machine for this purpose which is very simple in construction, and having improved means for controlling the movement of the blank through the machine avoiding so far as possible the use of reciprocating feeders.

A further object is to provide feed mechanism for the blank which will be very simple in construction and which will operate as conveyers to advance the blanks through the machine and expedite the bending of the blanks as they pass through the machine.

A further object of the invention is to provide an arrangement for advancing the blanks which will enable a plurality of the blanks to be advanced at one time and in succession so that the successive stages of the operation are effected continuously as the blanks advance, the movement of the feeding mechanism being constantly in a forward direction thereby avoiding delays and rendering the machine more advantageous than a reciprocating feeding machine for effecting a number of successive operations upon the blanks. In other words, it has been my object to construct the machine so that the feeding mechanism having once seized the blank, it carries the blank through the process without necessitating, as far as possible, regripping of the blank or transferring it to other feeding mechanism while the blanks are being folded in one direction.

Further objects of the invention will appear more clearly hereinafter.

In the drawing which fully illustrates the preferred embodiment of my invention, Figure 1 is a plan view, certain parts being broken away. Fig. 2 is a side elevation, certain parts being broken away. Fig. 3 is a longitudinal vertical section taken through the machine at the magazine or supply of the blanks. This view is upon an enlarged scale to show details. Fig. 4 is a side elevation and partial section of one side of the machine. Fig. 5 is a longitudinal section showing the arrangement of the devices for bending the edges of the blank. Fig. 6 is a view illustrating in cross section, the bending of the blank at different stages of the operation. Fig. 7 is a side view illustrating the details of the construction of a receiver for the finished blanks which constitutes a feature of the invention. Fig. 8 is a side elevation showing a detail of the feeding mechanism for advancing the blanks. Fig. 9 is a cross section further illustrating details of the invention. Fig. 10 is a plan illustrating a common form of blank upon which the machine may operate.

Before proceeding to a detail description of the mechanism of the machine, it will facilitate the disclosure of the invention to state that the blanks in passing through the machine travel first in one direction and then in a second direction transverse to, or substantially at right angles to the first direction of travel. The first direction of movement of the blank is parallel with lines on the blank at which the edges of the blank are to be folded, when the blank is advancing in the second direction of movement, the blank is folded on transverse lines. In feeding a blank, such as the blank 11 shown in Fig. 10, the first movement of the blank in the machine would effect a bending of the side portions of the blank on the lines 12, for instance and in the transverse movement of the blank the other side flaps or portions would be bent on the lines 13.

It is also understood that the machine not only bends the blank, but after bending

it, it returns the bent portions so that the finished blank is in its original flat condition except that the material which will form the corners of the box is "broken" or bent so that the blank can be readily folded into a box.

Referring more particularly to the parts of the machine illustrated, 14 represents a table which is preferably in the form of the letter L, being mounted upon a suitable frame 15. At the left end of this machine as illustrated in Fig. 1, I provide a magazine 16 which receives a supply of blanks 17. The position of this pile of blanks is illustrated by the dotted outline 18 in Fig. 1. The magazine is preferably of skeleton form comprising four corner bars or posts 19 which are preferably formed of angle iron arranged so that the angles engage the corners of the blank in some such way as indicated in Fig. 1. This arrangement enables the blanks to feed downwardly in the magazine but holds them in a neat pile.

The pairs of corner posts 19 on each side of the machine are connected by rails 20 and these rails are arranged to be adjusted toward or away from each other to accommodate the blanks of different widths. For this purpose, I prefer to provide oppositely disposed adjusting screws 21 having right hand threads 22 on one side of the machine and left hand threads 23 on the other side, said adjusting screws having a threaded engagement with the ends of the rails 20. These screws 21 are connected by beveled gears 24 and a shaft 25 so that when a head 26 on one of the screws is rotated, the same amount of rotation will be imparted to both screws.

In order to provide for an adjustment of the corner post 19 in a longitudinal direction of the machine, the lower ends of the posts 19 are preferably attached to gusset plates 27 having horizontal slots 28 receiving clamping bolts 29; by loosening the bolts 29 these corners can evidently be adjusted toward or away from each other.

In order to feed the blanks through the machine, I prefer to provide an endless conveyer preferably comprising an endless chain 30 which passes around sprocket wheels 31 and 32 under the table, arranged so that the upper run of the chain passes longitudinally in a slot 33 in the upper side of the table. This chain 30 is provided with means for engaging the bottom blank of the blanks 17 as the chain passes under the pile of blanks. For this purpose, I prefer to provide the chains with equidistant dogs 34, said dogs being of the form shown, and presenting an upwardly and forwardly directed tooth 35 which is of sufficient height to engage only the lowermost blank. These dogs 34 are attached pivotally on their under sides to certain of the pins 36 of the chain which connect the links 37 of the chain.

I provide an arrangement for guiding the dogs with some accuracy in order that only one blank will be taken at a time. For this purpose, I prefer to provide the sides of the dogs with tongues 38 and these tongues slide in side grooves or channels 39 in the vertical side faces of the slot 33. On opposite sides of the chain or conveyer, 30, I provide bending devices for bending the side flaps of the blank; the operation of these bending devices is most clearly illustrated in Figs. 1, 5 and 6. They are preferably in sections mounted so as to be adjustable inwardly toward the chain or away from the chain to accommodate blanks of different widths. The same operation takes place simultaneously on the two opposite edges of the blank. These bending devices are in the form of elongated blocks the inner edges of the blocks having a form adapted to engage the edges of the blanks, and coöperating with other parts to bend this part over. The first bending device consists of a block 40 the form of the inner edge of which changes, as indicated by the cross sections under the lines *a*, *b*, *c* of Fig. 5. At the point *a*, the block has the form of a relatively flat wedge 41. At the point *b*, the block is deeper and presents an inclined inner edge 42 making an obtuse angle with the face of the table. This inclined face 42 tends to bend the face of the flap 42 upwardly as indicated, but in order to hold down the edge of the body of the blank, it is necessary to provide some means such as the creasers 44, said creasers being in the form of elongated plates which incline so as to project into the angle, the lower edges of the creasers lying near the vertex of the angle; this inclined face becomes steeper and finally develops into a vertical face 44′ which bends the flap 43 into a vertical position. The blank then passes to the bending block 45 which presents an angle face 46 which inclines inwardly and gradually increases so as to form a more and more acute angle with the surface of the table.

At a suitable point in the block, a roller 47 is mounted, pressed downwardly by a spring 48, and the folded edge of the blank passes directly under this roller and is creased by the roller due to the pressure of the spring 48. The roller is preferably mounted in a small loose block 49 that is guided to move vertically through the block 45. Beyond the roller 47, the inner edge of the block again inclines outwardly, as indicated by the inclined face 50, and this face 50 gradually becomes less and less inclined until the block assumes the flat wedge form, indicated at 51, similar to the flat wedge shape shown at 41.

In order to enable the bending blocks to be adjusted inwardly or outwardly, the surface of the table is preferably provided

with transverse slots 52, and the blocks are provided with clamping bolts 53 running in these slots. The creasers 44 are preferably attached to substantially horizontal bars 54 which are fastened over the blocks 40, and these bars 54 have slots 55 and clamping bolts for securing and adjusting the creasers with respect to the blocks.

In order to insure that the side flaps 43 of the blanks will be returned to their original position, I prefer to provide openers for forcing the flaps back. These openers are preferably in the form of elongated plates or shoes 56 disposed on each side and about in line with the bending edges of the blocks. The forward edges of these shoes have bent points 57, the ends of which are adapted to engage under the flap and the shape of which tends to bend the flap back or outwardly as will be readily understood. These shoes 56 are preferably mounted on horizontal adjusting bolts 58 which extend inwardly from angle plates or angle brackets 59 which are mounted on the table preferably adjustable by means of slots 60, and clamping screws or bolts 61.

In order to adjust the tension of the chain 30, I prefer to mount the pulley 32 in an adjusting bracket 62 which may be adjusted outwardly by an adjusting screw 63 under the table, shown most clearly in Fig. 1.

Between the shoes 56 and preferably near the point where the blank is delivered to the transverse feed mechanism of the machine, I prefer to provide means for resiliently pressing the blank down upon the table. For this purpose I prefer to employ an elongated plate or strip 64 having a backwardly bent forward extension 65 secured on the cross bar 66, the forward end of the member forming a resilient bow or spring 67 which presses the lower part as a presser finger down on the table.

I shall now describe the mechanism for receiving the blank after it has been folded on the lines 12. This mechanism is preferably substantially similar to that already described, but in addition to this I provide special means for guiding the blank into its proper position and for alining it properly with the bending devices before the transverse movement. This transverse feeding mechanism may comprise an endless carrier in the form of a chain 68 which is mounted in a similar manner to the chain 30, the upper run of this chain passing along in a slot 69 in the face of the table. This chain 68 is also provided with dogs 70 similar to the dogs 34 for engaging the blanks and advancing them between the bending devices 71 which bending devices are arranged along the opposite sides of the slot 69 and may, if desired, be duplicates in construction and mode of operation of the bending devices already described. However, in the bending devices 71, I have not illustrated any rollers like the rollers 47, as these may be omitted if desired. The chain 68 passes around sprocket wheels 72 and 73, one of which is mounted in an adjustable bracket 74 for tightening the chain, and including an adjustable bolt 75, for this purpose. The sprocket wheel 72 is adjustably attached on a wheel 76, Fig. 1, by means of arcuate slots 77 and clamping bolts 78; this arrangement enables the position of the dogs 70 of the chains 68 to be adjusted with respect to the dogs 34 of the chain 30. At its receiving end the carrier or chain 68 projects across the plane of movement of the chain 30.

It is understood that in the operation of the machine, the chain 30 leaves the blank which has passed its corresponding bending mechanism, at a point just over the end of the chain 68. In order to aline this blank properly as it comes over the chain 68, I prefer to provide an alining device or alining plate 79 which is in the form of an angle plate, and mounted on the upper face of the table by means of adjusting slots 80 and clamping screws 81 mounted on the table; and I also provide a second alining plate 82 and adjusting slots 83 disposed transversely to the alining plate 82 for adjusting the same.

As the forward edge of the blank arrives at the alining plate 79, the dog which is advancing the blank passes down below the table and around the sprocket wheel 32 and releases the blank. In order to insure that the blank will be held down on the table, at this point, so as to be engaged by one of the dogs 70 of the chain 68, I prefer to provide guides or holding devices 84. The preferred form of one of these guides 84 is shown in Fig. 4; they are in the form of a horizontal rod one side of which is formed into an upwardly or laterally inclined fin 85, and the lower side of the rod 84 is over and near the table so that as the blank comes along, its forward edge strikes the fin 85 and it is thereby guided down onto the table. These guides or holders 84 are preferably supported at one end from a downwardly projecting post 86, and these posts are carried in adjusting slots 87 on the cross bar 88 extending across the machine.

In order to make the feeding mechanism operate most effectively, I prefer to arrange to drive the chains or conveyers intermittently, that is, when the chain 30 is advancing, the chain 68 is at rest and vice versa. For this purpose, the driving mechanism for the chains preferably includes a stop motion, such as the Geneva stop mechanism 89 illustrated in Fig. 4. The driving wheel 90 of this Geneva movement rotates continuously with the driving shaft 91 and inter-

mittently rotates a star wheel 92 which drives a counter shaft 93 through beveled gearing 94. The outer end of this shaft 93 drives beveled gears 95 for driving the sprocket wheel 31. On the opposite sides of the Geneva driving wheel 90 a star wheel 96 is provided which drives beveled gears 97 for driving the aforesaid sprocket wheel 72. With this arrangement, it will be evident that first one conveyer will advance and then the other.

The gear just described is constructed in such a way that at every movement of the chain, each dog moves forward until it arrives at the point where the next preceding dog remained at rest. In other words, the amount of feeding movement of each conveyer is the distance between two adjacent dogs.

It is unnecessary to describe the Geneva stop mechanism, in detail, as that illustrated is of a very common form, and if desired, any other mechanism can be used instead of the Geneva stop mechanism to produce an intermittent and alternate movement of the conveyers.

The mechanism of the machine is started or stopped by means of a lever 98 connected by a link 99 with a clutch 100, said clutch being pressed by a spring 101, toward its closed position. One of the clutch members 102 may be in the form of a belt pulley rotating continuously and on the shaft 103.

It is understood that the form and operation of the bending devices 71 are substantially the same as illustrated in Figs. 5 and 6, with the omission of the roller 47.

It is understood that when the chain 68 advances the blank toward the bending devices 71, the guides 84 hold the blank down until it passes under the creasers 104, the operation of the bending devices being the same as already described in connection with the first movement of the blank. These bending devices 71 bend the blank on the lines 13 and the blank is then straightened by means of shoes 105 similar to the openers or shoes 56.

Attention is called to the fact that when the blank is being advanced by the chain 68, the creases in the blank are disposed transversely to the new direction of advance, and the driving force exerted by the dog of the chain is applied at the rear edge, that is, on a creased flap of the blank; under such circumstances it is natural to expect that the blank would tend to buckle at its rearmost creased point. Such a buckling tendency is prevented, however, by the guides 84 and creasers 104 which hold the blank flat upon the table. Hence, these guides and the creasers perform a special function in coöperation with the chain, and in fact render possible the use of the dogs and the second driving chain for this purpose.

When the blank passes beyond the creasers 104, this function is performed by the rear ends of the bending devices 71 under which the edges of the blank fit neatly.

I provide a special arrangement for receiving the blanks when they are delivered from the shoes 105. The mechanism for this purpose constitutes a receiver 106, illustrated most clearly in Figs. 2 and 7. This receiver is shown also in Fig. 1 in plan, it being understood that the smaller portion of this view represents a part of the machine which is broken away from the main part of the view. This receiver preferably comprises a pair of conveyer chains 107 disposed oppositely to each other and passing around sprocket wheels 108 and 109. These chains carry outwardly extending arms, 110 which the chains hold in a substantially horizontal position so that they will operate as supports for collecting the blanks delivered to them. These arms or supports 110 are mounted preferably equidistant on the conveyer chains 107. The sprocket wheels 109 are preferably mounted on a horizontal shaft 111 and a feed mechanism is arranged for rotating this shaft to advance the chain periodically.

As indicated in Fig. 7, the upper support 110^a is receiving blanks from the machine. As the blanks are collected, I prefer to feed the chain continuously so that the support 110^a moves downwardly to accommodate the increasing number of the blanks. This continuous feed is accomplished by means of a ratchet wheel 112 which is rigid on the shaft 111. On this shaft 111, there is a loose arm 113 carrying a pawl 114, and this pawl carrying arm 113 is rocked continuously by means of a link 115 driven by a crank 116 which crank is operated through beveled gears 117 driven by the shaft 91 which extends to the delivery end of the shaft. The link 115 is attached to the arm in the adjusting slot 118. The ratchet and pawl feed however, is arranged so that the pawl will normally only advance the ratchet wheel through one or two tooth spaces, that is through a short movement. In order to accomplish this, I prefer to provide a trip plate 119 over which the pawl normally rides in the principal portion of its movement. On the forward movement however, of the pawl, just before it reaches the end of its movement the pawl drops off the edge of the plate and engages the ratchet wheel so that the remainder of its movement is effective. By controlling the position of this trip plate, I can, when desired, give the chains 107 a great movement. This great movement is given to the chains after the upper support 110^a has received a predetermined number of blanks. Such as, for instance, would collect on the support 110^a during one complete revolution of the

ratchet wheel. In order to control this trip plate, I prefer to provide a suitably guided stem 120 which is pressed by a spring 121 toward a cam 122 on the shaft 111. A roller 123 on the head 124 of this stem rides on the edge of this cam. Fig. 7 illustrates the roller 123 about to move inwardly on the cam edge 125; when the stem moves inwardly in this way, the link 126 carried by it rotates the trip plate 119 through the medium of an arm 127 which is rigid with the trip plate. The trip plate and the arm 127, of course, are loosely mounted on the shaft 111. With this arrangement, it will be evident that when the cam arrives at the proper point, the arm 127 will be rocked upwardly and the trip plate 119 will swing over to the right so that it will not hold the pawl out of engagement with the ratchet teeth, and therefore, the forward movement of the pawl will be effective during its entire stroke, giving the ratchet wheel a great rotary movement. This great rotary movement will be sufficient to move the supports 110 carrying the stack of blanks and bring the next support into receiving position. Just before this great movement takes place, the stack 128 of the blanks which have collected on one of the supports will be removed.

In order to guide the blanks onto the support 110^a, as they come to the machine, I prefer to provide a guard 129, said guard being preferably in the form of a bar having its upper portion inclining upwardly toward the point from which the blank comes into the receiver and having its lower portion bent so as to form an angle 130 below which the guard has a downwardly inclined extension 131 which inclines downwardly toward the support 110^a. The forward portion of the guard may be bent upwardly, as shown, and with this arrangement the machine may be operated at high speed. A blank projected from the chain 68 will strike the guard 129 and be deflected downwardly into the angle 130 which arrests its flight by engaging the forward edge of the blank, and the blank then falls downwardly, being guided on the inclined extension 131, and settles into position on the support 110^a. Opposite to the angle 130, I prefer to provide a guide 132 the upper portion of which inclines away from the position of the angle 130; the lower portion of this guide is a substantially vertical bar 133 which alines the blanks in a pile. As the support is fed downwardly, the left hand edges of the blanks engage the inclined portion 132 and the blanks are shoved over and alined into a neat pile. If the machine is running slowly, the rear edge of the blank which is projected toward the support 110^a will strike the inclined portion 132 and will be guided down the incline into position on the support. The stack 128 is held in position at the sides by providing upwardly extending guide posts 134.

The general mode of operation of the machine will now be described. Under the magazine 16 holding the blanks 17, the chain 30 passes so that each dog 34 engages the bottom blank of the pile and advances it along one of the extensions of the machine, passing the blank to the folding devices illustrated and including the creasers 44. This advancing or feeding movement of the conveyer shown is intermittent due to the Geneva stop mechanism 89. This folds the side flaps of the blanks and near the end of this movement in this direction the openers or shoes 56 will restore each blank to its flat state. Each blank then passes under the guides or holders 84 with its edge against the alining device 79. The chain 68 then advances the blank by engaging its edge with one of its dogs 70. The holders 84 hold the blank down so as to enable its corresponding dog to engage it and also hold the forward edge of the blank down so that it will pass under the creasers 104. The blank then passes on through the second course or direction and has its other edges bent, after which it is restored to its normal condition by the openers or shoes 105. The finished blank is then delivered to the receiver 106, the mode of operation of which will be clearly understood from the foregoing description.

It is understood that the embodiment of the invention described above is only one of the many embodiments or forms the invention may take, and I do not wish to be limited in the construction of my claims, nor in the practice of my invention, to the particular embodiment set forth.

What I claim is:—

1. In a blank bending machine, in combination, a table, an endless conveyer having a plurality of dogs projecting above the table for engaging the blanks to advance them in succession along said table, means for creasing the side edges of each blank as it is advanced by said endless conveyer, a second endless conveyer moving in a plane transverse to said first named conveyer and projecting at its receiving end across the plane of said first named conveyer, each dog of said first named conveyer operating to pass below the table near the second conveyer and leave a blank on the table over said second conveyer, said second conveyer having a plurality of dogs operating to engage each blank received from said first named conveyer and advance the same along said table, and means for bending the edges of the blank as it is advanced by said second conveyer.

2. In a blank bending machine, in combination, a table, an endless conveyer hav-

ing a plurality of dogs projecting above the table for engaging the blanks to advance them in succession along said table, means for creasing the side edges of each blank as it is advanced by said endless conveyer, a second endless conveyer moving in a plane transverse to said first named conveyer and projecting at its receiving end across the plane of said first named conveyer, each dog of said first named conveyer operating to pass below the table near the second conveyer and leave a blank on the table over said second conveyer, said second conveyer having a plurality of dogs operating to engage the rear edge of each blank received from said first named conveyer and advance the same along said table, means for bending the edges of the blank as it is advanced by said second conveyer, and means for pressing the blank down onto the table to prevent the blanks from buckling at their creased points.

3. In a blank bending machine, in combination, a table, an endless conveyer having a plurality of dogs projecting above the table for engaging the blanks to advance them in succession along said table, means for bending over the side edges of each blank and for bending the bent edges back into the plane of the blank, a second endless conveyer moving in a plane transverse to said first named conveyer and projecting at its receiving end across the plane of said first named conveyer, each dog of said first named conveyer operating to pass below the table near the second conveyer and leave a blank on the table over said second conveyer, said second conveyer having a plurality of dogs operating to engage the rear edge of each blank received from said first named conveyer and advance the same along said table, and means for bending the edges of the blank as it is advanced by said second conveyer.

4. In a blank bending machine, in combination, a table, an endless conveyer for advancing the blank along the table, means for bending the edges of the blank as it is advanced by said endless conveyer, a second endless conveyer disposed transversely of said first endless conveyer, arranged to receive the blank from said first conveyer, means for bending the blank as it is advanced by said second endless conveyer including creasers for engaging the upper face of the blank adjacent to the edges to be bent, and means for holding down the blank near the point where it is received by said second endless conveyer from said first endless conveyer to guide the same under said creasers.

5. In a blank bending machine, in combination, a table, an endless conveyer for advancing the blank along the table, means for bending the edges of the blank as it is advanced by said endless conveyer, a second endless conveyer disposed transversely of said first endless conveyer, arranged to receive the blank from said first conveyer, means for bending the blank as it is advanced by said second endless conveyer including creasers for engaging the upper face of the blank adjacent to the edges to be bent, and a guide above the table for directing the forward edge of the advancing blank down upon the table and for holding down the blank near the point where it is received by said second endless conveyer from said first endless conveyer to guide the same under said creasers.

6. In a blank bending machine, in combination, a table, an endless conveyer for advancing the blank along the table, means for bending the edges of the blank as it is advanced by said endless conveyer, a second endless conveyer disposed transversely of said first endless conveyer, arranged to receive the blank from said first conveyer, means for bending the blank as it is advanced by said second endless conveyer including creasers for engaging the upper face of the blank adjacent to the edges to be bent, and a guide above the table inclined transversely to direct the forward edge of the advancing blank down upon the table and extending horizontally with said second conveyer for holding down the blank near the point where it is received by said second endless conveyer from said first endless conveyer to guide the same under said creasers.

7. In a blank bending machine, in combination, a table, an endless conveyer for advancing the blank thereupon, means for bending and creasing the edges of the blank as it is advanced by said endless conveyer, means for receiving the blank from said endless conveyer and for engaging the rear edge of the blank to advance it along the table in a transverse direction with respect to the direction of movement of said endless conveyer with the creases in the blank transverse to the new direction of advance, means coöperating therewith to hold the blank down on the table, and means for bending the blank as it is advanced by said last named means.

8. In a blank bending machine, in combination, a table, an endless conveyer for advancing the blank along the table, means for bending the edges of the blank as it is advanced by said endless conveyer, a second endless conveyer disposed transversely of said first endless conveyer arranged to receive the blank from said first conveyer, means for bending the blank as it is advanced by said second endless conveyer, a guide above the table near the point where the blank passes from the said first conveyer to said second conveyer, said guide being inclined in a lateral direction downwardly toward the table to guide the blank toward the

table and extending longitudinally of the said second conveyer to guide the blank when it is advanced by said second conveyer.

9. In a blank bending machine, in combination, a table, an endless conveyer for advancing a blank on the table, means for bending the edges of the blank as it is advanced by said endless conveyer, feeding mechanism including a dog moving transversely near the surface of said table and adapted to engage an edge of the blank delivered by said endless conveyer and advance the same in another direction, stationary means arranged in the general path of movement of said dog for engaging an intermediate portion of the blank to hold the latter substantially flat upon the table during the movement of the blank, and bending devices coöperating with said feeding mechanism to further bend the blank at its edges.

10. In a blank bending machine in combination, a table, an endless conveyer for advancing a blank along the table, means for bending the edges of the blank as it is advanced by said endless conveyer, feeding mechanism including a dog moving transversely near the surface of said table and adapted to receive the blank from said endless conveyer and advance the same in another direction, means for holding the blank down near the table and in the path of said dog, bending devices coöperating with said feeding mechanism to further bend the blank, and means for resiliently pressing the upper side of the blank near the point where it passes from said first endless conveyer to said feeding mechanism.

11. In a blank bending machine, in combination, an endless conveyer having means for advancing a plurality of blanks in succession, laterally adjustable means for bending the edges of the blanks as they are advanced, a second endless conveyer movable in a path at right angles to the first named conveyer and arranged to take the blanks in succession from said first conveyer and for advancing a plurality of blanks in succession, stationary means for engaging the upper face of each blank intermediate its edges to hold the blank from buckling when moved by the second conveyer and laterally adjustable means for further bending the edges of the blanks as they are advanced by said second endless conveyer.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES D. REIFSNYDER.

Witnesses:
CARL E. SCHAEFFER,
SILAS E. CHILD.