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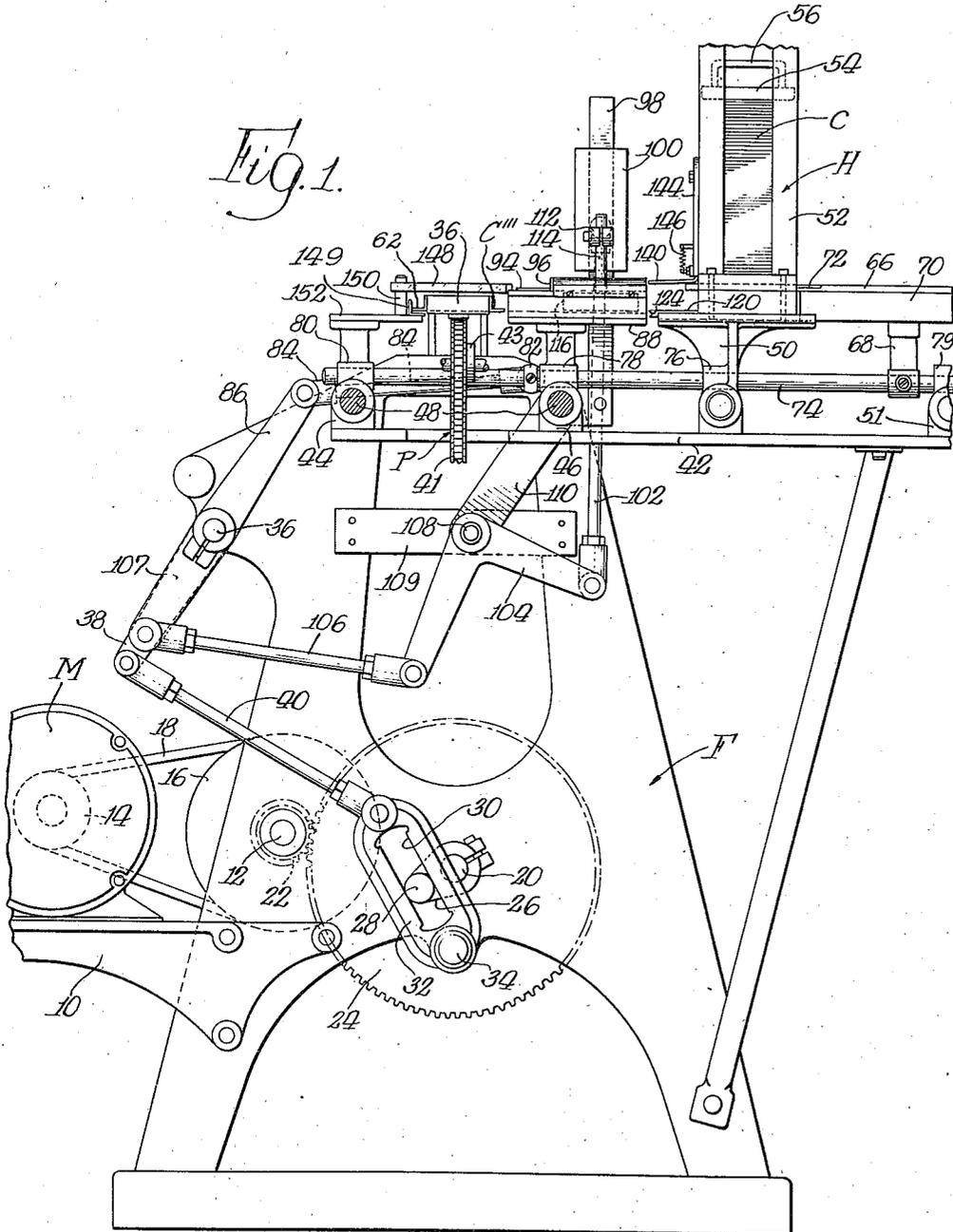
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2,430,620

CARD FORMING APPARATUS

Filed Sept. 21, 1943

4 Sheets-Sheet 1



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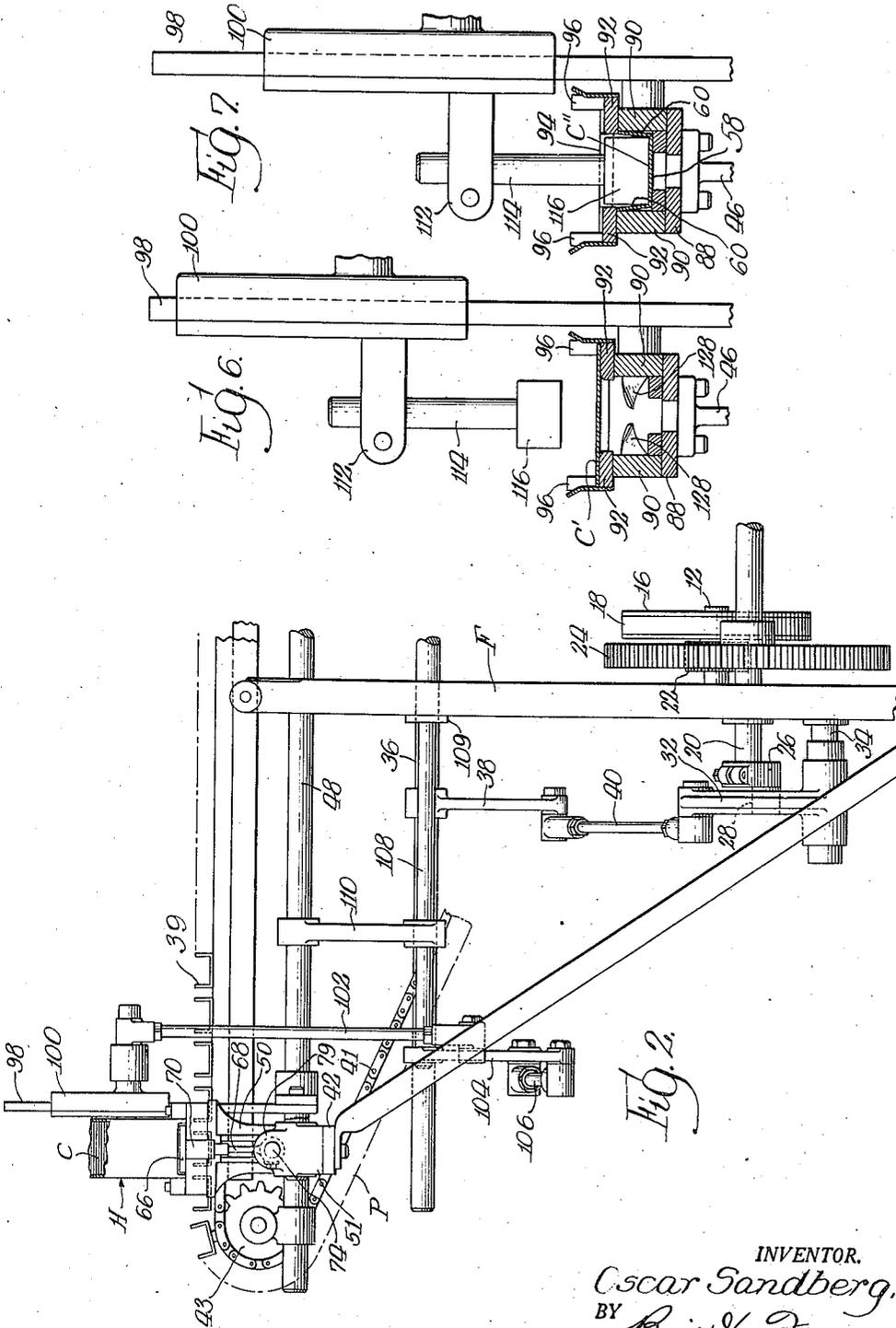
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CARD FORMING APPARATUS

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4 Sheets-Sheet 2



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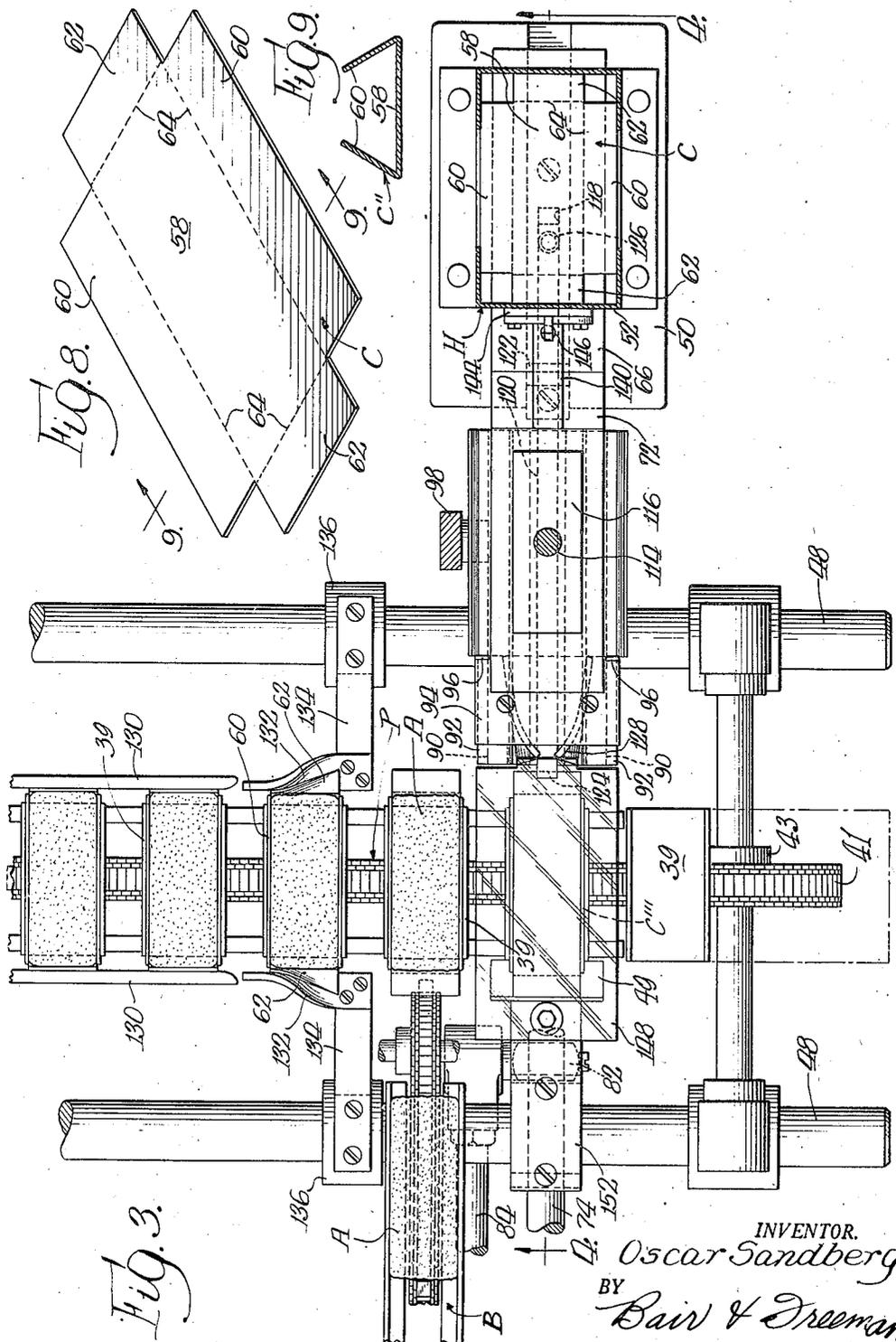
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CARD FORMING APPARATUS

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4 Sheets-Sheet 3



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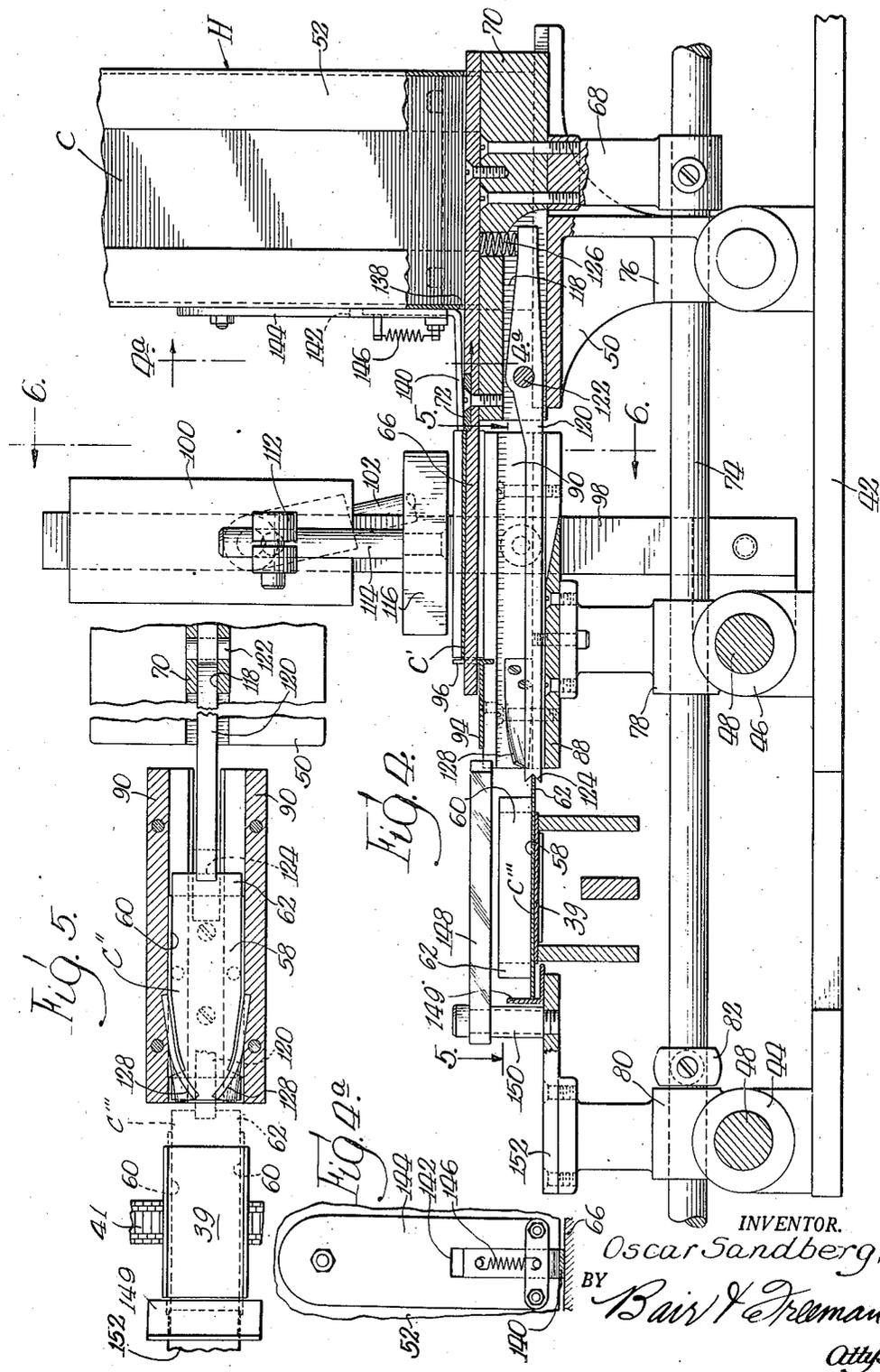
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CARD FORMING APPARATUS

Filed Sept. 21, 1943

4 Sheets-Sheet 4



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# UNITED STATES PATENT OFFICE

2,430,620

## CARD FORMING APPARATUS

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Application September 21, 1943, Serial No. 503,178

13 Claims. (Cl. 93—3)

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My present invention relates to a forming apparatus for cards such as cards suitable to support candy bars or the like which are wrapped in a wrapping machine of the kind shown in my Patent No. 2,208,776 or 2,283,097.

One object of the invention is to provide a simple forming or folding means for the card for forming it into either a channel shape or an open top box shape as desired.

Another object is to provide card forming mechanism which is operative to remove individual cards from a card hopper and position them on a pair of supports where they may be engaged by a plunger that lowers them into a channel shaped trough to form the cards channel shape.

A further object is to provide means for removing the cards from the channel member and bending the sides toward each other at an angle so that they will remain in channel shape to receive articles such as candy bars or the like.

It is a further object of the invention to provide a simple means for then bending the ends of the card upwardly to form a substantial five sided box for the candy bar after which it may be wrapped in a wrapping mechanism of the machine.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my card forming mechanism whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which:

Figure 1 is a rear elevation showing my card forming mechanism applied to a wrapping machine of the kind shown particularly in the second above mentioned patent.

Figure 2 is a side elevation of Figure 1 taken from the right side of the figure.

Figure 3 is an enlarged plan view of Figure 1.

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 3.

Figure 4a is a sectional view on the line 4a—4a of Figure 4.

Figure 5 is a horizontal sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a vertical sectional view on the line 6—6 of Figure 4.

Figure 7 is a similar sectional view showing the parts in a different position.

Figure 8 is a perspective view of the card formed in my forming apparatus, and

Figure 9 is a sectional view on the line 9—9 of Figure 8 showing the card in one of the positions it assumes during the forming operation.

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On the accompanying drawings I have used the reference character F to indicate generally a frame. On the frame F is a supporting bracket 10 on which is mounted a motor M for operating the wrapping machine and my card forming mechanism. The motor M drives a shaft 12 by means of pulleys 16 and 14, and a V-belt 18.

The shaft 12 is operatively connected with a main shaft 20 by means of a pinion 22 and a gear 24 meshing with each other. On the main shaft 20 is a crank arm 26 carrying a crank pin 28. The crank pin 28 reciprocates in a slot 30 of an arm 32 pivoted to the frame F at 34.

A rock shaft 36 is journaled in the frame F and has an operating arm 38. A link 40 has its ends pivoted to the arms 32 and 38 whereby oscillations of the arm 32 are imparted to the rock shaft.

The wrapping machine includes a pocket conveyor indicated generally at P consisting of a chain 41 and a plurality of channel shape pockets 39. The chain is trained around suitable sprockets, one of which is shown at 43 and is driven in an intermittent manner as shown in my above mentioned Patent No. 2,283,097 so that a pocket of the conveyor arrives, and stops momentarily, at a predetermined position for each oscillation of the rock shaft 36.

My card forming mechanism will now be described. It includes a supporting plate 42, supported by brackets 44 and 46 on stationary supporting rods 48 extending rigidly from the frame F. On the supporting plate 42 is a bracket 50 that supports a hopper H for cards C. The hopper H comprises a pair of channel shaped members 52, as perhaps best shown in Figure 2, adapted to receive a stack of the cards C. The stack of cards is fed properly by a weight 54 having a handle 56 for convenience of removing it when replenishing the supply of cards.

The cards C as shown in Figure 7 may be shaped so as to have a bottom wall 58, a pair of sides 59 and a pair of ends 62. The divisions between the bottom wall, sides and ends consists of scored lines 64 which facilitate bending the sides and ends upwardly as will hereinafter appear.

As a bottom for the hopper H, I provide a reciprocating plate 66 carried by brackets 68 and 69, a spacer block 70 being interposed between the two as shown in Figure 3. The plate 66 has a shoulder thereon provided by a hardened plate 72 counter-sunk in the plate 66.

The bracket 68 is secured to a rod 74 which is slidable in bearings 76, 78 and 80 of the brack-

ets 50, 46 and 44 respectively. As shown in Figure 1 there is a further bearing 79 formed on a bracket 51 which also is supported on the plate 42.

For reciprocating the rods 74, I provide a collar 82 thereon to which is pivoted one end of a link 84. The other end of the link is pivoted to the upper end of the arm 86 and the arm 86 is secured to the rock shaft 36.

On the bracket 46 I mount a channel member 88 which as shown in Figure 5 has a pair of sides 90. The sides 90 have at their upper edges a pair of supporting bars 92 which as shown at 94 overhang the sides 90 to a slight degree. A stop plate 94 is secured to the upper edges of the channel member sides 90 and stop fingers 96 extend upwardly therefrom.

Mounted on the bracket 46 there is also a vertical guide bar 98. Reciprocable thereon is a cross-head 100 and reciprocations are imparted to it by a link 102. The link 102 is pivoted to one arm of a bell crank 104, the other arm of which is operatively connected by a link 106 to an arm 107 mounted on the rock shaft 36.

The bell crank 104 is pivoted on a shaft 108 supported by a cross-bar 109 of the frame F, and a supporting link or arm 110 further out from the frame. The arm 110 is rigidly mounted on one of the stationary rods 48. Projecting from the cross-head 100 is a clamp bracket 112 carrying a vertical rod 114. A bar-like plunger 116 is mounted on the lower end of the rod 114.

Pivotally mounted in a slot 118 of the spacer block 70 is a propelling finger 120, the pivot of which is illustrated at 122 (see Figure 4). The forward end of the propelling finger 120 is notched at 124 for engaging the card C after it has been formed channel shape in the trough 88. A spring 126 biases the propelling finger downwardly at its rear end so that its forward end is in the proper position for engaging the card during reciprocations of the finger. The spring is just strong enough to counterbalance the forward end of the finger so that it remains in approximately the position shown in Figure 4. The notch 124 then guides the forward end of the finger into alignment with the card.

Along the sides 90 of the trough 88 I provide a pair of twisted plates 128 adapted to bend the sides 60 of the card C to the position shown in Figure 9 for a purpose which will hereinafter appear.

The wrapping machine has a conveyor B (see Figure 3) adapted to deliver articles A such as candy bars to the pocket conveyor C. Ahead of this conveyor, or upwardly as viewed in Figure 3, is a pair of side plates 130, and just rearwardly of these side plates is a pair of twisted plates 132 for forming the end portions 62 of the card C as will hereinafter be described. The twisted plates 132 are stationarily supported as by bars 134 extending from collars 136 on the stationary rods 48.

#### Practical operation.

In the operation of my card forming apparatus, the cards C, after being stacked in the hopper H, are fed one at a time to the wrapping machine and formed by the card forming mechanism into a five sided or open top box before they are wrapped along with the articles contained in them. The two sides are formed before the article is positioned on the card and the two ends are formed thereafter. Each reciprocation of the rod 74 results in the shoulder 72 of the reciprocating plate 66 engaging the rearmost edge

of the lowermost card C and feeding it from the hopper through a slot 138 (see Figure 4) in the front end thereof to the position shown at C'.

During this movement the card passes under a non-return spring 140 which is slidably mounted in a slot 142 of a plate 144 and biased downwardly by a spring 146. After the rear edge of the card passes the forward end of the spring 140, the spring snaps down back of the card so as to keep it from returning with the bar 66 when it is retracted. The card is then confined between the forward edge of the spring 140 and the stop fingers 96.

After the bar 66 is retracted, the plunger 116 is lowered from the position of Figure 6 to the position of Figure 7, and in so doing it bends the card in position C' to the position indicated at C'' in Figure 7. This forming operation bends the sides 60 upwardly relative to the bottom 58 and gives the card a channel shape in cross-section. The sides 60 spring under the overhanging portions 94 of the supporting bars 92 due to the resiliency of the cardboard, and the card at position C'' is thus retained against retraction when the plunger 116 is moved upwardly.

After the plunger is out of the way, then the next reciprocation of the bar 66 which brings a second card into position C' effects forward movement of the finger 120 causing its notched end 124 to engage the rear edge of the card in position C'' and move it to a third position indicated at C''' in Figure 4. In doing so, the sides 60 of the card are bent to an acute angle relative to the bottom 58 to the twisted plates 128 as shown in Figure 9 so that the card will remain in channel shape instead of tending to flatten out and "pop-up" with respect to the pockets 39 of the pocket conveyor before a candy bar A is placed on the card.

The first card formed channel shaped leaves the twisted plates 128 to pass under a top plate 148 made of transparent material so that the operator can observe whether or not the card has been properly formed as it passes into a pocket of the pocket conveyor (position C'''). It is stopped in that position by an angle shaped stop 149. The plate 148 is supported on posts 150 extending upwardly from a stationary plate 152 mounted on the bracket 44.

The pocket conveyor is of course in stopped position while the card is assuming the position C''' and then advances the distance of one pocket so that at its next position the conveyor B may place the article A therein. After the article is in position then the pocket conveyor advances another pocket and causes the card ends 62 to engage the twisted plates 132 as shown in Figure 3 where the beginning of their bend upwardly occurs.

The next forward movement of the pocket conveyor causes the ends 62 to completely raise and they then are engaged by the side plates 130 which keep them raised until they reach the folding way where the wrappers are folded around them as shown in my prior patents.

The timing of the various operations, of course, are such that one complete cycle advances the pocket conveyor the distance of one pocket, and the card folding apparatus acts upon two cards at the same time bringing one into the trough 88 while moving the previous card from the trough into the pocket conveyor. The article conveyor is also properly timed to discharge an article into the pocket conveyor during each cycle of operations so that a completely formed card and an article thereon arrive at the wrapping position

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each time a wrapper goes into position for being wrapped about the card and article.

The mechanism is comparatively simple and accomplishes the desired result of forming the card box-like with an open top so as to enclose the article with the exception of its top. Obviously the cards may be formed to merely channel shape if desired by omitting the end flaps 62, and the twisted plates 132 would then perform no function. Thus, either a three sided or channel shaped card may be provided or a five sided one if desired. The hopper H, of course, would be modified to fit the different shape of card or replaced by a different hopper as the hopper is readily removable.

Some changes may be made in the construction and arrangement of the parts of my card forming apparatus without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope without sacrificing any of the advantages thereof.

I claim as my invention:

1. In a card forming apparatus, a hopper for a stack of cards, a trough, means for engaging the lowermost card in such hopper and moving it into said trough, said means being thereafter retracted, means for engaging the rear edge of the card to prevent its retraction into the hopper when said first means is retracted, said trough having a pair of spaced supports and a channel member below said supports, said card being moved by said first means onto said supports, a reciprocating plunger adapted to engage said card between said supports and depress it into said channel member whereby the card is folded to channel shape, means shaped to engage said card after it is formed channel shape and moving it longitudinally into a pocket of a pocket conveyor and means for maintaining the card in channel shape as it is moved into said pocket.

2. In a card forming apparatus of the character disclosed, a hopper for a stack of cards, a trough, means for engaging the lowermost card in such hopper and moving it into said trough, said trough having a pair of spaced supports and a channel member below said supports, the marginal edges of said supports overhanging the sides of said channel member, said card being moved by said first means onto said supports, a plunger adapted to engage said card between said supports and depress it into said channel member whereby the card is folded to channel shape, and its flanges spring under said overhanging marginal edges of said supports, means for retracting said plunger, and means for engaging said card after it is formed channel shape and moving it into a pocket of a pocket conveyor.

3. A card forming apparatus comprising a hopper for a stack of cards, a trough, means for engaging the lowermost card in such hopper and moving it into said trough, said means being thereafter retracted, means for engaging the rear edge of the card to prevent its retraction into the hopper when said first means is retracted, a reciprocating plunger adapted to engage said card and depress it into said trough whereby the card is formed channel shape therein, means shaped to engage said card after it is formed channel shape and moving it into a pocket of a pocket conveyor and means for maintaining the card in channel shape as it is moved into said pocket.

4. In a card forming apparatus, a hopper for

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a stack of cards, a trough, means for engaging the lowermost card in such hopper and moving it into said trough, a plunger adapted to engage said card and depress it into said trough whereby the card is formed channel shape therein, means for retracting said plunger, said trough having marginal edge portions overhanging the edges of the flanges of the channel shaped card to prevent return of said card with said plunger as it is retracted from said trough, and means engaging said card after it is formed channel shape and moving it into a pocket of a pocket conveyor.

5. In a card forming apparatus, a hopper for a stack of cards, a trough, means for engaging the lowermost card in such hopper and moving it into said trough, a reciprocating plunger adapted to engage said card and depress it into said trough whereby the card is folded to channel shape, means for engaging said card after it is formed channel shape and moving it into a pocket of a pocket conveyor, and side plates twisted toward each other and engaging the sides of the channel shaped card to bend such sides inwardly at an acute angle relative to the body of the card as the card is moved from said trough to the pocket of the conveyor.

6. A card forming apparatus comprising a hopper for a stack of cards, a trough, means for engaging the lowermost card in such hopper and moving it into said trough, said means being thereafter retracted, means for engaging the rear edge of the card to prevent its retraction into the hopper when said first means is retracted, said last means comprising a leaf spring pressing on top of the card as it is moved from said hopper and said first means moving the card past the end of said spring before retraction of the first means, said trough having a pair of spaced supports and a channel member below said supports, said card being moved by said first means onto said supports, a plunger adapted to engage said card between said supports and depress it into said channel member whereby the card is folded to channel shape, said supports overhanging the sides of said channel member to prevent retraction of the card with the plunger as it is retracted, means for engaging said card after it is formed channel shape and moving it into a pocket of a pocket conveyor, and side plates twisted toward each other and engaging the sides of the channel shaped card to bend such sides inwardly at an acute angle as the card is moved from the channel member.

7. In a card forming apparatus, a hopper for a stack of cards, a trough, means for engaging the lowermost card in such hopper and moving it into said trough, said means being thereafter retracted, means for engaging the rear edge of the card to prevent its retraction into the hopper when said first means is retracted, said trough having a pair of spaced supports and a channel member below said supports, said card being moved by said first means onto said supports, a reciprocating plunger adapted to engage said card between said supports and depress it into said channel member whereby the card is folded to channel shape, means for engaging said card after it is formed channel shape and moving it into a pocket of a pocket conveyor while in such shape, and side plates twisted toward each other and engaging the sides of the channel shaped card to bend such sides inwardly at an angle relative to the body of the card as the card is moved from the channel member to the pocket conveyor.

8. In an apparatus of the character described, a trough, means for depositing cards one at a time therein, a plunger adapted to engage the card between the sides of and depress it into said trough whereby the card is folded to channel shape, means for engaging said card after it is formed and moving it into a channel shaped pocket of a pocket conveyor, and side plates twisted toward each other and engaging the sides of the channel shaped card to bend such sides inwardly so they will enter between the sides of said channel shaped pocket without catching thereon.

9. In a card forming apparatus, a hopper for a stack of cards, a trough comprising a pair of spaced supports and a channel member below said supports, means for engaging the lowermost card in said hopper and moving it onto said supports, a reciprocating plunger adapted to engage said card between said supports and depress it into said channel member whereby the card is folded to channel shape, means for engaging said card after it is formed channel shape and moving it into a pocket conveyor, and side plates twisted toward each other and engaging the sides of the channel shaped card to bend such sides inwardly to a position from which they spring to the desired channel shape when in the pocket of said pocket conveyor.

10. In a card forming apparatus, a hopper for a stack of cards, a trough, means for engaging a card and moving it from said hopper and into said trough, a plunger adapted to engage said card and depress it into said trough whereby the card is folded to channel shape, means for engaging said card after it is formed channel shape and moving it into a pocket of a pocket conveyor, means for depositing articles in the channel shaped cards, said pocket conveyor intermittently moving said cards and the articles therein in a lateral direction and twisted end plates adapted to simultaneously engage both ends of the card as it is so moved to bend said ends upwardly and thereby form the card into a five sided container for the article.

11. In a card forming apparatus, a hopper for a stack of cards, a trough, means for engaging the lowermost card in such hopper and moving it into said trough, a reciprocating plunger adapted to engage said card and depress it into said trough whereby the card is folded to channel shape, means for engaging said card after it is formed channel shape and moving it into a pocket of a pocket conveyor, twisted plates to bend the flanges of the channel shaped card inwardly at an acute angle as the card is so moved, means for de-

positing articles in said channel shaped cards after they leave said twisted plates, said pocket moving said cards and the articles therein in a lateral direction and second twisted plates adapted to engage the ends of the card as it is so moved to bend said ends upwardly and thereby form the card into a five sided container for the article.

12. In a card forming apparatus, a hopper for a stack of cards, means for forming the cards channel shape, means for engaging said card after it is formed channel shape and moving it into a pocket of a pocket conveyor, means for sliding articles endwise into said channel shaped cards, said pocket conveyor moving said cards and articles therein in a lateral direction, and a pair of twisted plates adapted to engage the ends of the card simultaneously as it is so moved to bend said ends upwardly and thereby form the card into a five sided container for the article.

13. In an apparatus of the class described, a hopper for a stack of cards, a trough, means for engaging a card in said hopper and moving it into said trough, means for engaging the rear edge of the card to prevent its retraction into the hopper when said first means is retracted, said last means comprising a leaf spring engaging the top of the card as it is moved from said hopper, said first means moving the card past the end of said spring before retraction of the first means, a reciprocating plunger adapted to engage said card and depress it into said trough whereby the card is formed into channel shape, said trough having overhanging means to engage the upper edges of the sides of the card while in channel shape to prevent retraction of the card with the plunger as it is retracted, means for engaging said card after it is formed channel shape and moving it into a pocket of a pocket conveyor, and side plates twisted toward each other and engaging the sides of the channel card to bend such sides inwardly at an angle relative to the body of the card as the card is moved from the trough to the pocket.

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