Feb. 16, 1932. E. W. SIBLEY 1,845,203

BLANK FORMING MACHINE

Filed April 9, 1927 7 Sheets-Sheet 1

Fig. 1.

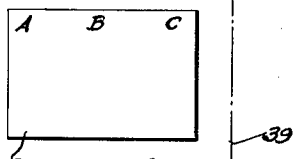


Fig. 2.

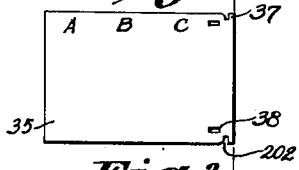


Fig. 3.

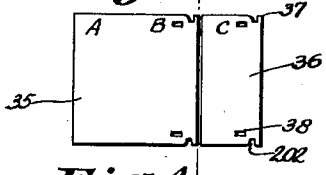


Fig. 4.

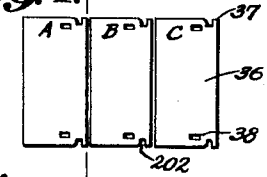


Fig. 5.

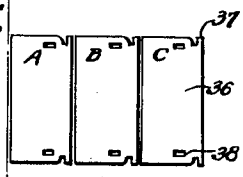


Fig. 6.

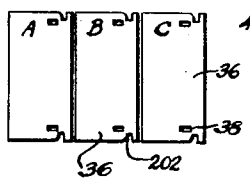


Fig. 7.

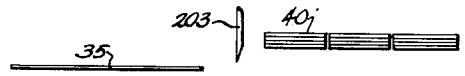


Fig. 8.

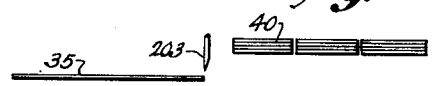


Fig. 9.

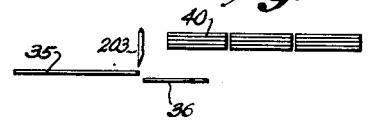


Fig. 14.

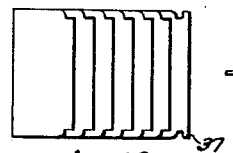


Fig. 10.

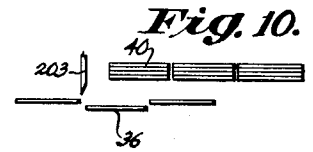


Fig. 13.

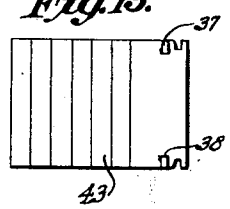


Fig. 11.

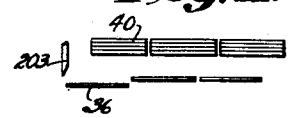


Fig. 12.

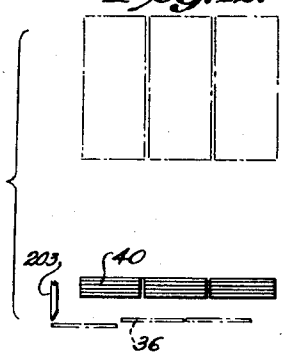
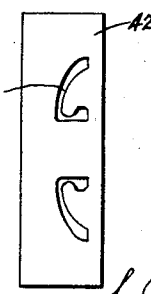


Fig. 15.



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Fig. 16.

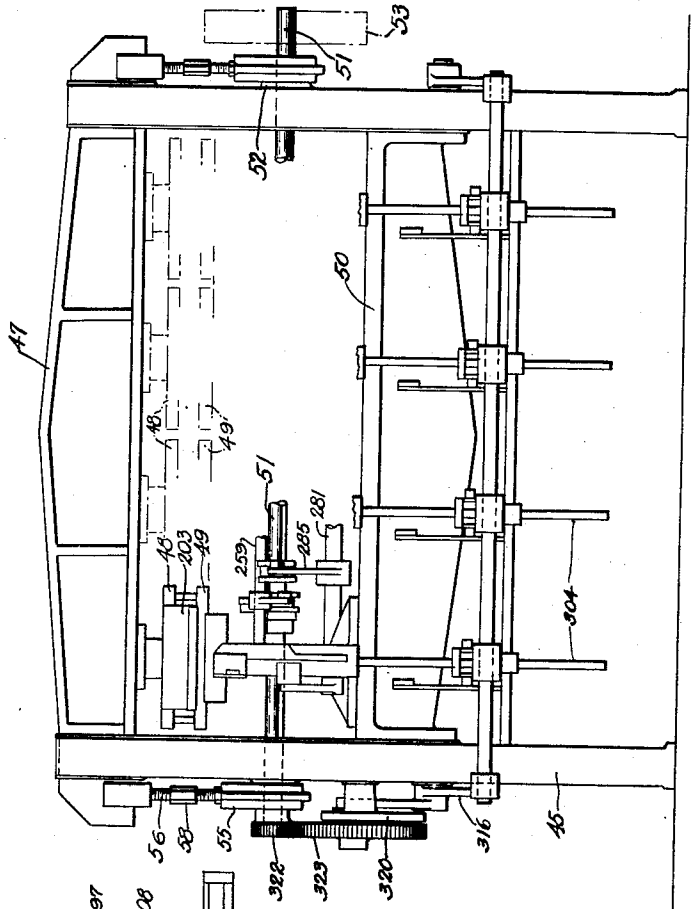
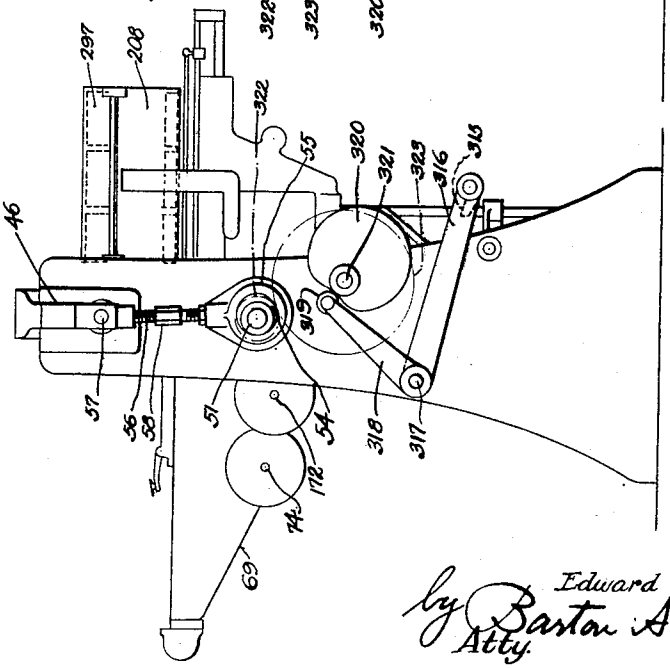


Fig. 17.



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BLANK FORMING MACHINE

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Fig. 18.

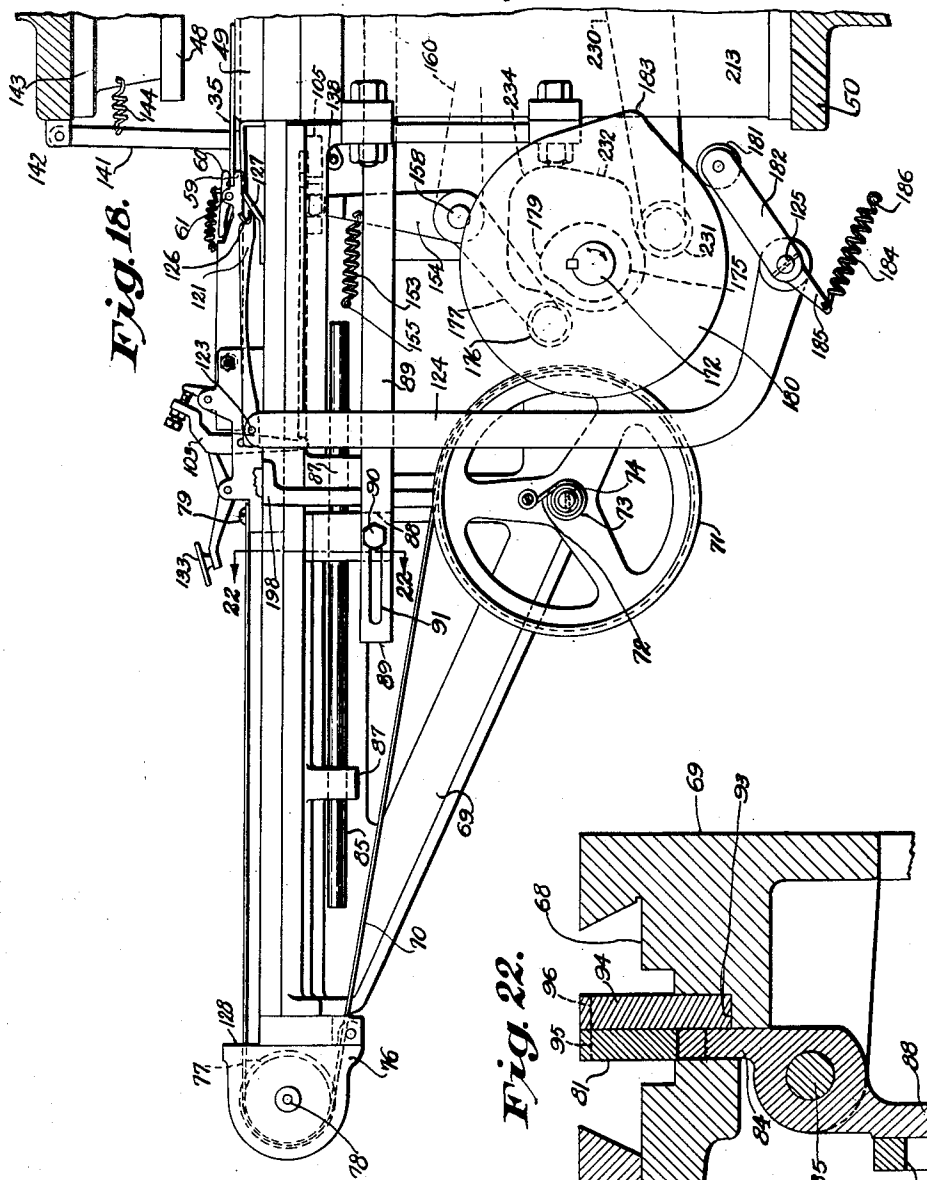


Fig. 22.

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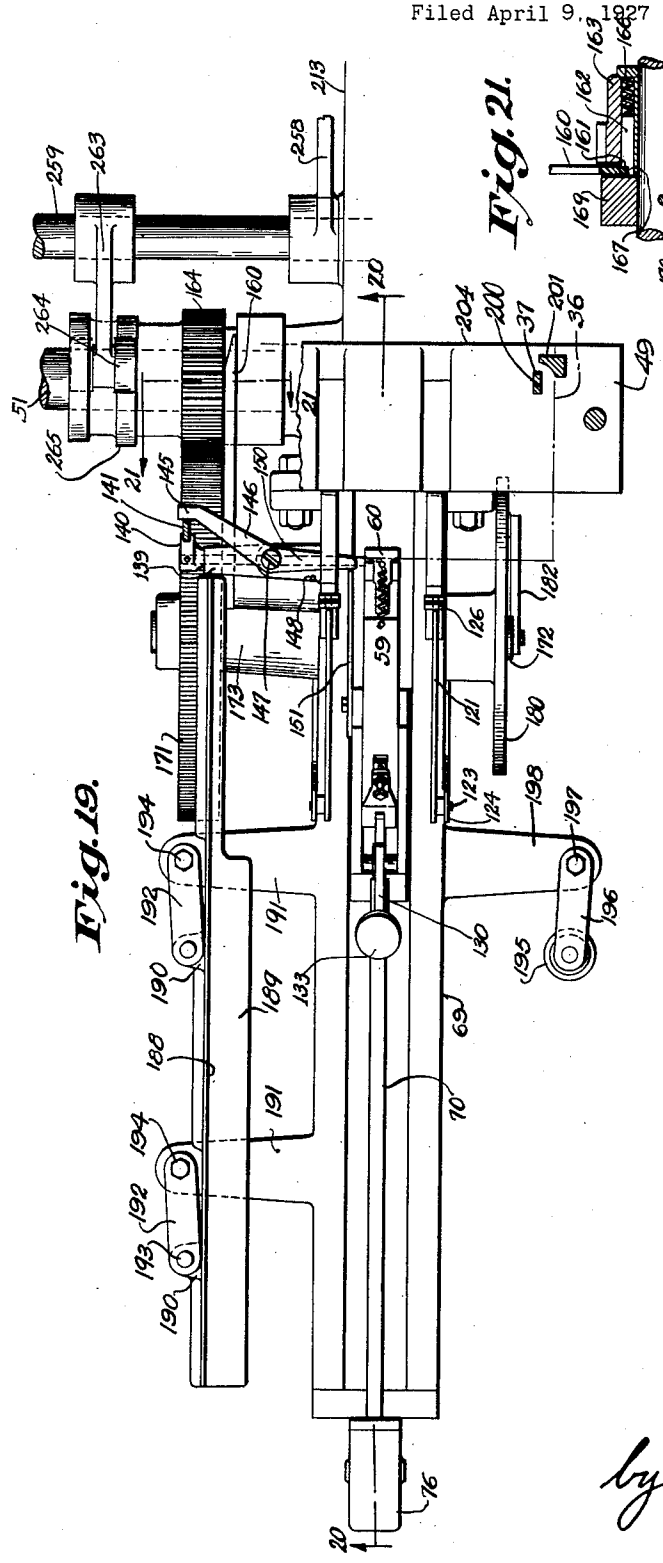


Fig. 19.

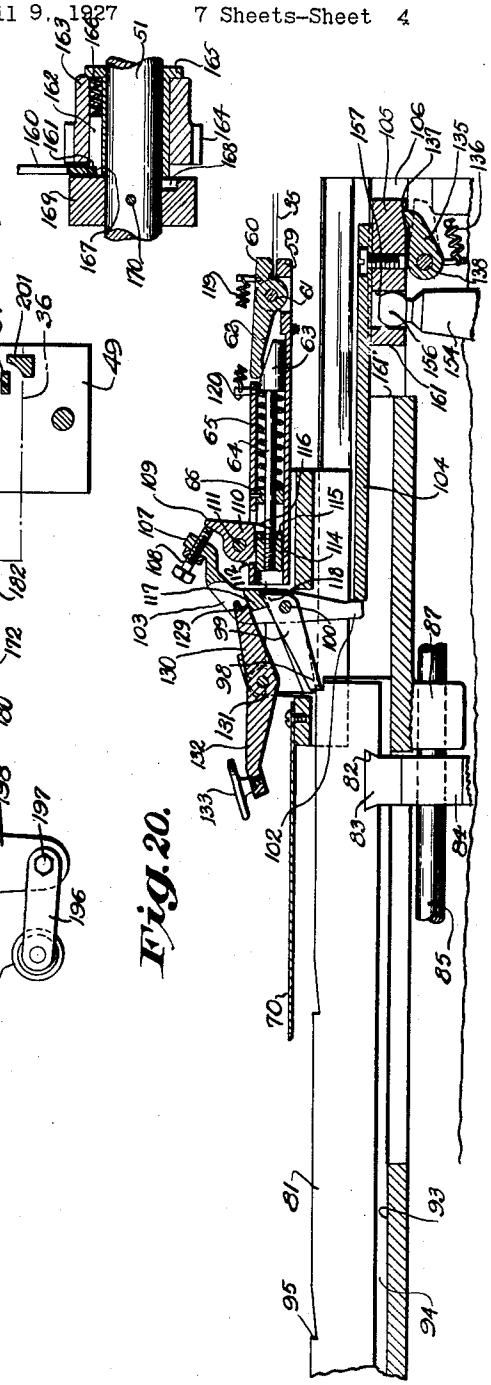


Fig. 20.

Fig. 21.

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BLANK FORMING MACHINE

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Fig. 23.

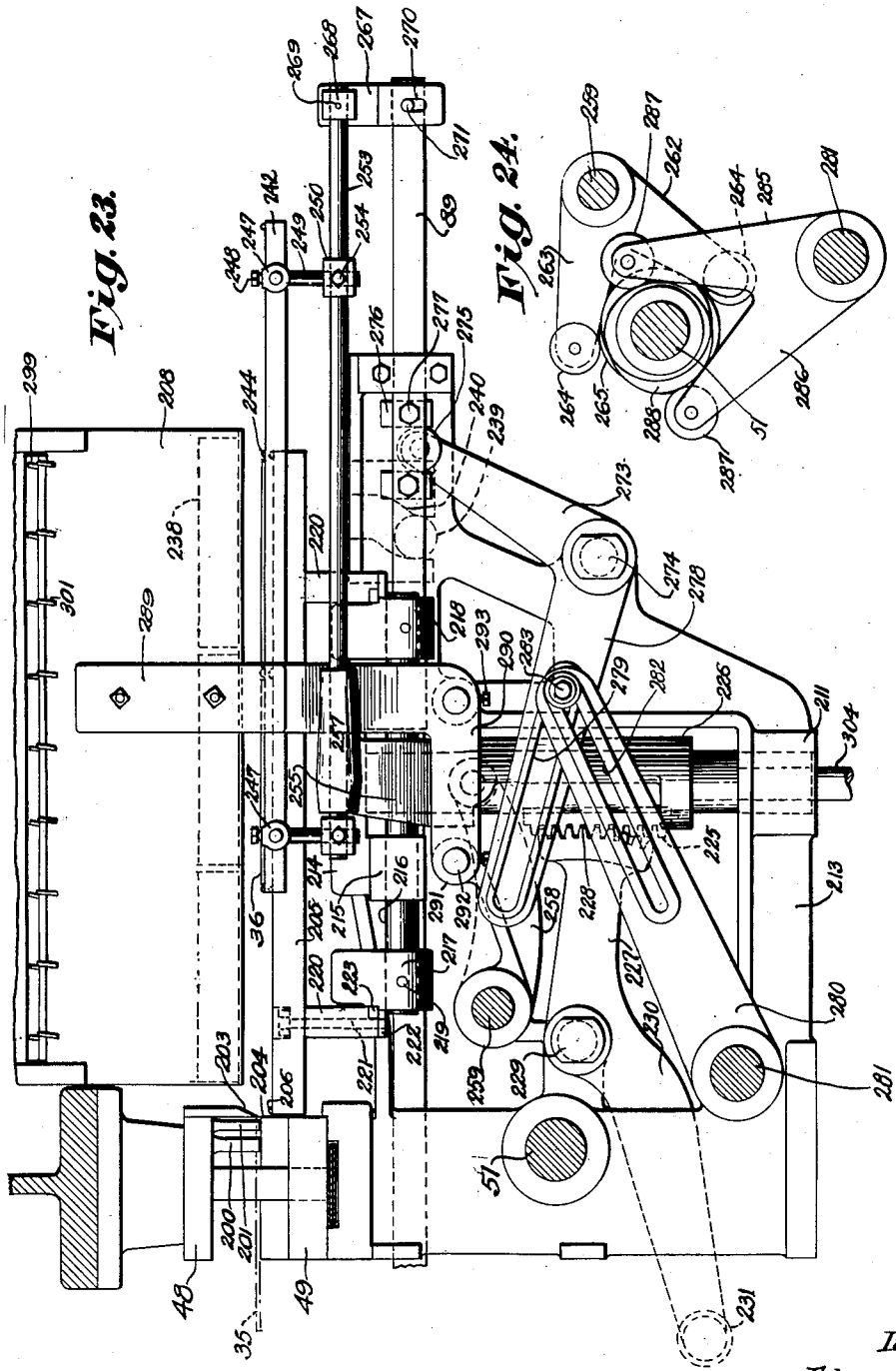


Fig. 24.

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Fig. 25.

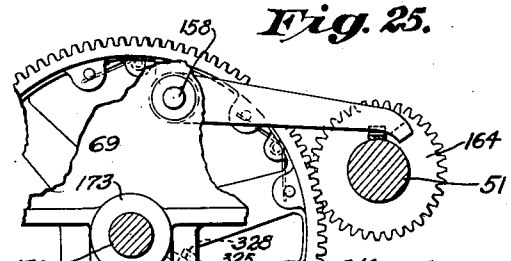


Fig. 27.

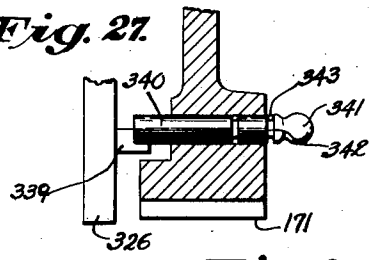


Fig. 28.

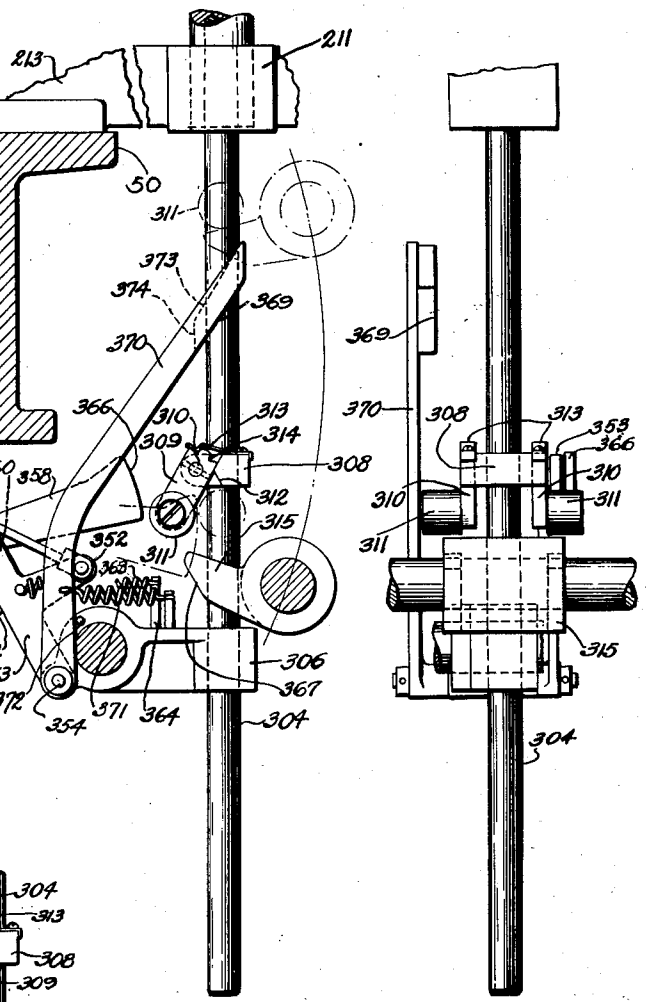


Fig. 26.

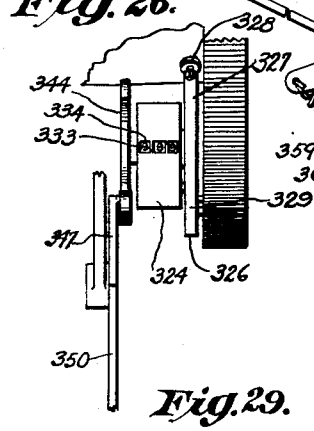
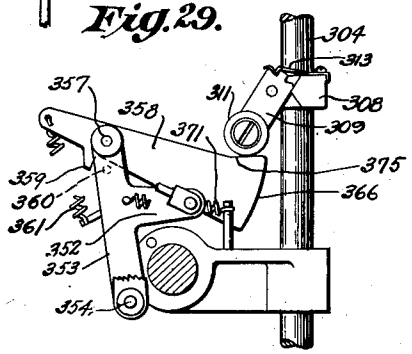


Fig. 29.



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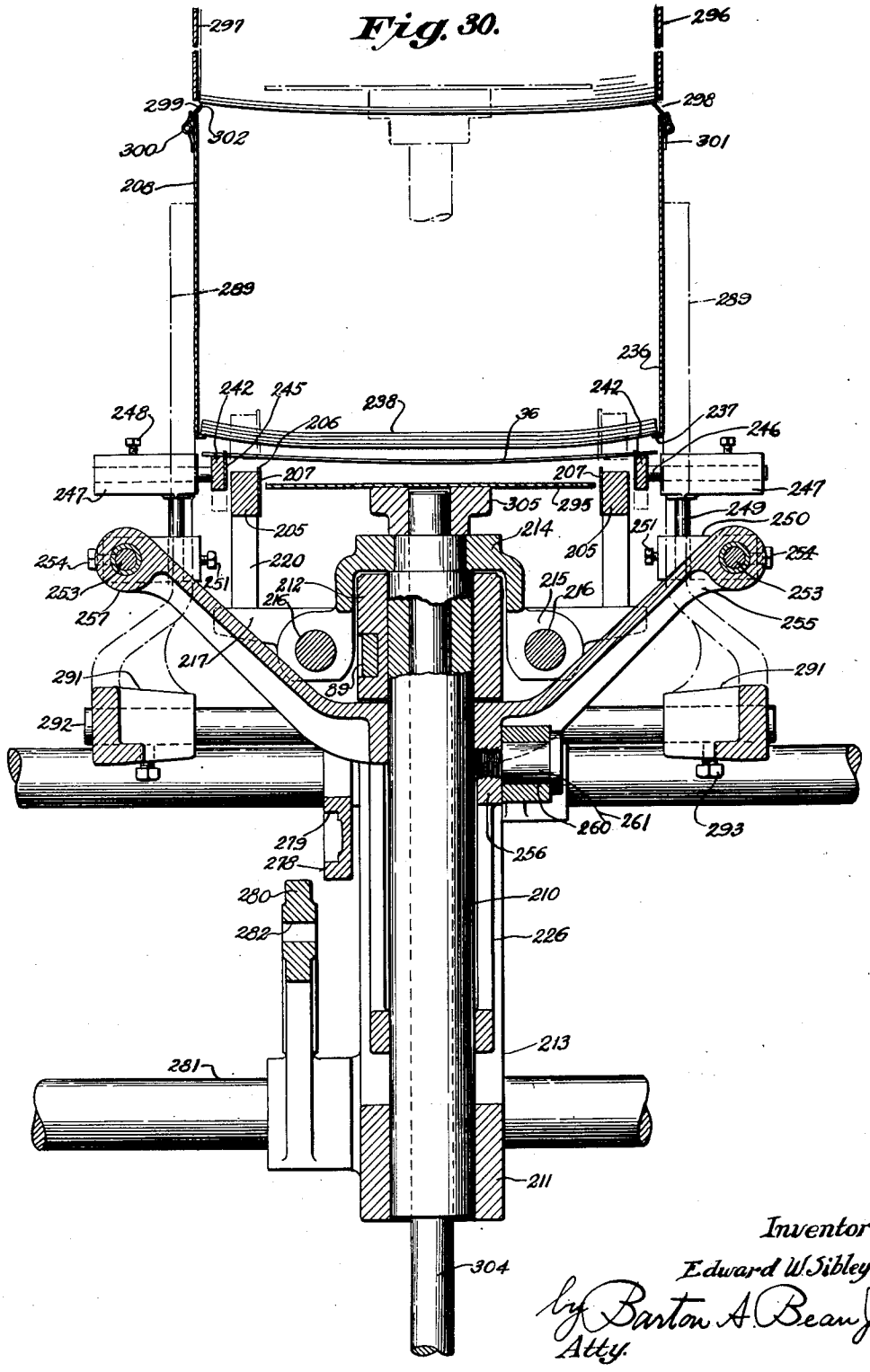
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BLANK FORMING MACHINE

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Fig. 30.



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Patented Feb. 16, 1932

1,845,203

UNITED STATES PATENT OFFICE

EDWARD W. SIBLEY, OF KENMORE, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO REMINGTON RAND INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

BLANK FORMING MACHINE

Application filed April 9, 1927. Serial No. 182,336.

This invention relates to a machine for forming sheet material into smaller portions and has reference more particularly to a machine for forming blanks such as index cards or other objects from sheet material such as cardboard or the like.

In the manufacture of index cards, the practice in the past has been to feed the sheet material to the punch press by hand. The result has been that a large amount of labor was necessary and the cost of manufacture, sorting, stacking, etc., was unnecessarily high.

An object of the invention is to provide a machine which will receive strips of cardboard, form index cards of said strips and stack said cards, the entire operation being automatic.

Another object of the invention is to provide a machine which will prepare index cards of the articulated type, or those which nest together, to expose a series of overlapping edges for the reception of indicia.

Another object of the invention is to provide a machine of the class described which will receive strips of material bearing a plurality of designating characters and form said strip into stacks of cards sorted in accordance with said characters.

A further object of the invention is to provide a machine which will punch index cards bearing attaching tongues and automatically count and stack the finished cards.

A still further object of the invention is to provide a machine having a drive shaft and feeding, punching and stacking mechanism all driven from said shaft; also to improve machines of the class described in other respects hereinafter specified and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification in which,

Figs. 1–6 are plan views of index cards in various stages of manufacture.

Figs. 7–12 inclusive are elevations of the index cards shown in Figs. 1–6 respectively,

Fig. 13 is a plan view of one side of a series of the index cards chained or articulated together to form a series of cards with overlapping edges;

Fig. 14 is a view similar to Fig. 13 but showing the opposite side of the series of cards,

Fig. 15 is a plan view of one of the many modified forms of index cards which may be made on the card machine,

Fig. 16 is a front elevation of the improved blank making machine with certain parts broken away,

Fig. 17 is an end elevation of said machine,

Fig. 18 is an enlarged fragmentary view, partly in section, of the feed end of the machine,

Fig. 19 is a sectional plan view of the feed end of the machine,

Fig. 20 is a sectional view through the machine on the line 20—20 of Fig. 19,

Fig. 21 is a fragmentary sectional view through the machine on the line 21—21 of Fig. 19,

Fig. 22 is a fragmentary sectional view through the machine on the line 22—22 of Fig. 18,

Fig. 23 is a fragmentary, sectional elevation of the delivery or stacking end of the machine,

Fig. 24 is a sectional view through the machine showing the cam movement to actuate certain shafts,

Fig. 25 is a sectional elevation through a portion of the machine showing the counting and elevating mechanism,

Fig. 26 is a fragmentary elevation of the counting mechanism,

Fig. 27 is a fragmentary, sectional view on line 27—27 of Fig. 25,

Fig. 28 is a fragmentary, end elevation showing the elevator mechanism,

Fig. 29 is a fragmentary, sectional elevation showing a portion of the elevator mechanism in one position, and

Fig. 30 is a fragmentary, sectional elevation showing the elevator mechanism.

Referring to the drawings by numerals, 35 indicates a strip of cardboard or other sheet material which is of a suitable length and which supplies the stock from which blanks such as index cards 36 may be made by means of my improved machine. In Figures 1–12

inclusive the position of the strip and cards in plan and elevation at various stages in their manufacture is shown. In Figure 1 the strip is shown ready to be advanced into the punch of the machine where attaching tongues 37 and attaching slots 38 are formed in the end of the strip as shown in Figure 2, where the end of the strip lies in line with the shear or cut-off line 39 of the punch. Figure 3 shows one card 36 cut from the strip and the tongues 37 and slots 38 formed on the end of the remaining strip while Figure 4 shows two finished cards and one partly finished card. Figure 5 shows all three cards 36 in finished form ready to be lifted into the card hopper in the form of stacks 40 as shown in Figures 6 and 12. Figures 7–12 inclusive are side elevations of the card during the different stages of manufacture as shown in Figures 1–6 respectively. When the stacks of cards 40 are complete with the required number of cards, such as 500 cards to the stack, the stacks are moved into a receiver by a suitable elevating mechanism into the position shown by the dot and dash lines of Figure 12, after which the operator can remove the stacks of cards from said receiver and wrap same for shipment.

It should be understood that my machine is suitable for making or punching out a large variety of cards and is manifestly not limited in use to the type of cards shown in outline in Figure 6. One of the other numerous types of index cards which may be formed on my machine is shown in Figure 15 where a pair of inwardly extending attaching tongues 41 are formed on said card 42, these tongues being adapted to engage a suitable slide to maintain said cards in nested position as shown in the patent to Hayes, 1,223,168. However, with the type of card shown in Figure 6, the cards are connected, chained or articulated together to form a series of cards as shown in Figures 13 and 14, by inserting the tongues 37 of one card into slots 38 of the adjacent card so that the free edges 43 of the cards in series are in visible, overlapping relation one to the other.

The machine for making the index cards comprises preferably, a pair of vertical standards or frame members 45 which may be in the form of castings having guideways 46 formed on their upper ends. These guideways are adapted to slidably receive the ends of a punch, actuating beam 47 which extends horizontally between the frames 45 (Figs. 16 and 17) and is adapted to simultaneously actuate a plurality of punches 48 cooperating with dies 49, the latter being rigidly secured to the frame members 45 by a suitable horizontal frame member 50. In order to reciprocate the punch beam 47 vertically, a transversely extending drive shaft 51 is rotatably mounted in suitable bearings 52 formed in the frames 45. This drive shaft 51 may be rotated in any suitable way such as by a pulley 53 connected by a belt to a line shaft. An eccentric 54 is rigidly secured near each end of shaft 51, said eccentrics operating in eccentric straps 55 connected by a connecting rod 56 to a pivot stud 57 secured in each end of beam 47. The rods 56 are adjustable in length by means of a turn buckle 58 so that the distance between the punches 48 and dies 49 can be accurately adjusted.

It is customary to supply sheet material such as cardboard to the machine in a suitable form such as strips 35 from which the cards 36 are punched and sheared. In order to advance the strips by a step by step intermittent movement under the punch 48, the end of the strip 35 is removably received in a carriage 59 which is provided with a clamping jaw 60 pivotally mounted on a pin 61 secured on said carriage 59 (Fig. 20). The clamping jaw 60 is in the form of a lever, the opposite arm 62 being engaged by a wedge member 63 secured on the end of a pin 64 so that the clamping jaw 60 is pressed against the strip 35 under the action of a spring 65 operating between the wedge 63 and a shoulder 66 on the carriage 59. The carriage 59 is slidably mounted for reciprocation on a dove tail track 68 (Fig. 22) formed in a track bracket 69 secured to the cross frame 50. The carriage 59 is normally urged to its rearmost position by a flexible strap 70, one end of said strap being secured to a spring pulley 71 urged to move in a clockwise direction as seen in Figure 18 by a coil spring 72 between a portion of the hub 73 and the shaft 74 on which the pulley 71 is rotatably mounted. At the rear of the track frame 69, a pulley bracket 76 is secured and an idler pulley 77 is rotatably mounted on a spindle 78 secured to said bracket 76. One end of the strap 70 passes around the pulley 77 and extends horizontally to the carriage 59 where it is secured thereto in any suitable way such as by screws 79.

In order to advance the carriage 59 toward the punch 48 with a step by step, intermittent movement, a rack 81 is slidably mounted in the track frame 69 for reciprocating movement. The lower edge of rack bar 81 is provided with a dove tail groove 82 which receives a dove tail tongue 83 formed on the upper end of a coupling member 84 secured to a slide rod 85. The rod 85 is slidably mounted for reciprocating movement in suitable bearings 87 formed on the bracket 69 and the coupling member 84 has a downwardly extending flange 88 adjustably secured to a slide bar 89 by means of a bolt 90 and slot 91 connection. The slide bar 89 is suitably connected to the drive shaft 51 by a mechanism to be hereinafter described, so that said bar 89 and rack bar 81 continuously reciprocate in a horizontal plane while the machine is in operation.

In a suitable groove 93 in the slide frame 69, a fixed rack bar 94 is detachably supported with its inner face in contact with the rack bar 81. Suitably spaced rack teeth 95 are formed in the upper edge of the movable rack bar 81 and similarly spaced rack teeth 96 are formed in the upper edge of the fixed rack bar 94. The rack teeth 95 and 96 are in the form of abrupt shoulders facing forwardly of the machine, said shoulders being adapted to receive the lower ends 98 of a pair of pawls 99 pivotally mounted on a pin 100, the latter being secured to suitable flanges on the carriage 59. The pawls 99 are urged to move in a counter-clockwise direction as seen in Figure 20, by the action of gravity so that when teeth 95 and 96 on the reciprocating bars engage the ends 98 of said pawls, the latter and carriage 59 are carried forwardly until the ends 98 of said pawls rest in a new, advanced tooth 96 on the upper edge of fixed rack 94. The rack 81 then moves rearwardly in its reciprocating movement until a new, advanced tooth 95 on said rack engages the lower end 98 of a pawl to carry said pawls and carriage 59 ahead again to a new, advanced tooth 96 on the fixed rack 94. Thus by means of the racks 81 and 94 cooperating with the pawls 99, the carriage 59 carrying the strip 35 is advanced toward the punch 48 with an intermittent, step by step movement.

When the carriage 59 is in its foremost position closest to the punch 48 as seen in Figure 20, an arm 102 on a lever 103 lies in a position abutting a flange 104, the latter being secured to a slide bracket 105 which is mounted for limited reciprocating movement in a groove 106 formed in the slide bracket 69. The lever 103 is pivotally mounted on the pin 100 and the upper end of said lever has an arm 107 through which passes an adjustable, actuating bolt 108, the inner end of said bolt being adapted to bear against an arm 109 on a lever 110 pivoted on pin 111, which is secured to suitable flanges 112 on the carriage 59. On the rear end of pin 64, is threaded a nut 114, on the forward end of which are a pair of shoulders 115 diametrically opposite one another and engaging a bifurcated arm 116 formed on the lower end of lever 109, said shoulders 115 being adapted to prevent the accidental rotation of said nut 114 due to vibration.

A laterally extending shoulder 117 is formed on the lever 103, said shoulder being adapted to engage the forward end 118 on pawl lever 99. At the proper moment when the carriage 59 has reached its position nearest the punch 48, the flange 104 is given a rearward movement by a mechanism to be hereinafter described, so that the lever 103 is moved in a clockwise direction as seen in Figure 20, thus causing the bolt 108 to act on lever arm 109 so that pin 64 and wedge 63 are moved to the left and the clamping lever 62 moves in a counterclockwise direction about pin 61 under the action of a spring 119 which extends between said lever 61 and a fixed pin 120 on the carriage 59, so that the clamping jaw 60 is released from the strip 35 which now has been reduced to one piece because of the fact that other cards have been sheared from said strip. It is now necessary to move this last piece of strip 35 out of the punch 48 after the clamping jaw 60 has been released and for this purpose a pair of fingers 121 are pivotally mounted at their rearmost ends on a pin 123 secured to the upper end of a lever 124, the latter being pivotally mounted on a shaft 125 which is rotatably mounted in suitable bearings in the framework of the machine. The pair of fingers 121 are arranged one on each side of the carriage 59, and the foremost end of each finger is provided with a V-shaped clip 126 which is adapted to slide up an inclined cam surface 127 and engage the rearward edge of the strip 35 and push the last piece of said strip forwardly out of the punch 48.

When the carriage 59 has reached its position nearest the punch and the lever 103 has been acted upon by the flange 104 to release the clamping jaw 60 as above described, the clockwise movement of the lever 103 also acts on the forward end 118 of the pawl levers 99 and lifts the lower ends 98 of said levers free of the foremost tooth 95 of rack bar 81. The carriage 59 then moves rearwardly under the action of strap 70 and spring 72 until the carriage is stopped in its rearmost position with its rear edge abutting against stop flange 128 on bracket 76. When the lever 103 has been moved in a clockwise direction by flange 104, a shoulder 129 on the forward arm of a lever 130, engages the shoulder 117 on lever 103 so as to lock the wedge 63 in its rearmost position against the action of spring 65, thus causing the locking jaw 60 to be held open ready for the reception of a new strip of cardboard. The lever 130 is pivotally mounted on a pin 131 secured in suitable bearings on the carriage 59, and the rearward arm 132 of said lever 130 is provided with a handle 133 which is adapted for manual actuation. When the carriage 59 has been moved to its rearmost position by the action of strap 70 and spring 72, the locking jaw 60 now being open, the operator of the machine inserts a new strip of cardboard 35 into the locking jaw 60 and then presses downwardly on the handle 133 which causes the wedge 63 to be moved to the right under the action of spring 65 so that clamping jaw 60 now securely engages the rearward end of the strip 35. The manual actuation of the handle 133 also causes the shoulder 117 on lever 103 to be released from lever arm 118 so that the pawl end 98 drops downwardly under the action of gravity and engages the tooth 95 of the reciprocating rack 81 which moves the carriage 59

forwardly and causes the strip 35 to be advanced into the punch 48 which forms the first card.

The slide bracket 105 is maintained in its forward position by a locking catch 135 which has a tooth adapted, under the action of a spring 136, to engage behind a shoulder 137 formed in the slide bracket 105. The catch 135 is secured to a shaft 138 which is rotatably mounted in a suitable bearing 139 formed on the slide frame 69. To the end of the shaft 138 opposite the catch 135, is secured a lever 140, which, under certain conditions, lies in the path of travel of the lower end of a lever 141 which is pivoted by pin 142 to the beam 47 which supports the punch 48. The lever 141 is thus given a vertical reciprocating movement by punch beam 47 and said lever is normally urged to move in a counterclockwise direction by a spring 144 extending between said lever and the punch beam 47. The counterclockwise movement of the lever 141 is limited by the arm 145 of a lever 146 which is rotatably mounted on a stud 147 secured to the bearing 139. The lever 146 is thus urged to move in a clockwise direction as seen in Figure 19, under the action of spring 144 and lever 141 and this movement of lever 146 is limited by a stop pin 148 secured to the bearing 139.

A second arm 150 of lever 146 lies in the path of travel of a flange 151 secured to the carriage 59 so that when said carriage advances to its foremost position, the flange 151 moves the lever 146 in a counterclockwise direction which in turn moves the lever 141, so that the lower end thereof contacts with the lever 140 and rocks the shaft 138 so that catch 135 is disconnected from the shoulder 137 on slide bracket 105. The slide bracket 105 is now free to move rearwardly under the action of a spring 153 which is connected between a bell crank lever 154 and a fixed pin 155. The upper end of bell crank lever 154 has a ball 156 which is mounted in a suitable socket 157 formed in slide bracket 105 so that said ball is permitted to move vertically slightly during the arcuate travel thereof on the end of lever 154. The lever 154 is secured to a rock shaft 158 which is rotatably mounted in suitable bearings in the slide frame 69. The end of shaft 158 opposite the lever 154 is provided with a clutch lever 160 secured thereto at one end. Thus when slide bracket 105 moves rearwardly until the shoulder 161 abuts against a shoulder 161′ formed on the slide frame 69, the clutch lever 160 is moved vertically so that the end thereof disconnects from a notch 161 formed in a clutch pin 162. The clutch pin 162 is mounted for lateral sliding movement in the hub 163 of a pinion 164 which is rotatably mounted on a bearing collar 165 which in turn is rotatably mounted on the drive shaft 51. As seen in Figure 21 the clutch pin 162 is normally urged to move to the left under the action of a spring 166 so that when the clutch lever 160 is withdrawn from said pin 162, the latter moves to the left so that the end 167 of said clutch pin will project into a recess 168 formed in the face of a collar 169, the latter being secured by a pin 170 to the shaft 51 adjacent the pinion 164. When the clutch pin 162 thus engages the collar 169, the latter, shaft 51 and pinion 164 move in unison. The lower edge of lever 160 is bevelled away on one side so that downward movement of said lever will engage the recess 168 and move the pin 162 to the right, out of engagement with the collar 169.

The pinion 164 meshes with a gear 171 which in turn is secured to a cam shaft 172, the latter being rotatably mounted in suitable bearings 173 formed on the slide frame 69. The rotation of gear 171 and shaft 172 by pinion 164 causes the rotation of a cam 175 which is also secured to shaft 172. When the catch 135 is disconnected from shoulder 137 so that slide bracket 105 moves rearwardly and lever 154 moves in a counter-clockwise direction as seen in Fig. 18, a roller 176 rotatably mounted on an arm 177 of the lever 154, contacts with the outer periphery of the cam 175. After the carriage 59 has moved rearwardly to its rearmost position, the cam 175 acts on roller 176 to move the lever 154 in a clockwise direction so that slide bracket 105 is moved forwardly until catch 135 again snaps into place behind shoulder 137 so that said slide bracket 105 is then ready for a new cycle of operations. The cam 175 has a high point 179 which moves the slide bracket 105 to its foremost position where the catch 136 engages the shoulder 137. A further movement of the cam 175 then causes the cam surface to disengage from the roller 176 due to the shape of the cam 175, until the catch 136 is again released from shoulder 137.

Also secured to the shaft 172 is a cam 180 which has an outer periphery adapted to be in rolling contact with a roller 181 rotatably mounted on the end of a lever 182, the latter being secured to the rock shaft 125. A high point 183 on cam 180 causes the roller 181 to rock the shaft 125 in a clockwise direction as seen in Figure 18, so that fingers 121 advance toward the punch 48 pushing the last end of the strip 35 out of the punch and into the receiving mechanism. When the roller leaves the high point 183, a spring 184 secured between a lever arm 185 and a fixed pin 186, causes the fingers 121 to return rearwardly to their normal position.

The machine is designed so that it may be adjusted to operate on strips of different widths and to form cards of different dimensions. When the carriage 59 is in its rearmost position, the operator places the strip 35 below the clamping jaw 60 with the edge of the strip resting against a gage 188, the

latter being formed on an elongate member 189 which has a pair of outstanding ears 190. Arms 191 extend outwardly from the slide frame 69 and a pair of parallel links 192 connect the outer ends of arms 191 with their respective ears 190. A pivot pin 193 rotatably connects the end of each link 192 with the ear 190 and a locking bolt 194 connects the opposite end of links 192 with the ends of the respective arms 191. Thus by loosening the bolts 194, the gage 188 may be moved inwardly or outwardly with the parallel movement provided by the links 192 so as to be adjusted to any width of strip it is desired to use. After the adjustment is made, bolts 194 are again tightened and the gage 188 is then held rigidly in place. A guide roller 195 is rotatably mounted on a link 196, the latter being pivotally attached by a bolt 197 to the end of an arm 198 formed on the slide frame 69 opposite the arms 191. The purpose of the roller 195 is to engage the edge of the strip opposite the gage 188 so that the strip is accurately positioned under the clamping jaw 60 by the operator. In order to make cards of different widths, the rack bars 81 and 94 may be changed for other rack bars having teeth 95 and 96 of a different pitch. In changing these bars, the bar 94 is first moved upwardly out of the groove 93 and the bar 81 is then moved laterally until the dove-tailed tongues 83 are disconnected from their respective dove-tailed grooves, after which the rack bar 81 may be moved vertically away from the machine and new ones substituted.

The punch 48 is composed of detachable punch members 200 and 201 which operate in similarly shaped openings in the die 49 so as to punch out the openings 38 and 202 respectively in the strip 35 thus forming the slots 38 and the attaching ears 37. The punch 48 also includes a shearing knife 203 which is in the form of a knife edge operated against a shoulder 204 formed on the die 49, this shear being adapted to cut off the cards at the same time that the punches 200 and 201 operate on the following strip.

When the finished cards 36 are cut off by the shearing knife 203, they fall onto a pair of movable bars 205 which have upstanding projections 206 formed along the upper edges thereof spaced apart substantially the width of the cards which are formed. With the spacing of the projections 206 shown in Figure 23, only three cards are designed to be formed from each strip and for narrower cards, additional projections 206 would be added to the upper edges of the bars 205. The projections 206 are formed on the upper edges of strips of metal 207 (Fig. 30) which are secured to the inner face of each bar 205 as by screws, not shown.

Especially for cards which are narrow in width, it is necessary for the end of the bar 205 to be closely abutting the shoulder 204 on die 49 so that the card will be deposited and properly positioned ahead of the rearmost projection 206 on the bars 205. The bars 205 are caused to move upwardly, by a mechanism to be hereinafter described, so as to deposit the finished cards in a receiver 208 arranged above the bars 205. It is necessary for the bars 205 to move outwardly away from the knife 203 as well as upwardly so that a combined movement approximately along a 45 degree angle is obtained for the bars 205.

The upward movement of the bars 205 is obtained by means of a sleeve 210 which is mounted for vertical, reciprocating movement in a lower bearing 211 and an upper bearing 212 formed in a delivery frame 213 secured on the cross beam 50. Bracket 214 is secured to the upper end of the sleeve 210 and downwardly extending slide bearings 215 are formed on said bracket, said bearings being adapted to slidably receive a pair of slide bars 216. A rear saddle 217 and front saddle 218 are secured to the slide bars 216 by pins 219, said saddles extending between the two parallel slide bars 216. A pair of upstanding arms 220 is adjustably secured to each of the saddles 217 and 218, said arms being secured to the bars 205 by means of long screws 221 extending downwardly through bars 205, arms 220 and being threaded into clamping strips 222 adjacent the lower ends of the arms 220, said clamping strip 222 being adapted to engage a tongue 223 formed on each saddle 217 and 218. By loosening the screws 221, the lateral distance between the arms 220 and bars 205 can be adjusted to suit any width of strip.

A rack bar 225 is secured to the rear of sleeve 210 extending outwardly through a suitable opening in the bearing frame 226. Lever 227 has an arcuate gear 228 formed on its end which meshes with the rack 225. The lever 227 is pivotally mounted on a stud 229 which is secured to the frame member 213. A second arm 230 of lever 227 extends rearwardly and has a roller 231 rotatably mounted on the end thereof, said roller being adapted to engage the outer periphery of a cam 232 which is secured to the shaft 172. The cam 232 has a high point 234 which is adapted to move the lever 227 in a counterclockwise direction as seen in Figure 23 so that gear 228 acts on rack 225 to lift the sleeve 210 and bars 205 vertically. The card receiver 208 is preferably in the form of a pair of spaced metal walls 236 along the lower edge of which is formed an inwardly turned narrow flange 237. When the cards 36 are lifted upwardly by the bars 205, the outer ends of the card engage the flanges 237 so that continued upward movement of the bars 205 causes the card to bow upwardly in the center until the ends of the card snap past the flanges 237, after which the lowering of the bars 205

causes the card to rest on the upper face of the flanges 237. Continued additions of cards 36 from below causes the formation of a stack of cards 238 in the card receiver 208. In order to cause the forward movement of the bars 205 as said bars are moved upwardly, so that the rearward end of said bars do not interfere with the knife 203, a roller 239 is rotatably mounted on the saddle 218, said roller being mounted for sliding movement in a fixed cam groove 240 formed in the frame member 213, said cam groove being adapted to move said roller forwardly as it raises, thus causing the bars 205 to move forwardly by rods 216 sliding in bearings 215.

As the cards are cut off by the knife 203, it is desirable to deposit or arrange said cards along the bars 205 in the same succession or order in which they occurred in the strip 35. Thus the finished stacks of cards shown in Fig. 6 will have the designating numerals A, B and C in the same relative position in which they existed in the strip 35 shown in Figure 1. For this purpose bars 242 are provided, preferably two in number and positioned just outside of the bars 205. These bars 242 are given a motion by a mechanism to be hereinafter described, such that any given point on said bars moves along the outline of a rectangle, the bars moving downwardly at the foremost end of their movement until their upper surface is below the upper surface of bars 205, the bars then moving rearwardly and at the rearmost position of their movement they raise vertically and lift the newly cut card from the bars 205. The next movement of the bars 242 is forwardly of the machine, which carries the newly cut card beyond the second projection 206 on the bars 205, after which the bars 242 lower and again deposit the card on the bars 205 in the second position. This cycle of movement of bars 242 is repeated twice, and when the third newly cut card is deposited in the first position in the bars 205, the latter lifts the three cards into the card receiver 208. The bars 242 have projections 244 which properly position the cards on said bars 242, these projections being formed on strips 245 secured one to each inner face of a bar 242 in any suitable way such as by screws, so that said strips 245 may be interchanged for other strips having different spacing of the projections 244 for different widths of cards.

Each of the bars 242 has a pair of laterally extending spindles 246 secured thereto, said spindles being received in supporting bearing brackets 247 and being rigidly but adjustably secured therein by set bolts 248. Each of the bearing brackets 247 has a downwardly extending spindle 249 which is securely and adjustably received in bracket 250, being secured thereto by a set bolt 251, so that said spindles may be adjusted vertically. A pair of parallel rods 253 is rigidly but detachably received in the brackets 250 being secured thereto by set bolts 254. A spider bracket 255 is provided with a bearing 256 which is mounted for sliding movement on the outside of sleeve 210 and said bracket 255 has a pair of long bearings 257 which are adapted to slidably receive the rods 253. The rods 253 and bars 242 are given their vertical movement by means of a lever 258 which is secured at one end to a rock shaft 259, the latter being mounted in suitable bearings in the frame member 213. The free end of lever 258 is provided with a laterally extending elongate opening 260 which engages a stud 261 secured in the bracket bearing 256. The shaft 259 is given a rocking movement by means of bifurcated lever 262 secured thereto, the two arms 263 of said lever being offset relative to each other and being provided with rollers 264 which engage the outer peripheries of a pair of conjugate cams 265 so that the rotation of shaft 51 and cams 265 causes the rocking of the shaft 259 with a positive movement in each direction.

The axial or longitudinal movement of the bars 242 is caused by the reciprocating slide bar 89 which extends forwardly from the rear of the machine. The forward end of the bar 89 is connected to the forward ends of rods 253 by means of a bracket 267 which has a pair of bearings 268 formed thereon adapted to receive the forward ends of said rods 253, the latter being secured thereto by set screw 269. The lower end of bracket 267 is provided with a slot 270 which slidably receives a pin 271 secured to the forward end of slide bar 89 so that vertical movement of the rods 253 relative to the bars 89 is possible. The bar 89 is given a reciprocating movement by means of a bell crank lever 273 which is rotatably mounted on a stud 274 secured to the frame member 213. The free end of lever 273 is provided with a roller 275 which is received between a pair of guide blocks 276, the latter being secured to the bar 89 by bolts 277 so as to permit the vertical movement of the roller 275 between said blocks when traveling in an arcuate path about the stud 274. A second arm 278 of the bell crank lever 273, extends rearwardly of the machine and is provided with a slot 279 at its outer end. A lever 280 is secured to a rock shaft 281 and the outer end of said lever 280 is provided with a slot 282 which is rotatably connected by a pivot bolt 283 to the slot 279. By adjustably securing the pivot bolt 283 along the slots 282 and 279, the throw of lever 273 relative to lever 280 can be adjusted through reasonable limits for accommodating strips 35 of different lengths. The shaft 281 is provided with a bifurcated lever 285, each arm 286 of which is provided with a rotatably mounted roller 287. The rollers

287 are adapted to engage diametrically opposite points on the peripheries of a pair of cams 288 secured to the drive shaft 51 so that the shaft 281 is rocked with a positive movement in each direction.

The walls 236 of card receiver 208 are positioned by and secured to standards 289, each of which has at its lower end a longitudinally extending arm 290 adapted to be adjustably received on outwardly extending studs 292 secured to the frame member 213. Set bolts 293 in bearings 291 fix the card receiver walls 236 in proper position to accommodate cards of different lengths.

After the stacks 238 have built up so that there are, say, 500 cards in a stack, a counting mechanism is provided which will actuate an elevator 295 which lifts the stacks 238 upwardly into a stack receiver 296 which is located above the card receiver 208. The walls 297 of the stack receiver are preferably located directly above the card receiver walls 236 and are spaced apart therefrom to form an opening 298. A narrow flange 299 is hingedly mounted on a hinge pin 300 which is secured to the walls 236. Springs 301 cause the flanges 299 to be urged to move inwardly so that the inner edge 302 thereof lies in the path of travel of the stack of cards 238 as it is moved upwardly. These cards press the flanges 299 outwardly and when the last card has been moved upwardly by said elevator 295, the flanges 299 snap inwardly into place and maintain the stack of cards in its elevated position after the elevator 295 has again moved downwardly.

The elevator 295 is preferably in the form of an elongate plate which, in its lowermost position, extends between the bars 205. An elevator rod 304 is slidably received inside the sleeve 210 and terminates at its upper end in bracket 305 to which the elevator 295 is secured by any suitable means. At its lower end the rod 304 is slidably received in a bearing 306, and its upper end inside of sleeve 210. A bracket 308 is secured to the rod 304 between the bearing 306 and sleeve 210 and a roller lever 309 is pivotally mounted on each side of said bracket by means of a pin 310 to which the levers are fixed. A roller 311 is rotatably mounted on the lower end of each of the levers 309 and said levers are adapted to rock in unison, their rocking movement being limited in each direction by stop shoulders 312 formed on the bracket 308. A spring catch 313 secured to the bracket 308 is adapted to engage either of two catch grooves 314 formed in the upper end of lever 309 so as to secure the rollers 311 in the positions shown in full lines or in the positions shown in dot and dash lines of Figure 25.

The rollers 311 are moved into the positions shown by dot and dash lines in Figure 25, when, for example, 500 cards have been formed into each stack, by a mechanism to be hereinafter described. When the rollers 311 are in said dot and dash position, they lie in the path of travel of a pair of fingers 315 secured to a bar 315′ which is carried on one extremity by a lever 315″, (Fig. 16) and at its other extremity in the end of a bell crank lever 316 which is mounted for rocking movement on a stud 317. The other arm 318 of the bell crank lever 316 is provided with a rotatably mounted roller 319 on the end thereof, which engages the outer periphery of a heart-shaped cam 320, the latter being secured to a shaft 321. A pinion 322 is secured to the end of the drive shaft 51 and said pinion meshes with a gear 323 secured to the end of shaft 321, so that the latter is continuously rotated by the shaft 51, thus causing a continuous rocking movement of the finger 315 in an arcuate path adjacent to the shaft 304, as seen in Figure 25. When the roller 311 is moved from full position to dot and dash position, the fingers 315 engage said rolls during the upward movement of the former and lifts the shaft 304 and elevator 295 upwardly to position the stack of cards in the stack receiver 296 (Fig. 30).

In order to move the rollers 311 into the dot and dash position for engagement with the fingers 315 at a suitable instant, such as after the stacks consist of 500 cards each, a suitable counting mechanism 324 is provided which is of conventional design, and is mounted on a stud 325 which is secured to a portion of the frame member 69. This counter 324 is actuated by a lever 326 which is rotatably mounted on the stud 325, said lever being provided with an arm 327 through the end of which passes an adjustable stop bolt 328 which is adapted to limit the counter-clockwise rotation of said lever as seen in Figure 25. The other arm 329 of said lever is provided with a laterally extending pin 331 upon which is mounted a pawl 332 which actuates the counter wheels 333 in the usual manner. The counter 324 is provided with a sight opening 334 through which is exposed a portion of the counter wheels 333 so that the number of strips punched in units, tens and hundreds can be seen at a glance. A spring 335 is secured on a pin 336 mounted on the end of lever arm 329, said spring being adapted to engage the pawl 332 and maintain said pawl in engagement with the teeth 337 of the ratchet wheel inside of the counter 324.

The lever 326 is provided with a laterally extending pin 339 which lies in the path of travel of an arcuate series of pins 340 adjustably mounted near the periphery of gear wheel 171. The pins 340 are provided with handles 341 on the ends for manual actuation of said pins into and out of operative position in the path of pin 339. A pair of annular grooves 342 is provided in each pin

340 and a spring 343 is provided for each pair of pins 340, said spring 343 being adapted to snap into the desired grooves 342 and resiliently maintain said pins 340 in operative or inoperative position. Several of the pins 340 are provided near the periphery of gear wheel 171 so that when one, two or more strips of material 35 are placed in the locking jaw 60 to be simultaneously punched by the punch 48, the corresponding number of counter pins 340 are moved into operative position so as to actuate the counter pin 339 as the gear wheel 171 rotates. In view of the fact that the gear wheel 171 is only caused to rotate after each complete strip 35 is punched, due to the movement of the clutch pin 162, the counter 324 merely counts the movement of strips 35 which are punched, which corresponds to the number of cards in each stack 238. Thus the counter 324 will insure the same number of cards in the stacks 238 regardless of the width of the cards punched. On the side of the counter 324 opposite the lever 326, is rotatably mounted a cam 344 having a pair of diametrically opposite depressions 345. This cam 344 is so geared to the counter wheels 334, that it makes one complete revolution for each thousand strips punched, or in other words, it is actuated through one tenth of a revolution at the end of the punching of each hundred strips.

A lever 347 is rotatably mounted on a stud 348 secured to the frame member 69 and the outer end of said lever is provided with a rotatably mounted roller 349 which is adapted to engage the periphery of cam 344. A second arm 350 of lever 347 is pivotally connected by a connecting rod 351 to an arm 352 of a T-shaped lever 353 which is pivotally mounted on a stud 354 secured to the bearing bracket 306. The length of the connecting rod 351 may be adjusted by means of a nut 355 so that the desired throw of the lever 353 is secured. A pin 357 is secured on the end of lever 353 and a trigger lever 358 is mounted for rocking movement on said pin. A shoulder 359 is provided on the lever 358, said shoulder being adapted to engage a pin 360 secured to the lever 353 so as to limit the counter clockwise movement of lever 358 as seen in Figure 25 under the action of a spring 361, the latter being secured between the end of said lever 358 and a pin 362 secured to the lever 353. A spring 363 connects the lever 353 with a pin 364 secured to the bearing bracket 306 so that the lever 353 is continuously urged to move in a clockwise direction as seen in Figure 25, about the pin 354, said movement being limited by the contact of the roller 349 on the outer periphery of cam 344. When the roller 349 drops into the cam recess 345 after 500 strips have been punched, the arcuate end 366 of lever 355 contacts with the roller 311 and moves the latter into the dot and dash position as shown in Figure 25, where it lies in the path of travel of the upwardly moving finger 315, thus causing shaft 304, elevator 295 and stack of cards 238 to be moved upwardly.

Since the movement of finger 315 is not synchronized with the movement of lever 358, it might so happen that the finger 315 would be in the upper part of its stroke when the roller 311 is moved to dot and dash position by the lever 358. Accordingly a cam surface 367 is provided on the lower side of finger 315 which is adapted to move the roller 311 back out of the way of finger 315 during the downward movement of the latter. However, the roller 311 under such conditions is again quickly moved into dot and dash position by the lever 358 to be acted upon and raised by the finger 315. As the roller 311 moves upwardly under the action of finger 315, near the upper part of its stroke, it contacts with a cam surface 369 formed on the upper end of a lever 370, the latter being rotatably mounted at its lower end on the pin 354. This lever 370 is urged to move in a clockwise direction by a spring 371, said movement being limited by a stop pin 372 provided on the bearing bracket 306. The contact of roller 311 with the cam surface 369 moves the lever 370 in a counterclockwise direction, as seen in Figure 25, until said roller 311 lies above the lever 370, whereupon the lever 370 again snaps in a clockwise direction until limited by stop pin 372. The downward movement of finger 315 now drops the roller 311 onto a downwardly inclined cam surface 373 on lever 370 which moves the roller 311 and lever 309 in a clockwise direction to the full line position of Figure 25 in which position the roller 311 may move downwardly past a shoulder 374 formed on said cam 373. As the roller 311 continues downwardly, it strikes a substantially horizontal cam surface 375 formed on the lever 358, as shown in Figure 29, and depresses the latter against the action of spring 361. The lever 358 is moved to the left after the hundred strips have been punched thus disengaging from the roller 311 and permitting the lever 358 to rise upwardly under the action of spring 361 to its uppermost position, where it is ready for a new cycle of operations.

The operation of the machine is briefly as follows:

The punches 48 secured to punch beam 47, are reciprocated vertically by the rotation of drive shaft 51 acting through eccentric 54 and connecting rod 56. As said punches 48 are reciprocated vertically relatively to the dies 49, a strip of cardboard 35 is moved into each punch with intermittent motion so that finished cards 36 are successively punched out and sheared from the stock by a knife 203 on said punch 48. This intermittent feeding operation is accomplished by a carriage 59, the forward intermittent movement

of which is started after the operator places the strip 35 in clamping jaw 60, by manual, downward pressure on the handle 133 which releases lever 103 from shoulder 129 and enables the pawls 99 to drop downwardly and engage the teeth 95 and 96 of the racks 81 and 94 and also moves the wedge 63 against clamping lever 62 so as to securely clamp the end of the strip 35 between clamping jaw 60 and carriage 59.

The forward movement of carriage 59 is continued until flange 151 strikes lever arm 150 which causes lever arm 145 to move vertically reciprocating lever 141 into the path of lever 140 so that the latter is moved downwardly thus releasing catch lever 135 from slide bracket 105 and permitting the latter to move rearwardly under the action of lever ball 156 actuated by spring 153. The rearward movement of slide bracket 105 causes the flange 104 to actuate lever arm 102 and withdraw wedge 63 from the clamping lever 62, thus releasing the clamping jaw 60 from the last card of the strip. The movement of shaft 158 moves the clutch lever 160 upwardly so that clutch pin 161 moves into engagement with collar 169 and starts the rotation of gear wheel 171 which is mounted on shaft 172. A cam 180 on said shaft 172 now actuates a roller 181 and moves lever 124 in a clockwise direction which causes fingers 121 to move to the right as seen in Figure 18 and transfer the last piece of the strip 35 from the punch 48 to the stacking mechanism. The actuation of lever arm 102 by flange 104 not only withdraws the wedge 63 from clamping lever 62 but also raises the pawls 99 from the rack teeth 95 and 96 and the entire carriage 59 then moves rearwardly of the machine under the action of strap 70 and spring 72.

As the finished cards drop from the knife 203 after being sheared from the strip, they drop onto the bars 205. Bars 242 then move downwardly from the position shown in Figure 23 and then rearwardly of the machine until the rear end of bars 242 extend under the card resting on bars 205. The bars 242 then move upwardly lifting the card from bar 205, and the bars 242 then move forwardly of the machine, carrying the finished card to a new, advanced position on the bars 205, this card being deposited on the bars 205 by downward movement of the bars 242. This cycle of movements of the bars is continued until the finished cards are deposited on the bars 205 in the order in which they appeared in the strip 35. The bars 205 then move upwardly along a 45 degree line and push the cards 36 upwardly beyond flanges 237 into the card receiver 208 where said cards gradually build up a stack of cards 238.

The vertical reciprocating movements of the bars 242 are obtained through lever 258 acting on spider bracket 255, the latter supporting horizontal slide rods 253. The lever 258 is rocked from drive shaft 51 by a bifurcated lever 262 having rollers 264 acting on cams 265. The horizontal reciprocating movement of bars 242 is obtained by lever 273 having roller 275 which moves slide bar 89 with a reciprocating movement, the bars 242 being connected through rods 253 and bracket 267 to the end of bar 89 by a slot 270 and pin 271, the latter permitting the vertical movement of bars 242. Lever 273 is actuated through lever 280 connected to shaft 281, the latter being rocked from drive shaft 51 by a bifurcated lever 285 having rollers 287 acting on cams 288.

The vertical movement of bars 205 is obtained by upward movement of a sleeve 210 which supports bracket 214 and slide bars 216, the latter having saddles 217 and 218 which support the bars 205 through arms 220. The sleeve 210 is reciprocated vertically by gear 228 engaging rack 225, said gear being formed on the end of lever 227 which is locked by roller 231 engaging the cam 232 on shaft 172. The horizontal reciprocation of the bars 205 is obtained by roller 239 engaging fixed guides 240 during the upward movement of bars 205.

When 500 strips have been punched, shaft 304 and elevator 295 move upwardly carrying with them the finished stacks of cards 238 into the stack receiver 296, after which the elevator 295 moves downwardly leaving the card stacks resting on spring pressed flanges 299. The upward movement of shaft 304 is obtained after 500 strips have been punched, by the action of lever 316 having roller 319 engaging cam 320 on shaft 321. Shaft 321 is driven through a gear 323 meshing with the pinion 322 on shaft 51. The lever 316 carries a pair of fingers 315, into the path of travel of which a pair of rollers 311 on shaft 304 is moved at the proper time.

The movement of strips punched is recorded by counter 324 which is actuated by pins 340 acting on a pin 339 on counter lever 326, the pins 340 being or gear wheel 171. The counter 324 actuates a cam 344 so that a roller 349 engaging the periphery of said cam, drops into the recess 345 at the proper moment and actuates lever 347, rod 351, lever 353, the latter moving lever 358 so that arcuate cam surface 366 moves the roller 311 into the path of travel of the fingers 315 so as to elevate shaft 304 and elevator 295. The upward movement of rollers 311 causes one of said rollers to engage cam surface 369 on lever 370 and rocks said lever 370 about pin 354. Downward movement of the fingers 315 drops the rollers 311 one of which engages cam surface 373 which throws the rollers 311 into full line position, as seen in Figure 25, and the said rollers move downwardly into the position shown in Figure 29. The movement of roller 349 out of cam recess 345 then moves the lever 358 out of con-

tact with rollers 311 ready for a new cycle of operation.

As a modified form of operation, the knife 203 may be removed from the punch 48 in which case the cards are not severed one from the other but the strip remains intact after the tongues 37 or 41 are formed thereon. In use, therefore, the punched strips are typewritten and the typewritten cards are then severed one from the other by the user. The word blank in the following claims, therefore, signifies the cards or strips either in their severed or in their unsevered form.

I would state in conclusion that while the illustrated example constitutes a preferred embodiment of my invention, I do not limit myself precisely to the details herein described, since manifestly the same can be considerably varied without departing from the spirt of the invention as defined in the appended claims.

I claim as my invention:—

1. In a blank forming and stacking machine, blanking means, stacking bars adjacent said blanking means, said blanking means adapted to deposit the blanks formed therein on said stacking bars, means controlled by the blanking means for advancing deposited blanks in spaced relation on said stacking bars, a blank receiver, and means to elevate said stacking bars and to deposit the blanks thereon in said blank receiver, said means controlled by the blanking means and rendered operative thereby upon the deposit of a predetermined number of blanks on said stacking bars.

2. In a blank forming and stacking machine, blanking means, a plurality of stacking bars adapted to receive blanks from said blanking means, means controlled by the blanking means for advancing the blanks received by said stacking bars in predetermined relation thereon, a blank receiver, means to elevate said stacking bars to deposit the blanks thereon in said receiver, said means controlled by the blanking means and rendered operative thereby upon the deposit of a predetermined number of cards on said stacking bars, a stack receiver above said blank receiver and stack elevating means for elevating stacks of blanks in said blank receiver into said stack receiver, said stack elevating means controlled by said blanking means upon a predetermined number of operations thereof.

3. In a blank forming and stacking machine, blanking means, feed means for advancing a strip of material through said blanking means, a plurality of receiving bars adapted to receive blanks from said blanking means, advancing means for advancing the blanks received by said receiving bars in spaced relation thereon, and a drive means controlled by the operation of said blanking means for operating both said feed and said advancing means, said drive means being adjustable to accommodate strips and blanks of different dimensions.

4. In a blank forming machine having blank forming means, a carriage, means for clamping a strip of material into said carriage, means for automatically operating the last-named means for said blank forming means to release the material therefrom, means for advancing said carriage and strip toward said blank forming means so that the blanks are formed from the strip by said forming means, and means controlled by the operation of said blank forming means for automatically returning said carriage to its original position after said strip has been released therefrom.

5. Feeding means for blank forming means comprising a driving means for said blank forming means, a carriage controlled by said driving means, gripping means on said carriage for clamping a strip of material thereon, said carriage adapted for intermittent movement for feeding said strip to said blank forming means, means for simultaneously releasing said gripping means and moving the last piece of material out of said blank forming means, and means controlled by the operation of said blank forming means for restoring said carriage to its original position subsequent to the operation of said releasing means.

6. Feeding means for a blank forming means comprising a driving means for said blank forming means, a carriage controlled by said driving means, a clamping jaw on said carriage, wedge means manually operable to actuate said clamping jaw to securely engage a strip of material, said carriage adapted for intermittent movement for feeding said strip to the blank forming means, and means controlled by the operation of said blank forming means for releasing said wedge from holding said clamping jaw to release the last strip piece of said strip.

7. Feeding means for blank forming means, a driving means for said blank forming means, a slidably mounted carriage, a rack mounted for reciprocating movement adjacent said carriage and operated by said driving means, a pawl on said carriage adapted to engage said rack, clamping means on said carriage, means associated with the clamping means for actuating the same to releasably grip a strip of material, said carriage and said strip being adapted for intermittent movement by the engagement of said pawl with said rack to feed said strip to the blank forming means, and coacting means associated with the blank forming means for releasing the clamping means when the same is advanced to a predetermined proximity to said forming means.

8. Feeding means for blank forming means, a driving means for said blank form-

ing means, a slidably mounted carriage, clamping means on said carriage, means associated with the clamping means for actuating the same to releasably grip a strip of material, a drive rack mounted for reciprocating movement adjacent said carriage and operated by said driving means, a fixed rack adjacent said drive rack, a drive pawl on said carriage adapted for engagement with said drive rack to intermittently move said carriage in a single direction and feed the accompanying strip into said blank feeding means, a stop pawl adapted to engage said fixed rack to prevent retrograde movement of said carriage, and coacting means associated with the blank forming means for releasing the clamping means when the same is advanced to a predetermined proximity to said forming means.

9. In a blank forming machine, blank forming means, a carriage mounted for sliding movement adjacent said forming means, clamping means on said carriage adapted to releasably engage a strip of sheet material, means for intermittently advancing said carriage and strip toward said forming means so as to form blanks, a slide bracket, and means associated with said forming means adapted to cause said slide bracket to release said clamping means when said strip and carriage have advanced to a predetermined position nearest said forming means.

10. In a blank forming machine, blank forming means, a carriage adapted to move with an intermittent movement from a starting position to a position nearest said forming means, means on said carriage for releasably engaging a strip of sheet material to be formed into blanks by said forming means and means associated with said forming means for causing said carriage to return to its starting position after it has reached its position nearest said forming means.

11. In a blank forming machine, blank forming means, a carriage, clamping means on said carriage adapted to releasably engage a strip of material to be formed into blanks, means for advancing said carriage with an intermittent movement from a starting position to a position near said forming means, and means associated with said forming means adapted to cause the release of said clamping means and to also cause the return of said carriage to said starting position after said carriage has reached its second position nearest said forming means.

12. In a blank forming machine, blank forming means, means for advancing a strip of sheet material toward said forming means so as to form blanks, a cam shaft adjacent said forming means for actuating said advancing means, drive means adapted to cause the reciprocation of said forming means for forming said blanks, and clutch means actuated from said forming means and adapted to cause the rotation of said cam shaft at a predetermined interval during the forming of each strip.

13. In a blank forming machine, blank forming means, means for advancing a strip of sheet material towards said forming means to form blanks, a cam shaft adjacent said forming means for actuating the last-named means, and clutch means associated with said forming means adapted to cause the rotation of said cam shaft when said advancing means has reached a position near said forming means.

14. In a blank forming machine, blank forming means, means for advancing a strip of sheet material towards said forming means to form blanks, a cam shaft adjacent said forming means, means for actuating said cam shaft when said strip has advanced to a predetermined position, and fingers actuated by said cam shaft and adapted to move the last piece of said strip from said advancing means into said forming means.

15. In a blank forming machine, blank forming means, a slide bracket adjacent said means, a carriage adapted to releasably engage a strip of material, means for moving said carriage and strip towards said forming means to form blanks, a cam shaft for actuating the last-named means, and clutch means adapted to cause the rotation of said cam shaft when said carriage has reached a position nearest said forming means.

16. In a blank forming machine, blank forming means, a carriage adapted to releasably engage a strip of material, means for moving said carriage from a starting position toward said blank forming means for forming it into into blanks by said forming means, and a flexible element secured to said carriage rendered operative by said forming means for causing the return of said carriage to said starting position after said carriage has reached a position nearest said forming means.

17. In a blank forming machine, blank forming means, a carriage adapted to releasably engage a strip of sheet material, means for advancing said carriage and strip from a starting position toward said forming means so as to form blanks of said strip material, and spring means rendered operative by said forming means for causing the return of said carriage to said starting position after said carriage has reached a position nearest said forming means.

18. In a blank forming machine, blank forming means, driving means adapted to cause the reciprocation of said forming means, a carriage, means on said carriage for engaging a strip of material, means operated by said blank forming means for actuating said engaging means to release said strip at the end of the travel of said carriage

toward said blank forming means, a rack continuously reciprocated by said driving means, and means for intermittently engaging said carriage with said rack for feeding said carriage in a step by step movement toward said forming means to form blanks of said strip.

19. In a blank forming machine having blank forming means, means for advancing a strip of sheet material towards said forming means to form blanks, means for forming said blanks into a stack, a stack receiver, means for transferring said stack to said stack receiver, and counting means associated with said forming means adapted to actuate said stack transferring means when a predetermined number of strips have been formed into blanks, the operation of said stack forming means, stack transferring means and said counting means being controlled by and occurring in timed relation with said blank forming means.

20. In a blank forming machine having blank forming means, means for advancing a strip of sheet material towards said forming means so as to form blanks, means for forming said blanks into a stack, a stack receiver, means for transferring said stack into said stack receiver, a cam, counting means adapted to actuate said cam when a predetermined number of strips have been formed into blanks, and means operated by said cam for actuating said stack transferring means, the operation of said stack forming means, stack transferring means and said counting means being controlled by and occurring in timed relation with said blank forming means.

21. In a blank forming and stacking machine, blanking means, stacking means for receiving blanks from said blanking means, a blank receiver above said stacking means and having an open bottom, said means controlled by said blanking means upon the deposit of a predetermined number of blanks on said stacking means to raise said stacking means and deposit the blanks thereon into said blank receiver through the open bottom thereof.

22. In a blank forming and stacking machine, blanking means, stacking means for receiving blanks from said blanking means, means controlled by said blanking means for arranging the blanks deposited on said stacking means in spaced relation, a blank receiver above said stacking means having an open bottom and means controlled by said blanking means for raising said stacking means to deposit a predetermined number of blanks through the open bottom of said blank receiver to form stacks of blanks arranged in spaced relation.

23. In a cutting and stacking machine for cutting and stacking strips of material having predetermined sections arranged thereon, cutting means, feeding means controlled by said cutting means for feeding said strip to said cutting means to form cards of the predetermined sections, stacking means for receiving said cards, means controlled by said cutting means adapted to space and arrange cards received by said stacking means in the same relation as the predetermined sections of the strip, a card receiver, and means controlled by the cutting means to actuate said stacking means to transfer the arranged cards into said card receiver to form stacks of cards in the described arrangement.

24. In a blank forming machine, having blank forming means adapted to form blanks of sheet material, a plurality of stacking bars movably mounted adjacent said forming means for receiving said blanks, a plurality of arranging bars movably mounted adjacent said stacking bars so as to arrange said blanks on said stacking bars in a predetermined order, a blank receiver above said stacking bars, and means controlled by the operation of said blank forming means for elevating said stacking bars and series of blanks to deposit said blanks in said blank receiver.

25. In a blank forming machine, having blank forming means adapted to form blanks of sheet material, stacking means movably mounted adjacent said forming means for the reception of said blanks, a pair of arranging bars adjacent said stacking element and adapted to move along a rectangular path and in timed relation to the operation of said blank forming means so as to arrange said blanks in series along said stacking element, a blank receiver and means controlled by the operation of said blank forming means for reciprocating said stacking element to deposit the blanks thereon in said blank receiver.

26. In a blank forming machine having blank forming means adapted to form blanks of sheet material, a plurality of stacking bars movably positioned adjacent said forming means, said forming means having a shearing knife for severing said sheet material into blanks, a blank receiver above said stacking bars, means controlled by the operation of said blank forming means for elevating said bars and blanks to deposit said blanks in said blank receiver, and means for moving said bars horizontally during the vertical movement thereof so as to clear said knife.

27. In a blank forming and arranging machine, blank forming means, a plurality of bars adjacent said blank forming means, spaced aligned projections on each of said bars defining blank receiving spaces, said blank forming means depositing blanks on the adjacent blank receiving space, and reciprocating means controlled by the blank forming means for progressively advancing the cards deposited on said bars into the next succeeding blank receiving space thereon

upon each operation of the blank forming means.

28. In a blank forming and stacking machine, blank forming means, stacking means for receiving blanks from said blank forming means, a blank receiver above said stacking means, means controlled by the blank feeding means for elevating said stacking means to deposit the blanks thereon in said blank receiver to form a stack of blanks, a stack receiver above said blank receiver, an elevator controlled by said blank forming means upon a predetermined number of operations thereof and adapted to elevate the stack of blanks into said stack receiver.

29. In a blank forming and stacking machine, blank forming means, a receiver comprising parallel walls having inwardly turned flanges along the bottom thereof, and stacking means controlled by the operation of said blank forming means and adapted to receive the blanks from said forming means and raise said blanks into said receiver to form stacks so that the bottom blank of said stack rests on the upper face of said flanges.

30. In a blank forming and stacking machine, blank forming means, stacking bars movably positioned adjacent said forming means, a bracket supporting said bars, a receiver, and a lever periodically rendered operative by said forming means and adapted to raise said bracket and bars so as to introduce said blanks into said receiver for the purpose of forming stacks of blanks.

31. In a blank forming and stacking machine, blanking means, a driving means for said blanking means, a stacking element adapted to receive said blanks, arranging bars adjacent said stacking element, lever means controlled by said driving means for reciprocating said arranging bars to position the blanks deposited on said stacking element in spaced relation, and means for adjusting the throw of said lever to regulate the movement of said arranging bars in accordance with the dimensions of the blanks being formed by said blanking means.

32. In a blank forming machine having blank forming means adapted to form blanks from strips of sheet material, means for forming said blanks into stacks, a stack receiver, an elevator, a counter adapted to record the number of strips formed into blanks, means actuated by said counter adapted to cause said elevator to raise said stack into said stack receiver when a predetermined number of blanks are formed into said stack, and means controlled by the operation of said blank forming means for operating said counter.

33. In a blank forming machine having blank forming means, a drive shaft adapted to reciprocate said forming means so as to form blanks from sheet material, means for forming said blanks into a stack, an elevator, a cam driven by said drive shaft, a stack receiver, and means controlled by said blank forming means for periodically causing said cam to actuate said elevator to lift said stack into said stack receiver.

34. In a blank forming machine having blank forming means adapted to form sheet material into blanks, means for stacking formed blanks, a stack receiver, an elevator, an element having an end thereof continuously reciprocating adjacent said elevator, and means on said elevator controlled by said blank forming means for engagement with said element at a predetermined interval so as to cause said elevator to lift said stack into said stack receiver.

35. In a blank forming machine having blank forming means adapted to form sheet material into blanks, means for stacking formed blanks, an elevator element, a counter controlled by the operation of said blank forming means and adapted to record the number of blanks in a stack, a member reciprocating adjacent said elevator element, and engaging means on said elevator element adapted to be actuated by said counter at a predetermined interval so as to cause said elevator element to be raised by said member to move said stack into said stack receiver.

36. In a blank forming machine having blank forming means adapted to form sheet material into blanks, means for stacking formed blanks, an elevator element, a lever, means for continuously rocking said lever in timed relation with the operation of said blank forming means, lever engaging means on said elevator element, a stack receiver and a trigger lever controlled by the operation of said blank forming means and adapted to cause said engaging means to engage said rocking lever at a predetermined interval so as to cause said elevator to move said stack of blanks into said stack receiver.

37. In a blank forming machine having blank forming means adapted to form blanks from sheet material, means for stacking formed blanks, a counter controlled by said blank forming means and adapted to record the number of blanks in said stack, an elevator element, a lever operating in timed relation with said blank forming means and adapted to rock continuously adjacent said elevator element, a trigger lever, an engaging member on said elevator element, and means actuated by said counter for causing said trigger lever to move said engaging member into the path of travel of said rocking lever when the blanks in said stack have reached a predetermined number, thus causing said stack to be raised into a position above the original position thereof.

38. In a blank forming machine having blank forming means adapted to form blanks from sheet material, means for stack-

ing formed blanks, an elevator element, a lever adapted to rock continuously adjacent said elevator element and in timed relation with the operation of said blank forming means, engaging means on said elevator element, and means controlled by the operation of said blank forming means for moving said engaging means into and out of the path of said lever at predetermined intervals so that said elevator element moves said stack from one position to a second position.

39. In a blank forming machine having blank forming means adapted to form blanks of sheet material, a blank receiver, a stacking element adapted to move said blanks into said receiver, an arranging element adapted to arrange said blanks in succession along said stacking element, a stack receiver, an elevator element adapted to raise said stack into said stack receiver, and means actuated by said forming means adapted to move said stacking element, arranging element and elevator element vertically along a common axis.

40. In a blank forming and stacking machine, blank forming means, stacking means for receiving blanks from said blank forming means, a blank receiver comprising a pair of spaced walls, means controlled by said blank forming means for periodically elevating said stacking means to insert the blanks thereon in said blank receiver to form a stack of blanks, a stack receiver comprissing spaced walls above and coplaner with the walls of said blank receiver, and means periodically rendered operative by said blank forming means for elevating a stack of blanks from said blank receiver into said stack receiver.

41. In a blank forming and stacking machine, blank forming means, stacking means for receiving blanks from said blank forming means, a blank receiver above said stacking means, means controlled by said blank forming means for periodically elevating said stacking means to insert the blanks thereon in said blank receiver to form a stack of blanks, a stack receiver above said blank receiver, yieldingly held flanges between said receivers, and elevating means controlled by said blank forming means for elevating a stack of blanks from said blank receiver into said stack receiver, said flanges yielding upon insertion of said stack in said stack receiver and engaging and holding the same upon complete insertion.

42. In a blank forming and stacking machine, blanking means, a stacking element, said blanking means adapted to deposit blanks on said stacking element, arranging bars adjacent said stacking element controlled by said blanking means and adapted to arrange blanks deposited thereon in spaced relation, means for adjusting the position of said arranging bars relative said stacking element so as to accommodate blanks of different dimensions, a blank receiver above said stacking element, and means controlled by said blanking means for periodically raising said stacking element to deposit blanks thereon in said blank receiver.

43. In a blank forming and stacking machine, means for advancing a strip of material, blank forming means for severing said strip into formed blanks, a blank receiver, means controlled by said blank forming means for conveying formed blanks into said blank receiver, means controlled by said blank forming means for automatically counting a predetermined number of blanks to a stack, a stack receiver adjacent said blank receiver, and means controlled by said counting means for moving counted stacks and delivering them to the stack receiver successively.

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